Contents

1. Etiology of malocclusion.............................................3-22
2. Malposition of individual teeth.................................23-24
3. Malrelationship of dental arch in different planes..........25-28
4. Deviation and Displacement.......................................29-31
ETIOLOGY OF MALOCCLUSION

The orthodontic specialty deals with treatment of various malocclusions. Etiology of malocclusion is the study of its cause or causes. Malocclusion can occur due to a number of possible causes. Broadly speaking malocclusions are caused by either genetic factors or by environmental factors.

<table>
<thead>
<tr>
<th>MOYER’S CLASSIFICATION</th>
<th>Classifications of etiology of malocclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heredity</td>
<td>b. Tongue thrusting</td>
</tr>
<tr>
<td>a. Neuromuscular System</td>
<td>c. Lip sucking and lip biting</td>
</tr>
<tr>
<td>b. Bone</td>
<td>d. Posture</td>
</tr>
<tr>
<td>c. Teeth</td>
<td>e. Nail biting</td>
</tr>
<tr>
<td>d. Soft parts</td>
<td>f. Other habits</td>
</tr>
<tr>
<td>2. Development defects of unknown origin</td>
<td></td>
</tr>
<tr>
<td>3. Trauma</td>
<td>6. Diseases</td>
</tr>
<tr>
<td>a. Prenatal trauma and birth injuries</td>
<td>a. Systemic diseases</td>
</tr>
<tr>
<td>b. Postnatal trauma</td>
<td>b. Endocrine disorders</td>
</tr>
<tr>
<td>4. Physical agents</td>
<td>c. Local diseases</td>
</tr>
<tr>
<td>a. Premature extraction of primary teeth</td>
<td>i. Nasopharyngeal diseases and disturbed respiratory function</td>
</tr>
<tr>
<td>b. Nature of food</td>
<td>ii. Gingival and periodontal disease</td>
</tr>
<tr>
<td>5. Habits</td>
<td>iii. Tumors</td>
</tr>
<tr>
<td>a. Thumb sucking and finger sucking</td>
<td>iv. Caries</td>
</tr>
<tr>
<td></td>
<td>7. Malnutrition</td>
</tr>
</tbody>
</table>
### WHITE AND GARDINER’S CLASSIFICATION

**A. Dental base abnormalities**
1. Antero-posterior malrelationship
2. Vertical malrelationship
3. Lateral malrelationship
4. Disproportion of size between teeth and basal bone
5. Congenital abnormalities

**B. Pre-eruption abnormalities**
1. Abnormalities in position of developing tooth germ
2. Missing teeth
3. Supernumerary teeth and teeth abnormal in form
4. Prolonged retention of deciduous teeth
5. Large labial frenum
6. Traumatic injury

**C. Post-eruption abnormalities**
1. Muscular
   a. Active muscle force
   b. Rest position of musculature
   c. Sucking habits
   d. Abnormalities in path of closure
2. Premature loss of deciduous teeth
3. Extraction of permanent teeth

---

### GRABER’S CLASSIFICATION

**GENERAL FACTORS**
1. Heredity
2. Congenital
3. Environment
   a. Pre-natal [trauma, maternal diet, German measles, maternal metabolism etc.,] b. Post natal [birth injury, cerebral palsy, T.M.J. injury.]
4. Pre-disposing metabolic climate and disease
   a. Endocrine imbalance
   b. Metabolic disturbances
   c. Infectious diseases
5. Dietary problems (nutritional deficiency)
6. Abnormal pressure habits and functional aberrations
7. Posture
8. Trauma and accidents

**LOCAL FACTORS**
1. Anomalies of number:
   Supernumerary teeth, Missing teeth [congenital absence or loss due to accidents, caries, etc.]
2. Anomalies of tooth size
3. Anomalies of tooth shape
4. Abnormal labial frenum : mucosal barriers
5. Premature loss of deciduous teeth
6. Prolonged retention of deciduous teeth

7. Respiratory abnormalities [mouth breathing etc...]
8. Tonsils and adenoids
9. Psychogenic tics and bruxism
| a. Abnormal sucking | deciduous teeth 
| b. Thumb and finger sucking | 7. Delayed eruption of permanent teeth 
| c. Tongue thrust and tongue sucking | 8. Abnormal eruptive path 
| d. lip and nail biting | 9. Ankylosis 
| e. Abnormal swallowing habits [improper deglutition] | 10. Dental caries 
| f. Speech defects | 11. Improper dental restoration |

**LOCAL FACTORS**

Mainly inherited factors:

**A**  Abnormalities in the size and number of teeth.
   
   (i) Missing or congenitally absent teeth.
   
   (ii) Teeth of abnormal shape and size.
   
   (iii) Supernumerary teeth.

**B**  Abnormal position of crypt and total displacement or Transposition of teeth.

**C**  Impaction of upper First permanent molars.

**D**  Abnormal fraenum labium.

   Mainly Environmental Factors.

**E**  Premature loss of deciduous teeth.

**F**  Retention of deciduous teeth.

**G**  Loss of permanent teeth.

**H**  Delayed eruption of permanent teeth.
I  Failure of teeth to erupt.
J  Habit- Sucking.
K  Trauma.
L  Local pathological factors.
M  Misplaced teeth causing abnormal path of closure.

GENERAL FACTORS:
Heredity – This largely dictate the tooth-tissue ratio, the general form and relationship of the jaws and the soft tissue pattern. The later have a greater influence on moulding of the alveolus.

Congenital – Clefts, birth-injury, adverse effects of drugs on foetus etc. These may affect the development of jaws and teeth causing malocclusion.

ENDOCRINE IMBALANCE: Endocrine glands exert profound influence on the formation, calcification and eruption of the teeth and regulates the expression of the growth pattern of the jaws, face and cranium. The effect of a given endocrinal hormonal disturbance varies at different periods of the life of an individual.

METABOLIC DISTURBANCES: The exact effects of the acute febrile conditions on the development of occlusion is not known. There is some recent evidence that acute febrile conditions may temporarily slowdown the
pace of growth and development. It can bring about disturbances in the complex time table of eruption, resorption, tooth loss etc.

INFECTIOUS DISEASES: Diseases with paralytic effect such as poliomyelitis are capable of producing bizarre malocclusion. Diseases with muscle malfunction such as muscular dystrophy and cerebral palsy can lead to characteristic deforming effect on the dental arch.

DIETARY PROBLEMS (NUTRITIONAL DEFICIENCY)
Malocclusion developing due to dietary problems is quite rate. But this is an inter-related problem. An acute febrile condition of an individual during active growth period, can lead to temporary slowing down of the pace of growth and development, which will upset the dental development time table leading on the malocclusion.

ABNORMAL PRESSURE HABITS
The severity of malocclusion caused due to abnormal habits depends upon the trident of factors. i.e., frequency, intensity and duration.

POSTURE
Posture in itself causing malocclusion is yet to be proved. Poor posture and malocclusion may both be the result of a common cause. Poor posture may accentuate an existing malocclusion.
ACCIDENTS AND TRAUMA

During growth, the child is prone to injuries while learning to crawl or during playing. The face and the dental areas are vulnerable to trauma. These injuries can result in fracture of teeth, loss of vitality of teeth, abnormal resorptive pattern and may deflect the permanent tooth germ.

Missing or Congenitally absent teeth: This may vary from the absence of a single tooth to complete anodontia (oligodontia). Where anodontia is more or less complete it is sometimes associated with dysplasia of other ectodermal structures-nails hair and sweat glands may be deficient.

The absence of a second permolar is often found in the lower jaw. The decision has then o be made whether or not to extract the second deciduous molar. If sound, it may well last for many years and its only effect is to retain the lower first permanent molar in a slightly post-normal position. If it is carious, depressed or for some other reason a ‘poor risk’, it should be removed and the decision made whether to retain the space for bridge or to close the space mechanically. It the lower arch is crowded the absence of a lower second premolar may obviate the need for the extraction of this or another tooth.
**Teeth of abnormal shape and size:** This includes gemination and fusion, megadontism, microdontism, supernumerary cusps, dilacerated incisors etc. These conditions give rise to very localized malocclusion and the treatment should be based on common sense. However, unless a tooth is grossly abnormal, it may be suitably crowned or trimmed. Otherwise the tooth may be extracted and space utilized for the alignment of adjacent teeth.

**Supernumerary Teeth:** These may be present any part of the mouth especially in the upper anterior region. They may be erupted or may remain unerupted any may be single or multiple. By their presence they may displace or prevent eruption of teeth of the normal series. Following their removal, the permanent teeth may be moved to their correct position, but there is marked tendency to relapse unless adequately retained.

A satisfactory supernumerary tooth may be suitable crowned or trimmed and accepted for an adjacent unerupted or poor tooth.

There are four main types of supernumerary teeth:

1. **Peg Teeth** – Small rudimentary conical shaped tooth often appearing in the upper midline (Mesiodens). This type may also be seen in upper molar areas.
2 Multi-cusped teeth – May occur with deep occlusal pits (tuberculated like permolars)

3 Supplemental Tooth – Then the tooth is identical in size and appearance to the adjacent teeth.

4 Teeth of normal shape but of large or smaller size.

**Abnormal position of crypt, total displacement and transposition:**
This is usually localized and again treatment must be based on commonsense.

**Impaction of upper first permanent molars**
In this condition the upper first permanent molar becomes caught beneath the distal bulge of the second deciduous molar, and fails to continue to erupt, having just broken the gum.

**Abnormal Labial Frenum**
At birth the fraenum labii superioris is attached to the incisive papilla. As growth proceeds and the teeth erupt, the attachment of the papilla. As growth proceeds and the teeth erupt, the attachment of the fraenum to the gum normally recedes to a point about midway between the alveolar border and the reflection of the mucosa with the apposition of the central incisor teeth. Where the deciduous incisors are spaced, the fraenum remains attached to the incisive papilla. When the permanent incisors erupt they
may also be spaced due to narrow teeth absence of lateral incisors, or because in a narrow maxilla their apices are crowded together and the crowns consequently tilted apart. In these cases the fraenum will remain attached low down and is not necessarily the cause of the diastema.

The effect of the loss of the deciduous molars is variable, and depends essentially on the tooth/tissue ratio.

i) If this is markedly unfavourable, the effect will be localized crowding in the premolar and caning region, with mesial drift of the molars and lingual collapse of the anterior segments.

ii) Where the space is just adequate, loss of deciduous molars will cause mesial drift of the permanent molars and some lingual collapse of the anterior segment as in the first group. It this case, however, a malocclusion is produced which would not otherwise be present.

iii) In case where the tooth/tissue ration is more than adequate and there is spacing or lack of contact of the teeth, loss of the deciduous molars has no effect and indeed mechanical efforts to bring about collapse of the arches are frequently without avail.
Retention of the Deciduous Teeth

The deciduous teeth normally shed a short time before the eruption of the corresponding permanent teeth. If the eruption of permanent tooth is delayed or if the tooth is absent or misplaced, the deciduous tooth will be retained for many years beyond its normal term. Occasionally deciduous tooth fails to resorb despite the presence of its permanent successor. This is usually because the deciduous the deciduous tooth is non-vital and infected. In this case the permanent tooth will erupt in an ectopic position. It is usually self-correcting following the extraction of deciduous tooth except where it is looked in malposition by the occlusion. Sometimes a deciduous tooth suffering low grade infection may become ankylosed and submerged. This will need surgical extraction.

Loss of Permanent Teeth

Any of the permanent teeth may be lost for a variety of reasons, but the most frequent are the incisors, which may be lost as a result of trauma, and the first molars, which may be extracted as a result of caries.

Loss of First Permanent molar- The effect of the loss of the first permanent molar varies somewhat between upper and lower jaws:

a) If the upper first molar is lost the space tends to close mainly by mesial drift of the second molar which will rotate mesio-lingually about its lingual
root, and tilt mesially. Distal drift of the upper premolars is usually to the extent of one or two millimeter and collapse of the anterior segment is slight, probably due to the splinting effect of the lower teeth. The degree of space-closure will depend on the tooth/tissue ratio.

b) Space closure in the lower arch is very much slower and is provided more or less equally by mesial drift of the second molar and distal drift of the premolars. In both cases the teeth tilt, often badly. A space may develop between the lower premolars, especially if the first molar has been extracted under nine years of age. There may be some collapse of the lower anterior segment. Moreover, loss of lower first molar will cause over eruption of upper first molars.

**Delayed Eruption of Permanent Teeth**

This may be general or local. The date of eruption of all teeth varies widely, especially those of the premolars, canines and second molars. Undue importance should not be given on delay in the eruption of teeth where the pattern of eruption is otherwise normal and radiographic investigation shows all teeth present and in good position.

**Failure of teeth to erupt**

One or a number of teeth may fail to erupt due to various causes such as Supernumerary, retained deciduous, eruption cyst, odontomes, impactions,
dilaceration and maldirection of eruption etc. Upper canines often fail to erupt besides second premolars and third molars. Removal of the cause preferably before the closure of the apex of the unerupted tooth should be the first line of treatment where possible. An unerupted tooth may be surgically exposed and helped to erupt by orthodontic force where the tooth is in good form and place and where space is available. A malformed or badly displaced tooth may be either removed or left alone, if causing no symptoms of damage to other teeth.

**Habits-Sucking**

Any habit which cause frequent and intermittent pressure on a tooth or a group of teeth will cause misplacement of the teeth concerned. The best known is undoubtedly finger and thumb sucking, but others, of varying degrees of probability, have been described. In general the effect is strictly local and the teeth can be returned to their correct position with little difficulty when the habit is discontinued.

**Traumatic misplacement of teeth**

Teeth may be misplaced following a blow or fall on face. Trauma which damages or knocks out a deciduous incisor may also damage or misplace the underlying permanent tooth. Traumas to the permanent incisors may result in dilacerations, fracture or even complete avulsion. Orthodontic
treatment varies between attempting to align the adjacent teeth and closing the space, where tooth has been extracted or needing extraction; or filling the space with prosthesis.

Pathological Causes
Malocclusion and displacement of the teeth can be caused by a wide variety of pathological conditions. While such conditions are rare and frequently self-evident, the possibility should not be forgotten that malocclusion may also be due to fracture of the jaw, the presence of a cyst, neoplasm or inflammatory conditions.

AETIOLOGY OF MALOCCLUSION

Hereditary Defects: Genetically determined, may present at any time of life.

Acquired Defects: Not genetically determined, may present at any time of life.

Congenital Defects: Defect present at birth, may be genetic or acquired.

Defects of the jaw
Agnathia (Absence of jaw): Complete failure of development of the jaw. Extremely rare; more commonly, a portion e.g Premaxilla, Condyle or Ramus is missing
**Micrognathia:** Small jaw or jaws. It may be-

1. Mandibular
2. Maxillary or
3. Both

Micrognathia may also be

1. True
   a. Congenital
      i. Congenital heart disease
      ii. Pierre-Robin syndrome
      iii. Absence of premaxilla
   b. Acquired
      i. Ankylosis of Temporomandibular joint
      ii. Symmetrical or Asymmetrical

2. Pseudo/False- A normal sized jaw may look smaller because the opposite jaw is larger than normal in size or posterior positioning of the condyle in relation to the skull.

**Macroglossia:** Large sized jaw or jaws. It may be

1. True or
2. False
True macrognathia: may be due to-

a) Pituitary gigantism

b) Paget's disease of bone

c) Acromegaly

**Facial hemi hypertrophy:** One side of the face is larger than the opposite side.

It may be due to

1. Hormonal imbalance
2. Incomplete twinning
3. Chromosomal abnormality

**Clinical signs:**

- Skin of affected side is coarser
- Presence of thick hairs
- Hemangioma of the skin
- Tongue larger on the affected side
- Velvety buccal mucosa
- Teeth on the affected side of the jaw are larger
- Teeth erupt earlier

**Facial hemi atrophy:** One side of the face is smaller than the other side.
It may be due to

1. Hereditary
2. Neural
3. Traumatic

Clinical signs:

- White line or furrow on one side of the face near midline
- Depressed eye
- Pigmented skin
- Loss of hair
- Trigeminal neuralgia
- Delayed eruption of teeth on the affected side

Defects of tongue

Microglossia: Small tongue. It is a congenital anomaly. There is difficulty in taking food speech.

Macroglossia: Large tongue. It occurs due to-

1. Muscular hypertrophy
2. Neoplasm of the tongue
3. Lymphatic obstruction
4. Cretinism
5. Acromegaly
Clinical Signs:

- Indentations of teeth on the border of the tongue
- Displacement of teeth

**Ankyloglossia (tongue tie):** Fixation of the tongue to the floor of the mouth.

It may be-

a) Complete

b) Partial

It occurs due to-

1. Frenum attachment being very near to the tip of the tongue

2. Short frenum

**Defects of teeth**

**Anodontia:** Absence of teeth.

It may be- (a) Complete or (b) Partial

It may also be- (a) True or (b) Pseudo [impaction]

It occurs due to-

1. Hereditary ectodermal dysplasia

2. Radiation to the law at the time of development

3. Genetic factors
Hyperdontia: It refers to the extra teeth formed by excessive proliferation of the dental lamina.

It includes-

Supernumerary teeth: These are extra teeth which do not resemble the normal series of dentition, i.e. molars, premolars, and incisors.

Examples:
(a) Mesiodens- the most common supernumerary teeth. Usually located between the maxillary central incisors and occurring singly.
(b) Paramolar- It is usually small and rudimentary, and located buccally or lingually to the maxillary molars.

These are extra teeth which resembles teeth in the normal series of dentition

Example: (a) Maxillary incisors
(b) Mandibular molars and premolars

Microdontia: Small sized teeth. It may be-

1. True

Due to-
• Pituitary dwarfism
• Ectodermal dysplasia
• Supernumerary teeth
2. Pseudo/Relative in comparison to large teeth or jaw.

**Macrodontia**: Large sized tooth.

It may be-

1. True

   Due to-

   • Pituitary gigantism
   • Facial hemiatrophy

2. Pseudo/Relative- in comparison to small teeth or jaw.

**Gemination**: Single tooth germ attempts to divide and forms two separate and incomplete teeth. Usually there are two complete or incomplete separate crowns with a single root and root canals.

**Fusion**: Two teeth germs attempt to form a single large tooth.

It may be-

(a) **Complete**- when two developing teeth germs are fused before their calcification begins.

(b) **Incomplete**- when one or both teeth crowns have completed their calcification, so resulting in two crowns and a single root.

**Twinning**: Complete, equivalent division of a tooth germ results in the formation of one normal end one supernumerary tooth.
**Dilaceration:** A sharp bend along the long axis of a tooth.

It may be due to-

1. Trauma to a partially calcified developing tooth.
2. Traumatic injury to the deciduous tooth, causing dilaceration in its permanent successor.

**Endocrine disease**

**Acromegaly:** Enlargement of the tongue and lips, spacing of the teeth and an increase in jaw particularly the mandible resulting in a class III malocclusion.

**Hypothyroidism:** Enlargement of tongue and lips and delayed eruption of tooth.
Malposition of individual teeth:

Individual tooth may have following position:

(1) Tilted or inclined:

The crown of the tooth may be tilted or inclined with its apex placed normally in the arch. Tilted teeth are described according to their direct of tilting.

Labioversion -----Labially tilted.

Linguo version -- Lingually tilted

Mesioversion ---- towards midline

Distoversion --- away from midline

Bucco version --- Buccaly inclined

(2) Displacement: They are also described according to their directing of displacement. Thus there may be

   A. Medial displacement

   B. Distal displacement

   C. Lingual or palatal displacement

   D. Labial or buccal displacement

(3) Rotation:

   A tooth may be rotated around its long axis. There may be –

   A. Mesiolabial or mesiobuccal rotation.
B. Distolabial or Distobuccal rotation
C. Lingual or mesioplatal rotation
D. Distolingual or Distopalatal rotation

(4) Supra Occlusion / Supraversion

When the tooth has over erupted passing the occlusal level.

(5) Infra occlusion / Infraversion

When the tooth has not reached the occlusion it is termed infra occlusion.

(6) Transposition or Transeversion:

When two teeth have reversed their position
e.g. upper canine in the position of 1\textsuperscript{st} premolar & 1\textsuperscript{st} premolar in the position of canine

(7) Imbrication:

Overlapping of adjacent teeth due to crowding commonly found in anterior segment.

(8) Transiversion:

Is twisted tooth, where the tooth is rotated on its long axis.

(10) Axioversion:
Malrelationship of dental arch in different planes:

Variation of occlusion relation may take place in 3 planes.

(1) Ant-post plane
(2) lateral plane
(3) vertical plane

1. Ant-post plane:

Relationship between upper & lower arch may be –

(a) **Normal or neutron occlusion**: When the lower arch is normally related to the upper arch produce a normal over jet 2-3 mm.

(b) **Post normal occlusion**: When the lower arch occlude distally in relation to the upper arch & thus increasing the over jet.

(c) **Prenormal occlusion**: When the lower arch occlude mesially or anteriorly in relations to the upper arch and there will be reduced over jet, edge to edge on even reverse over jet- it is called prenormal or mesio occlusion.

Molar relationship:

It is the relationship of the upper the permanent molar to lower permanent molars. It can be:

Class I – Normocclusion.
Class II – Distoocclusion.

Class II – subdivision – class II on one side and class I on the other side.

Class III – mesio occlusion

Class III Sub division – class III on one side and class I on the other side.

Class IV – class II on one side and class III on the other side.

**Canine relationship:**

Class I: Mesial inclination of the upper canine overlaps the distal inclination of the lower canine.

Class II: upper canine is placed forward. I.e. distal incline of upper canine contacts the mesial incline of lower canine.

Class III: The lower canine is placed forward to the upper canine and there is no overlapping.

**Incisor relationship:**

It is based on the British standard classification of incisor relationship. We have:

Class I

Class II division 1

Class II division 2
(2) **Lateral plane:**

Relationship between upper and lower may be –

(a) **Normal:** The lower arch is covered by the upper arch. So that the maxillary teeth occlude half a cusp buccal to the mandibular molars & the upper & lower midline considered.

(b) **Abnormal:** When fails to achieve normal relationship. These may be

i) Cross bite – When the maxillary posterior teeth occlude in the central fossa of the mandibular teeth that is the upper buccal teeth are in lingual occlusion. It may be –
  → Unilateral cross bite
  → Bilateral cross bite

ii) Reverse cross bite → when the maxillary posterior teeth are placed completely inside or outside the mandibular teeth.

iii) Mid line shifting.

(3) **Vertical plane:**

(a) **Complete overbite:** When the lower incisor occlude on the palatal surfaces of upper incisors or on the palatal mucosa, is called complete over bite.
(b) **Incomplete over bite:** When the lower incisors do not contact either the palatal surface of upper incisors or the palatal mucosa is incomplete.

(c) **Increased or excessive overbite:** When overlapping of lower incisors by the upper incisor is more than normal. It may be complete or incomplete.

(d) **Reduced over bite:** When overlapping of lower incisors by the upper incisors is less than normal, it may also be complete or incomplete.

(e) **Open bite:** When the upper incisor fails to overlap lower incisor or upper post. Teeth fail to overlap lower post. teeth. There is a vertical gap between them. It may be –

   (i) Anterior

   (ii) Posterior
DEVIAION

To maintain the ant oral seal or for the aesthetic reason mandible may take habit posture such as forward and back word, form endogenous posture. For this habit posture the path of closure of mandible will be upward and backward to achieve centric occlusion rather than simple hinge movement this movement called deviation of mandible.

Effects:

1) Proclination of incisors.
2) Crowding of the arch.
3) Open bite, incomplete overbite.
4) Pseudo arch relationship.
5) Increased overbite & over jet.
6) Changing of facial expression. 7. Increased freeway space.
**DISPLACEMENT**

we to the premature contact of the tooth of the path of closure of mandible in centric occlusion, the mandible moves away from centric occlusion to achieve / produce maximum cuspal occlusion this abnormality of mandible is called mandibular displacement.

Displacement always produces -----Lateral or ant cross bite.

**Effect:**

1) Unilateral cross bite.

2) Central line shift.

3) Pain in TMS

4) Anterior cross bite.

5) Attrition present.
### Difference between deviation and displacement

<table>
<thead>
<tr>
<th>Deviation</th>
<th>Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Deviation of the mandible occurs due to habit posture.</td>
<td>1. Due to occlusal interference.</td>
</tr>
<tr>
<td>2. To achieve ant. oral seal or for the esthetic.</td>
<td>2. to achieve maximum cuspal occlusion displacement of mandible occur.</td>
</tr>
<tr>
<td>3. Deviation is eliminated when the incisor relationship is correct.</td>
<td>3. Displacement is eliminated when occlusal interference is corrected.</td>
</tr>
<tr>
<td>4. Head of the condyle away from the glenoid fossa.</td>
<td>4. Head of the condyle remains in glenoid fossa.</td>
</tr>
<tr>
<td>5. Deviation occur in A/p plane</td>
<td>5. Mainly lateral plane and also in A/p plane.</td>
</tr>
<tr>
<td>6. Mandible does not go away from centric occlusion</td>
<td>6. Away from centric occlusion.</td>
</tr>
<tr>
<td>7. Definition</td>
<td>7.</td>
</tr>
<tr>
<td>8. Effects.</td>
<td>8.</td>
</tr>
</tbody>
</table>

### AETIOLOGY:

1. Premature contact of teeth.
2. Occlusal interference.
3. Congenital
4. Developmental
5. Pierre robin syndrome
6. #
7. Blow
8. Fall
9. Habitual
Bibliography:

4. Iida J. Lecture/class notes. Professor and chairman, Dept. of Orthodontics, School of dental science, Hokkaido University, Japan.
5. Lamiya C. Lecture/class notes. Ex Associate Professor and chairman, Dept. of Orthodontics, Sapporo Dental College.
17. Yoshiaki S. Lecture/class notes. Associate Professor and chairman, Dept. of Orthodontics, School of dental science, Hokkaido University, Japan.
Dedicated To

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

I wish to acknowledge the expertise and efforts of the various teachers for their help and inspiration:

1. Prof. Iida Junichiro – Chairman, Dept. of Orthodontics, Hokkaido University, Japan.
3. Asst. Prof. Kajii Takashi – Dept. of Orthodontics, Hokkaido University, Japan.
8. Prof. Amirul Islam – Principal, Bangladesh Dental college
9. Prof. Emadul Haq – Principal City Dental college
11. Asso. Prof. Lamiya Chowdhury – Chairman, Dept. of Orthodontics, Sapporo Dental College, Dhaka.
13. Asso. Prof. MA Sikder – Chairman, Dept. of Orthodontics, University Dental College, Dhaka.
Dr. Mohammad Khursheed Alam has obtained his PhD degree in Orthodontics from Japan in 2008. He worked as Asst. Professor and Head, Orthodontics department, Bangladesh Dental College for 3 years. At the same time he worked as consultant Orthodontist in the Dental office named “Sapporo Dental square”. Since then he has worked in several international projects in the field of Orthodontics. He is the author of more than 50 articles published in reputed journals. He is now working as Senior lecturer in Orthodontic unit, School of Dental Science, Universiti Sains Malaysia.

Volume of this Book has been reviewed by:

Dr. Kathiravan Purmal
BDS (Malaya), DGDP (UK), MFDSRCS (London), MOrth (Malaya), MOrth RCS( Edin), FRACPS.
School of Dental Science, Universiti Sains Malaysia.

Dr Kathiravan Purmal graduated from University Malaya 1993. He has been in private practice for almost 20 years. He is the first locally trained orthodontist in Malaysia with international qualification. He has undergone extensive training in the field of oral and maxillofacial surgery and general dentistry.