

# Return to Sport Testing After Arthroscopic Shoulder Surgery in Adolescent Patients

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## INTRODUCTION:

Readiness for return to sport (RTS) after surgery can be assessed using strength and functional performance testing. However, data regarding RTS testing after arthroscopic shoulder stabilization in adolescent patients is limited. The purpose of this study was investigate the results of strength and functional RTS testing following arthroscopic stabilization in adolescent patients with shoulder instability.

**METHODS:** A retrospective review of medical records was performed to identify adolescent patients who underwent arthroscopic shoulder stabilization and subsequent RTS testing between April 2017 and August 2021. Surgeries were performed by a single sports medicine fellowship-trained surgeon; RTS assessments were performed at the primary institution's sports rehabilitation clinic by a licensed physical therapist. Patient demographics, operative details, patient-reported outcome measures (PROMs) (VAS, Tegner, ASES, QuickDASH), and RTS testing results were collected. PROMs were obtained at the time of the RTS test. The recovery of muscle strength was defined by a limb symmetry index (LSI)  $\geq 90\%$ . Differences between the involved and uninvolved limbs were analyzed. Correlations between RTS testing results and PROMs were examined.

**RESULTS:** 37 patients (64.9% male) were identified with mean age of 15.6 years (range, 13-21 years). Football was the most common primary sport played (35.1%). 64.9% of patients underwent surgery on their dominant shoulder. 30 patients had isolated anterior repairs, four had combined anterior/posterior repairs, and three had an isolated posterior repair. RTS testing was performed at a mean of  $6.02 \pm 0.69$  months postoperatively. All PROMs improved significantly from pre-operative to the time of RTS testing ( $p < 0.0001$ ). All patients ( $n=37$ ) failed at least one component of the RTS testing (Table 1). Post-operative ASES scores were positively correlated with seated shotput LSI ( $r=0.52$ ,  $p < 0.05$ ). Post-operative QuickDash scores were negatively correlated with involved isometric IR LSI ( $r=-0.36$ ,  $p < 0.05$ ) and seated shotput LSI ( $r=-0.46$ ,  $p < 0.05$ ). Seated shotput scores were positively correlated with involved isokinetic IR peak torque at  $180^\circ/\text{sec}$  ( $r=0.72$ ,  $p < 0.05$ ) and  $300^\circ/\text{sec}$  ( $r=0.65$ ,  $p < 0.05$ ), and with ER peak torque at  $180^\circ/\text{sec}$  ( $r=0.69$ ,  $p < 0.05$ ) and  $300^\circ/\text{sec}$  ( $r=0.64$ ,  $p < 0.05$ ).

**DISCUSSION AND CONCLUSION:** At 6-months postoperative, shoulder strength and stability deficits persist in the surgical limb of adolescent patients. PROMs improve significantly from pre-operative to time of RTS testing. QuickDash and ASES scores may be associated with objective shoulder strength and stability measurements, and seated shotput LSI may be associated with isokinetic IR and ER peak torque.

Pass Criteria	% PASS
IND $< 10^\circ$ IR range of motion (n=36)	83.3
IND $< 10^\circ$ ER range of motion (n=36)	66.7
IND $< 10^\circ$ total shoulder arc range of motion (n=36)	52.8
LSI $\geq 90\%$ IR isometric strength (n=35)	57.1
LSI $\geq 90\%$ ER isometric strength (n=35)	77.1
ER:IR isometric strength ratio $> 70\%$ (n=35)	91.4
LSI $\geq 90\%$ IR isokinetic strength $180^\circ/\text{sec}$ (n=34)	58.8
LSI $\geq 90\%$ ER isokinetic strength $180^\circ/\text{sec}$ (n=34)	61.8
ER:IR isokinetic ratio $> 65\%$ , $180^\circ/\text{sec}$ (n=34)	67.6
LSI $\geq 90\%$ IR isokinetic strength $300^\circ/\text{sec}$ (n=34)	67.6
LSI $\geq 90\%$ ER isokinetic strength $300^\circ/\text{sec}$ (n=34)	64.7
ER:IR isokinetic ratio $> 65\%$ , $300^\circ/\text{sec}$ (n=34)	70.6
Grip strength percentile $> 25\%$ (n = 34)	91.2
Closed kinetic chain stability test $\geq 21$ (n = 34)	82.4
LSI $\geq 90\%$ seated shotput test (n=22)	82.4
YBT-UE composite score $\geq 80\%$ (n = 22)	62.9

<sup>a</sup>IND, Involved-Noninvolved difference; IR, internal rotation; ER, external rotation; LSI, limb symmetry index; YBT-UE, Upper Extremity Y-Balance Test