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ON

Fractures

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Fractures.

Fracture, or solition of continuity in bone, is generally the result of external violence; or it may be produced by muscular action; which may be followed by inflamation, gangrene, or Erysipelas. Barions appellations have been given, to designate the kind of injury produced. They are transverse, obligue and longitudinal, according to the direction in which the fracture has occured.

A transverse fracture is one, in which the bone is broken acrofs; an obligue fracture is one, in which the bone is broken in an obligue direction; a longitudinal fracture is that, in which the bone is broken in a strait direction, or what is designated by the phrase, Splitting of bone.

Fractures are said to be simple, when the bone is broken and the surrounding soft

parts receive no injury. They are compound, when both the bone and surrounding textures receive an injury, at the same time and place; for a person may receive a fall from such a distance as to produce a fracture, and at the same time the spiculae of bone may produce a wound, of the surrounding muscles. Fractures are comminuted when the bone is crushed into many fragments, and the breaking is not confined to any particular part of the bone; but it is broken in various directions. Those portions of the Skeletons which are most liable to be fractured, are the long bones, while all of the flat bones are least liable to fracture, except those of the cranium; unless the force applied be both direct and severe. The fracture is not always confined to the point that receives the blow, for example,

a concussion applied to the foot may
produce fracture of the Tibia, or the Fibula.
The fragments are generally displaced more
or less; the force that produces the injury
may displace one or both aside, and the
weight of the fractured limb will increase
the displacement to a still greater extent,
if it be elevated or an attempt is made
to put it into motion. But the chief
agents implicated in moveing or displaceing
the fractured bones; are those muscles sur
rounding the injury. Sometimes retraction
of the fragments takes place and elongation
of the part as in transverse fracture of the
patella; though it is most frequently the
case that the fragments overlap eachother,
which causes shortning of the limb.
Sometimes only one fragment is displaced
as in fracture of the clavicle, where the

sternal portion remains in its proper place or nearly so, while the other portion of it passes downwards and forwards.

It is very frequently the case, that both ends of the fractured bone suffer displacement to some extent; as in fracture of the humerus below its bicipital groove, where the upper portion passes in towards the chest, while the lower part is elevated and carried outwards by the deltoid muscle.

The liability to fracture varies with age. The bones of the adult and aged are more liable to be broken, than those of the infant and adolescent from the fact that the proportion of earthy matter is greater in them, than in young subjects. The superficial bones are more subject to fractures, than those that are well protected by the soft parts.

Thus the bones of the cranium are more liable to be injured than the scapula, and the clavicle more so than the ribs.
Certain diseases are predisposing causes of fractures, such as the venereal, cancer, scurvy, scrofula. Dr Lisfranc notices this fact, and Dr Bell mentions two patients laboring under Syphilis, who had the largest and hardest bones completely broken, by the action of the muscles of the limb. Louis mentions the case of a female, who had a cancer in her right breast, that had her thigh bone completely broken, by changeing her posture in bed. Lisfranc says he has met with similar cases, in the Hotel Dieu.
Causes, of fractures, are generally plain and simple, they are external force and muscular action.

Force may be applied in various directions, as in falls blows &c. In some instances the fracture is produced, by muscular action alone; as when the patella, or olecranon is broken during an intense muscular action. Whether, the long bones can be fractured by muscular action alone or not, is an unsettled point according to Mr Cooper.
But there are several cases on record; thus Curet tells us of a case, in a cabin boy aged seventeen, who had his femur broken by making a considerable effort to keep himself from being thrown down by the rolling of the vessel.
Leveille speaks of a case in which the neck of each thigh bone was broken, during a violent spasmodic actions of the muscles of the lower extremities.

Richerand pasitively denies that a long bone, when perfectly healthy can ever be broken by contraction of the muscles. But Mr Cooper says by makeing all due allowances for the inaccuracy of some of the reports made by writers, I think the passibility of the long bones being broken by muscular action is sufficiently proved. The Symptoms of fracture are usually plain, though they are sufficiently complicated at times to puzzle the Surgeon. One of the first Symptoms to be looked for, is deformity of the parts; and the muscular power is almost or entirely lost. A fractured limb is swollen and deformed, and the patient is unable to move it without some assistance. Sometimes the parts are elongated, but generally they are shortened.

Voluntary motion is almost lost, and in many cases the patient cannot move the fractured limb within himself, but very little if at all; though, at the same time its mobility is much increased, and the Surgeon can move it in different directions, and to an extent of which it was previously incapable, and the least examination shows, that the parts are remarkably mobile. Pain is severe and constant at the site of fracture, and is liable to acerbations from twitching of the muscles implicated in the injury; whereby the surrounding parts may be irritated; and if any of the fragments of bone should come in contact with the nerves by pressing on them, the pain will be increased considerably, and may prove to be very severe.

Swelling is sure to occurs, and is of three varieties. The first variety is caused by the displacement of the ends of the bones, which overlap eachother; and the surrounding muscles may become relax^d by the displacement, and by their increased circumference add to the swelling.
The second variety is caused by the extravasation of blood, into the surrounding parts and increases the first variety.
The second variety is followed and modified by an inflammatory action, which commences after the lapse of a few hours, and the surrounding tissues become infiltrated with serum and fibrinous exudation. But the most certain diagnostic sign of fractures, is what is denominated crepitus; that is a sense of rubbing, grateing, and crackling,

which is imparted to the hand and ear,
when the broken fragments are moved
in contact with eachother.
When the fractured ends of the bone
remains in their proper pasition, and
partly in appasition, this crepitus is
easily detected by makeing the least
movement of the parts; and it is
fregruently the case that both Surgeon
and patient, are made sensiable of this
fact. But whenever the fractures are
transverse, and the ends of the bones
are displaced to a considerable extent,
and overlap eachother completely, it
is a difficult matter to detect the
crepitation. Though it may be detected
by first reduceing the parts affected, and
then by makeing the nessessary motion
of the parts, you can get, this peculiar diagnastic sign.

The prognosis of fractures varies with age; the reparative process being much more rapid in the young and healthy subject, than in old and debilitated. The oblique fracture is usually more difficult of cure, than the transverse because the fractured ends of the bone are not so easily kept in apposition with each other. Compound and Comminuted fractures are more hazardous, than the simple Solution of continuity.
A fracture of a long bone in the shaft, is less troublesome than the same kind of injury at the extremities.
Fractures of the cranium, Spine and pelvis are more apt to prove fatal than any others. Some authors say that pregnancy has a tendency to retard the progress of union, while

others think differently. Thus Mr Cooper says he once attended a female who had both the bones of her leg broken, when she was several months advanced in pregnancy, and that it did not seem to be unfavourable to the union of the bones, as she got quite well in the usual time. And he says that the experience of Boyer seems to prove that pregnancy does not retard the union of bones.

While Miller says it is often found, that the pregnant female has a slower union than would otherwise happen; that the nutritive powers of the system are devoted to the uterine functions. The first step in the union of bone is the extravasation of blood around the site of fracture, which is partly coagulated and partly fluid, and it forms a

kind of pouch for the ends of the bone to rest in. This blood is absorbed and there is exudation of plasma, which takes the place of the blood. There has been some dispute as to the source of this plasma. Mr Miller says it is more than likely, that it comes from every tissue implicated in the injury. According to Duhamel it comes from the periosteum; while Haller and Dethleef say it exudes from the extremity of the fractured bone, particularly from the medullary texture, and is then effused all about the fracture. Prof Buchanan says it is an unsettled point from what part it exudes. After the exudation of the plasma takes place it forms a solid mass, and the serous portion is absorbed, while the fibrous part remains and is

converted into organized matter. The period of time at which this plastic exudation takes place is from eight to twelve days. Then the process of organization advances, and the plasma is converted into fibrous tissue. Then this organized mass that is formed contracts by absorption and becomes more dense, until it is gradually converted into bone. That portion of the plasma which is first assified is the most exterior part, then the process gradually advances towards the interior of the bone, and as assification advances the mass becomes more dense until it forms a covering over the ends of the bone, which is called the provisional callus, and which holds the ends of the bone together. The period of time which may elapse after a fracture has been produced, before this provisional callus is

formed is from four to six weeks. After the provisional callus is formed, there is still something for nature to do, the formation of the deffinitive callus then takes place. The deffinite callus is that portion that remains to be formed between the ends of the bone. The period of time at which this will be completed, must not be expected in a few days, for it will require months. Prof Coe says it will require ten months for the process to be completed thoroughly. After this takes place the strength and usefullness of the bone are restored.

The treatment of fractures consists in the fulfillment of three indications. viz. Reduction, Retention, and Prevention. Reduction is the bringing of the fractured ends of the bone together, and this is to be effected by mild and gradual means.

With one hand the Surgeon should grasp the distal extremity of the fractured limb, and gently though determinedly make extension, and at the same time counterextension, and coaptation should be made with the other hand. But at the same time that extension and counterextension are being made, the parts should be placed in such a position as to relax those muscles that are most likely to oppose the reduction. After the reduction is effected the parts are to be retained in that position by the hands of the Surgeon or an assistant, until the retentive apparatus can be applied. Retention is to be effected by the fulfillment of two indications. First by keeping the parts in such a position as to relax those muscles which are concerned in displacing them. Secondly by the

application of such mechanicle means as will prevent motion of the fractured bones. Such means as these are denominated Splints. They are variously constructed, and of various materials; but the same objects are had in view in the construction of them all, viz. to rest lightly upon the parts, and at the same time to prevent motion of the fractured bones. Those constructed of wood, tin, and pasteboard, are most generally used; and they should always be long enough to command the joints near the site of fracture. The splints are to be retained in their proper position by bandages, and they should be applied uniformly not so slack as to admit of any motion, and not so tight as to produce any constriction of the parts. In the application of the first bandage, due allowance should be made for the swelling

which is sure to occur to a certain extent.
They should always be lined with some soft
substance such as cotton, tow, or flannel,
to prevent chafing of the skin.
The splints and bandages having been proper
ly applied the parts should be placed in such
a position as will render the patient most
comfortable, and so as to relax those muscles
which would be most likely to produce
redisplacement. After the fracture has
been properly arranged, the parts should not
be disturbed unless from some cause they
should become displaced, or the bandages
become to slack, then the apparatus should
be reapplied. Prevention is to be effected by
carrying out the principles of retention, by
keeping the parts in their proper position
and preventing motion. The limb
should be placed so as to be favorable to the

return of venous blood, while an oppasite influence is exercised on the arterial. All undue motion of the parts is to be prevented, as it will retard the union of the bone. During the first few days we must be on the watch for inflammatory action, and be ready to prevent it if pasiable. If the skin becomes hot, the face flused, and the pulse quick, blood must be taken from the arm, and if the patient is robust give Antimony. If there is spasm of the muscles give Opium.
At the end of four or five weeks the reten tive apparatus is to be laid aside, but motion of the limb is to be resumed grad ually, for the callus at first is very pliable, undue motion or to much exercise may produce deformity or impair the motion of the limb.