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*Original Article*

# Superior outcome with anterolateral approach in treating O'Driscoll type II ulnar coronoid process fractures: a retrospective analysis

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**Abstract:** Background: O'Driscoll type II fractures of the ulnar coronoid process present significant challenges in orthopedic surgery, requiring precise techniques for optimal recovery. Objective: To compare the efficacy of anterolateral approach versus medial approach in treating O'Driscoll type II fractures of the ulnar coronoid process in the elbow. Methods: This retrospective study involved 226 patients with O'Driscoll type II fractures treated at the Fourth People's Hospital of Hengshui between January 2021 and December 2023. Patients were divided into two groups according to the type of surgical approach: lateral (n = 121) and medial (n = 105). Exclusion criteria included pathologic fractures, mental disorders, and open fractures. Surgical procedures were standardized for both groups, with the lateral group receiving a curved S-shaped incision and the medial group receiving a 5.0 cm anterior-medial incision. Surgical and recovery outcomes included elbow joint range of motion, Visual Analog Scale (VAS) scores, Mayo Elbow Performance Score (MEPS), incidence of postoperative complications, and SF-36 health-related quality of life scores over a six-month follow-up. Results: Preoperative characteristics were comparable between groups ($P > 0.05$). The lateral approach significantly improved postoperative elbow flexion and rotation at 1, 3, and 6 months ($P < 0.05$). Surgical-related indicators favored the lateral approach, which demonstrated reduced incision length, shorter surgery duration, and lower intraoperative blood loss ($P < 0.05$). No significant differences in VAS scores were noted between groups throughout the follow-up. The lateral group achieved higher MEPS scores at six months postoperative ($P < 0.05$) and a higher excellent/good rate ($P < 0.05$). Additionally, the lateral approach resulted in significantly fewer complications ($P < 0.05$). Short-Form 36 Health Survey Questionnaire (SF-36) scores showed no significant difference in quality of life between groups at six months postoperative ($P > 0.05$). Conclusion: The lateral surgical approach for O'Driscoll type II fractures of the ulnar coronoid process offers superior surgical and functional outcomes. It provides a better range of motion, fewer complications, and improved joint performance scores compared to the medial approach, though both methods yield comparable pain relief and quality of life. Therefore, the lateral approach is recommended to enhance postoperative recovery.

**Keywords:** O'Driscoll type II, ulnar coronoid process fracture, lateral surgical approach, medial surgical approach, postoperative recovery, orthopedic outcome

## Introduction

Fractures of the ulnar coronoid process are a common elbow joint injury, with O'Driscoll type II fractures, characterized by specific fracture morphology and anatomic location, presenting particular challenges for treatment [1]. The coronoid process plays a crucial role in the stability and kinematics of the elbow joint, and its disruption can result in joint instability, restricted range of motion, and long-term disability. Despite the importance of proper management, the optimal surgical approach for treating O'Driscoll type II fractures remains a subject of ongoing debate [2-5].

Two commonly used approaches are the lateral and medial approaches. The lateral approach, which accesses the fracture site through the anterolateral aspect of the elbow, is favored for its excellent visualization and protection of vital structures [6]. However, this approach may carry an increased risk of iatrogenic injury to the lateral collateral ligament and the radial

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nerve. In contrast, the medial approach, which accesses the fracture site through the anteromedial aspect of the elbow, offers a more direct route to the coronoid process and may reduce the risk of iatrogenic injury [7]. However, it is technically more challenging and may compromise the integrity of the medial collateral ligament.

Previous studies have reported varying outcomes for both approaches, but the evidence remains inconclusive due to small sample sizes, heterogeneous patient populations, and differing surgical techniques. Consequently, a meticulously designed retrospective analysis was warranted to compare the clinical outcomes between the lateral and medial approaches in a larger, more homogeneous patient cohort.

This study aims to address this gap in the literature by evaluating the clinical outcomes of lateral and medial approaches in the treatment of O'Driscoll type II fractures of the ulnar coronoid process. Specifically, we focused on the Mayo Elbow Performance Score (MEPS) as the primary outcome measure, due to its comprehensive assessment of elbow function and clinical relevance. Secondary outcomes included elbow joint range of motion, incidence of postoperative complications, postoperative pain levels, and quality of life measures. Through a comprehensive assessment of these outcomes, this study should assist clinicians in choosing the most suitable surgical approach for their patient's outcome.

Additionally, comparing the clinical outcomes of the anterolateral approach versus the medial approach in treating O'Driscoll type II fractures of the ulnar coronoid process is of significant research importance. First, this comparison helps clinicians better understand the specific operational differences, surgical difficulties, and risks associated with each approach [8, 9]. Through comparative analysis, this study provides surgeons with a comprehensive reference for selecting the approach optimally tailored to individual patient circumstances and specific surgical requirements. Second, evaluating the clinical outcomes of these two approaches provides an objective and scientific basis for evaluating surgical effectiveness [10-14].

## Materials and methods

### *Case selection*

This study was approved by the Ethics Committee of the Fourth People's Hospital of Hengshui. A total of 226 patients diagnosed with O'Driscoll type II fracture of ulnar coronoid process were included in this study. These patients were treated at the Fourth People's Hospital of Hengshui between January 2021 and December 2023. The patients were categorized into two groups based on their surgical approach: the lateral approach group (n = 121 cases) and the medial approach group (n = 105 cases).

Inclusion criteria: 1) Clinically confirmed O'Driscoll type II fracture, characterized by a fracture line involving the anterior medial prominence of the coronoid process [12]; 2) Age over 18 years; 3) Follow-up period of at least six months; 4) Availability of complete medical records and follow-up data.

Exclusion criteria: 1) Pathologic fractures (e.g., osteoporosis, tumors); 2) Mental disorders affecting patient compliance with follow-up; 3) Open fractures; 4) Previous elbow surgery or trauma; 5) Severe comorbidities that could influence surgical outcome (e.g., uncontrolled diabetes, cardiovascular disease); 6) Incomplete medical records or follow-up data.

### *Methods*

*Lateral approach group:* For the lateral approach, patients were positioned supine with the affected shoulder abducted and the elbow flexed to 90 degrees. The forearm was supported on a McConnell shoulder rest (MCRS-2587, McConnell Ltd., United Kingdom) to facilitate surgical access. After brachial plexus block anesthesia, the surgical site on the left upper limb was sterilized and exsanguinated. A curved S-shaped incision was made, starting 2 cm proximal to the distal cubital crease on the medial aspect of the upper arm, extending laterally to 4 cm distal to the lateral cubital crease of the proximal forearm, allowing exposure of the surgical area. Following skin and subcutaneous tissue incision, dissection proceeded through the neurovascular interval on the anterolateral aspect of the elbow, with careful protection of vital structures such as the bra-

chial artery and median nerve. The brachialis muscle tendon sheath was horizontally incised to expose the biceps brachii, partial pronator teres, brachial artery, and median nerve. The brachial artery and biceps brachii were retracted laterally, while the median nerve and pronator teres were retracted medially to expose the fractured ulnar coronoid process. The fracture fragment was anatomically reduced under direct vision and fixed using appropriate methods, such as hollow screws, mini titanium plates, or anchor sutures. If joint instability was present, an additional incision for lateral collateral ligament repair was performed, and hinged external fixation for stabilization was used if necessary. The surgical area was irrigated postoperatively, followed by wound closure and dressing. Patients were closely monitored for vital signs and surgical site conditions, with a tailored rehabilitation plan implemented to promote early recovery.

*Medial approach group:* For the medial approach, patients were positioned supine on the operating table with the affected limb adjusted to optimize exposure according to surgical requirements. To ensure patient safety and comfort during the procedure, brachial plexus block anesthesia was typically administered. The surgical site on the left upper limb was then sterilized, and exsanguination was performed using a tourniquet to establish a sterile field. A 5.0 cm incision was made along the anterior medial aspect of the elbow, starting between the origins of the flexor carpi ulnaris muscles on the ulnar side of the wrist and extending through the skin and subcutaneous tissue in a specific direction. Dissection proceeded through the interval between the pronator teres and flexor carpi radialis muscles on the radial side, retracting these muscles bilaterally to expose and dissect the brachialis muscle, thereby revealing the fractured ulnar coronoid process. Under direct vision, the fracture fragment was anatomically reduced and temporarily fixed with Kirschner wires (2.0/2.5 mm; Shanghai Kangding Medical Equipment Co., Ltd., China). The adequacy of the reduction was confirmed using C-arm fluoroscopy (DG3310A; Nanjing Huapu Medical Co., Ltd., China).

Depending on the size of the fracture fragment and patient bone quality, appropriate screws were selected for fixation, involving drilling and insertion of two hollow screws for sufficient stability. The surgical site was irrigated with saline to ensure removal of any residual foreign bodies. The wound was then closed layer by layer, followed by sterile dressing. Postoperatively, patients were closely monitored for vital signs and surgical site conditions to prevent complications such as bleeding or infection. Individualized rehabilitation plans, including functional exercises and pain management, were implemented based on each patient's specific condition to facilitate elbow joint recovery.

*Data collection*

*Primary outcome measures:* Mayo elbow performance score (MEPS) [13]: Preoperative and postoperative joint scores at 1 month, 3 months and 6 months were assessed using MEPS, encompassing pain (total score 45 points), motion (total score 20 points), stability (total score 10 points), and activities of daily living (total score 25 points). Higher scores indicate better joint function. Scores ≥ 90 were defined as excellent, 98-75 as good, 74-60 as acceptable, and < 60 as poor. The comparison focused on the excellent or good rate of elbow joint function at six months after surgery. The intraclass correlation coefficient (ICC) for MEPS scores was 0.90 [13].

S*econdary outcome measures:* 1) Elbow joint range of motion: The elbow joint range of motion was compared between the two groups before surgery and at 1, 3, and 6 months after surgery. 2) Surgical-related indicators: Surgical-related indicators, including incision length, surgical time, and intraoperative blood loss, were compared between the two groups. 3) Postoperative VAS (visual analog scale) scores: Postoperative VAS scores were compared between the two groups. The VAS was used to assess the degree of pain at 1, 3, and 6 months after surgery, with higher scores indicating more severe pain. Pain levels were evaluated using a 10-centimeter VAS during rest, daily activities, and at night. Patients were instructed to mark their perceived pain intensity along the line, where "0" denotes "no pain" and "10" signifies "the most severe pain imaginable". The distance between "0" and the mark made by the patients was measured. This scale is most suitable for adult patients. The Cronbach's alpha coefficient of the scale is

**Table 1.** Comparison of general patient data between the two groups

| | | Lateral (n = 121) | Medial (n = 105) | $t/\chi^2$ | *P* |
|---|---|---|---|---|---|
| Age (years) | | 40.45 ± 5.48 | 40.87 ± 5.37 | 0.590 | 0.556 |
| Gender [n (%)] | Male (0) | 73 (60.33%) | 70 (66.67%) | 0.971 | 0.324 |
| | Female (1) | 48 (39.67%) | 35 (33.33%) | | |
| BMI ($kg/m^2$) | | 22.58 ± 4.48 | 22.31 ± 4.17 | 0.467 | 0.641 |
| Fracture time (h) | | 15.48 ± 1.22 | 15.76 ± 1.34 | 1.669 | 0.096 |
| Cause of injury [n (%)] | Fall (0) | 25 (20.66%) | 23 (21.9%) | 1.126 | 0.890 |
| | Traffic accident (1) | 28 (23.14%) | 26 (24.76%) | | |
| | Crushing (2) | 16 (13.22%) | 12 (11.43%) | | |
| | Sport-related (3) | 25 (20.66%) | 17 (16.19%) | | |
| | Others (4) | 27 (22.31%) | 27 (25.71%) | | |
| Location of bone fracture [n (%)] | Left (0) | 59 (48.76%) | 49 (46.67%) | 0.099 | 0.753 |
| | Right (1) | 62 (51.24%) | 56 (53.33%) | | |
| Combined internal medicine diseases [n (%)] | Non (0) | 108 (89.26%) | 94 (89.52%) | 0.092 | 0.993 |
| | Hypertension (1) | 5 (4.13%) | 4 (3.81%) | | |
| | Heart disease (2) | 4 (3.31%) | 3 (2.86%) | | |
| | Diabetes (3) | 4 (3.31%) | 4 (3.81%) | | |
| ASA classification [n (%)] | Level 1 (0) | 87 (71.9%) | 65 (61.9%) | 2.551 | 0.110 |
| | Level 2 (1) | 34 (28.1%) | 40 (38.1%) | | |

Note: BMI = body mass index; ASA = American Society of Anesthesiologists.

0.86 [14]. 4) Incidence of postoperative complications: Postoperative complications were compared between the two groups, including elbow stiffness, heterotopic ossification, traumatic arthritis, and numbness of fingers. 5) SF-36 (short-form 36 health survey questionnaire) scores: SF-36 scores were compared between two groups six months after surgery. The SF-36 assesses eight dimensions: physical functioning (PF), role-physical (RP), bodily pain [15], general health perception (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). The simplified health survey is a self-management general health status questionnaire, with each dimension ranging from 0 to 100. The higher the score, the better the patient's quality of life. Cronbach's alpha coefficient of the scale is 0.800 [16].

*Statistical analysis*

Statistical analyses were conducted using SPSS version 23.0. Continuous data that followed a normal distribution were presented as mean ± standard deviation, and comparisons between groups were made using independent t-tests. Categorical variables were presented as "n (%)" and analyzed using the chi-square test. A *p*-value of less than 0.05 was considered significant.

## Results

*General data*

There were no significant differences in age ($t = 0.590$, $P = 0.556$), gender distribution ($\chi^2 = 0.971$, $P = 0.324$), body mass index (BMI) ($t = 0.467$, $P = 0.641$), or fracture site ($\chi^2 = 0.099$, $P = 0.753$) between the two groups (**Table 1**). Additionally, the time from injury to treatment did not differ significantly between the two groups ($t = 1.669$, $P = 0.096$), nor did the cause of injury ($\chi^2 = 1.126$, $P = 0.890$) or the presence of underlying medical conditions ($\chi^2 = 0.092$, $P = 0.993$). Regarding the American Society of Anesthesiologists (ASA) classification, there was a trend towards more patients being classified as Level 1 in the lateral group compared to the medial group, although this difference did not reach statistical significance ($\chi^2 = 2.551$, $P = 0.110$). Overall, these results suggest that the two groups were well-matched in terms of baseline characteristics, ensuring validity of the comparisons.

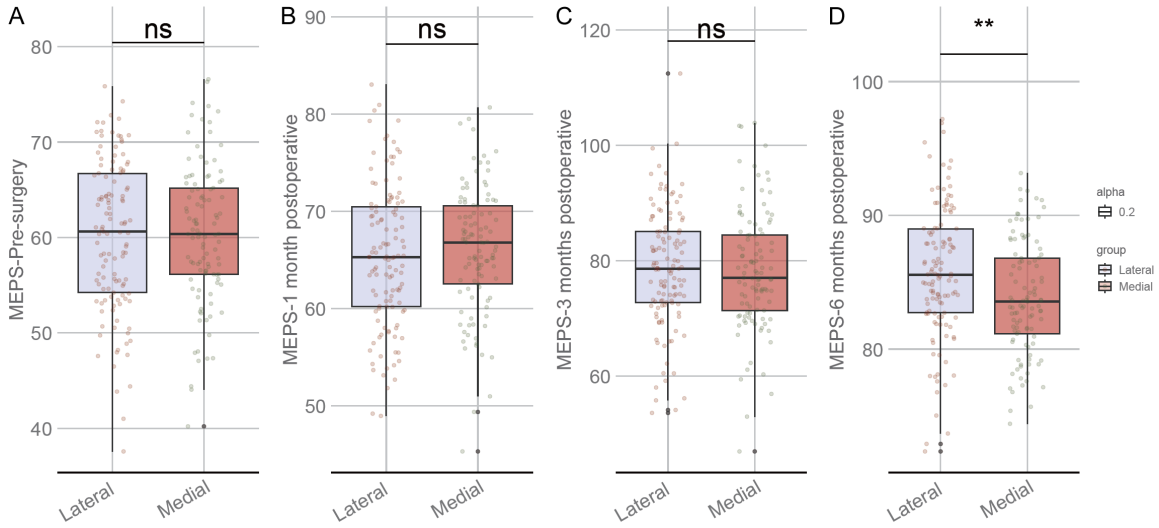


**Figure 1.** Comparison of joint scores between the two groups of patients. A: Pre-surgery; B: 1 month postoperative; C: 3 months postoperative; D: 6 months postoperative. Note: ns, No significant difference; **, $P < 0.01$; MEPS, Mayo Elbow Performance Score.

*Joint scores (Mayo Elbow Performance Score, MEPS)*

At the preoperative, 1-month, and 3-month postoperative assessments, no significant differences were observed between the two groups in terms of joint scores. However, at postoperative 6-month follow-up, there was a significant difference in joint scores, with the lateral group demonstrating a significantly higher MEPS score than the medial group (**Figure 1**). This suggests that the lateral surgical approach resulted in better functional outcomes at the 6-month follow-up.

*Elbow joint range of motion*

Preoperative comparisons of elbow flexion, extension, and rotation between the two groups showed no significant differences ($P > 0.05$). However, at 1-, 3-, and 6- months following surgery, the lateral approach group exhibited significantly greater elbow flexion and rotation compared to the medial approach group ($P < 0.05$), as shown in **Figures 2** and **3**.

*Surgical-related indicators*

As shown in **Table 2**, there were significant differences in surgical-related indicators between the two groups. The lateral approach group had a shorter incision length ($t = 2.341$, $P = 0.020$), shorter surgical time ($t = 2.507$, $P = 0.013$), and less intraoperative blood loss ($t = 2.248$, $P = 0.026$) compared to the medial approach group. These findings indicate that the lateral surgical approach resulted in more favorable surgical outcomes, including a smaller incision, shorter operative duration, and decreased blood loss during surgery.

*Postoperative VAS scores*

As shown in **Table 3**, there were no significant differences in postoperative VAS scores between the two groups at any follow-up time point. This comprises: 1 month postoperative ($t = 1.465$, $P = 0.145$), 3 months postoperative ($t = 0.518$, $P = 0.605$), and 6 months postoperative ($t = 1.610$, $P = 0.109$), Thus, both surgical approaches yielded comparable pain relief over the course of the follow-up period.

*Postoperative excellent/good rate*

**Table 4** illustrates that there were significant differences in the postoperative excellent/good rates between the two groups ($\chi^2 = 5.612$, $P = 0.018$). These results suggest that patients in the lateral group experienced a significantly higher proportion of favorable outcomes compared to those in the medial group.

*Incidence of postoperative complications*

As shown in **Table 5**, a significant difference was observed in the occurrence of postopera-

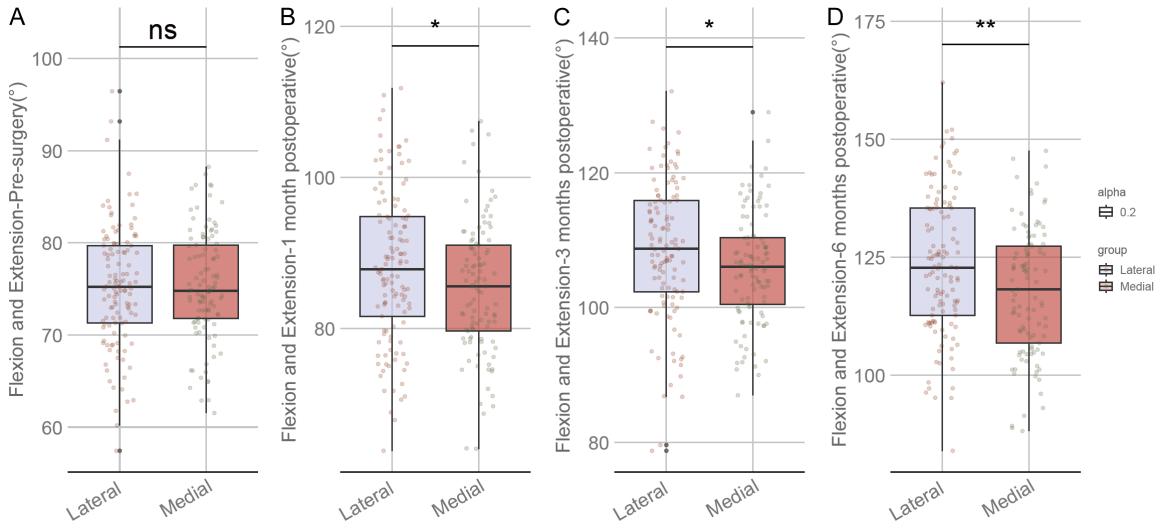


**Figure 2.** Comparison of elbow joint flexion and extension range at different postoperative times. A: Pre-surgery; B: 1 month postoperative; C: 3 months postoperative; D: 6 months postoperative. Note: ns, No significant difference; *, $P < 0.05$; **, $P < 0.01$.

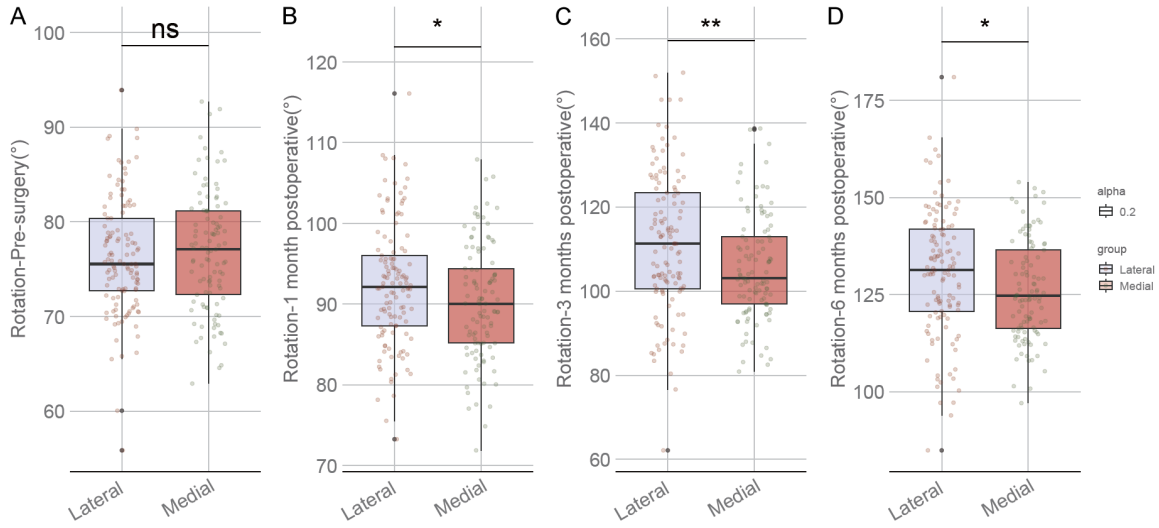


**Figure 3.** Comparison of elbow joint rotation range at different postoperative times. A: Pre-surgery; B: 1 month postoperative; C: 3 months postoperative; D: 6 months postoperative. Note: ns, No significant difference; *, $P < 0.05$; **, $P < 0.01$.

tive complications between the two groups (χ^2 = 10.441, $P = 0.001$). Patients undergoing medial surgery experienced a significantly higher incidence of postoperative complications than those in the lateral approach group, highlighting the need for careful consideration of surgical approach to minimize adverse outcomes.

*SF-36 scores*

**Table 6** demonstrates that at postoperative 6-months, there were no significant differences in the quality-of-life scores between the two groups of patients ($P > 0.05$). In all health-related quality of life dimensions measured by the SF-36 questionnaire, the scores were statistically similar between the two groups [PF (t = 0.596, $P = 0.552$), RP (t = 0.588, $P = 0.557$), bodily pain (t = 0.642, $P = 0.522$), GH (t = 0.595, $P = 0.553$), VT (t = 0.540, $P = 0.590$), SF ($\chi^2$ = 0.103, $P = 0.918$), RE (t = 0.293, $P = 0.770$), and MH (t = 0.204, $P = 0.839$)]. The overall trend indicates that both surgical approaches resulted in comparable quality of life outcomes,

**Table 2.** Comparison of surgical-related indicators between the two groups of patients

| | Incision length (cm) | Surgical time (min) | Intraoperative blood loss (ml) |
|---|---|---|---|
| Lateral (n = 121) | 7.08 ± 0.33 | 60.84 ± 4.33 | 30.55 ± 2.39 |
| Medial (n = 105) | 7.17 ± 0.25 | 62.55 ± 5.69 | 31.27 ± 2.41 |
| *t* | 2.341 | 2.507 | 2.248 |
| *P* | 0.020 | 0.013 | 0.026 |

**Table 3.** Comparison of postoperative VAS scores between two groups of patients

| | Lateral (n = 121) | Medial (n = 105) | *t* | *P* |
|---|---|---|---|---|
| 1 month postoperative | 4.66 ± 0.39 | 4.78 ± 0.72 | 1.465 | 0.145 |
| 3 months postoperative | 2.52 ± 0.65 | 2.57 ± 0.74 | 0.518 | 0.605 |
| 6 months postoperative | 1.31 ± 0.24 | 1.36 ± 0.22 | 1.610 | 0.109 |

Note: VAS: Visual Analog Scale.

with no significant differences in patient well-being post-surgery.

## Discussion

In orthopedic fracture management, particularly in fracture management of the ulnar coronoid process, the choice of surgical approach significantly affects patient outcome [17, 18]. Our retrospective study offers valuable insight into the comparative efficacy of the anterolateral and medial approaches for treating O'Driscoll type II fractures. Understanding the intricate balance between surgical efficacy and complication management is paramount to improving long-term outcomes for these patients [19, 20].

The lateral approach demonstrated superior postoperative joint function, aligning with the principle that minimizing surgical trauma enhances recovery. The lateral approach's muscle-sparing technique is likely a key factor in this outcome. By accessing the fracture site through the neurovascular interval on the anterolateral aspect of the elbow and protecting vital structures, this approach minimizes the disruption of soft tissues and neurovascular elements [21]. This precision likely contributes to the improved range of motion and reduced complications, particularly in avoiding the complex anatomy and structures encountered in the medial approach, such as the ulnar nerve which can be more challenging to navigate without potential for iatrogenic injury [22, 23].

Moreover, the lateral approach's significant reductions in operative time, incision length, and intraoperative blood loss highlight its less invasive nature. These elements are crucial in orthopedic interventions as they align with enhanced recovery after surgery (ERAS) protocols, emphasizing reduced trauma and inflammation. The significant reduction in intraoperative blood loss by the lateral approach group suggests that it provides a more efficient view and access, facilitating quicker and less treacherous surgical manipulation. This likely contributes to reduced postoperative swelling and hematoma risk, which in turn may promote faster rehabilitation by reducing initial postoperative discomfort and improving pain management [24].

Pain management is a fundamental component of postoperative care, as reflected in our VAS score comparisons, where both approaches yielded comparable scores. This suggests that immediate postoperative pain may not be significantly influenced by the surgical approach. However, long-term outcomes, as seen in MEPS, favored the lateral approach, indicating that the initial surgical choice has prolonged benefits, possibly by enabling more effective joint stabilization and ligament preservation. Our observation aligns with the research findings of Zhu et al. [25], which emphasized that anatomical reduction and stable fixation are paramount for successful long-term joint function after fracture repair.

The lateral group's superior MEPS scores and higher excellent/good rates highlight the correlation between reduced tissue trauma and effective rehabilitation, facilitated by stable, anatomically precise fracture fixation. Higher scores in these metrics are excellent prognostic indicators for long-term joint function preservation and quality of life. This can be attributed to the lateral approach's capability to enable holistic joint preservation through the direct visualization and management of fracture fragments and collateral ligament integrity, which reduces the likelihood of future degen-

**Table 4.** Comparison of postoperative excellent/good rates between the two groups of patients

| | Excellent (n) | Good (n) | Acceptable (n) | Poor (n) | Excellent/Good rate [n (%)] |
|---|---|---|---|---|---|
| Lateral (n = 121) | 59 | 45 | 14 | 3 | 104 (85.95%) |
| Medial (n = 105) | 35 | 42 | 24 | 4 | 77 (73.33%) |
| $\chi^2$ | | | | | 5.612 |
| *P* | | | | | 0.018 |

**Table 5.** Comparison of incidence of postoperative complications between the two groups of patients

| | Elbow stiffness (n) | Heterotopic ossification (n) | Traumatic arthritis (n) | Numbness of fingers (n) | Incidence rate [n (%)] |
|---|---|---|---|---|---|
| Lateral (n = 121) | 2 | 0 | 0 | 0 | 2 (1.65%) |
| Medial (n = 105) | 5 | 2 | 3 | 3 | 13 (12.38%) |
| $\chi^2$ | | | | | 10.441 |
| *P* | | | | | 0.001 |

**Table 6.** Comparison of quality of life between two groups of patients six months after surgery

| | Lateral (n = 121) | Medial (n = 105) | *t* | *P* |
|---|---|---|---|---|
| Physical functioning (PF) | 67.80 ± 9.26 | 68.56 ± 9.77 | 0.596 | 0.552 |
| Role-physical (RP) | 66.20 ± 10.51 | 65.39 ± 10.23 | 0.588 | 0.557 |
| Bodily pain | 69.34 ± 11.37 | 70.32 ± 11.51 | 0.642 | 0.522 |
| General health perception (GH) | 65.78 ± 10.23 | 64.96 ± 10.35 | 0.595 | 0.553 |
| Vitality (VT) | 64.37 ± 10.47 | 65.11 ± 9.98 | 0.540 | 0.590 |
| Social functioning (SF) | 60.98 ± 10.36 | 61.12 ± 10.84 | 0.103 | 0.918 |
| Role emotional (RE) | 69.78 ± 11.25 | 69.34 ± 11.36 | 0.293 | 0.770 |
| Mental health (MH) | 65.19 ± 10.34 | 65.48 ± 10.62 | 0.204 | 0.839 |

erative change and maintains joint biomechanics [26, 27].

The significantly lower incidence of postoperative complications in the lateral group further underscores the multifaceted advantages of this approach. In contrast, the medial approach's higher incidence of complications, such as elbow stiffness, heterotopic ossification, and traumatic arthritis, may stem from its more invasive nature, which can cause higher possible disruption of stabilizing structures such as ulnar collateral ligaments. Additionally, the medial approach involves greater exposure to neurovascular structures, increasing the risk of scar tissue formation and possibly leading to less precise anatomic restoration. This finding is consistent with previous research by Teng et al. [28], who reported a similar trend in their study on lateral versus medial approaches.

Of note, differential anatomical exposures are provided by each approach. The lateral approach allows for direct visualization and repair of the fracture site without the need for excessive retraction of soft tissues. This could help explain its lower incidence of complications related to nerve damage, such as finger numbness, which was more frequently observed in the medial group. Reduced incidence of nerve pathology following the lateral approach may enhance patient satisfaction due to minimized sensory deficits and indirect improvements to dexterity and functional autonomy post-surgery.

The decision for surgical approach must also consider the patient-specific factors such as bone quality, fracture complexity, and the presence of concomitant injuries. Given the variability in the presentation of O'Driscoll type II fractures, tailoring the surgical approach to the fracture's intricacy and patient's overall condition could optimize results further. Surgeons should assess whether the enhanced visibility and minimally invasive nature of the lateral

approach can be universally applied, while considering their own surgical expertise and the availability of necessary equipment.

Understanding the biomechanical and physiologic factors underlying these outcomes can guide future surgical training and decision-making framework. Our findings corroborate that while patient outcomes can be improved through meticulous surgical planning, the need for comprehensive postoperative care tailored to each patient's recovery trajectory, remains crucial. While SF-36 scores were similar, indicating that the overall quality of life was similar between the two groups; individualized rehabilitation protocols focusing on range of motion and functional strength may leverage the foundational joint stability provided by the lateral approach for better long-term patient satisfaction.

Despite the valuable insights gained from our study, several limitations should be acknowledged. First, as a retrospective study, it inherently possesses potential selection and recalls biases, which might affect the generalizability of our findings. Additionally, the study's single-institution design limits the diversity of surgical techniques and patient demographics, which may influence outcome. Furthermore, the relatively short follow-up period of six months may not fully capture long-term complications and functional outcomes, necessitating further longitudinal research to validate and expand upon our results. Lastly, variations in surgeon expertise and the absence of randomization might have introduced performance bias, impacting the study's internal validity.

In conclusion, our study advocates that the anterolateral approach offers multiple advantages over the medial approach regarding surgical metrics and patient outcomes in treating ulnar coronoid process fractures. While both approaches can achieve satisfactory outcomes, the lateral approach presents significant advantages in reducing complication risks and fostering superior joint function and mobility. These findings advocate for further refinement of approach-specific techniques and postoperative care protocols, with the potential to extend these benefits to other types of elbow fractures.

## Disclosure of conflict of interest

None.

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