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Original article

Myofunctional and speech rehabilitation after orthodontic-surgical treatment of dento-maxillofacial dysgnathia

- Gianluca Gallerano[a],
- Giovanni Ruoppolo[b],
- Alessandro Silvestri[c],

- [a] DDS Degree in Dentistry
- [b] (MD) Doctor of medicine; Ear, Nose and Throat Specialist (ENT); Specialist in Phoniatry; Associated Professor of Phoniatry and Audiology, Department of Sense Organs, "Sapienza" University of Rome
- [c] (MD) Doctor of Medicine; Ear, Nose and Throat Specialist (ENT); Specialist in Dentistry and Stomatology (DDS); Specialist in Orthognatodontics; Associated Professor of Orthodontics, Department of Dental Sciences,"Sapienza" University of Rome

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Abstract

Objectives

The lingual dysfunctions play a considerable role in the pathogenesis of dentoskeletal dysmorphisms. The treatment of dento-maxillofacial dysgnathia implies a functional rehabilitation to re-harmonize the stomatognathic system. This study aims to demonstrate the importance of a rehabilitation protocol of functional orofacial parameters at the end of a surgical-orthodontic treatment in order to achieve long-term success.

Materials and methods

After orthognathic surgery, facial expression exercises and jaw exercises are prescribed to promote the recovery of neuromuscular function. At the end of treatment, a sample of 30 dysgnathic patients underwent a functional evaluation of the orofacial district to identify any lingual or articulatory dysfunctions. The information gathered led to an individual re-education program that consisted of an active myofunctional-logopedic approach integrated with appliances used as retention.

Results

19 patients needed myofunctional therapy to re-educate deglutition and tongue posture. Articulatory disorders were found in 7 patients originally suffering from Class III and/or open-bite skeletal disharmony; 5 of these completed rehabilitation with speech therapy. After rehabilitation the functional parameters were completely normalized in 12 patients; in 5 cases, partial improvements were obtained, while in 2 cases the therapy was ineffective.

Conclusions

In a patient undergoing post-surgical reconsolidation of his/her functional equilibrium even an uncontrolled speech defect may lead to an instable result. Only through an interdisciplinary approach it is possible to intercept and re-educate all the functions that are not compliant with the structural changes and to eliminate a tendency to relapse of the dysgnathia.

Riassunto

Objettivi

Le disfunzioni linguali giocano un ruolo rilevante nella patogenesi dei dismorfismi dentoscheletrici. Il trattamento delle disgnazie dento-maxillo-facciali implica una riabilitazione funzionale finalizzata alla riarmonizzazione dell'apparato stomatognatico. L'obbiettivo dello studio è quello di dimostrare come, al termine del trattamento ortodontico-chirurgico, un protocollo di riabilitazione dei parametri funzionali oro-facciali sia importante per il raggiungimento del successo a lungo termine.

Materiali e metodi

Dopo la chirurgia ortognatica, vengono assegnati esercizi di mimica facciale e di ginnastica mandibolare al fine di promuovere il recupero della funzionalità neuromuscolare. Al termine del trattamento, un campione di 30 pazienti disgnatici è stato sottoposto ad una valutazione funzionale del distretto oro-facciale al fine di identificare eventuali disfunzioni linguali e di articolazione del linguaggio. Le informazioni ottenute hanno permesso di ricavare un programma individuale di rieducazione che consiste in un approccio attivo logopedico-miofunzionale integrato da dispositivi usati come contenzione.

Risultati

La terapia miofunzionale è stata necessaria per 19 pazienti al fine di rieducare la deglutizione e la postura linguale. Disturbi articolatori sono stati rintracciati in 7 pazienti originariamente affetti da III

Classe e/o open-bite dento-scheletrici; 5 di questi hanno completato l'iter rieducativo con la rieducazione del linguaggio. Dopo la riabilitazione si è assistito alla completa normalizzazione dei parametri funzionali in 12 pazienti; in 5 casi si è ottenuto un miglioramento parziale mentre in 2 casi la terapia è risultata inefficace.

Conclusioni

In un paziente in fase di riconsolidamento post-chirurgico del proprio equilibrio funzionale anche un difetto del linguaggio non controllato può determinare un'instabilità del risultato. Solo attraverso un approccio interdisciplinare è possibile intercettare e rieducare tutte le funzioni non compatibili con la nuova configurazione strutturale eliminando la tendenza alla recidiva della disgnazia.

Résumé

Objectifs

Les dysfonctions linguales jouent un rôle significatif sur la pathogenèse des dysmorphismes dento-squelettiques. Le traitement de la dysgnathie dento-maxillo-faciale entraîne une réhabilitation fonctionnelle dans le but de réharmoniser le système stomatognatique. Cette étude vise à démontrer l'importance d'un protocole de réhabilitation des paramètres orofaciaux fonctionnels à la fin d'un traitement orthodontique chirurgical pour obtenir un succès à long terme.

Matériels et méthodes

A près chirurgie ortognathique, des exercices de l'expression faciale et de la mandibule sont prescrits pour promouvoir la récupération de la fonction neuromusculaire. A la fin du traitement, un échantillon de 30 patients dysgnatiques ont été soumis à une évaluation fonctionnelle de la region orofaciale pour identifier d'éventuelles dysfonctions linguales ou d'articulation. L'information collectée a amené à un programme de rééducation individuelle qui s'est concrétisé dans une approche logopédique active myofonctionnelle accompagnée d'appareils utilisés comme mode de rétention.

Résultats

19 patients ont eu besoin d'une thérapie myofonctionnelle pour rééduquer la déglutition et la posture de la langue. Les troubles d'articulation ont été identifiés chez 7 patients qui souffraient originairement d'une désharmonie squelettique open bite et/ou Classe III; 5 de ces patients ont complété la réhabilitation avec une thérapie d'élocution. Après réhabilitation, les paramètres fonctionnels ont été complètement normalisés chez 12 patients; dans 5 cas, des améliorations partielles ont été obtenues alors que dans 2 cas la thérapie s'est avérée inefficace.

Conclusions

Chez un patient soumis à reconsolidation post-chirurgicale de son équilibre fonctionnel, même un défaut non contrôlé d'élocution peut déboucher sur un résultat instable. Ce n'est qu'au travers d'une approche interdisciplinaire qu'il est possible d'intercepter et de rééduquer toutes les fonctions qui ne s'accomodent pas au nouveau tableau structurel, cela éliminant aussi le risque de récidive de la dysgnathie.

Resumen

Objectivos

Las disfunciones linguales desempeñan un papel importante en la patogénesis de los dismorfismos dentoesqueléticos. El tratamiento de la disgnacia dento-maxilo-facial conlleva una rehabilitación funcional con vistas a harmonizar de nuevo el sistema estomatognático. Este estudio apunta a demostrar la importancia de un protocolo de rehabilitación de los parámetros orofaciales funcionales al final de un tratamiento ortodóncico quirúrgico para lograr un éxito a largo plazo.

Materiales y métodos

Después de la cirugía ortognática, se prescriben ejercicios de expresión facial y de la mandíbula a fin de promover la recuperación de la función neuromuscular. Al finalizar el tratamiento, una muestra de 30 pacientes disgnáticos fue sometida a evaluación funcional de la región orofacial para identificar cualquier disfunción lingual o de articulación. La información recogida llevó a un programa de reeducación individual que consistió en un enfoque logopédico miofuncional integrado con aparatos utilizados como medios de retención.

Resultados

19 pacientes necesitaron terapia miofuncional para reeducar la deglución y la postura de la lengua. Fueron encontrados trastornos de articulación en 7 pacientes que sufrían originariamente de desarmonía esquelética open bite y/o Clase III; cinco pacientes completaron la rehabilitación con terapia del habla. Después de la rehabilitación, los parámetros funcionales se normalizaron en 12 pacientes; en 5 casos se consiguieron mejorías parciales mientras que en 2 casos la terapia fue inefectiva.

Conclusiones

En un paciente sometido a reconsolidación posquirúrgica de su equilibrio funcional, incluso un defecto no controlado del habla puede acarrear un resultado inestable. Sólo a través de un enfoque interdisciplinario es posible interceptar y reeducar todas las funciones que no se ajustan al nuevo cuadro estructural, eliminando al tiempo el riesgo de reincidencia de la disgnacia.

Keywords

- Dento-maxillofacial dysgnathia;
- Myofunctional therapy;
- Post-surgical re-education;
- Retainers;
- Speech therapy

Figures and tables from this article:

Fig. 1. Functional relationship between the components of the stomatognathic apparatus (SGA): neuromuscular system (NMS), dento-periodontal apparatus (DPA), temporomandibular joint (TMJ), basal skeletal system (BSS).

Figure options

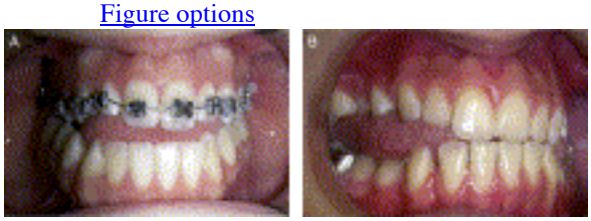

Fig. 2. Abnormal posture of the tongue with frontal **(A)** and lateral interposition **(B)**.

Figure options

Fig. 3. Typical lower tongue resting position in Class III dysgnathia.

Figure options

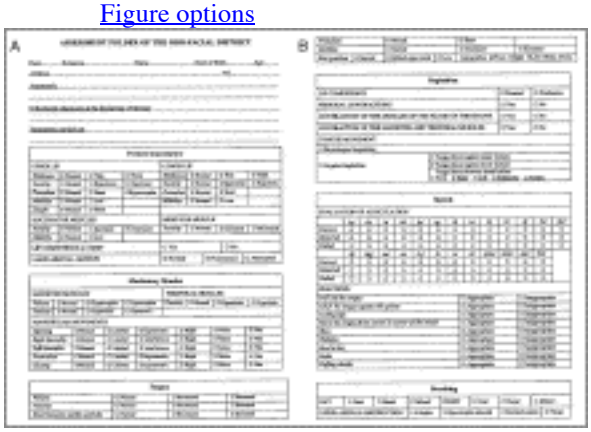

Fig. 4. Post-surgical functional assessment reports in dysgnathic patients **(A,B)**.

Figure options

Fig. 5. Deep pressure on the sides of the tongue with a blunt instrument.

Figure options

Fig. 6. Exercise with a single elastic for tongue posture.

Figure options

Fig. 7. Deglutition using a straw placed horizontally at the intercanine level.

Figure options

Fig. 8. Exercise for correcting the interdental lisps.

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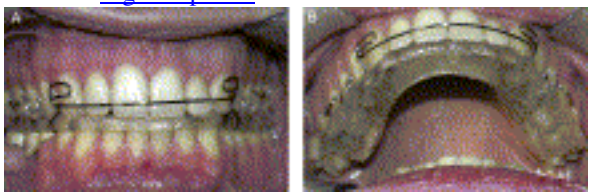

Fig. 9. Upper retainer with splinting of the upper arch.

Figure options

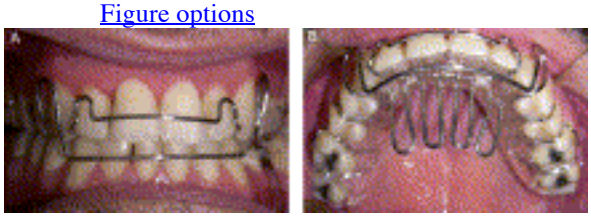

Fig. 10. Class III retainer with lingual grid and control arch for the lower front group (A,B).

Figure options

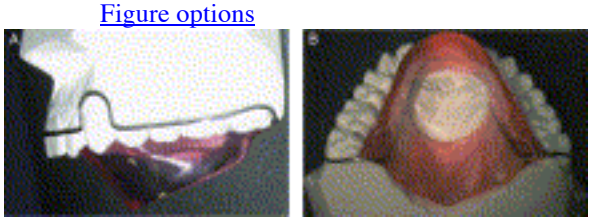

Fig. 11. Bonnet ELN for the rehabilitation of tongue posture.

Figure options

N°	NAME	AGE	GENDER	DIAGNOSIS	THERAPY	OPINION	POST-TREATMENT OROFACIAL EVALUATION				RESTRAINTS	MFT*	ST
							DEGLUTITION	TONGUE POSTURE	ARTICULATION DISORDERS	PERIORAL MUSCLES			
1	S. M.	32	M	CL*II; DB*	EX* 1.4,2.4 + PO* + BSSO*-GP*	EXCELLENT	NORMAL	BACKWARD	-----	NORMAL	SR*	-----	-----
2	B. A.	17	F	CL II; DB; IN* 1.3,2.3,3.3,4.3	EX 1.3,2.3,3.3,4.3 + PO + BSSO-GP	EXCELLENT	ATYPICAL	NORMAL	/r/	UNBALANCED	SR	YES	YES
3	E. F.	25	M	CL II; DB; SF*	EX 1.8,2.8,3.8,4.8 + PO + BSSO	GOOD	NORMAL	NORMAL	-----	UNBALANCED	SR	-----	-----
4	M. A.	26	M	CL II	PO + BSSO-GP	EXCELLENT	NORMAL	NORMAL	-----	NORMAL	SR	-----	-----
5	L. A.	26	F	CL II; MC*	PO + LFI*-BSSO	GOOD	NORMAL	BACKWARD	-----	NORMAL	SR	-----	-----
6	A. M.	26	F	CL II; TMD*	PO + LFI-BSSO	GOOD	ATYPICAL	NORMAL	-----	UNBALANCED	SR	YES	-----
7	S. P.	27	F	CL II	PO + LFI-BSSO	GOOD	NORMAL	FORWARD	-----	NORMAL	SR	YES	-----
8	C. S.	17	F	CL II	EX 1.4,2.4 + PO + LFI-BSSO	EXCELLENT	NORMAL	NORMAL	-----	NORMAL	SR	-----	-----
9	M. A.	21	F	CL III	PO + LFI-BSSO	GOOD	NORMAL	NORMAL	-----	NORMAL	RG*	-----	-----
10	P. E.	28	M	CL III; MC	PO + LFI-ID*	EXCELLENT	ATYPICAL	DOWNWARD	/t/d/	NORMAL	RG	YES	-----
11	D. M.	19	F	CL III	EX. 1.8,4.8 + PO + LFI-BSSO	EXCELLENT	NORMAL	NORMAL	-----	NORMAL	RG	-----	-----
12	P. C.	32	F	CL III	PO + LFI-BSSO	EXCELLENT	NORMAL	DOWNWARD	-----	UNBALANCED	RG	YES	-----
13	P. A.	19	M	CL III	EX 3.8,4.8 + PO + LFI-BSSO	EXCELLENT	ATYPICAL	DOWNWARD	-----	NORMAL	RG	YES	-----
14	L. M.	18	M	CL III; TMD; AG*1.3,2.3; MC	PO + LFI-BSSO	EXCELLENT	ATYPICAL	DOWNWARD	/s/dz/gi/	UNBALANCED	RG	YES	YES
15	S. R.	24	M	CL III; IN 2.3	PO + LFI-BSSO	GOOD	ATYPICAL	DOWNWARD	-----	UNBALANCED	RG	YES	-----
16	M. M.	28	F	CL III; MLD*	PO + LFI-BSSO	EXCELLENT	NORMAL	FORWARD	-----	NORMAL	RG	-----	-----
17	R. M.	25	M	CL III; MLD; TMD	PO + BSSO	EXCELLENT	ATYPICAL	DOWNWARD	-----	NORMAL	RG	YES	-----
18	C. T.	17	M	CL III; MLD	EX 1.8,3.8,4.8 + PO + LFI-BSSO-RP*	EXCELLENT	ATYPICAL	DOWNWARD	-----	UNBALANCED	RG	YES	-----
19	M. G.	30	M	CL III; LDM-RCF*	PO + LFI-BSSO-RP	EXCELLENT	NORMAL	NORMAL	-----	NORMAL	RG	-----	-----
20	R. I.	20	F	OB* ant.; LF*	PO + LFI-BSSO	EXCELLENT	ATYPICAL	FORWARD	-----	UNBALANCED	ELN*	YES	-----
21	R. F.	26	F	OB ant.; MLD	PO + LFI-BSSO	EXCELLENT	ATYPICAL	NORMAL	-----	NORMAL	ELN	YES	-----
22	P. D.	22	F	OB ant.; CL II; LF	PO + LFI-BSSO	GOOD	ATYPICAL	FORWARD	-----	UNBALANCED	ELN	YES	-----
23	V. E.	25	M	OB ant.; CL II; MC	PO + LFI	GOOD	ATYPICAL	FORWARD	/s/z/ʃ/t/	UNBALANCED	ELN	YES	YES
24	V. S.	19	F	OB ant.; CL III; TMD	EX 1.8,2.8 + PO + LFI-BSSO	EXCELLENT	ATYPICAL	DOWNWARD	-----	UNBALANCED	RG	YES	-----
25	S. W.	18	M	OB ant.; CL III	PO + LFI-BSSO	EXCELLENT	ATYPICAL	DOWNWARD	-----	NORMAL	RG	YES	-----
26	S. D.	19	F	OB ant.; CL III; LF	EX 3.8,4.8 + PO + BSSO	GOOD	ATYPICAL	FORWARD	/t/s/	UNBALANCED	ELN	YES	YES
27	P. V.	22	M	OB ant.; CL III; LF	EX 1.8,2.8,3.8,4.8 + PO + LFI-BSSO	EXCELLENT	ATYPICAL	DOWNWARD	/t/d/s/z/	UNBALANCED	ELN	YES	YES
28	L. E.	21	F	OB ant-lat.; CL III; MLD	EX 1.4,2.4 + PO + LFI-BSSO	GOOD	NORMAL	NORMAL	-----	NORMAL	RG	-----	-----
29	G. C.	21	M	OB lat.; CL III	EX 1.5 + PO + LFI-BSSO	GOOD	ATYPICAL	DOWNWARD	/gi/	NORMAL	RG	YES	-----
30	T. S.	27	F	OB lat.; CL III	PO + LFI-BSSO	EXCELLENT	NORMAL	NORMAL	-----	NORMAL	RG	-----	-----

Class II Classe III Open-bite

N°	NAME	RESTRAINTS	MFT	ST	OROFACIAL EVALUATION AFTER THE REHABILITATION			
					DEGLUTITION	TONGUE POSTURE	ARTICULATION DISORDERS	PERIORAL MUSCLES
2	B. A.	SR	YES	YES	NORMAL	NORMAL	/r/	NORMAL
6	A. M.	SR	YES	-----	NORMAL	NORMAL	-----	NORMAL
7	S. P.	SR	YES	-----	NORMAL	NORMAL	-----	NORMAL
10	P. E.	RG	YES	-----	NORMAL	NORMAL	-----	NORMAL
12	P. C.	RG	YES	-----	NORMAL	DOWNWARD	-----	NORMAL
13	P. A.	RG	YES	-----	NORMAL	NORMAL	-----	NORMAL
14	L. M.	RG	YES	YES	NORMAL	NORMAL	-----	NORMAL
15	S. R.	RG	YES	-----	ATYPICAL	NORMAL	-----	NORMAL
17	R. M.	RG	YES	-----	NORMAL	NORMAL	-----	NORMAL
18	C. T.	RG	YES	-----	ATYPICAL	DOWNWARD	-----	UNBALANCED
20	R. I.	ELN	YES	-----	NORMAL	NORMAL	-----	NORMAL
21	R. F.	ELN	YES	-----	NORMAL	NORMAL	-----	NORMAL
22	P. D.	ELN	YES	-----	NORMAL	NORMAL	-----	NORMAL
23	V. E.	ELN	YES	YES	NORMAL	NORMAL	/s/ʃ/	NORMAL
24	V. S.	RG	YES	-----	ATYPICAL	NORMAL	-----	UNBALANCED
25	S. W.	RG	YES	-----	NORMAL	NORMAL	-----	NORMAL
26	S. D.	ELN	YES	YES	NORMAL	NORMAL	-----	NORMAL
27	P. V.	ELN	YES	YES	ATYPICAL	DOWNWARD	/t/d/s/z/	UNBALANCED
29	G. C.	RG	YES	-----	NORMAL	NORMAL	-----	NORMAL

Class II Class III Open-bite