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Discrepancy between Clinical Recovery and Isokinetic Strength after Lower Trapezius Tendon Transfer for irreparable rotator cuff tears

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Introduction and Background

Lower trapezius tendon transfer (LTT) is a biomechanically favorable procedure for irreparable posterosuperior rotator cuff tears, particularly for restoring external rotation. However, little is known regarding postoperative neuromuscular performance, as isokinetic strength has rarely been evaluated. This study investigated clinical outcomes and isokinetic muscle recovery following LTT.

Material and Method

Nineteen patients who underwent LTT with minimum 1-year follow-up were retrospectively reviewed. Clinical outcomes (ASES, UCLA), range of motion (ROM), external rotation (ER) lag, and pseudoparalysis were assessed. Isokinetic strength testing (Biodex) was performed in eight patients at 1 year and three of them also had preoperative data. Peak ER torque at 60°/s and total work at 180°/s were analyzed. Paired comparisons and recovery ratios relative to the contralateral side were calculated.

Results

Clinical results significantly improved postoperatively (ASES 52.9→93.4, UCLA 18.2→31.3; both $p<0.001$). ER lag resolved in 8 of 10 affected patients (80%, $p=0.021$), and pseudoparalysis resolved in all affected cases (8/8, $p=0.008$). In the three patients with serial isokinetic testing, peak ER torque improved from 7.6 ± 4.0 to 17.3 ± 3.3 %BW ($p=0.058$), and total work improved from 28.0 ± 12.3 to 109.4 ± 12.0 ($p=0.006$), representing substantial postoperative gains.

However, at one year, the operated shoulder demonstrated significantly lower performance than the contralateral side in peak torque (17.0 ± 5.9 vs 25.9 ± 4.3 %BW; recovery 65%, $p<0.001$), total work (86.7 ± 28.4 vs 245.1 ± 37.0 ; recovery 36%, $p<0.001$), time-to-peak torque ($p=0.001$), and acceleration time ($p=0.049$), indicating persistent neuromuscular control deficits.

Conclusions

LTT leads to excellent clinical improvement and resolves ER lag and pseudoparalysis. Nevertheless, isokinetic analysis revealed incomplete restoration of muscular endurance and neuromuscular response compared with the contralateral shoulder. These findings support the need for targeted rehabilitation strategies and highlight the discrepancy between clinical recovery and functional muscle performance after LTT.

