EXTRCTIONS IN ORTHODONTICS

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“The decision of whether to extract teeth as part of orthodontic treatment may affect the outcome of treatment, including the soft tissue profile, esthetics, occlusion, function, patient satisfaction, and duration of treatment. It may also affect the process of treatment, such as the number of visits needed, the costs to both the patient and the clinician associated with extra visits, and potential adverse side effects from a surgical procedure. Ideally, to make this decision rationally, one must have some knowledge of both the risks and the benefits. To date, no quantifiable information is available to test the consequences of this decision because rigorous clinical epidemiological studies have not been conducted in orthodontics. At present, orthodontists opt to extract or not according to their education, past experiences, and generally subjective considerations.”

(Vig, 1990)

Historical perspective: “The swing of the pendulum”

10 CONSIDERATIONS in the decision to extract teeth for orthodontic purposes

1- Space requirements
2- Arch leveling
3- Facial profile & esthetics
   Skeletal pattern & vertical dimension
4- Perioral musculature
5- Health of the teeth and the periodontium
6- Arch relationships
7- Growth potential (age of the patient)
8- Demands of the patient; compromised/limited treatment
9- Patient’s cooperation
10- Special situations/conditions
    • anodontia
    • tooth size discrepancies
    • impactions
    • ankylosis
EXTRACTION CHOICE: CONSIDERATIONS IN THE SELECTION OF TEETH

Rule of thumb: usually, it preferable to extract a tooth that is nearest the deformity to be corrected ...but there are exceptions.

Note: the following represent guidelines and are not hard set rules. The extraction decision is dictated by the overall evaluation of each individual case.

INCISORS (upper & lower)
Advantages:
- may be nearest the deformity
- may eliminate a problem tooth (root canal, perio, prostho...)
- may solve a tooth-size discrepancy problem (Bolton ratio) e.g.: extraction of peg shaped U2s
- lower incisors: narrower = useful if only need moderate space for crowding relief

Disadvantages:
- may create a midline problem
- increases OVB/OVJ (mandibular incisor extraction )
- if U3 replaces U2: must be reshaped, shortened, etc. and color may not match that of U2s
- may create a malocclusion where one did not exist

CUSPIDS
Advantages:
- may eliminate a severely malposed cuspid (impacted, high & labial) which would be difficult to align
- may eliminate the need for perio surgery to expose an impacted cuspid
- can shorten treatment time significantly if don’t have to bring down into the arch a severely malaligned U3

Disadvantages
- function: lose cuspid guidance (cuspid-rise) and a long strong root
- must modify U4’s lingual cusp to provide a lingual guiding plane
- esthetics: U3s are in the corner of mouth; esthetic consideration, transition between anterior and posterior teeth
  lend fullness to corners of the mouth
difficult to replace cuspid esthetics
- lose a strong abutment for possible prosthodontic support if other teeth are eventually lost
- 3s are usually the last teeth to be lost due to their long root

MOLARS
For function, occlusion and to maintain adequate adjacent and opposing contacts, there should ideally be 2 molars in each quadrant. Therefore, before extraction of 6’s or 7’s, make sure that the 8’s are present and not of questionable value.

Advantages
- may eliminate a problematic tooth (root canal, caries, fractured, ankylosed, perio problems (furcation involvement, etc.)
- may help in closing an open bite

Disadvantages:
- may complicate treatment mechanics & anchorage during orthodontic tooth movement
- furthest from the problem area (anterior crowding & protrusion)
- 8’s must be present but they are unpredictable (eruption, anatomy, impaction, alignment)
- treatment time may be increased by extracting a molar
- the extraction itself may be more difficult (3 roots, sinus proximity, limited access, etc.)
PREMOLARS
Choice between 1st vs 2nd premolar; relative tooth size and anchorage considerations
(usually, tooth size (m-d width)= Upper: 4>5 Lower: 4<5)

MAXILLARY 1st
Advantages
• nearest the deformity
• less strain on anchorage, simpler mechanotherapy
• treatment time may be shorter
• provides space for crowding relief in both the posterior and anterior areas
• ideal choice to reduce an anterior protrusion (± crowding)

Disadvantages:
• anatomy: larger and stronger tooth (2 roots)
  longer and fuller clinical crown
• esthetics: more visible tooth, “smile tooth”

MAXILLARY 2nd
Advantages
• smaller tooth (less space to close)
• esthetics: less visible tooth
• anatomy: single rooted, weaker tooth

Disadvantages:
• anchorage easily lost (this may be an advantage in certain cases)
• furthest from the deformity
• may imply longer treatment time and mechanotherapy

MANDIBULAR 1st
Advantages
• nearest the deformity
• less strain on anchorage, simpler mechanotherapy
• treatment time may be shorter
• provides space for crowding relief in both the posterior and anterior areas
• ideal choice to reduce an anterior protrusion (± crowding)
• anatomy: smallest premolar
• less overbite collapse (bite closure). Note: this may be an advantage in open bite cases
• superior choice for occlusion, function and proximal contact

Disadvantages:
• more difficult to move posterior teeth forward (anchorage considerations)

MANDIBULAR 2nd
Advantages
• esthetics: less visible tooth
• favorable in minimal crowding or minimal protrusion
• often affected by special situations (anodontia, impactions, caries, perio problems...)
• facilitate molar CL-II correction (mesial movement of lower 6s)

Disadvantages:
• anchorage easily lost (this may be an advantage in certain cases)
• furthest from the deformity
• may imply longer treatment time and mechanotherapy
• 1st molars may tip forward; more difficult to upright
• anatomy: larger and stronger tooth
• less favorable function, occlusion and proximal contact
NOTES ON THIRD MOLARS and LOWER INCISOR CROWDING
or the Great Debate of the 8’s...!

- Frequently, dentists use anterior crowding as an *excuse* to remove the 8s.

- Erupting third molars have been implicated as a cause of lower anterior crowding. The concept that lower third molars (L8s), while erupting, can generate a force which *may* disturb the arch integrity is more than 100 years old and remains *controversial* today.

- **FACT**: Late crowding of the mandibular dentition is *very common* and usually affects the incisor region. (Sakuda, 1976)

- There is no conclusive evidence in the literature concerning the etiology of lower anterior crowding.

- It is believed that lower anterior crowding can be increased by pressure from the back of the arch but the origin of that force/pressure is debatable.

- Some studies found significantly greater lower anterior crowding in cases in which L8s were present vs L8s agenesis.

- Late mandibular growth may be a greater contributor to lower anterior crowding than the effect of the L8s.

- **Lack of growth** (failure of the facial skeleton to reach complete adult proportions) will cause the jaws to be smaller and prevent them from accommodating a normal tooth alignment.

- Incisor uprighting may account for the crowding appearing with time.

- The forces of occlusion on mesially inclined teeth may have a greater effect on tooth displacement than the forces of eruption

  - If the forces from the erupting L8s are so disruptive, why don’t we see tooth movement and crowding affecting the other teeth located between the L8s and the lower incisors? It is probably because lower anterior crowding is appearing as a result of a different and more important force than that generated by the 8’s.

- Removal of 8’s will not prevent lower anterior crowding; it can still happen.

- Most researchers agree that 8’s pressure is not significant enough to influence or cause anterior crowding and rotations.

- Study: The surgical removal of unerupted L8s didn’t significantly reduce the tightness of proximal posterior tooth contacts mesial to the L7s. The effect of the patient’s posture (lying down vs standing up) had a greater effect on the interdental forces than the 8’s did!!

  **Conclusion**: removal of L8s for the exclusive purpose of preventing mandibular incisor crowding appears to be unwarranted.

- The etiology of post-pubertal lower anterior crowding is considered *multifactorial*. It may be caused by so many factors other than the 8’s (tooth shape/size, narrowing of intercanine width, influence of the musculature, habits, incisor retrusion, adolescent growth changes, unfavorable direction of growth, inadequate growth, over-expansion/over-retraction during ortho treatment, etc...) that there is *little rationale for the extraction of 8’s solely to minimize present or future crowding of the lower anterior teeth*. (Bishara, 1975) and others

- Some suggest that 8’s impaction may be *caused by* dental arch crowding rather than causing it

  **NOTE**: There are however numerous valid reasons to remove the 8’s other than to prevent lower anterior crowding (e.g.: to prevent the development of pathologies associated with impacted teeth).