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Distal Radius Fractures: Comparing Surgical Approaches to Identify Functional Outcomes

Sonia Morales
A.T. Still University

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Sonia Morales, OTDS

A.T. Still University: Mesa, AZ

Introduction

Distal radius fractures (DRF) are commonly encountered fractures in clinical settings. Although the volar approach has gained recognition as the standard surgical treatment method to treat DRF there is still great debate as to what exactly the surgery should consist of. Individuals who suffer from a DRF have a high prevalence of developing carpal tunnel syndrome (CTS). Surgeons are unsure if individuals will benefit more from solely performing a volar open reduction and internal fixation (ORIF) surgery or to perform the volar ORIF along with carpal tunnel release (CTR) in the same surgery procedure. Therefore, the purpose of this study was to assess the functional outcomes between the two surgical approaches. There were two study groups; one with individuals who solely underwent a volar ORIF surgery and the other with individuals who underwent both a volar ORIF and CTR in the same surgery. Functional outcome measures were assessed using the Boston Carpal Tunnel Questionnaire (BCTQ), Nine-Hole Peg test, wrist extension/flexion range of motion (ROM), and circumference measurement at the metacarpophalangeal (MCP) joint and distal wrist crease to determine if one surgical method's outcomes were superior to the other in order to establish a standardized surgical approach when treating DRF.

Methods

- This a pilot descriptive analysis that took place in an outpatient hand therapy clinical setting.
- Participants were scouted using the clinic's electronic medical records system of all 12 sites.
- Outcome measurements were taken bi-weekly
  - -BCTQ
  - -Nine-Hole Peg Test
  - -Wrist Extension/Flexion ROM
  - -Circumference Measurement
    - Wrist Distal Crease
    - MCP Joint

References: See flyer for link

	Group	Start	End	Change
Circumference At Left MCP Joint	ORIF & CTS:	19.50cm	19.00cm	0.50cm
	ORIF Only:	18.00cm	17.75cm	0.25cm
Circumference At Right MCP Joint	ORIF & CTS:	19.12cm	19.00cm	0.12cm
	ORIF Only:	18.50cm	16.50cm	2.00cm
BCTQ-SSS	ORIF & CTS:	32.25pts	32.00pts	0.25pts
	ORIF Only:	26.28pts	19.50pts	6.78pts
Right Wrist Extension ROM	ORIF & CTS:	52°	55°	3°
	ORIF Only:	49°	65°	16°

Project Timeline (14 weeks) January 4, 2021 – April 9, 2021

Week		Plan	
1	January 4 – 8	4 Weeks	Shadow and train under the supervision of Rae Aaronson, build rapport with staff members at the clinical sites, build rapport with patients, and begin accepting participants for study. Deidentify participants, perform the BCTQ and Nine-Hole Peg test biweekly.
2	January 11 – 15		
3	January 18 - 22		
4	January 25 - 29		
5	February 1 – 5		Continue to add new participants, attend participants therapy appointments, and collect data bi-weekly
6	February 8 – 12		
7	February 15 – 19		Last Week to Accept New Participants
8	February 22 – 26	9 Weks	Continue with bi-weekly data collection by attending participants therapy appointments
9	March 1 – 5		
10	March 8 – 12		
11	March 15 – 19		
12	March 22 – 26		
13	March 29 – April 2		
14	April 5 – April 9	1 Week	Data analysis, organizing data, & end of data collection

Participants	
DRF	
ORIF	7
ORIF+CTR	4
Male	0
Female	11
18+	11
Be willing to attend designated outpatient clinic	

Limitations

The limitation to the study were population size, time frame for data collection, and lack of gender variability, which does not allow for public generalization. There was a total of 11 participants recruited for this study, the graduate student and overseeing licensed occupational therapist attempted to overcome this limitation by using all 12 sites of EMR system to recruit participants. However, due to the Corona Virus Disease-19 (COVID-19) pandemic, at the time the study was being implemented only elective surgeries were being performed in attempt to help prevent the spread of COVID-19, having medical personal on standby to assist with COVID-19 cases, and to protect equipment and ventilators for the use of serve COVID-19 cases. Consequently, making it difficult to recruit participants who fit the inclusion criteria as new patients being admitted to surgery for DRF. 14-weeks was not sufficient time to observe significant changes in participant; nevertheless, no changes could be made to the time frame as it was a set timeline the doctoral student school provided.

Conclusion

There is no standardized surgical procedure when treating DRF. The volar approach for performing an ORIF surgery has currently taken recognition as the preferred surgical procedure; however, this technique has yet to be mastered. There is great deliberation whether surgeons should perform both ORIF and CTR at the same time or to just perform the ORIF procedure and wait and see if the individual later requires CTR. The purpose of this pilot study was to help narrow the current gap in the literature and provide evidence that one surgical approach may be superior to the other by offering better functional outcomes. Future studies should attempt to gather a bigger and variable sample size, as well as track functional outcomes longer than 14-weeks.

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