

# A to Z ORTHODONTICS

Volume: 09



## PREVENTIVE AND INTERCEPTIVE ORTHODONTICS

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## **Preventive Orthodontics:**

Preventive Orthodontics is the action taken to preserve the integrity of what appears to be normal at a specific time. Any procedure that attempt to ward off untoward environmental attacks or anything that would change the normal course of events, e.g.

1. Early connection of proximal caries that might change the arch length
2. Early recognition and elimination of oral habits that might interfere with the normal developement of the teeth and jaws
3. Placing of a space maintainer to maintain proper position of contiguous teeth

## **Various Preventive procedures are-**

1. Pre-dental procedures
2. Care of deciduous dentition
3. Patient and parents education programs
4. Supernumerary teeth
5. Early loss of deciduous teeth
6. Ankylosed deciduous teeth
7. Ectopic eruption
8. Proximal caries

9. Prolonged retention of deciduous teeth
10. Labial frenum
- 11 Grinding of cusp tips
12. Deeply locked permanent first molars
13. Tongue tie
14. Oral habits
15. Space maintainers
16. Prevention of Milwaukee brace damage

### **1. Pre-dental procedures:**

Proper nutrition of the child

Proper nursing care of the infant.

Bottle feeding should be discouraged.

### **2. Care of deciduous dentition:**

Prevention and timely restoration of carious teeth. Every effort should be made to preserve the integrity of deciduous dentition by undertaking regular dental checkups, simple preventive procedures like application of fluorides, pit and fissure sealants etc.

### **3. Patient and parent's education programs:**

Need of maintaining good oral hygiene should be explained to the patient and the parents. Demonstration of brushing methods and diet counseling etc are also important.

#### **4. Supernumerary teeth:**

Supernumerary teeth and supplemental teeth can interfere with the eruption of nearby teeth. Presence of mesiodens prevents the two maxillary central incisors from approximating each other.

They should be removed at appropriate time.

#### **5. Early loss of deciduous teeth:**

Space maintainer should be fitted after the early loss of deciduous teeth particularly the molars.

#### **6. Ankylosed deciduous teeth:**

Ankylosis is a condition characterized by absence of the periodontal membrane in a small area or whole of the root surface.

They should be removed surgically at appropriate time to allow emergence of the successor.

#### **7. Ectopic eruption:**

Appropriate measure should be taken to prevent ectopic eruption of any teeth by timely removal of any supernumerary tooth, retained root etc.

## **8. Proximal caries:**

To maintain the integrity of dental arch, carious teeth must be treated promptly.

Dx: By clinical and radiographic examination (Bitewing radiograph)

## **9. Prolonged retention of deciduous teeth:**

They should be extracted to allow the successor teeth to erupt in normal position.

**10. Labial frenum:** Surgical removal of the abnormal labial frenum is needed to prevent median diastema.

## **11. Grinding of cusp tips/occlusal equilibration:**

Cuspal interference should be removed by selective grinding of the tooth. Abnormal anatomical features like enamel pearl, may cause premature contact.

Problem:

Deviation in the mandibular path of closure

Predispose to bruxism

Dx: articulating paper/bite paper

**12. Deeply locked permanent first molars:** Any locking of the first permanent molars, usually by the distal tilt of the second deciduous molars should be recognized and cleared (Slicing of distal surface).

**13. Tongue tie:** If such tie of the tongue interferes with the normal speech and or swallowing, it should be removed surgically.

**14. Oral habits:** Abnormal oral habits should be recognized and patient should be helped by motivation or by fitting a suitable habit breaking appliance.

**15. Space maintainers:**

Premature loss of deciduous teeth can cause drifting of the adjacent teeth into the space. Space maintainers must be inserted in appropriate cases after the loss of teeth, particularly after the loss of deciduous molars in inadequate arches.

**16. Maintenance of quadrant wise tooth shedding time table:**

**17. Preventing Milwaukee brace damage:**

Milwaukee brace is an orthopedic 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. Whenever such an appliance is used, occlusion should be protected using functional appliances or positioners made of soft material.



## **Interceptive Orthodontics:**

Interceptive orthodontics is employed to recognize and eliminate potential irregularities and malposition in the developing dentofacial complex.

These procedures are employed to lessen or to eliminate the severity of developing malocclusion. e.g. serial extraction.

Preventive and interceptive orthodontics is largely devoid of meaning. It encourages inappropriate expectation from treatment, implying that if the right treatment done at an early age, then no further treatment would be needed.

The current concept is that most children, who have had orthodontic treatment in the pre-adolescent years, will require a second stage of treatment after their succeeding permanent teeth erupt. Despite this, treatment in the mixed dentition or primary dentition can be very helpful.

**The various situations in which the interceptive orthodontics procedures will help to correct or reduce the severity of malocclusion are:**

### **1. Developing anterior cross bite:**

As soon as it is observed that the anterior teeth are erupting to form a crossbite position, they may be guided into normal position. After ensuring that adequate space is available and after eliminating the cause of ectopic

eruption, the tooth can be guided into correct position by using a tongue blade. The wooden tongue blade should be placed behind the affected tooth at an angle of 60° to the occlusal plane and patient should exert force by biting on it by using the lower anterior teeth as fulcrum for a period of 5-10 minutes each time. This should be done many times a day.

## **2. Ectopically erupted teeth:**

Ectopic eruption of the permanent teeth is generally seen due to the presence of interferences in the path of its eruption. Common causes of such interference are abnormal resorption of roots, retained root stumps, supernumerary tooth etc. Ectopic eruption can be prevented by timely elimination of such causes.

## **3. Anterior diastema and abnormal labial fraenum:**

When midline diastema is noted in presence of the abnormal labial fraenum confirmed by blanch test, surgical removal of the fraenum will be needed and the diastema should be corrected by mechanotherapy. Midline diastema at an early age should be distinguished from ugly duckling stage which usually does not require any treatment.

## **4. Disking / slicing of teeth:**

Slicing of the appropriate deciduous teeth to create space for the eruption of the succedaneous permanent teeth is occasionally needed.

## **5. Occlusal interferences:**

Occlusal interferences present during the development of occlusion can displace the mandible anteriorly, laterally or even posteriorly. Premature contacts should be identified and removed by grinding of the cusps where required. Such grinding should be limited to the thickness of the enamel. A displaced tooth such as a lingually displaced lateral incisor should be moved in to the arch by mechanotherapy, to eliminate the occlusal interference.

**6. Space regainer:** Premature loss of deciduous teeth causes migration of the adjacent teeth into the edentulous space and this cause inadequate space for the eruption of the succedaneous permanent teeth. Space regainers in the form of removable appliances or fixed appliances used to regain the space by moving the drifted teeth back to their original position.

**7. Habit control:** Deleterious oral habits such as thumb or finger sucking, tongue thrusting etc. should be recognized early and patient should be helped to give up by motivation or by fitting a suitable habit breaking appliance.

**8. Serial extraction:** Planned and timely removal of certain deciduous teeth followed by certain permanent teeth allows normal alignment of the permanent teeth.

## **9. Developing basal dysplasias/interception of skeletal malrelationship:**

The basal dysplasia in anteroposterior direction may cause prognathism or retrognathism of the jaws while such dysplasia in the vertical plane may cause either deepbite or openbite. The best time to intercept and correct the basal dysplasia is the mixed dentition stage by the use of activator, Frankel appliance, headgear, chin cap, reverse-pull head gears etc., depending on the type of basal dysplasia.

## **10. Cleft lip and or palate:**

Management of various problems associate with cleft palate and cleft lip cases can be undertaken during the mixed dentition stage as a part of interceptive orthodontic procedure.

## **11. Muscle exercises:**

Various muscle exercises may be undertaken which help to create a normal health and function in the oro-facial musculature. But such myotherapy can not be the substitute for mechanotherapy.

## **12. Removal of soft tissue or bony barrier to eruption of teeth:**

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

## **TIMING OF TREATMENT (Timing of Interceptive procedures)**

Children under 5 years of age:

- (a) Encourage to maintain good oral hygiene and dental care.
- (b) Reposition of arch in cleft lip and cleft palate cases.

Children of 5-8 years of Age:

- (a) Space Maintenance, guided eruption, disking etc.
- (b) Management of traumatic incisors and early straightening of permanent incisors.
- (c) Dealing with abnormal fraenum.
- (d) Dealing with extra teeth, missing teeth and timely removal of deciduous teeth.
- (e) Correction of incisor relation in Class III and cleft cases.
- (f) Dealing with sucking habit.
- (g) Dealing with the upper and lower jaw discrepancies (anterior-posterior and lateral) by providing orthopedic appliance, headgear, chin-cap etc.

Children of 8-12 years of Age:

- (a) Dealing with sucking habits and abnormal lip action.
- (b) Serial extraction procedure.
- (c) Extraction of poor first permanent molars with balancing and compensating extraction.

(d) Orthodontic treatment of irregularities of teeth and arch with fixed or removable appliances as necessary.

The following two things for considering in preventive or interceptive care:

1. The timing of preventive or interceptive treatment is critical.
2. A thorough knowledge of craniofacial growth and development is necessary.

## **Premature loss of deciduous teeth**

Definition – This refers to loss of tooth before its permanent successor is sufficiently advanced in development & eruption to occupy its place.

Commonly loss teeth:

1. Deciduous incisors
2. Deciduous canine

\* As they are normally spaced in the mouth their loss is usually in out effect on the permanent teeth.

Effects:

(1) If this is markedly unfavorable -

- (a) Effect will be localized crowding in the PM & C region.
- (b) Lingual collapse of the anterior segments.

(2) Where space is just adequate -

- (a) Loss of molar will cause mesial drift of permanent molars.
- (b) Lingual collapse of anterior segments.

(3) In case where tooth / tissue ratio is more than adequate and there is spacing or lack of contact of the teeth, loss of deciduous molars have no effects.

(4) Migration of adjacent teeth into the space can prevent eruption of permanent teeth.

(5) Premature loss of incisor – produce malocclusion.

(6) Premature loss of 2<sup>nd</sup> molar – cause marked shift of permanent molar.

### **EFFECTS OF PREMATURE LOSS OF DECIDUOUS TEETH:**

Unplanned early loss of deciduous teeth affects the developing occlusion in the following ways and complicates future orthodontic treatment –

#### **1. Crowding:**

Early loss in well formed arch in favorable soft tissue environment have no significant effect.

# Inadequate arch –

Loss of deciduous buccal teeth – 1<sup>st</sup> permanent molar will move forward causing crowding.

Loss of deciduous molar –

Effect:

# Canines may be excluded out of the arch & 2<sup>nd</sup> premolar may set impacted or displaced.

# Loss of 1<sup>st</sup> deciduous molar has comparatively lesser effect than loss of 2<sup>nd</sup> molar.



## **2. Increase over jet & over bite.**

- Lingual collapse of lower segment in class II division-2 cases there might be increase in oj & OB.
- Retroclination of lower labial segment is not actually due to lingual collapse but due to forward movement of their apex i growth of the mandible while their crowns remain at linguo-facial balance.

## **3. Reverse over jet –**

- Early loss in upper arch in skeletal class II, cases there might be –
- Collapse of upper labial segment resulting on aggravating reverse over jet.
- Also result crowding in upper labial segment.

## **4. Central line shift –**

- Early loss of deciduous incisor has little effect on permanent dentition but in crowded arch it may cause central line shift particularly when the loss is unilateral.
- Shift will be towards the lost side.

## **5. Delayed eruption of successor**

- Scar tissue may form at the site of loss which delays the eruption.

## **6. Rotation of 1<sup>st</sup> Molar –**

When deciduous molar is lost earlier it causes tilt & mesio-lingual rotation of 1<sup>st</sup> permanent molar particularly when loss occurred after the eruption of 1st molar.

### **7. Over closure of mandible**

In class III cases with loss of several deciduous teeth in both arches mandibular over closure may be encouraged at the time when the deciduous incisors are being shed & the 1<sup>st</sup> permanent molars are not yet in occlusion.

### **8. Case of appliance retaining teeth**

- Early loss of deciduous molars eliminates the appliance retaining teeth at early age

## **Sucking Habit**

1. Digit sucking
2. Thumb sucking.

### **Definition:**

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

Commonly seen in children till the age of 3½ -4 years.

\* Persistence habit beyond this age can lead to various malocclusions.

### **SEVERITY OF THUMB SUCKING DEPENDS ON**

Thumb and digit sucking are believed to cause a number of changes in the dental arch and the supporting structures. The severity of the malocclusion caused by thumb sucking depends on the trident of factors. They are:

- (a)Duration: The amount of time spent indulging in the habit.
- (b)Frequency: The number of times the habit is activated in a day.
- (c)Intensity: The vigor with which the habit is performed.

## **EFFECTS OF THUMB SUCKING**

- (1) Labial tipping of maxillary anterior teeth resulting in proclination of maxillary anteriors.
- (2) The overjet increases due to proclination of the maxillary anteriors.
- (3) Some children rest their hand on the mandibular anteriors during the sucking act. In such children lingual tipping of the mandibular incisors can be expected which further – the o.j.
- (4) Anterior open bites can occur as a result of restriction of incisor eruption and supra eruption of the buccal teeth.
- (5) The cheek muscles contract during thumb sucking resulting in a narrow maxillary arch which predisposes to post cross bites.
- (6) The child may develop tongue thrust habit as a result of the open bite.
- (7) The upper lip is generally hypotonic while the lower part of the face exhibits hyper active mentalis activity.

## **SPACE MAINTAINER**

### **Definition**

SM is a device used to maintain the space created by the loss of deciduous tooth.

### **Classification**

(A) 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) Certain combinations of above.

(B) According to Hinrichsen:

(1) Fixed space maintainers:

Class I (a) Non functional types

(i) Bar type.

(ii) Loop type.

(b) Functional types

(i) Pontic types.

(ii) Lingual arch type.

Class II – Cantilever type [distal shoe, band & loop]

## 2. Removable space maintainers

Acrylic partial denture

### **Requirements of space maintainers:**

1. It should maintain the entire mesiodistal space created by a lost tooth.
1. It must restore the function as far as possible and prevent over eruption of opposing teeth.
2. It should be simple in construction.
3. It should be strong enough to withstand the functional force.
4. It should not exert excessive stress on adjoining teeth.
5. It must permit maintenance of oral hygiene.
6. They do not restrict the normal growth or eruption of tooth.
7. They should not interfere with the mastication speech or deglutition.
8. The space maintainer should not come in the way of other functions.

### **Indication:**

1. 1. Early loss of 1<sup>st</sup> primary molar.
2. Early loss of 2<sup>nd</sup> primary molar before eruption of 2<sup>nd</sup> premolar.
3. Early loss of ant primary teeth.

4. Early loss of 1<sup>st</sup> par. molar (several case)  
Congenital missing of maxillary late. Incision causing mesial drifting of cuspid.
5. Congenital missing of 2<sup>nd</sup> PM & drifting of 1<sup>st</sup> par. M to fill the space.
6. Sometimes as an active space maintainer to push back the 1<sup>st</sup> Par. M for the eruption of 2<sup>nd</sup> PM.
7. To prevent drifting of the teeth & to maintain the space.
8. Restoration of function.
9. Aesthetics.
10. Psychology.
11. To prevent sequel of PD & caries problem.

#### **CONTRA INDICATION:**

1. When mesiodistal width of the underlying permanent tooth is less than the space present.
1. When the tooth is near crest of the ridge – on radiograph.
2. When the underlying permanent tooth missing.
3. When the molars are expected to drift forward.

**Purpose of use:**

1. To prevent / reduce / resist malocclusion.
2. To remove or reduce bad oral habit.
3. To prevent psychic trauma.
4. To prevent collapse of the arch.
5. To maintain space of missing tooth for prosthesis.



## **Serial Extraction**

### **Definition**

is a interceptive orthodontic procedure usually initiated in the early mixed dentition when one can recognize and anticipate potential irregularities in the dentofacial complex and 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 erupting permanent teeth in to a more favorable position.

**History** – Dr. B. Kjellgren in 1929 1st use as Rx.

**Rationale** – Serial extraction based on two basic principles.

(1) Arch length – tooth material Discrepancy.

(2) Physiologic tooth movement.

### **Objectives** –

To make Rx easier and to minimize the extent of the mechano-therapeutical intervention

\* The term applied to a planed and timely removal of certain deciduous teeth, followed by removal of certain permanent tooth in order to encourage A the spontaneous alignment of crowded incision.

## Indications

1. Straight profile.
2. Class I malocclusion i crowding.
3. Hereditary tooth size & arch size discrepancies.
4. Lingually locked lateral incisor.
5. Crowding in deciduous dentition.
6. Closed dentition [ " " without spacing]
7. When the arch length discrepancy is about 10-12mms. In the mixed dentition period.
8. Flaring of teeth.
9. Mesial migration of buccal segment.
10. Abnormal eruptive path & eruption sequence.
11. Premature loss of deciduous canine.
12. Abnormal resumption.
13. Midline deviations.
14. Can be carefully executed in mild skeletal class II malocclusion cases.
15. Ankylosis.

## Contraindications

1. Convex profile.

2. Severe crowding.
3. Deep bite.
4. Angles class II malocclusion cases.
5. Mild malocclusion.
6. Excessive spacing.
7. Malformed teeth.
8. Impacted canine.
9. Congenital absence of premolar or any other teeth.
10. Presence of diastema.
11. Open bite.
12. If fixed appliance cannot be used to prevent collapse of the arch.
13. Severe skeletal malocclusion.

**Procedure:**

Three of the popular methods are –

**Dowel's method:**

Step 1: The deciduous canine canines are extracted to create space for the alignment of the incisors. Carried out at 8-8Y of age.

Step 2: A year after the first step, the deciduous first molars are extracted so that the eruption of first premolars is accelerated.

Step 3: The erupting first premolars are extracted to permit permanent canines to erupt in their place.

### **Tweed's Method:**

This method involves the extraction of the deciduous 1<sup>st</sup> molars around 8 years of age. This is followed by the extraction of the 1<sup>st</sup> premolars and deciduous canines.

### **Nance method**

This is similar to the Tweeds technique and involves the extraction of the deciduous 1<sup>st</sup> molars followed by the extraction of the 1<sup>st</sup> premolars and the deciduous canine.

## **Submerged / Ankylosis / Retention of deciduous teeth**

**Definition** - Ankylosis is a condition where in a part or whole of the root surface is directly fused to the bone in the absence of the intervening PD membrane.

### **Cause –**

1. Eruption of permanent tooth delayed.
2. Tooth is absent.
3. Failure of resorption of root of deciduous teeth.
4. Non vital deciduous teeth.
5. Infected deciduous teeth.
6. Trauma.
7. Endocrine disorder.
8. Congenital disorder – cleidocranial dysostosis.

\* Clinically these teeth are fails to erupt to the normal level and are therefore called submerged teeth.

Effects on permanent teeth:

Permanent tooth erupts in an ectopic position and migration of adjacent teeth into the space.

**Correction:**

\* Self correcting following the extraction of deciduous teeth except where looked malposition by the occlusion.

\* Where tooth is infected – need surgical extraction.

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## Extraction

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To extract or not to extract has always been and will remain a controversy in orthodontics.

Extractions in orthodontics include —

Serial extractions carried out as an interceptive procedure and

Therapeutic extractions carried out as a treatment procedure for gaining space.

The nature of malocclusion and the age of the patient may be important factors in deciding whether or not to resort to extraction.

Before planning the extraction of any permanent teeth, it is important to ensure that all the remaining teeth are present and developing in a satisfactory position.

The factors which should be considered before the extraction of teeth are:

1. Prognosis
2. Position
3. Amount of space required
  - I. 1-2mm per quadrant, first premolar extraction should be avoided and a specialist opinion sought

- II. 3 mm per quadrant, often indicates premolar extraction
- III. 3-5 mm per quadrant extraction of more than one tooth per quadrant may be necessary.

**Extraction according to Angle's classification:**

Extraction of teeth impairs the forward development of the dental arches and the alveolar process

**Angle's Class II-** Extraction of upper arch only when indicated

**Angle's Class III—** Extraction of lower arch only when indicated

**Angle's Class I** - If extraction is required it should be carried out in both jaws.

**EXTRACTION OF 1<sup>ST</sup> PAR. M**

Extraction of the 1<sup>st</sup> par m is avoided for the following reasons –

- a. Ex of 1<sup>st</sup> permanent molar doesn't give adequate space in the incisor region.
- b. Ex of 1<sup>st</sup> M results in deepening of the bite.
- c. The 2<sup>nd</sup> PM and molar may tip into the Ex space.
- d. Mastication may be affected.
- e. Choice of tooth for anchorage.
- f. More space require



g. Tooth in normal condition.

**Indication:**

1. Minimal space requirement for correction of mild and crowding of on mild proclination.
2. Grossly decayed molar on heavily filled teeth.
3. Open bite cases can benefit from Ex of 1<sup>st</sup> M as there is tendency for the bite to deepen after Ex of 1<sup>st</sup> M.
4. Wilkinson extraction.
5. High angle class II div. 1 Class.

**Enforce extraction:**

- (i) Grossly decayed teeth.
- (ii) Poor periodontal conditions of the tooth.
- (iii) Fractured tooth.
- (iv) Impacted tooth.
- (v) Tooth in the live of #

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Dedicated To

My Mom, Zubaida Shaheen  
My Dad, Md. Islam  
&  
My Only Son  
Mohammad Sharjil

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