

Radiological comparison of two immobilization methods in the non-surgical treatment of distal radius fractures in the elderly: Single sugar-tong splint shows similar efficacy to long-arm cast

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ABSTRACT

BACKGROUND: This study aims to compare the effectiveness of the long-arm cast (LAC) and the single sugar-tong splint (SSTS) in the non-operative treatment of distal radius fractures in the geriatric population.

METHODS: Patients consulted at the Orthopedics and Traumatology Department within the Emergency Department (ED) were reviewed through the electronic archives of a tertiary university hospital over a five-year period. The study included patients aged 65 years and older with a distal radius fracture who required reduction, had successful closed reduction, and had at least six weeks of X-ray follow-up. The patients were divided into two groups based on the immobilization method: the SSTS group (n=88) and the LAC group (n=31). The patients' radiographs taken after reduction in the ED, as well as at the 1st, 2nd, 4th, and 6th weeks, were evaluated. Radial height, radial inclination, volar tilt, and ulnar variance were measured on the radiographs at each visit. The delta value was calculated by subtracting the measurement on the first post-reduction radiograph from the measurement taken at the sixth week. The data obtained were then compared between the two groups.

RESULTS: A total of 119 patients (93 females, 26 males, mean age: 72.9±7.3 years; range, 65 to 90 years) were included. The mean age was 74.6±7.6 in Group 1 and 72.3±7.2 in Group 2 (p=0.135). Group 1 consisted of 26 females and 5 males; Group 2 included 67 females and 21 males (p=0.52). Statistically significant differences were observed in post-reduction volar tilt (p=0.005), first week volar tilt (p=0.020), post-reduction ulnar variance (p=0.044), first week ulnar variance (p=0.037), and second week ulnar variance (p=0.027) between the groups. No statistically significant differences were detected in other radiological parameters, including delta values. Two patients in Group 1 and seven patients in Group 2 required secondary intervention (p=1).

CONCLUSION: In the non-operative management of geriatric distal radius fractures, the SSTS is an immobilization technique that is as effective as the LAC.

Keywords: Geriatric distal radius fracture; long-arm cast; single sugar-tong splint.

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INTRODUCTION

Distal radius fractures are the most common fractures of the upper extremity and the second most common fractures in the geriatric population, following hip fractures.^[1,2] They account for 18% of fractures in this age group.^[3] As life expectancy and activity levels increase in the geriatric population, the likelihood of sustaining this injury is expected to rise.^[4,5] These prevalent fractures not only cause significant morbidity but also place a substantial burden on healthcare systems.^[6] Consequently, numerous studies have been conducted to determine the ideal treatment options. Although there is no clear consensus on the treatment of distal radius fractures in the geriatric population, some studies have argued that conservative treatment is the gold standard.^[1,5,7]

In non-operative treatment, various immobilization devices are used to maintain the reduction of an extremity following closed reduction. Traditionally, short-arm casts (SAC) and long-arm casts (LAC) are employed. After the reduction of these fractures, soft tissue pressure increases due to swelling, particularly in circular casts. This can lead to neurovascular complications and skin issues.^[8] Splitting circular casts is a common technique used to prevent these complications and has been shown not to result in loss of reduction.^[9] However, splitting the cast can lead to saw-related complications and is time-consuming.^[9,10] Additionally, LACs rigidly restrict elbow movement, and prolonged elbow immobilization can result in a stiff elbow.^[11-13]

Recent publications have demonstrated that sugar-tong splints (STSs) are as effective as circular casts in managing these fractures in both pediatric and adult populations.^[14] In addition to providing adequate immobilization, STSs offer advantages such as eliminating the need for cast splitting and providing a less rigid form of fixation (Fig. 1).

The aim of the present study was to compare the effectiveness of LAC and single sugar-tong splint (SSTS) in the non-operative treatment of distal radius fractures in the geriatric population. The hypothesis was that SSTS would be as effective as LAC in this patient group.

MATERIALS AND METHODS

The current study was conducted as a single-center retrospective study in Ege University Hospital. Local ethics committee approval was obtained (decision no: 20-5.1T/4). Traditionally, in the tertiary university hospital where the study was conducted, long-arm casts were used for immobilization in the non-operative treatment of distal radius fractures requiring reduction, and these casts were split to prevent complications. However, after March 2018, single sugar-tong splints began to be used for these fractures to reduce time loss in the emergency room and to minimize cast and saw-related complications.

Patients who were consulted at the Orthopedics and Trau-

matology Department in the Emergency Department (ED) were reviewed using the hospital's electronic archive over a five-year period. The study included patients aged 65 years and older with distal radius fractures who required reduction, had successful closed reduction, and had at least six weeks of X-ray follow-up. Fractures for which satisfactory reduction could not be achieved and direct surgery was recommended, fractures that did not require reduction, open fractures, and patients with insufficient follow-up were excluded from the study. Ultimately, a total of 119 patients (93 females, 26 males; mean age: 72.9±7.3 years; range, 65 to 90 years) were included. The patients were divided into two groups according to the immobilization method: the SSTS group (n=88) and the LAC group (n=31).

Fractures were classified according to the AO (Arbeitsgemeinschaft für Osteosynthesefragen) classification. Patients' radiographs were taken after reduction in the ED, as well as at the 1st, 2nd, 4th, and 6th weeks. Cases requiring additional intervention (manipulation or surgery) during the follow-up period were identified. Radial height, radial inclination, volar tilt, and ulnar variance were measured on the radiographs at each visit. The delta value was calculated by subtracting the measurements on the first post-reduction radiograph from those taken at the sixth week. The data obtained were then compared between the two groups.

Treatment Methods

Closed reduction for all cases was performed immediately under sedation in the ED by a junior orthopedic resident under the supervision of a senior orthopedic resident. The sedation protocol was managed by ED physicians. Cases with acceptable reduction were followed non-operatively, while surgical treatment was planned for patients whose fractures could not be adequately reduced.

Circumferential cotton undercast padding was applied before both the LAC and SSTS were applied, using 10 cm plaster rolls. The SSTS were constructed with 15 layers of plaster. After applying circumferential cotton padding, the SSTS was placed starting just proximal to the palmar crease, extending dorsally around the elbow, and ending at the dorsal metacarpophalangeal joint level. The wrist was splinted in slight ulnar deviation and either flexion or extension, depending on the apex

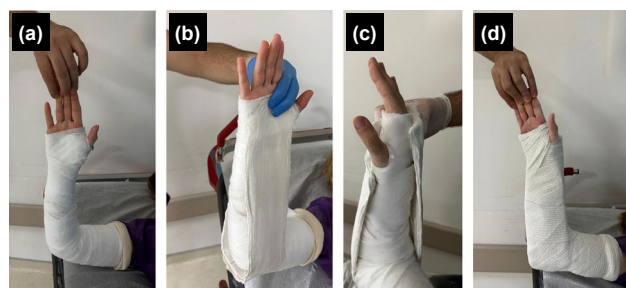


Figure 1. Preparation of the single sugar-tong splint (SSTS): (a) Application of circumferential cotton undercast padding. (b,c) Placement of the splint. (d) Securing with elastic wrapping.



Figure 2. Preparation of the long-arm cast (LAC): (a) Rolling of the plaster. (b) Positioning of the LAC.

direction of the fracture (apex volar fractures were splinted in flexion, and apex dorsal fractures were splinted in extension). An elastic wrap was used to secure the SSTS.^[11,14-16]

After cotton padding, three or four layers of plaster were applied for the LAC, depending on the size of the patient. Apex volar fractures were casted in slight flexion, ulnar deviation, and pronation, while apex dorsal fractures were casted in slight extension, ulnar deviation, and supination.

Patients in the LAC group, the cast was allowed to dry and then the cast was split and the patient was discharged, while those in the SSTS group were discharged immediately. Patients were instructed on circulatory monitoring and were subsequently called in for a circulatory examination. All patients underwent X-ray evaluations at the first, second, fourth, and sixth weeks. In cases where a loss of reduction was detected during follow-ups, re-manipulation or surgical treatment was applied if the fracture could not be re-reduced. If there was no loss of reduction during follow-ups in either the LAC or SSTS groups, the immobilization method was converted to a short-arm cast in the fourth week. The cast was removed in the sixth week, marking the end of the treatment.

Evaluation of the Radiographs

Evaluations and measurements were performed using Sectra version 22.1 software (Sectra AB, Linköping, Sweden). Fractures were classified according to the AO-Orthopaedic Trauma Association (OTA) classification system. X-rays taken immediately after reduction in the ED, as well as at the first, second, fourth, and sixth weeks, were analyzed. Radial inclination, radial height, volar tilt, and ulnar variance were measured at each visit. Measurements where the tilt was dorsal and the ulnar variance was negative were recorded as negative values. Delta (Δ) values were calculated by subtracting the measurements taken immediately after reduction from those taken at the sixth week. During the follow-up period, cases that required re-reduction or surgical intervention due to exceeding the acceptable reduction criteria were classified

as unsuccessful treatments.

Radiographic measurements were taken by three researchers, and the average of the obtained values was used for analysis. In cases where there was a difference of more than 10% between measurements, the final values were determined based on the consensus reached during face-to-face meetings between the researchers.

Statistical Analysis

Statistical analysis was performed using SPSS for Windows, version 23.0 (IBM Corp., Armonk, NY, USA). The normality of the distribution was assessed using the Kolmogorov-Smirnov test. An independent samples t-test was employed to compare continuous variables that met parametric assumptions, while the Mann-Whitney U test was used for continuous variables that did not meet parametric assumptions. The chi-square test was utilized to compare categorical variables. A p-value of less than 0.05 was considered statistically significant.

Post hoc power analysis was performed using G*Power software (version 3.1.9.7; Dusseldorf, Germany). The effect size was set at 0.5, and the alpha error probability was 0.05. The post-hoc power for the Mann-Whitney test, independent sample t-test, and chi square test were 0.75, 0.77, and 0.73, respectively.

RESULTS

There was no difference between the groups in terms of general characteristics. The mean age was 74.6 ± 7.6 in Group 1 and 72.3 ± 7.2 in Group 2 ($p=0.135$). Group 1 consisted of 26 females and 5 males; Group 2 included 67 females and 21 males ($p=0.52$). Thirteen right and 18 left upper extremities were injured in Group 1, while 46 right and 42 left upper extremities were injured in Group 2 ($p=0.435$). Two patients in Group 1 (6.5%) and seven patients in Group 2 (8%) required repeat interventions ($p=1$). When evaluating the distribution of fractures according to the AO-OTA classification, the most common fracture was AO-OTA class 2R3A2 [Group 1: 17 (54.8%); Group 2: 63 (73.6%)]. The second most common fracture was 2R3C1 [Group 1: 4 (12.9%); Group 2: 12 (13.6%)]. The least common fracture type was 2R3B3 [Group 1: 1 (3.2%); Group 2: 1 (1.1%)] (Table 1).

The mean post-reduction radial inclination was $20.46 \pm 5.35^\circ$ in Group 1 and $21.21 \pm 4.91^\circ$ in Group 2 ($p=0.488$). There were no differences in radial inclination at the 1st, 2nd, and 4th weeks ($p=0.305$, $p=0.853$, and $p=0.911$, respectively). The 6th-week radial inclination was $19.25 \pm 5.04^\circ$ in Group 1 and $19.15 \pm 4.86^\circ$ in Group 2 ($p=0.923$). Delta radial inclination did not show a statistically significant difference ($p=0.361$) (Table 2).

Mean post-reduction radial height was 10.60 ± 2.68 mm in Group 1 and 10.88 ± 2.86 mm in Group 2 ($p=0.645$). There were no differences in radial height at the 1st, 2nd, and 4th

Table 1. General characteristics of the patients

	Immobilization Type				p
	LAC Group (n=31)		SSTS Group (n=88)		
	N	%	N	%	
Sex Female	26	83.9%	67	76.1%	0.52
Male	5	16.1%	21	23.9%	
Side Right	13	41.9%	46	52.3%	0.435
Left	18	58.1%	42	47.7%	
AO-OTA Classification					
2R3A2	17	54.8%	63	71.6%	...
2R3A3	2	6.5%	2	2.3%	
2R3B1	3	9.7%	4	4.5%	
2R3B2	1	3.2%	3	3.4%	
2R3B3	1	3.2%	1	1.1%	
2R3C1	4	12.9%	12	13.6%	
2R3C2	3	9.7%	3	3.4%	
Need for Repeated Intervention					
Yes	2	6.5%	7	8.0%	1
No	29	93.5%	81	92.0%	
		Immobilization Type			p
		LAC Group (n=31)	SSTS Group (n=88)		
Age (years) ± Standard Deviation		74.6±7.6	72.3±7.2		0.135

Group 1: Long-Arm Cast (LAC), Group 2: Single Sugar-Tong Splint (SSTS).

weeks ($p=0.301$, $p=0.798$, and $p=0.863$, respectively). The 6th week radial height was 10.07 ± 2.88 mm in Group 1 and 9.85 ± 2.85 mm in Group 2 ($p=0.722$). Delta radial height did not show a statistically significant difference ($p=0.298$).

Mean post-reduction volar tilt was $3.73\pm 7.14^\circ$ in Group 1 and $8.92\pm 8.74^\circ$ in Group 2 ($p=0.005$). The 1st week volar tilt was $2.49\pm 9.53^\circ$ in Group 1 and $7.41\pm 9.64^\circ$ in Group 2 ($p=0.020$). There were no differences in volar tilt at the 2nd and 4th weeks ($p=0.128$ and $p=0.328$, respectively). The 6th week volar tilt was $1.16\pm 9.87^\circ$ in Group 1 and $4.26\pm 11.31^\circ$ in Group 2 ($p=0.193$). Delta volar tilt did not show a statistically significant difference ($p=0.260$).

Mean post-reduction ulnar variance was 3.16 ± 3.02 mm in Group 1 and 1.74 ± 3.28 mm in Group 2 ($p=0.044$). The first week ulnar variance was 3.43 ± 3.05 mm in Group 1 and 1.89 ± 3.48 mm in Group 2 ($p=0.037$). The second week ulnar variance was 3.61 ± 3.28 mm in Group 1 and 2.10 ± 3.06 mm in Group 2 ($p=0.027$). There were no differences in terms of 4th week ulnar variance ($p=0.054$). The 6th week ulnar variance was 3.63 ± 3.13 mm in Group 1 and 2.53 ± 3.01 mm in Group 2 ($p=0.096$). Delta ulnar variance did not show a statistically significant difference ($p=0.310$).

DISCUSSION

The most important finding in the current study is that, in the non-operative management of geriatric distal radius fractures, the SSTS is an immobilization technique as effective as LAC.

It is unsurprising that distal radius fractures attract significant attention from clinicians and researchers worldwide, as they account for nearly one-fifth of all fractures in certain age groups.^[17] Despite the extensive number of studies published on the treatment of these fractures, a clear consensus has yet to be reached. In recent years, there has been a trend toward the use of volar locking plating.^[18] A recent meta-analysis of randomized controlled trials suggests that surgical treatment may be more effective for certain patients with distal radius fractures.^[19] However, the elderly population should be treated differently than the general adult population. Older adults typically have lower activity expectations compared to younger individuals. Additionally, due to the higher likelihood of accompanying comorbidities, both patients and surgeons may prefer conservative treatment over surgical intervention.

There is an increasing trend toward open reduction not only in young adults but also in the elderly.^[20] However, a

Table 2. Radiological measurements of the patients

	Immobilization Type						p
	Total		LAC Group		SSTS Group		
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	
Post-Reduction Radial Inclination, Degrees	21.01	5.02	20.46	5.35	21.21	4.91	0.488
1st Week Radial Inclination, Degrees	20.38	4.83	19.58	5.21	20.66	4.68	0.305
2nd Week Radial Inclination, Degrees	20.25	5.13	20.40	5.50	20.20	5.03	0.853
4th Week Radial Inclination, Degrees	19.42	4.79	19.34	5.20	19.45	4.67	0.911
6th Week Radial Inclination, Degrees	19.17	4.89	19.25	5.04	19.15	4.86	0.923
Δ Radial Inclination, Degrees	-1.85	4.15	-1.24	3.72	-2.07	4.30	0.361
Post-Reduction Radial Height, mm	10.81	2.80	10.60	2.68	10.88	2.86	0.645
1st Week Radial Height, mm	10.61	2.77	10.16	2.76	10.78	2.77	0.301
2nd Week Radial Height, mm	10.43	2.82	10.54	2.92	10.39	2.80	0.798
4th Week Radial Height, mm	9.99	2.65	10.07	2.43	9.97	2.74	0.863
6th Week Radial Height, mm	9.91	2.85	10.07	2.88	9.85	2.85	0.722
Δ Radial Height, mm	-0.90	2.22	-0.53	2.14	-1.03	2.25	0.298
Post-Reduction Volar Tilt, Degrees	7.55	8.62	3.73	7.14	8.92	8.74	0.005
1st Week Volar Tilt, Degrees	6.12	9.81	2.49	9.53	7.41	9.64	0.020
2nd Week Volar Tilt, Degrees	4.17	9.51	1.86	8.77	5.00	9.67	0.128
4th Week Volar Tilt, Degrees	3.25	10.51	1.60	9.19	3.84	10.93	0.328
6th Week Volar Tilt, Degrees	3.44	10.99	1.16	9.87	4.26	11.31	0.193
Δ Volar Tilt, Degrees	-4.13	9.01	-2.50	8.44	-4.71	9.19	0.260
Post-Reduction Ulnar Variance, mm	2.12	3.26	3.16	3.02	1.74	3.28	0.044
1st Week Ulnar Variance, mm	2.30	3.42	3.43	3.05	1.89	3.48	0.037
2nd Week Ulnar Variance, mm	2.50	3.17	3.61	3.28	2.10	3.06	0.027
4th Week Ulnar Variance, mm	2.64	3.10	3.59	3.12	2.30	3.04	0.054
6th Week Ulnar Variance, mm	2.82	3.07	3.63	3.13	2.53	3.01	0.096
Δ Ulnar Variance, mm	0.70	1.43	0.47	1.31	0.79	1.47	0.310

Bold values indicate a level of significance at $p < 0.05$. Group 1: Long-arm cast (LAC), Group 2: Single sugar-tong splint (SSTS). Δ: 6th week - post-reduction value.

systematic review and meta-analysis by Michael et al. found no clinical benefit to the surgical treatment of distal radius fractures with volar locking plates in patients over 60 years old compared to nonsurgical treatment.^[21] Luokkala et al. concluded that non-operative treatment can be considered the gold standard for elderly patients.^[1] Gutiérrez-Monclus et al. reported no significant correlation between acceptable alignment based on radiological parameters and short- or medium-term functional outcomes in elderly patients with extra-articular distal radius fractures treated conservatively.^[22] Similarly, Hosokawa et al. found that malunion did not predict QuickDASH (Disabilities of the Arm, Shoulder, and Hand) scores at one-year post-surgery.^[23]

In a prospective randomized trial, Caruso et al. reported no difference between above-elbow and below-elbow casts in

the conservative treatment of extra-articular distal radius fractures.^[24] Similarly, in a systematic review and meta-analysis, Raj et al. found that above-elbow and below-elbow immobilization in adults resulted in non-significant differences in functional and radiological outcomes but a significant increase in complication rates in the above-elbow group.^[25] Although recent literature shows no difference between the outcomes of below-elbow and above-elbow immobilization, some practitioners continue to use above-elbow methods in their practice. The current study presents the results of two above-elbow methods.

Compartment syndrome, which may occur due to swelling after fractures, is one of the complications most feared by orthopedic surgeons. To prevent this, splitting the cast is often employed; however, this can result in loss of time and saw-

related complications. Since splitting is not necessary with SSTS, these issues are avoided.^[14] Above-elbow casts provide very rigid elbow immobilization and can cause elbow stiffness with prolonged use. In contrast, sugar-tong splints are less rigid and allow limited elbow movement.^[11-13] The current study found that LAC and SSTS had comparable effects in the non-surgical management of distal radius fractures. Therefore, clinicians who prefer above-elbow immobilization for these fractures may consider using SSTS.

The present study has several limitations. First, it has a retrospective design. The second limitation is that the radiological measurements were dependent on the quality of the radiographs. To minimize errors, radiographic measurements were conducted by three researchers, and the average of the obtained values was used for analysis. In cases where there was a difference of more than 10% between measurements, the final values were determined based on consensus reached during face-to-face meetings between the researchers. Third, the study does not include functional and clinical scores. Fourth, only two types of immobilization techniques were compared, and no below-elbow immobilization techniques were included. This limitation was due to the treatment practices in the clinic where the study was conducted. The fifth limitation is that interventions were performed by different clinicians; however, reductions and interventions were optimally standardized under the supervision of a senior orthopedic surgeon.

CONCLUSION

In the conservative treatment of geriatric distal radius fractures, the SSTS technique yielded radiological outcomes comparable to those achieved with LAC during short-term follow-up. Consequently, SSTS may serve as a viable alternative to LAC for managing these fractures in the elderly.

Ethics Committee Approval: This study was approved by the Ege University University School of Medicine Ethics Committee (Date: 28.05.2020, Decision No: 20-5.1T/4).

Peer-review: Externally peer-reviewed.

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REFERENCES

- Luokkala T, Laitinen MK, Hevonkorpi TP, Raittio L, Mattila VM, Lau-
- nonen AP. Distal radius fractures in the elderly population. *EFORT Open Rev* 2020;5:361–70. [CrossRef]
- Mauck BM, Swigler CW. Evidence-based review of distal radius fractures. *Orthopedic Clinics of North America* 2018;49:211–22. [CrossRef]
- Baron JA, Karagas M, Barrett J, Kniffin W, Malenka D, Mayor M, et al. Basic Epidemiology of Fractures of the Upper and Lower Limb among Americans over 65 Years of Age [Internet]. 1996. Available from: <http://www.jstor.org/URL:http://www.jstor.org/stable/3702912>. Accessed Oct 3, 2024. [CrossRef]
- Cooper AM, Wood TR, Scholten DJ, Carroll EA. Nonsurgical management of distal radius fractures in the elderly: approaches, risks and limitations. *Orthop Res Rev* 2022;14:287–92. [CrossRef]
- Levin LS, Rozell JC, Pulos N. Distal radius fractures in the elderly. *J American Academy of Orthopaedic Surgeons* 2017;25:179–87. [CrossRef]
- Shauver MJ, Yin H, Banerjee M, Chung KC. Current and future national costs to medicare for the treatment of distal radius fracture in the elderly. *J Hand Surg Am* 2011;36:1282–7. [CrossRef]
- Yu GS, Lin YB, Le LS, Zhan MF, Jiang XX. Internal fixation vs conservative treatment for displaced distal radius fractures: a meta-analysis of randomized controlled trials. *Ulus Travma Acil Cerrahi Derg* 2016;22:233–41. [CrossRef]
- Chaudhury S, Hazlerigg A, Vusirikala A, Nguyen J, Matthews S. Lower limb intracast pressures generated by different types of immobilisation casts. *World J Orthop* 2017;8:170–7. [CrossRef]
- Schulte D, Habernig S, Zuzak T, Staubli G, Altermatt S, Horst M, et al. Forearm fractures in children: Split opinions about splitting the cast. *European J Pediatric Surg* 2014;24:163–7. [CrossRef]
- Shuler FD, Grisafi FN. Cast-saw burns: Evaluation of skin, cast, and blade temperatures generated during cast removal. *J Bone and Joint Surg - Series A* 2008;90:2626–30. [CrossRef]
- Dastan AE, Vahabi A, Coskunol E, Aktuglu K. Comparison of the forearm rotation restriction capacities of four upper-extremity immobilization methods: there is no difference between single and double sugar tong splinting. *J Orthop Surg Res* 2024;19:282. [CrossRef]
- Kim JK, Kook SH, Kim YK. Comparison of forearm rotation allowed by different types of upper extremity immobilization. *J Bone Joint Surg Am* 2012;94:455–60. [CrossRef]
- Siemensma ME, van der Windt AE, van Es EM, Colaris JW, Eygendaal D. Management of the stiff elbow: a literature review. *EFORT Open Rev* 2023;8:351–60. [CrossRef]
- Daştan AE, Vahabi A, Aljasim O, Kılıçlı B, Küçük L, Coşkunol E. A comparison of two immobilization methods in the conservative treatment of pediatric distal forearm fractures: Long arm cast versus single sugar-tong splint. *Jt Dis Relat Surg* 2023;34:381–8. [CrossRef]
- Howell DM, Bechmann S, Underwood PJ. *Wrist Splint*. StatPearls [Internet]; StatPearls Publishing: Treasure Island, FL, USA, 2022.
- Grafstein E, Stenstrom R, Christenson J, Innes G, MacCormack R, Jackson C, et al. A prospective randomized controlled trial comparing circumferential casting and splinting in displaced Colles fractures. *CJEM* 2010;12:192–200. [CrossRef]
- Bilge O, Dündar ZD, Atılğan N, Yaka H, Kekeç AF, Karagüven D, et al. The epidemiology of adult fractures according to the AO/OTA fracture classification. *Ulus Travma Acil Cerrahi Derg* 2022;28:209–16.
- Mc Colgan R, Dalton DM, Cassar-Gheith AJ, Fox CM, O'Sullivan ME. Trends in the management of fractures of the distal radius in Ireland: did the Distal Radius Acute Fracture Fixation Trial (DRAFFT) change practice?. *Bone Joint J* 2019;101:1550–6. [CrossRef]
- Zhu C, Wang X, Liu M, Liu X, Chen J, Liu G, et al. Non-surgical vs. surgical treatment of distal radius fractures: a meta-analysis of randomized controlled trials. *BMC Surg* 2024;24:205. [CrossRef]
- Chung KC, Shauver MJ, Birkmeyer JD. Trends in the United States in the treatment of distal radial fractures in the elderly. *J Bone Joint Surg Am* 2009;91:1868–73. [CrossRef]

21. Michael R, Nakhouzi A, Kahhaleh E, Pelet S. Volar locking plating compared to conservative treatment in distal radius fractures in elderly patients (>60 years old): a systematic review and meta-analysis of randomized controlled trials. *J Hand Surg Glob Online* 2023;5:589–94.
22. Gutiérrez-Monclus R, Gutiérrez-Espinoza H, Zavala-González J, Olguín-Huerta C, Rubio-Oyarzún D, Araya-Quintanilla F. Correlation between radiological parameters and functional outcomes in patients older than 60 years of age with distal radius fracture. *Hand (NY)* 2019;14:770–5. [CrossRef]
23. Hosokawa T, Tajika T, Suto M, Chikuda H. Relationship between malunion and short-term outcomes of nonsurgical treatment of distal radius fractures in the elderly: differences between early- and late-geriatric patients. *J Hand Surg Am.* 2023 Feb 8;S0363-5023(23)00001-1. doi: 10.1016/j.jhssa.2022.12.013. [Epub ahead of print]. [CrossRef]
24. Caruso G, Tonon F, Gildone A, Andreotti M, Altavilla R, Valentini A, et al. Below-elbow or above-elbow cast for conservative treatment of extra-articular distal radius fractures with dorsal displacement: a prospective randomized trial. *J Orthop Surg Res* 2019;14:477. [CrossRef]
25. Raj V, Barik S, Richa. Comparison of above elbow and below elbow immobilisation for conservative treatment of distal end radius fracture in adults: A systematic review and meta-analysis of randomized clinical trials. *Chin J Traumatol* 2023;26:204–10. [CrossRef]

ORİJİNAL ÇALIŞMA - ÖZ

Yaşlılarda distal radius kırıklarının konservatif tedavisinde iki immobilizasyon yönteminin radyolojik karşılaştırılması: Tekli şeker maşası ateli ile uzun kol açısının etkinliği benzerdir

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AMAÇ: Bu çalışmada geriatric popülasyonda distal radius kırıklarının cerrahiolmayan tedavisinde uzun kol açısı (UKA) ve tekli şeker maşası atelinin (TŞMA) etkinliğini karşılaştırmak amaçlandı.

GEREÇ VE YÖNTEM: Acil servis (AS) ortopedi ve travmatoloji bölümünde konsülte edilen hastalar, beş yıllık bir süre boyunca üçüncü basamak bir üniversite hastanesinin elektronik arşivleri kullanılarak incelendi. Çalışmaya, redüksiyon gerektiren, başarılı kapalı redüksiyon geçiren ve en az altı hafta röntgen takibi olan 65 yaş ve üzeri distal radius kırığı olan hastalar dahil edildi. Hastalar immobilizasyon yöntemine göre iki gruba ayrıldı: TŞMA grubu (n=88) ve UKA grubu (n=31). Hastaların AS'den redüksiyondan sonra ve 1., 2., 4. ve 6. haftalarda çekilen radyografileri değerlendirildi. Her ziyarette radyografilerde radyal yükseklik, radyal eğim, volar eğim ve ulnar varyans ölçüldü. Delta değeri, altıncı haftada alınan ölçümden ilk redüksiyon sonrası radyografideki ölçüm çıkarılarak hesaplandı. Elde edilen veriler daha sonra iki grup arasında karşılaştırıldı.

BULGULAR: Toplam 119 hasta (93 kadın, 26 erkek; ortalama yaş: 72.9±7.3 yıl; aralık, 65 ila 90 yıl) dahil edildi. Ortalama yaş grup 1'de 74.6±7.6 ve grup 2'de 72.3±7.2 idi (p=0.135). Grup 1 26 kadın ve 5 erkekten oluşuyordu; grup 2 ise 67 kadın, 21 erkekti (p=0.52). Redüksiyon sonrası volar tilt (p=0.005), 1. hafta volar tilt (p=0.020), redüksiyon sonrası ulnar varyans (p=0.044), 1. hafta ulnar varyans (p=0.037), 2. hafta ulnar varyans (p=0.027) gruplar arasında istatistiksel olarak anlamlı fark gösterdi. Delta değerleri de dahil olmak üzere diğer radyolojik parametrelerde istatistiksel olarak anlamlı bir fark saptanmadı. Grup 1'deki iki hastaya ve grup 2'deki 7 hastaya tekrar müdahale gerekmişti (p=1).

SONUÇ: Geriatric distal radius kırıklarının konservatif tedavisinde TŞMA, UKA kadar etkili bir immobilizasyon tekniğidir.

Anahtar sözcükler: Geriatric distal radius kırığı; uzun kol açısı; şeker tong ateli.

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