

Editorial

Sports-related musculoskeletal injuries: From diagnostics to rehabilitation

Alessandro de Sire

*Physical and Rehabilitative Medicine, Department of Medical and Surgical Sciences, University of Catanzaro
“Magna Graecia”, Catanzaro, Italy
E-mail: alessandro.desire@unicz.it*

Sports injuries have recently been defined as “new or recurring musculoskeletal complaints occurred during competition or training and requiring medical attention” by the Consensus Statement of the International Olympic Committee (IOC) [1]. It should be noted that epidemiological data on prevalence and/or incidence of sport injuries is limited, with a high variability due to the differences in age of athletes and localization (e.g., muscles, tendons, and ligaments) [2]. In this context, a recent study by Prieto-González et al. [3] on 498 adolescent athletes performing various sports (soccer, swimming, weightlifting, athletics, basketball, tennis, judo, paddle, tennis, volleyball, and cycling) showed that 44% suffered from a sports injury over a 12-month observation period, with an incidence rate of 2.64 per 1000 hours of training or competition. Moreover, a recent scoping review by Gimigliano et al. [4] reported that athletics, karate, and football were the sports at higher incidence of musculoskeletal injuries, albeit it should be taken into consideration that injuries in athletes are not always systematically recorded in databases that could allow an adequate evaluation of epidemiology.

The mainstay for diagnosis of sport injuries is the physical examination that might be assisted by ultrasound and magnetic resonance imaging; accordingly, an adequate prognosis is established considering several factors: mechanism of injury, localization, and extension of the injury [5]. An individualized and patient-tailored approach including pain management, physical therapy, and rehabilitation has been widely recommended [6].

Concerning the pharmacological treatment, athletes commonly assume oral non-steroidal anti-inflammatory drugs, injectable, and trans-dermal anesthetics and other

medications to perform at the highest possible levels, despite the potential side effects [1,6]. In this scenario, prevention strategies include neuromuscular training programs, consisting of balance, coordination, strength, and agility exercises, and education of the athletes to avoid overtraining and high-risk maneuvers as rapid cutting and landing techniques [7]. Prevention rehabilitative approaches and training methods are still evolving, utilizing measurement and technologies investigating neuromuscular control, timing of muscle activation, postural and kinematic analysis of sport gesture to prevent the potential musculoskeletal injuries [8–10].

The *Journal of Back and Musculoskeletal Rehabilitation* (JBMR) is particularly active in proposing new training programs and rehabilitation strategies in sport-related musculoskeletal injuries, as shown by recent papers published in a recent issue [11–13]. Indeed, that issue presents several studies evaluating the role of an adequate diagnosis and rehabilitation plan for musculoskeletal injuries in sports men and women.

Although range of motion measurement seems to be outdated, it is still crucial in the early diagnosis and prevention of musculoskeletal sport-related injuries, in particular concerning overhead movements. The Editor’s Choice of this issue has been granted to Schmalzl et al. [11], who investigated the range of motion adaptation of the glenohumeral joint in volleyball and handball players, reporting potential implications in the clinical settings. In particular, the authors observed internal rotation deficit in 72% of the cohort, with more prevalence in players active for more than 5 years (odds ratio, OR = 3), training more than 3 times per week (OR = 1.4). Moreover, the authors investigated posterolateral impingement occurrence that was present in 24% of the

cohort, and in 75% of the athletes with internal rotation deficit more than 10°. Interestingly, the handball players were more interested in internal rotation limitation (OR = 2.7) while volleyball players presented posterolateral impingement more often (OR = 1.19). ROM limitation might as well be a red flag to monitor and eventually to counter with stretching and targeted intervention.

Sports have been a continuous evolution, as shown by padel, a racket sport played in a grass court of about one third of a tennis court, which has recently gained great popularity among sportsmen. Padel combines high-frequency and low-intensity athletic gestures, although the high action velocity and sudden changes in direction are considered major risk factors for musculoskeletal injuries in the literature [14].

In this scenario, surfing has made its debut appearance at the 2020 Tokyo Summer Olympics, as IOC integrated it in the 28 Olympic sports [15]. To cope with athlete rehabilitation needs, the possible overuse injury linked to surf practice has been recently investigated in a paper published in JBMR on a group of Italian surfers practicing surf, kitesurf, windsurf and stand up paddle for at least one year [12]. The authors found that spine and upper limb pain occurred more frequently than in the lower limbs in both the surf ($p < 0.001$) and windsurf groups ($p = 0.007$), whereas lower limb pain was more prevalent in the kitesurf group ($p = 0.017$). Low back pain was the most represented among the spine pain subgroups ($p < 0.001$). These findings might be the starting steps to individuate the correct prevention training strategies.

Besides primary prevention, rehabilitation in sport-related musculoskeletal injuries might be useful also after acute trauma, as reported by Li et al. [13]. The authors recently assessed the effects of tertiary rehabilitation in acute lateral ankle sprain, showing that the American Orthopedic Foot and Ankle Society scores increased after treatment ($p < 0.05$), swelling after treatment was reduced ($p < 0.05$), and the Visual Analogue Scale for pain scores declined two weeks after treatment, with better results observed in the rehabilitation group compared to standard treatment.

Taken together, the studies by Schmalzl et al., Farì et al. and Li et al. [11–13] published in JBMR highlight the role of an adequate evaluation and rehabilitation plan for subjects suffering from sport-related musculoskeletal injuries to improve their functional recovery and return to play.

Alessandro de Sire

Associate Editor

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