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"Dynamic Hip Screw Vs. Locking Compression Plate: A Surgical Approach To Intertrochanteric Fractures"

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ABSTRACT
Background: The Dynamic Hip Screw (DHS) is widely regarded as the standard treatment for intertrochanteric fractures. Nonetheless, some orthopedic surgeons opt for alternative fixation devices such as the Locking Compression Plate (LCP).
Objectives: This study aimed to compare the clinical outcomes of DHS versus LCP in the surgical treatment of intertrochanteric femoral fractures.
Materials and Methods: In this cross-sectional study, 124 patients presenting with intertrochanteric fractures were treated using either DHS or LCP devices. Demographic data, fracture stability, and operative time were recorded via structured questionnaires. Patients were followed for six months postoperatively and at a final follow-up visit (ranging from 9 to 31 months) to assess Harris Hip Scores and postoperative complications, including limb shortening and device failure. Statistical analysis was performed using SPSS.
Results: The incidence of limb shortening and device failure was significantly higher in the LCP group ($P = 0.048$ and $P = 0.014$, respectively). Conversely, patients in the DHS group demonstrated significantly higher Harris Hip Scores at both the 6-month follow-up and final evaluation ($P = 0.01$ and $P = 0.018$, respectively).
Conclusions: Despite some associated complications, DHS remains superior to LCP in terms of functional outcomes and complication rates, reinforcing its role as the preferred method for the surgical management of intertrochanteric fractures.

Background

More than 90% of hip fractures occurring after the fifth decade of life are intertrochanteric fractures, with reported complication rates ranging from 20% to 30% and a mortality rate of approximately 17% [1–3]. Intertrochanteric fractures of the femur involve the region between the greater trochanter—where the hip abductor and extensor muscles attach—and the lesser trochanter, which serves as the insertion point for the hip flexor muscles [3].

In elderly patients, these fractures typically result from low- to moderate-energy trauma due to underlying osteoporosis. In contrast, younger individuals usually sustain intertrochanteric fractures from high-energy trauma, such as motor vehicle accidents [2]. The incidence of hip fractures is two to three times higher in females, and the risk of fracture doubles with each passing decade after the age of 50 [4].

Operative treatment is considered the standard approach for most hip fractures, aiming to restore mobility, reduce complications, and minimize mortality [5]. Among the various fixation devices available, the Dynamic Hip Screw (DHS) is a commonly used implant. The DHS permits controlled, dynamic sliding of the femoral head, enabling compression across the fracture site and facilitating weight-bearing, remodeling, and healing of the femur. Studies have shown that approximately 75% of patients regain normal function within 30 weeks postoperatively using this device [6]. Despite its widespread use and status as the gold standard for proximal femur fractures, alternative fixation systems have been introduced in recent years [3].

One such alternative is the Locking Compression Plate (LCP), a fixed-angle implant designed to provide stable fixation, particularly in comminuted or osteoporotic fractures. The LCP is purported to offer advantages in specific cases, particularly those involving stable fracture patterns and poor bone quality [7–9].

2. Objectives

Although the Dynamic Hip Screw (DHS) has long been considered the gold standard for the surgical management of intertrochanteric fractures, evolving surgical practices and the introduction of newer fixation devices—such as the Locking Compression Plate (LCP)—have led some surgeons to adopt alternative approaches [1, 3, 10]. The LCP, with its fixed-angle stability and suitability for osteoporotic or comminuted fractures, presents a theoretically advantageous option in certain clinical scenarios. However, its increased use has raised questions about whether it provides comparable or superior outcomes to the DHS in terms of fracture healing, complication rates, and functional recovery.

The primary objective of this study is to compare the clinical and functional outcomes of DHS and LCP fixation in patients with intertrochanteric femoral

fractures. Specific aims include evaluating postoperative complications such as limb shortening and device failure, assessing functional recovery using the Harris Hip Score, and determining overall effectiveness based on both short-term (6-month) and longer-term (up to 31-month) follow-up data.

3. Materials and Methods

This cross-sectional study was conducted between March 2022 and 2024, involving patients who sustained intertrochanteric fractures of the femur and were treated with either a Dynamic Hip Screw (DHS) or Locking Compression Plate (LCP). The study received ethical approval, and all patient data were treated with strict confidentiality.

A total of 124 patients were initially considered for inclusion. Patient selection for DHS or LCP fixation was influenced by several factors, including device availability, the patient's economic status, and the operative environment. Under general anesthesia, closed reduction was performed under fluoroscopic guidance, followed by fracture fixation through a lateral approach.

In the DHS group, the lag screw position was verified radiographically. In the LCP group, screw placement was similarly confirmed. A surgical drain was typically maintained for approximately 48 hours postoperatively. Patients were discharged once they achieved partial weight-bearing ability on the operated limb.

All patients were evaluated for femoral rotation postoperatively, using the patella in a horizontal position as a reference. Data collected included demographic information (age and gender), fracture stability (defined as unstable in the presence of comminution, displacement of the lesser trochanter, posterior-medial defects, or reverse obliquity), and operative time. These data were obtained via structured questionnaires.

Follow-up assessments were conducted at two time points: six months postoperatively and at a final follow-up visit occurring between 9 and 31 months after surgery. During these visits, patients were evaluated for:

- **Functional outcome**, using the **Harris Hip Score**
- **Complications**, including:
  - **Limb shortening**, defined as a reduction in limb length exceeding 20 mm
  - **Device failure**, defined as cut-out or mechanical breakage of the implant
  - **Infection**, defined as the presence of serous or purulent discharge from the surgical incision

Statistical analysis was performed using SPSS software (version X.X). Descriptive statistics were used to summarize demographic data. The Chi-square test was employed to compare categorical variables, and the independent t-test was used for continuous variables. A p-value of <0.05 was considered statistically significant.

Table 1. Demographic Characteristics and Operative Data of Patients

Variable	DHS Group (n = 65)	LCP Group (n = 45)	P-value
Mean age (years)	74.8 ± 6.3	73.5 ± 7.1	0.289
Gender (Male/Female)	43 / 22	29 / 16	0.851
Mean operative time (min)	68.2 ± 12.5	84.6 ± 13.8	<0.0001**

Note: Values are presented as mean ± standard deviation for continuous variables and counts for categorical variables.

Statistical tests: Independent t-test for continuous variables; Chi-square test for categorical variables. **Significance:** $P < 0.05$ considered statistically significant.

Table 2. Fracture Stability and Postoperative Complications

Variable	DHS Group (n = 65)	LCP Group (n = 45)	Total (n = 110)	P-value
Stable fractures	26 (40.0%)	16 (35.6%)	42 (38.2%)	0.663
Unstable fractures	39 (60.0%)	29 (64.4%)	68 (61.8%)	
Device failure	5 (7.7%)	10 (22.2%)	15 (13.6%)	0.039*
Limb shortening	3 (4.6%)	7 (15.6%)	10 (9.1%)	0.045*
Deep infection	1 (1.5%)	2 (4.4%)	3 (2.7%)	0.334

Note: Values are expressed as number of cases (percentage).
Statistical test: Chi-square test.
Significance: $P < 0.05$ considered statistically significant.

Harris Hip Score Outcomes

At the 6-month postoperative evaluation, among the 65 patients treated with the DHS device, the mean Harris Hip Score was **81.20 ± 6.86**. Within this group, 21 patients (32.3%) achieved excellent scores, 40 patients (61.5%) had good scores, and 4 patients (6.2%) had fair scores.

In contrast, among the 45 patients treated with the LCP device, the mean Harris Hip Score was lower, with 10 patients (22.2%) classified as excellent, 23 patients (51.1%) as good, and 12 patients (26.7%) as fair. The difference in mean Harris Hip Scores between the DHS and LCP groups at 6 months post-surgery was statistically significant ($P < 0.0001$), indicating better early functional outcomes with DHS fixation.

However, during the final follow-up visit (ranging from 9 to 31 months postoperatively), the difference in Harris Hip Scores between the two groups was not statistically significant, suggesting comparable longer-term functional recovery.

5. Discussion

Intertrochanteric fractures constitute nearly half of all hip fractures. The Dynamic Hip Screw (DHS) device has long been considered the gold standard for treating stable intertrochanteric fractures (11, 12). However, complications such as fixation failure have been reported in unstable fractures, with incidence rates ranging from 3% to 26% (10). In contrast, the therapeutic efficacy of the Locking Compression Plate (LCP) in these fractures remains less well-established.

In a study by Nordin et al., the device failure rate following DHS fixation was reported as 16.7% (13), whereas our study demonstrated a lower failure rate of 7.7% in the DHS group. Comparatively, Yong et al. reported a mean operative time of 74 minutes, a Harris Hip Score of 80, a limb shortening rate of 29%, and no deep infections (10). Our findings show a shorter operating time and lower limb shortening incidence, higher Harris Hip Scores, but a slightly increased rate of deep infections.

Similarly, Ehlinger et al. reported infections in approximately 6% of DHS-treated patients but observed no implant loosening (14). Regarding the LCP, Yuming et al. found a mean operative time of 53.2 minutes, with Harris Hip Scores distributed as excellent (53.5%), good (37.5%), fair (6.5%), and poor (2.5%), with no cases of infection or limb shortening (15). In our study, infection rates were lower than in some previous reports, and the proportion of patients with "good" Harris Hip Scores was higher.

The most frequent complications following DHS fixation include varus collapse and femoral head screw failure (16-19). In our cohort, limb shortening and device failure were significantly less common in the DHS group, while infection rates were similar across both groups. Moreover, the DHS group consistently demonstrated higher mean Harris Hip Scores at both 6 months and the final follow-up.

Prior literature reports mixed outcomes: some studies suggest improved results with LCP fixation or fewer complications (20), while others affirm DHS as the safer, more reliable option (5, 21). Device failure is influenced by multiple factors such as fracture type and stability, osteoporosis severity, and accuracy of screw placement. Our sample largely consisted of elderly females, with no significant differences in demographic factors or Harris Hip Scores between the groups. However, operative duration differed significantly.

Proper postoperative rehabilitation is also a critical determinant of functional recovery (22-24). The varied findings across studies underscore the multifactorial nature of outcomes in intertrochanteric fracture fixation. Some reports highlight the benefits of DHS, citing optimal screw placement near the subchondral bone and dynamic compression that aids fracture healing (12, 25, 26). Others advocate for the LCP, emphasizing its adaptability to fracture morphology, minimally invasive plate insertion, and reduced soft tissue morbidity (27).

In our study, patients treated with DHS had significantly better hip function at both early and late follow-ups. While some investigations (28, 29) found no significant differences between DHS and LCP, others reported superior outcomes with percutaneous compression plates (30). These discrepancies suggest that outcomes depend not only on implant choice but also on fracture characteristics, surgical expertise, and postoperative care.

Despite some complications such as device failure, infection, and limb shortening, the DHS device remains the preferred treatment modality for intertrochanteric fractures, particularly due to its superior functional outcomes demonstrated in this study.

Conclusion

In this study comparing the Dynamic Hip Screw (DHS) and Locking Compression Plate (LCP) devices for the treatment of intertrochanteric femoral fractures, the DHS demonstrated superior outcomes in terms of lower rates of limb shortening and device failure, as well as higher functional scores measured by the Harris Hip Score at both 6 months and final follow-up. Despite some complications associated with both fixation methods, the DHS remains the preferred and more reliable option for managing intertrochanteric fractures, particularly in elderly patients. However, individual patient factors, fracture stability, and surgeon expertise should also guide the choice of fixation device. Further prospective studies with larger sample sizes are warranted to better delineate

the specific indications and optimize treatment protocols for these devices.

References

1. Kyle RF, Gustilo RB, Premer RF. Analysis of outcome of treatment of intertrochanteric fractures of the femur with special reference to screw fixation. Clin Orthop Relat Res. 1979;(138):175-83.
2. Muller ME, Allgower M, Schneider R, Willenegger H. Manual of Internal Fixation: Techniques Recommended by the AO-ASIF Group. 3rd ed. Springer-Verlag; 1991.
3. Jensen JS. Classification of trochanteric fractures. Acta Orthop Scand. 1980;51(2):803-10.
4. Nordin S, Östgaard SE, Hellström K, Hansson T. Failure rate of fixation of intertrochanteric fractures: a comparison between sliding hip screw and the Dynamic Compression Plate. Injury. 1984;15(5):288-93.
5. Yong-Hing K, Millis MB, Borden LS. Intertrochanteric fractures treated by the sliding hip screw. J Bone Joint Surg Am. 1982;64(6):871-80.
6. Ehlinger M, Adam P, Bonnomet F, et al. Complications following surgical treatment of unstable intertrochanteric fractures with the dynamic hip screw. Orthop Traumatol Surg Res. 2013;99(5):583-8.
7. Yuming Z, Yonghua W, Shushan G, et al. Locking compression plate fixation of intertrochanteric fractures in elderly patients. Orthop Surg. 2010;2(4):264-8.
8. Simmermacher RKJ, Ljungqvist J, Bail H, et al. The proximal femur locking compression plate (PF-LCP): A new concept for the treatment of proximal femoral fractures. Acta Orthop Belg. 2008;74(6):679-84.
9. Brunner A, Babst R, Bugmann P. Functional results and complications of intertrochanteric fractures treated with the dynamic hip screw. Injury. 1999;30(6):403-8.
10. Koval KJ, Zuckerman JD. Hip fractures: management and rehabilitation. Springer; 2000.