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Orthodontics

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Open Bite

Management of anterior open bite

Treatment of anterior open bite is one of the more challenging aspects of orthodontics, and it's range from simple habit control procedures to complex surgical procedures, in another wards "Management of an anterior open bite which is purely due to a digit-sucking habit can be straightforward, but where the skeletal pattern, growth, and/or soft tissue environment are unfavourable, correction without resort to orthognathic surgery may not be possible. This is complicated by the fact that vertical growth is the last dimension to be completed. That mean in some cases an anterior open bite may reduce spontaneously, possibly because of maturation of the soft tissues and improved lip competence, or favourable growth and the cases of Skeletal open bites with increased vertical proportions are often associated with a downward and backward rotation of the mandible with growth. Obviously, if growth is unfavourable, it is better to know this before planning treatment.

The main problems arise with anterior open bites that are **skeletal in origin** or due to a **digit habit that persists into the adult dentition and results in permanent skeletal change**. There is no evidence to show that correction of anterior open bite improves lisping/speech problems.

Treatment techniques can be categorized as **Acceptance of the anterior open bite, habit, orthodontic correction of open bite by intrusion, or surgical therapy**.

Simple techniques are those in which the etiologic factor is removed and the bite closes by the normal eruptive process, or closure is enhanced using orthodontic appliances. **More difficult procedures** are those in which intrusion (either active or relative intrusion achieved by inhibiting eruption of the posterior teeth) is attempted with orthodontic appliances. In some cases, orthognathic surgery is the last and only resort. Often treatment approaches are combined when the etiology is unclear.

1- Acceptance of the anterior open bite

In this case treatment is aimed at relief of any crowding and alignment of the arches. This approach can be considered in the following situations (particularly if the AOB does not present a problem to the patient):

- Mild cases
- Unfavourable STs, for example where the lips are markedly incompetent and/or an endogenous tongue thrust is suspected.

2- Habit therapy

In young children engaged in NNS, treatment consists of controlling the habit, which alone may be sufficient to allow the teeth to erupt to a normal position. Treatment may involve **habit awareness, time out, contract of reward or punishment, positive reinforcement, and sensory attenuation procedures** (procedures designed to interrupt the sensory feedback from NNS such as orthodontic appliances, chemical aversion, and hand wraps). So in the mixed dentition, a digit-sucking habit that has resulted in an anterior open bite should be gently discouraged. Because patient compliance and cooperation are essential in eliminating NNS habits, a child must want to terminate the habit before intervention begins, and then a removable appliance can be fitted to act as a reminder. After fitting, the acrylic behind the upper incisors should be trimmed to allow any spontaneous alignment.

3- Orthodontic correction of the anterior open bite

If growth and the soft tissue environment are favorable, an orthodontic solution to the anterior open bite can be considered. Extrusion of the incisors to close an anterior open bite is inadvisable, as the condition will relapse once the appliances are removed. Rather, treatment should aim to try and intrude the molars, or at least control their vertical development.

Methods of intruding the molars

- **High-pull headgear**
- **Fixed appliance mechanics**
- **Buccal capping on a removable/functional appliance**
- **Temporary anchorage devices (TADs).**

In the milder malocclusions the use of high-pull headgear during conventional treatment may suffice. In cases with a more marked anterior open bite associated with a Class II skeletal pattern, a removable appliance or a functional appliance incorporating buccal blocks and high pull headgear can be used to try to restrain vertical maxillary growth.

In order to achieve true growth modification it is necessary to apply an intrusive force to the maxilla for at least 14–16 hours per day during the pubertal growth spurt, and preferably continuing until the growth rate has slowed. This is only achievable with excellent patient co-operation and favorable growth.

A greater degree of molar intrusion can be achieved utilizing bone anchorage either with screws or plates. There is a risk of tipping the molars buccally with the traction force so some advocate using both palatal and buccal implants. In cases with bimaxillary crowding and proclination, retraction and alignment of the incisors can result in reduction of an open bite in most cases.

4- Surgery

This option can be considered once growth has slowed to adult levels for severe problems with a skeletal aetiology and/or where dental compensation will not give an aesthetic or stable result. In some patients an anterior open bite is associated with a ‘gummy’ smile which can be difficult to reduce by orthodontics alone necessitating a surgical approach. The most predictable and stable way of correcting an anterior open bite in an adult is by surgical impaction of the maxilla.

Contra-indications: Management of patients with increased vertical skeletal proportions and reduced OB requires careful planning to try and prevent an iatrogenic deterioration of the case. The following points should be avoided:

- ❖ Cervical –pull headgear as it causes extrusion of the maxillary molars teeth and this increase or worse the condition of the anterior open bite .
- ❖ Upper arch expansion. When the upper arch is expanded the upper molars are tilted buccally which results in the palatal cusps being tipped downwards. If arch expansion is required, this is best achieved using a fixed appliance so that buccal root torque can be used to limit downward tipping of the palatal cusps.
- ❖ Class II or Class III intermaxillary traction as this may causes extrusion of the maxillary and mandibular molars teeth and this increase or worse the condition of the anterior open bite .
- ❖ Extrusion of the labial segment beyond its eruptive potential unless it is related to a digit –sucking habit.

Retention after correction of anterior OB

Relapse into anterior OB can occur by any combination of depression of the incisors and elongation of the molars:

- Periodic observation of the child. If the main aetiological factor is a digit-sucking habit, as long as this ceases at an appropriate time, there can be complete and stable resolution of the anterior open bite.
- An appliance with posterior bite plane that create several mms of jaw separation(an open bite activator or bionator) stretches the patient soft tissues to provide a force opposing eruption of posterior teeth. Excessive vertical growth and eruption of the posterior teeth often continue until late teens or early twenties, so retention must continue till then.

Posterior Open bite

Etiology of it less well understood, but may be due to:-

- **Increased vertical skeletal proportion**
although this is more common associated with an anterior open bite which also extends posteriorly.
- In association with **early extraction of first permanent** molars, possibly occurring as a result of lateral tongue spread.
- Posterior open bite is also seen in cases with **eruption disturbances**.
- Primary failure of eruption is a genetic condition which almost exclusively affects molar teeth. Affected teeth may erupt and then cease to keep pace with vertical development becoming relatively submerged or may fail to erupt at all. Although these teeth are not ankylosed they do not respond normally to orthodontic force and indeed usually become ankylosed if traction is applied. Extraction is the only treatment alternative.
- In association with **unilateral condylar hyperplasia**, which also results in facial asymmetry. If this problem is suspected, a bone scan will be required. If the scan indicates excessive cell division in the condylar head region, a condylectomy alone, or in combination with surgery to correct the resultant deformity may be required.