

QUICK REFERENCE FOR HEALTHCARE PROVIDERS

# MANAGEMENT OF **ANTERIOR CROSSBITE**

## IN MIXED DENTITION

3RD EDITION



**MINISTRY OF HEALTH MALAYSIA**

**ORAL HEALTH PROGRAMME**

## KEY MESSAGES

1. An anterior crossbite is characterised by misalignment of the upper and lower front teeth, where the lower teeth overlap in front of the upper teeth. This may involve one or more anterior teeth and can occur during the mixed dentition phase.
2. Anterior crossbite, particularly crossbite involving all incisors, is commonly found in children who have skeletal Class III skeletal relationship.
3. Comprehensive history taking, clinical examination and radiographic investigations are important to determine the aetiology of the crossbite, whether it is dental, functional or skeletal origin.
4. Complete record keeping is important for evaluation, monitoring of treatment progress and medico-legal purposes.
5. Anterior crossbite among patients in mixed dentition should be corrected early to prevent unwanted implications.
6. Dental anterior crossbite among patients in mixed dentition can be corrected using upper removable appliance, lower inclined bite plane and cemented bite pads. The choice of treatment depends on the clinician's skill, preferences, and patient's compliance.
7. Correction of anterior crossbite using fixed appliances should be carried out by orthodontists.
8. Protraction facemask therapy may be used to correct skeletal anterior crossbite in growing patients with Class III malocclusion.

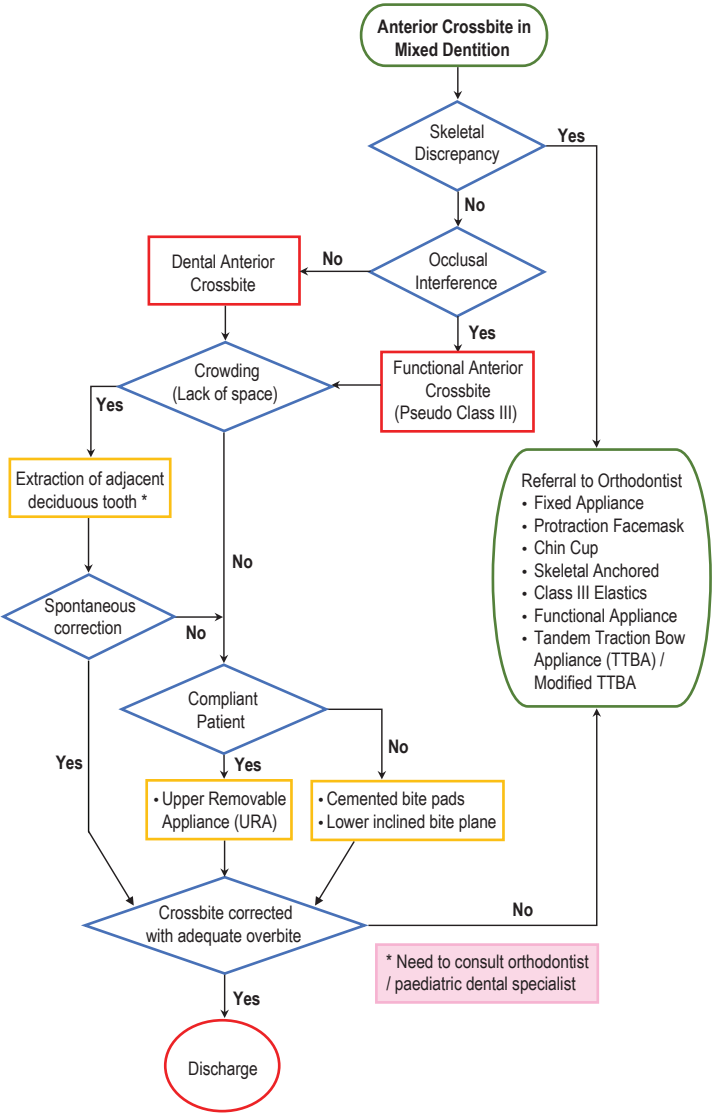
This Quick Reference provides key messages and a summary of the main recommendations in the Clinical Practice Guidelines (CPG) Management of Anterior Crossbite in Mixed Dentition (Third Edition)

Details of the evidence supporting these recommendations can be found in the above CPG, available on the following website:

Ministry of Health Malaysia: [www.moh.gov.my](http://www.moh.gov.my)

Oral Health Technology Section  
Oral Health Programme  
Ministry of Health Malaysia  
Level 5, Block E10, Precinct 1  
Federal Government Administrative Centre  
62590 Putrajaya, Malaysia

**ALGORITHM**  
**MANAGEMENT OF ANTERIOR CROSSBITE IN MIXED DENTITION**



## EXAMINATION AND DIAGNOSIS

### 1. HISTORY

- Patient's complaint or parents' concern
- Medical history – any relevant medical illness / syndrome
- Dental history – any history of trauma to teeth / jaw, age when trauma occur
- Family history – any family member with mandibular prognathism or Class III skeletal pattern
- Social history to assess patient motivation and compliance to treatment
- Habit

### 2. EXTRA-ORAL EXAMINATION

<b>Skeletal pattern</b>	<ul style="list-style-type: none"> <li>• In three planes i.e. anterior-posterior (A-P), vertical and transverse</li> </ul>
<b>Temporomandibular joint (TMJ)</b>	<ul style="list-style-type: none"> <li>• Clicking / crepitus</li> <li>• Tenderness</li> <li>• Deviation and displacement upon mouth opening and closing</li> </ul>
<b>Soft tissue</b>	<ul style="list-style-type: none"> <li>• Facial profile - straight / convex / concave</li> <li>• Lip competency</li> </ul>

### 3. INTRA-ORAL EXAMINATION

<b>General condition</b>	<ul style="list-style-type: none"> <li>• Oral hygiene and DMF status</li> <li>• Gingival health</li> <li>• Gingival recession</li> <li>• Tooth mobility</li> <li>• Tooth attrition</li> </ul>
<b>Assessment of the arches</b>	<ul style="list-style-type: none"> <li>• Severity of crowding</li> <li>• Spacing availability for alignment</li> <li>• Upper and lower incisors inclination</li> </ul>
<b>In occlusion</b>	<ul style="list-style-type: none"> <li>• Number of teeth involved in crossbite</li> <li>• Overjet and overbite</li> <li>• Able to achieve edge-to-edge incisor relationship</li> <li>• Any mandibular displacement in closure</li> <li>• Centreline discrepancy</li> <li>• Buccal segment relationship</li> </ul>



### 4. RADIOGRAPHIC EXAMINATION

<b>Orthopantomogram (OPG)</b>	<ul style="list-style-type: none"> <li>• To confirm the presence / absence of teeth</li> <li>• To assess general condition of teeth and supporting tissues</li> </ul>
<b>Lateral Cephalogram</b>	<ul style="list-style-type: none"> <li>• To assess skeletal relationship</li> <li>• To measure the inclination for the upper and lower incisors</li> <li>• To determine the aetiology of the malocclusion</li> </ul>
<b>Upper Anterior Standard Occlusal (if necessary)</b>	<ul style="list-style-type: none"> <li>• To detect any supernumerary teeth or other pathology in the anterior region</li> </ul>

Important signs to look for when patients present with anterior crossbite:

- Enamel wear – attrition of upper or lower incisors
- Periodontal problems (labial gingival recession associate with traumatic occlusion, bone dehiscence)
- Tooth mobility due to traumatic occlusion
- Presence of mandibular displacement that may occur when closing in the retruded contact position (RCP) into the intercuspal position (ICP) due to premature contact
- Patient's ability to achieve an edge-to-edge incisor relationship

FEATURES TO DIFFERENTIATE TYPES OF ANTERIOR CROSSBITE

FEATURES	DENTAL ANTERIOR CROSSBITE / FUNCTIONAL CROSSBITE (PSEUDO CLASS III)	SKELETAL ANTERIOR CROSSBITE
Aetiology	<ul style="list-style-type: none"><li>• Lack of space</li><li>• Crowding</li><li>• No size discrepancy between maxilla and mandible</li></ul>	<ul style="list-style-type: none"><li>• Genetic or hereditary in most cases</li><li>• Size discrepancy between maxilla and mandible</li></ul>
Maxillary incisor inclination	<ul style="list-style-type: none"><li>• Upright or retroclined</li></ul>	<ul style="list-style-type: none"><li>• Proclined</li></ul>
Mandibular incisor inclination	<ul style="list-style-type: none"><li>• Proclined or upright</li></ul>	<ul style="list-style-type: none"><li>• Retroclined</li></ul>
Transverse discrepancy	<ul style="list-style-type: none"><li>• Not present</li><li>• If present, may be associated with mandibular displacement (functional crossbite)</li></ul>	<ul style="list-style-type: none"><li>• Can be associated with posterior crossbite</li></ul>
Mandibular growth pattern	<ul style="list-style-type: none"><li>• Normal</li></ul>	<ul style="list-style-type: none"><li>• Unfavourable growth pattern</li></ul>
Number of teeth in crossbite	<ul style="list-style-type: none"><li>• One or more teeth</li></ul>	<ul style="list-style-type: none"><li>• Segmental crossbite</li></ul>
		

TYPES OF ANTERIOR CROSSBITE

DENTAL CROSSBITE	FUNCTIONAL CROSSBITE	SKELETAL CROSSBITE
<ul style="list-style-type: none"><li>• Localised in nature, involving lingually displaced maxillary central or lateral incisors.</li><li>• Does not have underlying skeletal problems.</li></ul>	<ul style="list-style-type: none"><li>• Caused by occlusal interferences between upper and lower incisor(s)</li><li>• This leads to forward displacement of the mandible to achieve maximum intercuspation.</li></ul>	<ul style="list-style-type: none"><li>• Result of skeletal discrepancies due to retrognathic maxilla or the prognathic mandible or combination of both.</li><li>• The greater the number of teeth in crossbite, the greater the skeletal component of the aetiology.</li></ul>

## EARLY INTERVENTION

Early correction is crucial to prevent adverse effects on the developing skeletal and dentoalveolar.

1. Rationale For Early Intervention
  - A crossbite has little possibility of self-correction
  - A crossbite in the primary dentition may lead to development of crossbite in the permanent dentition
  - Postponing treatment may result in prolonged treatment of greater complexity
  - A functional crossbite can develop from cuspal interference, resulting in a mandibular shift
  - Improves maxillary lip posture and facial appearance
2. Implication of Delayed or No Treatment
  - Damage to the teeth in crossbite through attrition
  - Mobility of the lower incisor due to labial displacement of this tooth accompanied by loss of gingival attachment labially
  - Gingival recession and loss of alveolar bone support to the opposing lower incisor
  - The potential adverse growth influences on the mandible and anterior portion of the maxilla
  - Constant protrusion of the mandibular condyle from the fossa may stimulate growth of the mandible
3. Consideration Before Embarking Interceptive Treatment
 

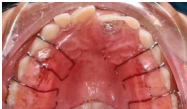



The following factors need to be considered before early intervention of anterior crossbite in mixed dentition:

  - Oral hygiene status
  - The severity of the underlying skeletal discrepancy
  - The amount of dento-alveolar compensation that has taken place (proclined upper incisors and retroclined lower incisors)
  - The amount of overbite present
  - Patient's compliance
  - Patient's overall health condition

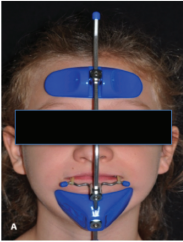



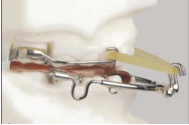
Criteria for successful treatment in eliminating anterior crossbite:

- Overall oral health
- Age and timing of treatment
- Patient's growth potential
- Severity of malocclusion
- Adequate space in the arch to align the tooth / to correct anterior crossbite
- Sufficient overbite to hold the tooth in position following correction
- Incisors inclination before treatment
- Patient compliance
- Operator's skill and experience
- Cost
- Safety

TREATMENT MODALITIES OF ANTERIOR CROSSBITE

DENTAL ANTERIOR CROSSBITE / FUNCTIONAL CROSSBITE		
Upper Removable Appliance (URA)		An appliance that is not attached to the teeth and can be removed by the patient. URA is efficient in tipping movement and need good compliance from the patients.
Lower Inclined Bite Planes		Inclined plane, either removable or cemented, can be placed at the lower incisors for non-compliant patients. It uses natural force for the tooth movement.
Cemented Bite Pads		It is a bite riser that are placed on lower first molars to disengage the occlusion, thus allowing the teeth to move freely by the tongue pressure.
Fixed Appliance		Orthodontic devices / braces which are attached onto the surfaces of teeth and cannot be removed by the patient. It is used for cases that need three-dimensional tooth movement.

TREATMENT MODALITIES OF ANTERIOR CROSSBITE

SKELETAL ANTERIOR CROSSBITE		
<b>Protraction facemask</b>		It is an orthopaedic device used in early mixed dentition to protract the maxilla. It can be used as a stand-alone treatment or in conjunction with other maxillary arch expansion appliances.
<b>Chin Cup</b>		a device outside of the mouth (extra oral appliance) that covers the chin and is attached to elastic bands that usually fit over the head. It is used to restrict the forward and downward growth of the mandible.
<b>Skeletal Anchored Class III Elastics</b>		Class III elastics applied from infra-zygomatic mini-plates / mini-screws in the maxilla to symphyseal mini-plates / mini-screws in the mandible.
<b>Functional Appliance</b>		Removable appliance used in growing patient with Class III skeletal pattern. <div>Functional appliance may be provided by an orthodontist for correction of skeletal anterior crossbite in mixed dentition.</div>
<b>Tandem Traction Bow Appliance (TTBA)</b>		It is an intraoral appliance with upper splint attached to a Rapid Maxillary Expander (RME) and a lower splint with headgear tubes connected by a traction bow and intraoral elastics.