

Reinstating Buccally Flared Molars using a Modified Transpalatal Arch

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ABSTRACT

Countless efforts have been made to correct scissors bite, intermaxillary cross elastics being the most conventional one. These generate extrusive forces on both upper and lower molars, thus opening the bite with consequent clockwise rotation of the mandible. Also, treatment results depend largely on patient cooperation.

Of late, microimplants have gained tremendous popularity in the treatment of such malocclusions because of their reliability and predictability. But, it carries surgical risks, requires more clinical time and cost.

The critical procedures for scissors bite correction are intruding and palatally tipping the involved tooth when it is both extruded and buccally flared. We have designed a modified transpalatal arch (M-TPA) to achieve both with minimal side effects. Advantages are quick and easy chairside fabrication and adjustment, no patient compliance required, no complicated laboratory procedure involved and is cost-effective. Moreover, the arms can be oriented distal or mesial to the M-TPA depending on the involved teeth.

Keywords: Buccally flared molars, Modified transpalatal arch, Scissors bite.

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INTRODUCTION

Buccal crown tipping of maxillary molars is a frequently encountered orthodontic problem. When the same occurs in excessive proportions, it results in a much expanded maxillary dental unit that literally 'contains' or engulfs the mandibular dental unit within it. Such a complete bilateral buccal cross bite of maxillary tooth is referred to as a scissors bite. This malady can be complete or partial; the latter being so when restricted to be occurring in specified regions within the mouth. Several authors have recommended the management of these molars using different treatment mechanics.^{1,2} Conventional orthodontic treatment interventions include various modalities including the use of intermaxillary cross elastics to correct such molars. These elastics can generate extrusive forces on both upper and lower molars. However, this has the potential of opening the bite and causing premature posterior contacts with a consequent clockwise rotation of the mandible. In addition, the treatment results depend largely on patient cooperation as well.³

In the recent years, microimplants have gained tremendous popularity in the treatment of such malocclusions. The treatment results with these are more reliable and predictable with minimal side effects. A single palatal miniscrew can also be used as anchorage to correct a scissor bite by engaging the elastomeric chain from the screw head to the buccal attachment on the affected tooth. But, palatal miniscrew placement carries the risk of damage to the greater palatine nerve and vessels in the molar region, and it requires more time in the clinic and cost to the patient.

A simple, quick and efficient alternative is using a modified transpalatal arch (M-TPA) (Fig. 1). It is removable; can be fabricated and adjusted chairside; does not require patient compliance; does not need any laboratory procedure nor a need to raise the bite; prevents extrusion of the teeth and is cost-effective. Moreover, the arms can be fabricated and oriented in any manner appropriate for the particular tooth in crossbite, whether distal or mesial to the M-TPA.

APPLIANCE DESIGN AND FABRICATION

The M-TPA is constructed from 0.8 mm stainless steel round wire with bilateral arms on either side of the U-loop which extend up to the flared molars distally (see Fig. 1). These arms are curved palatally to aid in engagement of the power chain. They can be fabricated in a mesial direction to correct a premolar scissors bite. The ends of the wire on either side of the M-TPA are bent to form a double-back to allow for insertion into the lingual sheaths of the first molar. Next, a lingual button is bonded onto the palatal aspect of the



Fig. 1: Modified transpalatal arch, a close-up

buccally flared molars (Fig. 2). Traction is begun with a power chain from the arms of the M-TPA to the lingual buttons on either side (Figs 3 and 4).

CASE REPORT

Diagnosis and Treatment Planning

- A 22 years old female patient, EA (Figs 5 and 6) presented with a group 3 cleft lip and palate on left side (cleft of lip, alveolus and hard palate) with average growth pattern, deficient maxilla and steep mandibular plane, expanded maxillary arch, right maxillary buccal crossbite, left maxillary posterior open bite, 1 mm overjet with an incompetent upper lip. She complained of cheek bite in the second and third molar region.
- She had undergone a cleft lip surgery at 5 months and a cleft palate surgery at 8 months of age. Maxillary advancement of 12.5 mm was performed through distraction osteogenesis a year and a half ago. Concurrently, a removable plate was given for slow maxillary expansion. This may have resulted in buccal flaring of the maxillary posteriors with which she reported to us.
- Correction of flared maxillary posteriors was planned using the M-TPA followed by fixed mechanotherapy using MBT 0.022" prescription. Maxillary advancement surgery along with reduction genioplasty was decided to improve the profile.

Treatment Progress

- Oral prophylaxis was carried out before the start of orthodontic treatment. The aforementioned design of the M-TPA was used for the molar correction (Fig. 7A). Leveling and alignment was carried out and complete correction was obtained in 3 months (Fig. 7B). The teeth in region of the cleft did not relocate due to the absence of bone in that region, and hence a bone graft was planned (Fig. 7C).

DISCUSSION

The characteristic malalignments in scissors bite are buccally flared and extruded upper molars with lingual tilting and extruded lower molars. Disadvantages and limitations exist in conventional orthodontic treatment for scissors bite corrections. Conventional orthodontic methods usually involve intermaxillary elastics combined with a semifixed or fixed orthodontic appliance. Side effects, such as extrusion and tipping of the anchorage teeth, might be uncontrollable. These might also induce undesirable clockwise rotation of the mandible and a decrease in

overbite. Patient cooperation is necessary and, therefore, the results of the treatment might be unpredictable.

The critical procedures for scissor bite correction are intruding and palatally tipping the involved tooth when it is both extruded and buccally flared. The direction of the force vector (Figs 8 and 9) with the M-TPA ensures both, the intrusion and palatal tipping. Hence, there is no risk of bite opening and clockwise rotation of the mandible.

Advantages of this appliance are quick and simple chairside fabrication, yet very efficient, with minimal side effects. Also, it is removable and thus can be adjusted easily. Furthermore, it does not require patient cooperation and hence the results more predictable. Complicated laboratory procedures are not involved. Another plus point is that there is no need to raise the bite and finally is cost-effective. These



Fig. 2: Bonding a lingual button palatally on the buccally flared molar



Fig. 3: Placing power chain from the arm of M-TPA to the lingual button



Fig. 4: Appliance in place during treatment



Fig. 5: Case EA—pretreatment photographs

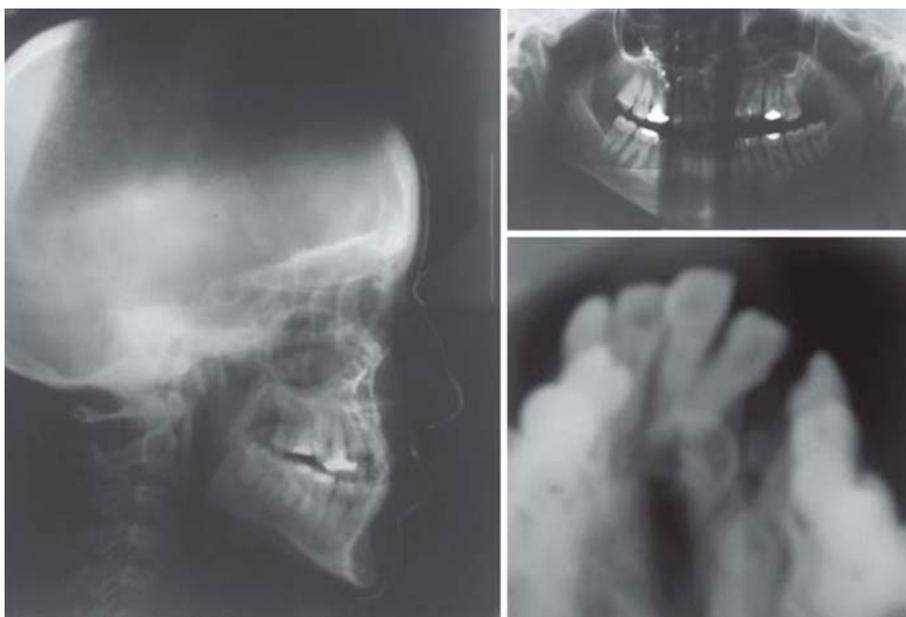


Fig. 6: Case EA—pretreatment radiographs



Figs 7A to C: (A) Day one, (B) after 3 months, (C) post-molar correction and alignment (after 6 months)

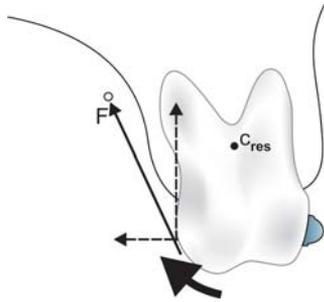


Fig. 8: Resultant force system

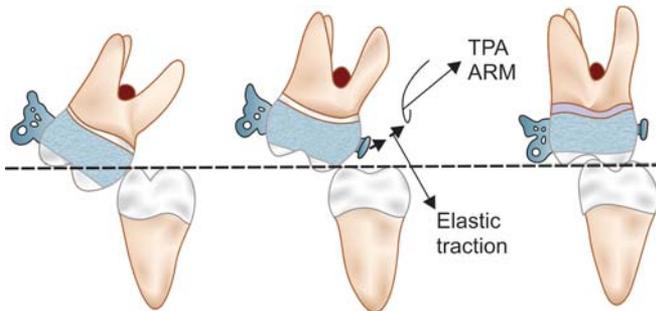


Fig. 9: Depiction of biomechanics; traction applied with elastomeric chain produces palatal crown torque along with an intrusive force component on malpositioned molar

arms can be fabricated and oriented in any manner appropriate for the particular tooth in crossbite, whether distal or mesial to the TPA.

CONCLUSION

The author recommends this appliance for the several advantages already mentioned under the discussion. The effectiveness of the same is depicted pictographically.

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