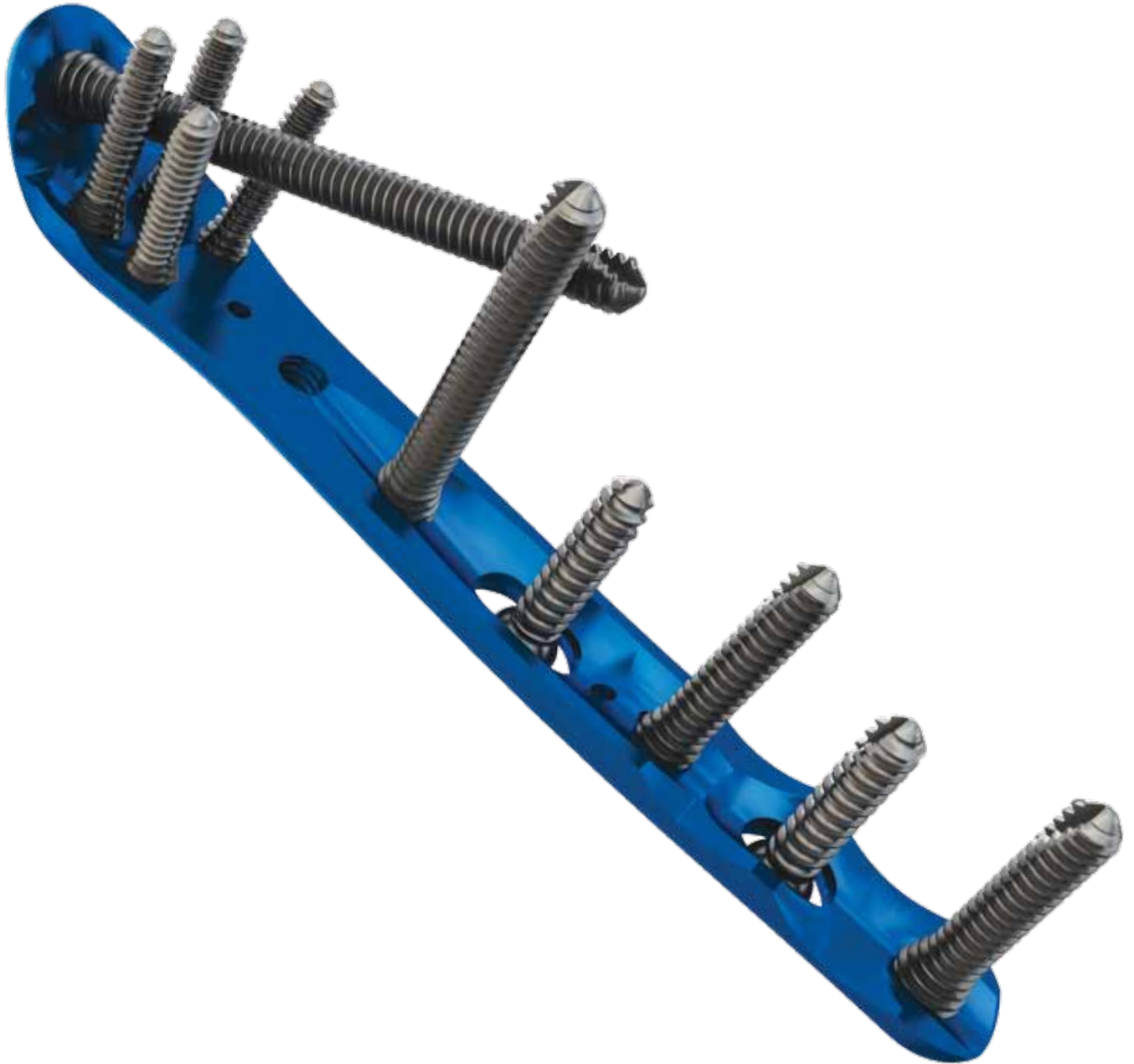


Case Study: Fixation of Open Olecranon Fracture

Treated with the Acumed® Elbow Plating System



Case Study: Elbow Plating System: Locking Olecranon Plate

Indication: Open Olecranon Fracture

Product: Locking Olecranon Plate and 18-Gauge Stainless Steel Wire

Surgeon: Gregory D. Gramstad, M.D.

History

Patient is an 84 year old female with a history of rheumatoid arthritis who sustained a ground-level fall, tripping over a curb and landing on her elbow, resulting in a left elbow open olecranon fracture. In addition to the 1cm open wound, there were multiple tears of her fragile skin in the region of planned operation. Significant past medical history includes rheumatoid arthritis currently on Imuran, Methotrexate and Prednisone.

Examination and Preoperative Treatment

Initial treatment, on admission to the Emergency Department, included broad-spectrum prophylactic antibiotics and a tetanus booster. An irrigation and debridement of the open fracture was undertaken on the evening of injury. The traumatized skin was cleansed and dressed. Secondary to the open fracture, her compromised skin envelope and her use of immunosuppressive medications, definitive fixation was planned for three weeks later, pending appropriate soft tissue recovery. The open wound was allowed to heal by secondary intention without closure, as it was located off the radial subcutaneous border of the olecranon with soft tissue coverage of the bone by the anconeus muscle. The skin tears were treated with dressing changes. Prophylactic antibiotics were used for five days post debridement. During this time, the elbow was placed in a removable splint for wound management purposes. Her Imuran and Methotrexate were held, after consulting with her rheumatologist, to aid in wound healing.

Operative Treatment

At three weeks post-injury, the skin had recovered uneventfully and there were no signs of infection. Delayed fixation of the fracture was performed through a standard dorsal approach. Subacute granulation tissue was excised and the fracture margins were clearly identified. The non-comminuted dorsal aspect of the fracture was used to judge fracture reduction and reduction was confirmed with fluoroscopy. Once reduction was achieved, an Acumed Olecranon Plate was used to fix the fracture. This plate was chosen for its ability to provide multiple points of divergent locking fixation in the small osteopenic proximal olecranon fragment. Despite solid fixation after placement of the "home-run screw" from proximal to distal, into the better bone of the coronoid, there was still a concern of delayed loss of reduction during rehabilitation, secondary to her extreme osteopenia. Therefore, an 18-gauge wire was used in a cerclage fashion to support the fracture fixation. It was passed under the triceps just proximal to the plate and again distally under the plate in figure-eight fashion. This provided excellent and stable fixation. The marginal impaction was not elevated secondary to the delayed treatment. The risk of generating loose articular fragments was deemed to be greater than the risk of non-anatomic articular surface reduction in this area of the olecranon, as long as the anatomic arc of the greater sigmoid notch could be restored. The locking drill guide was used to direct the path of the nonlocking "home-run screw" safely away from the articular surface of the trochlea in this instance.

Discussion

This plate was chosen for its low-profile and ability to provide multiple points of divergent locking screw fixation in the patient's small and osteopenic proximal olecranon fragment. The proximal screws are positioned in such a way as to minimize the risk of articular surface penetration when the locking drill guides are used. They allow for the unimpeded placement of the very important proximal to distal "home-run screw" which attains distal cortical purchase in the typically good bone of the coronoid process of the ulna. This screw can be placed in locking or nonlocking fashion and, when the locking drill guide is used, is directed safely away from the articular surfaces of the ulno-trochlear joint along the subchondral bone. The proximal spikes on the plate provide the ability to achieve compression through the plate without "strangulating" the underlying triceps. When extreme osteopenia and/or a very small proximal fragment is encountered, as in this case, supplemental fixation can be improved by using the plate and screws as fixation points for a cerclage wire, negating the need for Kirschner wires or treatment with fragment excision.

Follow-up

At six-week follow-up, the patient's range of motion is 10-100 degrees. Because of her delay to definitive surgery, triceps contracture had occurred and flexion past 90 degrees was tight with increasing displacement forces across the fracture with further flexion. After initial splinting for soft-tissue healing, a locking hinged elbow brace was used to prevent flexion past 90 degrees for the first six weeks. The strength of the fixation has been demonstrated by the maintenance of reduction despite non-compliance with brace wear. Radiographs demonstrate early consolidation across the fracture site. A static progressive splint was recommended at six weeks, which the patient deferred at this time.

X-Rays

