



EXAMINATION ON THE USE OF LOCKING PLATES IN THE TREATMENT OF ADULT SCAPULAR FRACTURES AT MAYO HOSPITAL, LAHORE

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ABSTRACT:

INTRODUCTION: A scapular fracture is a break in one or more of the scapula's bones (shoulder blade). These fractures may arise from a fall onto an extended arm or a direct blow to the shoulder. Scapular fracture symptoms might include shoulder discomfort and swelling, arm pain and stiffness, and shoulder blade deformity. A scapular fracture is often treated with physical therapy to restore strength and range of motion as well as immobilization of the shoulder in a sling or brace to enable the bone to heal. In this study, the functional outcomes of the displaced scapular neck, glenoid, and body fractures fixed internally with locking plates and open reduction were evaluated.

METHODS: In this study, locking plates were used to treat 10 scapular fracture patients (neck, glenoid, and body) at the Mayo Hospital in Lahore, Pakistan, whose ages ranged from 18 to 60. The functional outcome was evaluated with the constant-Murley scoring method.

RESULTS: The current research comprised a total of 10 participants. The patients were 44.9 ± 11.06 years old on average. Patients who were men (80%) outnumbered patients who were women (20%). The most frequent cause of injury (80%) was a motor vehicle collision. Neck and scapula body fractures (90%) were the most prevalent fracture type. Using the Constant and Murley scoring method, shoulder function was evaluated. Eighty percent of the patients had a good function, ten percent had an outstanding function, and ten percent had a fair function.

CONCLUSION: ORIF with a locking plate results in satisfactory functional outcomes for displaced scapular fractures. Usually, patients can restore shoulder strength and range of motion and resume their



regular activities. It is crucial to keep in mind that rehabilitation might take many months, and that physical therapy is often necessary to aid in regaining full function.

KEYWORDS: scapular fracture, treatment, locking plates

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INTRODUCTION: Scapular fractures are generally infrequent, making up between 0.4% and 1% of all fractures and between 3 and 5% of fractures of the upper extremities [1,2]. High-energy trauma is often the cause of scapular fractures [3]. The causes of all scapular fractures range from body and neck fractures, 62% to 98% of the time [4,5,6]. The majority of scapular fractures may be managed conservatively [7,8], however conservative management of severely displaced fractures can result in shoulder joint dysfunction, persistent discomfort, and other issues [9,10,12]. 20% of extra-articular scapular fracture patients had poor functional results with conservative therapy, 25% had a radiographic scapular deformity, and 12% had discomfort [12,13].

The function of the arm is significantly influenced by the scapula. It fits comfortably on the ribs and supports the upper extremities against the thorax. It also connects the upper extremities to the axial bone via the glenoid, clavicle, acromioclavicular joint, and sternoclavicular joint. Scapula fractures are uncommon; they account for 0.4% to 1% of all fractures and are present in between 3% and 5% of shoulder girdle injuries [14-18]. The scapula may have a low incidence of scapular fractures because of its thicker margins, high degree of movement during recoil, and position between layers of muscle. Patients with scapula fractures often range in age from 35 to 45.

Rare fractures of the shoulder girdle known as scapula fractures have been linked to high-energy trauma, concomitant lung or brain damage, and higher injury severity ratings [19]. Plain radiographs may be used for diagnosis. The comprehension of surgical planning and fracture geometry are both aided by CT imaging. Usually, treatment is conservative and involves immobilizing the shoulder. For misplaced

scapular neck fractures, intra-articular fractures, body fractures, exposed fractures, and fractures linked to unstable glenohumeral joints, surgery is advised.

Some scapular fracture patterns have inferior clinical outcomes with nonoperative therapy due to greater fracture displacement and angulation [20,21]. Because scapular fractures don't happen very often and there aren't many cases where internal fixation is indicated by the evidence, osteosynthesis is often achieved with non-anatomical-specific plating. The use of reconstruction plates, miniature or micro fragment plates and screws, tension bands, and wire fixation are all examples of fixation techniques. The incidence of hardware removal with various fixation techniques may reach 7.1% due to implant-related pain or failure [22,23].

METHODS: In the current research, patients with scapula fractures were operated on and given locking plates at the Mayo Hospital in Aurangabad's Department of Orthopedics. The research was done from January 2016 to December 2022.

CRITERIA FOR EXCLUSION: The following patients were excluded from the study.

- a. Patients with pathological fractures, old fractures, open fractures, and acute infections
- b. Unwilling to contribute or follow up; uninterested in doing so.
- c. For further medical reasons, patients were treated conservatively.
- d. Delayed and non-union union.

SELECTION CRITERIA: Patients between the ages of 18 and 60 who have closed, acute, glenoid, displaced scapular neck, and body fractures are surgical candidates.

Each patient signed a written statement of informed consent. A thorough history was taken, along with a clinical examination, regular testing, and a pre-anesthetic check. Scapular

true AP, scapular Y, and axillary lateral views were captured on film. For improved fracture geometry comprehension and surgical planning, a 3D CT scan was performed. Three conditions—a misplaced scapula neck fracture with more than 40 degrees of angulation or a 1 cm translation, an articular surface step-off or large gap measuring more than 5mm, and a floating shoulder—were indications for surgery. Under general anesthesia, all patients had surgery using a modified posterior technique to expose all of the fracture sites. Fracture fixation was accomplished using 3.5 mm and 2.4 mm locking plates. Diagram illustrating the steps involved in treating a displaced glenoid, neck, and scapula body fracture. A Schanz pin is first inserted into the scapula's body to begin the reduction process. Next, the length of the scapula's lateral border is adjusted by pulling it caudally during the traction phase. A pointed clamp is used to reduce the scapula's medium border after two holes with a 2.5-mm drill bit are produced on each side of the border. To accomplish reduction, the glenoid component is finally pulled medially using a bone hook. Provisional k-wires or mini plates are used to sustain fracture reduction.

All patients received the usual postoperative treatment. Following surgery, every patient was placed in a universal shoulder immobilizer. X-rays were performed after surgery to evaluate the degree of fracture reduction. Beginning on

the third postoperative day, pendular exercises and aided, passive, and active motions were introduced. After two weeks, rotational exercises were initiated. Using the Constant and Murley grading method, the shoulder's function was evaluated at four months. The follow-up lasted for four months. Descriptive statistics were used in the data collection and statistical analysis. The quantitative data were summarized by average and standard deviation, whereas the categorical variables were reported in percentages.

RESULTS: In the current investigation, a total of 10 patients were included. Among the three patients, two were between the ages of 31 and 40, and one was under the age of 30. There were 4 patients in the 41–50 age range. 3 patients remained, and they were in the 51–60 age group. Patient ages ranged from 44.9 to 11.06 years on average. Men made up 80% of the patient population, compared to women's 20% (Table 1). The most frequent cause of injury was a traffic collision (Table 2). Neck and scapula body fractures (90%) were the most prevalent fracture type. Glenoid and neck scapula was present in 1 patient (10%). Constant and Murley's grading method was used to evaluate the shoulder's function (Table 3). Eight (80%) of the patients had a good function, followed by ten (%) patients with outstanding function, and ten (%) patients with fair performance.

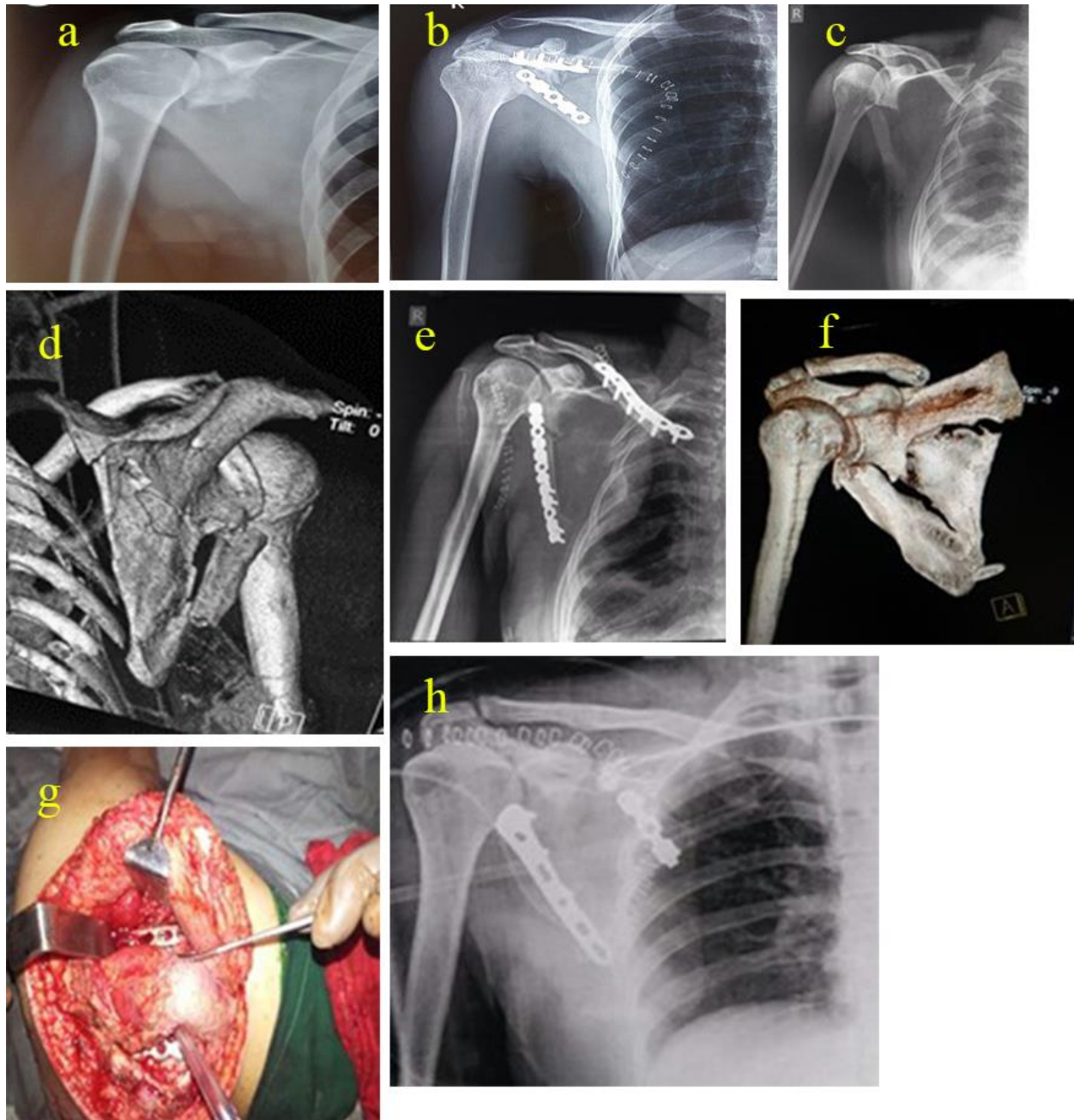


Figure 1: Complete operative procedure (a): Before operation X-ray, (b): After operation X-ray, (c): Before operation X-ray, (d): CT scan before the operation, (e): After operation X-ray, (f): CT scan before the operation, (g): During operation, (h): After operation X-ray

Table 1: The patients' age range distribution

Age	N (%)
≤ 30	1 (10%)
31-40	2 (20%)
41-50	4 (40%)
51-60	3 (30%)

Mean±SD	44.9±11.06
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Table 2: Patient percentage based on gender

Gender	Female	Male	Total
N (%)	2 (20%)	8 (80%)	10 (100%)

Table 3: Patient distribution according to kind of fracture

Type of Fracture	N(%)
Glenoid & Neck	1 (10%)
Neck & Body	9 (90%)
Total	10 (100%)

Table 4: Patient distribution based on the constant Murley score

Score	Range	No. of patients
Poor	[00-70]	0 (0%)
Fair	[70—79]	1 (10%)
Good	[80—89]	8 (80%)
Excellent	[100—90]	1 (10%)
Mean±SD		84.4±4.86

Table 5: Patient distribution based on complications

Complications	N (%)
No complication	9 (90%)
Stiffness	1 (10%)

Both malunion and nonunion at the operative site were absent. (Table 4) Stiffness was seen in one patient who had a neck and glenoid fracture. 9 patients, however, were trouble-free. No implant in our series failed (Table 5).

DISCUSSIONS: Scapular fractures are still difficult to treat. Although conservative treatment may successfully treat most of the scapula fractures, it's important to not pass up the chance to properly advise surgical surgery in some circumstances. Scapula fractures are rare and usually occur as a result of high-energy trauma [24,25]. The five regions of the scapula where fractures may occur include the coracoid, acromion, glenoid, and scapular body (50 to 60 percent of patients), as well as the scapular neck (25 percent of patients). Even for seasoned surgeons, treatment might be difficult

due to the unfavorable scapular anatomy and the difficulty of the fracture repair strategy. Regarding surgical reasons and the appropriateness of therapy, there is much debate in the literature. Treatment for scapula fractures has seen significant modification during the last 10 years. A scapular malunion may seriously compromise the function of the scapula, resulting in persistent discomfort, cosmetic deformity, impingement, and scapulothoracic dyskinesia, even though the scapula has a specialized muscular sheath that accidentally repairs most fractures. [26,27]. The distal radius T-type plate, the calcaneus distorted plate, the 3.5-mm locking plate, and the microplate are the common internal fixations for highly displaced, unstable fractures of the scapular body and neck [28,29].



According to earlier research, this kind of fracture may be treated with lateral and medial border fixation and several plates to provide adequate shoulder function [30]. In research comparing the application of single lateral and medial-lateral plates for the management of fracture scapula, single lateral plate therapy was shown to provide satisfactory clinical outcomes with reduced blood loss and plate-related problems. [31] Another study found that the anatomic sites of internal fixation are made up of rather a thick sclerotin along the lateral border of the scapulae, the scapular neck, and the base of the scapula spine. [32,33] The Constant-Murley scoring system was used in the current investigation to evaluate shoulder function. 8 (90%) patients had a good function, 1 (10%) patient had a medium function, and 1 (10%) patient had an excellent function. In this respect, the researchers analyzed the results in 20 individuals who had scapular fractures. [34]. According to the Constant-Murley score, this revealed that one patient had a bad result, four patients had average results, two had acceptable results, and thirteen patients had extraordinary results.[35].

While the results of 15 patients were shown in another investigation. 13 of the 3 outcomes were positive, 1 was balanced, and 1 was negative.

CONCLUSIONS:A surgical method called open reduction and internal fixation (ORIF) with a locking plate is used to repair misplaced scapular fractures. It entails creating an incision to access the fracture, decreasing the broken bone pieces into their correct positions, and fastening the plate into place. This course of therapy is linked to positive functional results, quick mobilization, and high levels of patient satisfaction.

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