Interceptive therapy with elastodontic appliance: case report

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Summary
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Aim of this report is to describe a case of a patient in mixed dentition with dento-skeletal class II malocclusion, deep bite, increased overjet and gummy smile.
In this kind of clinical case the objectives of treatment were: to correct the dento-skeletal malocclusion, to obtain a correct overbite and overjet, to control the permanent teeth in a good eruption, to improve aesthetical conditions and to maintain clinical results.
Treatment plan included just Occlus-o-guide®, the type that is indicated for mixed dentition (G type). The active phase of therapy was conducted in twelve months and the retention time was two years. Then the patient was controlled every three months and she used the appliance nighttime in alternance for one year more.
Occlus-o-guide® was the indicated appliance to obtain all the objectives requested to solve the malocclusion. The early therapy with Occlus-o-guide® is easy, short and most of treated cases don't need a second phase of orthodontic therapy.

Key words: elastodontics, deep bite, interceptive therapy.

Introduction

A new approach of interceptive treatment is "elastodontics" that is a particular type of orthodontic treatment using removable appliances made with silicone elastomer. The appliances are simple in construction and function, easy to use and safe; in mixed dentition the indicated appliance is Occlus-o-guide® G type (1,2,3).
Eruption guidance appliances present the combined characteristics of a functional appliance and a positioner. The characteristics attributed to functional appliances are mandibular advancement in order to correct Class II sagittal discrepancies, concurrently with a vertical opening in the anterior region to provide a greater vertical development of the posterior teeth. Positioners usually achieve minor tooth movement after orthodontic treatment as a result of the elastomeric material (4,5).
Class II malocclusion correction with eruption guidance appliances produces the following statistically significant changes: increase in mandibular growth and degree of mandibular protrusion, increase in lower anterior and total anterior face height, lingual tipping and retrusion of the maxillary incisors, protrusion of the mandibular incisors, increased mandibular molar mesial drifting and mandibular posterior dentoalveolar height, improvement in maxillomandibular and molar relationships, decrease in overjet and overbite and inhibition of the vertical development of the maxillary incisors (5).
Aim of this report is to describe a case of a patient with class II skeletal and dental malocclusion, severe deep bite, increased overjet, retrognatic and gummy smile. This case was solved during mixed dentition by using just Occlus-o-guide®.

Materials and methods

The subject, F.B., a 9 year-old Caucasian female, was selected from the Department of Orthodontics, University of Rome 'Tor Vergata'. The subject satisfied the following selection criteria: 9-11 years of age, mixed dentition, overjet>3 mm, overbite>3 mm, skeletal Class II malocclusion (ANB>4°), retrognathic mandible (SNB<78°), no history of previous orthodontic therapy. Radiographs data were taken before (T0), after 12 months of active therapy (T1) and after 24 months of retention (T2). Her medical history showed nothing remarkable. The patient's face was symmetric with gummy smile and low retrognatic profile (Figs. 1,2).
Clinical examination showed right and left class II molar relationship, no crowding in mandibular arch, increased overjet, severe deep bite, coincident midlines.
Arches analysis showed a mixed dentition presenting in maxilla: right and left first molar, permanent right and left central incisor, permanent right and left lateral incisor, right and left cuspid in eruption, right and left first bicuspid and right and left deciduous second molar. In mandibular arch right and left first molar, permanent right and left central incisor, permanent right and left lateral incisor, right and left cuspid, right and left first bicuspid in eruption, right and left deciduous second molar were observed (Figs 3,4,5). No problems in opening and closure movements could be noticed.
Orthopantomography analysis showed all permanent teeth at different formation stages and second upper and lower right and left deciduous molars (Fig. 6).
Cephalometric analysis (Fig. 7) revealed a skeletal Class

Figure 1 - Face and smile (T0).

Figure 2 - Profile (T0).

Figure 3 - Occlusion in frontal view (T0).

Figure 4 - Occlusion in right lateral view (T0).

Figure 5 - Occlusion in left lateral view (T0).

II malocclusion with mandibular retrusion (ANB=5, Nperp-Pg=-7) in a hypodivergent subject (FH^MP=22), dental deep bite (overbite=6 mm), increased overjet (overjet=6 mm), proclination of lower incisor and reclination of upper incisor (IMPA=100, U1^FH=108), alteration of profile (Nasolabial=112) (Table 1). The subject's skeletal maturity was the prepubertal stage of CS2.

In this clinical situation the treatment's objectives were:

- to treat class II malocclusion;
- to control bicuspids and canines eruption;
- to obtain a correct overbite and overjet;
- to improve gummy smile and profile;
- to maintain long-term clinical results.

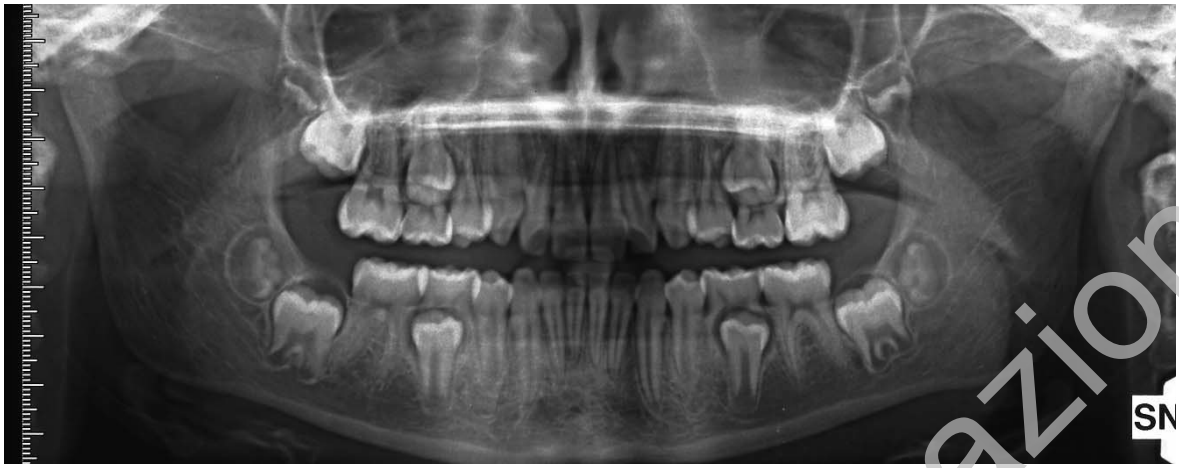

Figure 6 - Orthopantomography before treatment (T0).

Figure 7 - Latero-lateral teleradiography before treatment (T0).

Treatment plan included just Occlus-o-guide® G type (Fig. 8). The active phase of therapy was totally conducted in twelve months: the patient was instructed to use the appliance nighttime and two hours during the day. These two hours were divided into four periods of half an hour. In each period the patient had to bite into the appliance keeping the lips in contact. For the last twelve months the patient used Occlus-o-guide® just nighttime without exercises. Then the patient was controlled every three months and she used the appliance nighttime in alternance for one year more. Good collaboration was obtained by the patient observed in control visit once a month in all the time of active therapy. A check on her cooperation was made by an evident change of the appliance material: the appliance colour is made to alter according to the number of hours it is used. Initial problems with use of Occlus-o-guide® included only excessive salivation: this effect, however, gradually reduced after few days.

Results

In the examined case correction of class II malocclusion, increased overjet, crowding and deep bite can be obser-

Table 1 - Cephalometric analysis before treatment (T0), after one year of active treatment (T1) and after two years of retention (T2).

Sagittal skeletal	**T0**	**T1**	**T2**
SNA (°)	78	77	79
SNB (°)	73	74	76
ANB (°)	5	3	3
Nperp-A (mm)	6	6	6
Nperp-Pg (mm)	-7	-6	2
Co-A (mm)	88	90	94
Co-Gn (mm)	105	107	110
Vertical skeletal			
FH^MP (°)	22	21	24
FH^OP (°)	8	12	8
PP^MP (°)	27	30	26
N-ANS (mm)	53	55	55
ANS-Me (mm)	58	61	61
N-Me (mm)	112	118	118
Co-Go (mm)	40	44	54
Gonial angle (°)	123	127	128
Maxillary dentoalveolar			
U1^FH (°)	108	112	112
U1^Pt A vert (mm)	1,5	4	5
U1 horizontal (mm)	48	49	49
U1 vertical (mm)	28	28	28
U6 horizontal (mm)	15	16	13
U6 vertical (mm)	18	18	21
Mandibular dentoalveolar			
IMPA (°)	100	101	100
L1^Pt A-Pg (mm)	2	3	3
L1 horizontal (mm)	50	56	56
L1 vertical (mm)	25	30	32
L6 horizontal (mm)	21	25	26
L6 vertical (mm)	20	22	22
Interdental			
Interincisal (°)	124	125	126
Overjet (mm)	6	3	3
Overbite (mm)	6	2	2
Molar relationship (mm)	-1	1	2
L1 vertical (mm)	25	30	32
L6 horizontal (mm)	21		
L6 vertical (mm)	20	22	22
Soft tissue			
UL-EL (mm)	0	-4	-3
LL-EL (mm)	2	-2	0
Nasolabial angle (°)	112	104	110

ved associated with good aesthetical results of profile and correction of gummy smile. The profile analysis revealed an excellent result and it is possible to observe the resolution of gummy smile (Figs 9,10). The correction of skeletal class II malocclusion was obtained in twelve months just using Occlus-o-guide® at the right time of eruption of permanent teeth.

Figure 8 - Occlus-o-guide® G type.

Clinical analysis of occlusion shows the good correction of dental class II malocclusion, overjet and overbite associated with good eruption of posterior teeth (Figs 11,12,13).
Cephalometric analysis two years later the end of active treatment revealed the solution of skeletal class II malocclusion (ANB=3), control of divergence (FH^MP=22), good proclination of upper and lower incisor (U1^FH=112, IMPA=100), normal overbite (overbite=2 mm) and overjet (overjet=3 mm) and important improvement of aesthetical values analysis (Nasolabial angle=110, UL-LE= -3, LL-LE= 0) (Table 1) (Figs 14,15).
At the end of therapy, after three years, the patient shows correct intercuspidation, no crowding, normal overjet and overbite, right and left class I canine and molar and skeletal maturity postpubertal stage of CS5.

Discussion

In the case treated by using Occlus-o-guide® the overbite was simply corrected: the forces induced into the appliance are orthopaedic and they generate 150 to 600 pounds per square inch in the upper jaw. These forces control vertical and horizontal growth of the maxilla, allowing posterior teeth to erupt more than anterior teeth (6,7).
Timing is therefore very important for successful in early preventive treatment and it seems to be more critical in overbite than in overjet correction. Proper retention of early preventive overbite correction seems to be dependent on two different factors: collagenous fiber formation, particular interseptal, and alveolar and vertical jaw growth. Correct time for proper fiber formation occurs when treatment is initiated before or during active tooth eruption without any occlusal contact of opposing teeth (6).

Conclusions

The right choose of clinical case is the most important moment of therapy with Occlus-o-guide®. Different Authors show solved clinical cases and suggest to use Occlus-o-guide® in non-extraction malocclusion cases with permanent canines and bicuspids at the start of eruption, in order to correct overbite and overjet problems of any severity (6,1,8,9).
Careful supervision of the developing dentition and oc-

Figure 9 - Face and smile (T2).

Figure 10 - Profile (T2).

Figure 11 - Occlusion in frontal view (T2).

Figure 12 - Occlusion in right lateral view (T2).

Figure 13 - Occlusion in left lateral view (T2).

clusion, correct diagnosis, correct choose of clinical case and right time of treatment are important considerations to obtain good results and to prevent complications. The patient's collaboration is essential with this kind of therapy and younger subjects are usually better patients than teenagers (10,11).

Occlus-o-guide® is a safe appliance that gives clinical results in few months of patient collaboration. As other type of interceptive therapies it can substantially avoid future problems that a deep bite can create and reduce the real "risk" of orthodontic fixed appliances.

Figure 14 - Orthopantomography after two years of retention (T2).

Figure 15 - Latero-lateral teleradiography after two years of retention (T2).

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