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DEVELOPMENT OF WRESTLING MAT MATERIALS TO ACHIEVE BETTER MECHANICAL PROPERTIES AND IMPROVE THE SAFETY OF THE ATHLETES

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Background The quality of wrestling mats plays a major factor in minimizing the rate and severity of injuries. However, the last known studies on the topic were conducted more than 40 years ago, and scientific background for the current mat requirements is not available.

Objective The aim of the study was to collect data from athletes about their experiences on the quality of wrestling mats, to compare the mechanical properties of the most common mat materials, and to reconsider the current requirements for mats.

Design The members of the Hungarian national team were included in an anonymous, representative survey. The sample consisted of 120 athletes (average age: 23.2 ± 6.6 years). Furthermore, thirteen different material structure mats were tested, which covers the whole mat market.

Setting Athletes on any level can benefit from the results by implementing them in the international assessment protocol of wrestling mats.

Participants Members of the Hungarian national wrestling team, commercially available wrestling mats.

Main Outcome Measurements Injury incident rates, the role of wrestling mat in previous injuries, mat characteristics (cell structure, shock absorption, recovery capability, static stiffness, surface slipperiness)

Results Lower body injuries (knee 60%; ankle 57.5%) are more common, and a significant proportion of these can be attributed to poor quality sports mats. The incidence rate of concussion symptoms after inappropriate landing on a mat is also high. The mechanical properties of wrestling mats are significantly influenced by their material, density, and cell structure.

Conclusions Sufficient shock absorption of wrestling mats is not enough for injury prevention. The current regulation of wrestling mats should be updated by new measurement methods which deal with the effect of long-term, improper storage, static loads, and slippery surface to decrease low-extremity-related injuries. The development of multilayer foam structures is recommended to meet the requirements of United World Wrestling.

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IMMUNOLOGICAL BIOMARKERS AND INJURY PREVENTION IN ATHLETES

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Background Considering the high incidence and consequences of athletic injuries, it can be beneficial to investigate possible causes and prevention strategies. No previous studies have

reviewed the use of biomarkers for prevention and recovery of athletic injuries.

Objective To study the effect of exercise on immunological biomarkers in athletes and which prevention or rehabilitation interventions can help manage these biomarker concentrations and thus athletic injuries.

Design Systematic review.

Methods A search was carried out on databases using the keywords: 'Sports', 'Recovery', 'Injury prevention', 'Athletic injuries', 'Overtraining', 'Exercise immunology', 'Rehabilitation', 'Metabolism' and 'Training load'. These articles were screened and submitted to a quality assessment.

Results Rather than just high load, a high acute:chronic load ratio is a risk factor for injury. Competition should be seen as a rapid increase in load, and thus be identified as an injury risk factor. But when high loads are achieved gradually (weekly increments <10%) and in a controlled manner, a protective effect against injuries is observed. Adequate recovery time is an important factor, as insufficient rest leads to a higher injury risk. Recovery strategies such as active cool-down, foam rolling and whole-body cryotherapy may facilitate recovery and thus prevent injuries. An earlier training of exercise is effective for preventing muscle damage, if timed properly. To identify when an athlete has entered a maladaptive state, the load can be monitored as a combination of external and internal load measures that are relevant and specific to each sport.

Conclusion Immunological biomarkers indicating muscle damage increase after exercise. To keep these within a normal range, strategies such as load management, a prior session of exercise and/or gradually increasing the load (<10% per week) can be used. Other strategies such as active cool-down, foam rolling or whole-body cryotherapy can be considered, but sufficient evidence is lacking.

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THE EFFECTIVENESS OF A JUDO-SPECIFIC INJURY PREVENTION PROGRAMME: A RANDOMIZED CONTROLLED TRIAL

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Background Despite the relative high injury prevalence in recreational judo athletes, there is an absence of evidence-based prevention programmes in judo.

Objective To evaluate the effectiveness of a trainer-supervised judo-specific injury prevention warm-up programme (Injury Prevention and Performance Optimization Netherlands (IPPON) intervention) on the overall injury prevalence compared to usual warm-up in judo athletes.

Design Two-arm, cluster randomized controlled trial.

Setting Judo athletes were randomised per judo school-cluster in a group performing the trainer-supervised IPPON intervention (IPPON group) or a group performing the warm-up and practice as usual (control group).

Participants The main inclusion criterion was ≥ 12 years of age. 269 judo athletes (117 IPPON group and 152 control group) were included for analysis.

Intervention IPPON intervention with 16 to 26 weeks of follow-up.

Main Outcome Measurements The primary outcome was the overall injury prevalence (%) measured every fortnight with the online Oslo Sports and Trauma Research Centre questionnaire. Secondary outcome scores included prevalence of substantial injuries, overall incidence, time-loss injuries, exposure, adherence and experiences.

Results The mean injury prevalence was 23% (95% CI 20–26) in the IPPON group and 28% in the control group (95% CI 25–30). The risk of reporting injuries was 18% lower in the IPPON group (OR 0.72 95% CI 0.37–1.39, adjusted p-value of 0.33). Secondary outcome scores showed no differences between groups. For substantial injuries there was a 22% lower risk in the IPPON group (OR 0.80, 95% CI 0.36–1.78, adjusted p-value 0.58). Trainers and athletes experienced the IPPON intervention as successful.

Conclusions The IPPON trainer-supervised judo-specific injury prevention programme did not reach statistical significance in reducing the overall injury prevalence. The best-estimate of 18% injury reduction rate and successful experience indicate that the IPPON intervention might be practicable and relevant for the judo community.

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DOES INCREASING THE SEVERITY OF PENALTIES ASSESSED IN ASSOCIATION WITH THE 'ZERO TOLERANCE FOR HEAD CONTACT' POLICY TRANSLATE TO A REDUCTION IN HEAD IMPACT RATES IN YOUTH ICE HOCKEY?

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Background The risk of concussion is high in Canadian youth ice hockey. Aiming to reduce this burden, in 2011 Hockey Canada implemented a national 'zero tolerance for head contact (HC)' policy mandating the penalization of any player-to-player HC. In 2018–20, Hockey Canada further amended this HC-policy including stricter enforcement of severe HCs.

Objective To compare HC rates and HC enforcement pre-policy, post-policy, and following policy amendments in elite U15 Canadian youth ice hockey.

Design Prospective cohort.

Setting A collection of events recorded with a video-camera located at the highest point near centre-ice in public ice hockey arenas in Calgary, Alberta.

Participants A convenience sample of 10 AA (elite) U15 (13–14 year old) games pre-policy (2008–09), 8 games post-policy (2013–14), and 10 games following policy amendments (2020–21).

Assessment of Risk Factors An analysis of HC-policy implementation and policy amendments across three cohort years.

Main Outcome Measurements Using Dartfish video-analysis software; all player contacts and HCs [direct (HC1), indirect (e.g., boards, ice) (HC2)] were tagged using validated criteria. Univariate Poisson regression [clustering by team-game offset by game-length (minutes)] was used to estimate HC1 and HC2 incidence rates (IR) and incidence rate ratios (IRR) between cohorts.

Results A total of 11,427 physical contacts were tagged ($n_{2008-09}=3896$, $n_{2013-14}=3183$, $n_{2020-21}=4348$), with 538 contacts including the head (340 HC1, 198 HC2) ($n_{2008-09}$ HC1=125, HC2=66; $n_{2013-14}$ HC1=110, HC2=44; $n_{2020-21}$ HC1=105, HC2=88). With additional rule modifications, a 30% reduction in HC1s emerged ($IRR_{2013-2020}=0.70$, 95%CI:0.51–0.95). Since the HC-policy implementation, HC1s decreased by 24% ($IRR_{2008-2020}=0.76$, 95%CI:0.58–0.99). The proportion of HC1s penalized was similar across cohorts ($P_{2008-09}=14.4\%$; $P_{2013-14}=15.5\%$; $P_{2020-21}=16.2\%$).

Conclusions The HC-policy amendments and increased policy implementation time have led to a decreased rate of HC1s. However, referee enforcement can further boost the HC-policy effectiveness. These findings can help future referee training and potential rule modifications to increase player safety nationally.

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INJURIES IN PORTUGUESE RECREATIONAL SURFERS

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Background Surfing practice has been growing in recent years with an increasing number of recreational practitioners, especially in countries like Portugal with very good ocean conditions. Most studies consider all professional and recreational surfer injuries.

Objective Determine the rate of injuries and their characteristics during the recreational surf practice.

Design Retrospective cohort study.

Setting Standardised data collected with a validated questionnaire.

Patients 150 Portuguese surfers aged between 8 to 68 years practising during at least one of the two seasons in the study agreed to participate.

Interventions Both gender recreational surfers.

Main Outcome Measurements Retrospective assessment of the last 2 years injuries occurrence and conditions of occurrence.

Results A total of 33 athletes sustained 45 injuries (22% injured players) with 9,72 injuries per 1000 h of exposure. The greatest number of injuries occurred in the lower leg (ankle 20%; knee 13%) followed by the shoulder (17.8%). The most common injury mechanism was collision/direct contact (59%) or torsion (11.4%) with the joints most affected (24.4%). Injuries more frequent were wound (17.8%), contusion (11%) and inflammation (11%). The surfboard (28.9%) and the athlete itself (24.4%) were the main cause of the injury, occurring mainly when performing manoeuvres (20.9%) especially descending the wave (16.3%). There are no statistically significant differences in injury frequency per 1000 h of exposure with regards to sex, surfer position (goofy or regular), surfing side (left, right or both). Male athletes demonstrate higher injury rates (women 7.94, SD 1.96; men 10.27, SD 2.89) per 1000 h of exposure.