GOOD MORNING

CORRECTIVE ORTHODONTICS

Dr. HARIHARASUDAN J, MDS

CONTENTS

- Management of intra-arch problems
- Management of transverse malocclusions
- Management of vertical malocclusions
- Management of sagittal malocclusions

MANAGEMENT OF INTRA-ARCH PROBLEMS

- CROWDING
- SPACING
- MEDIAN DIASTEMA
- ROTATION

❖Crowding is a condition where there is malalignment of teeth caused by inadequate space.

❑CLASSIFICATION OF CROWDING:

1. **Primary crowding:** Determined genetically and is caused by disproportionately sized teeth and jaws.
2. **Secondary crowding:** Acquired crowding is caused by loss of arch length due to environmental cause.
3. **Tertiary crowding:** Also called late incisor crowding and is due to late mandibular growth.

❖*Crowding in mixed dentition*

1. **First-degree crowding:** Slight malalignment of the anterior teeth; no abnormality in supporting zone.
2. **Second-degree crowding:** Pronounced malalignment of anterior teeth; no abnormality in supporting zone.
3. **Third-degree crowding:** Severe malalignment of all four incisors; supporting zones restricted.

MANAGEMENT OF CROWDING

Investigations: Mixed dentition model analysis-- Moyer's analysis-- arch length discrepancy.

- **CROWDING IN MIXED DENTITION–THERAPY**

Age – After eruption of 11,12 and 21,22	Timing	Treatment
Slight crowding – slight changes in the position of anterior teeth	Wait and watch	No treatment
Moderate crowding – lack of space by width of one lateral incisor	Can wait till (or) before the eruption of premolar.	Expansion
Pronounced crowding	Immediate treatment	Guidance of eruption Serial extraction Extraction and ortho-dontic treatment

MANAGEMENT OF CROWDING IN YOUNG ADULT

Investigations

Arch length analysis for permanent dentition like Carey's analysis should be carried out.
Complete Kesling's diagnostic set-up should be carried out without proclining the incisors

❖Nonextraction

- In cases with mild discrepancy, non-extraction method of treatment is followed.
- ➤ Proximal reduction and treatment with either *removable appliances*or *fixed appliances*.
- ➤ *Lip bumpers* are useful in increasing the arch length.
- ➤ *Arch expansion* procedures also can be carried out to alleviate crowding.
- ➤ *Molar distalization* is another method to gain space in minor crowding correction.

❖Extraction

- Treatment planning should be aimed at the choice of extraction.
- After extraction, treatment is done with preferably fixed appliance mechanotherapy.
- If there is any unerupted tooth, it has to be brought into occlusion.

SPACING

❖Imperfections in the teeth alignment and distance, wherein there is a gap between two teeth or many teeth.

- **Types of spacing**
- There are two types of spacing: (i) localized spacing and (ii) generalized spacing.

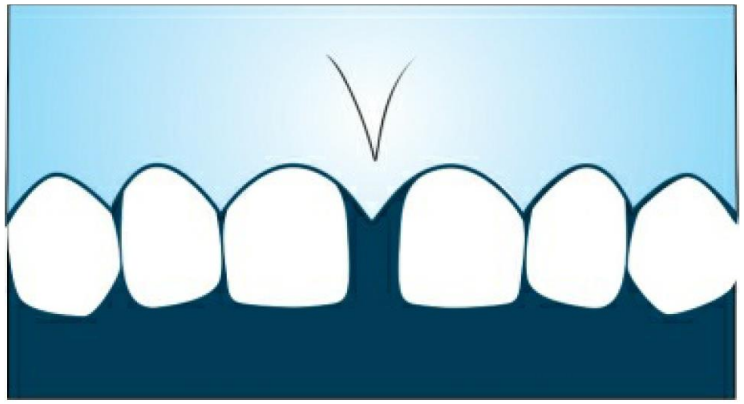


FIG. 29.2. Localized spacing.

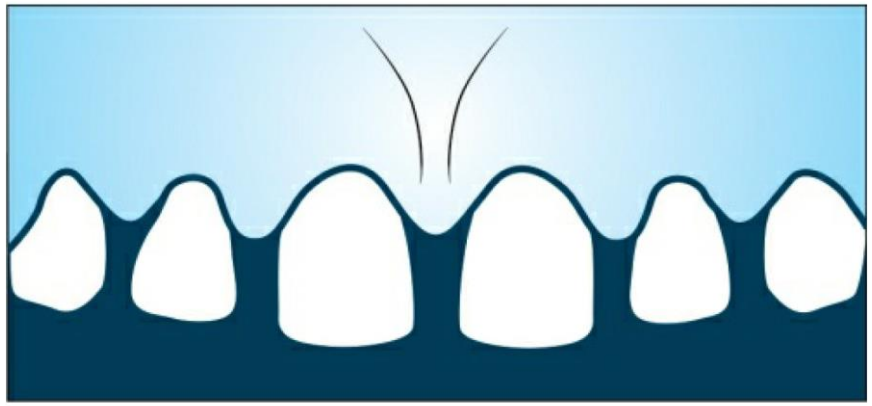
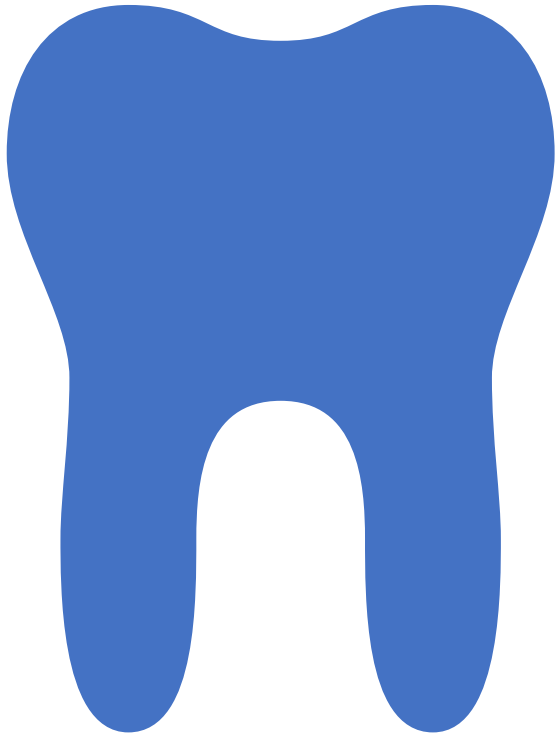
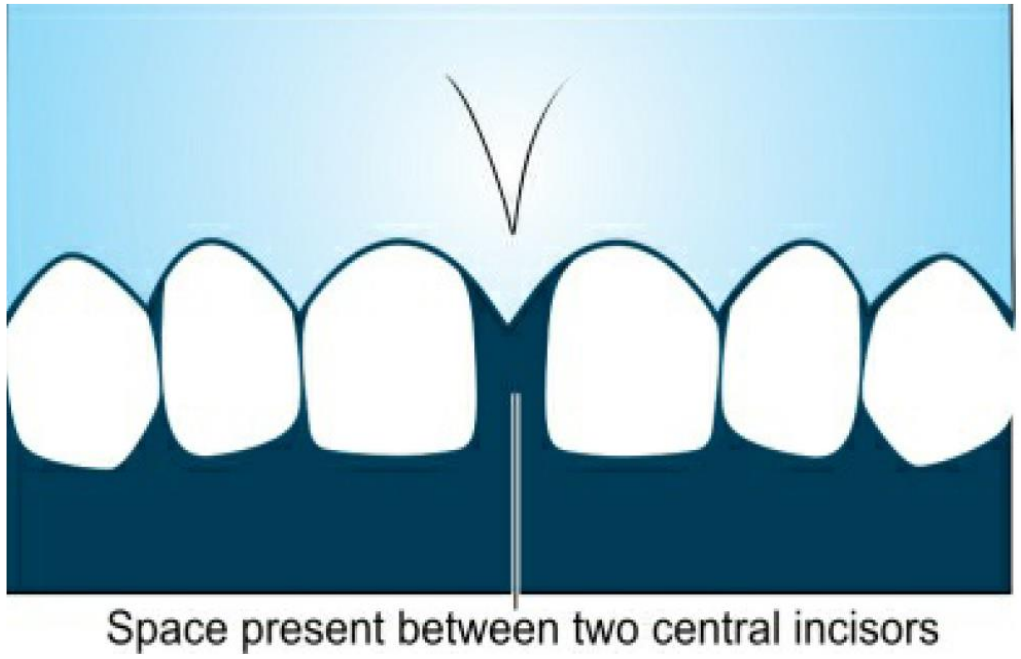


FIG. 29.3. Generalized spacing.



❖ Management

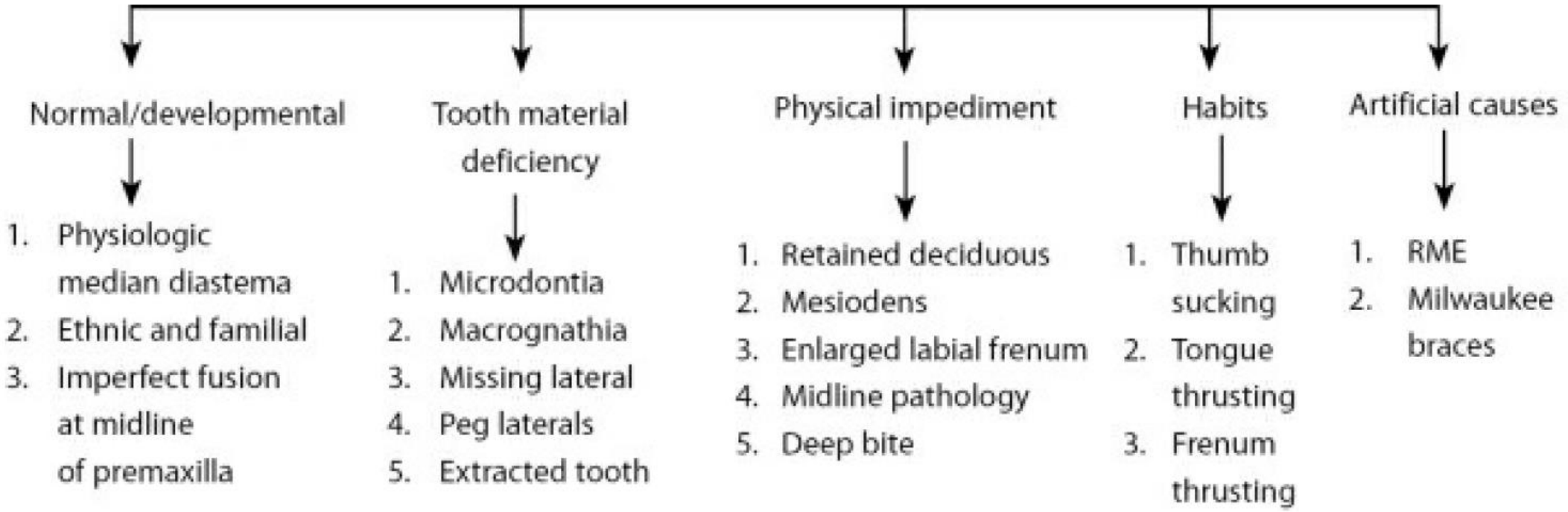
Management of spacing can be done by orthodontic, or combined orthodontic and prosthodontic treatment.



❑ Median diastema:

Median diastema is a form of localized spacing wherein there is space present between two central incisors.

ETIOLOGY


Normal/developmental
1. Physiologic median diastema
2. Ethnic and familial
3. Imperfect fusion at midline of premaxilla
Tooth material deficiency
1. Microdontia
2. Macrognathia
3. Missing lateral
4. Peg laterals
5. Extracted tooth
Physical impediment
1. Retained deciduous
2. Mesiodens
3. Enlarged labial frenum
4. Midline pathology
5. Deep bite
Habits
1. Thumb sucking
2. Tongue thrusting
3. Frenum thrusting
Artificial causes
1. RME
2. Milwaukee braces

❑ Orthodontic management of median diastema

Can be divided into four main categories:

1. Closure by mesial tipping movements

- Removable appliance with two finger springs for mesial movement of central incisors.
- Removable appliance with split labial bow.
- Ortho bands and elastics for the two central incisors.

FIG. 29.5. Finger springs used to close median diastema.

2. Closure by bodily movement: This can be achieved with the use of:

- Edgewise appliance
- Preadjusted edgewise appliance
- Begg brackets with passive uprighting spring

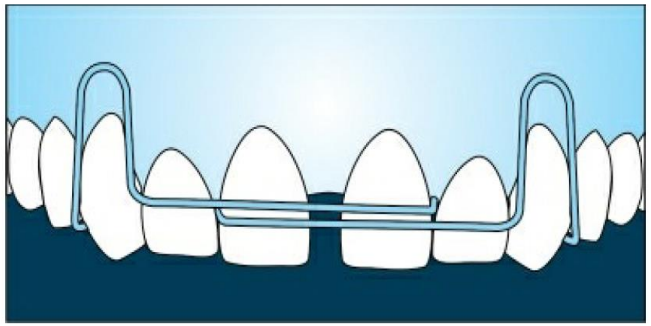
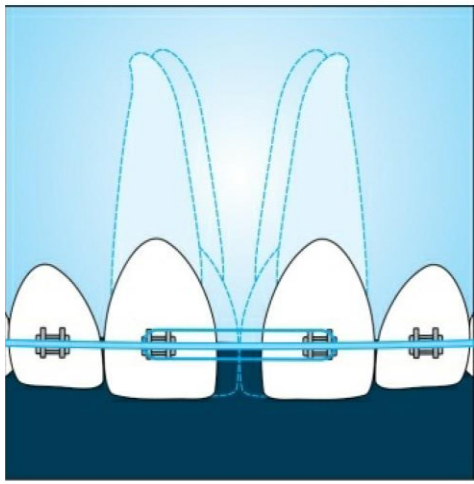


FIG. 29.6. Closure of median diastema by split labial bow.



3. **Closure by reduction of overjet:**

- In case with increased overjet, reduction of overjet will close the median diastema.
- This causes spontaneous closure of diastema along with overjet reduction.
- Removable Hawley appliance can be used for this purpose.
- Fixed appliances also are used.

4. **Overall orthodontic treatment:**

- When median diastema exists with other types of malocclusion, closure of median diastema is carried out along with other correction.
- This is best achieved by fixed appliance mechanotherapy.

ROTATION

Rotation is malposition due to abnormal turning of a tooth to its long axis

- **Types of rotation**
- 1. Centric rotation – only rotation around the long axis.
- 2. Eccentric rotation – rotation with tipping of the tooth also.

Derotation can be achieved by applying a couple.

- The forces get nullified and only moment exists which causes rotation.
- Force required for rotation correction is 35–60 g.
- There is greater tendency for the rotation to relapse after correction.
- Rotation can be achieved by two ways–by using a couple force and by using a single force and a stop.

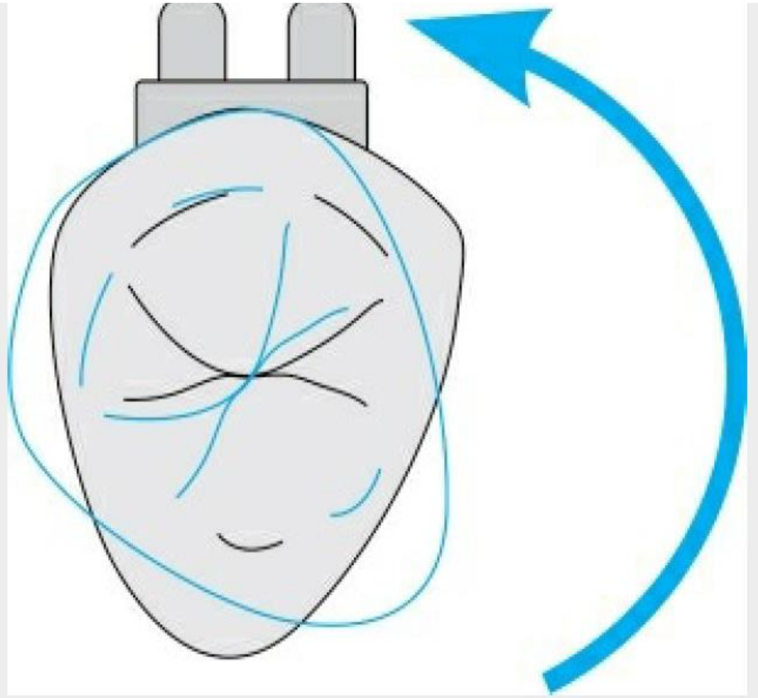


FIG. 29.8. Rotation.

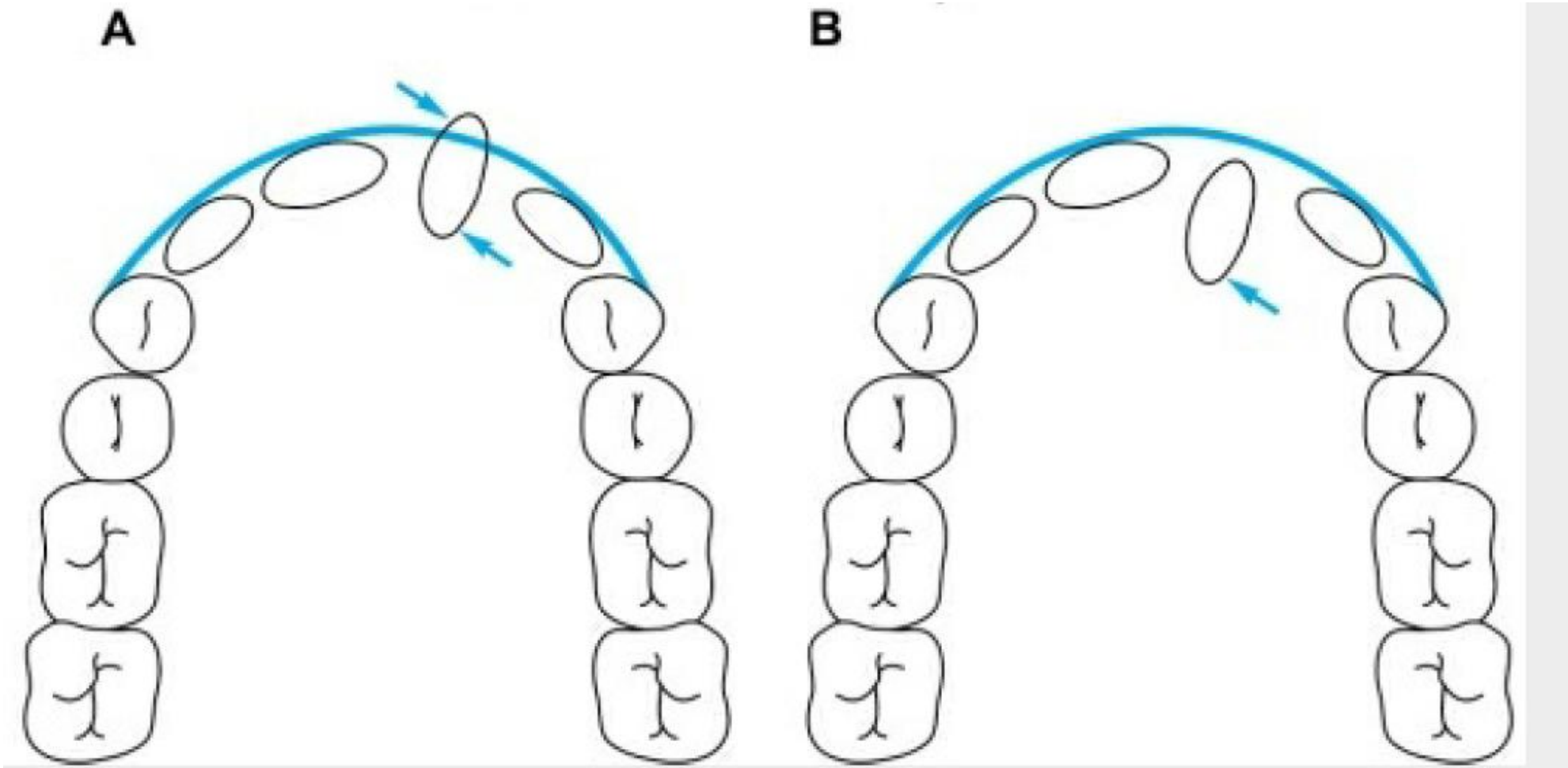


FIG. 29.9. Methods of rotation. (A) Use of couple for correction and (B) use of single force and stop.

MANAGEMENT OF TRANSVERSE MALOCCLUSIONS

- *'Crossbite' refers to a condition where one or more teeth may be abnormally malposed buccally or lingually or labially with reference to the opposing tooth or teeth.*

(Graber TM)

❑***Types of crossbite***

a. **Anterior crossbite:** (i) single tooth and (ii) multiple teeth or segmental.

b. **Posterior crossbite**: (i) Unilateral, (ii) bilateral and (iii) single tooth crossbite.

a. Dental: (i) anterior and (ii) posterior

b. Skeletal: (i) anterior and (ii) posterior

c. Functional crossbite


Cross-bite

Differential diagnosis and management of anterior crossbite

❖Diagnosis/differential diagnosis

The factors to be considered in diagnosis:

- **Number of teeth involved:** This gives an indication whether the crossbite is dental or skeletal.

1. Single tooth crossbite – usually local origin and dental crossbite or functional.
2. Segment crossbite – usually skeletal.

- **Locations of the tooth in crossbite:** Permanent teeth are usually deflected in their eruption path. Any deflection from the original places indicates dental type of crossbite.
- In skeletal crossbite, teeth are usually normally positioned.
- **Functional path of closure:** Functional path of closure of mandible and occlusal prematurities are important factors. In initial or developing stages of crossbite, simple occlusal grinding will eliminate the development of crossbite.

- **Molar and canine relationship:** In dental crossbite, in centric occlusion, molar and canine relationship will be class I. In true skeletal crossbites, the molar and canine relationship will be class III.
- **Radiographic findings:** Lateral cephalography is useful:

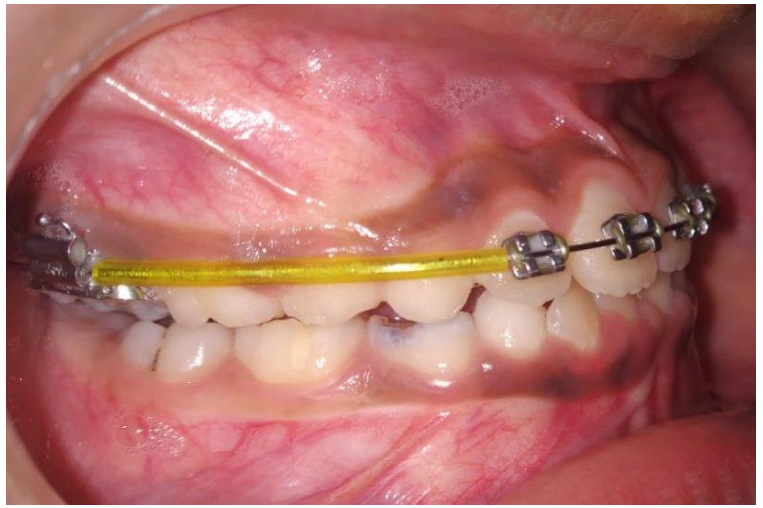
  To find out skeletal discrepancy and axial inclination of the incisors relation to the skeletal.

❖***Factors to be considered:***

- Availability of mesiodistal space to correct the inlocked tooth.
- Sufficient overbite.
- Position of the tooth.
- Occlusion – whether it is in class I or class III.
- Extents of root formation – light forces are advised for tooth with incomplete root formation.

Methods of correction of anterior crossbite:

- Occlusal equilibration
- Tongue blade therapy
- Inclined planes
- Expansion appliances with either screws or cantilever springs
- Fixed appliance



- ***Occlusal equilibration* for anterior crossbite:**

  Anterior mandibular displacement.

- **Inclined plane**
- **Expansion appliances:**

❑ Schwarz type expansion plate with posterior bite plane.

❑ Upper Hawley's appliance with cantilever spring to move the in-standing tooth. Posterior bite plane is added to the Hawley's appliance.

❑ Removable appliances with Z spring or double cantilever spring.

❑ In class III cases, due to retrognathic maxilla, functional appliances, like FR III, are used.

- **Fixed appliance:** The in-locked tooth or teeth is pulled into correct labial position by fixed appliances.

DIFFERENTIAL DIAGNOSIS AND MANAGEMENT OF POSTERIOR CROSSBITE

I. Definition

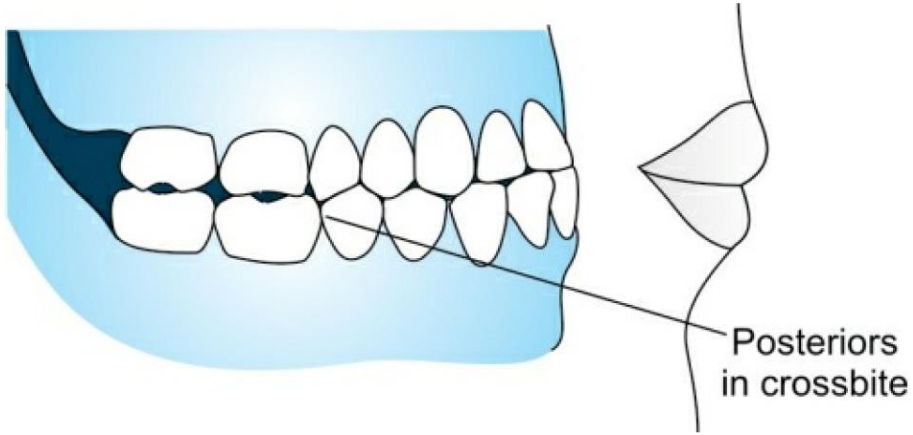
- A posterior crossbite is an abnormal buccolingual relationship of a tooth or teeth between maxilla and mandible when they are brought into centric occlusion.

II. **Clinical presentation**

- Posterior crossbite presents as any one or combination of the following ways:

1. Lingual crossbite 2. Buccal crossbite 3. Complete lingual crossbite	}	either unilateral or bilateral

❖Differential diagnosis



Study models using wax bite in centric relation is a useful diagnostic aid.

A dental crossbite will exhibit an abnormal buccal or lingual axial inclination.

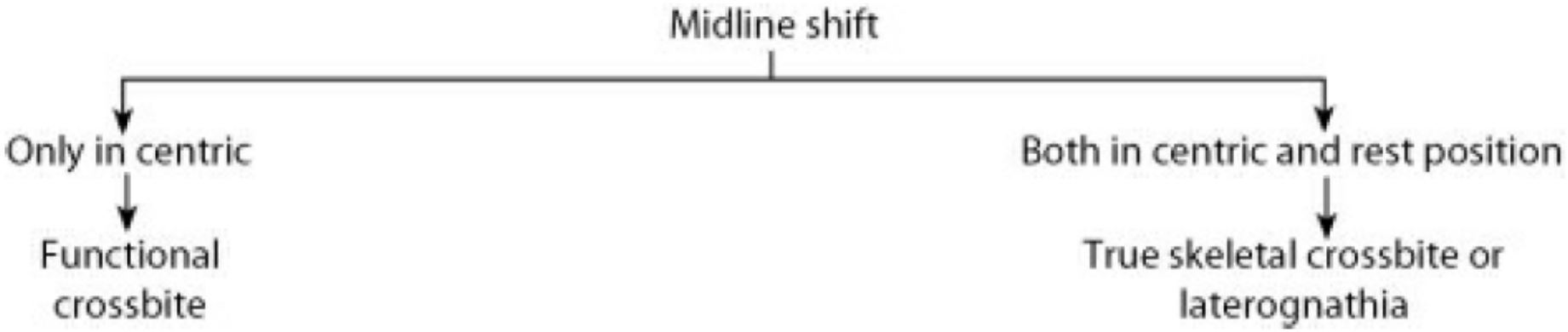
A skeletal crossbite may not exhibit abnormal axial inclination of teeth.

Study models will show which tooth is at fault in the dental crossbite whether maxillary tooth or mandibular tooth.

Symmetry of the dental arches can be assessed using grids, symmetroscope, Boley gauge or divider.

This helps in diagnosing the arch at fault in skeletal crossbite.

- Differential diagnosis of midline shift is as follows:



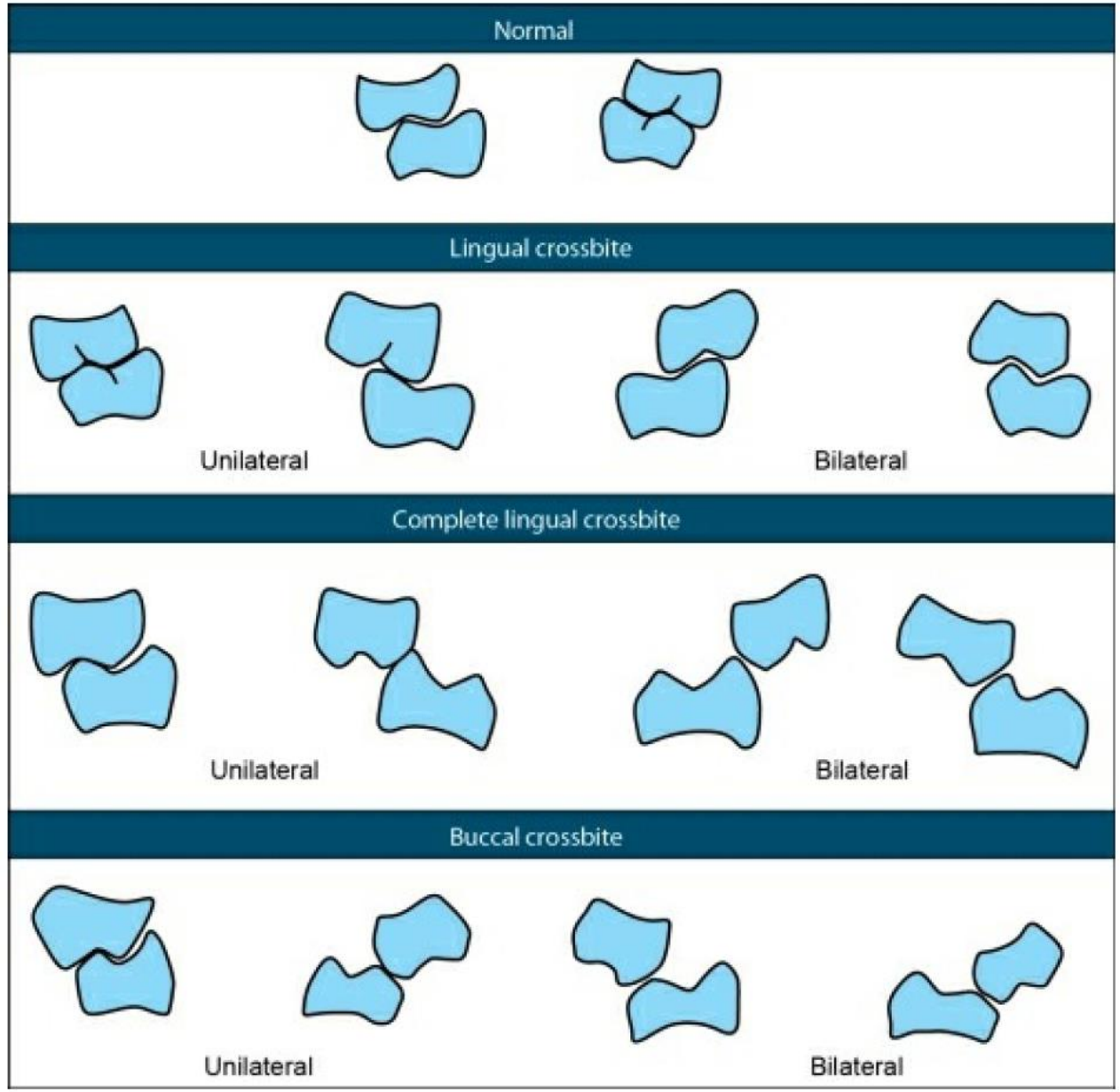


FIG. 30.4. Possible combinations of crossbite.

Treatment of posterior crossbite

❖***Factors to be considered:***

- Availability of mesiodistal space to correct the crossbites.
- Position of the apical portion of tooth after treatment. This should be in the same position as that of tooth in normal occlusion.
- Types of tooth movement required, either tipping or bodily movement.

1. SINGLE TOOTH DENTAL CROSSBITE: Usually in single tooth crossbite, both the antagonist teeth are tipped out of position.

- Simple through the bite elastics are effective in the treatment of such cases.
- It is also called crossbite elastics.
- Disadvantages with this method:
  - i. Requires patient cooperation.
  - ii. Requires banding of the teeth.

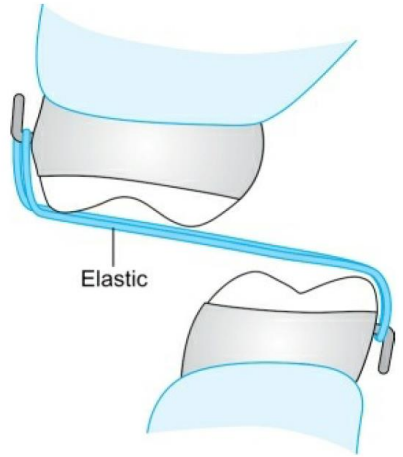


FIG. 30.5. Single tooth crossbite correction through the bite elastics.

2. DENTOALVEOLAR CONTRACTION AND CROSSBITE:

First any functional interference present is eliminated by occlusal equilibration.

- **Appliances** given after occlusal equilibration:

a. *Treatment of bilateral contraction of maxillary arch:*

(i) Quad helix, (ii) W arch and (c) RME.

b. *Treatment of unilateral contraction of maxillary arch:*

(i) Removable plates, (ii) quad helix, (iii) W arch and (iv) coffin spring.

c. *Mandibular dentoalveolar contraction:* (i) Quad helix spring.

- 3. **Skeletal crossbite:** This could be due to narrow maxilla or narrow mandible.

  a. **Narrow maxilla:** (a) Mild cases – quad helix or W arch; (b) Severe cases – RME or Minnesota expander.

  b. **Narrow mandible** – usually associated with retrognathic mandible – functional appliances.

- Very severe cases are treated by surgery.

ACCESSORY POINTS

➤ A crossbite is a dental malformation in *transverse plane.*

➤ An impending anterior crossbite should be treated *as soon as it is noticed.*

➤ Anterior crossbite causes *localized gingival recession* in children.

➤ Posterior crossbite is usually described in terms of position of *upper molars.*

➤ *Laterognathia* is true skeletal crossbite.

❖Management of vertical malocclusions

1. Open bite
2. Deep bite

❖Management of sagittal malocclusions

1. Class II-div1
2. Class III

Incisor edge–centroid relationship/edge–centroid relationship

- *''The relationship between the incisal edges of the lower incisors and the centroid of the upper incisor is called the incisor edge–centroid relationship.''*

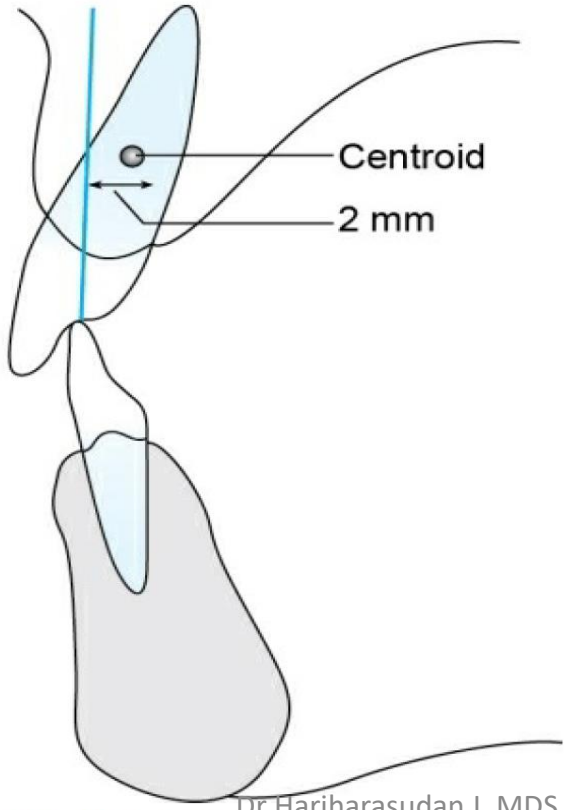


FIG. 32.4. Edge–centroid relationship.

➤ **For a stable occlusion, the lower incisor edge should be 2 mm in front of the centroid of the upper incisor (Houston, 1989).**

➤ When the lower incisor edges lie behind the upper centroid, it should be corrected.

- **Correction of unfavourable edge–centroid relationship:** Mild cases are treated with removable appliances. Severe cases are treated with fixed appliance.
- **Upper anterior bite planes:** These are effective in correcting the edge–centroid relationship.
- Retraction of upper incisors by extraction of upper first premolar is the simplest way of providing space to establish normal edge–centroid relationship.
- In severe cases, normal edge–centroid relationship is achieved by both palatal movement of upper incisors and labial movement of lower incisors.

Bimaxillary protrusion

- There are two types of bimaxillary protrusion. They are **(i) bimaxillary prognathism and (ii) bimaxillary dental protrusion.**

1. Bimaxillary prognathism

- Skeletal problem in which both maxilla and mandible are placed forward than normal in relation to cranium.
- It is a problem in the basic morphology and growth pattern of the bony skeleton, interception does not produce very satisfactory results.
- May exist alone or in combination with bimaxillary dental protrusion.
- **Treatment:** Camouflage or combined orthodontics and surgery.
- Camouflage treatment :- Symmetric extraction of premolars (mostly first premolar) and retraction of incisors.
- More severe cases are treated by combined orthodontics and surgery.

2. **Bimaxillary dental protrusion**

- Bimaxillary dental protrusion is proclination of both upper and lower dentitions on normal bony base.

❖**Diagnosis** is confirmed by measuring the interincisal angle.

❖**Treatment** consists of symmetric extraction of four first premolars and treatment with fixed appliance mechanotherapy.

- Results are more satisfactory than the treatment of bimaxillary prognathism.

THANK U GUYS