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Aesthetic perception of patient in developmental age in interceptive orthodontic treatment



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Abstract

Aim Patients at development age show considerable attention to the shape of the face from both an aesthetic and relational point of view, to arouse interest from researchers. There are few studies related to profile analysis in patients of developmental age. Therefore, the objective of the present study was to analyse the importance of the aesthetic perception of the patient in development age in relation to the profile, before and after interceptive orthodontic treatment.

Materials and methods A sample of 25 patients who came to our observation for dentoskeletal malocclusions was considered. A questionnaire was proposed to each patient, before and after the interceptive orthodontic treatment (T0 and T1), to evaluate the aesthetic perception before and after the orthodontic treatment and its psychosocial impact. Profile analysis was performed using photographic documentation (at T0 and T1). The variables considered were the Ricketts line, the facial convexity angle, the nasolabial angle, and the labiomental angle.

Results The variables assessed showed at T0 a negative aesthetic perception of the face and profile, also referable in some cases to some bullying incidents. After orthodontic treatment (T1), the results of the aesthetic analysis showed statistically significant changes associated with a high degree of satisfaction not only with the face but also with the profile.

Conclusions Interceptive orthodontic treatment has proven to be of valid clinical and psychological help. This result is confirmed by the complete aesthetic satisfaction of the patient in the frontal and latero-lateral planes.

KEYWORDS Interceptive orthodontic treatment, paediatric dentistry, aesthetic perception.

Introduction

Patients at development age show considerable attention to the shape of the face from both an aesthetic and relational point of view, to arouse interest from researchers [Sriphadungporn and Chamnannidiadha, 2017]. At the neuronal level, a harmonious face elicits a greater response from the medial orbitofrontal cortex [O'Doherty et al., 2003]. The perception of smile is subjective and influenced by various sociocultural factors, gender and age [Zange et al., 2011]. In fact, some Authors have found that the gingival smile or the black triangles can be perceived differently by different groups of patients [Abu Alhaija et al., 2011; Zange et al., 2011]. However, it is possible to find the presence of discomfort or relational problems associated with aesthetic dissatisfaction with one's face [Kouskoura et al., 2022]. For these reasons, it is interesting to study the psychosocial impact of the aesthetic perception of the smile after interceptive orthodontic treatment. Even more recent literature analyses the frontal aesthetic analysis more frequently, referring to the gingival smile, diastemas, and buccal corridors, as indicators of a harmonious appearance of the face [Parrini et al., 2016]. However, there are few studies related to profile analysis in patients of developmental age. Therefore, the objective of the present study was to analyse the importance of the aesthetic perception of the patient in development age in relation to the profile, before and after interceptive orthodontic treatment.

Materials and Methods

A sample of 25 patients who came to our observation for dentoskeletal malocclusions was considered according to the following eligibility criteria:

- Ages between 8 and 11 years
- Class II and Class III dentoskeletal malocclusion
- Patients who have not previously undergone orthodontic treatment.

A questionnaire was proposed to each patient, before and after the interceptive orthodontic treatment (T0 and T1), to evaluate the aesthetic perception before and after the orthodontic treatment and its psychosocial impact. The questionnaire is made up of 23 items with a 5-point Likert scale (0-4) (Fig.1). Profile analysis was performed using photographic documentation (at T0 and T1). The variables considered were the Ricketts line, the facial convexity angle, the nasolabial angle, and the labiomental angle. All data were recorded in a database (Excel, Microsoft Corporation, Redmond, WA, USA) to analyse both the aesthetic changes

that occurred before and after the interceptive orthodontic treatment and how the latter influenced the aesthetic perception of the patient's profile.

Results

In patients with Angle Class II malocclusion, treated with Twin Block, a reduction (at T1) in the distance of the lower lip from the Ricketts line, obtaining a result that agrees with the aesthetic parameters of the face. These results are confirmed by the facial convexity angle, which shows a convex profile at T0 while at T1 it highlights a harmonious profile. The nasolabial angle (at T1) increases in patients with class II first division malocclusion, while it is reduced in patients with class II second division malocclusion (Table 1). Patients with Angle's Class III malocclusion underwent a reduction in the distance between the upper lip and the Ricketts line (approximately 2mm) and a reduction in the angle of facial convexity, improving the patient's profile. Similarly, treatment with the rapid maxillary expander (RME) and Delaire mask achieved positive profilometric results. Furthermore, a reduction in the nasolabial angle was found in all patients, unlike the labiomental angle, in which a decrease was only evident in patients treated with Delaire Mask (Table 2). The results relating to the aesthetic perception of the patients analysed by means of a pre- and post-treatment questionnaire are in line with the clinical results obtained. In fact, at T0, a negative aesthetic perception of the face was highlighted, also in relation to the profile, aggravated in some cases by episodes of bullying or insecurity in social relationships or by low self-esteem. Instead, post-treatment (at T1) the results of the aesthetic analysis highlighted statistically significant positive changes associated with a high degree of satisfaction in all patient (Graph 1).

Discussion

Human beings have always tried to identify a canon of beauty by looking for references in art or in anatomical proportions with the help of science and mathematics [Avella et al., 2021]. The profile is the dimension of which patients, especially adolescents, are most aware [Pithon et al., 2014]. Early diagnosis of malocclusion is crucial, as well as the sharing of information with other clinicians that deal with children and their parents, who need to be informed about the various therapies that their child may need [Saccomanno S. et al., 2022; Paglia L., 2023]. Some Authors state that patients affected by Angle Class III undergo an improvement in the profile of soft and hard tissues in equal measure with the use of different orthodontic devices such as the facial mask and the rapid maxillary expander, with significant

QUESTIONNAIRE

❒ Male ❒ Female Age _____ Reason for orthodontic treatment:
❒ Crooked teeth ❒ Teeth with spaces ❒ Skeletal protrusion (maxillary-mandibular) ❒ Indicated by the dentist

		Not at all	A little	Somewhat	Strongly	Very strongly
1.	I am proud of my teeth	0	1	2	3	4
2.	I like to show my teeth when I smile	0	1	2	3	4
3.	I am pleased when I see my self in the mirror	0	1	2	3	4
4.	I would change something about my face	0	1	2	3	4
5.	I am satisfied with the appearance of my face	0	1	2	3	4
6.	I find that my teeth are well positioned	0	1	2	3	4
7.	I restrain myself from laughing so as not to show too much of my teeth	0	1	2	3	4
8.	I worry about what other people think about my teeth	0	1	2	3	4
9.	I'm afraid other people could make offensive remarks about my teeth	0	1	2	3	4
10.	I am somewhat inhibited in social contacts because of my teeth	0	1	2	3	4
11.	I sometimes put my hands in front of my mouth to hide my teeth	0	1	2	3	4
12.	I think people stare at me because of my teeth	0	1	2	3	4
13.	Criticism of my teeth irritates me even when it is done in a joking tone	0	1	2	3	4
14.	I worry about what my friends think about my face	0	1	2	3	4
15.	I envy the beauty of other people's teeth	0	1	2	3	4
16.	I am somewhat interested when I see other people's teeth	0	1	2	3	4
17.	I am unhappy with the appearance of my teeth	0	1	2	3	4
18.	I think other people are more beautiful than me	0	1	2	3	4
19.	It bothers me when when someone takes pictures of me from the side	0	1	2	3	4
20.	I wish my teeth looked better	0	1	2	3	4
21.	I like to see my teeth in the mirror	0	1	2	3	4
22.	I like to see my teeth in photographs	0	1	2	3	4
23.	I like to take pictures from the side	0	1	2	3	4

FIG. 1 A questionnaire proposed at T0 and T1 to evaluate aesthetic perception before and after orthodontic treatment and its psychosocial impact.

Orthodontic devices used in patients with Class II malocclusion	Ricketts' aesthetic line		Facial convexity angle		Nasolabial angle		Labiomental angle	
	T0	T1	T0	T1	T0	T1	T0	T1
Frankel II	1 mm sup. 3 mm inf.	1 mm sup. 1 mm inf.	154°	157°	102°	106°	125°	129°
Frankel II	2 mm sup. 3 mm inf.	2 mm sup. 2 mm inf.	161°	165°	121°	126°	198°	202°
Frankel II	1 mm sup. 2 mm inf.	1 mm sup. 1 mm inf.	153°	156°	106°	103°	123°	128°
Frankel II	2 mm sup. 3 mm inf.	2 mm sup. 2 mm inf.	158°	161°	108°	113°	130°	138°
Frankel II	2 mm sup. 2 mm inf.	2 mm sup. 1 mm inf.	151°	154°	102°	100°	119°	125°
Frankel II	2 mm sup. 3 mm inf.	2 mm sup. 2 mm inf.	167°	171°	105°	108°	210°	218°
Frankel II	2 mm sup. 2 mm inf.	2 mm sup. 2 mm inf.	171°	172°	108°	111°	133°	134°
Frankel II	2 mm sup. 3 mm inf.	2 mm sup. 2 mm inf.	158°	161°	108°	113°	130°	138°
Twin Block	2 mm sup. 3 mm inf.	2 mm sup. 2 mm inf.	152°	155°	103°	106°	109°	112°
Twin Block	1 mm sup. 3 mm inf.	2 mm sup. 3 mm inf.	162°	165°	105°	108°	143°	146°
Twin Block	2 mm sup. 3 mm inf.	2 mm sup. 2 mm inf.	155°	159°	108°	110°	115°	119°
Twin Block	2 mm sup. 4 mm inf.	2 mm sup. 2 mm inf.	153°	159°	102°	109°	180°	197°
Twin Block	1 mm sup. 3 mm inf.	2 mm sup. 1 mm inf.	155°	161°	106°	111°	118°	129°

TABLE 1
Results of pre- and post-treatment aesthetic analysis in patients with Class II malocclusion.

improvements at the level of soft tissues by increasing the angle of convexity of the facial [Celikoglu and Oktay, 2014; Ozzeybek and Turkkahraman, 2019]. Similarly, the clinical results of the present study have highlighted the importance of the use of orthodontic devices, both in patients with class II and class III malocclusion, to obtain values closer to a harmonious face and profile and also to show how these results are associated with a positive psychological and social impact [Sambataro S. et al., 2023]. Furthermore, during the completion of the pre-treatment questionnaire it was also possible to highlight psychological discomforts linked to one's aesthetic appearance and therefore probably associated with episodes of bullying, insecurity in social relationships and low self-esteem. On the contrary, following orthodontic therapies, it was possible to find positive responses attributable to improved self-esteem and self-perception that confirm the importance of treatment not only from a clinical but also psychosocial point of view. These results agree with Ribas et al., who, guaranteeing profile-metric corrections in relation to Class II first division patients with mandibular retrusion, demonstrated how mandibular advancement and consequently a more harmonious profile produce a positive social impact and psychological, even more considerable given the delicate growth phase of patients in developmental age [Ribas et al., 2018].

Conclusions

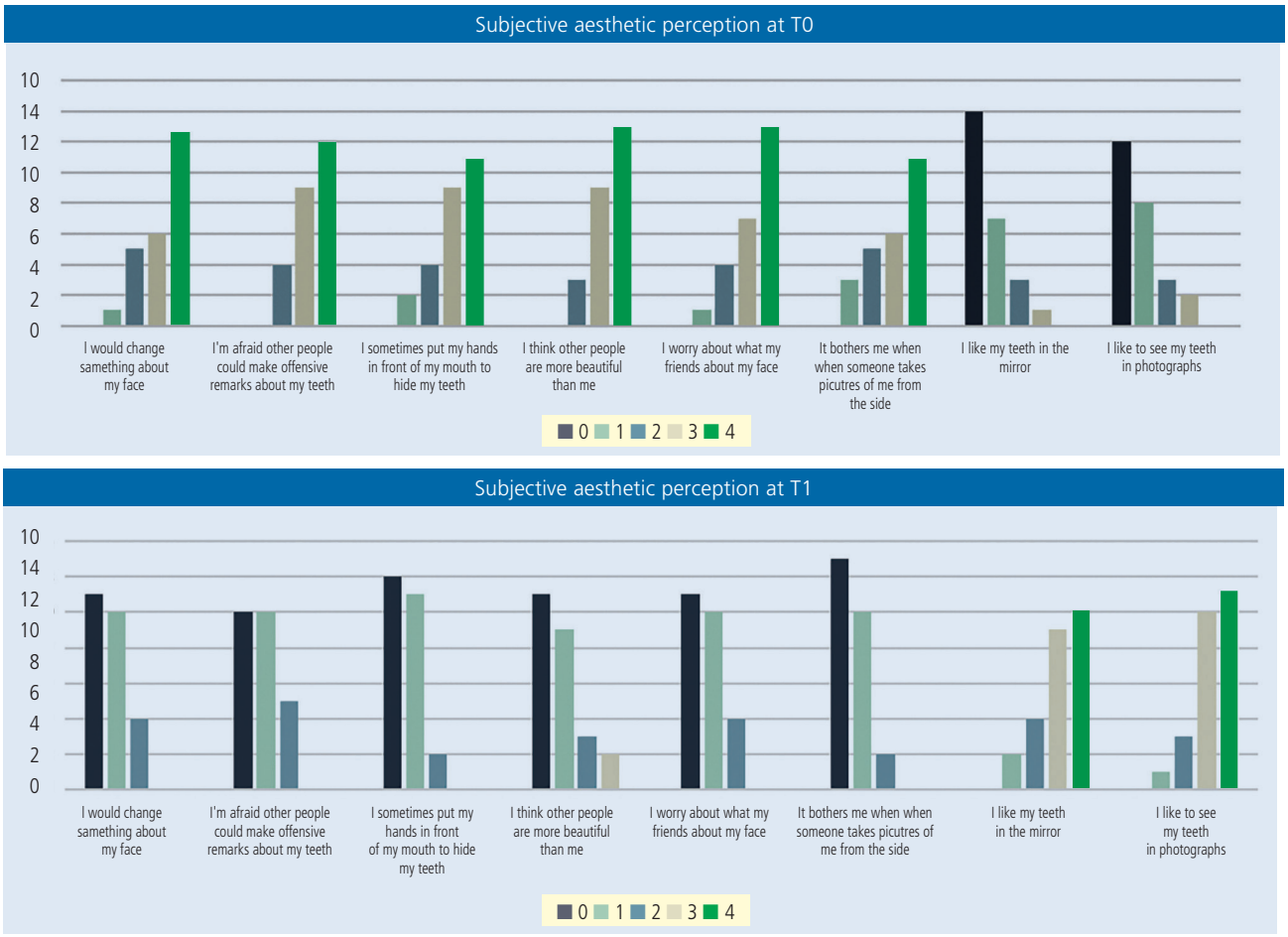
Interceptive orthodontic treatment has proven to be of valid clinical and psychological help. This result is confirmed by the complete aesthetic satisfaction of the patient in the frontal and latero-lateral planes. The aesthetic changes in the profile, more evident in patients with class III malocclusion, highlighted a positive and expected self-perception with a notable improvement in the relational approach and in one's emotional and behavioural state, even more fundamental in subjects of developmental age.

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Orthodontic devices used in patients with Class III malocclusion	Ricketts' aesthetic line		Facial convexity angle		Nasolabial angle		Labiomental angle	
	T0	T1	T0	T1	T0	T1	T0	T1
rme	6 mm sup. 1 mm inf.	4 mm sup. 2 mm inf.	181°	179°	115°	114°	109°	109°
rme	6 mm sup. 2 mm inf.	4 mm sup. 2 mm inf.	179°	177°	108°	107°	122°	122°
rme	5 mm sup. 3 mm inf.	3 mm sup. 2 mm inf.	177°	175°	119°	117°	119°	119°
Frankel III	7 mm sup. 2 mm inf.	4 mm sup. 2 mm inf.	181°	178°	108°	104°	124°	124°
Frankel III	5 mm sup. 2 mm inf.	3 mm sup. 2 mm inf.	177°	174°	103°	99°	116°	116°
Frankel III	6 mm sup. 3 mm inf.	4 mm sup. 2 mm inf.	176°	174°	107°	105°	123°	122°
Frankel III	6 mm sup. 4 mm inf.	4 mm sup. 3 mm inf.	179°	177°	105°	102°	127°	126°
Frankel III	6 mm sup. 3 mm inf.	3 mm sup. 2 mm inf.	174°	172°	102°	100°	116°	116°
Frankel III	7 mm sup. 3 mm inf.	5 mm sup. 3 mm inf.	178°	175°	106°	101°	128°	128°
Frankel III	6 mm sup. 2 mm inf.	5 mm sup. 2 mm inf.	180°	177°	108°	107°	117°	117°
Delaire Mask	7 mm sup. 3 mm inf.	5 mm sup. 2 mm inf.	183°	176°	110°	104°	112°	119°
rme + Delaire Mask	8 mm sup. 3 mm inf.	5 mm sup. 2 mm inf.	184°	177°	113°	106°	123°	129°

TABLE 2
Results of pre- and post-treatment aesthetic analysis in patients with Class III malocclusion.



GRAPH 1 Results of subjective aesthetic perception before and after orthodontic treatment.