Clinical and Radiographic Outcomes following Volar Locked Plating versus Dorsal Bridge Plating for Distal Radius Factures: A Propensity Score-Matched Analysis

Thomas Carroll, Akhil Dondapati, Michaela Lenore Malin, Constantinos Ketonis, Warren C Hammert¹, Ronald Gonzalez ¹Duke University Medical Center

INTRODUCTION: Distal radius fractures indicated for operative intervention are most commonly treated with volar locked plating (VLP) and dorsal bridge plating (DBP). The purpose of this study was to utilize a propensity score to match and compare the radiographic and clinical outcomes of patients undergoing VLP or DBP for distal radius fractures.

METHODS: We performed a retrospective, propensity score-matched analysis of patients undergoing VLP or DBP treatment for isolated distal radius fractures from 2015 to 2022. Patients were propensity score matched by a total of 8 demographic and comorbidity factors, AO Foundation/Orthopaedic Trauma Association (AO/OTA) classification, and preoperative Patient-Reported Outcomes Measurement Information System (PROMIS) scores. Our primary outcomes included postoperative complications, wrist and forearm range of motion, grip strength, and radiographic measurements, including radial height, radial inclination, volar tilt, and articular step-off. RESULTS:

Overall, 415 DBP and 2,075 VLP were successfully propensity score matched and included in this study. Grip strength and range of motion measurements at 6-month follow up, including wrist flexion, wrist extension, forearm pronation, forearm supination, radial deviation, and ulnar deviation, were increased in the VLP compared to DBP (p<0.05). Complication rates among both groups were relatively low, however, the rate of malunion and nonunion was significantly higher among the DBP group (p<0.05). Radial height, radial inclination, and articular step-off were improved in the VLP group compared to the DBP group (p<0.05), however, volar tilt was similar between groups. PROMIS Upper Extremity (UE) and Physical Function (PF) were significantly higher among the VLP group (p<0.05). There was no significant difference in PROMIS PI between groups.

DISCUSSION AND CONCLUSION: When compared to DBP, patients undergoing VLP are more likely to have improved clinical and radiographic outcomes. While improvement in wrist and forearm range of motion and radiographic parameters is statistically significant, it may not be clinically relevant.

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Table 1: Unsusched Cohort Char			,	Table 2: Proposity Scool Matched Cohort Characteristics.				Table 3: Programity Score Matched Differences in Postogenetive Clinical Outcomes at 6-Month Follow- Use from Final Sensical Procedure.			Table 4: Proposity Score Matched Differences in Protoperative Radiographic Outcomes at 6-Months from Initial Surgery.			Table 5: Subgroup Analysis of Matched Cohort by Age and Fractice Pattern at 6-Months from Surgeof Procedure						inal		
Characteristic	Volor Locked Plating (e=2465)	Doesel Bridge Plating (n=521)	produc	Characteristic	Veter Locked Plating (n=3015)	Donal Bridge Ploking (n=415)	Standardard Difference	Outcome	Volst Locked Plating	Doesal Bridge Plating	p value	Parameter (SD)	Votor Locked Plating	Donal Bridge Flating	e volue		Time	Voir.	Forum For	nen Veie	Visit 1	Ing Strongth
Denographics Age, years (SD)	57.4 (7.2)	62.3 (8.1)	p=0.901	Desographics Age (yr)	57.6	57.9	0.04	Fallow Circ (months)	(a-2875) 13.4(5.3)	(8~415) 13.9 (4.9)	0.08		(p=2075)	(9:415)			Firming*			Dengton	Design	(82)
BME :+0 ke/pr/thi	139 (5.6)		0.43		110-(5.3)		0.03	Reage of Metion (degrees)	13.4(0.3)	13.9 (4.9)	0.08	Radial Height (mm)	11.8 (1.9)	11.4 (2.0)	p=8.801		100		(10) (10)	(80)	in	
Female Chi	1521 (62)	361 (58)	0.09	Female (%)	1349 (65)	234 (90)	9.01	White Plantes	64.1 (4.2)	57.8 (5.3)	m:0.001	Radial Inclination (degrees) Volor Tilt (degrees)	21.1(3.1) 69(1.4)	20.3 (3.5)	p=8.001 0.22	OTA-A VI	A 400 G G	341/3/85	#1 Long. #55	96.5 H240.6	Herry I	0.1 (00.7)
Back CH	1/31/692	20,500	1000	Race (%)				Wast Education			p-0.091		0.54 (0.2)	0.82 (0.2)	p=8.001	-00						
Black or African American	150 (6.1)	39 (7.5)	0.23	Black or African America	127 (5.1)	27 (6.5)	0.02	Foreary Propagon	848 (0.9)	89.3 (1.3)	p-0.001	Afficial Sup-Cit (Eas)	10.5410.25	1.682(62)	beening.			661000	M50.0 M3	(8.0) T.5 (8.0)	3410.6	19 (13.1)
White	2185 (89)		0.099	White	2847 (89)	361 (97)	0.03	Foreign Superation	84.4 (0.6)	82.5 (1.1)	g~0.001					in-	for middle	m X 667	PERSONAL PROPERTY.	461 6,8921	F-3.60	199.00
Other	128 (5.2)	41 (7.9)	p-0.001	Other	301 (4.9)	27 (6.5)	0.05	Wast Radial Deviation	17.9 (1.8)	17.3 (2.2)	p=0.081					074.8 W	#27MD			no man		
Consolidation (%)				Consolvádán (%)			904	Witet Clear Deviation	24.9 (2.1)		p-0.001					OTA-B VI.	907 (4.1)	10.1 (0.2)	mide my	NO BIGS	211(2.0)	43 (11.1)
Tabacca Use	729 (M)	214(41)	g=0.001	Tebacco Use Dishotos	206 (34) 274 (18)	71 (17)	0.04	Guy Strongth (Sk.)	34.9 (12.8)	62.3 (13.4)	p-0.001					- 100 - 100	H1 [L6]	69.4 (4.9)	\$14.000 BIF	gan mrga	341(23)	4.2 (11.0)
Dishelus Blucanatoid Arthelis	394 (16) 136 (5.1)	164 (28) 33 (6.3)	0.027	Rhomated Arthritis	120 (5.0)	24 (5.8)	0.02	Patient Reported Outcomes								_be	100	r3.80	eam ea	MI +3MI	+3.80 I	
	139 (5.1)		0.15	Hypotherostines	131 (6.3)	27 (6.5)	0.00	PROMESTE	35.8 (3.5)	33.8 (5.8)	g=0.001						ar prami					
Hypethyreiden AO/OTA Classification (%)	139 (5.6)	38 (7.3)	0.15	AD/OTA Classification (%)	153 (9.59	27.95.0	9.00	PROMES PE	47.2 (3.1) 52.1 (3.7)	43.4 (3.4) 52.3 (4.2)	p-0.001					OTA-C VL		610000	\$1.0(1.2) \$2.9	1500	341020	(0.H) E.W.
WOOTACHINGGROUPS	491 (17)	145 (28)		23-A	359 (17)		0	Complications	3210.3	52.3 (4.2)	0.02					-86	95580	MARK	MARK 201	un Mean	21402	HADED.
			p=0.001 0.21				0	Need for Revision Sensory	55 (4.T)	28 (6.7)	0.078					. De-						
23-C	1133 (46)	264 (340)	0.51	23-C	930-1551	186 (55)	0	Makajan	44(2.1)	16 17 00	0.022					p.u	olar prikatil	p=3.862	pass pas	ALL PART	p-3.80	(8.46)
									17(15)	26.64.95						Assists VC	67.00	44.600	DAGE BY	gan megan	14 5 5 7 7 7	at m n
								Saverficial Infection	37 (1.6) 398 (5.2)	26 (4.0) D (3.0)	0.015					Age and the						
								Deep Infection	73 (5.5)	18 (4.5)	0.59					200	20.0 (6.0)	311(0.0)	111(0.3) 103	(1.0) 110(2.0)	211(2.6)	31 (14.8)
								Tondon Raptury	55 (2.5)	5 (1.9)	0.31					- D-	olor protests	1-5.662	PER PE	A62 p-5.862	P-2.890	4.665
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