

The Impact of Orthodontic Treatment on Facial Appearance in Angle Class III Patients: A Mini Review

João Paulo Pereira¹, Erika Regina Stocco Di Francesco², Antonio Santana Neto³, Danilo Lourenço³ and Irineu Gregnanin Pedron^{4*}

¹Undergraduate Student, Universidade Brasil, São Paulo, Brazil.

²Private practice, São Paulo, Brazil.

³Professor, Department of Orthodontics, Universidade Brasil, São Paulo, Brazil.

⁴Professor, Department of Periodontology, Implantology, Stomatology, Laser and Therapeutics, Universidade Brasil, São Paulo, Brazil.

***Corresponding Author:** Irineu Gregnanin Pedron, Professor, Department of Periodontology, Implantology, Stomatology, Laser and Therapeutics, School of Dentistry, Universidade Brasil, São Paulo, Brazil.

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Abstract

Angle Class III malocclusion has a strong genetic influence that can occur in several generations of the same family group. This dentofacial deformity can be identified from an early age, even in childhood. The perception of beauty in the transition phase to adolescence has a greater weight, because in this phase there are immense physiological changes. The need for attention through aesthetic enhancement generates vanity, which can have both beneficial and harmful influences. Nowadays, the young generation craves prominence and subsequently values the exaggerated importance of beauty and the quest for aesthetic perfection. A young patient with a dentofacial deformity caused by Angle Class III malocclusion has a major facial impact. They are usually the victims of teasing, nicknames and psychological pressure and bullying. They become embarrassed, irritable and their self-esteem and social integration suffer. From this perspective, early treatment in children can be beneficial, reducing the psychological burden of facial and dental alterations in the future. The purpose of this article is to review the literature on the facial aspects resulting from orthodontic treatment in Angle Class III patients.

Keywords: Angle Class III Malocclusion; Orthodontics; Self Concept; Smile; Quality of Life.

Introduction

Angle Class III malocclusion is a skeletal deformity and requires complex treatment, with few intervention alternatives, which are even more limited in patients without growth¹. In the Brazilian population, the prevalence of Class III malocclusion is 3%. Despite the low incidence, patients with Angle Class III usually have the lowest levels of self-esteem, as their faces are generally disharmonious and unbalanced².

The quality of the smile increases self-esteem, a factor of success, of social integration, a means of seduction, a factor of attraction³. A problem in the mouth can limit everyday life, causing discomfort, pain, mental distress, low self-esteem, sadness and worry, significantly reducing quality of life⁴.

It is important to diagnose the degree of skeletal discrepancy in order to develop an appropriate treatment plan. A combination of maxillary protraction and rapid maxillary expansion is one of the most common therapeutic approaches for the early treatment of skeletal Class III patients. Although camouflage treatment of skeletal Class III malocclusion is successful in some patients, careful attention must be paid until the end of growth. In addition, it is known that the earlier treatment begins, the greater the chance of therapeutic success⁵. Figures 1 to 4 illustrate the case of an Angle Class III patient whose skeletal deformity was initially treated by orthopaedic treatment (SN3) for 2 years, followed by orthodontic treatment (fixed appliance - Roth Technique). After 4 years of orthodontic preparation, orthognathic surgery (maxilla and mandible) was performed.

Class III malocclusions associated with craniofacial disharmonies are more complex to treat and tend to recur. It has been considered that treatment in the deciduous dentition provides greater skeletal gains than in the mixed dentition. Various types of appliance are used for early treatment, such as: chin-cup (exclusively or associated with fixed appliances); facial mask (exclusively or associated with rapid maxillary expansion appliances, fixed appliances, Bionator III, Fränkel RF-3, maxillary protraction arch, double plate and association of an upper removable appliance and extraoral traction in the lower arch). However, treatment at the beginning of the mixed dentition is considered better than in the permanent dentition⁶.

The co-operation of the patient is important for the success of the treatment. This is because the length of time the mask is worn during this stage of growth and development is crucial for the facial and occlusal effects to take place⁷.

The purpose of this article is to review the literature on the facial aspects resulting from orthodontic treatment in Angle Class III patients.



Figure 1: Pre-orthodontic treatment of a surgical skeletal Class III (A: frontal view; B: lateral view).



Figure 2: Clinical aspects of pre-orthodontic treatment.



Figure 3: Panoramic radiograph after 8 years of the surgical procedure.



Figure 4: Post-treatment of a surgical skeletal Class III after 11 years (A: frontal view; B: lateral view).

Review of the Literature

Oral Health and Wellness

Lecocq et al.⁸ (2014) report that the huge increase in the number of medical procedures designed to produce aesthetic changes means that beauty is no longer a gift of nature, but a condition that can be acquired. However, as professionals, we provide corrective care, transforming the misshapen into the harmonious. This type of therapy differs from aesthetic procedures that transform the normal into the "beautiful".

In the global concept of health, the oral health component also influences the general wellness of the individual. Oral health is an integral part of the craniofacial complex, which participates in essential physiological functions for human beings, such as eating, speaking and communicating. A problem at the oral level can limit these daily activities, generating discomfort, pain and a deterioration in quality of life, because at some point it can lead to deterioration at the mental level, reflecting low self-esteem, sadness and worry. Health-Related Quality of Life (HRQoL) is a concept that involves not only carrying out basic activities comfortably, but also the aesthetic value that individuals place on their oral cavity. Consequently, this in turn affects self-esteem, for which the appearance of the smile, the colour and shape of the teeth, the thickness and colour of the gums and lips are considered new parameters to be taken into account by patients that can alter their self-perception and influence their personality⁴.

Laus et al.⁹ (2020) evaluated the effects of visual media stimuli on the perception of dentofacial aesthetics and concluded that the psychosocial influences of malocclusion are not stable and tend to decrease over time. However, exposure to high smile aesthetics from other individuals can inhibit this process in people with more severe malocclusion and higher cognitive abilities.

Psychosocial aspects

Zhou et al.¹⁰ (2002) reported that almost half of patients with malocclusion had a nickname related to their dentofacial problems, and 8 out of 10 of these patients felt embarrassed or irritated by the nickname. In addition, the psychological state (embarrassment, feeling worn down, anger, pressure from friends and so on) of patients with skeletal malocclusion was closely related to the severity of the malocclusion. The authors concluded that orthodontists should be aware that young adult patients can expect orthodontic treatment to provide not only improvement in oral function and health, but also in aesthetics, self-esteem and social life.

Guth and Bacon³ (2010) reported that smile aesthetics is one of the main reasons for going to the orthodontist. This is because the quality of a smile increases self-esteem, a factor of success, of social integration, a means of seduction, a factor of attraction.

Chen et al.¹¹ (2015) showed that previous research has found an association between malocclusion and psychological distress. The psychometric scales revealed that issues related to the emotional and social domains, including aspects such as shyness, embarrassment, being upset and avoiding smiling or laughing, are more relevant to an orthodontic patient. In addition, the authors found that in both male and female patients, the need for orthodontic treatment significantly affected self-consciousness and feelings of tension. In addition, orthodontic patients with higher clinically assessed orthodontic needs reported more psychological impairments (difficulty relaxing and embarrassment) than those without borderline orthodontic treatment needs.

Social Aspects

Campbell¹² (1983) determined that if the maxilla does not grow vertically, the mandible rotates upwards and forwards, producing an appearance of mandibular prognathism that can be attributed to both the position and size of the mandible. In these cases, mechanical interference by excessive jaw closure can influence the growth of the maxilla and the alignment of the maxillary dentition. In addition, many young children can benefit from treatment because it reduces the psychological burden of facial and dental changes in the future.

Mossey et al.¹³ (1999) described that family genetic inheritance has a strong influence on craniofacial skeletal dimensions contributing to Class III malocclusion and the significantly higher incidence of this malocclusion has been found among members of the same families over many generations.

Nicodemo et al.¹⁴ (2007) described that facial deformity, with its destructive psychological and social potential, has a negative impact and can influence not only self-confidence of the patients, but also their external relationships, resulting in social and psychological disadvantages. The goals of treatment for patients with dentofacial deformity, related to repair, are also psychosocial and they may express the expectation of resolving their personal and social difficulties with physical change, i.e. improving their appearance through surgical correction. The authors showed that patients sought surgical correction for functional (34.5%), aesthetic (30.9%) and social reasons (29.1%); they wanted to improve their social situations (40%) and aesthetics (32%), with these wishes being realised after surgery. As for expectations, 49.4% of patients hoped to improve the functional aspect, followed by aesthetics (26.9%), social situations (11.2%) and self-esteem (6.7%). In all aspects, patients were very satisfied with the improvement in diction, aesthetics, beauty and a return to life without discrimination.

Silva Filho et al.² (2008) reported that in the Brazilian population, the prevalence of Class III malocclusion is 3%. Despite the low incidence, patients with Class III are usually the ones with the lowest self-esteem levels, as their faces are usually disharmonious and unbalanced.

Burden et al.¹⁵ (2010) carried out a comparative study on patients with Angle Class II and III skeletal discrepancies. They found that Class III skeletal patients had stronger feelings of insecurity about their facial appearance. In fact, they suggested that individuals with Class II skeletal discrepancy are less likely to have psychological problems than those with Class III skeletal discrepancy. It is possible that Class II skeletal individuals can easily disguise their discrepancy by projecting their mandible anteriorly.

Guth and Bacon³ (2010) reported that the search for aesthetic excellence has become one of the main objectives in dental and orthodontic treatment. Philosophical, psychological and sociological aspects have been considered to understand the role of the smile in human relationships and self-representation. The search for beauty is universal, but its evaluation remains subjective, even though attempts at objectivity have been made. Self-esteem is fundamental to mental and social well-being of the individuals. A human being has to submit to the rules and customs of their peers if they want to be part of the society in which they live. Even if some aesthetic standards cannot be circumvented and seem universal, the reality of beauty is unregulated by social dictates, as is the representation of a smile. It is therefore essential to listen to the patient before considering only their teeth.

Kovalenko et al.¹ (2012) reported that the human face is the part of the human body that primarily determines our physical attractiveness. It is the main means of identification and non-verbal communication. Facial aesthetics have a great influence on our social lives. Approximately 63% of patients considered that their facial appearance problems would negatively affect their personal lives and 44% their social lives. Skeletal malocclusions often worsen facial aesthetics, which can negatively influence the quality of life of the patients. This is one of the reasons why orthognathic treatment is increasingly in demand today, as it allows a person to achieve a considerable improvement in facial aesthetics in a short period of time. Subsequently, it is logical to expect that such changes can have a psychological impact on a patient. The authors showed that the psychological state of orthognathic patients was influenced by the degree of Class III malocclusion and concluded that orthognathic patients with different degrees of facial deformity have different psychological profiles. Patients with mild and moderate facial deformity had no psychological problems. Patients with severe facial deformity had a significantly higher prevalence of emotional instability, introversion, anxiety and insociability. Such psychological profiles make orthognathic patients with severe facial deformity prone to psychological distress, depression and adverse psychological reactions. Skeletal Class III malocclusion is a deformity and requires complex treatment, with few intervention alternatives, which are even more limited in patients without growth. In most cases, orthognathic surgery is the ideal treatment for adults, an option often refused by patients. Patients with mild to moderate skeletal Class III malocclusions and acceptable facial aesthetics can benefit from a course of treatment in which tooth movements are used to compensate for the skeletal discrepancy.

Zere et al.¹⁶ (2018) reported that Class III malocclusion represents a complex three-dimensional imbalance in facial skeletal growth between maxilla and mandible, along with varied dentoalveolar changes and soft tissue compensations that can be expressed morphologically. Class III malocclusion can be associated with deficient maxillary growth (and/or retrognathia), excess mandibular growth (and/or prognathism), or a combination of both, along with vertical and transverse malformations. The authors determined the cause of this malocclusion to be various factors such as growth stimulation; a history of prolonged tongue sucking or resting habits; atypical swallowing; nasal airway obstruction; mouth breathing; mandibular displacements due to respiratory needs; tongue size; changes in the shape and size of the pharyngeal airways (enlarged tonsils, large tongue, adenoids); hormonal imbalances and disorders such as gigantism or pituitary adenomas; trauma; premature loss of deciduous teeth; congenital anatomical defects (cleft lip or palate); and muscle dysfunction alone or in combination with other environmental factors can all play an aetiological role.

Araújo and Squeff¹⁷ (2021) concluded that orthodontic camouflage can be an effective treatment alternative for achieving functional occlusion, stability and aesthetics in adult patients with mild to moderate skeletal Class III malocclusion.

Sebastiani et al.¹⁸ (2021) postulated that individuals with dentofacial deformities, especially those requiring orthognathic surgery, commonly present alterations due to aesthetic impairment, functional problems, chronic headaches, which can influence their self-esteem and personal relationships due to the difficulty in establishing social ties. Normally, when planning orthognathic surgery, surgeons give greater importance to skeletal changes, functional and aesthetic parameters than to psychological aspects. However, to achieve success, patients must be treated as a whole. It is therefore essential for surgeons to understand all the physical aspects and psychological symptoms associated with patients requiring orthognathic surgery, since most of them feel a negative influence of their appearance on their psychosocial wellness. Individuals with dentofacial deformities have a higher prevalence of depression than the general population, which is an important predictor of worsening quality of life.

Discussion

Several authors have agreed that patients with a Class III pattern commonly present alterations due to facial aesthetic impairment, functional problems and even chronic headaches. Most of them feel a negative influence from their appearance, discomfort in their psychosocial well-being, as well as sadness and depression^{1,4,10,11,18}.

A combination of maxillary protraction and rapid maxillary expansion is one of the best-known therapeutic approaches with a favourable prognosis for the early treatment of skeletal Class III patients⁴.

Several authors have agreed on the importance of early diagnosis and treatment, and the younger the patient, the greater the chance of success of these types of therapy⁵. Treatment at a young age produces favourable changes in both the maxilla and mandible. Late treatment, on the other hand, only leads to significant restriction of the mandible. However, the co-operation of the patient is important to achieve successful treatment⁷. The possibility of recurrence and future surgical intervention should not be ruled out, as Class III malocclusions associated with craniofacial disharmonies are more difficult to treat and tend to recur⁶. The important benefits of early treatment should not be dismissed, due to concerns that some patients may still require additional treatment⁵. After surgical treatment, one study reported that patients in adulthood were very satisfied with their improved diction, aesthetics, beauty and return to life without discrimination¹⁴.

Conclusions

The quality of a smile increases a self-esteem of the individual. Problems in the oral region can limit the normal routine, causing discomfort, pain and a deterioration in quality of life, as at some point they can cause mental distress, reflecting low self-esteem and sadness. Early treatment in young children can be beneficial because it reduces the psychological burden of facial and dental alterations in the future. Treatment in the deciduous dentition has been found to provide greater skeletal gains than in the mixed dentition. The most commonly used orthopaedic appliances for skeletal Class III correction are the face mask with maxillary protraction function and rapid maxillary expansion. The treatment of Class III malocclusion can improve chewing, diction, dental and facial aesthetics.

Conflict of Interest

The authors declares no conflict of interest.

References

1. Kovalenko A, Slabkovskaya A, Drobysheva N, Persin L, Drobyshev A, Maddalone M. The association between the psychological status and the severity of facial deformity in orthognathic patients. *Angle Orthod* 2012;82(3):396-402.
2. Silva Filho OG, Queiroz APC, Herkrath FJ, Silva GFB. Correlation between facial pattern and sagittal relationship between dental arches in deciduous dentition: epidemiological considerations. *R Dental Press Ortodon Ortop Facial* 2008;13(1):101-112.
3. Guth É, Bacon W. Smile in self-representation and self-esteem. *Orthod Fr* 2010;81(4):323-329.
4. Díaz-Cárdenas S, Tirado-Amador L, Tamayo-Cabeza G. Impacto de la sonrisa sobre calidad de vida relacionada con salud bucal en adultos. *Rev Clin Periodoncia Implantol Rehabil Oral* 2018;11(2):78-83.

5. Kanno Z, Kim Y, Soma K. Early correction of a developing skeletal Class III malocclusion. *Angle Orthod* 2007;77(3):549-556.
6. Toffol L, Pavoni C, Baccetti T, Franchi L, Cozza P. Orthopedic treatment outcomes in Class III malocclusion. A systematic review. *Angle Orthod* 2008;78(3):561-573.
7. Gallão S, Martins LP, Faltin Júnior K, Gandini Júnior LG, Pieri LV, Gaspar AMM Bolini PDA. Class III diagnosis and early treatment: case report. *J Health Sci Inst* 2013;31(1):104-108.
8. Lecocq G, Truong L, Truong T. Smile esthetics: calculated beauty? *Int Orthod* 2014;12(2):149-170.
9. Laus I, Pavičić DK, Brumini M, Perković V, Pavlić A, Špalj S. Effects of visual stimuli from media on the perception of dentofacial esthetics. *Acta Stomatol Croat* 2020;54(3):283-293.
10. Zhou Y, Hägg U, Rabie ABM. Severity of dentofacial deformity, the motivations and the outcome of surgery in skeletal Class III patients. *Chin Med J (Engl)* 2002;115(7):1031-1034.
11. Chen M, Feng ZC, Liu X, Li ZM, Cai B, Wang DW. Impact of malocclusion and oral health-related quality of life. *Angle Orthod* 2015;85(6):986-991.
12. Campbell PM. The dilemma of Class III treatment. Early or late? *Angle Orthod* 1983;53(3):175-191.
13. Mossey PA. The heritability of malocclusion: part 2. The influence of genetics in malocclusion. *Br J Orthod* 1999;26(3):195-203.
14. Nicodemo D, Pereira MD, Ferreira LM. Orthognathic surgery: psychosocial approach in Angle Class III patients submitted to correction surgery of facial deformity. *R Dental Press Ortodon Ortop Facial* 2007;12(5):46-54
15. Burden DJ, Hunt O, Johnston CD, Stevenson M, O'Neill C, Hepper P. Psychological status of patients referred for orthognathic correction of skeletal II and III discrepancies. *Angle Orthod* 2010;80(1):43-48.
16. Zere E, Chaudhari PK, Sharan J, Dhingra K, Tiwari N. Developing Class III malocclusions: challenges and solutions. *Clin Cosmet Investig Dent* 2018;10:99-116.
17. Araujo MTS, Squeff LR. Orthodontic camouflage as a treatment alternative for skeletal Class III. *Dental Press J Orthod* 2021;26(4):e21bbo4.
18. Sebastiani AM, Gerber JT, Bergamaschi IP, Petinati MF, Meger MN, Costa DJ, Brancher JA, Küchler EC, Scariot R. Individuals requiring orthognathic surgery have more depression and pain than controls. *Braz Oral Res* 2021;35:e091

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