

Post-Surgical Impact on Trunk Muscle Strength in Patients with Midline Incisional Hernias: A Longitudinal Analysis

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OBJECTIVES:

The study aimed to evaluate the impact of surgical repair on trunk muscle strength (TMS) in patients with midline hernias, focusing on pre- and post-operative levels of maximal isometric force (MIF) and rate of force development (RFD).

METHODOLOGY:

A longitudinal study was conducted with 20 patients (13 females, mean age 55.1 ± 10.5 years) diagnosed with midline incisional hernias classified as W2-3 by the European Hernia Society. TMS was assessed pre- and one month post-surgery using a strain gauge. Body composition was evaluated via bioelectrical impedance. Statistical analyses included paired t-tests and correlations between anthropometric variables and changes in strength levels.

RESULTS:

Significant reductions in RFD were observed post-surgery at 90° ($p = 0.003$, $\Delta = -316.5 \text{ N}\cdot\text{m}\cdot\text{s}^{-1}$) and 45° ($p = 0.006$, $\Delta = -205.5 \text{ N}\cdot\text{m}\cdot\text{s}^{-1}$). However, no significant changes were detected in MIF. Men exhibited significant reductions in RFD at 90° ($p = 0.004$), while women showed significant reductions at 45° ($p = 0.014$). A moderate correlation was found between hernia diameter and changes in RFD at 90° ($r = 0.504$; $p = 0.024$). In women, weight ($r = 0.572$; $p = 0.041$) and BMI ($r = 0.577$; $p = 0.039$) were moderately correlated with RFD changes at 45°.

	Males				Females			
	Pre	Post	p	Δ	Pre	Post	p	Δ
MIF								
90°	179 (36.3)	188 (40.6)	0.714	8.7	158 (55.6)	141 (48.6)	0.219	-17.6
45°	145 (71.3)	176 (31.5)	0.793	31.0	147 (47.5)	132 (45.7)	0.300	-15.4
RFD								
90°	731 (286.3)	298 (98.5)	0.004**	-433.7	514 (630.4)	363 (207.8)	0.308	-151.3
45°	498 (445.4)	233 (109.7)	0.076	-265.5	419 (248.0)	246 (110.1)	0.014*	-173.2

MIF: Maximal Isometric Force; RFD: Rate of Force Development. Values are mean(s.d.) unless otherwise indicated.

* $p < .05$. ** $p < .01$. *** $p < .001$

CONCLUSIONS:

Surgical intervention significantly affects RFD but not MIF one month post-operation in midline hernia patients, with distinct differences between genders. The correlation between anthropometric factors and strength changes highlights the importance of personalized rehabilitation strategies to optimize postoperative recovery.