Development of the teeth and dental occlusion

The Deciduous Dentition

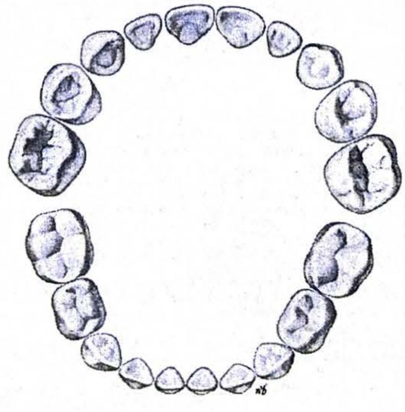


Figure 2–1. Composite artistic rendition of deciduous dentition taken from skull material. Bilateral differences are not unusual.

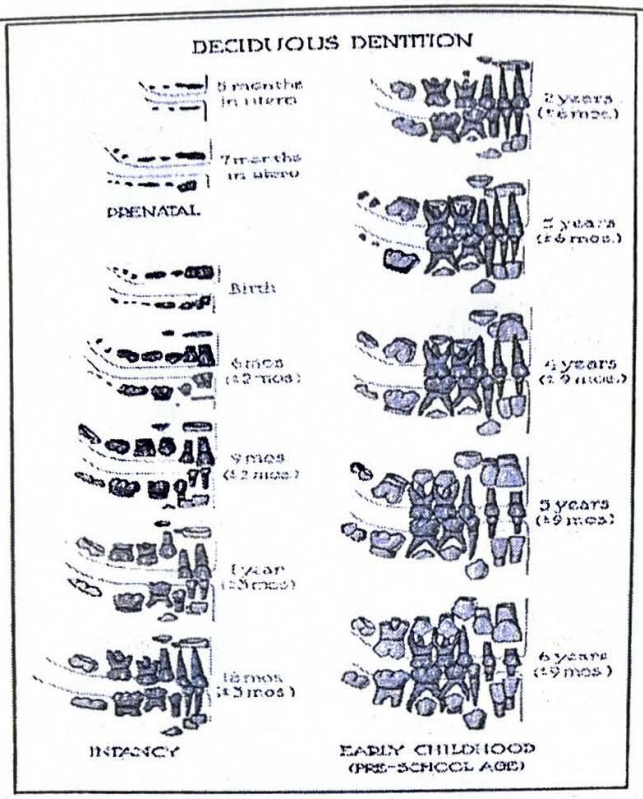


Figure 2-2. Development of the human dentition to the sixth year. The deciduous, or primary, teeth are the darker ones in the illustration. (From Schour, I., and Massler, M.: The development of the human dentition. J. Am. Dent. Assoc., 28:1153, 1941.)

Deciduous Teeth

- Usual Order of Appearance:
1. Central Incisors
2. Lateral Incisors
3. First Molars
4. Canines
5. Second Molars
- Mandibular Teeth Usually Precede Maxillary in order of Appearance

The Permanent Dentition

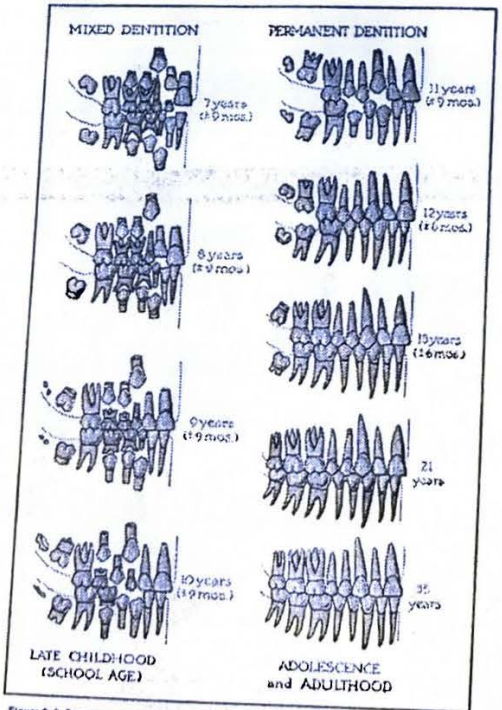


Figure 2–3. Development of the human dentition from the seventh year to maturity. Note the displacement deciduous teeth by succedaneous permanent teeth. (From Schour, I., and Massler, M.: The development of human dentition. J. Am. Dent. Assoc., 28:1153, 1941.)

Sequence of eruption of permanent teeth:

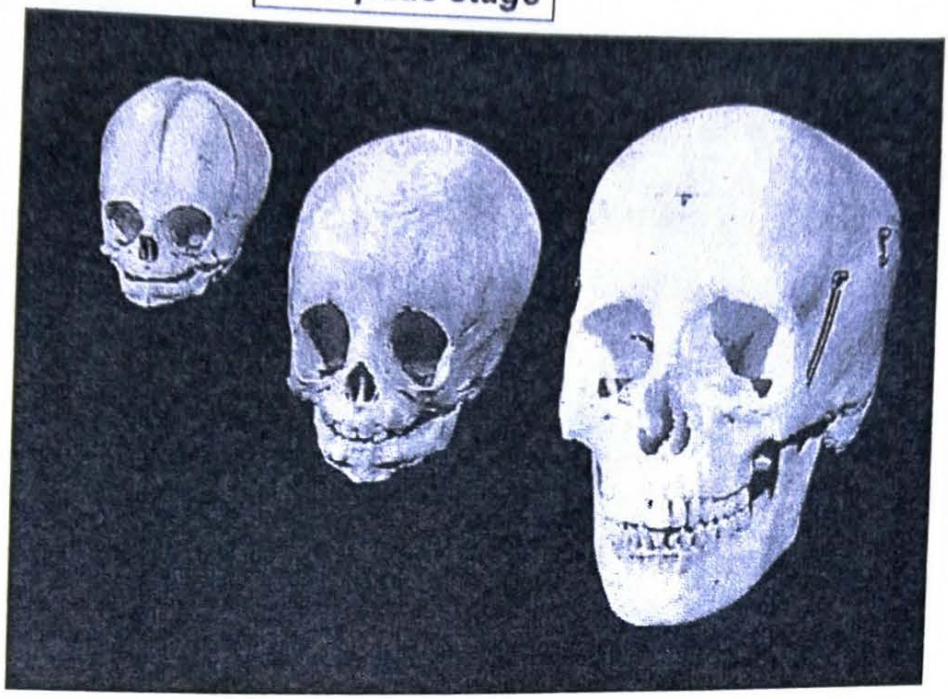
1- first permanent molars
2- central incisors
3- lateral incisors
4- first premolars
5- second premolars*
6- canines*
7- second permanent molars
8- third permanent molars

Mandibular Teeth Usually Precede Maxillary in order of Appearance

Stages of dental development

- *Gum pads stage*
- *Primary dentition stage*
- *Mixed dentition stage*
- *Permanent dentition stage*

Gum pads stage



Primary Dentition Stage

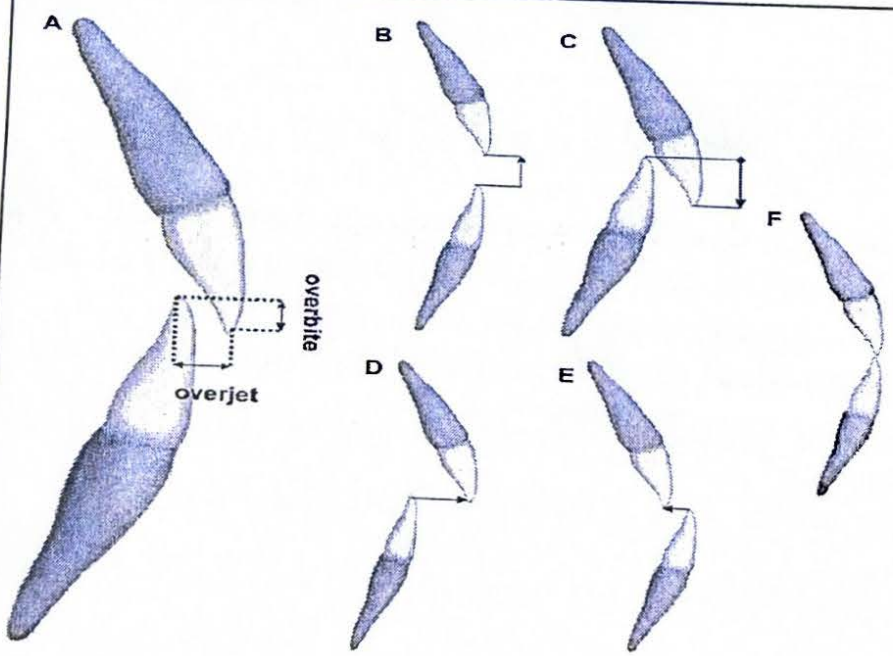
The primary dentition stage extends from the time of eruption of the primary teeth until the eruption of the first permanent tooth around 6 years of age. Three characteristics of the primary dentition stage are discussed in some detail.

1- Overbite
2- Overjet
3- Spacing

Overbite: Overbite is the amount of vertical overlap
between the maxillary and mandibular central.

When the incisal edges of the upper and lower incisors are at the same level, the condition is described as "edge to edge or zero overbite."

When there is a lack of overlap, the condition is described as open bite and quantified in millimeters.

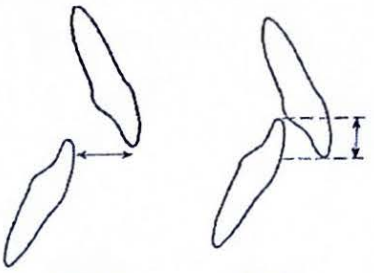


Overjet: Overjet is the horizontal relationship or the distance between the most protruded maxillary central incisor and the opposing mandibular central incisor.

This relationship is expressed in millimeters.

If the maxillary incisors are lingual to the mandibular incisors, the relationship is described as an underjet.

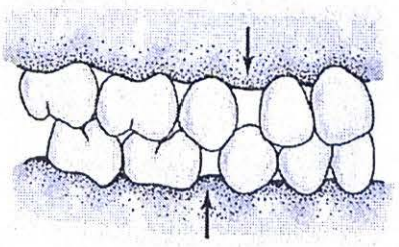
The normal range of overjet in the primary dentition varies between 0 and 4.0 mm.



Spacings: In the primary dentition stage a child may have generalized spaces between the teeth, localized spaces, no spaces, or a crowded dentition. The presence of spacing in the primary dentition stage is a common occurrence.

In addition to the generalized spacings, localized spacings are often present and are referred to as primate spaces.

Such spaces are present in 87% of the maxillary arches usually between the lateral incisors and canines.
The primate spaces are also present in 78% of the mandibular arches, usually between the canines and first primary molars.



primate spaces

A tooth size-arch length discrepancy (TSALD) in the form of crowding is less common and occurs in approximately 3% of the children in the primary dentition stage.

Mixed Dentition Stage

The mixed dentition stage starts with the eruption of the first permanent tooth, usually the mandibular central incisor, and is normally completed at the time the last primary tooth is shed.

The mixed dentition period is characterized by significant changes in the dentition as a result of the loss of 20 primary teeth and the eruption of their succedaneous permanent teeth.

In the early stages of the mixed dentition period there may be a temporary open bite, usually either as a result of the still incomplete eruption of the incisors or because of mechanical interference from a persistent finger habit.

During normal development this open bite is often transitory in nature; the open bite is present until the incisors complete their eruption process, unless the abnormal habit persists.

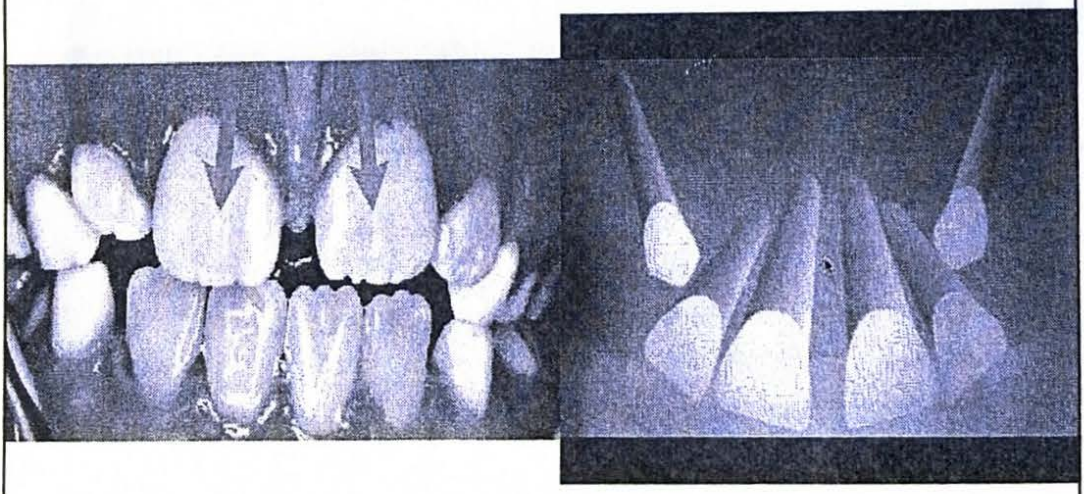
Spacing: A diastema is a space between any two neighboring teeth.

During the mixed dentition stage the presence of a midline diastema between the maxillary central incisors is a normal occurrence. This is called ugly duckling stage.

In most cases the size of the diastema may vary between 1.0 and 3.0 mm.

These diastemas usually close by the time the maxillary canines fully erupt and do not require any orthodontic intervention.

If the diastema persists in the permanent dentition stage and if the patient is concerned, the dentist may consider closing it orthodontically or with composite buildups to the teeth.



ugly duckling stage

Occlusion: is the way of articulation the maxillary and mandibular teeth

Class I

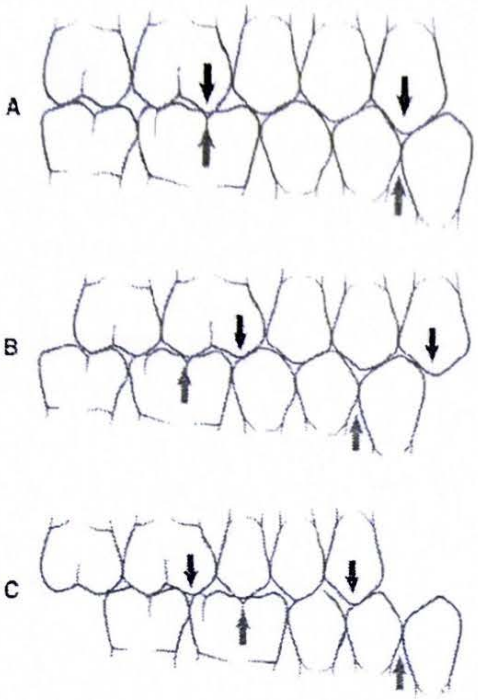
The class I occlusion is the normal class. In this case, the mesiobuccal cusp of the maxillary first molar is aligned with the mesiobuccal groove of the mandibular first molar.

Class II

The class II relationship is when the mesiobuccal cusp of the maxillary first molar is found in front compared to the mesiobuccal groove of the mandibular first molar.

Class III

The relationship is when the class III mesiobuccal cusp of the first upper molar found in the rear with respect to the mesiobuccal groove of the oral mandibular first molar



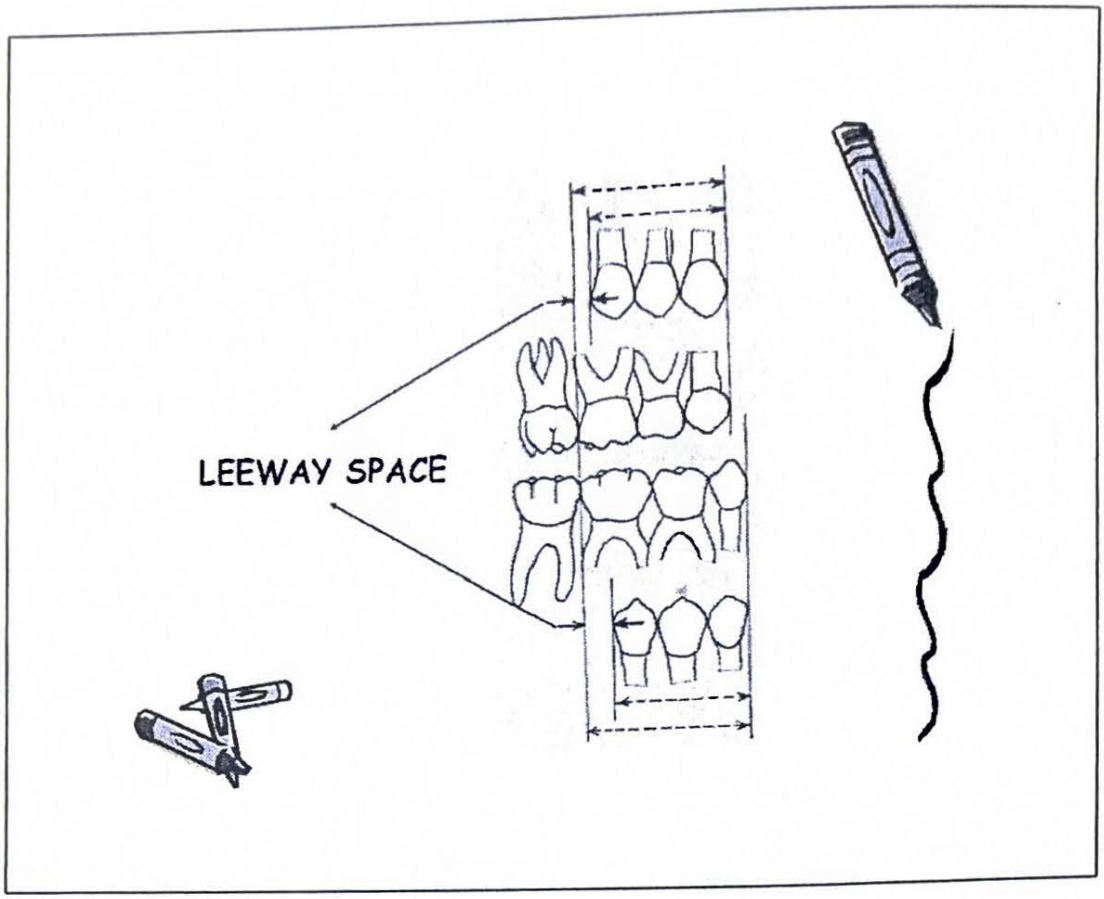
Class I

Class II

Class III

The Leeway Spaces:

In general, the sum of the mesiodistal width of the primary canine and the primary first and second molars is larger than the sum of their succedaneous teeth(permanent canine and first and second premolars)



The leeway space is larger in the mandibular arch than in the maxillary arch.

On the average, the unerupted canine and premolars are 1.8 mm smaller, per side, in the lower arch. In the upper arch, the leeway space averages only 0.9 mm per side.'

The leeway space differential between the two arches allows the first permanent molars to move mesially relatively more in the mandibular arch than in the maxillary arch.

Sometimes the combined sizes of the unerupted teeth are larger than the space available. This condition is called a leeway space deficiency, and dental arch crowding often results.

Mandibular Growth In general:

Both the maxilla and mandible grow downward and forward, but during this developmental stage the mandible grows relatively more forward than the maxilla. It was thought that these relative growth changes may contribute to the transition from an end-to-end to a Class I molar relationship.