A to Z ORTHODONTICS

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CLASS I
MALOCCLUSION

Dr. Mohammad Khursheed Alam
BDS, PGT, PhD (Japan)

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1. Class I malocclusion ......................................................... 3-6
2. Spacing ........................................................................... 7-10
3. Center line shift ........................................................... 10-12
4. Crowding ....................................................................... 12-15
5. Openbite ................................................................. 16-20
Class I occlusion

When the arch relationship is normal in antero-posterior plane with no occlusal abnormality, we call it normal or Class I occlusion.

Class I malocclusion

But, when there is any occlusal abnormality or individual tooth malocclusion in a case with normal arch relationship in antero-posterior plane, we call it Class I malocclusion.

Occlusal features in CLASS I MO

Intraoral

(1) Incisor & molar: class I relationship & Angles class I molar relationship.

(2) SK patterns: usually class I sk. pattern. It may however be possible to find mild class II or class III SK pattern.

(3) Soft tissue morphology & behaviour: The soft tissue form and activity are usually within the normal range.

(4) Upper & lower incisors: Normal axial angle.

(5) Over jet: Generally normal. An individual tooth may be proclined showing increased overjet or may be retroclined and locked inside the bite.

(6) Overbite: Usually normal & complete. But may be “incomplete OB’ or
even” an openbite”

(7) Cross bite: May be present.

(8) Dento Alveolar: Crowding is very frequent showing disproportion imbrications, displacement, rotation etc. in the incisor and canine areas. Spacing and diastema may also be present.

(9) FM plane Angle: Usually average.

(10) Mandibular posture of path of closure: Endogenous posture. Path of closure is simple hinge movement at condyles. But, premature contact at path of closure may cause mandibular displacement.

Extra Oral

(1) Straight profile.

(2) Competent / incompetent lips.

(3) Normal / deep / shallow mento labial sulcus.

**Occlusal abnormalities in CLASS I MO**

Class I malocclusion may present one or more occlusal abnormalities which are classified as follows:

1. Abnormalities caused by local factors:
   
   a. Medial, distal, buccal or lingual (palatal) tilts or inclinations.
   
   b. Medial, distal, buccal or lingual (palatal) displacements.
c. Proclination (e.g. due to retained deciduous) of the anterior teeth.

d. Supra-occlusion and infra-occlusion.

e. Localized spacing or diastema.

f. Rotations.

2. Abnormalities caused by tooth-arch (dento-alveolar) disproportion.

a. Crowding- Outstanding, instanding, imbrications, rotation etc.

b. Spacing, diastema.

3. Abnormalities caused by malrelationship of arch in lateral plane:

a. Cross bite.

b. Centre-line shift.

4. Abnormalities caused by malrelationship of arch in vertical plane:

a. Excessive overbite.

b. Open bite- Anterior, lateral (posterior).

**Treatment of CLASS I MO**

**Treatment aims:**

To improve the aesthetics and the function of the teeth and jaws.

To relieve crowding and align the teeth within the arches.

If necessary, to reduce a deep overbite and improve the interincisal angle.
**Planning of treatment:** As there is no antero-posterior arch discrepancy in Class I malocclusion, the treatment usually involves correction of local irregularities. But, treatment of the upper and lower arch must be co-coordinated. As a rule, treatment in lower arch is planned first and then the teeth of the upper arch aligned around the lower.

**The lower arch:** The size and form of the lower arch should be accepted. Treatment to relieve crowding will involve extraction of teeth and so minor crowding may be accepted. If the crowding is moderate to severe, and all the teeth present and sound, the extraction of 4/4 usually indicated. Usually spontaneous alignment of the teeth will follow these extractions.

The upper arch: If extractions are necessary in lower arch, teeth, usually 4/4 should be removed from the upper arch. This will them provide adequate space to retract the canines and align the upper incisors to achieve correct occlusal relationships with the lower arch. Removable appliances are suitable in most cases unless rotations and apical positions have to be corrected. Correction of rotations or apical positions will require fixed appliance.
SPACING

Definition: Condition where there are gaps or spaces present between the teeth.

Etiology

(A) General factor

1. Low tooth tissue rat
2. Basal narrowness of the jaw in lateral plane.
3. Abnormal soft tissue morphology & behavior –
4. Incompetent lip.
5. Tongue thrust [Adaptive or Endogenous]
6. Sucking habit [finger or lip] may cause proclination of the incisors and their spacing.
7. Large tongue.
8. Relative microdontia.

(B) Local factor

(1) missing teeth [commonly lateral incisor]
(2) Rudimentary teeth [small lateral incisor]
(3) Supernumeraries.
(4) proclamation of central & lateral incisors due to
- retained deciduous
- Sucking habit.

(5) Loss of tooth due to extraction in the same arch. [It not Rx by prosthesis]

(6) Pathological factors – cyst
  - Tumour.

(7) Rotation of teeth particularly the incisor.

(8) Premature loss of permanent teeth.

(9) Localized soft tissue abnormalities.

Causes of midline Diastema

1. Macrognathia
2. Micordontia
3. Hereditary
4. Racial
5. Mild generalised spacing of teeth.
7. Physiological
8. Congenitally missing teeth.
10. Extraction of teeth.
11. Ectopic eruption of teeth.
12. Midline cystic lesions.
13. Increased overjet.
14. Increased over bite.
15. Thumb sucking.
16. Tongue thrusting.
17. Frenum sucking.
18. Abnormal labial frenum.
19. Retained deciduous teeth.
20. Palatally erupted lateral incisors.
21. During rapid palatal expansion.

**Treatment:**

Principle: Tooth material Arch length Combination

1. Mild case – moving the incisors together and gathering the space distal to the lateral incisors.
2. More generalized case – the incisors and canines can be moved towards the midline and space gathered distal to the canines.
3. To prevent relapse – Some form of prosthesis will required for aesthetics.
4. When the lateral incisors are small, they may be widened by suitable jacket crowns or by composite work to mask the space.
5. Space of extracted tooth is reopened by moving the anterior teeth to their original positions and space closed by prosthesis.

6. Spacing adjacent to a crowded area should automatically correct unless there is occlusal interference.

7. Local spacing – Removing persisting local cause.

8. Where occlusion is satisfactory, localized spacing in the anterior segment corrected by widening one or few teeth with light cure composite materials, to mask such spacing.

**Central Line Shift**

Location: 1. Upper arch

2. Lower arch

3. Both.

Shift may be either to the right or to the left of the midsagittal line of the head.

Causes – Could be one or more of the following –

1. Unilateral early loss or extraction of deciduous teeth particularly in crowded arch.

2. Unilateral late corruption or early eruption of incisor teeth in crowded arch.
3. Abnormally large or small anterior teeth in one side of the arch.

4. Unilateral loss, absence or extraction in permanent teeth, particularly the anterior.

5. Sucking habit.


7. Extra on supernumerary teeth particularly when unilateral.

8. Abnormal relation of jaws due to –
   a. Premature contact and mandibular deviation [laterally]
   b. One arch too narrow or too wide than the other, resulting mandibular deviation and cross bite [unilateral]

9. Abnormalities and pathology of facial skeleton such as:
   a. Unilateral facial hypoplasia or hyperplasia.
   b. Mandibular condylar hypoplasia or hyperplasia.
   c. Unilateral facial atrophy.
   d. Unilateral trauma or infection of taw-condylar followed by malunion.
   e. Cleft lip & palate, auriculo-facial hypoplasia etc.
   f. Cyst, tumors.
   g. Any other factor which might cause unilateral craniofacial abnormalities.
TREATMENT

(1) Lower arch – Do not require any Rx

(2) Upper arch – Slight shift in well aligned arch should be accepted. But gross shift will be unsightly and need Rx.

(3) Any persisting causative factor should be removed and unilateral loss in arch will have to be balanced by extraction of the same tooth form the other side of the arch.

(4) To correct shift – Multiband appliances are usually used. But removable appliance can be used where --- distal tipping movement of few teeth should correct the shift.

(5) Central line shifts associated i mandibular deviation due to premature contact or unilateral cross bite should correct itself after premature contact is eliminated or crossbite is corrected.

(6) Central line shift associated with abnormalities or pathology of facial skeleton is better accepted.

CROWDING

Definition – is the irregularities of teeth due to inadequate space in the arch for normal alignment.

Manifestated by
1. Imbrications
2. Displacement
3. Impaction
4. Rotation
5. Tilts.

Type:
(A) Localized
(B) Generalized.

Race – Common in coccesian affecting approx 2/3 of the population.

N.B. Crowding is much more prevalent in modern population than it was prehistoric times. This is due to the introduction of a less abrasive diet so that less intreproximal tooth wears occurs.

AETIOLOGY

1. Large tooth size in relation to tooth length.
2. Prolooug retention of deciduous teeth.
3. Premature lass of deciduous teeth.
4. Delayed eruption of permanent teeth.
5. Altered path of corruption.
7. Trauma.
8. Localized abnormal size and shape of teeth.

9. Late horizontal growth of mandible.

10. Mesial migration of buccal segment.

Treatment

Preventive treatment

1. Clinical observation where family history present.

2. Specially design nipple for feeding bottle to prevent narrowsness of the arch.

3. O.H. maintenance & fluoridation to prevent D. Caries.

4. Restoration of proximal caries to maintain the arch length.

5. Preservation of D. teeth till their normal shedding time.

6. Surgical removal of high frenal att. [to prevent localized spacing & crowding to the other place]

7. Space maintainer for early loss of Do teeth [maintenance of lee way space]

8. Timely removal of retained on ankylosed D. Teeth.

9. Habit correction.

10. Early correction of --topically erupted tooth.

11. Serial extraction where necessary.
Corrective RX

1. ↑ Arch length – (a) expansion of the arch
   
   (1) Distalization of the molar.
   
   (2) Proclination of anteriors.

2. ↓ Tooth material – (a) proximal striping (Disking)

   (b) Extraction.

(3) Combination

   (c) Derotation of post tooth.

   (d) Uprighting of the molars.

* Alignment of malaligned tooth.

   (a) Mild crowding – Aligned with RA such as labial bow, spring, palatal finger spring, T spring, flapper spring.

   (b) Moderate crowding – Aligned with RA on FA.

   (c) Severe crowding – (i) Ex usually PM.

      (ii) Retraction of canine.

      (iii) Alignment of anteriors

   (d) F. A – sever crowding - Ex other than PM can be managed well by F.A.
**Open bite**

Condition where there is lack of vertical overlapping of tooth.

**Types:**

According to location

a. Anterior open bite.  
   i) Skeletal open bite.

b. Posterior open bite.

According to etiology:

a. Skeletal open bite.

b. Dento alveolar open bite.

c. Soft tissue open bite.

According to side involvement

a. Unilateral open bite.

b. Bilateral open bite.

**Etiology:**

Anterior open bite:

(1) Occurs during normal course of development of dentition.

(2) Disturbance in eruption of teeth and alveolar process.

Ex: Ankylosis.
(3) Mechanical interference with eruption and alveolar growth Ex: Finger on thumb sucking habit.

(4) Osseous dysplasia Ex: Micrognathia, gross mandibular hypertrophy.

(5) Soft tissue factor Ex: Tongue thrusting.

(6) Dental factor Ex: Localized failure of alveolar development.

(7) Skeletal factors:
   a. Increased lower facial height.
   b. Decreased ramal height.
   c. Increased maxillomandibular plane angle.

Posterior open bite:

(1) Lateral tongue thrust.

(2) Ankylosed primary teeth.

(3) Faulty orthodontic treatment.

(4) Primary failure of eruption.

Incidence of open bite:

Prevalent during the early stages of growth than at the later stages due to –

(i) Prevalence of habit at an early age.

(ii) Forward posture of tongue due to growth of lymphatic tissue and.

(iii) Delayed veridical growth of upper face.
TREATMENT:

Anterior open bite:

a. Elimination of abnormal habits like thumb sucking tongue thrusting, with removal or fixed habit breaking appliance depending upon the severity of the case and the cooperation of the patient.
b. Oral screen can be used to correct the habit and protrusion of anteriors, thereby correct the open bite.
c. If skeletal open bite is observed during mixed dentition period, then put the patient under Frankel IV or under chin cap with high pull headgear.
d. In permanent dentition, mild open bite cases eighteen skeletal / dental can be managed by using fixed appliances with box elastics.
e. In the permanent dentition, after completion of growth skeletal open bite can be managed by surgical correction only.
f. If the open bite is due to supra-eruption of posteriors, posterior segmental osteotomy should be done to reposition the segment.

Posterior or lateral open bite:

a. It is due to lateral tongue thrust habit, can be corrected by removable or fixed habit breaking appliances.
b. If it is due to primary failure of eruption, cannot be corrected orthodontic ally

**OPEN BITE RX**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rx need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habit on faulty orthodontic Rx</td>
<td>cause removed &amp; may be self correcting.</td>
</tr>
<tr>
<td>Open bite caused by other factor</td>
<td>difficult to Rx</td>
</tr>
<tr>
<td>Mild to moderated case</td>
<td>left alone or Rx by F.A</td>
</tr>
<tr>
<td>Sever case –</td>
<td>Vertical subigmoid on sagital bone splitting give best result.</td>
</tr>
<tr>
<td>Surgery done –</td>
<td>bony osteotomy</td>
</tr>
<tr>
<td>When occlusion permit –</td>
<td>from ileum done</td>
</tr>
<tr>
<td>When occlusion not permit –</td>
<td></td>
</tr>
<tr>
<td>Open bite with pragmatism bone grafting</td>
<td></td>
</tr>
</tbody>
</table>
### Difference between anterior and posterior openbite

<table>
<thead>
<tr>
<th>Anterior open bite</th>
<th>posterior open bite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior teeth involve</td>
<td>posterior teeth involve</td>
</tr>
<tr>
<td>Types – skeletal</td>
<td>No such types</td>
</tr>
<tr>
<td>– dental</td>
<td></td>
</tr>
<tr>
<td>esthetically unattractive</td>
<td>no esthetic problem occur.</td>
</tr>
<tr>
<td>Occur due to a variety of hereditary and non hereditary factors.</td>
<td>usually a result of infra occlusion of a segment of the posterior teeth.</td>
</tr>
<tr>
<td>Proclaimed upper anterior teeth.</td>
<td>Normal</td>
</tr>
<tr>
<td>Have a narrow maxillary arch.</td>
<td>Normal</td>
</tr>
</tbody>
</table>
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Dedicated To

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