

OPEN BITE

- Anterior open bite: there is no vertical overlap between the maxillary and mandibular teeth when buccal segment teeth are in occlusion.
- Posterior open bite: when the teeth are in occlusion there is a space between the posterior teeth.

AETIOLOGY OF ANTERIOR OPEN BITE

The aetiology of anterior open bite includes both inherited and environmental factors. These factors include skeletal pattern, soft tissues, habits, and localized failure of development. In many cases the aetiology is multifactorial, and the presenting malocclusion is similar.

Skeletal pattern

In orthodontics, patients can be classified into three groups according to their growth pattern: horizontal, normal, or vertical growth pattern. Individuals with a tendency to vertical rather than horizontal facial growth exhibit increased vertical skeletal proportions. Where the lower face height is increased there will be an increased inter-occlusal distance between the maxilla and mandible. Although the labial segment teeth appear to be able to compensate for this to a limited extent by further eruption, where the inter-occlusal distance exceeds this compensatory ability an anterior open bite will result. If the vertical, downwards, and backwards pattern of growth continues, the anterior open bite will become more marked. In this group of patients the anterior open bite is usually symmetrical and in the more severe cases may extend distally around the arch so that only the posterior molars are in contact when the patient is in maximum interdigitation.

Soft tissue pattern

Excessive activity of the tongue, in the act of swallowing or even at rest can change the incisors axial inclinations and cause an open bite.

Mostly, the tongue is considered to have a secondary role in the etiology of anterior open bite because it can maintain or aggravate the existing open bite when placed between the anterior teeth to obtain the anterior oral seal. In order to be able to swallow it is necessary to create an anterior oral seal. In younger children the lips are often incompetent and some will achieve anterior seal by positioning the tongue forward between the anterior teeth during swallowing. Individuals with increased vertical skeletal proportions have an increased likelihood of incompetent lips and may continue to achieve an anterior oral seal in this manner even when the soft tissues have matured. This type of

swallowing pattern is also seen in patients with an anterior open bite due to a digit-sucking habit. In these situations the behaviour of the tongue is adaptive.

An endogenous or primary tongue thrust is rare, but it is difficult to distinguish it from an adaptive tongue thrust as the occlusal features are similar. However it has been suggested that an endogenous tongue thrust is associated with sigmatism (lisp), and in some cases both the upper and lower incisors are proclined by the action of the tongue.

Habits

The effects of a habit depend upon its duration and intensity. If a persistent digit-sucking habit continues into the mixed and permanent dentitions, this can result in an anterior open bite due to restriction of development of the incisors by the finger or thumb.

Characteristically, the anterior open bite produced is asymmetrical (unless the patient sucks two fingers) and it is often associated with a posterior crossbite. Constriction of the upper arch is believed to be caused by cheek pressure and a low tongue position.

After a sucking habit stops the open bite tends to resolve, although this may take several months. During this period the tongue may come forward during swallowing to achieve an anterior seal. Where the habit has continued until growth is complete the open bite may persist.

Localized failure of development

This is seen in patients with a cleft of the lip and palate, although rarely it may occur for no apparent reason.

Mouth breathing

It has been suggested that the open-mouth posture adopted by individuals who habitually mouth breathe, either due to nasal obstruction or habit, results to overdevelopment of the buccal segment teeth. This leads to an increase in the height of the lower third of the face and consequently a greater incidence of anterior open bite.

Clinical Features of anterior open bite:

Extra-oral Features

- Long face due to increased lower facial height.
- Incompetent lips and may show hypertonicity or may be everted.

Intra-oral Features

- Maxillary and mandibular anterior teeth proclination.
- Spacing may be present in maxillary and/ or mandibular anterior segments.
- Narrow maxillary arch.
- Excessive gingival display with gingival hypertrophy.

Some Cephalometric Findings:

- An increased FMA angle

MANAGEMENT OF ANTERIOR OPEN BITE

Management of an anterior open bite due to a digit-sucking habit can be straight forward, but where the skeletal pattern, growth, and/or soft tissue environment are unfavourable, correction without resort to orthognathic surgery may not be possible.

In the mixed dentition, a digit-sucking habit that has resulted in an anterior open bite should be gently discouraged. If a child is keen to stop, 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. Once the permanent dentition is established, more active steps can be taken.

A period of observation may be helpful in the management of children with an anterior open bite which is not associated with a digit-sucking habit, 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.

- ❖ There is no evidence to show that correction of anterior open bite improves lisping/speech problems.

APPROACHES TO THE MANAGEMENT OF ANTERIOR OPEN BITE

There are three possible approaches for management

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 open bite does not present a problem to the patient):

- Mild cases.
- Lips are markedly incompetent and/or an endogenous tongue thrust is suspected.
- Severe malocclusions where the patient refuses surgery.

2. Orthodontic correction of the anterior open bite.

If growth and the soft tissue environment are favourable, 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 intrude the molars, or at least control their vertical development.

a. Anterior open bite due to abnormal oral habits

Habit breaking appliance followed by removable or fixed orthodontic treatment.

b. Anterior open bite in mixed dentition

FR-IV (Frankel appliance), high pull headgear.

c. Anterior open bite in permanent dentition

Fixed orthodontic treatment with box elastics. A greater degree of molar intrusion can be achieved utilizing bone anchorage either with screws or plates. Both palatal and buccal implants are used to decrease the risk of tipping the molars buccally. When Incisors are proclined, retraction and alignment of the incisors can result in reduction of an open bite.

3. 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 be reduced by orthodontics alone necessitating a surgical approach.

Contraindications:

The management of patients with increased vertical skeletal proportions requires careful planning to prevent worsening the case. The following should be avoided:

- a. Cervical-pull headgear as it causes molar extrusion.
- b. 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.
- c. Class II or Class III intermaxillary traction as this may extrude the molars.

RETENTION AFTER ANTERIOR OPEN BITE CORRECTION

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

- Digit sucking can produce intrusive forces on the incisors, while at the same time leading to an altered posture of the jaw that allows posterior teeth to erupt. If the habit continues after orthodontic treatment, relapse is guaranteed
- Tongue thrust swallowing has little role in relapse into open bite
- In patients who do not place some object between the front, return to open bite is almost always the result of elongation of the posterior teeth, particularly the upper molars, without any evidence of intrusion of incisors. Controlling eruption of the upper molars therefore is the key to retention in open bite patients.

An appliance with posterior bite plane that creates several millimeters of jaw separation (an open bite activator) stretches the patient's soft tissues to provide a force opposing eruption of posterior teeth.

Excessive vertical growth and eruption of the posterior teeth often continue until late in the teens or early twenties, so retention also must continue till then.

POSTERIOR OPEN BITE

Posterior open bite occurs more rarely than anterior open bite and the aetiology is less well understood. Possible causes include:

1. Increased vertical skeletal proportions, although it is more commonly associated with an anterior open bite which also extends posteriorly.
2. In association with early extraction of first permanent molars, possibly occurring as a result of lateral tongue spread.
3. With eruption disturbances. Posterior teeth may erupt slower than the 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.

Don't Wait For Appportunity, Create It

GOOD LUCK