

A Novel appliance for the correction of scissor bite

ABSTRACT

The transverse discrepancies of the occlusion are the common problems that are encountered in routine orthodontic practice. The most cited dental transverse discrepancies are the crossbite and scissor bite. Scissor bite is one of the toughest malocclusion to correct, and the appliances available for the effective correction are limited. One of the cause for scissor bite can be the expanded maxillary arch. The current manuscript demonstrates the effective correction of the expanded maxillary arch using the new TAS appliance. TAS appliance is an acronym for the authors (T-Tarulatha, A-Akashdeep, and S-Shyagali). The appliance construction is based on the sound biomechanical principles as well. The force was applied from the lingual side, and the applied force was nearer to the center of resistance of all the posterior teeth. Thus, the appliance produced less tipping of the molars. Unlike earlier mechanics used for the correction of scissor bite, the current appliance is not dependent on patient compliance, does not require archwire modification or the invasive procedure such as placement of mini implants or surgical intervention. The novel design of TAS appliance can help the clinician to correct the stubborn transverse discrepancy in an effective manner.

Keywords: Arch constriction, maxillary arch constriction, scissor bite, TAS appliance, transverse discrepancy

INTRODUCTION

The malocclusion is a three-dimensional phenomenon. It can occur due to the discrepancies in transverse or vertical or in horizontal direction. The transverse discrepancy can be skeletal or dental in nature, and it can be appreciated in the form of crossbite or the scissor bite. This can involve either single tooth or multiple teeth in the posterior section of the arch.^[1]

The posterior multiple tooth crossbite is the result of the maxillary arch constriction or the expanded mandibular arch. Nevertheless, the most commonly spotted reason is the maxillary arch constriction, and the treatment in such a situation is the expansion of the constricted arch. However, correction of the scissor bite may be cumbersome and can be tough too. There are limited number of appliances, which are explicitly used for the

scissor bite correction.^[2] Traditional crossbite elastics, modifying the maxillary archwire by constriction in the posterior section, using mini implant or else to go for the surgical correction of crossbite are a few of the options for correcting the scissor bite.^[2] However, the current appliance proposed in this article overcomes these difficulties posed by the earlier mechanics. Hence, the purpose of the present manuscript is to display the use of newly designed TAS appliance [Figure 1] for the scissor bite correction by constricting the maxillary arch. The appliance name is an acronym; the initial letters of the author's name were taken to denote the appliance (T-Tarulatha, A-Akashdeep, S-Shyagali/Singh).

TARULATHA REVANAPPA SHYAGALI, AKASHDEEP SINGH BAL

Department of Orthodontics and Dentofacial Orthopaedics,
Hitkarini Dental College and Hospital, Jabalpur,
Madhya Pradesh, India

Address for correspondence: Dr. Tarulatha Revanappa Shyagali,
Department of Orthodontics and Dentofacial Orthopaedics,
Hitkarini Dental College and Hospital, Jabalpur,
Madhya Pradesh, India.
E-mail: drtarulatha@gmail.com

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Figure 1: TAS appliance

CASE REPORT

A female patient aged 16 years came to the department of orthodontics with the chief complaint of upper and lower irregular front teeth. She was diagnosed with Class II division 1 malocclusion, and it was decided to go ahead with the nonextraction treatment modality. Before the start of the treatment, the patient was explained about the treatment planning, and the signed informed consent was obtained for the same. During the orthodontic treatment, the patient developed the scissor bite [Figure 2]. On closer examination, it was found that the cause of the scissor bite was expanded maxillary arch in the posterior region [Figure 3]. It was decided to remove the maxillary archwire. TAS appliance was placed in the maxillary arch for the arch constriction [Figure 1], and the posterior Glass ionomer cement bite plane was given to the mandibular posterior region. The patient was recalled for the checkup once in 25 days. The expanded arch was corrected within the span of 6 months, and the scissor bite was reduced simultaneously [Figures 4-6]. The nickel–titanium (NiTi) coil springs used were 9 mm in size, and the force produced was 250 g.

Philosophy behind the appliance and construction

The NiTi coil springs are the boon to orthodontic specialty. Their use is known for the creation of space and the closure of the space. They produce slow, continuous force, which is

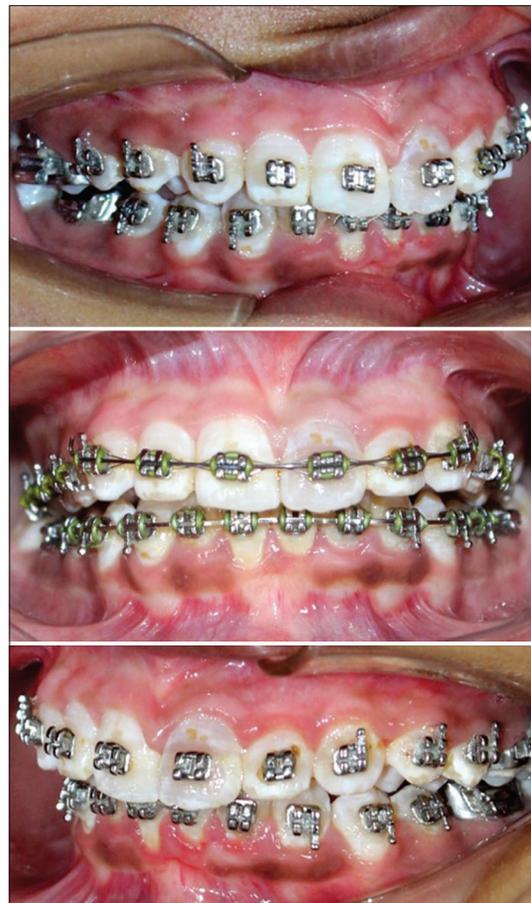


Figure 2: Pretreatment intraoral view

the ideal force system for the effective orthodontic tooth movement.^[3] This principle is taken into account, and a novel design was proposed to utilize the property of the NiTi closed coil spring to bring about the maxillary arch constriction.

Armamentarium and the materials

- Closed NiTi coil spring
- 019 × 025" stainless steel wire
- Plastic tubing
- Ligature wire.

Construction

The appliance consisted of two pieces of 020" Australian archwires or 019 × 025" stainless steel sectional archwires running from the maxillary premolars to the molars in both right and left quadrants [Figure 1]. These sectional archwires are constructed in such a way that they formed two cross over arms running along the occlusal table at the intersection of the canine and the premolar in the anterior region and at the junction of the first and the second molars in the posterior region. The crossover arms are bent to engulf the molars and premolars in the palatal region as depicted in the figure. The free ends were bent to form the hook [Figure 1].



Figure 3: Occlusal view maxilla and mandible



Figure 4: Posttreatment intraoral view

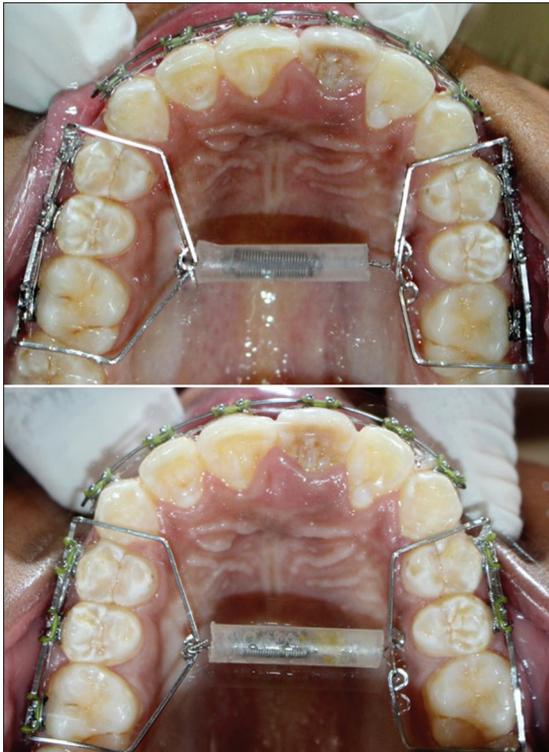


Figure 5: Occlusal view pre- and post-treatment

The ligature wire was tied at each end of NiTi coil spring. The coil spring was encased in a plastic tubing to avoid the trauma to the tongue. The closed coil spring was stretched



Figure 6: Comparison of the pre and post-treatment occlusal view

by tying the ligature wires to the hooks of the sectional wires on either side. The stretched coil spring will try to regain its original size, thus pulling the right and left segment of maxillary posterior dentition towards each other.

Advantages

- Easy to fabricate
- Can be prepared at chairside
- Does not require expensive material
- Does not require extra armamentarium.

DISCUSSION

The available treatment modalities for the expanded maxillary arch are limited. Conventionally, elastics are used to bring about the correction of the scissor bite.^[2] However, the patient compliance requirement makes them the least preferred choice. One can attempt reforming and constricting heavy stainless steel archwire to get the correction, which we had attempted and we did not appreciate the results for more than 3 months. However, when we used the TAS appliance, the changes were visible in the progressive appointments. The correction of arch constriction was possible using microimplant-supported friction mechanics as well.^[4,5] Nevertheless, the technique proposed in the present article is simple than the invasive technique involving the implants. The scissor bite is a stubborn malocclusion and is not amenable to simple orthodontic treatment. Such cases require orthognathic surgical management.^[6] As TAS appliance is applying force from the palatal aspect of the molars, it will produce less tipping of the molars [Figure 6]. This biomechanical advantage can be utilized in cases where the constriction of the arch has to be brought about solely by bodily tooth movement of the posterior teeth.

It is recommended to use TAS appliance in cases where there is scissor bite due to bilateral maxillary posterior teeth buccal tipping. However, we have to keep in mind few of the

limitations when we are planning to planning to give this particular appliance, namely:

- The maxillary arch should be aligned and leveled to give the heavier gauge sectional archwire
- Appliance can irritate the tongue and can lead to ulceration on the tongue
- May produce a horizontal step between the canine and the posterior section.

CONCLUSION

TAS appliance is an effective orthodontic appliance for the correction of expanded maxillary arch and the scissor bite. Further, clinical trials are required for the standardization of this appliance.

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Conflicts of interest

There are no conflicts of interest.

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