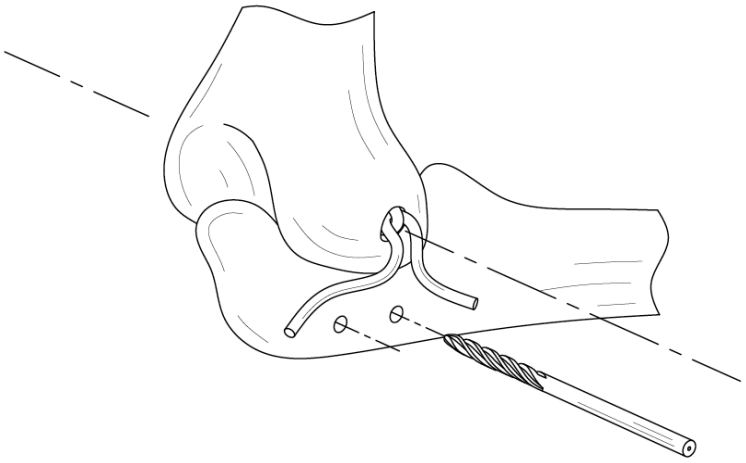
New paradigm for treatment of comminuted distal humerus fractures

Fractures of the distal humerus represent therapeutic challenges even for experienced orthopaedic surgeons. The most common surgical option represents open reduction with double plate osteosynthesis. The most frequent approach employs an osteotomy of the proximal ulna with its inherent complications. Even this extensive effort produces poor results in comminuted fractures of weakened bone.

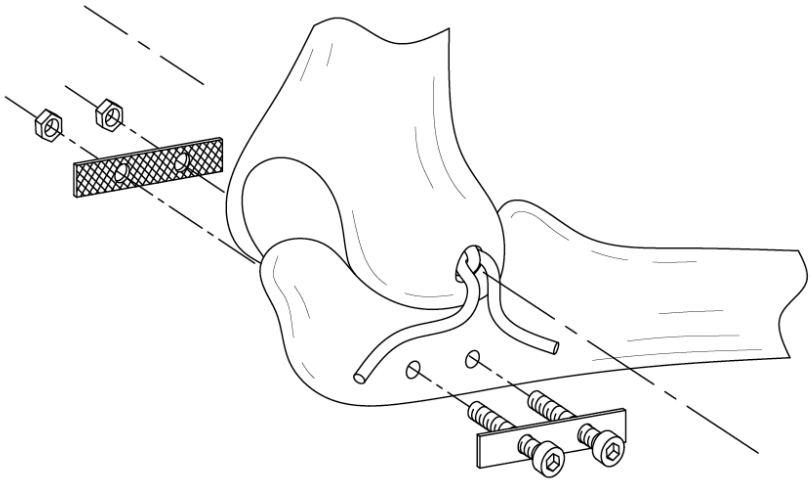
Acute fractures of the distal humerus represent potential candidates for the Kaufmann Total Elbow (KTE). It is best to allow these patients to heal without surgery and, perhaps, encourage reasonable alignment with a long-arm hanging cast. This method of fracture treatment will impart a gentle traction force on to the distal humerus due to the weight of gravity acting on the elbow. The elbow healing response is often quite vigorous and range of motion is encouraged after early fracture consolidation is seen radiographically. Once the fracture has healed, the elbow will either function in a reasonable manner or it will not. If significant pain and decreased motion is noted, then this elbow is ideal for successful implantation given that sufficient bone stock should be present given that the healing environment has not been disturbed. Waiting for the fracture to heal also allows for the soft tissue envelope, itself initially traumatized, to recover, which will create a more favorable soft tissue healing environment. Perhaps most importantly, patients have the ability to use their injured elbow and see if it really bothers them enough to even want a total or partial elbow replacement.

It is imperative that sufficient humerus bone stock be present prior to surgery. The KTE requires secure intramedullary purchase of threads in bone and an ability for bone to heal around the implant. In particular, the medial and lateral epicondyle must have healed enough to ensure that the ligament will be compressed against living bone so that it has a chance to incorporate. Only then can the ligament reconstruction be relied upon to successfully transfer forces between the humerus and ulna. In patients who exhibit very frail bone, this implant should be avoided.

In certain instances it may be advantageous to not replace the proximal ulna articulating surface and only replace the distal humerus. The distal humerus component then acts as a hemi arthroplasty. The cross locking screw holes can be drilled into the olecranon to secure the ligament reconstruction limbs even if the ulnar body component has not been placed.

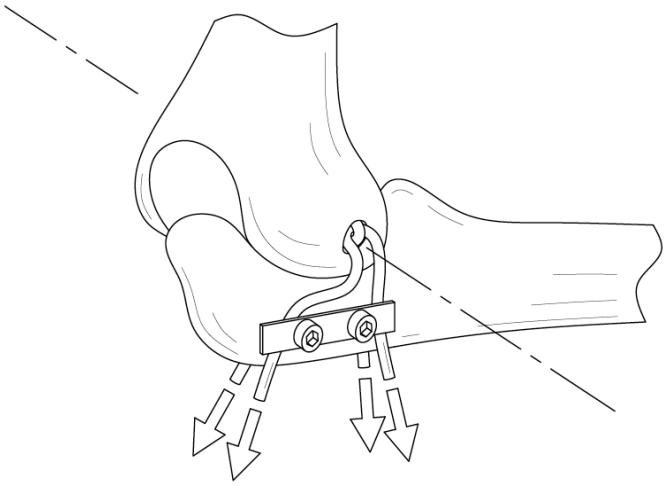


Drill holes are made in the ulna for the screws that will hold the cross locking plates. When ligaments are reconstructed but the joint is not resurfaced then the drill holes can be placed free hand. A drill hole is placed just proximal to the sublime tubercle on the medial side and the supinator crest on the lateral side. The more distal cross locking screw will traverse between these two holes. The more proximal cross locking drill hole can be placed using the cross locking plate as a guide.



Here are the cross locking screws being passed across the ulna in order to secure the cross locking screw plates. The ligament reconstruction limbs are placed under the cross locking plates with one limb just distal to the distal cross

locking screw and one limb proximal or between the proximal cross locking screw.



A hemi arthroplasty that replaces only the bone that is damaged may be considered for the management of severely comminuted distal humerus fractures.