PREMATURE LOSS OF FIRST PRIMARY MOLAR

The effect of premature loss of first primary molars in both arches is mostly dependent on the **state of eruption of the first permanent molars.**

1) If the primary first molar is lost during the primary dentition from ages 3 to 5 years, there should be little or no space loss associated with mesial movement of the second primary molar.
2) If the primary first molar is lost as the first permanent molars erupt at ages 5 to 7 years, this will cause:
    a. A strong force is exerted that pushes the second primary molar forward into the first primary molar space.
    b. A loss of posterior arch length within the quadrant that can lead to crowding as the canines and premolars erupt in later stages.
    c. Mandibular arch length may be further compromised by distal and lingual shifting of anterior teeth toward the side of first primary molar tooth loss.

Therefore the loss of a first primary molar in either arch, approximating eruption of first permanent molars, indicates that the use of a space maintainer is generally desirable to stabilize second primary molar and canine positioning.

3) If the first primary molar is lost after first permanent molars have erupted into occlusion and the second primary molar is still in position, minimal space loss should be evidenced in either arch.

Management:

a. For unilateral loss of primary first molar a unilateral band or crown and loop is usually the appliance of choice. The appliance incorporates a band or crown on the second primary molar with a soldered wire-loop extension extending forward to come into contact with the distal-cervical surface of the primary canine in the quadrant.
b. If first primary molars are lost bilaterally within a lower arch and the second primary molars are retained, two separate unilateral loop appliances are generally indicated until first permanent molar and incisor eruption is complete. Lingual holding arch designs should not be placed before eruption of the permanent incisors because the lingual wire may interfere with incisor positioning during eruption. Additionally, primary incisors as anterior stops do not offer sufficient anchorage to prevent loss of arch length in most cases.

PREMATURE LOSS OF SECOND PRIMARY MOLAR

The effect of the loss of the second primary molars also depends on the **state of eruption of the first permanent molars.**

1) If a second primary molar is lost in a child 2 to 5 years of age, no space loss should occur while the first permanent molar is in basal bone. The options for managing such early loss are very limited due to lack of retention elements for fixed appliances and difficulties with patient cooperation in the use of appliances at this age.
2) If the first permanent molars erupt considerable loss in arch length can occur if no second primary molar is present as an eruptive guide. The upper first permanent molar displaces forward through bodily crown-root movement and mesiolingual rotation around the palatal root. While the lower first permanent molars move forward by pronounced mesial tipping of the crown in addition to the distal movement and retroclination of teeth anterior to the space.
3) If the loss of the second primary molar occurs after the first permanent molars have fully erupted and normal cuspal interdigitation has been established, the degree of space loss should be less dramatic than earlier during molar transition, regardless of the arch involved.

Management:

a. If the loss occurs just before eruption of the first permanent molar, that is, when the first molar crown is still covered with oral mucosa and a thin partial covering of bone, a space maintainer to guide the positioning of the first permanent molar into normal occlusion is desirable. The appliance of choice is a distal shoe for both the maxillary and mandibular arches.
b. If the first permanent molars are erupting the classic bilateral mixed-dentition space maintainer in the mandibular arch is the passive lingual arch with bands fitted to the first permanent molars, a 0.036- or 0.040-inch stainless steel wire is contoured to the arch and extended forward to make contact with the cingulum area of the incisors.

- As stated earlier, lower lingual arches should not be placed before the eruption of the permanent incisors because of their frequent lingual eruption path. The lingual wire may interfere with normal incisor positioning if the appliance is in position before lateral incisor eruption. Additionally, abutting against primary incisors as anterior stops does not offer sufficient anchorage to prevent significant loss of arch length.

c. While in the maxillary arch the bilateral mixed dentition space maintainer, to stabilize molar positions bilaterally, is Nance appliance. The Nance appliance uses a contoured rigid wire with an acrylic "button" in contact with the palatal shelf as an anterior stop for bilateral molar stabilization in the maxillary arch. Providing the same molar rotation and bodily movement control as transpalatal bars, the added bracing of the acrylic button against the anterior palatal vault offers

some additional resistance against forward tipping movements of the molars.

AREAS OF MULTIPLE PRIMARY MOLAR LOSS

Loss of multiple primary molars may lead to mutilation of the developing dentition unless an appliance is constructed to maintain relationships of the remaining teeth and to guide eruption of the developing teeth. The types to be used are:

1. Removable acrylic partial dentures have been used successfully in either arch after the loss of multiple teeth.
2. The passive lingual arch or (Nance appliance)
3. Transpalatal-bar appliance
4. It is occasionally necessary to recommend extraction of all the primary teeth in a preschool child and wear complete dentures before the eruption of permanent teeth.

LOSS OF FIRST PERMANENT MOLARS

The first permanent molar is unquestionably the most important unit of mastication and is essential in the development of a functionally desirable occlusion. A carious lesion may develop rapidly in the first permanent molar and occasionally progress from an incipient lesion to a pulp exposure in a 6-month period. The loss of a first permanent molar in a child can lead to changes in the dental arches that can be traced throughout the child's life. Unless appropriate corrective measures are instituted, these changes include

1. Diminished local function,
2. Drifting of teeth,
3. Continued eruption of opposing teeth.
4. The second molars, even if unerupted, start to drift mesially after the loss of the first permanent molar. A greater degree of forward bodily movement will occur with loss of the first permanent molar in 8- to 12-year-old children.
5. In older children, if the loss occurs after eruption of the second permanent molar, more exaggerated mesial tipping of the second molar can be the expected outcome.
6. Although the premolars undergo the greatest amount of distal drifting, all the teeth anterior to the space, including the central and lateral incisors on the side where the loss occurred, may show evidence of movement.
7. Contacts open and the premolars, in particular, rotate as they fall distally. There is a tendency for the maxillary premolars to move distally in unison, whereas those in the lower arch may move separately.

8. When the maxillary first permanent molar loses its opponent, it erupts at a faster rate than the adjacent teeth. The alveolar process is also carried along with the molars and causes problems when prosthetic replacements are needed.

Management:

The treatment of patients with the loss of first permanent molars must be approached on an individual basis.

1. If the first permanent molars are removed several years before eruption of the second permanent molars, there is an excellent chance that the second molars will erupt in an acceptable position. However, the axial inclination of the second molars, particularly in the lower arch, may be greater than normal. The decision whether to allow the second molar to drift mesially or to guide it forward in an upright position may be influenced by the presence of a third molar of normal size.
2. When the first permanent molar is lost after the eruption of the second permanent molar, orthodontic evaluation is indicated, and the following points should be considered:
    a. Is the child in need of corrective treatment other than in the first permanent molar area?
    b. Should the space be maintained for a replacement prosthesis?
    c. Should the second molar be moved forward into the area formerly occupied by the first molar?

    The latter choice is often the more satisfactory, even though there will be a difference in the number of molars in the opposing arch. A third molar can often be removed to compensate for the difference. Without treatment, the second molar will tip forward within a matter of weeks.
3. Another option to consider is autotransplantation of a third molar into the first molar position