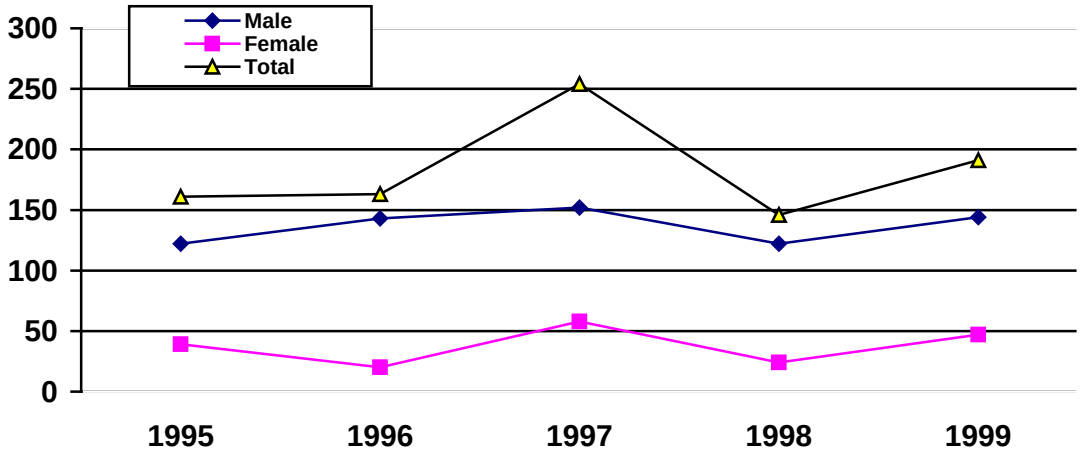
FACIAL AND JAW INJURY

854 patients were admitted to Liverpool Hospital during 1995-1999 with the diagnosis of facial injury. 683 (80%) of these patients were male. The graph shows the patients broken down into males and females, and the years that they were admitted. The number of facial injuries has remained relatively constant.



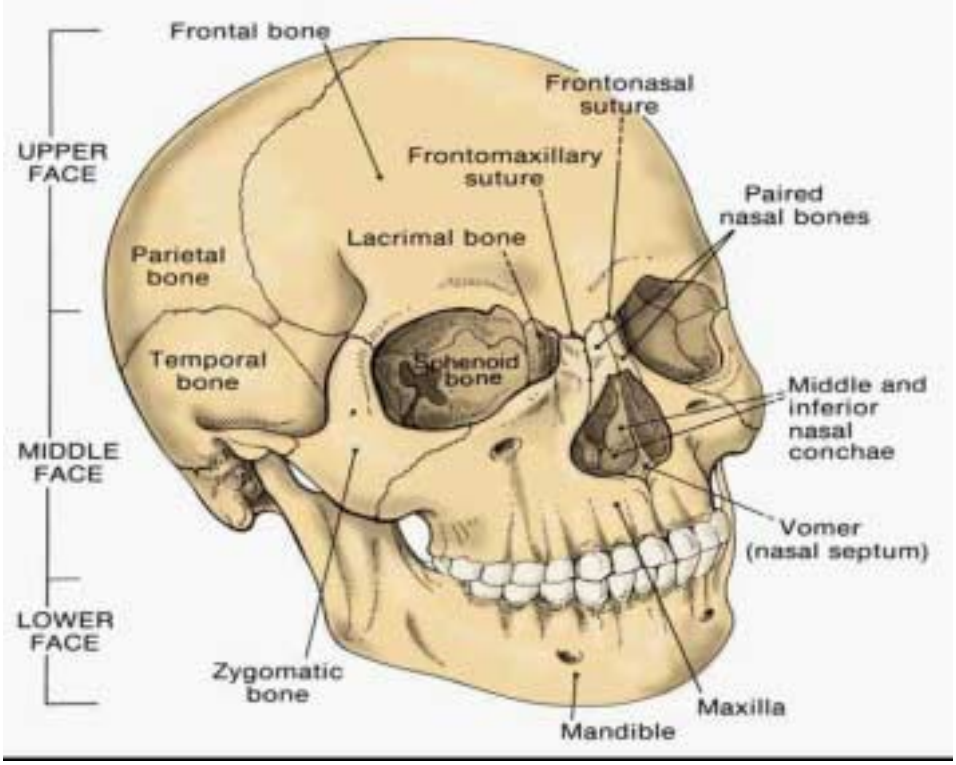
What is a facial injury?

The face is a complex array of bones and tissue. It may be injured as a result of blunt force (e.g. car crash, fall) or from a penetrating force (e.g. knife, bullet wound). Many facial injuries occur as a result of assault.

Facial injuries have been reduced greatly in the last 25 years with the legal requirement to wear a car seat belt in Australia. Despite all the road safety campaigns, some drivers and passengers ignore advice and the law, suffering potential deformity. Blunt assault, however, is now the most frequent cause of facial injury.

Facial injuries can cause a number of problems in the short and long term, especially cosmetically. Injuries frequently occur in combination. Severe facial injuries are often associated with large blood loss and significant swelling. This causes problems with breathing as the nose and/or mouth must be free from obstruction to breathe. Treatment methods for facial injury are covered in the common interventions and investigations section further on.

THE BONES OF THE FACE



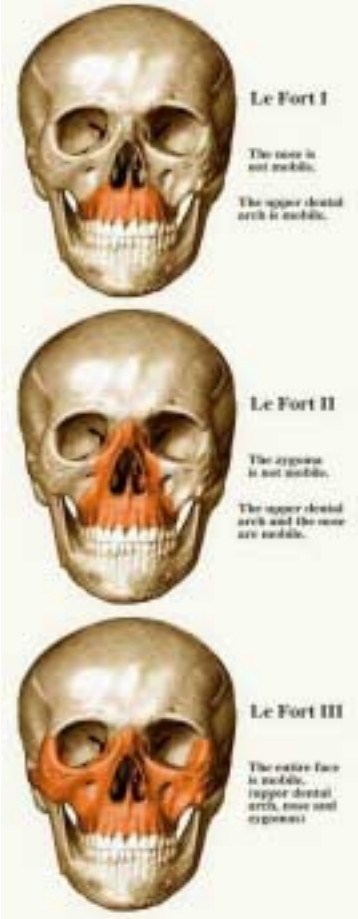
The Maxilla

The two maxillae join to make the upper jaw. They hold all of the upper teeth and form most of the hard palate (the roof of the mouth). They also form the lower part of the orbit (eye cavity) and part of the floor of the nasal cavity.

Injury to the maxilla

Common causes – to break the maxilla requires considerable force. As a result, if either of the maxillae is broken another injury is present in more than half of cases. The maxillae tend to break in specific patterns called LeFort fractures after the French doctor, who described them. He is popularly believed to have dropped cannon balls onto corpses' faces to study the effects. There are three types of LeFort fractures. Pictures of all three are shown below.

Diagnosis, Treatment & Outcome



Patients with this injury commonly complain of malocclusion (top and bottom teeth don't sit together properly), they have lip lacerations or broken teeth, and sometimes the hard palate moves when the doctor assesses it.
Treatment depends on the degree of displacement of the maxilla, the type of break (a straight, well-defined crack or crushed parts of bone) and other findings. Operations may include the application of arch bars or it may require open reduction and internal fixation.

Similar symptoms are found in Lefort II fractures, with pain, double vision and sometimes movement around the nose and eyes.
Treatment is open reduction and internal fixation. This injury is more severe, and is the most frequent of the LeFort fractures. Eye injury may also be present.

Le Fort III is the most severe. It results in a mobile mid-face, meaning that the middle of the face is separated from the rest, and is free to move. There is lots of swelling and bleeding and can compromise breathing.

Treatment is a complicated operation using open reduction and internal fixation, and sometimes the application of arch bars.

All the Le Fort fractures can cause problems with breathing by obstructing the airway. If this occurs, dcotors will protect the airway with a tube going into the trachea (windpipe) through the mouth or neck, so that the patient can get oxygen. If there is no threat to the airway, facial fractures take a low priority for treatment as they can be fixed at a later date with few additional complications.

The zygoma

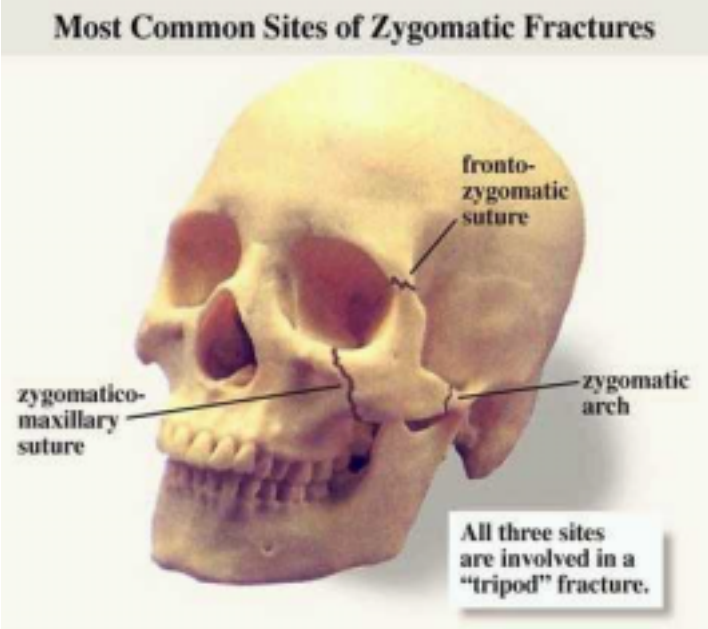
The zygomatic arch makes up the cheekbone on either side. The rest of the zygoma is shaped like a tripod and forms the outer wall of the orbit and joins the skull itself.

Injury to the Zygoma

Common Causes - The zygoma is in a prominent location that increases its risk of injury. It is most commonly injured as a result of assault.

Diagnosis - this is a combination of clinical examination and x-rays. If the patient is tender over the cheekbone with bruising and either swelling or a sunken appearance, the doctor will suspect a fracture. This can be confirmed with either an x-ray or CT.

Treatment - Treatment depends on the exact injury. If the bone is depressed (pushed in), then the patient will need an operation to lift the bone. The most common type of zygomatic injury is shown below. The zygoma breaks in these areas most frequently because these are the areas that are the weakest.



Outcome - As long as there is no associated eye injury or complications, the outcome is good.

The mandible

The mandible is the jaw. It is the largest and strongest bone in the face. It houses the lower teeth and is the major contributor to chewing. It is also the only bone in the face that is able to move.

Injury to the jaw

Common Causes – again assault is the common mechanism of injury.

Diagnosis – this is made by examination of the jaw, along with tests of its movement and assessing the clenching of teeth to establish any differences from normal. X-rays can be taken if suspicion remains post-examination.

Treatment - this is aimed at re-establishing the normal alignment of upper and lower teeth and stabilising the jaw. This may require of arch bars. Severe mandibular fractures may need open reduction and internal fixation.

Outcome - the recovery of most jaw fractures is uncomplicated.

The orbits

The orbits contain the eyeballs and associated muscles, blood vessels and nerves. Seven different bones that join to create the bony eyeball socket.

The roof of the orbit is part of the frontal bone (the forehead) and the sphenoid bones. The roof is thin and slightly rounded, and sits between the eyeball and the brain.

The medial wall is the side of the orbit closest to the nose. This wall is comprised of the maxilla, the sphenoid, the lacrimal bones and the ethmoid bones. This side of the wall is very thin and attaches to the nasal bone (the bone of the nose).

The lateral wall on the other side consists of the zygoma and the sphenoid bone. The floor of the orbit is made up of the maxilla, zygoma and palatine bones.

Common Causes - The orbital walls are quite thin and relatively easy to break. They are commonly fractured in combination with other bones.

Diagnosis - clinical examination must include an assessment of vision even if there is substantial swelling around the eye. The patient may have tenderness, swelling, bruising and a change in normal landmarks of the structures surrounding the eye. X-ray or CT will confirm the injury.

Treatment – a complication of orbital damage is eye injuries. For example, if the orbital floor breaks, the eye and/or one of its muscles may be caught in the fracture. These types of fractures are very difficult to fix and require operation.

Outcome – this is dependent on the severity of injury and any associated eye injury. Patients with an orbital injury will often have an operation and the most have good results.

The nasal bone

A nasal bone on each side of the face forms the bridge of the nose - the rest of the nose is made up of cartilage.

Common Causes

Blunt trauma is the pre-dominant mechanism of injury, with assault again high on list of causes. Falls, car and sporting accidents also account for a number.

Diagnosis – looking at the nose gives the diagnosis. It is swollen, bruised or lacerated, and may be deviated to one side. X-rays are rarely taken until several days have passed.

Treatment – this will depend on what the nose looks like once the swelling has gone down and what the patient thinks of it. If they are happy with the

appearance then no treatment is needed – this is often the case with boxers and footballers as future fractures are likely. If the patient is unhappy with the position then an operation will be done to straighten the bones around 7-10 days after the injury.

Outcome – broken noses are common and do well.

TESTS & INTERVENTIONS FOR PATIENTS WITH FACIAL INJURY

Facial CT scan – this uses x-rays to build up cross-sections of the face from different angles. These pictures show the facial surgeons the exact damage and allow them to decide if an operation is required and then plan it.

This is a photo of one of the CT scanners at Liverpool Hospital.
The patient is put on the table and it moves in and out depending on what needs to be scanned. Any part of the body can be scanned.

X-rays – x-rays of the chest, pelvis and neck are standard in all trauma patients unless only a minor facial injury is found. Facial x-rays will only be taken once any life-threatening injuries have been treated.

Endotracheal Tube – if a patient has a severe facial injury, swelling and bleeding may obstruct the airway threatening breathing. To protect the airway, an endotracheal tube is passed through the mouth into the throat and down the trachea (windpipe). Patients will be unconscious, sedated or anaesthetised for this procedure. Doctors can then assist the patient with breathing.

Tracheostomy – very destructive facial injuries may make insertion of an endotracheal tube by mouth impossible. In these cases a cut is made in the neck, down to the trachea at the Adam's apple and the tube inserted there. This is a life-saving procedure called a crico-thyroidotomy. Tracheostomies are similar but sited lower in the neck. They are put in several days after admission when it becomes clear that the patient will need help with breathing for a long time as endotracheal tubes can only be used for short periods.

Application of Arch Bars - the bars keep the upper and lower teeth in alignment. The bars are wired together so that there is no movement between the teeth. This means that while the bars are in place, the person cannot open their teeth to speak or eat. These people have to drink through straws until the bars are removed which are until the fractures are healed (usually a couple of months).

Open Reduction and Internal Fixation (ORIF) - this method of fixing broken bones can be done almost anywhere on the skeleton. Plates, screws, nails and various other devices are used to fix the fracture.

COMMON QUESTIONS

What happens when the patient leaves hospital?

Follow up with the plastic surgeon is routine. This may involve repeat x-rays to determine how the bones are healing, and if they are healing in alignment. If a patient has had the application of arch bars, removal will be required.

What happens in an emergency if a person has arch bars?

The arch bars are kept in place at all times until the doctor decides it is time for them to be removed. This means that the patient has their jaw wired shut, and is unable to open it. There are some instances where the broken bones take a low priority, and one of those times is in an emergency, for example if the patient is choking. In these instances, a wire cutter (a special medical one) is used to cut the wires, therefore allowing access to the mouth. Even when the person has gone home, they must have the cutters with them at all times to ensure that they are prepared should there be an emergency.

What are the long-term issues with facial injury?

This booklet. Has only dealt with the immediate treatment of facial injuries. Cosmetic and psychological consequences are very important for rehabilitation. Even minor lacerations may result in scarring, and the face is possibly the most visible part of the human body. Although specialist plastic surgeons carry out most of the treatment of facial injury, there are injuries for which the outcome is less than perfect . Whilst in hospital, the social worker makes a concerted effort to review, advise and assist in anyway possible to ensure the psychological aspects of the injury are acknowledged.

BETTER PRACTICE GUIDELINES

Better Practice Guidelines are available on a number of health related issues. These guidelines are compiled with the assistance of expert advice and research on the topics under scrutiny.

There is no current collection of better practice guidelines for the management of facial trauma.

FACILITIES AT LIVERPOOL HOSPITAL

Intensive Care

The Intensive Care Unit consists of 22 beds. Seriously ill patients receive one-to-one nursing. Specialist doctors with expertise in caring for ill patients with complex needs provide the medical care. Patients who have suffered major abdominal trauma may be admitted to this unit for further treatment and monitoring before or after operation.

Ward

The Trauma, Orthopaedics and Plastics ward where most of the patients with abdominal injuries are admitted is on the third floor of the clinical building. The ward has 40 beds, with a staff ratio of one nurse to five patients. The phone number for the ward is (02) 98283103.

Social Worker

Liverpool Hospital has social worker facilities provided throughout the duration of hospital stay. A social worker is alerted to the arrival of a trauma patient in the Emergency Department, and will provide any necessary assistance.

For the rest of the hospital stay, social work cover and help is available in Intensive Care, the ward and the Brain Injury Unit. Social workers will also assist in the completion of Workcover and sick entitlement forms.