EXTRACTION OF PRIMARY TEETH - BALANCE AND COMPENSATION

Introduction

When a practitioner is faced with enforced extraction of a primary tooth it is often a dilemma whether to merely remove the unsaveable tooth , to extract a contralateral tooth from the same arch (balance), or to extract a tooth from the opposing arch (compensation). The following guidelines are intended to assist in making such a decision and to minimise the effect of space loss on the developing dentition. There have been no properly controlled prospective randomised studies into the consequences of early loss of primary teeth, probably due to the difficulty of recruiting subjects for such studies and the need to follow them for up to 10 years. The recommendations given are therefore based partly upon current clinical opinion, although this is supported where possible by the best available research data. **There is a need for more research in the area.**

Consideration must always be given to the overall dental health and history of the child, which may over-ride purely orthodontic advice.

1.   Definitions

1.1   *Balance enforced extractions*
A balancing extraction is a tooth from the opposite side of the same arch, designed to minimise centreline shift.

1.2   *Compensate enforced extractions*
Compensation means extraction of a tooth from the opposing quadrant to the enforced extraction. It is designed to minimise occlusal interferance by allowing teeth to maintain occlusal relationships as they drift. It is more difficult to justify compensation than balance, especially when it would involve removal of a tooth from an intact arch.

2.   Recommendations

C>   **2.1**   *Radiographic screening* is highly desirable before extracting primary molars to check for the presence, position and correct formation of the crowns and roots of successional teeth. Potential problems indicate the need to seek an orthodontic opinion before teeth are removed.

B>   **2.2**   *Loss of primary incisors* – Early loss of primary incisors has little effect upon the permanent dentition although it does detract from appearance. It is not necessary to balance or compensate the loss of a primary incisor.

2.3 ***Loss of primary canines and first molars*** – Early loss of a primary canine in all but spaced dentitions is likely to have most effect on centre lines. The more

B> crowded the dentition, the more the need for balance.

With regard to a primary first molar, a balancing extraction may be needed in a crowded arch[1]. Compensation is not needed. In the event that unbalanced extraction of a primary canine or first molar has already occurred, one of three situations will apply.

- No centreline shift. Do not balance.
- Centreline shift with complete space closure. Delay balancing until a full orthodontic assessment is made.
- Centreline shift with spacing remaining mesial to the extraction site. Monitor to determine whether tooth movement is continuing: if so seek orthodontic advice.

2.4 ***Loss of primary second molars*** – There is no need to balance the loss of a primary second molar because this will have no appreciable effect on centreline

B> coincidence[3]. However this extraction may allow serious forward movement and tilting of the adjacent first permanent molar. Therefore when a primary second molar has to be extracted consideration should be given to fitting a space maintainer.

B> **2.5** ***Space maintainer*** - A tooth is the ideal space maintainer and every effort should be made to retain primary molars until the proper time for their natural loss. The decision to fit a space maintainer after enforced extraction must be arrived at by balancing the occlusal disturbance that may result if one is not used against the plaque accumulation and caries that the appliance may cause and poor oral hygiene is a contraindication . Space maintenance is most valuable in two situations.

- Loss of a primary first molar where crowding is severe, i.e. more than 3.5mm (half a unit) per quadrant. In this situation space loss due to drift may be so severe that the extraction of one premolar may be insufficient to relieve resultant crowding so that subsequent orthodontic treatment is more difficult.

- Loss of a primary second molar, except in spaced arches.

2.5.1 ***Types of space maintainer***

A tooth - even badly decayed primary molars can often be restored for a few years[2].

Band and loop - the design of choice for a single tooth space.

Lingual or palatal arch - best for bilateral spaces. Studies have shown a lingual arch to be very effective for maintaining arch perimeter [4,5] .

Upper removable appliance - avoid unless the appliance can be used also for active orthodontic treatment.

Explanatory Notes

1.   Normal Occlusal Development

1.1   The teeth of the first dentition are sometimes described as temporary or deciduous teeth, to be shed like the leaves of a tree and therefore of only passing importance. This is incorrect and short-sighted since the primary teeth, have a vital role to play in maintaining the dimensions and form of the dental arches during eruption of the permanent dentition.

1.2   *The primary dentition*

There is much natural variation in occlusal development. However three features indicative of good development are **incisor spacing** [6] **, anthropoid spaces** mesial to the maxillary primary canines and distal to the mandibular canines[7] and **straight** or **mesial step** primary second molar occlusion[8,9] .

1.3   *First permanent molar eruption*

A>   Class I molar relationship is the basis upon which a fully intercuspated Class I occlusion is built [10,11]. Development of Class 1 occlusion depends on the primary molars remaining in position until the correct time so that unwanted movements of permanent teeth are prevented.

2.   Effects of Premature Tooth Loss

Early loss of a primary incisor has little effect upon the permanent dentition although it does detract from appearance.

A>   Early loss of primary canines or molars is more serious, since space loss may follow. In each quadrant the primary canine and molars together are larger than the succeeding permanent canine and premolars, the difference in tooth sizes between the two dentitions being the **Leeway space** [11]. This can be assessed with reasonable accuracy by the size difference between first and second primary molars, since the primary first molar is equal in size to the premolar that will replace it, while the primary second molar is much larger than the second premolar. For this reason the Leeway space is also known as the **E space**.

Extraction of a primary canine or molar may cause mesial drift of teeth behind the space and distal drift of anterior teeth, with resultant displacement of permanent teeth and centreline disturbance.

2.1   *Factors affecting space loss*

Three factors are important.

- **Degree of crowding** is directly related to the rate and extent of space loss after primary tooth extractions.

- **Type of tooth lost**. Loss of one primary canine may cause centreline shift. Loss of a primary molar, especially the second may allow mesial drift of the first permanent molar.

- **Age of child**. The earlier a tooth is lost, the greater the opportunity for drift.

3.   Space Analysis

British dentists have a rather casual attitude to the possible consequences of the extraction of primary molars. In the United States the approach to space management is more careful and standard American textbooks stress the importance of space analysis when planning treatment in the mixed dentition [6,12].

Methods include:

- **Observation of erupting permanent incisors**. By the time that the permanent incisors reach full eruption the space available to accommodate them is at its greatest. In particular intercanine width is fixed so that incisor crowding can only worsen [13].

- **Exfoliation of a primary canine** during eruption of the permanent lateral incisor is a sign of severe crowding.

  - **Mixed dentition analysis (MDA).** This is quick and easy to do and gives an accurate assessment of future crowding by using the sizes of the erupted lower permanent incisors to predict those of the unerupted permanent canines and premolars [8].

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