Open Bite - "An Open Challenge"

James Sunny P, BDS*, Reena J. Rodrigues, MDS**, Ashima Vallathan, BDS, DDS, MS***

Open Bite malocclusion is a common clinical entity and has long been recognized as one of the more difficult problems to treat. Patient selection and treatment principles for non surgical open bite treatment are discussed.

Even though the incidence of open bite is low, it is high on the clinicians list because of its potential for frustration and failure. The frustration stems from conflicting reports that lead to ambiguity with indecision. Any clinician's attempt to correct open bite by following a routine rule book will eventually lead to relapse, failure or questionable compromise.

**Dental v/s skeletal Open Bite**

Open bites are generally skeletal or dental. Dental open bites are associated with the following characteristics: normal craniofacial pattern, proclined incisors, undererupted anterior teeth, normal or slightly excessive molar height and thumb or finger sucking habits.

The craniofacial characteristics most consistently associated with the skeletal open bite are increased mandibular plane angle, increased gonial angle, long anterior facial height, increased total facial height, palatal plane tipped up anteriorly and retrognathic mandible.1,2

Most open bites show some aspects of both dental and skeletal types. The difficulty lies in distinguishing whether a patient should be classified as a dental or a skeletal open bite. The importance of making such a distinction becomes evident when formulating a treatment plan.

The overbite depth indicator (ODI) proposed by Kim3 is found to be a better diagnostic criterion for the presence of skeletal open bite than any other cephalometric measurements or ratio. Normal overbite depth indicator value is $74^\circ \pm 6.07$. A value of $68^\circ$ or less indicates skeletal open bite tendency.

The objective of treatment for an anterior open bite malocclusion should be the creation of an overlapping relationship. The position of maxillary central incisors relative to the lip line must be at or near the 4 mm norm as measured. The maxillary central incisor edges, therefore should be the guide for the anterior limit of upper occlusal plane. The lower occlusal plane should then follow the upper so that there is a sufficient overlap between maxillary & mandibular incisors3.

A dental open bite can be treated with orthodontics alone. The true skeletal open bite requires a coordinated orthodontic and orthognathic surgical approach to achieve a stable occlusion.

---

* Postgraduate Student, Dept. of Orthodontics & Dentofacial Orthopaedics, College of Dental Surgery, Manipal - 576 119, Karnataka.

** Asst. Professor, Dept. of Orthodontics & Dentofacial Orthopaedics, College of Dental Surgery, Manipal - 576 119, Karnataka.

*** Professor and Head, Director of Postgraduate Studies, Dept. of Orthodontics & Dentofacial Orthopaedics, College of Dental Surgery, Manipal - 576 119, Karnataka.
Treatment modalities

Dental Open bite: Orthodontics has little influence on the skeletal frame work, but there is a great deal of benefit that can be derived from tooth movement in the correction of open bites, particularly in the nongrowing (adult) patient.

Sarver and Weissman\(^4\) discussed clinical results using extraction and retraction for dental open bite correction. Patients who are candidates for this type of therapy should meet the following criteria:
1. Proclined maxillary or mandibular Incisors
2. Little or no gingival display on smile
3. Normal craniofacial pattern
4. No more than 2 - 3 mm of upper incisor exposure at rest.

Kim Y.H\(^5\) proposed the use of multiloop edgewise arch wire (MEAW) as a resource to treat cases of dental open bite without the benefit of surgical intervention. Open bites are corrected by altering the occlusal plane and distally uplifting the posterior teeth. A modification of Kim's technique, using 016 × 022 upper accentuated curve and lower reverse curve Niti archwires was used by Enacar et al.\(^6\). This therapy not only prevents extrusion of posterior teeth but actually intrudes them, especially the lower posterior teeth.

Skeletal Open Bite

There are also a number of recommended techniques for orthodontic treatment of the patient with skeletal open bite. It has been postulated that 1mm of intrusive vertical movement of the molars results in approximately 3 mm of bite closure by mandibular counter clockwise rotation\(^7\).

Functional Appliances: According to Rolf & Christine Frankel\(^8\), the functional concept of treatment used in general orthopaedics is based on clinical experience that poor postural behaviour plays an important causative role in development of open bite. Therefore the primary therapeutic problem in Functional orthopaedics is to overcome these functional disorders.

Some consider the Functional Regulator Appliance (FRIV) to be mainly effective in changing dentoalveolar structures, but produces no significant skeletal changes\(^9\). Other studies have shown that the usual downward and backward rotation of mandible in patients with skeletal open bite can be changed by FR - IV Therapy\(^10\).

Activator and Bionator have also been used for correction of these problems. Stellzig et al\(^11\) presented the use of a modified activator - "Elastic Activator" for open bite correction. By stimulating orthopaedic gymnastics (Chewing gum effect), the elastic activator intrudes upper and lower posterior teeth.

Passive posterior bite Blocks

This treatment approach is claimed to be effective by inhibiting the increase in height of the buccal dentoalveolar process, thus preventing downward and backward rotation of mandible. It is most effective before cessation of growth of the jaws. Removable spring loaded bite blocks are also a modification of the basic design\(^12\).

Magnets

The use of samarium cobalt magnets embedded in acrylic have been considered superior to the static bite block appliance. Dellinger\(^13\) has used an "active vertical corrector" which works as an energized bite blocks. Energy system is obtained by the repelling force of samarium cobalt magnets.

Cemented magnets have been on average, twice as effective as the spring loaded appliance (3.0 mm improvement in over bite v/s 1.3 mm)\(^14\). Varun Kalra, Burstone & Nanda\(^15\) have evaluated the effects of fixed magnetic appliance on dentoalveolar complex. Treatment resulted in increase length of mandible, intrusion of teeth, upward and forward auto rotation of mandible and creation of temporary buccal cross bite caused by shearing forces of repelling magnets.

Use of magnetic activator device MAD (IV)\(^16\) acts with not only posterior repulsive magnets but also anterior attractive magnets, thus having the advantage of guiding the mandible to a midline centric position.

Extra Oral Forces

The use of high pull headgears, maintains the vertical position of maxilla and inhibits the eruption of maxillary posterior teeth. Duration of wear is 14 hours/day with a force greater than 12 ounces per side.

Another appliance that may be considered is the vertical pull chin cup. Pearson\(^17\) evaluated 79 patients with excessive vertical dimension and backward growth rotation tendencies. The chin cup was effective in reducing the mandibular plane angle and facial height during treatment.

Implants

Osseointegrated implants have been successfully used with intrusion mechanics in open
bite malocclusions to prevent extrusion of posterior teeth. Titanium miniplates implanted in the buccal cortical bone in apical regions of 1st and 2nd molars have been shown to produce as much as 3 to 5 mm of molar intrusion.

Conclusion

Although correction of an open bite cannot always be perfectly maintained, there are many patients who will derive considerable benefit from treatment with only orthodontic appliances. Prudent selection of patients and adherence to sound orthodontic principles can produce very acceptable and at times, outstanding treatment results.

References


---

Advanced PEA Course

by Dr. M. K. Prakash
Sponsored by 3M Unitek
On 5th & 6th January, 2002
At India Habitare Centre, New Delhi
(Course fee Rs. 8000/-)

This is for only the IOS Members. For advanced booking please contact

Mrs. Anju Dhawan
Spank Marketing and Services Pvt. Ltd.
15th First Floor, National Park
Lajpat Nagar - 4, New Delhi - 24
Tel.: 6285572, 6291401/02/03/04
7295952/7295923
Fax: 6229552 Email: spank@nda.vsnl.net.in