

F. K. Dzalaeva

**FUNCTION AND AESTHETIC.  
TREATMENT OF PATIENTS WITH  
FULL MONTH REHABILITATION**

Summary 2020-2023

2023

F. K. Dzalaeva

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Treatment of patients with  
full month rehabilitation.  
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Reviewers:

*Antonik M. M.* – Doctor of Medical Sciences, Associate Professor of the Moscow State Medical and Dental University named after A.I. Evdokimov of the Ministry of Health of Russia;

*Chikunov S. O.* – Doctor of Medical Sciences, Professor of the Peoples' Friendship University of Russia, Department of Orthopedic Dentistry

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For dentists of all profiles, teachers of dental school and Universities, postgraduate students, practical dentists, practical dental technicians and doctors.

**Dzalaeva Fatima Kazbekovna**

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## **Acknowledgments**

I gratefully dedicate this book to all my teachers who helped me grasp the fundamentals of gnathology and who inspired me along this challenging way by their support and personal examples. To Professor Rudolf Slavicek who had been helping and instructing me for 8 years. To Professor S.O. Chikunov, a beacon of man in gnathology, one among the first to bring this discipline into the Russian Federation. To Professor Sadao Sato who gave a new vision of the concept of treatment orthodontic patients. And also, to Mauro Fradeani and his annual Master program in Italy.

I would like to express my special gratitude to my parents who always supported me and believed in me. To my assistants who made a monumental contribution to collecting information and documenting clinical cases. A special gratitude goes to V. Kuznetsova who helped this book to become a reality.

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## **Introduction**

Dental practitioners must use esthetic parameters in their daily practice and understand the function to identify maxillofacial area dysfunction. In this book, I show how could a dental practitioner apply in their daily practice the knowledge of anatomy, physiology, laws of motion and gnathological aspects adopted by Rudolf Slavicek's approach. When dealing with the issue of patients' treatment, we apply interdisciplinary approach and joint work with allied health professionals such as somnologists, neurologists, osteopathic physicians, psychologists, cosmetologists and radiologists. This gave us an opportunity to address the problem of rehabilitation of patients with total restoration of tooth range in a comprehensive way.

In our work, we used the approach and philosophy of R. Slavicek in clinical, functional and instrumental analyses and also the procedure of collection of data and esthetic parameters. Both analyses, along with the conclusions of allied health professionals, provided an opportunity to make a comprehensive plan of diagnosis and treatment and consider the patient as an integrated cybernetical system.

The most important things for me were achieving comprehension and obtaining answers to the following questions: 1. what problem the patient has at the moment; 2. where are we going in our treatment; and 3. how are we going to get there. To solve these problems, we applied the basics of natural adaptation: arthral, dental-alveolar and vertical.

The purpose of the book is to show the use of gnathological aspects in daily practice of a dental practitioner. And also to show long-term results after 5 to 12 years. This approach puts a special focus on continuity in the possibility of holding consultations between practitioners remotely.

## **Clinical case №1**

Patient's birth date: 1975

Date of examination: March 2008

The patient applied to the medical center with complaint of pain in mastication muscles and chipping of composite restorations.

Physical examination revealed:

- The canine teeth have palatal inclination.
- The midline is shifted to the left.
- Dental class I on the left and Dental class II on the right.
- There is some chipping of composite restorations.
- Maxillary and mandibular dental arches in sagittal and transversal planes.
- Absence of reproducible central occlusion.
- Centric relation is not reproducible.
- Absence of canine and anterior guidance.





There is bruxism in the case history. The patient assesses their psychological state as calm.

Table 1

Dental History Analysis		Valuation	Yes	No		
1.	Do you have problems when you chew?	2	X			
2.	Do you have problems when you are talking?			X		
3.	Do you have problems in closing your teeth properly?	2	X			
4.	Are any of your teeth especially sensitive?			X		
5.	Do you have problem when you open your mouth very wide?			X		
6.	Do your jaw joints make noise and if so, on what side?			X		
7.	Do you have pain in the area of your jaw joints?			X		
8.	Do you suffer from headaches?			X		
9.	Do you suffer from cramps or spasm in your head, neck or throat?			X		
10.	Do you have in general problems with your posture?	2	X			
	Occlusal Index	2.00				
11.	Have you ever had serious accident?			X		
12.	Did you have one or more oral intubations?			X		
13.	Have you ever had orthodontic treatment or ...			X		
14.	Have you had a treatment with splint?			X		
15.	Are you grinding or pressing with your teeth?		X			
16.	Do you think that treatment is necessary?		X			
17.	Do you think that there is a serious disorder or illness?			X		
18.	When the last time you had dental treatment and what was done?					
	How would you describe your psychic behavior?					
19.	happy	sad	calm	excited	self-controlled	lack of self-control
			X			

Table 2

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.maseter (superficial)	X		X* (Closing)	
4.b	M.maseter (deep)	X		X* (closing and laterotractor)	
5.	Tuber maxillae	X		X* (protractor)	
6.	M.pterygoideus medialis	X		X* (protractor)	
7.	M.mylohyideus				
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jawjoints*				
	a) Lateral poles, statically	X			
	b) Lateral poles, in rotation	X			
	c) Retral joint space				
	d) Lig.temporo-mandibulare	X			

\* Ligament and capsule, TMJ position

Table 3

Sets of muscles:	
Muscles palpation	
Posture	1,2,7,12,13,14
Jaw-closing	3a, 3b, 4a, 4b, 5
Jaw-opening / protrusion	8, 9, 10
Retraction	3c, 8
Medio- / Laterotractor	6, 3a, 4a
Sublingual bone position	8, 9,10,11,13
Function	7, 8,9,10,11,14
POSTURE, PROTRACTOR, SUB-LINGUAL POSITION	

Muscle analysis revealed activity of m.masseter, m.pterygoideus, medialis. These muscles include ones responsible for jaw opening, laterotracors, protractors and also ligaments and muscles dealing with the position of the temporomandibular joint. Thus, dental history and physical examination revealed the **following problems:**

- Chipping of composite restorations.
- Muscles problems including jaw-closing, laterotracors.
- Esthetic problems.
- Crowding of mandibular bone teeth.
- Transversal mismatch of maxillary and mandibular dental arches.
- Palatal inclination of maxillary canine teeth.
- Absence of the tooth 1.4.
- Absence of posterior area support.

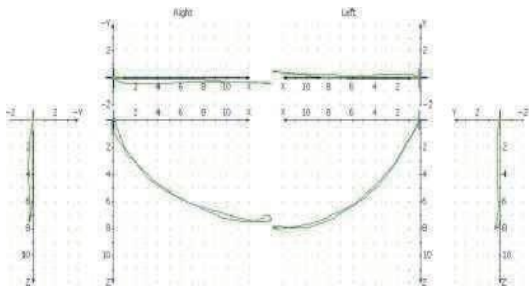
This means that there are indications for performing a considerable functional instrumental analysis: model analysis, condylography, cephalometric analysis.

# Condylography

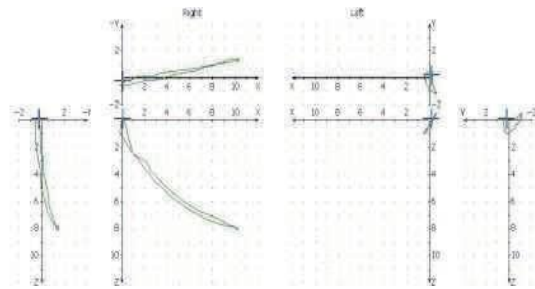
Condylography imaging revealed the following:

- Increasing protrusion-retrusion path length
- Weakening TMJ ligamentous apparatus

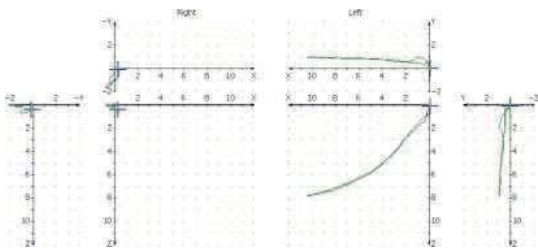
## Protrusion/retrusion



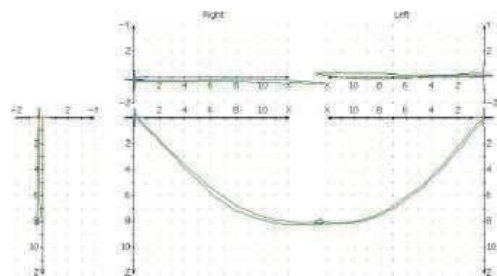
## Opening/closing



## Left mediotrusion



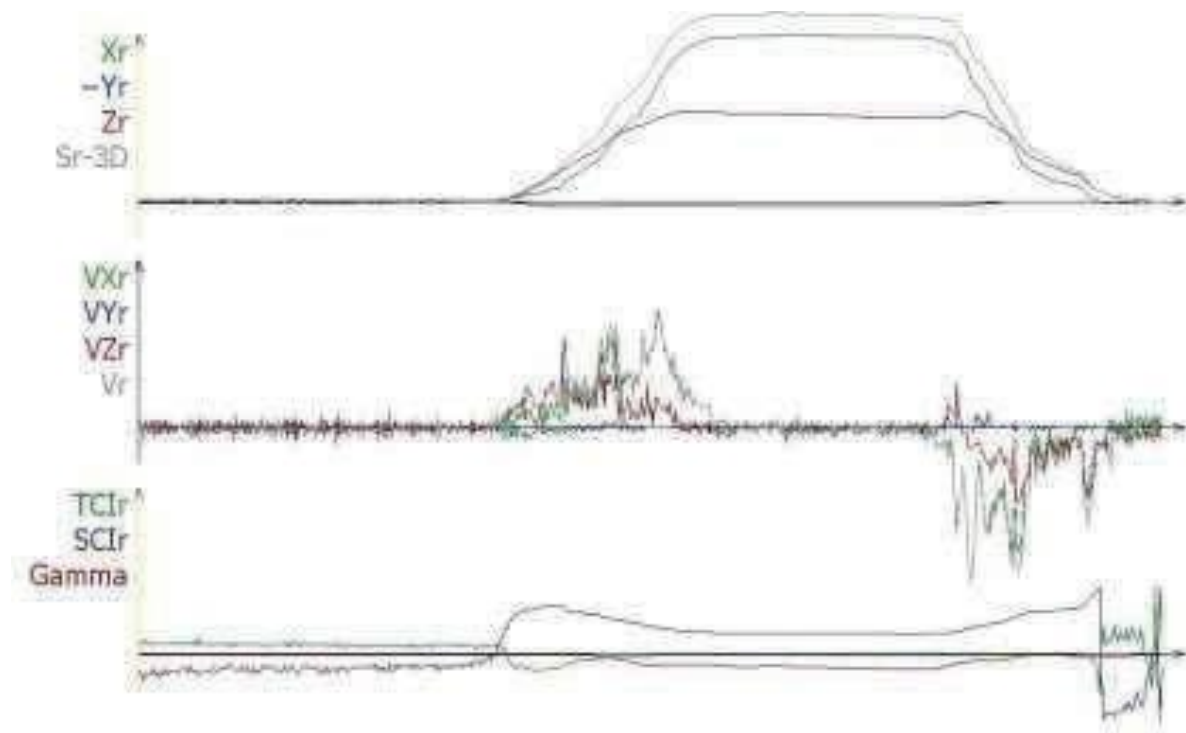
## Right mediotrusion



Redetrusion in the right TMJ in case of left mediotrusion.

Redetrusion in the left TMJ in case of right mediotrusion.

Muscle problems and ligaments weakening.

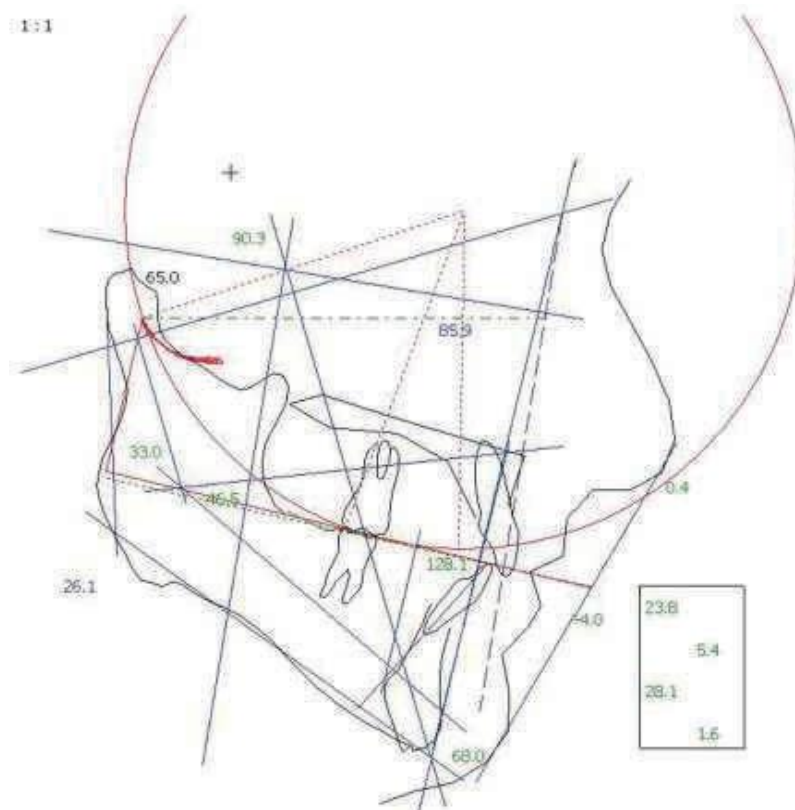


We can see from the time curve that these are muscular problems, not ligamentous. There is hypermobility in the ligament, over-opening of mouth due to the TMJ ligament hyperextension.

# Cephalometric Analysis

Table 4

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	90.2	
Facial Depth	91.5°	85.8	1-*
Mandibular Plane	21.5°	26.0	1D*
Facial Taper	68.0°	68.0	
Mandibular Arc	31.2°	33.1	
Maxillary Position	65.0°	66.7	
Convexity	-1.00 mm	0.4	
Lower Facial Height (by R. Slavicek)	45.2°	46.5	
Lower Facial Height to Point D	51.7°	48.3	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	128.0	
Upper Incisor Protrusion	4.3 mm	5.4	
Upper Incisor Inclination	23.1°	23.8	
Upper Incisor Vertical	mm	2.0	
Lower Incisor Protrusion	1.2 mm	1.6	
Lower Incisor Inclination	24.1°	28.0	
Upper Molar Position	21.0 mm		
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	9.2	
Idealized Occlusal Plane – Axis Orbital Plane	----°	13.7	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	35.5	
Radius of Curve of Spee	---- mm	56.3	
Lip Embrasure	0.0 mm	0.5	
Occlusal Plane Xi Distance	-1.4 mm	-4.7	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	52.4	
Horizontal Condylar Inclination left	----°	52.1	
Horizontal Condylar Inclination	----°	52.3	
Relative Condylar Inclination	----°	43.0	
Relative Condylar Inclination 6	----°	32.7	
Relative Condylar Inclination 7	----°	26.6	
Relative Condylar Inclination 8	----°	52.3	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.9 mm	-3.9	



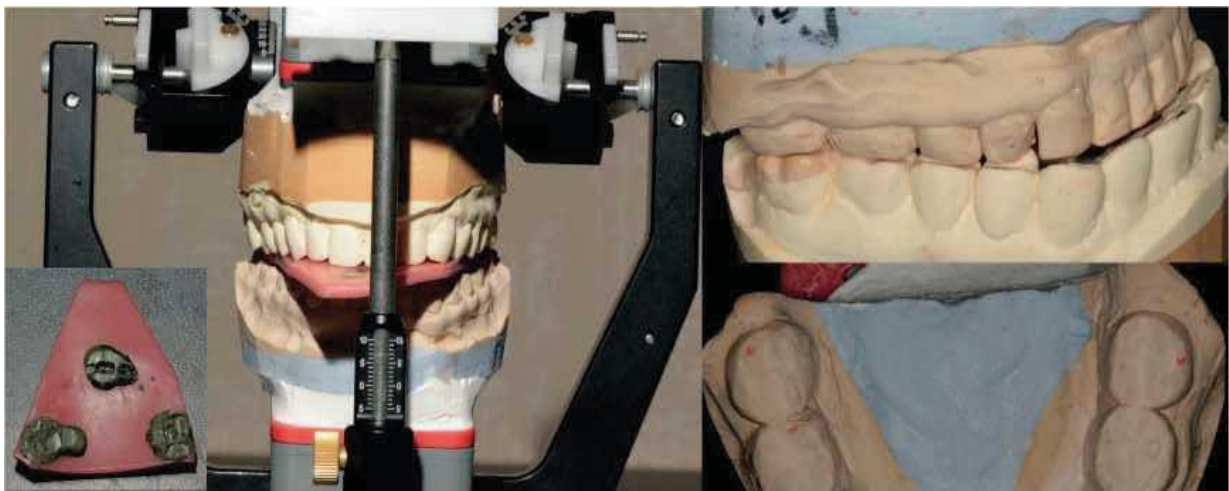
Cephalometric analysis revealed the following:

- Lower face height is normal;
- The interincisal angle =  $128^{\circ}$ , normal;
- OPI (Occlusal plane inclination) on the right side =  $6^{\circ}$ , OPI on the left side =  $9^{\circ}$
- This is a symmetrical case. Both left and right sagittal condylar paths SCI (sagittal condylar inclination) =  $52^{\circ}$
- Right DOA (opening angle) =  $16^{\circ}$ , left DOA =  $13^{\circ}$
- The maxilla position is neutral
- The mandible position is neutral
- Dental class II on both sides
- Anterior guidance was determined with the help of Weber template.

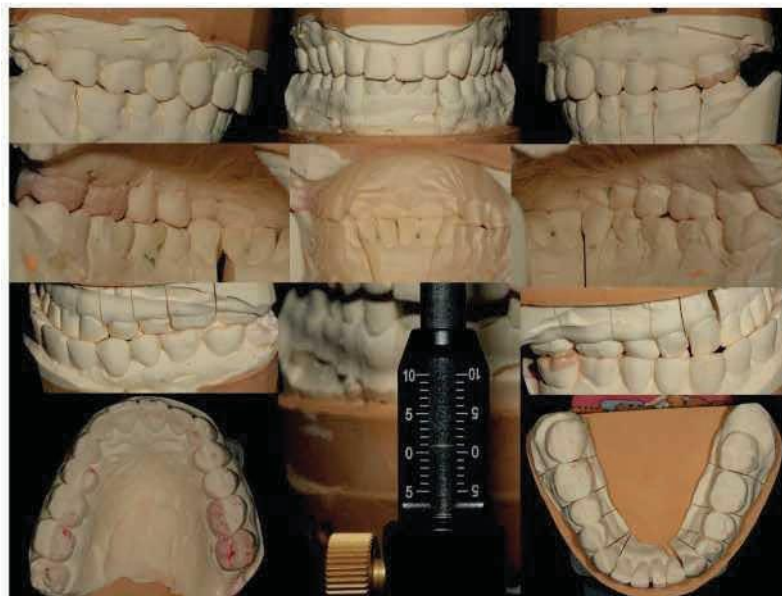
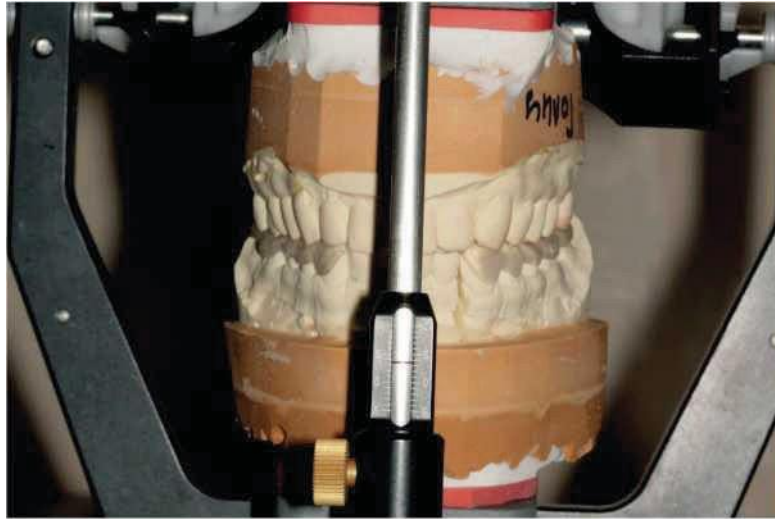


**Analysis of casts mounted in the centric relation of mandible to maxilla revealed the following:**

Absence of contacts on incisor tooth is found in the centric relation of mandible to maxilla position. Teeth 37, 46, 47 have premature occlusal contact. These casts are used to make a myopathic splint. Splint therapy was conducted.



Impressions were picked-up after splint therapy. Casts were remounted in a new therapeutic position for a diagnostic wax-up in 3 weeks after wearing the myopathic dental splint.



## **Wax-up parameters**

Dental class I Teeth ratio 1:2

Teeth 16 - 46, 17 - 47 belong to Class II of teeth occlusion

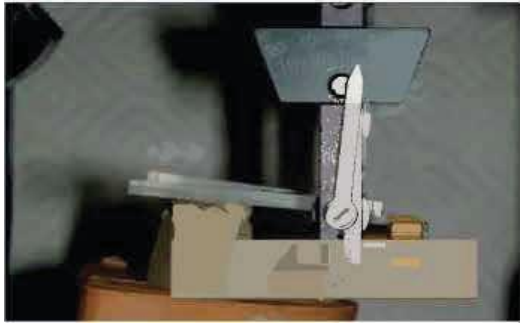
Maxillary passive arch must be adjusted to fit the mandibular active arch. We increase the vertical dimension by +2 mm with an incisal pin. The diagnostic wax-up is performed on the models in articulator according to the analysis of condylographic and cephalometric data. We obtain silicone indexes which are used for preparing the teeth of the maxilla and mandible. Then we make the first set of temporary crowns.

OPIR = 6°

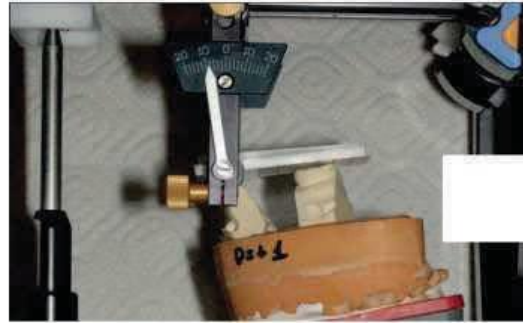
OPI L = 9°

OPI 46 must be changed to 9, DOA must be changed to 13° SCI R = L = 52°

Wax casting



**Right side OPI=6°**



**Left side OPI=9°**

Lower face height is unaffected.

We carry out occlusal plane modeling by using 2 points.

The first point of occlusal plane is lower incisors, and the second one is the distal cusp for the mandibular first molar OPI R = 9°, i.e.

OPI R = 6°

We change the occlusal table of the tooth 46 by 9 degrees.



$$52^{\circ}(\text{SCI}) - 6^{\circ}(\text{OPI}) = 46^{\circ}(\text{RCI})$$
$$46^{\circ}(\text{RCI}) - 30^{\circ}(\text{CI}) = 16^{\circ}(\text{DOA})$$



$$52^{\circ}(\text{SCI}) - 9^{\circ}(\text{OPI } 46) = 43^{\circ}(\text{RCI } 46)$$
$$43^{\circ}(\text{RCI } 46) - 30^{\circ}(\text{CI}) = 13^{\circ}(\text{DOA } 46)$$



The first temporary crowns set was made using a silicone index.

Canine teeth and the second molars are used as reference points for positioning template to the teeth and rebasing temporary restorations.



The second set of temporary crowns was made for esthetic reasons. Teeth were fully prepared, impressions were obtained, models were mounted in an articulator and the wax-up was made using silicone indexes.



Provisional crowns for protrusion restriction, laterotrusion restriction and canine guidance were checked in the articulator. Custom incisal table was used for the wax-up.

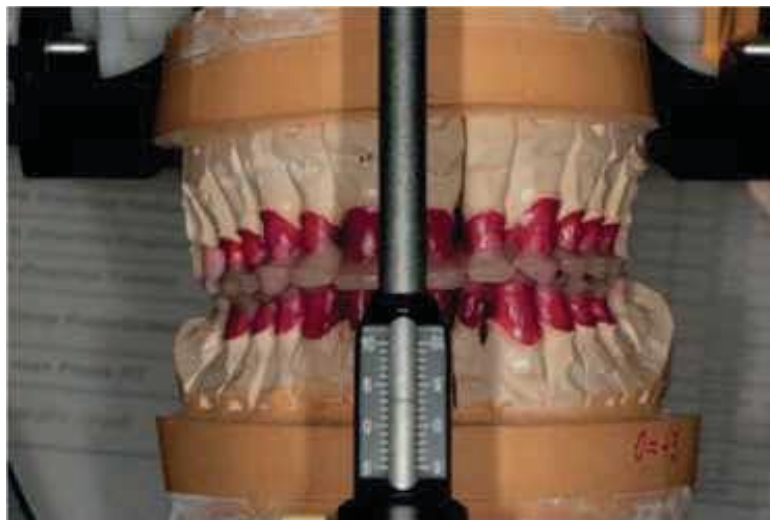


Table 5

	Inclination of the protrusive guidance elements (in degree)			
	Blue	Green	Orange	Yellow*
Front F	46°	51°	55°	60°
	Inclination of the lateral elements (in degree)			
	Blue	Green	Orange	Yellow*
Tooth 3	51°	55°	58°	65°
Tooth 4	41°	44°	47°	52°
Tooth 5	33°	37°	40°	46°
Tooth 6	25°	29°	33°	39°

### Laterotrusion

Right side:

Tooth 1.6 - 25°C blue table  
 Tooth 1.5 - 33°C blue table  
 Tooth 1.4 - 41°C blue table.

Left side:

Tooth 2.6 - 33°C, orange

Tooth 2.5 - 40°C, orange

Tooth 2.4 - 47°C

Anterior restriction = 55°C

Canine guidance

R (right) = 51°, blue

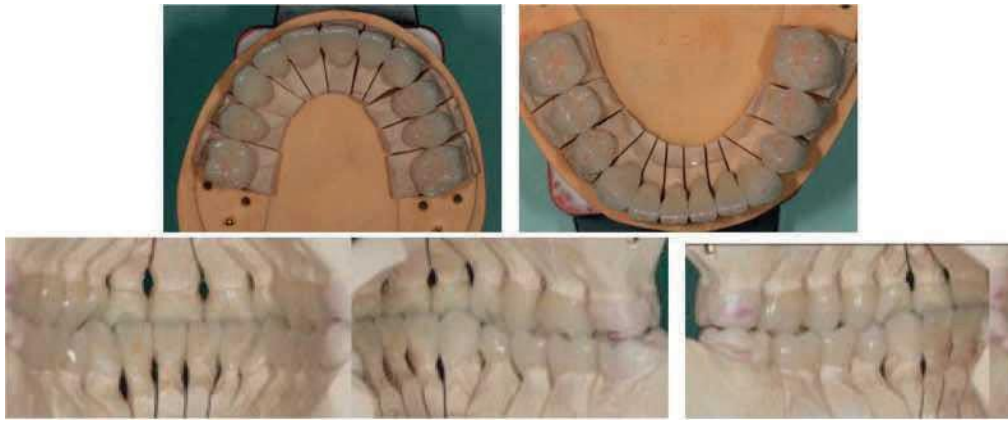
Canine guidance

L (left) = 58°, orange

Wax cast is transferred into the porcelain press and the final restoration is made.

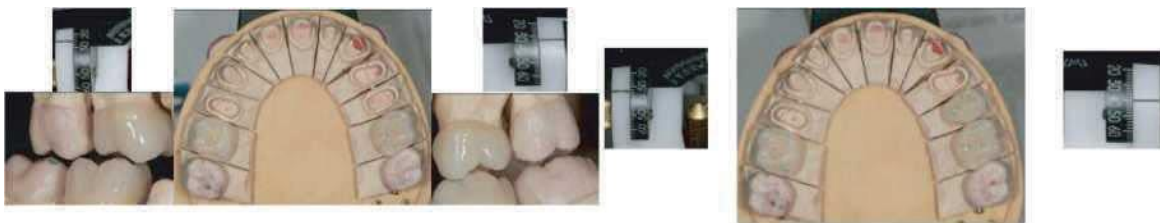


Final dental occlusion checked in static and dynamic positions of the articulator.



We create consistent guidance on final restorations.

Consistent opening on 16 and 26      Consistent opening on 25 and 14



Protrusion 2 mm

Protrusion 4 mm

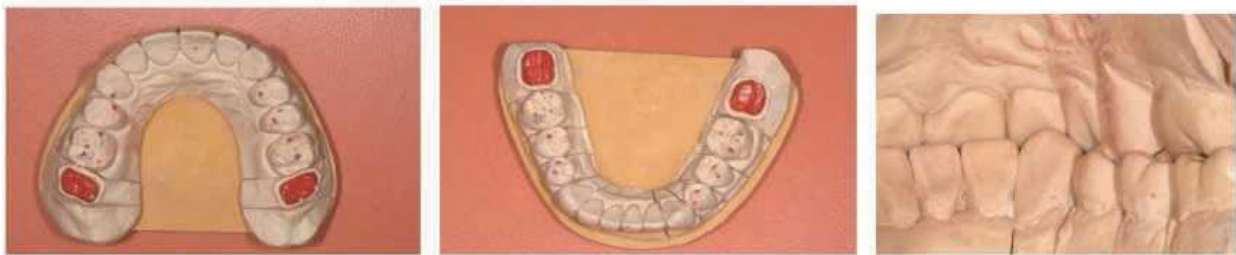
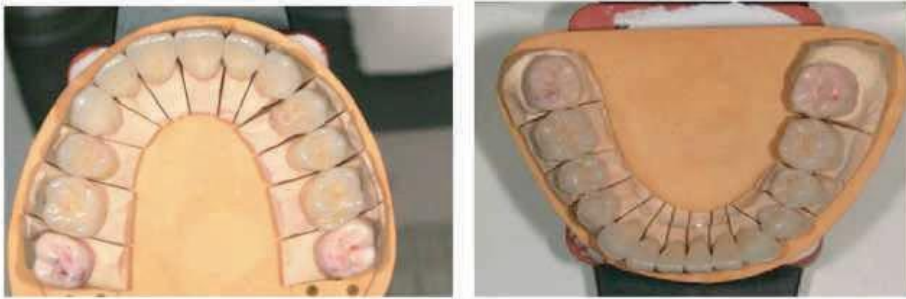


Restriction of the canine guidance on protrusion 4 mm.



Retrusion restriction







# Final dental restorations 2008

Before / after results

2008



2018



## Clinical case №2

Patient's birth date: 1955

Date of examination: September 2009

The patient applied to the medical center with complaints of poor masticatory performance and esthetic look.

Physical examination revealed:

- Absence of teeth support in a lateral area, extrusion 35 and 23
- Palatal inclination of canine teeth



In this case, we determine a sequence algorithm to make a prosthetic appliance with bilateral teeth absence using implant-supported prosthetic restorations.

For making a prosthetic appliance, clinical instrumental and functional analysis, cephalometric analysis, wax-up and splint therapy were used.

We collected clinical dental history data which did not reveal any diseases.

Table 1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		X
2.	Cardo-vascular systems		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern: esthetic, low chewing efficacy			

Table 2

Dental History Analysis		Valuation	Yes	No		
1.	Do you have problems when you chew?	1	X			
2.	Do you have problems when you are talking?			X		
3.	Do you have problems in closing your teeth property?			X		
4.	Are any of your teeth especially sensitive?			X		
5.	Do you have problem when you open your mouth very wide?			X		
6.	Do your jaw joints make noise and if so, on what side?			X		
7.	Do you have pain in the area of your jaw joints?			X		
8.	Do you suffer from headaches?			X		
9.	Do you suffer from cramps or spasm in your head, neck or throat?			X		
10.	Do you have in general problems with your posture?			X		
	Occlusal Index	1.00				
11.	Have you ever had serious accident?			X		
12.	Did you have one or more oral intubations?			X		
13.	Have you ever had orthodontic treatment or ...			X		
14.	Have you had a treatment with splint?			X		
15.	Are you grinding or pressing with your teeth?			X		
16.	Do you think that treatment is necessary?		X			
17.	Do you think that there is a serious disorder or illness?			X		
18.	When the last time you had dental treatment and what was done?					
	How would you describe your psychic behavior?					
	happy	sad	calm	excited	self-controlled	lack of self-control
19.			X		X	

Dental implants were installed in another medical center without any diagnosis and surgery template known.

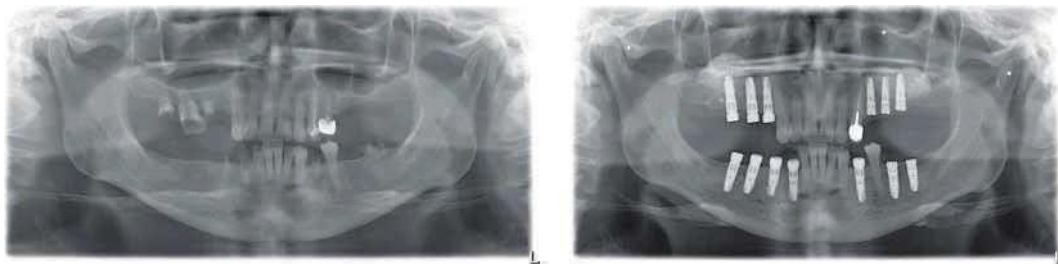
Muscle palpation revealed the activity of m.pterygoideus medialis protractor muscle and bypass interference mechanism using m.mylohyoideus.

Table 3

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae				
6.	M.pterygoideus medialis	X		X (protractor)	
7.	M.mylohyoideus			X (avoidance pattern)	
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare	X			

Table 4

Preliminary Brainstem Nerve Analysis	
1.	N.olfactorius (analysis)
2.	N.opticus (analysis)
3.	N.oculo-motorius (clinical mobility)
4.	N.trochlearis (clinical mobility)
5.	N.trigeminus (clinical palpation and sensitiveness)
6.	N.abducens (clinical mobility)
7.	N.facialis (clinical mobility)
8.	N.stato-acusticus (clinical check of the equilibrium and hearing)
9.	N.glosso-pharyngeus (clinical and analysis)
10.	N.vagus (analysis)
11.	N.accessorius (clinical and analysis)
12.	N.hypoglossus (clinical and analysis)



Thus, clinical dental history and physical examination revealed the following issues:

Absence of support in posterior teeth in both the maxilla and mandible, absence of retrusion restriction, absence of anterior guidance.

- Tooth 3.5 extrusion.
- Parodontal problems.
- Poor oral hygiene.
- Esthetics.
- Poor masticatory performance.

## **Treatment objectives**

- Occupational oral hygiene: periodontium treatment.
- Determine occlusal vertical dimension.
- Determine OPI and AG.
- Determine the centric relation.
- Create support in the area of posterior teeth.
- Retrusion restriction.

## **Treatment Plan**

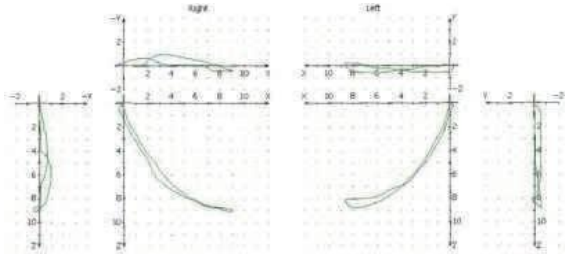
- Parodontal treatment.
- Clinical functional and instrumental analysis.
- 2nd condylography.
- Splint therapy.
- Wax up.
- Provisional crowns.
- Final dental restorations.

## **Treatment**

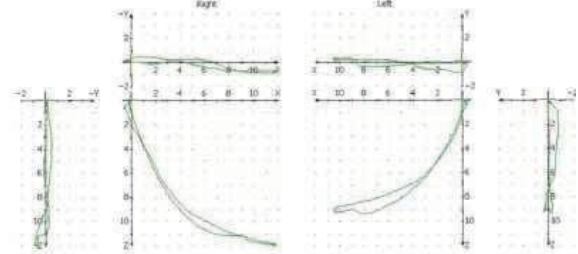
1. Picking up impressions from the upper and lower dental arches.
2. Fabricating a rigid plastic CR centric on temporary metal implant abutments 4.6, 3.7, 1.6 and 2.6. to determine centric relation.
3. Mounting of casts in articulator using plastic centric.
4. Fabricating a myopathic dental splint.
5. 14-days splint therapy and remounting of casts a for wax-up in the therapeutic position.
6. Making temporary crowns.
7. Final dental arches rebuilding procedure.

# Condylography

## Protrusion/retrusion



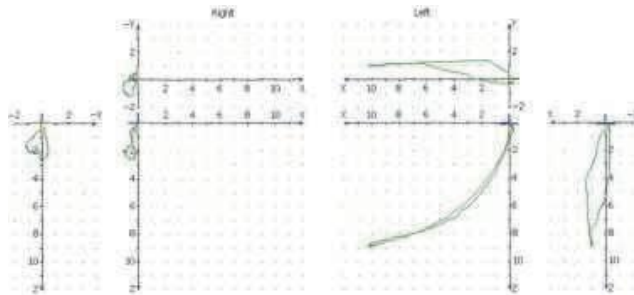
## Opening/closing



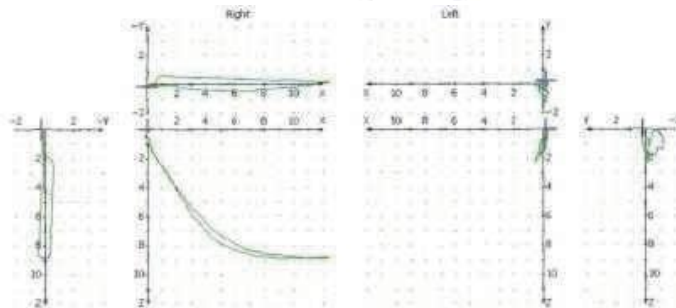
Loose ligaments and function of protracting and retracting muscles.

There is absence of support in the posterior region of tooth rows, excursion and incursion lines do not match. Start and end of movement are not coincident.

## Left mediotrusion

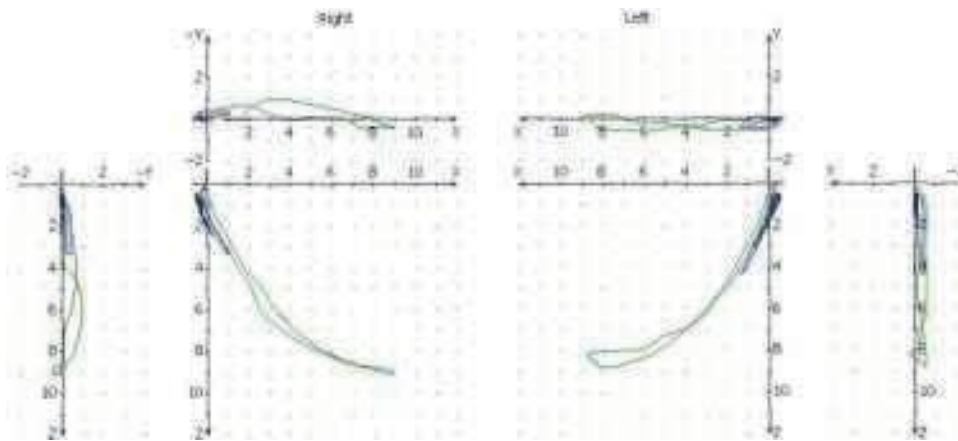


## Right mediotrusion



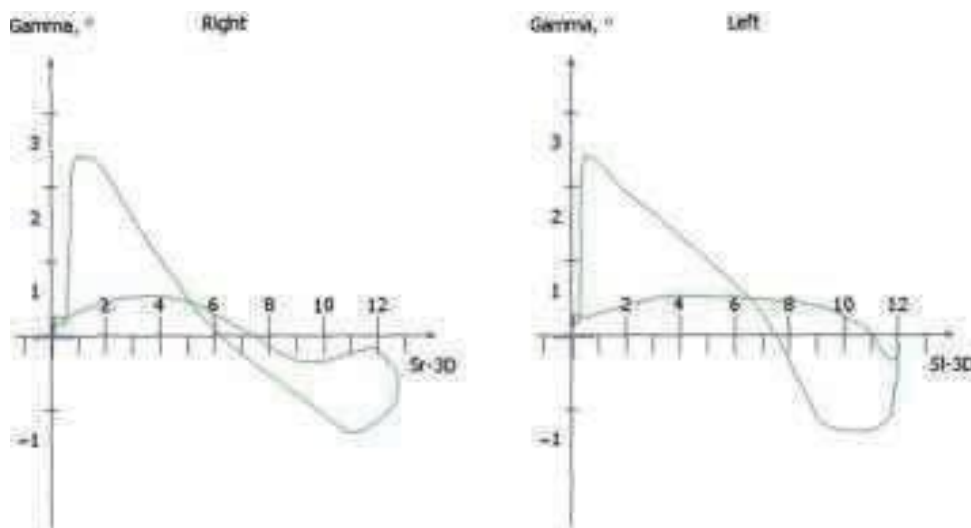


## Protrusion when speaking



Lower protrusion when speaking: the mandible goes back and down, no posterior support and anterior guidance are provided, hence the mandible goes down and forward when speaking.

## Gamma rotation

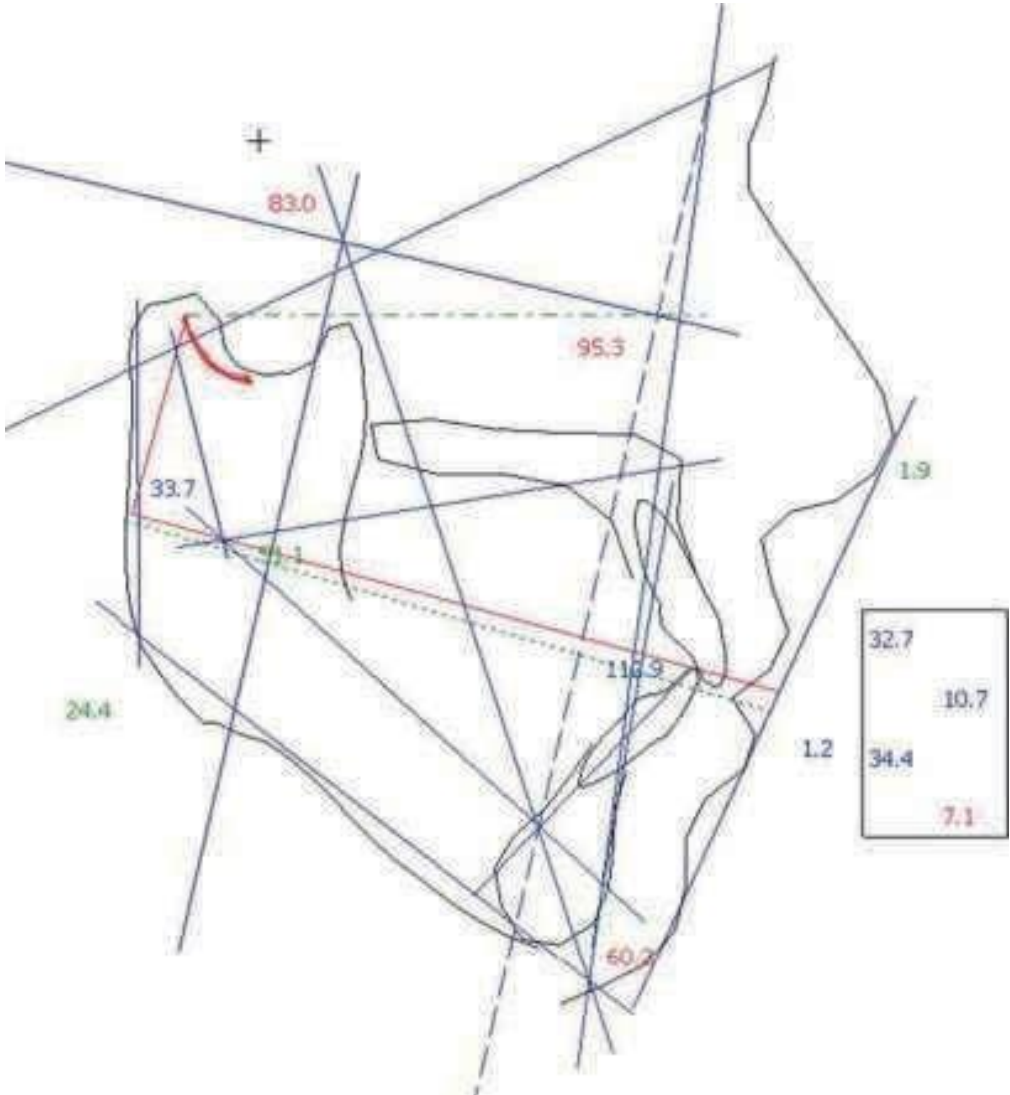


Strong positive gamma rotation per 1 mm of movement, interference in the frontal area.

# Cephalometric study analysis

revealed that lower face height was normal, maxillar and mandible positions were neutral.

## Slavicek Interactive Verbal Analysis



## Explanation

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is brachyfacial Skeletal class is I.

The maxilla is positioned neutral.

The mandible is positioned neutral Lower facial height is normal Dental class unknown.

The protrusion of the upper incisor is increased.

The inclination of the upper incisor is increased.

The protrusion of the lower incisor is strongly increased

The inclination of the lower incisor is increased.

The interincisal angle is diminished.

Occlusal concept: Unknown (data missing).

No functional statement.

Table 5

Determinants	Norm	Value	Trend
Facial Axis	90.0°	83.0	2D**
Facial Depth	89.0°	95.3	2+**
Facial Taper	68.0°	60.2	2D**
Mandibular Plane	24.0°	24.4	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	401.4	2+**
Facial Length Ratio	63.5%	58.3	2-**
Y Axis to S N	67.0°	74.4	2+**
Y Axis (Downs)	61.2°	55.3	1-*
S N to Gonion Gnathion Angle	32.6°	41.4	2+**

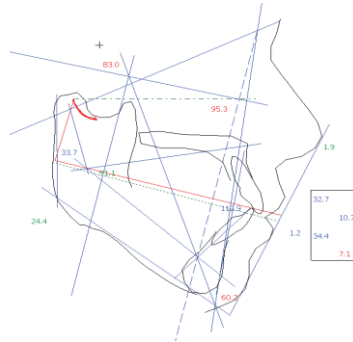


Table 6

<b>Slavicek Analysis</b>			
<b>Skeletal Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Facial Axis	90.0°	83.0	2D**
Facial Depth	89.0°	95.3	2+**
Mandibular Plane	24.0°	24.4	
Facial Taper	68.0°	60.2	2D**
Mandibular Arc	29.0°	33.7	1B*
Maxillary Position	65.0°	62.4	1-*
Convexity	0.0 mm	1.9	
Lower Facial Height (by R. Slavicek)	46.3°	51.0	
Lower Facial Height to Point D	52.8°	53.0	
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	131.3°	112.9	1-*
Upper Incisor Protrusion	5.6 mm	10.6	1+*
Upper Incisor Inclination	26.4°	32.7	1+*
Upper Incisor Vertical	Mm		
Lower Incisor Protrusion	0.9 mm	7.1	2+**
Lower Incisor Inclination	22.3°	34.3	1+*
Upper Molar Position	18.0 mm		
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°		
Idealized Occlusal Plane – Axis Orbital Plane	----°	17.5	
Distance Occlusal Plane – Axis (DPO)	40.9 mm		
Radius of Curve of Spee	mm		
Lip Embrasure	0.0 mm		
Occlusal Plane Xi Distance	-1.4 mm		
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	62.5	
Horizontal Condylar Inclination left	----°	65.3	
Horizontal Condylar Inclination	----°	63.9	
Relative Condylar Inclination	----°	63.9	
Relative Condylar Inclination 6	----°	63.9	
Relative Condylar Inclination 7	----°	63.9	
Relative Condylar Inclination 8	----°	63.9	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.3 mm	1.2	1+*

- Dolichocephalic facial type.
- The interincisal angle is normal.
- Asymmetric case history, SCI R=62° SCI L=65°.
- Occlusal plane -17,5°.

Table 7

Incisal Pin Table													
Incisal Pin Height	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
Lower Facial Height	51.1	51.5	51.9	52.3	52.7	53.1	53.5	54.2	55.0	55.7	56.3	57.0	58.3
LFH (Norm)	46.3	46.4	46.5	46.6	46.7	46.8	46.9	47.1	47.3	47.5	47.7	47.9	48.3
LFH (Variation)	-0.0	0.4	0.8	1.2	1.6	2.0	2.4	3.1	3.9	4.6	5.2	5.9	7.2
Menton Vertical	0.0	0.3	0.7	1.0	1.3	1.6	1.9	2.5	3.0	3.6	4.1	4.5	5.4
Pogonion Sagittal	0.0	-0.8	-1.6	-2.4	-3.2	-4.0	-4.8	-6.5	-8.1	-9.8	-11.4	-13.1	-16.4
Incision Inf. Vertical	0.0	0.5	1.0	1.5	2.0	2.5	2.9	3.9	4.8	5.6	6.4	7.2	8.8
Incision Inf. Sagittal	0.0	-0.6	-1.1	-1.7	-2.3	-2.8	-3.4	-4.6	-5.8	-7.0	-8.3	-9.5	-12.1
Incisal Pin Height	0.0	-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-8.0	-10.0	-12.0	-14.0	-16.0	-20.0
Lower Facial Height	51.1	50.7	50.2	49.8	49.3	48.9	48.4	47.5	46.5	45.4	44.3	43.2	40.8
LFH (Norm)	46.3	46.2	46.1	46.0	45.9	45.8	45.7	45.5	45.2	45.5	44.8	44.6	44.2
LFH (Variation)	-0.0	-0.4	-0.9	-1.3	-1.7	-2.2	-2.7	-3.6	-4.6	-5.7	-6.7	-7.9	-10.3
Menton Vertical	0.0	-0.4	-0.7	-1.1	-1.5	-1.9	-2.4	-3.1	-4.4	-4.9	-5.9	-6.9	-9.2
Pogonion Sagittal	0.0	0.8	1.6	2.1	3.2	3.9	4.7	6.2	7.7	9.2	10.7	12.1	14.8
Incision Inf. Vertical	0.0	-0.5	-1.1	-1.6	-2.1	-2.7	-3.3	-4.4	-5.7	-6.9	-8.2	-9.6	-12.5
Incision Inf. Sagittal	0.0	0.5	1.6	1.6	2.1	2.7	3.2	4.1	5.1	6.0	6.8	7.6	9.0

Impressions of the maxilla and mandible with both stock trays and customized trays were obtained. Custom impression coping was made.

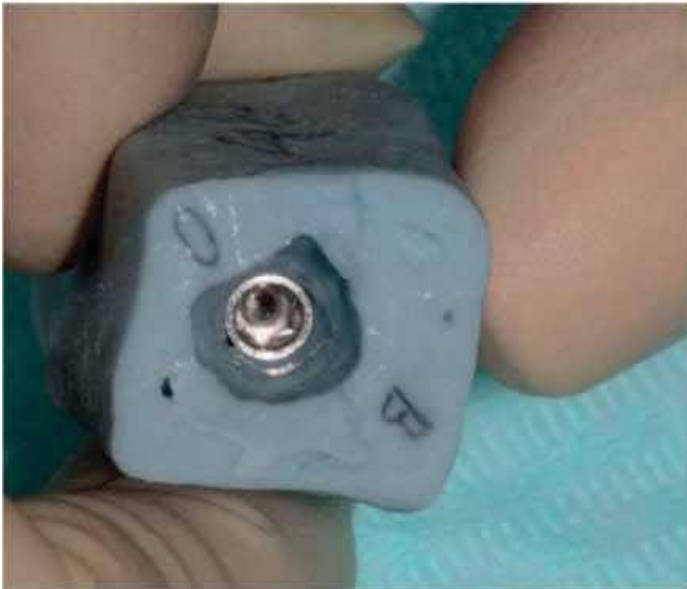
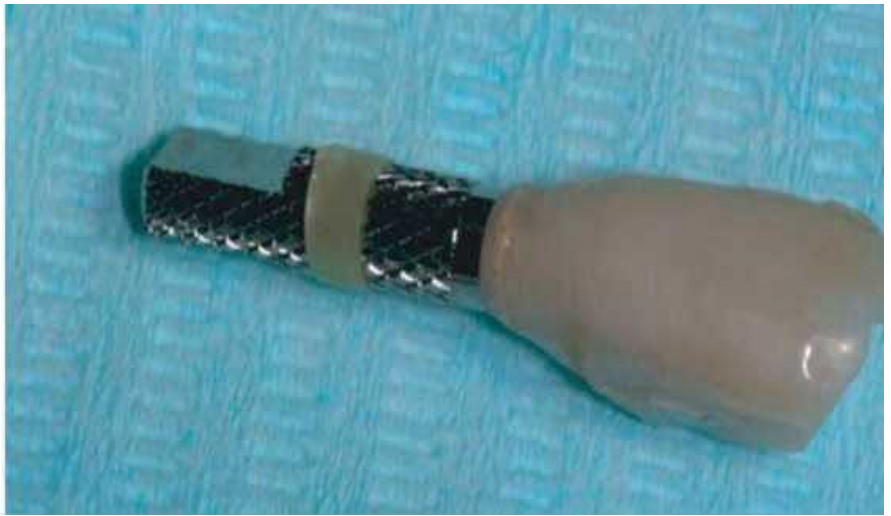


Rigid centric fabricating.

We form the temporary crown emergence profile and expand it next to the gingival margin per 0.5 mm in a single action.

If we want to expand the emergence profile by 2 mm in diameter, we need to visit the prosthodontist 4 times.

When forming soft tissue profile, gingival ischemia may occur. After the formation of an emergence profile, ischemia should disappear in 6-8 minutes. If ischemia doesn't disappear, we reduce the crown diameter in the gingival margin.



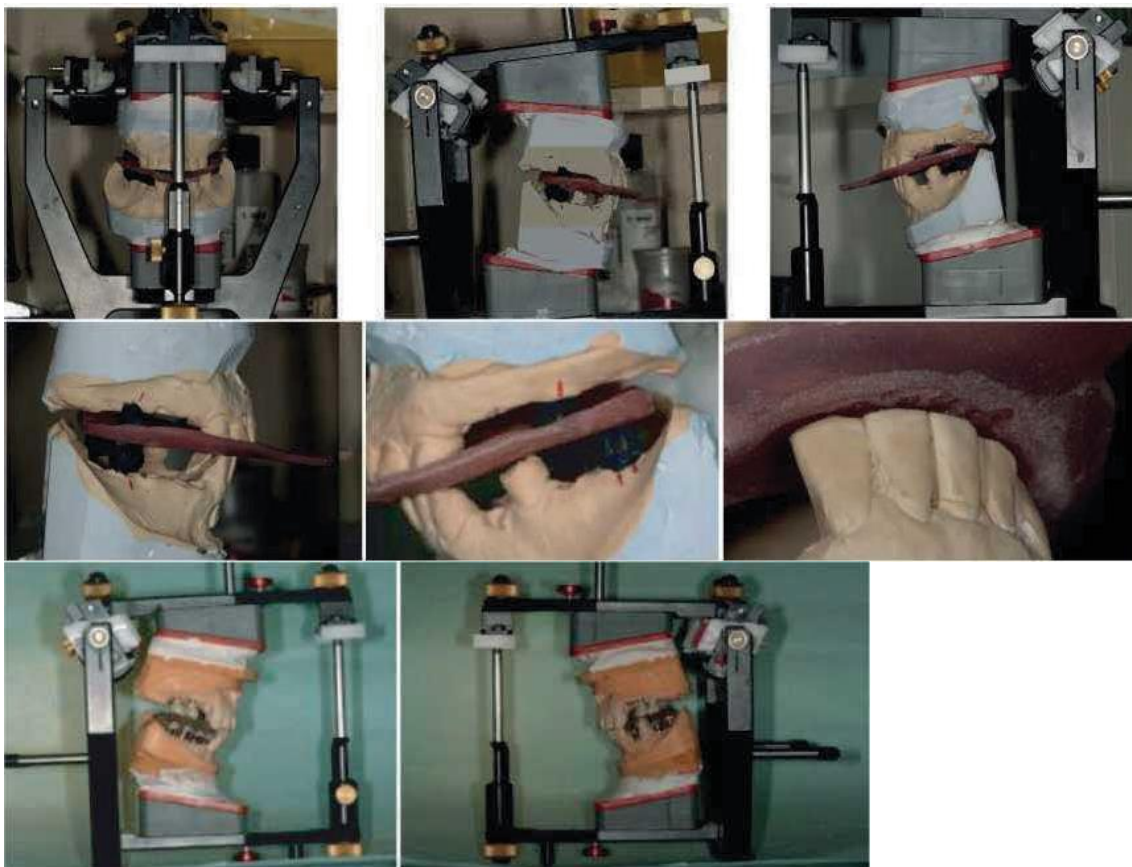




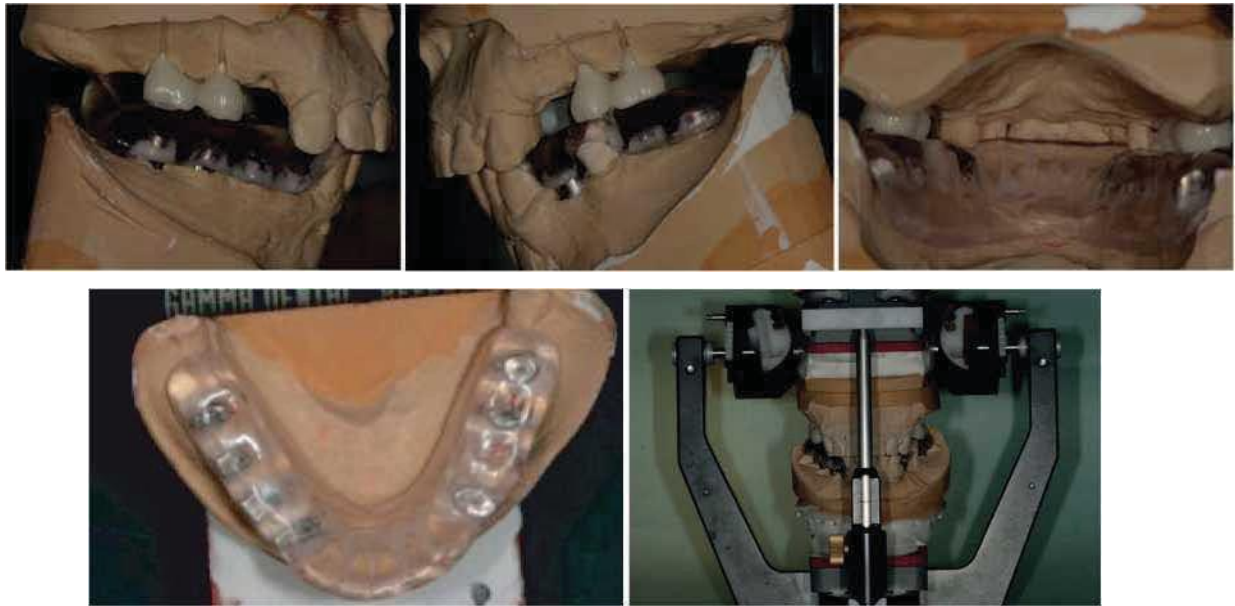
Impressions from upper and lower dental arches were obtained using standard tray and Impregnum impression material as well as transfer coping. "Red artificial gingiva" is used for making master casts.

Making CR centric with plastic tooth placed on metal temporary implant abutments 4.6, 3.7, 1.6 and 2.6.

Casts are remounted after determining the centric relation. Myopathic dental splint was made in this position.



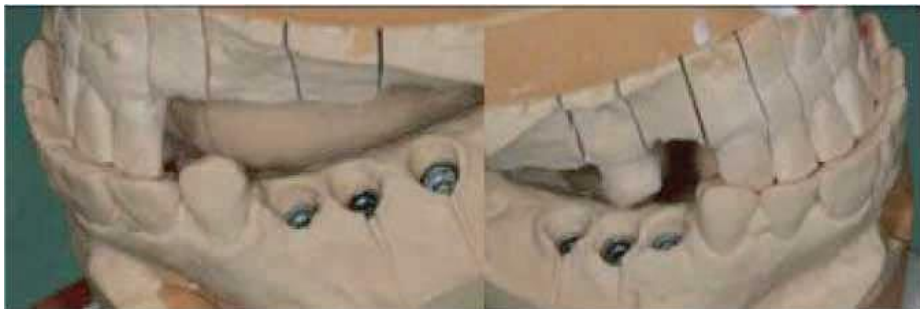
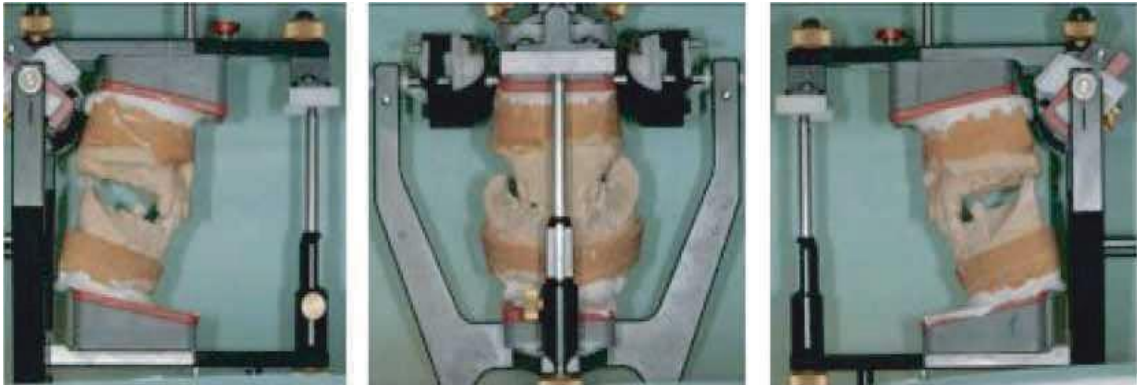
Fabricating myopathic dental splint supported by 5 mm height healing abutment and temporary crowns on temporary abutments on the teeth 1.5-1.6 and 2.5-2.6.



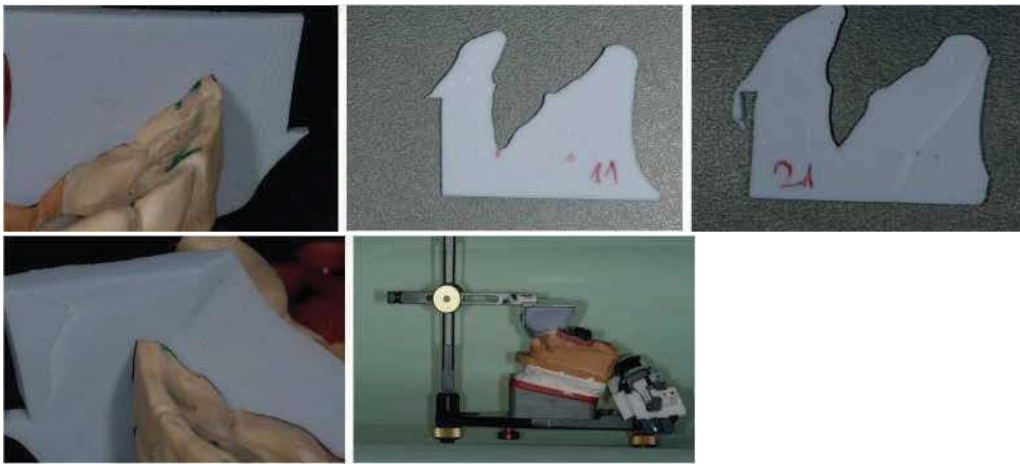
Selective grinding of myopathic dental splint had been performing for 14 days, and then the centric relation was determined using Aluwax wax and the myopathic dental splint.



Remounting of cast models in the articulator after 14 days if splint therapy.



Determination of the anterior guidance on incisive table on silicone index made from incisors impression.



We use Weber template to calculate the 3D position of holding cusps points and custom guide plane for each tooth.

Table 8

Inlay	Right			Left		
	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm
Straight	61°	60°	56°	65°	64°	57°
Convex	*54°	*57°	*58°	*59°	*60°	*61°
Retrusive	Black	Black	Black	Black	Black	Black

Table 9

### Transversal Condylar Guidance Reference® SL

Inlay	Right			Left		
	3 <sup>rd</sup> mm	5 <sup>m</sup> mm	10 <sup>th</sup> mm	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm
White	*12°	*9°	*5°	22°	22°	17°
Yellow	0°	0°	0°	*14°	11°	0°
Red	0°	0°	0°	4°	*1°	*0°
Blue	0°	0°	0°	0°	0°	0°

**Gamma Sequence Incisal Table** Condylography values used for calculation  
 Protrusion at 5 mm: SCI 60,0°  
 Mediotrusion right at 5 mm: SCI 62,6° TCI 10,8°  
 Mediotrusion left at 5 mm: SCI 65,7° TCI 33.1° Suggested sequence table setting

Protrusion element: ORANGE (YELLOW) Right lateral element: BLUE  
 Left lateral element: ORANGE (YELLOW)

Condylography values used for calculation Protrusion at 5 mm: SCI 60,9°

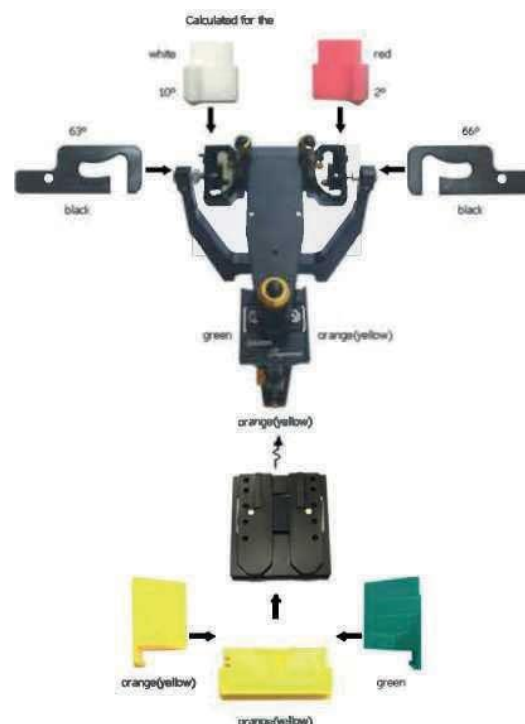
Mediotrusion right at 5 mm: SCI 62,6° TCI 10,8°

Mediotrusion left at 5 mm: SCI 65,7° TCI 33,1°

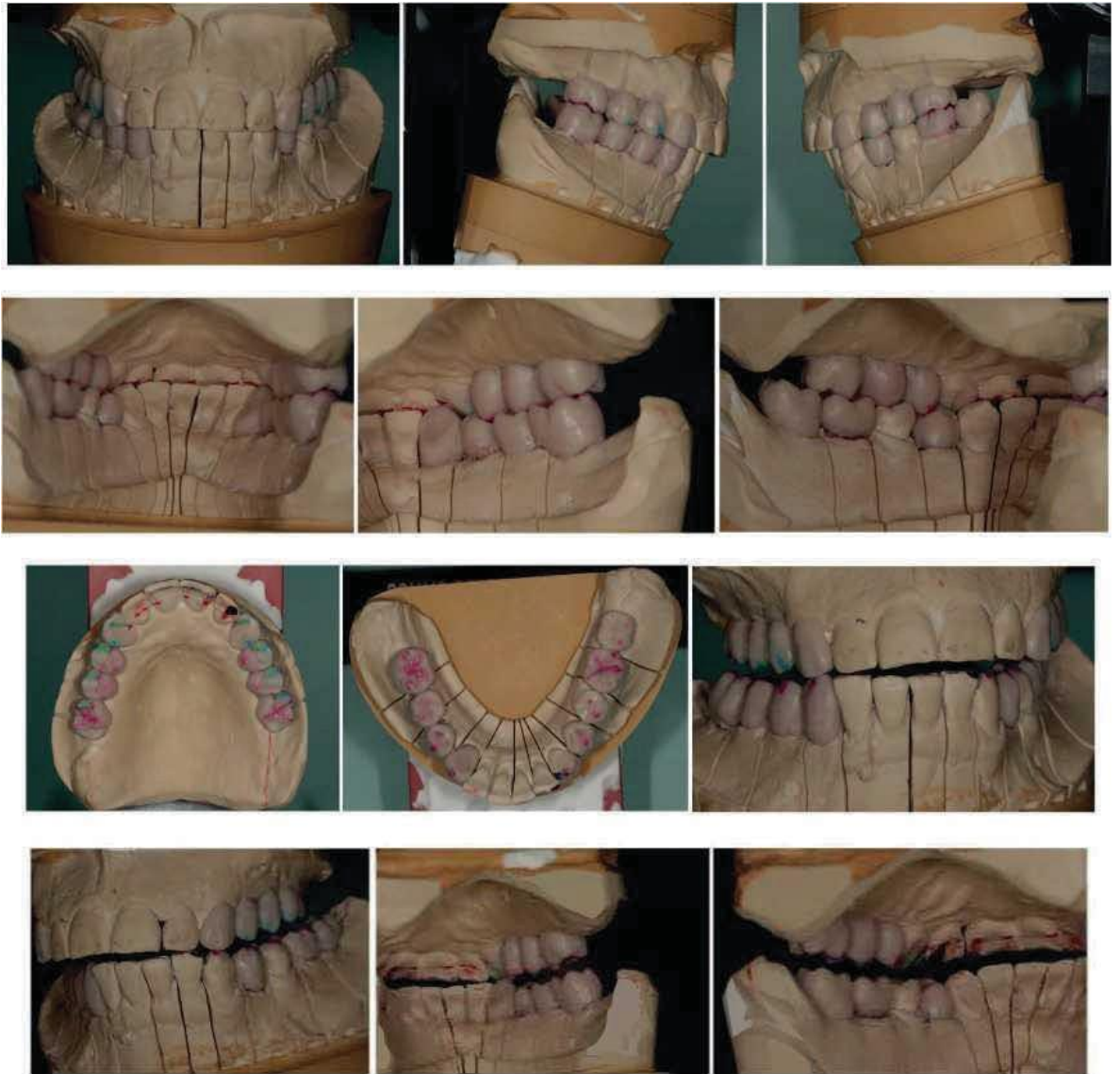
Calculation for incisal table setting: Sequential disocclusion according to R.S  
 Computed using ideal anterior guidance

Table 10

Calculated vertical cusp tip positions								
	Right				Left			
	TA	I-Table	T-S1	T-S2	TA	I-Table	T-S1	T-S2
1.	58.2°	59°	45°	67°	58.2°	59°	45°	67°
2.	58.2°	59°	45°	67°	58.2°	59°	44°	68°
3.	48.2°	53°			48.2°	64°		



## Wax casting



After the wax-up, we decided to make dental veneers on 3.3 and 3.5 and change the inclination of palatal surfaces 1.3 and 2.3.

**Protrusion**

Protrusion restriction on 2 and 4 mm.



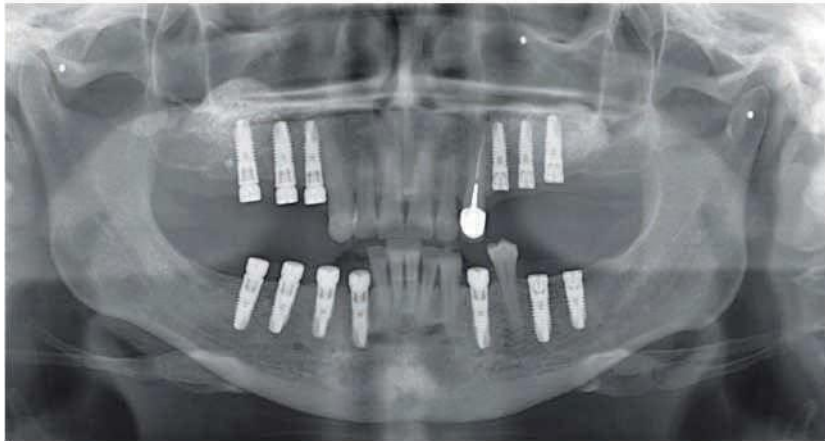
**Results:**

Final dental restorations.

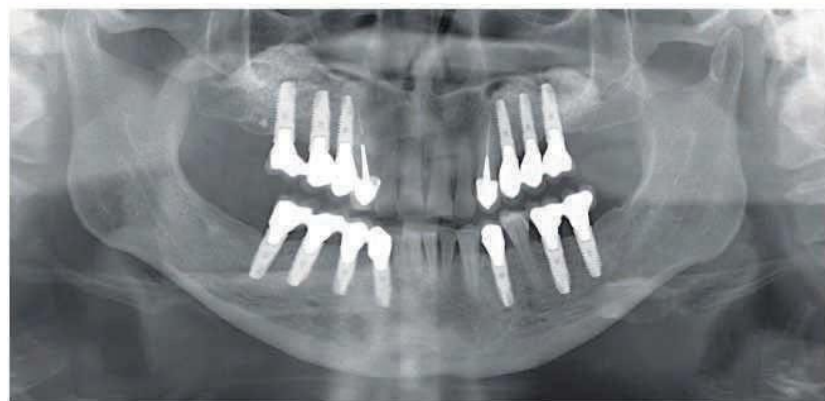


# Before / After

2008



2018





## **Conclusion**

Thus, this treatment and patient diagnostic regimen with bilateral teeth absence is necessary for the predicted long-term result. Individual parameters of sagittal joint path for the right and left sides enable fitting individual dentures for the right and left sides. Splint therapy provides for determining the centric relation.

## Clinical case №3

Patient's birth date: 1966.

Date of examination: March 2009.

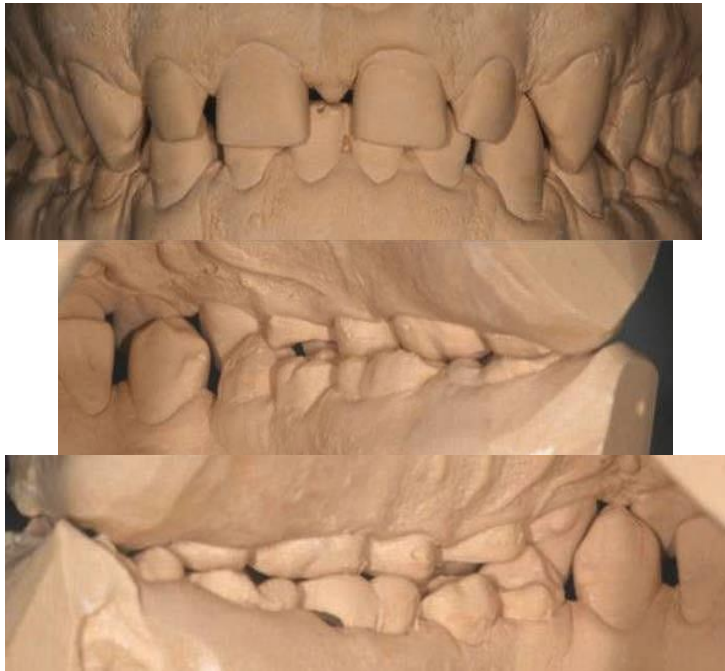
The patient came to the hospital complaining to unsatisfactory aesthetics, muscular aches and aching masticatory muscles.

Physical examination revealed:

- Vertical overlap.
- Diastemata.
- Decrease of the interincisal angle, non-matching midlines.
- Dental Class I.



Active and passive dental arches do not match Model casting.



**Purpose of examination:**

Determine the ways of applying compensation mechanism knowledge for dentoprosthetic rehabilitation in total reconstruction of dentitions. And to replace orthodontic care with orthopedic care involving aesthetic parameters planning. Assess the possibility of creating a canine guidance, anterior and retrusive control, align active and passive dental ranges of the maxilla and mandible along the sagittal and transversal planes. Use data obtained from conditioning studies, cephalometric and model analysis, combined with data from these sources with muscle palpation and wax-up data. Individual wax-up parameters determined by Weber template using XYZ coordinate system to determine the location of reference cusps in Cartesian coordinate system within the articulator space.

## **Materials and methods:**

In order to address this clinical case, we used large clinical, functional and instrumental analyses, as well as an analysis of casts mounted in the centric relation in an articulator, cephalometric and palpation studies of muscles, nerve endings, patient history collection and chronic pain detection in the maxillofacial region and the patient's body.

Important stages of treatment include splint therapy and follow-up examination of its results after 14 days. This will give a positive result in the long term. Interdisciplinary approach: involvement of an osteopathic physician provides an opportunity to relieve muscle pain and tensions in the patient's body. Psychosomatic esthetic correction contributes to the result as well.

## **Patient's history**

revealed problems with chewing, opening the mouth wide and closing, pain in the area of the temporomandibular joints, spasms in the neck and larynx, in the head, and also posture problems.

Table 1

Dental History Analysis		Valuation	yes	no
1.	Do you have problems when you chew?	2	X	
2.	Do you have problems when you are talking?			X
3.	Do you have problems in closing your teeth property?			X
4.	Are any of your teeth especially sensitive?			X
5.	Do you have problem when you open your mouth very wide?	1	X	
6.	Do your jaw joints make noise and if so, on what side?			X
7.	Do you have pain in the area of your jaw joints?	1	X	
8.	Do you suffer from headaches?			
9.	Do you suffer from cramps or spasm in your head, neck or throat?	1	X	
10.	Do you have in general problems with your posture?		2X**	
	Occlusal Index	1.40		
11.	Have you ever had serious accident?			X
12.	Did you have one or more oral intubations?			X
13.	Have you ever had orthodontic treatment or ...			X
14.	Have you had a treatment with splint?		X	
15.	Are you grinding or pressing with your teeth?		X	
16.	Do you think that treatment is necessary?		X	
17.	Do you think that there is a serious disorder or illness?			X
18.	When the last time you had dental treatment and what was done?			

Table 2

Special Medical Analysis		Do you have or did ever have an illness with regard to point 1-12?	
		yes	no
1.	Infections		X
2.	Cardo-vascular systems		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern:			

Muscle palpation revealed aches in postural muscles, closing muscles, protractor muscles, retractor muscles, medio- and laterotracors as well as changes in sublingual bone indicating swallowing function impairment.

Table 3

Muscular movement	
Posture	1, 2, 7, 12, 13, 14
Jaw-closing	3a, 3b, 4a, 4b, 5
Jaw-opening / protrusion	8, 9, 10
Retraction	3c, 8
Medio- /Laterotrraction	6, 3a, 4a
Sublingual bone position	8, 9, 10, 11, 13
Function	7, 8, 9, 10, 11, 14
POSTURE, PRORACTOR, SUB-LINGUAL POSITION	

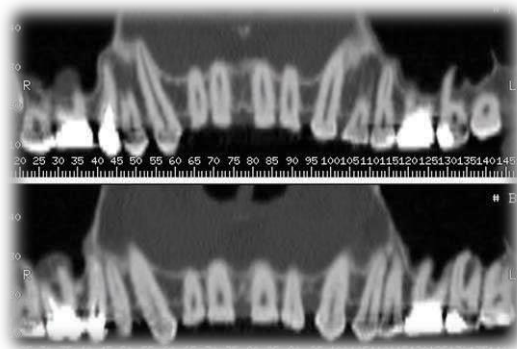
Thus, these mucules are tensioned.

Table 4

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)	X		X	
4.b	M.masseter (deep)	X		X	
5.	Tuber maxillae	X			X
6.	M.pterygoideus medialis		X		
7.	M.mylohyideus		X		X
8.	M.digastricus	X		X	
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints*				
	a) Lateral poles, statically	X		X	
	b) Lateral poles, in rotation		X		X
	c) Retral joint space		X	X	
	d) Lig.temporo-mandibulare	X		X	



Targeted X-ray images revealed dental cavities in teeth 17, 27 root canal treatment in 16 and 26.



### List of issues

- Sagittal and transverse divergence of the upper and lower dental arches.
- Incisal vertical overlap.
- Speech and aesthetics.
- Muscular aches when chewing.
- Indication for further functional instrumental analysis.

### Diagnostics

- Skeletal Class I.
- Dental Class I.
- Vertical overlap.
- Muscle problems.

## Treatment objectives

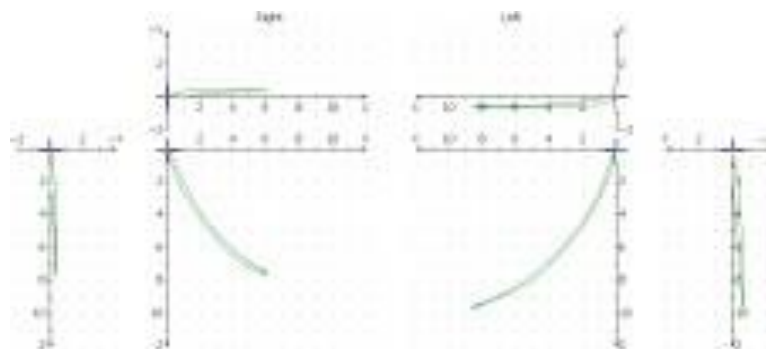
- Remove teeth 18 and 28.
- Increase the occlusal vertical dimension and change the depth of occlusion.
- Reshape both upper and lower dental arches.
- Change OPI and DOA.

## Treatment Plan

- Occupational oral hygiene.
- Wax-up.
- Root canal treatment.
- Periorestorative treatment.
- Prosthodontic teeth restoration.

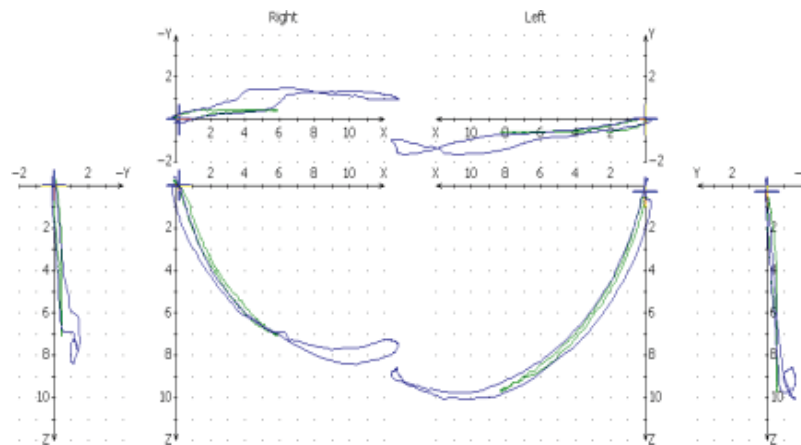
## Condylography

### Protrusion



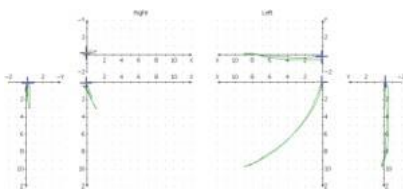


## Protrusion - retrusion and opening – closing

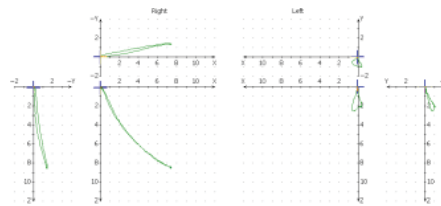


Reduction of movement length on the rights, i.e. quality is low and the quantity is reduced.

### Left mediotrusion

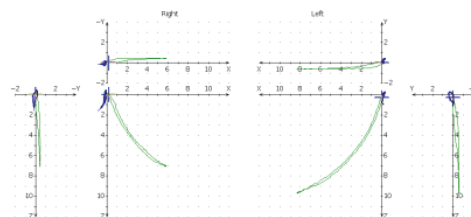
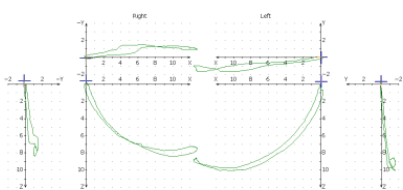


### Right mediotrusion



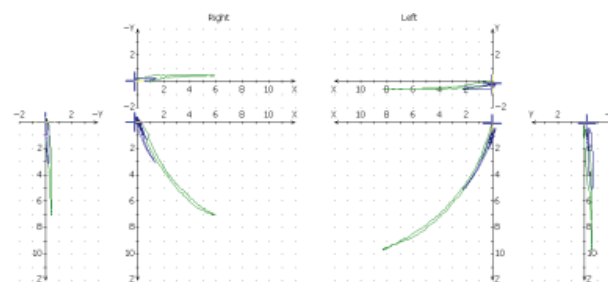
Protrusion and zero Bennet value are detected in the right joint. This is either due to disc adhesion or obstacle avoidance mechanism. Detrusion in the left joint at the right mediotrusion, but Bennet angle is positive. Normal.

### Odontoprisis Bruxism

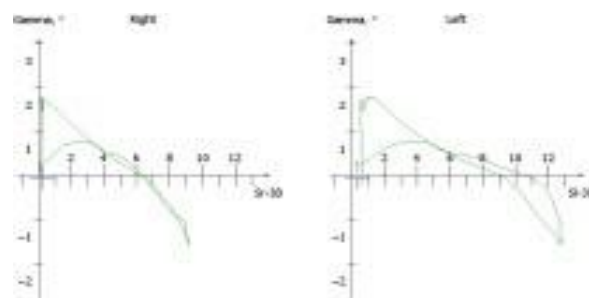


The beginning and the end of movement are not coincident. This indicates non- stable occlusion and divergence between protractor and retractor muscles.

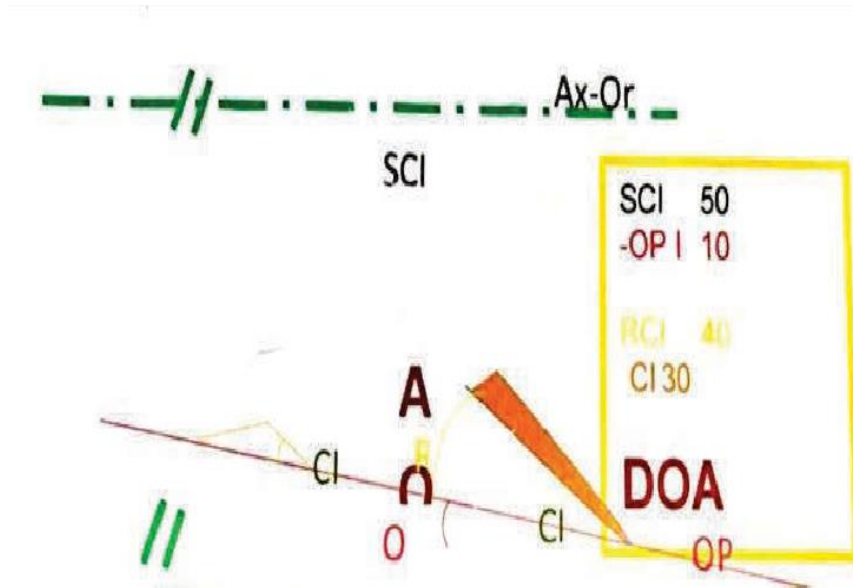
Redetrusion, i.e. bruxism jaw, does not overlap protrusion caused by sharp slope of palatine surface of upper incisors, and the lower jaw is moved to the retrusion position with downwards shear.



Speaking movement overlaps with the first 4 mm of protrusion. Normal. Gamma rotation indicates interference in the frontal area.



Disocclusion angle calculation in the lateral area in order to calculate the chewing efficiency.



TRG, AG, DOA and OPI

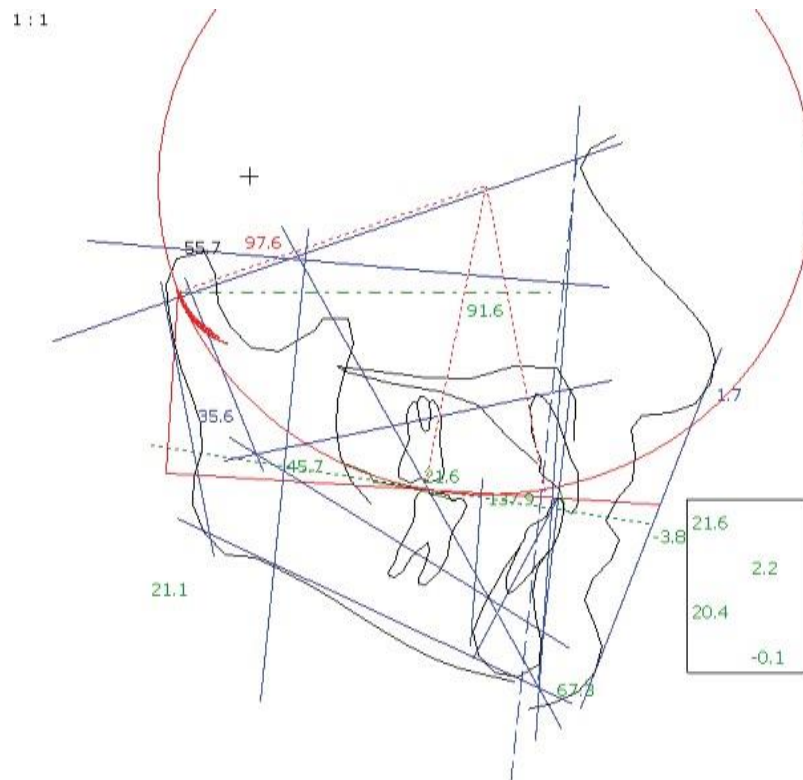


Table 1

<b>Slavicek Analysis</b>			
<b>Skeletal Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Facial Axis	90.0°	97.5	2B*
Facial Depth	91.5°	91.6	
Mandibular Plane	21.5°	21.1	
Facial Taper	68.0°	67.2	
Mandibular Arc	31.2°	35.5	1B*
Maxillary Position	65.0°	64.9	
Convexity	-1.0 mm	1.6	1X*
Lower Facial Height (by R. Slavicek)	42.7°	45.7	
Lower Facial Height to Point D	49.2°	49.4	
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	132.8°	137.9	
Upper Incisor Protrusion	4.3 mm	2.2	
Upper Incisor Inclination	23.1°	21.6	
Upper Incisor Vertical	mm	2.5	
Lower Incisor Protrusion	1.2 mm	0.0	
Lower Incisor Inclination	24.1°	20.4	
Upper Molar Position	21.0 mm	21.5	
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	3.7	
Idealized Occlusal Plane – Axis Orbital Plane	----°	10.7	
Distance Occlusal	40.9	32.8	
Plane – Axis (DPO)	mm		
Radius of Curve of Spee	mm	55.6	
Lip Embrasure	0.0 mm	2.7	
Occlusal Plane Xi Distance	-1.4 mm	-4.6	
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	57.2	
Horizontal Condylar Inclination left	----°	62.5	
Horizontal Condylar Inclination	----°	59.8	
Relative Condylar Inclination	----°	56.1	
Relative Condylar Inclination 6	----°	40.9	
Relative Condylar Inclination 7	----°	50.8	
Relative Condylar Inclination 8	----°	36.7	
Anterior Guidance (S-AOP)	----°	75.5	
Relative Anterior Guidance	----°	71.8	
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.9 mm	-3.7	

## Cephalometric Analysis

- Both jaws are in prognathic state, vertical size can be increased from 45.7 to 47.5.
- Incisal pin + 4.5 mm.
- OPI is decreased – must be increased to 10° for the right side and to 16° to the left side.
- Increase the angle of frontal restriction.
- Skeletal Class I
- Asymmetric case.
- Increase OPI by 36 and 46 to obtain DOA = 10°.
- The occlusal vertical dimension is increased.

Table 2

Incisal Pin Table													
Incisal Pin Height	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
Lower Facial Height	45.7	46.2	46.6	47.1	47.5	47.9	48.3	49.1	49.9	50.7	51.4	52.1	53.5
LFH (Norm)	42.7	42.8	42.9	43.0	43.2	43.3	43.4	43.6	43.8	44.1	44.3	44.5	44.9
LFH (Variation)	0.0	0.5	0.9	1.3	1.8	2.2	2.6	3.4	4.2	5.0	5.7	6.4	7.7
Menton Vertical	0.0	0.4	0.8	1.2	1.6	1.9	2.3	3.0	3.6	4.3	4.9	5.5	6.6
Pogorion Sagittal	0.0	-0.7	-1.4	-2.1	-2.8	-3.5	-4.2	-5.7	-7.1	-8.6	-10.0	-11.5	-14.5
Incision Inf. Vertical	0.0	0.5	0.9	1.4	1.8	2.3	2.7	3.6	4.4	5.2	6.0	6.7	8.1
Incision Inf. Sagittal	0.0	-0.5	-1.0	-1.5	-2.0	-2.5	-3.0	-4.0	-5.1	-6.2	-7.3	-8.4	-10.7
Incisal Pin Height	0.0	-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-8.0	-10.0	-12.0	-14.0	-16.0	-20.0
Lower Facial Height	45.7	45.2	44.8	44.3	43.8	43.3	42.8	41.7	40.6	39.4	38.2	36.9	34.1

LFH (Norm)	42.7	42.6	42.5	42.4	42.2	42.1	42.0	41.8	41.5	41.3	41.1	40.8	40.4
LFH (Variation)	0.0	-0.5	-0.9	-1.4	-1.9	-2.4	-2.9	-4.0	-5.1	-6.3	-7.5	-8.8	-11.6
Menton Vertical	0.0	-0.4	-0.8	-1.3	-1.7	-2.1	-2.6	-3.5	-4.5	-5.6	-6.7	-7.8	-10.3
Pogorion Sagittal	0.0	0.7	1.4	2.0	2.7	3.4	4.0	5.3	6.6	7.8	9.0	10.1	12.3
Incision Inf. Vertical	0.0	-0.5	-1.0	-1.5	-2.0	-2.5	-3.0	-4.1	-5.2	-6.3	-7.5	-8.8	-11.4
Incision Inf. Sagittal	0.0	0.5	0.9	1.4	1.8	2.3	2.7	3.5	4.3	5.0	5.7	6.3	7.4

### Articulator Settings:

SCI R = 57°

SCI L = 63°

OPI R = 10°

OPI L = 16°

DOA = 17°

DOA = 17°

AG = 75 ° too much



## **Gamma Sequence Incisal Table**

Condylography values used for calculation Protrusion at 5 mm: SCI 63,1°

Mediotrusion right at 5 mm: SCI 59,8° TCI 8,1°

Mediotrusion left at 5 mm: SCI 63,9° TCI -4,3°

Suggested sequence table setting.

Protrusion element: ORANGE (YELLOW).

Right lateral element: ORANGE (YELLOW).

Left lateral element: ORANGE (YELLOW).

## **Condylography values used for calculation**

Protrusion at 5 mm: SCI 63,1°

Mediotrusion right at 5 mm: SCI 58,8° TCI 8,1°

Mediotrusion left at 5 mm: SCI 63,9° TCI -4,3°

Calculation for incisal table setting:

Sequential disocclusion according to R.S.

Computed using ideal anterior guidance.

Unable to compute the right curve of Spee – cusps 3r, 6dr must be in.

Unable to compute the left curve of Spee – cusps 3l, 6dl must be in.

Failed to compute incisor table setting for ideal positions.

Table 3

Calculated vertical cusp tip positions								
	Right				Left			
	TA	I-Table	T-S1	T-S2	TA	I-Table	T-S1	T-S2
1	59.1°	60°	49°	68°	59.1°	60°	49°	68°
2	59.1°	60°	49°	68°	59.1°	60°	49°	68°
3	49.1°	77°			49.1°	66°		
4	36.7°	64°			36.7°	50°		
5	29.7°	58°			29.7°	41°		
6m	23.6°	50°			23.6°	31°		
6d								
7m								
7d								
8m								
8d								

### Occlusal Plane Value

Unable to compute the right curve of Spee – cusps 3r, 6dr must be in.

Unable to compute the left curve of Spee – cusps 3l, 6dl must be in.

Table 4

### Occlusal plane adjustment for average SCI value: 63° (5 min)

Cuspal Angle	20°	25°	30°
Balanced Occlusion 1/6	43°	38°	33°
Balanced Occlusion 1/7	52°	47°	42°
Canine protected Occlusion 1/6	34°	29°	24°
Canine protected Occlusion 1/7	43°	38°	33°

### Articulator settings (custom incisal table)

Coordinates of mandibular cusps are determined using Weber template and added to the table for calculating the angle for each of the teeth.

Table 5

### CADIAX® Curves

	Protrusion		Mediotrusion right		Mediotrusion left	
	SI right	SCI left	SCI	TCI	SCI	TCI
1 <sup>st</sup>	58.4°	66.5°	55.7°	6.9°	70.3°	-11.6°
2 <sup>nd</sup>	63.3°	69.4°	59.5°	5.5°	69.9°	-7.4°
3 <sup>rd</sup>	63.3°	69.3°	61.7°	7.6°	68.3°	-5.6°



4 <sup>th</sup>	62.7°	66.9°	60.6°	7.5°	66.3°	-5.7°
5 <sup>th</sup>	60.9°	65.3°	59.8°	8.1°	63.9°	-4.3°
6 <sup>th</sup>	59.3°	63.3°	58.7°	8.4°	62.2°	-3.9°
8 <sup>th</sup>	55.5°	59.1°	55.3°	10.5°	58.2°	-2.3°
10 <sup>th</sup>		54.8°	51.6°	10.9°	54.1°	-0.5°
14 <sup>th</sup>						
	Retrusion					
-1.		88.7°d				
-2.		88.7°d				

Table 6

### Coordinates of Cusp Tips

	Right			Left		
	X	Y	Z	X	Y	Z
1	81.00	4.00	54.00	81.00	0.00	54.00
2	80.00	9.00	53.50	80.00	4.00	54.00
3	74.00	15.00	53.00	77.00	13.00	53.50
4	64.00	20.00	53.50	71.00	19.00	53.00
5	60.00	22.00	53.50	62.00	24.00	52.50
6m	52.00	26.00	51.00	58.00	26.00	51.00
6d						
7m						
7d						
8m						
8d						

Table 7

### Sagittal Condylar Guidance Reference® SL

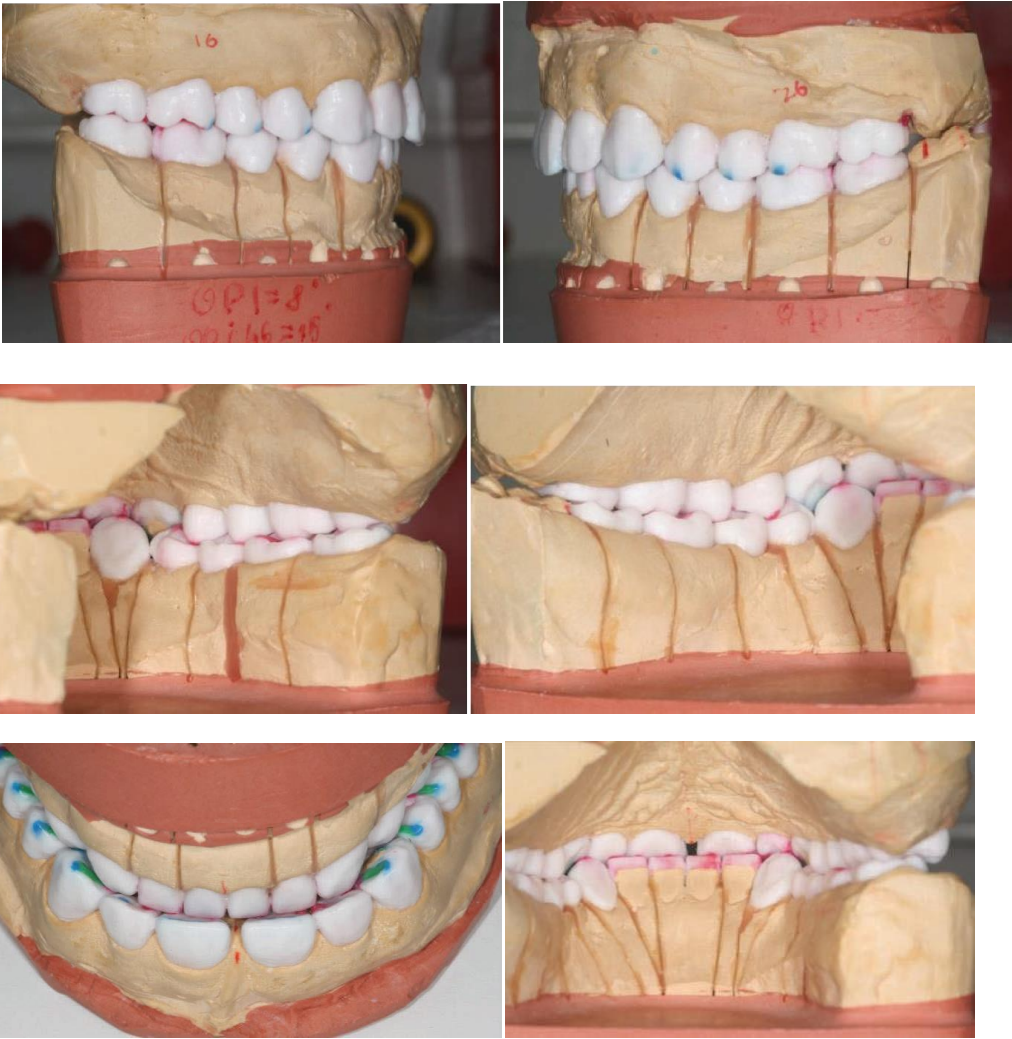
Inlay	Right			Left		
	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm
Straight	63°	62°		69°	67°	61°
Convex	*57°	*59°		*63°	*64°	*63°
Retrusive	Black	Black		Black	Black	Black

Table 8

### Transversal Condylar Guidance Reference® SL

Inlay	Right			Left		
	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm
White	*4°	*4°	*5°	*0°	*0°	*0°
Yellow	0°	0°	0°	0°	0°	0°
Red	0°	0°	0°	0°	0°	0°
Blue	0°	0°	0°	0°	0°	0°

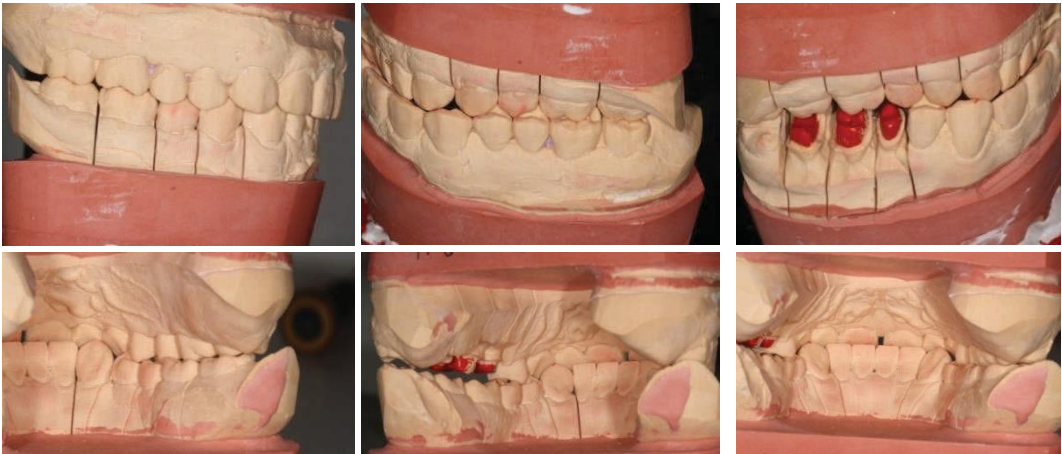
**Remounting of casts after splint therapy for wax-up**



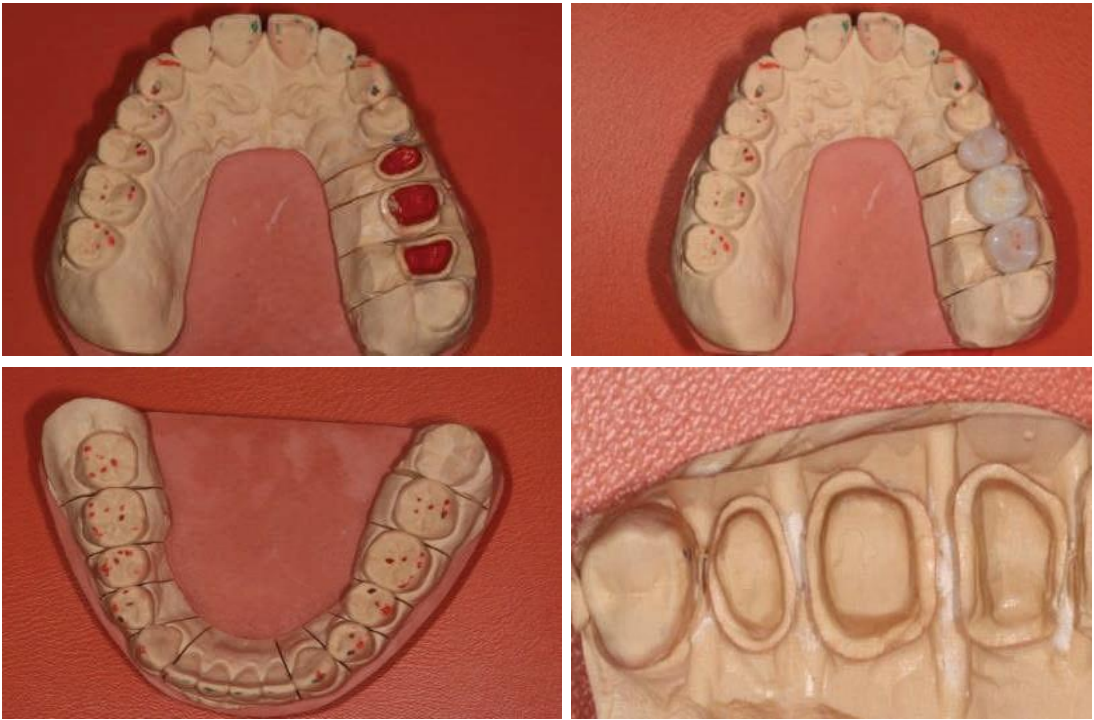
**Impressions**



# Finished product



Finished product mounted in the articulator. The front control of the canine guidance and the retrusion control on the first molars of the maxilla and the first premolar of the mandible are reconstructed.



## Final restoration 2009



## OPG (orthopantomography) 8 months after the treatment



2018



## Before/after

Before treatment



After treatment



After 9 years



## Clinical case №4

Patient: age 47, sex: male.

Chief complaint: poor masticatory performance. Esthetic problems.

Inability to bite off a piece of spaghetti.

All complaints occurred after 3 orthodontic treatments and orthodontic operation.

### Basic questions of the esthetic protocol:

- What do you want to express with your smile? Answer: happiness.
- Which aspects of your personality do you want to emphasize and which ones do you want to soften?

Answer: It doesn't matter. I'm happy. I want to eat spaghetti. Smile symmetry and lower lip line.

Esthetic parameter estimation in the present condition.

- Tooth shape requires correction;
- Change of teeth position;
- Teeth size and proportions asymmetry on the right and left sides;
- The patient wants a symmetrical smile line;
- Photographs and casts of the previous treatment are presented in full.

### Intraoral photographs:





### **We discovered the following:**

- Sagittal and transversal dental arches don't fit together;
- Midline shift;
- Abfractions;
- Palatal inclination of the maxilla canine teeth.

### **Esthetic Analysis**

- Facial analysis and speech;
- Dental analysis;
- Dento-labial analysis;

### **Facial analysis**

- Facial profile (convex, concave, normal);
- Inter-pupillary line is parallel to the incisal edge of the upper incisors;



- Skeletal development and tooth position (buccoclination, palatal, correct);
- Face proportions: lower third of the face.

### **Dental analysis:**

- Inclination of lower incisors;
- Teeth proportions;
- Central incisors axial inclination estimation of lower incisors 11 and 21 is perpendicular to the occlusal plane (OPI);
- Depth and width central incisors overbite;
- Incisors abrasion, palatal abrasion;

### **Dentolabial analysis**

- Inter-incisal line inclination;
- Smile line;
- Buccal corridor.

### **Data processing**

Correlation 1:1. The desired esthetic result is achieved with a tooth proportion of 76%- 83%.

Dento-labial lines are verified.

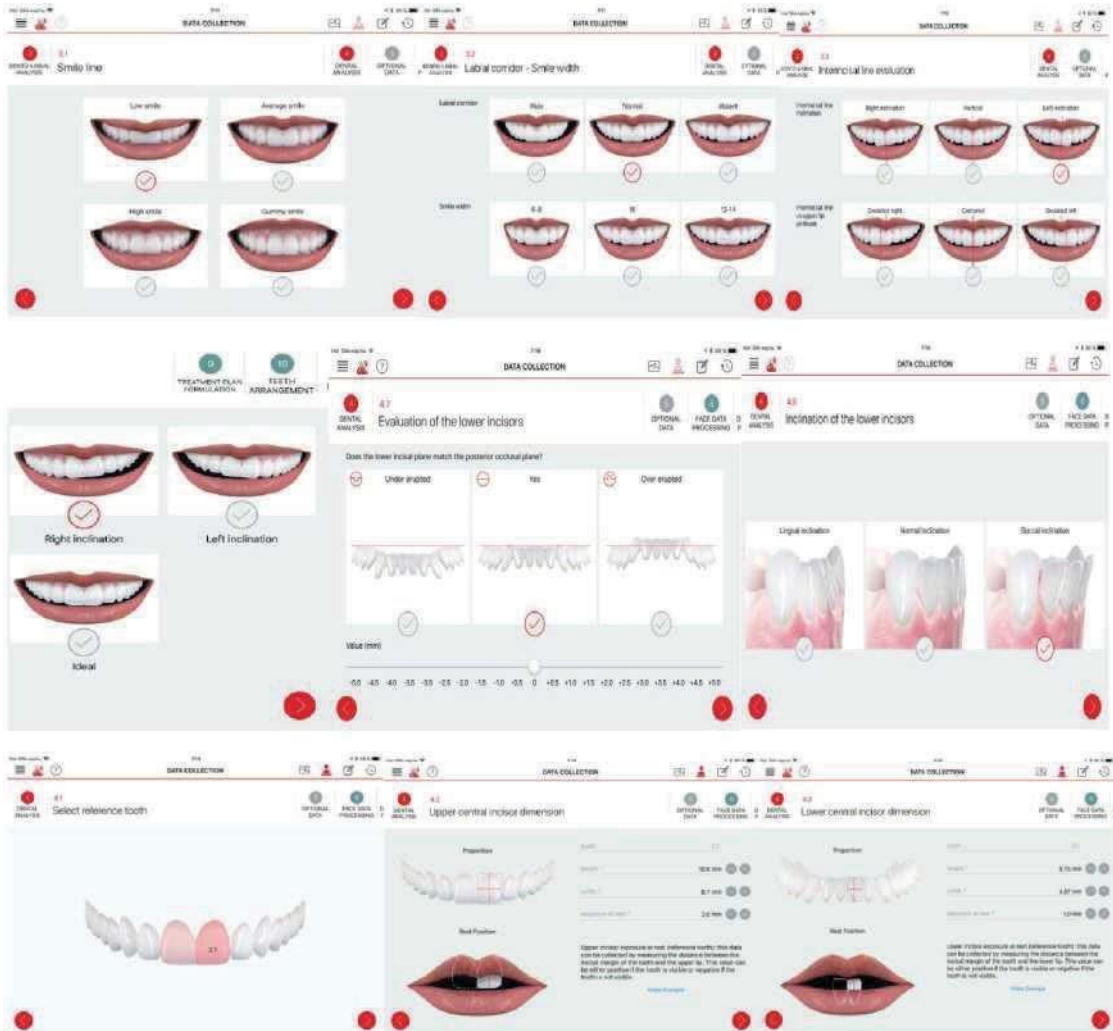
Inter-pupillary line is parallel to the incisal edge of the maxilla central incisors. Incisal edge position of the maxilla incisors is relined according to the lower lip. Estimate of the canine position according to the alar nasalis.

Incisors profile was estimated from the profile photo. Phonetic tests:

sounds  $\Phi$  (F) and C (S).

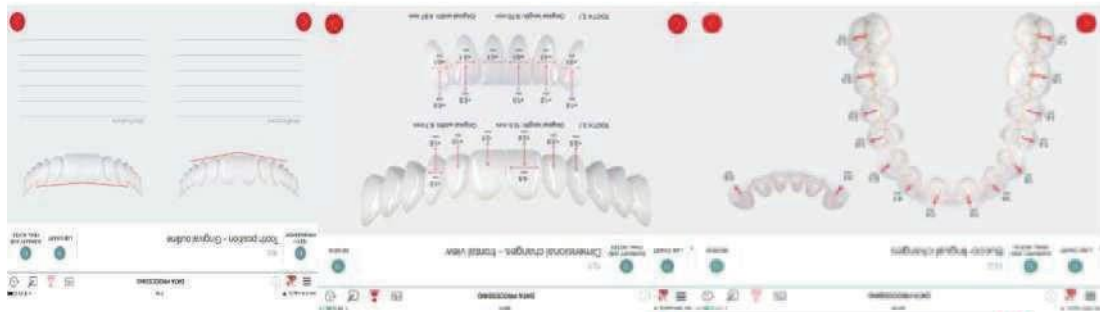
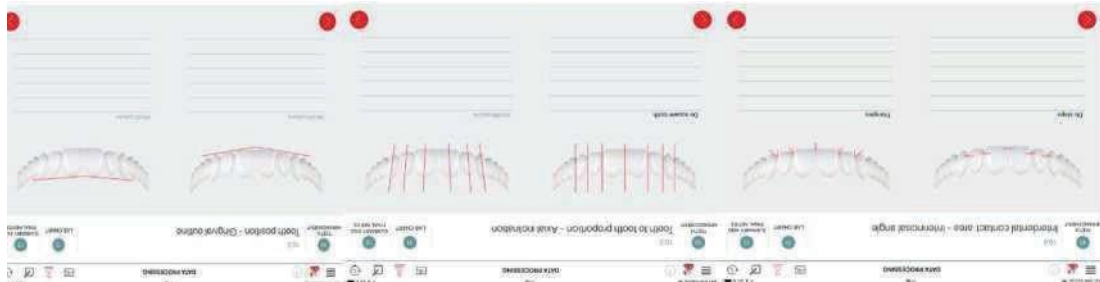
The labial corridor was corrected.

## Esthetic analysis




## Material selection






# Esthetic settings

### DIMENSIONAL CHANGES



FRONTAL LENGTH OF THE REFERENCE CENTRAL INCISOR  
Average length: 14.21  
Range length: 8.19

FRONTAL WIDTH OF THE REFERENCE CENTRAL INCISOR  
Average width: 8.71  
Range width: 8



FRONTAL LENGTH OF THE REFERENCE CENTRAL INCISOR  
Average length: 8.79  
Range length: 8

FRONTAL WIDTH OF THE REFERENCE CENTRAL INCISOR  
Average width: 4.31  
Range width: 0.1


### LABORATORY ORDER

Characteristics:  Yes  No

Functional:  Yes  No

Notes: Check the signs on the left side with upper incisors cut-off, for right -> 1 (aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned), 10 (1 - aligned).

### FUNCTIONAL INFORMATION



ORIGINAL CEMENT: 0.1 mm

PAUL CEMENT: 0 mm

ORIGINAL CERAMIC: 0.1 mm

PAUL CERAMIC: 1.1 mm

COLLATION: 0 mm

ARTICULATOR: Fully adjustable

MANDIBULAR ARCH: Custom

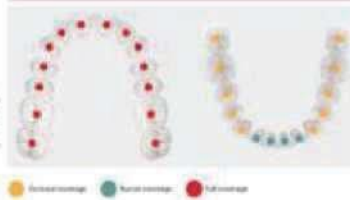
MAXILLARY ARCH: Custom

OCCLUSAL CONTACT AREA: Custom

OCCLUSION: 100% bite

ARCHFORM: Normal

### TYPE OF RESTORATION



Legend: Yellow dot = Veneer coverage, Green dot = Natural coverage, Red dot = Full crown cap


### COLOR SELECTION

SHADE GUIDE: A2

INITIAL TOOTH COLOR: A2

DESIRED COLOR OF THE RESTORANT: A2

ABUTMENT COLOR: A2



### VIDEOS OF PATIENT

Right lateral view of "0" Smile

Left lateral view of "0" Smile

Natural smile

"0" Smile

Natural rest position

### ESTHETIC INFORMATION

HEALTHY CHARACTERISTIC: No

ALTERNATE: No


APPEARANCE: Young

TOOTH TYPE: Good


SMILE TYPE: Slight

GUM CHARACTERIZATION: White and uniform

SMILE LINE: Average


The visibility of the anterior teeth support: 

LABIAL CORNER: White


Increase the buccal volume of the patient: 

HAIR LINES: Not defined


HYPERPLASIA LINE RELOCATION: Left inclination

Diagnose the horizontal line: 

OCCLUSAL PLANE ORIENTATION: Left inclination


Redesign the occlusal plane orientation: 

INCISAL EDGE POSITION: No


Remember the incisal edge curvature to the: 

### IDEAL DENTAL COMPOSITION


TOOTH TO TOOTH PROPORTIONS  
Disappears teeth




ALL DIMENSIONAL ANGLE  
Thinner




AXIAL REGULATION  
Change size




TOOTH POSITION



INTERDENTAL CONTACT AREA  
Division



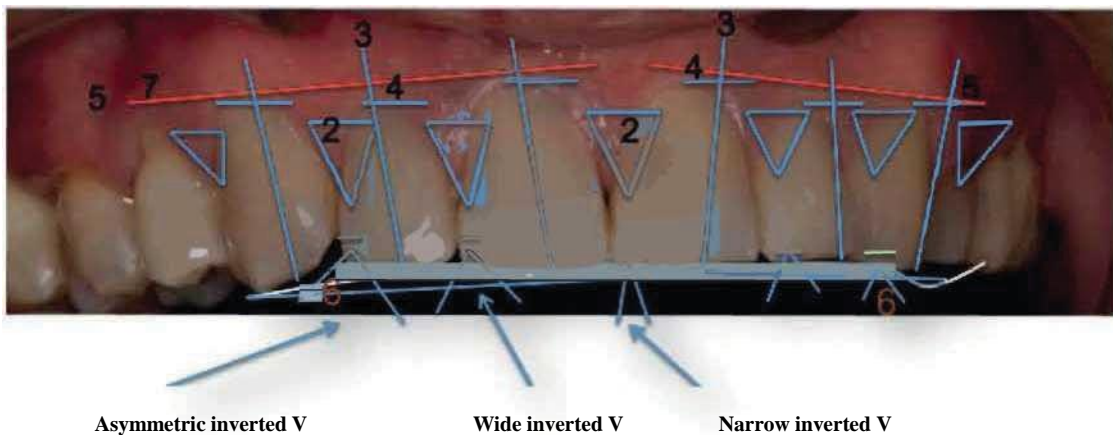
ORIGINAL OUTLINE



75

## Basic and relative criteria for teeth evaluating

- Occlusion;
- Tooth axis;
- Emergence profile topgallant;
- Gingiva level;
- Inter-proximal contact level;
- Tooth relative size;
- Tooth shape basic characteristics;
- Basic characteristics;
- Surface texture;
- Color;
- Incisal edge configuration;
- Lower lip line;
- Smile symmetry.



Average crown height			Average crown width		
10.1	8.7	10.2	8.6	6.6	7.6
8.9	7.8	9.4	8.1	6.1	7.1
		9.0	9.0	6.0	7.5
11.3	10.0	11.0	Actual 9.0	6.7	7.6

Table 1

Tooth	13	12	11	21	22	23
Height	11,12	8,4	10,2	10,51	8,67	9,94
Width	7,8	6,3	7,8	8,70	6,01	6,69

## Key features of tooth shape



## Triangular

- Extraverted;
- Communicator;
- Enthusiast;
- Dynamic;
- Impulsive.

Table 2

Oval	Triangular	Square cut	Square
Central incisors are dominated	Smile upline	Central incisors are dominated	Absence of domination
Round cusps	Divergent tooth axes	Flat incisal edge	Axes divergence
Lateral mandibular incisors are poorly pronounced	Cusps inclination	Aggressive cusps	Horizontal line of incisors cutting edge and canines
Round dental arch		Vertical axes	

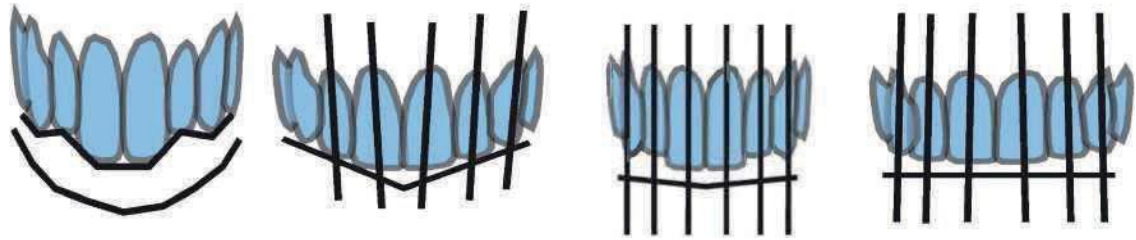


Table 3

Melancholic	Optimistic	Choleric	Phlegmatic
Sensible	Dynamic	Strong	Calm
Oval	Triangular	Square cut	Square
Organized	Extravert	Certain	Diplomatic
Perfectionist	Sociable	Objective	Peaceful
Artistic	Enthusiastic	Explosive	Secretive
Abstracted	Dynamic	Strained	Spiritual
Shy	Impulsive	Keeper	Conformist
Modest		Sharp-tempered	Prudent

### Selection of teeth

- Even or crowded;
- Age: young, middle age, old;
- Form: oval, triangle, four-square, square cut;
- Texture: macro, micro, missing;
- Color.

### Esthetics and Functions

- Esthetics evaluation;
- Tooth 21-11 is visible at 1 mm in a relaxed state;
- The lower incisor is visible at 3 mm.

## Functional evaluation

- Central incisor depth overbite = 1 mm;
- Central incisor width overbite = 1 mm;
- Anterior guidance = 0 mm;
- Vertical dimension = 19,32;
- Centric relation.

Table 4

## Phonetics evaluation of sounds F and S

### Clinical functional analysis

Dental History Analysis		Valuation	Yes	No	
1.	Do you have problems when you chew?	1	X		
2.	Do you have problems when you are talking?	1	X		
3.	Do you have problems in closing your teeth property?			X	
4.	Are any of your teeth especially sensitive?			X	
5.	Do you have problem when you open your mouth very wide?	1	X		
6.	Do your jaw joints make noise and if so, on what side?	1	X		
7.	Do you have pain in the area of your jaw joints?			X	
8.	Do you suffer from headaches?			X	
9.	Do you suffer from cramps or spasm in your head, neck or throat?	1	X		
10.	Do you have in general problems with your posture?			X	
Occlusal Index		1.00			
11.	Have you ever had serious accident?			X	
12.	Did you have one or more oral intubations?			X	
13.	Have you ever had orthodontic treatment or ...		X		
14.	Have you had a treatment with splint?		X		
15.	Are you grinding or pressing with your teeth?		X		
16.	Do you think that treatment is necessary?		X		
17.	Do you think that there is a serious disorder or illness?			X	
18.	When the last time you had dental treatment and what was done?				
19.	How would you describe your psychic behavior?				
	happy	sad	calm	excited	self-controlled
			X		



Table 5

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		yes	no
1.	Infections		X
2.	Cardo-vascular systems		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern: problem with biting spaghetti by incisor, speech, chewing, during last year first contact point changed			

## Muscles analysis

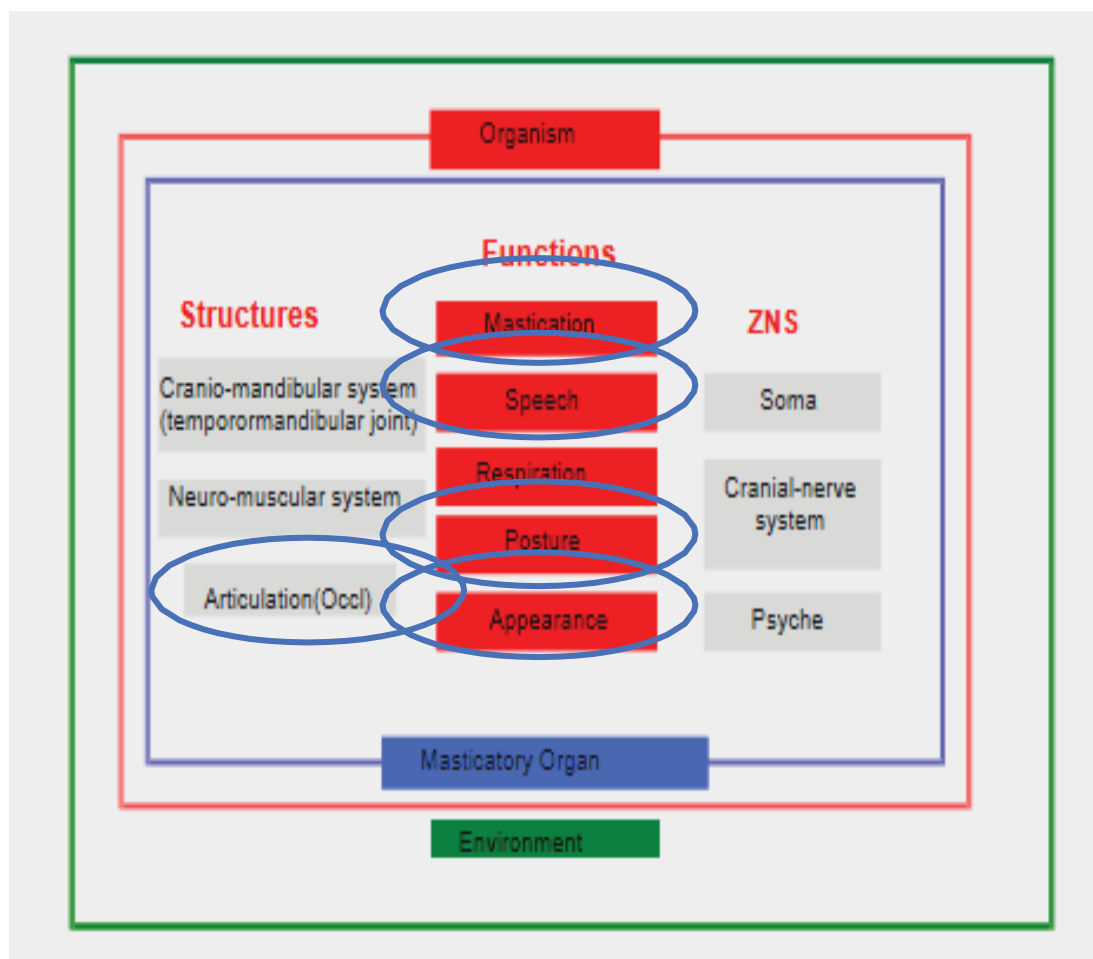
Table 6

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae	X		X	
6.	M.pterygoideus medialis				
7.	M.mylohyideus			X	
8.	M.digastricus	X			
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation	X		X	
	c) Retral joint space		X		X
	d) Lig.temporo-mandibulare	X			X

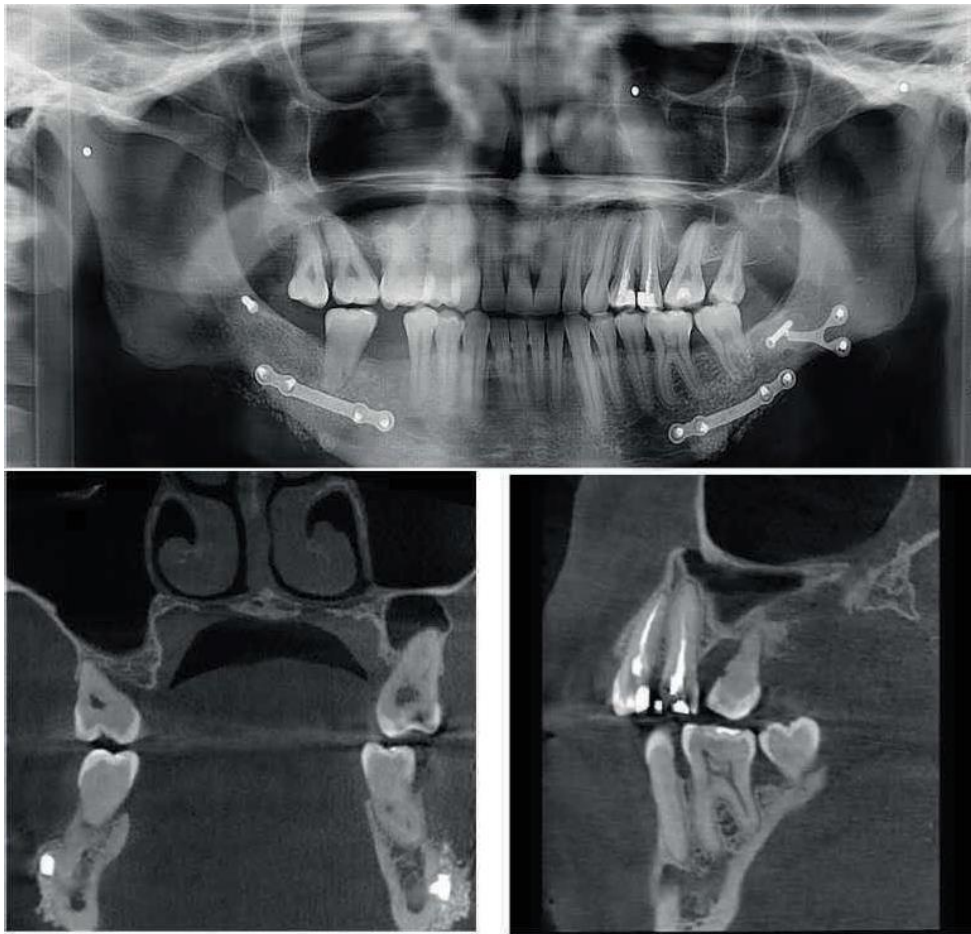
Table 7

Posture	1,2, 7, 12, 13, 14
Jaw-closing	3a, 3b, 4a, 4b, 5
Jaw-opening / protrusion	8, 9, 10
Retraction	3c, 8
Medio- /Laterotrraction	6, 3a, 4a
Sublingual bone position	8, 9,10,11,13
Function	7, 8, 9, 10, 11, 14
POSTURE, PRORACTOR, SUB-LINGUAL POSITION	

## Cybernetic system of the masticating organ



## Panoramic radiograph and cone-beam computerized tomography



### List of issues

- Dental arches on sagittal and transversal planes don't fit together;
- Absence of front restriction and canine guidance;
- Difficulties with speaking;
- Difficulties with chewing;
- Difficulties with esthetics.

### Diagnosis

- Arthrosis in the TMJ on both sides;
- Total ventral disc dislocation of the TMJ on both sides;

- Dental Class I. After orthodontic treatment;
- Occlusion: cusp to cusp in the frontal area.

Table 8

Load vector	Cranial/ventrocranial
Symptom	No pain and free movement restrictions
	Crepitation
Clinical diagnostics	No pain in TMJ even on activity
	Condyle palpation detects crepitation
	Crepitation increases during motionpalpation
Instrumental analysis	Condylography

Table 9

X-ray diagnostics	Panoramic radiograph, MRI
Treatment	Caudal relocation in the relaxed state, decompression

### **Treatment objectives**

- Remove tooth 18;
- Providing support in posterior area of teeth;
- Canine guidance and anterior restriction;
- Matching dental curves on sagittal and transversal planes;
- Change the occlusal plane and the angle of disocclusion.

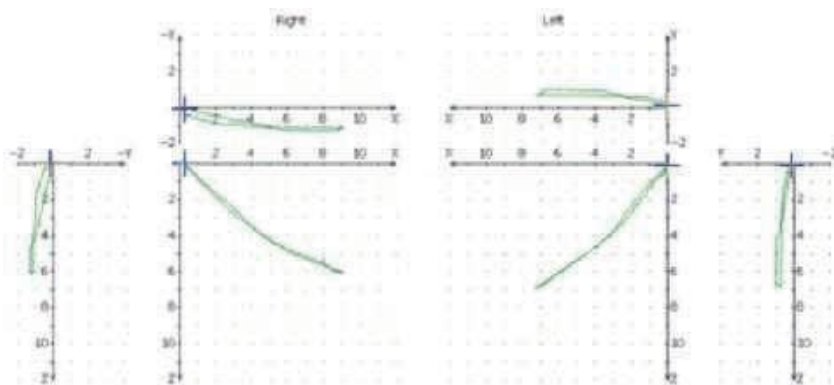
### **Treatment Plan**

1. Clinical instrumental and functional analysis;

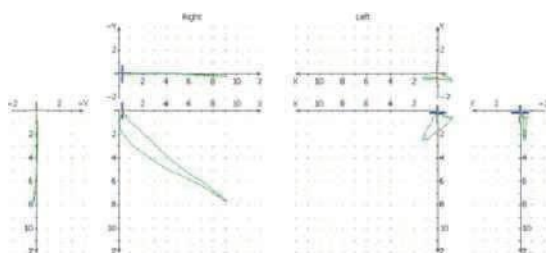
2. Splint therapy for decompression, relaxation, and distraction to place the condylar disc in a physiological position, and for remodulation of the condyle.
3. Remounting in the new therapeutic position.
4. Wax-up.
5. Long-term temporary crowns.
6. Additional condylography, cephalometric analysis, cone-beam CT, panoramic radiograph.
7. Final dental restorations.

## Initial condylography

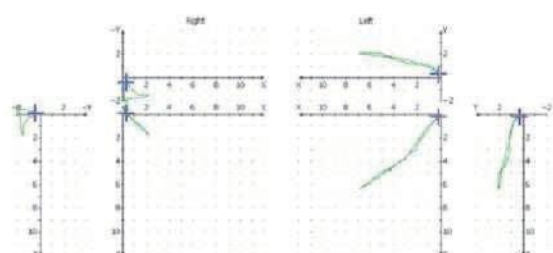
### Protrusion-retrusion



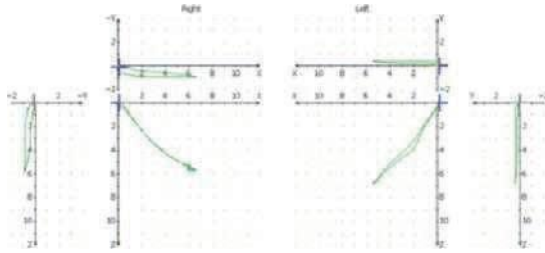
### Right mediotrusion



### Left mediotrusion

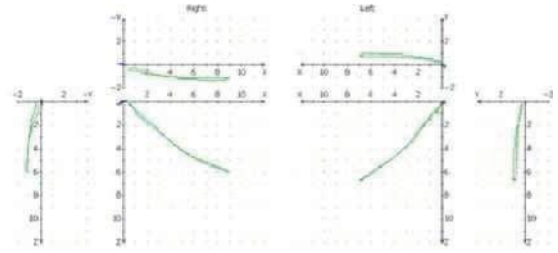


## Opening-closing



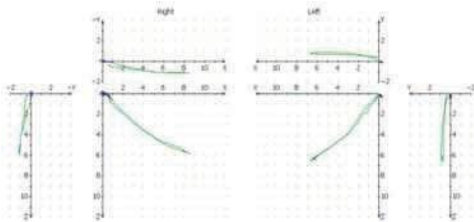
TMJ protrusion

## Bruxism



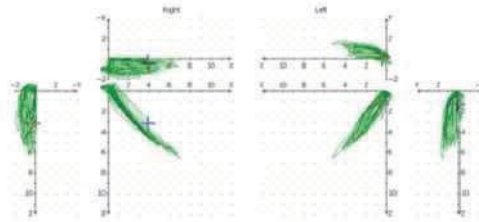
Redetrusion and compression in both TMJs

## Protrusion when speaking



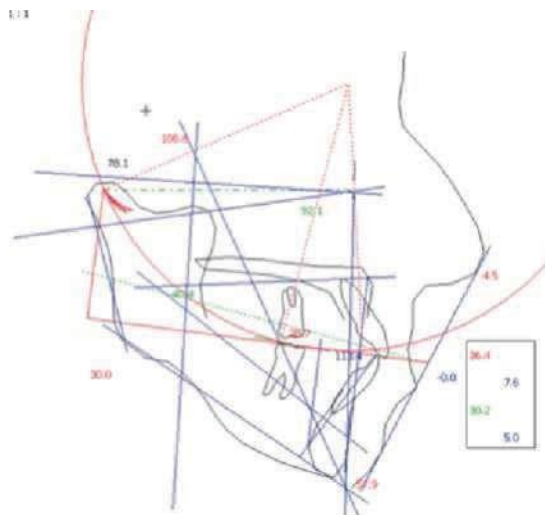
Speech in compression in both TMJ

## Mastication



Motion restrictions during mastication

# Cephalometric Analysis



## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial. The skeletal trend of the mandible is unknown Skeletal class is extremely II.

The maxilla is positioned extremely prognathic. The mandible is positioned extremely prognathic Lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is increased.

The inclination of the upper incisor is strongly increased. The protrusion of the lower incisor is increased.

The inclination of the lower incisor is normal. The interincisal angle is diminished.

Occlusal concept: Group function No functional statement available.

## Explanation

Table 10

Deteminants	Norm	Value	Trend
Facial Axis	90.0°	106.6	5B***>
Facial Depth	91.5°	92.1	
Facial Taper	68.0°	57.8	2D**
Mandibular Plane	21.5°	30.0	2D**
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	372.2	9-***>
Facial Length Ratio	63.5%	77.8	7+***>
Y Axis to S N	67.0°	40.9	8-***>
Y Axis (Downs)	61.8°	58.2	1-*
S N to Gonion Gnathion Angle	31.6°	12.2	5-***>

Table 11

## Analysis

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	106.6	5B***>
Facial Depth	91.5°	92.1	
Mandibular Plane	21.5°	30.0	2D**
Facial Taper	68.0°	57.8	2D**
Mandibular Arc	31.2°		
Maxillary Position	65.0°	109.7	17-***>
Convexity	-1.0 mm	4.4	2X**
Lower Facial Height (by R. Slavicek)	42.7°	40.4	
Lower Facial Height to Point D	49.2°	45.9	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	113.4	1-*
Upper Incisor Protrusion	4.3 mm	7.5	1+*
Upper Incisor Inclination	23.1°	36.3	2+***
Upper Incisor Vertical	mm	0.2	
Lower Incisor Protrusion	1.2 mm	4.9	1+*
Lower Incisor Inclination	24.1°	30.2	
Upper Molar Position	21.0 mm	28.7	3+***
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	7.4	
Idealized Occlusal Plane – Axis Orbital Plane	----°	15.8	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	37.4	
Radius of Curve of Spee	mm	78.1	
Lip Embrasure	0.0 mm	-0.6	
Occlusal Plane Xi Distance	-1.4 mm	-11.6	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	41.8	
Horizontal Condylar Inclination left	----°	48.8	
Horizontal Condylar Inclination	----°	45.3	
Relative Condylar Inclination	----°	37.8	
Relative Condylar Inclination 6	----°	33.7	
Relative Condylar Inclination 7	----°	36.2	
Relative Condylar Inclination 8	----°	45.3	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.9 mm	0.0	1+*



## Asymmetric case

SCI R = 42°

SCI L = 49°

OPI R = 6°

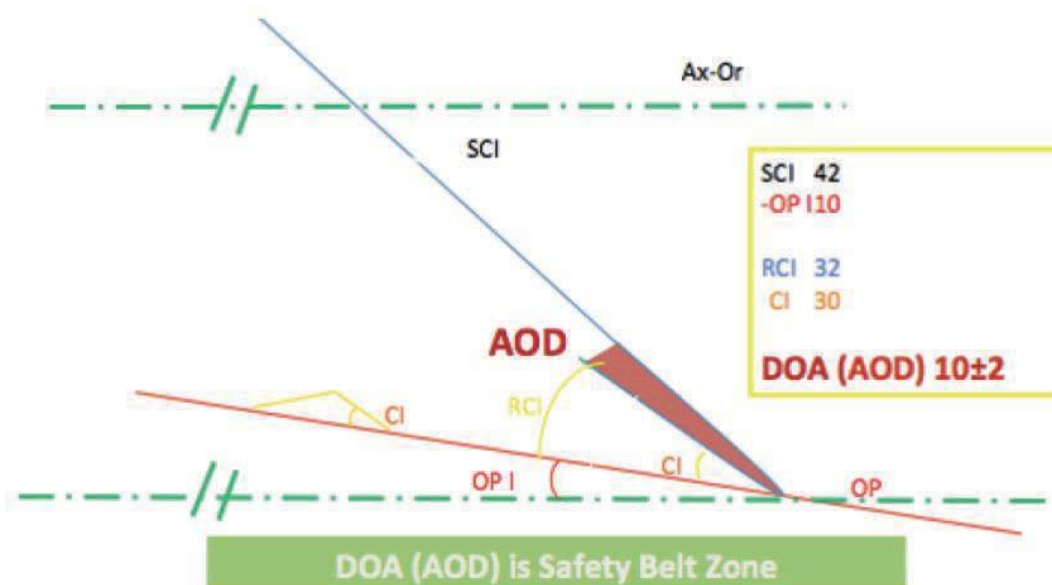
OPI L = 4°

DOA R = 6°

DOA L = 15°

Change OPI R to 2° Change OPI L to 8°

The occlusal plane changed for disocclusal angle correction.



## Casts in RP

No lateral support for teeth; No canine and front guidances; Tooth 18: no antagonist.

Attrition facets of stamp cusps; Absence of tooth 46;

Removing 15 on previous orthodontic treatment;

The patient refused repeated orthodontic treatment and orthodontic surgery.



## Functional settings

SCI R = 42° black insert;

SCI L = 48° black insert;

Bennet insert R = 2 °;

white insert Bennet insert L = 7 °;

yellow insert OPIR = 2 °;

OPIL = 8 °;

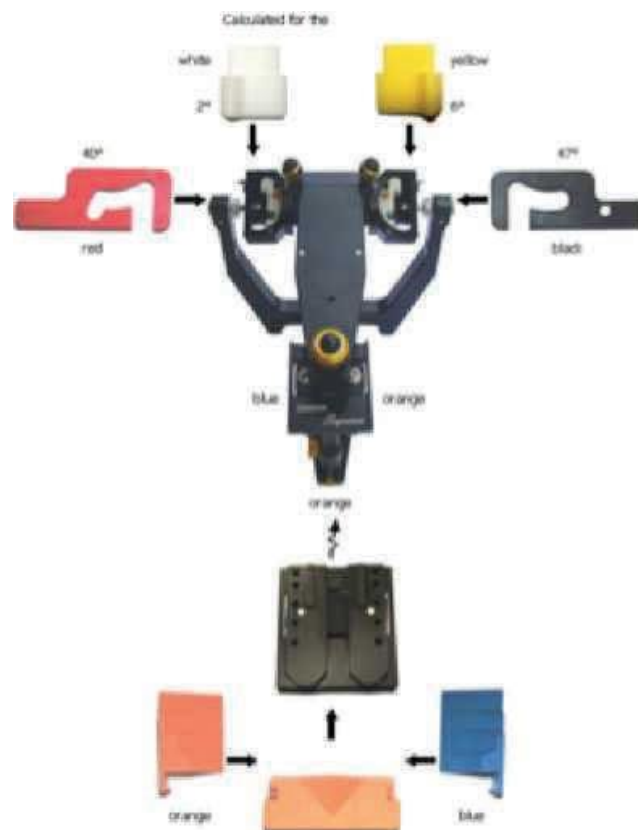
AG = 52 ° right side;

58 ° left side Dental class I.

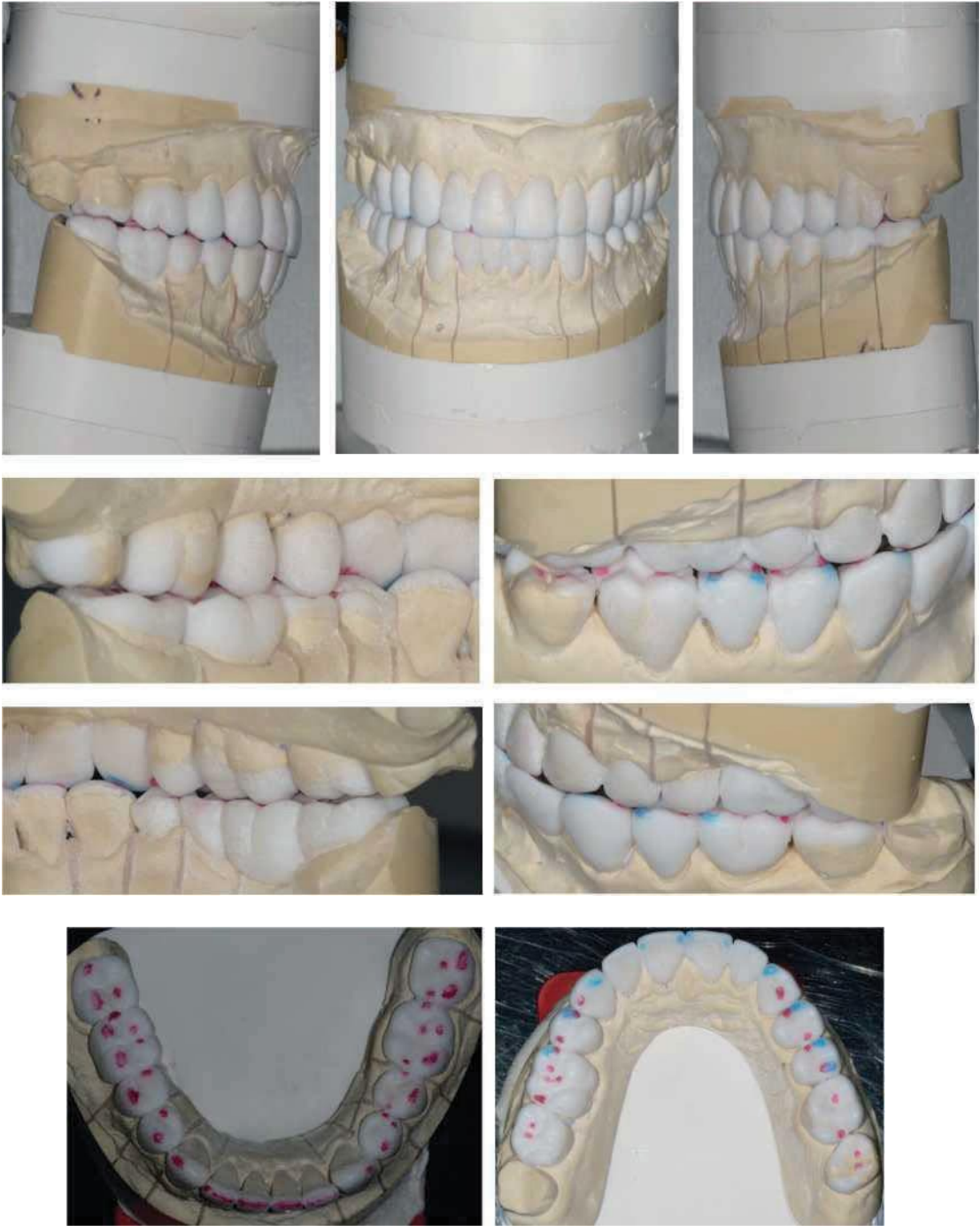
Increasing lower face height + 3 mm with an incisal pin.

The space between the central incisors was closed by maxillary teeth.

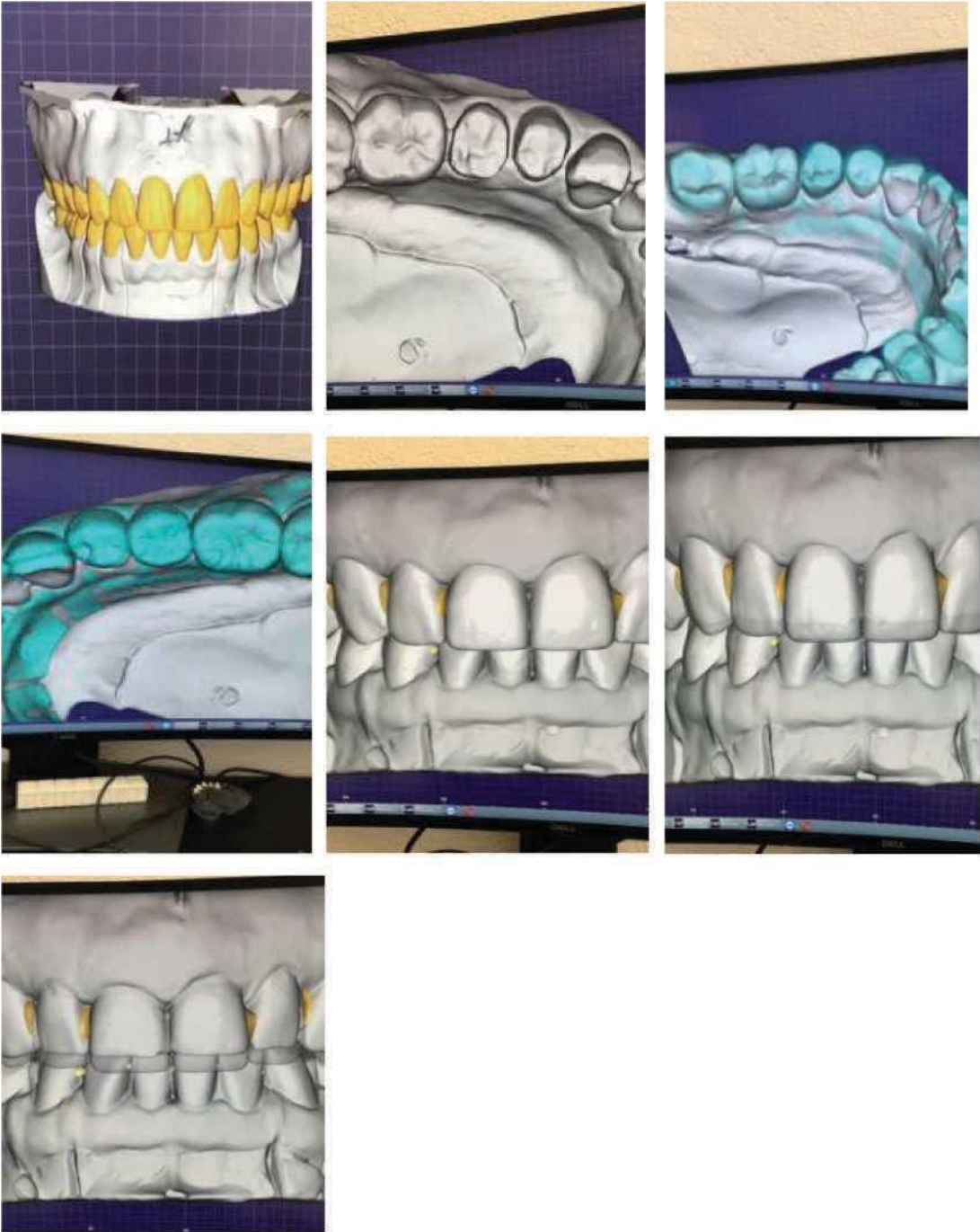
## Articulator Settings



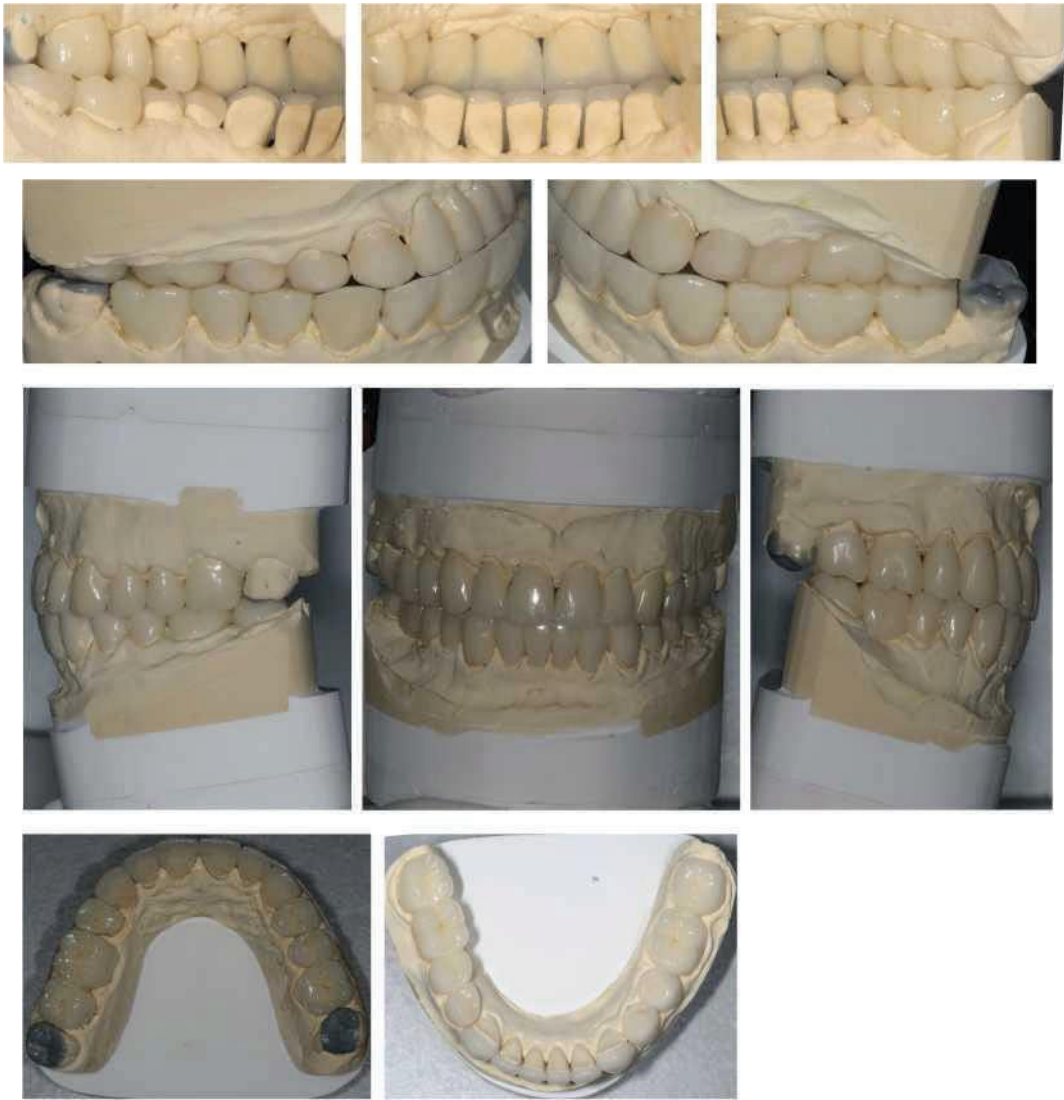
**Wax-up**



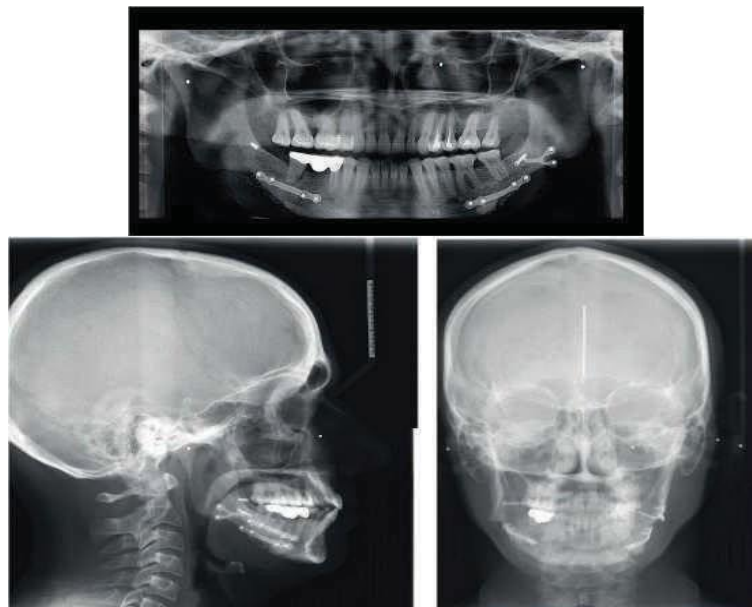
**Computer wax-up simulation**



## Long-term temporaries

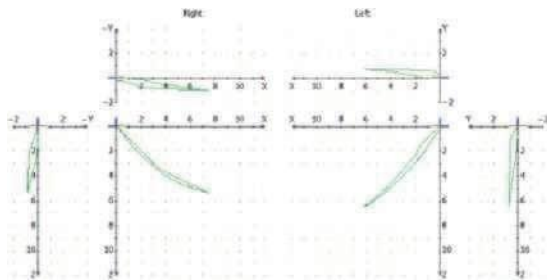


## Panoramic radiograph and cone-beam computerized tomography

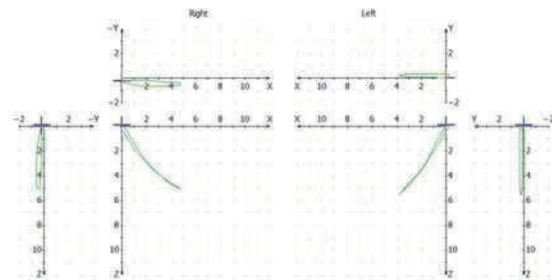


## Final restorations as of October, 2017, and the final condylography

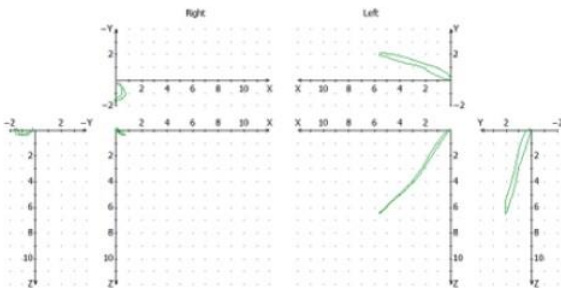
### Protrusion/retrusion



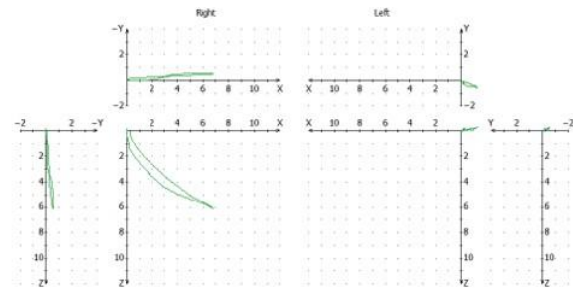
### Opening/closing



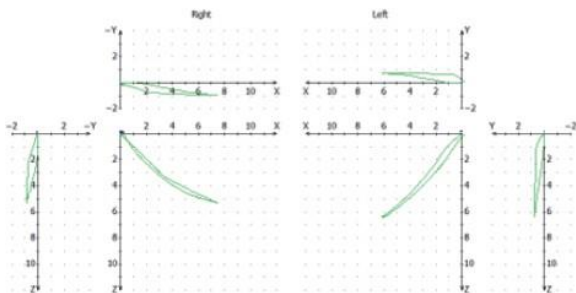
### Left mediotrusion



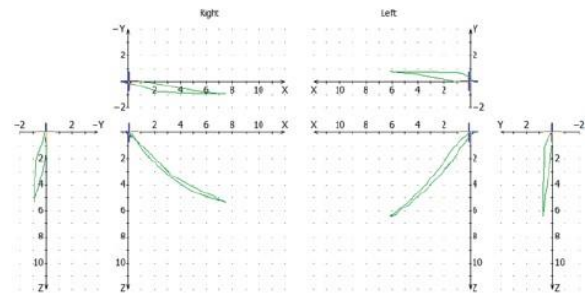
### Right mediotrusion



### Bruxism



### Speaking



## Analysis

### Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is extremely dolichofacial. Skeletal class is II with tends to I.

The maxilla is positioned prognathic.

The mandible is positioned neutral, with tendency to prognathic. The lower facial height is diminished.

Dental class unknown.

The protrusion of the upper incisor is normal.  
 The inclination of the upper incisor is strongly increased.

The protrusion of the lower incisor is increased.  
 The inclination of the lower incisor is normal.  
 The interincisal angle is diminished.  
 Occlusal concept: Group function.

## Explanation

Table 12

Deteminants	Norm	Value	Trend
Facial Axis	90.0°	91.9	
Facial Depth	91.5°	93.2	
Facial Taper	68.0°	62.5	1D*
Mandibular Plane	21.5°	24.1	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	372.2	
Facial Length Ratio	63.5%	58.1	2-***
Y Axis to S N	67.0°	65.5	
Y Axis (Downs)	61.8°	52.6	3-***
S N to Gonion Gnathion Angle	31.6°	37.3	1+*

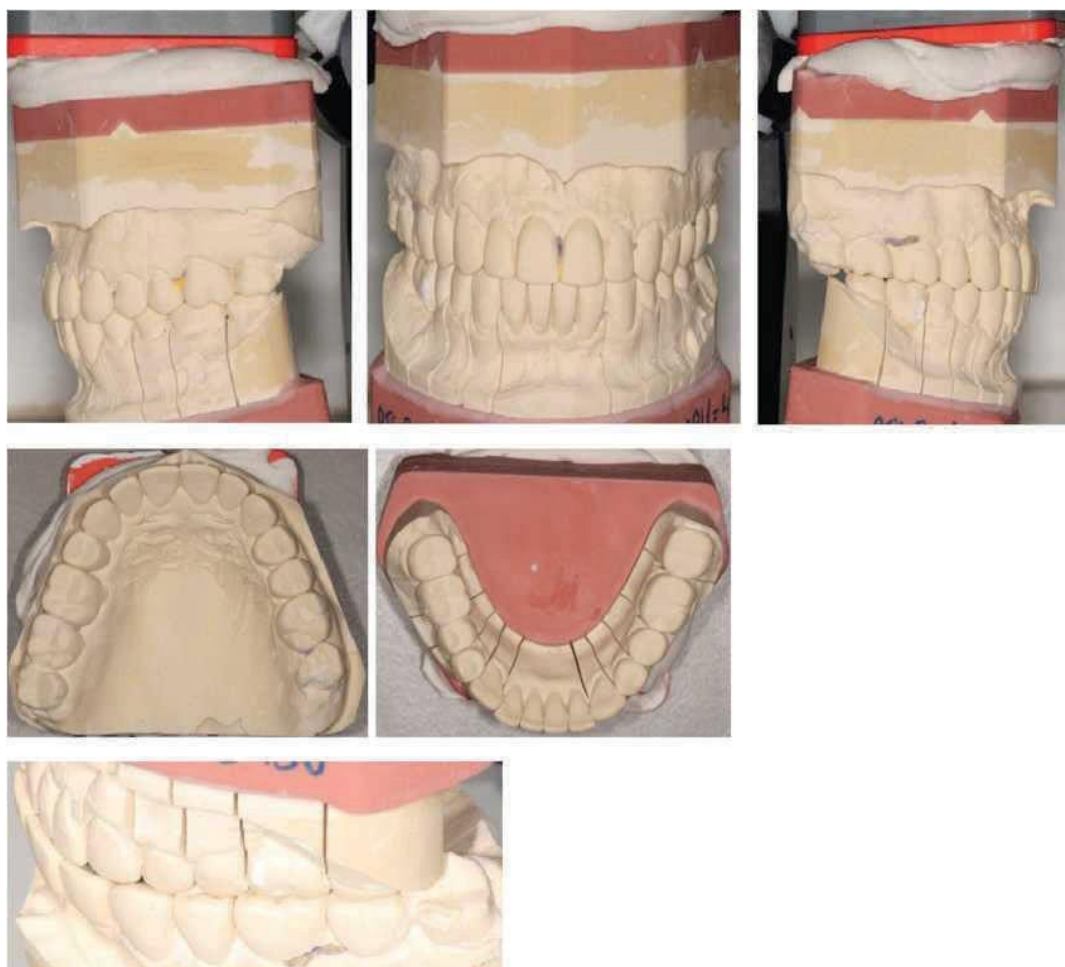
Table 13

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	91.9	
Facial Depth	91.5°	93.2	
Mandibular Plane	21.5°	24.1	
Facial Taper	68.0°	62.5	1D*
Mandibular Arc	31.2°	9.1	5D***>
Maxillary Position	65.0°	69.4	1-+*
Convexity	-1.0 mm	3.2	2X**
Lower Facial Height (by R. Slavicek)	42.6°	36.3	1-*
Lower Facial Height to Point D	50.3°	39.7	1-*
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	111.1	1-*
Upper Incisor Protrusion	4.3 mm	7.5	
Upper Incisor Inclination	23.1°	37.9	2+**
Upper Incisor Vertical	mm	0.2	
Lower Incisor Protrusion	1.2 mm	4.1	1+*
Lower Incisor Inclination	24.1°	30.8	
Upper Molar Position	21.0 mm	30.5	4+***>
Occlusal Plane	Norm	Value	Trend



Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	7.9	
Idealized Occlusal Plane – Axis Orbital Plane	----°	22.1	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	34.0	
Radius of Curve of Spee	mm	73.8	
Lip Embrasure	0.0 mm	0.1	
Occlusal Plane Xi Distance	-1.4 mm	-19.5	4-***>
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	44.9	
Horizontal Condylar Inclination left	----°	49.2	
Horizontal Condylar Inclination	----°	47.1	
Relative Condylar Inclination	----°	39.1	
Relative Condylar Inclination 6	----°	34.8	
Relative Condylar Inclination 7	----°	36.6	
Relative Condylar Inclination 8	----°		
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.9 mm	-1.1	

## Final RP result





## Final dental restoration



## Clinical case №5

Patient's birth date: 1949

Date of examination: 2009

Patient visited the medical center with complaints of mastication dysfunction and an esthetic defect. He was unable to bite in one position, had troubles with opening the mouth wide and posture problems.

Medical history included cardiovascular disease and high blood pressure. Muscles palpation detected activity of m.mylohyoideus, m.pterygoideus medialis on both sides and in the area of TMJ, lateral poles in rotation, lig.temporomanolibulare. These muscles are responsible for protrusion, interference avoidance mechanisms and temporomandibular joint location.

### Medical analysis

Table 1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		X
2.	Cardo-vascular systems ( <b>высокое давление</b> )		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern: нарушение функции жевания			

Table 2

Dental History Analysis					Valuation	Yes	No
1.	Do you have problems when you chew?				2	X	
2.	Do you have problems when you are talking?						X
3.	Do you have problems in closing your teeth property?				2	X	
4.	Are any of your teeth especially sensitive? <b>(45 improved masticatory performance)</b>				2	X	
5.	Do you have problem when you open your mouth very wide?				2	X	
6.	Do your jaw joints make noise and if so, on what side?						X
7.	Do you have pain in the area of your jaw joints?						X
8.	Do you suffer from headaches?						X
9.	Do you suffer from cramps or spasm in your head, neck or throat?						X
10.	Do you have in general problems with your posture?				1	X	
Occlusal Index					1.80		
11.	Have you ever had serious accident?						X
12.	Did you have one or more oral intubations?						X
13.	Have you ever had orthodontic treatment or ...						X
14.	Have you had a treatment with splint?						X
15.	Are you grinding or pressing with your teeth?					X	
16.	Do you think that treatment is necessary?						
17.	Do you think that there is a serious disorder or illness?						
18.	When the last time you had dental treatment and what was done?						
19.	How would you describe your psychic behavior?						
	happy	sad	calm	excited	self-controlled	lack of self-control	

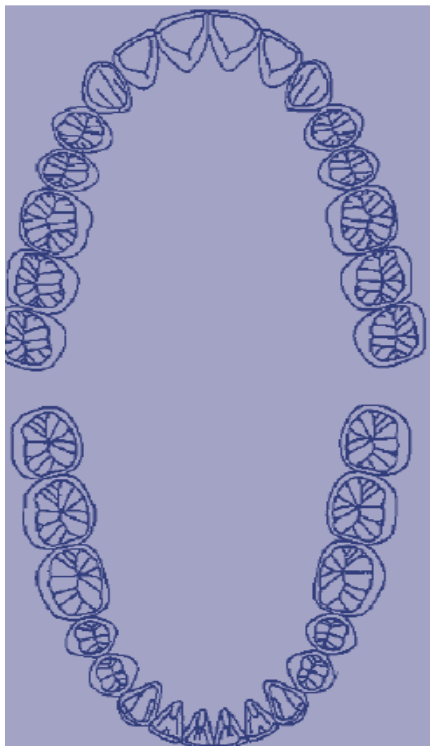
## Muscles palpation and chronic pain

Table 3

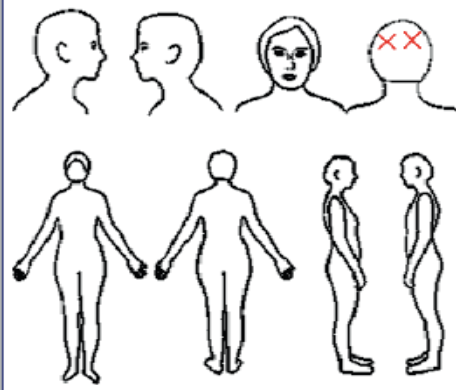
Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck			X	
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae				
6.	M.pterygoideus medialis	X		X	
7.	M.mylohyideus		X		X

8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation	X		X	
	c) Retral joint space				
	d) Lig.temporo-mandibulare			X	

tooth Status - Periodontal Status - Occlusalgram



Chronic pain

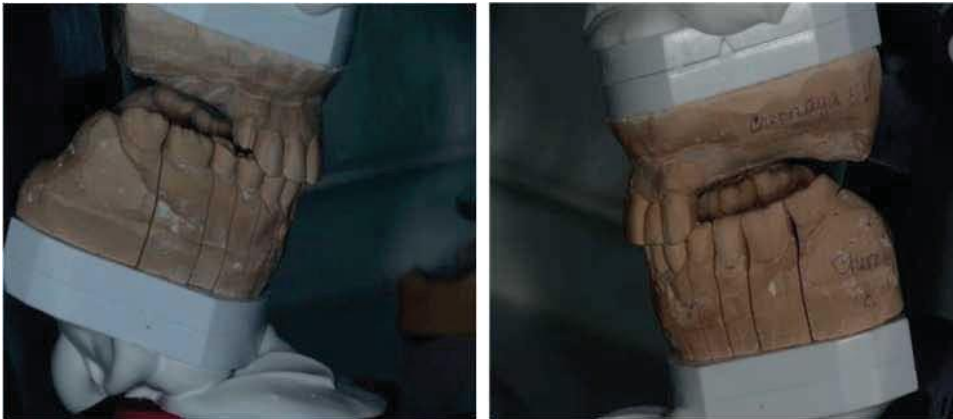


## Intraoral photographs

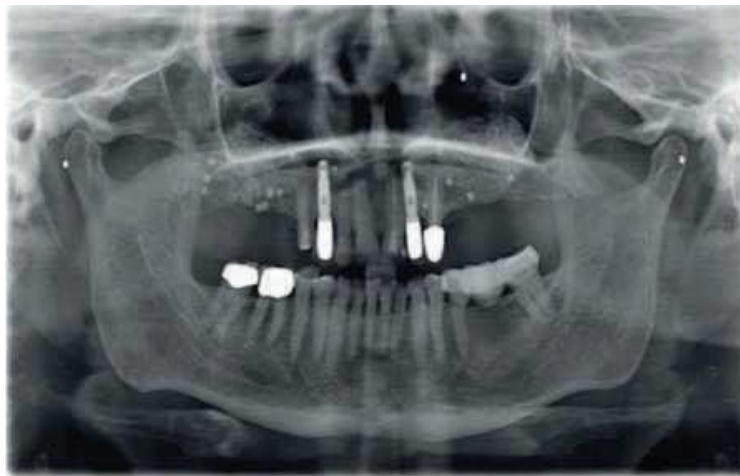


- Absence of support in the posterior teeth.
- Mandibular teeth over-crowding;
- Absence of reproducible centric occlusion;
- Wedge-shaped defect on the canines and premolars of the mandible.
- Emergence profile recession on the incisors and molars of the mandible;
- Absence of canine and anterior guidance.

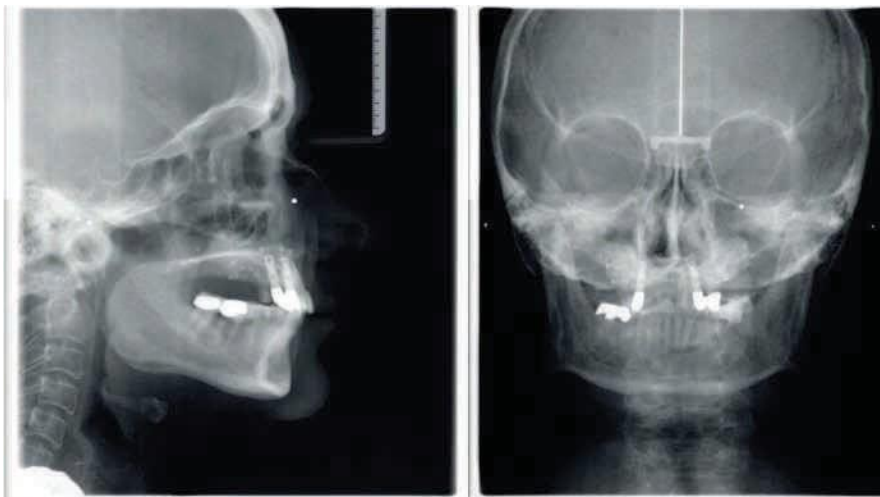
Casts mounted into in the articulator with kinematic axis in the centric relation



**Panoramic radiograph before dental implant placement**



**Lateral teleradiography**

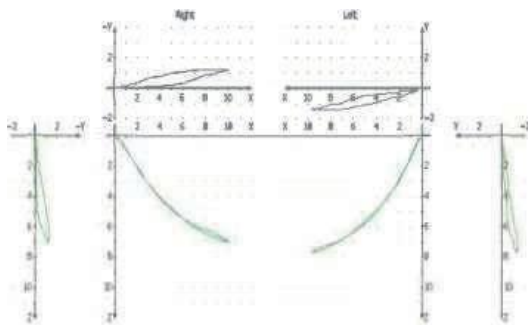


## List of issues

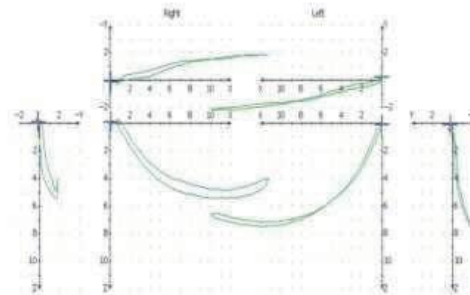
1. Maxillary and mandibular dental arches in sagittal and transversal planes don't fit together.
2. Absence of occlusal plane
3. Muscle pain.
4. Absence of teeth in the maxilla.

## Condylography

### Protrusion-retrusion



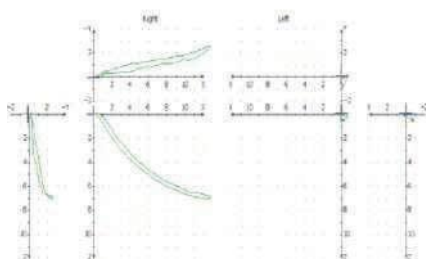
### Opening-closing



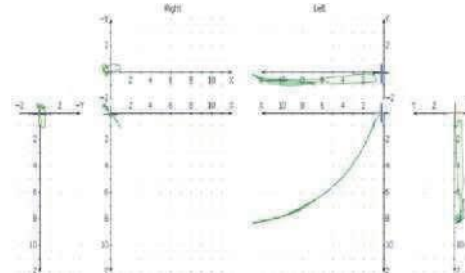
Shift to the right after 1 mm protrusion and deviation are due to muscle problems.

Shift to the left and the position of protrusion above retrusion are due to protractors activity.

### Right mediotrusion



### Left mediotrusion



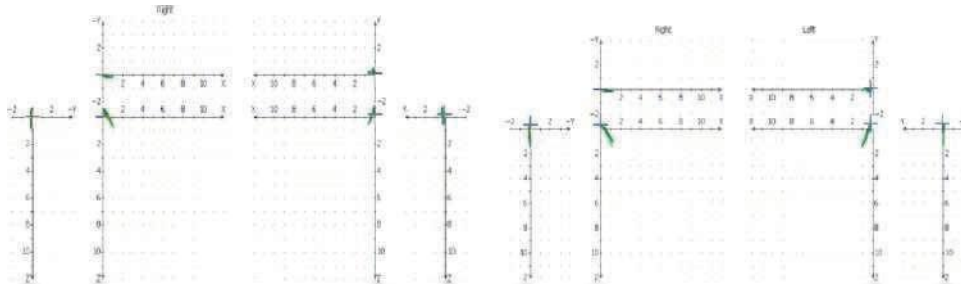
Negative Bennett angle, midline deviation of the disc.



# Condylography

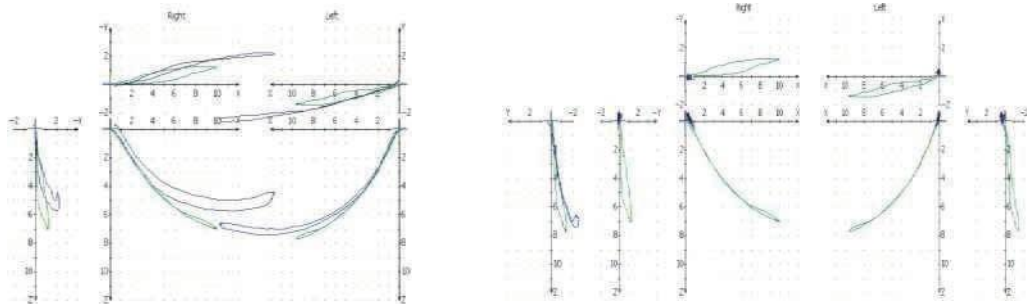
Bruxism

Speaking



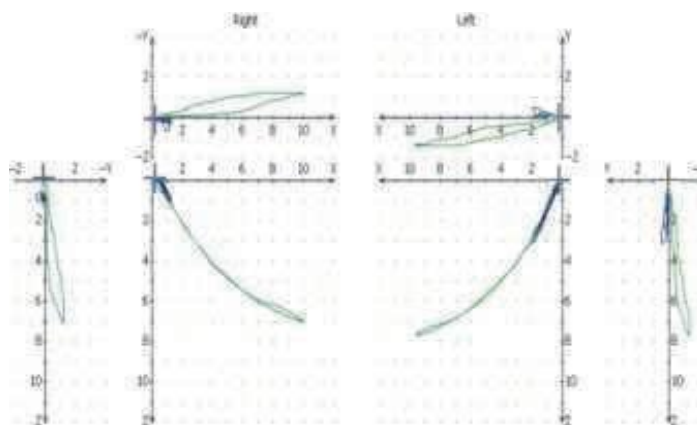
Protrusion – opening

Protrusion - bruxism



The mandible is cranially shifted at bruxism, implying compression in the temporomandibular joint.

Speaking



Speech on the protrusion path is a good situation.

According to condylography data: compression in both TMJ during bruxism, dental dam retractors activity and shift of the disc in left TMJ under left mediotrusion.

### **Cephalometric analysis**

Asymmetric case

SCI R = 44°;

SCI L = 51°;

OPI = 20° on both sides;

DOA R = -6°;

DOA L = 1°;

Change right general OPI = 8°;

OPI R = 4° (occlusal plane for the tooth 46);

OPI L = 10°;

left OPI6 = 10° (occlusal plane for the tooth 36);

DOA for both sides = 10°.

LFH (Lower face height) is normal. The maxilla is in a neutral position, the mandible is in retrognathic position with a tendency to neutral. We are planning to increase lower facial height by + 2 mm for creating occlusal contacts and increasing the incisor angle. Dental Class I.

Table 4

<b>Slavicek Analysis</b>			
<b>Skeletal Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Facial Axis	90.0°	94.6	1B*
Facial Depth	89.0°	85.4	1-*
Mandibular Plane	24.0°	24.9	
Facial Taper	68.0°	69.5	

Mandibular Arc	29.0°		
Maxillary Position	65.0°	63.0	
Convexity	0.0 mm	4.4	2X**
Lower Facial Height (by R. Slavicek)	44.1°	45.3	
Lower Facial Height to Point D	50.6°	49.1	
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	131.3°	116.3	1-*
Upper Incisor Protrusion	5.6 mm	5.5	
Upper Incisor Inclination	26.4°	29.0	
Upper Incisor Vertical	mm	-0.2	
Lower Incisor Protrusion	0.9 mm	2.7	1+*
Lower Incisor Inclination	22.3°	34.6	
Upper Molar Position	18.0 mm		
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	20.9	
Idealized Occlusal Plane – Axis Orbital Plane	----°	10.7	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	19.5	2-***
Radius of Curve of Spee	mm	121.7	
Lip Embrasure	0.0 mm	-0.4	
Occlusal Plane Xi Distance	-1.4 mm	11.1	3+****
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	44.3	
Horizontal Condylar Inclination left	----°	51.1	
Horizontal Condylar Inclination	----°	47.7	
Relative Condylar Inclination	----°	26.8	
Relative Condylar Inclination 6	----°	26.2	
Relative Condylar Inclination 7	----°	21.4	
Relative Condylar Inclination 8	----°	47.7	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.3 mm	-3.1	

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is unknown.

The skeletal trend of the mandible is extremely dolichofacial Skeletal class is II with tends to I.

The maxilla is positioned neutral.

The mandible is positioned retrognathic, with tendency to neutral. Lower facial height is normal.

Dental class unknown.

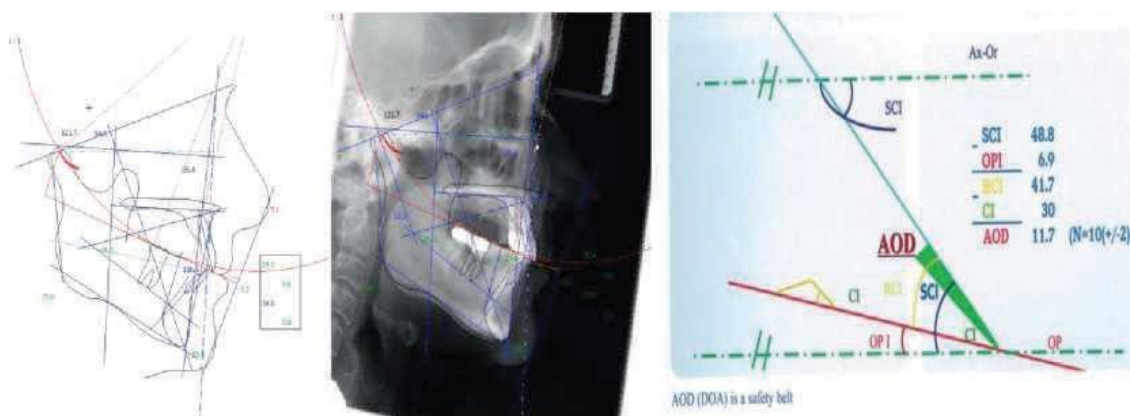
The protrusion of the upper incisor is normal The inclination of the upper incisor is normal The protrusion of the lower incisor is normal The inclination of the lower incisor is increased The interincisal angle is diminished.

Occlusal concept: Unknown (data missing) No functional statement available.

## Explanation

Table 5

Deteminants	Norm	Value	Trend
Facial Axis	90.0°	94.6	1B*
Facial Depth	89.5°	85.4	1-*
Facial Taper	68.0°	69.5	
Mandibular Plane	24.0°	24.9	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	392.0	1-*
Facial Length Ratio	63.5%	65.8	1+*
Y Axis to S N	67.0°	71.1	1+*
Y Axis (Downs)	61.2°	61.1	
S N to Gonion Gnathion Angle	32.6°	32.0	



# Cephalometric analysis and calculation of the disocclusal angle

Table 5

Incisal Pin Table													
Incisal Pin Height	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
Lower Facial Height	45.3	45.8	46.2	46.6	47.0	47.4	47.8	48.6	49.4	50.1	50.8	51.5	52.9
LFH (Norm)	44.1	44.2	44.3	44.4	44.5	44.6	44.8	45.0	45.2	45.4	45.6	45.9	46.3
LFH (Variation)	-0.0	0.4	0.9	1.3	1.7	2.1	2.5	3.3	4.0	4.8	5.4	6.1	7.4
Menton Vertical	0.0	0.5	0.9	1.4	1.8	2.2	2.6	3.4	4.2	4.9	5.6	6.3	7.6
Pogorion Sagittal	0.0	-0.7	-1.5	-2.3	-3.0	-3.8	-4.5	-6.1	-7.6	-9.2	-10.8	-12.4	-15.5
Incision Inf. Vertical	0.0	0.6	1.1	1.7	2.2	2.7	3.3	4.3	5.3	6.2	7.2	8.1	9.8
Incision Inf. Sagittal	0.0	-0.5	-1.1	-1.6	-2.2	-2.7	-3.3	-4.5	-5.6	-6.8	-8.1	-9.3	-11.8
Incisal Pin Height		-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-8.0	-10.0	-12.0	-14.0	-16.0	-20.0
Lower Facial Height	45.3	44.9	44.4	43.9	43.5	43.0	42.5	41.4	40.3	39.1	37.9	36.6	33.8
LFH (Norm)	44.1	44.0	43.8	43.7	43.6	43.5	43.4	43.2	42.9	42.7	42.4	42.2	41.7
LFH (Variation)	-0.0	-0.5	-0.9	-1.4	-1.9	-2.4	-2.9	-3.9	-5.0	-6.2	-7.4	-8.7	-11.5
Menton Vertical	0.0	-0.5	-1.0	-1.4	-1.9	-2.5	-3.0	-4.1	-5.2	-6.4	-7.7	-9.0	-11.8
Pogorion Sagittal	0.0	0.7	1.5	2.2	2.9	3.7	4.4	5.8	7.1	8.5	9.8	11.0	13.4
Incision Inf. Vertical	0.0	-0.6	-1.2	-1.8	-2.4	-3.0	-3.6	-4.9	-6.2	-7.6	-9.0	-10.5	-13.7
Incision Inf. Sagittal	0.0	0.5	1.0	1.6	2.1	2.5	3.0	4.0	4.8	5.7	6.5	7.2	8.4

## Increased occlusal vertical dimension

Dental Class I Muscle tension Loose ligaments.

## Visualization of the treatment plan

Lower facial height will be increased by + 2 mm with an incisal pin. The occlusal plane adjusts for 36 to 6.5°

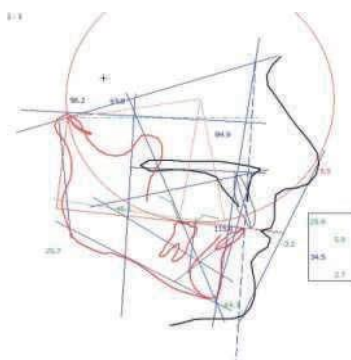


Table 6

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	93.8	1B*
Facial Depth	89.0°	84.9	1-*
Mandibular Plane	24.0°	26.7	
Facial Taper	68.0°	69.3	
Mandibular Arc	29.0°		
Maxillary Position	65.0°	63.0	
Convexity	0.0 mm	5.5	2X**
Lower Facial Height (by R. Slavicek)	44.4°	46.1	
Lower Facial Height to Point D	50.9°	49.9	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	131.3°	115.5	1-*
Upper Incisor Protrusion	5.6 mm	5.8	
Upper Incisor Inclination	26.4°	29.9	
Upper Incisor Vertical	mm	-0.5	
Lower Incisor Protrusion	0.9 mm	2.6	
Lower Incisor Inclination	22.3°	34.5	1+*
Upper Molar Position	18.0 mm		
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	6.6	
Idealized Occlusal Plane – Axis Orbital Plane	----°	10.5	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	41.3	
Radius of Curve of Spee	mm	56.1	
Lip Embrasure	0.0 mm	0.2	
Occlusal Plane Xi Distance	-1.4 mm	-4.2	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	44.3	

Horizontal Condylar Inclination left	----°	51.1	
Horizontal Condylar Inclination	----°	47.7	
Relative Condylar Inclination	----°	41.1	
Relative Condylar Inclination 6	----°	25.5	
Relative Condylar Inclination 7	----°	20.7	
Relative Condylar Inclination 8	----°	47.7	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.3 mm	-3.1	

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is unknown.

The skeletal trend of the mandible is extremely dolichofacial Skeletal class is II.

The maxilla is positioned neutral. The mandible is positioned retrognathic Lower facial height is normal. Dental class unknown.

The protrusion of the upper incisor is normal. The inclination of the upper incisor is normal. The protrusion of the lower incisor is normal. The inclination of the lower incisor is increased. The interincisal angle is diminished.

Occlusal concept: Unknown (data missing). No functional statement available.

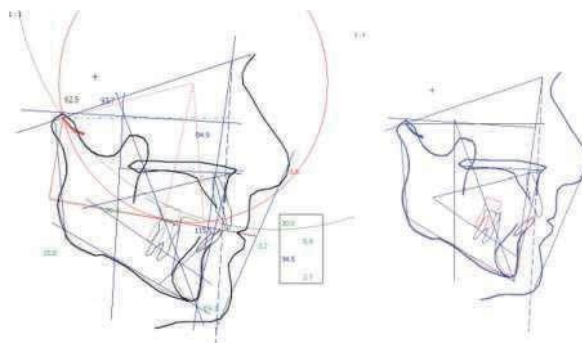
## Explanation

Table 7

Determinants	Norm	Value	Trend
Facial Axis	90.0°	93.8	1B*
Facial Depth	89.5°	84.9	1-*
Facial Taper	68.0°	69.3	
Mandibular Plane	24.0°	25.7	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	392.0	1-*
Facial Length Ratio	63.5%	65.4	
Y Axis to S N	67.0°	71.7	1+*
Y Axis (Downs)	61.2°	61.7	
S N to Gonion Gnathion Angle	32.6°	32.8	

## VTO on the right (Visualization of the treatment plan)

Lower facial height will be increased by + 2 mm with an incisal pin. The occlusal plane on the left =10°



After the splint therapy and osteopathic manipulative treatment, palpation of joints was repeated and the centric relation was changed. Results of the performed condylography and cephalometric evaluation and dental wax-up were submitted to the dental technical laboratory.

Table 8

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	93.7	1B*
Facial Depth	89.0°	84.8	1-*
Mandibular Plane	24.0°	26.8	
Facial Taper	68.0°	69.2	
Mandibular Arc	29.0°		
Maxillary Position	65.0°	63.0	
Convexity	0.0 mm	5.5	2X**
Lower Facial Height (by R. Slavicek)	44.4°	46.2	
Lower Facial Height to Point D	50.9°	50.0	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	131.3°	115.5	1-*
Upper Incisor Protrusion	5.6 mm	5.9	
Upper Incisor Inclination	26.4°	30.0	
Upper Incisor Vertical	mm	-0.8	
Lower Incisor Protrusion	0.9 mm	2.6	
Lower Incisor Inclination	22.3°	34.4	1+*
Upper Molar Position	18.0 mm		
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	10.0	
Idealized Occlusal Plane – Axis Orbital Plane	----°	10.5	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	36.7	



Radius of Curve of Spee	mm	62.5	
Lip Embrasure	0.0 mm	-0.2	
Occlusal Plane Xi Distance	-1.4 mm	-0.8	
<b>Functional Measurement</b>		<b>Norm</b>	<b>Value</b>
Horizontal Condylar Inclination right	----°	44.3	
Horizontal Condylar Inclination left	----°	51.1	
Horizontal Condylar Inclination	----°	47.7	
Relative Condylar Inclination	----°	37.7	
Relative Condylar Inclination 6	----°	25.4	
Relative Condylar Inclination 7	----°	20.6	
Relative Condylar Inclination 8	----°	47.7	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>		<b>Norm</b>	<b>Value</b>
Esthetic Plane	-2.3 mm	-3.1	

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is unknown.

The skeletal trend of the mandible is extremely dolichofacial Skeletal class is II.

The maxilla is positioned neutral.

The mandible is positioned retrognathic Lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal. The inclination of the upper incisor is normal. The protrusion of the lower incisor is normal.

The inclination of the lower incisor is increased. The interincisal angle is diminished

Occlusal concept: Unknown (data missing). No functional statement available.

## Explanation

Deteminants	Norm	Value	Trend
Facial Axis	90.0°	93.7	1B*
Facial Depth	89.5°	84.	1-*
Facial Taper	68.0°	69.2	
Mandibular Plane	24.0°	25.8	
Related Values	Norm	Value	Trend

Bjoerk Sum	396.0°	392.9	1-*
Facial Length Ratio	63.5%	65.3	
Y Axis to S N	67.0°	71.8	1+*
Y Axis (Downs)	61.2°	61.8	
S N to Gonion Gnathion Angle	32.6°	32.9	

## Technical Assignment for Wax-up

- Incisal pin = +2 mm.
- Occlusal plane = 6.5° on the right and =10° on the left.
- Occlusal plane OPI 36 = 10°, OPI46 = 4°.
- In the anterior dental group, when the vertical dimension of occlusion is increased we are filling the GAP by increasing the palatal surface of the crowns in the central incisor of the maxilla.
- Asymmetric case SCI R44 ° (blue insert), SCI L = 51 ° (black insert).
- Right Bennett angle = 14° degrees (white insert), left - 0° (white insert).
- Dental Class I.

## Articulator settings



## Treatment Plan

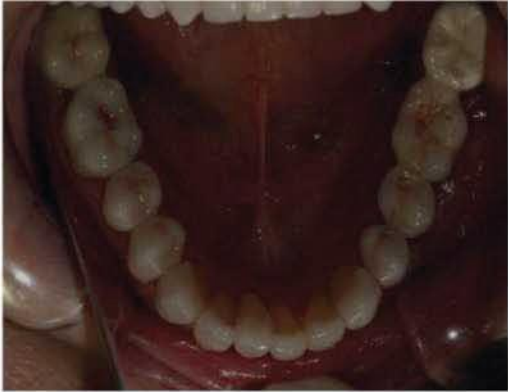
1. Splint therapy and osteopathic manipulative treatment.
2. Repeated joint palpation and centric relation.
3. Wax-UP.
4. Long-term temporary crowns in the centric relation.
5. Surgical correction of the emergence profile correction of the gingiva in 4 weeks after setting the abutments.
6. After casting wax, 21 and 24 are created.
7. Tooth preparation for long-term temporary crowns.
8. Long-term temporary crowns.
9. Definitive impressions for the final restorations.
10. Producing the restorations.

## Remounting of the models after splint therapy and a casting wax





**Final dental restorations**



## **Clinical case №6**

Patient's birth date: 1976

Date of examination: 08/09/2010

The patient applied to the medical center with complaints of poor esthetic and masticatory performance.

Physical examination revealed:

- There is a defect observed in the maxilla and mandible because of the lack of support in the posterior area;
- The central lines mismatch;
- Deep overbite;
- Chipping of the ceramic veneer of porcelain jacket crown on the tooth 24.



The patient's dental history was investigated. General medical analysis did not reveal any diseases.

## Enlargement X-ray



## Panoramic Radiography



**Thus, dental history and physical examination revealed the following problems:**

- Lack of support in the posterior areas of the maxilla and mandible;
- Difficulties with chewing;
- Midline shifted;
- Esthetic problems;
- Deep overbite;

## Treatment Plan

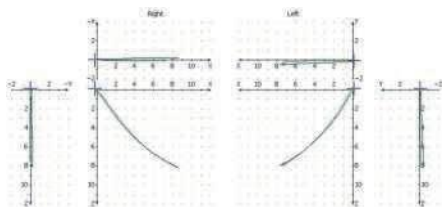
1. Getting the impressions to produce a post and core on 36, 35, 37, 45, 47.
2. Condylography.



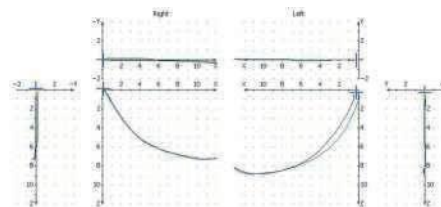
3. Mounting the maxilla casts according to the individual mandibular axis.
4. Cephalometric analysis.
5. Determining the centric relation.
6. Mounting the mandible model in the articulator.
7. Removal of the tooth 24.
8. Crowns for 14, 13, 12, 11, 21, 22, 34, 35, 36, 37, 32, 31, 41, 42, 43, 44, 45, 47.
9. Crowns for custom abutments 17-16-15, 25-26-27, 33, 46.
10. Long-term temporary crowns for teeth 23-24 and an implant for tooth 23.
11. Manufacturing final restorations.

### Condylography after splint therapy

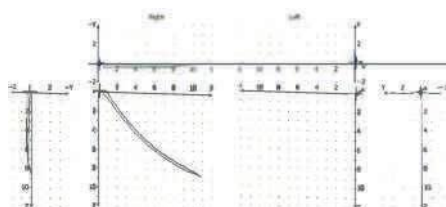
Protrusion



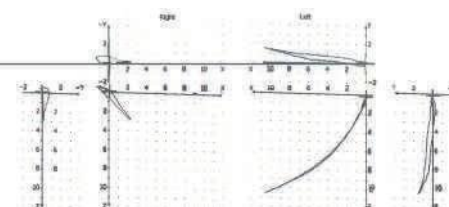
Opening/closing



Right mediotrusion



Left mediotrusion

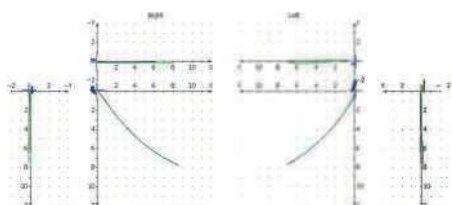


There is a negative Bennett angle in the right mediotrusion implying there is a pattern of avoiding an obstacle either in the joint structure or in the occlusion area. For the following analysis the cast models and MRI analysis of the TMJ will be used.

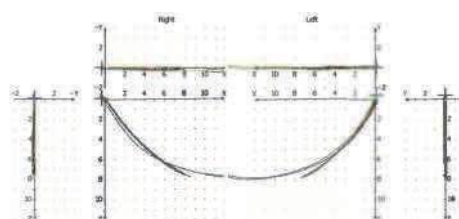
Also, the retrusion is noted in the left joint.

When left mediotrusion occurs, a protrusive component in the right joint is noted.

Bruxism- opening- closing

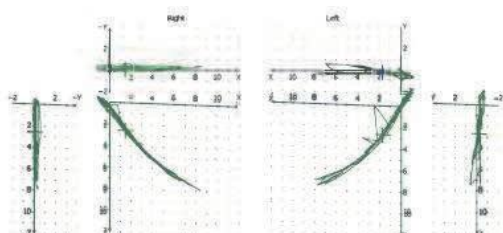


Overlay plots opening/closing  
-protrusion-retroversion

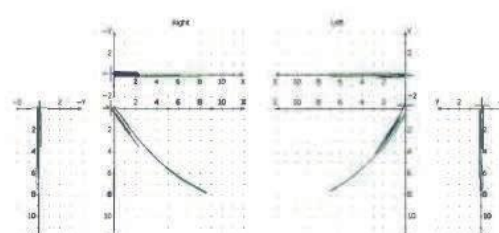


At bruxism, the mandible moves posteriorly and cranially, causing compression of the bilaminar zone which results in pain in the TMJ.

Unobstructed movement

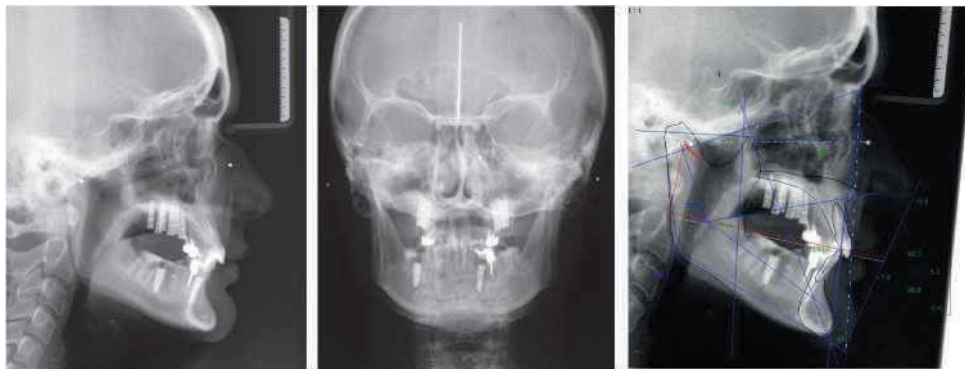


Speaking – protrusion



There is a compression in the left TMJ and distraction in right TMJ when speaking. It is the result of the absence in the posterior areas.

## Teleradiography (TRG) in frontal and lateral projection



### Cephalometric Analysis

#### Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is brachyfacial Skeletal class is I. The maxilla is positioned strongly prognathic.

The mandible is positioned stark prognathic. The lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal. The inclination of the upper incisor is normal. The protrusion of the lower incisor is normal. The inclination of the lower incisor is normal. The interincisal angle is normal

Occlusal concept: Unknown (data missing). No functional statement available.

### Explanation

Table 1

Determinants	Norm	Value	Trend
Facial Axis	90.0°	91.8	
Facial Depth	89.0°	86.1	
Facial Taper	68.0°	65.7	

Mandibular Plane	24.0°	28.0	1D*
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	383.2	5-***
Facial Length Ratio	63.5%	72.6	4+***
Y Axis to S N	67.0°	61.2	1-*
Y Axis (Downs)	61.2°	64.3	1+*
S N to Gonion Gnathion Angle	32.6°	23.2	2-**

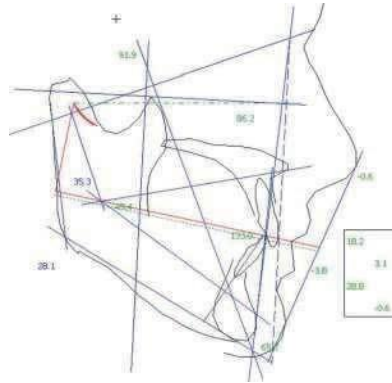


Table 2

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	91.7	
Facial Depth	89.0°	90.1	
Mandibular Plane	24.0°	22.8	
Facial Taper	68.0°	66.9	
Mandibular Arc	29.0°	48.3	4B***>
Maxillary Position	65.0°	69.0	1+*
Convexity	0.0 mm	-0.4	
Lower Facial Height (by R. Slavicek)	44.2°	44.8	
Lower Facial Height to Point D	50.7°	48.9	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	131.5	
Upper Incisor Protrusion	4.3 mm	3.8	
Upper Incisor Inclination	23.1°	18.4	
Upper Incisor Vertical	mm	3.6	
Lower Incisor Protrusion	1.2 mm	-0.6	
Lower Incisor Inclination	24.1°	30.0	
Upper Molar Position	18.0 mm		
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	12.8	
Idealized Occlusal Plane – Axis Orbital Plane	----°	12.0	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	30.8	1-*
Radius of Curve of Spee	mm	82.7	
Lip Embrasure	0.0 mm	1.4	
Occlusal Plane Xi Distance	-1.4 mm	2.5	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	51.7	
Horizontal Condylar Inclination left	----°	55.1	
Horizontal Condylar Inclination	----°	53.5	

Relative Condylar Inclination	----°	40.5	
Relative Condylar Inclination 6	----°	24.5	
Relative Condylar Inclination 7	----°	53.4	
Relative Condylar Inclination 8	----°	53.4	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.3 mm	-4.7	1-*

Lower face height is normal. The occlusal plane =16°. The lip seal line corresponds to the central incisor point.

The structural point for tracing the distal slope of 46 and 36 was determined by OPI.

Table 3

Incisal Pin Table													
Incisal Pin Height	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
Lower Facial Height	45.4	45.8	46.2	46.6	47.1	47.5	48.6	49.1	49.4	50.1	50.8	51.5	52.9
LFH (Norm)	45.2	45.3	45.4	45.5	45.6	45.7	45.8	46.0	46.2	46.4	46.6	46.8	47.2
LFH (Variation)	0.0	0.4	0.9	1.3	1.7	2.1	2.5	3.3	4.0	4.8	5.5	6.2	7.5
Menton Vertical	0.0	0.4	0.9	1.3	1.7	2.1	2.5	3.2	4.0	4.6	5.3	5.9	7.1
Pogorion Sagittal	0.0	-0.8	-1.6	-2.3	-3.1	-3.9	-4.7	-6.3	-7.9	-9.5	-11.1	-12.8	-16.0
Incision Inf. Vertical	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.9	4.8	5.6	6.5	7.3	8.8
Incision Inf. Sagittal	0.0	-0.5	-1.1	-1.6	-2.2	-2.8	-3.3	-4.5	-5.7	-6.8	-8.1	-9.3	-11.8
Incisal Pin Height	0.0	-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-8.0	-10.0	-12.0	-14.0	-16.0	-20.0
Lower Facial Height	45.4	44.9	44.5	44.0	43.5	43.0	42.5	41.5	40.5	39.4	38.2	37.0	34.4
LFH (Norm)	45.2	45.1	45.0	44.9	44.8	44.7	44.6	44.4	44.2	44.0	43.8	43.6	43.1
LFH (Variation)	0.0	-0.4	-0.9	-1.4	-1.8	-2.3	-2.8	-3.8	-4.9	-6.0	-7.1	-8.3	-10.9

Menton Vertical	0.0	-0.4	-0.9	-1.4	-1.9	-2.3	-2.9	-3.9	-5.0	-6.1	-7.3	-8.6	-11.3
Pogorion Sagittal	0.0	0.8	1.5	2.3	3.0	3.8	4.5	6.0	7.4	8.8	10.2	11.5	14.0
Incision Inf. Vertical	0.0	-0.5	-1.1	-1.6	-2.1	-2.7	-3.3	-4.4	-5.7	-6.9	-8.2	-9.6	-12.5
Incision Inf. Sagittal	0.0	0.5	1.1	1.6	2.1	2.6	3.0	4.0	4.9	5.7	6.5	7.3	8.6

## Articulator settings for the custom incisal table

Condylography values used for calculation.

Protrusion at 5 mm: SCI 54,0°.

Mediotrusion right at 5 mm: SCI 49,8° TCI 2,2°.

Mediotrusion left at 5 mm: SCI 58,9° TCI 9,5°.

L for incisal table setting: Sequential disocclusion according to R.S.

Computed using ideal anterior guidance to compute the right curve of Spee - cusps 3r, 6dr must be in.

e to compute the left curve of Spee - cusps 3l, 6dl must be in.

ailed to compute incisor table setting for ideal positions.

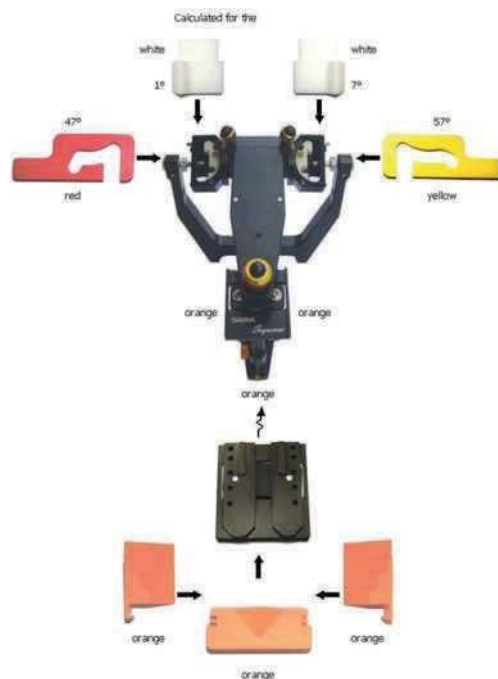


Table 4

Calculated vertical cusp tip positions								
	Right				Left			
	TA	I-Table	T-S1	T-S2	TA	I-Table	T-S1	T-S2
1	55.4°	55°	42°	64°	55.4°	55°	42°	64°
2								
3	45.4°	61°			45.4°	61°		
4								
5								
6m								
6d								
7m								
7d								
8m								
8d								

### Occlusal Plane Value

Unable to compute the right curve of Spee - cusps 3r, 6dr must be in.

Unable to compute the left curve of Spee - cusps 3l, 6dl must be in.

**Occlusal plane adjustment for average SCI value: 54° (5 min)**

Table 5

Cuspal Angle	20°	25°	30°
Balanced Occlusion 1/6	34°	29°	24°
Balanced Occlusion 1/7	43°	38°	33°
Canine protected Occlusion 1/6	25°	20°	15°
Canine protected Occlusion 1/7	34°	29°	24°

After carrying out the splint therapy and determining the centric relation of the jaws, the casts were remounted in the articulator. Instead of the red insert, we used the white one without the retrusion component and made a prosthetic appliance in the new therapeutic position. We determined the location of the stamp cusps in the mandible according to Weber template and calculation of guidance of each tooth. Lower face height, interincisal angle and OPI are normal. In other words, we determined the centric relation of jaws with the splint.

Type of splints: myopathic (relaxational) OPI R= 13

OPI L= 15;

CuIRL = 28-30.

Table 6

### Sagittal Condylar Guidance Reference® SL

Inlay	Right			Left		
	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm
Straight	51°	52°	48°	62°	59°	52°
Convex	*45°	*48°	*51°	*56°	*56°	*55°
Retrusive	Red	Red	Red	Yellow	Yellow	Yellow

Table 7

### Transversal Condylar Guidance Reference® SL

Inlay	Right			Left		
	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>th</sup> mm	3 <sup>rd</sup> mm	5 <sup>th</sup> mm	10 <sup>m</sup> mm
White	*1°	*1°	*1°	*6°	*7°	*6°
Yellow	0°	0°	0°	0°	0°	0°
Red	0°	0°	0°	0°	0°	0°
Blue	0°	0°	0°	0°	0°	0°

### Gamma Sequence Incisal Table

Condylography values used for calculation Protrusion at 5 mm: SCI 54,0°

Mediotrusion right at 5 mm: SCI 49,8° TCI 2,2°

Mediotrusion left at 5 mm: SCI 58,9° TCI 9.5°

Suggested sequence table setting Protrusion element: ORANGE

Right lateral element: ORANGE Left lateral element: ORANGE



Table 8

**CADIAX® Curves**

	Protrusion		Mediotrusion right		Mediotrusion left	
	SI right	SCI left	SCI	TCI	SCI	TCI
1 <sup>st</sup>	49.9°	65.2°	57.7°	1.0°	64.2°	7,6°
2 <sup>nd</sup>	51.3°	62.7°	55.9°	0.0°	63.2°	8,0°
3 <sup>rd</sup>	52.3°	60.0°	53.4°	2.5°	61.4°	8,1°
4 <sup>th</sup>	52.0°	58.8°	52.0°	1.8°	60.2°	9,6°
5 <sup>th</sup>	51.2°	56.8°	49.8°	2.2°	58.9°	9,5°
6 <sup>th</sup>	50.2°	55.3°	48.4°	1.6°	57.6°	9,4°
8 <sup>th</sup>	48.3°	52.4°	44.3°	1.1°	54.0°	8,0°
10 <sup>th</sup>	45.3°	48.4°	41.3°	2.0°	49.8°	6,0°
14 <sup>th</sup>					41.7°	6,3°
	Retrusion					
-1	23,3°r	54,7°r				
-2		53,5°r				

Table 9

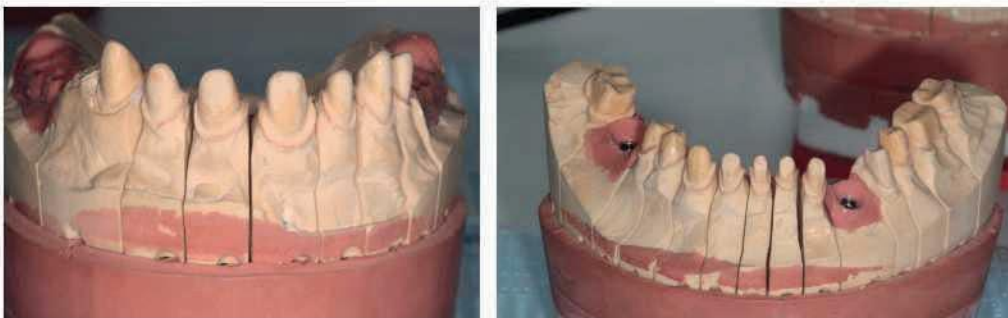
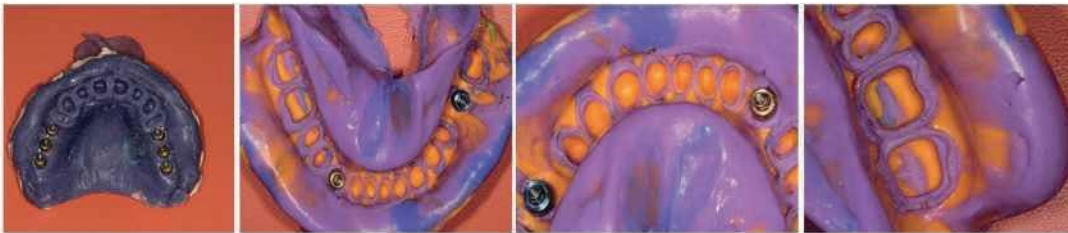
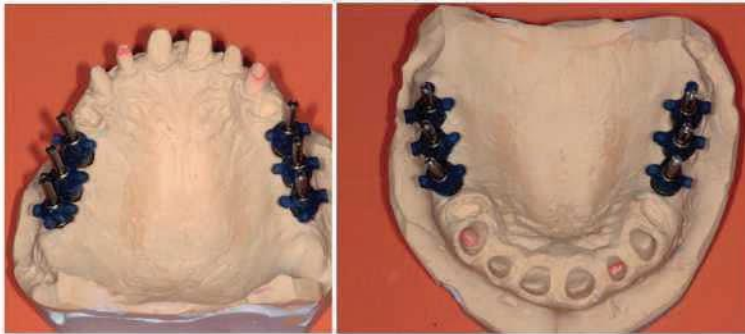
**Coordinates of Cusp Tips**

	Right			Left		
	X	Y	Z	X	Y	Z
1	66.30	6.20	48.50	66.00	-2.00	48.50
2						
3	62.00	16.00	4.00	62.00	8.00	47.50
4						
5						
6m						
6d						
7m						
7d						
8m						
8d						

**Fabricating post-cores**



## Custom trays for teeth and transfer coping



# Wax-up of mesiocclusion



All of the laterotrusion guidances are transferred to the lingual cusps of the mandible. The protrusive restriction remains on the central incisor of the upper jaw. Laterotrusion canine guidance is on the medline slope of the canine. The bearing cusps in this case are posterior cusps of the upper jaw.

**Indices for temporary crowns**



**Long-term temporary crowns**



Production of individual abutments with preliminary formation of the emergence profile.

## Final dental restorations



Myopathic or repositioning splint is used to determine the centric relation with bilateral tooth absence, and then it is followed by remounting in the articulator. The discrepancy between the sizes of the passive and active dental arches of the maxilla and mandible is changed due to the reverse overlapping of the teeth when the stamp cusps are transferred to the posterior cusps of the upper molars, and the lateral-torsion guidance to the lingual cusp of the first molar of the mandible. The target points for determining the distal edges 36 and 46 are the occlusal plane and the cutting edge of the lower incisor. The axis of inclination of the central incisor of the mandible is perpendicular to the axis of closing and corresponds to the Page rule.

Thus, the design points for determining the centric relation, the points for calculating OPI and LFH are selected taking into account all the features of prosthetics with a complete removable prosthetic appliance.

## **Clinical case №7**

Patient's birth date: 1964

Date of examination: September 2008

The patient applied to the medical center with complaints of poor masticatory performance and sensitivity of teeth 12, 11, 21, 22.

According to physical examination, the posterior occlusal plane is positioned too high on the right and left side. Active and passive dental arches do not match. The palatal inclination of the canine does not provide for a canine guidance. The implants were placed earlier in another clinic without an operating template and preliminary planning of prosthodontic structures.



**Intraoral photographs**



An algorithm for the sequence of making a prosthetic appliance for dentitions with a bilateral end defect of the mandible and an overestimated posterior occlusal plane on the molars of the maxilla using prosthodontic structures with support on implants has been determined.

Compensatory strategy is applied for making a prosthetic appliance of dental class I with reduced lower facial height. We created space for the manufacture of crowns on implants due to the lack of vertical space.

### **Materials and methods for diagnosis and treatment:**

Dental and clinical history, condylography and cephalometric analysis, analysis of maxillar and mandibular models, splint therapy and following determination of the centric relation of the jaws, mounting the models in the articulator and a wax-up.

The patient's clinical dental history was taken. The general medical analysis revealed rheumatism and concussion due to an injury in an accident.

Table 1

<b>Dental History Analysis</b>		Valuation	Yes	No
1.	Do you have problems when you chew?			X
2.	Do you have problems when you are talking?			X
3.	Do you have problems in closing your teeth property?			X
4.	Are any of your teeth especially sensitive? Кислое 11, 21, 22, 12	0	X	
5.	Do you have problem when you open your mouth very wide?			X
6.	Do your jaw joints make noise and if so, on what side?			X
7.	Do you have pain in the area of your jaw joints?			X
8.	Do you suffer from headaches?			X
9.	Do you suffer from cramps or spasm in your head, neck or throat?			X
10.	Do you have in general problems with your posture?			X
	Occlusal Index	0.00		

11.	Have you ever had serious accident? Сотрясение мозга, авария на мотоцикле	X	
12.	Did you have one or more oral intubations?		
13.	Have you ever had orthodontic treatment or ...		X
14.	Have you had a treatment with splint?		X
15.	Are you grinding or pressing with your teeth?		X
16.	Do you think that treatment is necessary?	X	
17.	Do you think that there is a serious disorder or illness?		
18.	When the last time you had dental treatment and what was done?		

Table 2

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		yes	no
1.	Infections		
2.	Cardo-vascular systems		
3.	Respiratory system		
4.	Digestive system		
5.	Metabolic system		
6.	Allergies		
7.	Urogenital problems		
8.	Central nervous system		
9.	Psychological problems (therapy)		
10.	Rheumatic disease - Ревмаизм	X	
11.	Hormonal disease		
12.	Special problems		
Main concern:			

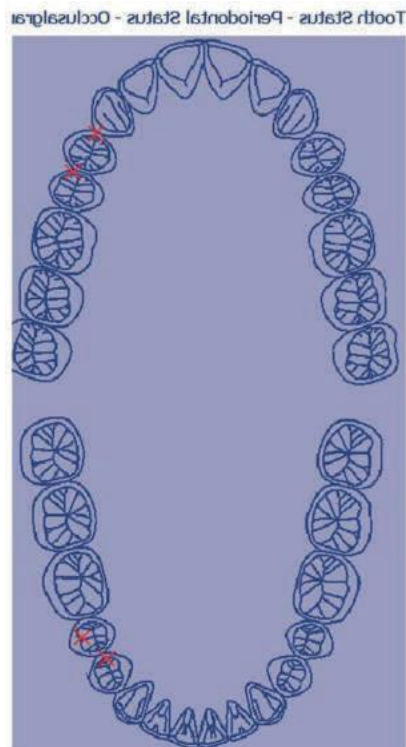
Table 3

## Muscles palpation

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae		X		X
6.	M.pterygoideus medialis				
7.	M.mylohyideus				
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				

11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints*				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare				

## Muscles palpation



Upon mounting the casts in the articulator, the initial contact occurs on the tooth 24 and 25, 34 and 35.

## Panoramic radiograph



Thus, dental history and physical examination revealed the following **issues:**

- Over-crowding of central teeth in the mandible.
- Mismatching upper and lower dental arches.
- Active and passive dental arches do not fit together.
- Palatal inclination of the canine teeth in the lower jaw.
- Extrusion – 17.
- Chipping on the lower premolars 13 and 21.
- Palatal root resorption 14 should be removed.
- According to CT in the area of teeth 16 and 27, there are clearly visible cysts on palatal roots.
- No occlusal support in the posterior areas of the lower dentition.

### **Treatment Plan**

1. Removal of teeth 16, 14, 27, 24
2. Splint therapy. Vertical adjustment 5 mm. We can increase the vertical dimension. Both jaws are in the protrusive position.
3. The second clinical functional and instrumental analysis and articulator settings are based on the result of splint therapy with long-term temporary crowns.
4. Making a model of the anterior restriction and canine guidance
5. Restoring the posterior occlusal support in occlusion class I.
6. Occlusal concept: consistent opening.

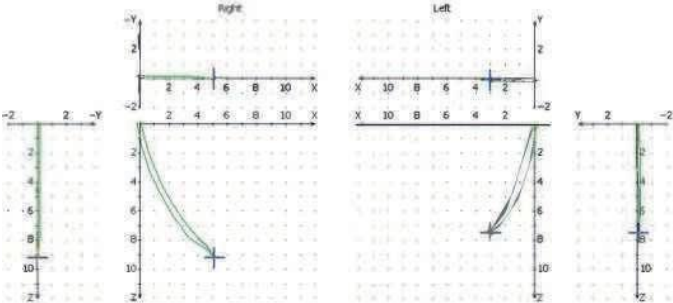
Objectives: reduce the palatal inclination of the canine teeth, remove teeth over-crowding in the mandible and change the interincisal angle.

### Condylography

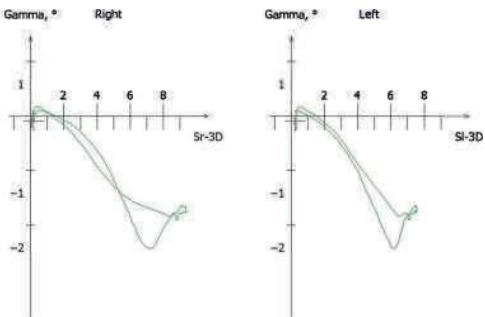
The beginning and end of the movement do not match. There is strong negative rotation at the beginning of the movement. The left retrusion is of poor quality and it is shortened.

Muscle difficulties.

Protrusion/retrusion

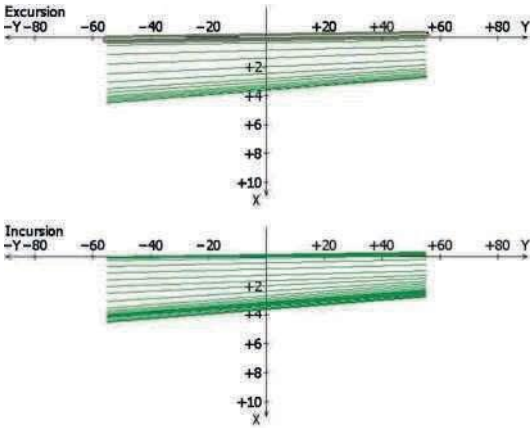


Gamma rotation



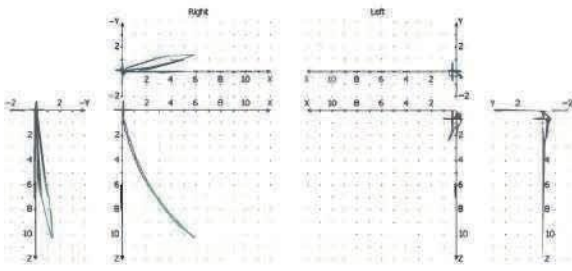
The gamma rotation is negative because of deformed shape of the TMJ condyle after suffering rheumatism.

### Maxillar axis movements

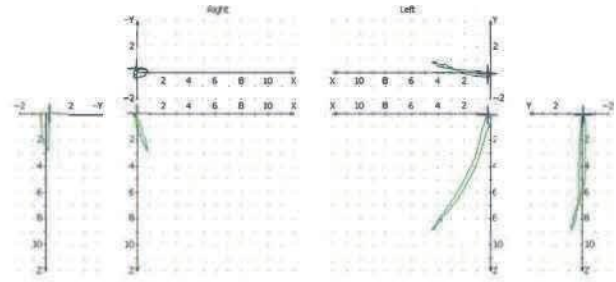


The Bennett angle is negative and there might be a midline deviation of the disc or obstacle avoidance mechanism.

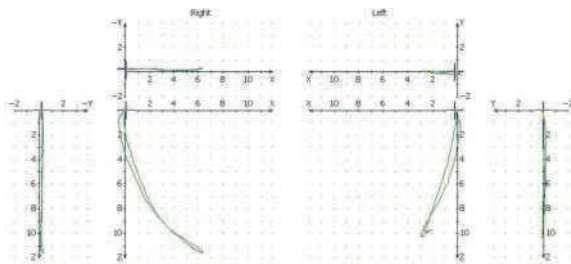
## Right mediotrusion



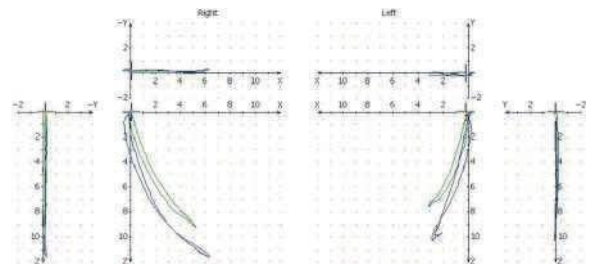
## Left mediotrusion



Muscle difficulties. There is retrusion at the beginning of the movement.

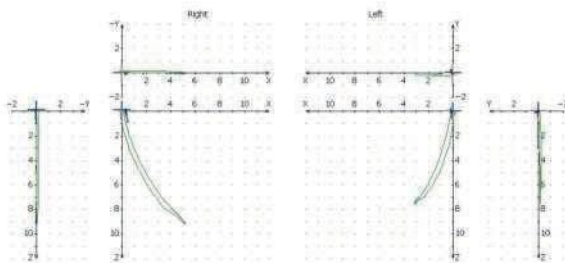


Protrusion/retrusion

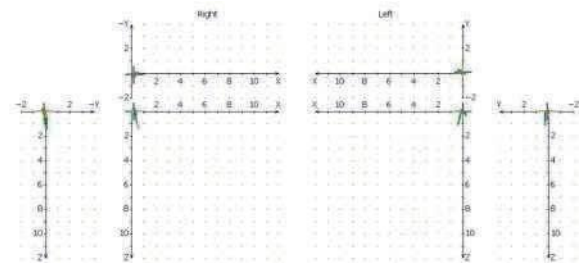


Opening-filling

## Bruxism



## Speaking 50 - 60



The condyle is pressed to the eminentia articulare ossis temporalis due to bruxism.

# Cephalometric Analysis

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial. The skeletal trend of the mandible is brachyfacial.

Skeletal class is I.

The maxilla is positioned prognathic The mandible is positioned prognathic, with tendency to neutral.

Lower facial height is normal Dental class unknown.

The protrusion of the upper incisor is increased.

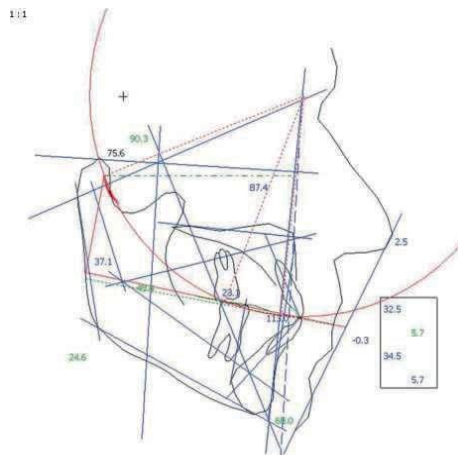
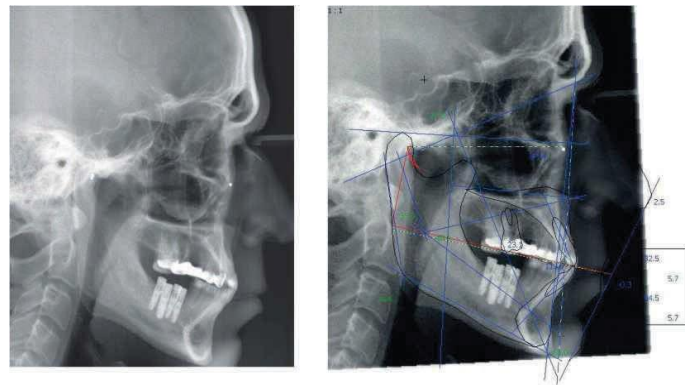
The inclination of the upper incisor is increased.

The protrusion of the lower incisor is increased..

The inclination of the lower incisor is increased

The interincisal angle is diminished.

Occlusal concept: Group function. No functional statement available.





## Explanation

Table 4

Determinants	Norm	Value	Trend		Norm	Value	Trend
Facial Axis	90.0°	90.3			90.0°	88.8	
Facial Depth	91.5°	87.4	1-*		91.5°	86.4	1-*
Facial Taper	68.0°	68.0			68.0°	67.5	
Mandibular Plane	21.5°	24.5			21.5°	26.0	1D*
Related Values	Norm	Value	Trend		Norm	Value	Trend
Bjoerk Sum	396.0°	385.4	4+***>		396.0°	386.9	3-***
Facial Length Ratio	63.5%	73.0	4+***>		63.5%	71.9	4+***>
Y Axis to S N	67.0°	64.0			67.0°	65.2	
Y Axis (Downs)	61.8°	61.6			61.8°	62.8	
S N to Gonion Gnathion Angle	31.6°	25.4	1-*		31.6°	26.9	1-*

We can increase lower facial height as both jaws are protrusive and leave the teeth function in the form of consistent opening of the dentition.

Table 5

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	90.3	
Facial Depth	91.5°	87.4	1-*
Mandibular Plane	21.5°	24.5	
Facial Taper	68.0°	68.0	
Mandibular Arc	31.2°	37.0	1B*
Maxillary Position	65.0°	66.9	
Convexity	-1.0 mm	2.4	1X*
Lower Facial Height (by R. Slavicek)	44.2°	48.3	
Lower Facial Height to Point D	50.7°	51.2	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	113.0	1-*
Upper Incisor Protrusion	4.3 mm	5.7	
Upper Incisor Inclination	23.1°	32.5	1+*
Upper Incisor Vertical	mm	0.0	
Lower Incisor Protrusion	1.2 mm	5.7	1+*
Lower Incisor Inclination	24.1°	34.4	1+*
Upper Molar Position	21.0 mm	23.1	1+*
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	11.5	
Idealized Occlusal Plane – Axis Orbital Plane	----°	11.2	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	33.5	
Radius of Curve of Spee	mm	75.6	
Lip Embrasure	0.0 mm	0.2	

Occlusal Plane Xi Distance	-1.4 mm	0.4	
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	68.5	
Horizontal Condylar Inclination left	----°	71.6	
Horizontal Condylar Inclination	----°	70.0	
Relative Condylar Inclination	----°	58.5	
Relative Condylar Inclination 6	----°	63.7	
Relative Condylar Inclination 7	----°	57.2	
Relative Condylar Inclination 8	----°	70.0	
Anterior Guidance (S-AOP)	°	54.2	
Relative Anterior Guidance	°	42.7	
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.9 mm	-0.2	1+*

SCI right = 68.5 degrees;

SCI left = 71.6 degrees very steep slope;

Symmetrical case AG (anterior restriction) = 54.2 degrees;

The anterior restriction is based on SCI +10 degrees, but not more than 60 degrees OPI= 11.

DOA for the right molar is 28 degrees DOA for the left molar is 30 degrees

Low masticatory performance is observed. Lower facial height is reduced. Compensatory backwards rotation of the mandible since there were no chewing teeth for a long time.

Table 6

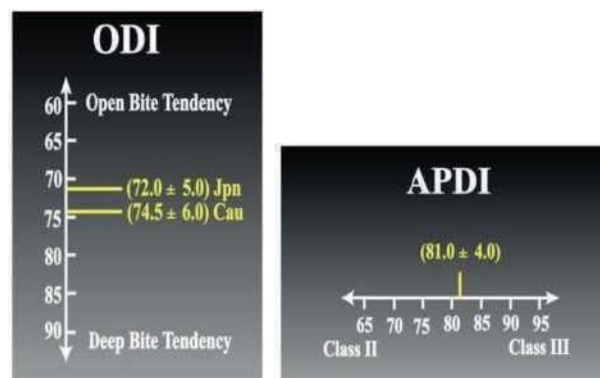
<b>Sato Analysis</b>			
<b>Denture frame analysis</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
FH – MP	25.9°	23.0	
PP – MP	24.6°	20.5	1-*
OP – MP	13.2°	15.4	
OP – MP / PP – MP	54.0%	75.3	2+**
AB – MP	71.3°	73.3	
A` – P`	50.0 mm	41.2	1+*
A` – 6`	23.0 mm	16.6	2+**
A` – 6` / A` – P`	50.0 %	40.3	
U1 – AB (degree)	31.7°	33.4	
U1 – AB (mm)	9.5 mm	6.0	2-**

L1 – AB (degree)	25.4°	33.5	
L1 – AB (mm)	6.2 mm	6.0	
Inter moral angle	174.0°	158.6	4+***>
FH – PP	1.3°	2.4	1+*
Kim analysis		Norm	Value
ODI	72.0°	75.8	
APDI	81.0°	86.1	1+*
Combination factor	153.0°	161.9	
Downs-Graber analysis		Norm	Value
Facial Angle	85.1°	87.4	
Convexity	-5.6°	-5.4	
AB – Facial plane angle	-5.1°	-3.7	
FH – MP	25.9°	23.0	
Y Axis	65.7°	61.6	1+*
FH – OP	9.5°	7.5	
Interincisal angle	129.7°	113.0	1+*
L1 – OP	68.0°	58.0	1+*
L1 – MP	94.7°	106.8	1D*
U1 – A.POG	7.9 mm	5.7	
FH – SN	6.0°	2.4	1+*
SNA Angle	81.9°	87.6	1D*
SNB Angle	78.6°	85.0	2D**
ANB Angle	3.3°	2.5	
U1 – Facial Plane (mm)	9.9 mm	7.2	
U1 – FH (degree)	108.9°	117.0	1+*
U1 – SN (degree)	103.1°	114.6	2+**
Gonial angle	119.4°	123.2	
Ramus Inclination	2.6°	10.4	1+*

ODI 75,8: normal.

APDI 86,1 tends to class III.

Overbite depth indicator (ODI). Anteroposterior dysplasia indicator (APDI).



## Overbite Depth Indicator (ODI)

AJO 65:586-611, 1974.

The A-B plane to the mandibular plane plus or minus. The palatal plane to the Frankfort horizontal plane angle\*.

Table 7

### CAUCASIAN SAMPLE

	Normal (N=119)	Deep bite (N=174)	Open bite (N=56)
Mean	74.50°	77.7°	65.5°.
S.D.	6.07°	6.58°	6.13°

The correlation coefficient the incisor over-bite was 0.588 (highest correlation in 43 measurements tested).

	N	Mean	S.D.	Source
Chinese	50	72.83°	5.22°	Peking University
Japanese	46	72.34°	4.82°	Koyama, Ikegami
Korean	190	71.95°	5.29°	Suh, Park

\* When the palatal plane slopes downward and forward, the angle is read in the positive figure. When the plane slopes upward and forward, the angle is read in the negative figure.

## Anteroposterior Dysplasia Indicator (APDI)

Overbite depth indicator (ODI). Anteroposterior dysplasia indicator (APDI).

AJO 73: 619-633,1978.

The facial plane the FH plane plus or minus.

The A-B plane to the facial plane plus or minus\*. The palatal plane to the FH plane angle.

Table 8

CAUCASIAN SAMPLE

	Normal (N=102)	C1.I (N=174)	C1.II (N=624)	C1.III (N=36)
Mean	81.37°	80.36°	75.24	88.50°.
S.D.	3.79°	4.45°	4.36°	6.68°

The correlation coefficient against the molar displacement was 0.643 (highest correlation in 30 measurements tested).

	N	Mean	S.D.	Source
Chinese	50	81.10°	4.04°	Peking University
Japanese	46	80.61°	3.82°	Koyama, Ikegami
Korean	90	81.04°	4.35°	Suh, Park

\*When the point B is behind the point A, the angle is read in the negative figure (Downs' A-B plane angle).

**Articulator settings**

Lower face height is increased from 48.3 to 50.3 degrees by + 5 mm with an incisal pin. OPI changes from 11 to 13 degrees.



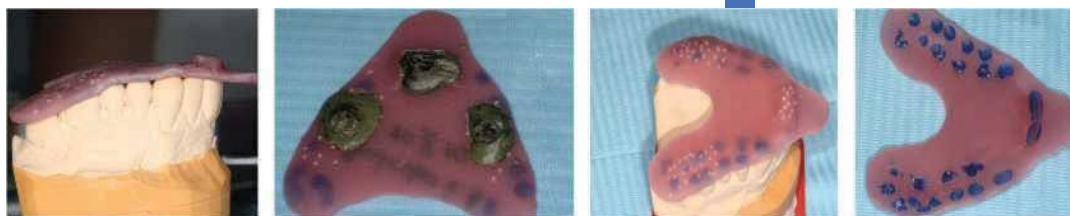
Table 9

Slavicek Analysis				a		
Skeletal Measurement	Norm	Value	Trend	Norm	Value	Trend
Facial Axis	90.0°	90.3		90.0°	88.8	
Facial Depth	91.5°	87.4	1-*	91.5°	86.4	1-*
Mandibular Plane	21.5°	24.5		21.5°	26.0	1D*
Facial Taper	68.0°	68.0		68.0°	67.5	
Mandibular Arc	31.2°	37.0	1B*	31.2°	36.1	1B*
Maxillary Position	65.0°	66.9		65.0°	66.9	
Convexity	-1.0 mm	2.4	1X*	-1.0 mm	3.4	2X**
Lower Facial Height (by R. Slavicek)	44.9°	48.3		44.9°	50.3	
Lower Facial Height to Point D	51.4°	51.2		51.4°	53.2	
Dental Measurement	Norm	Value	Trend	Norm	Value	Trend
Interincisal Angle	132.8°	113.0	1-*	132.8°	111.5	1-*
Upper Incisor Protrusion	4.3 mm	5.7		4.3 mm	6.3	
Upper Incisor Inclination	23.1°	32.5	1+*	23.1°	34.4	1+*
Upper Incisor Vertical	mm	0.0		mm	-2.0	
Lower Incisor Protrusion	1.2 mm	5.7	1+*	1.2 mm	5.4	1+*
Lower Incisor Inclination	24.1°	34.4	1+*	24.1°	34.0	1+*
Upper Molar Position	21.0 mm	23.1	1+*	21.0 mm	23.1	1+*
Occlusal Plane	Norm	Value	Trend	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	11.5		----°	13.0	

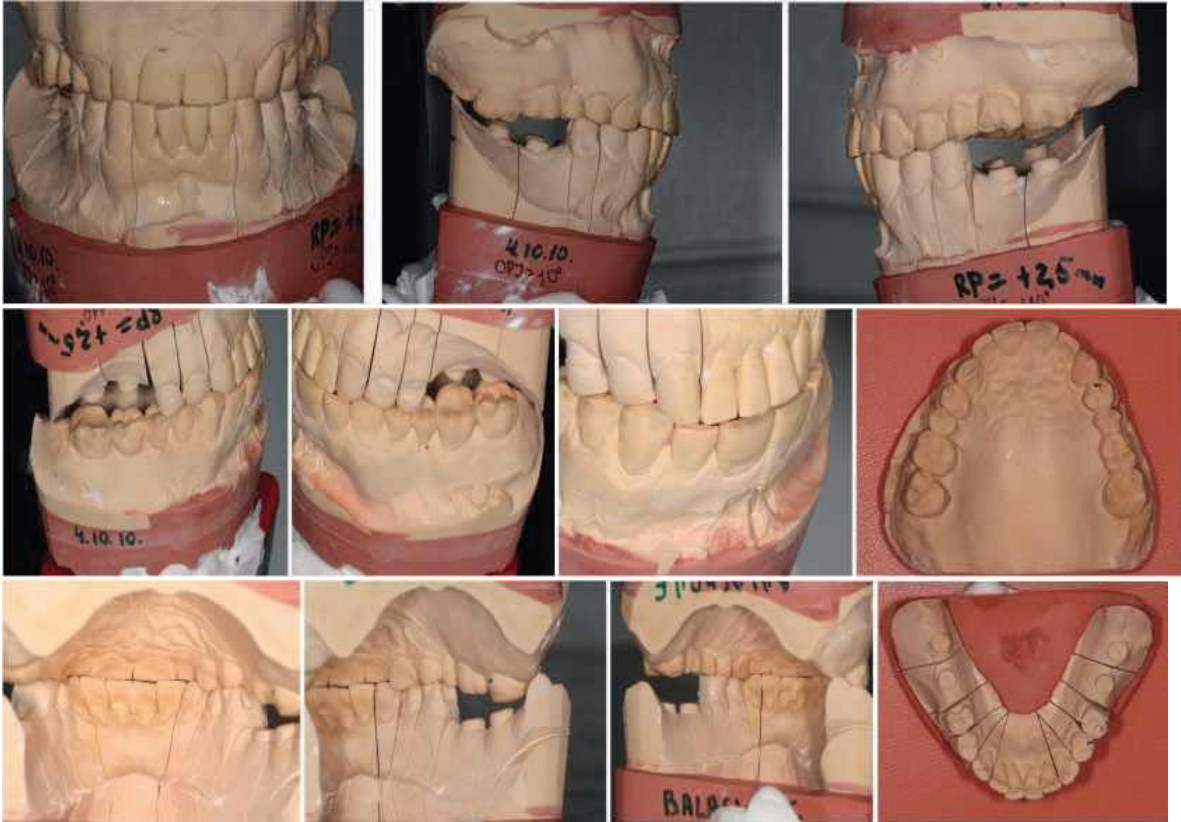
Idealized Occlusal Plane – Axis Orbital Plane	----°	11.2		----°	10.8	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	33.5		40.9 mm	33.5	
Radius of Curve of Spee	mm	75.6		mm	75.6	
Lip Embrasure	0.0 mm	0.2		0.0 mm	-2.0	
Occlusal Plane Xi Distance	-1.4 mm	0.4		-1.4 mm	0.7	
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	68.5		----°	68.5	
Horizontal Condylar Inclination left	----°	71.6		----°	71.6	
Horizontal Condylar Inclination	----°	70.0		----°	70.0	
Relative Condylar Inclination	----°	58.5		----°	57.0	
Relative Condylar Inclination 6	----°	63.7		----°	62.3	
Relative Condylar Inclination 7	----°	57.2		----°	55.7	
Relative Condylar Inclination 8	----°	70.0		----°	70.0	
Anterior Guidance (S-AOP)	----°	54.2		----°	54.2	
Relative Anterior Guidance	----°	42.7		----°	41.2	
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.9 mm	-0.2	1+*	-2.9 mm	-0.2	1+*

The maxilla and mandible casts are mounted in articulator according to the individual hinge axis.

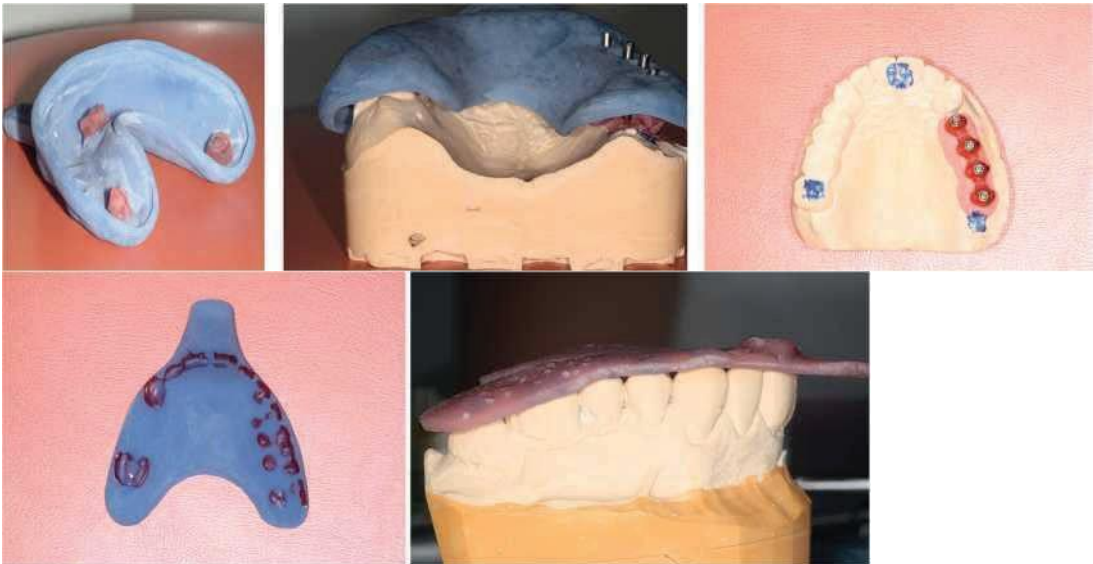
### Centric Relation



**Casts in the articulator are set in the centric relation**

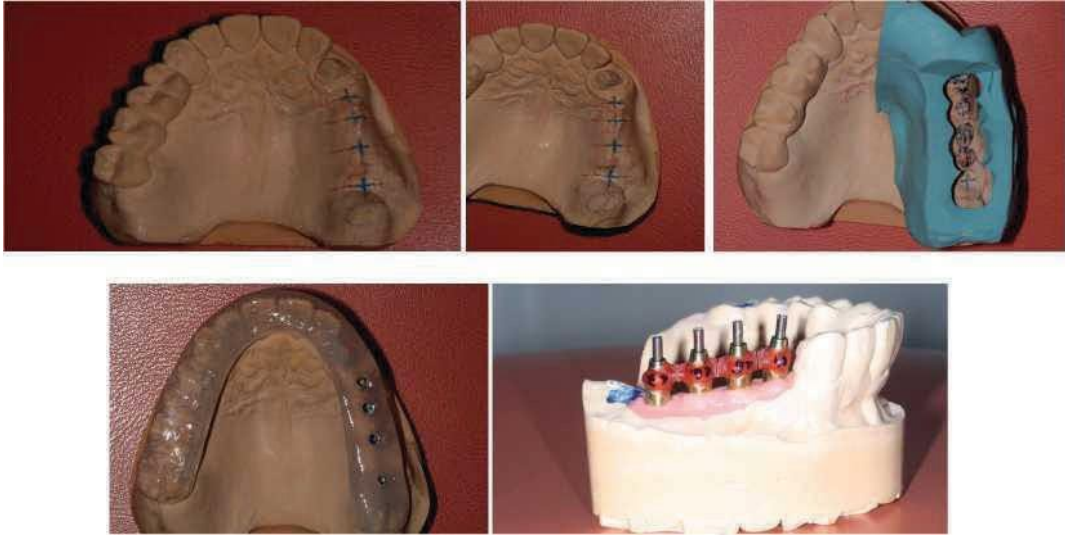


**Custom tray for molding teeth**





# Operating Template



Individual transfer copings for imprint impressions.

## Final dental restorations



## Clinical case №8

Patient's birth date: 1974

Date of examination: 2010

The patient applied to the medical center with complaints of poor masticatory performance, poor esthetic look and sensitivity of tooth 15.

Examination revealed:

- Absence of support in the posterior areas as a result of the secondary partial loss of teeth.
- Absence of canine restriction and anterior guidance.
- Attrition facets on the teeth in the anterior area of the maxilla and mandibles.
- Palatal inclination of canine teeth.
- Deep overbite.
- Occlusion class I.
- Extrusion of teeth 17 and deformed occlusal plane.
- Gingival recession of class I in area 13,14,15,17,25,46.
- Cervical abfraction of non-carious origin of 13,15.
- Lower facial height is reduced.

## Intraoral photographs



## Cast models



The medical history of the patient is complicated by cardiovascular diseases, Dental history revealed hypersensitivity in the area of tooth 15. According to the patient there was a noise in the area of both joints and muscle spasm during prolonged mouth opening.

Table 1

Dental History Analysis					Valuation	Yes	No
1.	Do you have problems when you chew?				1	X	
2.	Do you have problems when you are talking?				1	X	
3.	Do you have problems in closing your teeth properly?						X
4.	Are any of your teeth especially sensitive? <b>15</b>				1	X	
5.	Do you have problem when you open your mouth very wide? <b>There is muscle spasm during prolonged opening</b>				1	X	
6.	Do your jaw joints make noise and if so, on what side? <b>Both sides</b>				1	X	
7.	Do you have pain in the area of your jaw joints?						X
8.	Do you suffer from headaches?				1	X	
9.	Do you suffer from cramps or spasm in your head, neck or throat?						X
10.	Do you have in general problems with your posture?				2	X	
	Occlusal Index				1.14		
11.	Have you ever had serious accident?						X
12.	Did you have one or more oral intubations?						X
13.	Have you ever had orthodontic treatment or ...						X
14.	Have you had a treatment with splint?						X
15.	Are you grinding or pressing with your teeth?					X	
16.	Do you think that treatment is necessary?					X	
17.	Do you think that there is a serious disorder or illness?						
18.	When the last time you had dental treatment and what was done?						
19.	How would you describe your psychic behavior?						
	happy	sad	calm	excited	self-controlled	lack of self-control	

Table 2

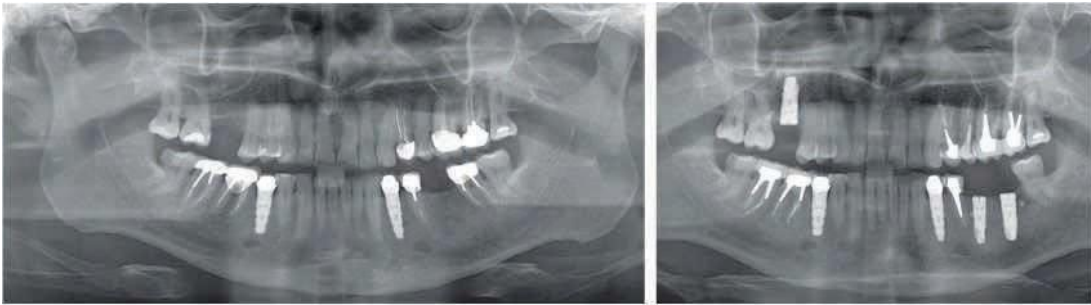
Special Medical Analysis		
Do you have or did ever have an illness with regard to point 1-12?		
	Yes	No
1.	Infections	
2.	Cardo-vascular systems	X
3.	Respiratory system	
4.	Digestive system	X
5.	Metabolic system	X
6.	Allergies	X
7.	Urogenital problems	X
8.	Central nervous system	X
9.	Psychological problems (therapy)	X
10.	Rheumatic disease	X
11.	Hormonal disease	X
12.	Special problems	
Main concern:		

Table 3

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae	X			X
6.	M.pterygoideus medialis	X			X
7.	M.mylohyideus				
8.	M.digastricus			X	
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus	X		X	
14.	Tongue				
15.	Comparative palpation of jaw joints*				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare			X	

Palpation of the muscles revealed bilateral symmetrical sensitivity, which may indicate a sign of either improper transverse condylar position or a decrease in lower facial height. Discomfort on the left m.digastricus, m.omohyoideus of the temporomandibular ligament was also revealed during the palpation.

## Panoramic radiograph



2009 November, 2010: implants in areas 36 and 37

Thus, dental history and physical examination revealed the following **issues:**

- Absence of occlusal support in the posterior areas of the mandible.
- Upper and lower dental arches don't fit together.
- Flat, poorly expressed anatomical shape of cusps of molar teeth.
- Extrusion of the tooth 17 and deformation of the occlusal plane.
- Absence of retrusion restriction, anterior guidance and canine restriction.
- Poor esthetic.
- Poor masticatory performance.
- Poor oral hygiene.

### **Diagnosis:**

- Dental Class I.
- Remove functional limitations of the mandible mobility (muscle difficulties).

### **Treatment objectives:**

- Expand upper and lower dental arches.
- Increase lower facial height.
- Change the posterior occlusal plane.

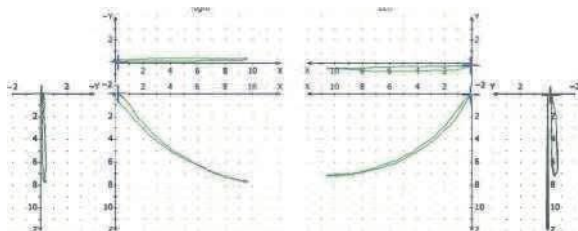
- Restore the posterior occlusal support in occlusion class I with the canine guidance.
- Remove the posterior occlusal interference.

### **Treatment Plan:**

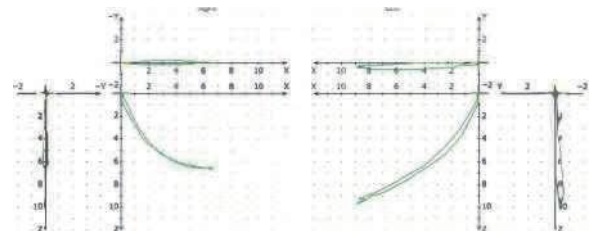
1. Occupational oral hygiene.
2. Clinical instrumental analysis.
3. Splint therapy and remounting the models in the articulator after the procedure.
4. Wax-up.
5. Manufacturing long-term temporary restorations.
6. Veneers: 13, 14, 15, 43, 44, 33, 23.
7. Crowns: 17, 24, 25, 26, 27, 35, 46, 47.
8. Implant supported crowns: 16, 36, 37, 34, 45.

## **Condylography**

Protrusion-retrusion



Opening-closing

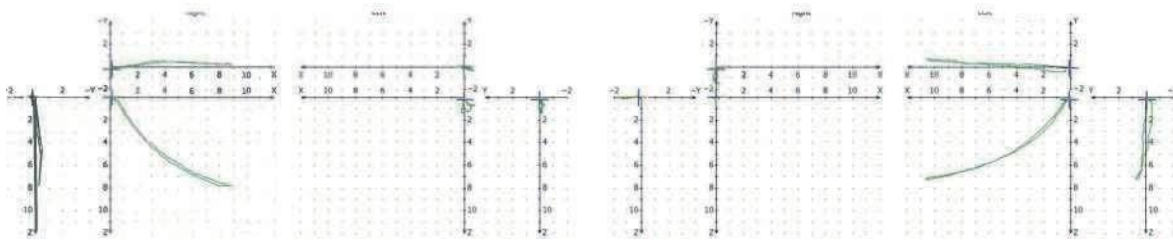


There is an asymmetry of the right and left protrusion-retrusions.



## Right Mediotrusion Bennett Movement

## Left mediotrusion



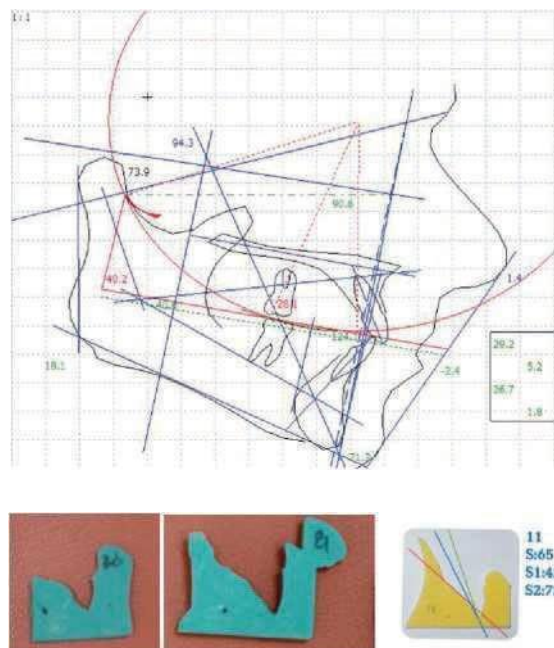
There is a redetraction in the left joint with mediotrusion on the right side and negative Bennett angle.

## Cephalometric Analysis

Table 3

Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	11.7	
Idealized Occlusal Plane – Axis Orbital Plane	----°	12.3	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	33.5	
Radius of Curve of Spee	mm	73.8	
Lip Embrasure	0.0 mm	2.3	
Occlusal Plane Xi Distance	-1.4 mm	1.4	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	51.2	
Horizontal Condylar Inclination left	----°	51.2	
Horizontal Condylar Inclination	----°	51.2	
Relative Condylar Inclination	----°	39.5	
Relative Condylar Inclination 6	----°	32.5	
Relative Condylar Inclination 7	----°	32.2	
Relative Condylar Inclination 8	----°	51.2	
Anterior Guidance (S-AOP)	°	40.2	
Relative Anterior Guidance	°	28.4	
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.9 mm	-2.3	
Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	94.2	1B*
Facial Depth	91.5°	90.6	
Mandibular Plane	21.5°	18.0	

Facial Taper	68.0°	71.2	
Mandibular Arc	31.2°	40.1	2B*
Maxillary Position	65.0°	70.1	2+**
Convexity	-1.0 mm	1.3	1X*
Lower Facial Height (by R. Slavicek)	42.8°	40.6	
Lower Facial Height to Point D	49.3°	45.0	1-*
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	132.8°	124.0	
Upper Incisor Protrusion	4.3 mm	5.2	
Upper Incisor Inclination	23.1°	29.2	
Upper Incisor Vertical	mm	2.1	
Lower Incisor Protrusion	1.2 mm	1.8	
Lower Incisor Inclination	24.1°	26.6	
Upper Molar Position	21.0 mm	28.0	3+**



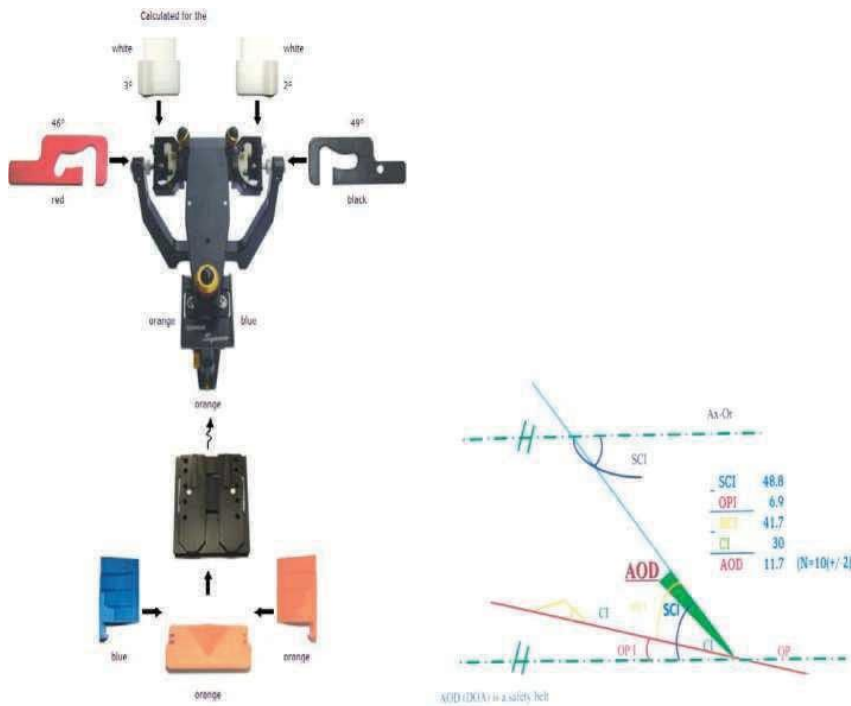
Lower facial height is reduced.

The position of the maxilla and mandible is neutral.

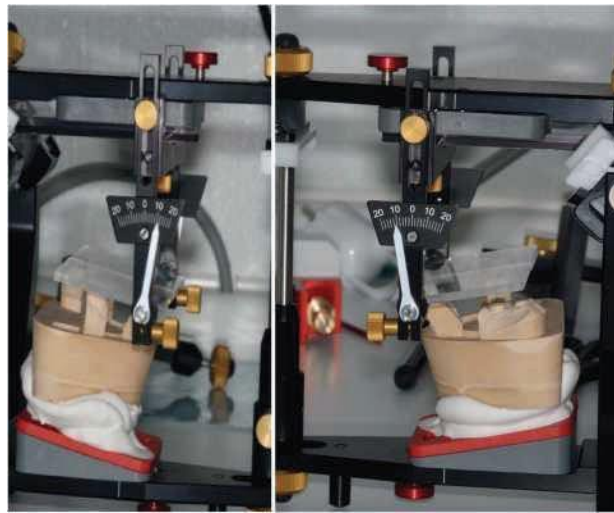
The interincisal angle is 124 degrees. The occlusal plane on the left is 11.7°.

We used Weber template to determine the calculation of the guidance for 23 and 21.

# Articulator Settings



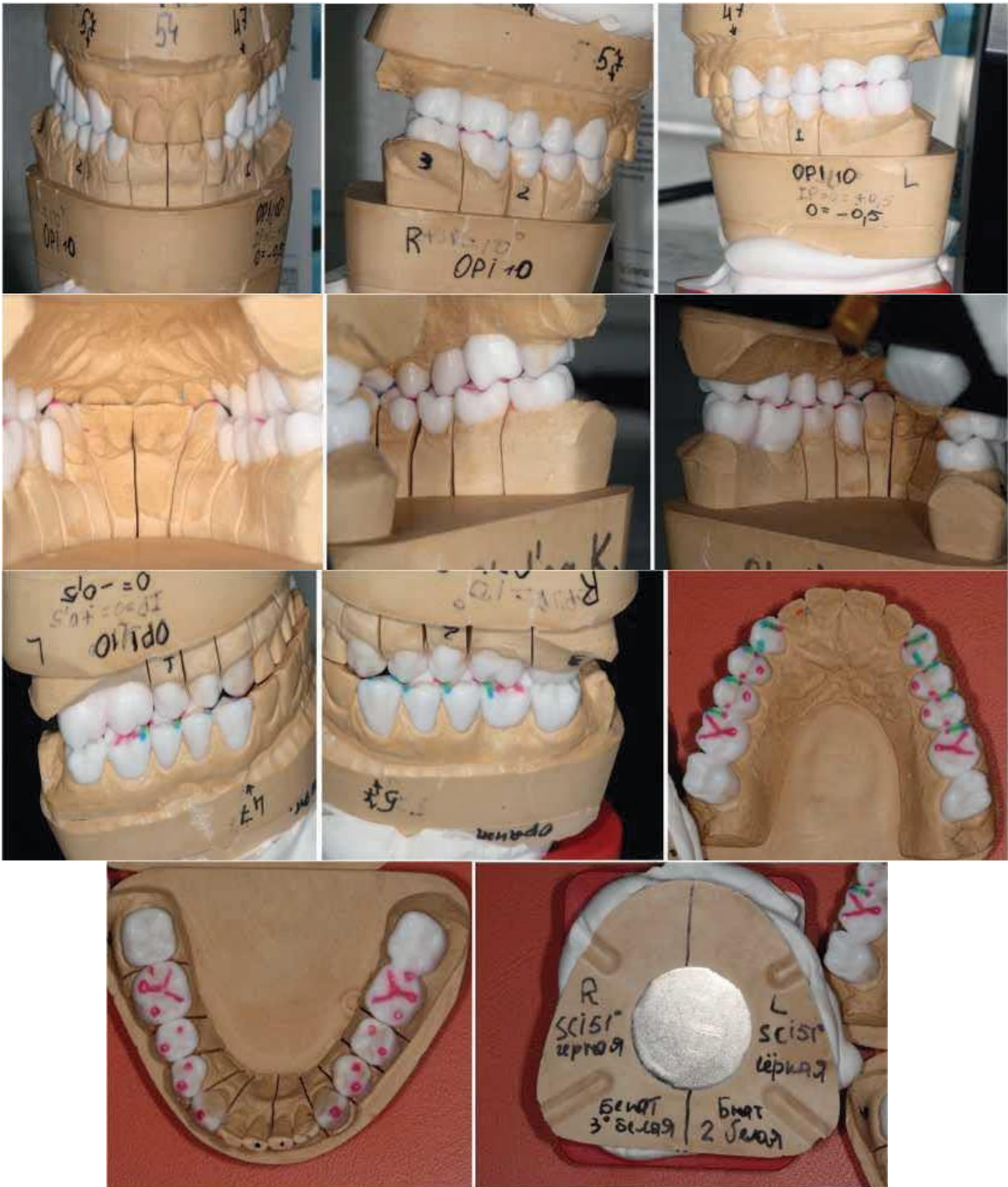
- The initial contact in the reference position occurs on teeth 45, 15. When we remove these teeth from a split cast model, the second contact will occur on teeth 17, 47. When we change the occlusal position by extracting these tooth from the cast model, the third contact is made on teeth 25, 35. Incisal pin = -0.5 mm.
- Orange incisal pin table = 47 degrees for canine guidance.
- Blue incisal pin table = 51 degrees for canine guidance.



OPI right =10 degrees.

OPI left =10 degrees.

# Remounting casts in the articulator after splint therapy for a diagnostic wax-up



## Final dental restorations



After 5 years



## **Conclusion**

Use of tooth/joint compensation mechanisms and clinical conclusions on the results of condylographic and cephalometric analyses, muscle palpation data analysis, plaster casts and splint therapy made it possible to improve aesthetic parameters of the face and smile, as well as to restore masticatory performance. The change of the occlusal plane made it possible to correct the angle of disocclusion and restore the masticatory performance. After splint therapy and 14-days follow-up and achieving favorable muscle state, new casts of the mandible were made in the new therapeutic position with subsequent wax-up, forming canine guide and laterotrusive guidances, retrusive restriction.



## Clinical case №9

Patient's birth date: 1977

**Chief complaint:** chipping of enamel of the central incisors of the maxilla and mandible. Complaints of pain in the masticatory muscle during prolonged chewing and increased tooth sensitivity when eating cold food and the absence of reproducible centric occlusion.

Bruxism.

**Physical examination** revealed enamel chippings on the central incisors of the maxilla, wedge-shaped defects on the incisors, canine teeth, premolars of the maxilla and mandibles, attrition facets on the molars of both jaws, over-crowding of the teeth in the mandible.

### Intraoral photographs



Table 1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections	X	
2.	Cardo-vascular systems (высокое давление)		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern: no special concerns			

Table 2

Dental History Analysis		valuation	yes	no	
1.	Do you have problems when you chew?			X	
2.	Do you have problems when you are talking?			X	
3.	Do you have problems in closing your teeth property?		X		
4.	Are any of your teeth especially sensitive?		X		
5.	Do you have problem when you open your mouth very wide?			X	
6.	Do your jaw joints make noise and if so, on what side?			X	
7.	Do you have pain in the area of your jaw joints?			X	
8.	Do you suffer from headaches?			X	
9.	Do you suffer from cramps or spasm in your head, neck or throat?			X	
10.	Do you have in general problems with your posture?			X	
	Occlusal Index	0.00			
11.	Have you ever had serious accident? <b>just bone breaks (many)</b>				
12.	Did you have one or more oral intubations?			X	
13.	Have you ever had orthodontic treatment or ...			X	
14.	Have you had a treatment with splint?			X	
15.	Are you grinding or pressing with your teeth?		X		
16.	Do you think that treatment is necessary?				
17.	Do you think that there is a serious disorder or illness?			X	
18.	When the last time you had dental treatment and what was done? <b>1,5 years ago, general tooth fillings</b>				
19.	How would you describe your psychic behavior?				
	happy	sad	calm	excited	self-controlled
				X	

## Panoramic radiograph

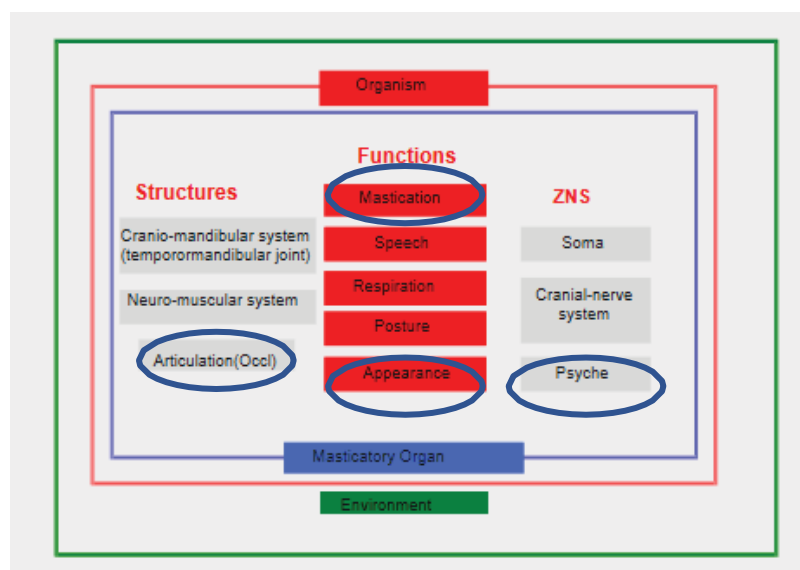


Esthetic assessment of the anterior group of maxillary teeth.

Table 3

Tooth	Lenght	Width
13	12.11 MM	7.11 MM
12	11.46 MM	6.32 MM
11	10.00 MM	8.49 MM
21	10.33 MM	8.28 MM
22	10.72 MM	7.20 MM
23	11.57 MM	7.88 MM

## Cybernetic system of the masticatory organ



**There are defects on the incisal edge due to functional overload.**



**Maxillar and mandibular casts in central occlusion.**



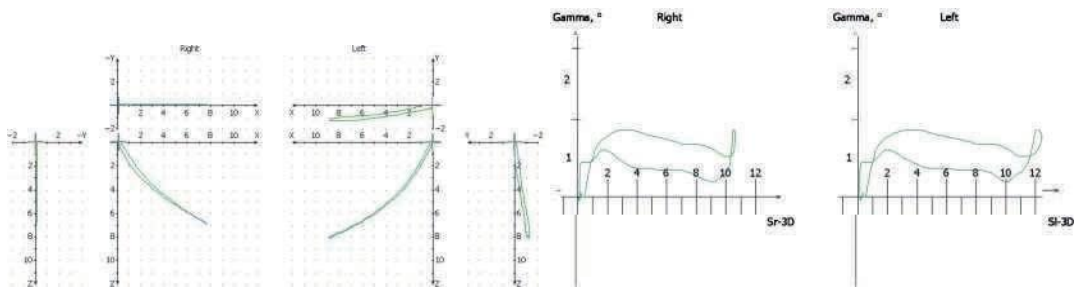
**The abrasion of enamel and dentin leads to a decrease in lower facial height.**



A large clinical functional analysis is indicated.

# Condylography

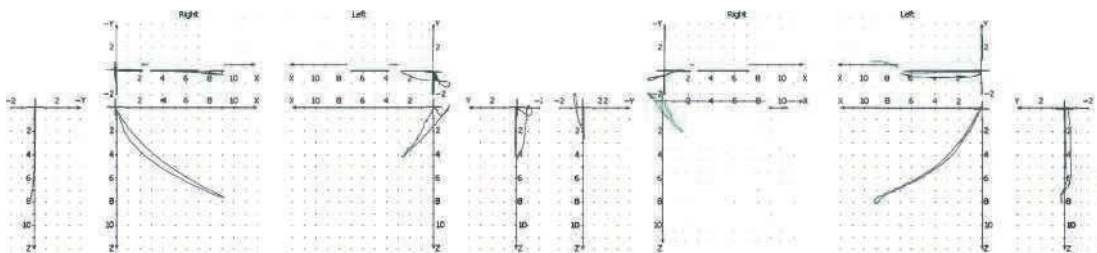
## Protrusion/retrusion



In the right and left temporomandibular joint the length of the path is reduced. Gammarotation is about  $1^\circ$ .

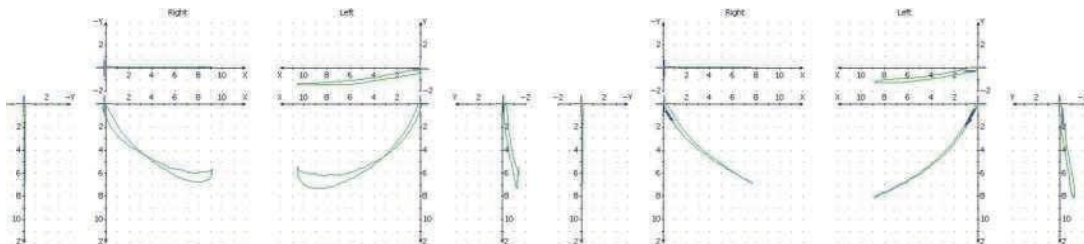
## Right mediotrusion

## Left mediotrusion



## Opening/closing

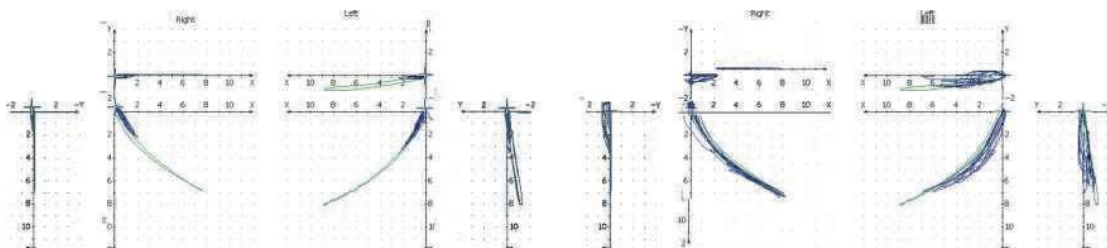
## Speaking 50-60 - protrusion



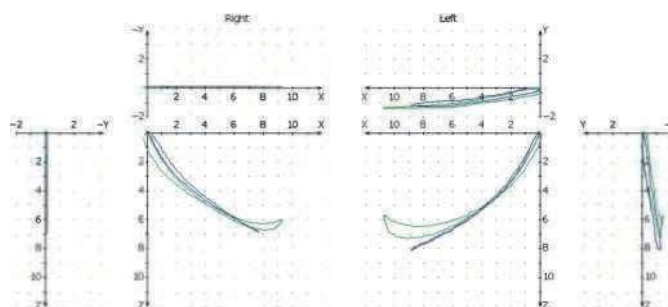
## Muscle activity

## Bruxism – Protrusion

## Chewing – Protrusion



## Protrusion - retrusion - opening - closing



Right and left mediotrusion revealed retrusion and protrusion components on the mediotrusion side, i.e. the joint on the opposite side is involved in mediotrusion and instead of rotation we have a translational component. Speech is produced at the bottom part of opening and closing and in a distraction. It is caused by the lack of support and a decrease in lower facial height in the posterior teeth area. Compression occurs in the right TMJ due to bruxism.

## Cephalometric Analysis

Cephalometric analysis revealed that both jaws were in the protrusion position that allowed to increase lower facial height.

The asymmetric case must be calculated on both right and left sides separately.

SCI R = 53°.

SCI L = 48°.

Table 4

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	92.7	
Facial Depth	91.5°	89.8	
Mandibular Plane	21.5°	19.5	
Facial Taper	68.0°	70.6	
Mandibular Arc	31.2°	34.1	

Maxillary Position	65.0°	74.0	3+****
Convexity	-1.0 mm	5.7	3X****
Lower Facial Height (by R. Slavicek)	43.3°	44.1	
Lower Facial Height to Point D	49.8°	47.1	
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	132.8°	120.7	1-*
Upper Incisor Protrusion	4.3 mm	6.9	1+*
Upper Incisor Inclination	23.1°	33.6	1+*
Upper Incisor Vertical	mm	4.4	
Lower Incisor Protrusion	1.2 mm	2.6	
Lower Incisor Inclination	24.1°	25.6	
Upper Molar Position	21.0 mm	26.0	2+**
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	4.5	
Idealized Occlusal Plane – Axis Orbital Plane	----°	12.4	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	37.9	
Radius of Curve of Spee	mm	66.3	
Lip Embrasure	0.0 mm	4.6	1+*
Occlusal Plane Xi Distance	-1.4 mm	-6.1	1-*
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	48.7	
Horizontal Condylar Inclination left	----°	53.3	
Horizontal Condylar Inclination	----°	51.0	
Relative Condylar Inclination	----°	46.5	
Relative Condylar Inclination 6	----°	26.1	
Relative Condylar Inclination 7	----°	24.3	
Relative Condylar Inclination 8	----°	51.0	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Esthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Esthetic Plane	-2.9 mm	-2.2	

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial. The skeletal trend of the mandible is mesiofacial Skeletal class is II.

The maxilla is positioned extremely prognathic. The mandible is positioned prognathic with tendency to neutral. The lower facial height is normal. Dental class unknown.

The protrusion of the upper incisor is increased. The inclination of the upper incisor is increased. The protrusion of the lower incisor is normal. The inclination of the lower incisor is normal. The interincisal angle is

diminished. Occlusal concept: Unknown (data missing). No functional statement available.

## Explanation

Table 5

Deteminants	Norm	Value	Trend
Facial Axis	90.0°	92.7	
Facial Depth	91.5°	89.8	
Facial Taper	68.0°	70.6	
Mandibular Plane	21.5°	19.5	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	384.2	4 -***>
Facial Length Ratio	63.5%	75.8	6 +****>
Y Axis to S N	67.0°	69.8	
Y Axis (Downs)	61.2°	64.6	
S N to Gonion Gnathion Angle	32.6°	24.2	2 -**

## Treatment Plan:

1. Osteopathic treatment.
2. Psychological correction.
3. Selective grinding areas 18, 28, 38, 48.
4. Redefining the centric relation.
5. Casts in reference position.
6. Wax-up.
7. Long-term temporary crowns.
8. Second condylography and cephalometric analysis.
9. Producing final restorations.

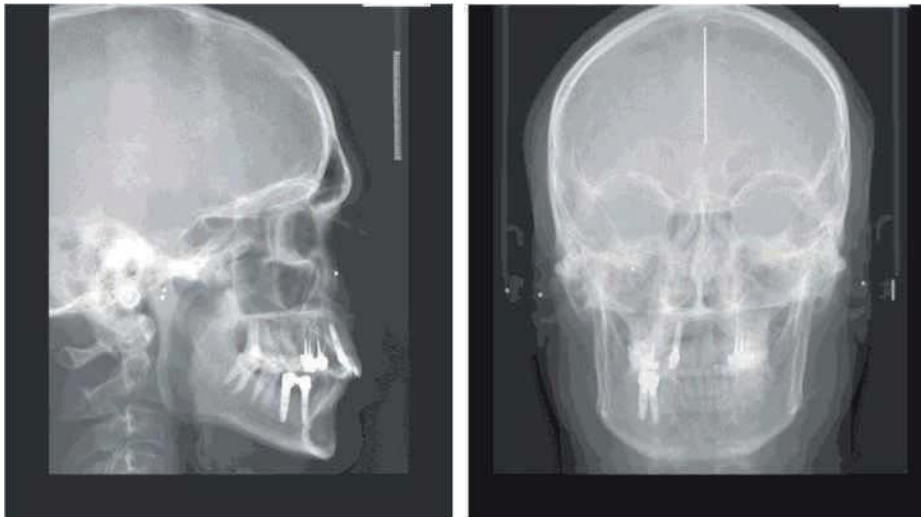
## Treatment objectives:

- Determining the centric relation.
- Creating anterior restriction.
- Producing canine guidance.
- Sagittal and transversal planes of the dental arches must fit together.

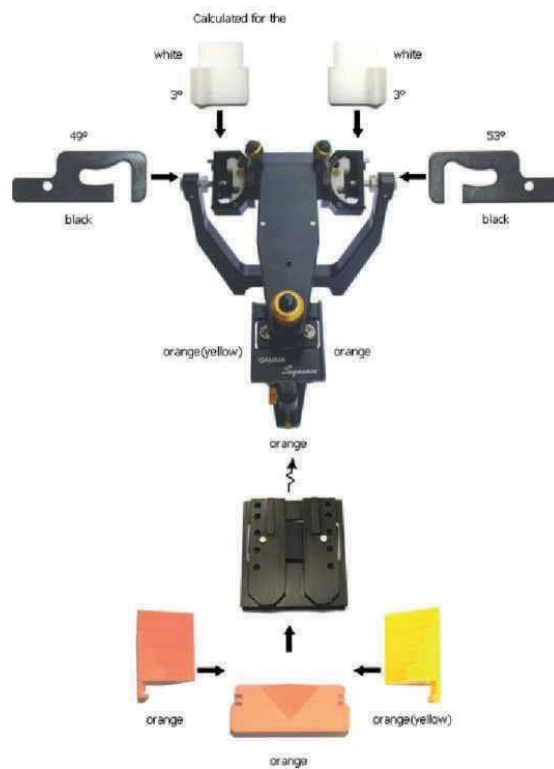


- Change in the occlusal plane with an disocclusion angle of 8-10°.
- Dental Class I.
- Dental Class II.

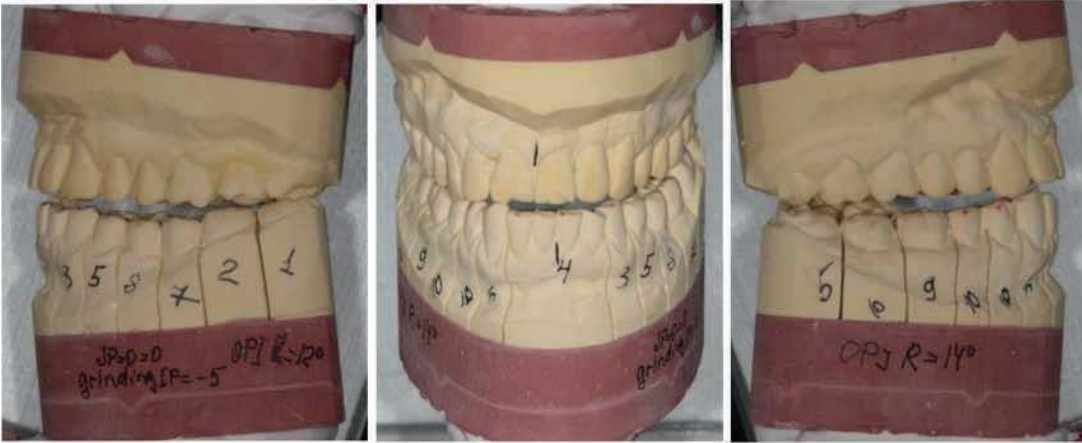
## Cephalometric Analysis



## Articulator Settings



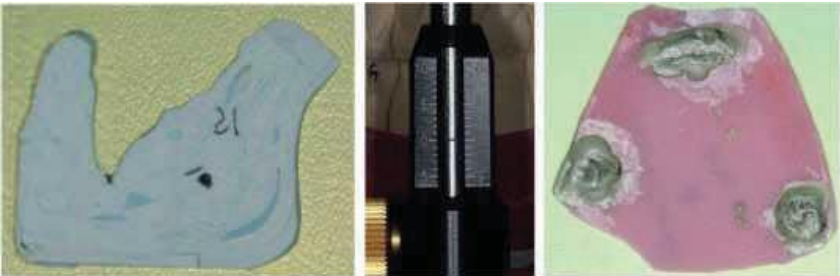
**Casts in the centric relation.**



**Casts in RP**



**Determining the anterior guidance.**

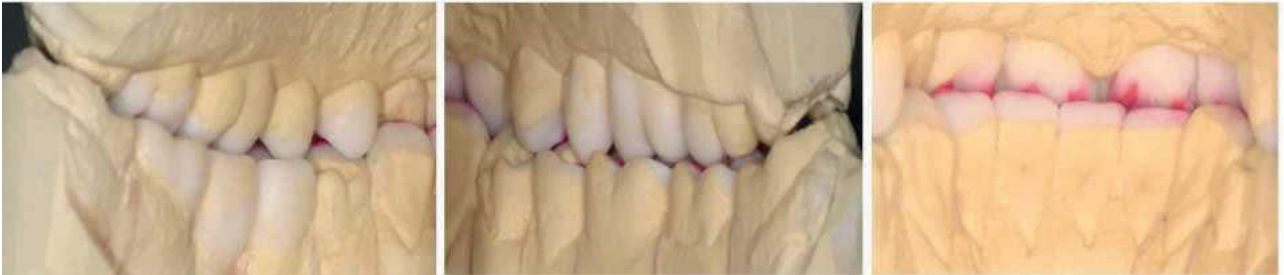
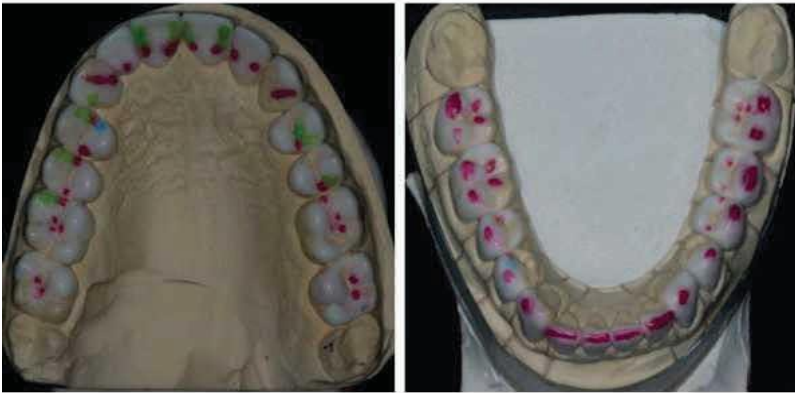
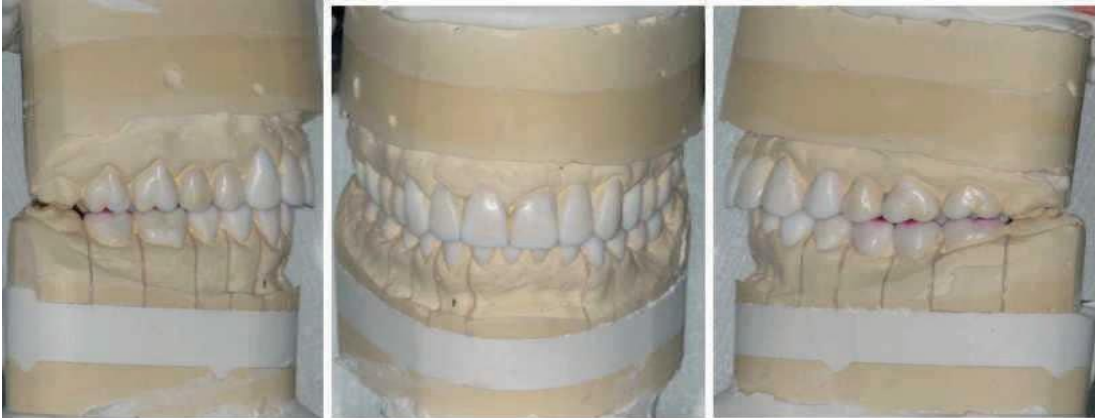


## Occlusal plane measurement.



We increased lower facial height by 3 mm and filled the gap between the central incisors by incisors of the maxilla and the mandible equally. The point of contact corresponds to the lip line. Upper 2 incisors from the palatal line, all stamp cusps, canine guidance and anterior restriction are restored. We carried out the preliminary selective grinding of area 18, 28, 38, 48. The incisal pin is decreased by 5 mm. After that, vertical positioning was carried out.

**Wax-up**



## Final Dental Restoration



## **Conclusion**

The application of data collection algorithms for the diagnosis and treatment of patients with TMJ and total dental restorations made it possible to halve the time for patients and reduce risks that arise 1.3 or 5 years after the treatment. Taking into consideration both static and functional parameters, we managed to achieve a synergy.

E.g. bruxism may originate in psychology first and then manifest in occlusion, being a common "solution to a deferred problem". And vice versa, an interfering contact on the occlusal surface of the tooth can cause the development of bruxism.

Therefore, I carried out treatment of patients with TMJ disorders and total restorations with leveraging on the sum of knowledge on the function, dysfunction and esthetics of the masticatory organ.

## Clinical case №10

Patient`s date of birth: 1984

Date of examination: 18.03.2021

A patient came to the medical center after orthodontic treatment with complaints on inability to chew food.

Physical examination revealed:

- Canines are inclined buccally.
- Midline shifted to the left.
- Dental class I with tendency to III.
- Abfractions and grinding facetts.
- Chipping of composite restorations.

**Intraoral picture. March 2021**





**Intraoral pictures. March 2021**



**Occlusal plane upper and lower jaw.**





**Dental class I with tendancy to III Cross bite left side**



**Trema 23. No posterior support and posterior OPI is steep with steps**



Table 1

Special Medical Analysis		
Do you have or did ever have an illness with regard to point 1-12?		
	Yes	No
1. Infections		X
2. Cardio-vascular systems		X
3. Respiratory systems		X
4. Digestive system		X
5. Metabolic system		X
6. Allergies	X	
7. Urogenital problems		X
8. Central nervous system		X
9. Psychological problems (therapy)		X
10. Rheumatic disease		X
11. Hormonal disease		X
12. Special problms		X
Main concern: aesthetic, low chewing efficacy		

Table 2

Dental History Analysis		Valuation	Yes	No		
1.	Do you have problems when you chew?			X		
2.	Do you have problems when you are talking?			X		
3.	Do you have problems in closing you teeth property?			X		
4.	Are any of your teeth especially sensitive?			X		
5.	Do you have problem when you open your mouth very wide?			X		
6.	Do you jaw joints noise and if so, on what side?			X		
7.	Do you have pain in the area of your jaw joints?			X		
8.	Do you suffer from headaches?			X		
9.	Do you suffer from cramps or spas in your head, neck or throat?			X		
10.	Do you have in general problems with your posture?			X		
	Occlusal Index	0.00				
11.	Have you ever had serious accident?			X		
12.	Did you have one or more oral intubations?			X		
13.	Have you ever had orthodontic treatment or ...			X		
14.	Have you had a treatment with splint?			X		
15.	Are you grinding or pressing with your teeth?			X		
16.	Do you think that treatment is necessary?			X		
17.	Do you think that is a serious disorder or illness?			X		
18.	When the last time you had dental treatment and what was done?					
19.	How would you describe your psychic behavior?					
	happy	sad	calm	excited	self-controlled	lack of self-control
	X					

Table 3

Preliminary Brainstem Nerve Analysis	
1.	N. olfactorious (analysis)
2.	N. opticus (analysis)
3.	N. oculo-motorius (clinical mobility)
4.	N. trochlearis (clinical mobility)
5.	N. trigeminus (clinical palpation and sensitiveness)
6.	N. abducens (clinical mobility)
7.	N. facials (clinical mobility)
8.	N. stato-acusticus (clinical check of the equilibrium and hearing)
9.	N. glosso-pharyngeus (clinical and analysis)
10.	N. vagus (analysis)
11.	N. accessories (clinical and analysis)
12.	N.hypoglossus (clinical and analysis)

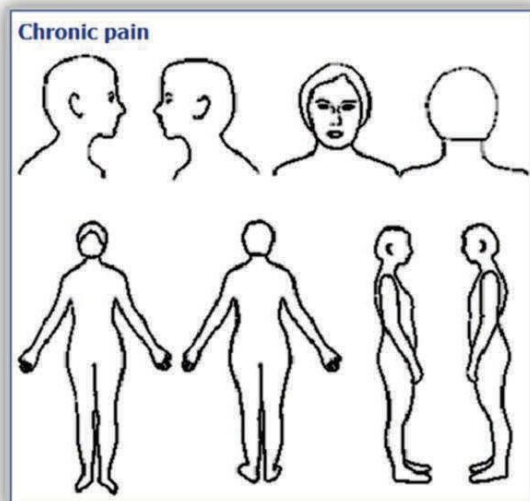
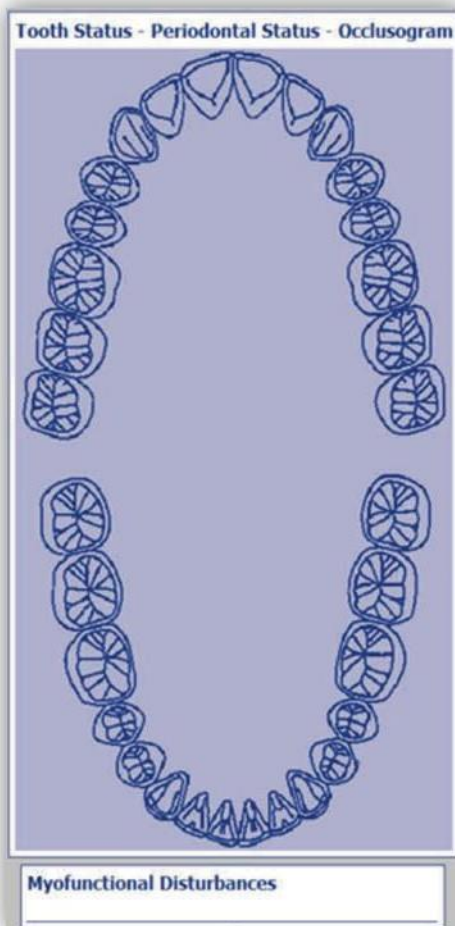


Table 4

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipitalal region				
3.a	M. temporalis ant.			X	
3.b	M. temporalis med.				
3.c	M. temporalis post.				
4.a	M. masseter (superficialis)				
4.b	M. masseter (deep)				
5.	Tuber maxillae				
6.	M. pterygoideus medialis				
7.	M. mylohyideus				
8.	M. digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M. sterno-cleido-mastoideus				
13.	M. omohyoides				
14.	Tongue				
15.	Comparative palpation of jaw joints *				
	a. Lateral poles, statically				

b. Lateral poles, in rotation				
c. Retral joint space				X
d. Lig. temporo-mandibulare				X
• Ligament and capsule, TMJ position				

Table 5

Sets of muscles:	
Muscle palpation	
Posture	1,2, 7, 12, 13, 14
Closing	3a, 3b, 4a, 4b, 5
Opening / Protraction	8, 9, 10
Retraction	3c, 8
Medio-/Laterotraction	6, 3a, 4a
Hyoid-Position	8, 9, 10, 11, 13
Functions	7, 8, 9,10, 11, 14
TMJ	15a, 15b, 15c, 15d
Closing, TMJ	

### List of problem:

- No posterior support.
- No retrusive control.
- No anterior guidance.
- Cross bite left side.
- Parodontal problems.
- Esthetics.
- No chewing efficacy.

This mean that there are indications for performing a considerable functional instrumental analysis: condylography, model analysis, cephalometric analysis, aesthetic analysis.

# Condylography

## Hinge axis kinematic vs Arbitrary

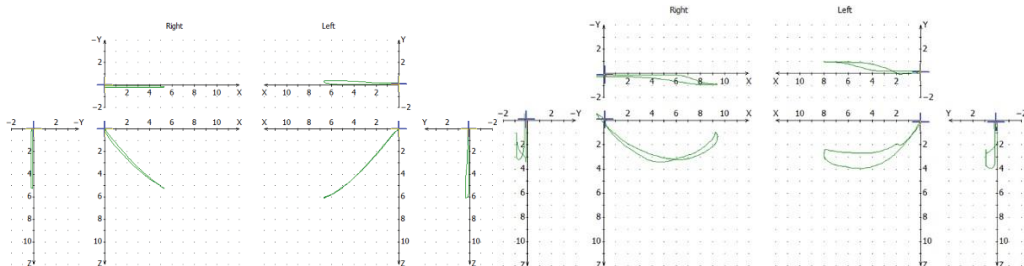


Condylography imaging revealed the following:

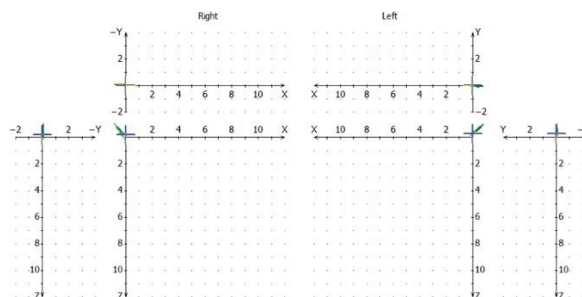
- Decreasing protrusion-retrusion path length
- Weakening TMJ ligamentous apparatus

Protrusion/retrusion (left)

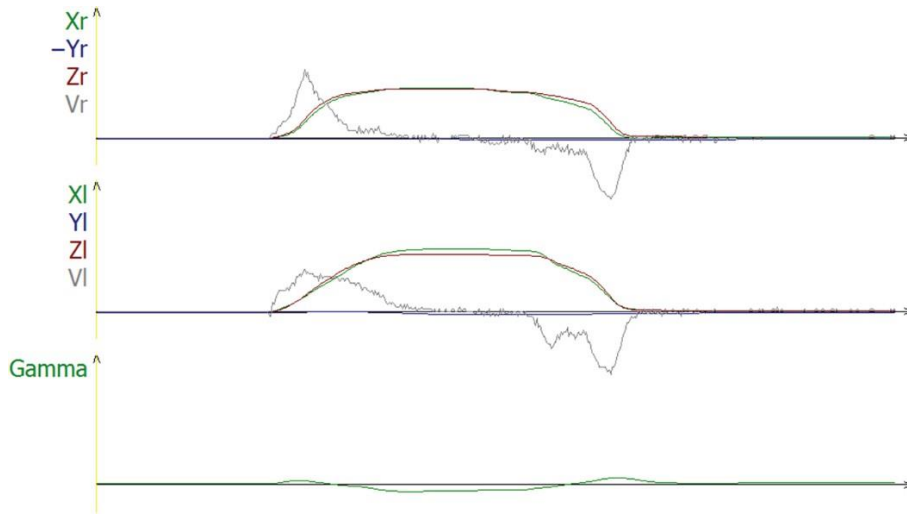
Open-close



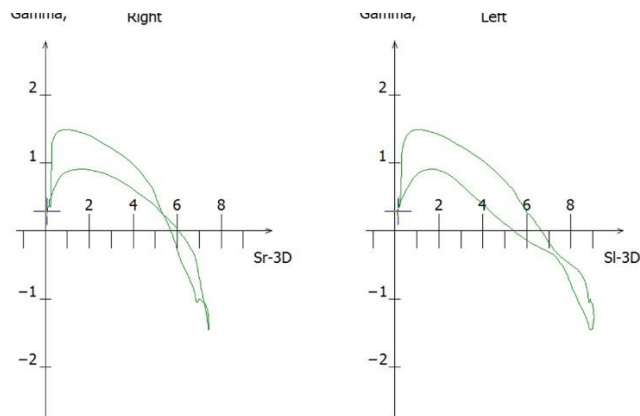
Speech 50-60 Interference in frontal area and backward movement



# Time curve. Muscle problems

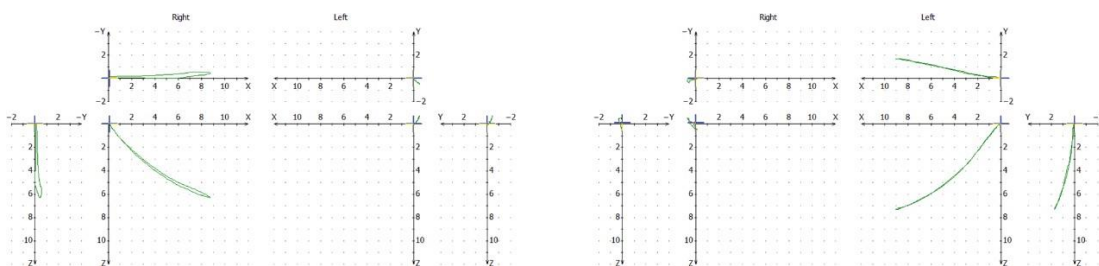


# Gamma rotation – norm

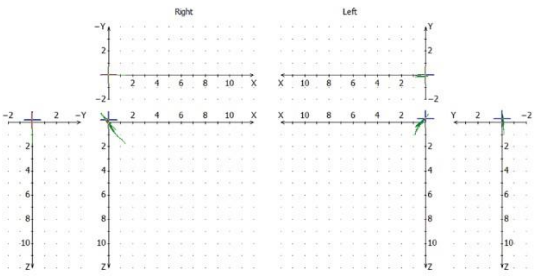


# Mediotrusion (right)

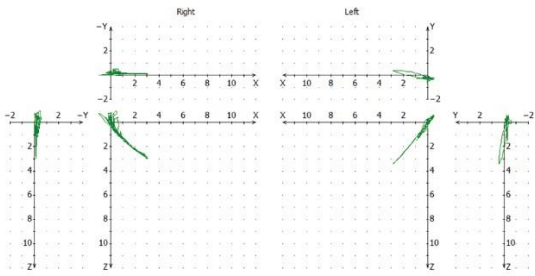
# Mediotrusion (left)



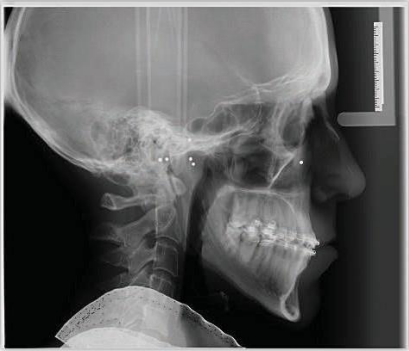
# Speech 60-70



# Mastication



# Lateral X ray



# Cephalometric Analysis

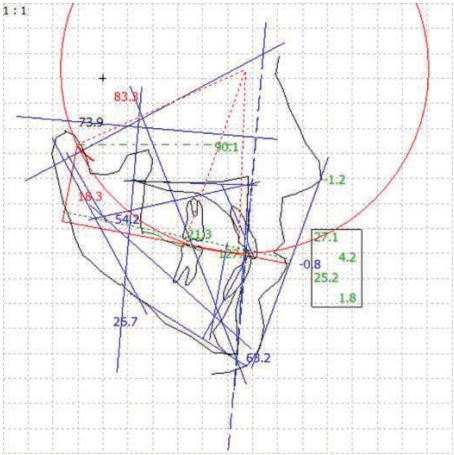


Table 5

<b>Slavicek Analysis</b>			
<b>Skeletal Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Facial Axis	90.0	83.2	2D**
Facial Depth	91.5	90.0	
Mandibular Plane	21.5	26.7	1D*
Facial Taper	68.0	63.1	1D*
Mandibular Arc	31.2	18.3	3D***
Maxillary Position	65.0	58.7	2-**
Convexity	-1.0 mm	-1.2	
Lower Facial Height (by R. Slavicek)	45.1	54.2	1+*
Lower Facial Height to Point D	50.3	57.1	1+*
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	131.3	127.6	
Upper Incisor Protrusion	5.6 mm	4.2	
Upper Incisor Inclination	26.4	27.1	
Upper Incisor Vertical	mm	0.6	
Lower Incisor Protrusions	0.9 mm	1.8	
Lower Incisor Inclination	22.3	25.2	
Upper Molar Position	21.0 mm	21.2	
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	-----	10.6	
Idealized Occlusal Plane – Axis Orbital Plane	-----	12.8	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	30.9	1-*
Radius of Curve of Spee	----- mm	73.9	
Lip Emrasure	0.0 mm	-2.1	
Occlusal Plane Xi Distance	-1.4 mm	-4.9	
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Sagittal Condylar Inclination right	-----	46.6	
Sagittal Condylar Inclination left	-----	47.0	
Sagittal Condylar Inclination	-----	46.8	
Relative Condylar Inclination	-----	36.2	
Relative Condylar Inclination 6	-----	24.4	
Relative Condylar Inclination 7	-----	27.1	
Relative Condylar Inclination 8	-----	31.2	
Anterior Guidance (S-AOP)			
Relative Anterior Guidance			
<b>Aesthetic Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Aesthetic Plane	-2.9 mm	-0.7	1+*

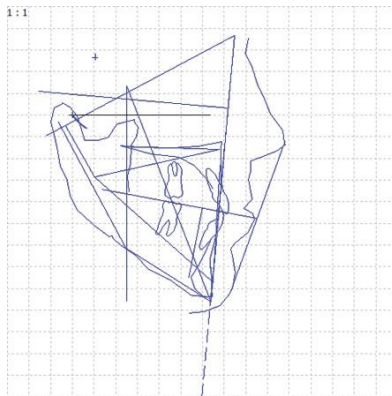
### Important:

- Lower facial height – increased.
- OPI = 10 degrees.
- SCI R=L= 47 degrees.
- Interincisal angle- 127 degrees.



- Anterior Guidance – 57 degrees.
- DOA R= 7 degrees.
- DOA L= -3 degrees.
- Maxilla position – retrognathic.
- Mandible position – retrognathic.
- Dental class I right and III left side.
- Cross bite.

## **Slavicek Interactive Verbal Analysis**



The skeletal trend of the skull is dolichofacial.

The skeletal trend of the mandible is extremely dolichofacial Skeletal class is III with tends to I.

The maxilla is positioned retrognathic.

The mandible is positioned neutral, with tendency to retrognathic.

The lower facial height is increased.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is normal.

The protrusion of the incisor is normal.

The inclination of the lower incisor is normal.

The interincisal angle is normal.

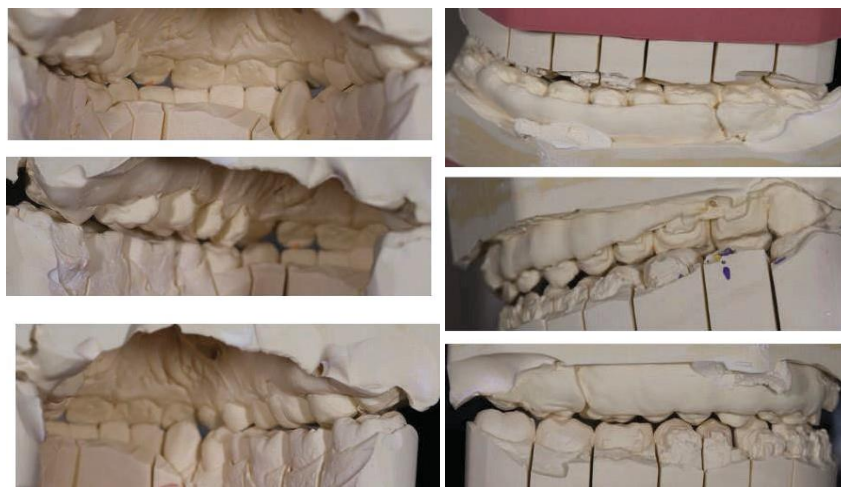
Occlusal concept: Tendency to group function.

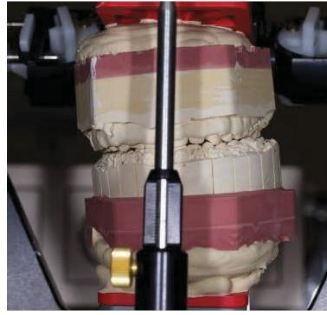
## Explanation

Table 6

Determinants	Norm	Value	Trend
Facial Axis	90.0°	83.2	2D**
Facial Depth	91.5°	90.0	
Facial Taper	68.0°	63.1	1D*
Mandibular Plane	21.5°	26.7	1D*
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	401.7	2+**
Facial Length Ratio	63.5%	72.2	4+***>
Y Axis to S N	67.0°	73.3	2+**
Y Axis (Downs)	61.8°	59.5	
S N to Gonion Gnathion Angle	31.6°	41.7	2+**

Casts are mounted in the articulator in RP with plastic template after first condilography with braces on teeth.





Casts mounted in articulator in Reference position.



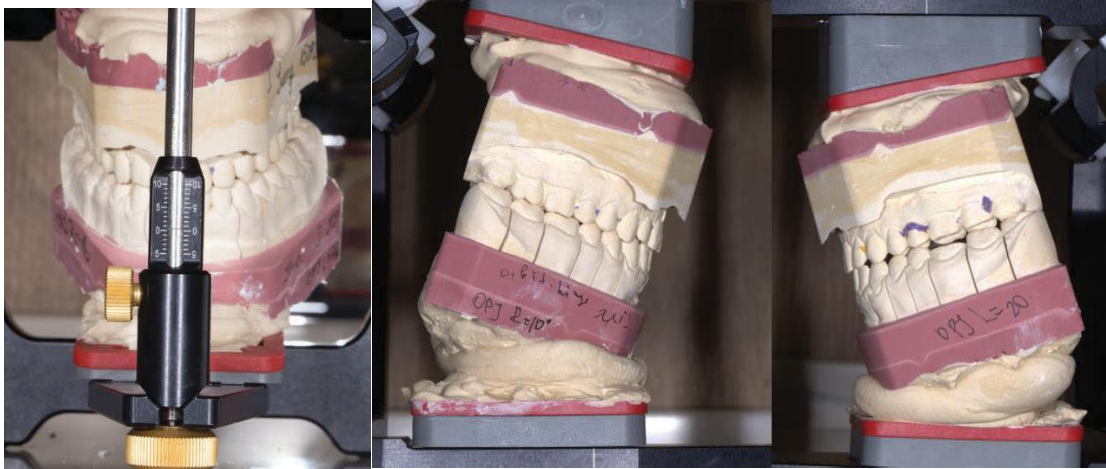
### **Treatment objectives:**

- Determine Vertical dimension.
- Determine OPI and AG.
- Determine CR.
- Create Posterior support.
- Mouth hygiene – parodontal treatment.
- Retrusive control.

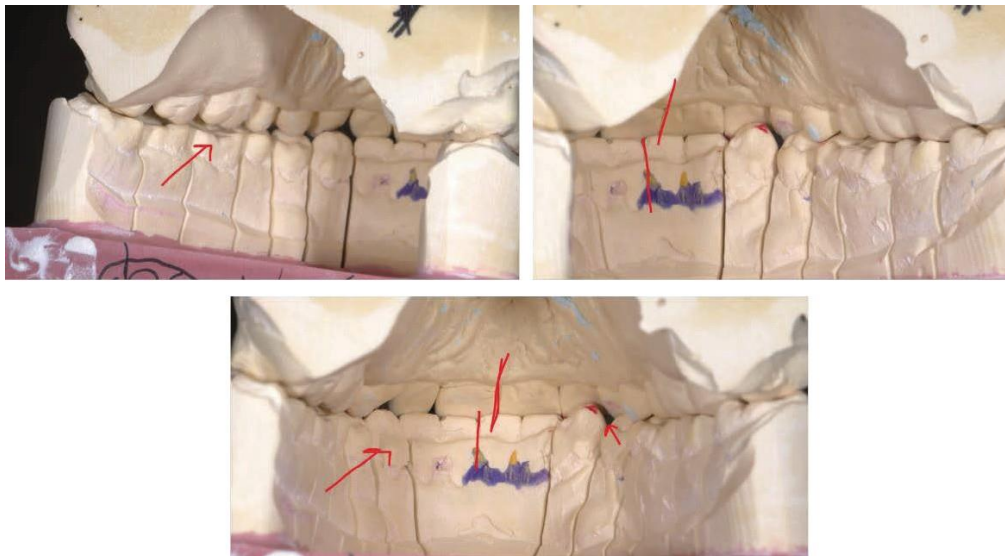
### **Treatment plan:**

1. CR determination.
2. WAX-UP.
3. LONG TIME TEMPORARIES.
4. FINAL RESTORATIONS.

Casts mounted in articulator.



- NO posterior support.
- 41-31 are inclined lingually.
- upper frontal incisors are inclined palatally.
- Interference 28-38.
- No retrusive control.

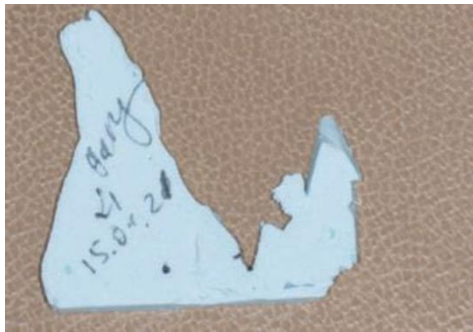


21 – anterior guidance on lower 1/3 of 21. The length of the path -1 mm.

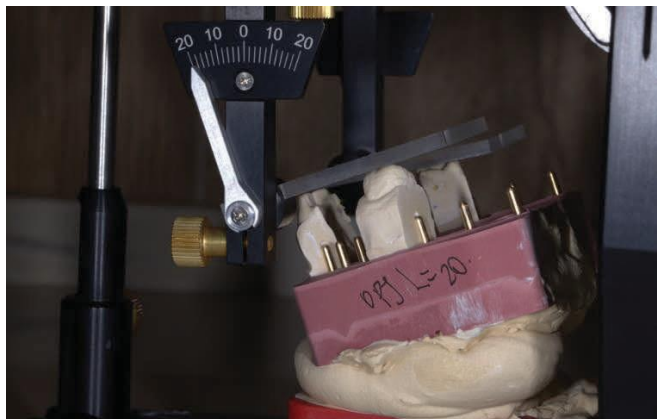
Canine guidance – 3 mm both side on mesial path.



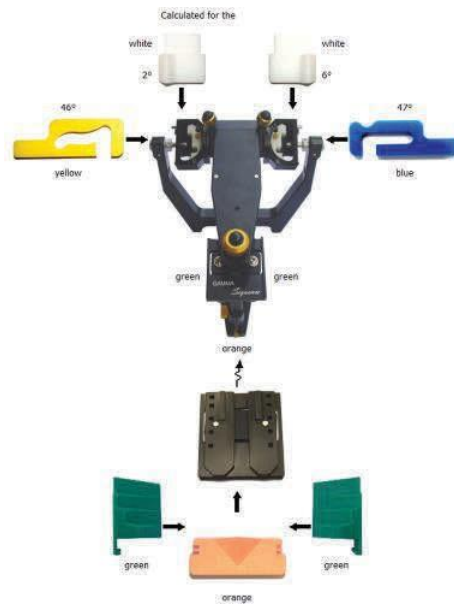
Anterior Guidance – 57 degrees to AOP – (axis orbital plane).



OPI R = 10, OPI L= 20.



## Articulator settings (Function)



### Important

Lower facial height – increased.

OPI R = 10 degrees.

OPI L – 10 degrees (increase VD +1 mm) and increase the length of 31-41 +2 mm. At the same time decrease the length of 36 and 46 for 2 mm

OPI 36 and 46 = 6 degrees SCI R=L= 47 degrees.

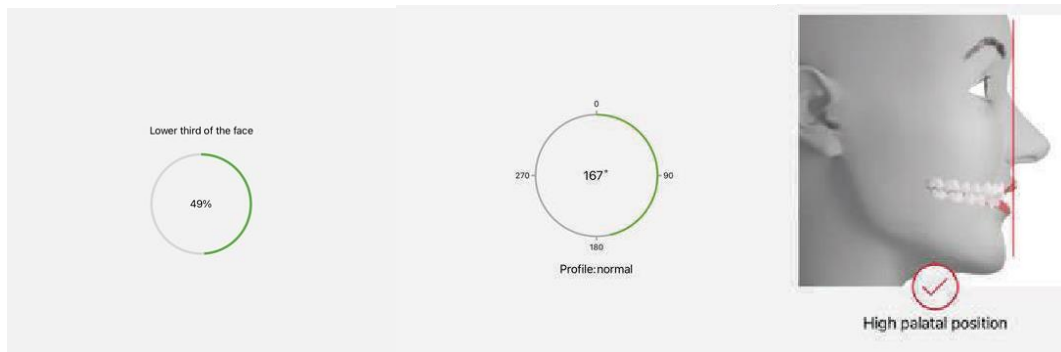
Interincisal angle - 127 degrees Anterior Guidance – 57 degrees Maxilla position – retrognathic.

Mandibule position – retrognathic Dental class I.

Cross bite left side.

# Aesthetic analysis

## Face Profile



F and S sound – rotational component.

### VIDEOS OF PATIENT

Right lateral view of "F" Sound



Left lateral view of "F" Sound



Natural smile



"S" Sound

Natural rest position

### VIDEOS OF PATIENT

Right lateral view of "F" Sound



Left lateral view of "F" Sound



Natural smile



"S" Sound

Natural rest position

Table 7




ESTHETIC INFORMATION	
HIGHLY DEMANDING PATIENT	Yes
ALIGNMENT	No set
APPEARANCE	Young
TOOTH TYPE	Ovoid
MACRO TEXTURE	Slight
COLOR CHARACTERIZATION	Wide and uniform
SMILE LINE	Average
The visibility of the anterior teeth suggest y	
LABIAL CORRIDOR	Absent
Decrease the buccal volume of the posteri	
SMILE WIDTH	6-8
	
INTERINCISAL LINE INCLINATION	Vertical
Missing information.	

Table 8

COLOR SELECTION	
SHADE GUIDE	
DESIRED COLOR OF THE RESTORATION	A2
Value	High <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Low
ABUTMENT COLOR	
	



Table 9

FUNCTIONAL INFORMATION	
ORIGINAL OVERBITE	0.1
FINAL OVERBITE	1.1
ORIGINAL OVERJET	0.1
FINAL OVERJET	1
VDO ALTERATION	0
ARTICULATOR	Fully-adjustable
IMMEDIATE BENNETT	Custom
BENNETT ANGLE	Custom
CONDYLAR EMINANCE ANGLE	Custom
DISOCCLUSION	Canine-guide, Incisal guidance
FACEBOW	arbitrary

Table 10

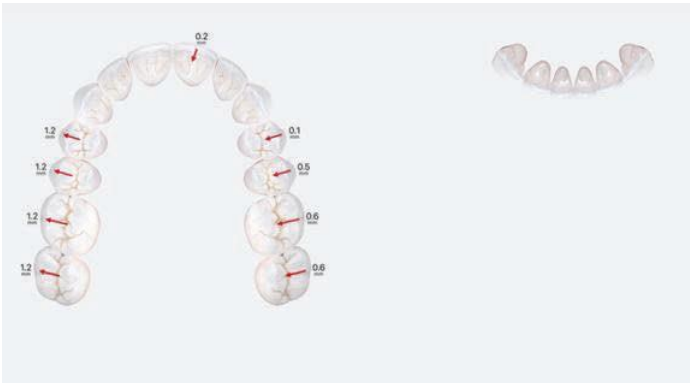
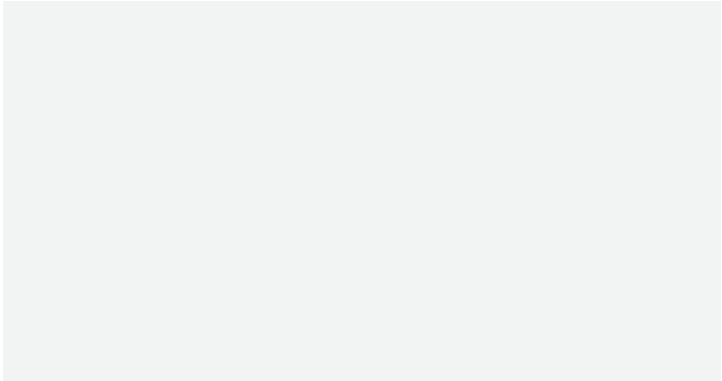
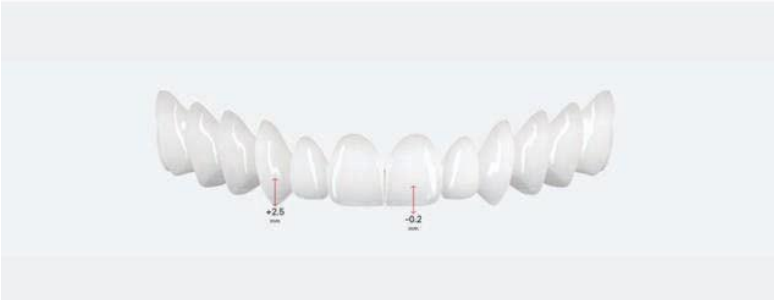

BUCCO-LINGUAL CHANGES

FINAL NOTES


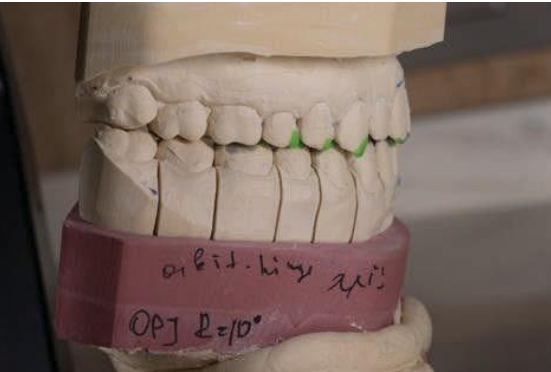
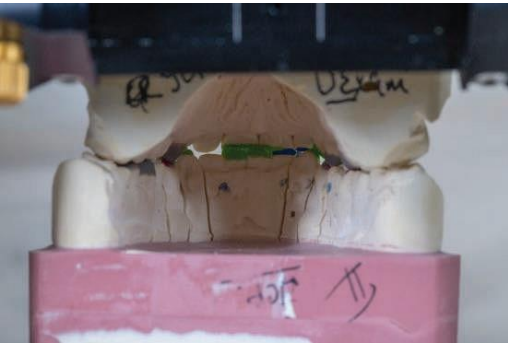
Table 11

DIMENSIONAL CHANGES	
	
ORIGINAL LENGTH OF THE REFERENCE CENTRAL INCISOR	1.2mm
change length	-0.2mm
ORIGINAL WIDTH OF THE REFERENCE CENTRAL INCISOR	0.8mm
change width	0mm
	
ORIGINAL LENGTH OF THE REFERENCE CENTRAL INCISOR	1mm
change length	0mm
ORIGINAL WIDTH OF THE REFERENCE CENTRAL INCISOR	0.7mm
change width	0mm

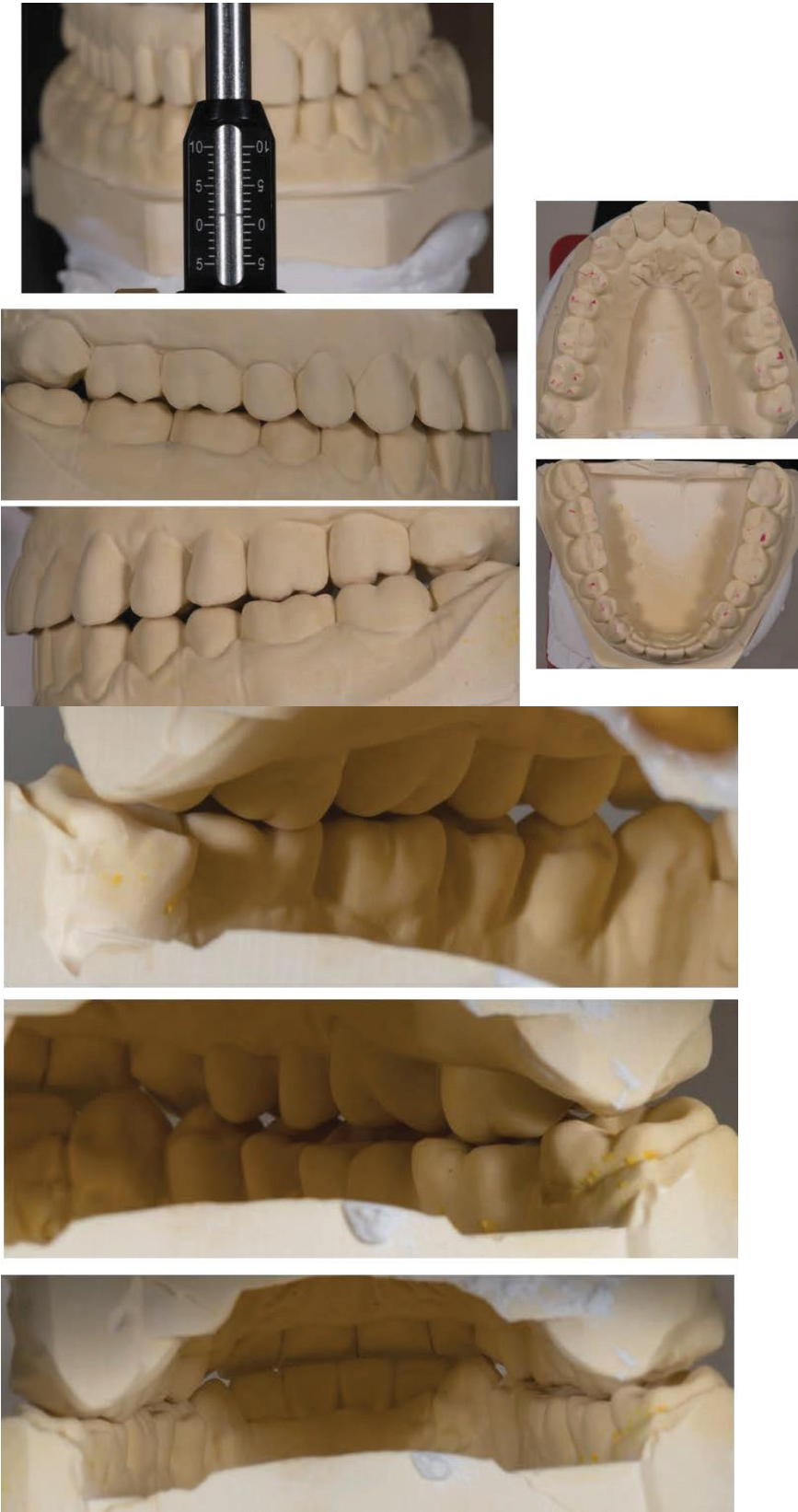
### Esthetic:

- +2 mm lower incisors.
- +2 mm upper incisors.
- VD +1 mm.
- Central line is shifted left.
- Change inclination of upper and lower incisors.

Wax up



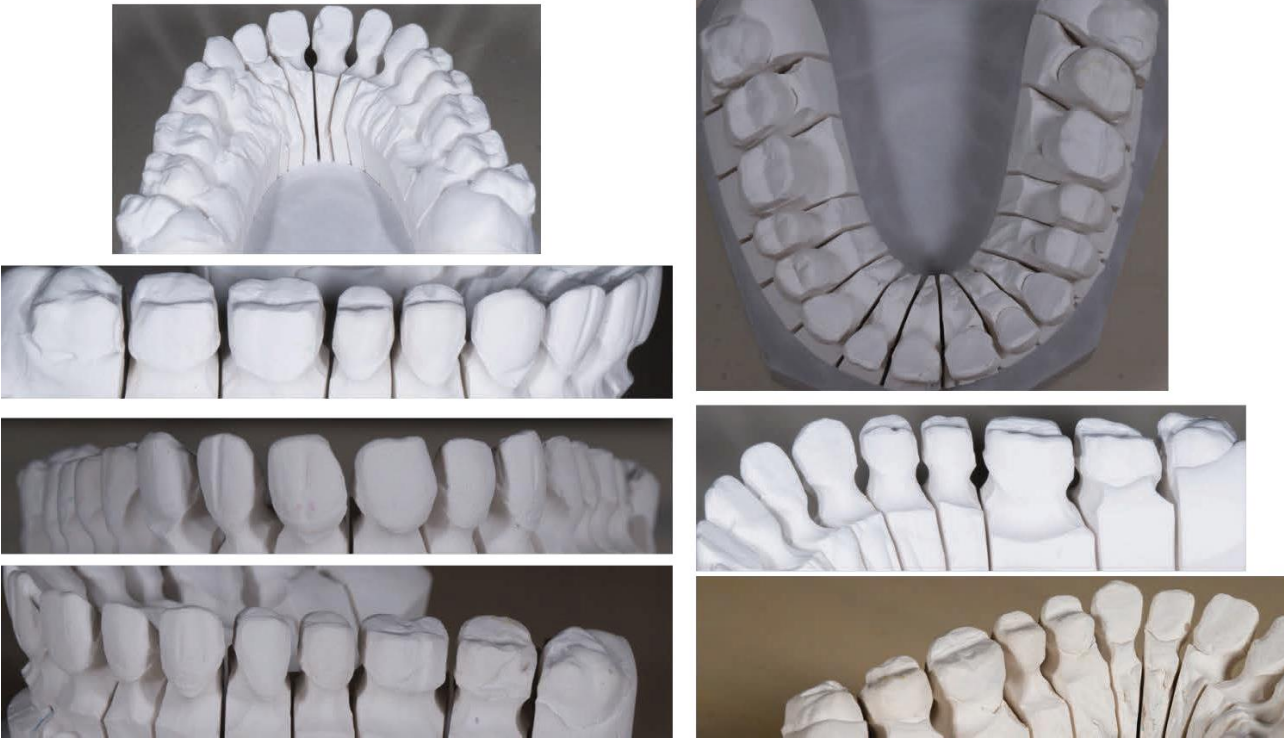
**Wax up**



**Mock-up**



**Teeth preparation**



## Finding Final-Diagnostics

Table 11

Special Medical Analysis		
Do you have or did ever have an illness with regard to point 1-12?		
	Yes	No
1.	Infections	X
2.	Cardo-vascular systems	X
3.	Respiratory systems	X
4.	Digestive system	X
5.	Metabolic system	X
6.	Allergies	X
7.	Urogenital problems	X
8.	Central nervous system	X
9.	Psychological problems (therapy)	X
10.	Rheumatic disease	X
11.	Hormonal disease	X
12.	Special problms	X
Main concern: aesthetic, low chewing efficacy		

Table 12

Dental History Analysis		Valuation	Yes	No		
1.	Do you have problems when you chew?			X		
2.	Do you have problems when you are talking?			X		
3.	Do you have problems in closing you teeth property?			X		
4.	Are any of your teeth especially sensitive?			X		
5.	Do you have problem when you open your mouth very wide?			X		
6.	Do you jaw joints noise and if so, on what side?			X		
7.	Do you have pain in the area of your jaw joints?			X		
8.	Do you suffer from headaches?			X		
9.	Do you suffer from cramps or spas in your head, neck or throat?			X		
10.	Do you have in general problems with your posture?			X		
	Occlusal Index	0.00				
11.	Have you ever had serious accident?			X		
12.	Did you have one or more oral intubations?			X		
13.	Have you ever had orthodontic treatment or ...			X		
14.	Have you had a treatment with splint?			X		
15.	Are you grinding or pressing with your teeth?			X		
16.	Do you think that treatment is necessary?			X		
17.	Do you think that is a serious disorder or illness?			X		
18.	When the last time you had dental treatment and what was done?					
19.	How would you describe your psychic behavior?					
	happy	sad	calm	excited	self-controlled	lack of self-control
	X					

Table 13

Preliminary Brainstem Nerve Analysis	
1.	N. olfactorious (analysis)
2.	N. opticus (analysis)
3.	N. oculo-motorius (clinical mobility)
4.	N. trochlearis (clinical mobility)
5.	N. trigeminus (clinical palpation and sensitiveness)
6.	N. abducens (clinical mobility)
7.	N. facials (clinical mobility)
8.	N. stato-acusticus (clinical check of the equilibrium and hearing)
9.	N. glosso-pharyngeus (clinical and analysis)
10.	N. vagus (analysis)
11.	N. accessories (clinical and analysis)
12.	N.hypoglossus (clinical and analysis)

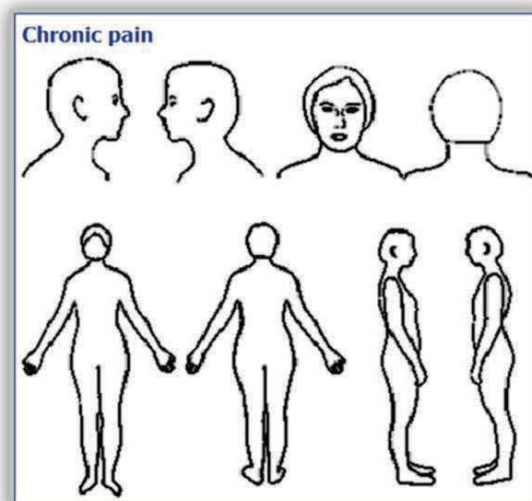
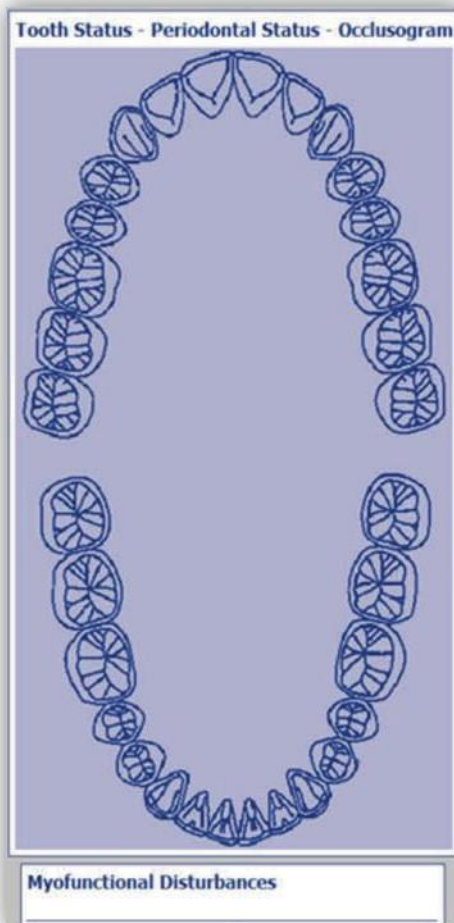


Table 14

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipitalal region				
3.a	M. temporalis ant.				
3.b	M. temporalis med.				
3.c	M. temporalis post.				
4.a	M. masseter (superficialis)				
4.b	M. masseter (deep)				
5.	Tuber maxillae				
6.	M. pterygoideus medialis				
7.	M. mylohyideus				
8.	M. digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M. sterno-cleido-mastoideus				
13.	M. omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints *				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig. temporo-mandibulare				
<ul style="list-style-type: none"> <li>• Ligament and capsule, TMJ position</li> </ul>					



# Final Restorations





## Clinical case №11

Patient L (date of birth 1954)

Date of examination: 03.06.2021

- Violation of chewing function.
- Aesthetic problem.
- Hypersensitivity of the teeth.
- Problems with speech.

### Smile line



### Intraoral picture June 2021.





**Dental class I with tendency to III.**



**Diagnostic cast of the upper jaw.**





**Diagnostic cast of the lower jaw.**



# Medical Analyses and Dental Analyses

## Special Medical Analyses

Table 1

Special Medical Analysis		
Do you have or did ever have an illness with regard to point 1-12?		
	Yes	No
1.	Infections	X
2.	Cardo-vascular systems	X
3.	Respiratory systems	X
4.	Digestive system	X
5.	Metabolic system	X
6.	Allergies	X
7.	Urogenital problems	X
8.	Central nervous system	X
9.	Psychological problems (therapy)	X
10.	Rheumatic disease	X
11.	Hormonal disease	X
12.	Special problems	X
Main concern: aesthetic, low chewing efficacy		

Table 2

Dental History Analysis		Valuation	Yes	No
1.	Do you have problems when you chew?	3	X	
2.	Do you have problems when you are talking?	2	X	
3.	Do you have problems in closing you teeth property?			X
4.	Are any of your teeth especially sensitive?	2	X	
5.	Do you have problem when you open your mouth very wide?			X
6.	Do you jaw joints noise and if so, on what side?			X
7.	Do you have pain in the area of your jaw joints?			X
8.	Do you suffer from headaches?	2	X	
9.	Do you suffer from cramps or spas in your head, neck or throat?			X
10.	Do you have in general problems with your posture?			X
	Occlusal Index	2.25		
11.	Have you ever had serious accident?			X
12.	Did you have one or more oral intubations?			X
13.	Have you ever had orthodontic treatment or ...			X
14.	Have you had a treatment with splint?			X
15.	Are you grinding or pressing with your teeth?			X
16.	Do you think that treatment is necessary?			X

17.	Do you think that is a serious disorder or illness?					X	
18.	When the last time you had dental treatment and what was done?	May 2021 operation implantation					
19.	How would you describe your psychic behavior?	happy	sad	calm	excited	self-controlled	lack of self-control
						X	

Table 3

Preliminary Brainstem Nerve Analysis	
1.	N. olfactorious (analysis)
2.	N. opticus (analysis)
3.	N. occulo-motorius (clinical mobility)
4.	N. trochlearis (clinical mobility)
5.	N. trigeminus (clinical palpation and sensitiveness)
6.	N. abducens (clinical mobility)
7.	N. facials (clinical mobility)
8.	N. stato-acusticus (clinical check of the equilibrium and hearing)
9.	N. glosso-pharyngeus (clinical and analysis)
10.	N. vagus (analysis)
11.	N. accessories (clinical and analysis)
12.	N.hypoglossus (clinical and analysis)

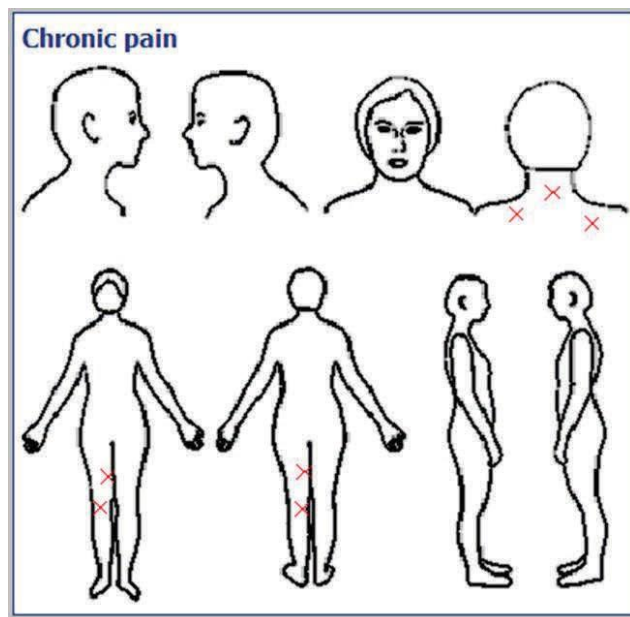
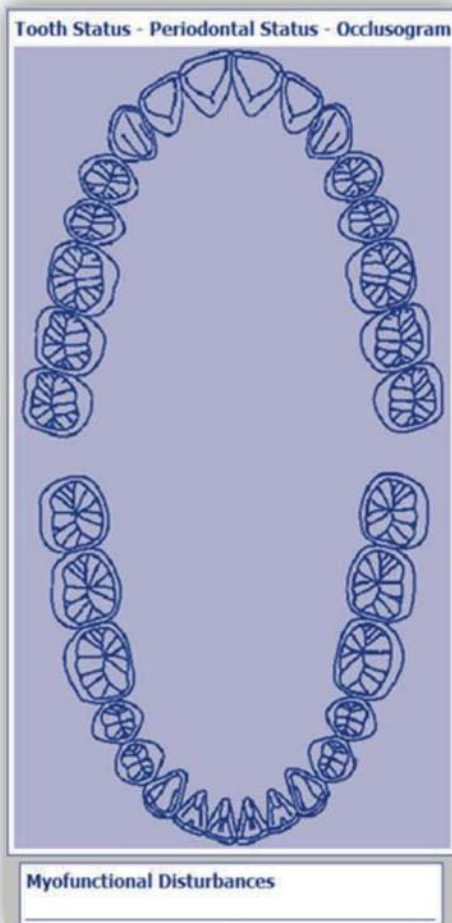


Table 4

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipitalal region				
3.a	M. temporalis ant.				
3.b	M. temporalis med.				
3.c	M. temporalis post.				
4.a	M. masseter (superficialis)				
4.b	M. masseter (deep)				
5.	Tuber maxillae			X	
6.	M. pterygoideus medialis		X		X
7.	M. mylohyideus				
8.	M. digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M. sterno-cleido-mastoideus				
13.	M. omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints *				
	a) Lateral poles, statically				X
	b) Lateral poles, in rotation				X
	c) Retral joint space				
	d) Lig. temporo-mandibulare				X
<ul style="list-style-type: none"> <li>• Ligament and capsule, TMJ position</li> </ul>					

## Muscle palpation

### Movement Muscles

Posture - 1,2, 7, 12, 13, 14

Closing - 3a, 3b, 4a, 4b, 5

Opening / Protraction - 8, 9, 10

Retraction 3c, 8

Medio-/Laterotrraction - 6, 3a, 4a

Hyoid-Position - 8, 9, 10, 11, 13

Functions - 7, 8, 9,10, 11, 14

TMJ - 15a, 15b, 15c, 15d



## Closing, Medio-/Laterotrraction, TMJ

### List of problem:

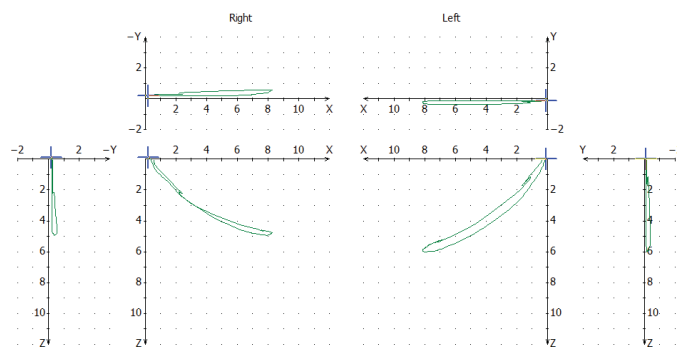
- No posterior support.
- No retrusive control.
- No anterior guidance.
- Gum recession.
- Esthetics.
- No chewing efficacy.

### Treatment objectives:

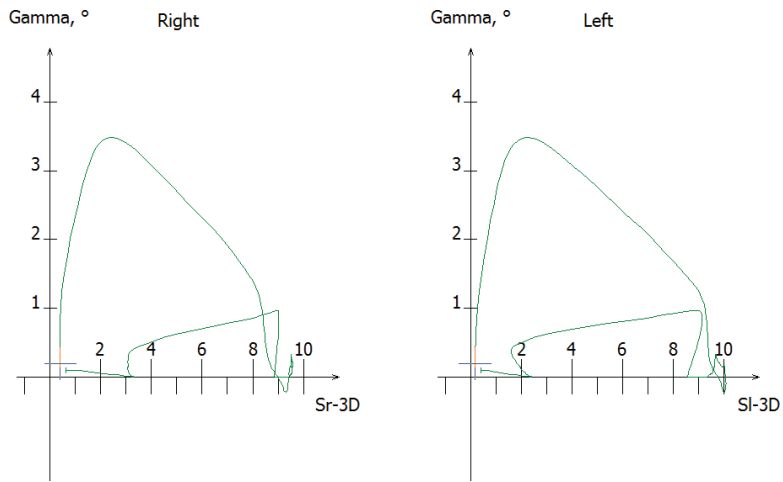
- Determine OPI and AG.
- Determine CR.
- Create Posterior support.
- Root canal treatment 22.
- Prosthetic on implants.
- Retrusive control.

## Results of condylography

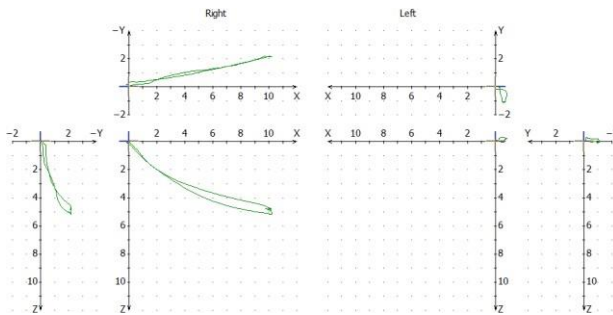
### Protrusion/retrusion (left)



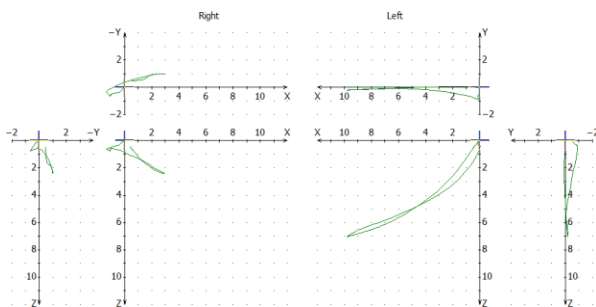
# Ligament problems Gamma rotation – norm



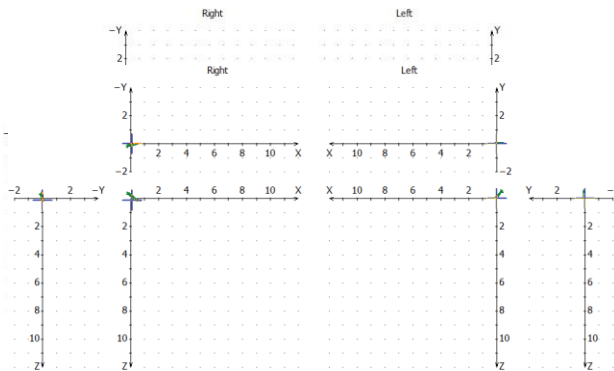
## Mediotruson (right)



## Mediotruson (left)



## Negative Bennett movement – disc adhesion, Open-close

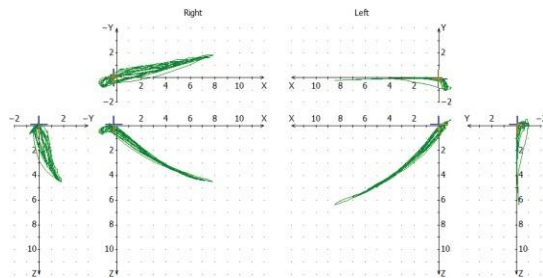


## Loop of digastric muscle at the open – during speech

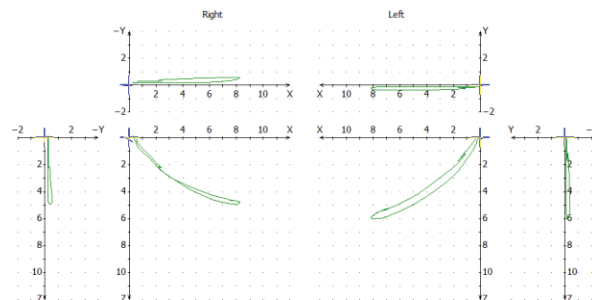
Speech 50-60

Interference in frontal area and backward movement

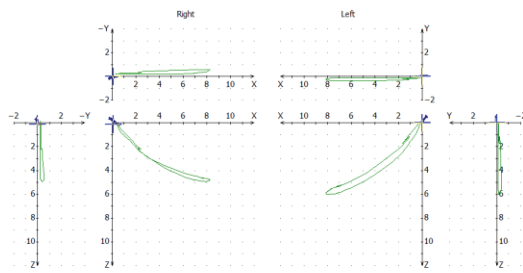
## Mastication



## Protrusive component and absence of lateral movement Brux



## Pure rotation during bruxing Speech 50-60



Resurtrusion. Interference on canines and anterior Frontal teeth? Disc adhesion?

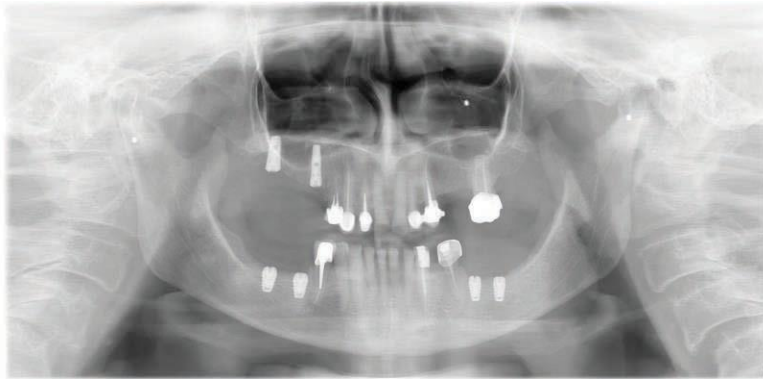
Hinge axis kinematic vs Arbitrary



## Lateral X ray



# OPG



## Cephalometric Analysis

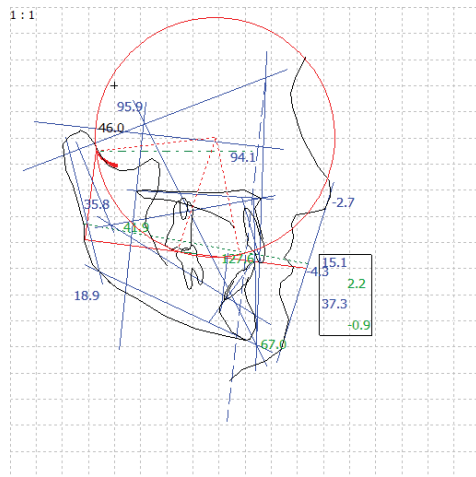


Table 5

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	95.9	1B*
Facial Depth	89.0°	94.1	1+*
Mandibular Plane	24.0°	18.9	1B*
Facial Taper	68.0°	66.9	
Mandibular Arc	29.0°	35.7	1B*
Maxillary Position	65.0°	64.7	
Convexity	0.0 mm	-2.6	1V*
Lower Facial Height (by R. Slavicek)	43.7°	41.8	
Lower Facial Height to Point D	50.3°	45.2	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	127.5	
Upper Incisor Protrusion	4.3 mm	2.2	
Upper Incisor Inclination	23.1°	15.0	1-*
Upper Incisor Vertical	mm	0.1	
Lower Incisor Protrusions	1.2 mm	-0.9	

Lower Incisor Inclination	24.1°	37.3	1+*
Upper Molar Position	18.0 mm		
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	-----°	7.5	
Idealized Occlusal Plane – Axis Orbital Plane	-----°	11.3	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	34.0	
Radius of Curve of Spee	----- mm	45.9	
Lip Emrasure	0.0 mm	-2.4	
Occlusal Plane Xi Distance	-1.4 mm	-6.8	1-*
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Sagittal Condylar Inclination right	-----°	42.7	
Sagittal Condylar Inclination left	-----°	47.1	
Sagittal Condylar Inclination	-----°	44.9	
Relative Condylar Inclination	-----°	37.4	
Relative Condylar Inclination 6	-----°	39.2	
Relative Condylar Inclination 7	°		
Relative Condylar Inclination 8	°		
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
<b>Aesthetic Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Aesthetic Plane	-2.3 mm	-4.3	1-*

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is brachyfacial.

The skeletal trend of the mandible is brachyfacial Skeletal class is III with tends to I.

The maxilla is positioned neutral.

The mandible is positioned prognathic.

The lower facial height is normal Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is diminished.

The protrusion of the incisor is normal.

The inclination of the lower incisor is increased.

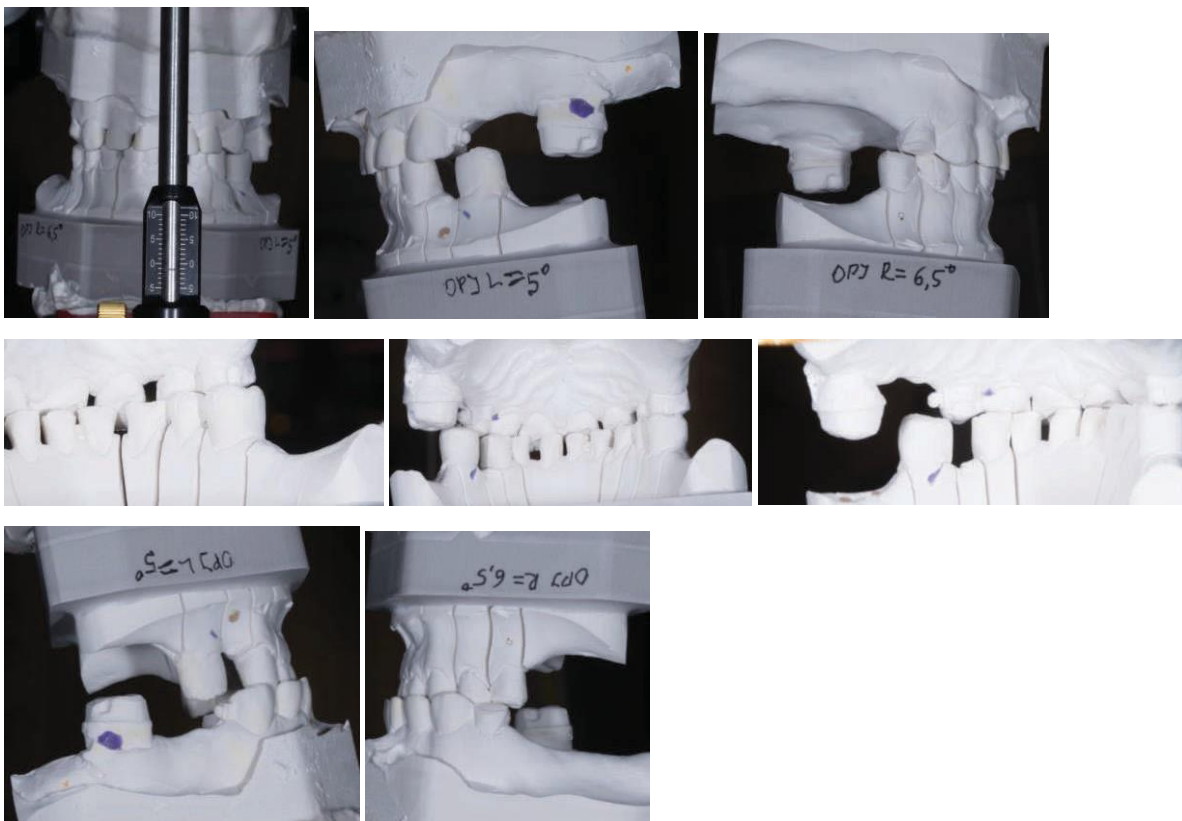
The interincisal angle is normal.

Occlusal concept: Unknown (data missing).

## Explanation

Determinants	Norm	Value	Trend
Facial Axis	90.0	95.9	1B*
Facial Depth	89.0	94.1	1+*
Facial Taper	68.0	66.9	
Mandibular Plane	24.0°	18.9	1B*
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	386.0	3-***
Facial Length Ratio	63.5%	71.5	4+***>
Y Axis to S N	67.0°	64.3	
Y Axis (Downs)	61.2°	55.0	2-**
S N to Gonion Gnathion Angle	32.6°	26.0	1-**

**Casts are mounted in the articulator in RP with plastic template after condilography.**

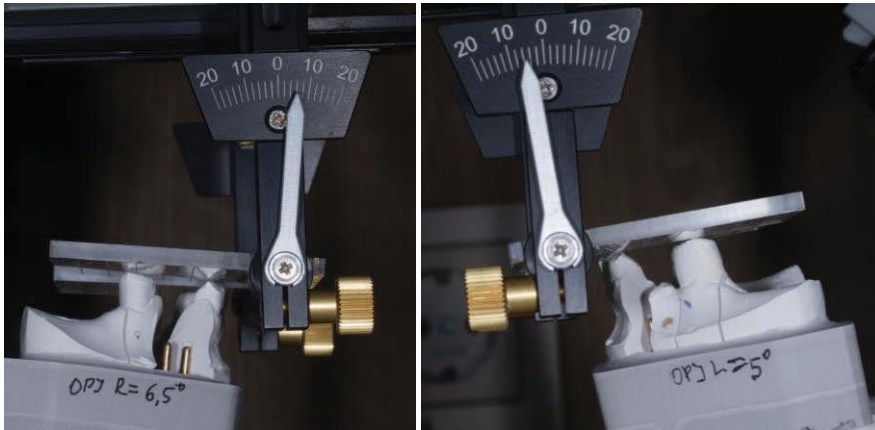


## Treatment plan:

- CR determination
- WAX-UP
- LONG TIME TEMPORARIES and implants loading

## ➤ FINAL RESTORATIONS

OPI R = 6,5, OPI L= 5.



### Articulator settings

Lower facial height – normal.

OPI R = 6 degrees.

OPI L = 6 degrees (increase VD +2 mm).

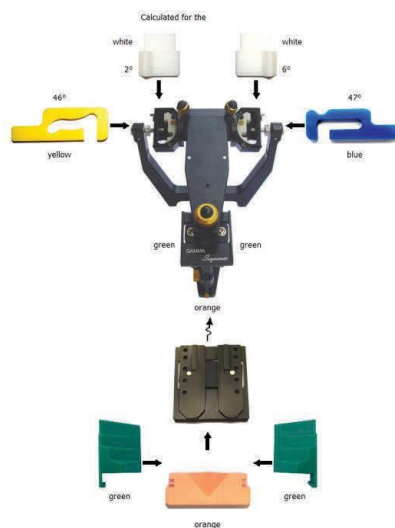
SCI R=L= 47 degrees.

Anterior Guidance =57 degrees.

DOA R= 10 degrees.

DOA L= 10 degrees Maxilla position – neutral.

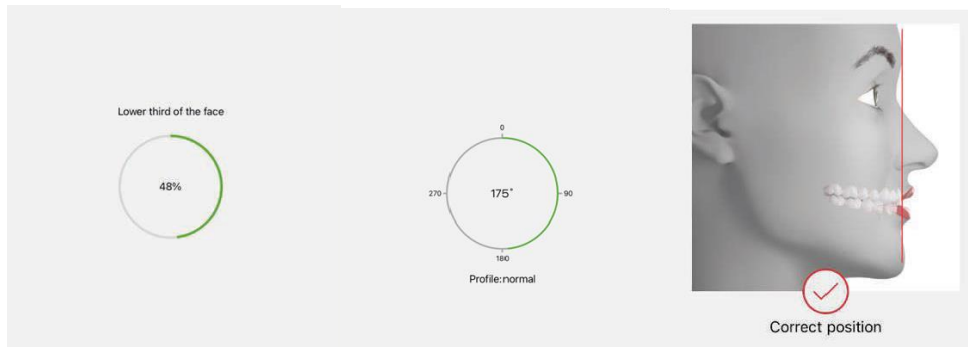
Mandibule position – prognathic Dental class I right and I left side.





# Esthetic analyses

## Face Profile



F and S sound – rotational component.

### VIDEOS OF PATIENT

Right lateral view of "F" Sound



Left lateral view of "F" Sound



Natural smile



"S" Sound

Natural rest position

Table 7

IDEAL DENTAL COMPOSITION	
	<p><b>TOOTH TO TOOTH PROPORTIONS</b> Central line on upper incisors is coincident with facial center and filthrum.</p>
	<p><b>AXIAL INCLINATON</b> Tooth axis 22, 23, 24 are inclined to the left from the frontal point of view</p>


	No contacts
---	-------------

Table 8







ESTHETIC INFORMATION	
HIGHLY DEMANDING PATIENT	Yes
ALIGNMENT	No set
APPEARANCE	Middle age
TOOTH TYPE	Ovoid
MACRO TEXTURE	Slight
COLOR CHARACTERIZATION	Tessature
SMILE LINE	Low
	
LABIAL CORRIDOR	Absent
Decrease the buccal volume of the posterior	
SMILE WIDTH	10
	
INTERINCISAL LINE INCLINATION	Vertical
Missing information.	
OCCLUSAL PLANE ORIENTATION	
Missing information.	
INCISAL EDGE POSITION	
convex	

Table 9


COLOR SELECTION	
SHADE GUIDE	
DESIRED COLOR OF THE RESTORATION	A1
Value	High  Low
ABUTMENT COLOR	



Table 10

FUNCTIONAL INFORMATION	
ORIGINAL OVERBITE	0.2
FINAL OVERBITE	0.2
ORIGINAL OVERJET	5
FINAL OVERJET	5.7
VDO ALTERATION	0
ARTICULATOR	Fully-adjustable
IMMEDIATE BENNETT	Custom
BENNETT ANGLE	Custom
CONDYLAR EMINANCE ANGLE	Custom
DISOCCLUSION	
FACEBOW	

**Wax up**



**Silicone keys for Mock up.**



**Photos after the preparation of teeth.**



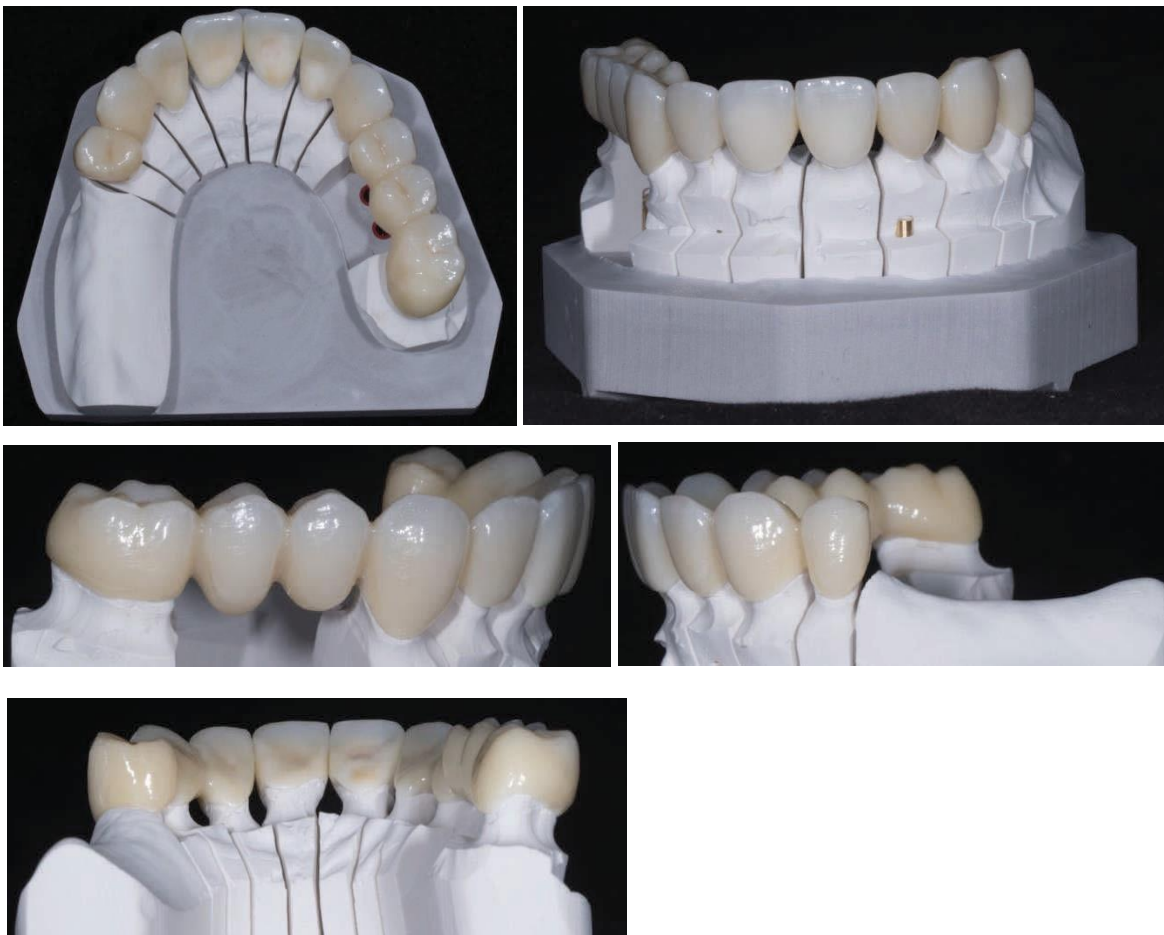
**Abutment teeth color**



## Final impressions



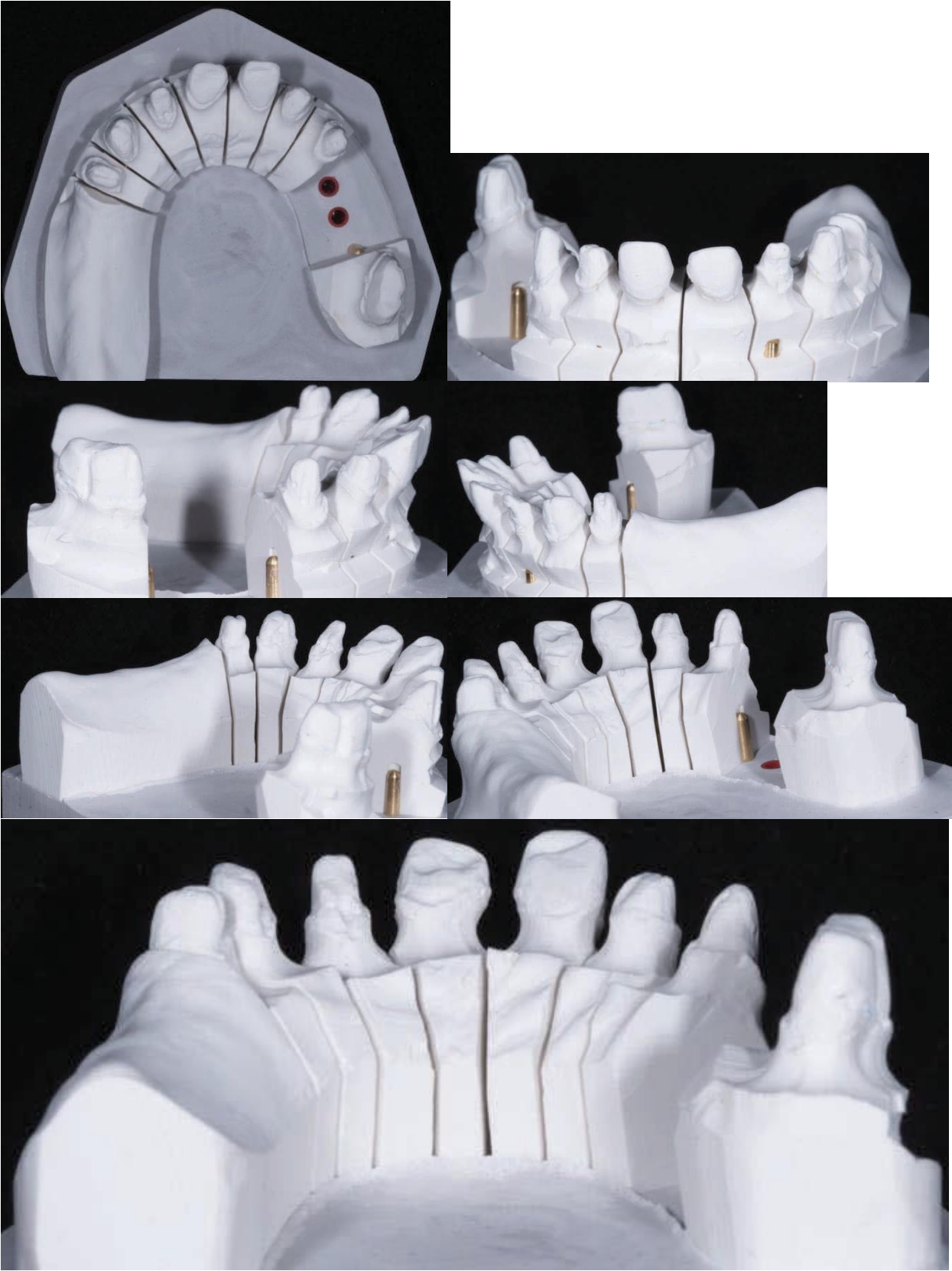
## Final work on the upper jaw cast



**Final work on the lower jaw cast**



**Cast of the prepared teeth of the upper jaw**





**Cast of the prepared the eth of the lower jaw**



**Final work 1.07.2021 (immediately after fixing)**



## Clinical case №12

Patient A date of birth: 1968

Date of examination: 15.02.2010

Chief complain – chipping of ceramic restorations.

After the last prostodontic treatment the mandible was shifted backward and appeared muscle tension in the neck. Swimming helped to solve this problem.

Table 1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		X
2.	Cardo-vascular systems		X
3.	Respiratory systems		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problms		X
Main concern: aesthetic, low chewing efficacy			

Table 2

	Muscle Diagnosis	Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipitalal region				
3.a	M. temporalis ant.				
3.b	M. temporalis med.				
3.c	M. temporalis post.				
4.a	M. masseter (superficialis)				
4.b	M. masseter (deep)			X	
5.	Tuber maxillae			X	

6.	M. pterygoideus medialis				X
7.	M. mylohyideus			X	
8.	M. digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M. sterno-cleido-mastoideus				
13.	M. omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints *				
	a. Lateral poles, statically				
	b. Lateral poles, in rotation			X	
	c. Retral joint space		X		X
	d. Lig. temporo-mandibulare			X	
• Ligament and capsule, TMJ position					

Table 3

Sets of muscles:	
Muscle palpation	
Posture	1,2, 7, 12, 13, 14
Closing	3a, 3b, 4a, 4b, 5
Opening / Protraction	8, 9, 10
Retraction	3c, 8
Medio-/Laterotrraction	6, 3a, 4a
Hyoid-Position	8, 9, 10, 11, 13
Functions	7, 8, 9,10, 11, 14
TMJ	15 a, 15b, 15c, 15d
Closing, Medio-/Laterotrraction, Functions, TMJ	

**Intraoral picture**



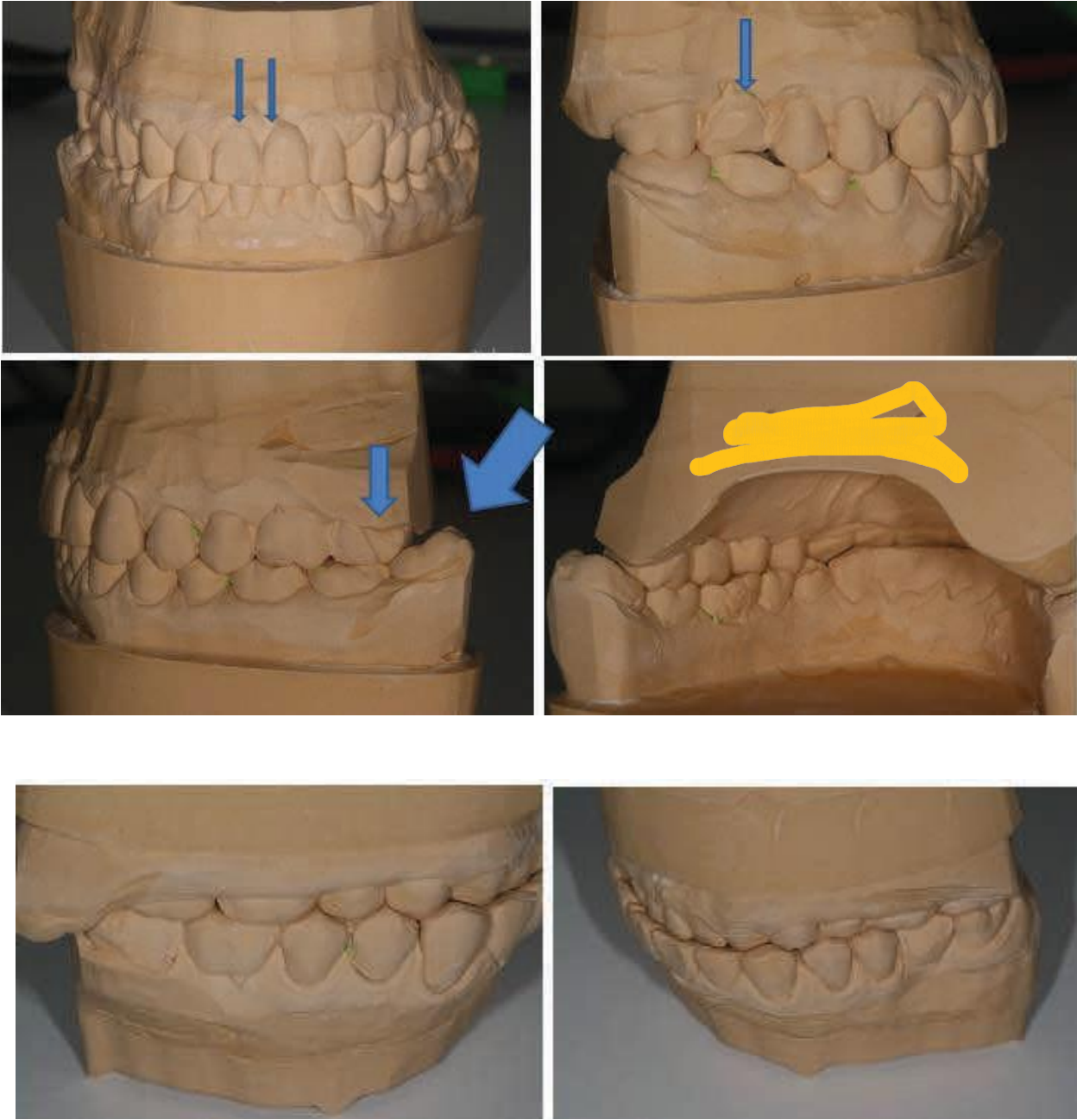
Mandible shifts to the right?



I class

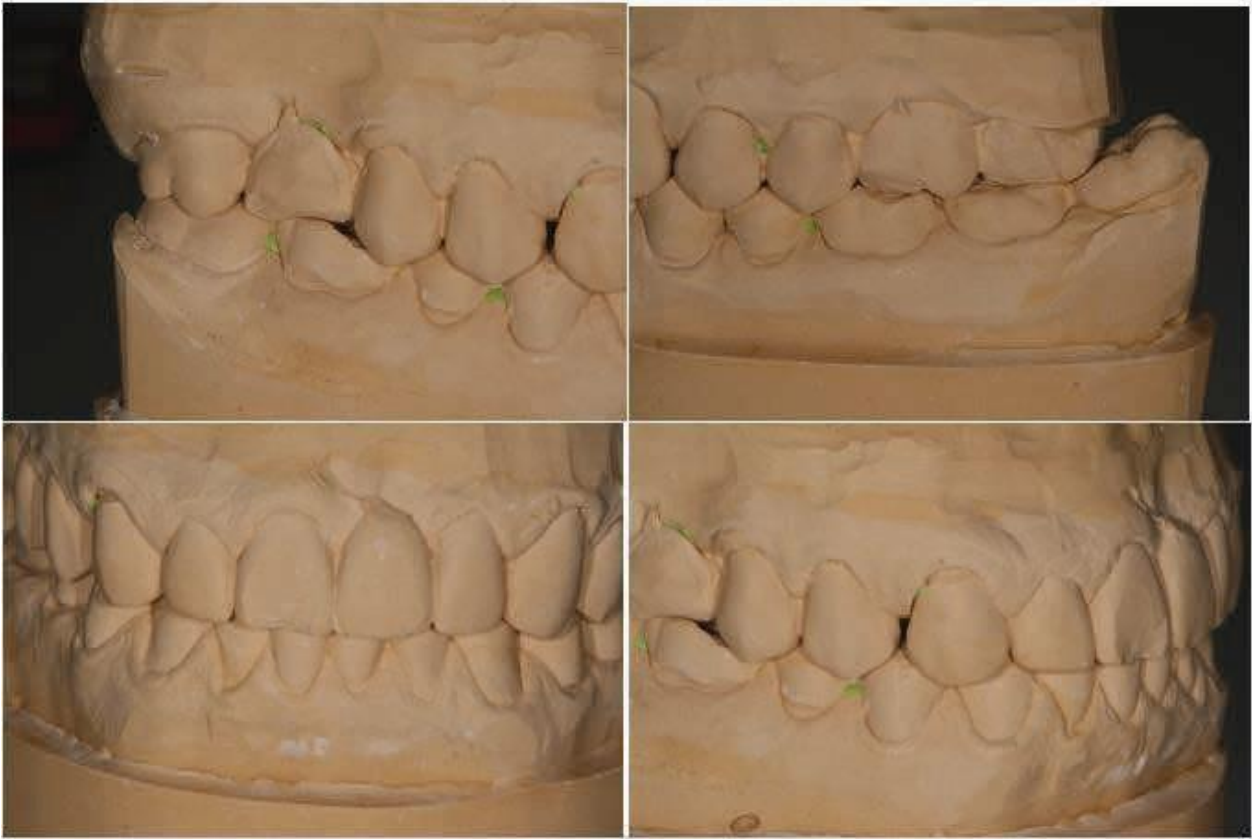


**Casts before treatment**

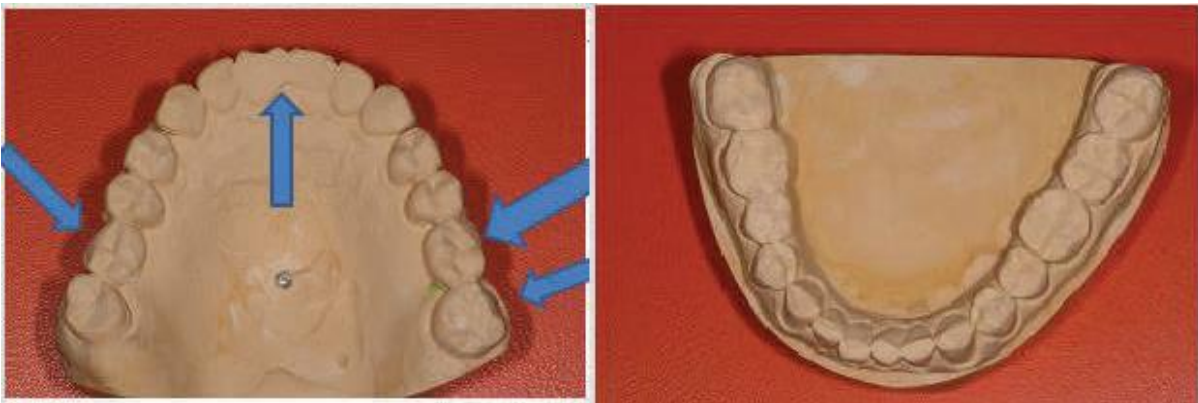


**Ceramic chipping**

Steep canines cause chipping ceramic in molar region and no posterior support, palatal inclined incisors.



Grinding facets, chipping of ceramic.



# Periodontal status

Дата осмотра 1 15.02.10 2 \_\_\_\_\_ 3 \_\_\_\_\_

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
экссудат																	экссудат
реакции																	фуркации
движность																	подвижность
прикр. десн																	прикр. десн
рецессия					2	2					2						рецессия
кар. 3																	гл. кар. 3
кар. 2																	гл. кар. 2
кар. 1																	гл. кар. 1

востибулярная поверхность

Д  
Е  
В  
О

небная поверхность

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
кар. 1																	гл. кар. 1
кар. 2																	гл. кар. 2
кар. 3																	гл. кар. 3
рецессия																	рецессия
кар. 3																	гл. кар. 3
кар. 2																	гл. кар. 2
кар. 1																	гл. кар. 1

язычная поверхность

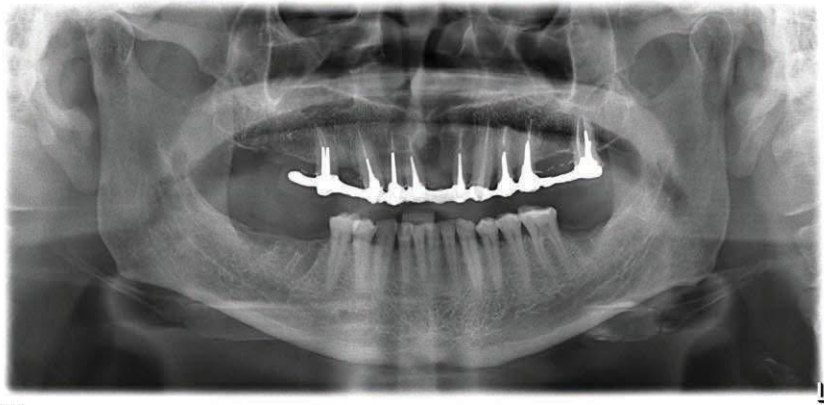
Д  
Е  
В  
О

востибулярная поверхность

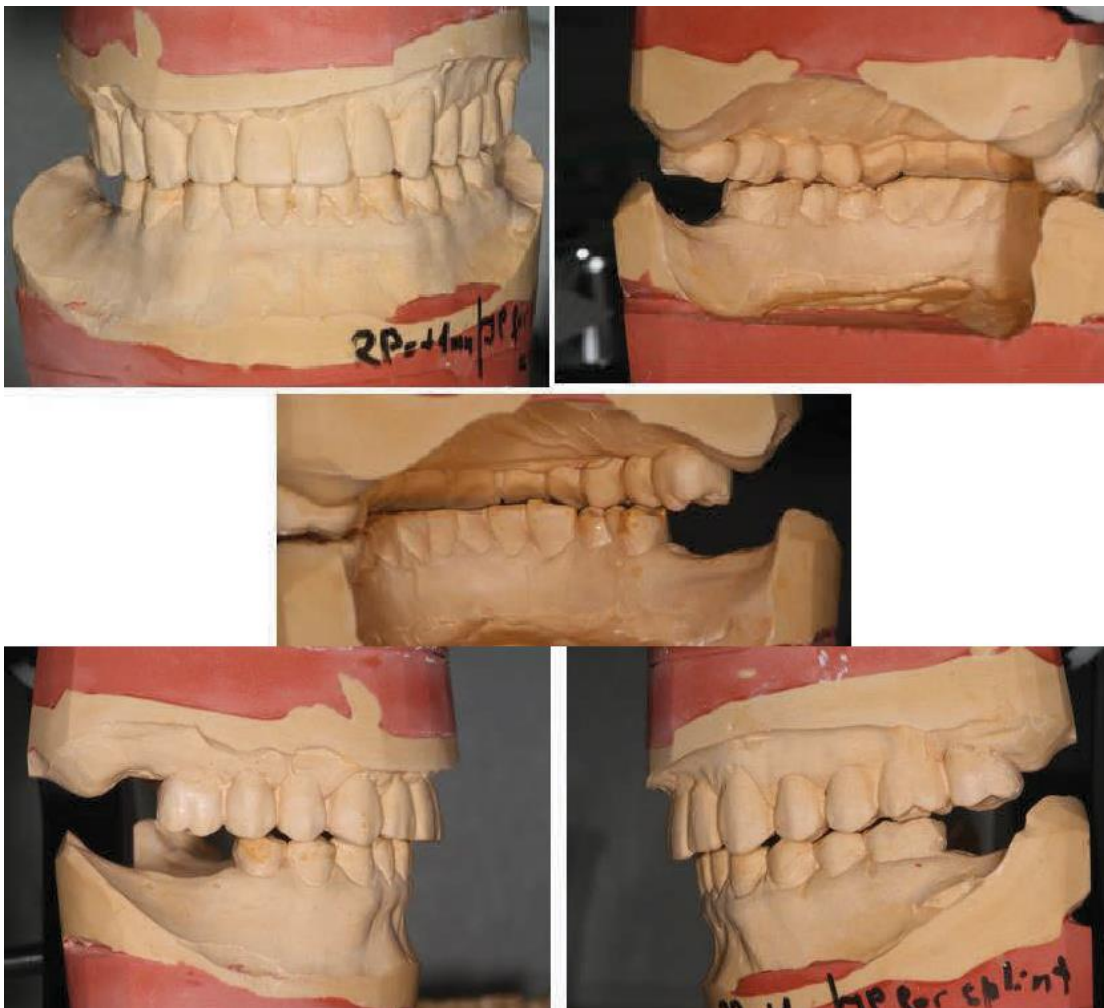
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
кар. 1																	гл. кар. 1
кар. 2																	гл. кар. 2
кар. 3																	гл. кар. 3
рецессия																	рецессия
прикр. десн																	прикр. десн
движность																	подвижность
реакции																	фуркации
экссудат																	экссудат

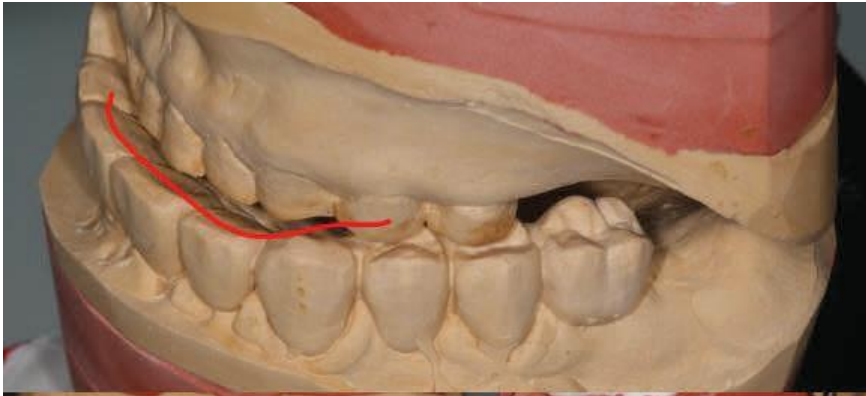


OPG after teeth extraction. We made endodontic treatment of all the teeth of upper jaw and cores and temporaries 17.08.2010. Some teeth of upper 17,14 and lower jaw -37,38, 46,47, were extracted because of root canal problems and inflammation.



After tooth extraction new casts with new temporary crowns on the upper jaw. Casts were remounted in RP 17.08.2010.





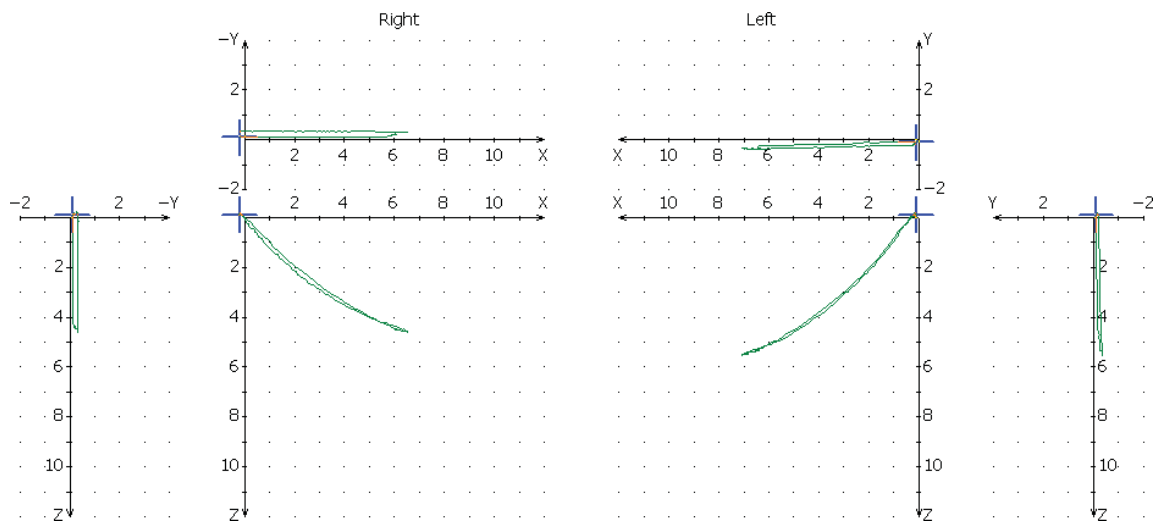
**CR**



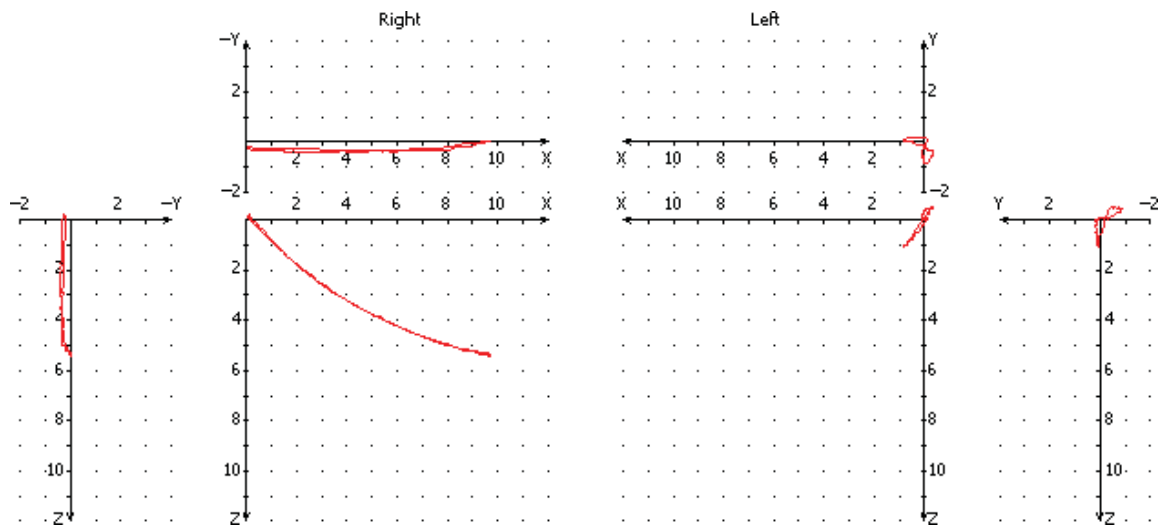
## Occlusal plane



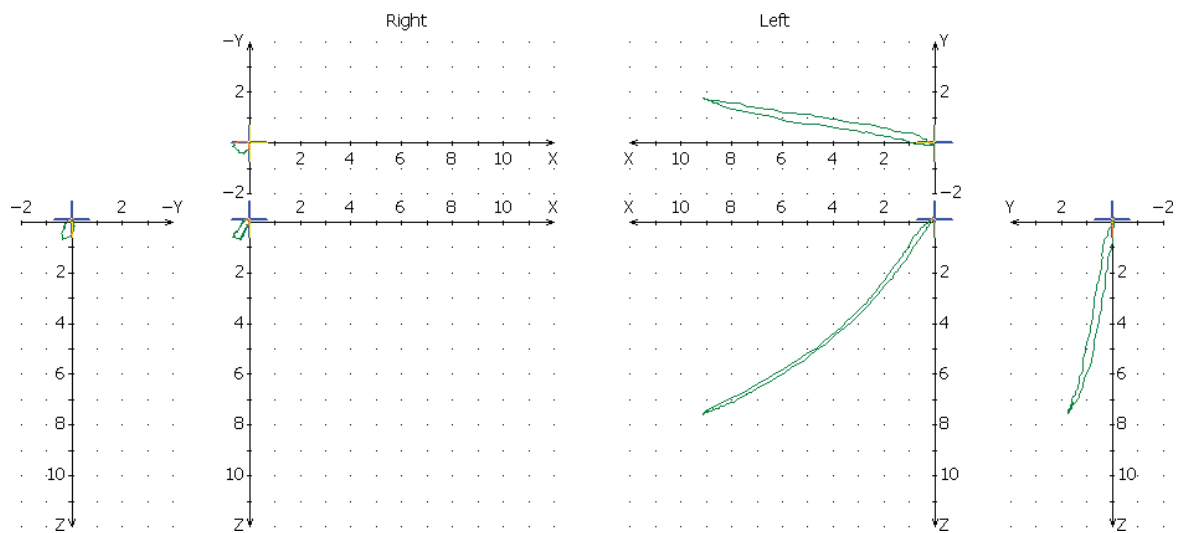
## Condylography before splint -therapy



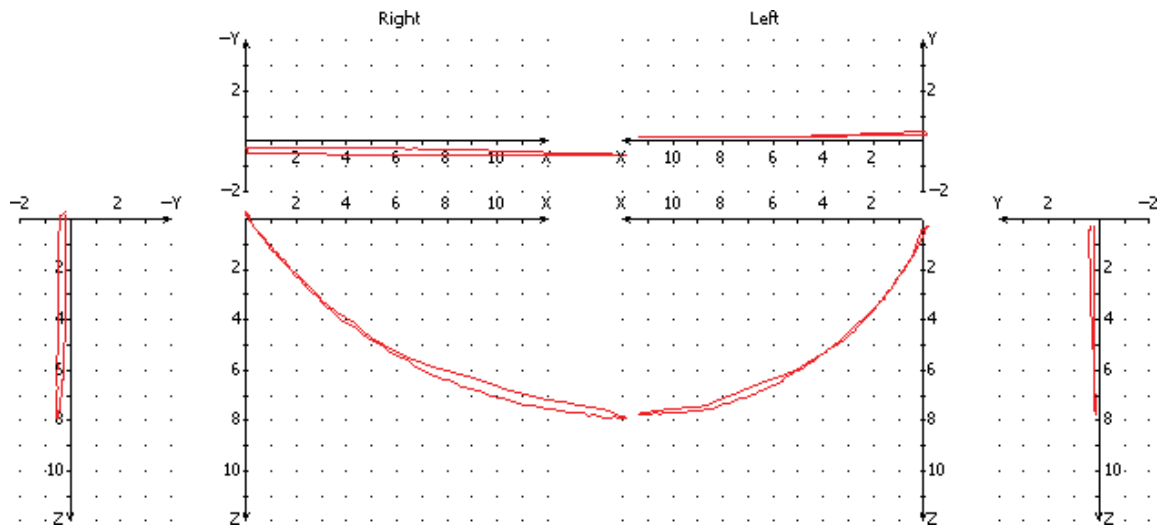
## Mediotrusion right before splint -therapy



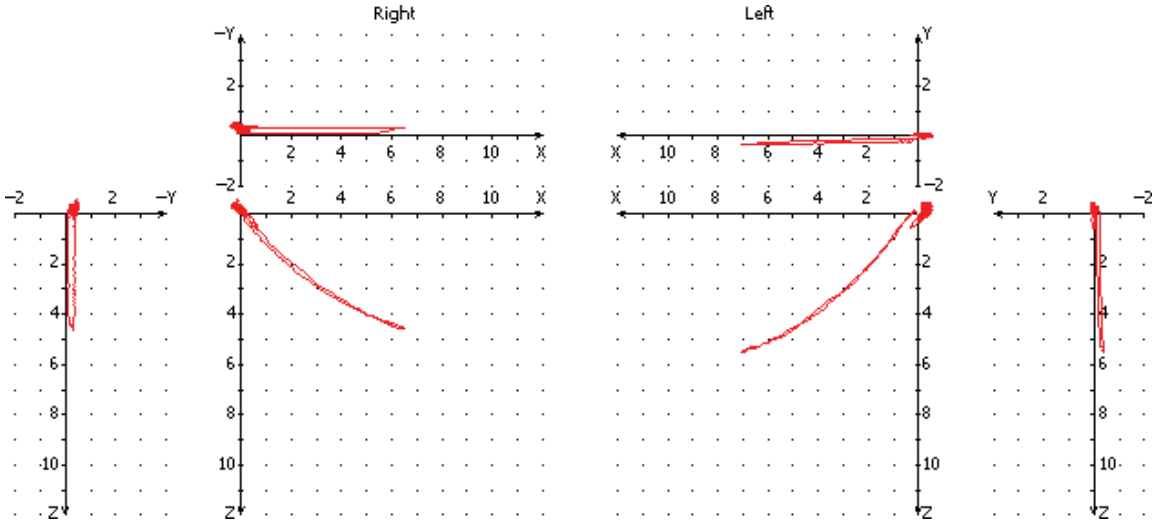
Mediotrusion left before splint -therapy



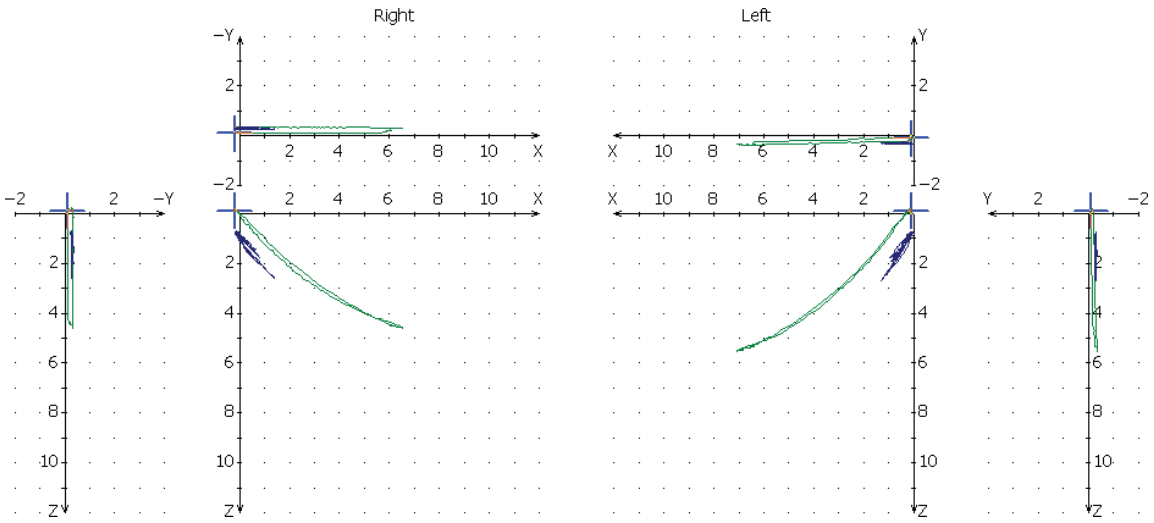
Open - close before splint -therapy



Brux- protrusion before splint -therapy

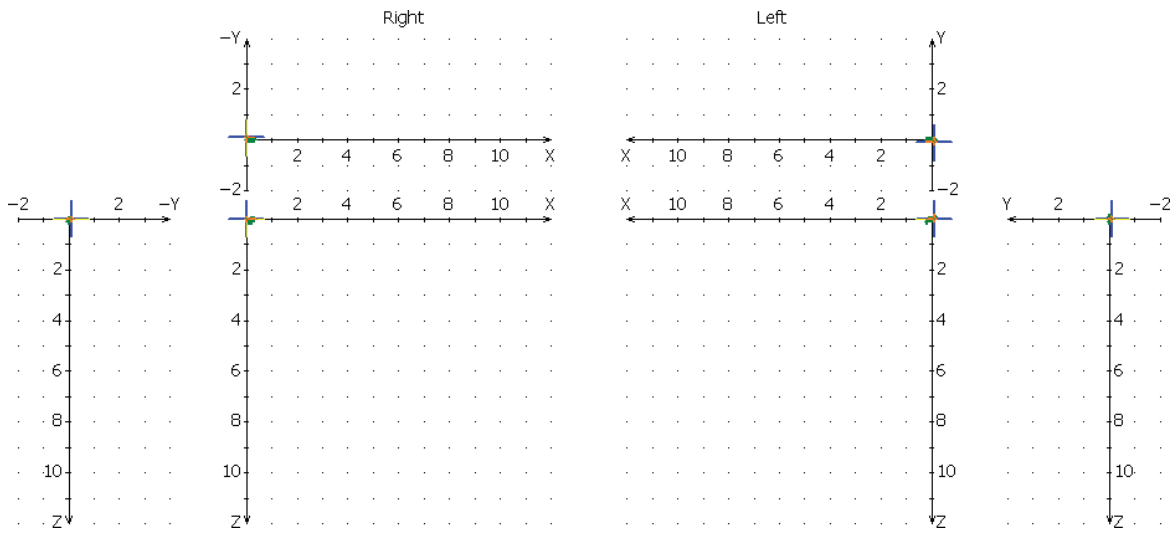


Speech- Protrusion before 1-st splint -therapy

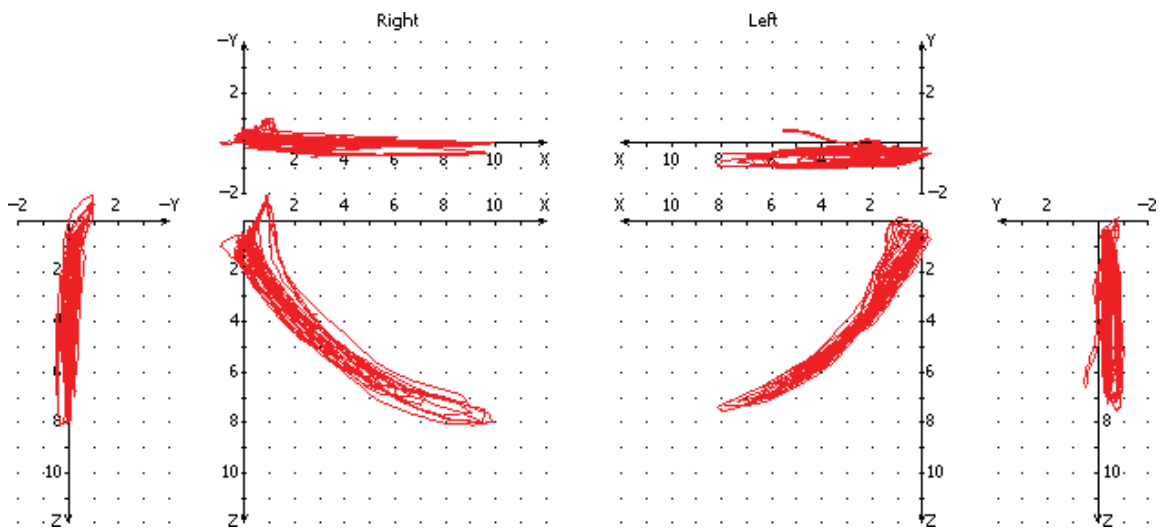


Distruction during speech

# CPM before splint -therapy



# Mastication



# Lateral X-ray 17.08.2010.

Before splint.

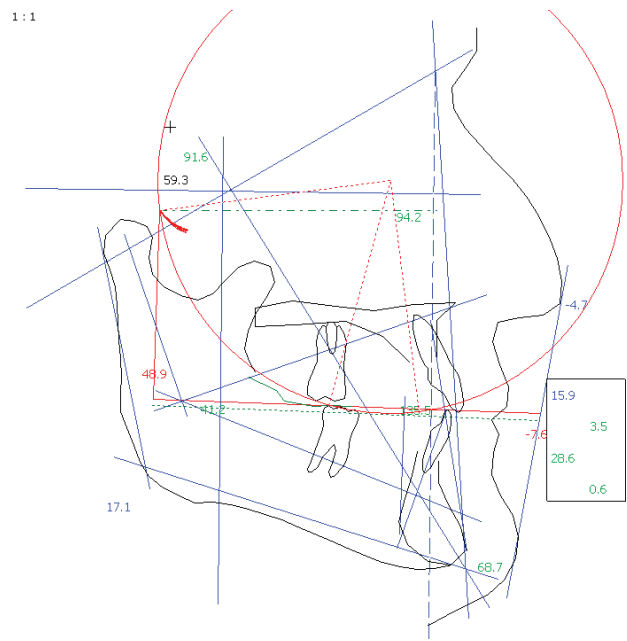
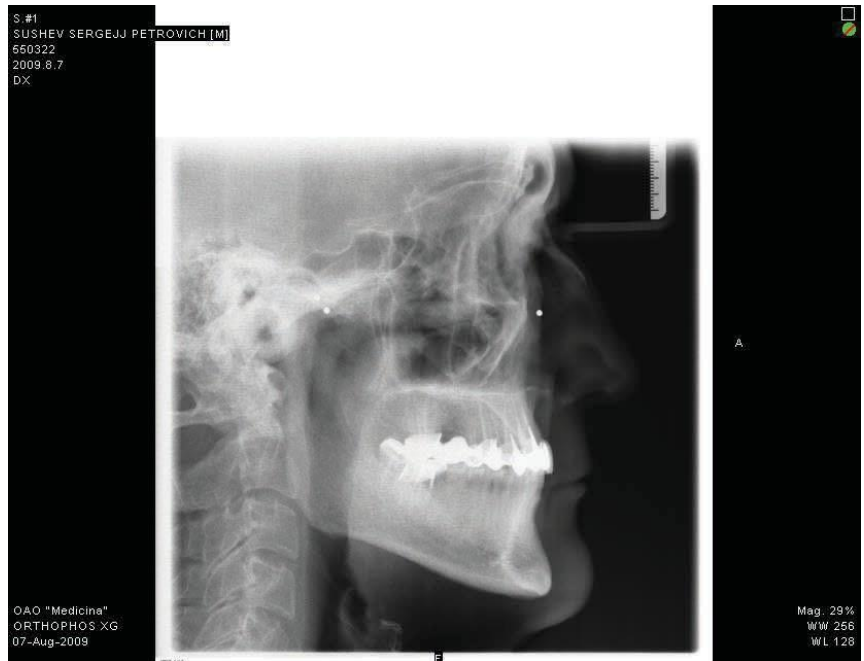


Table 4

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0	91.5	
Facial Depth	91.5	94.1	



Mandibular Plane	21.5	17.0	1B*
Facial Taper	68.0	68.7	
Mandibular Arc	31.2	48.9	4B***>
Maxillary Position	65.0	63.0	
Convexity	-1.0 mm	-4.6	1V*
Lower Facial Height (by R. Slavicek)	43.1	41.1	
Lower Facial Height to Point D	49.6	45.4	1-*
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	131.7	135.5	
Upper Incisor Protrusion	3.7 mm	3.4	
Upper Incisor Inclination	24.0	15.9	1-*
Upper Incisor Vertical	mm	0.4	
Lower Incisor Protrusions	2.7 mm	0.5	
Lower Incisor Inclination	24.0	28.5	
Upper Molar Position	21.0 mm		
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	-----	2.1	
Idealized Occlusal Plane – Axis Orbital Plane	-----	3.2	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	47.8	
Radius of Curve of Spee	----- mm	59.2	
Lip Emrasure	0.0 mm	1.7	
Occlusal Plane Xi Distance	-1.4 mm	0.2	
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Sagittal Condylar Inclination right	-----	39.2	
Sagittal Condylar Inclination left	-----	43.8	
Sagittal Condylar Inclination	-----	41.5	
Relative Condylar Inclination	-----	39.4	
Relative Condylar Inclination 6	-----	40.6	
Relative Condylar Inclination 7	-----	31.0	
Relative Condylar Inclination 8	-----	16.2	
Anterior Guidance (S-AOP)			
Relative Anterior Guidance			
<b>Aesthetic Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Aesthetic Plane	-2.9mm	-7.5	2-**

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is extremely brachyfacial Skeletal class is III with tends to I.

The maxilla is positioned neutral.

The mandible is positioned neutral, with tendency to prognatic.

The lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is diminished.

The protrusion of the incisor is normal

The inclination of the lower incisor is normal.

The interincisal angle is normal.

Occlusal concept: Unknown (data missing).

No functional statement available.

Table 5

Determinants	Norm	Value	Trend
Facial Axis	90.0°	91.5	
Facial Depth	91.5°	94.1	
Facial Taper	68.0°	68.7	
Mandibular Plane	21.5°	17.0	1B*
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	386.1	3-***
Facial Length Ratio	63.5%	71.8	4+***>
Y Axis to S N	67.0°	68.2	
Y Axis (Downs)	61.8°	55.4	2-***
S N to Gonion Gnathion Angle	31.6°	26.1	1-*

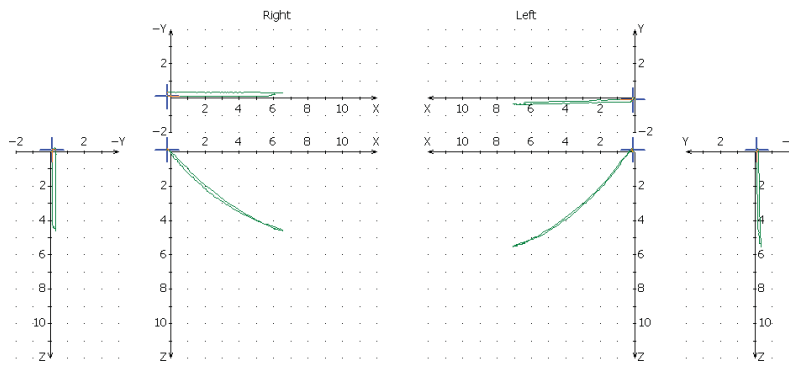
Splint-therapy: +4 mm verticalization.



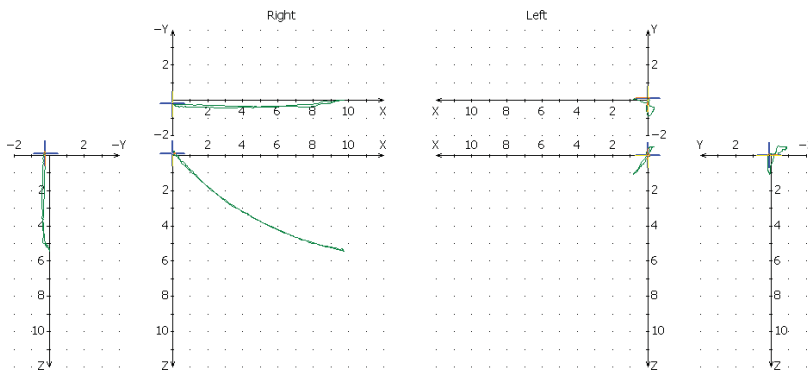
Casts after splint therapy in MPI both condyles distraction on Z axis for 2 mm.



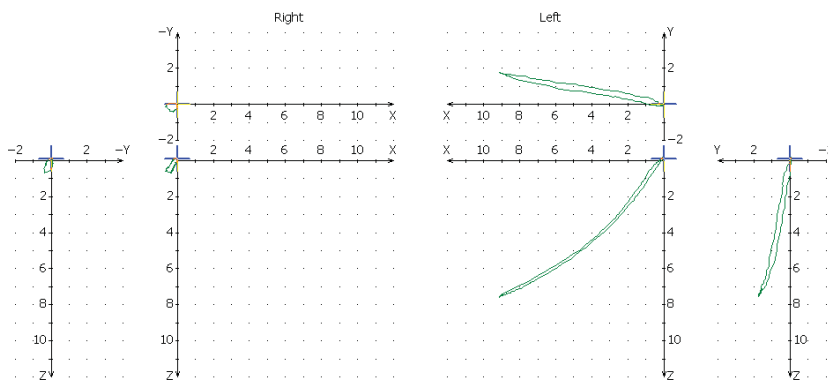
Before



Before may be medially displaced disc or disc adhesion—

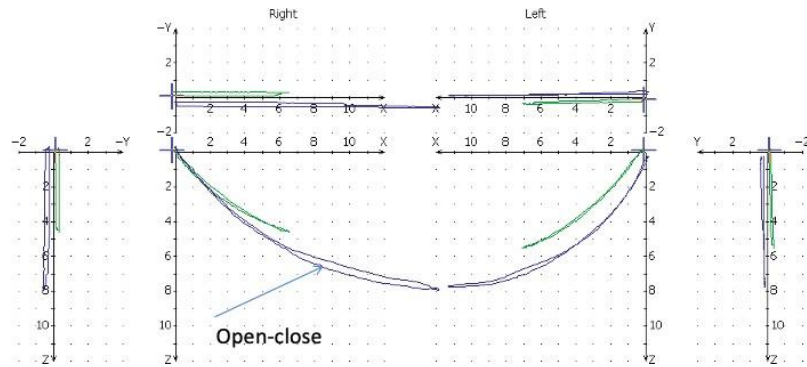


Muscles avoid interference before

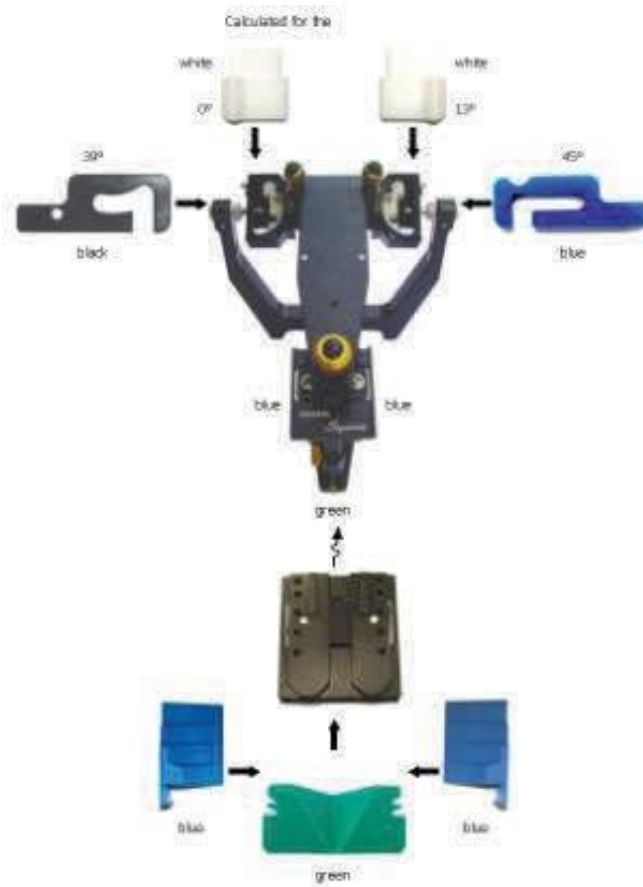


# Overrotation

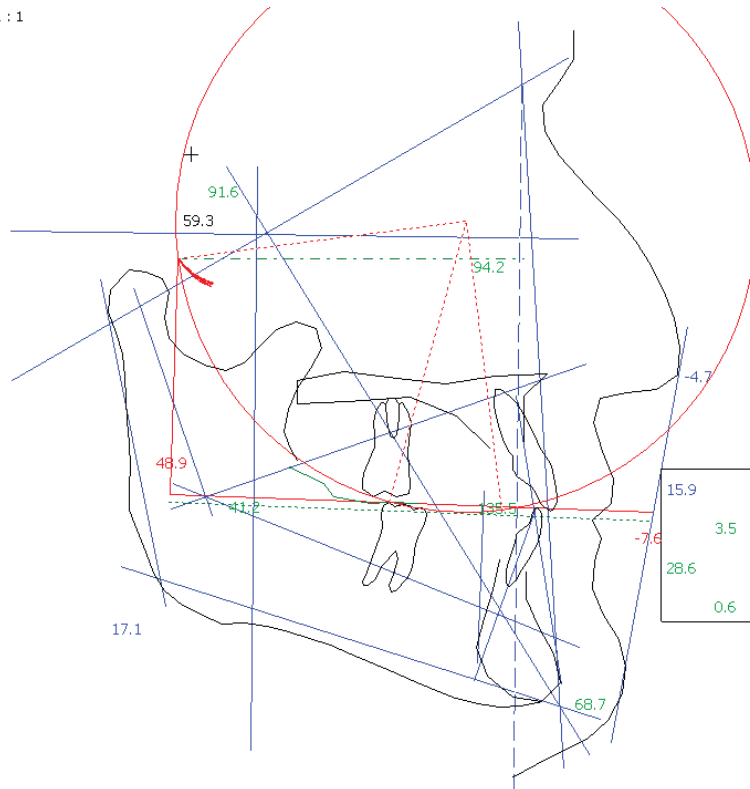
Overlay protrusion-retrusion and Open-close before splint-therapy



## Articulator settings



1:1



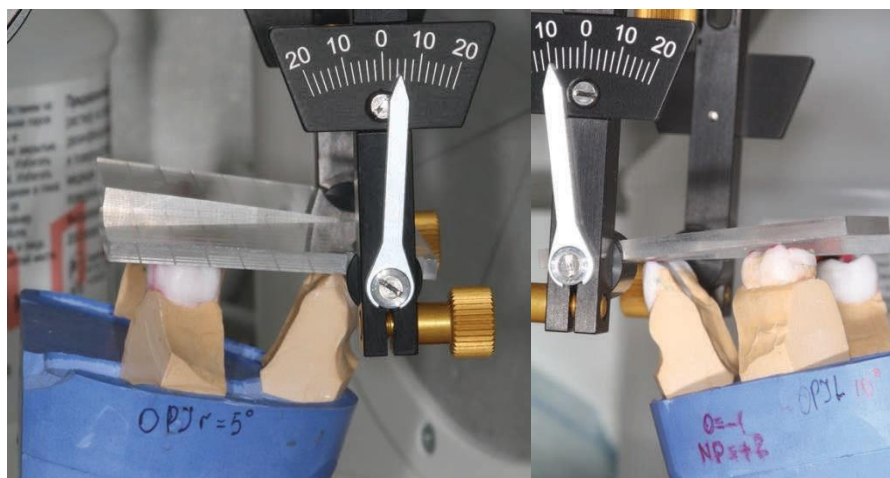
### Comparison of dates:

- SCI right 39.
- SCI left 43.
- LFH 41,1.
- OPI 2,1.
- DOA 9.
- Skeletal class III with tend to I.
  
- Asimmetrical case – wax with setting for right and left side
- I class.
- Occlusal concept – Sequential guidance.
- LFH +3 mm on incisal pin increase vertical dimension increase 2 mm lower s and 1 mm upper.

- OPI right side - minus 1 degree.
- OPI left side – plus 5 degree.
- SCI right 39 degree left black insert.
- SCI left 45 degrees right blue insert.
- Bennett right 0 white.
- Bennett left 13 white.
- Incisal table green- frontal part, both sides –blue.
- AG It should be 10 degrees higher than SCI for right side – 49 degree and for left side – 55 degrees.
- It should be done bone unloading bilaminar zone, not eliminate compression. Compression means bone to bone contacts.
- After 1-st splint therapy grinding the mandible moved forward and up – it means the condyle moved backward and downward. - cranial movement.
- Mastication centre is on the right side is down- avoidance pattern
- Speech avoiding pattern- 2 mm downward on z axis in compare to protrusion-retrusion movement.
- Protrusion muscles problem – m.pterygoideus medialis and lateralis
- Hyoid bone problems – hyoid goes downward and muscles of hyoid bone goes than to clavicula.
- Patients with Parkinsons disease. It is difficult to determine for them protrusion-retrusion and mediotrusion. Ask the patient to move the mandible in free movement. The most cranial is a close to eminence is chosen like protrusion. Also, in operated joint the patient has a guidance and SCI.
- Curve of Spee is only a lateral segment and include only 34, 35, 36,

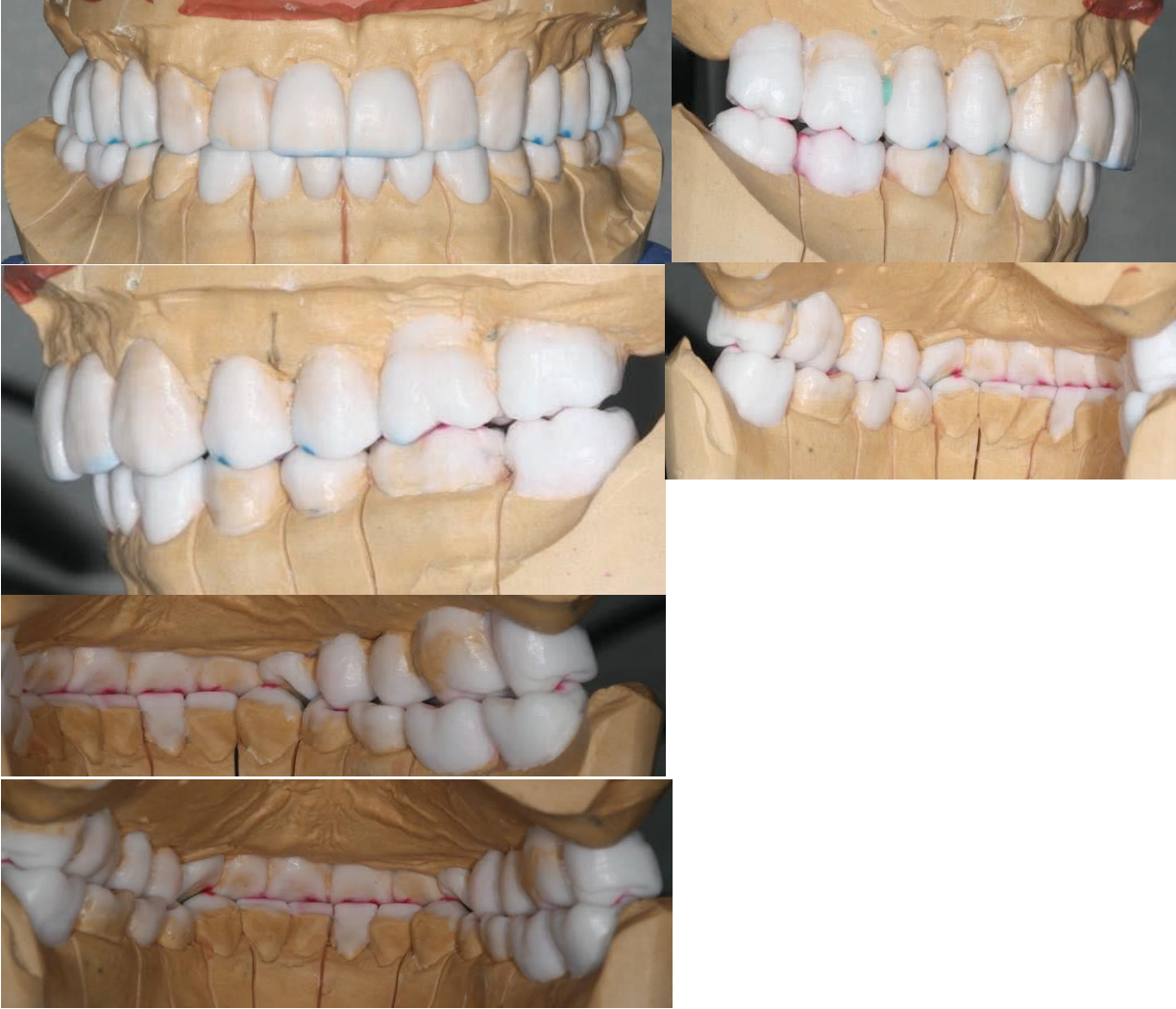
37. For curve of Spee.

- determination we need 3 points: axis, OPI6, not perpendicular to 41. It was the original article from Ortlieb and this theory is old. Perpendiculars are to tooth 6. In full dentures to 6 and 1 lowers OPI 6 is a secante to Curve of Spee. In determination of curve of Spee we don't use CANINES.
- We should make occlusal tables for 4,5,6,7.





**Wax up**





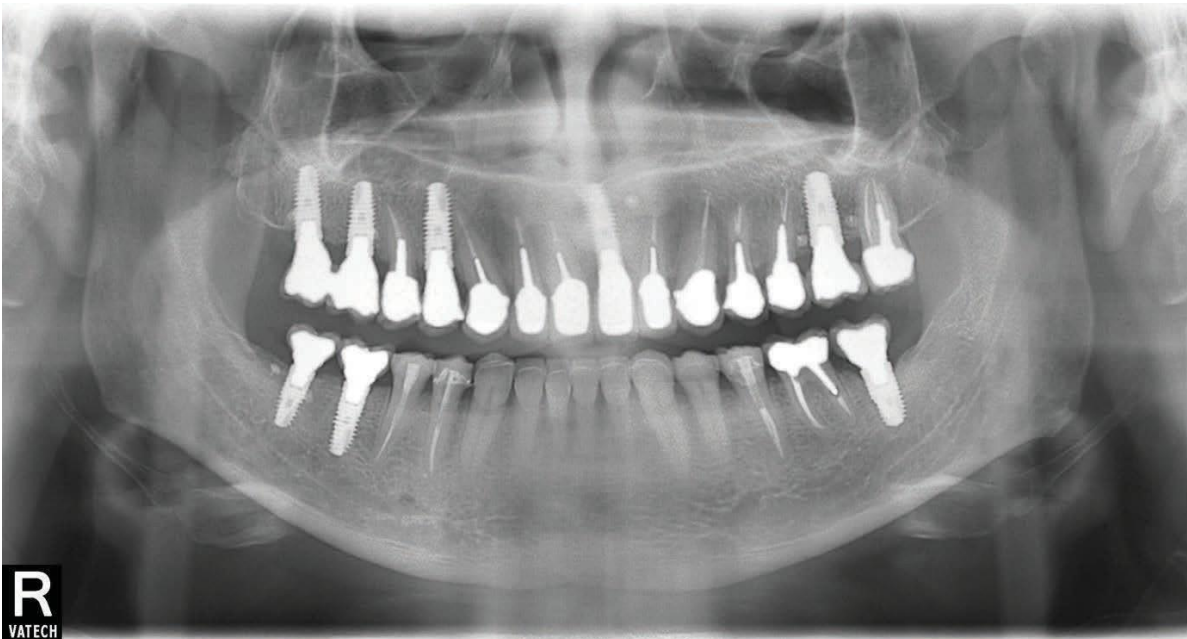
**January 2011 permanent temporary crowns for implantation.**



On March 1, an implantation operation was performed on the upper and lower jaw and the incisal canal cyst was removed.



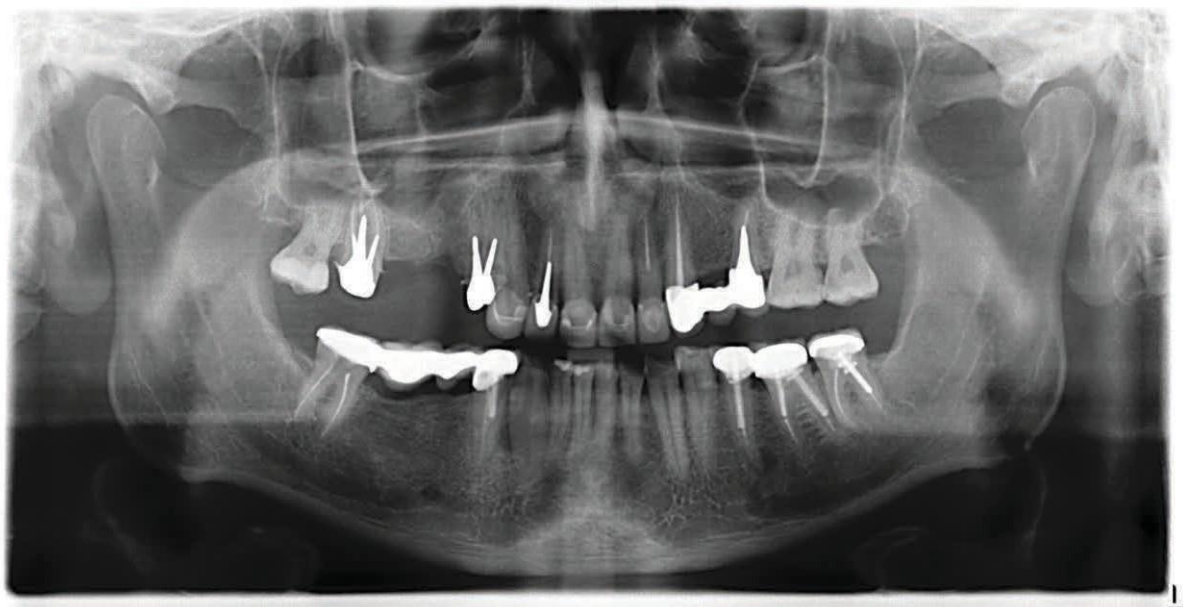
**OPG**



## Clinical case №13

Patient A date of birth: 1969

Chief complain: chipping ceramic restorations, breakage of restorations  
OPG 2008.



### Clinical functional analyses

Table 1

Special Medical Analysis		
Do you have or did ever have an illness with regard to point 1-12?		
	Yes	No
1. Infections		X
2. Cardio-vascular systems		X
3. Respiratory systems		X
4. Digestive system		X
5. Metabolic system		X
6. Allergies		X
7. Urogenital problems		X
8. Central nervous system		X
9. Psychological problems (therapy)		X
10. Rheumatic disease		X
11. Hormonal disease		X
12. Special problms		X
Main concern: aesthetic, low chewing efficacy		

Table 2

Dental History Analysis		Valuation	Yes	No		
1.	Do you have problems when you chew?	2	X			
2.	Do you have problems when you are talking?			X		
3.	Do you have problems in closing you teeth property?	2	X			
4.	Are any of your teeth especially sensitive?			X		
5.	Do you have problem when you open your mouth very wide?			X		
6.	Do you jaw joints noise and if so, on what side?			X		
7.	Do you have pain in the area of your jaw joints?			X		
8.	Do you suffer from headaches?	1	X			
9.	Do you suffer from cramps or spas in your head, neck or throat?			X		
10.	Do you have in general problems with your posture?	1	X			
	Occlusal Index	1.50				
11.	Have you ever had serious accident?			X		
12.	Did you have one or more oral intubations?			X		
13.	Have you ever had orthodontic treatment or ...			X		
14.	Have you had a treatment with splint?			X		
15.	Are you grinding or pressing with your teeth?		X			
16.	Do you think that treatment is necessary?		X			
17.	Do you think that is a serious disorder or illness?		X			
18.	When the last time you had dental treatment and what was done?					
19.	How would you describe your psychic behavior?					
	happy	sad	calm	excited	self-controlled	lack of self-control

Table 3

Preliminary Brainstem Nerve Analysis	
1.	N. olfactorious (analysis)
2.	N. opticus (analysis)
3.	N. occulo-motorius (clinical mobility)
4.	N. trochlearis (clinical mobility)
5.	N. trigeminus (clinical palpation and sensitiveness)
6.	N. abducens (clinical mobility)
7.	N. facials (clinical mobility)
8.	N. stato-acusticus (clinical check of the equilibrim and hearing)
9.	N. glosso-pharyngeus (clinical and analysis)
10.	N. vagus (analysis)
11.	N. accessories (clinical and analysis)
12.	N.hypoglossus (clinical and analysis)

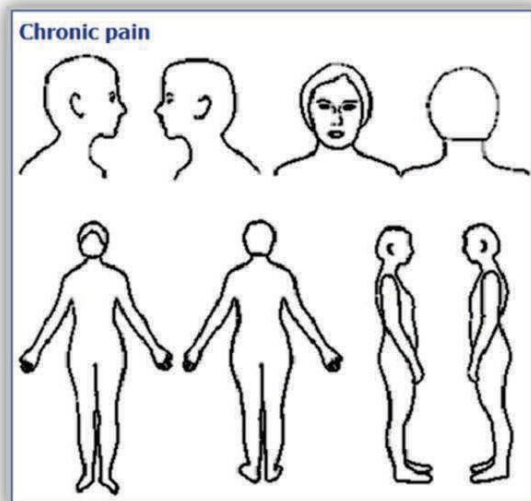
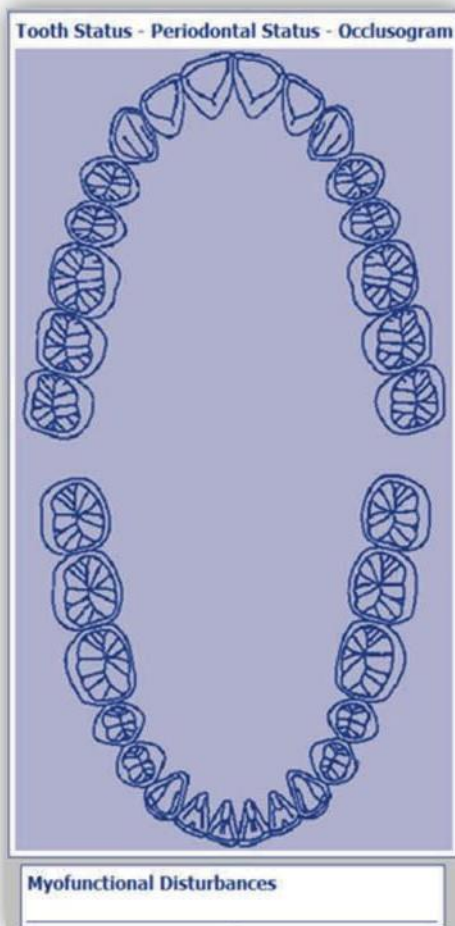


Table 4

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M. temporalis ant.				
3.b	M. temporalis med.				
3.c	M. temporalis post.				
4.a	M. masseter (superficialis)				
4.b	M. masseter (deep)				
5.	Tuber maxillae			X	
6.	M. pterygoideus medialis		X		
7.	M. mylohyideus				
8.	M. digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M. sterno-cleido-mastoideus				
13.	M. omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints *				

e. Lateral poles, statically				
f. Lateral poles, in rotation				
g. Retral joint space				
h. Lig. temporo-mandibulare	X		X	
• Ligament and capsule, TMJ position				

Table 5

Sets of muscles:	
Muscle palpation	
Posture	1,2, 7, 12, 13, 14
Closing	3a, 3b, 4a, 4b, 5
Opening / Protraction	8, 9, 10
Retraction	3c, 8
Medio-/Laterotrraction	6, 3a, 4a
Hyoid-Position	8, 9, 10, 11, 13
Functions	7, 8, 9,10, 11, 14
TMJ	15 a, 15b, 15c, 15d
Closing, Medio-/Laterotrraction, TMJ	

### Intraoral photo



- Occlusal plane is flat.
- Overeruption of 27.
- Gingivitis.
- II class occlusion right and left side.



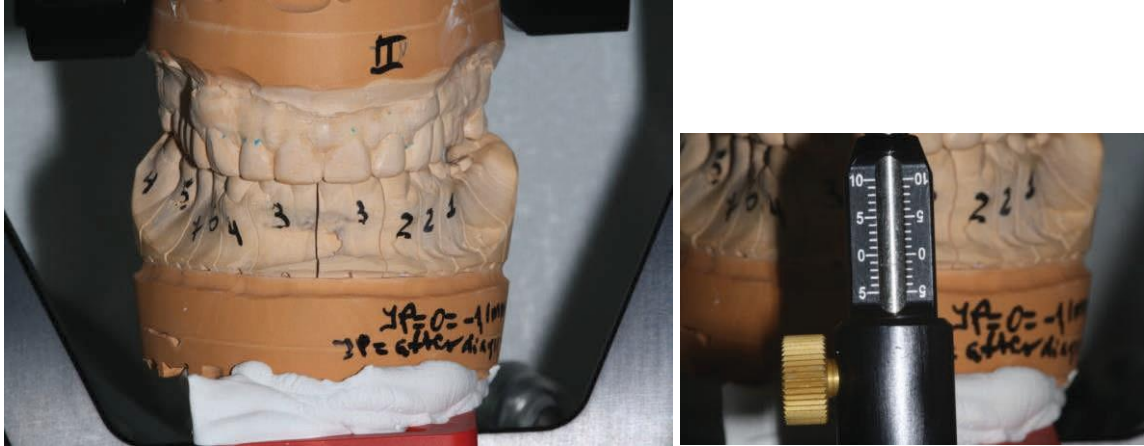


Position of lower incisors: to close to each other



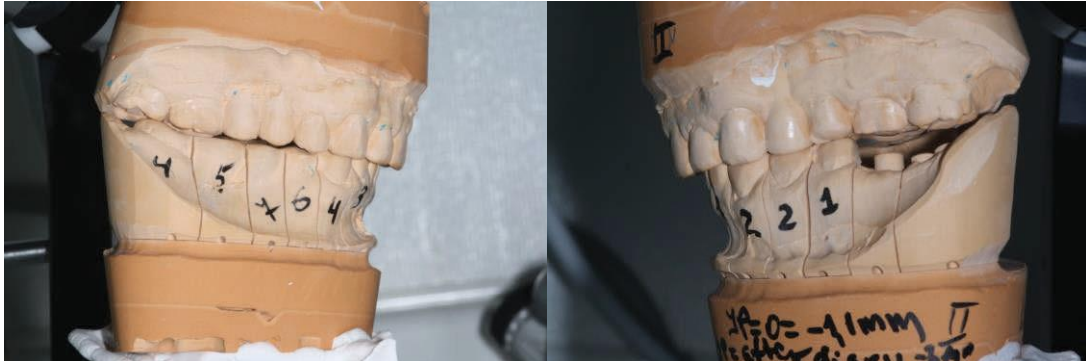
## Casts in RP

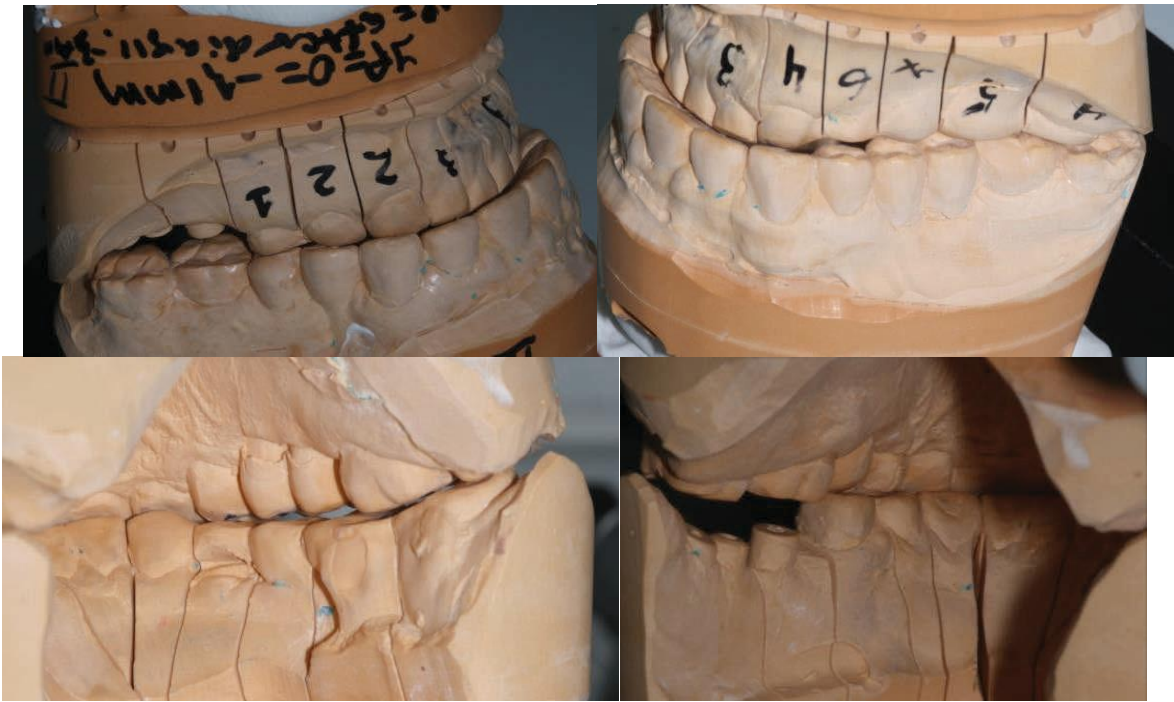
Difference between RP and I CP after diagnostic Grinding is  $-2$  mm. In RP incisal pin =  $-1$  degree. After grinding =  $-3$  degrees



No posterior support

SCI is 59 degrees, OPI should be increased, it means that there is no place for 37 and 47.

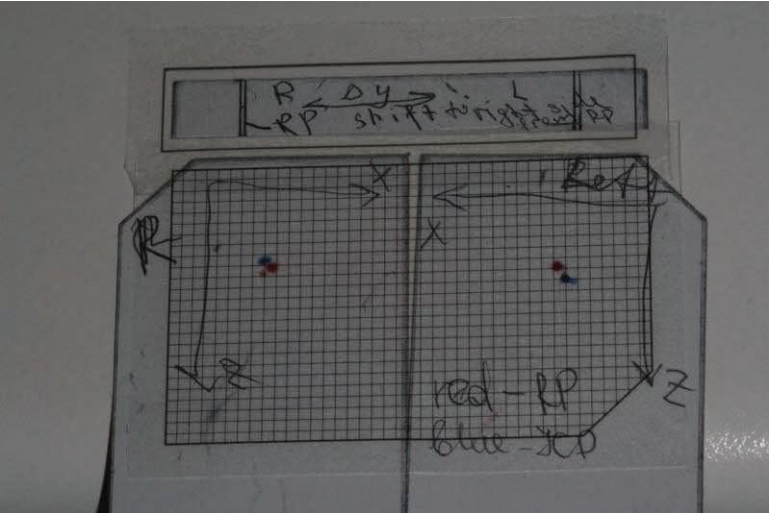




Transversal and sagittal discrepancy of upper and lower jaw



# MPI



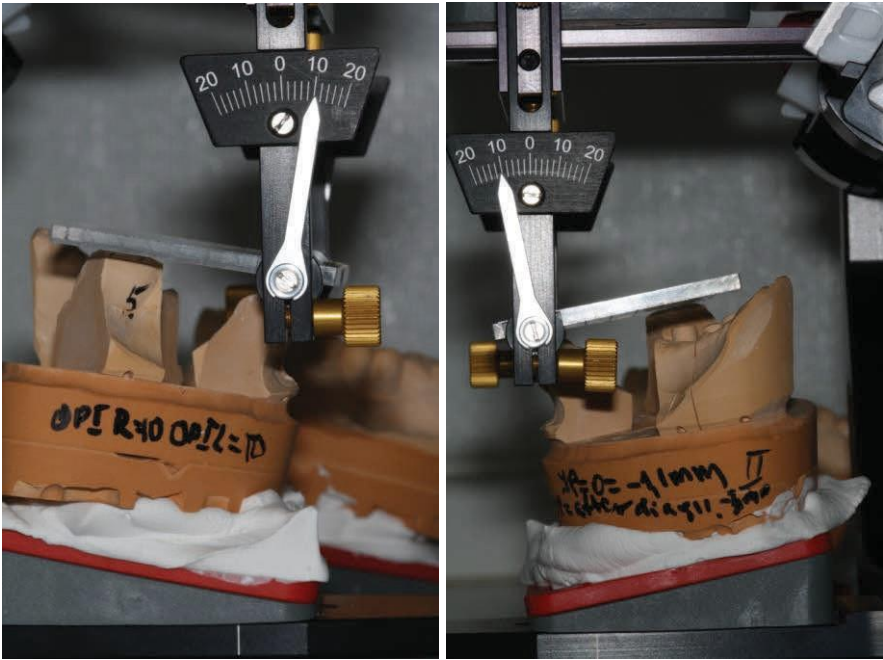
# Anterior Guidance



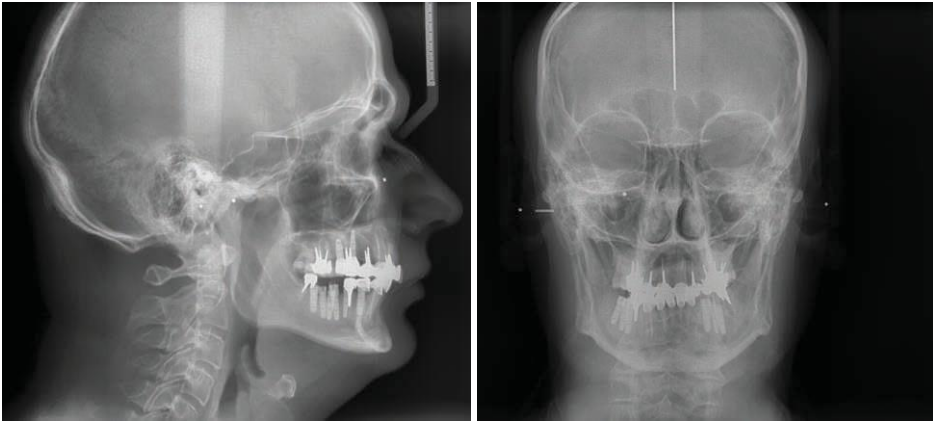
Anterior Guidance (S-AOP)	-----	45.0	
Relative Anterior Guidance	-----	35.4	
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.9	-3.8	

**OPI**

OPI right and left side = 10 degrees



**Lateral X-ray**



**OPG**



## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is mesiofacial Skeletal class is II with tends to I.

The maxilla is positioned prognathic.

The mandible is positioned neutral, with tendency to prognathic.

The lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is diminished.

The protrusion of the incisor is normal

The inclination of the lower incisor is normal.

The interincisal angle is normal.

Occlusal concept: Tendency to group function.

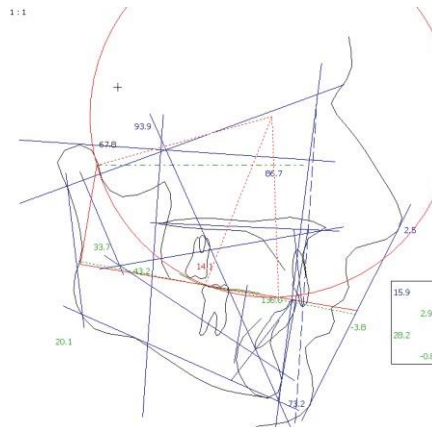
No functional statement available.

### Explanation

Table 1

Determinants	Norm	Value	Trend
Facial Axis	90.0°	93.9	1B*
Facial Depth	91.5°	86.7	1-*
Facial Taper	68.0°	73.1	1B*
Mandibular Plane	21.5°	20.1	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	380.0	6-***>
Facial Length Ratio	63.5%	76.2	6+***>
Y Axis to S N	67.0°	60.9	2-**
Y Axis (Downs)	61.8°	59.0	
S N to Gonion Gnathion Angle	31.6°	20.0	3-***

- SCI 59 degrees.
- Symmetrical case.
- OPI should be 12 degrees.
- OPI 6= 19 degrees.
- DOA 6= 10 degrees.



## Incisal Pin Table

Table 2

Incisal Pin Height	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
Lower Fadal Height	43.2	43.6	44.1	44.5	44.9	45.3	45.7	46.4	47.2	47.9	48.6	49.3	50.6
LFH (Norm)	43.2	43.3	43.4	43.5	43.7	43.8	43.9	44.1	44.3	44.5	44.7	44.9	45.3
LFH (Variation)	0.0	0.4	0.9	1.3	1.7	2.1	2.5	3.2	4.0	4.7	5.4	6.1	7.4
Menton Vertical	0.0	0.5	0.9	1.3	1.8	2.2	2.6	3.3	4.1	4.8	5.5	6.1	7.4
Pogonion Sagittal	0.0	-0.8	-1.7	-2.5	-3.3	-4.2	-5.0	-6.7	-8.4	-10.1	-11.8	-13.5	-16.9
Incision Inf. Vertical	0.0	0.5	1.1	1.6	2.1	2.6	3.1	4.0	5.0	5.9	6.7	7.6	9.2
Incision Inf. Sagittal	0.0	-0.6	-1.2	-1.8	-2.4	-3.0	-3.6	-4.8	-6.1	-7.4	-8.6	-9.9	-12.6



Table 3

Incisal Pin Height	0.0	-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-8.0	-10.0	-12.0	-14.0	-16.0	-20.0
Lower Fadal Height	43.2	42.8	42.3	41.9	41.4	40.9	40.5	39.5	38.5	37.4	36.3	35.1	32.6
LFH (Norm)	43.2	43.1	43.0	42.9	42.8	42.7	42.6	42.4	42.2	41.9	41.7	41.5	41.1
LFH (Variation)	0.0	-0.4	-0.9	-1.3	-1.8	-2.3	-2.7	-3.7	-4.8	-5.8	-6.9	-8.1	-10.6
Menton Vertical	0.0	-0.5	-0.9	-1.4	-1.9	-2.4	-2.9	-4.0	-5.2	-6.3	-7.6	-8.9	-11.7
Pogonion Sagittal	0.0	0.8	1.6	2.5	3.3	4.1	4.9	6.4	8.0	9.5	11.0	12.4	15.2
Incision Inf. Vertical	0.0	-0.5	-1.1	-1.7	-2.2	-2.8	-3.4	-4.6	-5.9	-7.2	-8.6	-10.0	-13.0
Incision Inf. Sagittal	0.0	0.6	1.1	1.7	2.2	2.8	3.3	4.4	5.3	6.3	7.2	8.0	9.5

Table 4

Sato Analysis			
Denture frame analysis	Norm	Value	Trend
FH-MP	25.9	18.0	1-*
PP-MP	24.6	19.4	1-*
OP-MP	13.2	7.3	1+*
OP-MP/ PP-MP	54.0 %	38.0	1%*
AB-MP	71.3	87.6	3+***
A'-P'	50.0 mm	54.0	
A'-6'	23.0 mm	31.2	3+***
A'-6'/ A'-P'	50.0 %	57.8	
U1-AB (degree)	31.7	25.6	1-*
U1-AB (mm)	9.5 mm	6.9	1-*
L1-AB (mm)	25.4	18.3	1-*
L1-AB (mm)	6.2 mm	2.9	2-**
Inter molar angle	174.0	168.0	1+*
FH-PP	1.3	-1.3	2-**
Kim analysis	Norm	Value	Trend
ODI	72.0	86.7	2+**
APDI	81.0	72.9	1+*
Combination factor	153.0	159.2	
Downs-Graber analysis	Norm	Value	Trend
Facial angle	85.1	86.2	
Convexity	-5.6	-5.1	
AB-Facial plane angle	-5.1	-12.4	2-**
FH-MP	25.9	18.0	1-*
Y Axis	65.7	58.7	2+**
FH-OP	9.5	10.6	
Interincisal angle	129.7	135.9	
L1-OP	68.0	61.6	1+*
L1-MP	94.7	105.9	1D*
U1-A.POG	7.9 mm	2.9	2-**

FH-SN	6.0	1.9	1+*
SNA Angle	81.9	87.3	1D*
SNB Angle	78.6	81.3	
ANB Angle	3.3	6.0	1D*
U1-Facial Plane (mm)	9.9 mm	4.3	1-*
U1-FH (deg)	108.9	99.9	1-*
U1-SN (deg)	103.1	98.0	
Gonial angle	119.4	115.4	
Ramus Inclination	2.6	7.3	1+*

Table 5

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	93.9	1B*
Facial Depth	91.5°	86.7	1-*
Mandibular Plane	21.5°	20.1	
Facial Taper	68.0°	73.1	1B*
Mandibular Arc	31.2°	33.6	
Maxillary Position	65.0°	69.0	1+*
Convexity	-1.0 mm	2.4	1X*
Lower Facial Height (by R. Slavicek)	43.2°	43.2	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	135.9	
Upper Incisor Protrusion	4.3 mm	2.9	
Upper Incisor Inclination	23.1°	15.8	1-*
Upper Incisor Vertical	Mm	1.9	
Lower Incisor Protrusions	1.2 mm	-0.7	
Lower Incisor Inclination	24.1°	28.1	
Upper Molar Position	21.0 mm	14.0	3-***
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	-----	9.5	
Idealized Occlusal Plane – Axis Orbital Plane	-----	11.9	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	37.3	
Radius of Curve of Spee	----- mm	67.8	
Lip Emrasure	0.0 mm	1.3	
Occlusal Plane Xi Distance	-1.4 mm	-1.9	
Functional Measurement	Norm	Value	Trend
Sagittal Condylar Inclination right	-----	57.8	
Sagittal Condylar Inclination left	-----	60.0	
Sagittal Condylar Inclination	-----	58.9	
Relative Condylar Inclination	-----	49.4	
Relative Condylar Inclination 6	-----	45.7	
Relative Condylar Inclination 7	-----	32.9	
Relative Condylar Inclination 8	-----	58.9	
Anterior Guidance (S-AOP)	-----	45.0	
Relative Anterior Guidance	-----	35.4	
Aesthetic Measurement	Norm	Value	Trend
Aesthetic Plane	-2.9mm	-3.8	
Lower Facial Height to Point D	49.7	44.3	1-*

## Symmetrical case

SCI = 59 degrees right and left.

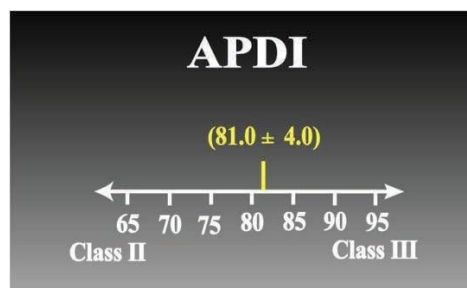
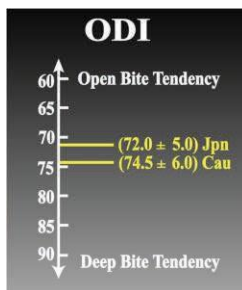
OPI total = 10 degrees change OPI 6 to 19 degrees both sides.

Or total OPI = 14 degrees and change OPI 6 to 19 degrees.

Now DOA= 19 degrees low chewing efficacy II dental class, deep bite.

Increase VD on incisal pin +4 mm.

Upper incisor inclination is decreased APDI= 72,9 class II tendency.



ODI= 86,2 deep bite tendency.

VTO increase.

VD+2 mm

(IP=+1). VTO

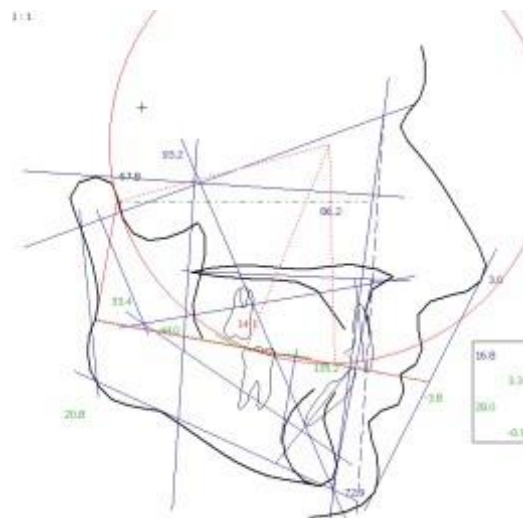
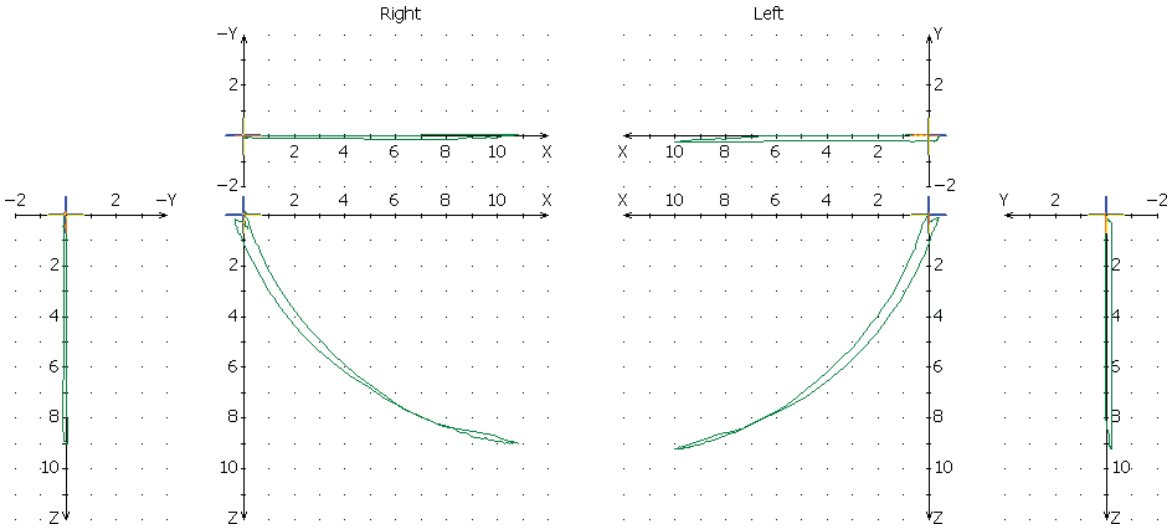


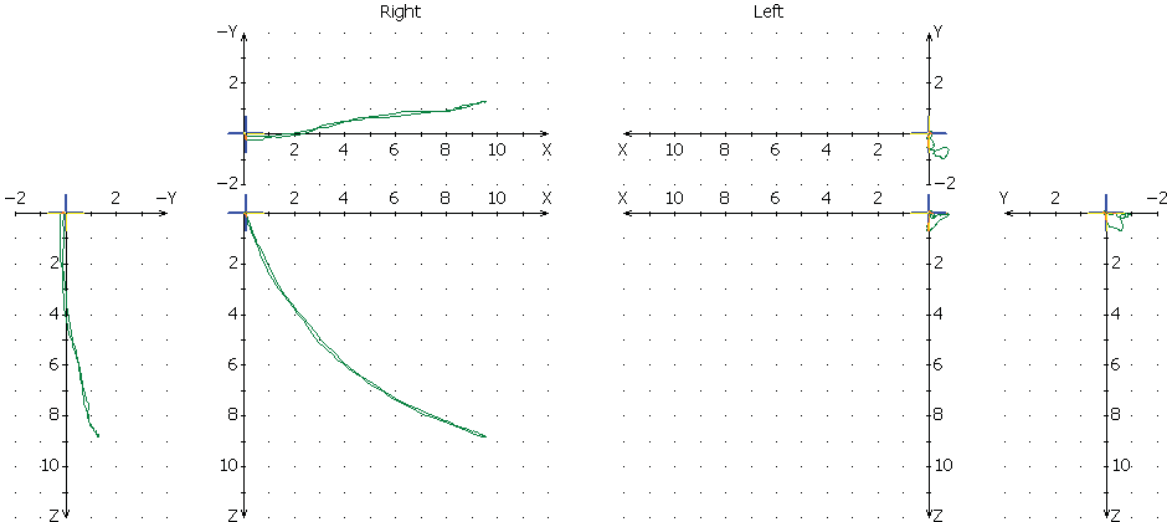
Table 6

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	93.1	1B*
Facial Depth	91.5°	86.2	1-*
Mandibular Plane	21.5°	20.8	
Facial Taper	68.0°	72.9	1B*
Mandibular Arc	31.2°	33.4	
Maxillary Position	65.0°	69.0	1+*
Convexity	-1.0 mm	2.9	1X*
Lower Facial Height (by R. Slavicek)	43.5°	44.0	
Lower Facial Height to Point D	50.0°	45.2	1-*
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	135.2	
Upper Incisor Protrusion	4.3 mm	3.3	
Upper Incisor Inclination	23.1°	16.7	1-*
Upper Incisor Vertical	Mm	0.8	
Lower Incisor Protrusions	1.2 mm	-0.9	
Lower Incisor Inclination	24.1°	27.9	
Upper Molar Position	21.0 mm	14.0	3-***
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	-----	10.3	
Idealized Occlusal Plane – Axis Orbital Plane	-----	11.7	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	37.3	
Radius of Curve of Spee	----- mm	67.8	
Lip Emrasure	0.0 mm	0.1	
Occlusal Plane Xi Distance	-1.4 mm	-1.8	
Functional Measurement	Norm	Value	Trend
Sagittal Condylar Inclination right	-----		
Sagittal Condylar Inclination left	-----		
Sagittal Condylar Inclination	-----		
Relative Condylar Inclination	-----		
Relative Condylar Inclination 6	-----		
Relative Condylar Inclination 7	-----		
Relative Condylar Inclination 8	-----		
Anterior Guidance (S-AOP)	-----	45.0	
Relative Anterior Guidance	-----	35.4	
Aesthetic Measurement	Norm	Value	Trend
Aesthetic Plane	-2.9mm	-3.8	

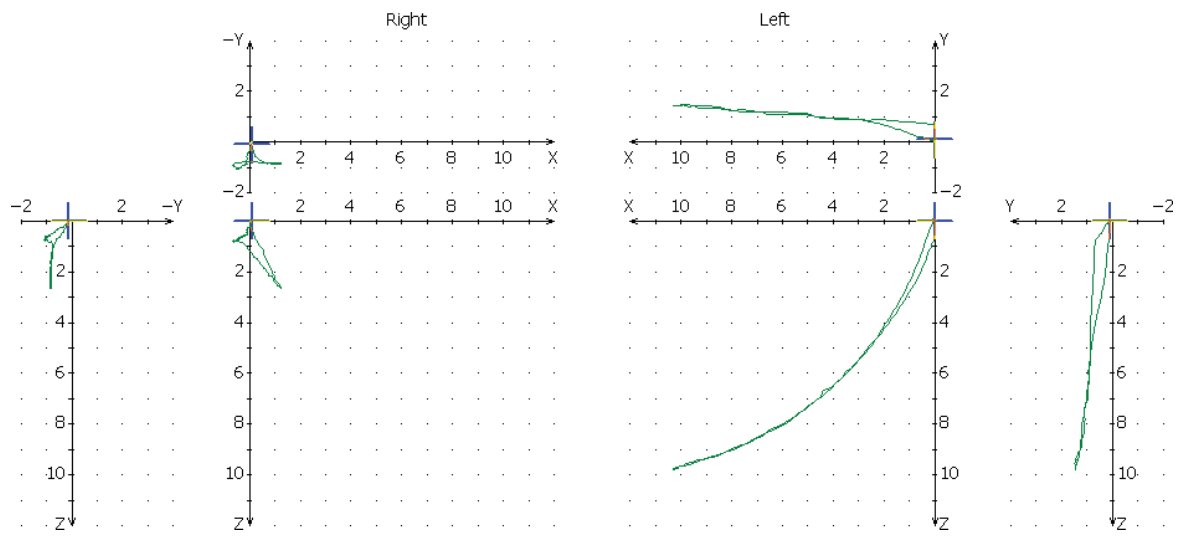
# Protrusion- retrusion



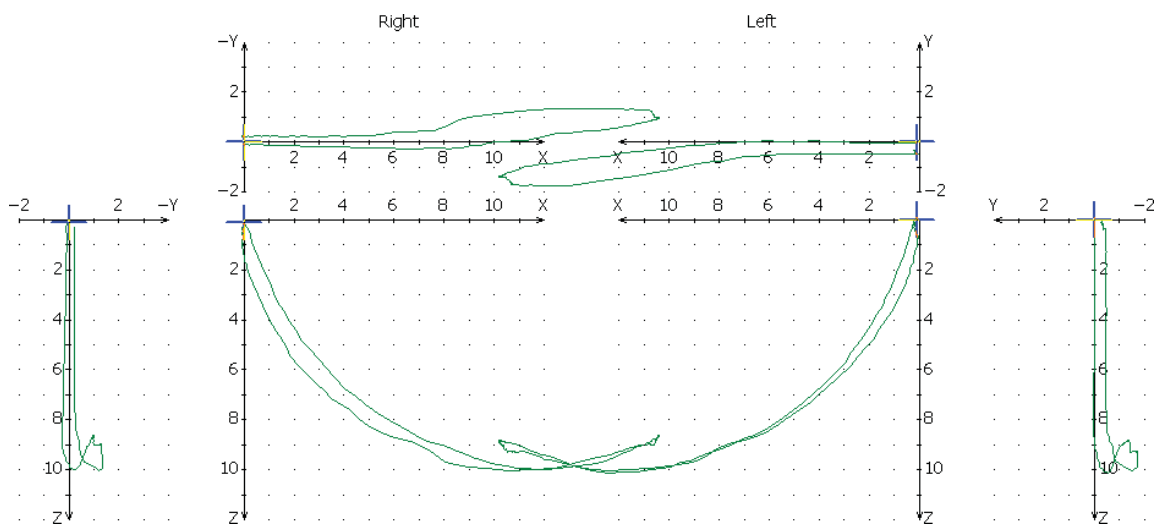
# Mediotrusion right



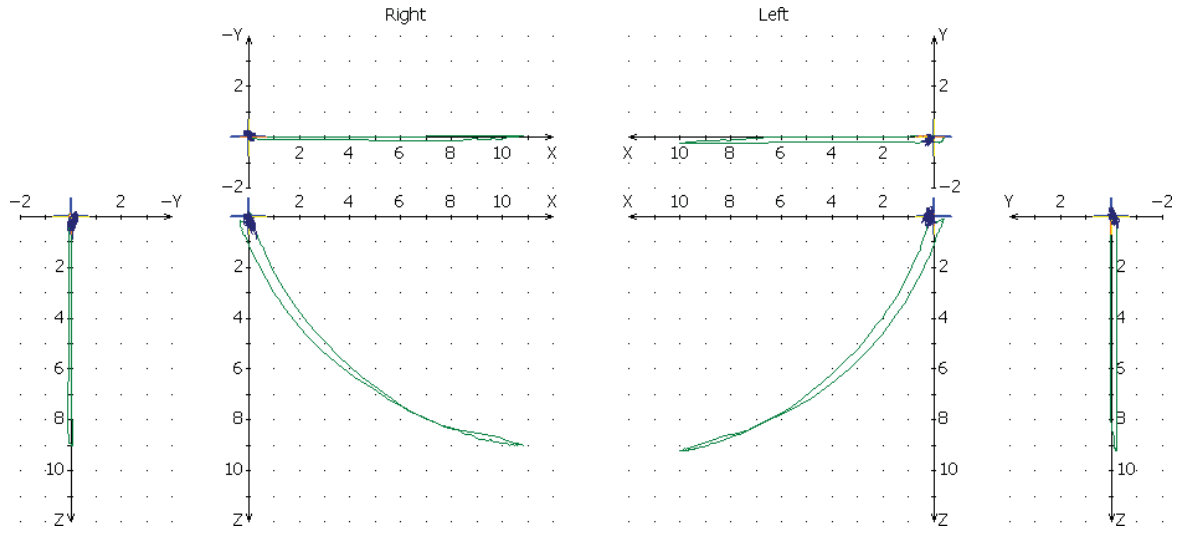
# Mediotrusion left



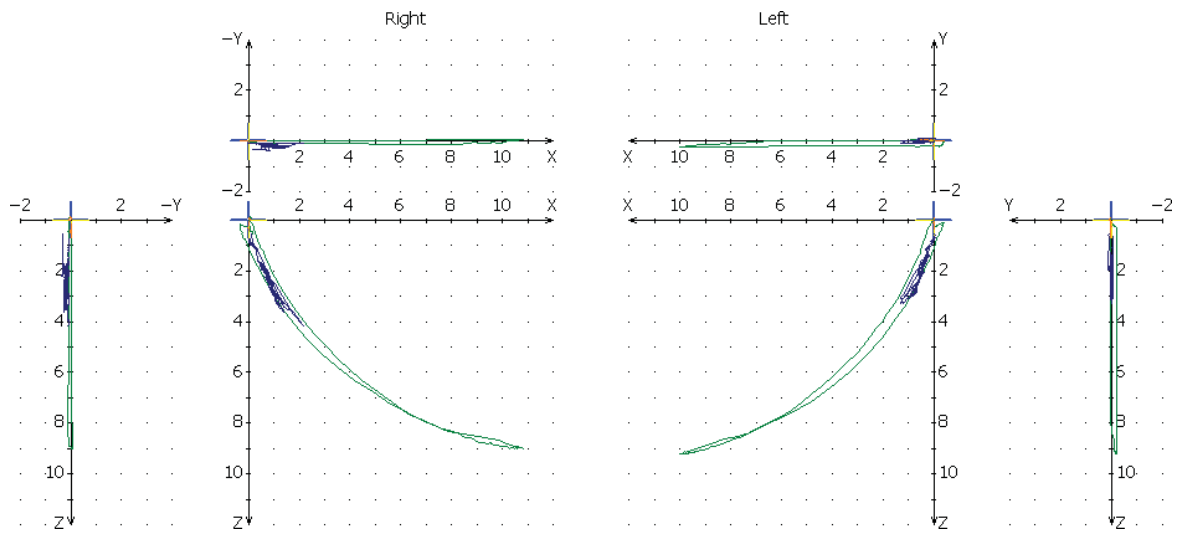
# Open- close



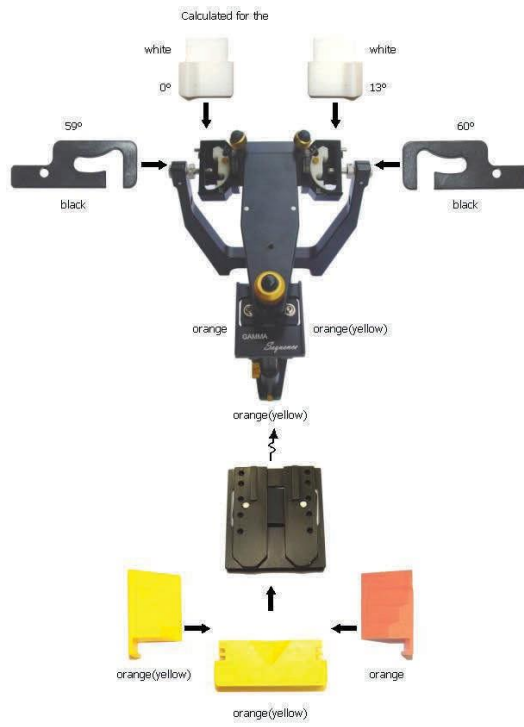
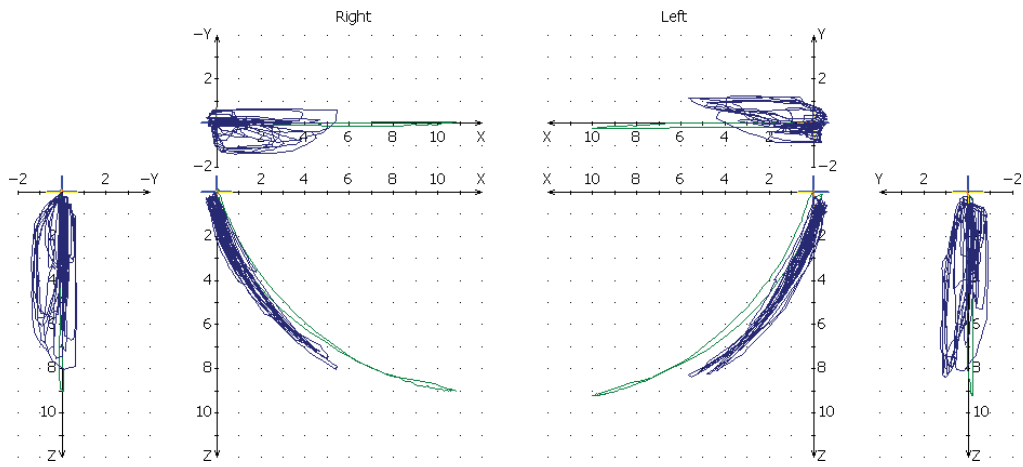
# Brux



# Speech 50-60



# Mastication



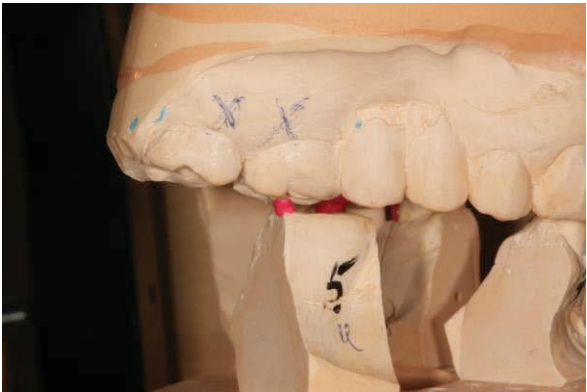
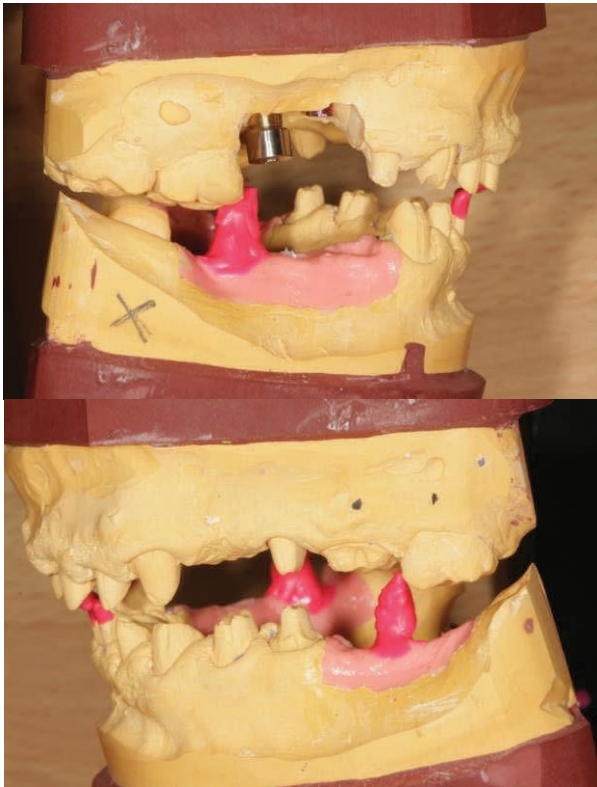


- Increase VD for wax-up to 2 mm(Incisal pin = +1 mm) close the gap with upper incisors ( VTO) Both jaws are in protruded position.
- II class occlusion.
- OPI total = 12 degrees.
- OPI 6= 19 degrees.
- SCI left =59 degrees, black insert.
- SCI right= 59 degrees,black insert.
- Bennett right = 0 degrees, white insert.
- Bennett left = 13 degrees, white insert.
- AG 60 degrees.
- OPI stops on 36 and 47.
- Extract 18,17,47 and may be 17(from parodontal point of view no place for gingivotomy- distal root has a strong bone loss.

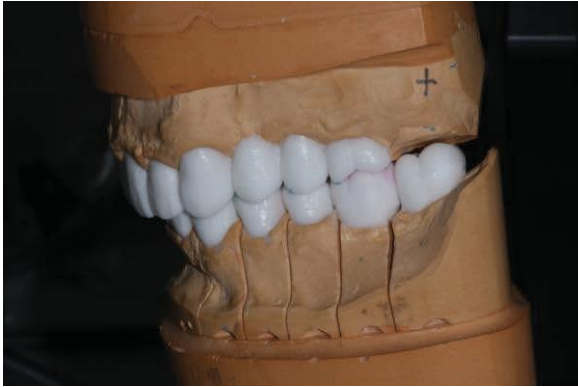
Photos before the treatment, after the removal of old orthopedic structures.



**Wax**



**Wax up 05/09/2012**





Photos of casts for temporary crowns.



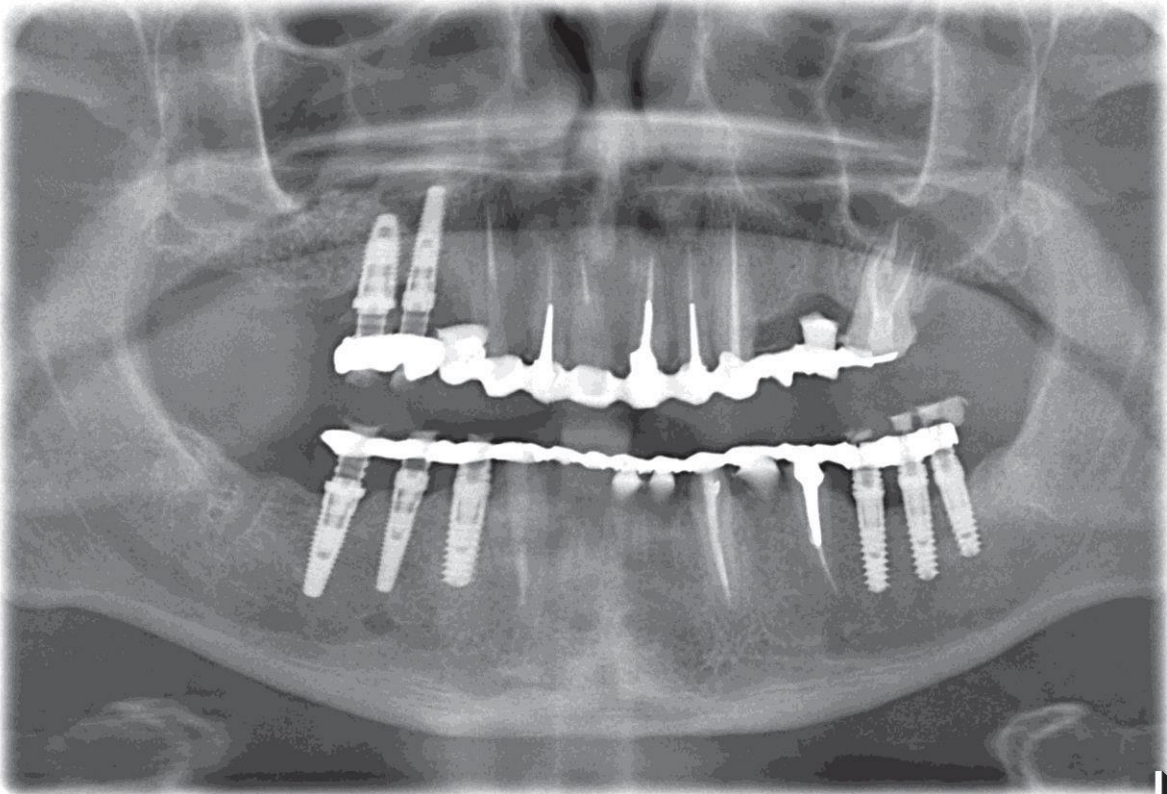
Photos of temporary crowns.



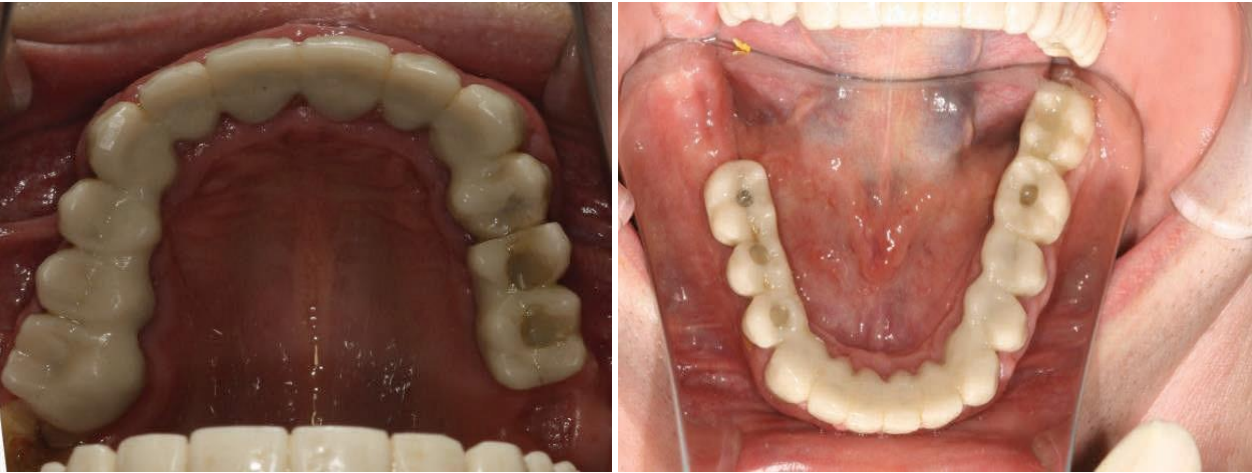
Tooth 27: length 18 is sealed on 14. x-ray from April 2012.



**OPG**



Temporary crowns July 2012.



Templates for surgery 2012.



# Periodontal chart 2012.

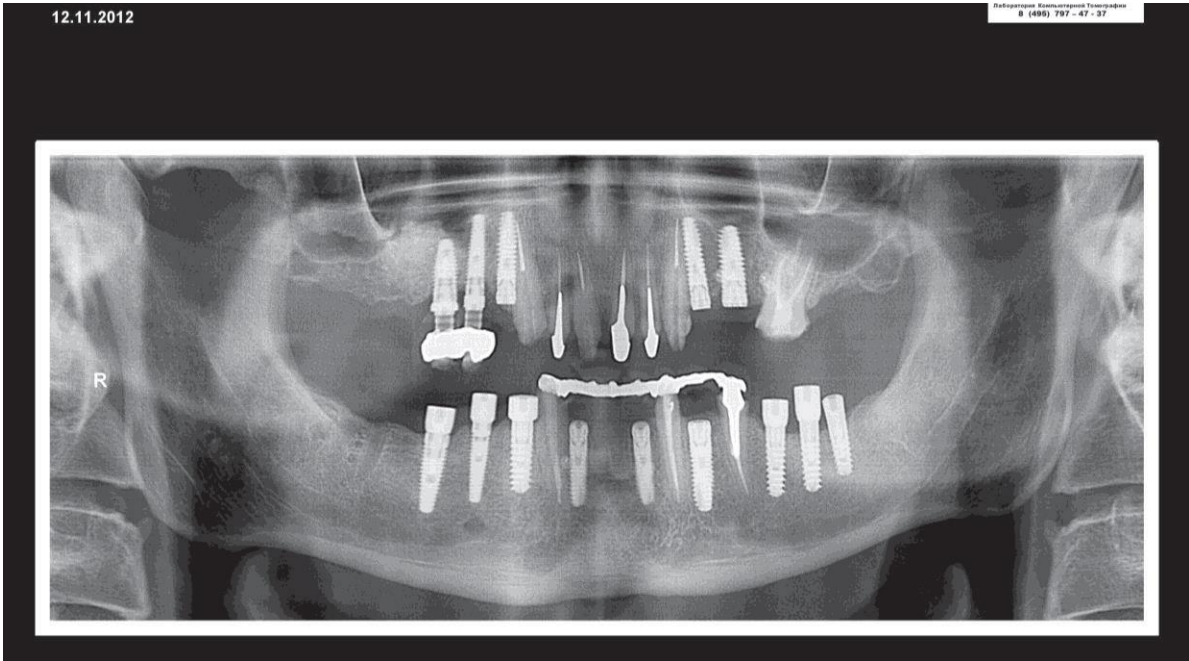
экссудат	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	экссудат
фурацилин																	фурацилин
подвижность																	подвижность
прикр.десн																	прикр.десн
решесния																	решесния
гл.кар. 1																	гл.кар. 3
гл.кар. 2																	гл.кар. 2
гл.кар. 1																	гл.кар. 1
везикулярная поверхность																	
П																	Л
Р																	В
А																	В
В																	О
О																	О
нибная поверхность																	
гл.кар. 1	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	гл.кар. 1
гл.кар. 2																	гл.кар. 2
гл.кар. 3																	гл.кар. 3
решесния																	решесния
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28		
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38		
решесния																	решесния
гл.кар. 3																	гл.кар. 3
гл.кар. 2																	гл.кар. 2
гл.кар. 1																	гл.кар. 1
язычная поверхность																	
П																	Л
Р																	В
А																	В
В																	О
О																	О
везикулярная поверхность																	
гл.кар. 1																	гл.кар. 1
гл.кар. 2																	гл.кар. 2
гл.кар. 3																	гл.кар. 3
решесния																	решесния
прикр.десн																	прикр.десн
подвижность																	подвижность
фурацилин																	фурацилин
экссудат																	экссудат
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38		

Trying on the operating template September 5, 2012.

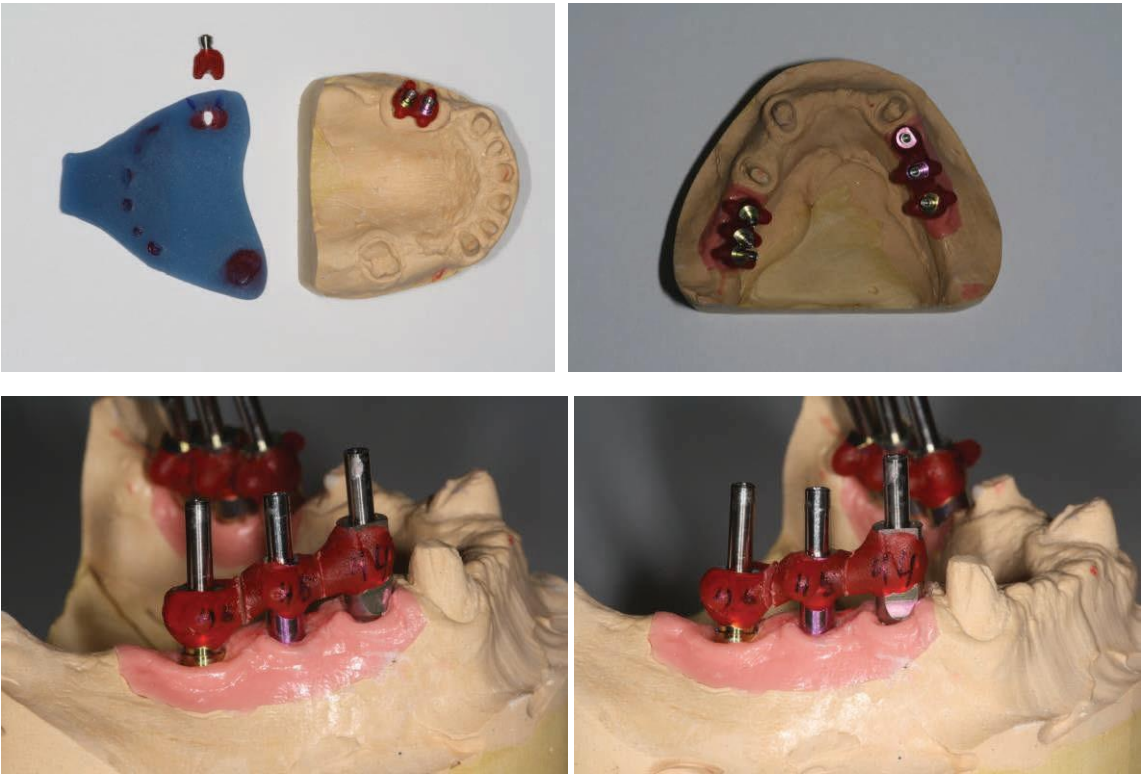


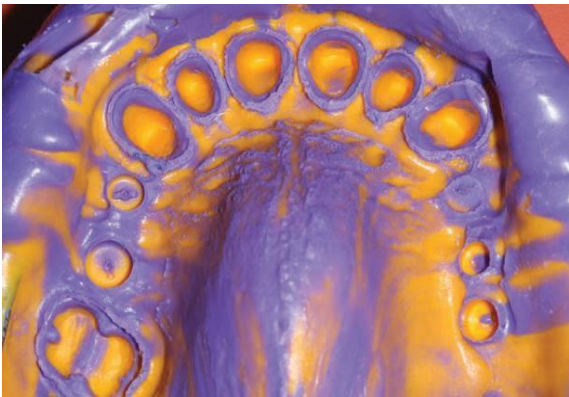
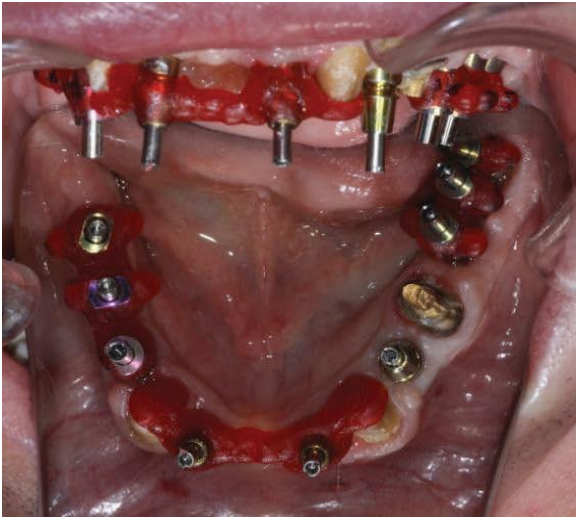
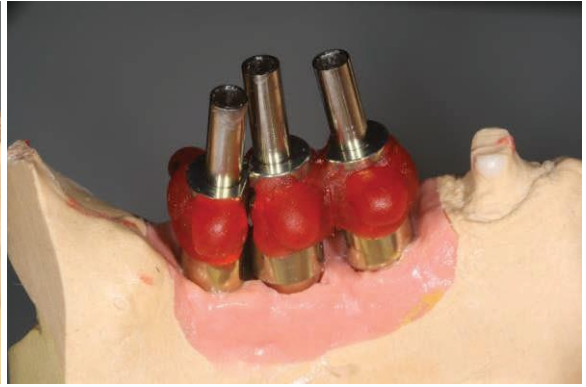


OPG 12.11.2012

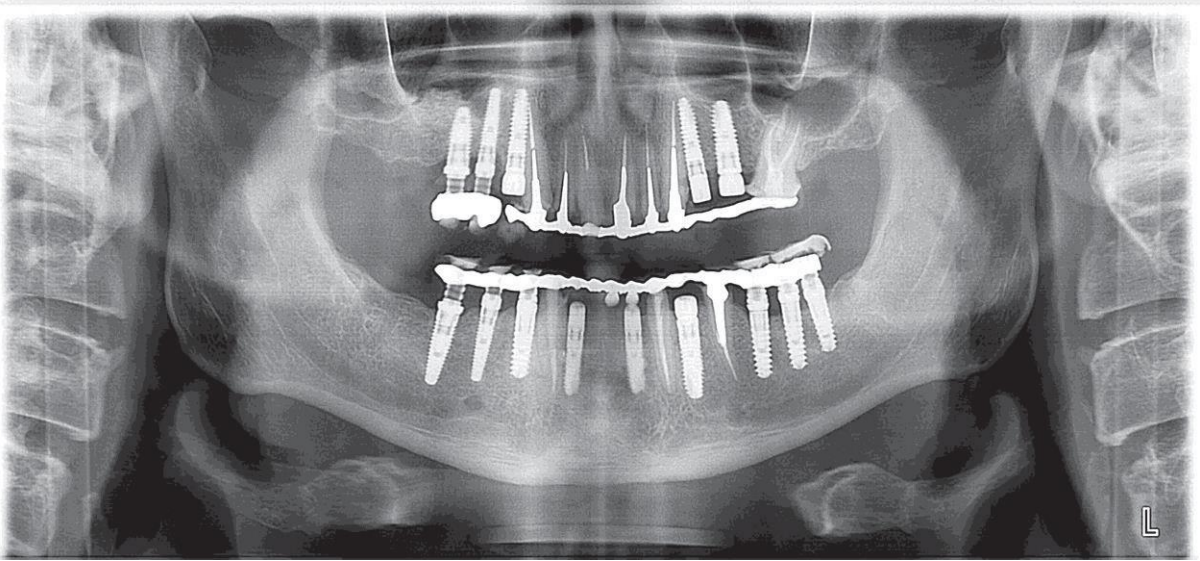


Photos of impression transfers 05/17/2013





OPG July 2013



Final restoration July 2013



## Clinical case №14

Patient A date of birth 1950

Main concern: pain in right TMJ, no posterior support, acute pain in 44-45.

### Intraoral photo



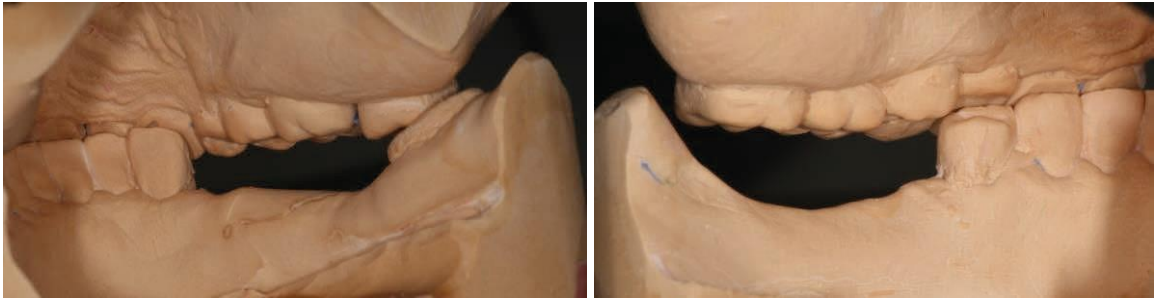
**Canines and incisors are inclined palatal.**



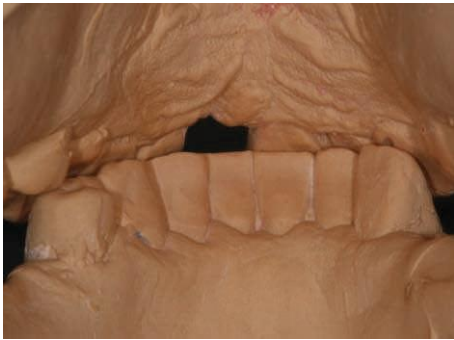
Cast mounted in intercaspal position.



Cast mounted in intercaspal position.



Cast mounted in intercaspal position.

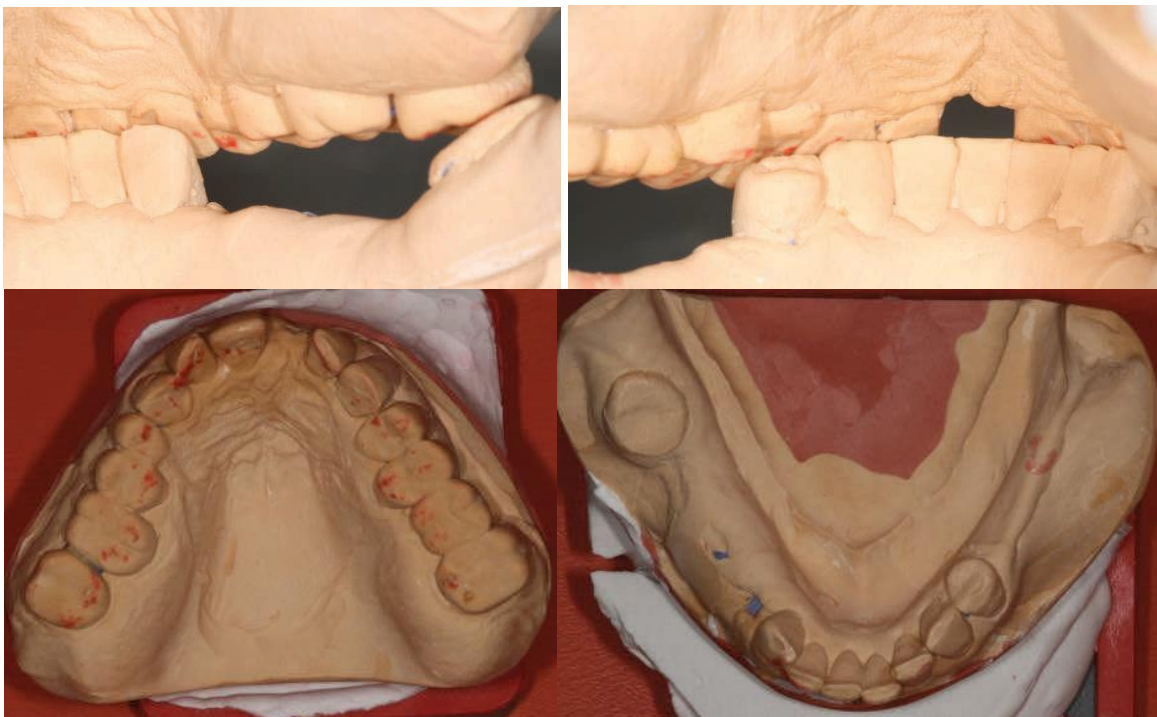




Splint-therapy(myopathic splint).

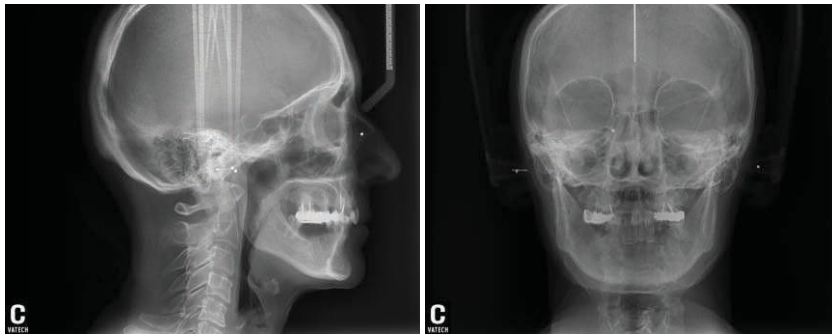


Casts after splint-therapy.



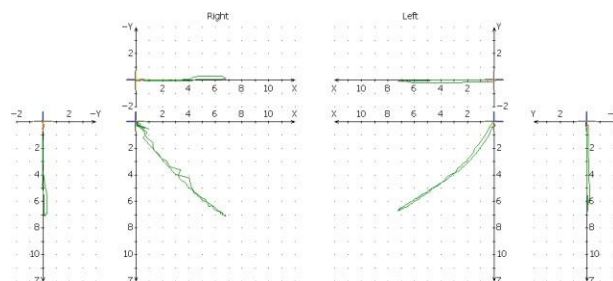


## Lateral X-ray.



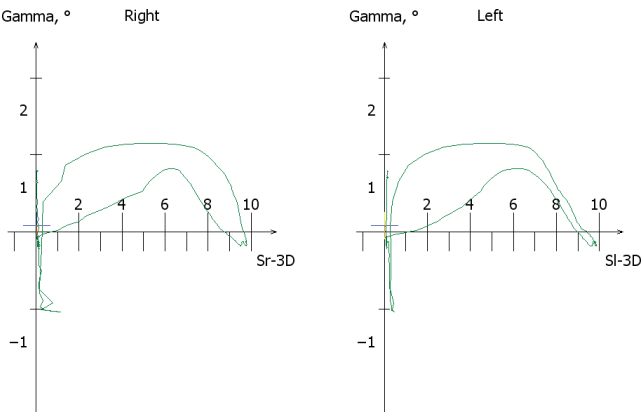
## OPG

### Protrusion-Retrusion



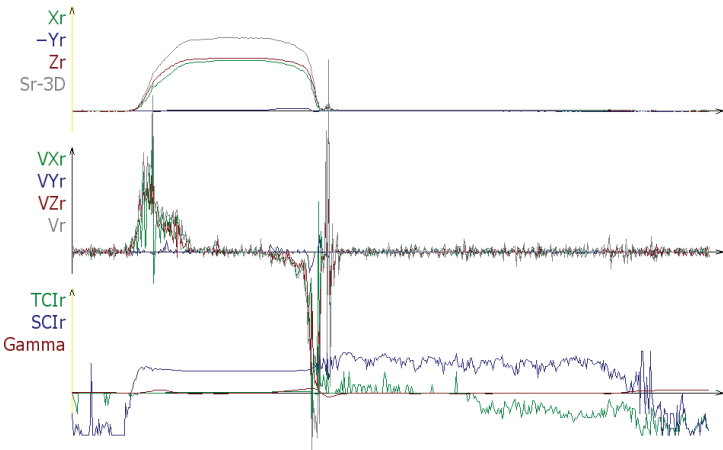
Right side- muscle problems, reciprocal click, not reproducible Length of movement is decreased.

# Translation-rotation



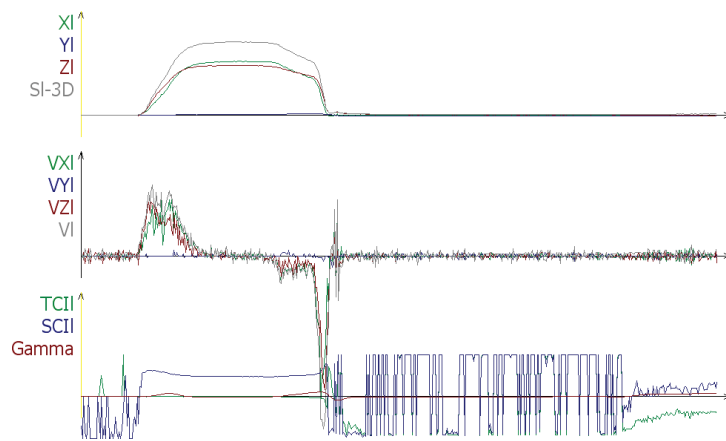
Negative rotation at the beginning of the movement- interference in frontal tooth.

## Time curves (right side)

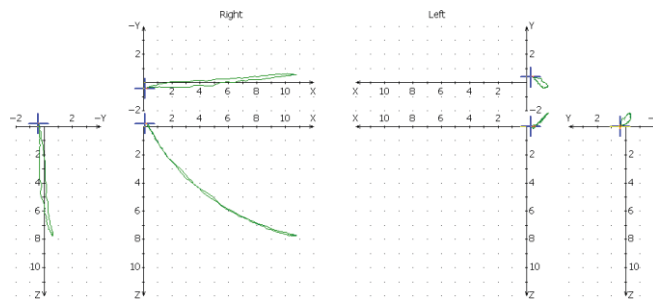




## Time curves (left side)

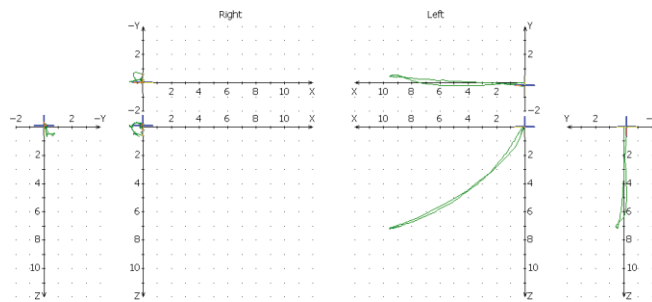


## Mediotrusion right



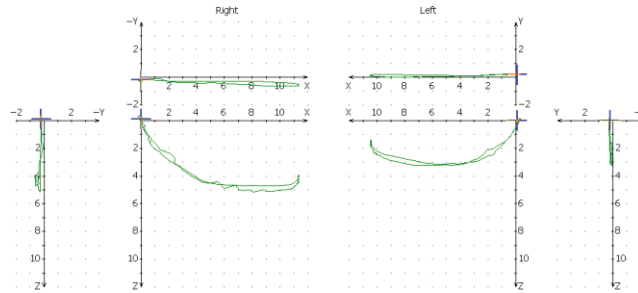
## Negative Bennett movement.

## Mediotrusion left

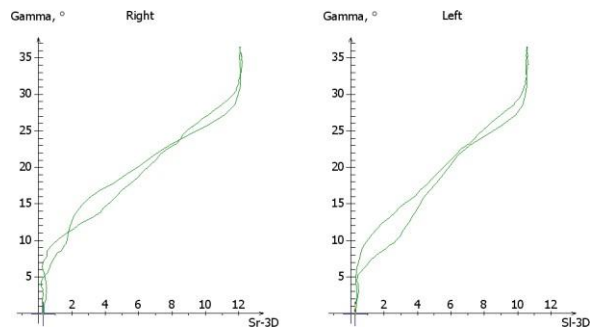


## Negative Bennett movement.

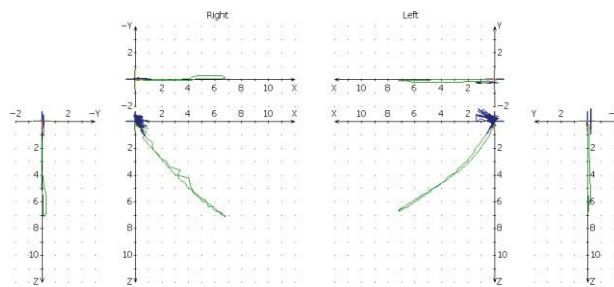
## Open-close



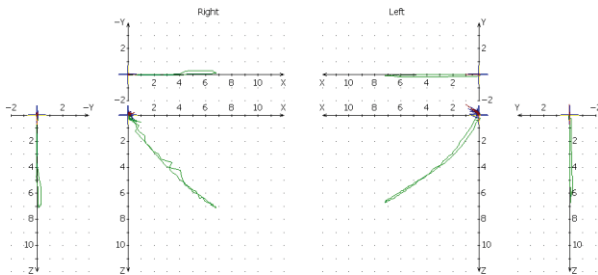
## Translation-rotation



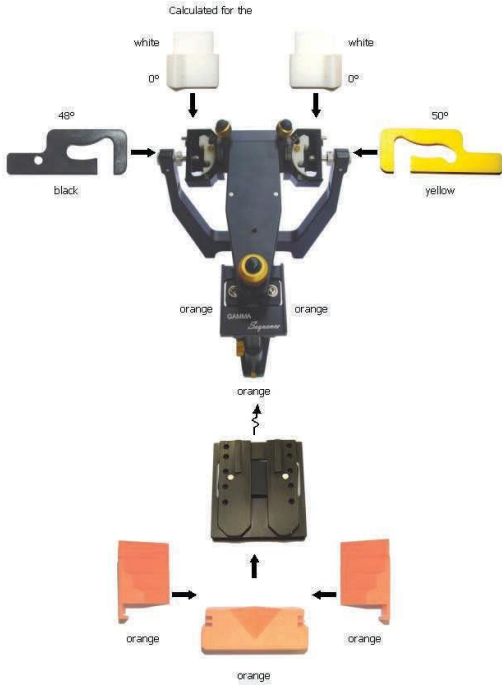
## Protrusion- speech 60-70



# Protrusion-brux



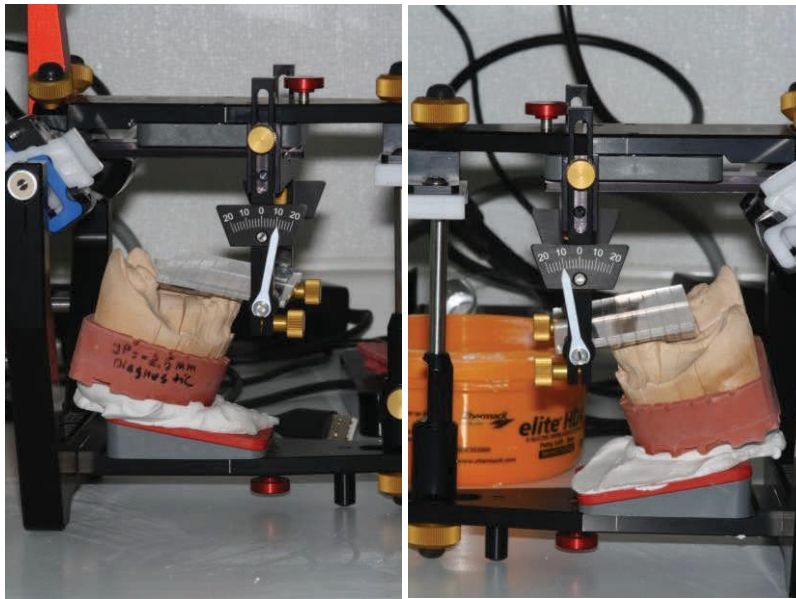
# Articulator settings



# Anterior guidance



OPI right and left



## Cephalometry

### Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is mesiofacial Skeletal class is I with tends to II.

The maxilla is positioned strongly prognathic.

The mandible is positioned prognathic, with tendency to neutral.

The lower facial height is increased.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is normal.

The protrusion of the incisor is normal.

The inclination of the lower incisor is normal.

The interincisal angle is normal.

Occlusal concept: Unknown (data missing).

No functional statement available.

## Explanation

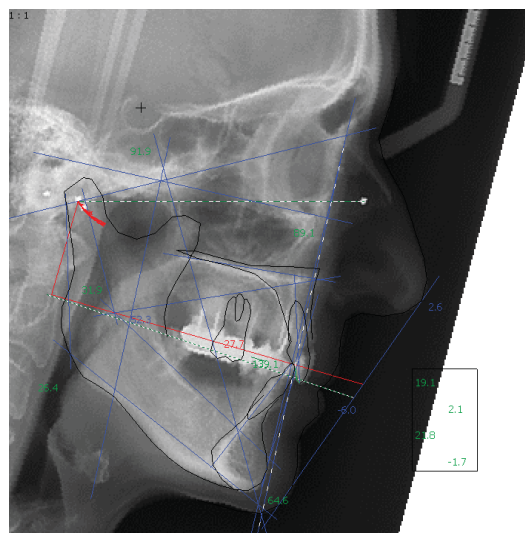
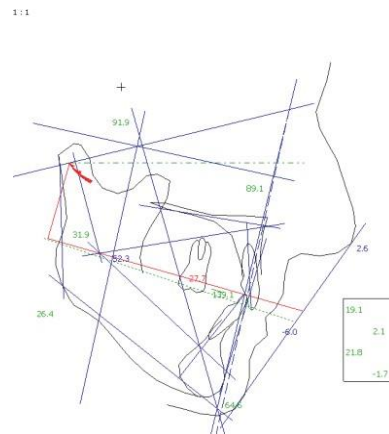
Table 1

Determinants	Norm	Value	Trend
Facial Axis	90.0°	91.8	
Facial Depth	89.0°	89.0	
Facial Taper	68.0°	64.5	
Mandibular Plane	24.0°	26.3	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	388.4	3-***
Facial Length Ratio	63.5%	69.7	3+***
Y Axis to S N	67.0°	65.9	
Y Axis (Downs)	61.2°	61.0	
S N to Gonion Gnathion Angle	32.6°	28.4	1-*

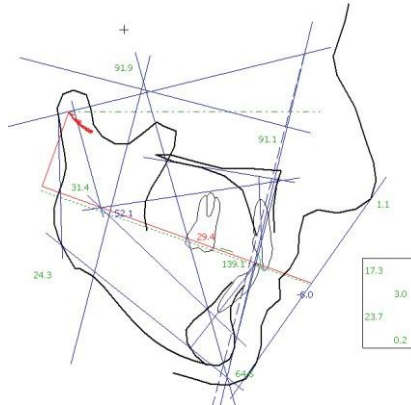
Table 2

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0	91.8	
Facial Depth	89.0°	89.0	
Mandibular Plane	24.0°	26.3	
Facial Taper	68.0°	64.5	
Mandibular Arc	29.0°	31.9	
Maxillary Position	65.0°	69.3	1+*
Convexity	0.0 mm	2.6	1X*
Lower Facial Height (by R. Slavicek)	44.9	52.3	1+*
Lower Facial Height to Point D	51.4	58.5	1+*
Dental Measurement	Norm	Value	Trend
Interincisal Angle	132.8°	139.0	
Upper Incisor Protrusion	4.3 mm	2.1	
Upper Incisor Inclination	23.1°	19.0	1-*
Upper Incisor Vertical	Mm		
Lower Incisor Protrusions	1.2 mm	-1.6	
Lower Incisor Inclination	24.1°	21.8	
Upper Molar Position	18.0 mm	27.6	4+***>
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	-----		
Idealized Occlusal Plane – Axis Orbital Plane	-----	19.6	
Distance Occlusal Plane – Axis (DPO)	40.9 mm		
Radius of Curve of Spee	----- mm		
Lip Emrasure	0.0 mm		
Occlusal Plane Xi Distance	-1.4 mm		
Functional Measurement	Norm	Value	Trend

Sagittal Condylar Inclination right	-----°	49.9	
Sagittal Condylar Inclination left	-----°	46.1	
Sagittal Condylar Inclination	-----°	48.0	
Relative Condylar Inclination	-----°	48.0	
Relative Condylar Inclination 6	-----°	48.0	
Relative Condylar Inclination 7	-----°	48.0	
Relative Condylar Inclination 8	-----°	48.0	
Anterior Guidance (S-AOP)	-----°	75.9	
Relative Anterior Guidance			
Aesthetic Measurement	Norm	Value	Trend
Aesthetic Plane	-2.3mm	-5.9	1-*



VTO – cut 2 mm on incisor edge of 31,32,41,42,33,43.



### Asymmetrical case:

- SCI R = 50 degrees.
- SCI L = 46 degrees.
- OPI = 10 degrees.
- DOA R =  $50 - 10 = 40 - 30 = 10$  – norm.
- DOA L =  $46 - 10 = 36 - 30 = 6$  – interference.
- OPI l should be 6 degrees.
- LFH - norm.

### Treatment plan:

1. Myopatic splint therapy.
2. Wax-up.
3. Root canal retreatment 16,15,13,11,25,27.
4. Extract 24,17,47.
5. Place implants 14,11,14,16,35,36,37,44,45,46. Exact number of implants we can say only after wax-up.
6. Long time temporaries.

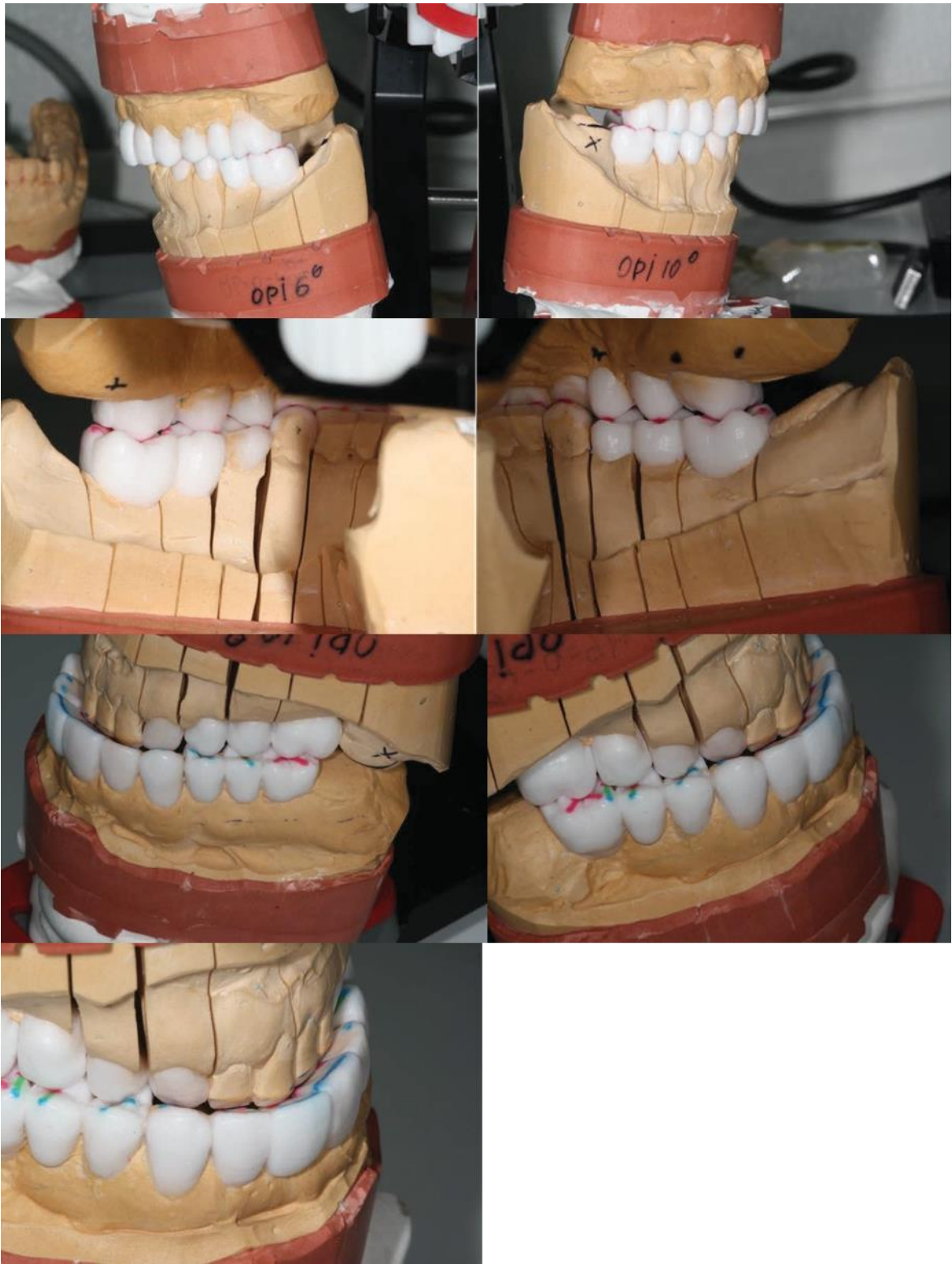
## Technical specification:

- SCI R = 50 degrees, black insert.
- SCI L = 46 degrees, yellow insert.
- Bennett both sides- white inserts, = 0 degrees.
- OPI R = 10 degrees.
- OPI L = 6 degrees.
- LFH - no changes, but cut the height of lower incisors for 2 mm, Frontal overbite and overjet after this cutting close with palatal surface (crowns) of upper frontal teeth.
- Smile line- right and left side different.
- Incisal table – orange.
- I class occlusion

## Wax up

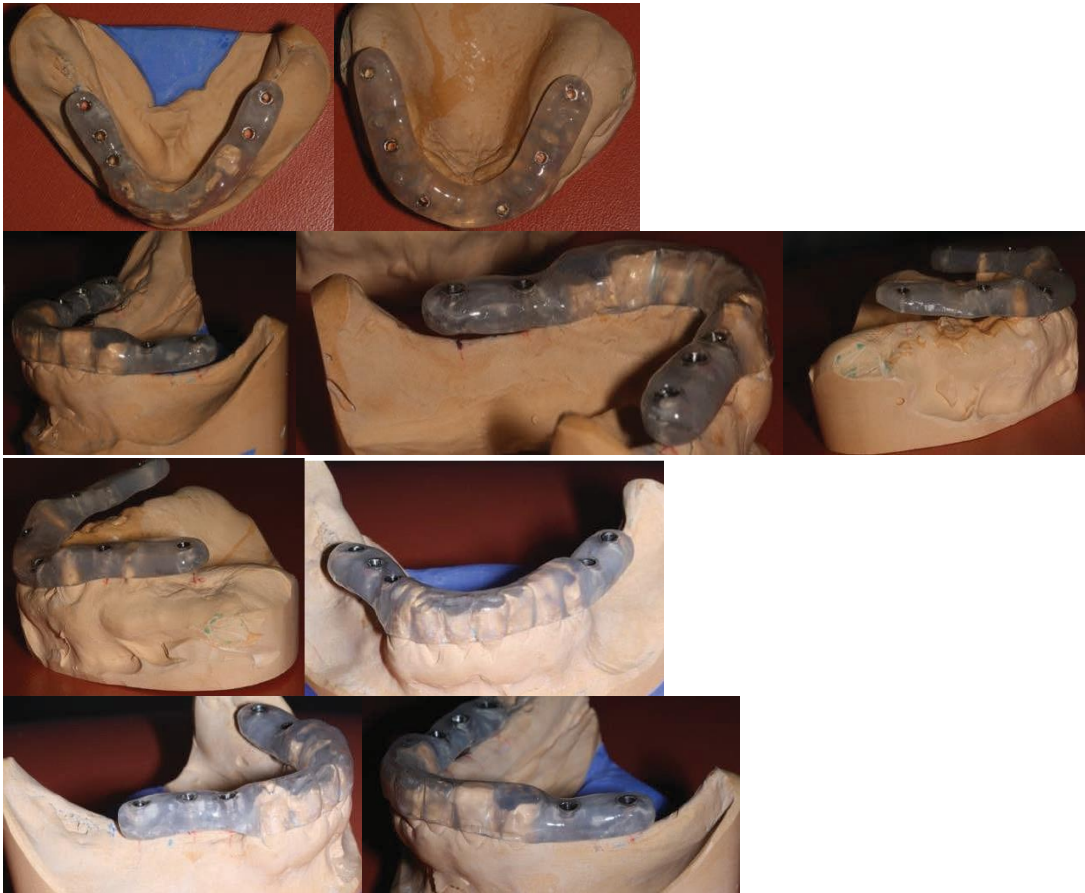








**Operational template March 2012**



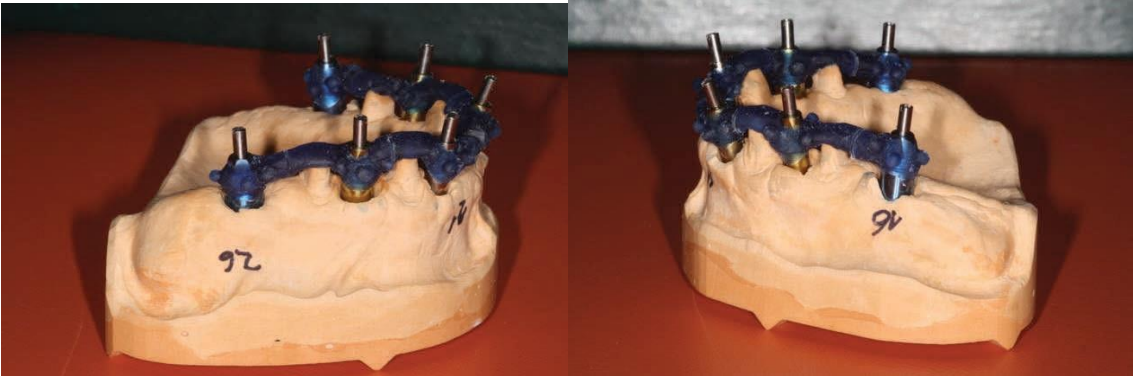
**Removing impressions for individual spoons**



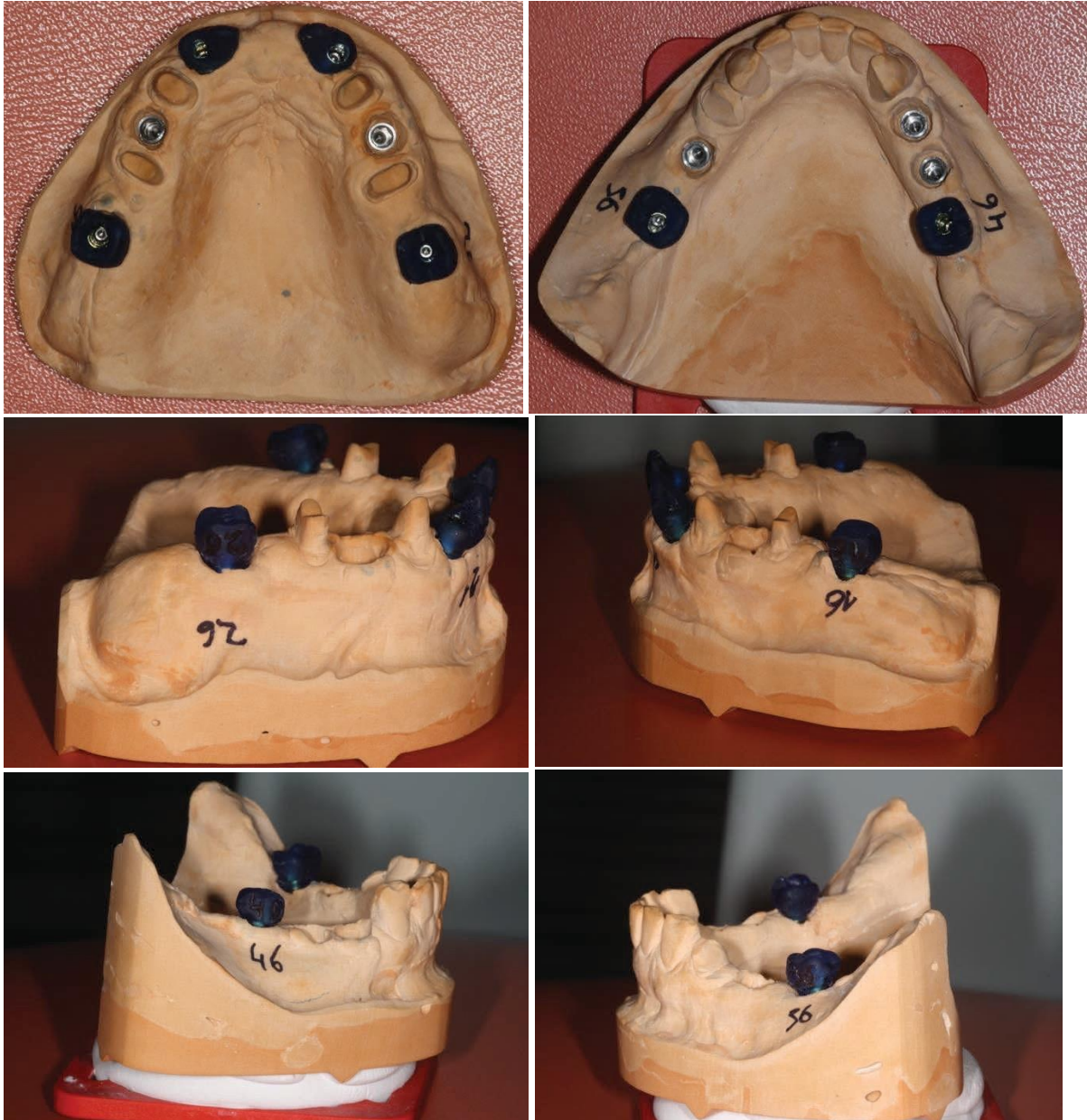
**Individual Fradeani spoon**



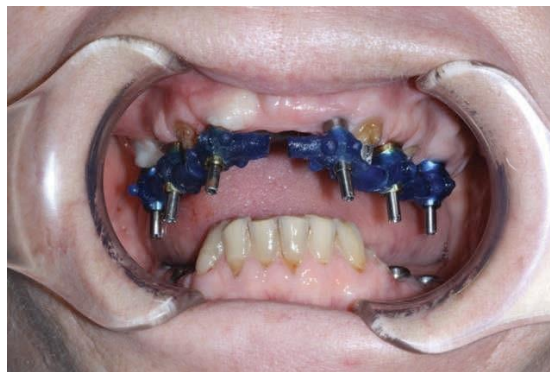
# Individual spoons and blanks



## Centric Relation

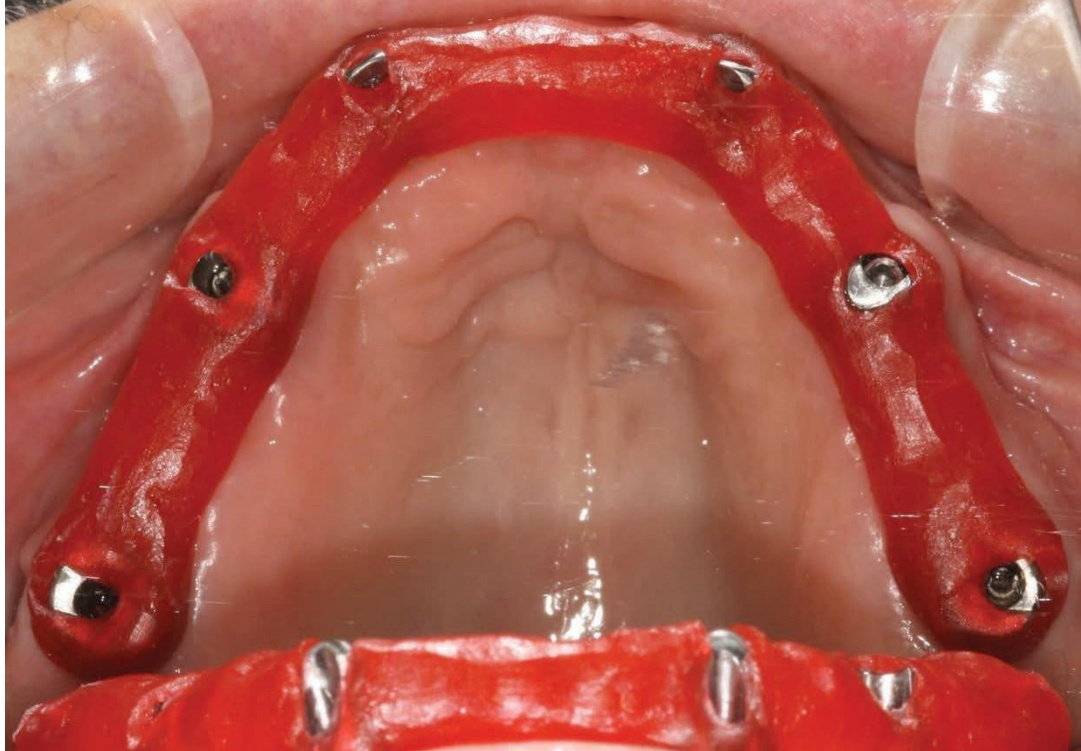
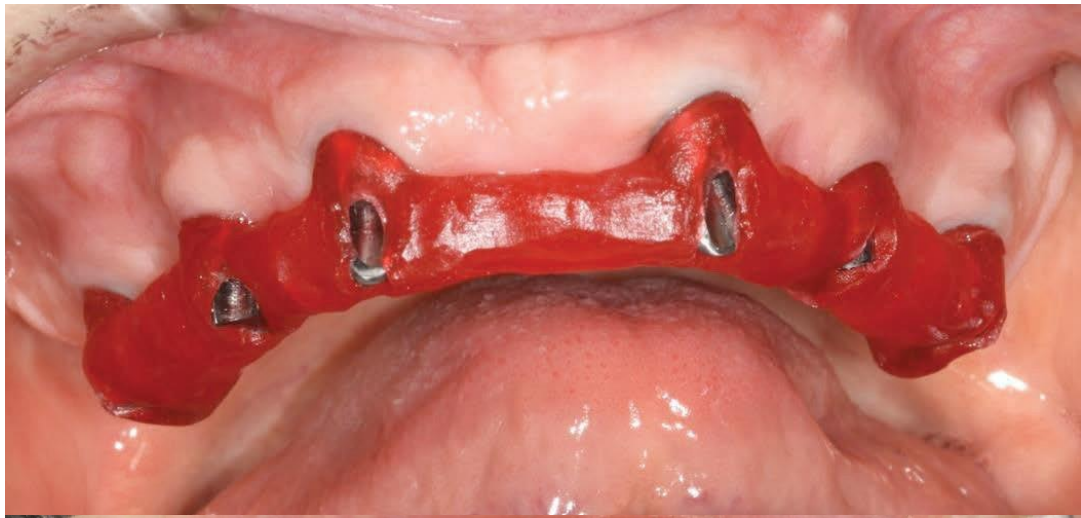


## Impression caps in oral cavity



**Fitting abutments**

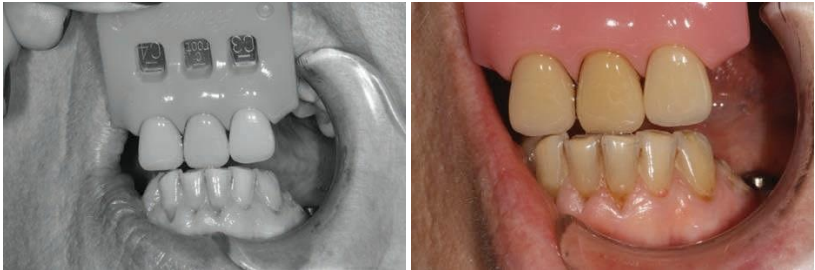




**Impression for temporary crowns on implants and centric**



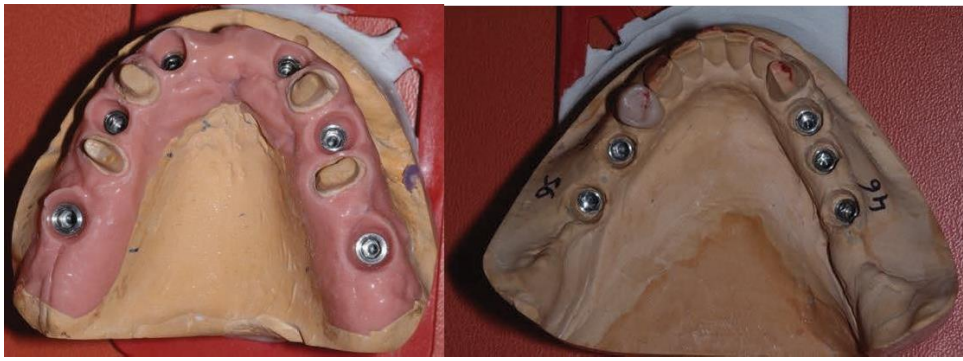
**Color detection 10/5/2012**



**Impression for the final restoration**





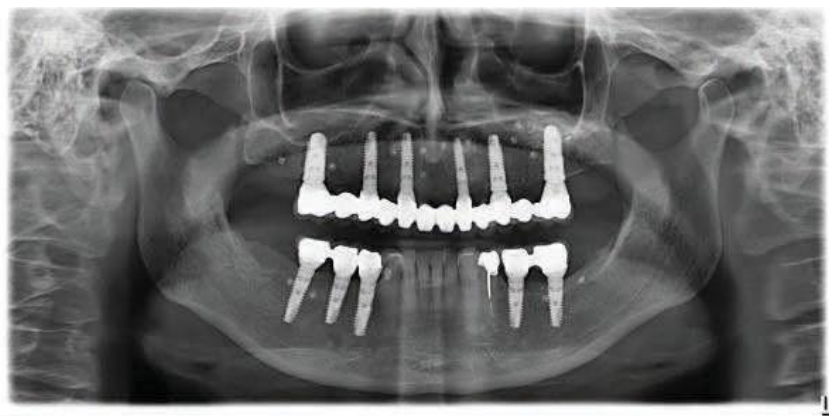


**Final restoration March 2013**





**Checkup 2015. August OPG**





## Clinical case №15

Patient A date of birth: 1984

Date of examination 15.04.2022 Midline shifted to the right.

Skeletal class III wish tends to I.

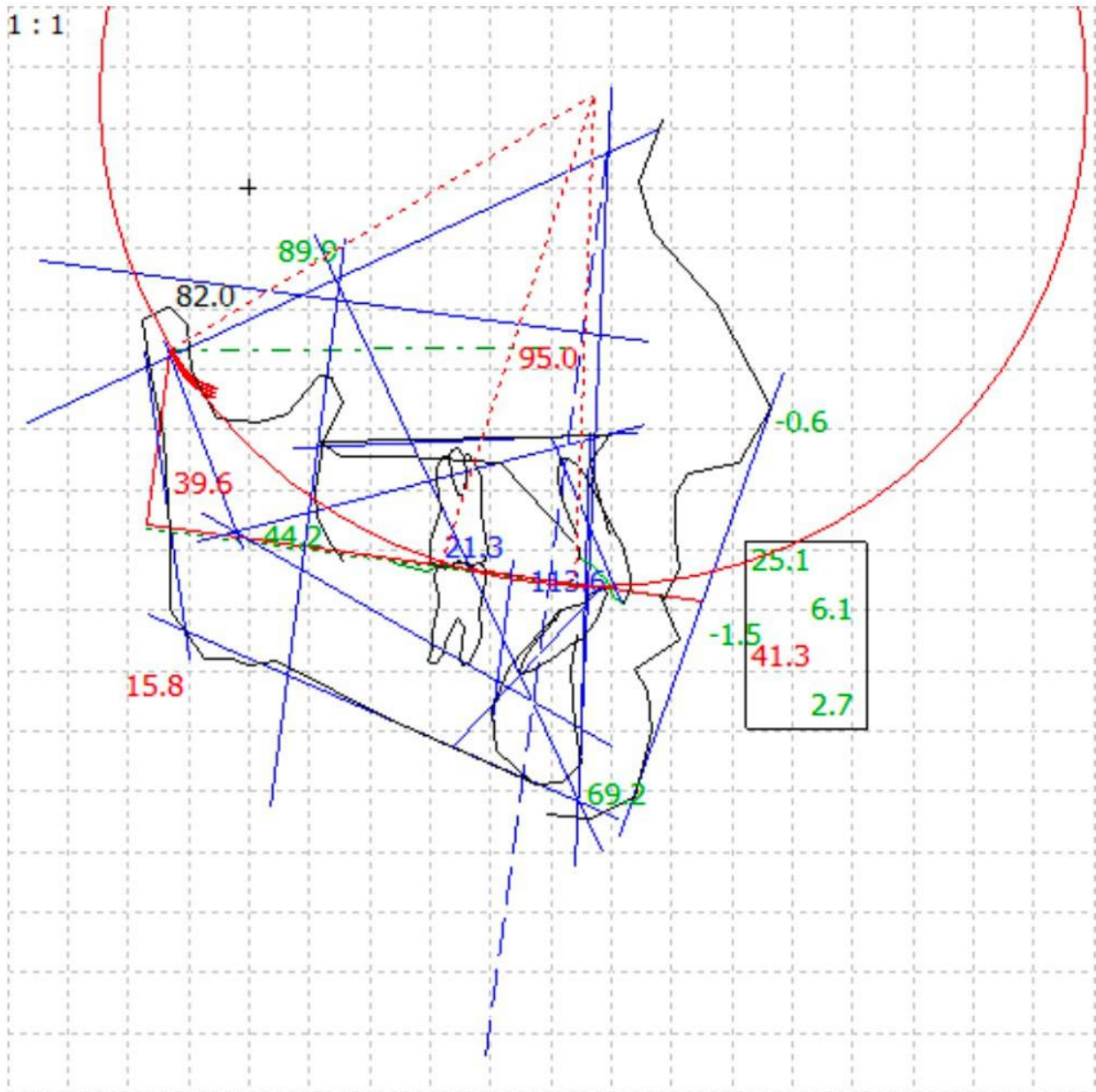




# Cephalometric analyses

Table 1

<b>Slavicek Analysis</b>			
<b>Skeletal Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Facial Axis	90.0°	89.8	
Facial Depth	89°	95.0	2+**
Mandibular Plane	24.°	15.7	2B**
Facial Taper	68.0°	96.1	
Mandibular Arc	29°	39.5	2B**
Maxillary Position	65.0°	60.0	1-*
Convexity	00 mm	-0.6	
Lower Facial Height (by R. Slavicek)	44.2°	44.0	
Lower Facial Height to Point D	50.3°	48.0	
<b>Dental Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Interincisal Angle	131.7°	113,6	1-*
Upper Incisor Protrusion	3.7 mm	6.1	
Upper Incisor Inclination	24.0°	25	
Upper Incisor Vertical	mm	2.1	
Lower Incisor Protrusion	2,7 mm	2.6	
Lower Incisor Inclination	24.°	41.2	2+**
Upper Molar Position	18.0 mm	22	1+*
<b>Occlusal Plane</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	7.9	
Idealized Occlusal Plane – Axis Orbital Plane	----°	8.6	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	29.1	1-*
Radius of Curve of Spee	---- mm	82.3	
Lip Embrasure	0.0 mm	0.0	
Occlusal Plane Xi Distance	-1.4 mm	-0.8	
<b>Functional Measurement</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Horizontal Condylar Inclination right	----°	50.4	
Horizontal Condylar Inclination left	----°	58.6	
Horizontal Condylar Inclination	----°	54.5	
Relative Condylar Inclination	----°	46.5	
Relative Condylar Inclination 6	----°	43.1	
Relative Condylar Inclination 7	----°	42.1	
Relative Condylar Inclination 8	----°		
Anterior Guidance (S-AOP)	°	48.7	
Relative Anterior Guidance	°	40.7	
<b>Aesthetic Measurement (Lip Relation)</b>	<b>Norm</b>	<b>Value</b>	<b>Trend</b>
Aesthetic Plane	-2.9 mm	1.5	



### Important

OPI R = 2 degrees.

OPI L = 6 degrees.

SCI R = 52,4 degrees.

SCI L = 56,6 degrees.

Interincisal angle 113,6 degrees.

Anterior Guidance 48,7 degrees too low DOAR= 20de- grees,

DOAL= 20 degrees.

Low chewing efficacy.

Maxilla position – neutral.

Mandibule position – prognathic, wish tendency to neutral.

Skeletal class is III wish tends to I.

## **Slavicek Interactive Verbal Analysis**

The skeletal trend of the skull is brachiofacial

The skeletal trend of the mandible is strongly brachyfacial Skeletal class is III with tends to I.

The maxilla is positioned prognathic.

The mandible is positioned prognathic.

Lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is normal.

The protrusion of the lower incisor is normal

The inclination of the lower strongly increased.

The interincisal angle is diminished.

Occlusal concept: Group function.



## Explanation

Table 2

Determinants	Norm	Value	Trend
Facial Axis	90.0°	89.8	
Facial Depth	89.0°	95.0	2+**
Facial Taper	68.0°	69.1	
Mandibular Plane	24.0°	15.7	2B**
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	389.0	2-**
Facial Length Ratio	63.5%	69.0	2+**
Y Axis to S N	67.0°	74.4	
Y Axis (Downs)	61.2°	54.1	2-**
S N to Gonion Gnathion Angle	32.6°	29.0	-1*

## Special Medical Analysis and dental analyses

Table 3

Dental History Analysis				Valuation	Yes	No
1.	Do you have problems when you chew?					
2.	Do you have problems when you are talking?			2	X	
3.	Do you have problems in closing your teeth property?			1	X	
4.	Are any of your teeth especially sensitive?					X
5.	Do you have problem when you open your mouth very wide?					X
6.	Do your jaw joints make noise and if so, on what side?			3	X	
7.	Do you have pain in the area of your jaw joints?			2	X	
8.	Do you suffer from headaches?			2	X	
9.	Do you suffer from cramps or spasm in your head, neck or throat?			1	X	
10.	Do you have in general problems with your posture?			1	X	
	Occlusal Index			1.71		
11.	Have you ever had serious accident?					X
12.	Did you have one or more oral intubations?					X
13.	Have you ever had orthodontic treatment or ...				X	
14.	Have you had a treatment with splint?					X
15.	Are you grinding or pressing with your teeth?				X	
16.	Do you think that treatment is necessary?				X	
17.	Do you think that there is a serious disorder or illness?					X
18.	When the last time you had dental treatment and what was done?					
19.	How would you describe your psychic behavior?					
	happy	sad	calm	excited	self-controlled	lack of self-control
					X	

Table 4

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		X
2.	Cardo-vascular systems		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern: aesthetic, low chewing efficacy			

## Muscle palpation

Table 5

Muscle Diagnosis		Right		Left		
		+	++	+		
		+	++	+		++
1.	Shoulders and neck					
2.	Atlanto-occipital region					
3.a	M.temporalis ant.					
3.b	M.temporalis med.			X		
3.c	M.temporalis post.					
4.a	M.masseter (superficial)					
4.b	M.masseter (deep)					
5.	Tuber maxillae			X		
6.	M.pterygoideus medialis					
7.	M.mylohyideus	X		(avoidance pattern)		X
8.	M.digastricus					
9.	Suprahyoidale M.					
10.	Infrahyoidale M.					
11.	Larynx					
12.	M.sterno-cleido-mastoideus	X				X
13.	M.omohyoideus	X				X
14.	Tongue					
15.	Comparative palpation of jaw joints					
	a) Lateral poles, statically					
	b) Lateral poles, in rotation					
	c) Retral joint space					
	d) Lig.temporo-mandibulare		X			

## **Movement Muscles:**

- Posture 1,2, 7, 12, 13, 14.
- Closing 3a, 3b, 4a, 4b, 5.
- Opening / Protraction 8, 9, 10.
- Retraction 3c, 8 Medio-/Laterotrraction 6, 3a, 4a Hyoid-Position 8, 9,10, 11, 13.
- Functions 7, 8, 9,10, 11, 14 TMJ 15a, 15b, 15c, 15d.
- Closing, TMJ.

## **List of problem:**

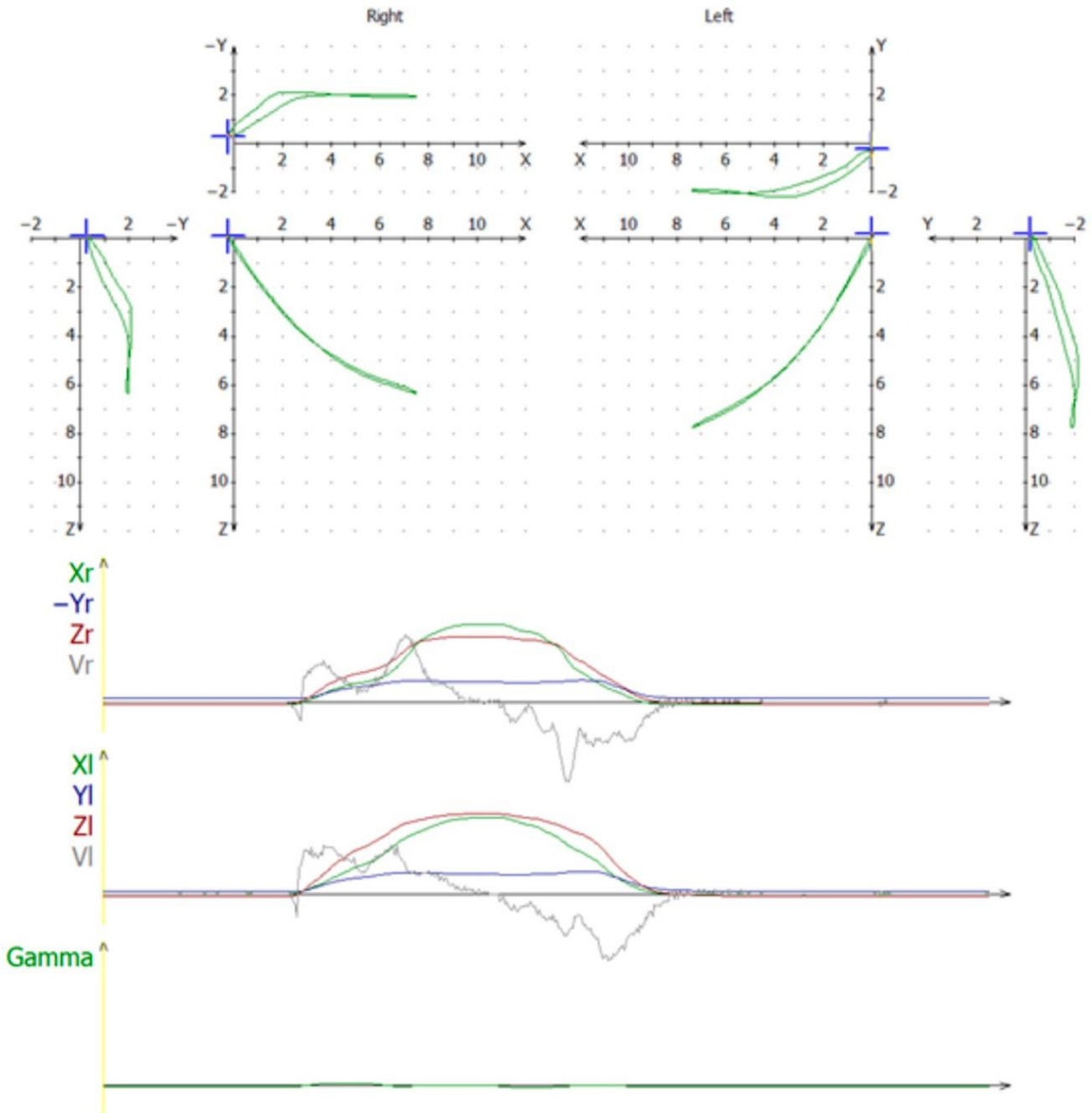
1. No anterior control.
2. No canine control.
3. Lower incisal are crowding.
4. Elongation 11, 21.
5. Muscle problems.
6. Posture.

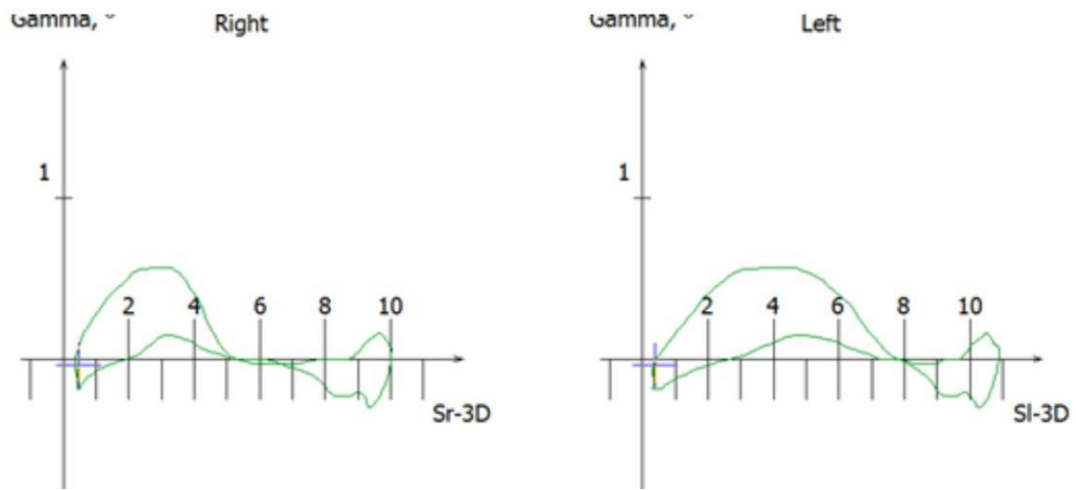
## **Treatment objectives:**

- Centric relation and casts remounting.
- Myopatic splint therapy.
- Full mouth rehabilitation.

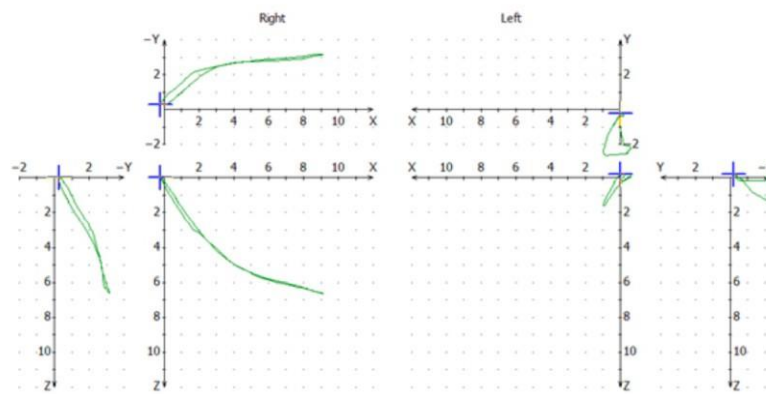
# Condylography

Protrusion/retrusion (left). Time curve. Muscle tension. Gamma rotation  
– no rotation, translational component. Deviation to the left.

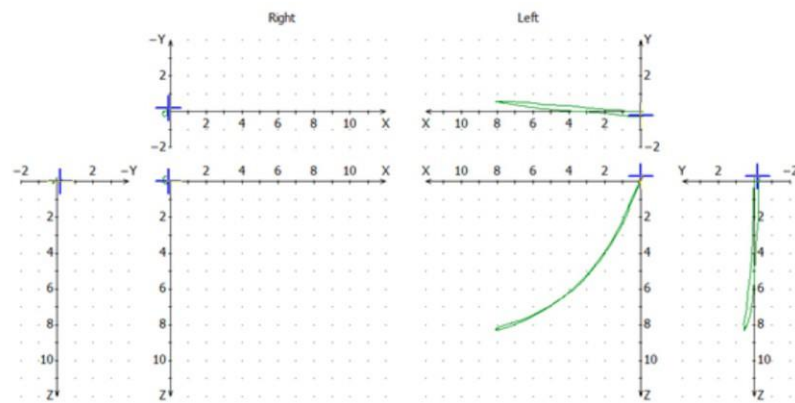




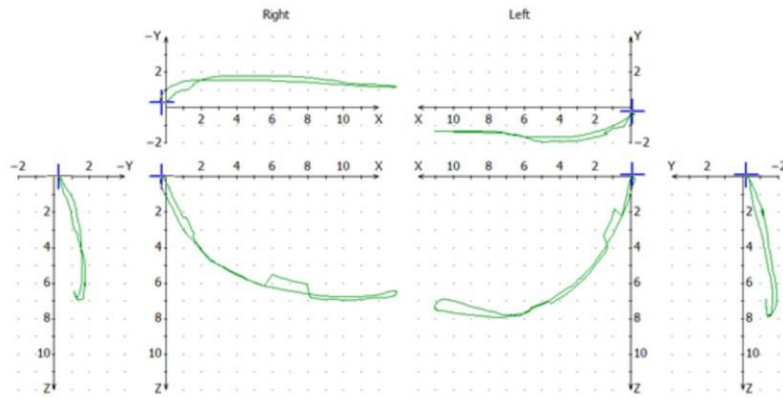
Mediotrusion right



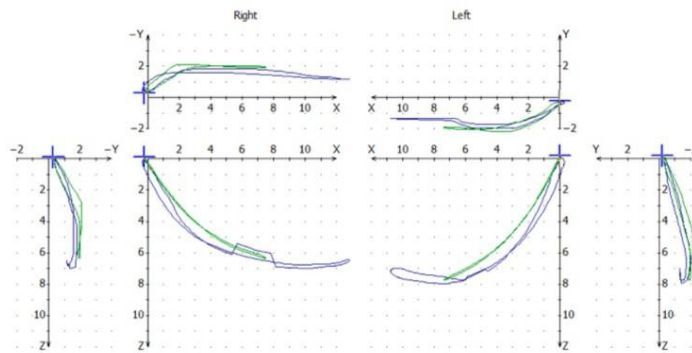
Mediotrusion left



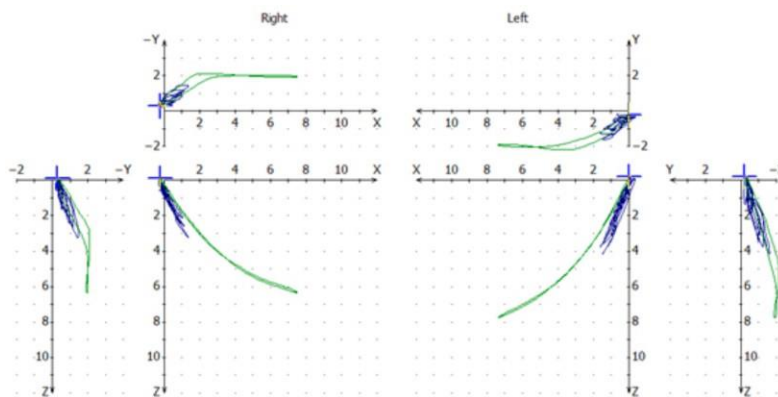
## Open – Close



## Overlap open-close and Protrusion/retrusion

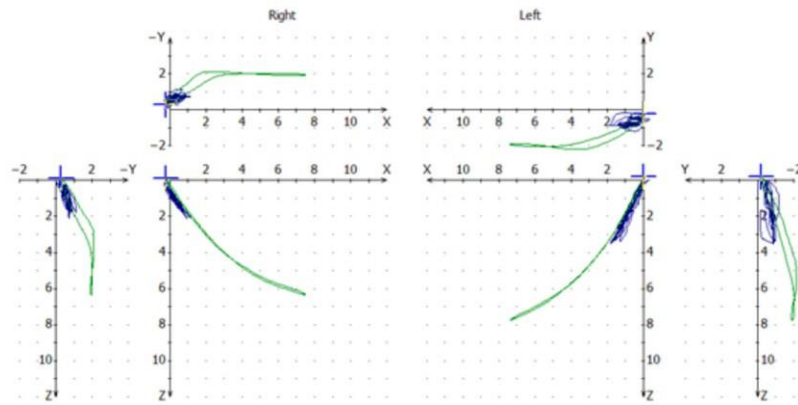


## Speech 50-60 - Detrusion

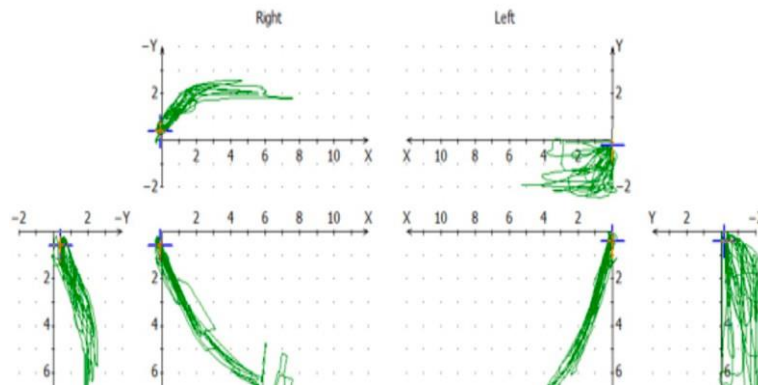




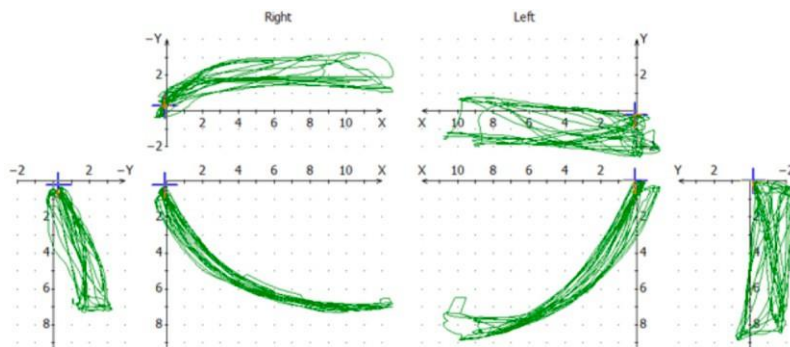
## Speech 60-70



## Mastication



## Free movement



## Treatment plan:

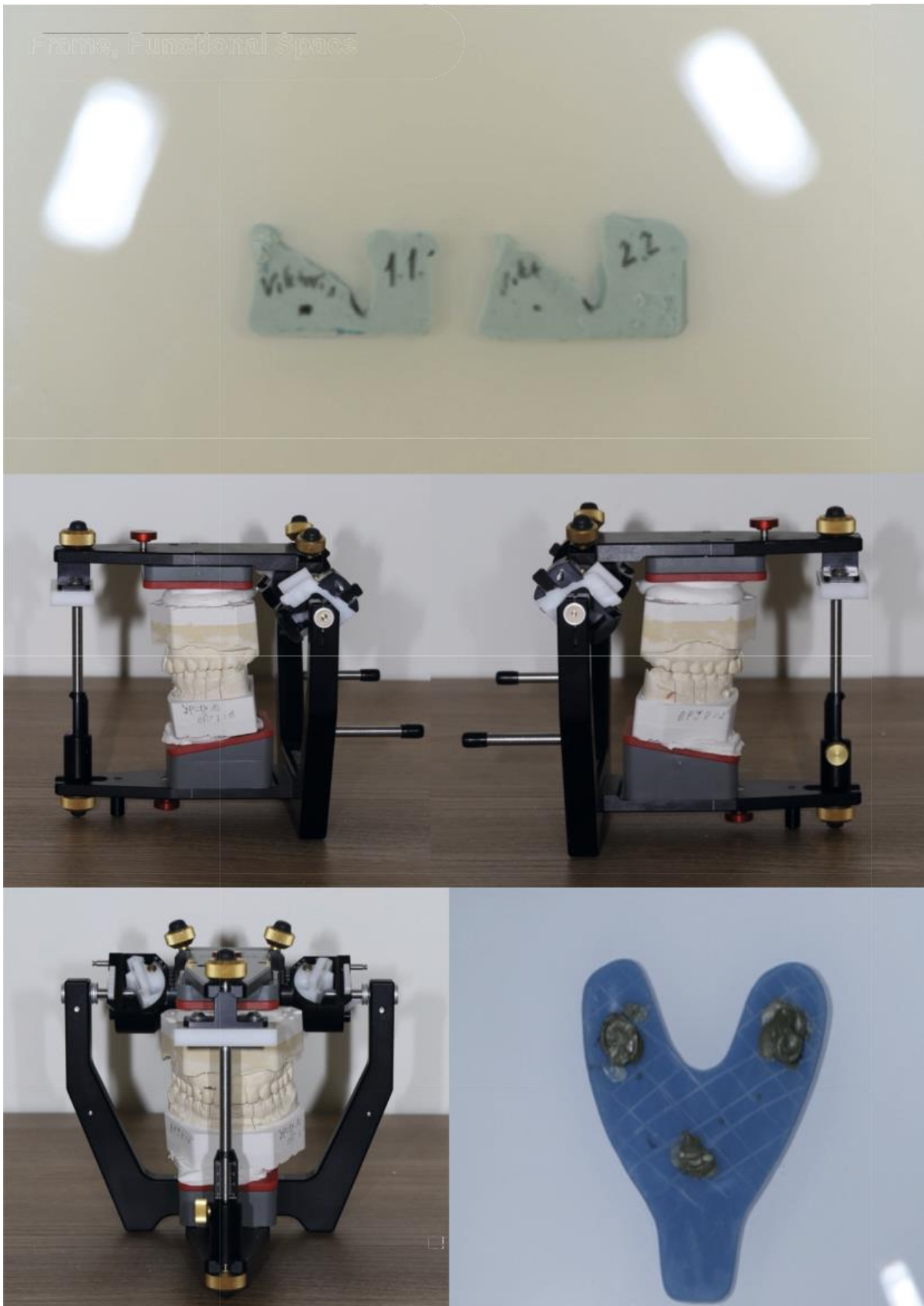
1. CR determination.
2. Wax-up.
3. Long time temporaries.
4. Final restorations.

## Muscle Palpation after treatment

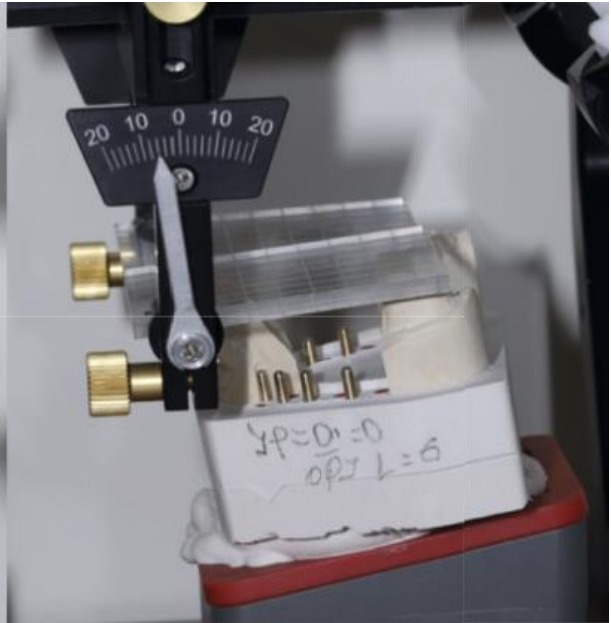
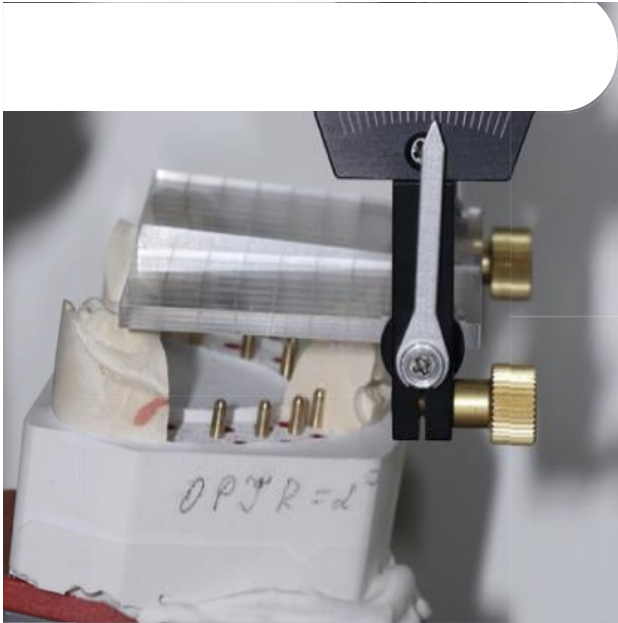
Table 6

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.			X	
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae				
6.	M.pterygoideus medialis				
7.	M.mylohyideus			X	
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare				

**Casts mounted in articulator.**

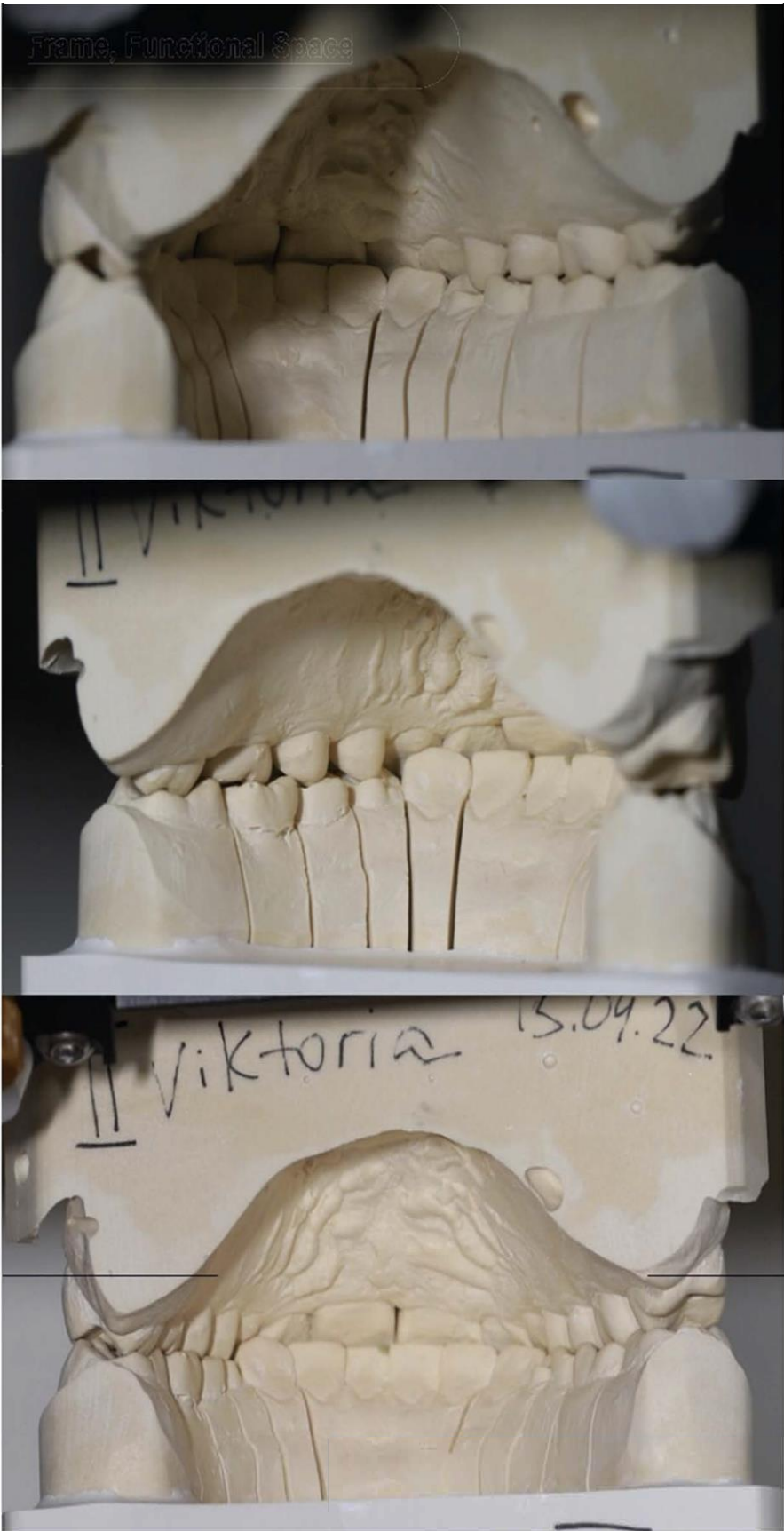






OPI R = 2, OPI L= 6.

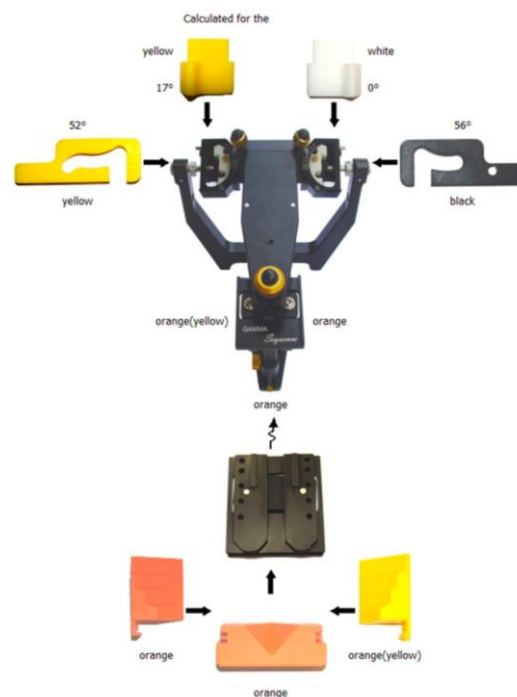
Casts mounted in reference position.



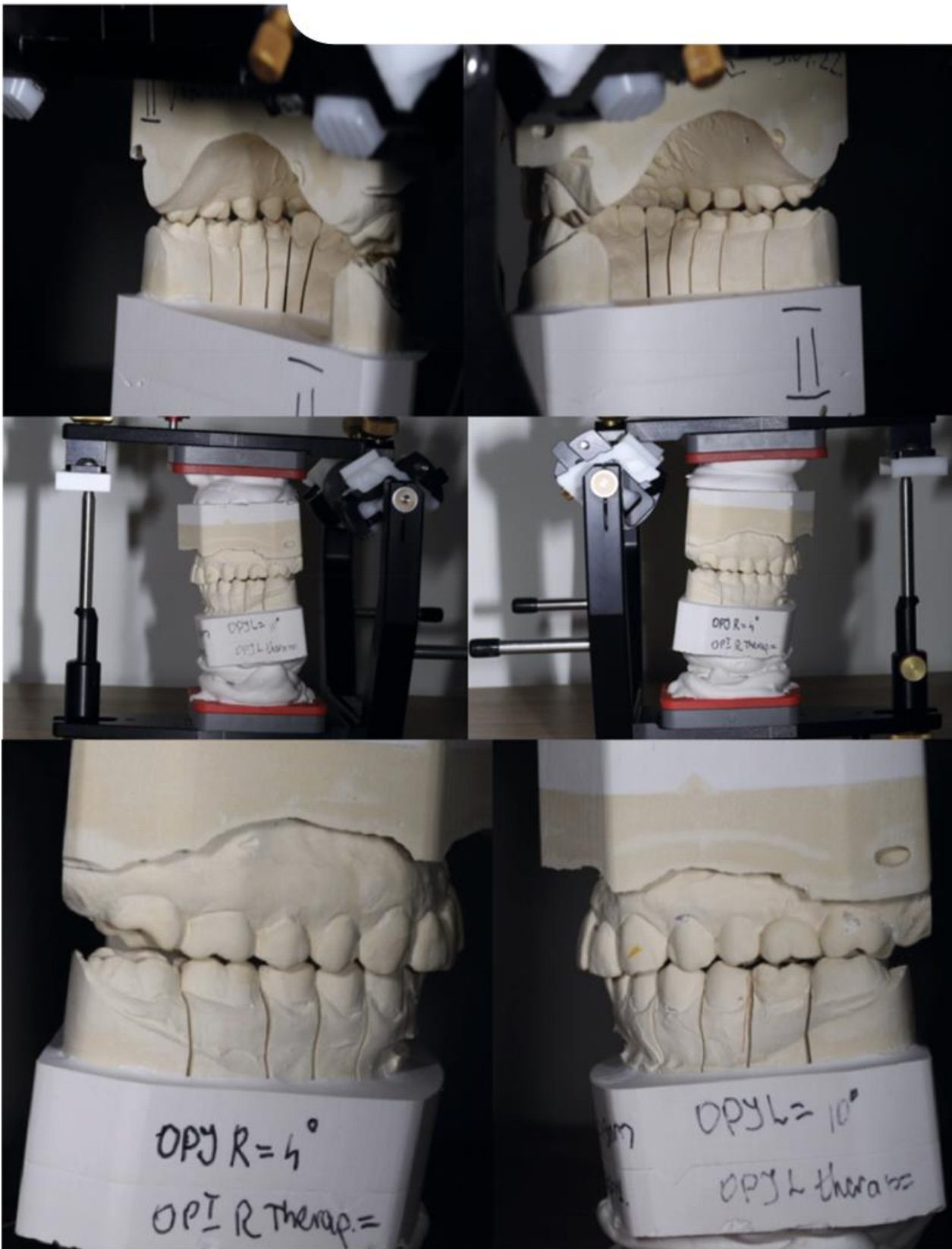
## Treatment plan correction:

- Gingiva correction 11, 21.
- Muscle relaxation.
- AG - +10 degrees, = 58 degrees.
- Canine control.
- OPI R = 12 degrees.
- OPI L total = 16 degrees.
- SCI R = 52 degrees, yellow insert.
- SCI L = 56 degrees, black insert.
- Bennett movement `R = 17 degrees, yellow insert.
- Bennett movement L = 0 degrees, white degrees.
- Decrease lower incisors -1,5 mm increase hight of lower molars.  
Create posterior support.

## Articulator settings



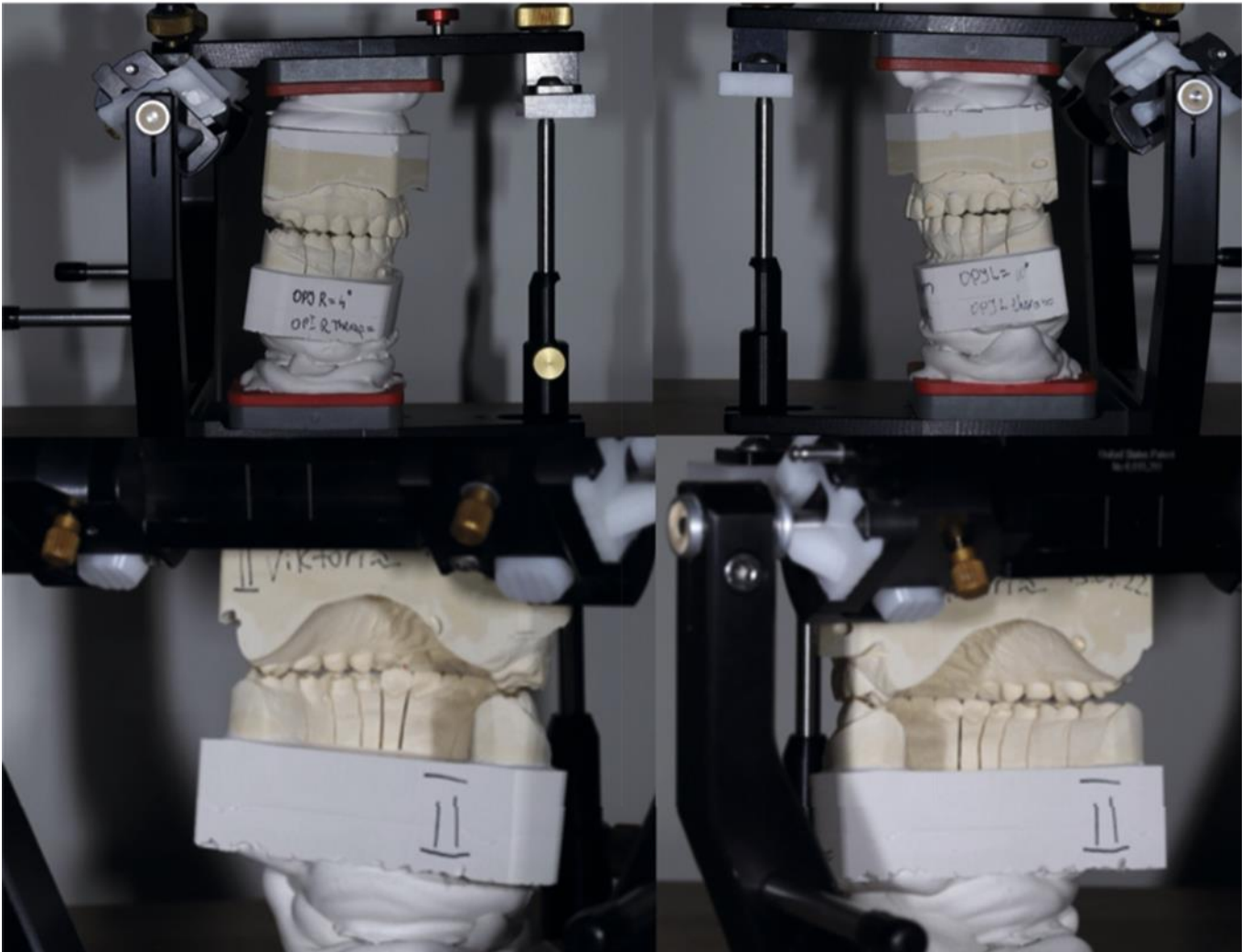
**Determination of Therapeutic position after osteopathic treatment  
Casts in PR.**





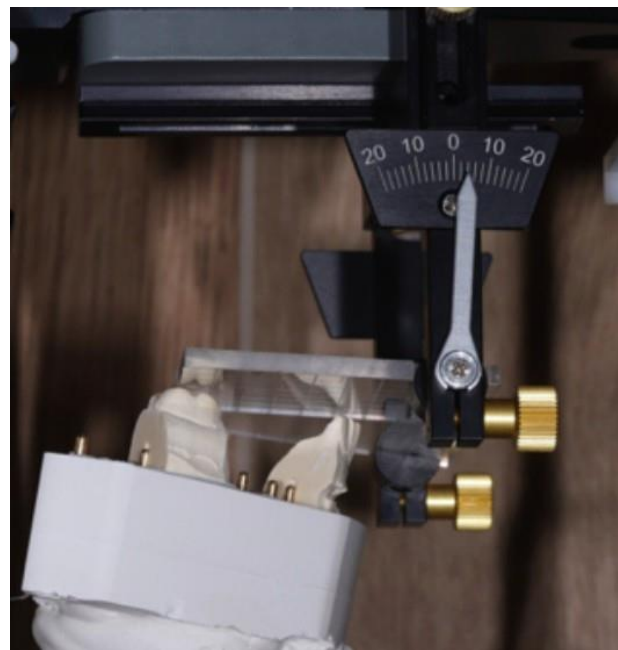
## Determination of Therapeutic position after osteopathic treatment

### Casts in PR with centric relation.



- Casts were remounted into articulator after centric relation determination.
- Verticalisation +2 mm was done.
- In dental laboratory was done elongation of the length of upper incisors and canines.
- The gap between incisors in the frontal area we close symmetrically with upper and lower incisors.
- AG change to 60 degrees.
- Asymmetrical case.

## VTO +2 mm incisal pin



SCI R. 52 18

OPI=4    DAO

SCI L. 56 16

OPI=10    DAO

# Cephalometric analyses VTO

Table 7

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	88.9	
Facial Depth	89°	94.4	1+**
Mandibular Plane	24.°	16.7	1B*
Facial Taper	68.0°	68.8	
Mandibular Arc	29°	39.6	2B**
Maxillary Position	65.0°	60.0	1-*
Convexity	00 mm	0.00	
Lower Facial Height (by R. Slavicek)	44.2°	45.0	
Lower Facial Height to Point D	50.3°	49.3	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	131.7°	112,7	1-*
Upper Incisor Protrusion	3.7 mm	6.5	1+*
Upper Incisor Inclination	24.0°	26.2	
Upper Incisor Vertical	mm	-0.4	
Lower Incisor Protrusion	2,7 mm	2.5	
Lower Incisor Inclination	24.°	41.0	2+**
Upper Molar Position	18.0 mm	21.2	1+*
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	11.2	
Idealized Occlusal Plane – Axis Orbital Plane	----°	8.2	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	27	1-*
Radius of Curve of Spee	---- mm	82.	
Lip Embrasure	0.0 mm	-2.8	
Occlusal Plane Xi Distance	-1.4 mm	0.7	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	50.4	
Horizontal Condylar Inclination left	----°	58.6	
Horizontal Condylar Inclination	----°	54.5	
Relative Condylar Inclination	----°	46.5	
Relative Condylar Inclination 6	----°	43.1	
Relative Condylar Inclination 7	----°	42.1	
Relative Condylar Inclination 8	----°		
Anterior Guidance (S-AOP)	°	48.7	
Relative Anterior Guidance	°	40.7	
Aesthetic Measurement (Lip Relation)	Norm	Value	Trend
Aesthetic Plane	-2.9 mm	-1.5	

## Slavicek Interactive Verbal Analysis

The skeletal trend of the skull is mesiofacial.

The skeletal trend of the mandible is strongly brachyfacial Skeletal class is III with tends to I.

The maxilla is positioned neutral

The mandible is positioned neutral with tendency to prognathic.

Lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is increased.

The inclination of the upper incisor is normal.

The protrusion of the lower incisor is normal.

The inclination of the lower strongly increased.

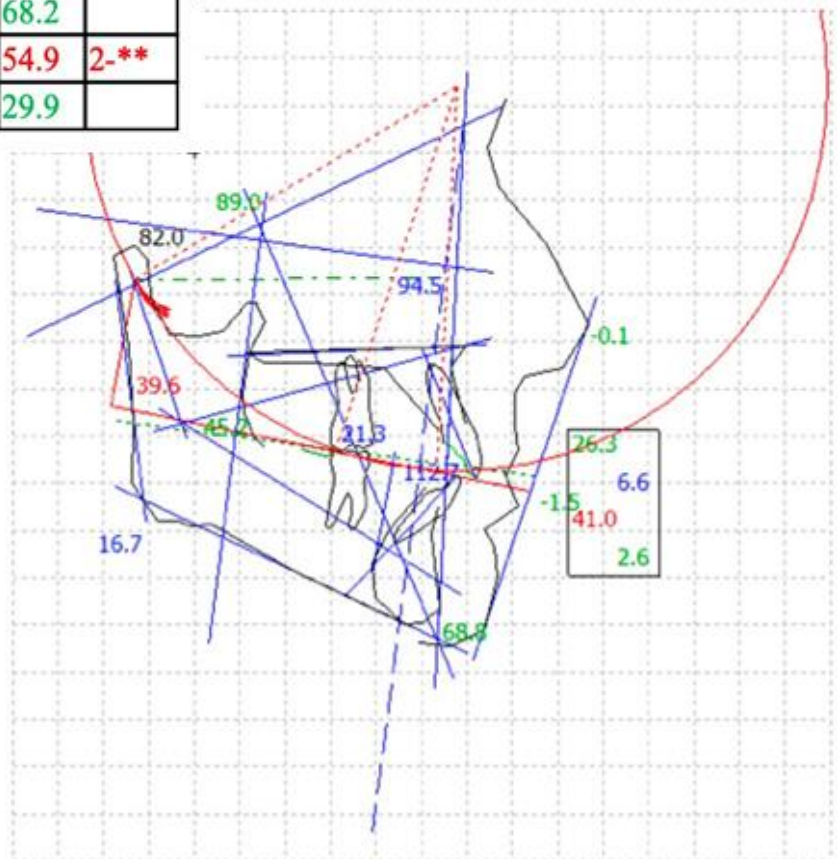
The interincisal angle is diminished.

Occlusal concept: Group function.

### **Explanation**

Table 8

Determinants	Norm	Value	Trend
Facial Axis	90.0°	88.8	
Facial Depth	89.0°	94.0	1+*
Facial Taper	68.0°	68.8	
Mandibular Plane	24.0°	15.7	1B*
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	389.9	2-**
Facial Length Ratio	63.5%	68.4	2+**
Y Axis to S N	67.0°	68.2	
Y Axis (Downs)	61.2°	54.9	2-**
S N to Gonion Gnathion Angle	32.6°	29.9	



**Muscle Palpation was done after osteo- pathic treatment. CR determination +2 mm incisal pin.**

Table 9

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.			X	
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae				
6.	M.pterygoideus medialis				
7.	M.mylohyideus			X	
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare				

## Muscle Palpation

Table 10

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae				
6.	M.pterygoideus medialis				
7.	M.mylohyideus	X			
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare				

## Basic and relative criteria for teeth evaluation.

- Occlusion.
- Tooth axis.
- Gingival level.
- Interproximal contact level.
- Tooth relative size.
- Tooth shape basic characteristics (basic characteristics, surface texture, color).
- Incisal edge configuration.
- Lower lip line.
- Smile symmetry.

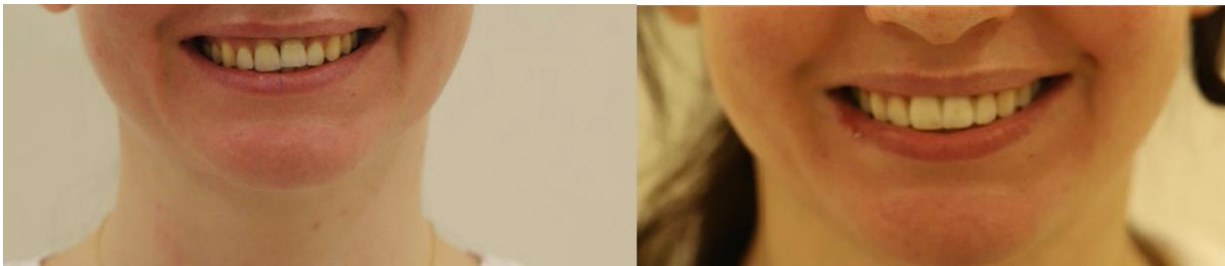


Table 11

### Tooth relative size

<b>Tooth</b>	<b>13</b>	<b>12</b>	<b>11</b>	<b>21</b>	<b>22</b>	<b>23</b>
Height	11,12	8,4	10,2	10,51	8,67	9,94
Width	7,8	6,3	7,8	8,70	6,01	6,69

### Functional evaluation

- Central incisor depth overbite= 1mm.
- Central incisor width overbite = 1 mm.
- Anterior guidance = 0 mm.

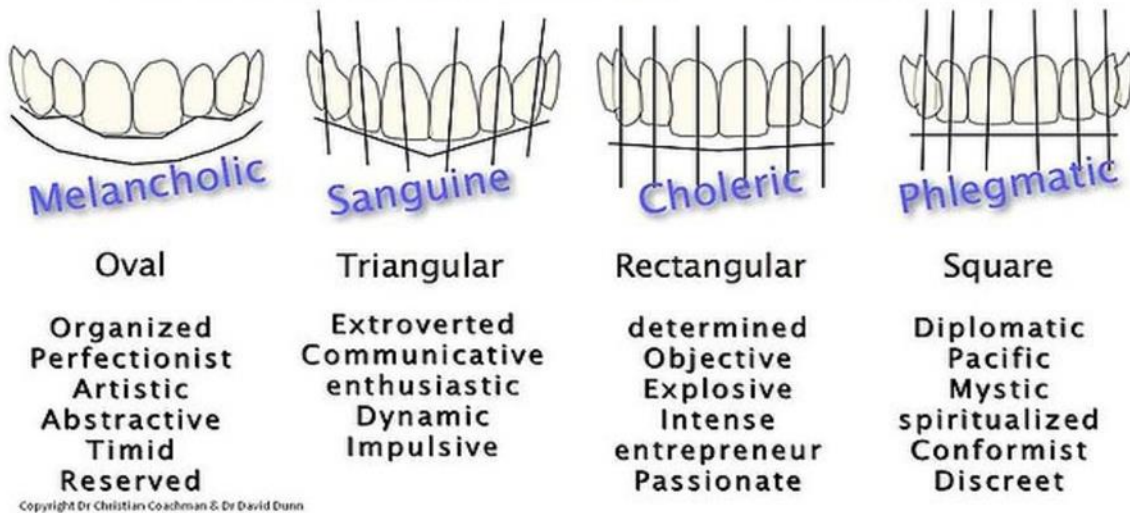


- Vertical dimension = 19.32.
- Centric relation.

### **Aesthetic evaluation**

- Tooth 21-11 is visible at 1 mm in a relaxed state.
- The lower inc.
- Aesthetic and functions.
- Incisor is visible in a relaxed state.

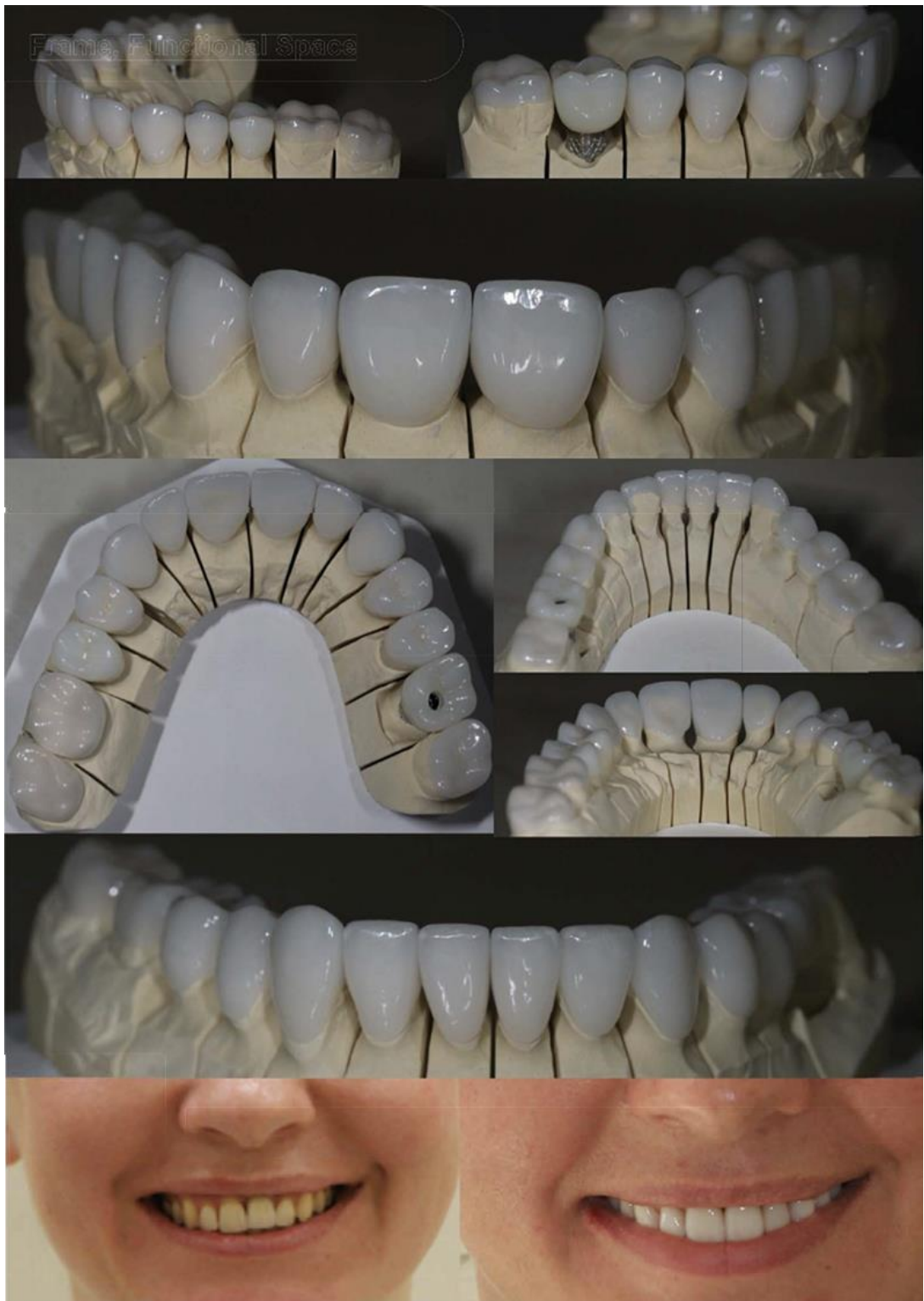
## Morpho psychology – Visagism



Oval	Triangular	Square cut	Square
Central incisors are dominated	Smile upline	Central incisors are dominated	Absence of domination
Round cusps	Divergent tooth axis	Flat incisal edge	Axis divergence
Lateral mandibular incisors are poorly pronounced	Cusps inclination	Aggressive cusps	Horizontal line of cutting edge and canines
Round dental arch		Vertical axis	
Melancholic	Sanguine	Choleric	Phlegmatic
Organized Perfectionist Artistic Abstractive Timid Reserved	Extroverted Communicative Enthusiastic Dynamic Impulsive	Determined Objective Explosive Intense Entrepreneurs passionate	Diplomatic Pacific Mystic Spiritualized Conformist Discreet

**Final restoration June 2022.**





## Clinical Case № 16

Date of birth: 1974.

Date of examination: 31.03.2009.

Main concern: esthetics.

**Intraoral photos 2009**





Pic. 1-7. Intraoral photos



Pic. 8. Symmetry of dentition

## **List of problems**

- Upper and lower arches discrepancy
- No anterior guidance and canine control
- Speech problems
- Chewing problems
- Esthetic problems

## **Diagnosis**

Sagittal and transversal discrepancy

After orthodontic treatment no anterior guidance and canine control

Cusp to cusp occlusion in frontal area.

## **Treatment objectives**

- Posterior support
- Canine control and anterior guidance
- Sagittal and transversal correction of dental arches
- Change OPI and angle of disocclusion

## **Treatment plan**

- Splint therapy
- Hygienist
- Wax-up
- Long time temporaries
- Final restorations

## Findings Initial Diagnostics

Table №1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		
2.	Cardo-vascular systems		
3.	Respiratory system		
4.	Digestive system		
5.	Metabolic system		
6.	Allergies		
7.	Urogenital problems		
8.	Central nervous system		
9.	Psychological problems (therapy)		
10.	Rheumatic disease		
11.	Hormonal disease		
12.	Special problems		
Main concern:			



Dental History Analysis		Valuation	Yes	No		
1.	Do you have problems when you chew?			X		
2.	Do you have problems when you are talking?	1	X			
3.	Do you have problems in closing your teeth property?	0	X			
4.	Are any of your teeth especially sensitive?			X		
5.	Do you have problem when you open your mouth very wide?			X		
6.	Do your jaw joints make noise and if so, on what side?			X		
7.	Do you have pain in the area of your jaw joints?			X		
8.	Do you suffer from headaches?			X		
9.	Do you suffer from cramps or spasm in your head, neck or throat?			X		
10.	Do you have in general problems with your posture?			X		
	Occlusal Index	0.50				
11.	Have you ever had serious accident?					
12.	Did you have one or more oral intubations?					
13.	Have you ever had orthodontic treatment or ...					
14.	Have you had a treatment with splint?					
15.	Are you grinding or pressing with your teeth?					
16.	Do you think that treatment is necessary?					
17.	Do you think that there is a serious disorder or illness?					
18.	When the last time you had dental treatment and what was done?					
	How would you describe your psychic behavior?					
	happy	sad	calm	excited	self-controlled	lack of self-control
19.	X					

Table №2

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)	X	X		X
5.	Tuber maxillae	X		X	
6.	M.pterygoideus medialis				
7.	M.mylohyideus				
8.	M.digastricus	X		X	
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints*				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation		X		
	c) Retral joint space		X		X
	d) Lig.temporo-mandibulare		X		X

## Muscle palpation

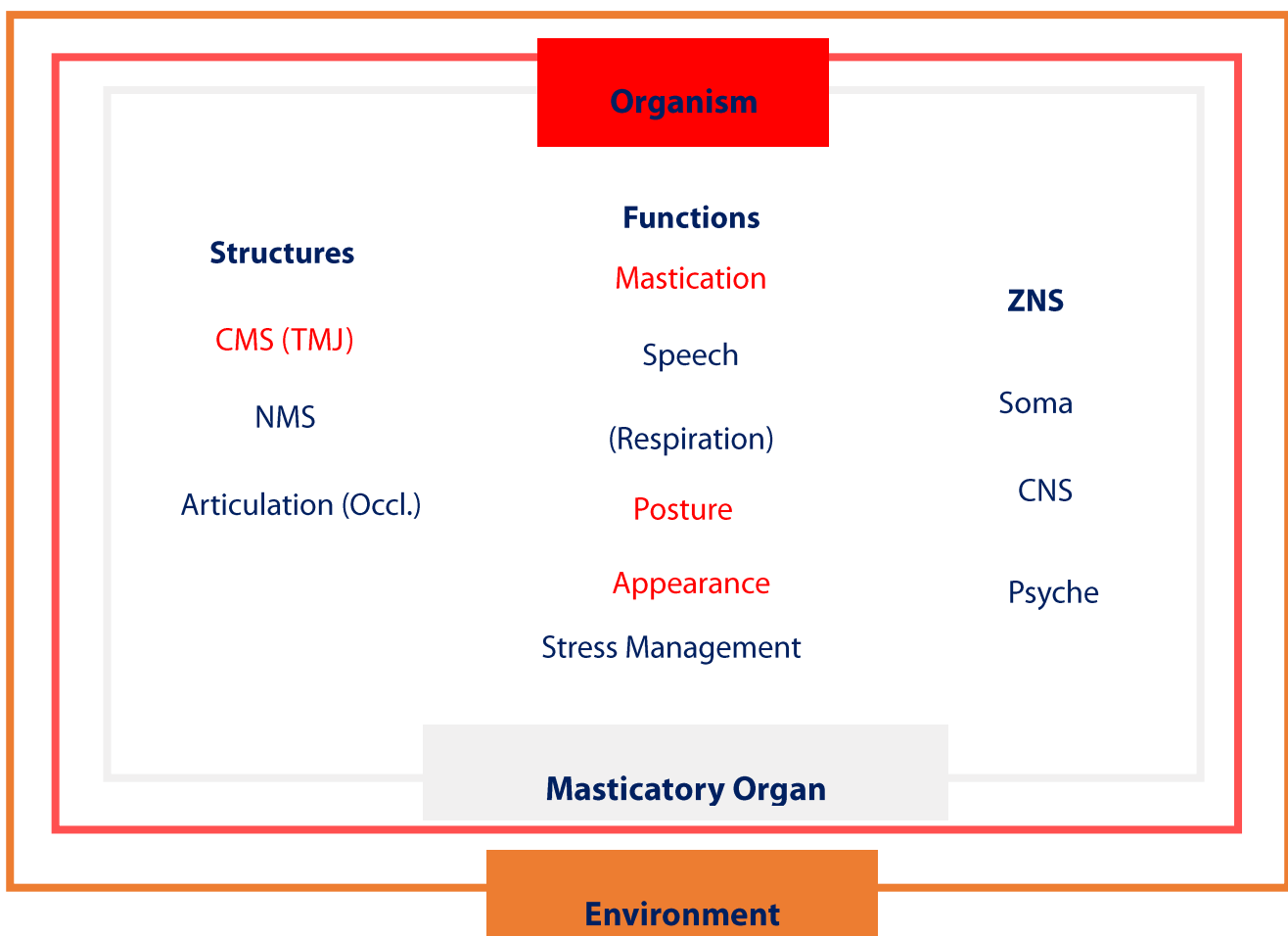
## Muscle movements

Table №3

Sets of muscles:	
Muscles palpation	
Posture	1,2,7,12,13,14
Jaw-closing	3a, 3b, 4a, 4b, 5
Jaw-opening / protrusion	8, 9, 10
Retraction	3c, 8
Medio- / Laterotrraction	6, 3a, 4a
Sublingual bone position	8, 9,10,11,13
Function	7, 8,9,10,11,14
Joint position Joint Structure, Capsule,Ligaments,Bilaminar zone, M.pterygoideus lateralis, Superior head	15

## Cybernetic System of the Masticatory Organ

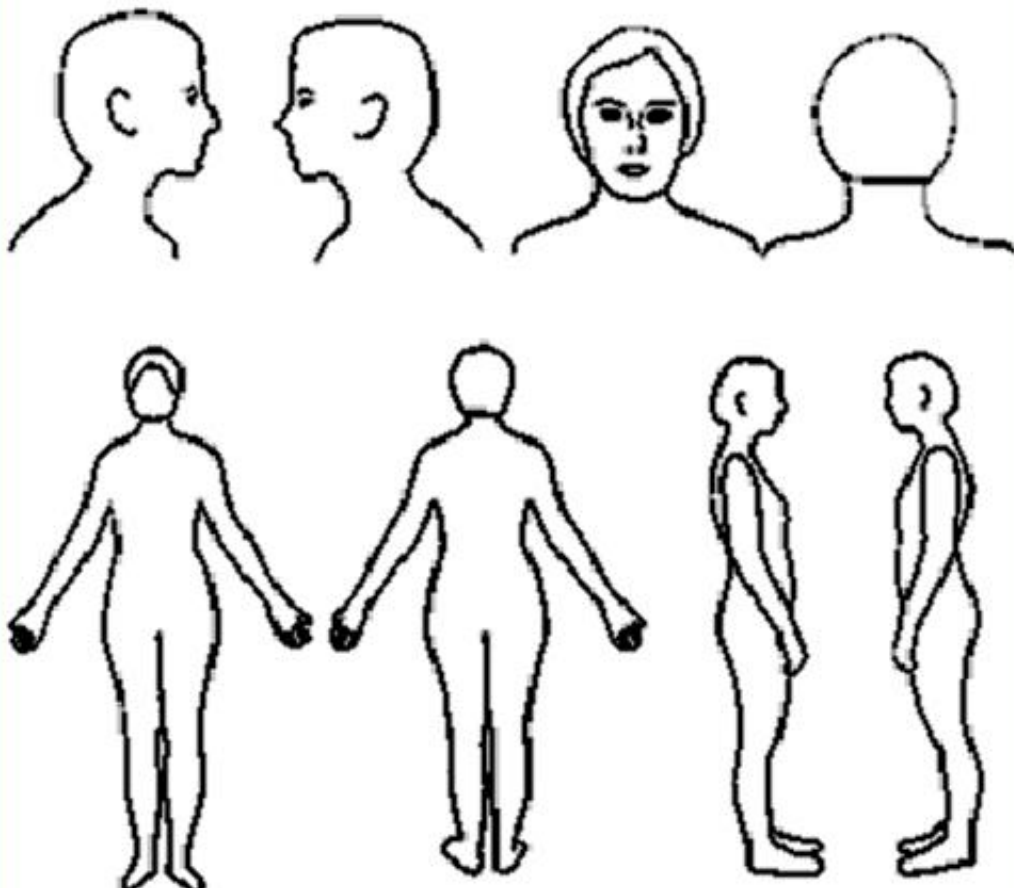
Table №4



## Preliminary Brainstem Nerve Analysis

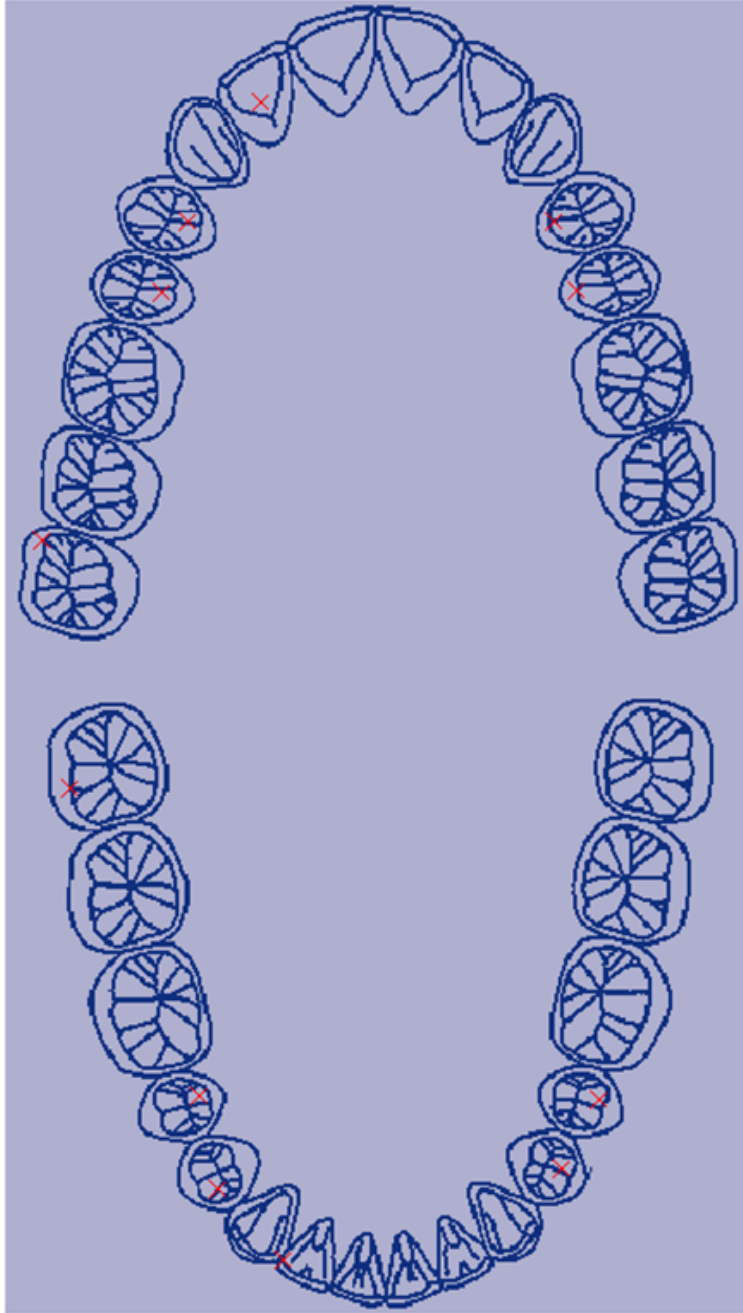
1. N.olfactorius (analysis)
2. N.opticus (analysis)
3. N.oculo-motorius (clinical mobility)
4. N.trochlearis (clinical mobility)
5. N.trigeminus (clinical palpation and sensitiveness)
6. N.abducens (clinical mobility)
7. N.facialis (clinical mobility)
8. N.stato-acusticus (clinical check of equilibrium and hearing)
9. N.glosso-pharyngeus (clinical and analysis)
10. N.vagus (analysis)
11. N.accessorius (clinical and analysis)
12. N.hypoglossus (clinical and analysis)

## Chronic pain



Pic. 9. Preliminary brainstem nerve analysis

**Tooth Status - Periodontal Status - Occlusalgram**

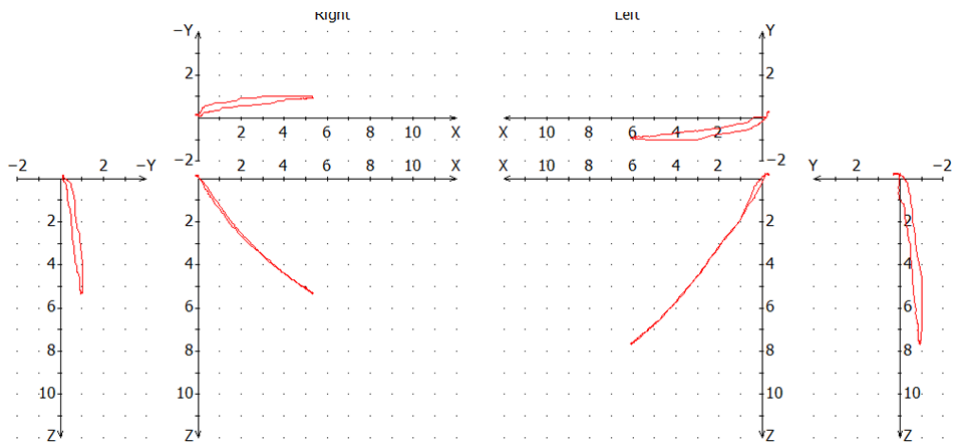


**Myofunctional Disturbances**

Pic. 10. Occlusalgram

# Condylography

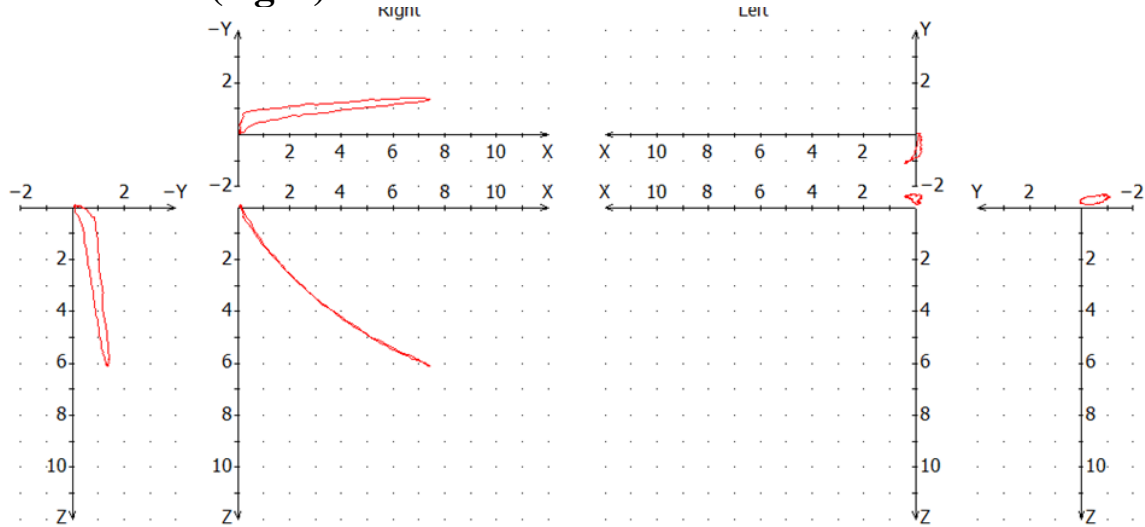
## Protrusion/retrusion



Pic. 11. Condylography. Protrusion/retrusion tracings

Shift to Delta Y MLT 1 mm to the left side, therapeutic position of the mandible before the closing.

## Mediotrusion (right)

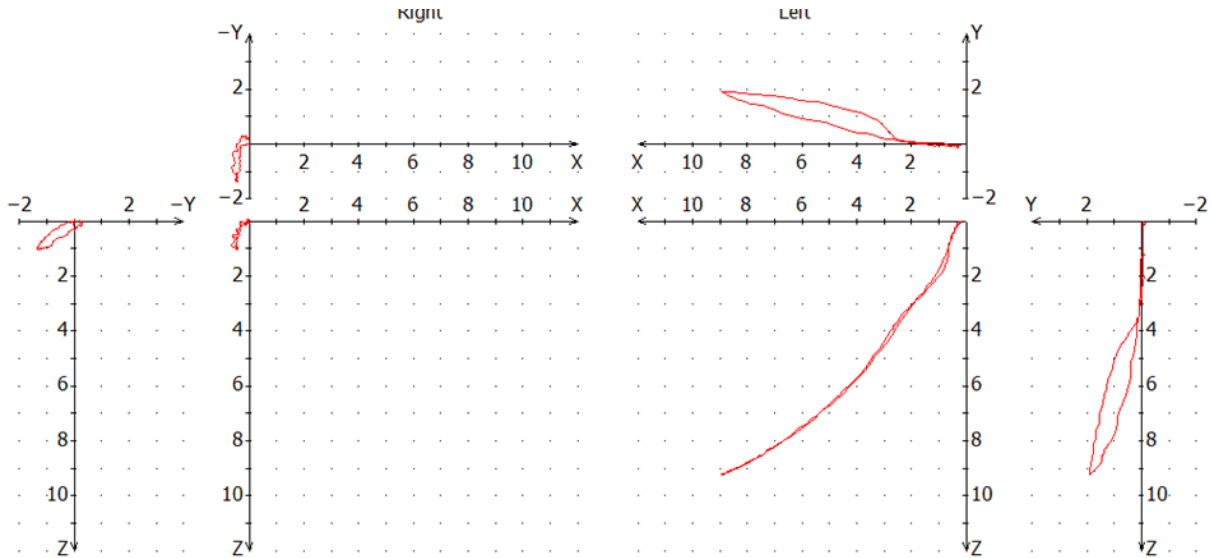


Pic. 12. Mediotrusion (right) tracings

Mediotrusive side – medially displaced disk IMMEDIATE SIDE SHIFT.

Laterotrusive side – resurtrusion, lateral displaced disk or avoidance pattern.

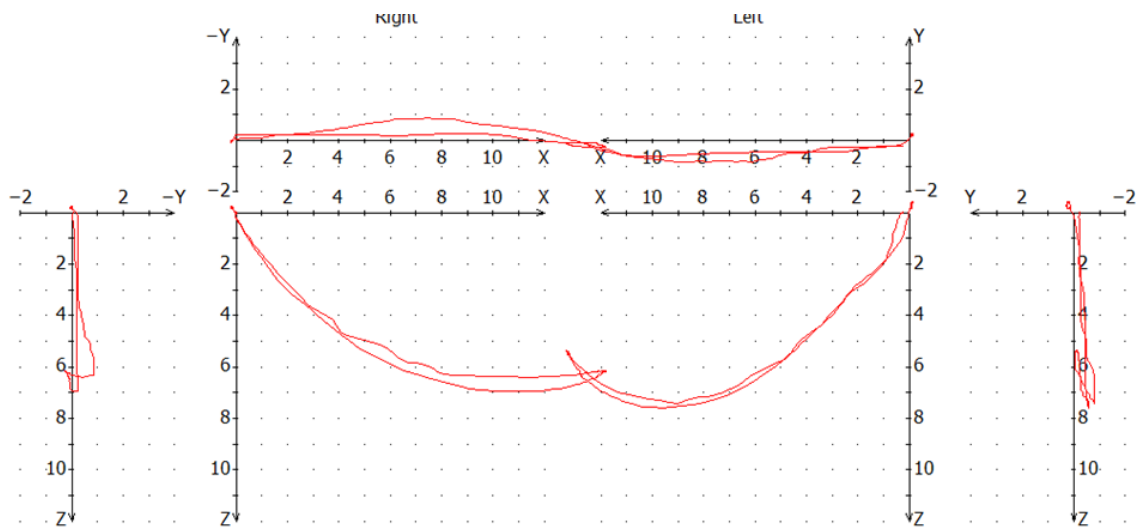
## Mediotrusion (left)



Pic. 13. Mediotrusion (left) tracings

Mediotrusive side – medially displaced disk or avoidance pattern.

## Open-close



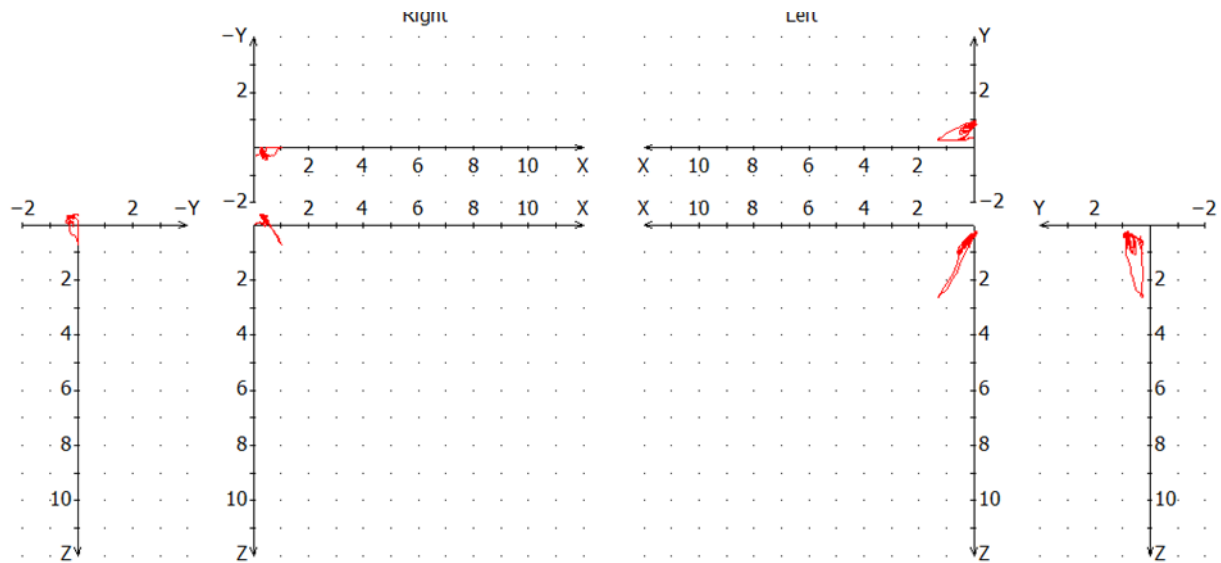
Pic. 14. Open-close tracings

Loose ligaments, range of movements increased, overrotation of mandible.

Delta Y MLT 1 mm to the left on the 2mm from RP.

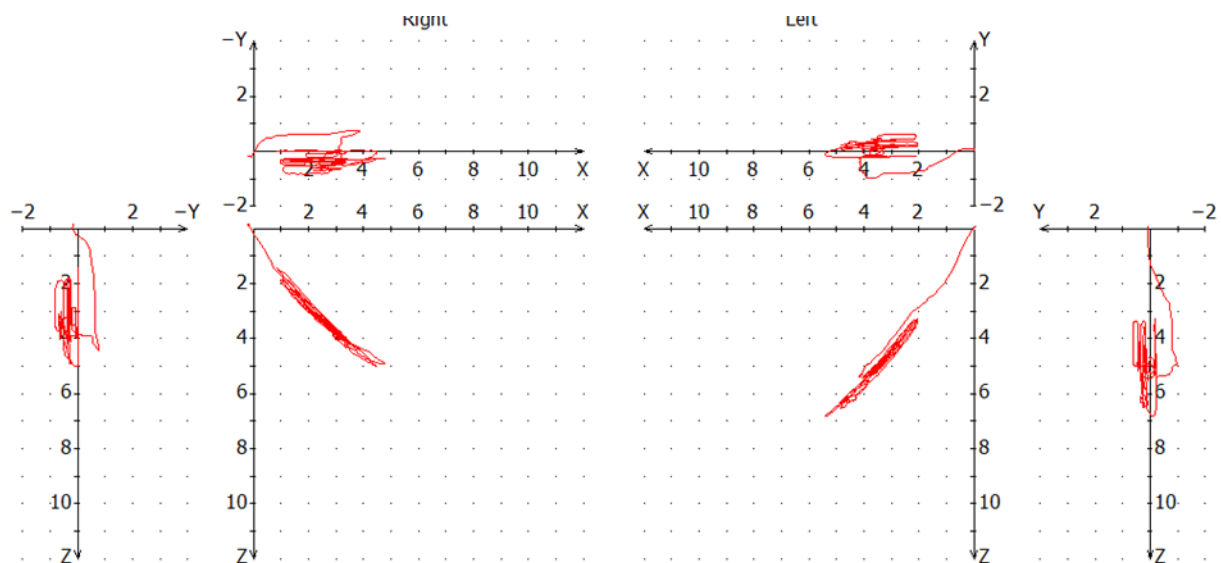
Loop at the end- m. digastricus activity.

## Bruxism



Pic. 15. Bruxism tracings

## Speech 50-60 and Protrusion



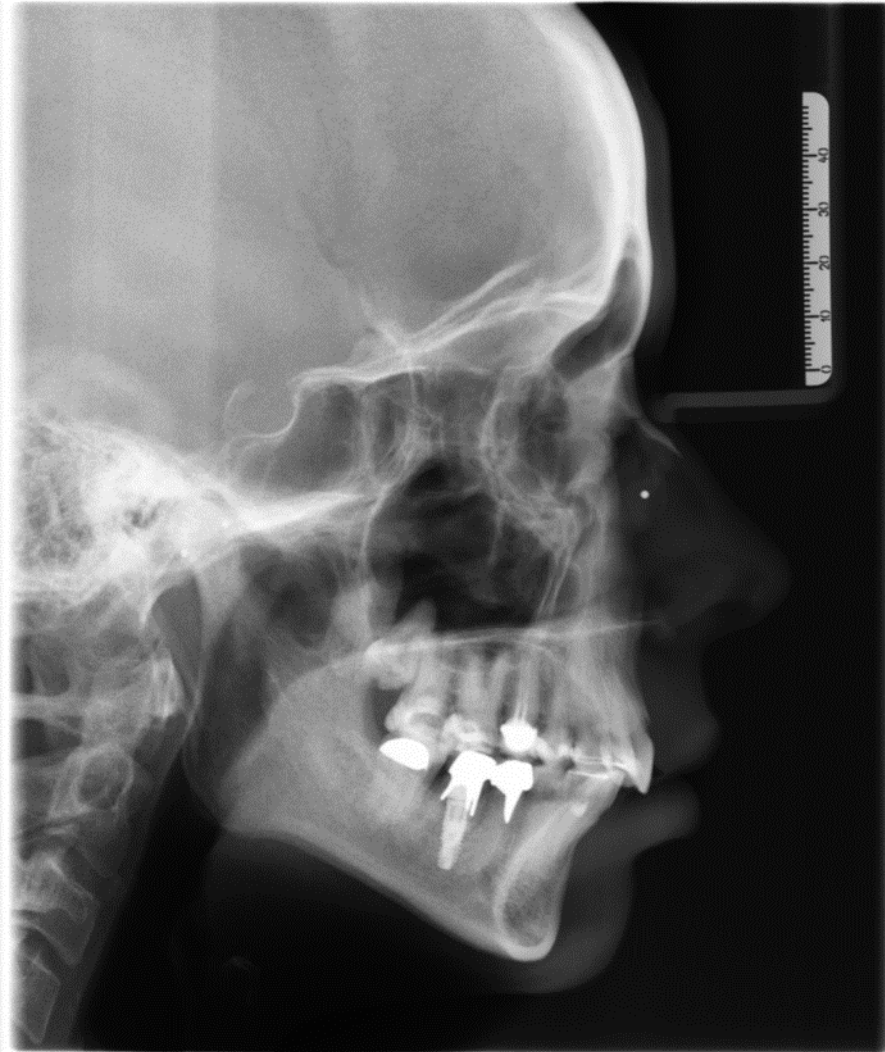
Pic. 16. Speech 50-60 and Protrusion tracings

## Summary: Condylography

- Morphology of both condyles is not satisfying, medially displaced disk on the right side and laterally displaced disk on the left side, avoidance pattern.
- Ligaments are normal.

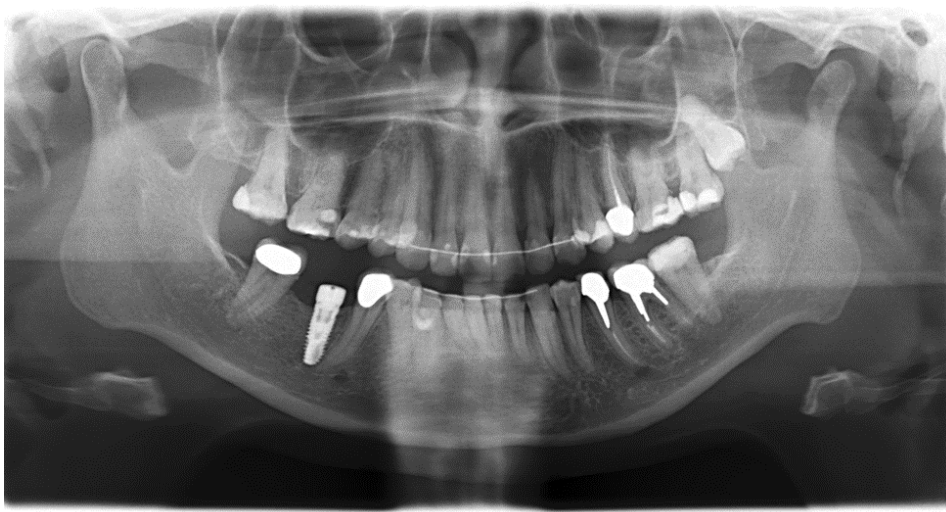


## Lateral X ray



Pic. 17. Lateral X ray

## Orthopantomography

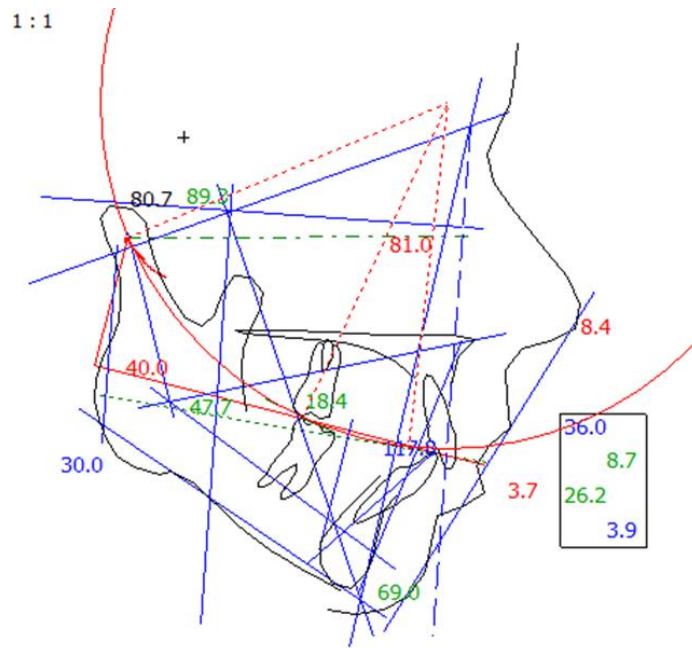


Pic. 18. OPG

## Cephalometric analyses

Table №5

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	89.2	
Facial Depth	89.0°	80.9	2-***
Mandibular Plane	24.0°	30.0	1D
Facial Taper	68.0°	68.9	
Mandibular Arc	29.0°	39.9	2B**
Maxillary Position	65.0°	63.7	
Convexity	0.00 mm	8.3	4X***>
Lower Facial Height (by R. Slavicek)	45.2°	47.7	
Lower Facial Height to Point D	52.7°	50.9	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	130.4°	117.8	1-*
Upper Incisor Protrusion	6.8 mm	8.7	
Upper Incisor Inclination	28.5°	36.0	1+*
Upper Incisor Vertical	mm	3.0	
Lower Incisor Protrusion	1.0 mm	3.9	1+*
Lower Incisor Inclination	21.1°	26.1	
Upper Molar Position	18.0 mm	18.3	
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	14.2	
Idealized Occlusal Plane – Axis Orbital Plane	----°	10.7	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	30.8	1-*
Radius of Curve of Spee	---- mm	80.7	
Lip Embrasure	0.0 mm	-0.4	
Occlusal Plane Xi Distance	-1.4 mm	3.8	1+*
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	79.6	
Horizontal Condylar Inclination left	----°	56.9	
Horizontal Condylar Inclination	----°	68.3	
Relative Condylar Inclination	----°	54.0	
Relative Condylar Inclination 6	----°	44.6	
Relative Condylar Inclination 7	----°	43.9	
Relative Condylar Inclination 8	----°	68.3	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.3 mm	3.7	3+***



Pic. 19. Cephalometric analyses

## Interactive Verbal Analysis

**The skeletal trend of the skull is dolichofacial.**

The skeletal trend of the mandible is strongly brachyfacial.

Skeletal class is severe II.

The maxilla is positioned neutral.

The mandible is positioned retrognathic.

The lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is increased.

The protrusion of the lower incisor is increased.

The inclination of the lower incisor is normal.

The interincisal angle is diminished.

Occlusal concept: group function.

No functional statement available.

Table №6

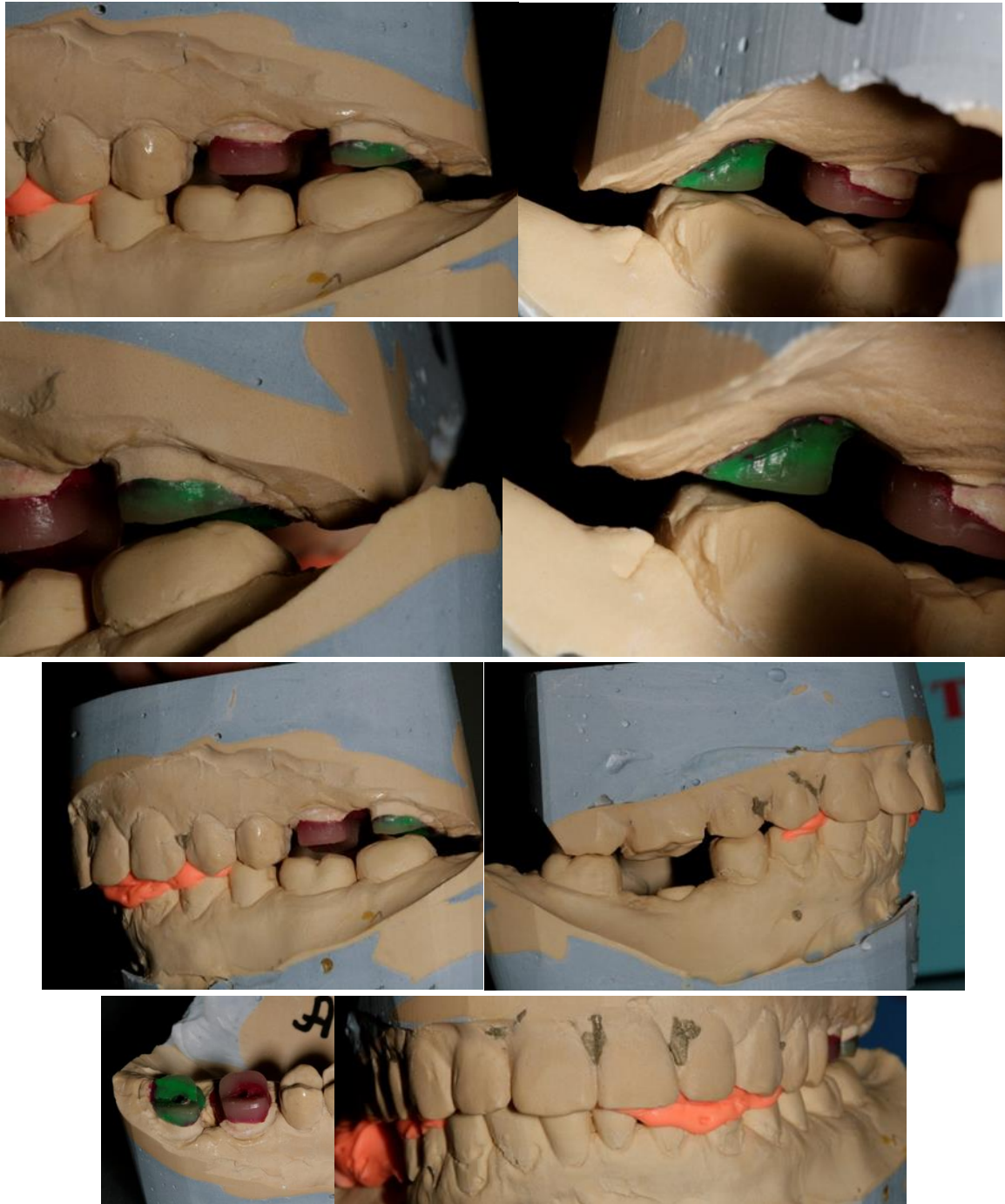
Determinants	Norm	Value	Trend
Facial Axis	90.0°	89.2	
Facial Depth	89.0°	80.9	2-**
Facial Taper	68.0°	68.9	
Mandibular Plane	24.0°	30.0	1D*
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	394.1	
Facial Length Ratio	63.5%	63.5	
Y Axis to S N	67.0°	71.5	1+*
Y Axis (Downs)	61.2°	64.9	1+*
S N to Gonion Gnathion Angle	32.6°	34.1	

**Casts mounted in articulator in RP**

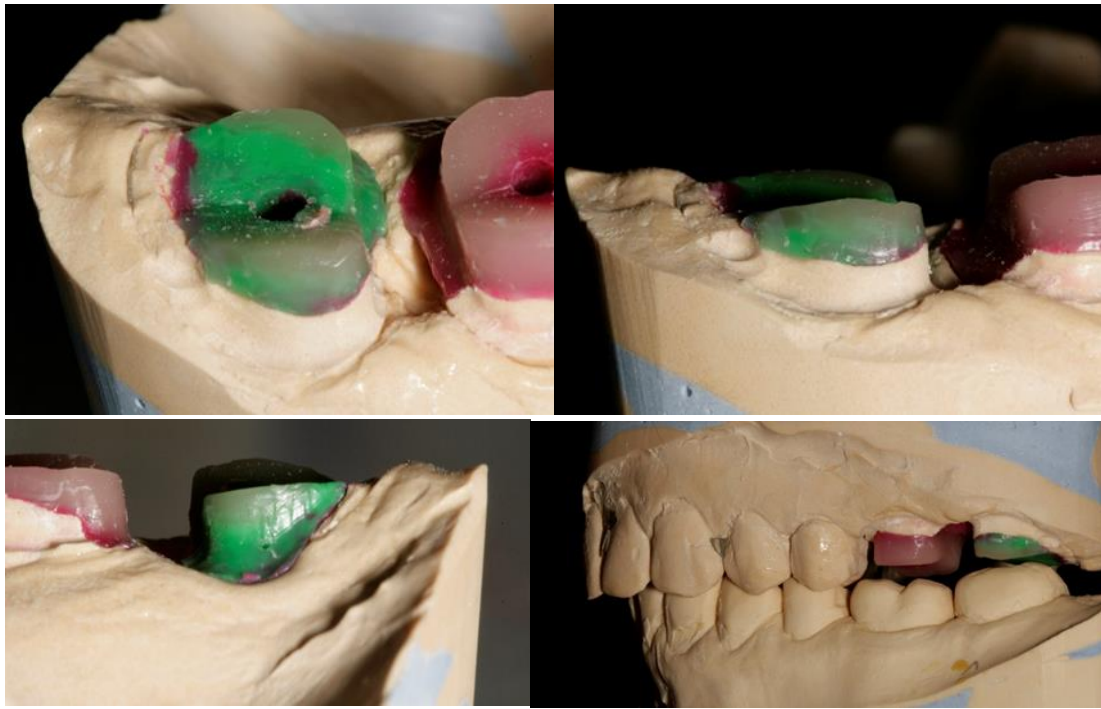


Pic. 20-29. Casts in articulator in RP

Post cores

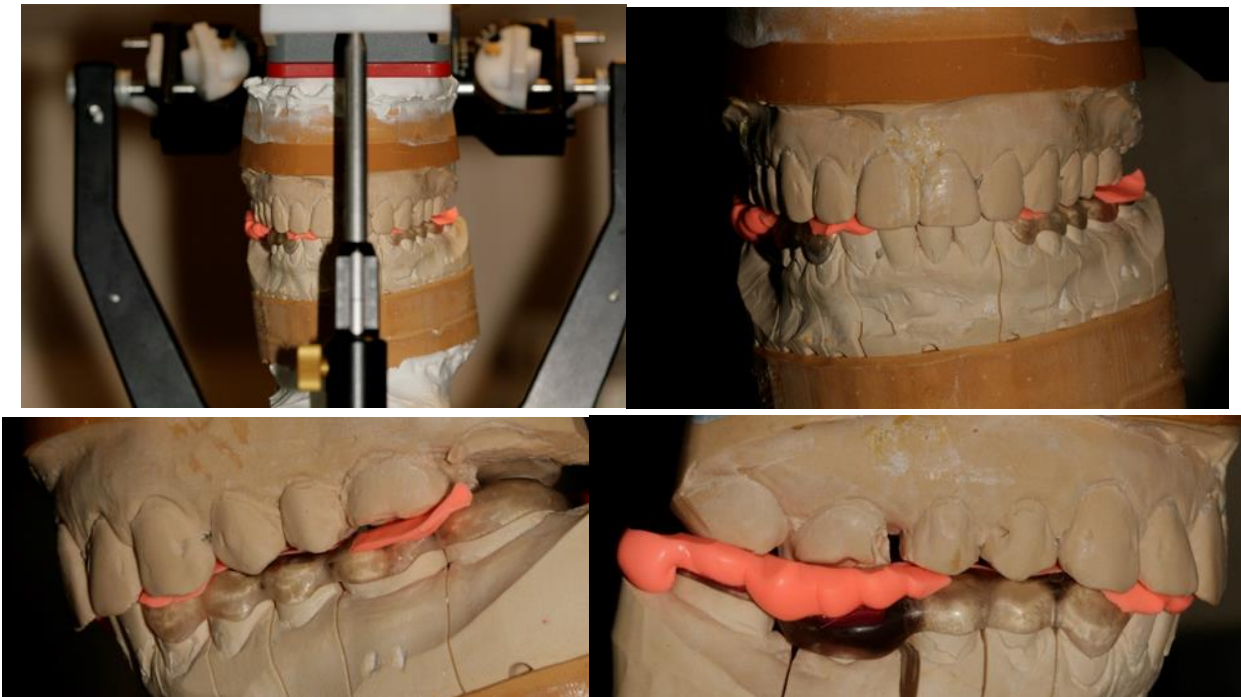


Pic. 30-37. Post cores

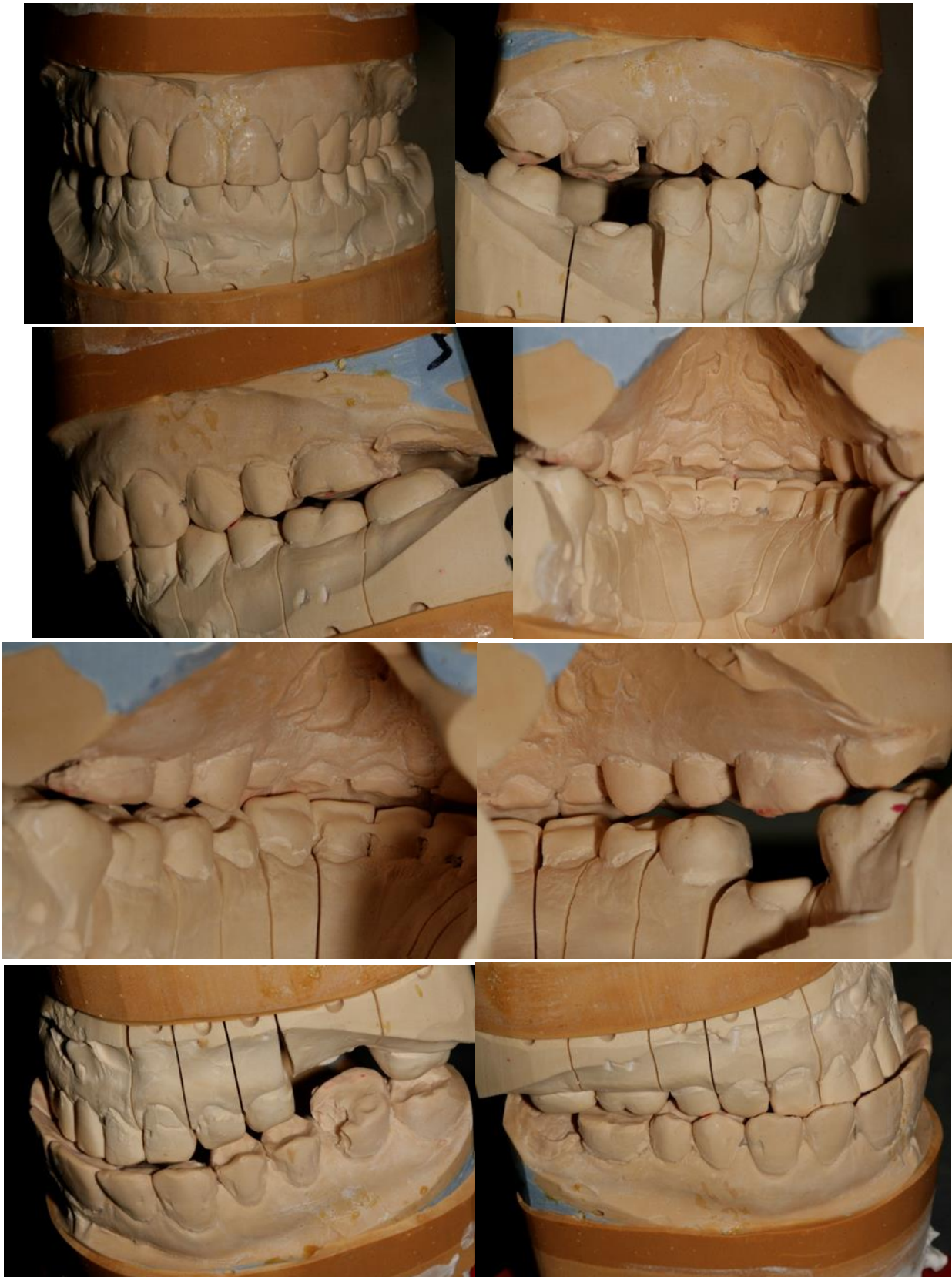


Pic. 38-41. Post cores

## New theraputic position

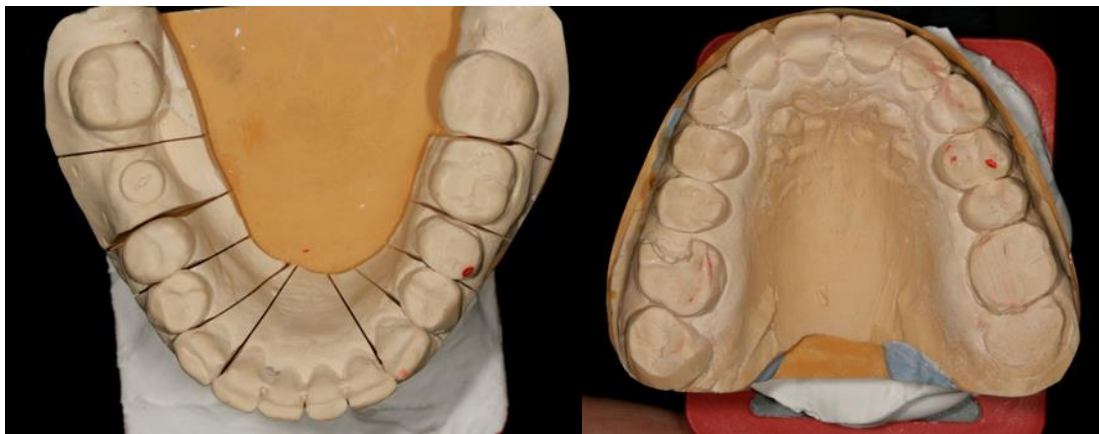


Pic. 42-45. New theraputic position



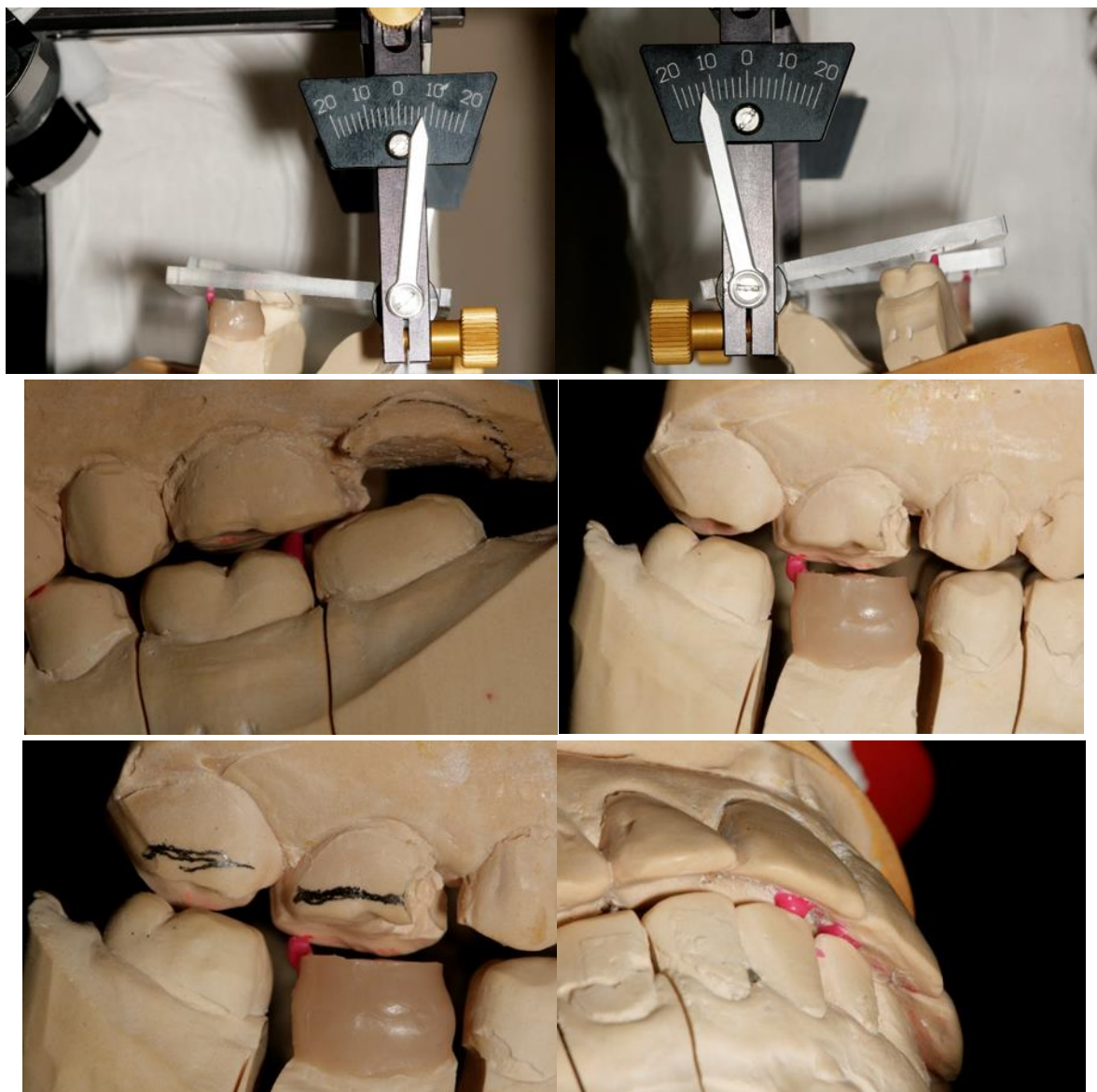
Pic. 46-53. New therapeutic position





Pic. 59-60. New therapeutic position

## Wax-up



Pic. 61-66. Wax-up



Pic. 67. Wax-up

**Final restorations 2009**



Pic. 68-71 Final restorations 2009

**Check-up 2023**

**Chief complain – esthetic.**

**Intraoral photos April 2023**





**Pic. 1-6. Intraoral photos.**

**Intraoral April 2022**



**Pic. 7. Symmetry of dentition**

## **List of problems**

- No anterior guidance and canine control.
- Esthetic problems.

## **Diagnosis**

Chipping of ceramic restorations.

## **Treatment objectives**

- Canine control and anterior guidance.
- Sagittal and transversal correction of dental arches.
- Change OPI and angle of disocclusion.

## **Treatment plan**

- Wax-up.
- Long time temporaries.
- Final restorations.

## Findings Initial-Diagnostics

Table №1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		X
2.	Cardo-vascular systems		X
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system		X
6.	Allergies	X	
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern:			

Dental History Analysis					Valuation	Yes	No
1.	Do you have problems when you chew?						X
2.	Do you have problems when you are talking?						X
3.	Do you have problems in closing your teeth property?						X
4.	Are any of your teeth especially sensitive?						X
5.	Do you have problem when you open your mouth very wide?						X
6.	Do your jaw joints make noise and if so, on what side?						X
7.	Do you have pain in the area of your jaw joints?						X
8.	Do you suffer from headaches?						X
9.	Do you suffer from cramps or spasm in your head, neck or throat?						X
10.	Do you have in general problems with your posture?						X
	Occlusal Index				0.00		
11.	Have you ever had serious accident?						X
12.	Did you have one or more oral intubations?						X
13.	Have you ever had orthodontic treatment or ...					X	
14.	Have you had a treatment with splint?					X	
15.	Are you grinding or pressing with your teeth?					X	
16.	Do you think that treatment is necessary?						X
17.	Do you think that there is a serious disorder or illness?						X
18.	When the last time you had dental treatment and what was done?						
19.	How would you describe your psychic behavior?						
	happy	sad	calm	excited	self-controlled	lack of self-control	
					X		



Table №2

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck	X		X	
2.	Atlanto-occipital region	X		X	
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)	X			X
4.b	M.masseter (deep)	X			X
5.	Tuber maxillae	X			X
6.	M.pterygoideus medialis				
7.	M.mylohyideus				
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints*				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare	X			X

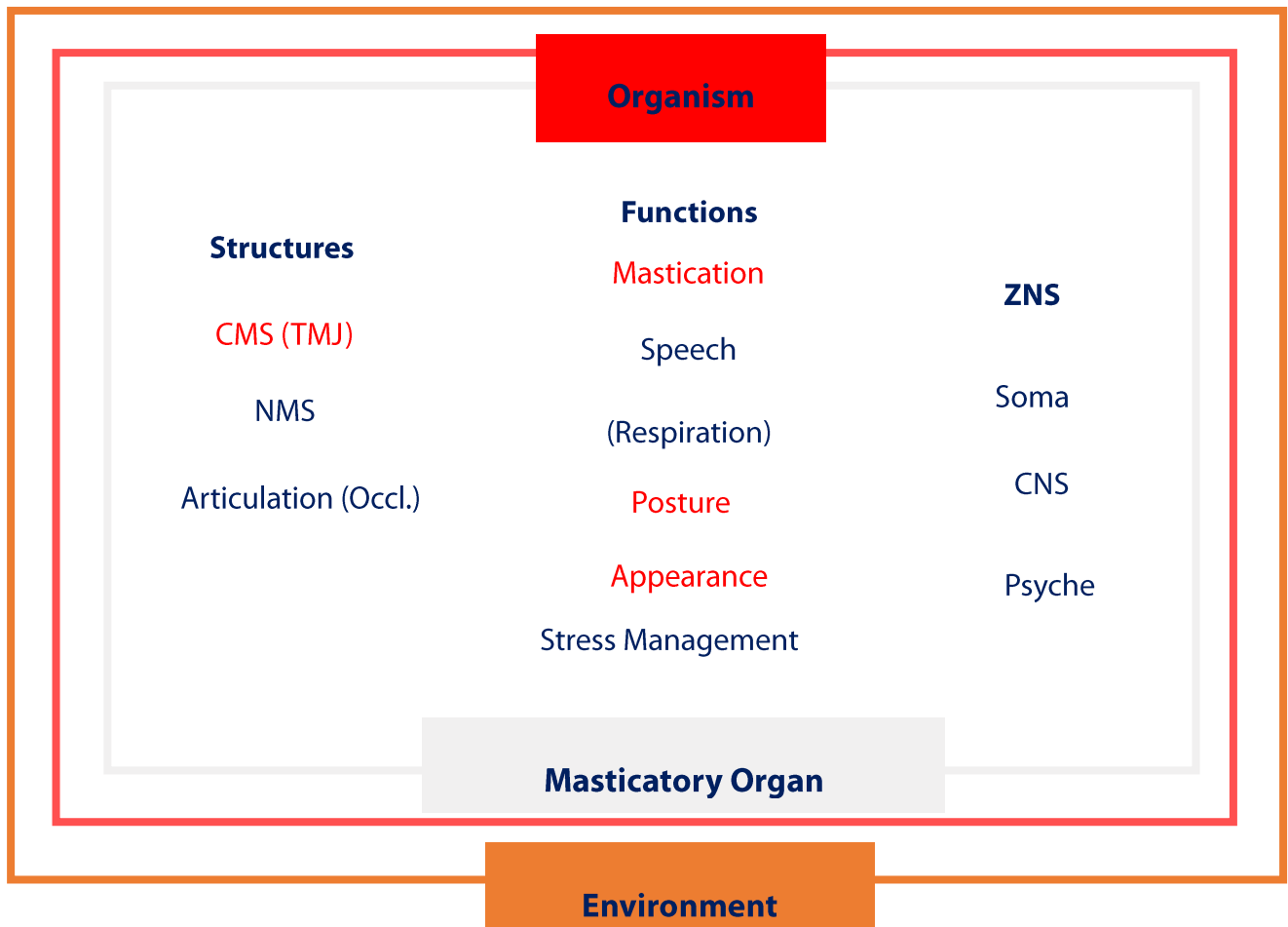
## Muscle palpation

Table №3

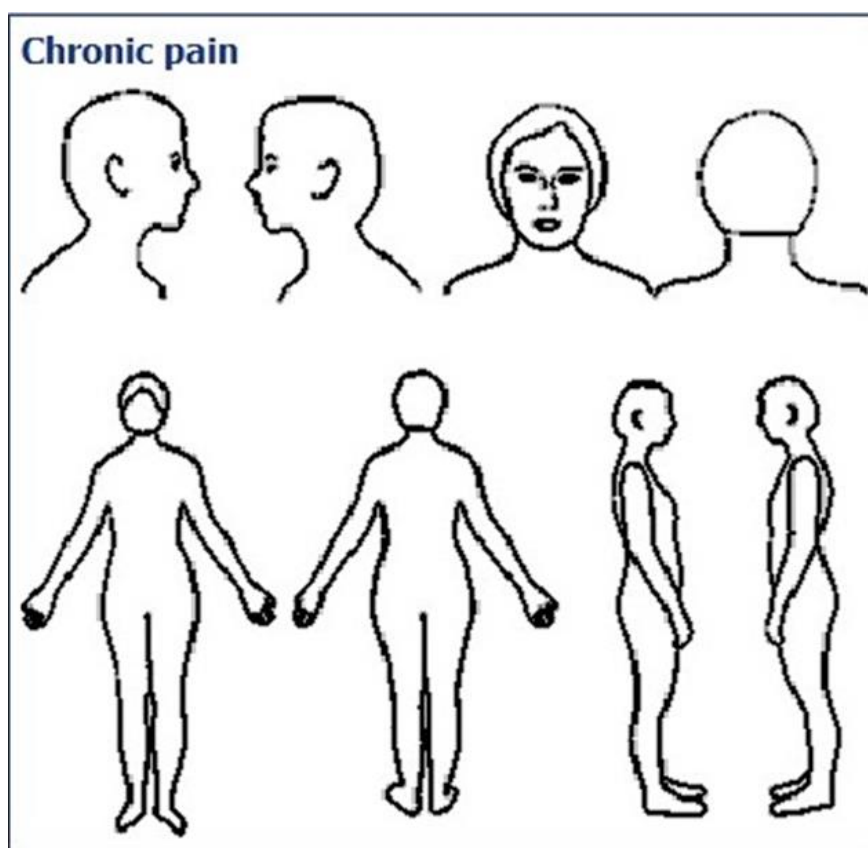
Sets of muscles:	
Muscles palpation	
Posture	1,2,7,12,13,14
Jaw-closing	3a, 3b, 4a, 4b, 5
Jaw-opening / protrusion	8, 9, 10
Retraction	3c, 8
Medio- / Laterotrraction	6, 3a, 4a
Sublingual bone position	8, 9,10,11,13
Function	7, 8,9,10,11,14
Joint position	15
Joint Structure, Capsule,Ligaments,Bilaminar zone, M.pterygoideus lateralis, Superior head	

## Cybernetic System of the Masticatory Organ

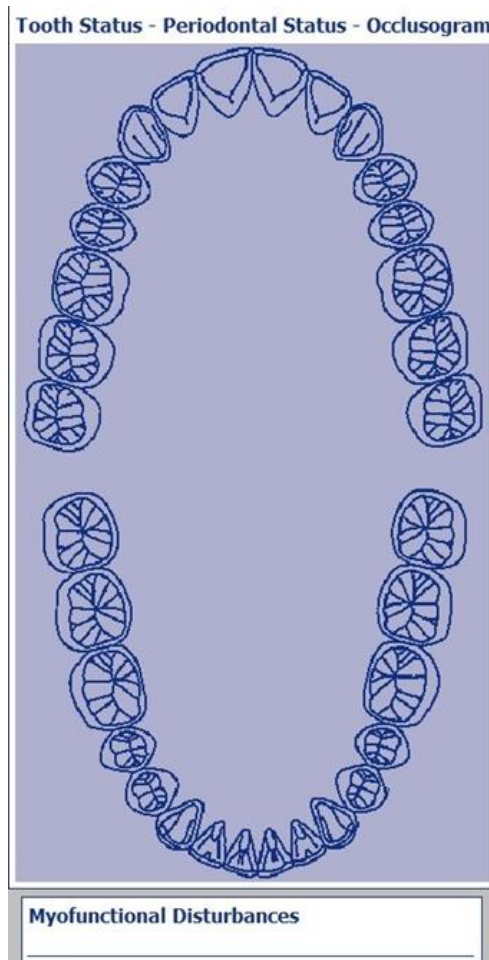
Table №4



Preliminary Brainstem Nerve Analysis	
1.	N.olfactorius (analysis)
2.	N.opticus (analysis)
3.	N.oculo-motorius (clinical mobility)
4.	N.trochlearis (clinical mobility)
5.	N.trigeminus (clinical palpation and sensitiveness)
6.	N.abducens (clinical mobility)
7.	N.facialis (clinical mobility)
8.	N.stato-acusticus (clinical heck of equilibrium and hearing)
9.	N.glosso-pharyngeus (clinical and analysis)
10.	N.vagus (analysis)
11.	N.accessorius (clinical and analysis)
12.	N.hypoglossus (clinical and analysis)



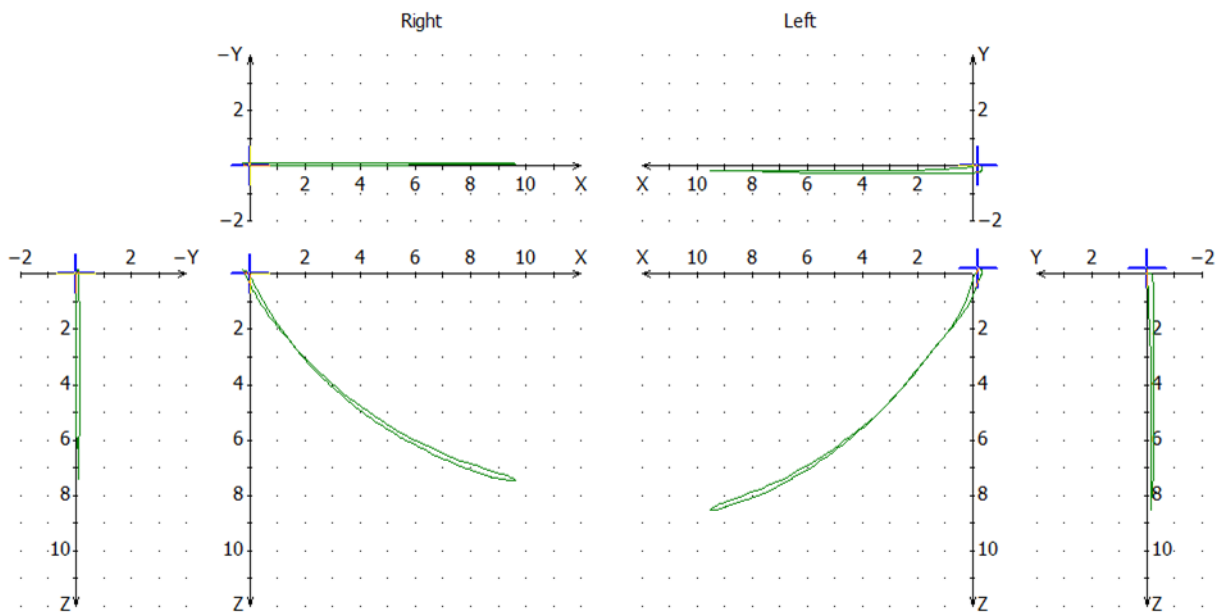
Pic. 8. Chronic pain map



Pic. 9. Occlusogramm

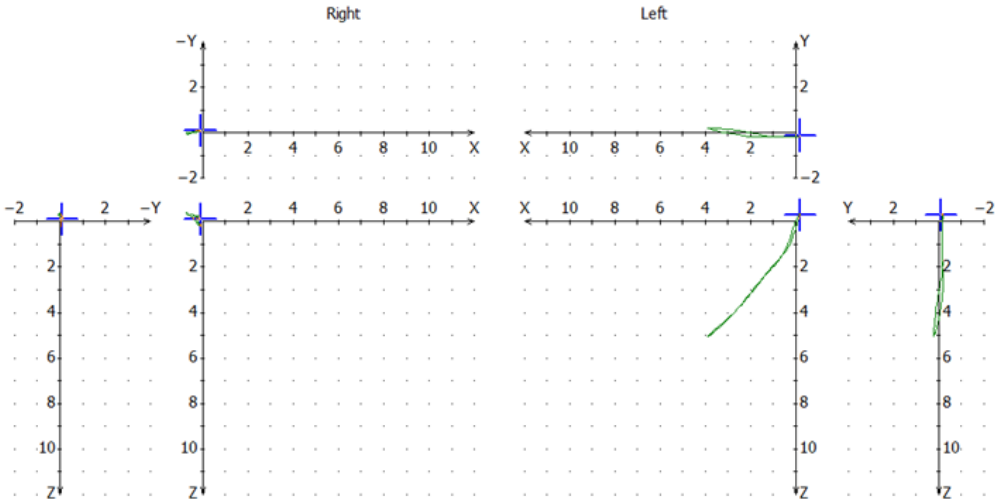
## Condylography

### Protrusion/retrusion



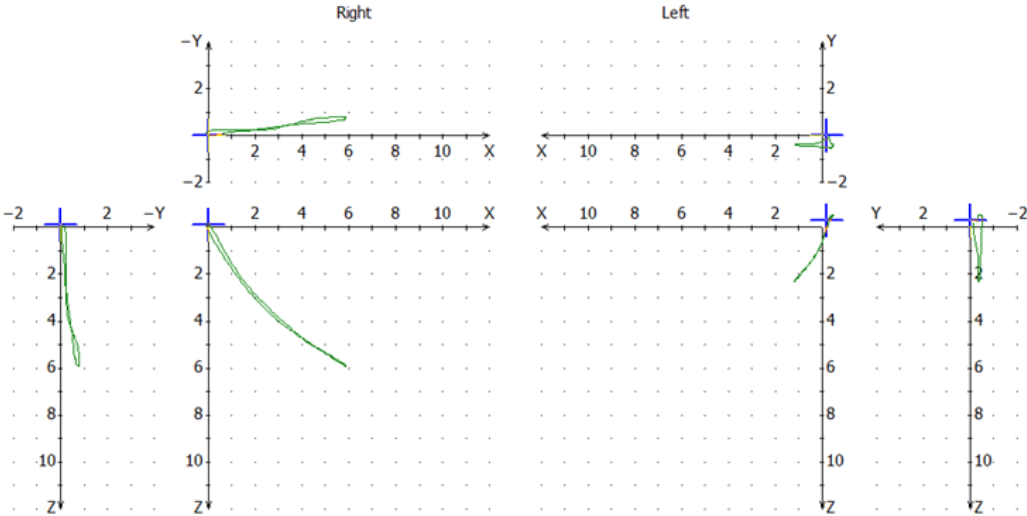
Pic. 10. Condylography. Protrusion/retrusion tracings

# Mediotrusion (right)



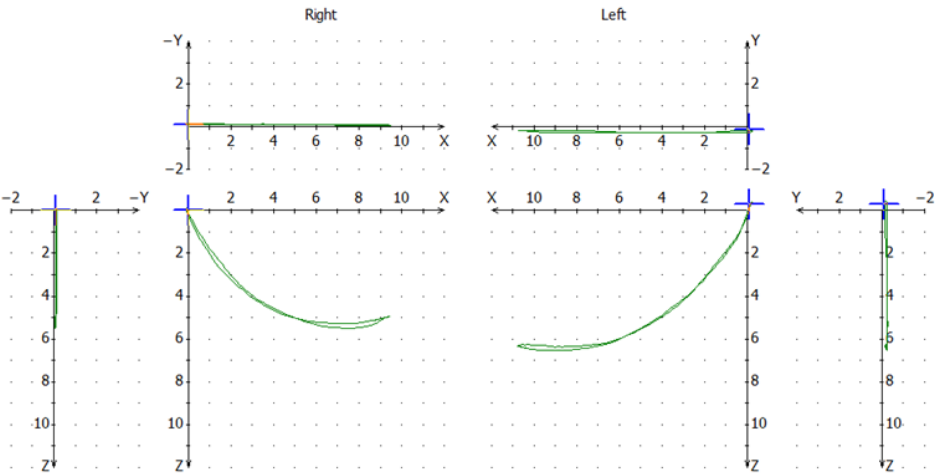
Pic. 11. Mediotrusion (right) tracings

# Mediotrusion (left)



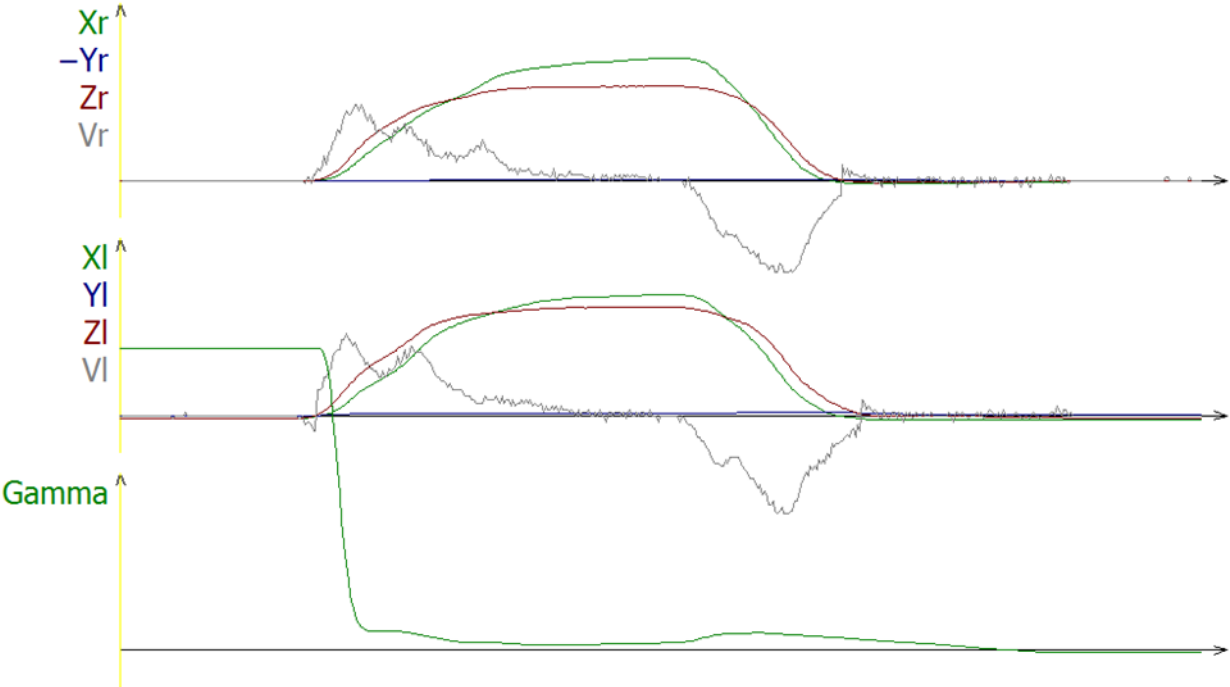
Pic. 12. Mediotrusion (left) tracings

# Open-close



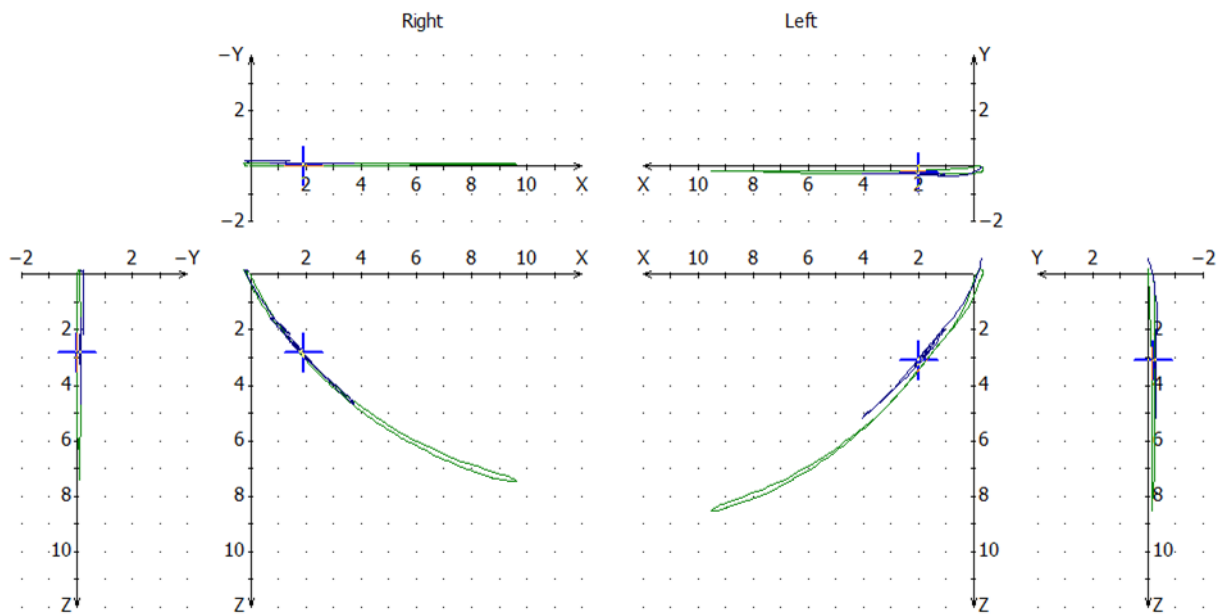
Pic. 13. Open-close tracings

# Open-close time curve



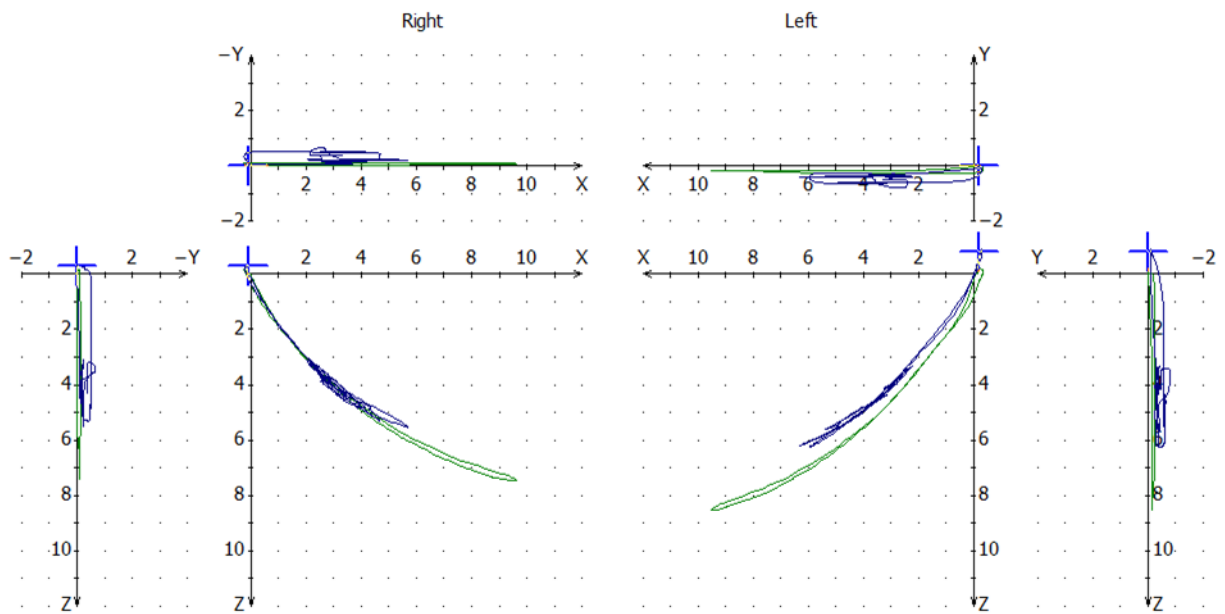
Pic. 14. Open- close time curve tracings

## Speech 50-60 and Protrusion



Pic. 15. Speech 50-60 and Protrusion tracings

## Speech 60-70 and Protrusion



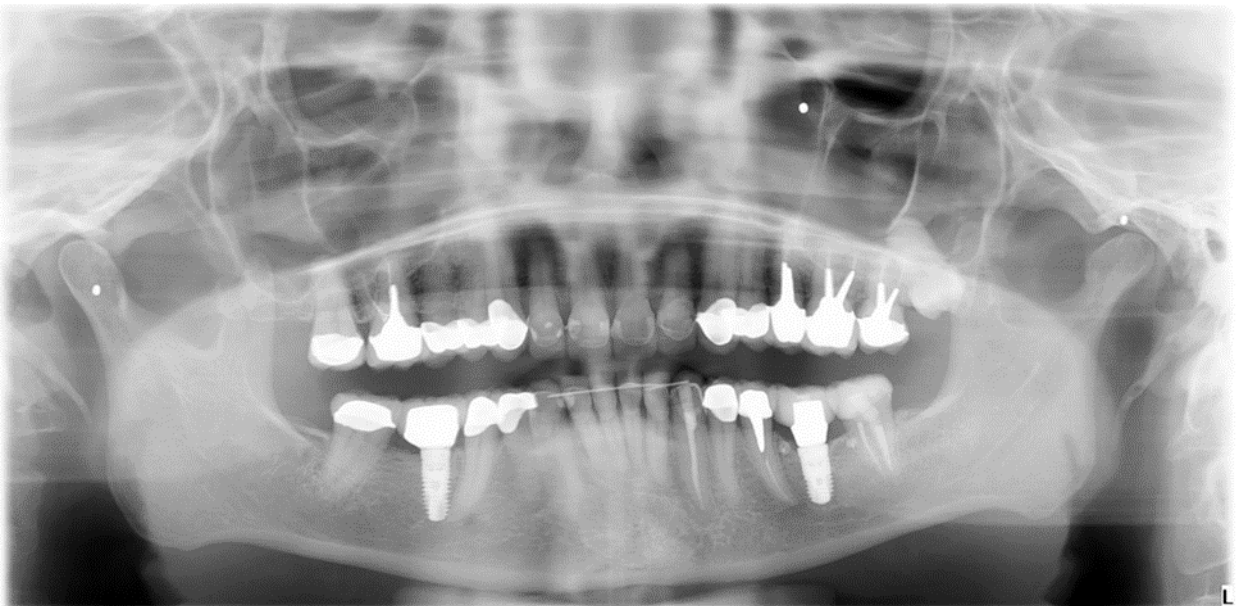
Pic. 16. Speech 60-70 and Protrusion

## Lateral X ray



Pic. 17. Lateral X ray

## Orthopantomography



Pic. 18. OPG



## Cephalometric analyses

Table №6

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	89.2	
Facial Depth	89.0°	81.9	2-***
Mandibular Plane	24.0°	31.7	1D
Facial Taper	68.0°	66.3	
Mandibular Arc	29.0°	27.2	
Maxillary Position	65.0°	61.7	1-*
Convexity	0.00 mm	7.1	3X***
Lower Facial Height (by R. Slavicek)	44.2°	48.0	
Lower Facial Height to Point D	50.7°	53.7	
Dental Measurement	Norm	Value	Trend
Interincisal Angle	131.3°	126.9	
Upper Incisor Protrusion	5.6 mm	7.4	
Upper Incisor Inclination	26.4°	27.1	
Upper Incisor Vertical	Mm	5.6	
Lower Incisor Protrusion	0.9 mm	3.5	
Lower Incisor Inclination	22.3°	25.8	
Upper Molar Position	18.0 mm	14.7	1-*
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	4.0	
Idealized Occlusal Plane – Axis Orbital Plane	----°	12.6	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	38.2	
Radius of Curve of Spee	---- mm	57.8	
Lip Embrasure	0.0 mm	1.5	
Occlusal Plane Xi Distance	-1.4 mm	-8.5	1-*
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	51.6	
Horizontal Condylar Inclination left	----°	55.7	
Horizontal Condylar Inclination	----°	53.6	
Relative Condylar Inclination	----°	49.5	
Relative Condylar Inclination 6	----°	48.4	
Relative Condylar Inclination 7	----°	27.1	
Relative Condylar Inclination 8	----°		
Anterior Guidance (S-AOP)	°	66.5	
Relative Anterior Guidance	°	62.4	
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.3 mm	4.2	3+***

SCI R = 51 degree

SCI left = 55 degree

OPI R = 8 degree

OPI L = 8 degree

DOA R = 51-8-Cui 30= 13 degrees (norm)

DOA L = 55-8-Cui 30 = 17 degrees

Change OPI to 12 degrees (with tooth 36 height)

AG = 66 degrees

### **Interactive Verbal Analysis**

**The skeletal trend of the skull is dolichofacial.**

The skeletal trend of the mandible is mesiofacial.

Skeletal class is severe II.

The maxilla is positioned neutral.

The mandible is positioned retrognathic.

The lower facial height is normal.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is normal.

The protrusion of the lower incisor is normal.

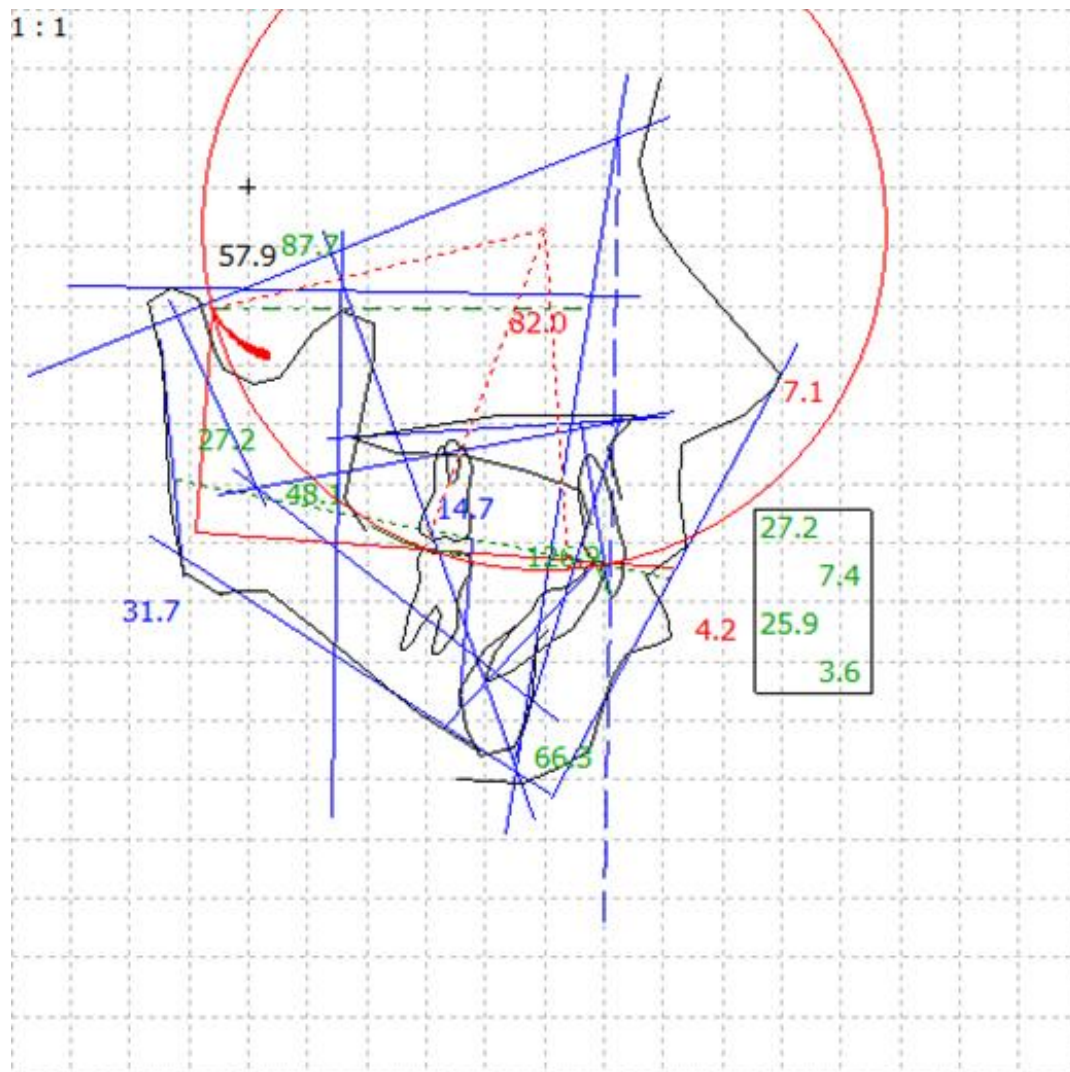
The inclination of the lower incisor is normal.

The interincisal angle is normal.

Occlusal concept: group function.

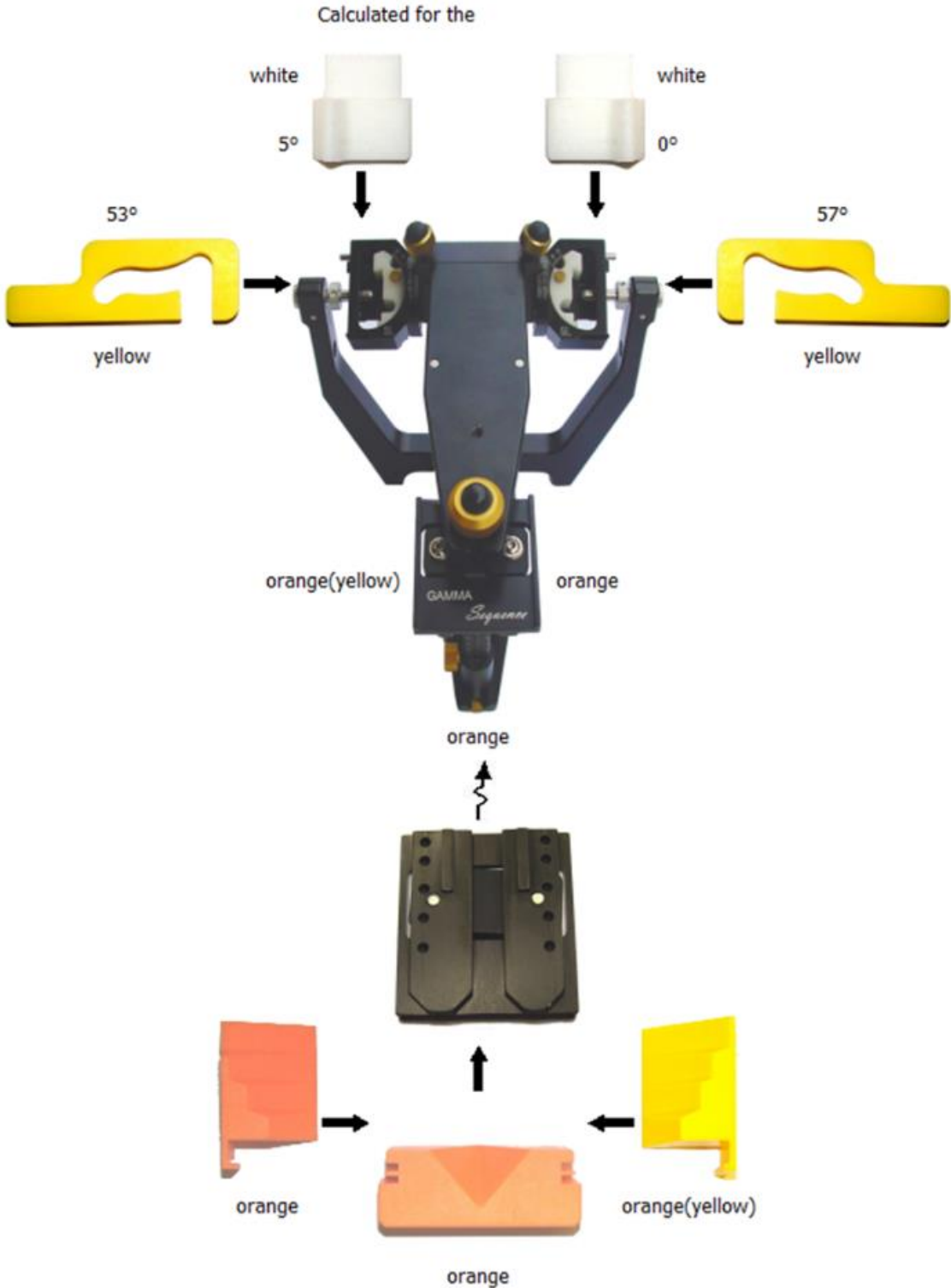
Table №7

Determinants	Norm	Value	Trend
Facial Axis	90.0°	83.3	2D**
Facial Depth	89.0°	84.8	1-*
Facial Taper	68.0°	69.3	
Mandibular Plane	24.0°	25.7	
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	396.2	
Facial Length Ratio	63.5%	62.8	
Y Axis to S N	67.0°	72.5	1+*
Y Axis (Downs)	61.2°	61.2	
S N to Gonion Gnathion Angle	32.6°	36.2	1+*



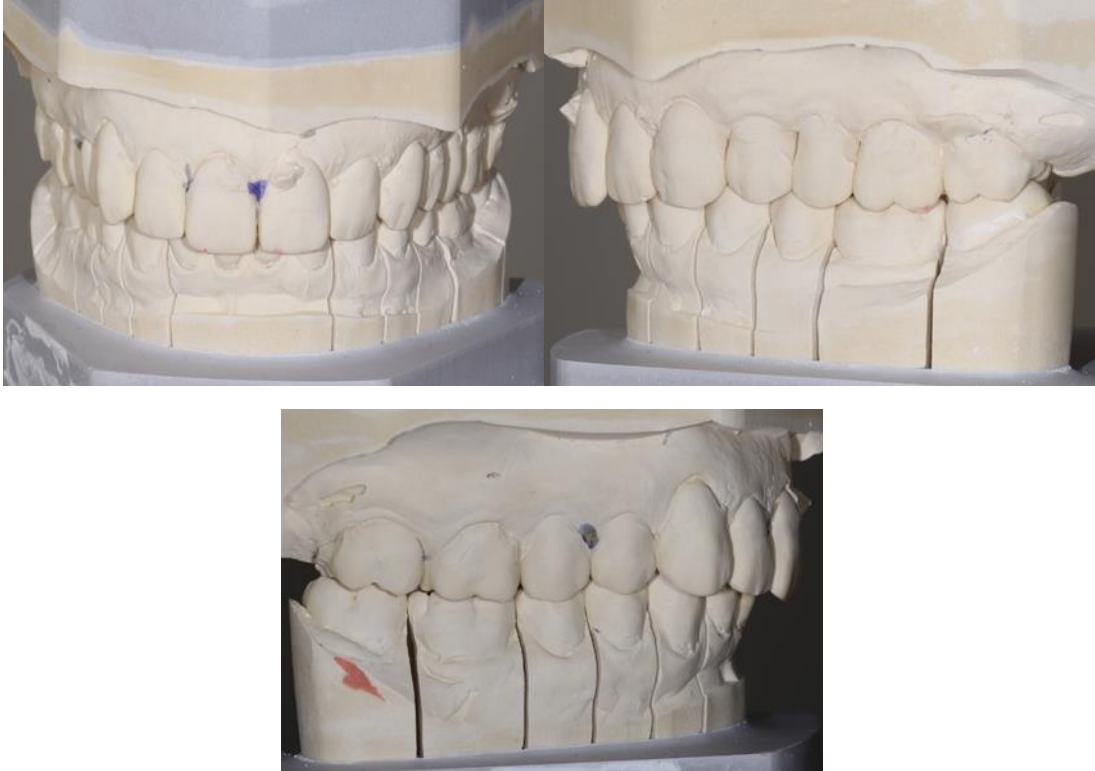
Pic. 19. Cephalometric analyses

# Articulator settings



Pic. 20. Articulator settings

## Casts ICP



Pic. 21-23. Casts ICP

## Anterior guidance and canine control



Pic. 24-26. AG and CC

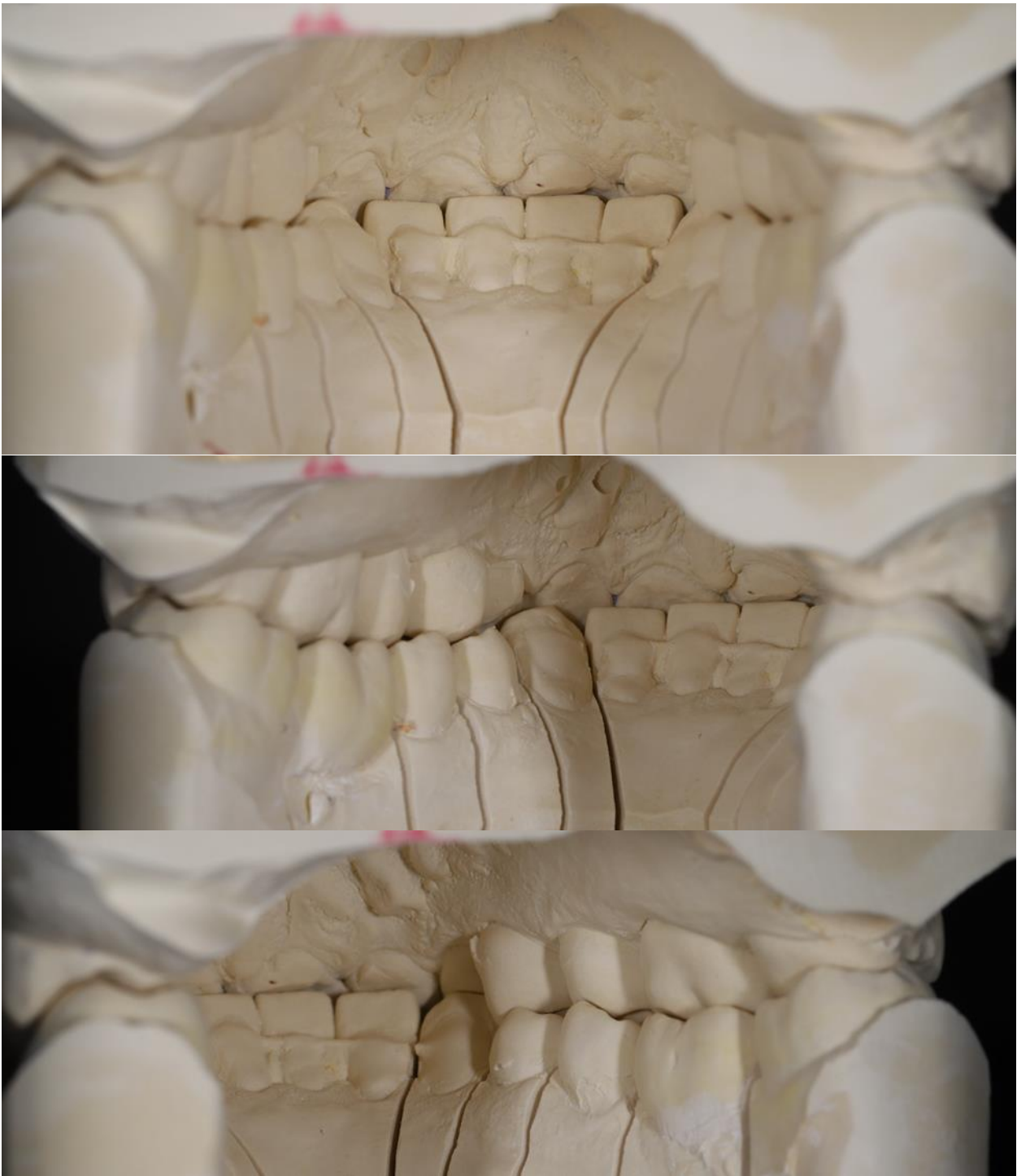


Pic. 27-28. Casts with AG and CC tracings

**Casts mounted in articulator in RP**



Pic. 29-31. Casts mounted in articulator in RP



Pic. 32-34. Casts ICP occlusion (from the inside)

OPI R = 8, OPI L = 8



Pic. 35-36. The value of indicators OPI L и OPI R

## **Aesthetic Analyses**

I. Facial analyses and speech

II. Dental analyses

III. Dento-labial analyses

### **Dento-labial analyses**

1. Interincisal line inclination
2. Smile line
3. Smile width
4. Labial corridor

### **Face Analyses**

1. Profile (convex, concave, normal)
2. Bipupillar line parallel to upper incisors incisal edge
3. Skeletal evaluation of tooth position (buccal, palatal or correct)
4. Facial proportions – lower third of the face



## **Dental Analyses**

1. Inclination of lower incisors
2. Proportion of teeth
3. Evaluation of lower incisors to lower OPI
4. Overbite, overjet
5. Incisal wear, palatal wear

Evaluation lower incisors

## **Processing the data**

### **Dental Data**

1. Definition of 1.1 tooth length and width, exposure at rest. Find desired proportion and optimize the tooth proportion at rest. 76 %-83%

## **Dento-labial processing reference lines**

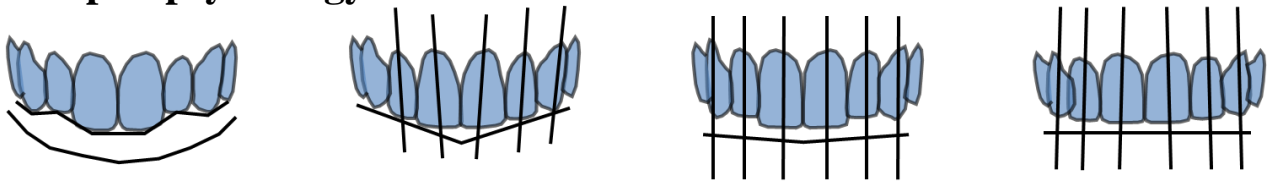
1. Interpupillaru line- frontal uppers incisal edge.
2. Incisal edge position.
3. Canine evaluation.
4. Incisal profile.
5. Phonetic F-S sound: buccalized, lingualized or vermillion.
6. Labial corridoe in mm.
7. How much distance from Vermillion.
8. Premolars and molars position

Basic and relative criteria for teeth evaluating

- Occlusion;
- Tooth axis;
- Emergence profile topgallant;
- Gingiva level;

- Inter-proximal contact level;
- Tooth relative size;
- Tooth shape basic characteristics;
- Basic characteristics;
- Surface texture;
- Color;
- Incisal edge configuration;
- Lower lip line;
- Smile symmetry.

### Morpho psychology



<b>Melancholic</b>	<b>Sanguine</b>	<b>Choleric</b>	<b>Phlegmatic</b>
<b>Sensible</b>	<b>Dynamic</b>	<b>Strong</b>	<b>Calm</b>
<b>Oval</b>	<b>Triangular</b>	<b>Rectangular</b>	<b>Square</b>
Organized	Extroverted	Determined	Diplomatic
Perfectionist	Communicative	Objective	Pacific
Artistic	Enthusiastic	Explosive	Mystic
Abstractive	Dynamic	Intense	Spiritualized
Timid	Impulsive	Entrepreneur	Conformist
Reserved		Passionate	Discreet

# Aesthetic analysis

Table 8





ESTHETIC INFORMATION	
HIGHLY DEMANDING PATIENT	Yes
ALIGNMENT	No set
APPEARANCE	Young
TOOTH TYPE	Ovoid
MACRO TEXTURE	Slight
COLOR CHARACTERIZATION	Wide and uniform
SMILE LINE	Low smile
The visibility off the anterior teeth suggest	
LABIAL CORRIDOR	Absent
Increase the buccal volume of the posterior	
SMILE WIDTH	12-14
	
INTERINCISAL LINE INCLINATION	Right inclination
Missing information.	

Table 9

COLOR SELECTION	
SHADE GUIDE	
DESIRED COLOR OF THE RESTORATION	A1
Value	Value High <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> Low
ABUTMENT COLOR	A1
	

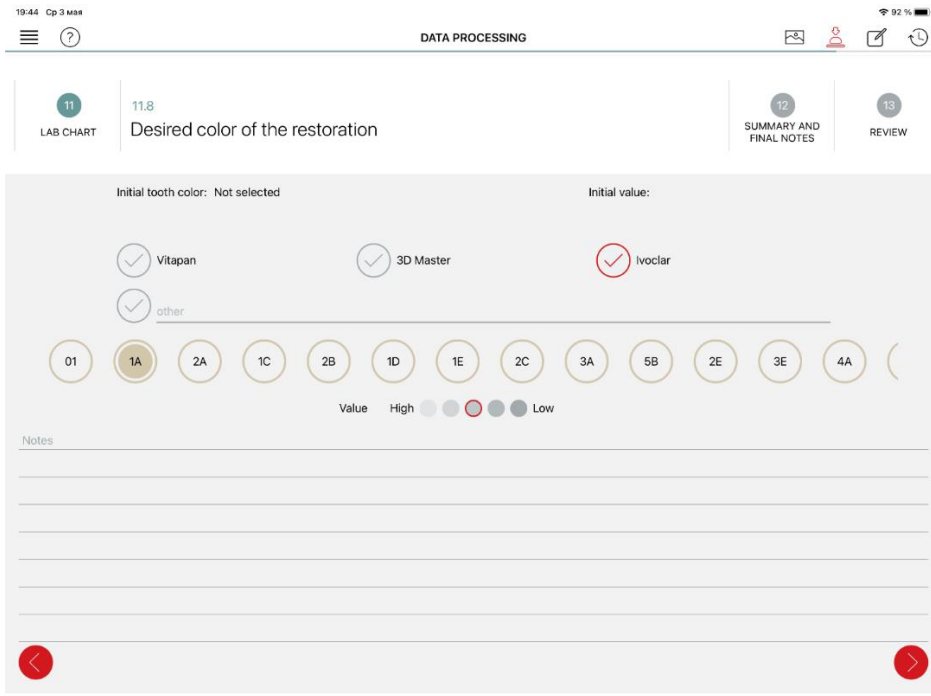
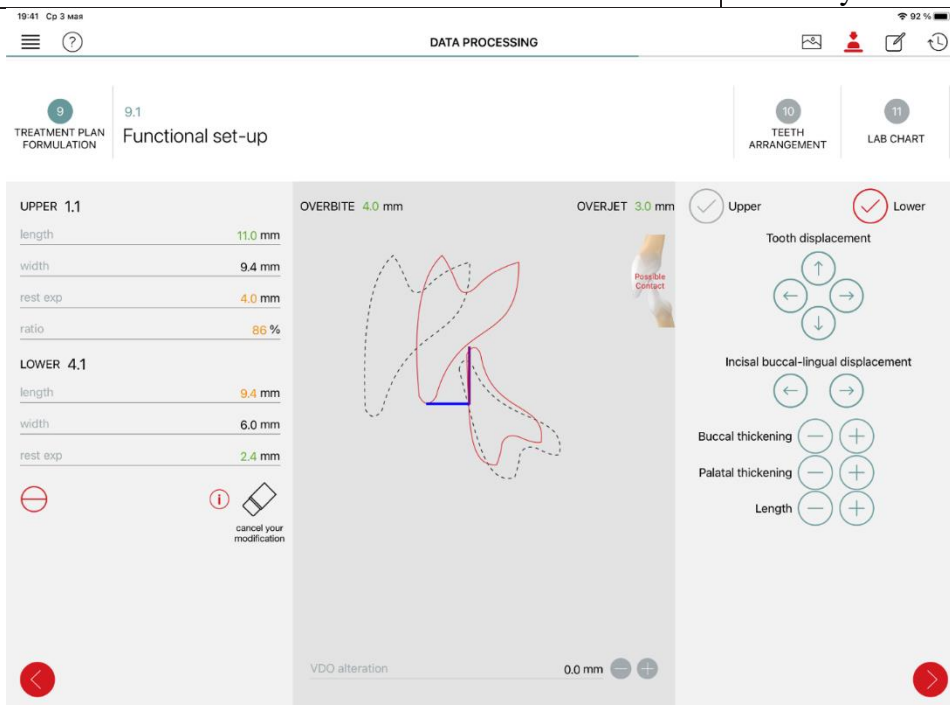


Table 10

FUNCTIONAL INFORMATION	
ORIGINAL OVERBITE	4.0 mm
FINAL OVERBITE	4.0 mm
ORIGINAL OVERJET	7.0 mm
FINAL OVERJET	3.0 mm
VDO ALTERATION	0.0 mm
ARTICULATOR	Fully adjustable
IMMEDIATE BENNETT	Custom
BENNETT ANGLE	Custom
CONDYLAR EMINANCE ANGLE	Custom
DISOCCLUSION	Canine guidance
FACEBOW	Arbitrary



**Table 11**

**BUCCO-LINGUAL CHANGES**



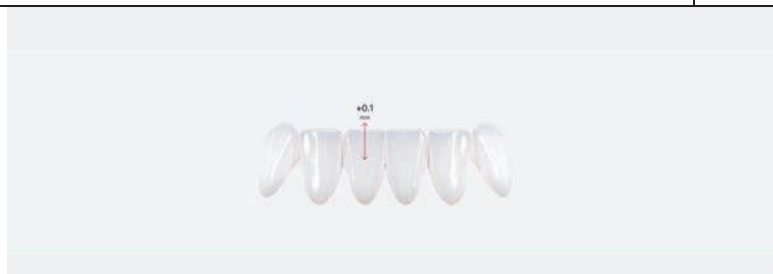
24	0.2mm
25	0.4 mm
16	0.4 mm
17	0.4 mm

**Table 12**

**DIMENSIONAL CHANGES**



ORIGINAL LENGTH OF THE REFERENCE CENTRAL INCISOR	12.0 mm
change length	-1.0 mm
ORIGINAL WIDTH OF THE REFERENCE CENTRAL INCISOR	9.0 mm
change width	+0.4 mm
Exposure at rest	5.0 mm



ORIGINAL LENGTH OF THE REFERENCE CENTRAL INCISOR	10 mm
change length	-0.6 mm
ORIGINAL WIDTH OF THE REFERENCE CENTRAL INCISOR	6.00 mm
change width	0 mm
Exposure at rest	3.0 mm



4 DENTAL ANALYSIS

### 4.2 Upper central incisor dimension

5 OPTIONAL DATA

6 FACE DATA PROCESSING

tooth	1.1
length *	12.0 mm
width *	9.0 mm
exposure at rest *	5.0 mm

Upper incisor exposure at rest (reference tooth): this data can be collected by measuring the distance between the incisal margin of the tooth and the upper lip. This value can be either positive if the tooth is visible or negative if the tooth is not visible.

[Video Example](#)



4 DENTAL ANALYSIS

### 4.3 Lower central incisor dimension

5 OPTIONAL DATA

6 FACE DATA PROCESSING

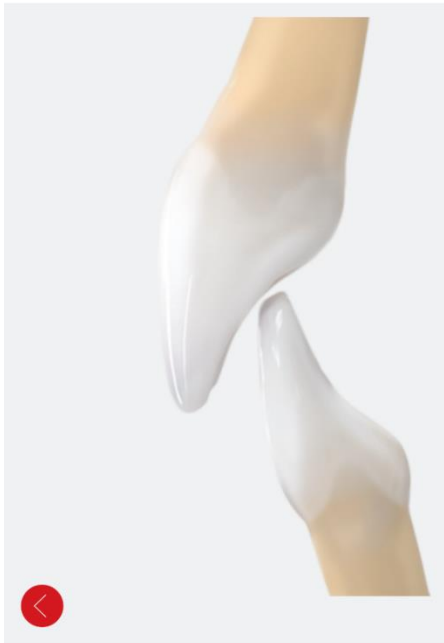
tooth	4.1
length *	10.0 mm
width *	6.0 mm
exposure at rest *	3.0 mm

Lower incisor exposure at rest (reference tooth): this data can be collected by measuring the distance between the incisal margin of the tooth and the lower lip. This value can be either positive if the tooth is visible or negative if the tooth is not visible.

[Video Example](#)

4 DENTAL ANALYSIS 4.4 Anterior occlusal relationship

5 OPTIONAL DATA 6 FACE DATA PROCESSING



overbite \* 4 mm

overjet \* 7 mm

Anterior Dental Contact  Yes  No

Incisal Wear  Yes  No

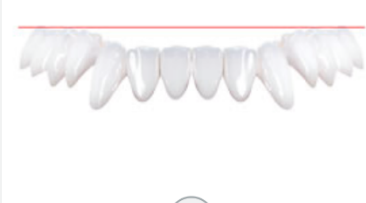
Palatal Wear  Yes  No

4 DENTAL ANALYSIS 4.7 Evaluation of the lower incisors


5 OPTIONAL DATA 6 FACE DATA PROCESSING

Does the lower incisal plane match the posterior occlusal plane?

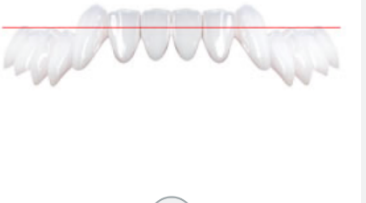
Under erupted



Yes

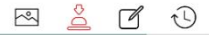


Over erupted



Value (mm)

-5.0 -4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0 +0.5 +1.0 +1.5 +2.0 +2.5 +3.0 +3.5 +4.0 +4.5 +5.0



11

LAB CHART

12

SUMMARY AND FINAL NOTES

12.3

Functional Setup and Restoration

13

REVIEW

Original overbite	4.0 mm
Final overbite	4.0 mm
Original overjet	7.0 mm
Final overjet	3.0 mm
VDO alteration	0.0 mm

● Occlusal coverage   
 ● Buccal coverage   
 ● Full coverage



4

DENTAL ANALYSIS

4.8

Inclination of the lower incisors

5

OPTIONAL DATA

6

FACE DATA PROCESSING

Lingual inclination      Normal inclination      Buccal inclination

✓      ✓      ✓



**Esthetic:**

- Smile line – low smile.
- Labial corridor – absent.
- Smile width – 12-14.
- Interincisal line inclination – right inclination.
- Interincisal line vs upper lip philtrum – centered.
- Occlusal Plane Orientation – ideal.
- Incisal Edge Position – convex.
- Overbite – 4 mm.
- Overjet – 7 mm.
- Inclination of the lower incisors – buccal inclination.
- Phonetic – “F” sound – vermilion.

<b>Definition of the upper teeth size</b>	
11 lengthen/shorten	<b>-1.0 mm</b>
12 lengthen/shorten	0.0 mm
13 lengthen/shorten	0.0 mm
21 lengthen/shorten	0.0 mm
22 lengthen/shorten	0.0 mm
23 lengthen/shorten	<b>-0.5 mm</b>
11 widen/narrow	<b>0.4 mm</b>
12 widen/narrow	0.0 mm
13 widen/narrow	0.0 mm
21 widen/narrow	0.0 mm
22 widen/narrow	0.0 mm
23 widen/narrow	0.0 mm
<b>Buccal-labial teeth movement</b>	
11 lingual	<b>0.2 mm</b>
12 buccal/lingual	0.0 mm
13 buccal/lingual	0.0 mm
21 buccal/lingual	0.0 mm
22 buccal/lingual	0.0 mm

23 buccal/lingual	0.0 mm
-------------------	--------

<b>Definition of the lower teeth size</b>	
41 lengthen/shorten	<b>-0.6 mm</b>
42 lengthen/shorten	0.0 mm
43 lengthen/shorten	0.0 mm
31 lengthen/shorten	0.0 mm
32 lengthen/shorten	0.0 mm
33 lengthen/shorten	0.0 mm
41 widen/narrow	0.0 mm
42 widen/narrow	0.0 mm
43 widen/narrow	0.0 mm
31 widen/narrow	0.0 mm
32 widen/narrow	0.0 mm
33 widen/narrow	0.0 mm
<b>Buccal-labial teeth movement</b>	
41 lingual	0.0 mm
42 buccal/lingual	0.0 mm
43 buccal/lingual	0.0 mm
31 buccal/lingual	0.0 mm
32 buccal/lingual	0.0 mm
23 buccal/lingual	0.0 mm

Laboratory work order:

- Diagnostic wax-up
- Provisional prosthesis
- Final prosthesis

Functional aspects:

- Articulator – fully adjustable.
- Disocclusion – canine guidance.



1

PATIENT

1.2

Detailed medical history

2

PHOTO AND VIDEO

3

DENTO-LABIAL ANALYSIS

Diseases >

Is the patient in good health?

Yes  No

If no, why

Is the patient undergoing any medical treatment?

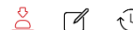
Yes  No

If yes, which one

Does the patient present any allergy or intolerance to medicines?

Yes  No

If yes, which ones



1

PATIENT

1.3

Detailed medical history

2

PHOTO AND VIDEO

3

DENTO-LABIAL ANALYSIS

Has the patient ever presented any allergic reaction to dental anaesthesia?

Yes  No

Is the patient a heavy smoker?

Yes  No

Has the patient been a heavy smoker for many years?

Yes  No

Is the patient a heavy drinker?

Yes  No

Is the patient drug-addicted, or has been in the past?

Yes  No

Has the patient ever undergone blood or hemoderivative transfusions?

Yes  No



1 PATIENT

### 1.4 Detailed medical history

2 PHOTO AND VIDEO

3 DENTO-LABIAL ANALYSIS

Does the patient report excessive bleeding after injuries or extractions?

Yes  No

Does the patient get bruised easily?

Yes  No

Has the patient ever undergone radiation therapy in the head or neck area?

Yes  No

Does the patient have a pace maker?

Yes  No

Is the patient pregnant?

Yes  No

Has the patient recently undergone surgical treatments?

Yes  No

If yes, which ones

Text input field for surgical treatments



1 PATIENT

### 1.5 Detailed medical history

2 PHOTO AND VIDEO

3 DENTO-LABIAL ANALYSIS

Is the patient presently undergoing, or has undergone, therapies related to:

Osteoporosis

Yes  No

Hyperparathyroidism

Yes  No

Paget's disease

Yes  No

Multiple myeloma

Yes  No

Any other important pathology to report?

Yes  No

If yes, which ones

Text input field for other pathologies





1

PATIENT

1.8

Treatment requested by the patient

2

PHOTO AND VIDEO

3

DENTO-LABIAL ANALYSIS

Alignment



Yes



No

Appearance



Young



Adult



Mature

Tooth type



Triangular



Ovoid



Square

Macro texture



No



Slight



Pronounced

Color characterization



White and uniform



Slightly characterized



Highly characterized

Highly demanding patient?



Yes



No



3

DENTO-LABIAL ANALYSIS

3.1

Smile line

4

DENTAL ANALYSIS

5

OPTIONAL DATA

Low smile



Average smile



High smile



Gummy smile



3 DENTO-LABIAL ANALYSIS

3.2 Labial corridor - Smile width

4 DENTAL ANALYSIS

5 OPTIONAL DATA

Labial corridor

Wide	Normal	Absent
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Smile width

6-8	10	12-14
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3 DENTO-LABIAL ANALYSIS

3.3 Interincisal line evaluation

4 DENTAL ANALYSIS

5 OPTIONAL DATA

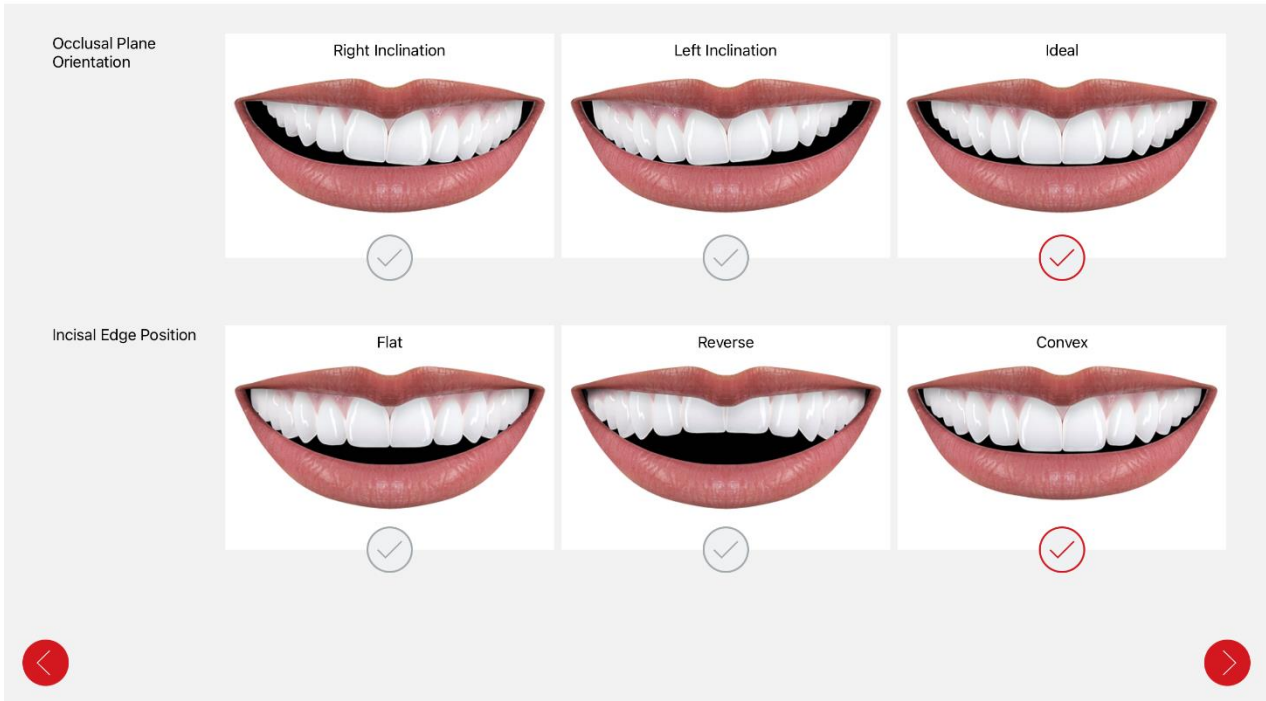
Interincisal line inclination

Right inclination	Vertical	Left inclination
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

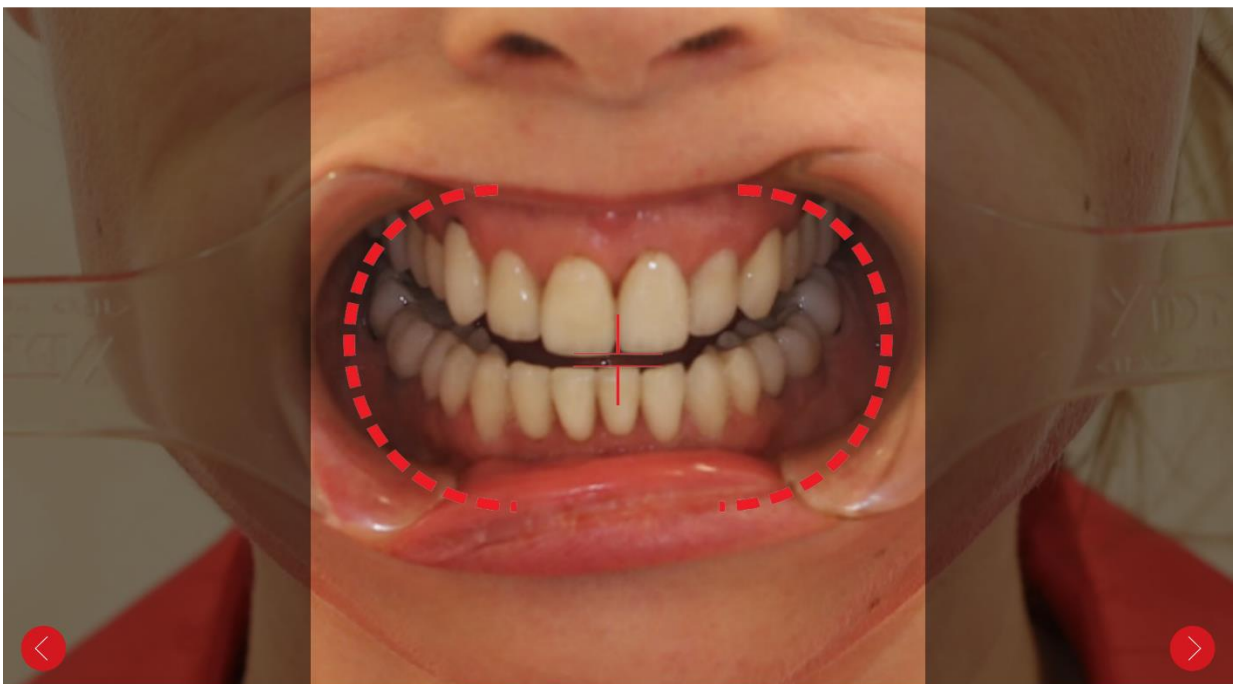
Interincisal line vs upper lip philtrum

Deviated right	Centered	Deviated left
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3.4 Occlusal plane orientation & Incisal edge position



7.2 Zoom and crop the upper and lower arch



7

DENTAL DATA PROCESSING

7.3

### Definition of the central incisor length

8

DENTO-LABIAL PROCESSING

9

TREATMENT PLAN FORMULATION



tooth	1.1
length	12.0 mm
width	9.0 mm
exposure at rest	5.0 mm

Ratio %



This is the ratio between the length and width of the reference incisor as per the initial conditions. In the following steps it will be possible to modify these values so to alter the ratio.

7

DENTAL DATA PROCESSING

7.4

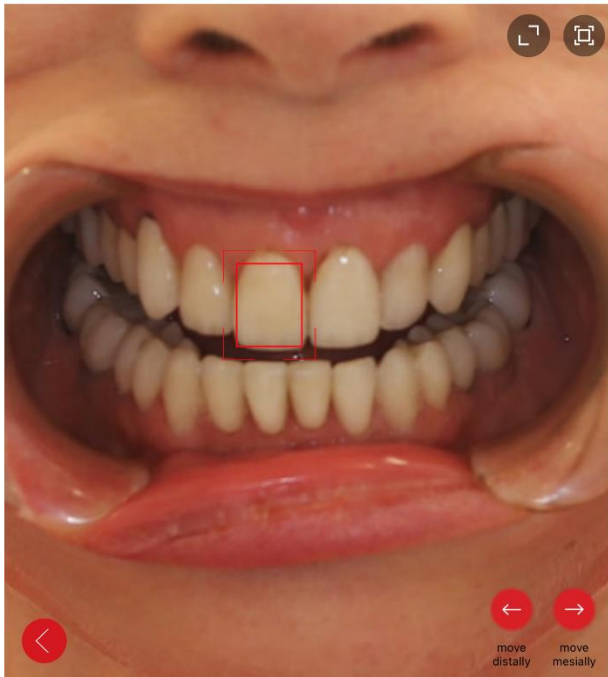
### Definition of the central incisor width

8

DENTO-LABIAL PROCESSING

9

TREATMENT PLAN FORMULATION



tooth	1.1
length	12.0 mm
width	9.4 mm
exposure at rest	5.0 mm

Ratio %



In the following step the tooth length will be modified to reach ideal tooth proportions and optimize the value of tooth exposure at rest.

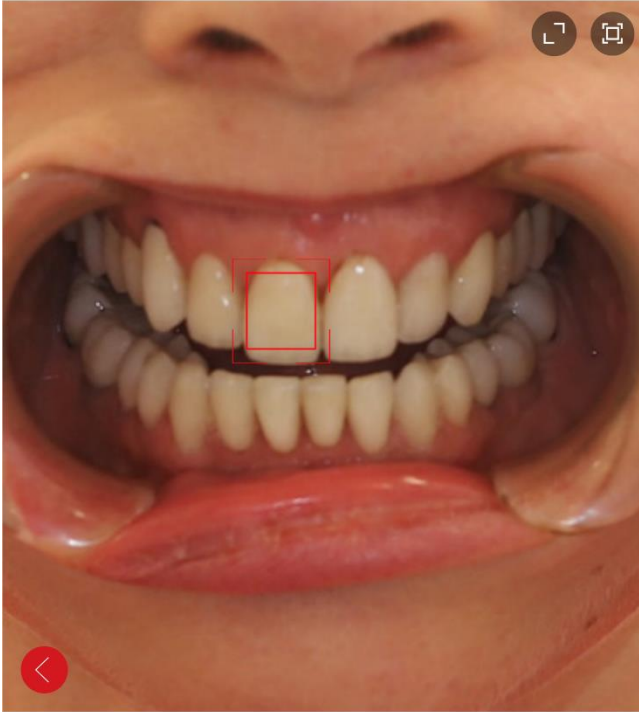


7 DENTAL DATA PROCESSING

7.5 Definition of the central incisor length

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION



tooth	1.1
length	10.4 mm
width	9.4 mm
final tooth exposure at rest	3.4 mm
incisal lengthening	-1.6 mm
marginal cervical shift	0.0 mm

Ratio %



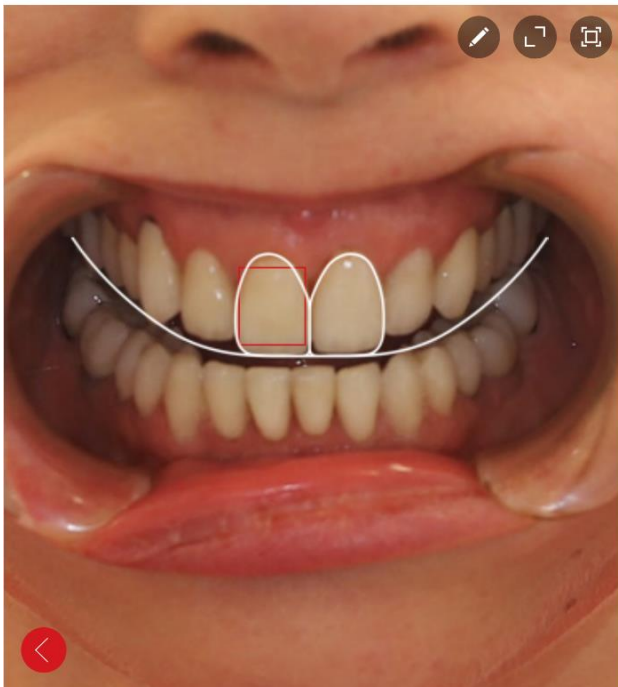
The ratio has been optimized according to the tooth dimensions.

7 DENTAL DATA PROCESSING

7.6 Incisal edge optimization

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION



tooth	1.1
length	11.0 mm - +
width	9.4 mm - +
final tooth exposure at rest	4.0 mm - +
incisal lengthening	-1.0 mm - +
marginal cervical shift	0.0 mm - +

Ratio %

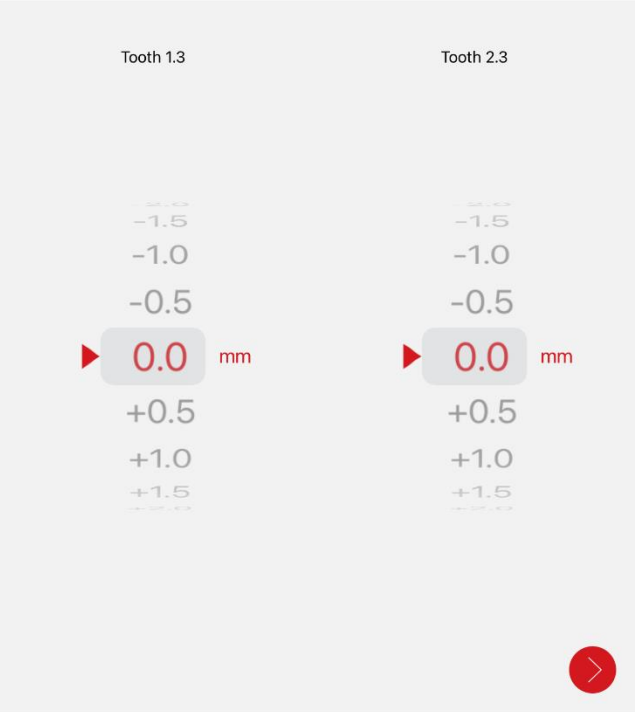
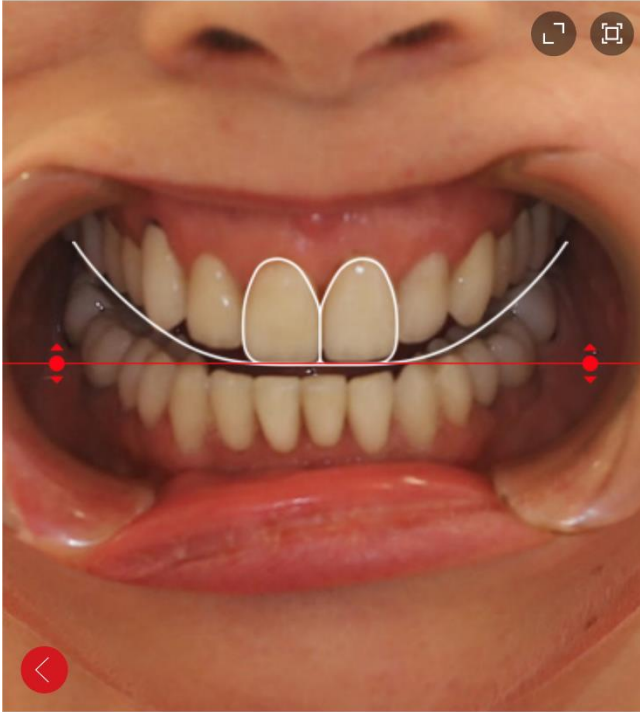


7 DENTAL DATA PROCESSING

7.7 Canine evaluation

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION

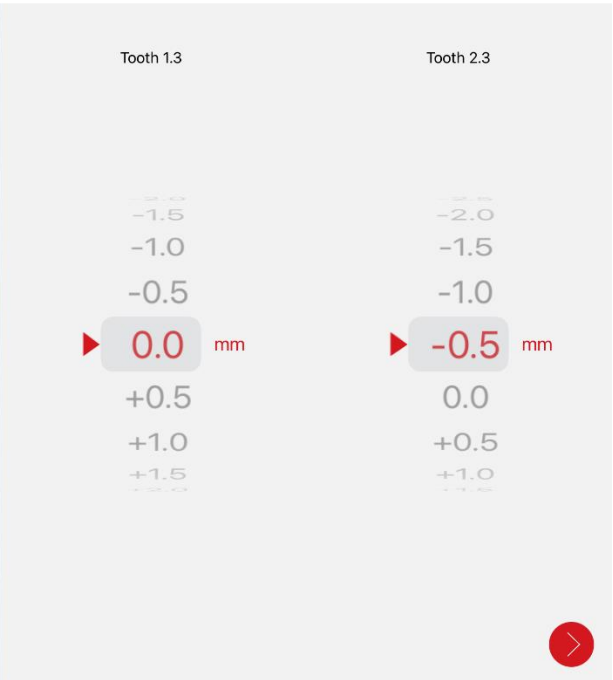
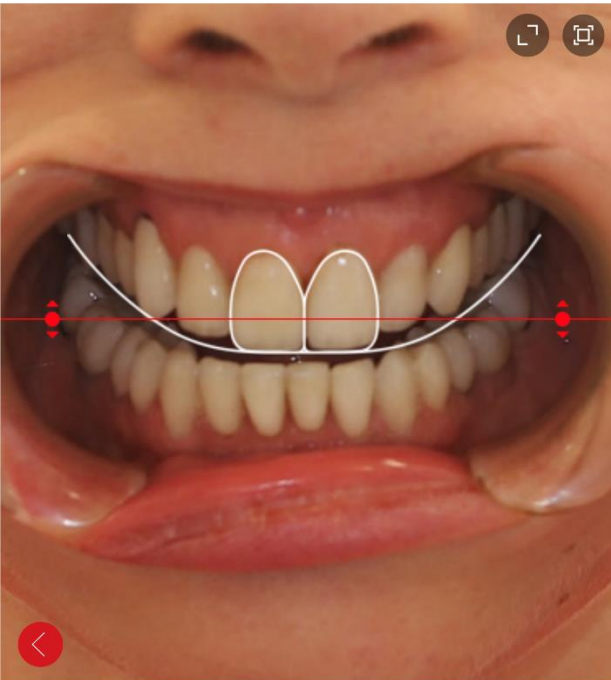


7 DENTAL DATA PROCESSING

7.7 Canine evaluation

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION

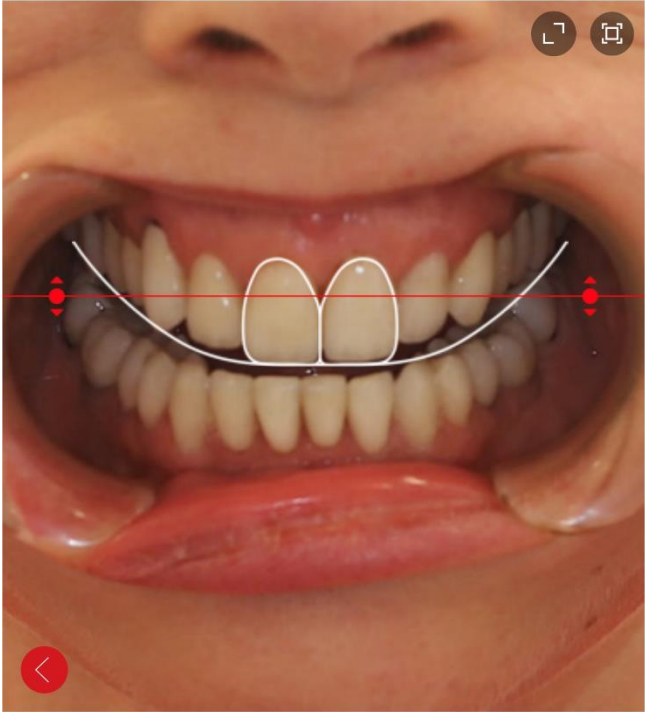


7 DENTAL DATA PROCESSING

7.8 First molar evaluation

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION



Tooth 1.6

Tooth 2.6

-1.5  
-1.0  
-0.5  
**0.0** mm  
+0.5  
+1.0  
+1.5

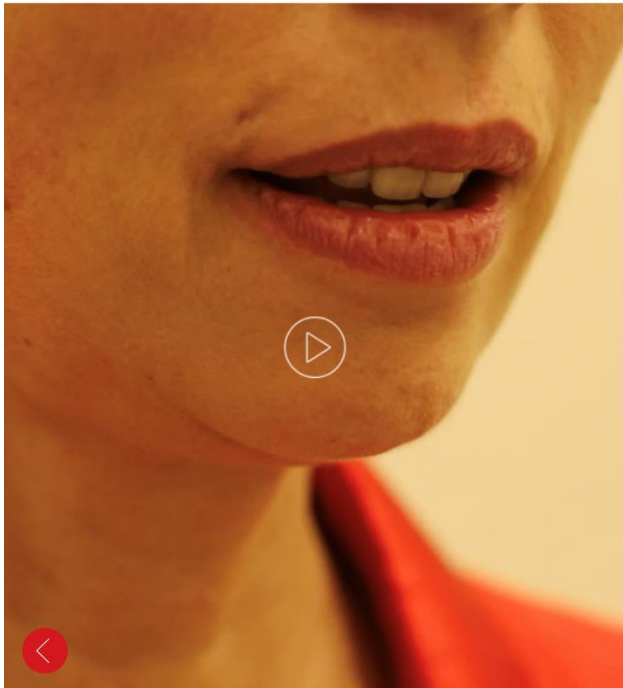
-1.5  
-1.0  
-0.5  
**0.0** mm  
+0.5  
+1.0  
+1.5

8 DENTO-LABIAL PROCESSING

8.2 Phonetics - "F" sound

9 TREATMENT PLAN FORMULATION

10 TEETH ARRANGEMENT



- Vermilion
- Lingualized
- Buccalized

## **Wax-up**

SCI R = 51 degree.

SCI left = 55 degree.

OPI R = 8 degree.

OPI L = 8 degree.

DOA R = 51-8-Cui 30 = 13 degrees (norm).

DOA L = 55-8-Cui 30 = 17 degrees.

Change OPI to 12 degrees (with tooth 36 height or decrease the height of central lower incisors - 0,6 mm).

AG= 66 degrees.

Create canine control on the both sides 62-66 degrees.

Lip line coincident with point of contacts of upper and lower central incisors.

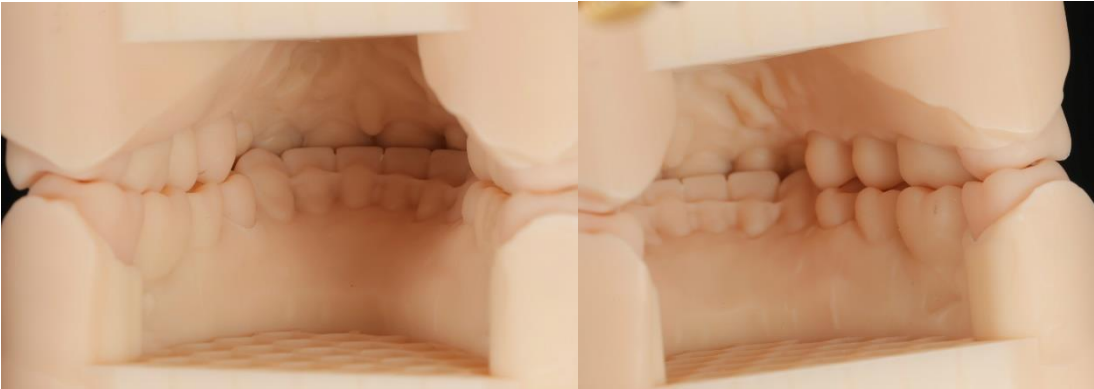
Dental class II.

No changes in vertical dimension. The maxilla is retrial position.

During last 14 years the shape of condyle changed on the left side. It is remodeling of the shape of the condyle and SCI changed from 70 to 51 degree.

Posture problems.

**Digital Wax-up 2023**

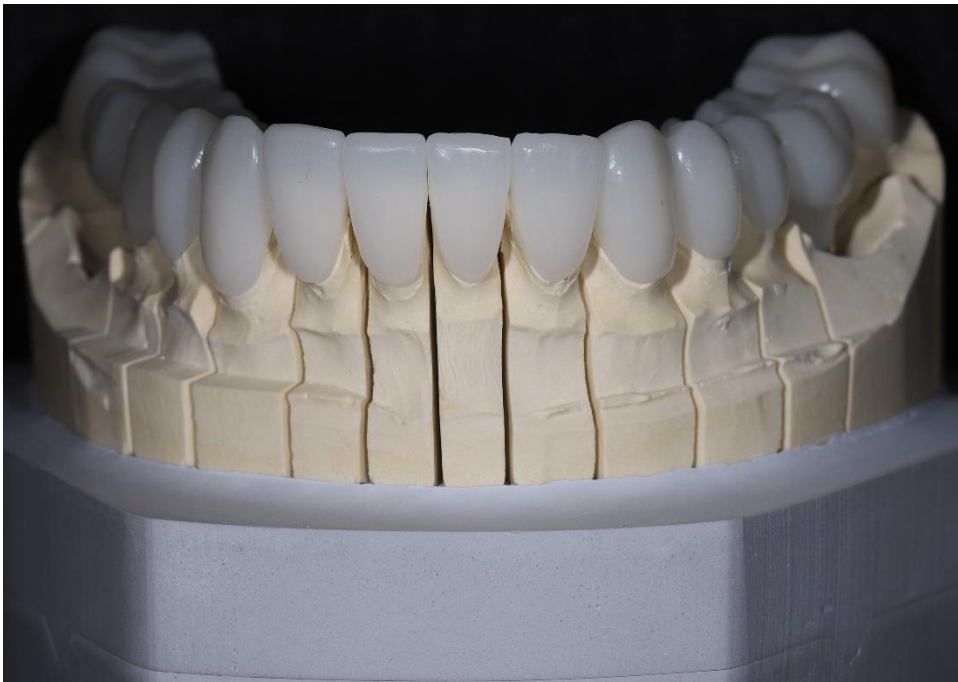




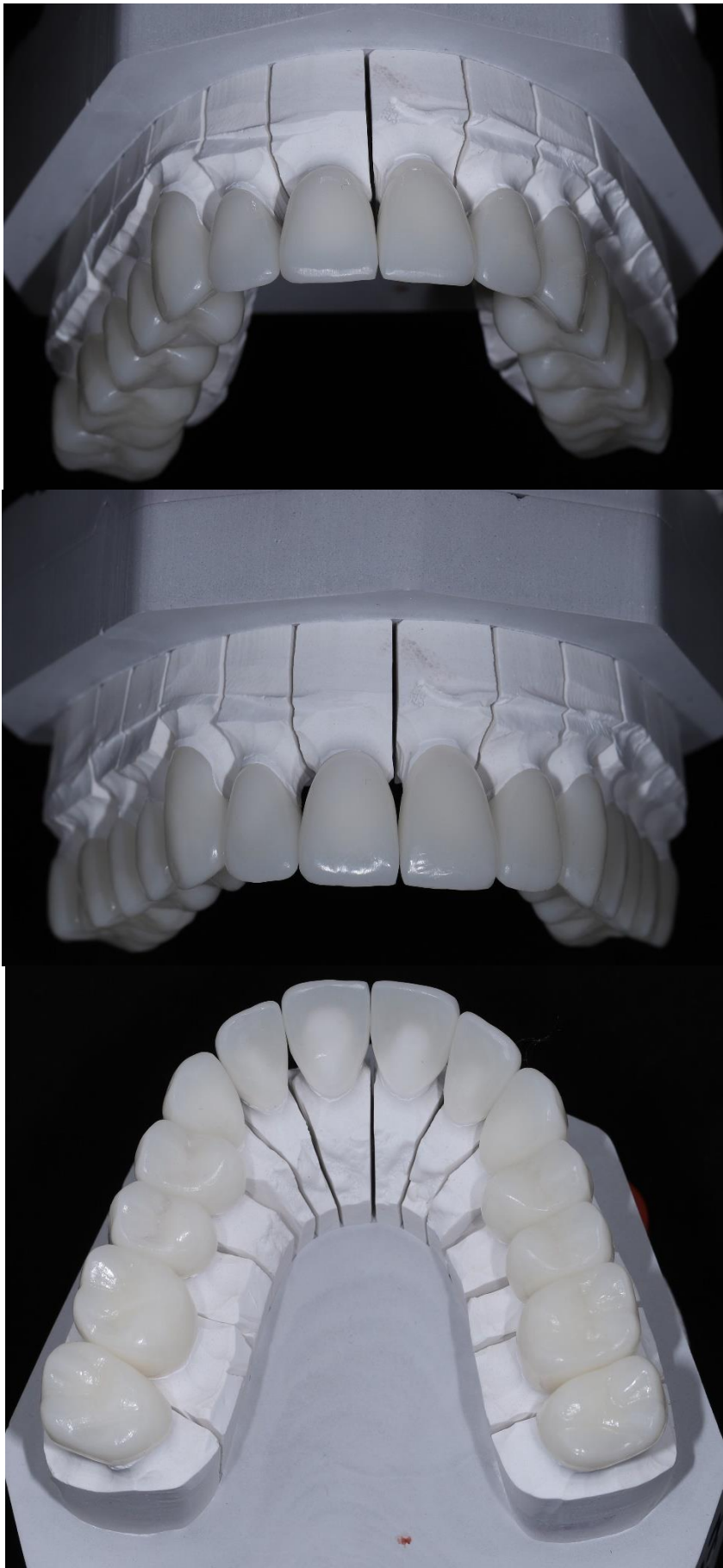
















## Clinical case № 17

Date of birth: 1973

Date of examination: March 2023

Main concern: Periimplantitis, postorthodontic changes in occlusion.

**Intraoral photos March 2023**





Pic. 1-6. Intraoral photos

**Intraoral march April 2022**



Pic. 7. Symmetry of dentition

## Findings Initial-Diagnostics

Table №1

Special Medical Analysis			
Do you have or did ever have an illness with regard to point 1-12?			
		Yes	No
1.	Infections		X
2.	Cardo-vascular systems - varicosis		
3.	Respiratory system		X
4.	Digestive system		X
5.	Metabolic system	X	
6.	Allergies		X
7.	Urogenital problems		X
8.	Central nervous system		X
9.	Psychological problems (therapy)		X
10.	Rheumatic disease		X
11.	Hormonal disease		X
12.	Special problems		X
Main concern: Bone resorbtion around implant (increase of uric acid, cholesterol, thrombocytes, loss of weight)			



Dental History Analysis					Valuation	Yes	No
1.	Do you have problems when you chew?						X
2.	Do you have problems when you are talking?				1	X	
3.	Do you have problems in closing your teeth property?						X
4.	Are any of your teeth especially sensitive?						X
5.	Do you have problem when you open your mouth very wide?						X
6.	Do your jaw joints make noise and if so, on what side?						X
7.	Do you have pain in the area of your jaw joints?						
8.	Do you suffer from headaches?						X
9.	Do you suffer from cramps or spasm in your head, neck or throat?				1	X	
10.	Do you have in general problems with your posture?						X
	Occlusal Index				1.0		
11.	Have you ever had serious accident?						
12.	Did you have one or more oral intubations?						
13.	Have you ever had orthodontic treatment or ...						
14.	Have you had a treatment with splint?						
15.	Are you grinding or pressing with your teeth?						
16.	Do you think that treatment is necessary?						
17.	Do you think that there is a serious disorder or illness?						
18.	When the last time you had dental treatment and what was done?						
	How would you describe your psychic behavior?						
	happy	sad	calm	excited	self-controlled	lack of self-control	
19.	X						

Table №2

Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck	X		X	
2.	Atlanto-occipital region	X		X	
3.a	M.temporalis ant.				
3.b	M.temporalis med.				
3.c	M.temporalis post.				
4.a	M.masseter (superficial)	X			X
4.b	M.masseter (deep)	X			X
5.	Tuber maxillae	X			X
6.	M.pterygoideus medialis				
7.	M.mylohyideus				
8.	M.digastricus				
9.	Suprahyoidale M.				
10.	Infrahyoidale M.				
11.	Larynx				
12.	M.sterno-cleido-mastoideus				
13.	M.omohyoideus				
14.	Tongue				
15.	Comparative palpation of jaw joints*				
	a) Lateral poles, statically				
	b) Lateral poles, in rotation				
	c) Retral joint space				
	d) Lig.temporo-mandibulare	X			X

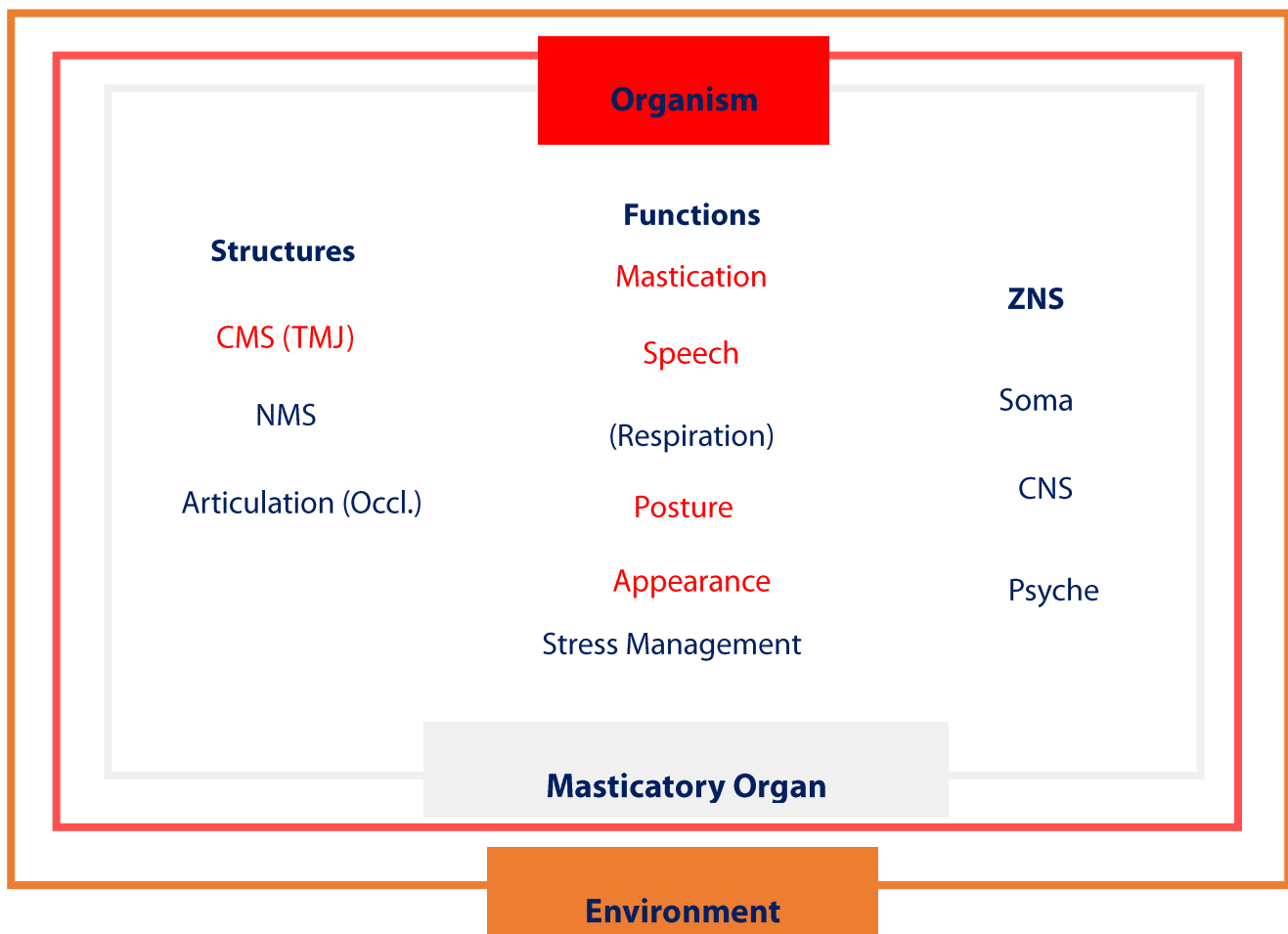
## Muscle palpation

Table №3

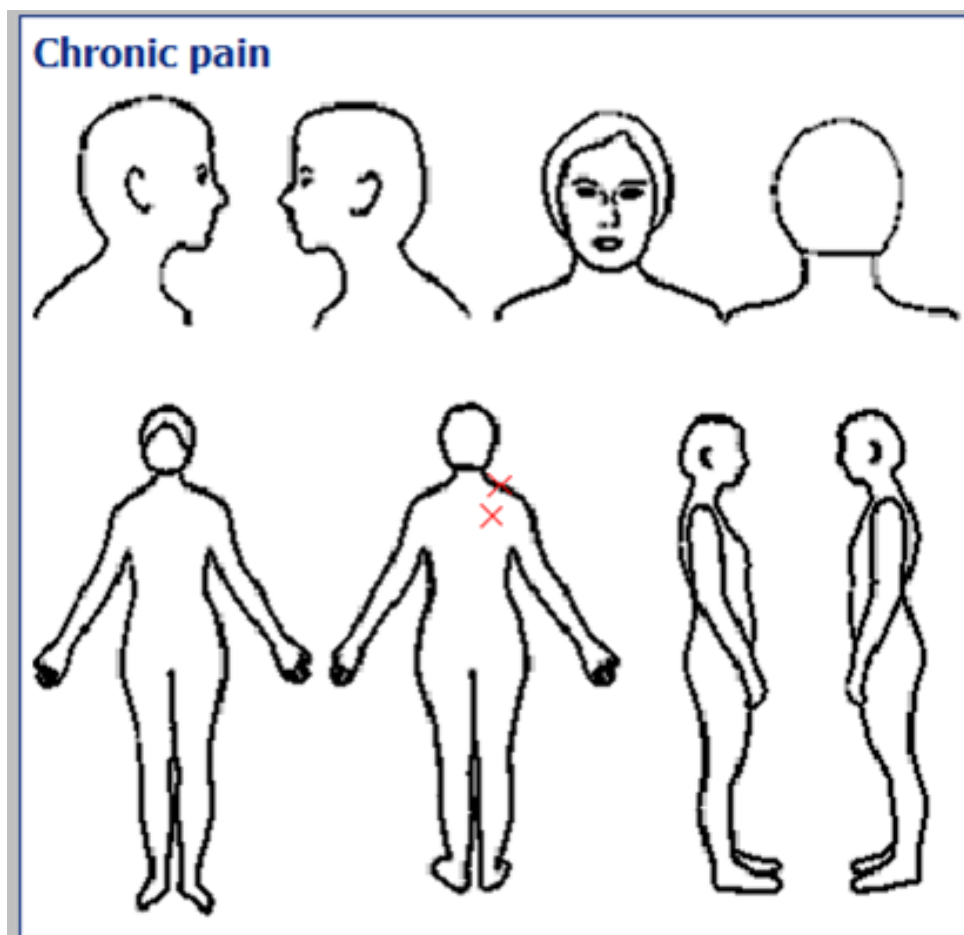
Sets of muscles:	
Muscles palpation	
Posture	1,2,7,12,13,14
Jaw-closing	3a, 3b, 4a, 4b, 5
Jaw-opening / protrusion	8, 9, 10
Retraction	3c, 8
Medio- / Laterotrraction	6, 3a, 4a
Sublingual bone position	8, 9,10,11,13
Function	7, 8,9,10,11,14
TMJ	15

## Cybernetic System of the Masticatory Organ

Table №4



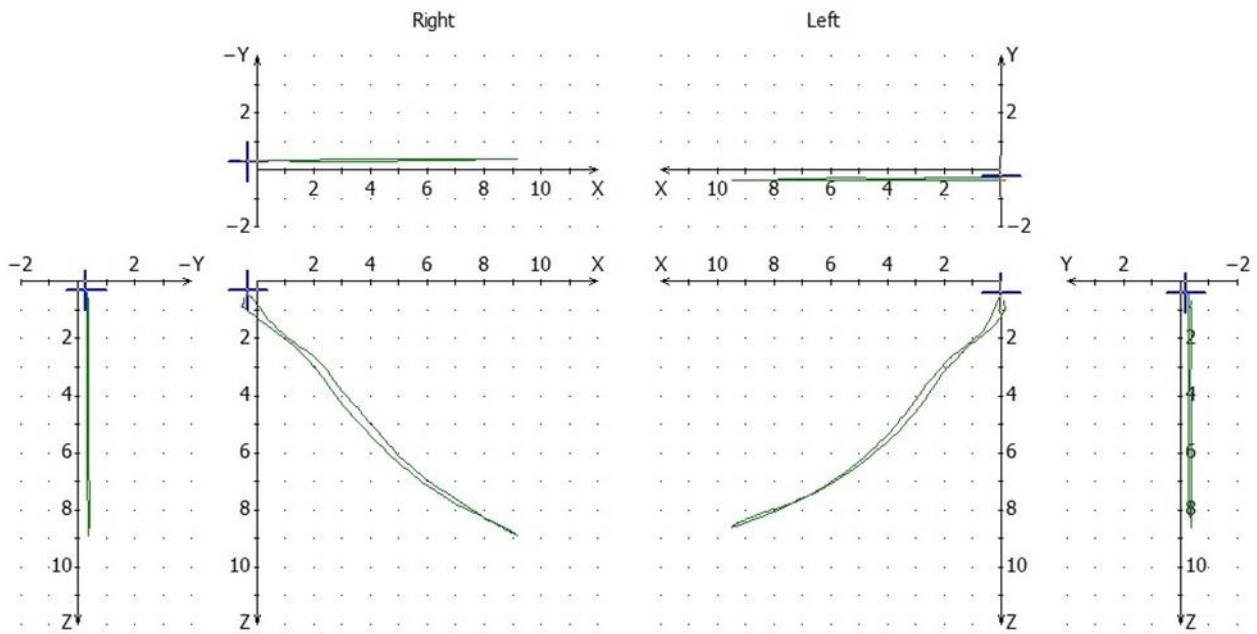
Preliminary Brainstem Nerve Analysis		
1.	N.olfactorius (analysis)	
2.	N.opticus (analysis)	
3.	N.oculo-motorius (clinical mobility)	
4.	N.trochlearis (clinical mobility)	
5.	N.trigeminus (clinical palpation and sensitiveness)	
6.	N.abducens (clinical mobility)	
7.	N.facialis (clinical mobility)	
8.	N.stato-acusticus (clinical heck of equilibrium and hearing)	
9.	N.glosso-pharyngeus (clinical and analysis)	
10.	N.vagus (analysis)	
11.	N.accessorius (clinical and analysis)	
12.	N.hypoglossus (clinical and analysis)	



Pic. 8. Chronic pain map

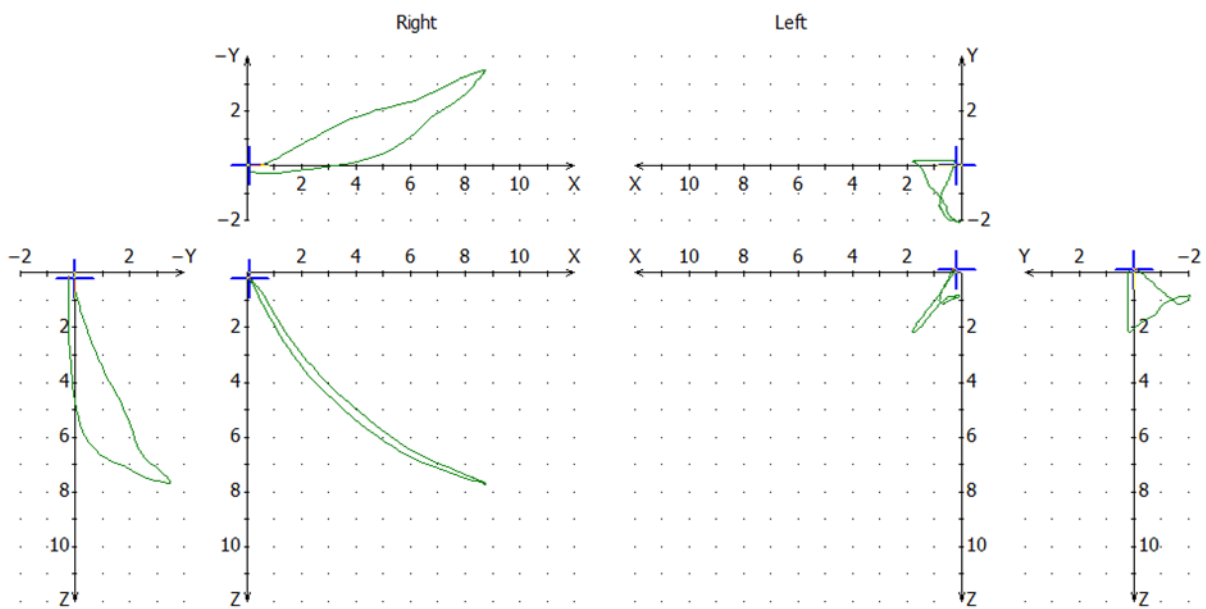
# Condylography

## Protrusion/retrusion



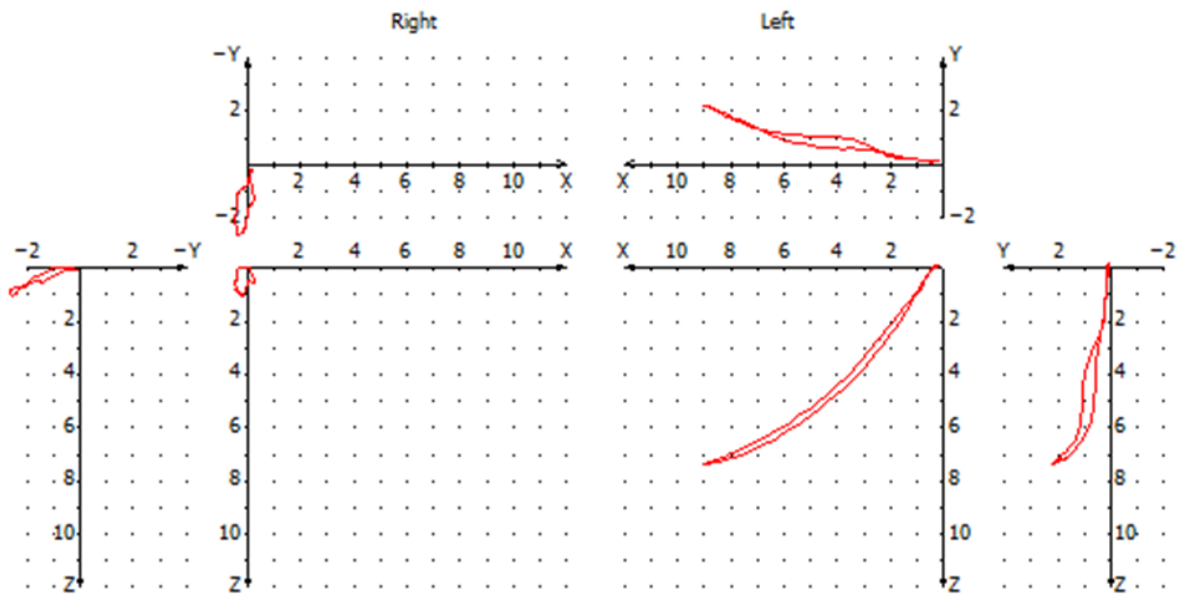
Pic. 10. Protrusion/retrusion

## Mediotrusion (right)



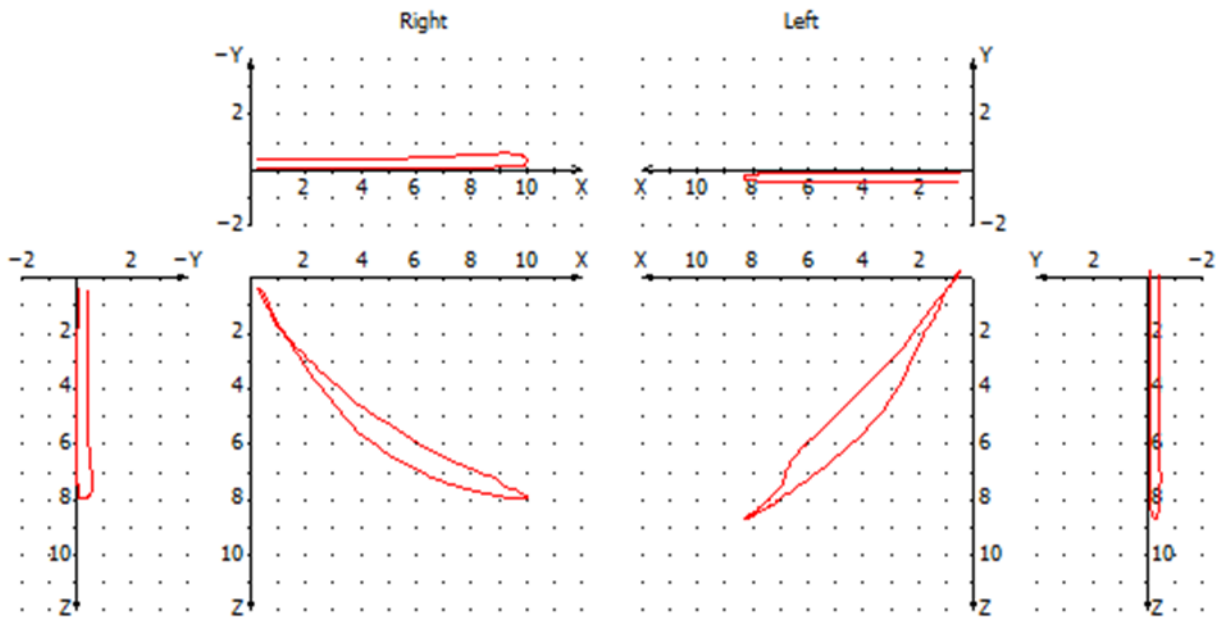
Pic. 11. Mediotrusion (right)

## Mediotrusion (left)



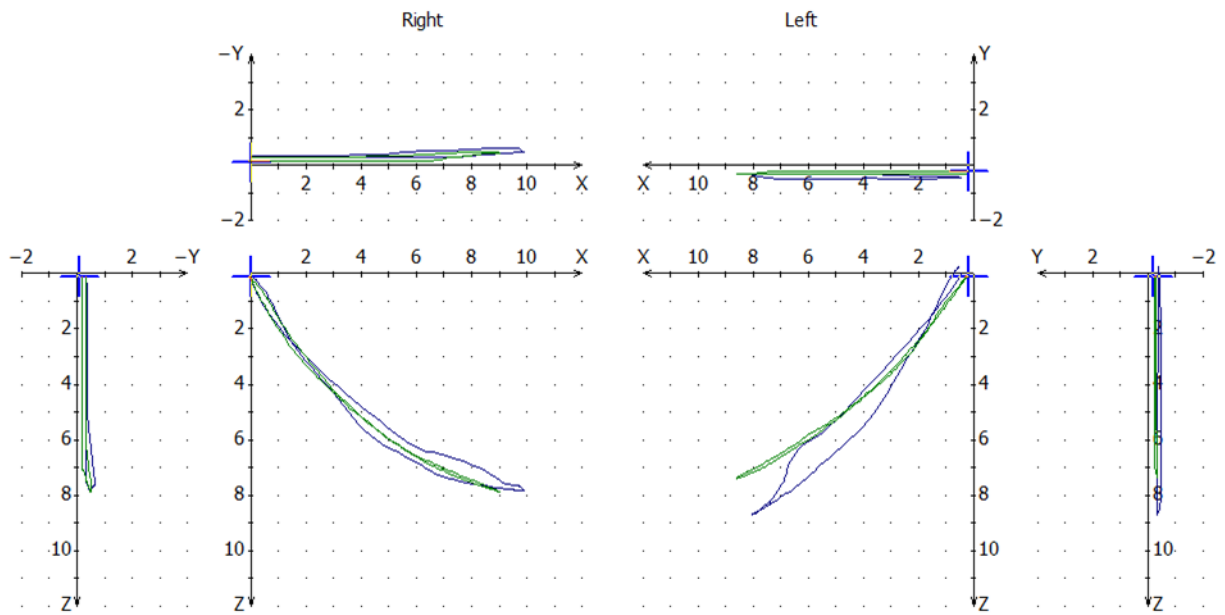
Pic. 12. Mediotrusion (left)

## Open-close



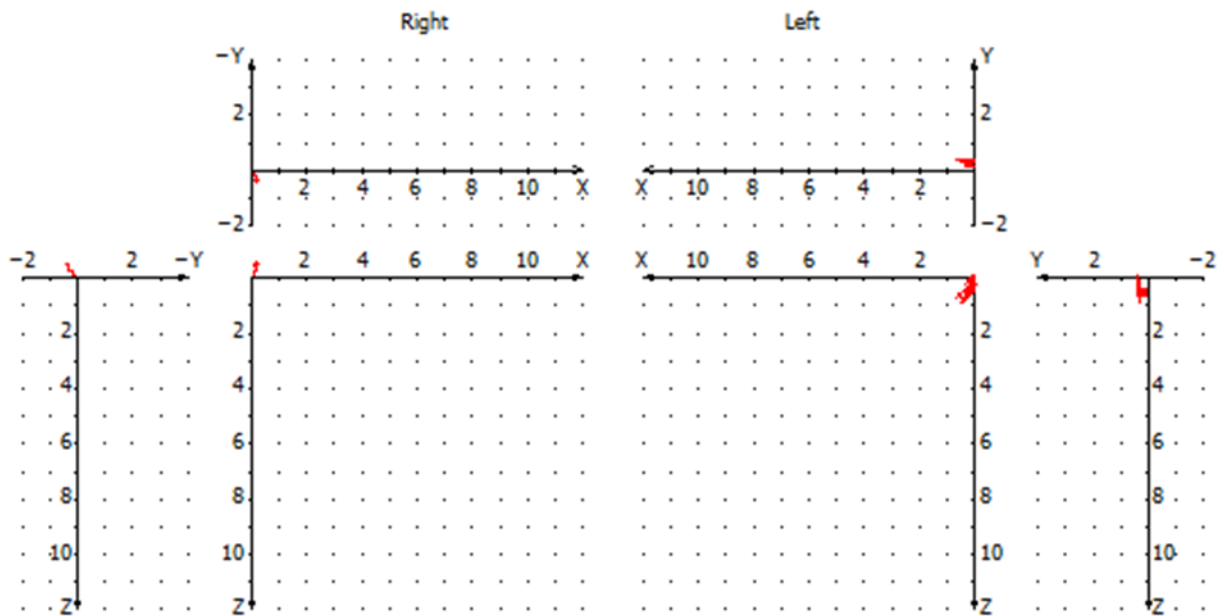
Pic. 13. Open-close

## Open and protrusion



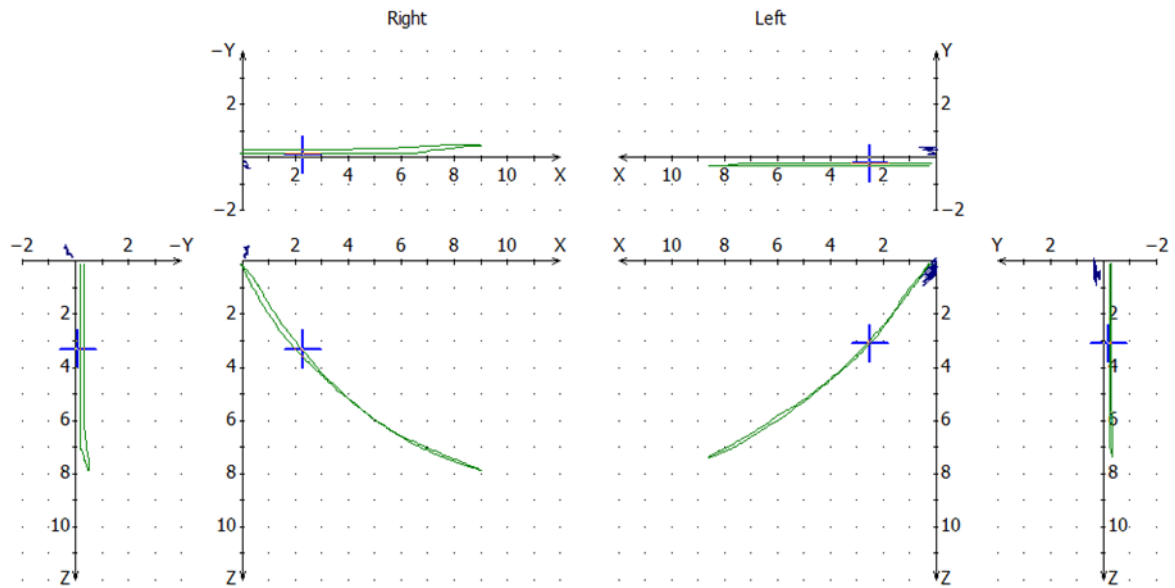
Pic. 14. Open and protrusion

## Bruxism



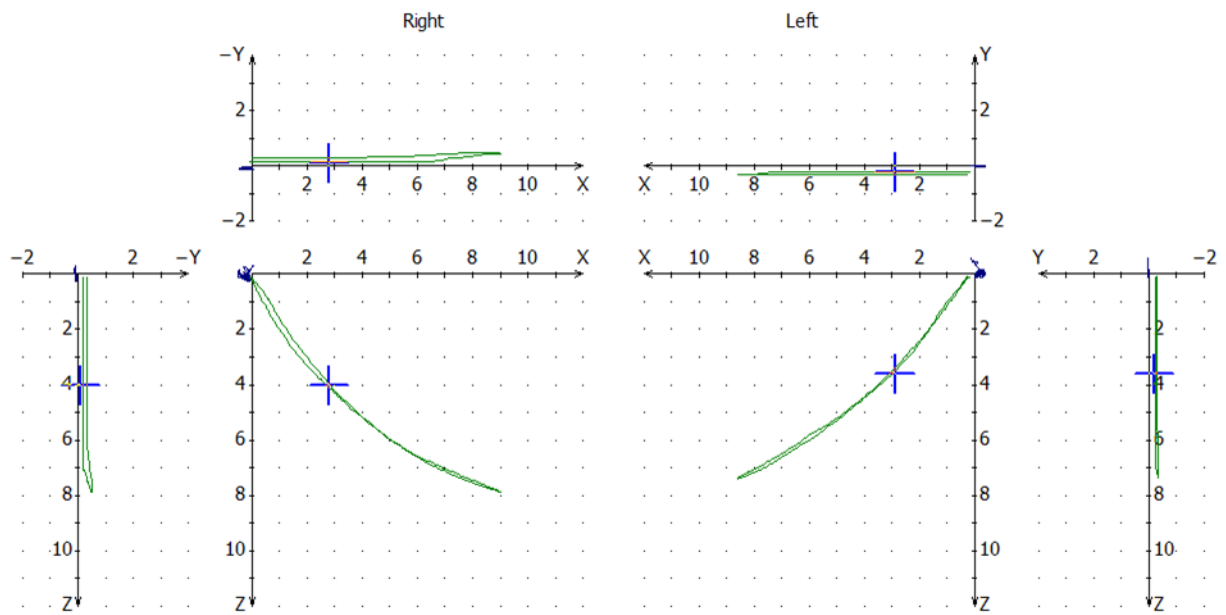
Pic. 15. Bruxism

## Bruxism and protrusion



Pic. 16. Bruxism and protrusion

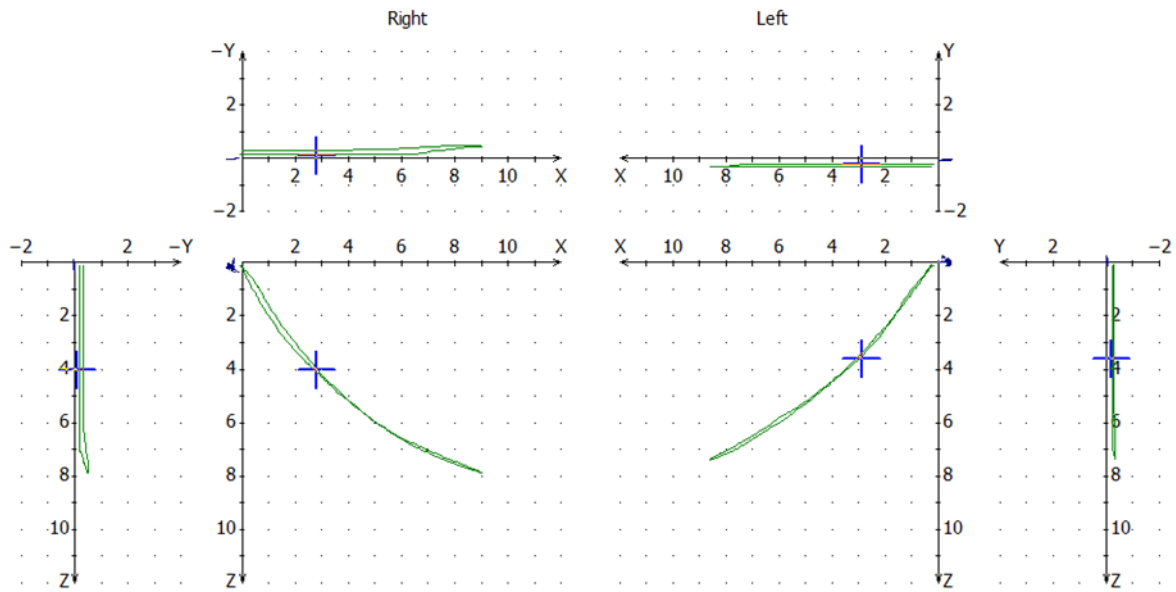
## Speech 50-60 and Protrusion



Pic. 17. Speech 50-60 and Protrusion

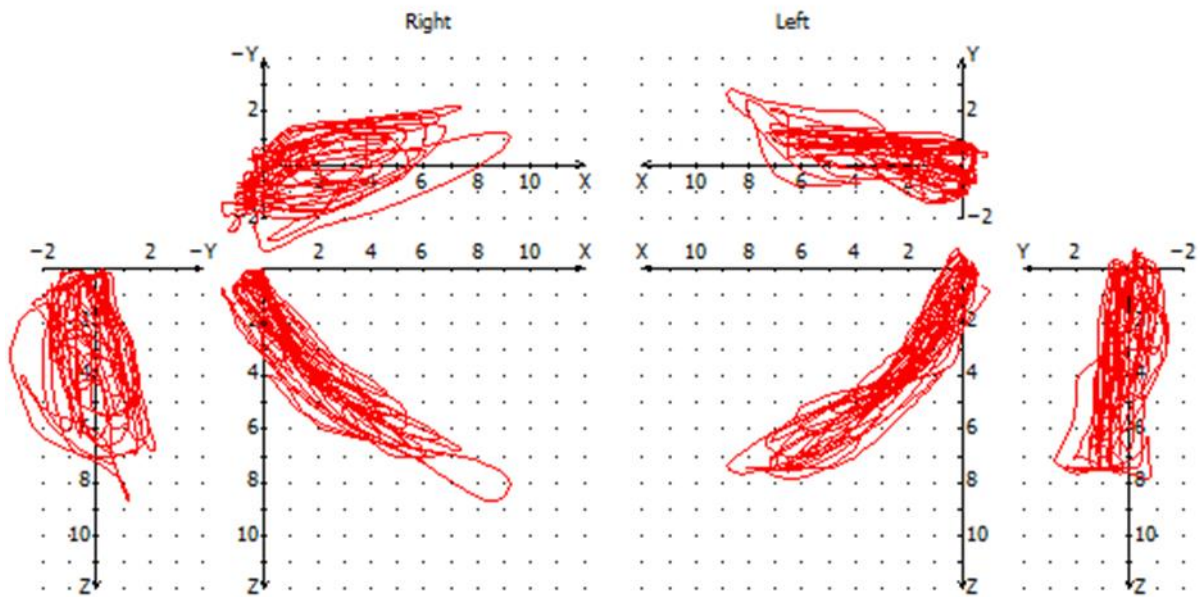


## Speech 60-70 and Protrusion



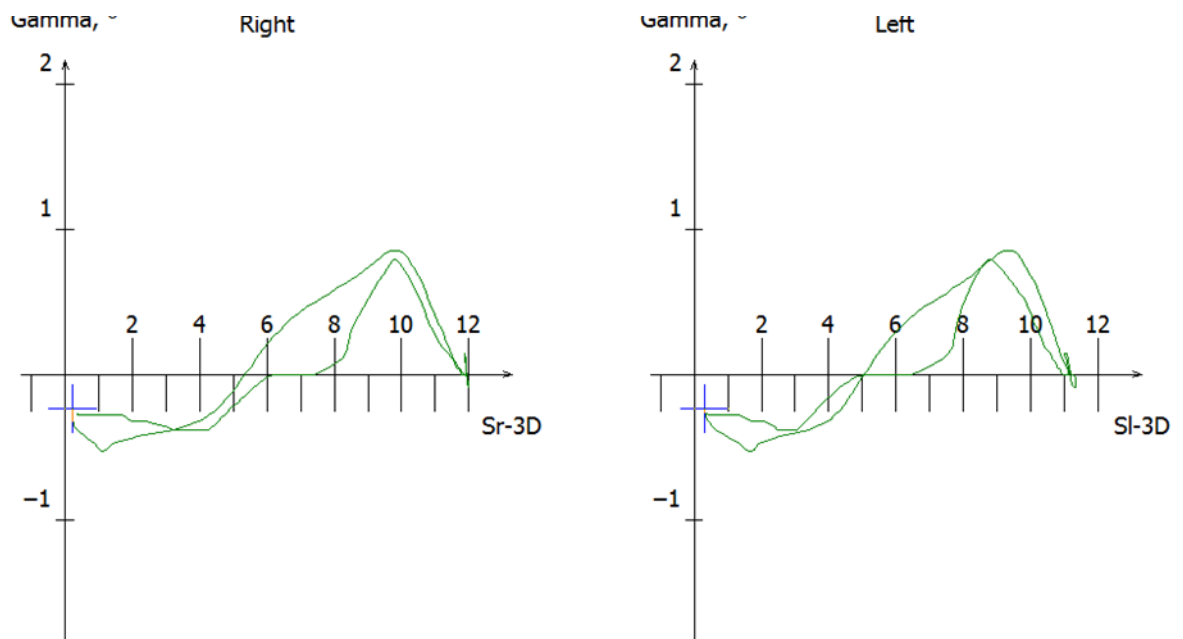
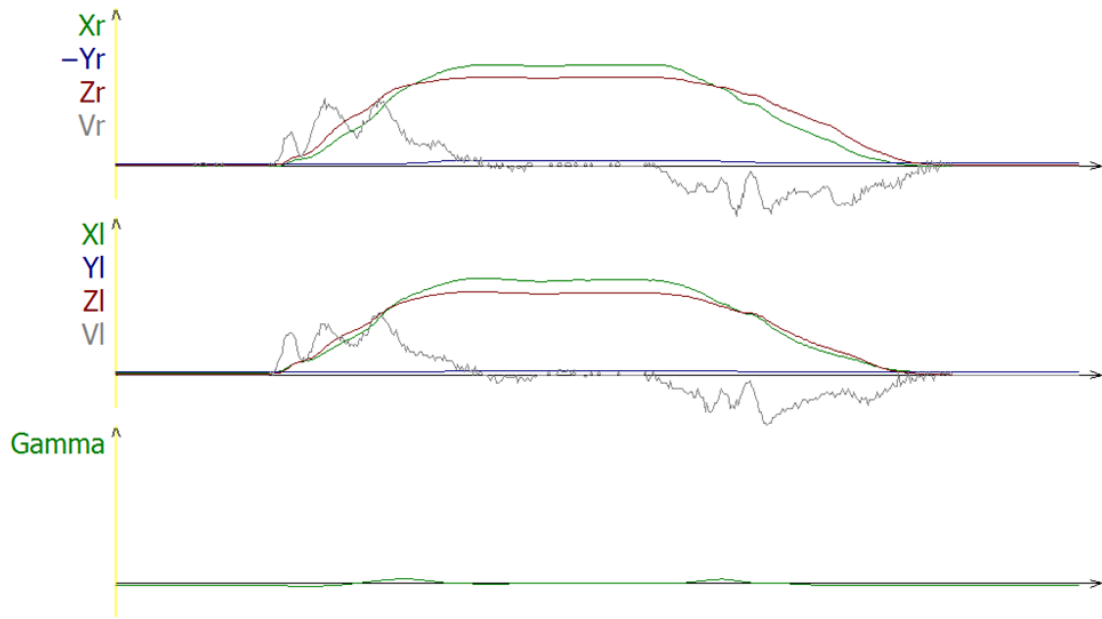
Pic. 18. Speech 60-70 and Protrusion

## Mastication



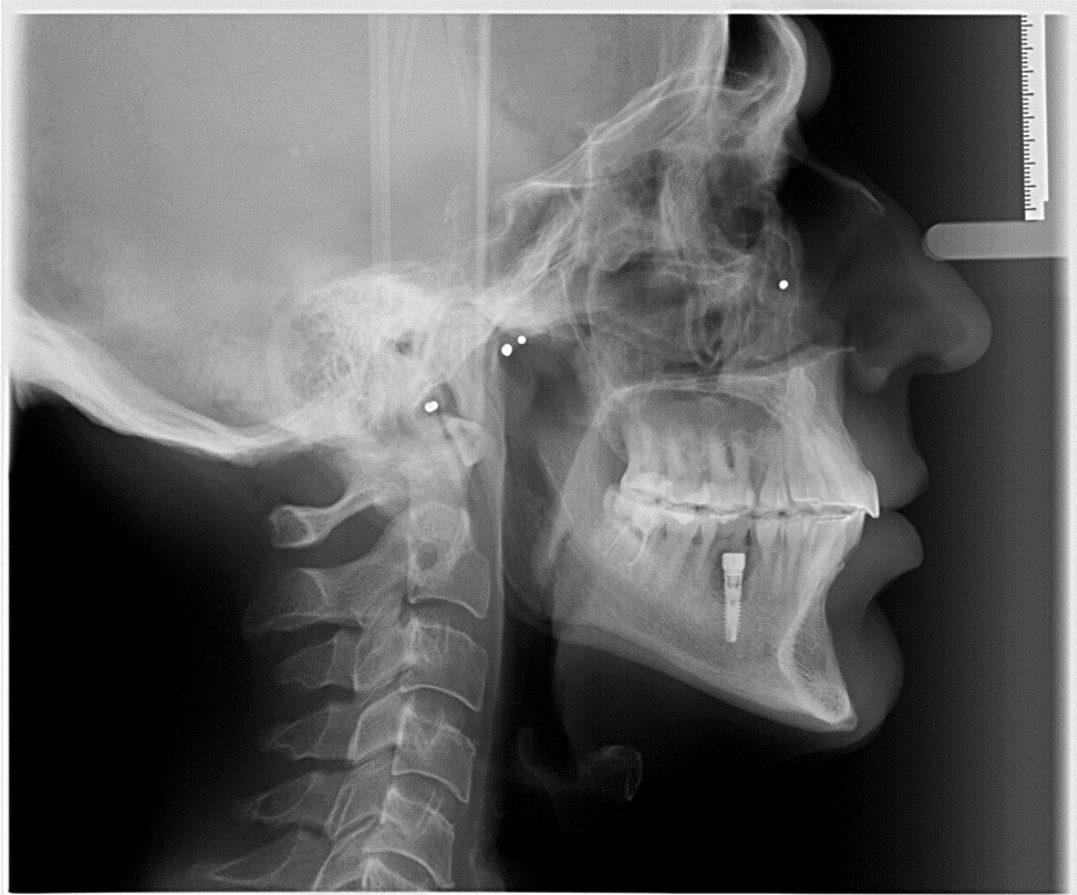
Pic. 19. Mastication

# Protrusion time Curve



Pic. 20-21. Protrusion Gamma rotation

**Lateral X ray**



Pic. 24. Lateral X ray

**Orthopantomography**

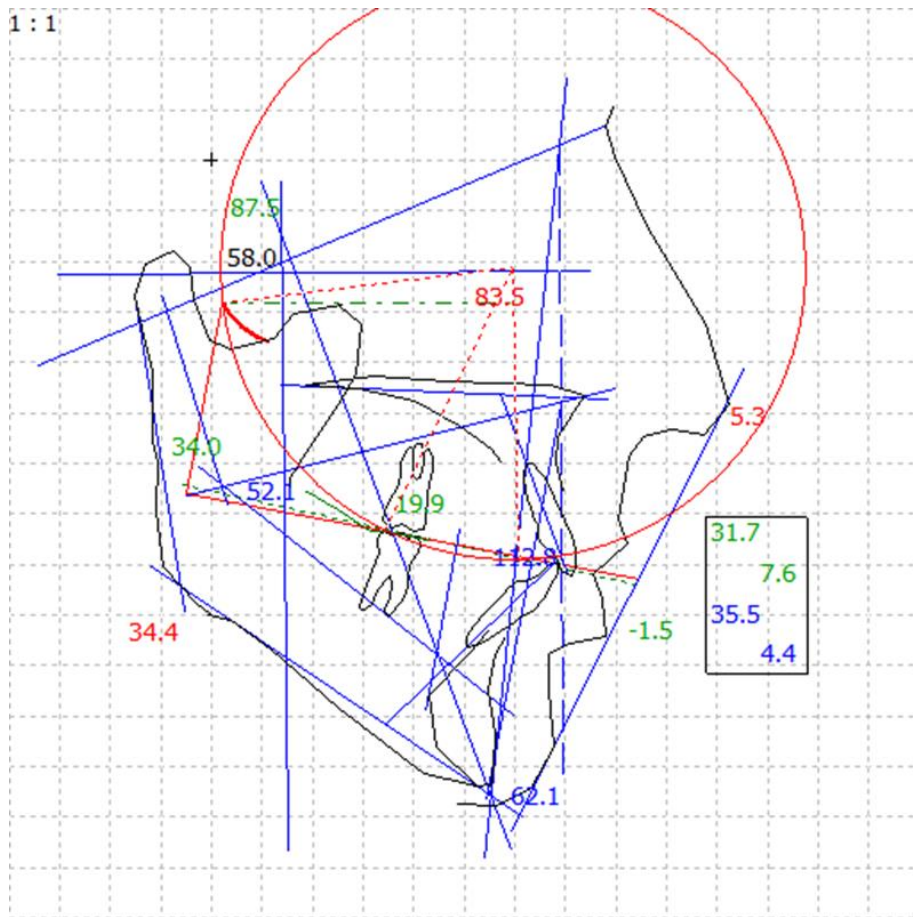


Pic. 25. OPG

## Cephalometric analyses

Table №3

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
Facial Axis	90.0°	87.4	
Facial Depth	91.5°	83.4	2-***
Mandibular Plane	21.5°	34.4	3D***
Facial Taper	68.0°	62.1	1D*
Mandibular Arc	31.2°	33.9	
Maxillary Position	65.0°	70.6	2+***
Convexity	-1.00 mm	5.3	3X***
Lower Facial Height (by R. Slavicek)	42.6°	52.1	1+*
Lower Facial Height to Point D	50.3°	58.4	1+*
Dental Measurement	Norm	Value	Trend
Interincisal Angle	130.4°	112.8	1-*
Upper Incisor Protrusion	6.8 mm	7.6	
Upper Incisor Inclination	28.5°	31.6	
Upper Incisor Vertical	mm	1.9	
Lower Incisor Protrusion	1.0 mm	4.3	1+*
Lower Incisor Inclination	21.1°	35.5	1+*
Upper Molar Position	21.0 mm	19.8	
Occlusal Plane	Norm	Value	Trend
Occlusal Plane – Axis Orbital Plane (Slavicek)	----°	10.4	
Idealized Occlusal Plane – Axis Orbital Plane	----°	13.3	
Distance Occlusal Plane – Axis (DPO)	40.9 mm	38.5	
Radius of Curve of Spee	---- mm	57.9	
Lip Embrasure	0.0 mm	0.8	
Occlusal Plane Xi Distance	-1.4 mm	-2.8	
Functional Measurement	Norm	Value	Trend
Horizontal Condylar Inclination right	----°	51.6	
Horizontal Condylar Inclination left	----°	48.5	
Horizontal Condylar Inclination	----°	50.1	
Relative Condylar Inclination	----°	39.6	
Relative Condylar Inclination 6	----°	39.5	
Relative Condylar Inclination 7	----°	17.3	
Relative Condylar Inclination 8	----°	19.1	
Anterior Guidance (S-AOP)	°		
Relative Anterior Guidance	°		
Esthetic Measurement (Lip Relation)	Norm	Value	Trend
Esthetic Plane	-2.9 mm	-1.4	



Pic. 26. Cephalometric analyses

### Interactive Verbal Analysis

**The skeletal trend of the skull is dolichofacial.**

The skeletal trend of the mandible is mesiofacial.

Skeletal class is severe II.

The maxilla is positioned strongly prognathic.

The mandible is positioned neutral.

The lower facial height is increased.

Dental class unknown.

The protrusion of the upper incisor is normal.

The inclination of the upper incisor is normal.

The protrusion of the lower incisor is increased.

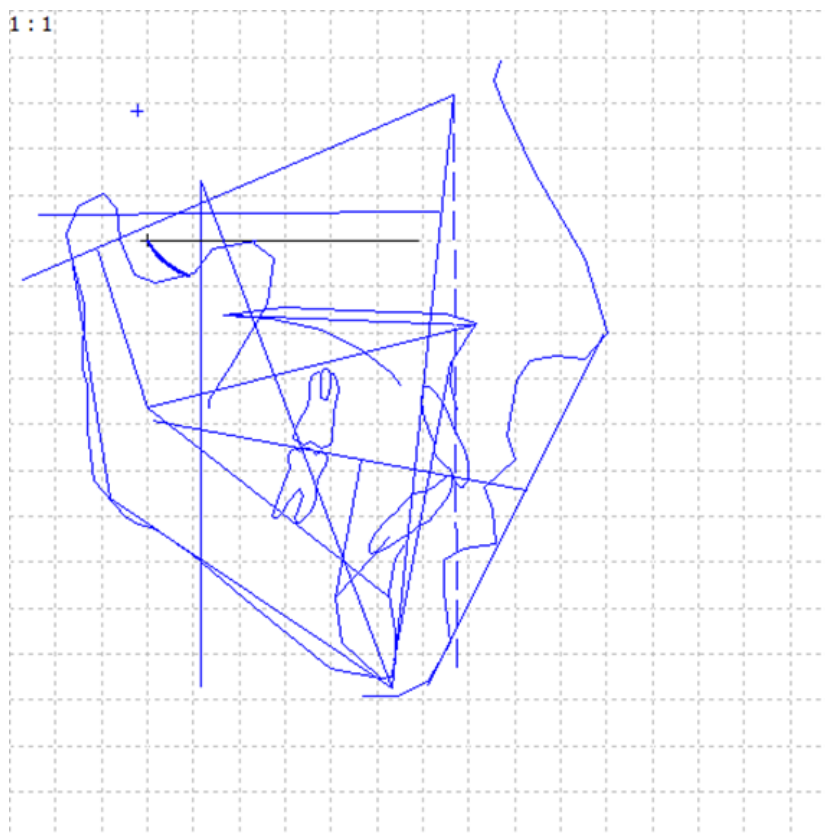
The inclination of the lower incisor is increased.

The interincisal angle is diminished.

Occlusal concept: group function.

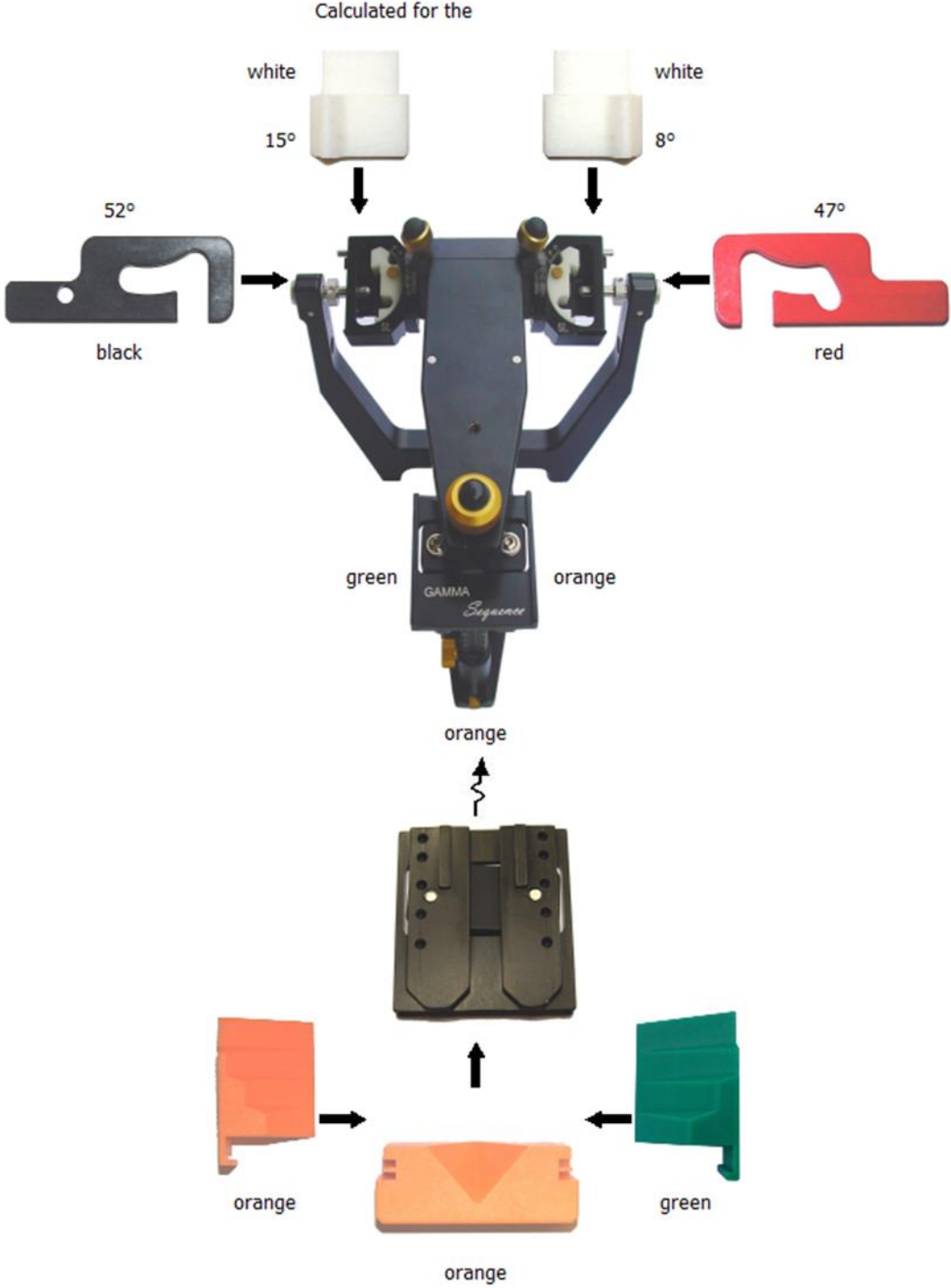
Table №4

Determinants	Norm	Value	Trend
Facial Axis	90.0°	897.4	
Facial Depth	91.5°	83.4	2-**
Facial Taper	68.0°	62.1	1D*
Mandibular Plane	21.°	34.4	3D***
Related Values	Norm	Value	Trend
Bjoerk Sum	396.0°	395.6	
Facial Length Ratio	63.5%	65.9	1+*
Y Axis to S N	67.0°	68.9	
Y Axis (Downs)	61.8°	66.7	1+*
S N to Gonion Gnathion Angle	31.6°	35.6	1+*



Pic. 27. Lateral X – ray with values

# Articulator settings



Pic.28. Articulator settings

**Casts ICP**



Pic. 29-30. Silicon keys with anterior guidance and canine control



**AG and CC**

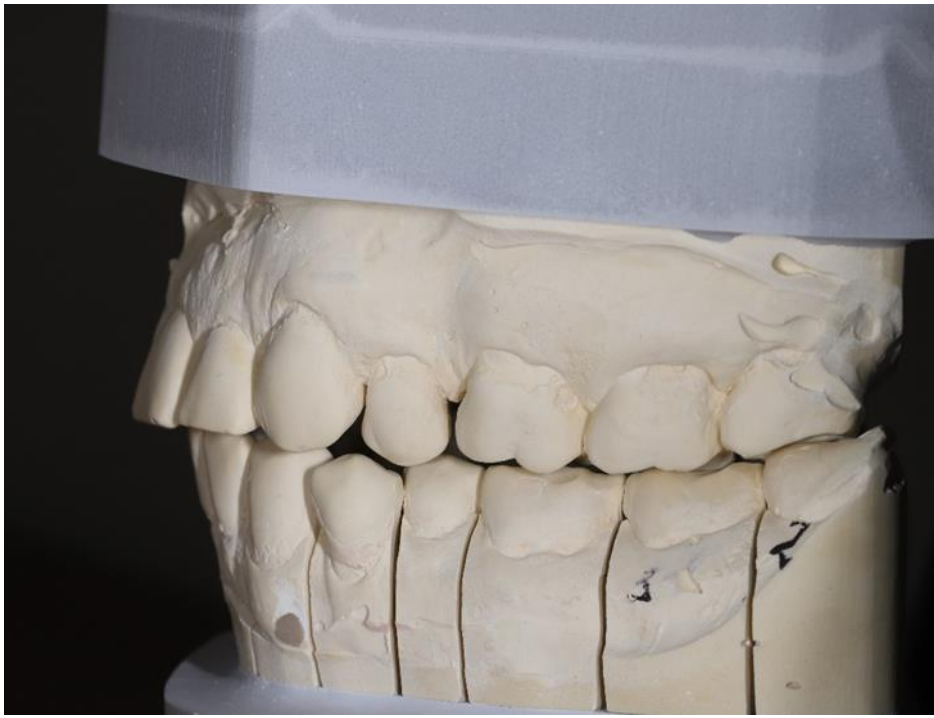


Pic. 31-33. Silicone keys with incisal (pic. 32) and canine guidance (pic. 31, 33)

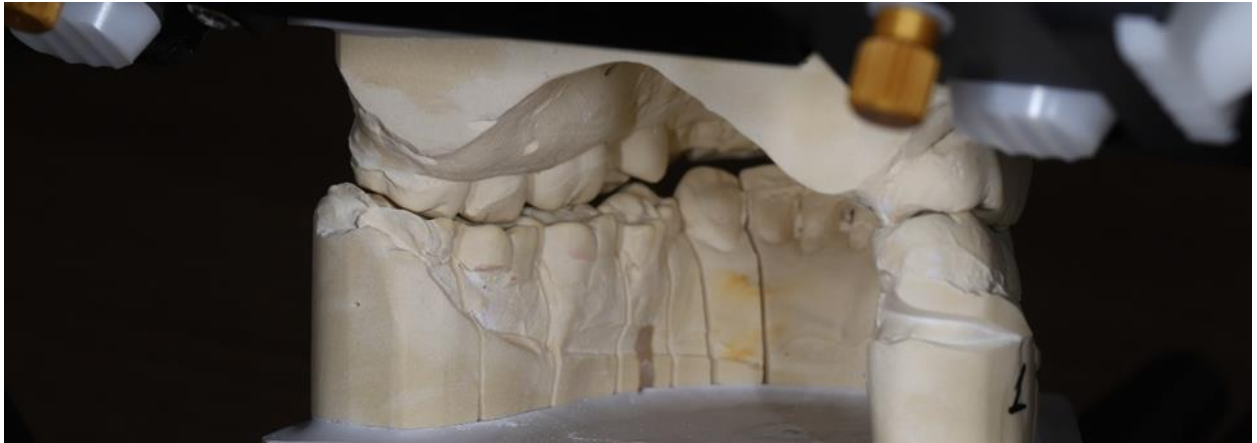
**Casts mounted in articulator in RP**



Pic. 34-36. Casts mounted in articulator in RP



Pic. 37-38. Casts in ICP position



Pic. 39-41. Casts in ICP position

**OPI R =16, OPI L= 12**



Pic. 42-43. The value of indicators OPI L и OPI R

## **Aesthetic Analyses**

- I. Facial analyses and speech
- II. Dental analyses
- III. Dento-labial analyses

## **Dento-labial analyses**

- 1. Interincisal line inclination
- 2. Smile line
- 3. Smile width
- 4. Labial corridor

## **Face Analyses**

1. Profile (convex, concave, normal)
2. Bipupillar line parallel to upper incisors incisal edge
3. Skeletal evaluation of tooth position (buccal, palatal or correct)
4. Facial proportions – lower third of the face

## **Dental Analyses**

1. Inclination of lower incisors
2. Proportion of teeth
3. Evaluation of lower incisors to lower OPI
4. Overbite, overjet
5. Incisal wear, palatal wear

Evaluation lower incisors

## **Processing the data**

### **Dental Data**

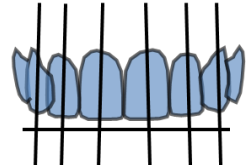
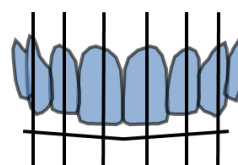
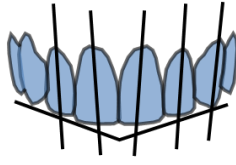
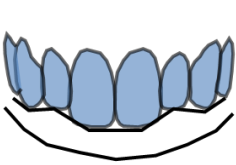
1. Definition of 1.1 tooth length and width, exposure at rest. Find desired proportion and optimize the tooth proportion at rest. 76 %-83%

### **Dento-labial processing reference lines**

1. Interpupillaru line- frontal uppers incisal edge.
2. Incisal edge position.
3. Canine evaluation.
4. Incisal profile.
5. Phonetic F-S sound: buccalized, lingualized or vermillion.
6. Labial corridoe in mm.
7. How much distance from Vermillion.

8. Premolars and molars position.

**Morpho psychology - Visagism**



<b>Melancholic</b>	<b>Sanguine</b>	<b>Choleric</b>	<b>Phlegmatic</b>
<b>Sensible</b>	<b>Dynamic</b>	<b>Strong</b>	<b>Calm</b>
<b>Oval</b>	<b>Triangular</b>	<b>Rectangular</b>	<b>Square</b>
Organized	Extroverted	Determined	Diplomatic
Perfectionist	Communicative	Objective	Pacific
Artistic	Enthusiastic	Explosive	Mystic
Abstractive	Dynamic	Intense	Spiritualized
Timid	Impulsive	Entrepreneur	Conformist
Reserved		Passionate	Discreet

## **List of problems**

- Upper and lower arches discrepancy
- No anterior guidance and canine control
- Speech problems
- Chewing problems
- Esthetic problems

## **Diagnosis**

After orthodontic treatment.

Cusp to cusp occlusion

## **Treatment objectives**

- Posterior support
- Canine guidance and anterior guidance
- Sagittal and transversal correction of dental arches
- Change OPI and angle of disocclusion

## **Treatment plan**

- Wax-up
- Long time temporaries
- Final restorations






## Basic and relative criteria for teeth evaluating



- Occlusion;
- Tooth axis;
- Emergence profile topgallant;
- Gingiva level;
- Inter-proximal contact level;
- Tooth relative size;
- Tooth shape basic characteristics;
- Basic characteristics;
- Surface texture;
- Color;
- Incisal edge configuration;
- Lower lip line;
- Smile symmetry.

# Aesthetic analysis

**Table 8**

ESTHETIC INFORMATION	
HIGHLY DEMANDING PATIENT	Yes
ALIGNMENT	No set
APPEARANCE	Young
TOOTH TYPE	Ovoid
MACRO TEXTURE	Slight
COLOR CHARACTERIZATION	Wide and uniform
SMILE LINE	Low smile
The visibility off the anterior teeth suggest	
LABIAL CORRIDOR	Absent
Increase the buccal volume of the posterior	
SMILE WIDTH	6-8
	
INTERINCISAL LINE INCLINATION	Right inclination
Missing information.	


**Table 9**

COLOR SELECTION	
SHADE GUIDE	
DESIRED COLOR OF THE RESTORATION	A1
Value	Value High  Low
ABUTMENT COLOR	A3
	


**Table 10**

FUNCTIONAL INFORMATION	
ORIGINAL OVERBITE	2.5 mm
FINAL OVERBITE	3.6 mm
ORIGINAL OVERJET	2.0 mm
FINAL OVERJET	1.5 mm
VDO ALTERATION	0.0 mm
ARTICULATOR	Fully adjustable
IMMEDIATE BENNETT	Custom
BENNETT ANGLE	Custom
CONDYLAR EMINANCE ANGLE	Custom
DISOCCLUSION	Group function
FACEBOW	Arbitrary

**Table 11**

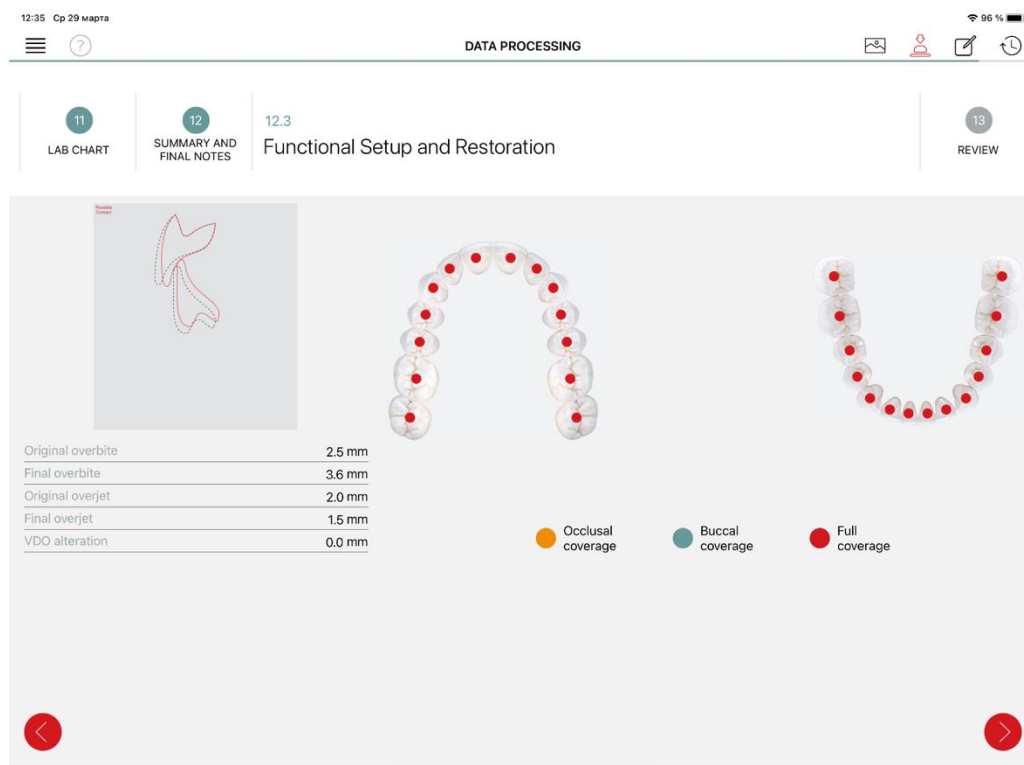
BUCCO-LINGUAL CHANGES	
	
24	1.4 mm

**Table 12**

DIMENSIONAL CHANGES	
	
ORIGINAL LENGTH OF THE REFERENCE CENTRAL INCISOR	10.0 mm
change length	+1.0 mm
ORIGINAL WIDTH OF THE REFERENCE CENTRAL INCISOR	8.5 mm
change width	0.0 mm
Exposure at rest	7.0 mm



ORIGINAL LENGTH OF THE REFERENCE CENTRAL INCISOR	10 mm
change length	0.0 mm
ORIGINAL WIDTH OF THE REFERENCE CENTRAL INCISOR	5.00 mm
change width	0 mm
Exposure at rest	4.0 mm



### Esthetic:

- Smile line – low smile.
- Labial corridor – absent.
- Smile width – 6-8.
- Interincisal line inclination – right inclination.
- Interincisal line vs upper lip philtrum – deviated left.

- Occlusal Plane Orientation – left inclination.
- Incisal Edge Position – convex.
- Overbite – 2 mm.
- Overjet – 2 mm.
- Inclination of the lower incisors – normal inclination.
- Phonetic – “F” sound – vermilion.

<b>Definition of the upper teeth size</b>	
11 lengthen/shorten	0.0 mm
12 lengthen/shorten	0.0 mm
13 lengthen/shorten	<b>1.5 mm</b>
21 lengthen/shorten	<b>1.0 mm</b>
22 lengthen/shorten	<b>1.0 mm</b>
23 lengthen/shorten	<b>2.0 mm</b>
11 widen/narrow	<b>-0.5 mm</b>
12 widen/narrow	0.0 mm
13 widen/narrow	0.0 mm
21 widen/narrow	0.0 mm
22 widen/narrow	0.0 mm
23 widen/narrow	0.0 mm
<b>Buccal-labial teeth movement</b>	
11 lingual	<b>1.4 mm</b>
12 buccal/lingual	0.0 mm
13 buccal/lingual	0.0 mm
21 buccal/lingual	0.0 mm
22 buccal/lingual	0.0 mm
23 buccal/lingual	0.0 mm

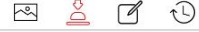
<b>Definition of the lower teeth size</b>	
41 lengthen/shorten	0.0 mm
42 lengthen/shorten	0.0 mm
43 lengthen/shorten	0.0 mm
31 lengthen/shorten	0.0 mm
32 lengthen/shorten	0.0 mm
33 lengthen/shorten	0.0 mm
41 widen/narrow	0.0 mm
42 widen/narrow	0.0 mm
43 widen/narrow	0.0 mm
31 widen/narrow	0.0 mm
32 widen/narrow	0.0 mm
33 widen/narrow	0.0 mm
<b>Buccal-labial teeth movement</b>	
41 buccal/lingual	0.0 mm
42 buccal/lingual	0.0 mm
43 buccal/lingual	0.0 mm
31 buccal/lingual	0.0 mm
32 buccal/lingual	0.0 mm
23 buccal/lingual	0.0 mm

Laboratory work order:

- Diagnostic wax-up
- Provisional prosthesis
- Final restorations

Functional aspects:

- Articulator – fully adjustable.
- Disocclusion – canine control

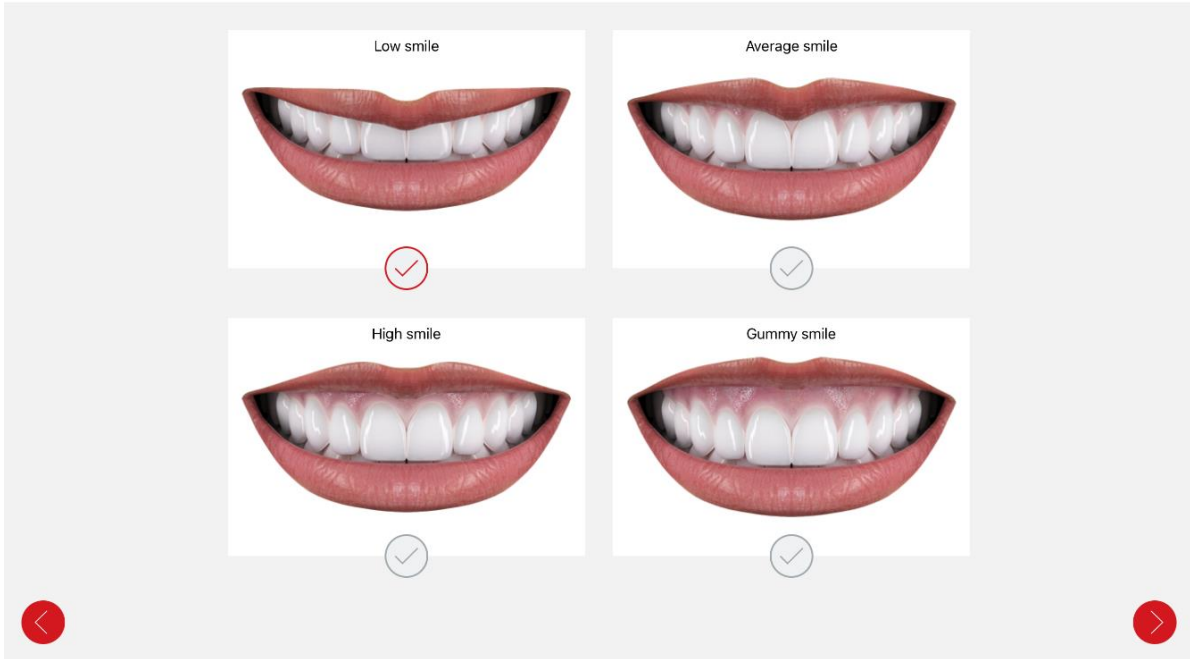


3 DENTO-LABIAL ANALYSIS

3.1 Smile line

4 DENTAL ANALYSIS

5 OPTIONAL DATA

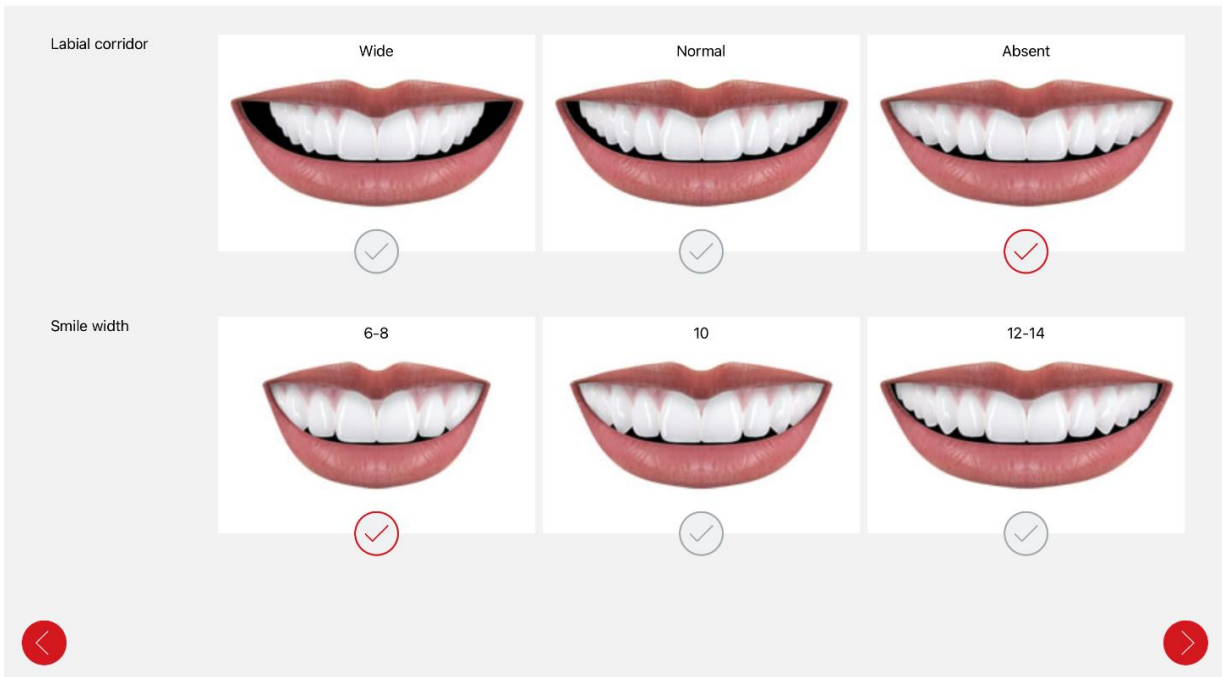


3 DENTO-LABIAL ANALYSIS

3.2 Labial corridor - Smile width

4 DENTAL ANALYSIS

5 OPTIONAL DATA





3 DENTO-LABIAL ANALYSIS

3.3 Interincisal line evaluation

4 DENTAL ANALYSIS

5 OPTIONAL DATA

Interincisal line inclination

Right inclination	Vertical	Left inclination
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Interincisal line vs upper lip philtrum

Deviated right	Centered	Deviated left
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Within 4 mm       > 4 mm



3 DENTO-LABIAL ANALYSIS

3.4 Occlusal plane orientation & Incisal edge position

4 DENTAL ANALYSIS

5 OPTIONAL DATA

Occlusal Plane Orientation

Right Inclination	Left Inclination	Ideal
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Incisal Edge Position

Flat	Reverse	Convex
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>




4 DENTAL ANALYSIS

### 4.4 Anterior occlusal relationship

5 OPTIONAL DATA

6 FACE DATA PROCESSING



overbite *	2.5 mm	⊖	⊕
overjet *	2.0 mm	⊖	⊕
Anterior Dental Contact	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<input checked="" type="checkbox"/> Incisal Wear	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
<input checked="" type="checkbox"/> Palatal Wear	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	

4 DENTAL ANALYSIS

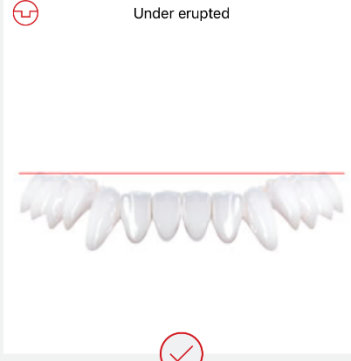
### 4.7 Evaluation of the lower incisors

5 OPTIONAL DATA

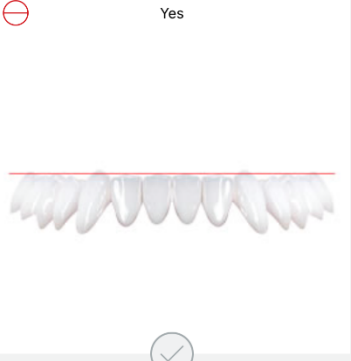
6 FACE DATA PROCESSING

Does the lower incisal plane match the posterior occlusal plane?

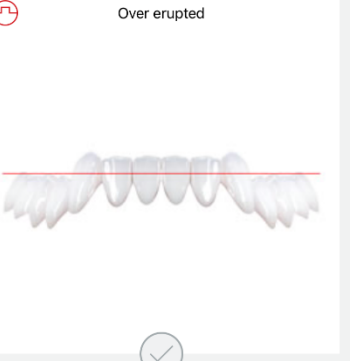
Under erupted



Yes



Over erupted



Value (mm)

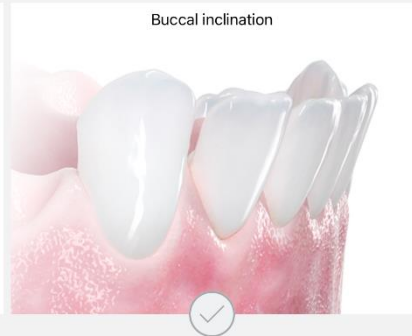
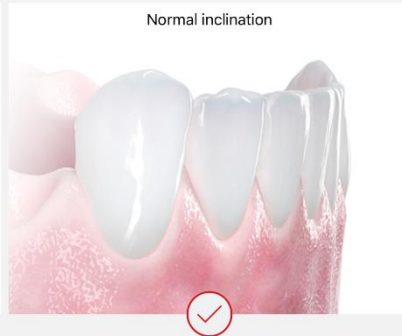
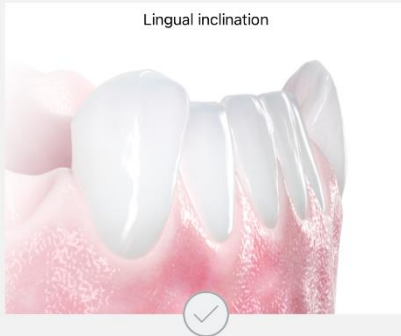
-5.0 -4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0 +0.5 +1.0 +1.5 +2.0 +2.5 +3.0 +3.5 +4.0 +4.5 +5.0

4 DENTAL ANALYSIS

4.8 Inclination of the lower incisors

5 OPTIONAL DATA

6 FACE DATA PROCESSING

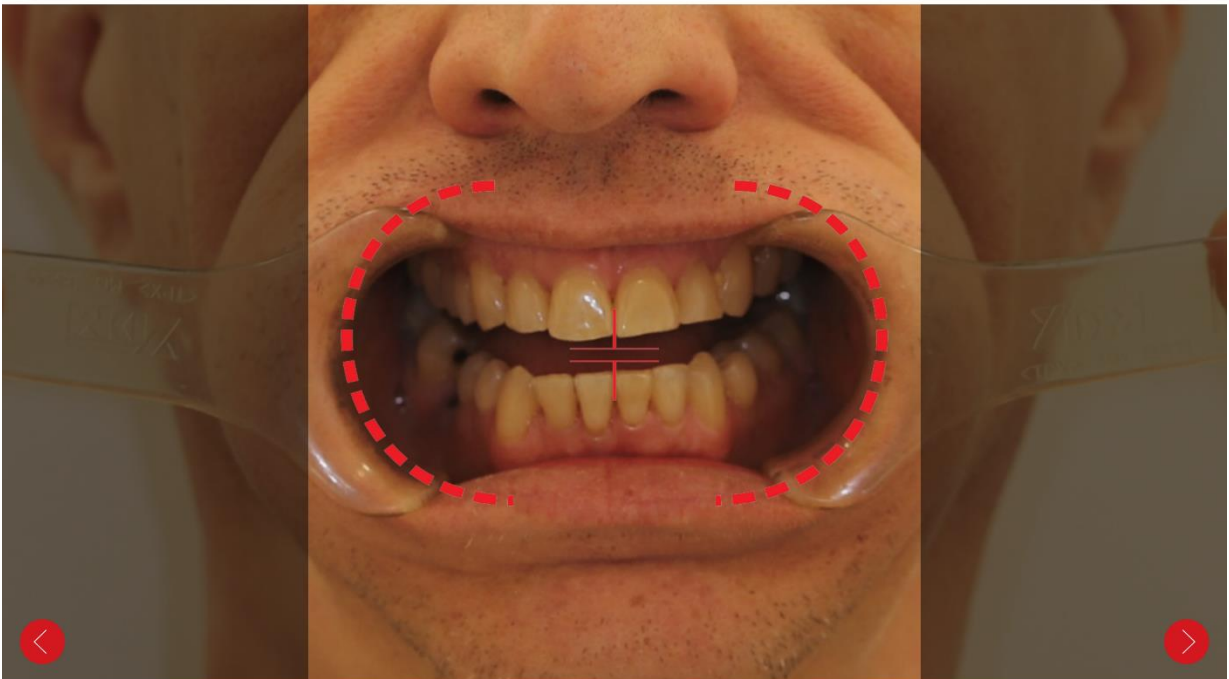


7 DENTO-LABIAL PROCESSING

7.2 Zoom and crop the upper and lower arch

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION

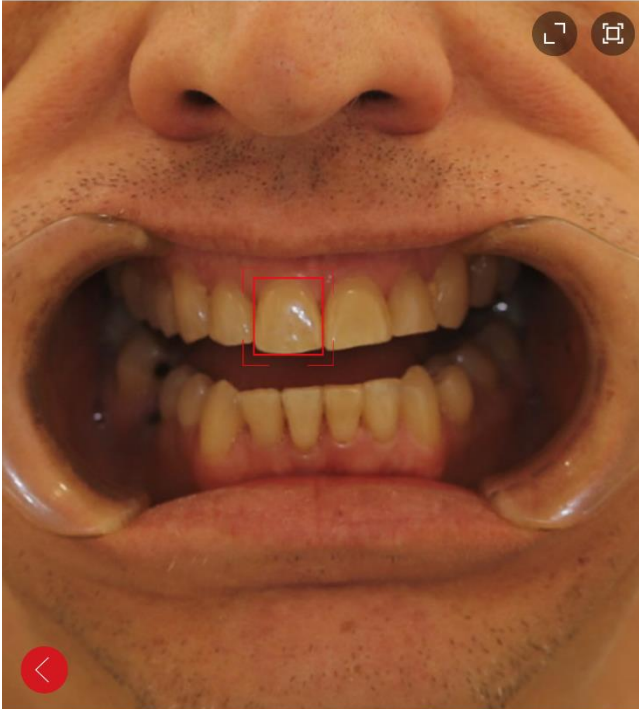


7 DENTAL DATA PROCESSING

7.3 Definition of the central incisor length

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION



tooth	1.1
length	10.0 mm
width	9.0 mm
exposure at rest	7.0 mm

Ratio %



This is the ratio between the length and width of the reference incisor as per the initial conditions. In the following steps it will be possible to modify these values so to alter the ratio.

7 DENTAL DATA PROCESSING

7.4 Definition of the central incisor width

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION



tooth	1.1
length	10.0 mm
width	8.5 mm <span>−</span> <span>+</span>
exposure at rest	7.0 mm

Ratio %



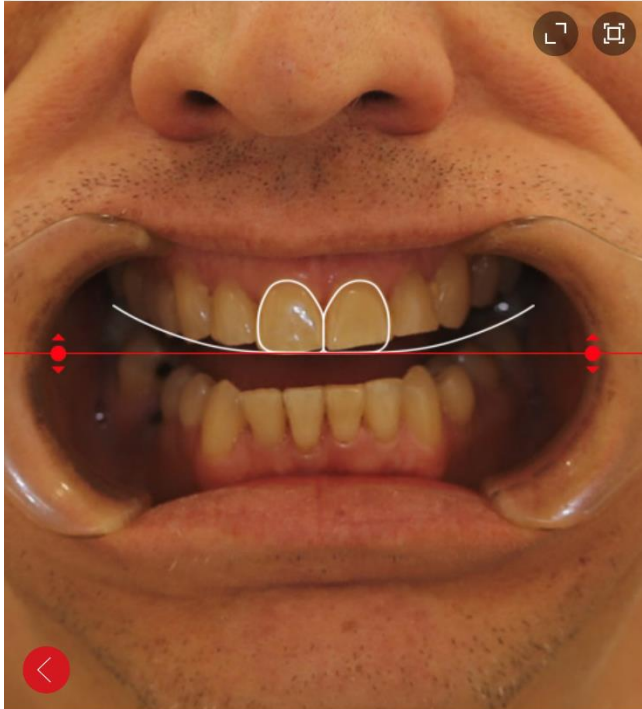
In the following step the tooth length will be modified to reach ideal tooth proportions and optimize the value of tooth exposure at rest.

7 DENTAL DATA PROCESSING

7.7 Canine evaluation

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION

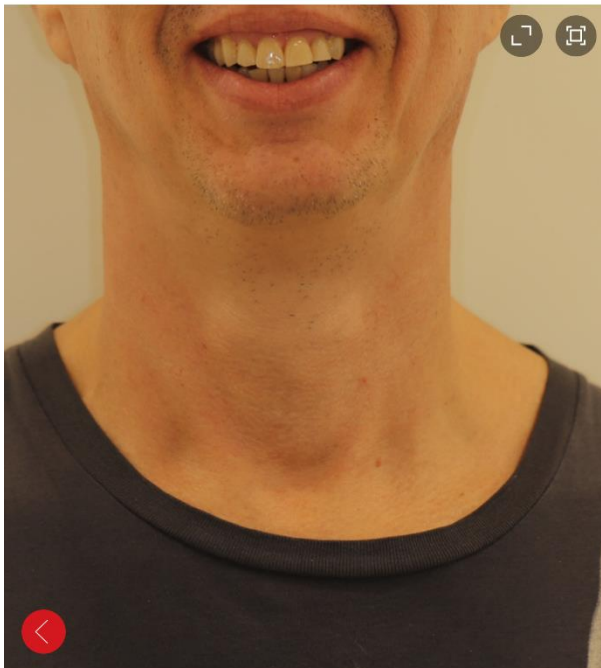


7 DENTAL DATA PROCESSING

7.9 Labial corridor

8 DENTO-LABIAL PROCESSING

9 TREATMENT PLAN FORMULATION



tooth 1.4	0.0 mm	-	+
tooth 1.5	0.0 mm	-	+
tooth 1.6	0.0 mm	-	+
tooth 1.7	0.0 mm	-	+
tooth 2.4	0.0 mm	-	+
tooth 2.5	0.0 mm	-	+
tooth 2.6	0.0 mm	-	+
tooth 2.7	0.0 mm	-	+





10 TEETH ARRANGEMENT

10.1 Definition of the upper teeth size

11 LAB CHART

12 SUMMARY AND FINAL NOTES



11 lengthen/shorten	0.0 mm	11 widen/narrow	-0.5 mm
12 lengthen/shorten	0.0 mm	12 widen/narrow	0.0 mm
13 lengthen/shorten	1.5 mm	13 widen/narrow	0.0 mm
21 lengthen/shorten	1 mm	21 widen/narrow	0.0 mm
22 lengthen/shorten	1 mm	22 widen/narrow	0.0 mm
23 lengthen/shorten	2.0 mm	23 widen/narrow	0.0 mm



11 LAB CHART

11.8 Desired color of the restoration

12 SUMMARY AND FINAL NOTES

13 REVIEW

Initial tooth color: Not selected

Initial value:

Vitapan

3D Master

Ivoclar

other

- 01
- 1A
- 2A
- 1C
- 2B
- 1D
- 1E
- 2C
- 3A
- 5B
- 2E
- 3E
- 4A

Value High     Low

Notes

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11

LAB CHART

11.9

Abutment colour

12

SUMMARY AND FINAL NOTES

13

REVIEW

ABUTMENT COLOUR

1 2 3 4 5 6 7 8

clear tooth

The interface displays 12 teeth arranged in two rows of six. Each tooth has a small orange circle with the number '3' on its base. Below the teeth is a legend titled 'ABUTMENT COLOUR' with eight color swatches numbered 1 to 8. Swatch 3 is selected. To the right of the legend are two icons labeled 'clear tooth'.

# Periodontal screening record

## Пародонтальная карта

Дата 29.03.2013

Фамилия МН  ИМФ

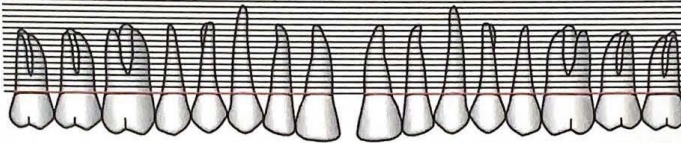
Имя  Да

Дата рождения 26.10.1973

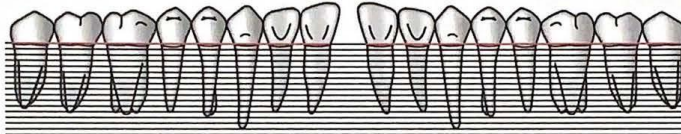
Первичное обследование  Контрольное обследование Врач

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Подвижность	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Имплантат																
Фуркация																
Кровоточивость при зондировании																
Зубные отложения	2 3 4	2 2 2	3 3 3						2 2 2	3 2 2	0 0 0				2 5 2	3 3 3
Десневой край	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Глубина зондирования	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0

Вестибулярно



Оралью

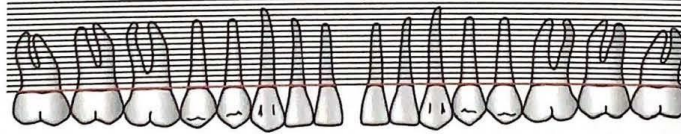


Десневой край	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Глубина зондирования	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Зубные отложения	5 3 3	4 4 2	5 4 2	3 3 3	3 3 3	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	3 3 3	3 3 3	2 2 2	3 3 3	3 3 3
Кровоточивость при зондировании																
Фуркация																
Примечания																

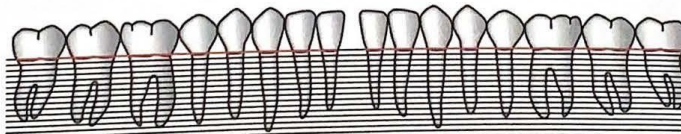
Сред. глубина зондиров. = 0 мм Сред. высота прикреп. = 0 мм 0% Зубные отложения 0% Кровот. при зондир.

Примечания																
Фуркация																
Кровоточивость при зондировании																
Зубные отложения	5 3 3	3 3 3	2 2 2	2 2 2	2 2 2	2 2 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	3 3 3	3 3 3	2 2 2	3 3 3	3 3 3
Десневой край	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Глубина зондирования	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0

Оралью



Вестибулярно



533

Десневой край	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Глубина зондирования	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Зубные отложения	5 3 3	4 4 2		2 2 2	2 2 2	2 2 2	1 1 1	1 1 1	2 2 2	2 2 2	2 2 2	3 3 3	4 4 4	3 4 5	4 5 5	5 5 5
Кровоточивость при зондировании																
Фуркация																
Имплантат	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Подвижность	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38



## **List of problems**

- No anterior guidance and canine control.
- Esthetic problems.
- Speech problems
- Mastication problems

## **Diagnosis**

Periimplantitis

Paradontitis

Malocclusion

Avoidance pattern in chewing

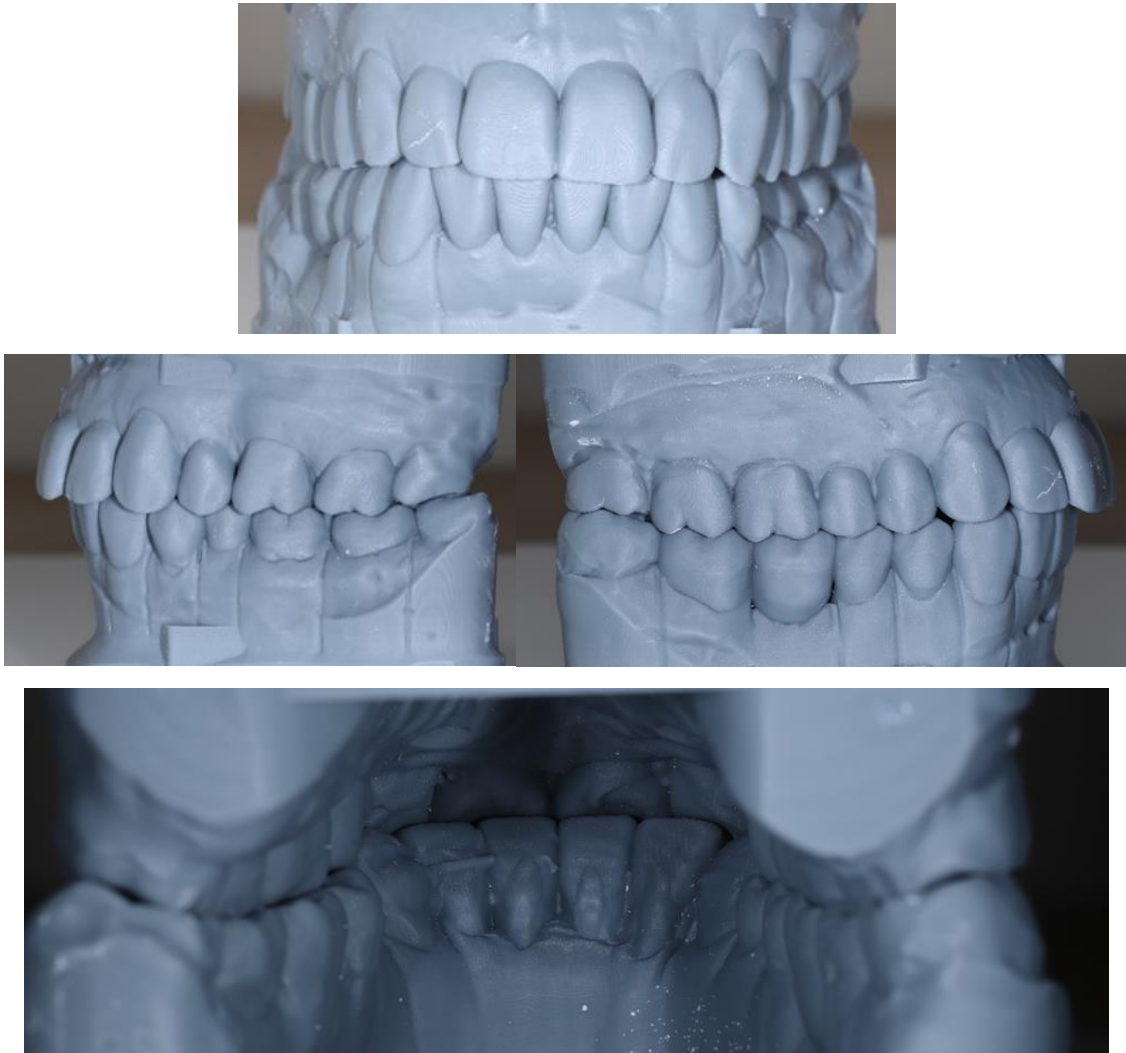
## **Treatment objectives**

- Canine control and anterior guidance.
- Sagittal and transversal correction of dental arches.
- Change OPI and angle of disocclusion.

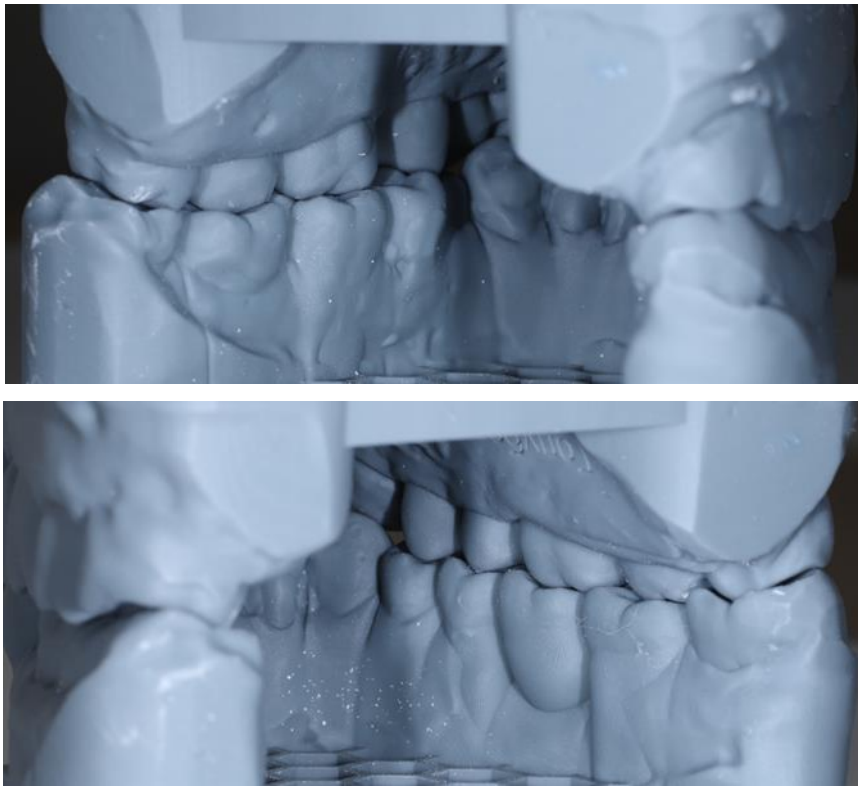
## **Treatment plan**

- Paradontologist
- Diet
- Analyses
- Osteopathist
- Wax-up.
- Long time temporaries.
- Final restorations

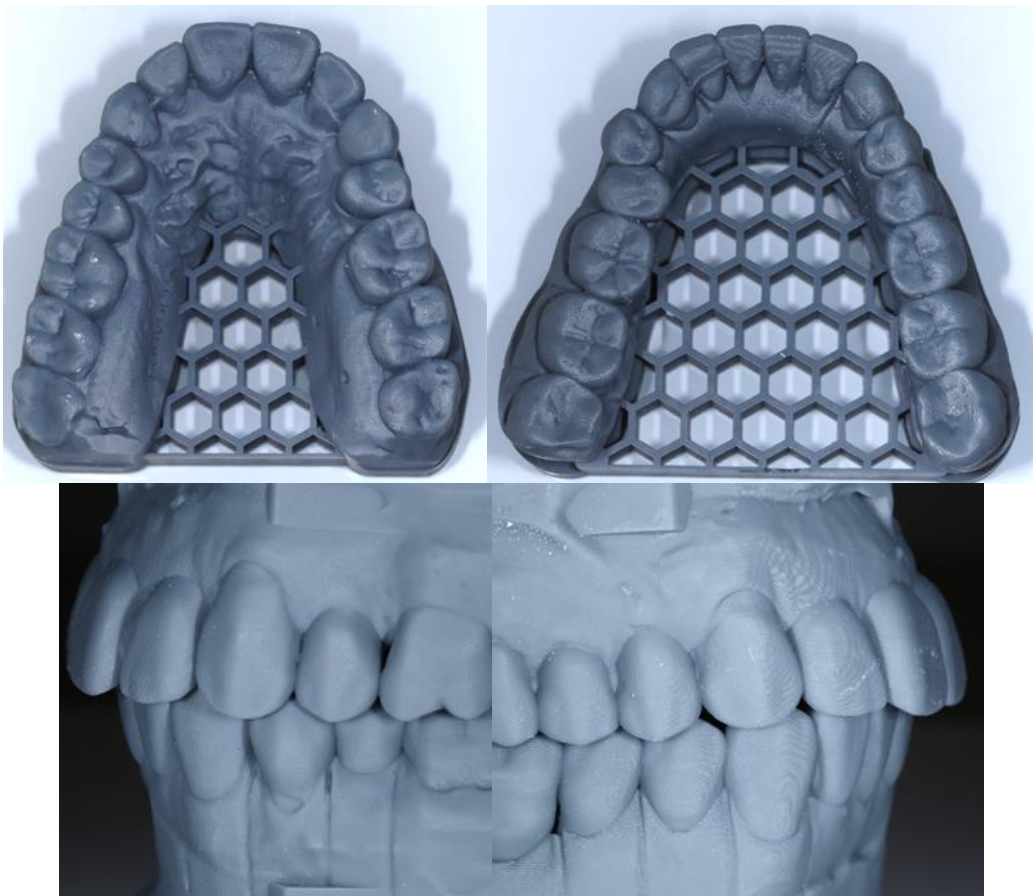
## Digital wax- up



Pic. 44-45. Printed Casts with digital wax-up



Pic.46-47. Printed Casts with digital wax-up



Pic. 48-51. Printed casts incisal overlap in true position (50, 51)

**Preparation photos April 2023**



Pic. 52-54. Preparation photos

**Final result April 2023**



Pic. 55-60. Final result

### DENTOLABIAL ANALYSIS

**TOOTH EXPOSURE AT REST**

Indicate  A  B  C  E

Max \_\_\_\_\_ mm  
Mand \_\_\_\_\_ mm

**INCISAL CURVE VS LOWER LIP**

Convex  Flat  Reverse

Contacting  Not contacting

Rt \_\_\_\_\_ mm Lt \_\_\_\_\_ mm Rt \_\_\_\_\_ mm Lt \_\_\_\_\_ mm

**SMILE LINE**

Average  Low  High

Rt \_\_\_\_\_ mm Lt \_\_\_\_\_ mm Rt \_\_\_\_\_ mm Lt \_\_\_\_\_ mm

**SMILE WIDTH (NO. OF TEETH VISIBLE)**

6-8  10  12-14

**LABIAL CORRIDOR**

Normal  Wide  Absent

Rt \_\_\_\_\_ mm Lt \_\_\_\_\_ mm Rt \_\_\_\_\_ mm Lt \_\_\_\_\_ mm

**UPPER INTERINCISAL LINE vs MIDLINE**

Coincident  Deviated Rt \_\_\_\_\_ mm  Deviated Lt \_\_\_\_\_ mm

**OCCUSAL PLANE vs COMMISSURAL LINE/HORIZON**

Parallel  Slanted Rt \_\_\_\_\_ mm  Slanted Lt \_\_\_\_\_ mm

Indicate by tooth number current situation; mark deviation (in mm) from ideal: + (if too long), - (if too short)

16	15	14	13	12	11	21	22	23	24	25	26
46	45	44	43	42	41	31	32	33	34	35	36

### PHONETIC ANALYSIS

**M** Interocclusal rest space \_\_\_\_\_ mm

**E** Interlabial space occupied by maxillary teeth

≤ 80% \_\_\_\_\_ %  
 > 80% \_\_\_\_\_ %

**F** Dental exposure

Max \_\_\_\_\_ mm Mand \_\_\_\_\_ mm

**V** Incisal profile

Vermilion \_\_\_\_\_ mm  
 Buccal \_\_\_\_\_ mm  
 Lingual \_\_\_\_\_ mm

**S** Mandibular movement

Vertical \_\_\_\_\_ mm  
 Horizontal \_\_\_\_\_ mm

Interarch space \_\_\_\_\_ mm  Absent

### TOOTH ANALYSIS

Table of esthetic changes (natural and/or iatrogenic) that have occurred over the years, by tooth number

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

INDICATE: O = Restoration, X = Missing, A = Abraded, D = Dyschromic, E = Extruded, F = Fractured, R = Rotated

**MAXILLARY vs MANDIBULAR INTERINCISAL LINE**

Coincident  Deviated Rt \_\_\_\_\_ mm  Deviated Lt \_\_\_\_\_ mm

**TOOTH TYPE**

Ovoid  Tapering  Square

**TEXTURE**

Macro  No  Slight  Pronounced  
Micro  No  Slight  Pronounced

**MAXILLARY CENTRAL INCISORS: SHAPE, CONTOUR, AND PROPORTION**

**W/H ratio** 11 \_\_\_\_\_ % 21 \_\_\_\_\_ %



Profile 11  Normal 21  Buccal 11  Lingual 21  Lingual

**OCCUSAL RELATIONSHIP**

Dental Class  I  II  III

Overbite \_\_\_\_\_ mm Interarch relationship  MIP  CO-CR

Overjet \_\_\_\_\_ mm Incisal guidance  Yes  No Centric guidance Lt  Yes  No Rt  Yes  No

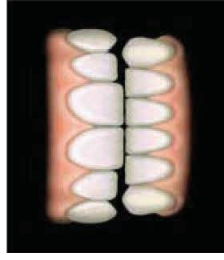
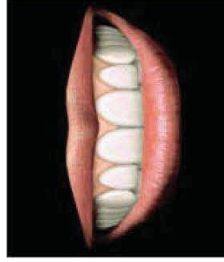
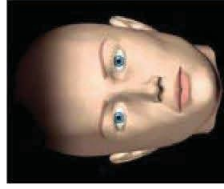
TOOTH ANALYSIS		GINGIVAL ANALYSIS	
<b>CONTOUR</b> <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <b>PROPORTION</b> <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <b>INTERDICAL ANGLES</b> <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <b>TOOTH AXES</b> <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <b>TOOTH ARRANGEMENT</b> <input type="checkbox"/> Regular <input type="checkbox"/> Crowded <input type="checkbox"/> Diastemata		<b>GINGIVAL MARGINS</b> <input type="checkbox"/> Symmetric <input type="checkbox"/> Asymmetric <b>ZENITHS</b> <input type="checkbox"/> Regular <input type="checkbox"/> Irregular <b>PAPILLAE</b> <input type="checkbox"/> Present <input type="checkbox"/> Absent <b>BIOTYPE</b> <input type="checkbox"/> Thick <input type="checkbox"/> Thin <b>ALTERATIONS</b> <input type="checkbox"/> Gingival inflammation <input type="checkbox"/> Hypertrophy <input type="checkbox"/> Recession <b>EDENTULOUS RIDGES</b> <input type="checkbox"/> Normal <input type="checkbox"/> Deformed	 <p>MARK ANY IRREGULARITIES ON DRAWING</p>

Notes

# ESTHETIC CHECKLIST

MAURO FRADEAN

Patient: \_\_\_\_\_ Examiner: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Age: \_\_\_\_\_

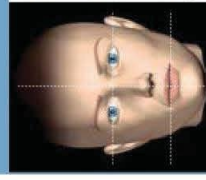


## Esthetic self-evaluation

Patient's requests and expectations

Preferences  White and aligned teeth  Teeth with slight irregularities  
 Past records: **Smile photo**  Yes  No **Study casts**  Yes  No **Radiographs**  Yes  No

## FACIAL ANALYSIS



<b>Interpupillary line vs horizon</b> Parallel <input type="checkbox"/> Slanted <input type="checkbox"/> Rt <input type="checkbox"/> Lt <input type="checkbox"/> <b>Commissural line vs horizon</b> Parallel <input type="checkbox"/> Slanted <input type="checkbox"/> Rt <input type="checkbox"/> Lt <input type="checkbox"/> <b>Facial midline</b> Centered <input type="checkbox"/> Deviated <input type="checkbox"/> Rt <input type="checkbox"/> Lt <input type="checkbox"/>	<b>Profile</b> <input type="checkbox"/> Normal <input type="checkbox"/> Convex <input type="checkbox"/> Concave <b>E-line</b> <input type="checkbox"/> Max - mm <input type="checkbox"/> Mand - mm <b>Lips</b> <input type="checkbox"/> Thick <input type="checkbox"/> Medium <input type="checkbox"/> Thin
---	--

Notes

# Findings Initial-Diagnostics

Name \_\_\_\_\_ Date \_\_\_\_\_

Main concern \_\_\_\_\_

## Special Medical Analysis

Do you have or did you ever have an illness with regard to points 1-12?

	yes	no		yes	no
1. Infections			7. Urogenital problems		
2. Cardio-vascular systems			8. Central nervous systems		
3. Respiratory systems			9. Psychological problems (therapy)		
4. Digestive systems			10. Rheumatic disease		
5. Metabolic systems			11. Hormonal disease		
6. Allergies			12. Special problems		

## Dental History Analysis – Occlusal Index

	valuation	yes	no
1. Do you have problems when you chew?			
2. Do you have problems when you are talking?			
3. Do you have problems in closing your teeth properly?			
4. Are any of your teeth especially sensitive?			
5. Do you have a problem when you open your mouth very wide?			
6. Do your jaw joints make noise and if so, on what side?			
7. Do you have pain in the area of your jaw joints?			
8. Do you suffer from headaches?			
9. Do you suffer from cramps or spasm in your head, neck or throat?			
10. Do you have in general problems with your posture?			
Occlusal Index	0.00		

	yes	no
11. Have you ever had a serious accident?		
12. Did you have one or more oral intubations?		
13. Have you ever had orthodontic treatment or...		
14. Have you had a treatment with a splint?		
15. Are you grinding or pressing with your teeth?		
16. Do you think that treatment is necessary?		
17. Do you think that there is a serious disorder or illness?		

18. When was the last time you had dental treatment and what was done?

19. How would you describe your psychic behaviour?  
 happy  sad  calm  excited  self-controlled  lack of self control



Name \_\_\_\_\_ Date \_\_\_\_\_

### Muscle Diagnosis

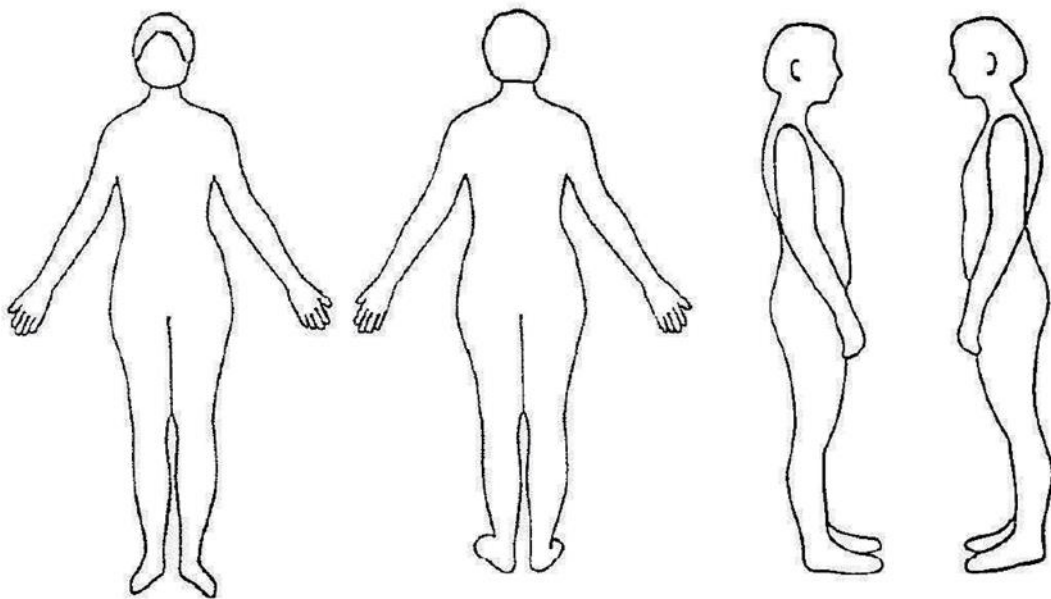
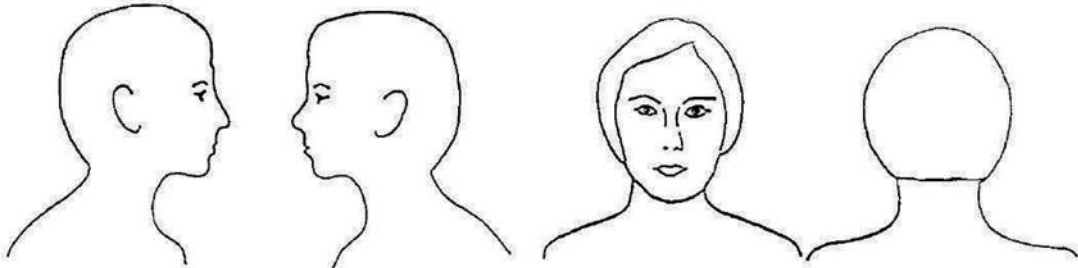
	right		left	
	+	++	+	++
1. shoulders and neck				
2. atlanto-occipital region				
3.a M.temporalis ant.				
3.b M.temporalis med.				
3.c M.temporalis post.				
4.a M.masseter (superficial)				
4.b M.masseter (deep)				
5. Tuber maxillae				
6. M.pterygoideus medialis				
7. M.mylohyoideus				
8. M.digastricus				
9. suprahyoidale M.				
10. infrahyoidale M.				
11. Larynx				
12. M.sterno-cleido-mastoideus				
13. M.omochoideus				
14. Tongue				
	+	++	+	++
15. comparative palpation of jaw joints				
a) lateral poles, statically				
b) lateral poles, in rotation				
c) retral joint space				
d) Lig.temporo-mandibulare				

### Preliminary Brainstem Nerve Analysis

1. N.olfactorius (analysis)	
2. N.opticus (analysis)	
3. N.oculo-motorius (clinical mobility)	
4. N.trochlearis (clinical mobility)	
5. N.trigeminus (clinical palpation and sensitiveness)	
6. N.abducens (clinical mobility)	
7. N.facialis (clinical mobility)	
8. N.stato-acusticus (clinical check of equilibrium and hearing)	
9. N.glosso-pharyngeus (clinical and analysis)	
10. N.vagus (analysis)	
11. N.accessorius (clinical and analysis)	
12. N.hypoglossus (clinical and analysis)	

Name \_\_\_\_\_ Date \_\_\_\_\_

**Chronic pain**



**Myofunctional Disturbances**

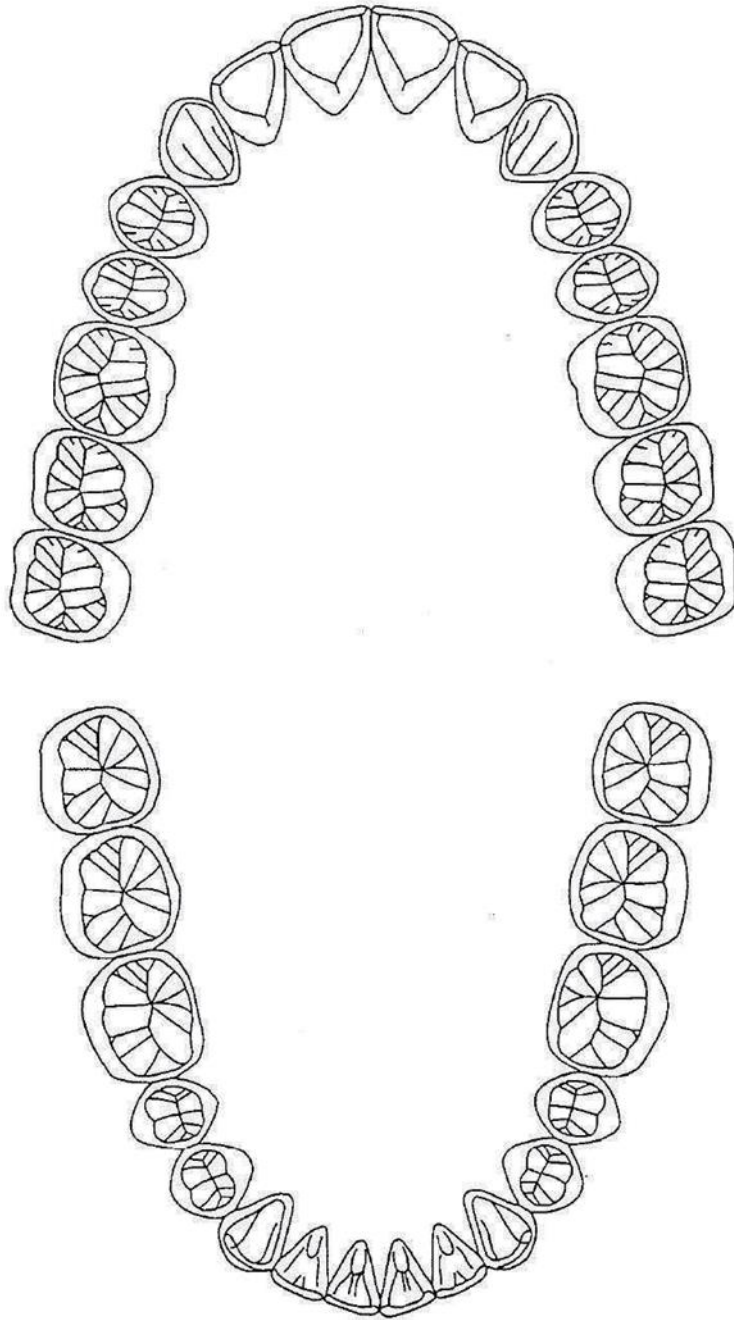
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Name \_\_\_\_\_ Date \_\_\_\_\_

**Tooth Status – Periodontal Status - Occlusogram**



# Check list practical work / VC – Module A

(check off each finished item)

Name: \_\_\_\_\_

## Photo documentation

- Extra oral ..... 0
- Intra oral..... 0
- Models ..... 0

## Casts / models

- Impression taking..... 0
- Model fabrication ..... 0

## Initial diagnostics

- Medical analysis ..... 0
- Dental history analysis..... 0
- Occlusal index ..... 0
- Muscle diagnosis / Palpation ..... 0
- Preliminary Brainstem nerve analysis..... 0
- Chronic pain..... 0
- Myofunctional disturbances ..... 0

## Reference position

- Reference Position (procedure)..... 0

## Face bow / Articulator

- Face bow anatomic..... 0
- Maxillary cast mounting in articulator ..... 0
- Mandibular mounting in articulator..... 0

# Training Checklist / VC – Module B

Name: \_\_\_\_\_

## Condylography

- Individual Para-Occlusal Clutch.....
- Mount Upper-Lower Condylograph.....
- Hinge-Axis Location (manually!!).....
- Set-Up Electronic System and Computer Software.....
- Perform Standard Excursive Tracings.....
- E-CPM – Records.....
- Perform functional Tracings (Speech, Brux, Chewing).....
  
- Remove Electronics, store recorded data on the computer.....
- Mark Reference points on the skin (pen).....
- Remove lower face-bow.....
- Mount bite-fork to upper condylograph and remove face-bow

## Exact Mounting (after condylography!!)

- Mount upper model according to exact hinge-axis.....
- Mount lower with centric bite record.....

## Ceph (after condylography!!)

- Stick metal grain onto the Reference marks on the skin.....
- Ceph picture.....
- Do Ceph Tracing analysed (computerized - CADIAS).....

## Brux-Checker (before mounting!!)

- Make upper and lower Brux-Checker. Wear 2 nights (Sat-Sun, Sun-Mon) alternating upper and lower

**Order**

Full name of the technician		
Full name of the Doctor		
Patient's full name		
Date of sending		
Date of completion of the work		
They were transferred to the laboratory		
<b>SCI</b>		
degree	R	L
color	R	L
<b>Bennett</b>		
degree	R	L
color	R	L
Anterior guidance		
Lower Facial height VD(veri dimertia)	initial	therapeutic
degree		
Change(+/-) incisal pin		
Close the gap	upper	lower
MPY	X= Y= Z=	X1= Y1= Z1
Splint therapy settings		

Type of splint	релаксационный	декомпрессионный	стабилизирующий;	позиционирующий	репонирующий
Guidance type					
Diagnostic casts					
Hard centric					
Pin-stump tab Type of metal					
Wax modeling by Slavichек					
Ceramic restoration					
Color of structures					
Individual spoon					
Settings					

Upper jaw:

Split-caste models	
Double Pin	

1.
2.
- 3.
- 4.

Lower jaw:

Split-caste models	
Double Pin	

1.
2.
- 3.
- 4.

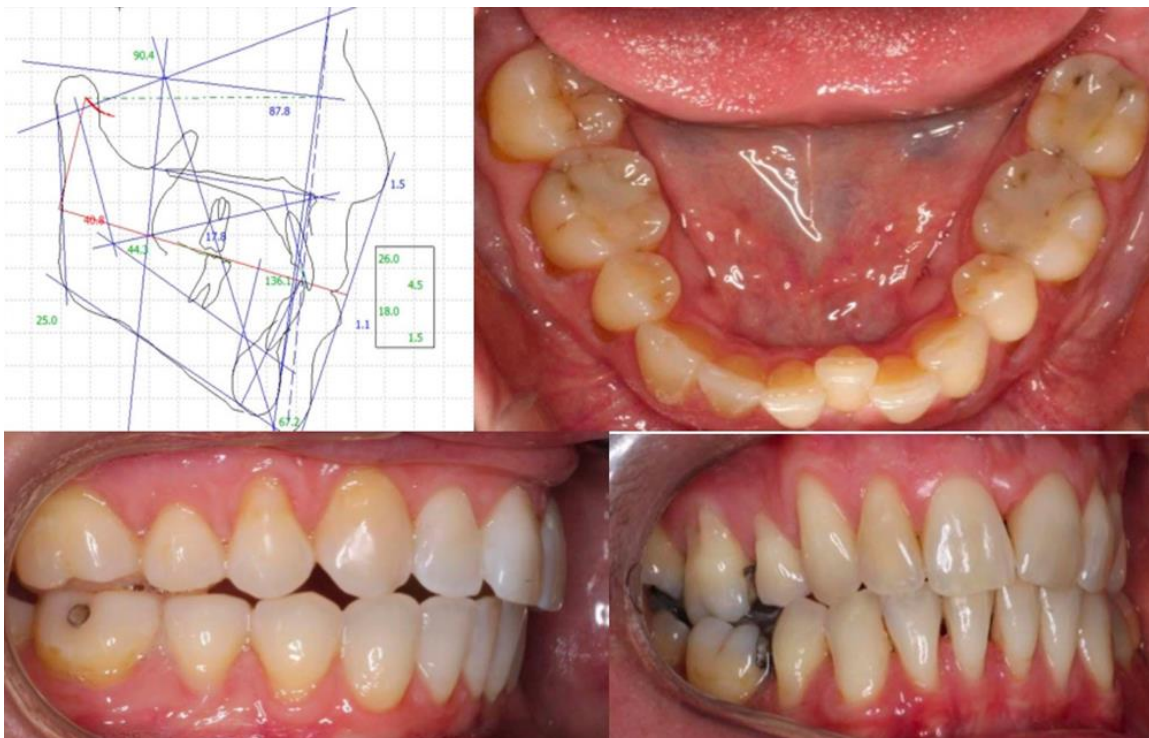
Sent to the courier:

Doctor's signature:

Date:

## Main causes for post- orthodontic malocclusion.

1. Lack of understanding of how malocclusion developed.
2. Underlying factors are not corrected.
3. Original malocclusion may return.
4. This may be more of a problem in certain types of malocclusion.
5. Lack of understanding of how malocclusion developed.
6. Incorrect diagnoses/ treatment planning and incomplete understanding of CMS function.
7. Extraction treatment.
8. Lack of occlusal support and guidance.
9. Incorrect Diagnoses and treatment planning and incomplete understanding CMS function: Occlusal plane inclination, vertical dimension, posterior discrepancy is not into account and are often the cause of malocclusion.
10. If the root cause is not identified and corrected will lead to functional problems and relapse post treatment.





## **Clear aligner therapy:**

1. Poor tool to tork teeth and often cases finish with anterior guidance too steep.
2. Almost impossible to establish good posterior support.
3. No control over the occlusal plane.
4. Often see overloaded anterior teeth and overloaded joints due to the above factors.

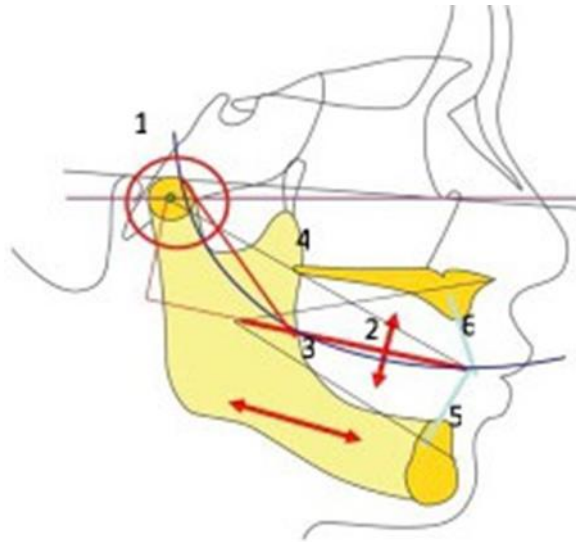


## **Proposal to prevent posterior malocclusion.**

1. Proper exam and diagnostic of root cause of the malocclusion.
2. Remove 8s to resolve posterior discrepancy.
3. Establish proper vertical dimension.
4. Reconstruct the occlusal plane.
5. Create canine dominated sequential guidance.
6. Avoid premolar extraction.
7. Pay special attention to the tork of all upper anterior teeth.

8. Treat to a broad arch form.
9. Create strong posterior support to maintain mandibular position and protect the anterior teeth/joints.

1. Mandibular position.
2. Vertical dimension.
3. Occlusal plane.
4. Skeletal classification.
5. Mandibular incisors.
6. Maxillary incisors.

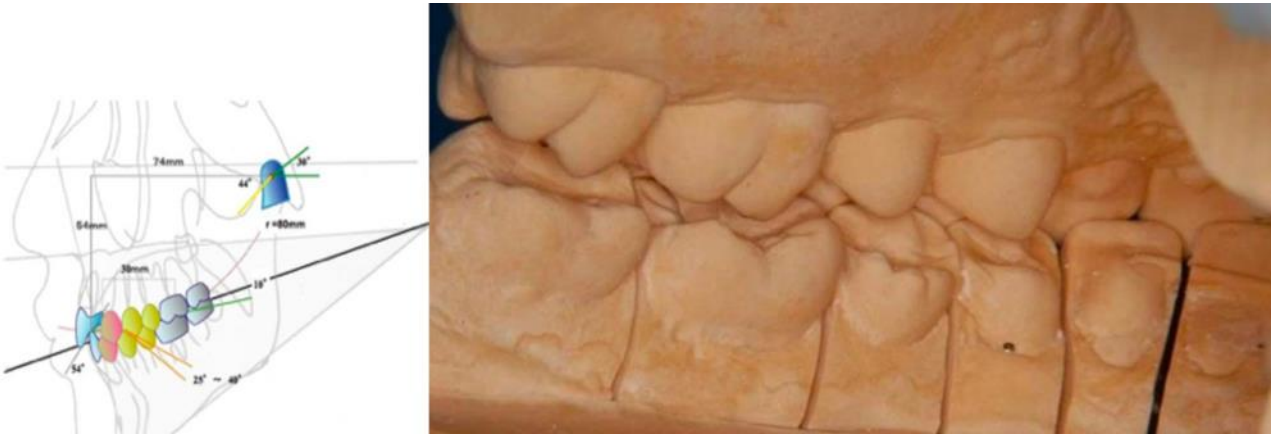


### **Extraction of premolars.**

1. Incisors guidance too steep.
2. Narrow arch form.
3. Molars and premolars with poor inclination.
4. Loss of posterior support and retrusive guidance.

## Main causes for orthodontic malocclusion.

1. Lack of occlusal support and guidance: many times, after treatment the buccal segments. Have been up righted mesio-distally and labio-lingually.
2. Often the incisor and cuspid guidance is steep
- 3.



Restore small laterals instead of closing space and lower IPR. To achieve these goals: MEAW as working wire.

1. Establish vertical dimension and correct occlusal plane.
2. Sure smile as a finishing tool to achieve final detailing.
3. High torque brackets.
4. Use of intraoral scanner/ occlusograms to check occlusion from the lingual.
5. Finish with minimal OJ/OB in patients where the upper incisors have a strong tendency to make the mandible pull back.



## Traditional vs new orthodontics.

Traditional	New Orthodontic
Genetic	Mostly epigenetic and environmental
Symptomatic treatment	Root cause treatment
Mechanical	Biologic
Tooth centered treatment	Joint centered treatment
Static	Dynamic
Esthetic	Functional and esthetic
8s are a local problem	8s have far reaching effects
Traditional treatment approach	New treatment approach
Headgear	OP/VD and PD control
Premolar extraction	Extraction of 8s
Orthognathic surgery	Very little orthognathic surgery
Longer treatment plan	Shorter treatment times
Often has built in instability	Very stable
No reconstruction of occlusal plane	Functional and esthetic
8s are a local problem	Reconstruction of occlusal plane
Focused on sagittal	Focused on vertical dimension
Maxilla centered mechanical tx	Mandibular position centered tx

## Conclusion

The main reason for post orthodontic malocclusion is:

1. How malocclusions develop in the first place. Because the underlying factors are not corrected, it is no surprise that the original malocclusion may return. This is true more so for some than other forms of malocclusion.
2. Based on the principle that the cranio-facial complex is highly adaptable, we use biological principles within the masticatory system to encourage the adaptation we want to take place.
3. Several important factors that occur during facial development and are often the cause of malocclusions are: the steepness of the OP, the VD and posterior discrepancy. When these factors are not taken into account the root cause of the problem will not be corrected, which may lead to functional problems and relapse after treatment is completed.
4. One of the biggest things to avoid is the removal of any teeth, e.g. any number of bicuspids or the closing of spaces of any congenitally missing teeth. This often leads to upper incisors that have too steep a guidance, an arch form that is too narrow, and molars that have a poor mesio-distal and labio-lingual inclination, which leads to loss of posterior support. Furthermore, when 4's are removed, the retrusive guidance tool is removed

Also, we prefer to use restorative solutions rather than IPR if needed.

## **What should profession do better?**

1. Diagnose better and resolve the root cause of the problem: Extract 8's to relieve posterior discrepancy, establish the proper VD, reconstruct the OP and create cuspid dominated sequential guidance, we should treat to a joint determined position not a not a tooth deter- mined position.
2. Whenever possible treat to an occlusion with 28 teeth.
3. Pay special attention to the inclination (torque) of all upper anterior teeth (cuspid to cus- pid), and have a broad archform.
4. Create strong posterior support to maintain mandibular position and protect the anterior teeth and joints.

## **Means of achieving this**

1. MEAW as a working wire to establish VD and correct the OP.
2. Suresmile as a finishing tool to achieve the final detailing.
3. Use of high torque brackets on the upper anterior teeth.
4. Use of an intraoral scanner to observe the occlusion from the lingual before debanding.
5. Some patients have a very strong reaction to retracted/steep upper incisors. In these patients the proper torque is very important and we are now trying to finish them like Class III patients with minimal OJ/OB.

**Invisalign has several significant drawbacks.**

1. It is a very poor tool to torque teeth and very often cases are finished with too steep of a guidance.
2. It is almost impossible to establish good posterior support.
3. No control over the OP.
4. What we often see in finished Invisalign cases is overloading of the anterior teeth and the joints because of the above-mentioned factors. This holds true for all aligner therapy systems, not just Invisalign.

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