SERIAL EXTRACTION

(Guidance of Occlusion)

In many children with severe crowding, a decision can be made during the early mixed dentition that expansion is fruitless and that some permanent teeth will have to be extracted to make room for the others. A planned sequence of tooth removal can reduce crowding and irregularity during the transition from the primary to the permanent dentition.

It will also allow the teeth to erupt over the alveolus and through keratinized tissue, rather than being displaced buccally or lingually. This sequence, often termed ***serial extraction,*** simply involves the timed extraction of primary and, ultimately, permanent teeth to relieve severe crowding.

Serial extraction was first advocated in 1948 by Kjellgren, a Swedish orthodontist, as a solution to a shortage of orthodontists. Kjellgren hoped that his scheme would facilitate the treatment of patients with straightforward crowding by their own dentists, thus minimizing demands upon the orthodontic service.

Aim of serial extraction:

Is to provide space for the teeth to erupt into good alignment, rather than allow them to erupt into irregular positions in a crowded dentition and subsequently make space and correct the irregularities.

Indications of serial extraction:

- Patient aged about 8-9 years.
- Minimum 7.0 mm of crowding in the anterior areas per arch.
- Coincident upper and lower midlines.
- Bilateral Class I molar relationship.
- Balanced skeletal pattern in all three planes of space.

- ✓ It is unwise to start serial extraction in a child who has a skeletal problem, because closure of extraction spaces would be affected by how the skeletal problem was being addressed.
- ✓ If the initial discrepancy is smaller, more residual space must be anticipated.

The basic stages of serial extraction procedure：

The typical serial extraction protocol is initiated about the time of the appearance of the permanent lateral incisors, which erupt in rotated positions or initially are prevented from eruption by the deciduous canines.

1. In the most commonly used protocol (Dewel-CD4), the first teeth to be removed are the deciduous canines. The removal of these teeth allows for the eruption, posterior movement, and spontaneous improvement in the alignment of the permanent lateral incisors.
    - ✓ There is usually some lingual tipping of the lower incisors and overbite often increases during this stage.
    - ✓ Labiolingual displacements resolve better than rotational irregularity.

2. In about 6 to 12 months, the removal of the four deciduous first molars is undertaken, ideally, the root development of the four first premolars is ahead of that of the permanent canines, so that the first premolars will erupt before the canines.
    - ✓ At this stage, if the canines are erupting close to the same time as the first premolars, some clinicians prefer to extract the first premolars at the same time that the first deciduous molars are removed.

3. The next step in the usual protocol is the extraction of the first premolars after these teeth have been extracted, the canines can move distally into this space.
    - ✓ The maxillary premolars usually erupt before the canines, so the eruption sequence is rarely a problem in the upper arch (this usually makes serial extraction more successful in the upper arch than in the lower). In the lower arch, however, the canines often erupt before the first premolars, which causes the canines to be displaced facially. To avoid this result, the lower primary first molar should

be extracted when there is 1/2 to 2/3 root formation of the first premolar. This usually will speed up the premolar eruption and cause it to enter the arch before the canine.

4. Simple mechanotherapy to obtain ideal alignment, root positioning, correct overbite and space closure, although it may not be necessary in some cases.

   - ❖ Serial extraction should be done at both arches at the same times.
   - ❖ Serial extraction borrow space in the mixed dentition for early alignment of the labial segments and ultimately re-pays this by extraction of 4s.

Advantages of serial extraction:

1- Immediate relief of crowding.
2- Less mechanotherapy and low cost especially if at the end the teeth arranged with good alignment.
3- Simple procedure.
4- More physiologic treatment as teeth are guided into normal positions using physiologic forces.
5- Results are more stable.

Disadvantages of serial extraction:

1- Good clinical judgment is required.
2- Treatment time is prolonged.
3- Residual spaces can remain between the canine and the 2nd premolar.
4- Subjecting the child to multiple progressive extraction visits of 12 teeth, may leave a bad impression toward dentist.

Complications that may occur during serial extraction:

1. ***Premature eruption of the permanent canines***: a complication can occur if the primary first molar is extracted early and the first premolar still does not erupt before the canine, this can lead to impaction of the premolar and requires later surgical removal- In this case the underlying premolar can also be extracted at the same time-a procedure termed enucleation. If

possible, however, enucleation should be avoided because the erupting premolar brings alveolar bone with it. Early enucleation can leave a bone defect that persists.

2. ***The increase in overbite*** can become a problem during later treatment. A variation in the extraction sequence can be used to help in controlling this problem. The mandibular primary canines are retained and some space for anterior alignment is made available when the permanent laterals erupt by extracting the primary first molars instead. With this approach, eruption of the permanent first premolars is encouraged, and the incisors are less prone to tip lingually.

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