

Broken Collarbone

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Believe it or not, the clavicle is the only true bone connection between the entire arm and the rest of your skeleton. You may wonder how this is possible since your shoulder and arm seem to be directly connected to your body. To understand this better, think of how far your arm and shoulder can move. Think of how you can touch the middle of your back, your toes and the back of your head. Try this yourself and feel your shoulder blade move on your back. Feeling its movement, you can tell it is not attached directly to the chest. It rides both up and down and in and out over the ribs, controlled by an amazing group of muscles.

Now, feel your collarbone (clavicle) as you move. It is attached to the shoulder blade through a small joint near the top outer tip of the blade, just next to where the deltoid muscle (the largest muscle in your shoulder) attaches. If you follow the collarbone with your finger back towards the center of your body, you will find it attaches to the upper part of your sternum. That joint, the sternal-clavicular joint, is the only point where your whole arm attaches to the rest of the skeleton. It's hard to believe! But, because of this single attachment, the arm and shoulder are allowed a good deal of freedom in their movement. Because the shoulder is attached at one point near the middle of the upper chest, to a bone that's shaped like a thin stick, you can touch almost any part of the rest of your body with little difficulty.

Understanding that the shoulder is attached to the body only through the collarbone helps to explain why the clavicle is frequently fractured (broken) when we fall. Its thin, long shape also explains why it fractures with a direct blow, as in a football tackle. Since it is connecting the body and the arm, it can break if the arm is used as protection during a fall. It is also frequently injured during falls off of a bike or motorcycle accidents.

The clavicle typically breaks in the middle. These breaks can be simple (just two pieces with little displacement) or complex (many pieces and/or displaced). They can be closed (not breaking the skin) or open (breaking through the skin). It can also break near either end. When it breaks, the acromioclavicular (AC) joint or supporting ligaments could also be involved. The injury can occur in young children, teenagers and active adults. The location of the fracture, the angulation, the displacement, the skin status and the age of the patient are all important in considering treatment.

Treatment for Clavicle Fractures

In young children, the fracture ends are often close, and there may be a lot of deformity of the bone. In growing children, the bones will heal even with a lot of displacement or angulation. In general, many simple fractures can be treated with a sling until the fracture starts to mend (or as we often say, gets sticky). A lump may appear as it heals. Then some arm movement will be



permitted. When X-rays show good healing, the patient can gradually resume activities. In time, and with proper treatment, the lump of new bone that first appears will remodel itself back to the shape of the smooth bone. When the fracture is more complex or other structures are involved, surgery can be necessary.

Indications for Operative Treatment of Clavicle Fractures

In general, clavicle fractures in children are treated in a sling. However, there are exceptions: fractures that break through the skin (open fractures), fractures that threaten to break the skin by the nature of their sharp bone ends and how much they tent the skin, fractures with muscles trapped between the bone ends and fractures that cause nerve compression. If any of the above is true, the fracture should be surgically repaired. The same is true in adults except adults heal more slowly and less reliably. Also, in children, the fracture “remodels” as the child grows so the deformity we can expect to heal and remodel back to the normal clavicle shape increases with decreasing age. In other words, the younger the child the more deformity we can accept for an excellent outcome.

There are a few additional considerations for adult patients. One significant factor is the shortening of the fracture. “Shortening” means that the bone is overlapped more than 2 cm or is 2 cm shorter than normal. In those cases, it should be fixed. Other doctors would add that if it is angulated more than 45 degrees, and, if the shortening is in the dominant arm or in a throwing athlete, no more than 1 cm of shortening can be accepted. In any case, patients with deformity, muscle trapped between the fragments or the other factors noted already also require an open reduction and internal fixation.

Fractures near the acromioclavicular (AC) joint or the outer end of the clavicle may require special care. The fractures that are lateral (away from the neck) to the coracoclavicular ligaments seem to heal well if the ligaments are intact. If the ligaments are torn or the fracture is medial (closer to the neck) to at least one of the two coraco-clavicular alignments, there is a high rate of non-healing (or non-union). These need to be fixed, and if the lateral fragment is small, the challenge is to hold them in place until they heal. Some of these fragments are small and involve the AC joint. When that occurs and the ligaments are torn, removing the fragments and reconstructing the ligaments may be the only viable choice. Newer plates were invented in an effort to solve this complex problem with better results. Once the fracture heals, this special plate may be removed. The distal (most lateral) fractures in children may be growth plate injuries and also need to be fixed.

Fractures of the mid-third of the clavicle do well with non-operative treatment, except for those in which the fracture is displaced posteriorly. That type of fracture can place pressure on major blood vessels and nerves that are just behind the clavicle in this location. In those cases, an open reduction and fixation are needed.



Excerpt on Clavicle Fractures

Clavicle Fractures

After much discussion over the past three decades about the best way to treat clavicle fractures, a study published in the Sept. 4 issue of the Journal of Bone & Joint Surgery compared nonsurgical treatment, open reduction and plate fixation for midshaft displaced clavicle fractures. As reported in a prior newsletter, in a good evidence-based article by: C.M. Robinson, FRCSEd(Tr&Orth); et al.: Open Reduction and Plate Fixation versus Non-operative Treatment for Displaced Midshaft Clavicular Fractures: A Multicenter, Randomized, Controlled Trial: J Bone Joint Surg Am, 2013 Sep 04;95(17):1576-1584 goes a long way to answer this question.

According to the results of this study, improved outcomes and reduced rate of nonunion after acute displaced, midshaft clavicle fractures was associated with internal fixation using plates. It is important to note that after excluding nonunions from analysis, the authors found no significant differences in DASH or Constant scores at any time point during the study period. The implication of this finding was nonunion (the failure of healing) was the prime driver of the poor outcomes and 16 times more likely in the nonrepaired group. The results for displaced mid shaft fractures are therefore improved when the bone is fixed with a plate (preferably earlier, within two weeks of the injury) and the complications of a non-union can be avoided.