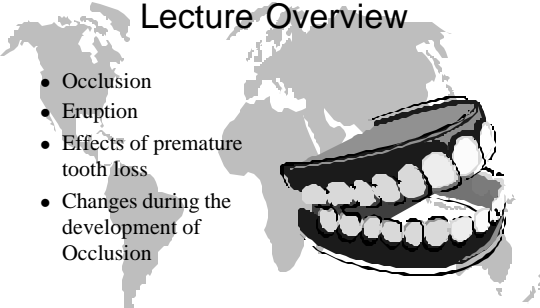


The Developing Occlusion

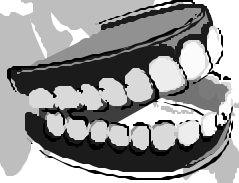
Theory and Practice of Pediatric Dentistry

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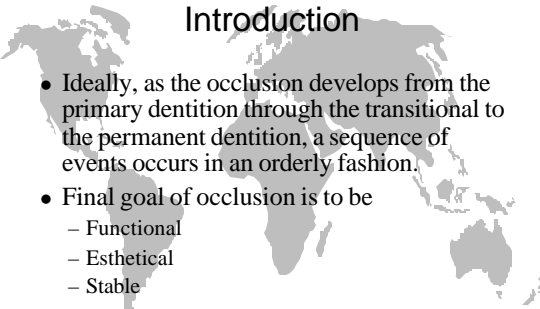


Lecture Overview

- Occlusion
- Eruption
- Effects of premature tooth loss
- Changes during the development of Occlusion



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Introduction

- Ideally, as the occlusion develops from the primary dentition through the transitional to the permanent dentition, a sequence of events occurs in an orderly fashion.
- Final goal of occlusion is to be
 - Functional
 - Esthetical
 - Stable

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Desired Eruption sequence in the Permanent Dentition



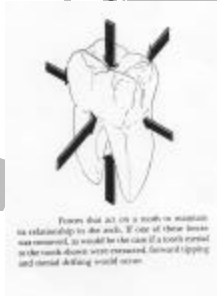
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Variables that influence eruption

- Genetics
 - Familial tendencies, African Americans > Caucasians, Females > Males
- Environmental
 - Delayed in LBW and ventilator dependency
- Systemic
 - Endocrinal, eg: hypopituitarism, hypothyroidism

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Forces acting on a Tooth



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Natural Space Maintenance

- The natural tooth is the best space maintainer - functional, correct size & exfoliates appropriately.
- Ensure that you ideally restore all the interproximal contours when you restore teeth.
- Strive to save the tooth even if pulp treatment is needed.

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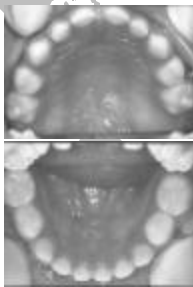
Effects of Premature loss of a Tooth

- Loss of arch circumference
- Delayed or accelerated eruption of succedaneous teeth



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Generalized Spacing



- 40% of children have spacing in their primary dentition.
- Allows for adequate space for the permanent dentition.

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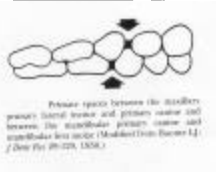
Tooth migration and Arch Changes during Development of Occlusion

- Primate Spaces
- Early Mesial Shift
- Late Mesial Shift
- Secondary Spacing
- Leeway Space

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Primate Spaces

- Seen in the primary dentition only.
- Incidence of 70% in the mx and 63% in the md.
- Congenital rather than developmental.
- 2 distinct diastema's -
 - Mx laterals and canines - 1.7 mm
 - Md canines and first molars - 1.5 mm



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Early Mesial Shift

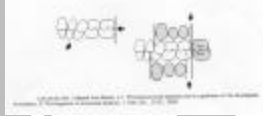
- Mesial migration of the erupting md permanent molar
- Uses the md primate space
- Seen in arches (63%) have the md primate space
- Occurs around 6 years of age



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Late Mesial Shift

- Mesial migration of erupted md permanent molar after the loss of the primary second molar
- Uses the Leeway space
- Seen around the age of 11 yrs
- Seen in all cases



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Secondary Spacing

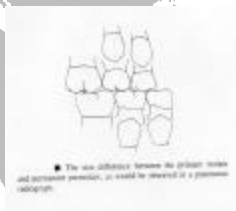
- Usually occurs in primary arches that have no primary spacing.
- When the md permanent lateral incisors erupt, the primary md canines are moved laterally, thus creating space for the maxillary permanent lateral incisors.



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Leeway Space

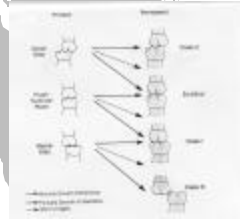
- Premolars are smaller than the primary teeth they replace
- This extra space is called Leeway space
- This is the space that is used up in the Late Mesial Shift
- Leeway space in each quadrant
 - Mx - 1.5 mm
 - Md - 2.5 mm



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Occlusal Relationship of Primary Teeth

- 3 types
 - Straight terminal plane - 76% incidence, Class For II
 - Mesial Step - 14% incidence, ideal, Class I
 - Distal Step - 10% incidence, abnormal, Class II



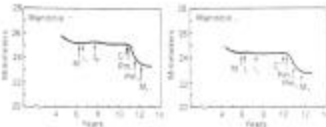
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Arch Length

- The distance from the distal surface of the second primary molar (or mesial surface of the first permanent molar) on one side of the arch to that same surface on the opposite side.
- Decrease in circumference as child grows - seen during the mesial migration of first permanent molar during the late mesial shift.

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Changes in Arch Length



Reduction in arch length is a result of mesial drift of permanent teeth. (Lundquist, L. Central incisor - I, lateral incisor - II, permanent first molar - III, second molar - IV, first premolar - P1, second premolar - P2, third premolar - P3, first molar - M1, second molar - M2, third molar - M3). (F. P. J., 1961, p. 225).
K.B. Changes in the dental arch dimensions registered on the bases of teeth (maxilla) as a result of tooth eruption. J. Dent. Res. 44 (12), 1963.

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Arch Length Analysis

- Several different types can be used
- Types
 - Nance Analysis - based on radiographic pictures and is not used much these days
 - Moyer's Mixed Dentition Analysis - based on a correlation of tooth size and the use of a prediction chart.

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Summary

- The development of the occlusion is an orderly sequence of events.
- Any variation in this sequence will result in some form of malocclusion.
- There are several forces that act on a tooth in the arch.
- Natural teeth are the best space maintainers.
- There are several spaces present in the primary dentition that allow space for the larger permanent dentition.

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