

## Mandibular fractures and dislocations

Mandibular fractures are common and may need emergency treatment, especially if there is any compromise of the airway. Dislocation of the temporomandibular joint can occur as a result of direct trauma but more often occurs as a result of excessive opening of the mandible, such as when yawning or during dental procedures.

### Mandibular fractures<sup>[1]</sup>

When a blow to the mandible causes a fracture there are often other fractures too and these must be sought:

- Trauma to one side often produces an ipsilateral body fracture and a contralateral subcondylar fracture.
- A heavy blow to the symphysis produces a symphyseal fracture and bilateral subcondylar fractures.
- It is also important to exclude damage to the cervical spine and to ascertain that the airway is not compromised.

### Mandibular fractures epidemiology<sup>[2]</sup>

- Fractures of the mandible are common.<sup>[3]</sup> The most commonly fractured sites are the body of the mandible, condyle, angle, symphysis, ramus and the coronoid process.
- The cause of the injury may be road traffic accidents, assault, falls, industrial injuries or sports injuries but the relative number of each varies considerably between countries and areas.
- Under the age of 25, dental trauma accounts for more lost teeth than caries or gum disease.<sup>[4]</sup>
- In terms of violence, young males are most at risk with alcohol an aggravating factor.

- Women and children are much less at risk but can be from domestic violence.

### **Mandibular fractures symptoms (presentation)** [5]

The history may indicate the site and direction of force, the possible presence of other injuries (especially to the neck) and other relevant features such as loss of consciousness and head injury.

### **Examination**

- Note any abnormality in facial contour and shape of the mandible as well as tenderness, swelling, redness, lacerations or haematoma.
- Check movements of the mandible and malocclusion.
- Loose and fractured teeth should be evaluated and counted.
- If teeth are missing and unaccounted for, consider CXR in case of inhalation.

If the mucosa is intact, clinical findings may be limited to bruising. If the mandibular branch of the trigeminal nerve (the inferior alveolar or mental nerve) has been injured, there will be paraesthesia or anaesthesia of the chin. Documenting this and any damage to the marginal mandibular nerve branch of the facial nerve is important before surgery.

Spasm of the muscles of mastication can produce trismus that impairs a proper oral examination. The pull of muscles may reduce or distract a fracture. Facial oedema, erythema, and pain may also occur.

Some fractures can result in the posterior displacement of the tongue and lead to airway compromise. The airway obstruction requires immediate attention.

### **Investigations** [6]

Computed tomography (CT) is the preferred method when attempting to identify acute mandibular fractures, particularly in trauma patients, and has very high specificity and sensitivity.

- Multidetector CT now represents the standard of care, enabling fast scan times, reduced artifact, accurate reconstructed views, and three-dimensional reconstructions.

- Cone-beam CT is a newer advanced imaging modality that is increasingly being used worldwide, particularly in the ambulatory and intraoperative setting.

## **X-Rays**

There are a number of views of plain X-rays that give a good picture of the mandible, teeth and their roots. A panoramic view is especially useful. CXR may also be required if teeth are unaccounted for.

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# **Mandibular fractures treatment and management<sup>[1]</sup>**

A patient with teeth that may be loose or knocked out requires immediate referral to a dentist if other injuries do not override that consideration.

Fractures in the region of the teeth must be considered as compound fractures, as there is a risk of infection from the oral cavity. An open laceration may overlie a compound fracture.

## **General measures**

Treatment is usually surgical but a conservative approach may be acceptable for children with a greenstick fracture or the elderly edentulous patient with minimal displacement. Support to the jaw may relieve discomfort. Chewing should be minimised or avoided with a liquid or puréed diet.

## **Surgical**

A surgical approach is often advocated nowadays where a conservative line may have been acceptable before.

- Pre-operative and peri-operative antibiotics are used to reduce the risk of infection.
- Closed reduction may be achieved or open reduction permits direct inspection and mechanisms to stabilise the fracture.
- Wire tends to be reserved for children and titanium plates and screw fixation are often used in adults.

- Mandibulo-maxillary fixation (MMF) may be required:
  - Children have MMF for four weeks, adults for six weeks; however, the elderly may require eight weeks.
  - Patients with condylar fractures must have MMF removed by two weeks, and aggressive physiotherapy is required to prevent ankylosis.
  - MMF requires tube feeding of a liquid or puréed diet and attention to oral hygiene.
- Implants may be used to correct deformity.<sup>[7]</sup> Teeth on the fracture line rarely need removal.

### **Pharmacological**

Pre-operative antibiotics reduce the frequency of infection considerably.

### **Complications**

Complications may be related to the trauma to the mandible or related trauma.

- Delay in fixing the fractured mandible increases the risk of complications but neurological complications or other problems such as airway compromise may make this inevitable.
- If there is bilateral fracture of the body of mandible, parasymphiseal, or condylar fractures, there is risk of impairment of airways, as the muscular action pulls the distal mandibular segment backwards, allowing the tongue to obstruct the oropharynx.
- There may also be nerve damage:
  - In neuropraxia, function takes 4-6 weeks to return; however, in neurotmesis, function takes around 18 months to return, if it returns.
- Infection increases complications including malunion or non-union.
- Ankylosis can result in poor ability to open the mouth.<sup>[8]</sup>

- The psychological implications of facial trauma are such that the risk of [post-traumatic stress disorder](#) is increased in this condition. <sup>[9]</sup>  
<sup>[10]</sup>

## Prevention

- Mouth guards in sport reduce the incidence of trauma to the mandible. <sup>[11]</sup> <sup>[12]</sup>
- They do not have an adverse effect on aerobic performance. <sup>[13]</sup>
- The mouthguard needs to be appropriate to the individual and to the sport. <sup>[14]</sup> <sup>[15]</sup>

## Mandibular dislocation <sup>[16]</sup>

Temporal mandibular joint dislocation (mandibular dislocation) can present as bilateral or unilateral displacement of the mandibular condyle from the articular surface of the temporal bone (glenoid fossa). Anterior, posterior, superior and lateral mandibular dislocations can occur.

The condyle becomes locked when it has extended too far forward (in relation to the eminence) and spasm of the pterygoid and masseter muscles prevent it from moving back.

Associated spasm and oedema produce extreme discomfort and anxiety for a patient who can't speak because they are unable to close their mouth.

## Risk factors

- Shallow mandibular fossa in the temporal bone.
- Weak or torn temporomandibular joint (TMJ) ligaments.
- Underdeveloped condyle of the mandible.
- Connective tissue diseases - eg, [Marfan's syndrome](#) or [Ehlers-Danlos syndrome](#).
- Neuroleptic use (orofacial spasm).

## Mandibular dislocation symptoms (presentation)

- Anatomical abnormality of the fossa/interior articular eminence.

- Dislocation can occur bilaterally, or unilaterally, with jaw locked open symmetrically or deviating to one side (opposite to dislocation).
- Palpation shows TMJ anterior to the articular eminence.
- Usually occurs during maximum opening of mouth - eg, during yawning, laughing, prolonged dental work or an [epileptic seizure](#).
- May also be secondary to trauma.

## Investigations

X-ray of the jaw to exclude fracture in addition to the dislocation.

## Mandibular dislocation treatment and management

Relief of pain and muscle spasm - eg, using intravenous benzodiazepine with or without an opioid or by using an injection of local anaesthetic into the condylar area.

For reduction of the dislocation:

- Face the patient with your thumbs on the lower molars or on the ridge of the mandible behind the molars, and your fingers placed externally around the inferior border of each side of the mandible (near the angles).
- Your thumbs should be protected with thick wrapping of gauze or tongue depressors wrapped in gauze.
- Apply firm, steady pressure in a downward and posterior direction.
- Reduction can be performed one side at a time if bilateral reduction is not possible.

Following reduction:

- X-rays should be obtained to exclude fracture of the mandibular condyles caused by the reduction.
- Patients should eat a soft diet for one week.
- Avoid wide opening of mouth; place fist under chin when yawning.
- Prescribe analgesics and muscle relaxants. Local heat may offer relief.

- Refer to oral or maxillofacial surgeon for follow-up.

## Chronic and recurrent dislocation<sup>[17]</sup>

- The management is divided into two stages, initially conservative with surgical options used if conservative methods are unsuccessful.
- The conservative method includes the use of various sclerosing agents like alcohol, sodium tetradecyl sulphate, sodium psylliate, morrhuate sodium, and platelet-rich plasma injected into the joint space.
- The use of autologous blood in recurrent dislocation is very popular. It is based on the principle to restrict mandibular movements by inducing fibrosis in the upper joint space, the pericapsular tissues, or both.
- In the case of chronic protracted dislocation, elastic rubber traction with arch bars and ligature wires/intermaxillary fixation with elastic bands are useful to achieve the reduction.
- In recurrent cases, surgical options include either eminectomy or siting a mini-plate on the articular eminence.<sup>[18]</sup> <sup>[19]</sup>

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## Further reading

- [Jain P, Rathee M](#); Mandible Body Fracture. StatPearls, June 2022.
- [Shakya S, Zhang X, Liu L](#); Key points in surgical management of mandibular condylar fractures. Chin J Traumatol. 2020 Apr;23(2):63–70. doi: 10.1016/j.cjtee.2019.08.006. Epub 2019 Nov 1.

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