EXTRACTION IN ORTHODONTICS

Extraction in orthodontics represents one of the most common methods of gaining space in the arch. One of the most effective ways to create space is by the extraction of teeth. The decision to extract and the choice of teeth will depend upon a number of factors.

The major reasons to extract teeth in orthodontics is to gain space to:

1. Relief crowding and align the remaining teeth.
2. Correct sagittal inter-arch relationship.
3. Improve facial esthetics (e.g. in bimaxillary protrusion).

- Extraction in Orthodontics guidelines:

1- Arch Length-Tooth Material Discrepancy (Crowding)

If the dentition is too large to fit in the dental arch without irregularity, it may be necessary to reduce the dentition size by the extraction of teeth. It is not normally acceptable to increase the dental arch size, because the increased dental arch dimension would not be tolerated by the oral musculature.

Guidelines for extraction in class I crowding/protrusion:

- Less than 4 mm arch length discrepancy - extraction rarely indicated.
- 5-9 mm arch length discrepancy-non-extraction or extraction possible; depends on the details of the therapy.
- 10 mm or more arch length discrepancy-extraction almost always required

2- Correction of Sagittal (antero-posterior) Interarch Relationship

Abnormal sagittal malrelationship such as Class II /III malocclusion may require extraction to achieve a normal interarch relationship.

In Class I malocclusion, it is preferable to extract in both the arches because it is not advisable to discourage the development of only one arch more than the other.

In most Class II cases (with abnormal upper proclination. normal alignment of the lower teeth and where A point is abnormally forward relative to the B point), it is advisable to extract teeth only in the upper arch and to retract the upper incisors and canines. However, when the lower arch is crowded or molars are not in full cusp Class II molar relationship, it might be preferable to extract in both the arches.

Class III cases are usually treated by extracting teeth only in the lower arch.

SELECTION OF TEETH TO BE EXTRACTED:

Extraction for orthodontic reasons will be governed by:

1.Condition of the teeth: Heavily restored or carious teeth should always be considered for elective extraction in the developing dentition, particularly if arch space is required. Similarly, during planning for orthodontic extractions, a potentially compromised tooth should always be removed in preference to a healthy one. Tooth condition is the overriding factor, even treatment would be more difficult or prolonged.

2.Position of the crowding: Crowding in one part of the arch is more readily corrected if extractions are done in that part rather than a remote area of the arch, however, incisor crowding is usually relieved by premolar extraction as it gives a more pleasing appearance and occlusal balance than with incisor extraction. The first premolar, positioned in the center of each quadrant, is usually near the area of crowding whether in the anterior or buccal segment. Hence, it is also the tooth most frequently extracted along with the orthodontic treatment.

3.Position of the teeth: Grossly malpositioned teeth which are difficult to align may often be the teeth of choice for extraction. The position of the apex of the tooth must be considered as it is more difficult to move the apex than the crown.

TYPES OF EXTRACTION PROCEDURES

1. ***Balancing extraction:*** Balancing extractions may be defined as the removal of a tooth on the opposite side of the same arch (although not necessarily the same) in order to preserve symmetry. Ex: midline shift occurs after unilateral extraction of deciduous canine due to the movement of anterior teeth across the center of the arch, extracting the opposing (c) is necessary.

2. ***Compensating Extractions:*** Removal of the equivalent tooth in the opposing arch to maintain buccal occlusion. In some Class I crowding cases, it is necessary to extract in both arches to maintain lateral symmetry. Compensating extractions preserve interarch relationship by allowing the posterior teeth to drift forward together.

3. ***Enforced Extractions:*** These extractions are carried out because they are necessary as in the case of grossly decayed teeth, poor periodontal status, fractured tooth, impacted tooth, etc.

4. ***Therapeutic Extraction***: Certain sound healthy teeth may have to be extracted to facilitate proper alignment of other teeth in cases of sever arch length-tooth material discrepancy. These are extractions carried out for the purpose of orthodontic treatment, before planning extraction of any permanent teeth it is essential to ensure that all remaining teeth are present and developing appropriately.

EXTRACTION OF INCISORS

❖ *Upper Incisors:*

The incisors, especially the upper central incisors, are rarely extracted as a part of orthodontic therapy, due to the risk of compromising aesthetics and it can also be difficult to fit four incisors in one arch against three incisors in the opposing arch. Indications for upper incisor extraction:

1. Unfavorably impacted upper incisors.
2. Grossly carious incisor that cannot be restored.
3. Trauma/irreparable damage to incisors by fracture.
4. Buccally or lingually blocked out lateral incisor with good contact between central incisor and canines.

❖ *Lower Incisors*

Indications for mandibular incisor extraction:

1- When one incisor is completely excluded from the arch and there are satisfactory approximal contacts between other incisors.
2- Incisor has poor prognosis or compromised periodontal support.
3- Buccal segments are Class I, but there is lower incisor crowding.
4- Adult patient who has a mild Class III skeletal pattern with well aligned buccal segments, with an acceptable upper arch and lower incisor crowding, a lower incisor may be extracted to achieve normal overjet, overbite and to relieve crowding.

❖ *CANINES*

Permanent canines form the cornerstone of the arch and are important both aesthetically and functionally. They are important teeth and not frequently extracted as a part of orthodontic treatment. Their extraction causes flattening of the face, altered facial balance and change in facial expression.

When the lower canine is crowded, it is sometimes tempting to extract this tooth. However, this is avoided because the approximal contact between the lateral incisor and first premolar is rarely satisfactory.

Indications: Canine may be extracted in one of the following instances:

- Carious or involved in some other pathology
- Totally excluded from the arch
- Severely impacted or grossly displaced from their eruptive path. (The position of the apex is the prime consideration)

❖ *FIRST PREMOLARS*

It is the tooth most commonly extracted as part of orthodontic therapy especially for the relief of crowding because.

- It is positioned near the center of each quadrant of the arch and is therefore near the site of crowding, ex: the space gained by their extraction can be utilized for correction both in the anterior and posterior region.
- First premolar extraction is the least likely to upset molar occlusion and is the best alternative to maintain vertical dimension.
- The contact between the canine and second premolar is satisfactory.
- First premolar extraction leaves behind a posterior segment that offers adequate anchorage for retraction of the 6 anterior teeth.

Timing of Extraction

The first premolars should not be extracted until all premolars, permanent incisors and canines have erupted sufficiently for brackets to be placed on them, as mesial migration is greatly increased by extraction. The only exception to this rule is when second premolars cannot erupt because they are impacted.

The first premolars should not be extracted more than three weeks before starting active treatment to avoid mesial migration of posterior teeth and therefore leaving insufficient space for retraction.

❖ *SECOND PREMOLARS*

Indications:

- Mild to moderate space requirement (3-8 mm space required)
- Space closure by forward movement of the molars, rather than retraction of the labial segments is indicated.
- Sever displacement of the second premolar.
- In open bite as it encourages deepening of the bite.
- Grossly carious or periodontally compromised second premolar

❖ *FIRST MOLARS*

Extraction of first permanent molars often makes orthodontic treatment more difficult and prolonged. Extraction of first molars is avoided because:

1. Does not give adequate space to relieve anterior crowding.
2. Deepening of bite.
3. Poor approximal contact between second premolar and second molar.
4. Second premolar and second molar may tip into extraction space.
5. Mastication is affected.

However, if fixed appliances are used skillfully most problems caused by enforced first molar extractions can be overcome, but treatment lasts some-what longer than with first premolar extraction.

Indications

1. Minimum space requirement for correction of anterior crowding or mild proclination.
2. Grossly decayed/periodontally compromised molar with poor prognosis.
3. Impacted molar (rarely seen)

Time for Extraction

When crowding is absent or confined to the premolar segment and no space is needed for anterior alignment then first molar is removed before second molar erupts to allow it to move forward during eruption and take up the first molar position.

Lower first molar needs to be removed earlier than upper first molar because second molar moves forward less readily in the lower jaw.

When space is required for alignment of anteriors. It is preferable to wait for second molar eruption before first molar extraction to avoid space closure by forward movement of second molar.

❖ *SECOND MOLARS*

Second molars are positioned at the end of the dental arch and therefore **is away** from the site of crowding. Its extraction does not help in relieving the crowding.

Extraction of second permanent molars has been suggested in the following cases:

- Provided that third molar are in favorable angulation, position, size and shape for eruption
- Facilitation of distal movement of upper buccal segments
- Relief of mild lower premolar crowding.
- Badly carious.

❖ *THIRD MOLARS*

Extraction of third molars during orthodontic treatment does not yield space for decrowding or reduction of proclination.

Indications:

1. Impacted third molar: third molars are commonly impacted and unless other teeth are missing or have been extracted, there is rarely room to accommodate them in the arch. Third molar extraction is frequently carried out to relieve impaction. The conventional timing of extraction of a third molar is when two-thirds of its root is formed.

Extraction of third molar should not be delayed because:

- More difficult to remove when roots are completed.
- Danger of root dilacerations which may make removal more difficult.
- Pericoronitis can develop and cause bone loss and pocket formation may occur distal to second molar.

2. Erupting mandibular third molars in an attempt to prevent or minimize late lower anterior crowding.
3. Malformed third molars, which interfere with normal occlusion, should be extracted.

Stay Positive, Work Hard and Make It Happen

GOOD LUCK