

## TREATMENT OF FRACTURES OF THE DISTAL HUMERUS

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**Annotation.** Treating distal humerus fractures, especially those involving complex technically demanding. Although there still exist many controversial issues, the goal of treatment is to establish anatomical stable fixation by restoring the two columns and the articular surface. Universally, a posterior midline incision is applied, and the approach varies according to the further management of the triceps or olecranon

**Key words:** humerus, articular surface fracture fixation, restoration, methods.

## ЛЕЧЕНИЯ ПЕРЕЛОМОВ ДИСТАЛЬНОГО ОТДЕЛА ПЛЕЧЕВОЙ КОСТИ

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**Аннотация.** Лечение переломов дистального отдела плечевой кости является технически сложным. Хотя до сих пор существует много спорных вопросов, целью лечения является установление анатомически стабильной фиксации путем восстановления двух колонн и суставной поверхности. Обычно применяется задний срединный разрез, и доступ варьируется в зависимости от дальнейшего лечения трицепса или локтевого отростка. Доказательства подтверждают, что фиксация двумя пластинами является оптимальным методом фиксации, и споры относительно соответствующей конфигурации пластин все еще продолжаются.

**Ключевые слова :** плечевая кость, суставная поверхность, фиксация перелома, восстановление, методы.

Fractures of the distal humerus in adults are considered complex due to a combination of anatomical and therapeutic difficulties, adverse outcomes and complications. The estimated incidence in adults is 5.7 per 100,000 people per year, which is less than 7% of fractures in adults [ 1 , 2 ]. These fractures have a bimodal distribution with an early peak in young men due to high-energy injury and a late peak in older men due to low-energy injury. Despite great success in the treatment of fractures of the distal humerus, there are many controversial issues, including optimal surgical access, fixation method, implants and treatment of the ulnar nerve. This article discusses the strategy of open reposition and internal fixation of intra-articular fractures of the distal humerus.

#### Preoperative plan

It is necessary to conduct a full review of the anamnesis, including the mechanism of injury and the state of health before the injury. You should carefully monitor the condition of the skin or the presence of open wounds. Before surgery, the function of the nerve (especially the ulnar and radial nerves) and the condition of the vessels, including the peripheral pulse, should be evaluated. For imaging studies, conventional

radiography is usually sufficient to make a diagnosis and determine a treatment plan. Computed tomography is useful for understanding the fracture pattern, especially if damage to the coronary plane is suspected, such as a shear fracture of the head and block.

#### Basic Settings

Surgical treatment of a fracture of the distal humerus often requires a long operation. Lying on your stomach or on your side is recommended for good visualization of the lesion and because it makes it easy to position the C-arc. All pressure points should be carefully closed to avoid nerve compression and wound formation due to the long operation time. A universal posterior median incision is performed when the fracture affects the condyle and the surrounding area. The introduction of Marcaine with adrenaline promotes hemostasis during exposure. The full-layered medial and lateral cutaneous fascial flaps are lifted to avoid skin devascularization and seroma formation. In the case of osteotomy of the ulnar process, the incision should bend around the lateral side of the ulnar process in order to facilitate hardware coverage and avoid direct irritation, which may lead to the formation of a hematoma or skin problems in the future.

#### Operational approaches

##### Paratricidal approach

The dissection is continued to the medial and lateral borders of the triceps. The triceps muscle is separated from the posterior surface of the intermuscular septum. On the lateral side, the radial nerve passing posterior through the intermuscular septum is identified. After lifting the triceps muscle above the periosteum and its medial reflection, the posterolateral shaft of the humerus is exposed. Then the ulnar muscle together with the triceps is lifted to preserve its innervation and blood supply. With medial exposure, the ulnar nerve is first identified and exposed. Medial dissection along the posterior edge of the intermuscular septum exposes the posteromedial part of the distal humerus. Visualization of the entire posterior humerus is possible after mobilization and lifting of the triceps muscle from the posterior cortex of the humerus. Since this approach spares the elbow and extensor mechanism and avoids osteotomy of the ulnar process, the operation time is shortened, thereby reducing the risk of perioperative or postoperative complications.[3- 4]. This approach is usually adequate for extra-articular fractures and allows articular reposition of C1 and C2 fractures with large medial and supracondylar fragments. However, in the case of an intra-articular multifragmental (C3) fracture, further exposure is required by osteotomy of the ulnar process. This approach can be transformed into a more extensive exposure with or without osteotomy of the ulnar process during the procedure [5].

##### Triceps-Reflective Approach (Brian-Morris)

The importance of this approach lies in the fact that the triceps tendon, the fascia of the forearm and the periosteum are released as a whole from the medial to the lateral in the form of a continuous sleeve reflecting directly from the ulnar process. Proximally, the entire extensor mechanism and the posterior capsule are reflected and withdrawn laterally to expose the joint. Since the triceps is diverted laterally, careful monitoring of the ulnar nerve is required to avoid traction damage. This approach was originally introduced for endoprosthetics. After fixing the fracture, the triceps tendon is reattached to the ulnar process by drilling two cruciform holes. Also, the patient should avoid

active extension of the elbow joint with resistance for six weeks. As long as the extensor mechanisms are tightly fixed, there will be no extensor mechanisms.[6].

#### Conclusion

The decision to treat fractures of the distal humerus should be based on a combination of the best available evidence and the surgeon's preferences. If these principles are observed during the procedure, the overall results of treatment of intra-articular fractures are generally quite satisfactory. In addition, the early stability achieved by surgery can lead to excellent results of early intensive rehabilitation to restore movement in the elbow joint.

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