1. *Delayed eruption of permanent teeth*

The sequence of eruption has a certain amount of flexibility; but if one of the teeth does not occupy its designated place in this sequence there is a likelihood of migration of other teeth into the available space. As a result the tooth whose eruption has been delayed might get displaced or impacted.

Various reasons have been attributed for the delay eruption of the permanent teeth:

1. Early loss adjacent primary teeth with a consequential flaring or spacing between erupted permanent teeth. This may lead to decreased space availability for eruption of the succedaneous teeth.

2. Early loss of primary tooth leading to mucosal thickening over the succedaneous tooth. The mucosa might have to be incised to accelerate eruption.



Mucosal thickening over the lateral incisors preventing their eruption

3. Early loss of the primary tooth might cause excessive bone deposition over the succedaneous tooth

4. Hereditary, in certain children teeth erupt much later than established norms

5. Presence of supernumerary tooth can block the erupting permanent tooth.

6. Presence of odontomas or other cysts and tumors (in the path of eruption) might prevent the permanent tooth from erupting



Impacted canine and destruction associated with a cystic growth in the mandible

7. Presence of deciduous root fragment that are not absorbed can block the erupting tooth or may deflect it preventing its eruption in an ideal location.



Retained roots of the deciduous 2nd molar deflected the erupting 2nd pre-molar buccally

8. Presence of ankylosed deciduous teeth. These might not get absorbed causing a delay in the eruption of the permanent tooth.



Ankylosed deciduous canines, which did not expoliate on time, resulted in labially erupting permanent canines

9. The succedaneous tooth might be congenitally missing, delaying the loss of the primary tooth

10. In certain endocrine disorders the eruption of permanent teeth might be delayed, e.g. hypothyroidism.

Whatever the reasons for the delay in eruption, it is important to maintain and if required to create space for its eruption.

Proper knowledge of preventive and interceptive orthodontics can definitely reduce the occurrence of malocclusions, if not prevent them from occurring; this can significantly reduce the severity of the malocclusion.

1. *Abnormal eruptive path*

Each tooth travels on a distinct path from its inception to the location at which it erupts. It can deviate from this eruption path because of many reasons:

1. Tooth bud facing and/or placed or displaced from its ideal location

2. Presence of a supernumerary tooth may divert a tooth from its eruptive path

3. Presence of odontomas or a cyst may divert it if not altogether prevent its eruption.

4. Unresorbed or retained deciduous teeth might force a tooth to erupt along a path of least resistance rather than in place of the deciduous tooth

5. Retained root fragments (especially of deciduous molars) may deflect an erupting permanent tooth

6. A true arch length deficiencies or excess of tooth material may cause one or more teeth to deviate from their eruptive path



A true arch length deficiency

The tooth that most frequently erupts in an abnormal location is the maximally canine. Various reasons have been attributed for this behavior. These include:

1. It travels the longest distance, from near the floor of the orbit to the cover of the arch.
2. It is the last anterior tooth to erupt and loss in arch length—anterior or posterior may impinge on the space required for its eruption.
3. Abnormal position of the tooth bud. Ideally it should slide along the distal aspect of the root of the lateral incisor. Any problem in the position of the lateral incisor may divert the erupting canine.
4. *Ankylosis*

Ankylosis is a condition which involves the union of the root or part of a root directly to the bone, i.e. without the intervening periodontal membrane. Ankylosis of teeth is seen more commonly associated with certain infection, endocrine disorders and congenital disorders, e.g. Cleidocranial dysostosis, but these are rare occurrences. It should be suspected in cases where there is a past history of trauma, or a mobile tooth has regained stability.

1. *Dental caries*

Proximal caries are especially to blame for the reduction in arch length. This might be brought about by migration of adjacent teeth and/or tilting of adjacent teeth into the space available and/or supra-eruption of the teeth in the opposing arch. A clear reduction in arch length can be expected if several adjacent teeth involved by proximal caries are left unrestored. This is especially true for deciduous molars.

Proximal decay in the 1st molar leading to decreased arch length

Mesial migration of the left posterior segment due to the presence of a grossly decayed deciduous 1st molar

Also caries can lead to the premature loss of deciduous or permanent teeth which can by themselves cause malocclusion.

1. *Improper dental restorations*

Improper dental restorations can cause malocclusion. How?

* Under contoured proximal restoration can lead to a significant decrease in the arch length especially in the deciduous molars.
* Over contoured proximal restorations might bulge into the space to be occupied by a succedaneous tooth and result in a reduction of this space.
* Overhang or poor proximal contacts may predispose to periodontal breakdown around these teeth.
* Premature contacts on over contoured occlusal restoration can cause a functional shift of the mandible during jaw closure,
* Under-contoured occlusal restorations can lead to the supra-eruption of the opposing dentition.

**Abnormal pressure habits and functional aberrations**

These are possibly the most frequently encountered causes of malocclusion. These include:

a. Abnormal sucking

b. Thumb and finger sucking.



Patient with a thumb sucking habit

c. Tongue thrust and tongue sucking.



Tongue thrust habit because of an abnormally large tongue

d. Lip and nail biting.



Lip biting

e. Abnormal swallowing habits (improper deglutition)

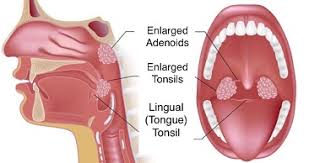
f. Speech defects

g. Respiratory abnormalities (mouth breathing, etc.).

Typical features of a mouth breather. Note the gingival inflammation in the maxillary anterior region

h. Tonsils and adenoids

Patient suffering from enlarged adenoids

i. Psychogenic habits and bruxism.

All of these habits are functional abrasions which produce forces that are abnormal. Since these forces are produced repeatedly over time they are capable of bringing about a permanent deformity in the developing musculoskeletal unit.

The deformity produced depends upon the intensity, duration and frequency of the habit. The effect of habits basically follows the functional matrix theory of growth as proposed by Moss—in its simplest form it says that—“function creates form and normal function creates normal form”.