

Use of a Washer Does Not Affect the Rate of Implant Removal or Elbow Motion After Fixation of Medial Epicondyle Fractures

Neeraj M. Patel, MD, MPH, MBS¹; Christopher R. Gajewski, BA²; Anthony M. Ascoli, BS²; J. Todd R. Lawrence, MD, PhD²

¹Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL

²Children's Hospital of Philadelphia, Philadelphia, PA

BACKGROUND

- Many controversies surround the evaluation and treatment of medial epicondyle fractures in children.
- Use of a washer to supplement screw fixation can prevent fragmentation and penetration during the fixation of medial epicondyle fractures.
- However, concerns may arise regarding screw prominence and the need for subsequent implant removal.
- The purpose of this study is to evaluate the impact of washer utilization on the need for hardware removal and elbow range of motion (ROM).

METHODS

- All surgically-treated pediatric medial epicondyle fractures with a single screw over a 7-year period were queried for this retrospective case-control study.
- Implant removal was performed only if the patient experienced a complication or implant-related symptoms that were refractory to non-operative management.
- Full ROM was considered flexion beyond 130 degrees and less than a 10-degree loss of extension.
- Univariate analysis was followed by Kaplan-Meier (one minus survival) analysis to evaluate the time until full ROM was regained. Curves between patients with and without a washer were compared with a log rank test.

RESULTS

- 137 patients were included (Table 1). 54% received a 4.0 mm cannulated screw and all others received a 4.5 mm cannulated screw.
- 31 patients (23%) required implant removal.
- There was not an increased rate of screw removal in patients with a washer ($p=0.11$, Table 2).
- The mean BMI of patients that underwent hardware removal (19.1 ± 2.5) was similar to that of children who did not (20.4 ± 3.5 , $p=0.06$).
- In athletes ($n=102$): There was no difference in removal rate if a washer was used ($p=0.64$).
- 107 patients (78%) regained full ROM at a mean of 13.9 ± 9.7 weeks after surgery (Figure 1).
- There was no difference in the rate of patients achieving full ROM or the mean time to full ROM in those with and without a washer ($p=0.46$ and 0.21 , respectively).

Sex	
Male	85 (62%)
Female	52 (38%)
Age at surgery	12.2 ± 2.3 years
BMI	20.1 ± 3.3
Competitive athlete	102 (74%)
Concomitant presenting symptoms	
Elbow dislocation	58 (42%)
Ulnar nerve symptoms	21 (15%)
Incarcerated fragment	18 (13%)
Washer used	90 (66%)

Table 1. Demographic information

	Screw + washer	Screw only
Implants removed	17 (19%)	14 (30%)
Implants retained	73 (81%)	33 (70%)
Total	90 (100%)	47 (100%)

Table 2. Implant removal rate vs. washer use ($p=0.11$)

DISCUSSION

- A washer may distribute compressive forces over a larger surface area, but concerns of hardware prominence may discourage surgeons from utilizing a washer in some situations.
- Pace and Hennrikus (2017)¹: 17 patients, of which 58% with a washer required hardware removal vs. 0% of those without.
 - Of note, only 5/17 were treated without a washer.
 - 16/17 were competitive athletes.
 - These differences were not found in the present study ($n=137$).
- Limitations:
 - Retrospective.
 - No quantifiable indication for washer use.

CONCLUSION

- Use of a washer did not affect
 - The rate of implant removal
 - Likelihood of achieving full ROM
 - Time required to achieve full ROM
- These results held true in subgroup analysis of
 - Competitive athletes
 - Thinner (lower BMI) patients

REFERENCES

1. Pace GI, Hennrikus WL. Fixation of Displaced Medial Epicondyle Fractures in Adolescents. J Pediatr Orthop. 2017 Mar;37(2):e80-e2.

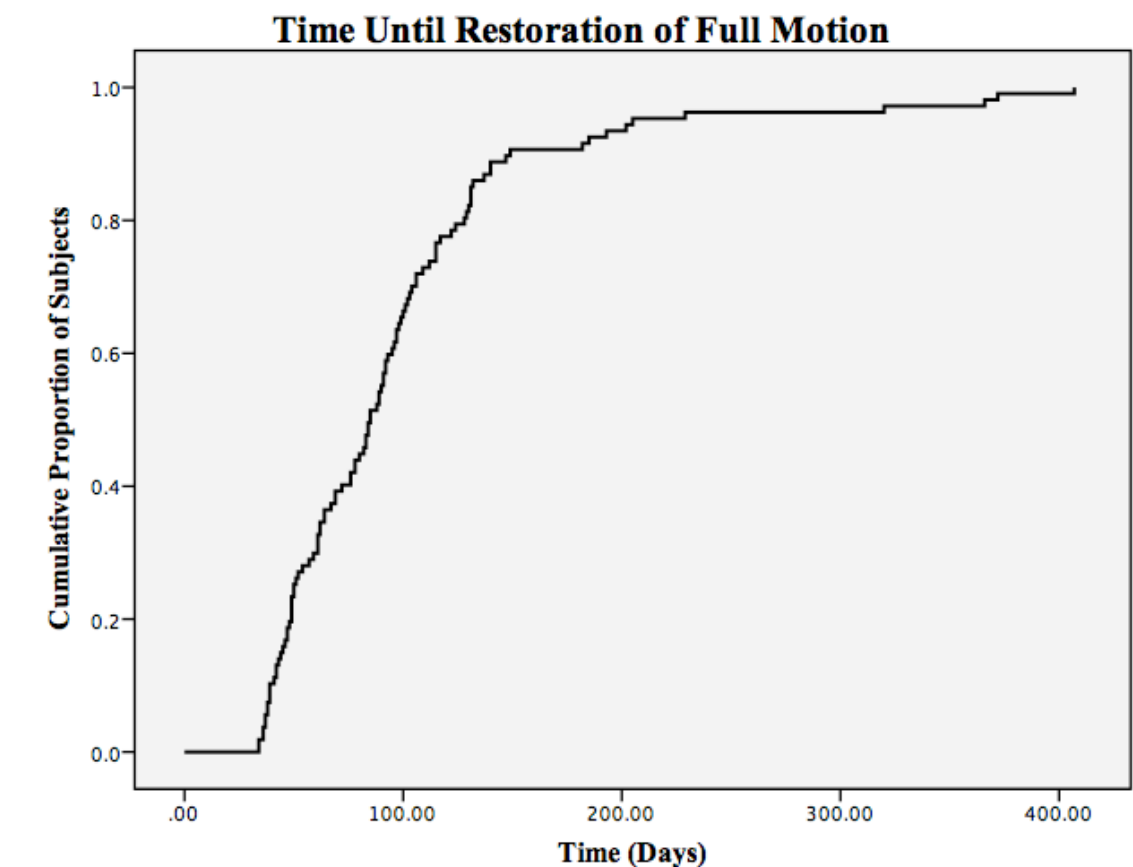


Figure 1. Kaplan-Meier (1-survival) analysis. The mean time to full ROM was 85 days.