

## 217 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.

## 218 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.

## 219 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.