

Understanding the Role of Compliance in Determining Short- and Long-Term Functional Outcome of Proximal Humerus Fracture Rehabilitation: A Prospective Cohort Study

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Purpose: Proximal humeral fractures (PHFs) are a common fragility fracture. While the majority of PHFs are treated nonsurgically through progressive rehabilitation regimes, the role of rehabilitation compliance in determining both short- and long-term functional outcomes has not been established. Our primary aim was to evaluate the impact of rehabilitation compliance on the short-term (3 months) and long-term (1 year) functional outcomes for nonsurgically managed PHFs. The secondary aim was to ascertain reasons for noncompliance to rehabilitation from both therapist and patient perspectives.

Methods: In this prospective longitudinal cohort study design, inclusion criteria were (1) PHF presented within 3 weeks of injury and (2) nonsurgical treatment. Exclusion criteria were (1) delayed presentation (>3 weeks), (2) cognitive impairment, (3) severe medical comorbidities precluding surgery, (4) polytrauma, and (5) pathological fracture. Compliance measures were (1) therapist-reported Sport Injury Rehabilitation Adherence Scale (SIRAS) at 6 weeks and 3 months, (2) patient-reported compliance questionnaire (subjective compliance, frequency of exercise) at 6 weeks and 3 months, and (3) therapy attendance records. Functional outcome measures were the QuickDASH score (an abbreviated version of the Disabilities of the Arm, Shoulder and Hand questionnaire), Constant score, Oxford Shoulder Score (OSS), active range of motion (ROM), and finger grip strength at 3 months (short-term) and 1 year (long-term). Correlation and adjusted regression analysis were performed to establish relationships between compliance measures and functional outcomes.

Results: 107 patients were recruited (mean age 69, 79% female). For short-term outcomes, the 6-week SIRAS had a significant relationship with 3-month Constant score (R2: 0.283, P = 0.023), OSS (R2: 0.161, P = 0.038), flexion ROM (R2: 0.325, P<0.001), extension ROM (R2: 0.089, P = 0.035), and abduction ROM (R2: 0.258, P = 0.002). 6-week patient-reported subjective compliance was positively related to 3-month OSS (R2: 0.156, P = 0.039), flexion ROM (R2: 0.180, P = 0.013). For long-term outcomes, 6-weeks SIRAS had a positive relationship with 1-year flexion ROM (R2: 0.435, P = 0.006), extension ROM (R2: 0.092, P = 0.029), and abduction (R2: 0.397, P = 0.021). Pain was the top reason for noncompliance from both therapist (43.9% at 6 weeks, 20.6% at 3 months) and patient perspectives (33.6% at 6 weeks, 24.3% at 3 months).

Conclusion: Rehabilitation compliance, particularly within the first 6 weeks post-injury is key to ensure good short-term functional outcome and can potentially impact long-term functional outcomes at 1 year. The importance of compliance should be emphasized early to patients and continually reinforced throughout the rehabilitation journey. The main barrier to rehabilitation compliance from both patient and therapist perspectives is pain, even up to 3 months post-injury with fracture union. Pain control should be optimized early through a combination of pharmacological and non-pharmacological modalities to maximize rehabilitation compliance and improve PHF outcomes.