Journal of Dentistry and Oral Biology

Editorial
Published: 30 Apr, 2018

Space Maintainers: A Stitch in Time

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Editorial

Pedodontists have traditionally accepted active supervision of the developing dentition as major responsibility. Management of space problems associated with the transitional stages from primary to permanent dentition is a routine component of pedodontic practice. It is a complex phenomenon, which is composed of a variety of physiological adaptations of occlusion during this period. The exfoliation of the primary teeth, the permanent teeth eruption and the occlusion though independent, occur in a harmonious sequence. There are many morphogenetic and environmental influences, which manage the occlusal development and a disorder or deviation in any of these elements may influence the occlusion. Among these elements, there is the importance of the primary teeth because when they are physiologically exfoliated, there is a favorable alveolar growth and space for a better accommodation of the successor permanent teeth. The permanent teeth dislocation occurs in the eruptive, pre functional and functional periods of the eruption, that are within the primary arch and in the mixed dentition stage.

Space management is an important responsibility of clinicians who are involved in monitoring the developing dentition, as the loss of arch length may lead to problems such as crowding, ectopic eruption, dental impaction, cross bite formation, and dental centerline discrepancies. The use of space maintainers may potentially obviate the need for later extractions and/or complex orthodontic treatment.

Management of space during dentition development is important for the equilibrium of stomatognathic system. The developmental phases of dentition as well as its eruption sequence, symmetry, and chronology should be known by the practitioner, in addition to managing leeway space for proper positioning of permanent dentition.

Space maintainers are fixed or removable appliances used to preserve arch length following the premature loss or elective extraction of a tooth/teeth. They are mainly used to maintain the mesiodistal relationship in a given arch when it is indicated. A space maintainer is utilized when there is early loss of the primary molar as this can prevent or reduce the severity of a developing malocclusion. Retained primary teeth can also act as space maintainers. Space maintainer appliances are most commonly used to maintain the space created by early loss of a first or second primary molar while awaiting the eruption of its successor. One of the factors that can cause an imbalance in this process is the ectopic eruption, in which the permanent tooth is deviated from its normal eruption course, resulting in abnormal resorption of the preceding deciduous tooth.

Growth and development and drifting patterns of teeth are closely interdependent. In the field of pediatric dentistry much emphasis should be put on these factors in order to secure the optimal benefit of systematic dental care for the child. It is well known that after early loss of deciduous molars dental arch crowding arises in some cases, while in other cases it does not.

The main observations are that following premature loss of a primary molar, mesial migration of molars and distal drift of canines occur, and the extent to which these occur will depend upon the timing of tooth loss, the severity of crowding, and the actual tooth lost. The reduction in arch length is more severe in the maxilla, but there is more distal movement of the primary canines in the mandible. There is less space loss following loss of primary first molars compared to second molars, but eruption of maxillary canines can be impaired following early loss of primary first molars.

Management of premature tooth loss in the primary dentition requires careful thought by the clinician because the consequences of proper or improper space management may influence dental development well into adolescence. Early loss of primary teeth may compromise the eruption of succedaneous teeth if there is reduction in the arch length. Timely intervention may save space for the eruption of the permanent dentition. The key to space maintenance in the primary dentition is to know which problems to treat.

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Received Date: *04 Apr 2018*
Accepted Date: *27 Apr 2018*
Published Date: *30 Apr 2018*

Citation:
Gupta K. Space Maintainers: A Stitch in Time. J Dent Oral Biol. 2018; 3(3): 1130.

ISSN: 2475-5680

In order to prevent arch length changes, the best space maintainer is a well-maintained primary tooth, as all space maintainer appliances are plaque retentive, thereby placing patients at a greater risk of developing caries and gingival inflammation. Space maintainer appliances may also impinge on the soft tissues, interfere with the eruption of adjacent teeth, fracture, and become dislodged or lost. Therefore, every effort should be made to retain primary molars until they are naturally exfoliated.

Space maintainer appliances can be unilateral or bilateral and fixed or removable. Fixed appliances are easier to maintain, and they are less likely to be damaged, lost, or removed. Contraindications for all space maintainers are: children with poor oral hygiene, children with a high caries rate, uncooperative children, and children with irregular attendance, as the gingival tissues may grow over the space maintainer, necessitating surgical removal of the appliance.

Different kinds of appliances can be used for space maintenance depending on the child's stage of dental development, dental arch, involved missing teeth, occlusion, and patient's age, ability to cooperate and to tolerate a removable appliance.

The child's stage of dentitional development, which dental arch is involved, or how many and which primary teeth are missing. Occlusion may also be a factor in determining the type of space maintainer, depending on the number of primary teeth missing, the presence of teeth normally opposing the missing primary tooth, the extrusion risk of these teeth, and the need to replace masticatory surfaces of missing primary teeth to avoid chewing impairment.

Space maintaining appliances can be fixed, removable or semi removable. Fixed includes (a) Several kinds of band and loop and crowns with welded tube and loop, (b) Fixed wire composite resin space maintainers, (c) Distal shoe retainers, (d) Mandibular lingual arch, (d) Nance appliance and transpalatal arch. Several kinds of removable appliances in the form of removable partial dentures. Removable space maintainers can be methylmethacrylate custom made appliances with retaining wires. Such appliances can be functional or nonfunctional. Semi removable space maintainers can be passive lingual or palatal arch wires.

The decision to use unilateral or bilateral appliances depends on which teeth are lost and which are available to support the space maintainer.

The need for space maintenance challenges the practitioner's prognostic skills. The following two important factors must be studied for each child.

- Potential space loss in the arch or arch.
- Timing of emergence of the permanent teeth.

One of the pediatric dentist's greatest restorative challenges is the esthetic rehabilitation of a young toddler who has suffered multiple tooth loss subsequent to rampant early implications of this situation include neuromuscular imbalance with decreased masticatory efficacy, speech disturbances, development of parafunctional buccal habits and psychological problems. In this century, dental esthetics is on the mind of more adolescents & children. So pediatric dentists aim to incorporate esthetics while maintaining space, by giving esthetic space maintainers to children.

Today's parents demand the restoration of their children's teeth for function and aesthetics. Children who have damaged, discolored and missing teeth sometimes have problems with self esteem which can be improved with aesthetic dentistry. When a child has lost one or more front teeth, the dentist can give the child a cosmetic and functional solution by fabricating an "aesthetic" space maintainer.