Original Article

Outcomes of Dynamic Condylar Screw Fixation in the Management of Distal Femur Fractures

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ABSTRACT:

Background: *Distal femur fractures constitute a small but challenging group of injuries that demand precise fixation for optimal recovery. The dynamic condylar screw (DCS) system provides angular stability and allows controlled compression at the fracture site.*

Objective: *This study aimed to evaluate the clinical and radiological outcomes of DCS fixation in patients with distal femur fractures treated at a tertiary care hospital.*

Methods: *A prospective study was conducted on 26 patients diagnosed radiographically with distal femur fractures and managed surgically using dynamic condylar screw fixation between January and December 2022. Patients aged 20–65 years were included. Postoperative progress, union rate, and functional outcomes were assessed both clinically and radiographically.*

Results: *Of the 26 patients, 76.9% were males and 23.1% females. The majority (46.15%) were aged 41–60 years. The average operative time was 78 ± 6.15 minutes, and the mean hospital stay was 8.5 ± 2.5 days. Complications included one nonunion, two superficial infections, and one implant failure. Based on Neer's criteria, the final outcomes were excellent in 61.54%, good in 23.07%, fair in 11.54%, and poor in 3.85% of cases. The overall union rate was 94.84%, with a range of motion between 10° and 130°.*

Conclusion: *Dynamic condylar screw fixation offers reliable results with excellent union rates and functional recovery when performed with proper surgical expertise. It remains an effective method for managing distal femur fractures, especially in settings with limited resources.*

Key Words:
Distal femur fracture, dynamic condylar screw, fracture union, knee range of motion.

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Introduction

Distal femoral fractures account for approximately 3–6% of all femoral fractures and less than 1% of total skeletal injuries. These fractures often exhibit a bimodal distribution: high-energy trauma in younger males (15–50 years) and low-energy osteoporotic fractures in elderly women. Road traffic accidents remain the leading cause in developing countries.

Managing distal femur fractures poses significant surgical challenges due to complex anatomy and limited soft-tissue coverage. Achieving anatomical reconstruction and maintaining articular congruity are essential for successful outcomes. Multiple fixation options exist, including intramedullary nails, locking plates, and angle-stable devices such as the 95° dynamic condylar screw (DCS) plate.

The DCS system provides strong fixation and allows interfragmentary compression across the condyles, making it advantageous for both osteoporotic and comminuted fractures. This study was designed to assess the effectiveness and long-term outcomes of DCS fixation in distal femur fractures treated at a tertiary hospital in Bangladesh.

Materials and Methods

Study Design and Setting

This prospective study was conducted in the Department of Orthopaedics and Traumatology, 250-Bedded General Hospital, Tangail, from January to December 2022.

Study Population

A total of 26 patients (20–65 years old) of both sexes with radiographically confirmed distal femur fractures were included. Patients with open, pathological, or polytrauma fractures were excluded. Informed consent was obtained from all participants.

Surgical Procedure

Under general or spinal anesthesia, patients were positioned supine on a radiolucent table. A lateral approach to the distal femur was used. The articular surface was reduced using clamps and temporarily stabilized with K-wires. A central guide wire was inserted parallel to the joint surface, followed by drilling using a triple reamer. The DCS lag screw was inserted, and the plate was mounted over the lag screw and secured proximally with at least three bicortical screws. Suction drains were used and removed after 48 hours.

Postoperative Care

All patients received a long leg back slab for three weeks. Isometric quadriceps exercises began on the first postoperative day, and passive range of motion was initiated after three weeks. Weight-bearing was advised based on radiological signs of healing.

Assessment and Follow-Up

Follow-ups were conducted monthly until union. Evaluation included clinical and radiological assessments such as the Knee Society Score (KSS), Lysholm score, range of motion (ROM), and stability. Neer's criteria were used for final functional outcome classification.

Figure 1 : Pre-operaive A-P and Lateral radiographes showing distal femur fracturs.

Figure 2 : A-P and Lateral radiographes showing good callus formation at the end of four months.

Results:

Of 26 patients, 20 were male (76.92%) and 6 female (23.08%). Most patients were aged between 41–60 years (46.15%), followed by 20–40 years (42.3%). Right-sided fractures were more frequent (57.69%) than left-sided (42.3%).

Table 1 : Demographic information of the patients (n=26)

Variable	Frequency	Percent(%)
	Sex	
Male	20	76.92
Female	6	23.08
	Effective side	
Right	15	57.69
Left	11	42.3

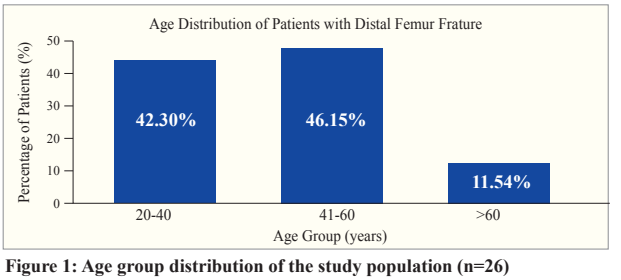

Figure 1: Age group distribution of the study population (n=26)

Figure 1 shows that 41–60 years group had the highest incidence (46.15%), followed by 20–40 years (42.3%), and >60 years (11.54%).

Road traffic accidents accounted for 76.92% of cases, followed by falls from height (15.38%) and other causes (7.69%).

Table 2: Causes of fractures (n=26)

Causes	No	%
Road accident	20	76.92
Fall from height	4	15.38
Others	2	7.69

Surgical and Clinical Outcomes

Mean operative time was 78 ± 6 minutes, and hospital stay averaged 8.5 ± 2.5 days. Complications included one case of nonunion (3.35%), two infections (6.68%), and one implant failure (3.35%).

Functional outcomes based on Neer's criteria:

- Excellent: 61.54%
- Good: 23.07%
- Fair: 11.54%
- Poor: 3.85%

The union rate was 94.84%, and average knee motion at one year ranged from 10° to 130°.

Table 3: Surgical and Clinical Outcomes

Category	Variable / Outcome	Frequency	% / Findings
Complications	Nonunion	1	3.35
	Infections	2	6.68
	Implant failure	1	3.35
Functional (Outcome Neer's Criteria)	Excellent	16	61.54
	Good	6	23.07
	Fair	3	11.54
	Poor	1	3.85
Overall Findings	Union of bone	—	94.84%
	Range of motion (°)	—	10–130

Discussion

Distal femur fractures involve the lower 9–15 cm of the femoral shaft extending to the knee joint. Both conservative and operative methods exist, but operative fixation provides better alignment and functional recovery. Previous studies have reported satisfactory results in 70–80% of surgically treated patients compared to 56% in nonoperative cases.

The present study showed that middle-aged males were most commonly affected, consistent with Sandeep et al. (2018), who reported 78% of cases between 21 and 60 years. Road traffic accidents were the predominant cause, aligning with findings by Anyaehie et al. (2015) and Khan et al. (2017). Our mean hospital stay (8.5 ± 2.5 days) and union rate (94.84%) are comparable with earlier studies reporting union rates between 85–95%.

Dynamic condylar screw fixation demonstrated excellent stability, allowing early mobilization and minimizing complications. Compared to intramedullary nails, plating methods such as DCS and locking compression plates continue to yield superior alignment and union outcomes.

The overall results affirm that DCS fixation remains a dependable option for distal femur fractures, particularly in resource-limited settings where advanced implants may be unavailable.

Conclusion

Dynamic condylar screw fixation is a dependable technique for distal femur fracture management, providing stable fixation, high union rates, and good functional outcomes. When executed with precise surgical technique, DCS fixation leads to faster recovery and fewer complications, making it a valuable tool in modern orthopaedic practice.

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