Management of periodontally compromised patient by orthodontic treatment: Does it help esthetically and biologically?

SUBHASH C. RAO

Abstract

Adults are always keen to know whether they can still opt for orthodontic treatment and they often ask the same question to the orthodontist and the orthodontist replies, it primarily depends on the health of the bone supporting the teeth. Yes, it is the bone health which is of prime importance to undergo orthodontic treatment. Here is a case report of a patient who underwent orthodontic treatment because of lower midline spacing and protrusion of the upper anteriors. The bone health of the upper and lower anteriors was compromised. At the end of the treatment, there was marked improvement in the bone level and the profile of the patient.

Keywords: Bone level, bone support, compromised

Introduction

Orthodontic treatment has become one of the most commonly carried out treatment procedure in the present generation, and more and more adult patients are in verge of accepting treatment because of improved and more developed diagnostic and treatment techniques. The most common argument for biological plausibility is that dental alignment obtained with orthodontic therapy facilitates plaque removal and reduces occlusal trauma. The bristles of the toothbrush cannot access all tooth surfaces when the teeth are severely crowded. As a result, to the extent that one considers plaque control important in the management of periodontal conditions, orthodontic therapy can be considered equally important to facilitating this process.[1] Fixed orthodontic appliances cause an increase in all bacterial counts around the bracket[2] and band's ecosystem.[3] Epidemiologic studies are a second line of evidence regarding risk factors for periodontal conditions that potentially are modifiable through orthodontic therapy. Of particular relevance to orthodontic therapy is the finding in a small number of studies that among patients with established periodontitis, occlusal forces are related to pocket depth.[4][6]

Diagnosis

A 26-year-old female patient presented with chief complaint of protruding maxillary anterior teeth and spacing in the lower anterior front teeth. Initial examination revealed proclination of the upper anteriors with spacing in the lower anterior segment [Figures 1a-c]. Clinical examination of the lower anterior teeth showed gingival recession with Grade II mobility, Boltons tooth material discrepancy of 1.92 mm anterior mandibular excess, and a bilateral Class II molar relationship with 2 mm overbite and 5 mm of overjet.

The maxillary and mandibular dental midline was matching the skeletal midline. The incisors of both the arches were protrusive relative to the basal bone. Facial analysis confirmed the skeletal Class II basal relation with proclination of upper and lower anteriors. The consequences were lip incompetence, convex profile, and acute nasolabial angle.

The initial cephalometric tracing confirmed proclined upper and lower anteriors, Class II soft tissue profile, skeletal Class II relationship, and presented with hypodivergent growth pattern with normal upper lip thickness and normal nasolabial angle and mentolabial sulcus [Figure 2a and Table 1].

Table 1: Pretreatment cephalometric data

| Metric | Norm | Pretreatment |
|--------|------|--------------|
| SNA    | 82.8° ± 4.0° | 84°          |
| SNB    | 80.1° ± 3.9° | 77°          |
| ANB    | 2.7° ± 2.0°  | 7°           |
| SN-GoGn| 31.1° ± 5.6° | 23°          |
| U1 to SN plane | 105.7° ± 6.3° | 117°        |
| Interincisal angle | 125.4° ± 7.9° | 96°          |
| L1 to mandibular plane | 93.9° ± 6.2° | 121°        |
The panoramic radiograph showed that all the permanent teeth were present along with bone loss in the upper and lower anterior segment with more severity in the lower anterior segment [Figure 2b].

**Treatment planning**

The primary treatment objectives were to correct the lower midline spacing, reduction of dentoalveolar proclination, to achieve a Class I canine relationship, and to correct the overjet and overbite.

The treatment approach was to extract maxillary first premolars for correction of dentoalveolar proclination to achieve normal overjet.

In the mandibular arch, extraction of 31 was carried out than 41, since periodontal health of 41 was considerably better than 31, followed by levelling and alignment and closure of the space by loop mechanics using vertical loop with closed helix for controlled space closure. Important consideration during treatment plan was to finish the case by not considering lower midline to match upper dental and skeletal midline at the end of the treatment, so that Class I canine relationship could be achieved.

Since the lower anteriors had thin labial fragile gingival tissue, palatal soft tissue graft was planned at the end of the treatment to resist lip force, thus preventing further gingival recession.

**Treatment progress**

Preadjusted Edgewise appliance 0.022″ × 0.028″ slot with MBT prescription was placed in both the arches, with bands on the first molars at the beginning of the treatment and on the second molar at the finishing stages.

Since the treatment plan was to finish the case in Class II molar relationship, mandibular second molar tubes were swiped and placed on maxillary first molar to finish the case in the Class II molar relationship by better seating of the distobuccal cusp of maxillary first molars.

Maxillary transpalatal arch was used for anchorage to distalize the upper canine on 0.019″ × 0.025″ SS wire using active tie backs and simultaneously reduce overjet.

After levelling and aligning were achieved in 4 months, the incisors were retracted using 0.019″ × 0.025″ SS wire in the upper arch and in the lower arch using closed vertical loop with helix in the midline using 0.016″ × 0.025″ TMA wire.

Loops were activated by pulling and cinching back the distal end of the wire by 2 mm bilaterally and were not activated for 45 days till the loop attained its initial configuration. After 16 months of treatment, space closure was achieved and planned for periodontic consultation for palatal graft to correct the fragile gingival tissue. The finishing wire was
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Figure 3: (a) post-treatment intraoral frontal photograph, (b) post-treatment intraoral lateral right photograph, (c) post-treatment intraoral lateral left photograph, (d) cephalometric readings prior to debonding

placed after 4 weeks of graft placement to encourage soft tissue healing.

The patient was debonded after 4 months of finishing with the help of radiographs and photographs.

Treatment results

Final records were taken after treatment demonstrated a balanced face, an esthetic smile line and a good lip position. Treatment produced Class II molar relationship and a Class I canine relationship, a 1 mm overbite, and overjet was achieved with well-aligned arch form. Cephalometrically, the patient presented with good lip position and also the position of the incisors with respect to their basal bone [Figures 3a, b, c, d and Table 2].

Panoramic radiograph showed marked improvement in the alveolar bone height [Figures 4a, b]. The mobility was reduced to Grade I, root parallelism, and proper interproximal contacts were achieved. Superimposition on pre- and post-treatment cephalometric tracings indicated the amount of retraction of incisors, showing them well positioned over the basal bone [Figure 4c].

The retention regimen consisted of bonded retainer spanning from 4-4 in upper and lower arches.

Key note for readers

Configuration of the loop may be complicated, but they can overcome various complex malocclusions because of better control than the other counterparts.

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How to cite this article: Rao SC. Management of periodontally compromised patient by orthodontic treatment: Does it help esthetically and biologically?. Contemp Clin Dent 2012;3:215-8.

Source of Support: Nil. Conflict of Interest: None declared.