

Simultaneous Intrusion and Retraction Using a K-SIR-Arch

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ABSTRACT:

The straight wire appliance has supreme control and finishing potential. This case report will evaluate the management of Class I malocclusion with severe crowding and deep bite with extraction of first premolars and K-SIR arch. Clinical evaluation revealed Class I dental pattern, severe crowding, high mandibular plane angle, protruded upper and lower lips, decreased overjet and overbite. The goal of treatment was to use light forces and to provide maximum space for the retraction of anterior teeth. Intrusion of anterior teeth to correct deep overbite was decided due to unaesthetic excessive maxillary incisor showing at rest and a deep mandibular curve of spee associated with a long lower facial height. Post-treatment changes were good and stable.

Key words: K-SIR ARCH, MBT mechanics, Malocclusion, Deep bite

Introduction

Malocclusion can occur in three planes of space i.e. sagittal, transverse and vertical plane. The maxillary dental arch being larger than the mandibular dental arch allows the maxillary anteriors to overlap the mandibular anteriors. This overlapping of the mandibular teeth occurs in both the horizontal as well as vertical direction.^{1,2} The horizontal overlap is called as overjet while the vertical overlap is termed overbite. Thus some degree of vertical overlapping or overbite is a normal feature of human dentition. However, some patients present with excessive overbite. Thus a condition where there is an excessive vertical overlapping of the mandibular anteriors by maxillary anteriors is termed as deep bite. The excessive overbite is a complex orthodontic problem that may involve group of teeth or whole dentition, alveolar bone, mandible and maxilla and/or soft tissues of the face. Unfavorable sequelae of this malocclusion predispose a patient to periodontal involvement. Abnormal function, improper mastication, excessive stresses, trauma, functional problems, bruxism, clenching and temporomandibular joint disturbance make geriatric dental service a losing battle unless overbite can be controlled.^{3,4}

The correction of deep bite is one of the primary objectives of orthodontic treatment. Deep bite has been considered one of the most common malocclusion and the most difficult to treat successfully. Thus an optimal treatment of deep bite requires a proper diagnosis, a careful treatment plan and an efficient appliance design.

Diagnosis

A 12-year-old male presented with a chief concern of upper and "lower incisor crowding". Clinical examination revealed incompetent lips and convex profile. Esthetics was compromised due to improper alignment of dentition, gummy smile and lip strain. The molar and canine relationships were Class I. Model analysis revealed crowding of 05 mm in the upper arch and 09 mm in the lower arch. Lower arch presents with the lingual placement of lateral incisors. The patient had a deep-bite and the dental midline shifted right side in both the arches. Poor oral hygiene was evident, slight gingival recession was found in the areas of the lower anteriors. (Fig. 1)

Treatment Objectives

- Relieving of upper and lower anterior crowding
- Good and stable dentoalveolar changes
- Maintenance of class I canine and molar relation
- To achieve ideal overjet /overbite
- To achieve dental midline symmetry
- Maintenance of good profile

Treatment plan

Upper and lower first premolar extraction was planned because of severe space requirement for achieving dental correction. K-SIR arch (Fig. 2) was used to correct the severe deep bite by intrusion.

Treatment Progress

The patient was referred to have the premolar extracted. Anchorage control brought about by use of lace backs for canine control, bend backs for incisor control, soldered transpalatal arch in upper and lingual arch in lower for molar control. Initial alignment and leveling was done with 0.016" NiTi followed by 0.019x0.025" NiTi wire. After initial alignment & leveling, K-SIR arch was placed in upper arch and 0.019"x0.025" stainless steel was placed in the lower arch for torque expression and closure of spaces. Active tie-backs were used to close

the spaces in lower arch.

Treatment Results

The Class I molar and canine relationship was maintained, and the spaces were completely closed. Good cusp to fossa occlusion achieved both palatally and buccally. The good overjet and overbite were achieved. Both arches showed good alignment, with the upper midline centered on the middle of the lower incisors (Fig. 3, 4).

Discussion

Retraction of the six anterior teeth under the edgewise system is usually carried out in two distinct steps: canine retraction followed by incisor retraction.⁵ In the Begg and Tip-Edge techniques, on the other hand, the canines and incisors are retracted en masse.⁴ The rationale for separate retraction in the edgewise technique is that molar anchorage is conserved. However, Burstone and Nanda have demonstrated molar anchorage control, using non-frictional loop mechanics for en masse retraction of the anterior teeth that compares favorably with that of conventional edgewise sliding mechanics

K-SIR⁶ (Kalra Simultaneous Intrusion and Retraction) archwire is a modification of the segmented loop mechanics of Burstone and Nanda. It is a continuous .019"x.025" TMA archwire with closed 7mm x 2mm U-loops at the extraction sites. To obtain bodily movement and prevent tipping of teeth into the extraction spaces- 90° V-bend at level of each U-loop. 60° V-bend located posterior to the center of the interbracket distance produces an increased clockwise moment on the first molar. Off-center V-bend creates greater moment on molar, increasing molar anchorage and intrusion of anterior teeth. To prevent the buccal segments from rolling mesio-lingually, 20° anti-rotation bend is placed in archwire just distal to each U-loop.

The second premolars are bypassed to increase the interbracket distance between the two ends of attachment. This allows the clinician to utilize the mechanics of the off-center V-bend. The archwire should be reactivated every six to eight weeks until all space has been closed.

Main indication for the K-SIR archwire is for the retraction of anterior teeth in a first-premolar extraction patient who has a deep overbite and excessive overjet and who requires both intrusion of the anterior teeth and maximum molar



Fig. 1: Pre-treatment extraoral and intraoral photograph

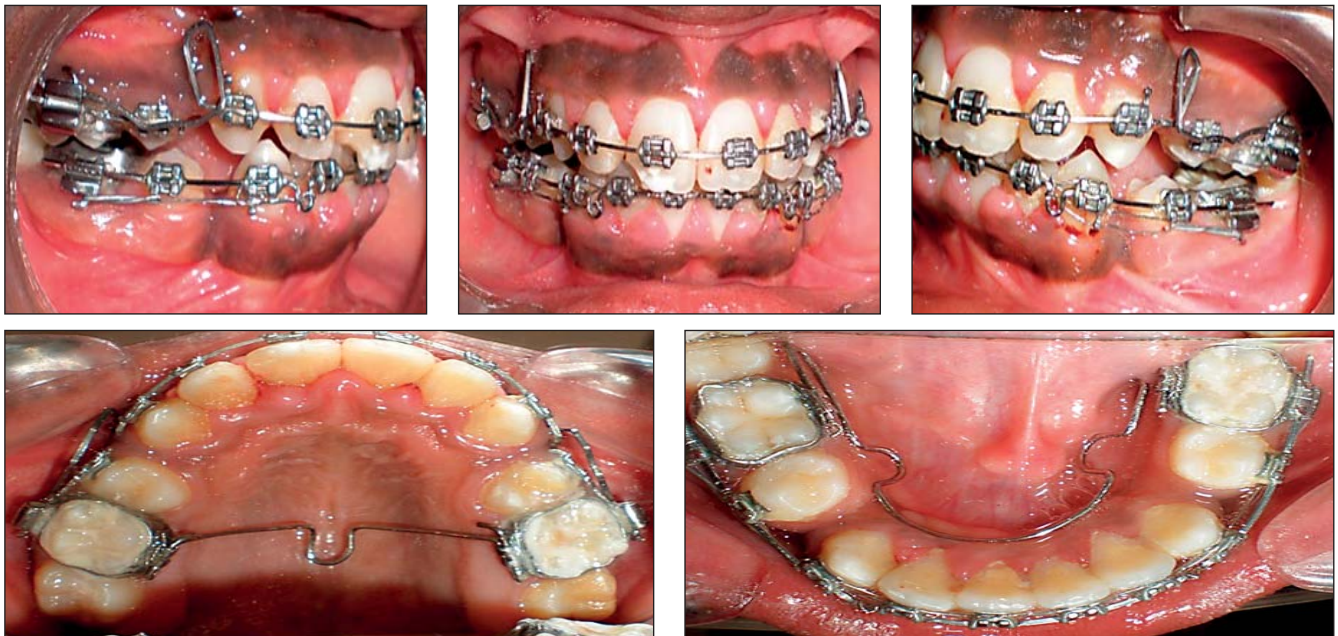


Fig. 2: K-SIR arch

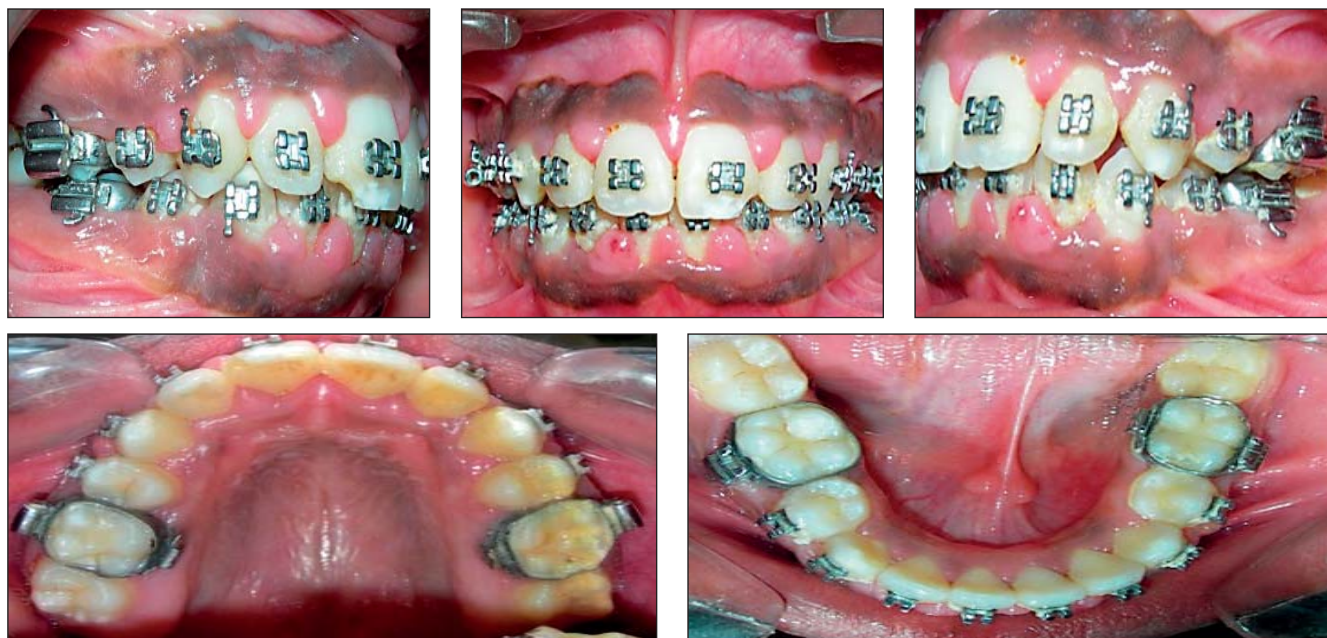


Fig. 3: Post-space closure



Fig. 4: Finishing

anchorage. Archwire can be modified to close extraction spaces in moderate and minimum anchorage situations with varying degrees of overbite.

The 0.019" × 0.025" TMA provides sufficient strength to resist distortion, as well as enough stiffness to generate the required moments. At the same time, the design of the archwire and the material properties of TMA combine to produce relatively low forces, a low load-deflection rate, and a range of activation that allows the appliance to continue closing space over an eight-week period. TMA can be activated twice as much as stainless steel without undergoing permanent deformation and it produces half the force per unit activation.

Because the intrusion of the six anterior teeth occurs at the same time as their retraction, and because the canines and incisors are retracted as a

unit, the K-SIR archwire shortens treatment time compared to conventional edgewise mechanics. In addition, the en masse retraction of the six anterior teeth prevents the appearance of an unsightly space distal to the incisors, which occurs if the canines are retracted separately.

Bibliography

1. Graber T.M., Swain B.E. Orthodontics: Current Principles and Techniques, St. Louis: Mosby Co; 1985.
2. Graber T.M. Orthodontics: Principles and Practice. 3rd Ed., W.B. Saunders, Philadelphia.
3. Proffit W.R., Field H.W., Ackerman J. L., Bailey L.T., Tulloch J.F.C. Contemporary Orthodontics 3rd, C.V. Mosby Co; 2000.
4. Jayade V.P. Refined Begg's for Modern Times 1st Ed. Publisher: Mrs. Anuradha V. Jayade, Hubli, Karnataka State, India.
5. Bennett J. McLaughlin R. Management of deep bite with a preadjusted appliance system J. Clin. Orthod 1990; 24 (11): 684 -696.
6. Kalra V. Simultaneous intrusion and retraction of the anterior teeth. J Clin Orthod 1998; 32:535-540.