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EDITORIAL ARTICLE

Improving compliance with shoulder injury prevention programs in handball

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ABSTRACT

Shoulder injuries are common in handball with studies showing the development of such injuries to begin early in the career. Previous studies have shown injury prevention programs, addressing modifiable risk factors like shoulder rotation strength, to be effective in reducing shoulder injuries among handball players despite participants not reaching the recommended dosage. Further, lack of time and motivation among players and coaching staff have been reported to be main barriers for handball players´ full compliance with such programs. However, current evidence indicates that the minimum effective dosage needed to reduce injuries and maintain muscle strength is lower than what has previously been recommended for shoulder injury prevention programs in handball. By highlighting that improvements in injury prevention and muscle strength can be achieved with minimal effort, compliance with shoulder injury prevention programs may be increased. Further, by incorporating elements of Behavioral Skills Training and Motivational Interviewing into the coaching staffs´ playbook and linking injury prevention exercises to important performance metrics (e.g. ball velocity), compliance with shoulder injury prevention programs among handball players can also potentially be increased. These perspectives call for empirical evaluation in both applied and research settings. A coordinated approach that integrates behavioral and psychological principles into routine coaching practice may strengthen both shoulder health and sustained engagement in injury prevention efforts.

Keywords: Shoulder injuries, prevention, handball, behavior skills training, motivational interviewing.

Introduction

Shoulder injuries are common in handball with the prevalence among elite players, both male and female, reported to be between 17-28%.[1-4] The development of shoulder injuries begins early among handball players, with Asker et al. reporting an average lifetime prevalence of 41% among a mixed cohort of youth players (15-18 years old),[5] indicating the need to address preventative measures early on. Modifiable risk factors, e.g. reduced shoulder external rotation (ER) and internal rotation (IR) strength and scapular dyskinesis[1,6], as well as reduced shoulder IR range of motion (ROM)[1] have been positively associated with shoulder injuries among handball players. In line with this, prevention programs addressing these modifiable risk factors have been shown to be effective in reducing shoulder injuries, both among youth players[7] and elite players.[4] Interestingly, despite the effectiveness, both Asker et al.[7] and Andersson et al.[4] reported the prevention programs to be implemented less frequently than recommended by the researchers (on average 1.3 and 1.6 times per week, respectively, compared with the recommended three times per week). These results are in line with previous study by Andersson et al. investigating attitudes, beliefs and behavior towards shoulder injury prevention in handball.[8] When the results from Andersson et al.[8] are viewed through the lens of the "Reach Efficacy Adoption Implementation Maintenance" (RE-AIM) framework, a well-established injury prevention implementation model,[9] the challenge of adherence to prevention programs seems to lie primarily within the "Implementation" and "Maintenance" dimensions of the model. The results showed that, while both coaching staff and players reported a positive attitude towards the prevention program and believed in its ability to reduce shoulder injuries, they reported the main barriers for full compliance to being the time required to perform the program and lack of motivation from players and coaching staff.[8]

However, it can be argued that if a shoulder injury prevention program performed approximately one to two times per week is effective,[4,7] such findings can be used as a counterargument to time being the main barrier for compliance. Further, results regarding prevention of lower limb injuries showed that following a six week pre-season „build up phase", a single session of an adductor strengthening exercise per week throughout a season was effective in reducing groin injuries among football players.[10] Moreover, regarding muscle strength among the general younger population, the minimal dose for the maintenance of muscle strength has been shown to be a single session per week.[11] By placing more emphasis on educating the coaching staff (e.g., coaches, physiotherapists, strength and conditioning coaches) and players about how much can be achieved regarding muscle strength maintenance and injury prevention with relatively little effort, the barriers of time and motivation could potentially be reduced. Increasing the knowledge among the coaching staff of potential risk factors in terms of load management can also be considered very important, as a sudden increase in weekly handball load (20-60% increase) has been shown to influence shoulder injury among handball players.[12] By increasing the compliance to shoulder prevention programs, coaches might improve their players´ availability and therefore increase the team´s chances of success.

A pathway towards shoulder health and injury prevention

The RE-AIM analysis indicates that the clinical efficacy of shoulder injury prevention programs, particularly those targeting shoulder rotation and scapular dyskinesis,[1,6] is constrained by practical barriers such as time limitations and player´s motivation. To address these specific deficits in implementation and maintenance, the integration of evidence-based behavioral strategies into the coaching workflow could be a potential solution.

An effective strategy for addressing time constraints in injury prevention programming is to enhance the athlete's fluency with prescribed exercises, thereby increasing the likelihood that the movements feel natural and are performed correctly. In practice, the dissemination of new exercises by coaching staff typically relies on verbal instruction accompanied by demonstration. Although this approach is common and often sufficient for simple skills, verbal instruction and modeling alone do not ensure that athletes fully understand the exercise or can perform it with adequate technical accuracy. When comprehension or execution is compromised, athlete engagement is reduced, limiting both adherence and perceived value of the exercise. To address these limitations, coaching staff can adopt evidence-based instructional strategies such as Behavioral Skills Training (BST). BST systematically extends traditional instruction by incorporating rehearsal and performance-based feedback, thereby promoting skill acquisition, consistency, and athlete buy-in.[13]

Applications of BST in sport have consistently demonstrated rapid acquisition of complex, multi-component motor skills across activities such as football, field hockey, and weightlifting, particularly in contexts where performance accuracy and injury risk are salient concerns.[14-18] Importantly, these outcomes extend beyond skill acquisition in controlled settings. For example, within American football, BST has been shown to effectively establish safe and technically correct tackling techniques in youth athletes, with demonstrated generalization to competitive game contexts.[13,18]

Sustaining the athlete´s motivation is a critical determinant of exercise adherence and program completion. One effective strategy for supporting motivation is the use of objective, athlete-specific data to provide regular and meaningful feedback. When outcomes are uncertain and consequences are delayed, individuals are more likely to disengage from otherwise beneficial activities due to the absence of immediate performance-related feedback. To counteract this effect, coaching staff should integrate data-driven feedback mechanisms, particularly during the early phases of skill acquisition and exercise adoption. Within shoulder injury prevention programs, objective measures should be selected that are meaningful to both the athlete and coaching staff. Critically, these measures must be straightforward to collect, easy to interpret, and feasible within the constraints of routine training. While global performance outcomes such as ball velocity may be intuitively relevant, emphasizing performance (e.g. peak power production) in exercises such as thorax rotation, both linked to increased ball velocity[19,20] and associated with reduced severity of shoulder injuries,[2] may further strengthen the athlete´s motivation by directly linking injury prevention exercises to performance enhancement. Motivation is enhanced when athletes receive frequent, performance-relevant feedback presented through clear visual representations of their data. Such visual feedback allows athletes to track progress over time while enabling coaching staff to establish concrete goals and monitor adherence to prescribed programs.[22] Importantly, athletes differ in how they respond to motivational strategies, making individualized approaches essential. Some athletes are more responsive to gamified prevention strategies that incorporate competition, scoring, or achievement-based elements, whereas others benefit more from intrinsically oriented, value-based approaches emphasizing personal improvement and long-term health outcomes. Identifying these individual preferences allows coaching staff to tailor feedback delivery and goal-setting procedures, thereby maximizing engagement and adherence to shoulder injury prevention programs.[22,23]

Securing athlete buy-in represents a critical prerequisite for the successful implementation and long-term adherence to skill-training and injury prevention programs. From the author's perspective, the acquisition of foundational skills in Motivational Interviewing (MI) represents a

valuable addition to the coaching staff's skill set. MI has demonstrated robust effectiveness in rehabilitation contexts for improving treatment adherence and clinical outcomes.[24] Conceptually, MI aligns well with behavior-change frameworks such as BST and, when combined with objective performance data, offers a coherent structure for supporting adherence. Through the use of open-ended questioning and reflective listening, coaching staff can assist athletes in articulating their own reasons for adherence, explicitly linking targeted shoulder health behaviors to personally salient performance goals, such as increased ball velocity or increased court time. In this way, MI shifts the focus from externally driven compliance toward autonomous motivation, a factor consistently associated with improved adherence and maintenance in health behavior–change research.[24]

Shoulder injuries will always be, to some extent, a part of a high speed throwing and collision sport like handball. However, as previous studies have shown, the scale of those injuries can be positively influenced[4,7] but even effective practices can be further improved. By incorporating BST, practical data collection and MI into the coaching staff´s playbook, compliance to shoulder injury prevention programs among handball players could potentially be increased. That might lead to a shift in attitudes among both coaches and players towards prevention exercises, ultimately making engagement in prevention programs a natural part of the game rather than a time-consuming addition.

Conflict of Interest:

The authors have no conflicts of interest to declare.

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