Postoperative Recovery Curve After Locked Plate Fixation of Proximal Humerus Fractures Using Patient-Reported Outcomes Measurement Information System

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Purpose: This study aims to characterize the recovery process up to 1 year after proximal humerus ORIF (open reduction and interval fixation) using Patient-Reported Outcomes Measurement Information System (PROMIS) and range of motion (ROM) data. In addition, we aim to evaluate the correlation of PROMIS with ROM outcomes.

Methods: Patients who underwent proximal humerus ORIF with >1 year of follow-up were identified. PROMIS physical function (PF), pain interference (PI), and depression scores were recorded. ROM values including active forward flexion (AFF), passive forward flexion (PFF), and external rotation (ER) were recorded. Changes in outcomes were evaluated at each time point. Correlations between PROMIS and ROM at each time point were tested using Pearson correlation coefficient with strength of association interpreted as follows: $0.1 \leq |r| < 0.3$, small; $0.3 \leq |r| < 0.5$, moderate; $|r| \geq 0.5$, large.

POSTER ABSTRACTS

Results: 69 patients were identified. Table 1 details PROMIS and ROM outcomes over the first postoperative year. Significant improvements were identified in PROMIS PF and PI at 6 weeks, 3 months, and 6 months ($P<0.01$). AFF and ER significantly improved at 6 weeks, 3 months, and 6 months ($P<0.01$). Improvements in PFF were demonstrated up to 3 months. AFF demonstrated moderate-strong correlations with PROMIS PF and PI at 3 to 6 months, and PROMIS depression at 3 months ($P<0.05$, $|r|>0.3$ for all). ER was moderately correlated with PROMIS PI and PF at 6 months, and PROMIS depression at 3 months.

Table 1. Changes in Outcomes Following Proximal Humerus ORIF

	Mean ± SD	Mean Difference ± SD	†p-value*
PROMIS PF			
2-week	33.1 ± 7.7	-	-
6-week	**37.5 ± 6.6**	**3.8 ± 6.3**	**<0.01**
3-month	**40.1 ± 7.8**	**3.5 ± 5.8**	**<0.01**
6-month	**43.2 ± 8.0**	**3.6 ± 5.8**	**<0.01**
1-year	45.0 ± 7.0	1.8 ± 6.1	0.10
PROMIS PI			
2-week	63.2 ± 6.6	--	-
6-week	**58.7 ± 5.8**	**-4.8 ± 6.3**	**<0.01**
3-month	**55.3 ± 7.7**	**-3.4 ± 5.7**	**<0.01**
6-month	**53.5 ± 8.4**	**-3.3 ± 6.6**	**<0.01**
1-year	52.0 ± 8.3	-1.4 ± 5.2	0.14
PROMIS Depression			
2-week	50.8 ± 9.9	--	-
6-week	50.7 ± 8.8	-1.9 ± 6.7	0.05
3-month	**47.5 ± 9.6**	**-3.3 ± 6.0**	**<0.01**
6-month	48.7 ± 9.8	-0.3 ± 7.0	0.80
1-year	47.0 ± 10.4	-0.6 ± 5.4	0.54
Active Forward Flexion (°)			
2-week	2.4 ± 12.6	--	-
6-week	**36.7 ± 40.9**	**34.4 ± 43.9**	**<0.01**
3-month	**95.0 ± 41.1**	**53.5 ± 51.3**	**<0.01**
6-month	**116.5 ± 31.2**	**23.6 ± 31.7**	**<0.01**
1-year	114.9 ± 37.7	5.1 ± 20.4	0.24
Passive Forward Flexion (°)			
2-week	25.2 ± 39.7	--	-
6-week	**81.6 ± 46.3**	**57.3 ± 45.0**	**<0.01**
3-month	**117.7 ± 43.2**	**26.4 ± 46.9**	**<0.01**
6-month	134.1 ± 23.8	4.7 ± 22.0	0.25
1-year	129.4 ± 42.6	-1.1 ± 33.1	0.91
External Rotation (°)			
2-week	2.5 ± 9.1	-	-
6-week	**22.5 ± 20.4**	**19.3 ± 17.8**	**<0.01**
3-month	**38.7 ± 20.4**	**15.4 ± 21.4**	**<0.01**
6-month	**47.1 ± 21.6**	**9.6 ± 16.4**	**<0.01**
1-year	45.4 ± 23.8	2.2 ± 14.5	0.52

SD = Standard Deviation; PROMIS = Patient Reported Outcomes Measurement Information System, PF = Physical Function domain, PI = Pain Interference domain
***Boldface** indicates statistical significance.
†P-value is calculated using paired t-test comparing scores at each timepoint to preceding timepoint

Conclusion: Significant improvements in pain and function are achieved by 6 weeks after proximal humerus ORIF and continues up to 6 months postoperatively. This provides useful prognostic information regarding the anticipated postoperative recovery course. In addition, AFF correlated with patient reports of pain and function at 3 to 6 months. An emphasis on regaining AFF may help maximize outcomes.