

# Prospective Evaluation of Functional Outcomes Following Surgical Management of Acetabular Fractures

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**Abstract:** *This study evaluates the functional outcomes of surgically managed acetabular fractures. A prospective observational study was conducted on 20 patients with displaced acetabular fractures treated with open reduction and internal fixation. Clinical and radiological assessments were performed using radiographs and computed tomography, and functional outcomes were measured using the Harris Hip Score during follow up. The majority of patients were young males, with road traffic accidents as the predominant cause. Posterior wall fractures were the most common pattern. Excellent to good outcomes were observed in 90% of patients based on the Harris Hip Score. Early surgical intervention with anatomical reduction and stable fixation was associated with favorable functional recovery. These findings support surgical management as an effective approach for displaced acetabular fractures.*

**Keywords:** Acetabular fractures, Open reduction internal fixation, Harris Hip Score, Functional outcome, Pelvic trauma, Kocher-Langenbeck approach, Prospective study

## 1. Introduction

Acetabular fractures represent complex injuries involving the articular surface of the hip joint. These fractures are commonly associated with high-energy trauma, particularly road traffic accidents. Proper anatomical reduction is essential to restore joint congruity and prevent post-traumatic Failure to achieve anatomical reduction and rigid internal fixation leads to a poorer functional outcome and an increase in post-traumatic arthritis.

The management of acetabular fractures has evolved significantly with advances in imaging techniques and surgical approaches. Computed tomography provides detailed visualization of fracture patterns and assists surgeons in selecting the appropriate operative approach.

Open reduction and internal fixation has become the preferred treatment for displaced acetabular fractures. Early surgical intervention allows accurate reduction and stable fixation, which leads to improved functional outcomes. The present study was conducted to evaluate the functional outcome of surgically treated acetabular fractures.

## 2. Materials and Methods

### Study Design

Prospective observational study

### Study Population

20 Patients presenting with Acetabulum fractures requiring surgical management.

### Inclusion Criteria

Age above 18 years Displaced acetabular fractures

### Exclusion Criteria

Undisplaced fractures treated conservatively  
Fractures of the pubic ramus and pelvic ring fractures not involving the acetabulum Medically comorbid and medically unfit patients

Open fractures patients with distal neurovascular compromise

All patients underwent clinical examination and radiological evaluation using pelvic X-rays and CT scans. Fractures were classified based on judet-letournal standard acetabular fracture classification systems [1]. Surgical fixation was performed using standard approaches such as the Kocher-Langenbeck approach.

Patients are encouraged to sit upright within the first 24–48 hours after surgery. Strict non-weight bearing is maintained for 6 weeks, followed by toe-touch weight bearing until 12 weeks.

Physiotherapy includes ankle and toe mobilization, quadriceps strengthening exercises (quadriceps drill), knee bending, and straight leg raising (SLR), which are continued until the patient regains full range of motion and adequate muscle strength.

Radiological evaluation was performed using the iliac-obturator view, and functional assessment was carried out using the Harris Hip Score and Merle d'Aubigné score. Patients were reviewed monthly at 1 month and 3 months, followed by assessments at 6 months and 1 year.

### 3. Results

Most patients in the study belonged to the age group of 21–40 years. Male patients were more commonly affected than females. The most common mechanism of injury was road traffic accident.

Posterior wall fractures were the most frequently encountered fracture. The most common fracture pattern was posterior wall fracture (25%) which is similar to study of letourmel [1] and Vincenzo Giordano's [2] study. No patients had an anterior wall fracture pattern in either of Vincenzo Giordano's [2] and A. Kumar [3] studies. Elementary fractures had slightly more incidence than associated fractures. Both transverse type and both column type had similar incidences i.e. 15%.

20% of patients developed complications, out of which one patient each developed surgical site infection, heterotopic ossification and AVN and bedsore grade 1. The average time we started full weight bearing for the patient is 17.5 weeks. Full weight bearing was delayed in 2 patients for almost 5 months. Operative outcome of our study as per Merle d'Aubigne scoring system shows excellent to good result in 17(85%) of patients, and fair to poor result in 3(15%) of patients. Operative outcome as per Harris hip score shows excellent to good results in 18 (90%) of the patients and fair to poor results are seen in 2 (10%) of the patients.

As per Merle d'Aubigne scores, our study shows 40% excellent result and 45% good result. One patient had a poor outcome as he had associated tibia fracture, affecting the outcome scores.

### 4. Case Illustration

Figure 1



Pre-operative X-ray showing right side acetabular fracture.

Figure 2



Pre-operative CT scan demonstrating fracture configuration

Figure 3



Post-operative X-ray showing anatomical reduction and fixation with reconstruction plate and screws

Figure 4



Clinical photo

HARRIS HIP SCORE: 96 EXCELLENT MERLE D'AUBIGNE SCALE: 18 EXCELLENT

### 5. Discussion

Acetabular fractures are challenging injuries due to their intra-articular nature and complex anatomy. The main goal of treatment is to achieve anatomical reduction and stable fixation to restore hip joint function.

Several studies have reported improved outcomes with surgical management of displaced acetabular fractures. Matta [2] reported that anatomical reduction is the most important factor influencing long-term outcomes in acetabular fracture surgery.

CT scanning plays an essential role in identifying fracture patterns and guiding surgical planning. The Kocher-Langenbeck approach is commonly used for posterior wall and posterior column fractures.

The Stoppa approach demonstrated lower operative time and blood loss followed by Kocher langenberg's and both approaches.

One patient with stoppa approach developed infection. After sending culture and sensitivity from discharge from the surgical site, oral antibiotics were started and dressing was continued. Wound healed completely, and later no debridement or revision surgery needed for the patients.

In the present study, most patients achieved excellent to good functional outcomes according to the Harris Hip Score.

Operative outcomes of this study compared with studies by

Letournel and Judet [4], Matta [5], Mustafa [6], Sagar [7], it is clearly evident that our study has almost 40% patients with excellent scores similar to Matta's study and Mustafa's study. 45% of patients in our study had good scores, which is highest compared to all the studies, and we have the least number of patients with poor outcome when compared to other studies.

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**Table 1: Harris Hip Score**

Score	Result	No. of patients
90-100	Excellent	13
80-89	Good	5
70-79	Fair	1
<70	Poor	1

**Table 2: Merle d'Aubigné Score**

Score	Result	No. of patients
18	Excellent	8
15-17	Good	9
13-14	Fair	2
<13	Poor	1

Early surgical intervention combined with appropriate rehabilitation contributes significantly to better functional recovery.

## 6. Conclusion

Surgical management of displaced acetabular fractures using open reduction and internal fixation provides favorable functional outcomes when anatomical reduction is achieved. Posterior wall fractures were the most common pattern, and early intervention within one week was associated with improved recovery. Appropriate surgical approach selection and structured rehabilitation contribute significantly to outcomes. These findings support the effectiveness of standardized surgical protocols in managing acetabular fractures, although larger studies are needed for broader validation.

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