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Efficacy of exercise interventions on prevention of sport-related concussion and related outcomes: A systematic review and meta-analysis

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Abstract 509 Table 1 Descriptives of all collected impacts

	Number		PLA (g)		PAA (rad/s ²)		PLV (m/s)		PAV (rad/sec)		Workload (J)	
	<i>N</i>		<i>Median</i>	<i>IQR</i>	<i>Median</i>	<i>IQR</i>	<i>Median</i>	<i>IQR</i>	<i>Median</i>	<i>IQR</i>	<i>Median</i>	<i>IQR</i>
Bottom Rear	113		9.9	4.8	873	619	0.5	0.3	5.7	5.2	1.5	2.4
Front Low	207		9.7	4.8	753	545	0.6	0.4	5.4	3.9	1.7	2.1
Front High	457		12.5	7.7	869	636	0.8	0.5	6.6	4.9	2.7	3.6
Bottom Front	64		9.9	4.2	830	462	0.6	0.3	5.5	4.7	1.5	2.7
Left Low	99		10.8	5.5	992	553	0.7	0.5	5.9	5.4	1.7	2.3
Right Low	57		9.2	5.2	916	567	0.5	0.3	6.4	3.2	1.3	1.9
Rear Low	18		12.4	6.0	1167	429	0.7	0.3	6.2	5.0	1.6	2.4
Left High	55		13.5	6.3	1063	690	1.0	0.6	7.9	5.4	3.5	3.7
Top Front	95		12.0	7.3	934	849	0.7	0.4	6.9	4.3	3.3	3.9
Right High	39		11.6	7.6	930	636	0.9	0.5	7.7	4.2	3.3	3.1
Top Rear	7		13.0	6.1	1181	483	0.9	0.9	7.9	6.1	2.9	4.4
Rear High	12		9.2	6.1	961	339	0.6	0.2	6.1	4.8	1.4	1.8
Total	1223		11.3	6.6	893	617	0.7	0.5	6.3	5.0	2.2	3.2
Maximum	-		55.0	-	6545	-	2.3	-	35.2	-	48.4	-

PLA = peak linear acceleration, PAA = peak angular acceleration, PLV = peak linear velocity, PAV = peak angular velocity

Conclusions The results suggest that NfL and GFAP might respond differently to linear and rotational accelerations and/or that the effects of different types of accelerations are individual. Future studies are recommended to combine impact monitoring mouthguards and blood biomarkers better understand how head impact characteristics affect head injuries.

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MEP047 – THE EFFICACY OF EXERCISE INTERVENTIONS ON OUTCOMES RELATED TO PREVENTION OF SPORT-RELATED CONCUSSION: A SYSTEMATIC REVIEW AND META-ANALYSIS

10.1136/bjsports-2024-IOC.266

Background Greater neck muscle strength, greater neck circumference, and lower linear and rotational head accelerations have been proposed as important modifiable factors to prevent Sport-Related Concussion (SRC).

Objective To systematically review the efficacy of exercise interventions on outcomes related to prevention of SRC.

Methods Eligibility criteria

1) original, peer-reviewed Randomized controlled trials (including cluster, crossover, and quasi randomized trials)

2) studies including: i) athletes and/or general population; ii) exercise interventions aimed at outcomes (concussion incidence, linear and rotational head accelerations, isometric neck strength, and neck circumference) related to prevention of SRC.

Search Strategy A literature search was performed in the following databases: PubMed, Embase, CINAHL, Scopus, SPORTDiscus, and Web of Science.

Selection Process and Data Extraction Two researchers performed screening of the titles/abstracts, full-text articles, and extraction of data from the included studies.

Methodological Quality Assessment The methodological quality was evaluated by two researchers, using the Cochrane Risk-of-Bias tool (RoB 2).

Effect Measures and Synthesis Methods Outcome data was summarized in separate meta-analyses for each outcome, with sub-group analyses based on the exercise modality.

Results Isotonic exercise programs resulted in a statistically significant increase in isometric neck flexion (SMD 0.52, 95% CI 0.09–0.95), and lateral flexion strength (SMD 0.81, 95% CI 0.07–1.56).

Multimodal exercise programs resulted in a statistically significant increase in isometric neck flexion (SMD 0.57, 95% CI 0.30–0.85), extension (SMD 0.37, 95% CI 0.09–0.64), and lateral flexion strength (SMD 0.34, 95% CI 0.05–0.63).

Conclusion Both isotonic and multimodal exercise programs seem effective in increasing isometric neck strength in various directions. The effectiveness and feasibility of these programs in real-world settings should be further explored. More evidence is needed in order to evaluate the efficacy of exercise programs on concussion incidence, linear and rotational head accelerations, and neck circumference, as current studies are few.

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MEP048 – EVALUATING A NECK STRENGTH PROTOCOL FOR NEUROMUSCULAR INDICATORS IN INTERCOLLEGIATE FEMALE ATHLETES TO REDUCE THE INCIDENCE OF CONCUSSIONS

10.1136/bjsports-2024-IOC.267

Background The proposed presentation includes research findings from a dynamic neck strength training protocol implemented with a Division I NCAA volleyball team over the course of two years.

Objective The primary goal of this research was to determine the efficacy of a neck strength protocol to increase isometric and dynamic neck strength.

Design This research was conducted in collaboration with the Citadel Military College of South Carolina volleyball team. The study was conducted over a period of a full year with retrospective data regarding concussion occurrence prior to the neck training program.