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Effects of a Short-Term Neuromuscular Training Program on Jump Performance and Landing Mechanics

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Non-contact knee injuries are prevalent in sports that involve jumping and cutting. Further, implementing an effective training protocol can be challenging due to restrictions from the academic calendar and rules of the athletic governing body. **PURPOSE:** To investigate changes in jump performance and jump landing mechanics in collegiate team sport athletes after a short-term neuromuscular training (NMT) protocol. **METHODS:** 9 healthy athletes (6 females, height = $1.60 \pm 0.02\text{m}$, mass = $59.4 \pm 5.1\text{kg}$; 3 males, height = $1.71 \pm 0.07\text{m}$, mass = $69.8 \pm 13.6\text{kg}$) volunteered and provided written informed consent. The pre- and post-test measure was a repeat vertical jump task, where subjects performed two consecutive jumps aiming to maximize height and minimize ground contact time (GCT). Subjects performed three trials with one-minute rest between each trial. Two cameras (60Hz) filmed trials from the frontal and sagittal plane. Variables of interest were Vertical Jump Height (VJH), GCT, Reactive Strength Index (RSI), and Landing Error Scoring System (LESS) scores. Video review was used to determine GCT and flight time, with VJH calculated from flight time ($VJH=1/8 \cdot g \cdot t^2$). Two investigators independently analyzed landing mechanics using LESS. NMT protocol included 12 one-hour sessions over six weeks, on non-consecutive days (Mon-Thu). Each session included warm-up, jump training, sprint training, and strength training. **RESULTS:** Effect Size (ES) statistics were calculated for each variable. Improvements were seen in RSI, GCT, and LESS, with ES values of 2.2, 1.5, and 0.6, respectively. VJH showed only trivial changes ($ES < 0.2$). **CONCLUSION:** A short-term NMT program can improve jump landing mechanics and enhance performance in explosive jumping tasks.

Table 1: Pre- and Post-Test Results for RSI, GCT, VJH, and LESS

	RSI		GCT (s)		VJH (m)		LESS	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Mean	0.92	1.30	0.37	0.28	0.35	0.35	5.44	4.44
SD	0.17	0.36	0.06	0.05	0.06	0.07	1.70	1.67
Effect Size	2.2		1.5		0.0		0.6	

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