Dept. of Public Health Dentistry

Preventive and Interceptive Orthodontics

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Def.: It is the branch and science of orthodontics which aims at elimination of factors that may lead to malocclusion.

Preventive orthodontics is that part of orthodontic practice which is concerned with the patient's and parents' education, supervision of the growth and development of the dentition and the craniofacial structures, the diagnostic procedures undertaken to predict the appearance of malocclusion and the treatment procedures instituted to prevent the **onset of malocclusion**.

Preventive Orthodontics is largely a responsibility of the general dentist. It consist of-

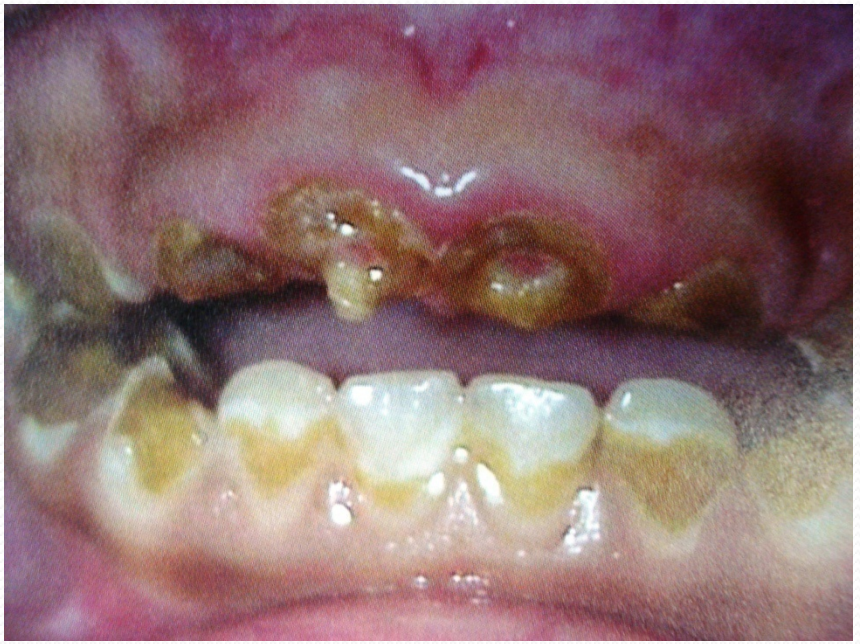
1. Parent Education
2. Caries control
3. Care of Deciduous dentition
4. Management of Ankylosed tooth
5. Maintenance of quadrant wise tooth shedding time table
6. Correction of Occlusal Irregularities
7. Extraction of supernumerary teeth
8. Space Maintenance
9. Management of abnormal frenal attachment.
10. Check up for oral habits and parents education
11. Prevention of Damage to Occlusion e.g. Milwaukee Braces
12. Management of Deeply Locked First Permanent Molars

1. Parent Education

- Preventive dentistry should ideally begin much before birth. The expecting mother should be educated on matters such as nutrition & provide ideal environment to fetus.
- After birth mother should be educated on proper nursing & care of child. Mother is advised to use physiologic nipple rather then conventional nipple.
- The parents should also be educated on the need for maintaining good oral hygiene and to teach the correct method of brushing the child's teeth.

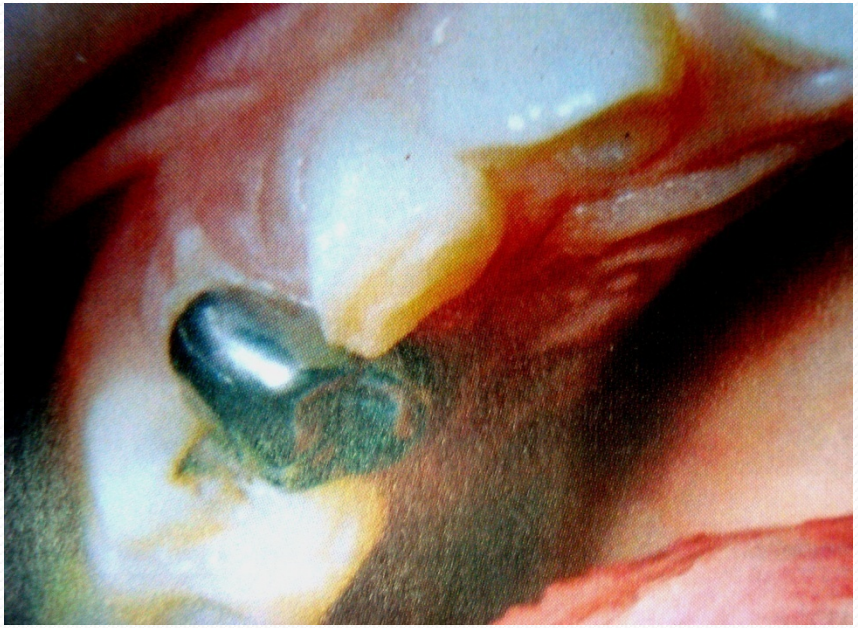
2. Caries Control :

- Caries involving the proximal surface of deciduous teeth if not restored leads to loss of arch length by movement of adjacent teeth into that space. Once caries is detected, proper restoration of the affected teeth should be undertaken immediately to prevent loss of arch length.



3. Care of Deciduous Dentition

- Preventive orthodontics includes care of the deciduous dentition by way of prevention and timely restoration of carious teeth. The deciduous teeth are excellent natural space maintainers until the developing permanent teeth are ready to erupt into the oral cavity. Thus all efforts should be taken to prevent early loss of the deciduous teeth.



4. Management of Ankylosed Teeth:

- Ankylosed deciduous teeth do not get resorbed and therefore either prevent the permanent teeth from erupting or deflect them to erupt in abnormal positions. These ankylosed teeth should be diagnosed and surgically removed at an appropriate time to permit the permanent teeth to erupt.

5. Maintenance of Tooth Shedding Time Table

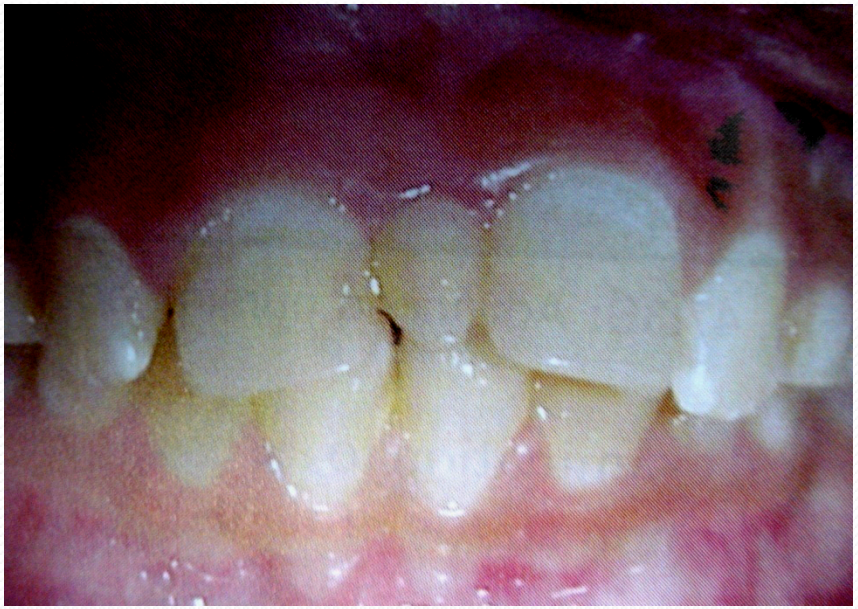
- There should not be more than 3 months difference in shedding of deciduous teeth and eruption of permanent teeth in one quadrant as compared to other quadrants. Delay in eruption may be due to one of the following factors:
- a. Presence of over-retained deciduous teeth or root
- b. Supernumerary tooth
- c. Over-hanging restoration in deciduous teeth
- d. Ankylosed primary teeth
- e. Cysts.

6. Correction of Occlusal Irregularities:

- Occlusal irregularities like overextended restoration and faulty restoration of contact areas may also result in malocclusion. They should be corrected carefully when full occlusal contact is established.

7. Extraction of Supernumerary Teeth:

- Presence of supernumerary and supplemental teeth can interfere with the eruption of nearby normal teeth. They can deflect adjacent teeth to erupt in abnormal positions. Thus supernumerary teeth should be identified and extracted before they cause displacement of other teeth.



8. Space Maintenance:

- Premature loss of deciduous teeth can cause drifting of the adjacent teeth into the space. It can result in abnormal axial inclination of teeth, spacing between teeth and shift in the dental midline.
- space maintenance is maintaining the mesiodistal width of an extracted or unerupted tooth.

Space Maintainer: It is a device used to maintain the space created by the loss of deciduous tooth. Space maintainers are generally used in mixed dentition period.

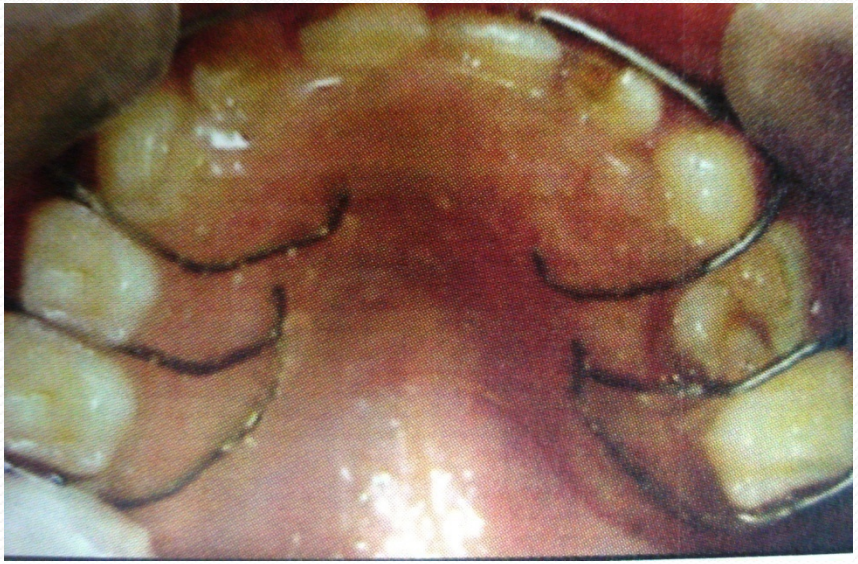
- **Classification: (According to Hitchcock)**
- 1. Removable or fixed or semi-fixed
- 2. With bands or without bands
- 3. Functional or non functional
- 4. Active or passive
- 5. Combination of the above

Requirements of Space Maintainers:

- 1. It should maintain the mesiodistal space created by a lost tooth.
- 2. It must restore the function as far as possible and prevent overeruption of opposing teeth.
- 3. It should be simple in construction.
- 4. It should be strong enough to withstand the functional forces.
- 5. It should not exert excessive stress on adjoining teeth.
- 6. It must permit maintenance of oral hygiene.
- 7. It should not interfere with normal growth, development and function.

Removable Space Maintainers: Partial Denture Space maintainer

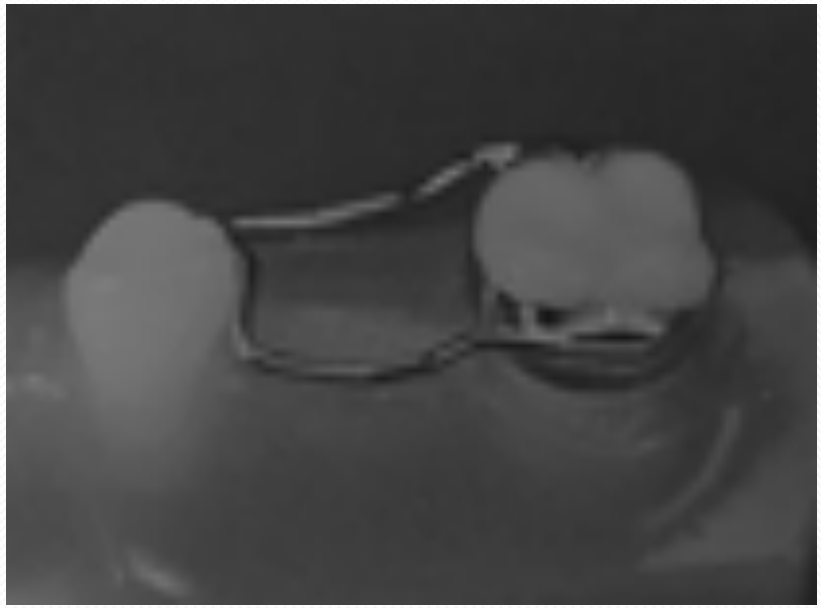
The partial denture is most useful for bilateral posterior space maintenance when more than one tooth has been lost per segment and the permanent incisors have not yet erupted.



Fixed Space Maintainers

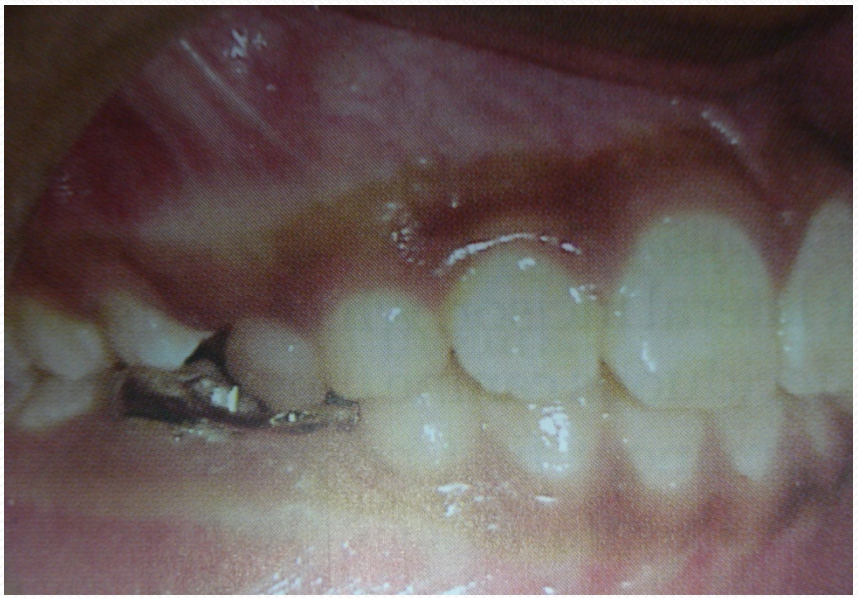
1. Band and loop space Maintainer:

It is a unilateral fixed appliance indicated for space maintenance in the posterior segments when a single tooth is lost. It is used most frequently to maintain the space of a deciduous first molar before eruption of permanent first premolar.



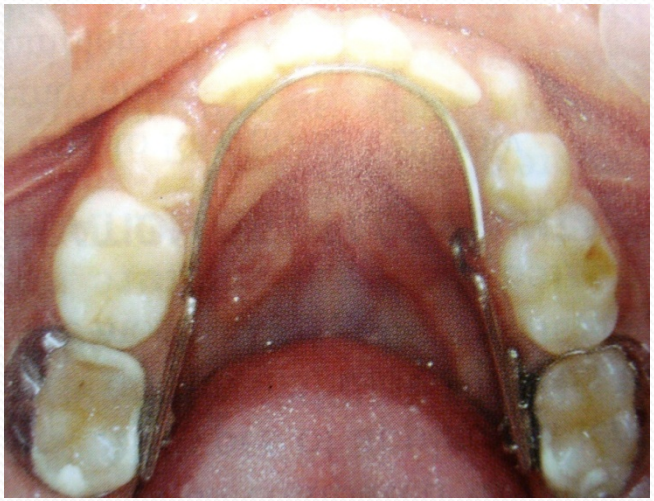
2. Crown and loop space maintainer

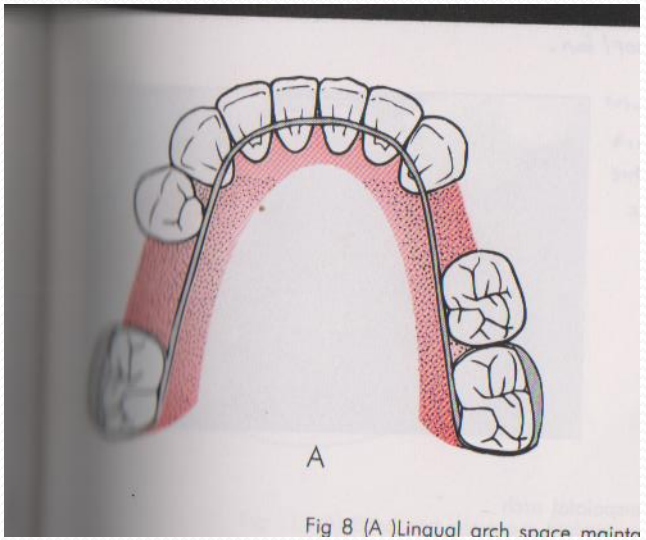
Crown and loop appliances are similar to band and loop space maintainers in all respects except that a stainless steel crown is used for the abutment tooth. The crown is used in preference to the band when the abutment tooth is highly carious, exhibits marked hypoplasia or is pulpotomized.



3. Lingual Arch Space Maintainer:

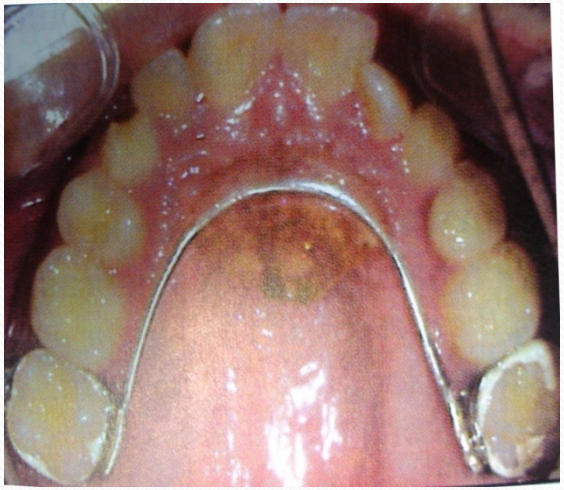
A lingual arch space maintainer is indicated for space maintenance when multiple lower deciduous posterior teeth are missing and the permanent incisors have erupted. It helps in maintaining the arch perimeter by preventing both mesial drifting of the molars and also lingual collapse of the anterior teeth.

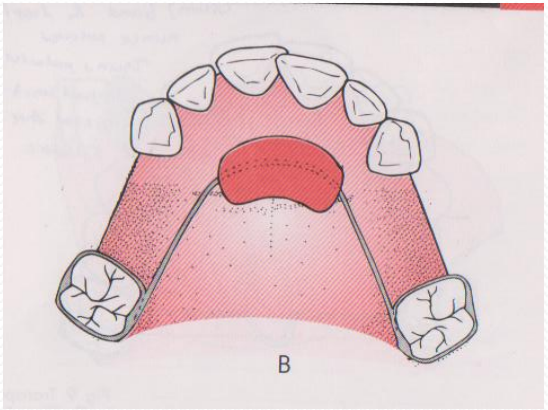




4. Nance Palatal Arch

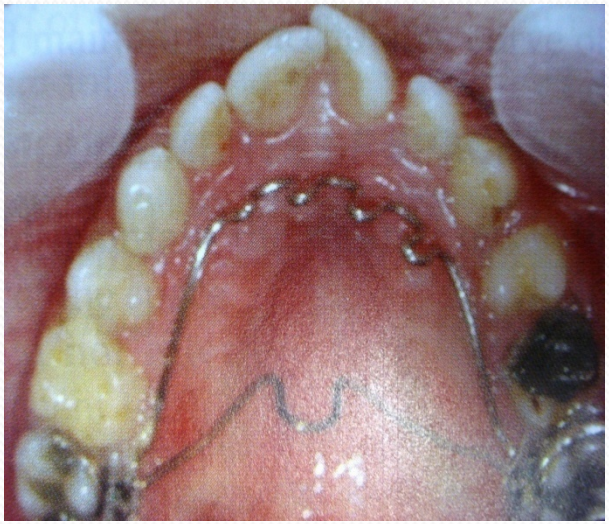
It is used to prevent mesial migration of the maxillary molars. It is simply a maxillary palatal arch which does not contact the anterior teeth, but approximates the anterior palate. The appliance carries an acrylic button that contacts the palatal tissue and resists anterior movement of posterior teeth.

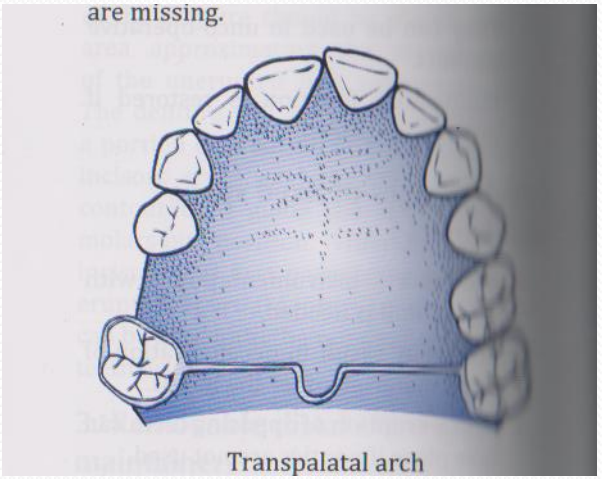




5. Transpalatal Arch :

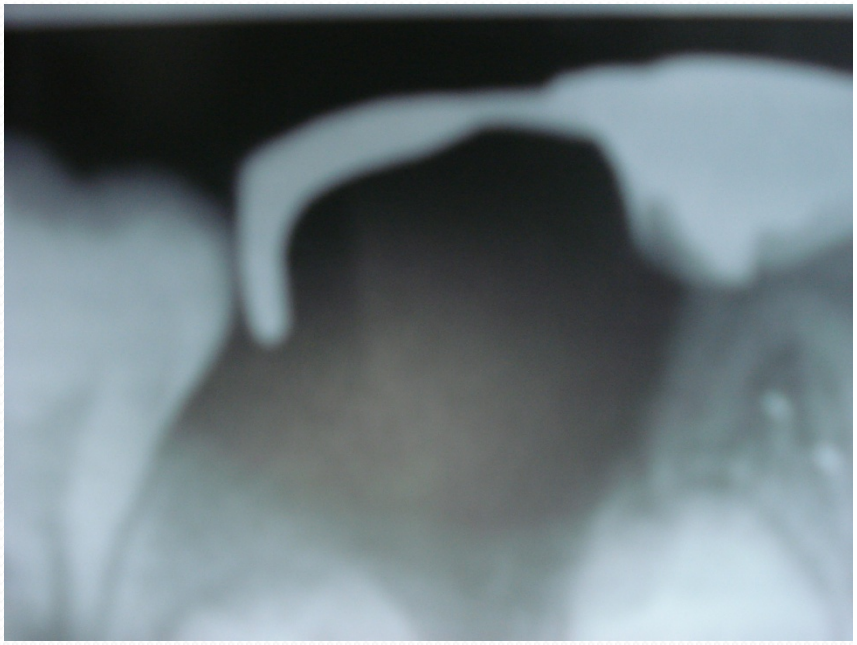
It has been recommended for stabilizing the maxillary first permanent molars when the primary molars require extraction. The best indication for transpalatal arch is when one side of the arch is intact, and several primary teeth on the other side are missing.



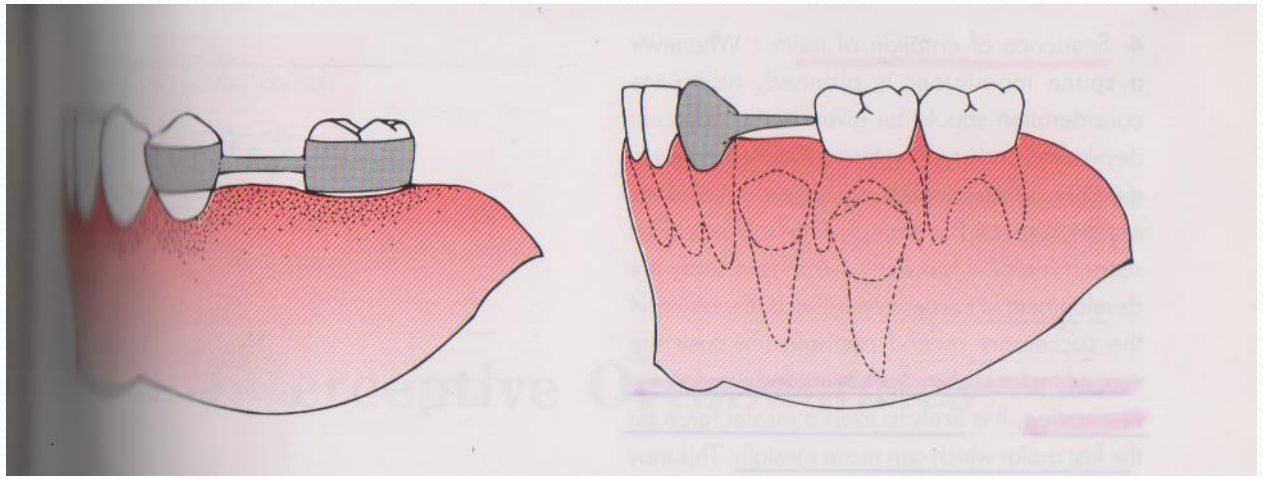


6. Distal Shoe Space Maintainer

It is the appliances of choice when a deciduous second molar is lost before eruption of permanent first molar. It is known as the intra-alveolar appliance. When the second primary molar is removed prior to eruption of the first permanent molar, this appliance provides greater control of the path of eruption of the unerupted tooth and prevents undesirable mesial migration. (Willet's appliance , Roche's distal shoe)

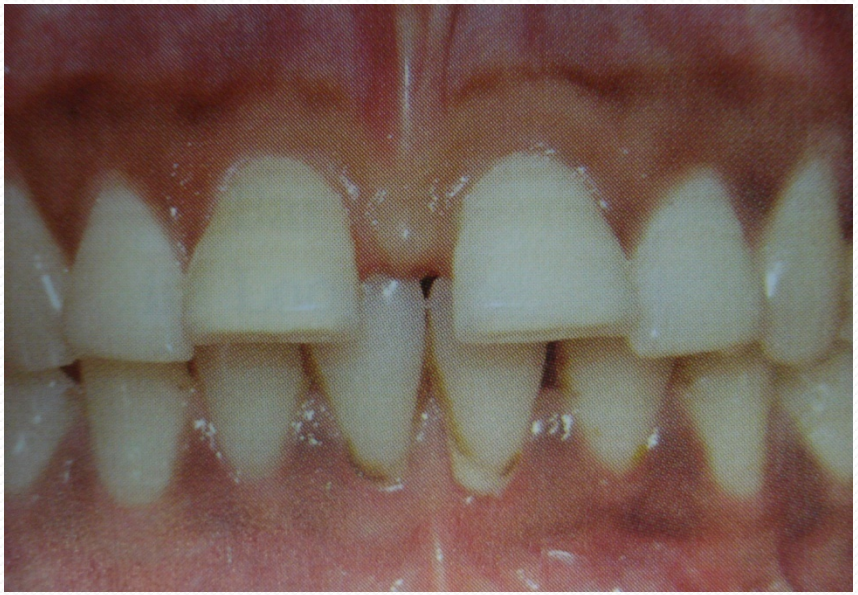


7.Band and bar, crown and bar space maintainer



9. Management of Abnormal Frenal Attachment

- The presence of a thick and fleshy maxillary labial frenum that is attached relatively low prevents the maxillary central incisors from approximating each other. This kind of abnormal frenal attachment in most patients is caused due to hereditary factors. They should hence be diagnosed and treated at an early age.

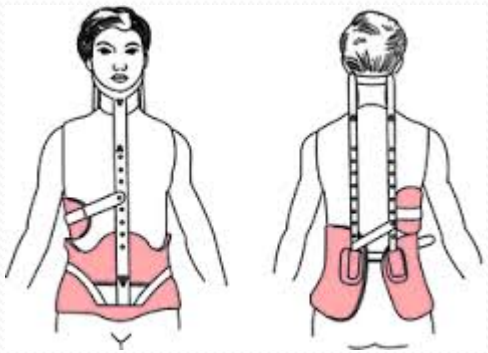


10. Check up for oral habits and parents education :

- Habit: It is a fixed constant, regular and settled practice established by the frequent repetitions of the same act. In other words habit is a commitment to perform the action repeatedly and regularly over a sustained period of time.

11.Prevention of Damage to Occlusion

- Milwaukee brace is an orthodontic appliance used for the correction of scoliosis.
- This appliance exerts tremendous force on the mandible and the developing occlusion leading to retardation of mandibular growth and possible deformities.
- So whenever it is used occlusion should be protected using functional appliances or positioners made on soft materials



12. Deeply locked first molars

- The deciduous second molars occasionally have a prominent distal bulge which prevents the eruption of the first permanent molars
- Slicing the distal surface of deciduous second molar help in guiding the eruption of first permanent molars

INTERCEPTIVE ORHODONTICS

INTERCEPTIVE ORTHODONTICS has been defined as that phase of the science and art of orthodontics employed to recognize and eliminate potential irregularities and malposition of developing dentofacial complex.

Basically Interceptive Orthodontics refers to measures undertaken to prevent a potential malocclusion from progressing into a more severe one.

Interceptive Orthodontics include

1. Resolution Of Crowding
2. Correction Of Developing Crossbite
3. Control Of Abnormal Habits
4. Space Regaining
5. Muscle Exercise
6. Interception Of Skeletal Malrelations
7. Removal Of Soft Tissue Or Bony Barrier To Enable Eruption Of Teeth

1.Resolution Of Crowding

- Crowding present in different stages of mixed dentition.
- Normally it is resolved by its self but if cannot resolved then one should go for treatment
- Resolution of crowding occur in natural ways due to :

1.Interdental spacing:

Interdental and primate spaces in deciduous dentition are useful for accommodation of larger permanent incisors

2. Intercanine arch growth:

Resolution occurs to some extent due to attainment of intercanine width space by growth of jaws which is generally 3-4mm more in maxilla than mandible. The growth can be affected by early loss of deciduous teeth.

3. Labial positioning of incisors

Space can also be provided by more labial positioning of permanent incisors. So they tend to increase dental arch perimeter. It is about 1-2mm.

4. Leeway space of Nance:

Combined mesiodistal width of permanent premolars and canines are less than that of deciduous canines and molars. It is about 1.8 mm in maxilla and 3.4mm in mandible. It is available for exchange of deciduous canines and molars.

If resolution of crowding do not occur in natural way then one should go for therapeutic procedure like:

Serial Extraction:

It is an interceptive orthodontic procedure usually initiated in early mixed dentition when one can recognize and anticipate potential irregularities in dento-facial complex & is corrected by a procedure that includes the planned extraction of certain deciduous teeth and later specific permanent teeth in an orderly sequence and predetermined pattern to guide the permanent teeth into more favorable position

- Indications

1. Class-I malocclusion showing harmony between skeletal and muscular system
2. Arch length deficiency as compared to tooth material
3. Where growth is not enough to overcome the discrepancy between tooth material and basal bone
4. Patients with straight profile and pleasing appearance

Contraindication

Serial extractions are contraindicated in

1. Class-II & III malocclusion with skeletal abnormalities
2. Spaced dentition
3. Anodontia/Oligodontia
4. Open bite & deep bite
5. Midline diastema
6. Class-I malocclusion with minimal space deficiency
7. Unerupted malformed teeth e.g. dilaceration

Advantages

Serial extraction carried out at early or mixed dentition stage has following advantages:

1. Treatment is more physiologic as it guides teeth using physiologic forces
2. Reduces duration of multibanded fixed treatment
3. Better oral hygine is possible reduces risk of caries
4. Lesser retention period is required
5. Health of investing tissue is prevented

Disadvantages

1. Treatment time is **prolonged** as the treatment carried out in stages spread over 2-3 years
2. Patient has to visit dentist often thus require patients cooperation
3. Tendency of developing **tongue thrust**
4. Deepening of the bite can result
5. If procedures are not carried out properly then there is risk of mesial migration of buccal segment
6. Ditching or space can be present between canine & second premolar

Methods :

There are three popular methods

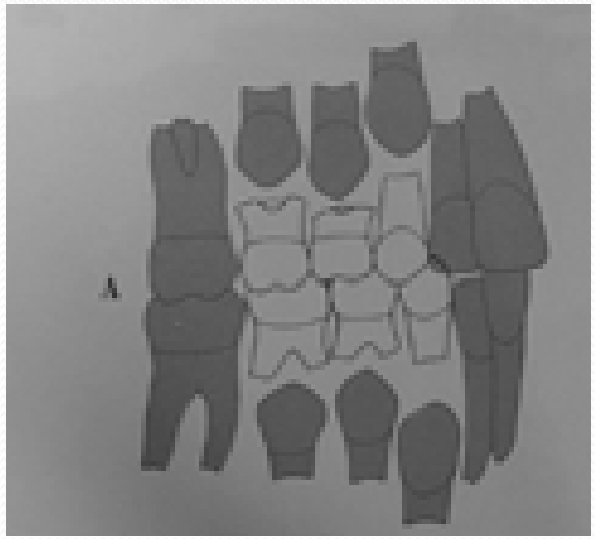
1. Dewel's method
2. Tweed's method
3. Nance method

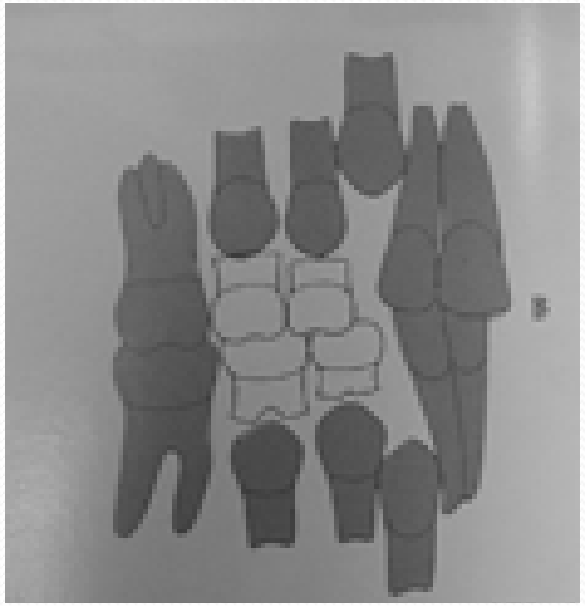
1. Dewel's Method

It is a three step serial extraction procedure.

In the first step deciduous canines are extracted at 8-9 years to create space for the alignment of incisors.

A year later, the deciduous first molars are extracted so eruption of first premolars are accelerated

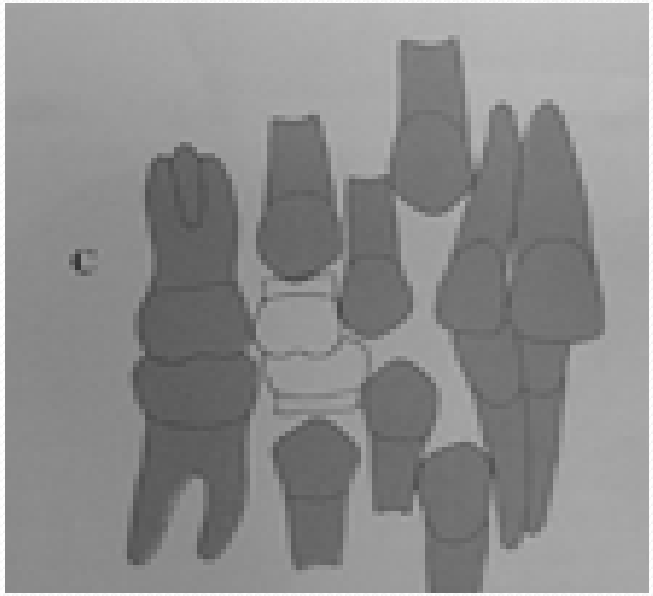


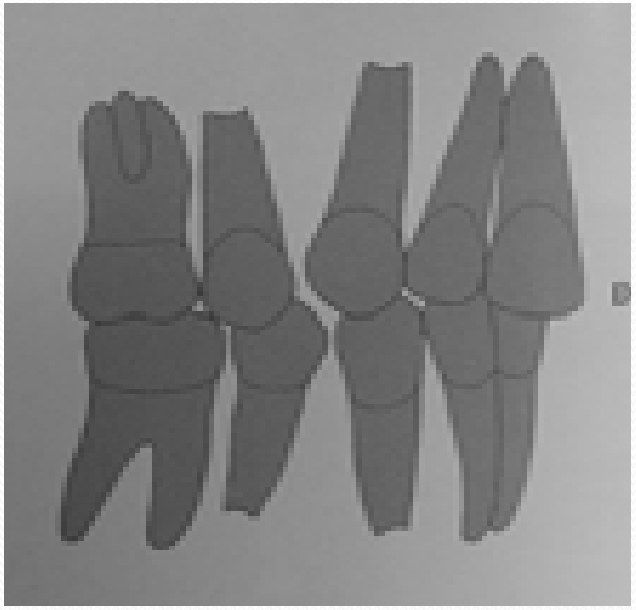


This is followed by the extraction of the erupting first premolars to permit permanent canines to erupt in their places (C-D-4)

- **Modified Dewel's technique:**

In this technique first premolars are enucleated at the time of extraction of deciduous first molar





2. Tweed's method

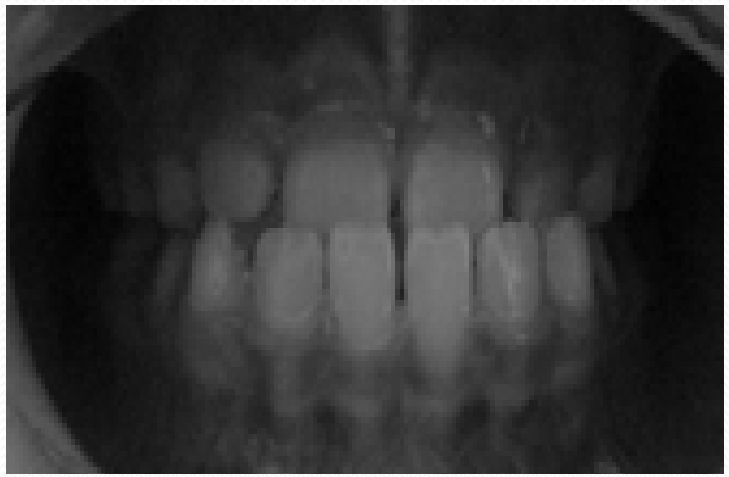
- **This method involves the extraction of deciduous first molars around 8 years of age.**
- **This is followed by the extraction of the first premolars & deciduous canines simultaneously.**
- **D-4C**

3.Nance method

- This is similar to Tweed's method and involves the extraction of the deciduous first molars followed by extractions of first premolars and the deciduous canines.
- D-4C

2. Correction of Developing Anterior Crossbite

Anterior cross bite is characterized by reverse over jet where in one or more maxillary anterior teeth are in lingual relation to the mandibular teeth.



- Anterior crossbite should be treated and intercepted at early age so as to prevent a minor orthodontic problem from progressing into a major dento-facial anomaly.
- It is said in orthodontics that “The best time to treat a crossbite is the first time it is seen”

Anterior crossbite should be treated early for the following reason :

1. This type of malocclusion is self perpetuating i.e. if the cross bite is present In deciduous dentition, it may manifest in the mixed and permanent dentition as well.
2. Simple anterior cross bites not treated early have the potential of growing into skeletal malocclusion that later need complicated orthodontic treatment.

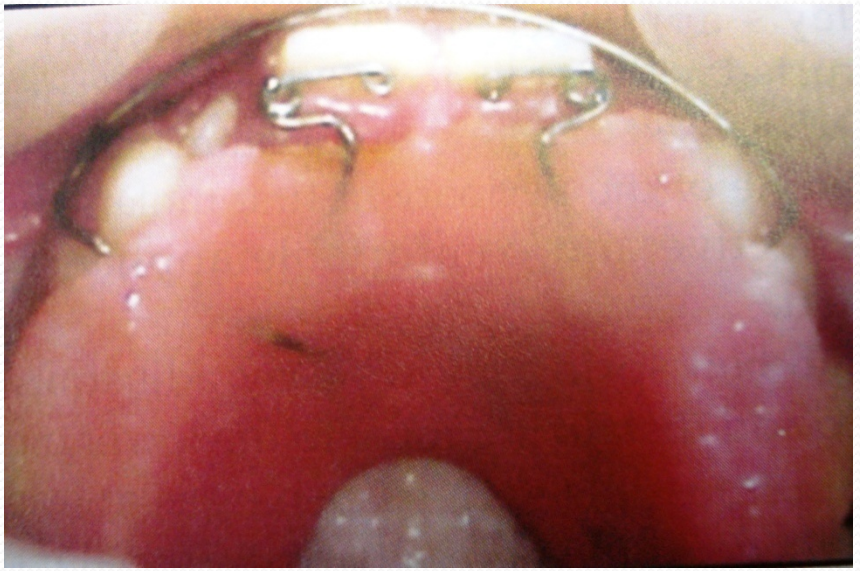
They are broadly classified as:

1. Dento-alveolar anterior crossbites
2. Skeletal anterior crossbite
3. Functional anterior crossbites

1. Dento-alveolar anterior crossbite

This kind of cross bites are mainly manifested as single tooth crossbite and usually occurs due to over-retained deciduous teeth.

These can be effectively treated by using tongue blades, Catlan's appliances ,double cantilever springs with posterior bite plane



2. Functional anterior crossbite

This type of crossbites are also called as pseudo Class-III malocclusion where mandible is compelled to close in a position forward of its true centric relation.

These are to be treated by eliminating the occlusal prematurities.

3. Skeletal anterior crossbite

- It occurs as a result of skeletal discrepancies in growth of maxilla or the mandible.
- It can be a result of maxillary skeletal retrognathism or hypoplasia or mandibular prognathism
- These are best treated by use of myofunctional or orthopedic appliances.

3. Interception of oral habits

- Habit: It is a fixed constant, regular and settled practice established by the frequent repetitions of the same act. In other words habit is a commitment to perform the action repeatedly and regularly over a sustained period of time.

- Children sometimes develop or acquire some habits which have detrimental and harmful effects on the dental arches and the jaws like:

1. -Thumb sucking or Digit Sucking
2. -Tongue thrusting
3. -Mouth breathing

- Habits can be prevented by

(i) parent and child counseling

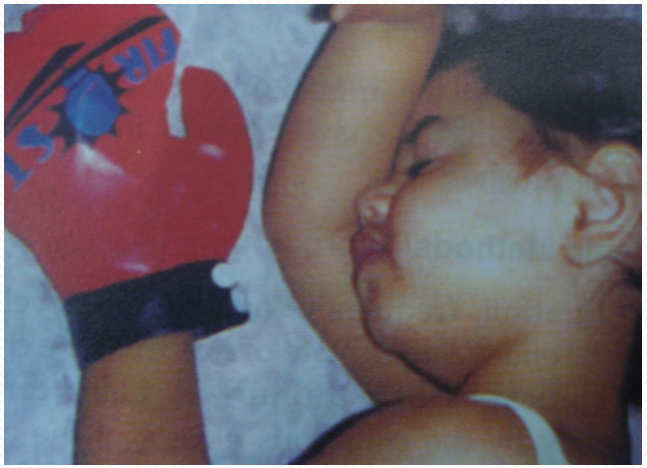
(ii) habit breaking appliances.

1. Thumb Sucking

Thumb sucking is defined as placement of the thumb or one more fingers in varying depths into the mouth.

Management

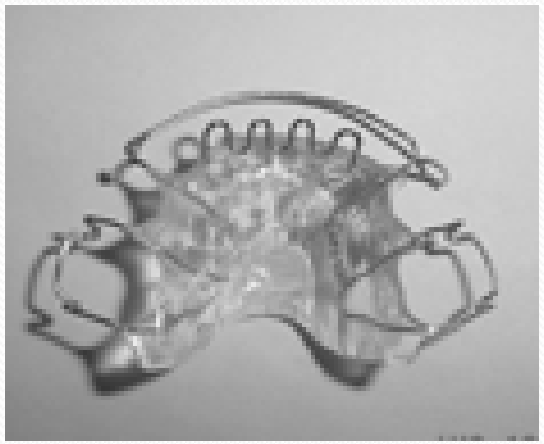
1. Gloves for digits: for finger sucking
2. Thumb caps: for thumb sucking



Habit breakers can be of two types.

a) Removable habit breakers:

b)Fixed habit breakers:



- Chemical Approach: use of bitter tasting or foul smelling preparation placed on the thumb that is sucked can make the habit distasteful. The medicaments that can be used include:

a. Pepper dissolved in a volatile medium

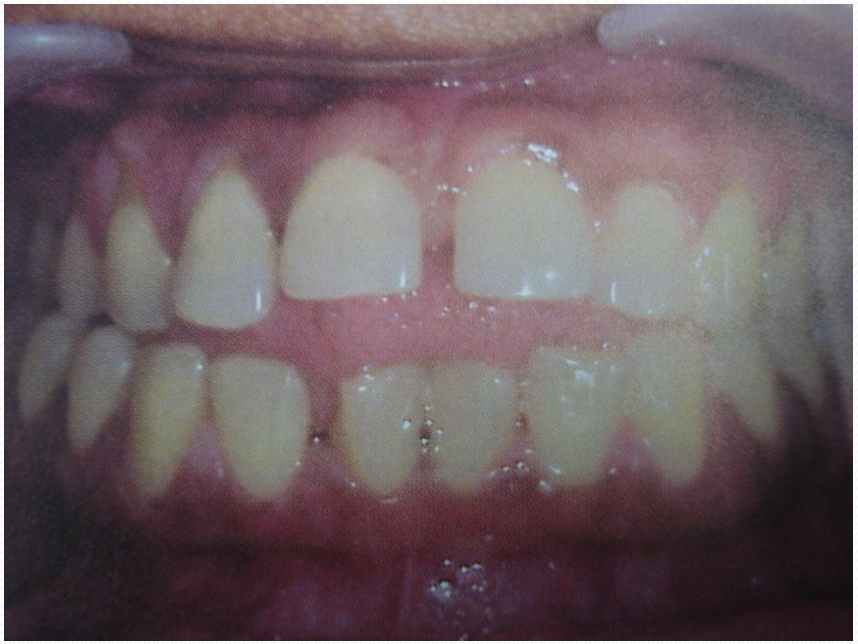
b. Quinine

c. Asafetida

- Other aids that can be used to intercept the habit include bandaging the thumb and bandaging of the elbow.

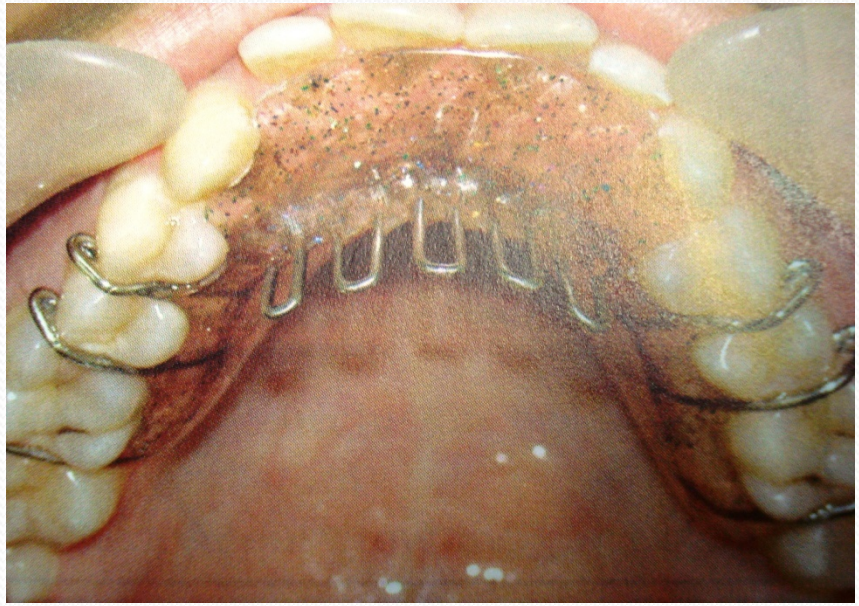
2. Tongue Thrust Habit

Tongue thrust is defined as a condition in which the tongue makes contact with any teeth anterior to the molars during swallowing.



Management:

1. the tongue thrust can be intercepted by use of habit breakers same as for thumb sucking. Both fixed and removable cribs or rakes are valuable aids in breaking the habit.
2. The child is taught the correct method of swallowing.



3.Mouth Breathing Habit

It is classified into 3 types:

a. Obstructive

b. Habitual

c. Anatomic

Management of mouth breathing:

Removal of nasal obstruction: Any nasal or pharyngeal obstruction should be removed by reffering the patient to the ENT surgeon.

Interception of the habit:

Mouth breathing can be intercepted by use of a vestibular or oral screen. Alternatively adhesive tapes can be used to establish lip seal.

4. Space Regaining

If a primary molar lost early and maintainers are not used, a reduction in arch length can be expected. This space can be regained by distal movement of the first molar.

This procedures are preferably undertaken at an early age prior to eruption of the second molar.

Common space regainers are:

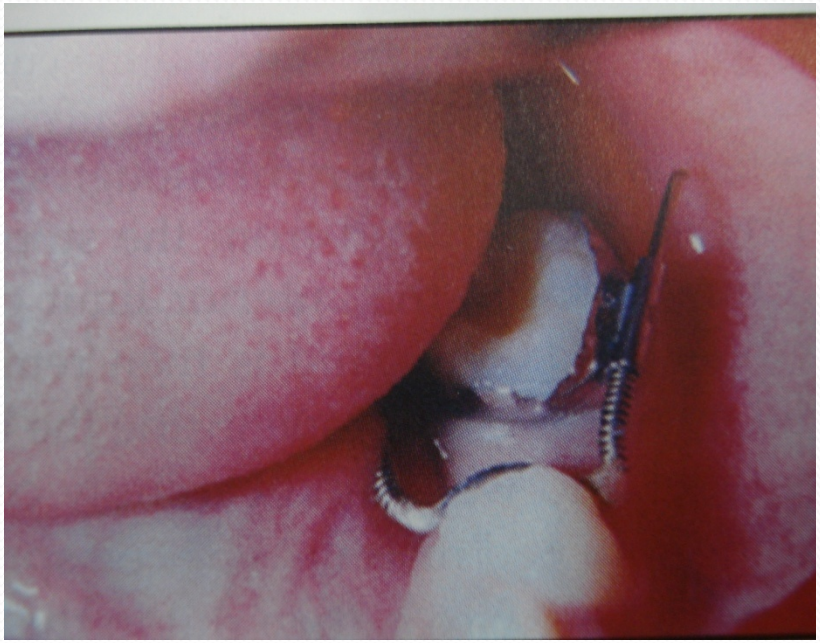
1. Graber Space Regainer

It consists of a U shaped hollow tubing & a U shaped rod that enters the tubing.

The tube is welded on the mesial aspect of molar to be moved, U rod contact the tooth mesial to edentulous space.

Open coil springs are inserted around rod and inserted in assembly.

Forces generated by the spring bring distal movement.



2. Space regainers using Jack Screws

Space regaining can be brought about using jack screws placed in such a way that an increase in arch length obtained by distalization of molars

The appliance consist of split acrylic plate with jack screw in relation to edentulous space and retained using Adam's clasp.

3. Space regaining using Cantilever Springs

The molar can by distalized by using removable appliances that incorporate simple finger springs

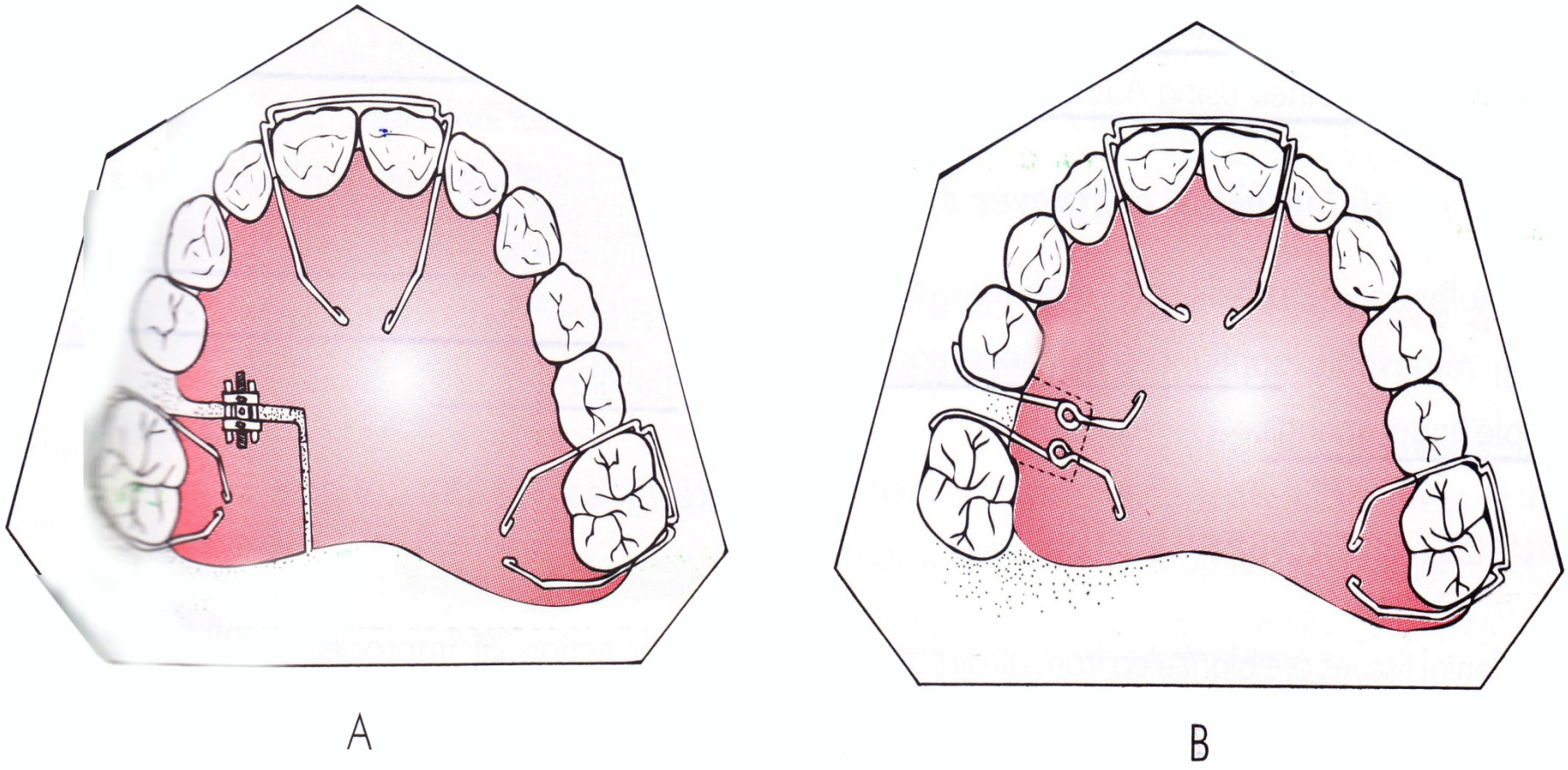


Fig 6 (A) Space regainer using jack screw (B) Space regainer using cantilever springs

4. Muscle exercise

Normal occlusal development depends upon the presence of normal oro-facial muscle function. It helps in improving abberent muscle function. They are:

Exercise for Masseter Muscle

It involves the clenching of teeth by patient while counting to ten. The patient is asked to repeat for some duration of time.

Exercise for Lips(circum-oral muscles)

They are :

- Patient is asked to hold a piece of paper between lips.
- To stretch the upper lip in downward direction.
- Holding and pumping of water back and forth behind the lips.
- Massaging of lips.
- Button pull exercise: A thread is passed through the button hole(1 ½ inch). The patient is asked to place it behind lips and pull the thread.
- Tug of war exercise: similar to the button pull exercise. Two button are used

Exercise for tongue

They are

- One elastic swallow: It is used for correction of positioning of tongue. A 5/16 inch elastic is placed on the tip of the tongue and the patient is asked to hold it against the rugae area and swallow.
- Tongue hold exercise: A5/16 inch elastic is positioned over the tongue for prescribed period of time with lips closed. The patient is asked to swallow.
- The hold pull exercise: The tip of tongue and the midpoint are to contact the palate and the mandible is gradually opened. It helps in stretching the lingual frenum

5. Interception of Skeletal Malrelation

Skeletal malocclusion if diagnosed at an early age can be intercepted so as to reduce the severity of the malocclusion that may occur.

Interception of class-II malocclusions

Class-II malocclusion occurs due to excessive maxillary growth can be restricted by use of face bow with head gear, or if due to deficient mandibular growth is usually treated by myofunctional appliances

Interception of class-III malocclusion

Class-III malocclusion occurs as a result of mandibular prognathism can be restricted with use of chin cup with head gear or if due to maxillary deficiency then face mask is used.

6. Removal of Soft Tissue and Bony Barrier

Whenever permanent tooth fails to erupt at the appropriate time, its eruption may be stimulated by surgically exposing the crown.

This involves excision of soft tissue and removal of any bone overlying crown of the unerupted tooth.

The surgically created opening in the tissue is slightly larger than greatest diameter of tooth.

The wound is given cement dressing for 2 weeks.

References :

- William Proffit
- M.S. Rani
- Gurkeeratsingh


Thank You