MORPHOLOGIC DIFFERENCES BETWEEN PRIMARY AND PERMANENT TEETH

The morphology of the primary dentition is different in many respects from that of the permanent dentition, and not only in the sizes of the crowns and roots. They have following morphologic difference:

Features of a Deciduous Crown

1. The crown of the deciduous tooth is shorter than the permanent tooth.
2. The occlusal table of a deciduous tooth is narrower labiolingually than is the permanent tooth.
3. The deciduous tooth is constricted in the cervical portion of the crown.
4. The enamel and dentin layers are thinner in the deciduous tooth.
5. The enamel rods in the gingival third extend in a slightly occlusal direction from the dentino-enamel junction in deciduous teeth but extend slightly apically in the permanent dentition.
6. The contact areas between the deciduous molars are very broad and flat.
7. The color of the deciduous tooth is lighter than permanent teeth .

Features of a Deciduous Root

1. The root of the deciduous anterior tooth is narrower mesiodistally than is that of the permanent anterior tooth.
2. The roots of the posterior deciduous tooth are longer and slenderer in relation to crown size than are those of the permanent tooth.
3. The roots of the deciduous molar flare more as they approach the apex (which affords the necessary room for the development of the permanent tooth buds) than do the permanent molar roots

Features of a Deciduous Pulp

1. The pulp of the deciduous tooth is larger than that of the permanent tooth in relation to the crown size.
2. The pulp horns of the deciduous tooth (especially the mesial horns) are closer to the outer surface of the tooth than are those of the permanent tooth.
3. The mandibular molar has larger pulp chambers than does the maxillary molar in the deciduous tooth.
4. The form of the pulp chamber of the deciduous tooth follows the surface of the crown.
5. Usually there is a pulp horn under each cusp.

6. Thin and slender roots pulp canals.
7. Accessory canals extend from floor of the pulpal chamber to the furcation or interradicular area.
8. Increased blood supply, due to which the deciduous pulp exhibits typical inflammatory response.
9. Responds by inflammatory process, resulting in increased internal resorption.
10. Reduced sensitivity to pain—due to less number of nerve fibers.
11. Increased reparative dentin formation.
12. Poor localization of infection and inflammation.
13. Multiple ramifications, making complete debridement impossible.
14. Ribbon shaped root canal (hour glass appearance) that is narrower mesiodistally, discourages gross enlargement of the canal.

GENERAL DIFFERENCES

1-No. of teeth present for primary is 20 and permanent is 28-32
2- Bicuspids and third molars are absent in the primary teeth.
3- Primary teeth are smaller in size when compare to permanent teeth.
4- First tooth to erupt into the oral cavity is mandibular incisor whereas in permanent teeth it is the mandibular first molar.

SIZE AND MORPHOLOGY OF THE PRIMARY TOOTH PULP CHAMBER

Considerable individual variation exists in the sizes of the pulp chambers and pulp canals of the primary teeth. Immediately after tooth eruption, the pulp chambers are large and generally follow the outline of the crown. They decrease in size as age increases and under the influence of both function and abrasion of the occlusal and incisal surfaces of the teeth. Radiographs do not demonstrate completely the extent of the pulp horn into the cuspal area. In addition, the cemento-enamel junction of primary teeth presents three interesting morphologic relationships, in which the cementum is over enamel, the cementum and enamel are edge to edge, or there is a gap between the cementum and enamel with dentin exposure. This irregularity in the cemento-enamel junction may indicate the need for care during restorative and other procedures to avoid damage

PRIMARY ROOT CANAL ANATOMY

To treat the pulps of primary teeth successfully, the clinician must have a thorough knowledge of the anatomy of the primary root canal systems and the

variations that normally exist in these systems. To understand some of the variations in the primary root canal systems requires an understanding of root formation.

Root Formation

The roots begin after enamel and dentin formation has reached the future CEJ. The epithelial dental organ forms Hertwig's epithelial root sheath, which initiates formation and molds the shape of the roots. Hertwig's sheath takes the form of one or more epithelial tubes (depending on the number of roots of the tooth, one tube for each root). During root formation the apical foramen of each root has a wide opening. The dentinal walls diverge apically, and the shape of the pulp canal is like a wide-open tube. Each root contains one canal at this time, and the number of canals is the same as the number of roots.

When root length is established, the sheath disappears but dentin deposition continues internally within the roots. As growth proceeds, the root canal is narrowed by continued deposition of dentin and the pulp tissue is compressed. Additional deposition of dentin and cementum closes the apex of the tooth and creates the apical convergence of the root canals common to the completely formed tooth.

Root length is not completed until 1 to 4 years after a tooth erupts into the oral cavity. In the primary teeth the root length is completed in a shorter period of time than in the permanent tooth because of the shorter length of the primary roots.

The primary tooth is unique in so far as resorption of the roots begins after a short period of complete root length formation. At this time the form and shape of the root canals roughly correspond to the form and shape of the external anatomy of the teeth. Root resorption or the deposition of additional dentin within the root canal system, however, significantly changes the number, size, and shape of the root canals within the primary tooth.

ROOT COMPLETION OF PRIMARY TEETH

Primary tooth roots are completed between the ages of 18 months to 3 years. The complete primary dentition (with 20 teeth) is in the mouth from about 2 years of age to about 6 years, during which no permanent teeth are visible in the mouth, but permanent teeth are forming within the jaws.

EXFOLIATION (SHEDDING) OF PRIMARY TEETH

The roots of primary teeth are complete for only a short period of time. Only about 3 years after completion, primary tooth roots begin to resorb, usually at the apex or on one side near the apex. Resorption of a primary tooth root is the gradual dissolving away of the root due to the underlying eruption of the succedaneous tooth that will replace it. Root resorption continues as succedaneous teeth move closer to the surface until deciduous teeth eventually become loose and finally "fall off" (like leaves fall off of deciduous trees). This process of shedding is called exfoliation. When a primary tooth is shed, the crown of the succedaneous tooth is close to the surface and ready to emerge.

Root canal anatomy of primary anterior teeth

The form and shape of the root canals of the primary anterior teeth resemble the form and shape of the roots of the teeth. The permanent tooth bud lies lingual and apical to the primary anterior tooth. Owing to the position of the permanent tooth bud, resorption of the primary incisors and canines is initiated on the lingual surface in the apical third of the roots.

Maxillary Incisors

The root canals of the primary maxillary, central, and lateral incisors are almost round but somewhat compressed. Normally these teeth have one canal without bifurcations. Apical ramifications or accessory canals and lateral canals are rare, but they do occur.

Mandibular Incisors

The root canals of the primary mandibular central and lateral incisors are flattened on the mesial and distal surfaces and sometimes grooved, pointing to an eventual division into two canals. The presence of two canals is seen less than 10% of the time. Occasionally lateral or accessory canals are observed.

Maxillary and Mandibular Canines

The root canals of the maxillary and mandibular canines correspond to the exterior root shape, a rounded, triangular shape with the base toward the facial surface. The canines have the simplest root canal systems of all the primary teeth and offer few problems when being treated endodontically. Bifurcation of the canal does not normally occur. Lateral canals and accessory canals are rare.

Root canal anatomy of primary molars

Normally the primary molars have the same number and position of roots as the corresponding permanent molars. The maxillary molars have three roots: two BUCCAL and one palatal; the mandibular have two roots: mesial and distal. In the primary molars, resorption usually begins on the inner surfaces of the roots next to the inter-radicular septum. When full length of the roots of the primary molars has just been completed, only one root canal is present in each of the roots. The continued deposition of dentin internally may divide the root into two or more canals. During this process, communications exist between the canals and may remain in the fully developed primary tooth. Subsequent deposition of secondary dentin may produce a complete separation of the root canal into two or more individual canals. Many fine-connecting branches or lateral fibrils form a connecting network between the facial and lingual aspects of the root canals. Accessory canals, lateral canals, and apical ramifications of the pulp in primary molars occur in 10% to 20%.

Maxillary First Primary Molar

It has three to four canals that roughly correspond to the exterior root form with much variation. The palatal root is often rounded; it is often longer than the two facial roots. In most of these teeth three separate canals are present, with a very narrow isthmus connecting them especially between the palatal and distal. Islands of dentin may exist between the canals, with many connecting branches and fibrils.

Maxillary Second Primary Molar

It has three to five canals roughly corresponding to the exterior root shape. The mesiofacial root usually bifurcates or contains two distinct canals. This occurs in approximately 85% to 95% of maxillary second primary molars. Fusion of the palatal and distofacial roots may occur. These fused roots may have a common canal, two distinct canals, or two canals with a narrow connecting isthmus of dentin islands between them and many connecting branches or fibrils.

Mandibular First Primary Molar

It usually has two canals roughly corresponding to the external root anatomy, but it may have two to four canals. It is reported that approximately 75% of

the mesial roots contain two canals, whereas only 25% of the distal roots contain more than one canal.

Mandibular Second Primary Molar

It may have two to four canals, but it usually has three. The mesial root has two canals approximately 85% of the time, whereas the distal root contains more than one canal only 25% of the time

Functions of primary teeth

Function of Primary teeth are essential in the development of the mouth. The primary teeth maintain the arch length within the jaw, the bone and the permanent teeth replacements develop from the same tooth germs as the primary teeth. The primary teeth provide guides for the eruption pathway of the permanent teeth.

Well deciduous teeth are important and they are required to serve a number of functions above and beyond simply biting and chewing. This is why the children and parents need to take care of them and make sure they last until the permanent teeth are ready to come through.

Many opinions have been expressed about the features that characterize a normal primary dentition, but three features are seen frequently enough for them to be considered normal:

1. 'Straight' or 'mesial step second molar relationship'

In most dentitions the maxillary and mandibular primary second molars are in cusp-to-cusp occlusion so that their distal surfaces are in the same distal plane. Frequently, however, there is a mesial step in this vertical plane. This can also be considered normal. Distal „step" indicate a class II arch relationship.

2. Incisor spacing:

Spacing among the primary incisors is normal, and indicates that the permanent successors will probably have adequate space into which to erupt. Lack of spacing or imbrication of primary incisors are signs that permanent incisors will probably be crowded when they erupt.

3. Anthropoid (primate space): The most common sites for spaces in the primary teeth are in the canine regions. The anthropoid spaces are mesial to the maxillary canines and distal to the mandibular canines.

The major functions of primary teeth

1-Speech production and development

Learning to speak clearly is crucial for cognitive, social, and emotional development. The proper positioning of primary teeth facilitates correct syllable pronunciation and prevents the tongue from straying during speech formation.

2-Eating and nutrition.

The ability to bite and chew also helps to break up food into more easily digestible pieces and allow for better digestion of food. As the food is being broken up by the teeth, it is also mixed with saliva containing enzymes that begin the digestive process. A child that swallows too rapidly without chewing the food adequately will prolong the digestive process.

Children with malformed or severely decayed primary teeth are more likely to experience dietary deficiencies, malnourishment, and to be underweight. Proper chewing motions are acquired over time and with extensive practice. Healthy primary teeth promote good chewing habits and facilitate nutritious eating

3-Self-confidence

Even very young children can be quick to point out ugly teeth and crooked smiles. Taking good care of primary teeth can make social interactions more pleasant, reduce the risk of bad breath, and promote confident smiles and positive social interactions.

4- Place Holder (space maintainer)

One of the major functions of primary teeth is to hold an appropriate amount of space for developing adult teeth. In addition, these spacers facilitate the proper alignment of adult teeth and also promote jaw development. Left untreated, missing primary teeth cause the remaining teeth to "shift" and fill spaces improperly. For this reason, pediatric dentists often recommend space-maintaining devices.

5-Excellent oral health

Badly decayed primary teeth can promote the onset of childhood periodontal disease. As a result of this condition, oral bacteria invade and erode gums, ligaments, and eventually bone. If left untreated, primary teeth can drop out completely – causing health and spacing problems for emerging permanent teeth. To avoid periodontal disease, children should practice an adult-guided

oral care routine each day, and infant gums should be rubbed gently with a clean, damp cloth after meals

6-Development of the Jaw Bones and Facial Muscles

The presence or absence of teeth will affect the way in which the jaw bones and facial muscles develop. The growth of the jaw bones is affected by the facial muscles. Teeth and the chewing function help to exercise the facial muscles and facilitate the development of the jaw bones.

TYPES AND FUNCTION OF INDIVIDUAL PRIMARY TEETH

INCISORS

Incisors are the eight teeth in the front of the mouth (four on top and four on bottom). These are the teeth that are used to take bites of eaten food. Incisors are usually the first teeth to erupt — at around 6 months for the baby teeth, and between ages 6 and 8 for the adult

Function of primary incisors

1. Incisors cut and slice food when the child takes a bite. The incisors are the main teeth used for cutting pieces of food, for example when eating a whole apple, the incisors are the teeth that slice through the apple and help to get the piece of apple into the mouth to be fully chewed by other teeth.
2. Incisors support the lips and face. The sides of the lips are probably resting right up against the front teeth. Because of this, incisor teeth help to form the overall appearance of the face.
3. Help in speech. As in pronunciation of some sounds, the tongue touches the upper incisors. It touches near the top of the incisors for the “t” sound and near the bottom for the “th” sound. Many sounds need the incisor teeth to be pronounced. It‟s also why denture wearers have to re-learn how to speak clearly when they get their dentures.
4. They can make the smile beautiful. The first thing that most people notice in the smile will be the teeth. Since the incisors are the front teeth, they have a tremendous effect on how the smile looks.
5. Incisors help to guide the jaw when closing the mouth.

CANINES

The four canines are the next type of teeth to develop. These are the sharpest teeth and are used for tearing food apart. Primary canines generally appear

with the upper canines coming in just ahead of the lower canines. In permanent teeth, the order is reversed.

MOLARS

Molars are used for chewing and grinding food. Primary molars are replaced by the first and second premolars. The permanent molars do not replace any primary teeth, but come in behind all of them, further back in the jaw