

Access this article online

Quick Response Code:



Website:

www.jorthodsci.org

DOI:

10.4103/2278-0203.205454

Early correction of unilateral scissor bite using transforce appliance and modified twin block appliance

Harshal Chandorikar, Arun Nagrik¹, Wasundhara A Bhad², Santosh J Chavan² and Umal H Doshi³

Abstract:

Early treatment of scissor bite has been advocated mainly to prevent function jaw shift that can eventually lead to permanent skeletal asymmetry and temporomandibular joint pathosis. Although unilateral scissor bite is more common, most of the times, bilateral mandibular expansion is indicated. Lingual transforce appliance can be useful in such cases. This article presents a patient with unilateral scissor bite in mixed dentition with alveolar narrowing. Transforce appliance was used for scissor bite correction followed by modified twin block appliance for stabilization and settling of occlusion till the eruption of premolars. The case was finished with fixed mechanotherapy. Two years after completion of treatment, results were well maintained. Our results suggest that lingual transforce appliance along with careful management of occlusion is effective in the early management of severe unilateral scissor bite.

Keywords:

Scissor bite, transforce appliance, twin block

Introduction

Scissor bite,^[1] also known as Brodie bite^[2] or buccal nonocclusion, is a complete buccal crossbite resulting due to the combination of excessive maxillary width and a narrow mandibular alveolar process. In many cases, the problem may be limited to only one quadrant, for example, underdeveloped mandibular dentoalveolar segment. In such cases, the width of the mandibular base is usually normal, but the mandibular alveolar process itself is narrow.^[3] Although the crossbite itself might not cause pathosis, compromised mastication could eventually lead to temporomandibular dysfunction.^[4]

Early treatment with emphasis on arch development can be beneficial in managing scissor bite cases. For the early transverse development of mandibular arch in mixed

dentition, various fixed or removable appliances have been advocated. Various methods include the use of split lingual arch,^[1] an innovative mandibular labial appliance,^[5] modified lingual arch,^[6] and a removable mandibular appliance with an expansion screw.^[7]

Transforce mandibular arch development appliance introduced by Clark^[8] can also be used for the early correction of contracted arch forms. It is a fixed lingual appliance that utilizes nickel–titanium spring enclosed in a tube to deliver a smooth and continuous force of 100–200 g. For mandibular arch development, two sizes are available. Size is selected using a template based on intercanine and intermolar width. Although this appliance had been advocated for arch development in cases of mild crowding, mild proclination, or Class II cases, in the present case, the same appliance has been used for the early correction of unilateral scissor bite.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Chandorikar H, Nagrik A, Bhad WA, Chavan SJ, Doshi UH. Early correction of unilateral scissor bite using transforce appliance and modified twin block appliance. J Orthodont Sci 2017;6:76-80.

Department of
Orthodontics, Nair
Dental College and
Hospital, Mumbai,
¹Department of Dentistry,
Government Medical
College and Hospital,
Nanded, ²Department
of Orthodontics,
Government Dental
College and Hospital,
Nagpur, ³Department
of Orthodontics and
Dentofacial Orthopedics,
CSMSS Dental College
and Hospital, Aurangabad,
Maharashtra, India

Address for correspondence:

Dr. Umal H Doshi,
UPHAR, Builders Society,
Near Nandanvan Colony,
Aurangabad, Maharashtra,
India.
E-mail: umal_16@
rediffmail.com

Diagnosis and Treatment Planning

A 9-year-old male presented with a chief complaint of inability to chew food on the right side [Figure 1]. His medical history was unremarkable.

The patient had dolichofacial pattern with the right side deviated nasal septum, straight facial profile, and competent lips. A functional shift to the left was noted from centric relation to centric occlusion with corresponding deviation of chin to the left side.

Intraoral examination revealed mixed dentition status with complete scissor bite on the right side. On the left side, Class I molar relation was noted. Lower dental midline was shifted on the left side. The lower arch was constricted on the right side with lingual tipping of teeth. Upper and lower incisors were proclined with resultant spacing.

On lateral cephalogram [Figure 2, Table 1], skeletal Class I base with average to vertical growth pattern was noted. Grummons analysis on anteroposterior radiograph indicated normal mandibular basal bone without skeletal asymmetry [Figure 2].

On cast analysis, the intramaxillary arch width at the first permanent molar central pits was 45.1 mm, and the same measurement in the mandibular arch was 33.8 mm. The maxillary arch width was >1 standard deviation from the mean of 41.9 mm, whereas the mandibular arch was significantly deficient by more than two standard deviations from the mean of 40.4 mm.^[9]

Treatment objectives

The specific treatment objective was to expand the mandibular arch for correction of the right side scissor

bite and to achieve acceptable interdigitation and occlusion. After expansion, the mandibular arch would be retained using a lingual arch soldered to molar bands until the late mixed dentition. The patient will be placed on periodic recalls until early permanent dentition stage to evaluate the stability of expansion. Correction of proclination by closing spaces has to be completed after the eruption of premolars to achieve a balanced soft tissue profile.

Treatment options

As the mandibular arch was constricted, expansion of the lower arch was indicated. Since the patient was noncompliant, the use of removable appliance with midline screw was not recommended. For fixed appliances, two options were suggested. The first was a modified fixed lingual arch and the second was a transforce arch development appliance (Ortho Organizers, Aston Avenue Carlsbad, CA, USA). The patient and his parents were informed about maintenance phase after crossbite correction during the transition from mixed to permanent dentition and then the finishing phase with space closure using fixed orthodontic appliance.

Table 1: Lateral cephalometric measurements

Measurement	Pretreatment	Post-treatment
SNA (°)	84	85
SNB (°)	82	83
ANB (°)	3	2
SN-MP (°)	31	35
TAFH (mm)	109	122
LAFH (mm)	61	67
UAFH (mm)	48	55
LAFH (mm)	61	67
UI - NA (°)	29	20
UI - SN (°)	115	103
LI - NB (°)	36	28
IMPA (°)	98	96



Figure 1: Pretreatment facial and intraoral photographs

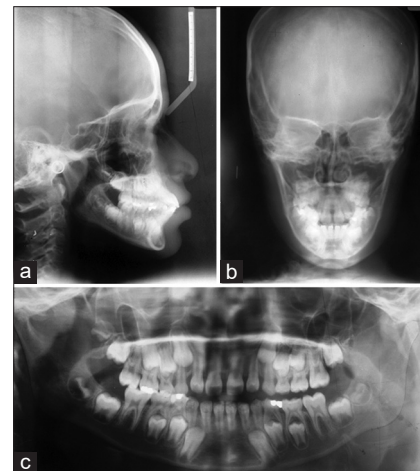


Figure 2: Pretreatment (a) lateral, (b) frontal, and (c) panoramic radiographs

Treatment sequence

One of the fixed appliance options was the use of modified lingual arch with frequent activations to achieve the desired expansion. However, with the transforce appliance, no such frequent activations are necessary. And since, it utilizes gentle continuous pressure with nickel–titanium springs, patient discomfort is usually minimal. Hence, the patient and his parents opted for the transforce appliance. Based on arch width, a 28 mm, size 2 lingual transforce mandibular arch development appliance was selected [Figure 3a]. An upper anterior bite plane was placed for disocclusion [Figure 3b]. After cementing the appliance, follow-up visits were scheduled at 6- to 8-week intervals. Five months later, the right side crossbite was corrected with subsequent development of an open bite on the anterior and left sides [Figure 4a]. This was mainly attributed to the uprighting and slight extrusion of the lingually tipped dentoalveolar segment on the right side. Because of the increase in arch width, there was an increase in interproximal spaces between incisors.

After the crossbite was corrected, the transforce appliance was removed. With the development of new occlusion on the right side, the patient had difficulty in chewing as well as tendency for the deviation of lower jaw to the

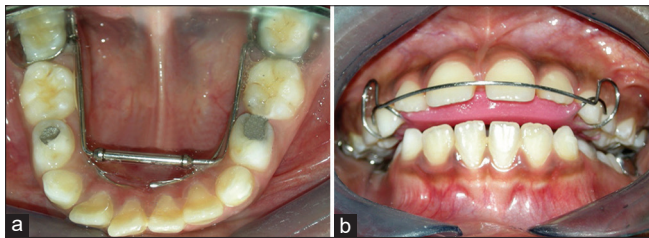


Figure 3: (a) Lingual transforce appliance, (b) removable anterior bite plane

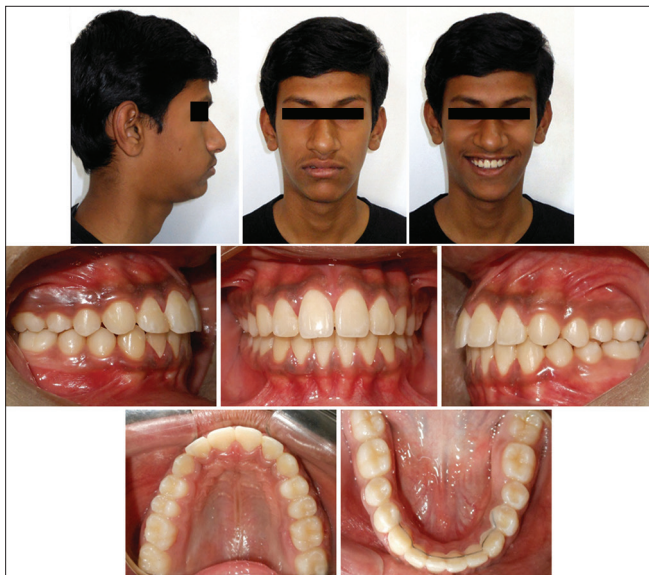


Figure 5: Post-treatment facial and intraoral photographs

left side. To stabilize the occlusion and to maintain the corrected transverse relationship, a modified twin block appliance^[8] was constructed [Figure 4b]. The mandible in the corrected position was used as a reference for constructing the bite with 3 mm vertical opening in the deciduous molar area on the right side. Because of the lateral open bite on the left side, the thickness of the bite block was about 5.5 mm. No sagittal advancement was required. The inclines of the bite blocks were used as a guide plane for the desired positioning of jaw until this new bite settles. No trimming of the blocks was done during the initial 3 months. Later, gradual trimming of 1 mm/month was done only on the left side until the thickness of blocks was similar to the right side.

This appliance with equal block thickness was worn until the eruption of premolars. Once complete eruption of the premolars occurred (the patient was 11 years and 8 months age), 0.022 MBT preadjusted brackets were bonded in both arches. The achieved corrected

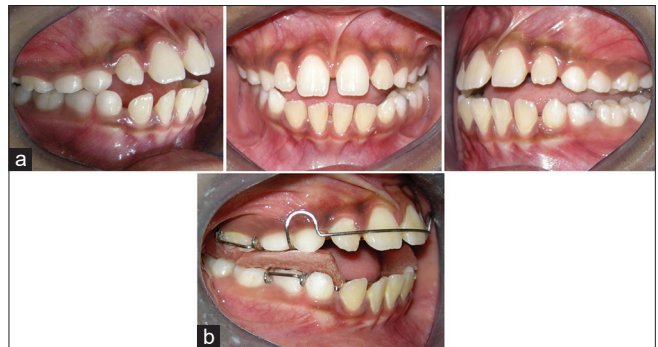


Figure 4: (a) Postexpansion intraoral photographs, (b) twin block appliance

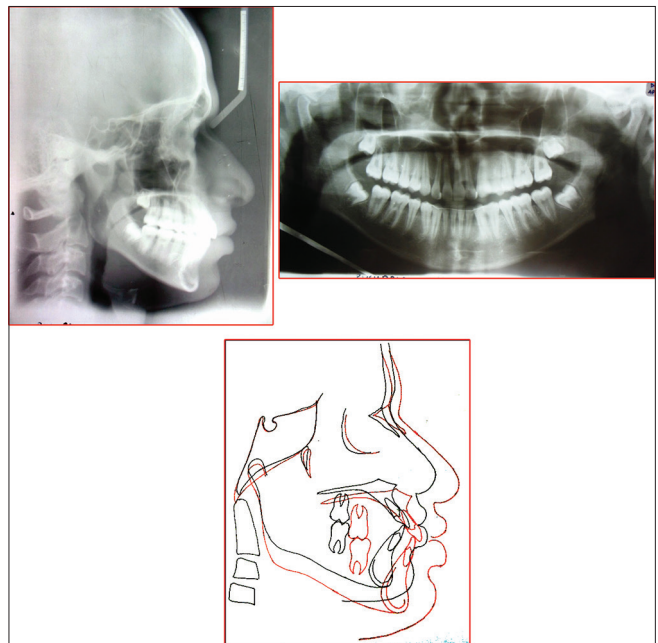


Figure 6: Post-treatment radiographs and superimposition



Figure 7: Two years post-treatment intraoral photographs

bite was observed to be stable. Complete space closure and settling on both sides was achieved in 10-month period [Figure 5]. After appliance removal, lower bonded lingual retainer was placed, along with a wraparound upper retainer. To close the residual interproximal spaces due to triangular maxillary lateral incisors' shape, composite build-ups were done [Figure 5].

Treatment results

A significant improvement was noted to the lateral as well as the frontal profile [Figure 5]. A complete resolution of jaw deviation was noted. Class I molar canine relation was achieved, with 2.5 mm overjet and 2 mm overbite [Figure 5]. On the panoramic radiographs, adequate root parallelism was evident [Figure 6]. Cephalometric evaluation [Figure 6; Table 1] showed opening of mandibular plane angle by 4° and a significant retraction of incisors was noted. Superimposition of pre- and post-treatment lateral cephalograms showed that normal downward and forward growth of the maxilla and mandible with uprighting of mandibular incisors was observed [Figure 6].

Two years after completion of treatment [Figure 7], results were well maintained.

Discussion

Unilateral posterior crossbite is a relatively common malocclusion in children with reported prevalence between 8.7% and 23.3%.^[3,10] It can be unilateral or bilateral and might develop during the primary or mixed dentition.^[11] The etiology of this malocclusion can be dental, skeletal, or functional alone, or in combination. It is usually accompanied by a lateral functional shift of the mandible from initial contact to maximum intercuspation. This functional shift is usually in a transverse plane with lower dental midline deviation relative to the maxillary and facial midlines.

In children with unilateral posterior crossbite, it has been documented that both condyles are relatively malpositioned in their condylar fossae.^[11] Long-standing complete disocclusion of the posterior teeth may eventually lead to temporomandibular disorders.^[4] Asymmetric growth of mandible may occur if adaptive remodeling of temporomandibular joint takes place

which may be seen as early as during mixed dentition period.^[12]

Early treatment has been advocated because spontaneous correction is unusual.^[3] On correction of the unilateral posterior crossbite in children, the functional shift is usually eliminated, and the malpositioned condyles are allowed to assume bilaterally symmetric positions.^[3,13] Early treatment by expansion is currently advocated to redirect the erupting teeth into their normal positions and to eliminate premature occlusal contacts, thereby favoring beneficial dentoskeletal changes during growth periods. Lingual appliances for arch development apply gentle forces to the lingual surfaces of the teeth, causing the teeth to migrate through the alveolar bone toward ideal arch form position.^[1,3,7]

In the present case, these desired results were achieved using the transforce appliance,^[8] which facilitated the crossbite correction. But as shown, one of the side effects of this appliance was uprighting of alveolar segment along with extrusion that may lead to lateral and anterior open bite. To solve this problem modified, twin block appliance was used. Usually, twin block appliance is advocated for Class II or Class III skeletal malocclusions.^[8] In the present case by selective grinding of blocks on lateral open bite side and by intrusive force of blocks on normal side, stabilization of new mandibular position was achieved. The same appliance was continued till eruption of premolars, followed by fixed mechanotherapy for the final finishing.

This early treatment approach can give predictable results with less patient dependence and discomfort. If not treated at early age and if permanent asymmetry results, surgical treatment modality remains the treatment of choice.

Conclusion

Early intervention of scissor bite is essential to correct the inclination of the affected teeth and alveolar arch and thus prevents the development of permanent transverse malocclusion. A mandibular expansion with transforce appliance with bite plates has been shown to be effective in treating scissor bite cases. Modified twin block appliance can also be useful for the correction of

potential side effects. Follow-up during the transition period is mandatory to guide the permanent teeth into ideal occlusion.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Mills JR. Principles and Practice of Orthodontics. Edinburgh: Churchill Livingstone; 1982.
2. Brodie AG. Bureau of public relations. Orthodontics. J Am Dent Assoc 1943;30:433-8.
3. Pinho T. Early treatment of scissor bite. J Clin Orthod 2011;45:498-506.
4. Thilander B, Bjerklin K. Posterior crossbite and temporomandibular disorders (TMDs): Need for orthodontic treatment? Eur J Orthod 2012;34:667-73.
5. Williams DW. A method of treating total lingual occlusion. Trans Br Soc Study Orthod 1970;56:97-8.
6. Gellin ME. Treatment and retention of a mandibular arch telescoped within the maxillary arch: Case report. Pediatr Dent 1991;13:167-9.
7. Tulley WJ, Campbell AC. A Manual of Practical Orthodontics. 3rd ed. Bristol: John Wright and Sons; 1970. p. 179-80.
8. Clark WJ. New horizons in orthodontics and dentofacial orthopaedics. J Orthod Sci 2012;1:60-2.
9. Moyers RE, van der Linden FP, Riolo ML, McNamara JA. Standards of Human Occlusal Development. Ann Arbor, MI: University of Michigan, Center for Human Growth and Development; 1976. p. 82-8.
10. Chugh VK, Sharma VP, Tandon P, Singh GP. Brodie bite with an extracted mandibular first molar in a young adult: A case report. Am J Orthod Dentofacial Orthop 2010;137:694-700.
11. Kurol J, Berglund L. Longitudinal study and cost-benefit analysis of the effect of early treatment of posterior cross-bites in the primary dentition. Eur J Orthod 1992;14:173-9.
12. Lam PH, Sadowsky C, Omerza F. Mandibular asymmetry and condylar position in children with unilateral posterior crossbite. Am J Orthod Dentofacial Orthop 1999;115:569-75.
13. Hesse KL, Artun J, Joondeph DR, Kennedy DB. Changes in condylar position and occlusion associated with maxillary expansion for correction of functional unilateral posterior crossbite. Am J Orthod Dentofacial Orthop 1997;111:410-8.

Staying in touch with the journal

1) Table of Contents (TOC) email alert

Receive an email alert containing the TOC when a new complete issue of the journal is made available online. To register for TOC alerts go to www.jorthodsci.org/signup.asp.

2) RSS feeds

Really Simple Syndication (RSS) helps you to get alerts on new publication right on your desktop without going to the journal's website. You need a software (e.g. RSSReader, Feed Demon, FeedReader, My Yahoo!, NewsGator and NewzCrawler) to get advantage of this tool. RSS feeds can also be read through FireFox or Microsoft Outlook 2007. Once any of these small (and mostly free) software is installed, add www.jorthodsci.org/rssfeed.asp as one of the feeds.