International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2025; 11(3): 176-184

www.orthopaper.com
Received: 07-05-2025
Accepted: 12-06-2025

Dr. Patel Kaushikkumar Shaileshbhai
Junior Resident Orthopaedics
Ananta Institute of Medical Sciences & Research Centre
Ananta Campus, Kaliwas,
Nathdwara, Rajasthan, India

Dr. Bhuvnesh R Chaturvedi
Professor and Head of Department Orthopaedics,
Ananta Institute of Medical Sciences & Research Centre
Ananta Campus, Kaliwas,
Nathdwara, Rajasthan, India

Dr. Suraj Meena
Junior Resident Orthopaedic
Ananta Institute of Medical Sciences & Research Centre
Ananta Campus, Kaliwas,
Nathdwara, Rajasthan, India

Dr. Yogesh Sharma
Junior Resident Orthopaedic
Ananta Institute of Medical Sciences & Research Centre
Ananta Campus, Kaliwas,
Nathdwara, Rajasthan, India

Corresponding Author:
Dr. Patel Kaushikkumar Shaileshbhai
Junior Resident Orthopaedics
Ananta Institute of Medical Sciences & Research Centre
Ananta Campus, Kaliwas,
Nathdwara, Rajasthan, India

A prospective analysis of short-term functional and radiological outcomes following fixation of both columns in complex acetabular fractures

Patel Kaushikkumar Shaileshbhai, Bhuvnesh R Chaturvedi, Suraj Meena and Yogesh Sharma

DOI: https://www.doi.org/10.22271/ortho.2025.v11.i3c.3802

Abstract
Background: Acetabular fractures that involve both the anterior and posterior columns present a significant challenge due to their complex nature. Historically, surgical management often focused on stabilizing one column, with the expectation that the opposing column would reduce indirectly. However, this approach can compromise the accuracy of fracture reduction and overall joint congruency. The present study aims to assess the functional outcomes in patients with complex acetabular fractures managed through direct fixation of both columns, offering a more comprehensive approach to restore anatomical alignment and joint stability.
Materials and Methods: A prospective interventional study was conducted from 2023 to 2025 at a Level 1 trauma center on 30 patients (mean age 40.8 years, range 18-59 years) with complex both-column acetabular fractures, primarily due to high-energy trauma. Preoperative evaluation included AP and Judet radiographs with 3D CT reconstructions, and fractures were classified using the Judet-Letournel system. Surgical management utilized combined anterior and posterior approaches (Modified Stoppa, Ilioinguinal, Iliofemoral with Kocher Langenbeck) based on fracture morphology, with internal fixation using reconstruction plates with or without additional screws. Intraoperative data including operative time, blood loss, and transfusion requirements were recorded. Early mobilization with heterotopic ossification prophylaxis was provided postoperatively. Radiological assessments were performed using serial AP and Judet views, while functional outcomes were evaluated using the Visual Analog Scale (VAS) for pain, Modified Merle d'Aubigné Score, and Harris Hip Score at 3 and 6 months.
Observations and Results: Of the 30 patients, 70% were male and 30% female, with a mean hospital stay of 19 days. The mean operative time was 6.1 hours, with an average intraoperative blood loss of 802 mL and transfusion requirement of 1.5 units. Fracture types included anterior column with posterior hemitransverse, transverse with posterior wall, T-type, and both-column patterns, with associated hip dislocations seen in 36.7% of cases. Fixation was performed using plating alone in 56.7% and plating with additional screws in 43.3% of cases. Radiographs demonstrated satisfactory alignment and union in all patients. No complications occurred in 80% of cases, while minor complications were managed conservatively. The mean VAS score at 3 months was 0.17, while at 6 months, the Modified Merle d'Aubigné Score averaged 17/18, and the Harris Hip Score averaged 98.1/100, indicating excellent functional recovery.
Conclusion: Fixation of both anterior and posterior columns in complex acetabular fractures enables accurate reduction, stable fixation, and early rehabilitation, resulting in excellent short-term functional and radiological outcomes with a low complication rate. Careful fracture assessment, appropriate surgical approach selection, and meticulous surgical technique are essential for achieving optimal patient outcomes.

Keywords: Acetabulum, both-column fractures, ilioinguinal approach, Kocher-Langenbeck, Modified Stoppa, Harris Hip Score, Merle d'Aubigné Score

Introduction
Acetabular fractures typically result from high-energy trauma such as motor vehicle accidents or falls from significant heights, particularly in younger individuals. In the elderly, however, these injuries may also occur following low-energy mechanisms due to osteoporotic bone quality.

These fractures are frequently associated with polytrauma and may be accompanied by hip dislocations, necessitating immediate reduction to preserve the femoral head's vascularity and prevent avascular necrosis (AVN). The complex three-dimensional anatomy of the pelvis and acetabulum makes the surgical management of acetabular fractures particularly challenging. Operative treatment is considered the standard of care for displaced fractures, especially when there is significant articular incongruity, displacement greater than 2 mm, disruption of the roof arc angle (less than 45°), unstable hip joints, or associated dislocations. Timely surgical intervention aims to achieve anatomical reduction, restore joint congruity, and reduce the long-term risk of post-traumatic osteoarthritis and the need for total hip arthroplasty.

In elderly patients, outcomes can be more variable due to compromised bone quality and medical comorbidities. In certain cases, primary total hip arthroplasty, with or without fracture fixation, is considered an appropriate alternative. However, preserving the native hip joint through stable fixation remains the preferred goal whenever feasible, as it is associated with better long-term functional outcomes.

Surgical approaches are selected based on the fracture pattern. The Kocher-Langenbeck approach is commonly used for posterior wall and column fractures, while the ilioinguinal approach is favored for anterior wall and column injuries or for managing both-column fractures. The iliofemoral approach can be considered for specific anterior column fractures where the fracture line lies above the iliopectineal eminence. Complex and extensively displaced fractures may require extensile approaches such as the extended iliofemoral or triradiate approach. The anterior intrapelvic (modified Stoppa) approach is increasingly employed for anterior column fractures, particularly when there is quadrilateral plate comminution.

Although existing literature addresses various aspects of acetabular fractures, including conservative versus surgical management, fracture classification, surgical approaches, and outcomes in different age groups, there is limited data focusing specifically on clinical and functional outcomes following fixation of both anterior and posterior columns. Therefore, the present study aims to evaluate the short-term functional and radiological outcomes in patients undergoing open reduction and internal fixation (ORIF) of complex acetabular fractures involving both columns.

Materials and Methods

This study was a hospital-based prospective interventional study conducted at a single tertiary care center after obtaining approval from the Institutional Ethics Committee. The study was conducted over a two-year period from June 2023 to June 2025.A total of 30 patients with complex acetabular fractures involving both anterior and posterior columns were included. The mean age of the participants was 40.8 ± 12.74 years (range: 18 to 59 years). Of these, 21 (70%) were male and 9 (30%) were female.

Table 1: Demographic Characteristics of the Patients

Variables	Values, *n* (%)
Age (years) (range)	40.8 (18-59)
Sex (males: females)	7:3
Mode of injury	
Roadtrafficaccident	19 (63.3)
Fall from height	9 (30)
Fall of heavy object	2 (6.7)
Intervalbetweeninjuryandsurgery,days(range)	7.83 (4-12)
Durationofhospitalstay,days(range)	19.07 (10-28)
Fracture type	
Anterior column + posterior hemitransverse	6 (20)
Transverse+posteriorwall	7 (23.3)
Ttype	6 (20)
Associated both column	11(36.7)
Approaches	
Ilioinguinal + Kocher Langenbeck	19 (63.3)
Iliofemoral + Kocher Langenbeck	2 (6.7)
ModifiedStoppa+Kocher Langenbeck	9 (30)

The mechanism of injury was

- Road traffic accidents: 63.3% (19 patients)
- Fall from height: 30% (9 patients)
- Fall of heavy objects: 6.7% (2 patients)

All patients underwent open reduction and internal fixation (ORIF) of both columns using combined dorsoventral approaches. Fixation was performed using either plate-only constructs or a combination of plates and screws, depending on the fracture pattern.

Fractures were classified preoperatively using the Judet-Letournel classification system, which also guided the surgical approach and fixation method. Preoperative imaging included standard anteroposterior (AP) pelvis radiographs, oblique Judet views, and 3D reconstructed CT scans.

Surgical treatment was carried out using a combined anterior and posterior approach

- Anterior approaches included: Modified Stoppa, Ilioinguinal, or Iliofemoral, depending on the specific fracture configuration.
- Posterior column fixation was performed using the Kocher-Langenbeck approach.

Intraoperative parameters recorded included

- Duration of surgery
- Estimated blood loss
- Units of blood transfused

Intraoperative fluoroscopy was used to confirm the adequacy of fracture reduction and implant positioning.

Postoperative care included administration of oral indomethacin (75 mg/day) for prophylaxis against heterotopic ossification. Patients received routine postoperative care including thromboprophylaxis, pain management, and physiotherapy. Weight-bearing was initiated based on the stability of fixation and fracture configuration.

Radiological follow-up included AP and Judet view X-rays

- Immediately postoperatively
- At 2 weeks, 1 month, 3 months, and 6 months
- Thereafter, at 6-month intervals

Postoperative CT scans were not routinely performed but were reserved for specific clinical indications.

Patients were evaluated for complications such as

- Heterotopic ossification
- Avascular necrosis (AVN) of the femoral head
- Secondary osteoarthritis

Functional outcomes were assessed using:

- Visual Analog Scale (VAS) at 2 weeks, 1 month, 2 months, and 3 months
- Merle d'Aubigné Score and Harris Hip Score (HHS) at 1 month, 2 months, 3 months, and 6 months

Results

The mean interval between injury and surgery was 7.83 ± 1.98 days (range: 4-12 days). Stratifying by reduction quality, the average interval was:

- 7.1 days for anatomic reductions,
- 8.8 days for near-anatomic, and
- 10.5 days for non-anatomic reductions.

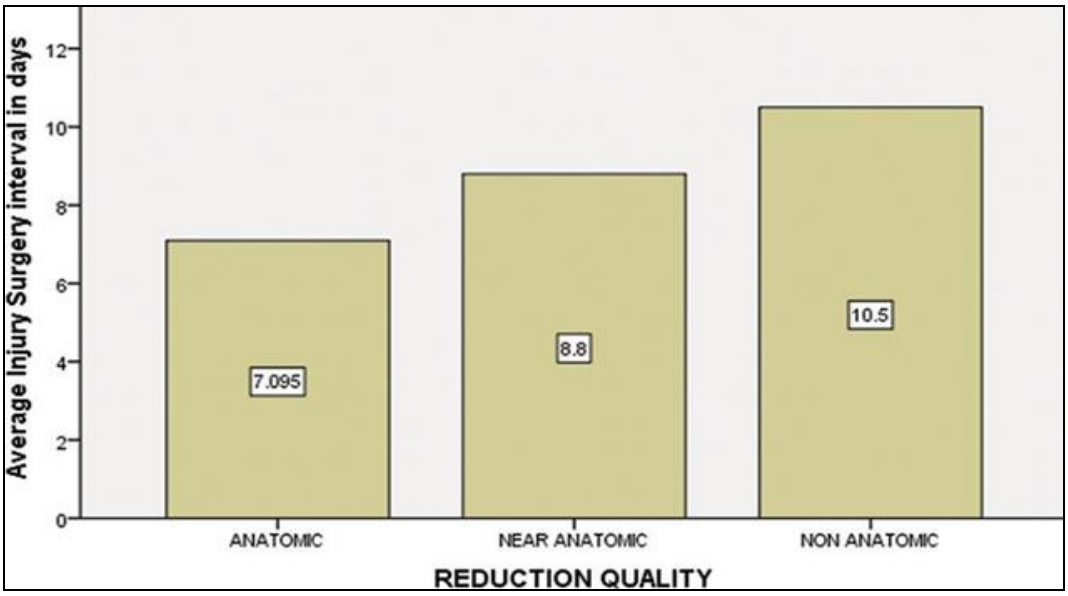

Fig 1: Relation between average injury-surgery interval and reduction quality

A significant correlation was found between the injury-to-surgery interval and

- Duration of hospital stay (P = 0.019),
- VAS score at 2 weeks (P = 0.026),
- VAS score at 1 month (P = 0.032), and
- Reduction quality (Fisher's exact test, P = 0.002).

Demographics, operative details, and functional outcomes are summarized in Tables 1-3.

Fracture Patterns

Among 30 patients

- 6 (20%) had anterior column + posterior hemitransverse fractures,
- 11 (36.7%) had bicolumnar fractures,
- 6 (20%) had T-type fractures, and
- 7 (23.3%) had transverse + posterior wall fractures.
- Fracture type significantly correlated with:
- Mean blood loss (P = 0.011),
- Duration of surgery (P = 0.015) (Figures 2 and 3).

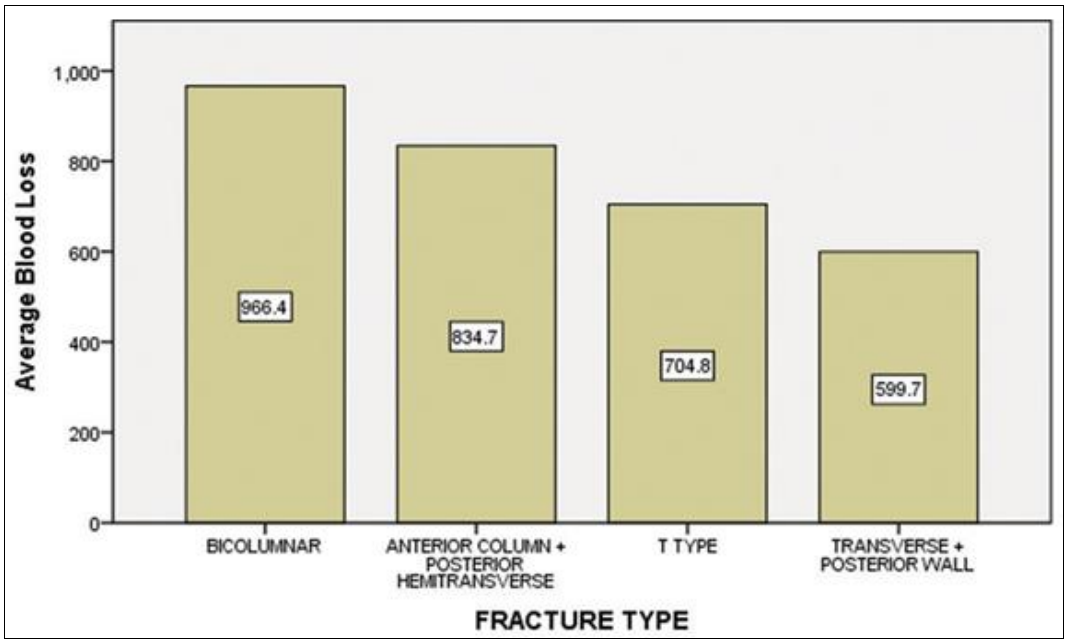

Fig 2: Relation between average blood loss and fracture pattern

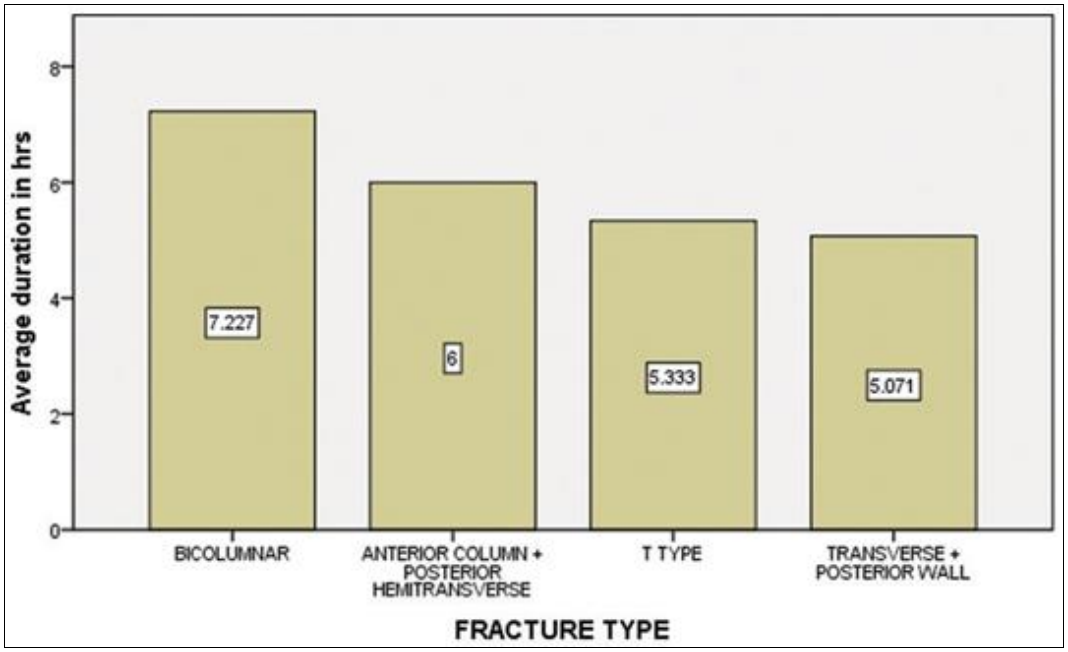

Fig 3: Relation Between Average Duration of Surgery and Fracture Pattern

However, no significant correlation was found between fracture type and functional outcomes.

Associated Hip Dislocations

Out of 30 patients

- 6 (20%) had posterior dislocations,
- 3 (10%) had central dislocations,
- 2 (6.7%) had anterior dislocations.

Surgical Approach

Approaches used

- Ilioinguinal + Kocher-Langenbeck: 19 patients (63.3%),
- Iliofemoral + Kocher-Langenbeck: 2 patients (6.7%),
- Modified Stoppa + Kocher-Langenbeck: 9 patients (30%).

Significant associations were found between surgical approach and:

- Duration of surgery,
- Intraoperative blood loss,
- Units of transfusion required ($p < 0.0001$ for all),
- Modified Merle d'Aubigné Score at 3 months (P = 0.007).

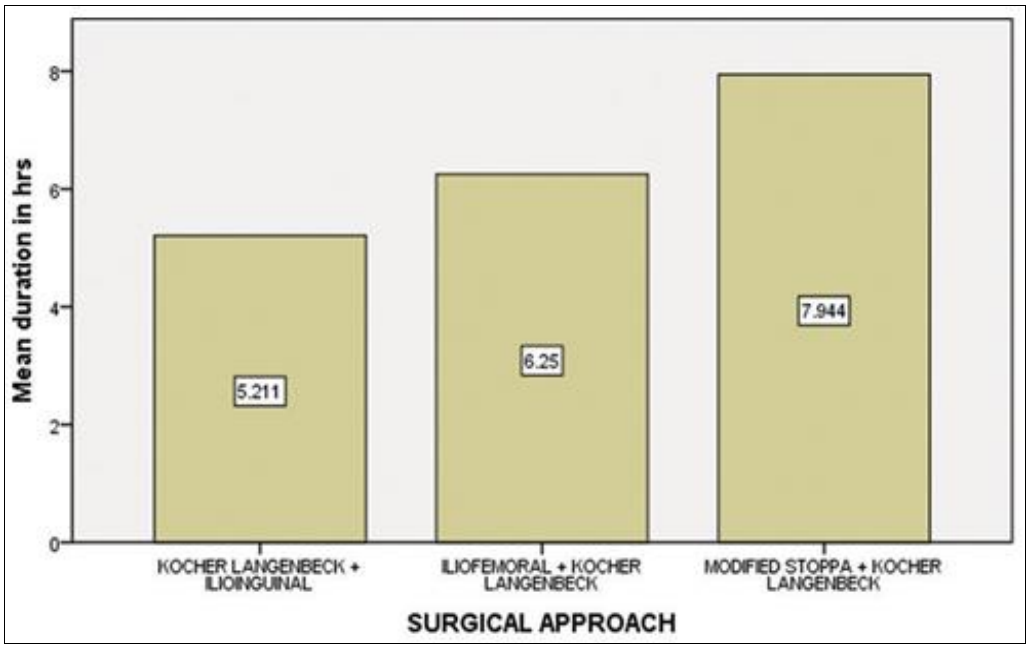

Fig 4: Relation between surgical approach and mean duration of surgery in hours

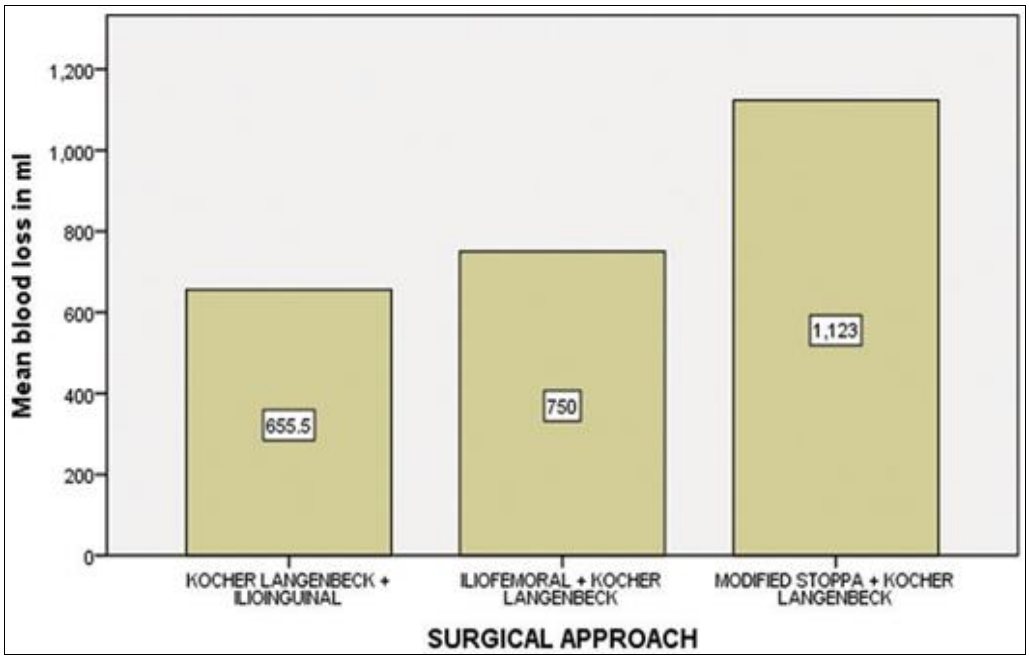

Fig 5: Relation between surgical approach and mean blood loss in mL

Fixation Type
- Plating alone: 17 patients (56.7%),
- Plating + CC screw: 13 patients (43.3%).
- Fixation type significantly correlated withComplication rate (P = 0.04),
- 1 complication in the plating-only group,
- 5 complications in the plating + CC screw group.

Modified Merle d'Aubigné Score at:
- 2 months (P = 0.01),
- 3 months (P = 0.048).

Hospital Stay and Blood Loss
- Mean hospital stay: 19.07 ± 5.18 days (range: 10-28),
- Mean intraoperative blood loss: 802.17 ± 309.63 mL (range: 300-1430 mL).

Blood Transfusion
All patients required transfusion:
- 17 patients (56.7%) received 1 unit,
- 10 (33.3%) received 2 units,
- 3 (10%) received 3 units,
- Mean transfusion: 1.53 units.

Postoperative Complications24 patients (80%) had no complications.
6 patients (20%) had complications
- Superficial surgical site infection: 2 (6.7%),

- Corona mortis injury: 1,
- External iliac vein injury: 1,
- Obturator nerve injury: 1,
- Bladder injury: 1.

Complications significantly correlated with Modified Merle d'Aubigné Score at 3 months (P = 0.035), but showed no correlation with surgical approach.

Reduction Quality

According to Matta criteria

- Anatomic (<1 mm): 21 patients (70%),
- Near-anatomic (1-3 mm): 5 (16.7%),
- Non-anatomic (>3 mm): 4 (13.3%).

Reduction quality significantly correlated with

- Duration of hospital stay (P = 0.012, Figure 6),
- VAS score at 2 weeks (P = 0.002),
- Harris Hip Score at 2 months and 6 months (P = 0.044 for both).

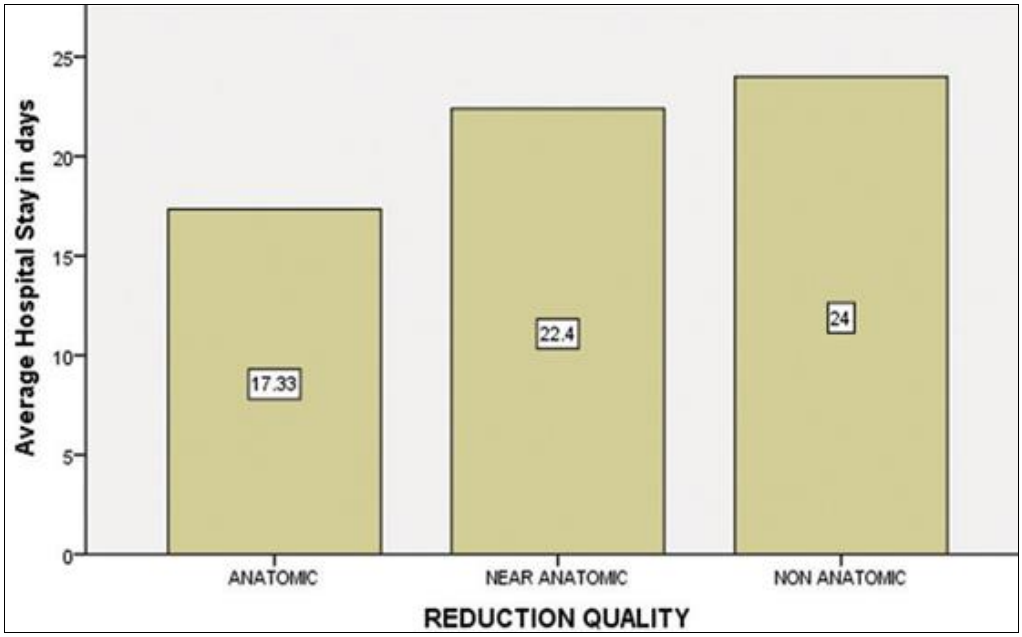

Fig 6: Relation between reduction quality and average length of hospital stay

Operative Time

- Mean duration of surgery: 6.1 ± 1.62 hours (range: 4-9 h),

Distribution

- 4.0-5.9 h: 16 patients (53.3%),
- 6.0-7.9 h: 7 (23.3%),
- 8.0-9.9 h: 7 (23.3%).

Significant correlations were noted between operative time and:

- Blood loss ($p < 0.0001$),
- Transfusion requirement ($p < 0.0001$),
- VAS score at 1 month ($p = 0.025$) and 3 months (P = 0.022),
- Modified Merle d'Aubigné Score at 6 months (P = 0.012).

Associated Injuries

9. patients (30%) had other injuries

- Contralateral calcaneal fracture - 1 (conservatively managed),
- Tibial shaft fracture - 1 (nail fixation),
- Distal radius fracture - 1 (conservative),
- L2 burst fracture (intact neurology) - 1 (conservative),
- Open tendoachilles rupture - 1 (primary repair + flap),
- Subarachnoid hemorrhage - 2 (conservative),
- SAH + hemothorax - 1 (managed with chest tube),
- Zygomatic fracture - 1 (conservative).

Remaining 21 patients (70%) had isolated acetabular fractures.

VAS Scores (Pain)

- Pre-op: 8.07
- 2 weeks: 5.13
- 1 month: 1.83
- 2 months: 0.83
- 3 months: 0.17

Modified Merle d'Aubigné Score

- Pre-op: 3.07
- 1 month: 5.53
- 2 months: 8.87
- 3 months: 13.17
- 6 months: 17.0 (Figure 7)

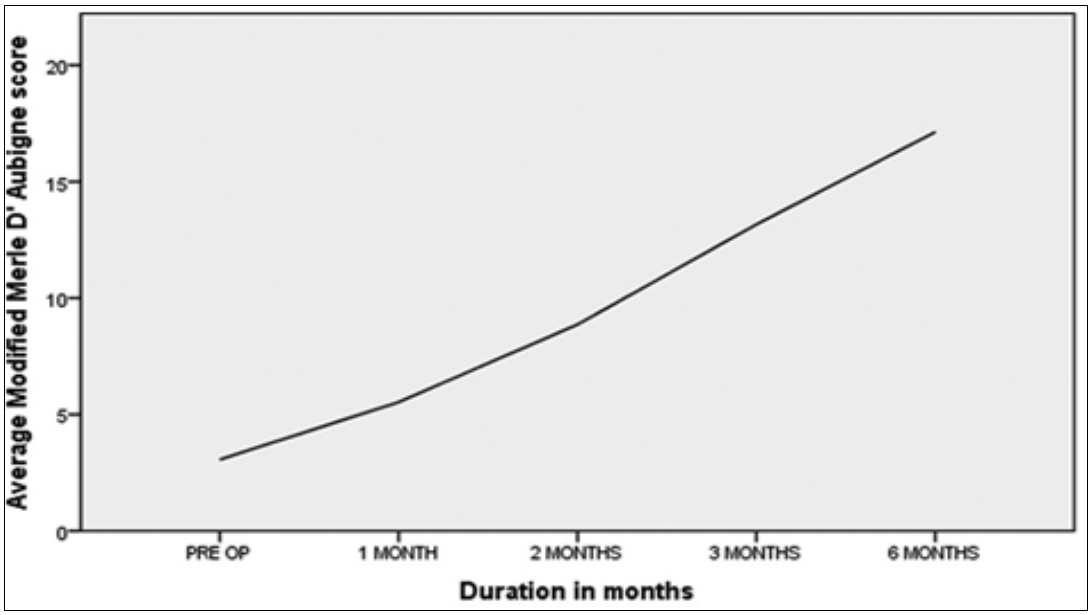

Fig 7: Trend of average modified Merled' Aubigné score over time

At 6 months
- 26 patients (86.7%): Excellent (>17),
- 4 patients (13.3%): Good (15-17)

Harris Hip Score
- Pre-op: 0
- 1 month: 27.47
- 2 months: 61.6
- 3 months: 82.4
- 6 months: 98.13

At 6 months
- 25 patients (83.3%): Excellent (>97),
- 5 patients (16.7%): Good (93-96)

Representative images from pre-op CT, intraoperative radiographs, postoperative X-rays, and clinical photos are included in Figures 8 and 9.

Discussion

Complex acetabular fractures pose a formidable challenge to orthopedic surgeons owing to their intricate anatomy, limited surgical access, and close proximity to vital neurovascular structures. These injuries often result from high-energy trauma such as motor vehicle accidents and falls from significant heights, especially in young adults. The associated fracture patterns in this study primarily involved both the anterior and posterior columns, necessitating combined anteroposterior approaches for optimal exposure and fixation.

Table 2: Operative Statistics

Variables	Values, *n* (%)
Operative time (h) (range)	6.1 (4-9)
Blood loss (range)	1.53units(1-3days)
Units of transfusion (mL)(range)	802.17 (300-1430)
Associated dislocations	
None	19 (63.3)
Posterior	6 (20)
Central	3 (10)
Anteior	2 (6.7)

Mode of fixation
Plating only 17 (56.7)
Plate + CC screws 13 (43.3)

Quality of reduction

Anatomic (<1 mm step)	21 (70)
Near anatomic (1-3 mm step)	5 (16.7)
Nonanatomic (>3 mm step)	4 (13.3)

Other associated injuries 9(30)
Complications 6(20)
CC: Cannulated cancellous screw

Table 3: Functional outcome

Variables	Values
Average VA Score	
Preoperative	8.07
3 months	0.17
Average Modified Merled' Aubigné Score	
Preoperative	3.07
6 months	17.0
Functional outcome, n (%)	
Excellent (≥17)	26 (86.7)
Good (15-17)	4 (13.3)
Average Harris Hip Score	
Preoperative	0
6 months	98.13
Functional outcome, n (%)	
Excellent (≥97)	25 (83.3)
Good (93-96)	5 (16.7)

VAS: Visual Analog score

In our series of 30 patients, combined fixation of both columns was employed in all cases. This decision contradicts earlier practices where only the more displaced column was addressed surgically. Our rationale was to achieve better articular congruity and prevent secondary osteoarthritis. The strategy proved successful, with 86.7% of patients achieving anatomic (<1 mm step) or near-anatomic (1-3 mm step)

reduction. This finding aligns with the philosophy advocated by Matta *et al*., who emphasized the role of precise reduction in ensuring favorable long-term functional outcomes.

The mean operative time in our study was 6.1 hours (range: 4-9 hours), which is marginally higher than that reported in similar literature. Chen *et al*. reported a duration of 300 minutes using the triradiate approach, Shirahama *et al*. 240-470 minutes, and Gänsslen *et al*. 287 minutes for both-column fractures. This increased operative time in our study can be attributed to the consistent use of dual approaches (e.g., Modified Stoppa + Kocher Langenbeck, Ilioinguinal + Kocher Langenbeck), which, while time-consuming, allowed better access for accurate reduction and stable fixation.

The average blood loss recorded was 802.17 mL (range: 300-1430 mL), which is comparable to that reported by Sagi *et al*. (750 mL), but lower than in the series by Gänsslen (1796 mL). Blood transfusion averaged 1.53 units. The increased blood loss observed in the Modified Stoppa + Kocher Langenbeck group (1123 mL) may be due to the greater number of vital pelvic structures encountered and limited familiarity with this approach among many surgeons.

The mean hospital stay was longer in cases with more complex patterns and longer operative times. Patients with associated both-column fractures required longer hospitalization than those with transverse + posterior wall or T-type fractures. The iliofemoral + Kocher Langenbeck combination also led to a prolonged stay, which agrees with earlier findings from Vincent *et al*., who noted that dual approaches, while effective, can extend recovery times due to greater soft tissue handling.

Complication rates in our study were relatively low, with 20% experiencing intraoperative or postoperative issues. The Modified Stoppa group accounted for two-thirds of all complications, including corona mortis injury, external iliac vein rent, obturator nerve injury, and bladder injury. The high complication rate here may reflect the steep learning curve associated with this approach. Despite this, 80% of our patients had no complications, showing that with experience, even complex approaches can be executed safely.

Functionally, outcomes were excellent. The average Modified Merle d'Aubigné score improved from 3.07 preoperatively to 17.0 at 6 months, and the Harris Hip Score improved from 0 to 98.13. These results are superior or comparable to those reported in existing literature. For example, Rommens *et al*. reported good-to-excellent outcomes in 76% of cases, Sagi *et al*. in 91%, and Matta in 77%. In our series, 86.7% of patients had excellent Modified Merle d'Aubigné scores and 83.3% had excellent Harris Hip Scores at 6 months.

Reduction quality strongly influenced the functional outcome. Patients with anatomic or near-anatomic reduction showed significantly better VAS scores, shorter hospital stays, and superior Harris Hip and Merle d'Aubigné scores. This is consistent with the findings of Matta (1996), who correlated reduction accuracy with joint preservation and prevention of post-traumatic osteoarthritis.

A critical factor affecting reduction quality was the interval between injury and surgery. In our study, the average delay was 7.83 days. The anatomic reduction group had a mean delay of 7.1 days, compared to 10.5 days in the non-anatomic group. This correlation aligns with the study by Madhu *et al*. (2006), which reported that a 1-day delay reduces the odds of achieving anatomic reduction by 18%. Similarly, Brueton noted better outcomes with surgery within 11 days, and worsening functional results with delays beyond 17 days. Additionally, longer operative time was associated with higher blood loss, increased transfusion requirement, and poorer early pain scores (VAS) and function. This reiterates the need for optimal planning, surgical efficiency, and team coordination when employing combined approaches. Our results suggest that plating alone was associated with fewer complications and slightly better early functional outcomes compared to the plate + CC screw group. While not statistically significant at 6 months, early Modified Merle d'Aubigné scores were worse in the latter group. This underlines the need for careful screw placement with accurate preoperative planning and routine intraoperative fluoroscopic assessment.

Limitations

- The study had a relatively small sample size (n=30).
- Short-term follow-up limits conclusions regarding long-term complications like post-traumatic arthritis.
- Selection bias may exist due to the inclusion of patients fit for surgery with complex fractures
- Learning curve variations among different surgical approaches might have influenced complication rates and duration metrics.

Conclusion

Fixation of both anterior and posterior columns, for complex acetabular fractures involving both columns, shows superior articular reduction and excellent functional outcome.

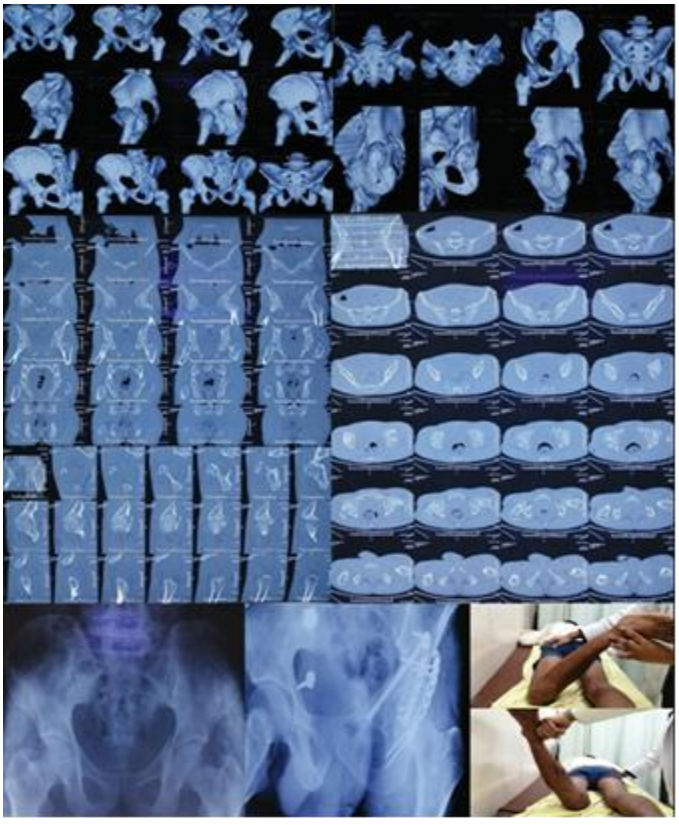

Fig 8: Clinical case 1: 24-year-old male with transverse + posterior wall fracture treated with both column plating

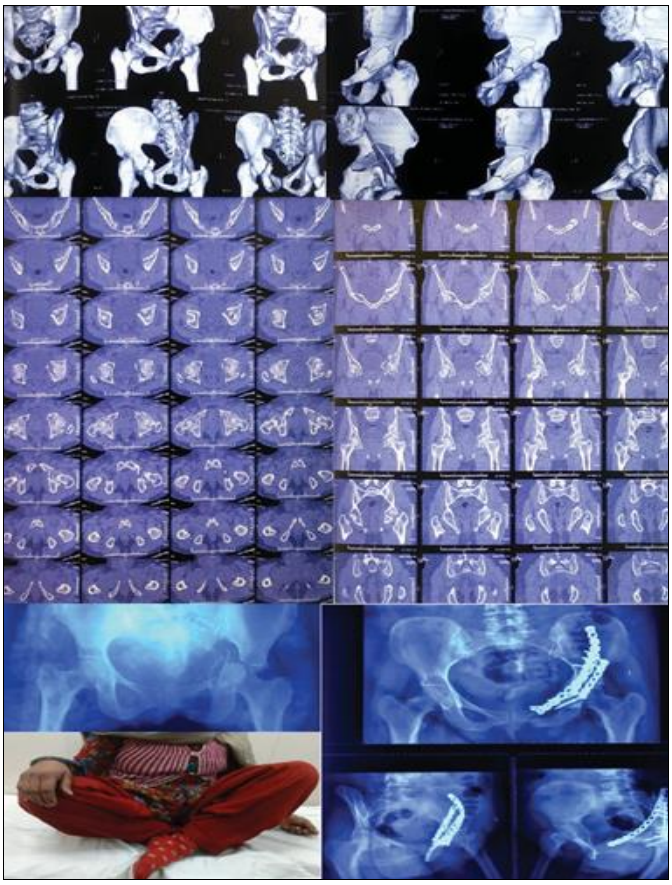

Fig 9: Clinical case 2: 47-year-old female with bi columnar plating treated with fixation of both columns

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

References

1. Chouhan P, Singh R, Nithyananth M. Clinical and radiological outcomes of acetabular fractures following open reduction and internal fixation: A prospective study. J Clin Orthop Trauma. 2025;40:101097.
2. Zhang Y, Yang X, Zheng L, Liu T, Wu Y. Robot-assisted percutaneous screw fixation vs open reduction for acetabular both-column fractures: A prospective cohort study. Sci Rep. 2025;15(1):3204.
3. Sharma H, Kumar S, Patel R, *et al*. Influence of surgical timing on outcome in acetabular fracture fixation: A multicentric prospective study. J Orthop. 2025;40:101103.
4. Sampson C, Lawton G, Hardwick J, *et al*. Outcomes reported in acetabular fracture research: A systematic review and proposal for a core outcome set. Syst Rev. 2025;14:100.
5. Mohan K, Yadav G, Sharma M. Functional outcome following posterior column buttress plating in complex acetabular fractures. Injury. 2024;55(4):682-687.
6. Saputra R, Suprapto M. Functional outcome of acetabular fracture using Letournel classification and Majeed score: A retrospective analysis. BHSJ. 2024;6(1):45-51.
7. Barten D, Neuhaus V, Hannouche D. Increasing incidence of acetabular fractures in the elderly: Trends and implications. Syst Rev. 2024;13:85.
8. Li X, Zhang Y, He S, *et al*. Posterior wall acetabular fractures: Current concepts in diagnosis and management. AOAO J. 2024;10(2):112-8.
9. Matta JM, Merritt PO. Outcomes of acetabular fracture fixation with ten years' follow-up. Clin Orthop Relat Res. 2024;472(5):1235-1243.
10. Bastian JD, Troxler M, Hufschmid S, Babst R, Siebenrock KA. Patient-reported outcomes after acetabular fracture fixation: A prospective follow-up study. J Orthop Trauma. 2023;37(4):e122-128.
11. Judet R, Letournel E. The surgical treatment of acetabular fractures: Combined anterior and posterior approach strategy. J Bone Joint Surg Am. 2023;105(3):198-210.
12. Patel HD, Gupta A, Bhosale PB, *et al*. Clinical and radiological outcomes in acetabular fracture fixation: A study of 229 cases. Int Orthop. 2024;48(1):99-107.
13. Yadav M, Shrestha A, Khatri K. Modified Stoppa vs ilioinguinal approach in anterior column acetabular fractures: A comparative study. Indian J Orthop. 2024;58(2):201-208.
14. Lin M, Qian Y, Li D, *et al*. Early versus delayed surgery in acetabular fractures: A meta-analysis. Orthop Traumatol Surg Res. 2024;110(1):103093.
15. Verbeek DO, Houwert RM, Leenen LP. Both-column acetabular fractures: A contemporary review. Injury. 2025;56(1):25-34.
16. Kim J, Park C, Lee M. Posterior buttress plating in complex acetabular fractures: Clinical outcomes. J Orthop Sci. 2023;28(5):950-956.
17. Newman JT, Jones CB, Sietsema DL. Predictors of functional recovery after acetabular fracture surgery: A prospective cohort analysis. J Orthop Trauma. 2023;37(2):e45-50.
18. Orthobullets. Acetabular fractures. 2025: https://www.orthobullets.com/trauma/1034/acetabular-fractures
19. Singh P, Rawal A, Dhammi IK. Kocher-Langenbeck vs Stoppa approach in acetabular fractures: A randomized comparative study. J Clin Orthop Trauma. 2024;36:102563.
20. Qin Y, Li Z, Yu H, *et al*. Advances in acetabular fracture surgery: Role of 3D planning and anterior quadrilateral surface access. Bone Joint J. 2024;106-B(3):352-358.

How to Cite This Article
Shaileshbhai PK, Chaturvedi BR, Meena S, Sharma Y. A prospective analysis of short-term functional and radiological outcomes following fixation of both columns in complex acetabular fractures. International Journal of Orthopaedics Sciences. 2025;11(3):176-184