

Upper Limb Disability after Treatment in Robinson Type IIB1 Clavicle Fractures in a Secondary Care Hospital

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ABSTRACT

Introduction: Robinson type IIB1 clavicle fractures are the most common mid-clavicular fractures, and their management remains a subject of debate. While conservative treatment has historically been the first choice, recent evidence suggests functional advantages of surgical management.

Objective: To compare upper limb disability after conservative and surgical treatment in type IIB1 clavicle fractures in a secondary level hospital.

Materials and methods: This was an observational, cross-sectional, analytical, and prospective study conducted between March 2025 and August 2025. Patients aged 18–40 years with type IIB1 fractures treated conservatively or surgically were included. Functional disability was assessed at six months using the QuickDASH scale. Student's t-test was used to compare means; $p < 0.05$ was considered significant.

Results: One hundred patients were analyzed: 86% male, with a mean age of 29.3 years. The predominant mechanism of injury was traffic accident (76%). The mean QuickDASH disability score was 8.68 in the conservative group and 8.14 in the surgical group. The difference was not statistically significant ($t=1.23$; $p=0.224$).

Conclusions: Surgical treatment resulted in less upper limb disability compared to conservative management, although the difference did not reach statistical significance. Clinically, surgery may offer slightly better functional recovery in type IIB1 displaced fractures.

KEYWORDS: Clavicle fracture, QuickDASH, surgical treatment, conservative treatment, Robinson IIB1.

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INTRODUCTION

Clavicle fractures represent between 2.6% and 4% of all fractures, with those of the middle third (Robinson IIB1) being the most frequent. Although conservative management has prevailed for decades due to the high rate of union, recent studies indicate higher rates of malunion, shortening, and nonunion in displaced fractures treated without surgery.

Surgical treatment has gained importance because it provides anatomical alignment, mechanical stability, and early functional recovery. However, the evidence remains inconsistent, and the treatment decision depends on the clinical context and local resources.

Given the absence of comparative studies in our region and the importance of measuring upper limb functionality in orthopedic practice, we proposed to evaluate upper limb disability after both types of treatment using the QuickDASH scale.

MATERIALS AND METHODS

Study design

Observational, cross-sectional, analytical, prospective study. Conducted at the Orizaba Veracruz Regional General Hospital. No. 1.

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Population and sample

Patients aged 18 to 40 years diagnosed with Robinson type IIB1 clavicle fracture treated at a secondary care hospital between March and August 2025.

Convenience sampling. Total: **100 patients**.

Inclusion criteria

- Radiological diagnosis of type IIB1 fracture
- Conservative or surgical treatment
- Informed consent
- Minimum follow-up of 6 months

Exclusion criteria

- Open fractures
- Brachial plexus injury
- Abandonment of monitoring
- Incomplete data or QuickDASH not answered

Variables

- **Independent:** type of treatment
- **Dependent:** Disability (QuickDASH)
- **Other factors:** age, sex, laterality, dominant limb, mechanism of injury

ETHICAL CONSIDERATIONS

The present research project was submitted for evaluation by the Local Committees for Research and Ethics in Health 3101 of the Mexican Social Security Institute for its assessment and acceptance.

This study was conducted on human beings and under criteria of respect for their dignity and the protection of their rights, considering the regulations of the General Health Law on Health Research in its article 17, since this research is classified without risk since the information will be obtained through a survey answered by the patients.

This project also adheres to the following documents and declarations:

-The Declaration of Helsinki of the World Medical Association, which sets forth the Ethical Principles for Medical Research Involving Human Subjects, adopted by the 8th World Medical Assembly, Helsinki, Finland in June 1964. This includes the latest amendment made by the General Assembly in October 2013, and the Taipei Declaration on Ethical Considerations Regarding Health Databases and Biobanks, which officially complements the Declaration of Helsinki since 2016, as reported by the World Medical Assembly.

The data was used correctly and absolute confidentiality was maintained. This is in accordance with the Federal Law on the Protection of Personal Data, and NOM-004-SSA3-2012, Clinical Record (sections 5.4, 5.5 and 5.7).

Functional assessment

QuickDASH scale was applied six months post-treatment (0% = no disability).

Statistical analysis

Mean comparisons were performed using Student's t-test. $p < 0.05$ was considered significant.

RESULTS

One hundred patients diagnosed with clavicle fractures, classified as Robinson IIB1, were analyzed. Two treatment groups were formed: conservative and surgical. The sample consisted of 86 men (86%) and 14 women (14%). The mean age was 29.32 years. Functional status (QuickDash): The mean disability score on this scale was 8.68 for the conservatively treated group and 8.13 for the surgically treated group. A comparison of means was performed using SPSS. A Student's t-test yielded a t-value of 1.23. The **p-value** for the Student's t-test was $p \approx 0.224$; therefore, the difference between the two groups was **not considered statistically significant**.

Statistical analysis

- $t = 1.23$
- $p = 0.224$
→ Not significant.

Interpretation: Although the surgical group showed less disability, the difference did not reach statistical significance.

DISCUSSION

The results of this study show that surgical management of type IIB1 fractures produces a slightly lower disability at six months compared to conservative management, although without a statistically significant difference.

These findings are partially consistent with recent studies such as those by **Han et al. (2024)**, who found faster union, less malunion, and earlier return to work in surgically managed patients, although without marked differences in QuickDASH.

Meta-analyses such as that of **Qvist et al. (2024)** report that surgery offers early functional advantages, but small in magnitude, which coincides with the small difference observed in our study (8.14 vs 8.68).

Other international studies (Mannan 2024, Kolipaka 2024) reinforce the functional superiority of surgical management in displaced fractures, although with variability in outcomes. In Latin America, studies such as **Colina Velasco's (2023)** demonstrate better functional results with surgery, although with a higher risk of pseudoarthrosis.

The homogeneity of our population (young adults, high-energy mechanism) and adequate follow-up strengthen the internal validity of the findings. However, the limited sample size and possible selection bias could explain the lack of statistical significance.

CONCLUSIONS

Surgical treatment of type IIB1 clavicle fractures showed less upper limb disability according to QuickDASH at six months. The functional difference compared to conservative treatment was not statistically significant, but it was clinically relevant. The results support surgery for displaced fractures, especially in young and active patients. The treatment decision should be individualized, considering the risk-benefit ratio, functional demands, and patient preferences.

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APPENDICES

Table 1. Sex of patients with clavicle fracture

Sex	Frequency	Percentage
Male	86	86
Female	14	14
Total	100	100

Male predominated 86 (86%) n=100

Table 2. Mechanism of injury in patients with clavicle fracture

	Conservative treatment f %	Surgical treatment f %	Total
Drop from support plane	0 0	0 0	0
Traffic accident	33 33	43 43	76
Injury sports	9 9	5 5	14
Others	8 8	2 2	10

Traffic accidents predominate as the injury mechanism in 76 (76%) n=100

Table 3. Laterality of the clavicle fracture

Laterality	Conservative treatment f %	Surgical treatment f %
Left	18 18	20 20
Right	32 32	30 30

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Table 4. Dominant thoracic limb

Dominant thoracic limb	Conservative treatment (F)	Conservative treatment (%)	Surgical treatment (F)	Surgical treatment (%)
Left	7	7	10	10
Right	40	40	43	43

The right side predominated with 62 patients (62%) n=100