Management of the developing dentition

Chapter 3, Pages 31-41

3.1 Introduction

• In a developing malocclusion;
  **Difficult to judge**;
  When to intervene
  When to let nature take its course
  **This is because**;
  Experience
  Observation
  Decision

• Parents pressure ‘to do something’.

3.2 NORMAL DENTAL DEVELOPMENT

Normal → average → not ideal

What constitutes the range of normal

3.2.1 Calcification and eruption times

The knowledge is invaluable → tables.

It is helpful for:
- assessing dental as opposed to chronological age
- determining presence or absence of teeth
- hypoplasia (chronological hypoplasia)

### Eruption times

<table>
<thead>
<tr>
<th>Primary Dentition</th>
<th>Permanent Dentition</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Calculated (Pre-mat)</td>
</tr>
<tr>
<td>Central incisors</td>
<td>12-18 weeks</td>
</tr>
<tr>
<td>Lateral incisors</td>
<td>13-16</td>
</tr>
<tr>
<td>Canines</td>
<td>15-18</td>
</tr>
<tr>
<td>First molars</td>
<td>14-17</td>
</tr>
<tr>
<td>Second molars</td>
<td>16-23</td>
</tr>
</tbody>
</table>

**Post-calciﬁcation complete 3-6 years after eruption**
NORMAL DENTAL DEVELOPMENT
3.2.2 The transition from primary to mixed dentition

Eruption of first tooth is a landmark. Six months can lead to unnecessary concern.

Primary dentition \(\rightarrow\) completed around three years of age.

The deciduous incisors erupt upright and spaced – a lack of spacing strongly suggests that the permanent successors will be crowded.

Overbite reduces throughout the primary dentition until the incisors are edge to edge, which can contribute to marked attrition.

Mixed dentition \(\rightarrow\) eruption of 6’s or \(\uparrow\) 1’s.

Upper permanent incisors:
- Develop lingual to their predecessors.
- Greater width \(\rightarrow\) additional space is gained.
- Erupt onto a wider arc
- More proclined than the primary incisors.
- If the arch is intrinsically crowded \(\rightarrow\) will not resolve with intercanine growth.

Lower permanent incisors:
- Develop lingual to their predecessors.
- Crowding \(\rightarrow\) align spontaneously.
- If the arch is inherently crowded \(\rightarrow\) will not resolve with intercanine growth.

The upper canines develop palatally, but migrate labially to come to lie slightly labial and distal to the root apex of the lateral incisors.

In normal development they can be palpated buccally from as young as eight years of age.

The deciduous second molars usually erupt with their distal surfaces flush anteroposteriorly.

The transition to the stepped Class I molar relationship occurs during the mixed dentition as a result of differential mandibular growth and/or the leeway space.

• Leeway space;
  - 1-1.5 mm in maxilla
  - 2-2.5 mm in mandible

• Normal exfoliation time, there will be sufficient space for the permanent canine and premolars.

• The deciduous second molars usually erupt with their distal surfaces flush anteroposteriorly.

• The transition to the stepped Class I molar relationship occurs during the mixed dentition as a result of differential mandibular growth and/or the leeway space.

3.3 ABNORMALITIES OF ERUPTION AND EXFOLIATION

3.3.1 Screening
- Early detection of abnormalities \(\rightarrow\) interception.
- Careful observation of the developing dentition.
- Panoramic radiograph \(\rightarrow\) eight years of age.
- 9-10 years \(\rightarrow\) palpate the buccal sulcus.

3.3.2 Natal teeth
- A tooth present at birth, or erupts soon after.
- Lower primary incisor erupted prematurely (not extra).
- Interferes with breast feeding or mobile that there is a danger of inhalation, removal is indicated.
- If the tooth is symptom less, it can be left in situ.
3.3. Eruption cyst
An eruption cyst is caused by an accumulation of fluid or blood in the follicular space overlying the crown of an erupting tooth. They usually rupture spontaneously, but very occasionally marsupialization may be necessary.

3.3.4. Failure or delayed eruption
- Wide individual variation in eruption times.
  - Disruption in normal sequence of eruption.
  - Asymmetry in eruption pattern between contra lateral teeth.

<table>
<thead>
<tr>
<th>Causes of delayed eruption</th>
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<tbody>
<tr>
<td>Generalized causes</td>
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<tr>
<td>Hereditary gingival fibromatosis</td>
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<tr>
<td>Down syndrome</td>
</tr>
<tr>
<td>Craniofacial dysostosis</td>
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<tr>
<td>Cleft lip and palate</td>
</tr>
<tr>
<td>Rickets</td>
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<tr>
<td>Localized causes</td>
</tr>
<tr>
<td>Congenital absence</td>
</tr>
<tr>
<td>Crowding</td>
</tr>
<tr>
<td>Delayed exfoliation of primary teeth</td>
</tr>
<tr>
<td>Supernumerary tooth</td>
</tr>
<tr>
<td>Dilacerations</td>
</tr>
<tr>
<td>Abnormal position of crypt</td>
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<tr>
<td>Primary failure of eruption</td>
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<tr>
<td>Calcification</td>
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</tbody>
</table>

3.4 MIXED DENTITION PROBLEMS
- 3.4.1. Premature loss of deciduous teeth
- 3.4.2. Retained deciduous teeth
- 3.4.3. Submerged deciduous molars
- 3.4.4. Impacted first permanent molars
- 3.4.5. Dilaceration
- 3.4.6. Supernumerary teeth
- 3.4.7. Habits
- 3.4.8. Poor prognosis
- 3.4.9. Median diastema

3.4 MIXED DENTITION PROBLEMS
- 3.4.1. Premature loss of deciduous teeth
  - Balancing & compensating extraction.
  - Effect of early loss → drift, tilt → crowding.
    - Deciduous incisor → little impact.
    - Deciduous canine → centre-line shift.
    - Deciduous first molar → centre-line shift.
    - Deciduous second molar → first permanent molar will drift forwards.

3.4 MIXED DENTITION PROBLEMS
- 3.4.2. Retained deciduous teeth
  - A difference of more than six months between the shedding of contralateral teeth should be regarded with suspicion.
  - Provided that the permanent successor is present, retained primary teeth should be extracted particularly if they are causing deflection of the permanent tooth.

3.4 MIXED DENTITION PROBLEMS
3.4.3 Submerged primary molars
- Tooth is become submerged when is not erupting vertically while the bony growth and development of the adjacent teeth continues.
- Extraction of a submerged primary tooth:
  - Tooth disappearing below gingival level.
  - Root formation of the permanent tooth is nearing completion.
  - Permanent successor is missing, submergence may be progressive.
3.4 MIXED DENTITION PROBLEMS
3.4.4 Impacted first permanent molars

• Impaction of a first permanent molar tooth against the second deciduous molar (ectopic eruption) occurs in approximately 2-6 per cent of children and is indicative of crowding.

• It most commonly occurs in the upper arch.
• Management;
  – Spontaneous disimpaction.
  – Contact point separation.
  – Extraction of deciduous tooth.

3.4 MIXED DENTITION PROBLEMS
3.4.5 Dilaceration

• Dilaceration is a distortion or bend in the root of a tooth
• Aetiology
  – Developmental
  – Trauma
• Management
  – Causes failure of eruption
    • Align the tooth
    • Remove the affected tooth

3.4 MIXED DENTITION PROBLEMS
3.4.6 Supernumerary teeth

• A supernumerary tooth → Extra or Additional tooth.
• More common in males than females. cleft of the alveolus.
• Permanent dentition 2% and less than 1% in primary dentition.
• Etiology → is not completely understood.
  – An offshoot of the dental lamina.
  – Tertiary dentition.
• Classification;
  – Morphology:
    • Supplemental: Conical: Tuberculate: Odontome:
    – Position
    • Mesiodens, Distomolar, and paramolar.
• Effects and management
  – Failure of eruption
  – Displacement
  – Crowding
  – No effect

3.4 MIXED DENTITION PROBLEMS
3.4.7 Habits

• The effect of a habit will depend upon;
  – Frequency
  – Duration
  – Intensity
  – Thumb sucking

3.4 MIXED DENTITION PROBLEMS
3.4.8 Poor prognosis of first permanent molars

• Difficult option: not or last extraction choice.
  – Little space is provided.
  – Compromises anchorage.
  – Good result in the lower arch is rare.
• However, the planned extraction of first permanent molars of poor quality may be preferable to their enforced extraction later on.
• Factors to consider:
  – all permanent teeth present.
  – Crowding or spacing.
  – Maxilla → mesial drift.
  – Mandible → 7’s bifurcation.
  – Angle of 15° and 30°.
  – Crypt of the second molar.
  – Relieve buccal segment crowding not anterior.
  – Serious consideration → balanced and compensating extraction.
  – Impaction of 8’s is less likely.

3.4 MIXED DENTITION PROBLEMS
3.4.9 Median diastema

• Prevalence; 98% of 6 year, 49% of 11 years, and 7% of 12-18 years.
• Aetiology
  – Physiological (normal dental development)
  – Small teeth in large jaws (a spaced dentition)
  – Missing teeth
  – Midline supernumerary tooth/teeth
  – Proclination of the upper labial segment
  – Prominent frenum.
• Management
• 3.5. SERIAL EXTRACTION

• Advocated in 1948 by Kjellgren, Swedish orthodontist
• Solution to a shortage of orthodontists.
• It would facilitate the treatment.
• The planned sequence of extractions designed to allow crowded incisor segments to align spontaneously during the mixed dentition by shifting labial segment crowding to the buccal segments where it could be dealt with by premolar extractions.
• Classical technique
  • Extraction of the C’s → D’s → (E’s) → 4s.

Indications:
- In a crowded Class I malocclusion.
- In a crowded lower labial segment → periodontal attachment.
- Extraction of the lower in class III malocclusion.
- To provide space for appliance therapy.
- To improve position of displaced permanent canine.

Disadvantages:
- Require general anaestheia → several general anaesthetics.
- Difficult to assess accurately crowding.
- Extraction of C’s and D’s → drift of buccal segment.
- Extraction of lower C’s → tilting lingually → Deep OB.
- Appliance therapy may still be required.

Conclusion
Serial extraction can produce a nice result in carefully selected cases.

The steps in serial extractions
1) Extraction of deciduous canines.
   Why? To provide space for incisors alignment.
   When? When the lateral incisors are half erupted (7-8y).
2) Extraction of deciduous first molars.
   Why? To speed the eruption of first premolar.
   When? When the root of the first premolars is half-way (10-11y).
3) Extraction of first premolars.
   Why? To provide space for permanent canines.
   When? When the eruption of permanent canines is under way (10-12y).

Leeway space
- Average width = 23 mm
- Average width = 21 mm

End of Lecture