

F. K. Dzalaeva

Postorthodontic rehabilitation of the patient

2022

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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

Postorthodontic rehabilitation of the patient

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CASE REPORT

Patient (date of birth /1984) Date of examination 15.04.2022

Midline shifted to the right

Skeletal class III wish tends to I



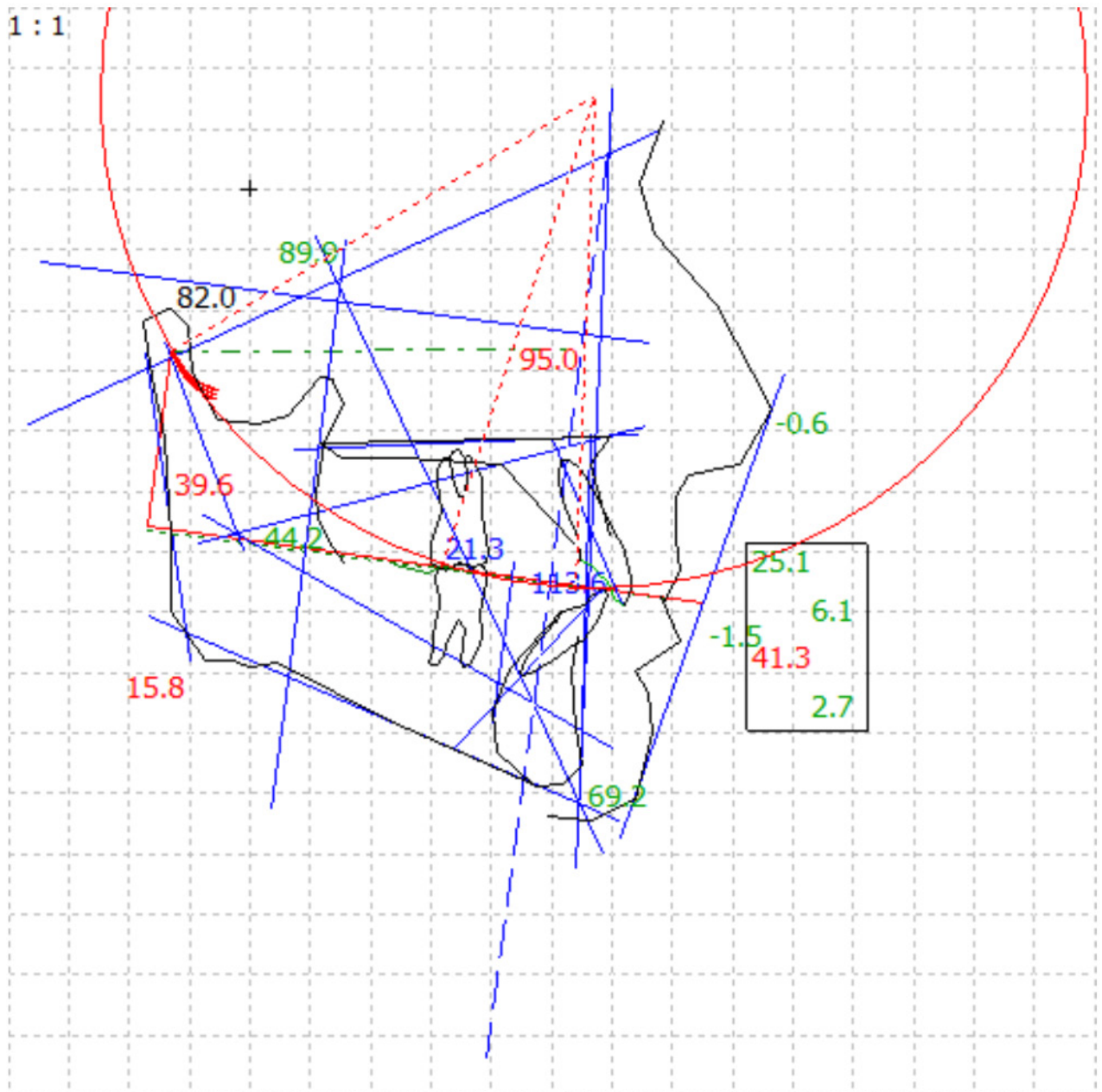
2. Lateral X ray



3. Cephalometric analyses

Slavicek Analysis			
Skeletal Measurement	Norm	Value	Trend
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	
Dental Measurement	Norm	Value	Trend
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+*
Occlusal Plane	Norm	Value	Trend
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	
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	

3. Cephalometric analyses



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= 20degrees,

DOAL= 20degrees

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

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*

4. Special Medical Analysis and dental analyses

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		

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

5. Muscle palpation

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

6. List of problem



No anterior control

No canine control

Lower incisal are crowding Elongation 11, 21

Muscle problems

Posture



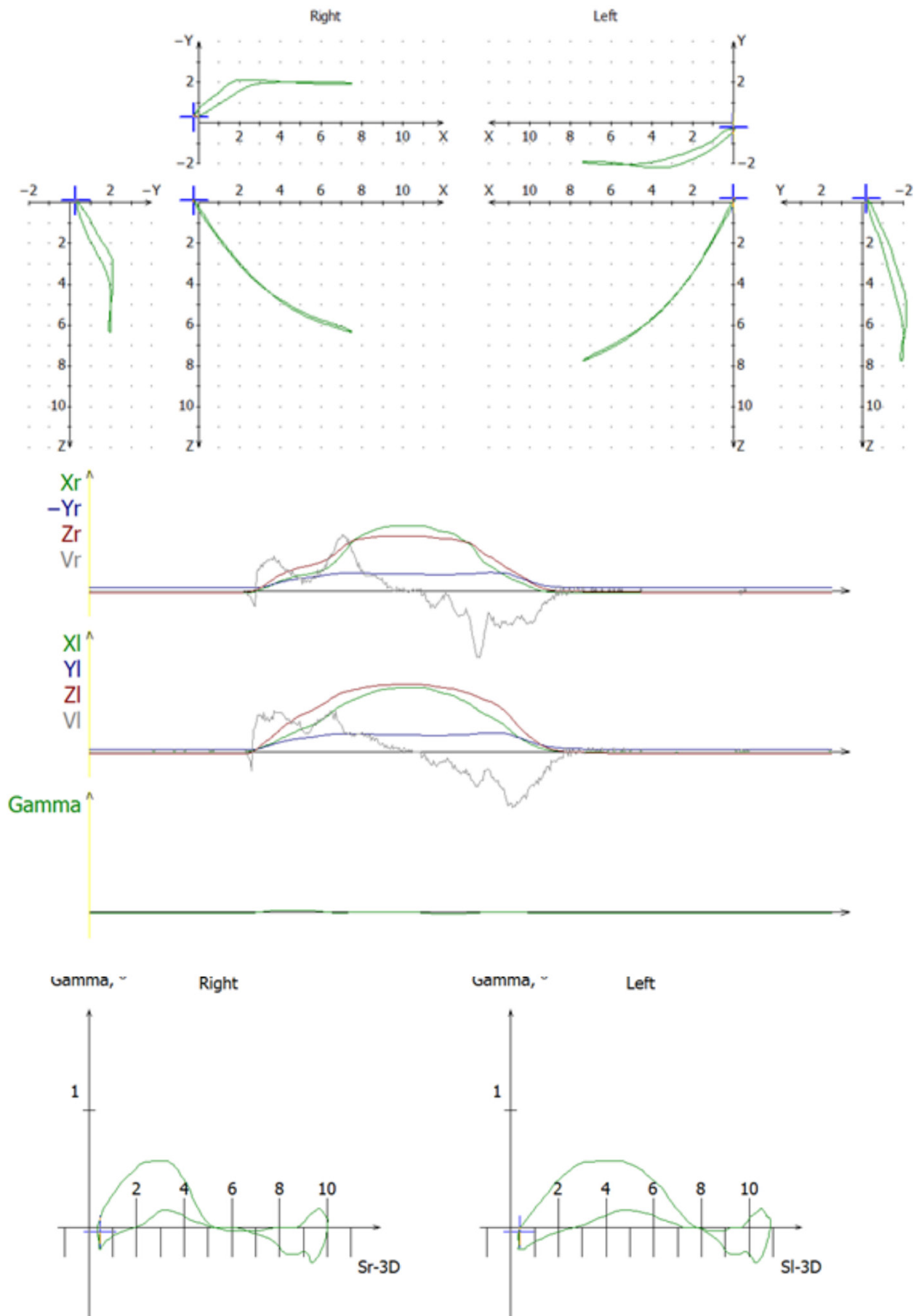
Centric relation and casts remounting

Myopathic splint therapy

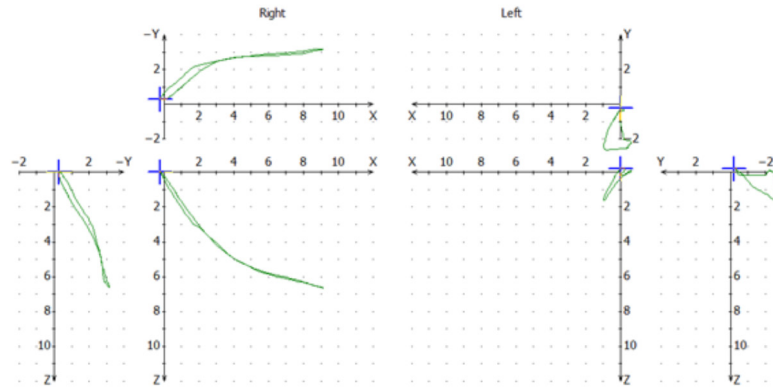
Full mouth rehabilitation

8. Condylography

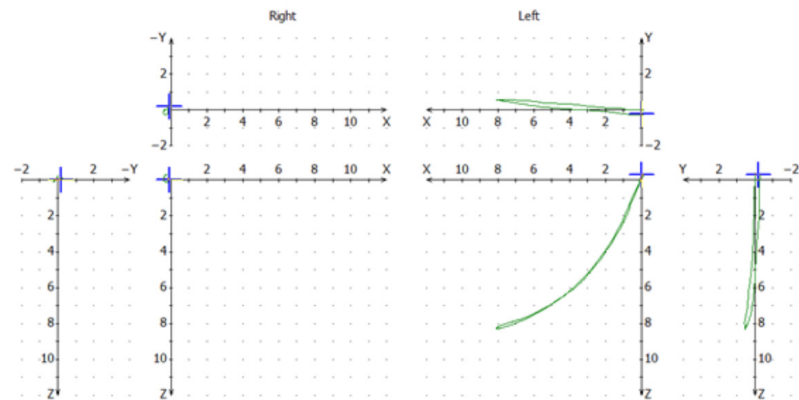
Protrusion/retrusion (left) Time curve . Muscle tension Gamma rotation – no rotation , translational component. Deviation to the left



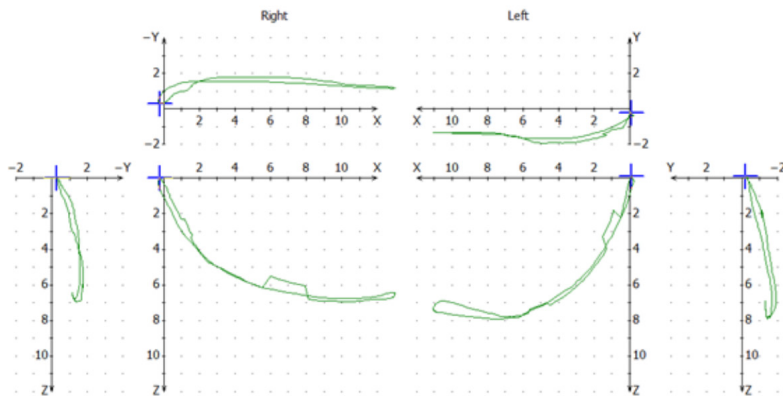
Mediotrusion right



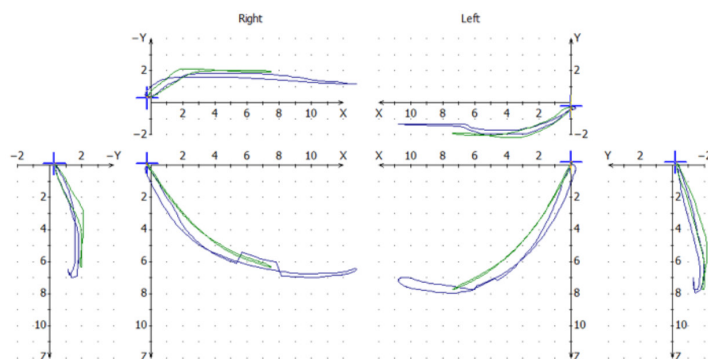
Mediotrusion left



Open – Close

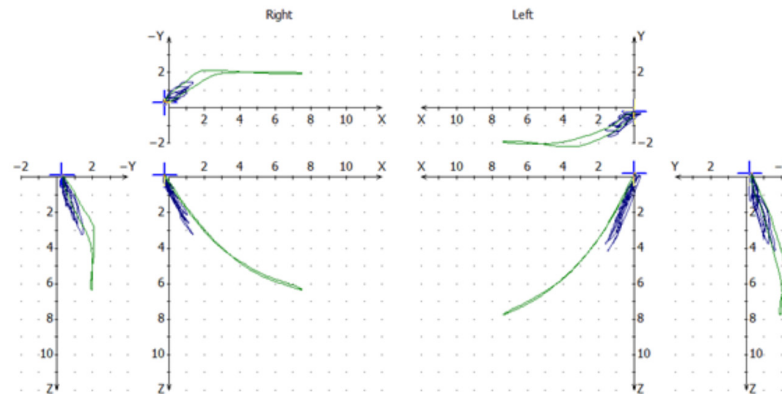


Overlap open-close and Protrusion/retrusion

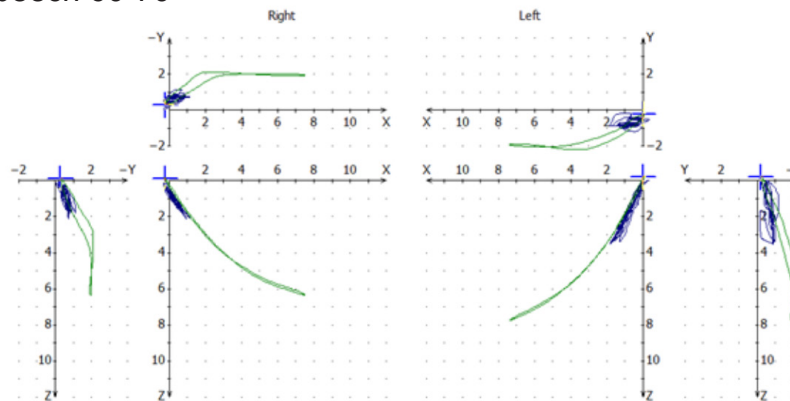


8. Condylography

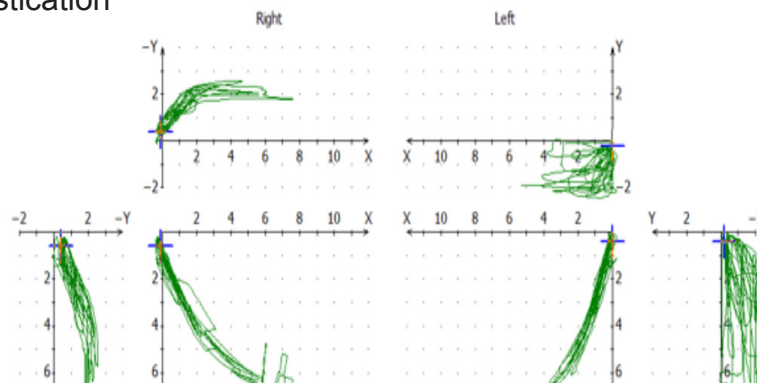
Speech 50-60 - Detrusion



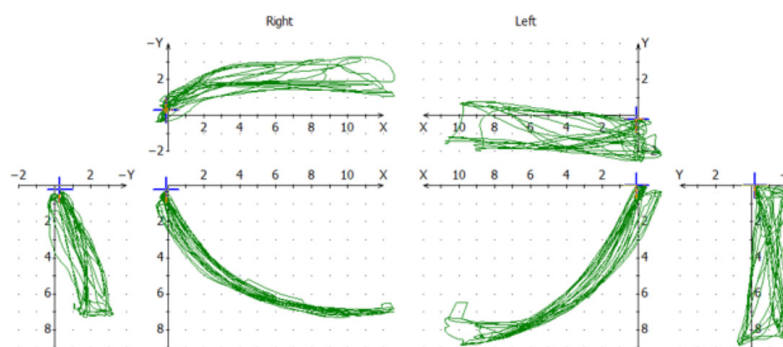
Speech 60-70



Mastication



Free movement



CR DETERMINATION

WAX-UP

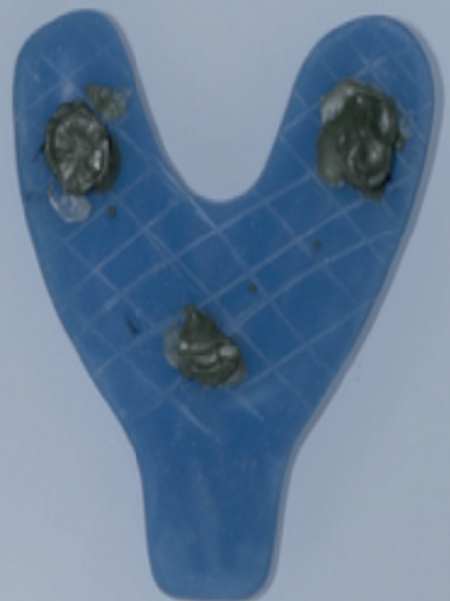
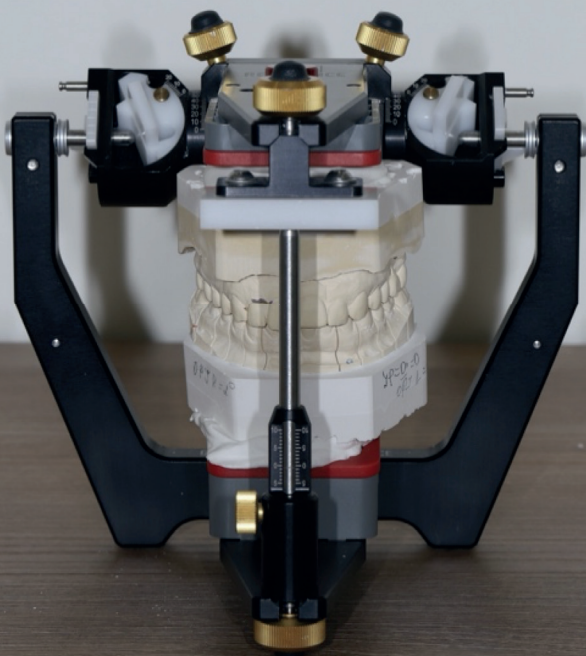
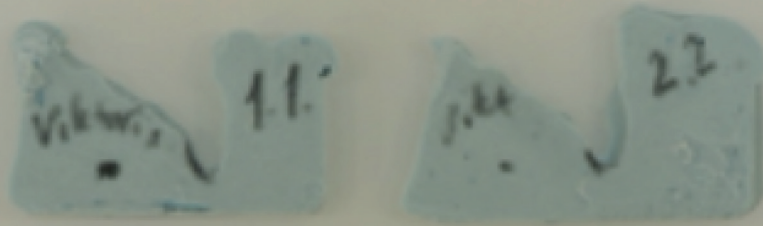
LONG TIME TEMPORARIES

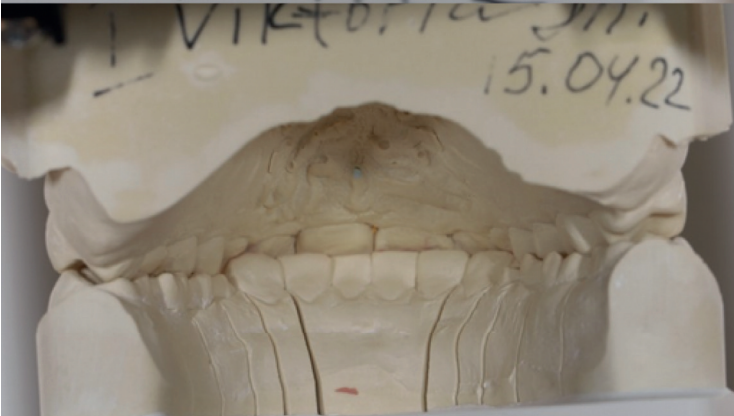
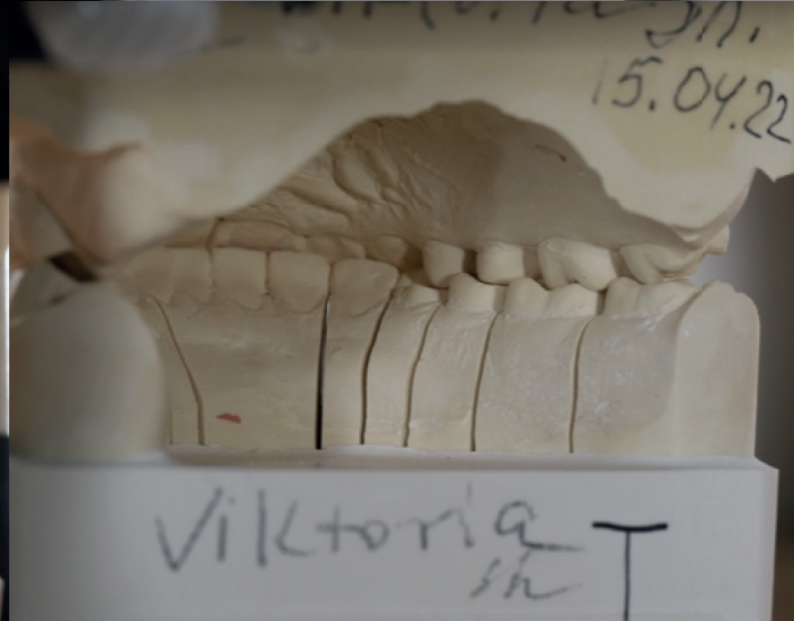
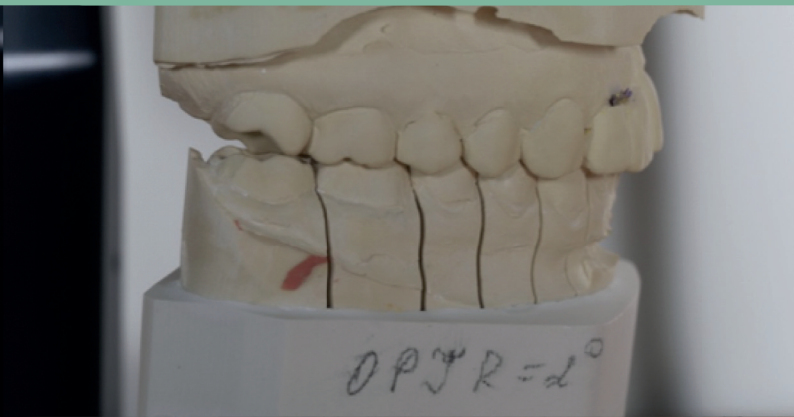
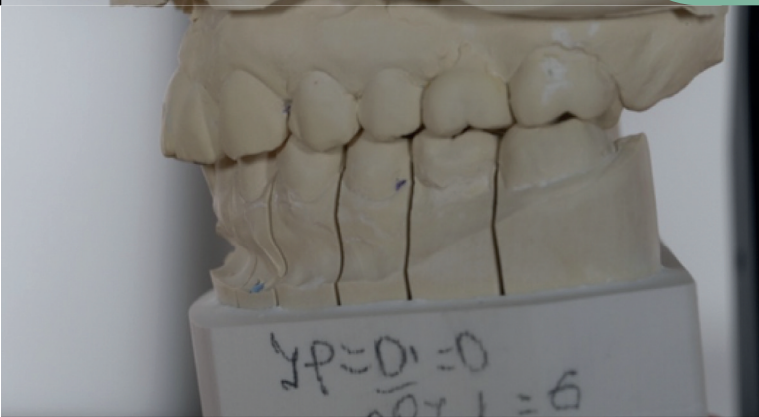
FINAL RESTORATIONS

10.Muscle Palpation after treatment

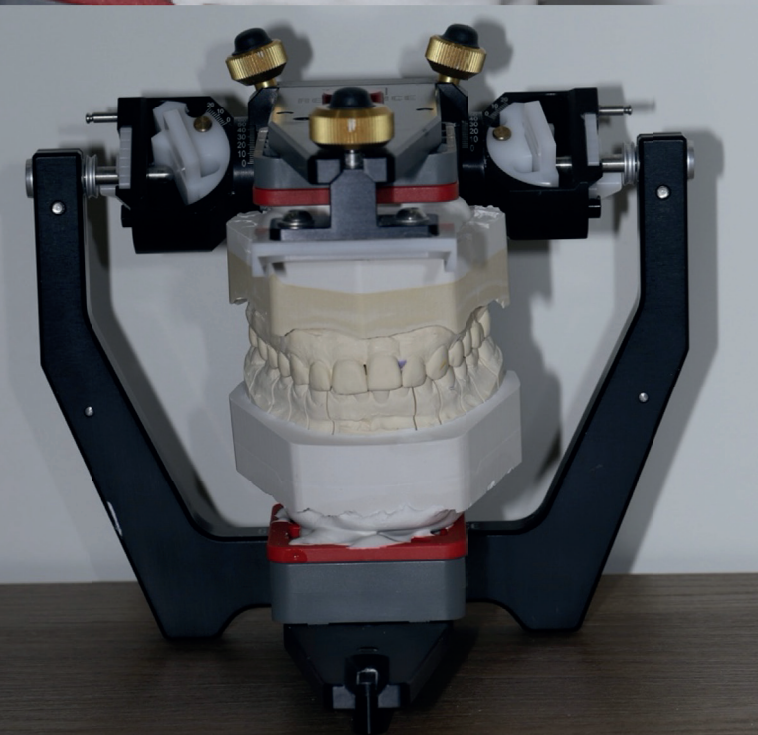
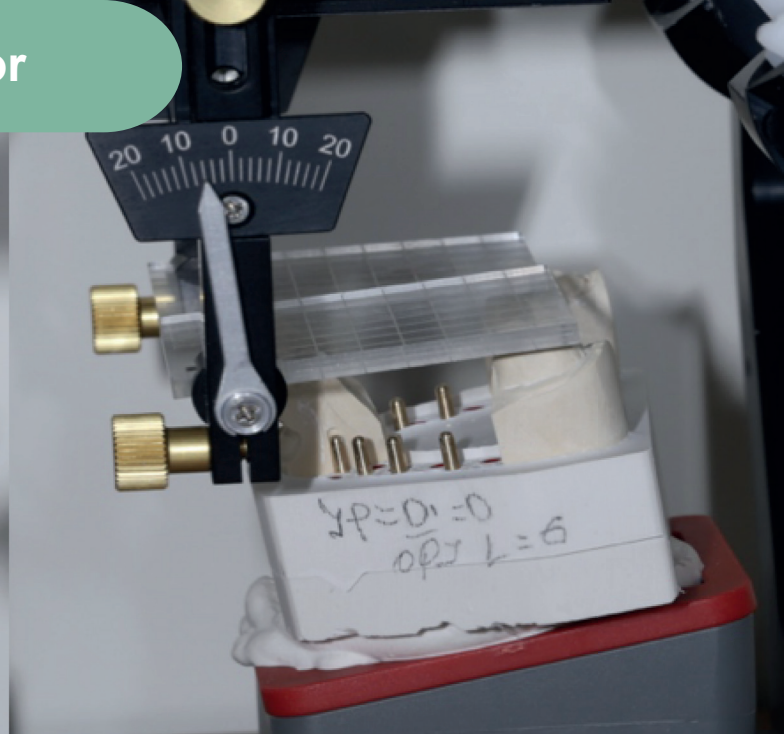
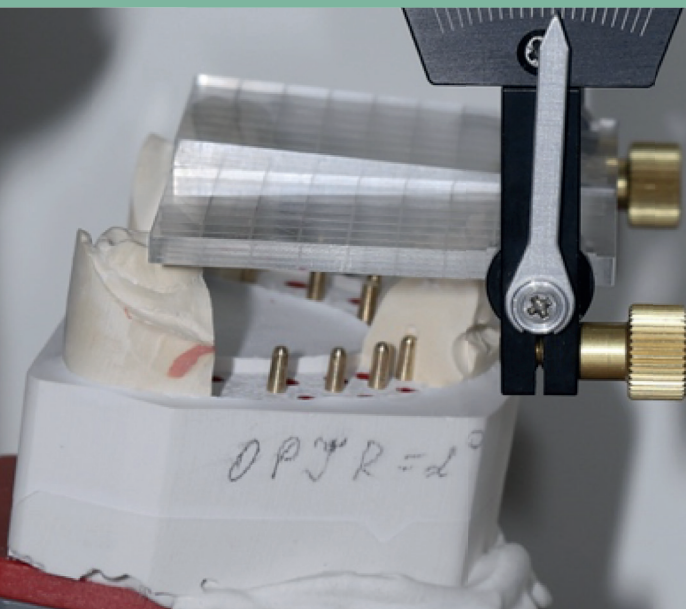
Muscle Diagnosis		Right		Left	
		+	++	+	++
1.	Shoulders and neck				
2.	Atlanto-occipital region				
3.a	M.temporalis ant.				
3.b	M.temporalis med.			X	
3.c	M.temporalis post.				
4.a	M.masseter (superficial)				
4.b	M.masseter (deep)				
5.	Tuber maxillae				
6.	M.pterygoideus medialis				
7.	M.mylohyideus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

11. Casts mounted in articulator



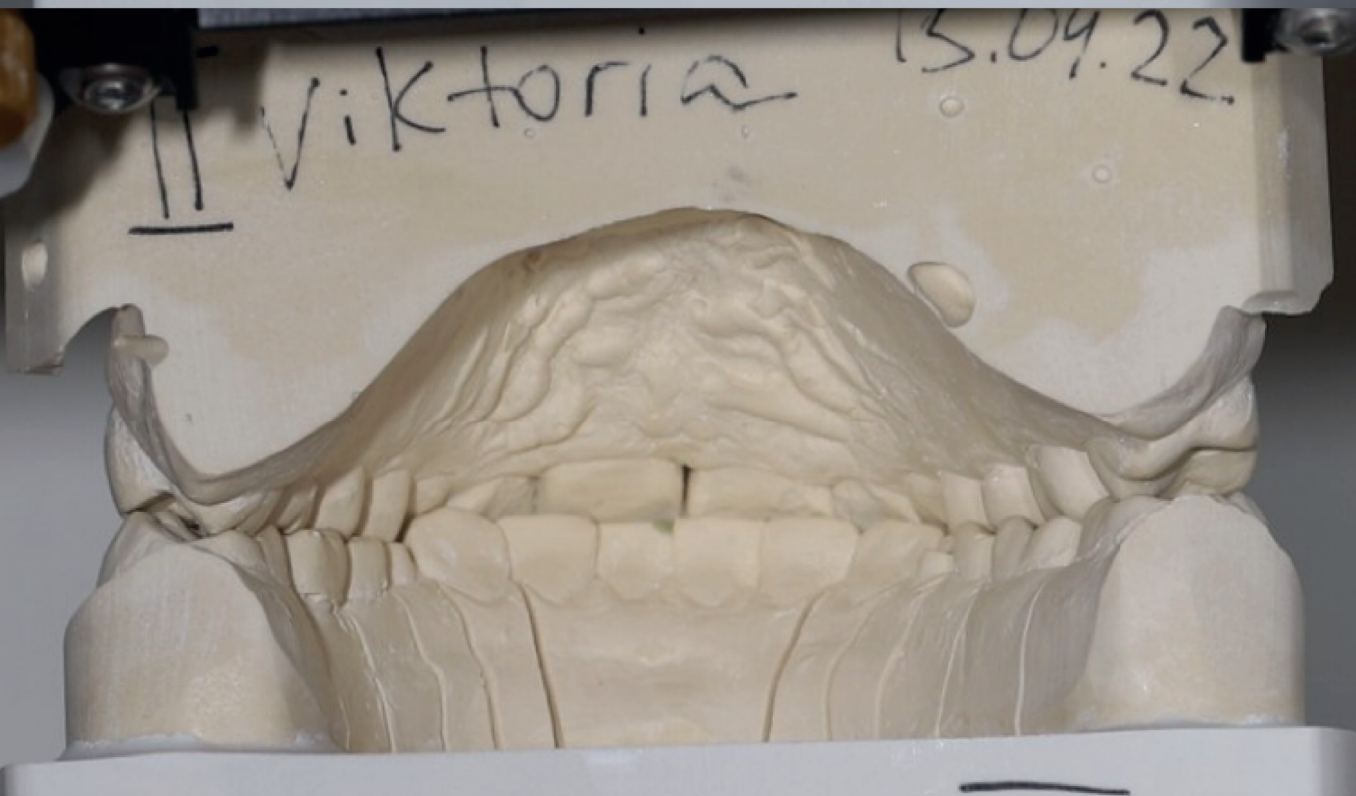


11. Casts mounted in articulator



OPI R = 2 , OPI L = 6

Casts mounted in reference position



12. Treatment plan correction

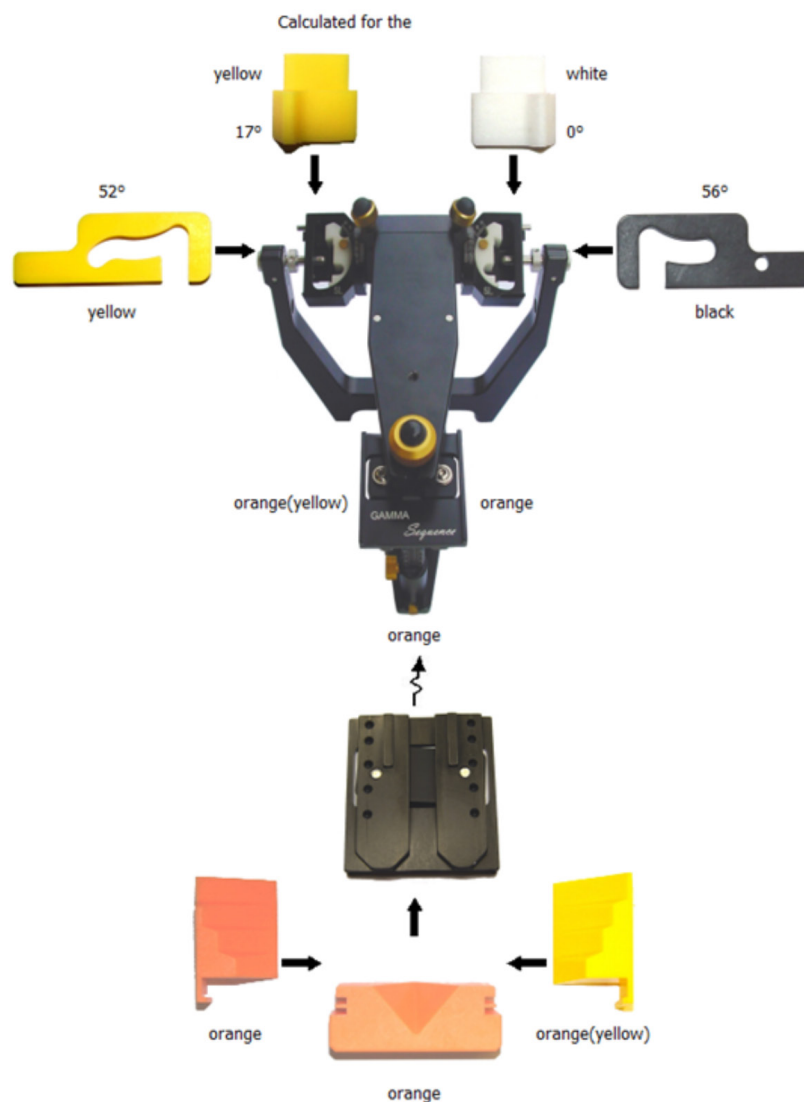
- Gingiva correction 11, 21
- Muscle relaxation
- AG - +10 degrees , = 58 degrees • Canine control
- OPI R = 12 degrees
- OPI L total = 16 degrees

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

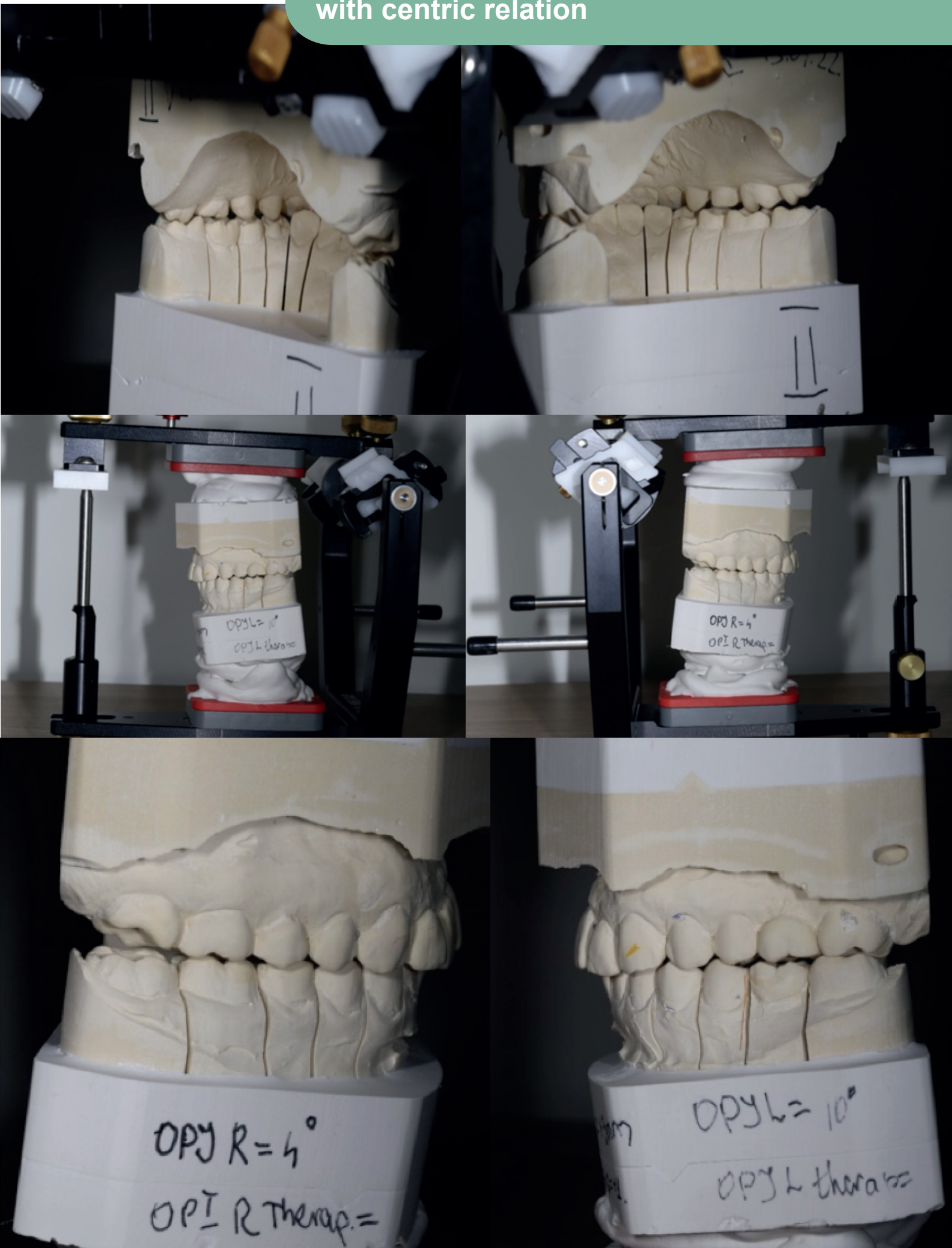
Decrease lower incisors -1,5 mm increase height of lower molars Create posterior support

13. Articulator settings

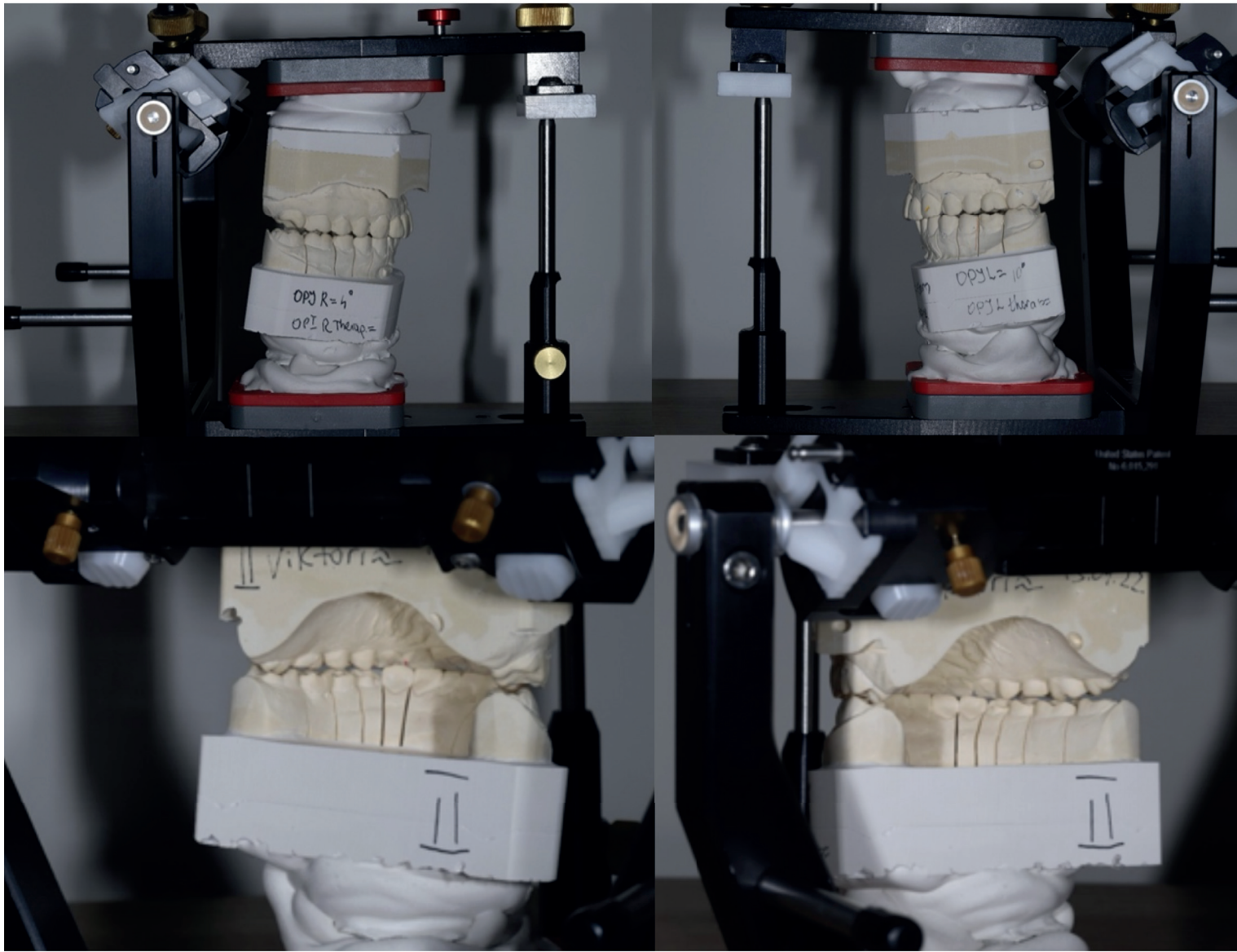


Date of examination
07.05.2022

14. Determination of Therapeutic position after osteopathic treatment Casts in PR with centric relation



14. 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

15. VTO +2 mm incisal pin



- SCI R. 52 18 OPI=4 DAO
- SCI L. 56 16 OPI=10 DAO

16. Cephalometric analyses VTO

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	

16. Cephalometric analyses VTO

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

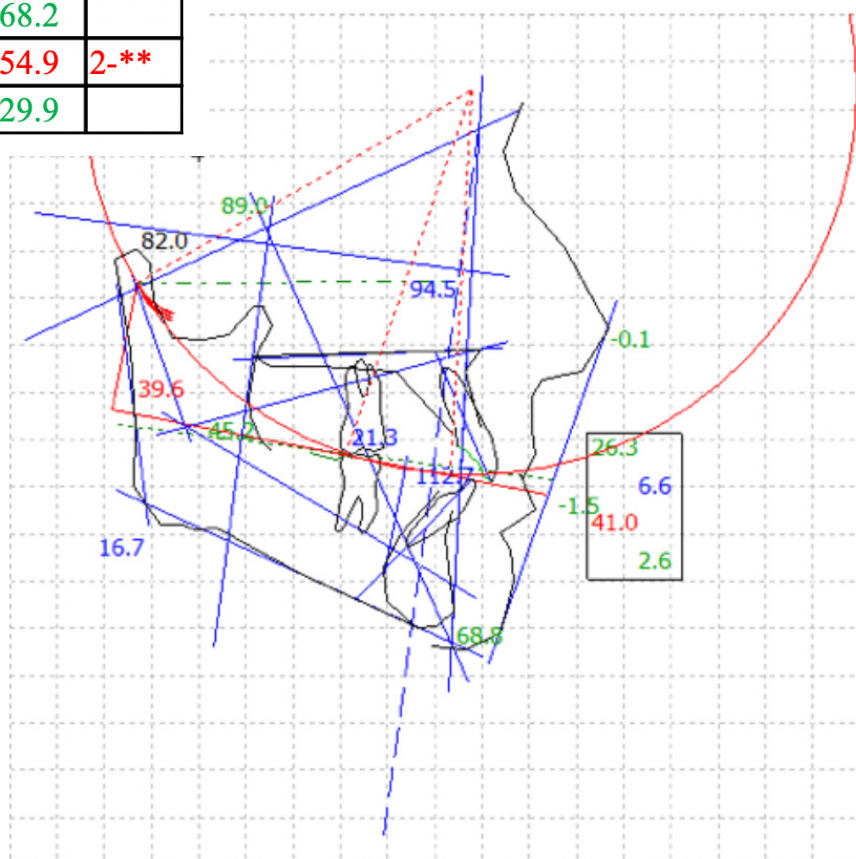
The protrusion of the lower incisor is normal

The inclination of the lower strongly increased The interincisal angle is diminished

Occlusal concept: Group function

Explanation

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	



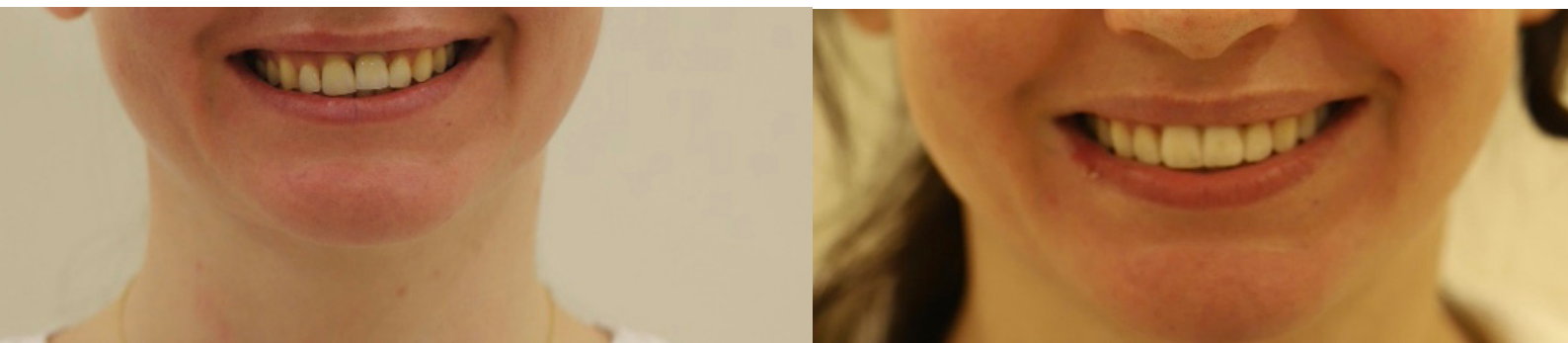
16. Muscle Palpation was done after osteopathic treatment. CR determination +2 mm incisal pin.

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 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				

18. 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, colour)
- Incisal edge configuration • Lower lip line
- Smile symmetry



Tooth relative size

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

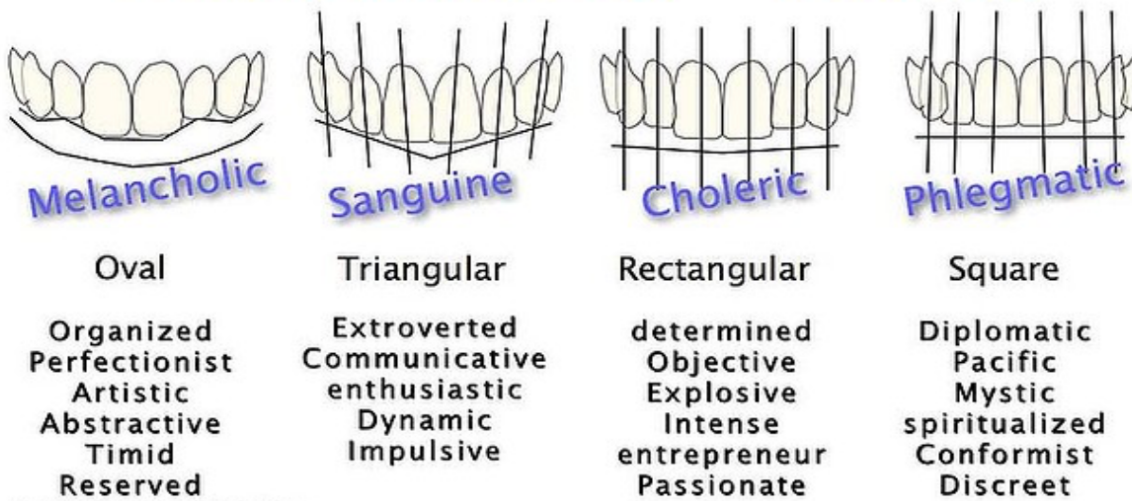
Functional evaluation

- Central incisor depth overbite= 1mm • Central incisor width overbite= 1mm
- 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 incAesthetic 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

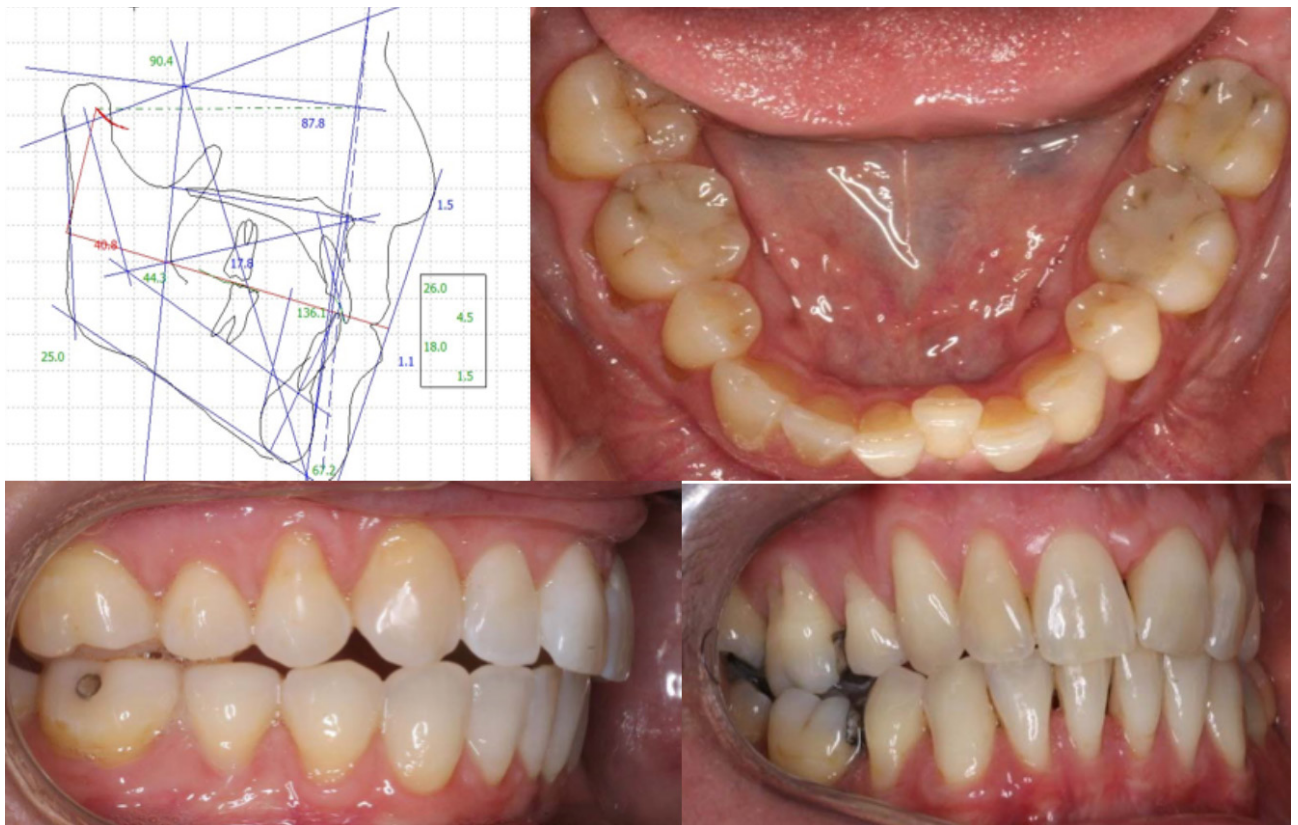
19. Final restoration June 2022



20. Main causes for post- orthodontic malocclusion

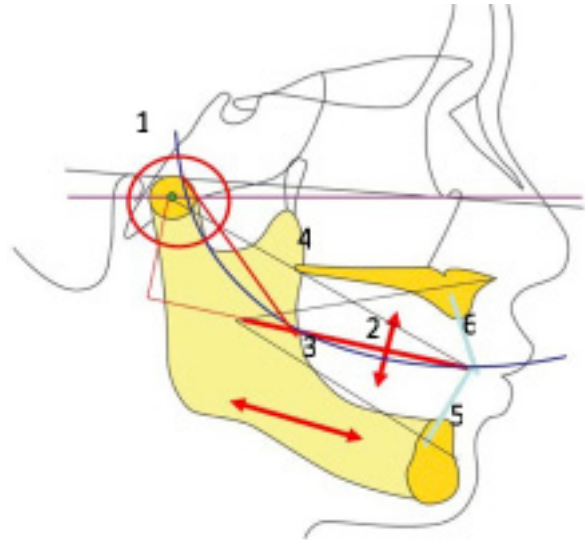
1. Lack of understanding of how malocclusion developed.
2. Underlying factors are not corrected.
3. Original malocclusion may return.
4. This may be more of a problem in certain types of malocclusion.
5. Lack of understanding of how malocclusion developed.
6. Incorrect diagnoses/ treatment planning and 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 are not into account and are often the cause of malocclusion.

If the root cause is not identified and corrected will lead to functional problems and relapse post treatment.



20. Main causes for post- orthodontic malocclusion

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

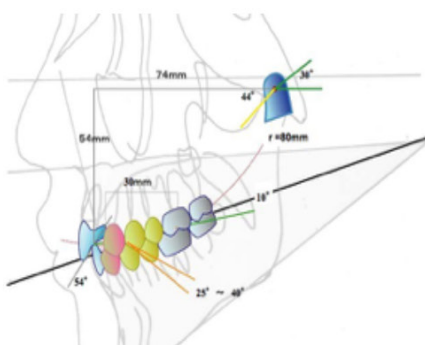


Extraction of premolars

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 uprighted mesio-distally and labio-lingually.
2. Often the incisor and cuspid guidance is steep



20. Main causes for post- orthodontic malocclusion

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.

20. Main causes for post- orthodontic malocclusion

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

1. Establish vertical dimension and correct occlusal plane.
2. Suresmile 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.



20. Main causes for post- orthodontic malocclusion

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

Summary

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 bicuspid 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 tooth determined 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 cuspid), and have a broad archform.
4. Create strong posterior support to maintain mandibular position and protect the anterior teeth and joints.

20. Main causes for post- orthodontic malocclusion

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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