

Maxillary sagittal expansion in an adult patient

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Abstract

Relevance. Skeletal Class III malocclusion is known to be one of the most difficult malocclusions to correct. Nonsurgical treatment of Class III in adults is a challenge; however, this patient refused surgery. A treatment method with Fixed Anterior Growth Guidance Appliance (FAGGA) was investigated in the study.

Materials and methods. This case report presents a 37-year-old woman with skeletal Class III malocclusion for maxillary deficiency. As the patient didn't agree to surgery, she was treated by Fixed Anterior Growth Guidance Appliance, followed by 3D SMILE® clear aligners. Fixed Anterior Growth Guidance Appliance was used initially. After 4 months, the appliance was removed and clear aligner treatment was initiated. Post-treatment radiographs showed improvement.

Results. Intraorally, in the upper arch, a total of 4.00 mm of space were gained (about 2.00mm distal to each canine). The post-treatment cephalometric analysis showed a skeletal A-P Class I, the Upper incisor inclination to the optic plane was not significantly altered, ANS — antArc was improved by 1.5mm, the Effective Length of the Premaxilla increased by 2.6mm, U1 — ANS' decreased by 1.7mm, Incisor mandibular plane angle (IMPA) autonomously improved by 11 degrees.

Conclusions. Maxillary deficiency was corrected successfully with the Fixed Anterior Growth Guidance Appliance. The treatment is being continued by 3D SMILE® clear aligners. The goal was achieved despite the patient's age and nonsurgical treatment.

Key words: FAGGA, Class III, Nonsurgical treatment

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RELEVANCE

Skeletal Class III malocclusion is known to be one of the most difficult malocclusions to correct. Class III malocclusion can be defined as facial and skeletal deformities characterized by maxillary retrognathism, mandibular prognathism, or a combination of both. A study found that 30% of Class III cases had maxillary retrognathism and mandibular prognathism. 1 Manifestations of Class III malocclusion results from the interaction between the genetic hereditary or congenital factors and the environmental factors. 2 Habsburg Jaw is the best-known example of familial inheritance, where mandibular prognathism in the European royalty recurred over multiple generations. 3 Environmental factors such as trauma, hormonal disturbances, premature loss of primary teeth, innate anatomic defect, i.e. cleft palate, cleft lip, mouth breathing, and muscle dysfunction alone or in combination with other environmental factors, as it has been mentioned above, play an unequivocal etiological role.

A number of non-surgical treatment methods can be found in the literature regarding the treatment of Class III malocclusion with maxillary deficiency in growing patients. The orthopedic face mask was developed by Delaire to stimulate maxillary growth. Reverse-pull headgear or protraction face mask was also used to treat this discrepancy. 4. Ankylosed primary canines were also used as an anchorage for maxillary orthopedic retraction. 5. Miniplates, 6. miniscrews, 7. bone-anchored maxillary protraction, 8. tongue plate, and tongue appliance. 9 were also used for the treatment of maxillary deficiency. However, surgical treatment will eventually be required in such patients because the maxilla cannot be moved after the completion of growth. 10.

Nonsurgical treatment of Class III in adults is a challenge; however, this patient refused surgery. Fixed Anterior Growth Guidance Appliance (FAGGA) treatment technique was studied by the present work.

MATERIALS AND METHODS

A 37-year-old woman presented to our office with complaints of crooked teeth and a clicking sound in the right temporomandibular joint area when she opens her mouth.

The extraoral examination showed a high nasolabial angle [Figure 1. a].

The intraoral examination showed a Class I molar relationship on the left side, a Class III molar relationship on the right side, Class I canine relationship on both sides [Figures 2 – 6]. Cephalometric analysis demonstrated a skeletal A-P Class III, retroclined lower incisors, and a vertical growth pattern with a short maxillary frontal section [Table 1, Figure 1. g].

Treatment goals

1. Correct the deficient pre-maxilla.
2. Correct the malocclusion using 3D SMILE® clear aligner system to provide a functional intercuspation.

Treatment alternatives

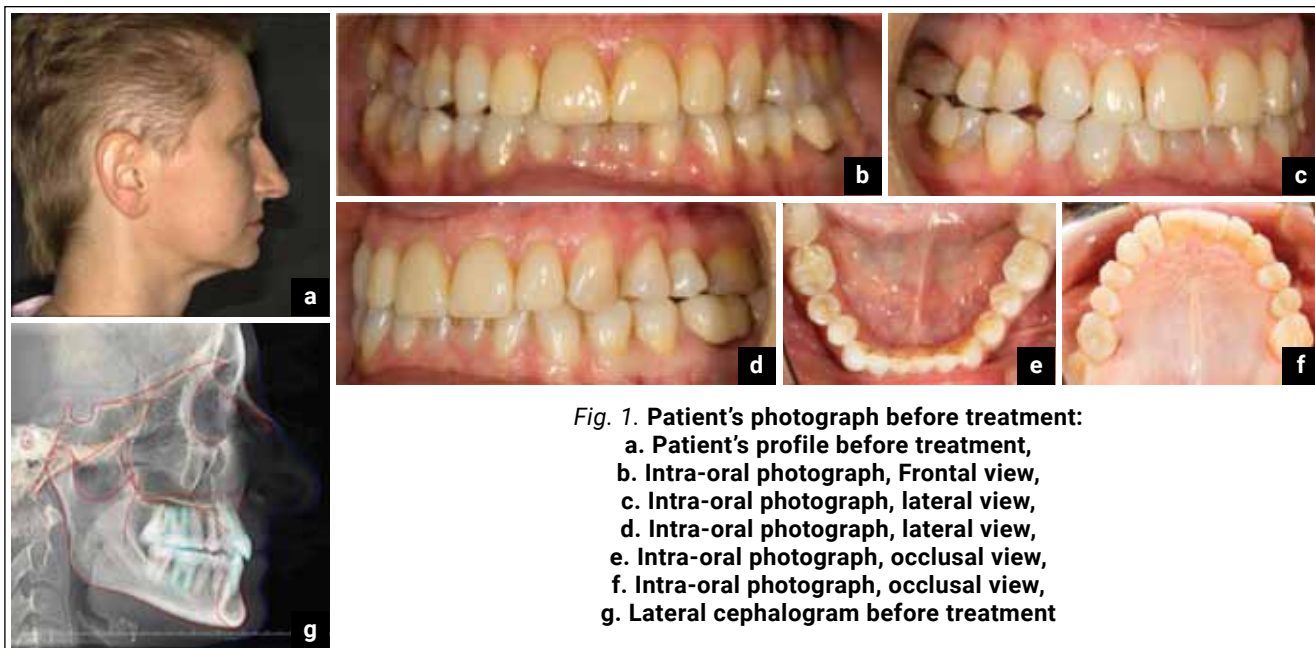
The surgical advancement of the maxilla was considered an alternative option. 10 The patient rejected the surgical option and chose the orthodontic treatment. Therefore, the patient signed the required documents to be treated orthodontically, then it was decided to treat the maxillary deficiency by using the Fixed Anterior Growth Guidance Appliance (FAGGA), followed by 3D SMILE® clear aligner system.

Treatment progress

Fixed Anterior Growth Guidance Appliance (FAGGA) was used for 4 months to correct the pre-maxillary deficiency. The appliance had two 1st premolar bands, two 1st molar bands, an acrylic pad resting on the premaxilla, and an auxiliary wire supported by the incisors and the canines to prevent slippage of the acrylic pad [Figure 2. a]. was activated by adding One open coil spring with stoppers was

Table 1. Cephalometric sassouni plus analysis

Cephalometric data	pre-treatment	Post-treatment	Norm. Range
A-P	4.0 mm	0.6 mm	-2.0 mm – +2.0 mm
∠ U1 I Optic	104°	103.7°	110° – 113°
U1 – ANS'	2.4 mm	0.7 mm	0 mm – 4 mm
ELP	8.2 mm	10.8 mm	12 mm – 15 mm
ANS – antArc	-1.5 mm	0 mm	-2.0 mm – +2.0 mm
IMPA	81.8°	93.6°	95° – 102°



added on each side to activate FAGGA. The patient visited our clinic once a month for activation. After 4 Months of wearing the Fixed Anterior Growth Guidance Appliance, the occlusion improved, FAGGA was removed, and clear aligner attachments were fixed. Then, the treatment was continued with clear aligners [Figure 2. b].

RESULTS

Intraorally, in the upper arch, a total of 4.00 mm of space were gained (about 2.00 mm distal to each canine). The post-treatment cephalometric analysis showed a skeletal A-P Class I, the Upper incisor inclination to the optic plane had not significantly altered, ANS – antArc improved by 1.5mm, the Effective Length of the Premaxilla increased by 2.6mm, U1 – ANS' decreased by 1.7mm, Incisor mandibular plane angle (IMPA) autonomously improved by 11 degrees [Table 1, Figure 2. c].

CONCLUSION

The clinical case presents an adult 37-year-old patient with skeletal A-P Class III malocclusion due to deficiency in the anterior maxilla. The patient's age made the treatment plan challenging.

Fixed Anterior Growth Guidance appliance was used in this case because it can apply a considerable pressure on the deficient maxilla, and possibly correct its deficiency. We can explain the mechanics behind the generated force by two open coil springs with two stoppers generating a force that will be transmitted to the premaxilla by the acrylic pad. The more distally the stoppers are positioned, the greater force will be generated. The treatment is being continued by 3D SMILE® clear aligners.

Maxillary deficiency was corrected successfully with the Fixed Anterior Growth Guidance Appliance.

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