INTEGRATING FIELD HANDBALL INTO HANDBALL TRAINING: PERFORMANCE, PSYCHOLOGICAL AND INJURY-RELATED EFFECTS – A NARRATIVE REVIEW

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Abstract: *The research examines the potential benefits and risks associated with incorporating field handball into the training process in modern handball. The game of field handball, historically played on large outdoor pitches, offers various advantages, including the development of motor skills, enhanced functional abilities, refined technical execution, and psychological benefits through outdoor training. Players benefit from improved ball handling, endurance, and mental resilience, alongside reduced injury risks. Training on grass surfaces promotes joint stability and reduces overuse injuries often associated with repetitive training. However, there are inherent risks in overemphasising the use of field handball in the training process. The larger playing field and different rules may detract from technical and tactical skills specific to indoor handball, particularly spatial awareness and coordination in limited manoeuvring spaces. Moreover, environmental factors such as prolonged sun exposure, high humidity, and allergens pose health risks, including dehydration, respiratory and skin issues. Careful planning, including appropriate timing of outdoor sessions and protective measures, can mitigate these risks. Despite these challenges, the strategic incorporation of field handball into handball training programs presents a unique opportunity to enhance both individual and team performance while diversifying traditional training methods.*
Key words: *field handball, outdoor training, physical preparation, motor skills, sports injuries*

INTRODUCTION

Handball is one of the most widespread and popular team sports. Throughout its evolution, handball rules changed several times, which directly affected the change in the structure of the game (Ilić, 2025). Handball belongs to the group of polystructured sports, in which cyclic and acyclic movement structures are equally represented (Bragazzi et al., 2020; Branković et al., 2012; Vuleta & Milanović, 2004). Namely, handball, as rarely any other sport, contains almost all natural forms of movement that constantly alternate such as running, jumping, pushing and landing (Buchheit et al., 2009; Chelly et al., 2010). The results achieved by the most successful clubs and national teams in the world can be attributed to the high level of preparation of handball players, who are subjected to a well-planned and organised training process (Bjelica et al., 2012; Gómez-López et al., 2020). The long-term training process in handball leads to the transformation of morphological characteristics, motor and functional abilities that are responsible for achieving top results in the handball game (Pavlović et al., 2013; Pori et al., 2012; Sporiš et al., 2010). The training process is the continuous repetition and combination of planned exercises and movements with the aim of adapting the body to the required demands (Fulgozi, 1994; Koprivica, 2013). In the handball training process, physical preparation is one of the most important training areas, which is supplemented by tactical, technical and psychological preparation (Bompa, 2000; Fulgozi, 1994; Granados et al., 2008; Koprivica, 2013; Milanović, 2010; Milanović et al., 2012; Stojanović et al., 2009). According to Željaskov (2004), the physical preparation of athletes is defined as a complex process of implementing various programs and means for the development, maintenance and improvement of athletes' morphological characteristics, motor and functional abilities. Malacko (2002), Metvejev (2000) and Jalolovich (2022) point out that the primary task of physical preparation is to improve training and sports results by raising the basic and specific abilities necessary for handball.

The current iteration of handball is a modern version of field handball, the game that was played at the beginning and middle of the 20th century, and was in many ways comparable to football (Ilić, 2000; Kamolovich, 2024). It was played on a grass surface whose field dimensions ranged from 90 to 100 m in length and 55 to 65 m in width. With the introduction of indoor handball, interest in field handball declined, which led to the need for its modernisation. Additional pair of parallel lines, which divided the pitch into three parts, was introduced - defence, midfield, also known as central, and attack zone. The

end zones were 35 m long, while the central zone length varied and depended on the length of the field. The game was played between two teams of 11 players on the fields and two substitutes. At one time a maximum of six attacking players could be in the attack zone, as well as a maximum of six players which could occupy the defence zone. The goalkeeper's area was semicircular in shape with a radius of 13 m, whilst the penalty was taken from a distance of 14 m. The ball could be held in the hands for three or six seconds, depending on the rule, or it could be used for a maximum of three steps, after which the player had to pass or dribble it. Unlike dribbling rules in indoor handball, players could dribble the ball once, catch the ball and make three steps with it, after which they could dribble it again. The match consisted of two halves lasting 30 minutes each for men and 25 minutes for women, with a 10-minute break between halves. Progressive punishment in field handball was reflected in a five- or ten-minute suspension, or in the case of the most serious violations, a sending-off for the rest of the game.

Because of the field handball specific rules and pitch size, training on a large pitch, on which a game of field handball is played can, on the one hand, adequately implement existing training processes that lead to learning and improving technical and tactical (TE-TA) skills of handball players, which could still be applied in modern, indoor handball, and on the other hand, the supra-situational character of this training can contribute to improving the standard or existing training process by introducing new stimuli and on-field situations. The goal of this research is to ascertain the potential of integrating the game and elements of field handball in the modern handball training process, with the aim of identifying the potential benefits and risks of the implementation of this training method.

METHODS

This study was designed as a narrative literature review with the aim of synthesising current knowledge on the integration of field handball as an outdoor training method within the handball training process. A narrative approach was chosen because it allows the combination of heterogeneous sources, including empirical studies on handball and other team sports, theoretical and methodological texts on training, sports medicine literature, and historical accounts of field handball. This flexibility was necessary due to the limited number of studies directly examining field handball and the multidimensional character of the topic, which encompasses performance, psychological adaptation, injury prevention, and environmental conditions.

The literature search was conducted in several major scientific databases (Scopus, Web of Science, PubMed, and SPORTDiscus), supplemented by searches in Google Scholar and by reviewing reference lists of key articles and books. In addition, relevant textbooks on sport training theory and handball, as well as official documents and materials from handball governing bodies, were consulted to contextualise the historical development and rules of field handball and its relationship to modern indoor handball. The search strategy combined keywords related to handball, field handball, outdoor training, grass surface, physical preparation, environmental conditions, psychological effects, and injury prevention. For empirical training and sports medicine studies, the primary focus was on works published from 2000 onwards, whereas no lower year limit was imposed on historical or conceptual sources relevant to the origins and rules of field handball.

Studies and documents were included if they addressed at least one of the following areas relevant to the potential implementation of field handball in training: (a) the physical, functional, or technical development of handball players or athletes in comparable team sports; (b) the effects of outdoor or natural-surface training on performance, health, or injury risk; (c) psychological or cognitive outcomes associated with outdoor or nature-based exercise; (d) environmental and climatic factors (such as heat, humidity, solar radiation, allergens, or altitude) that may influence training load and health in outdoor settings; or (e) descriptions of field handball rules and playing characteristics with implications for training design. Sources were excluded if they were unrelated to training and performance, did not provide sufficient methodological information, or focused exclusively on indoor technical–tactical analysis without relevance to outdoor or field-based contexts. red.

BENEFITS OF THE FIELD HANDBALL TRAINING IMPLEMENTATION

The modern training process requires a very meticulous approach from the coach in its planning and programming. Determining the impact of differently designed, planned and programmed handball training programs on changes in morphological characteristics, motor and functional abilities in different cycles of the training process is of great importance in order to maximise the training benefits. The past research demonstrated the effects and impacts of various training programs that could be applied to improve the characteristics and abilities of handball players (Buchheit et al., 2010; Gorostiaga et al., 2006; Iacono et al., 2016). However, there is a lack of research related to the game of field handball and its potential implementation in the indoor handball training process. The game of field handball represents a specific situational and supra-situational training method that can be applied in the training process. In addition to the training taking place outdoors, the implementation of field handball in the training process of handball players has a number of positive benefits. Among them, the development and improvement of general and specific motor skills, the development of functional abilities, improvement of the players' technique, as well as a positive effect on the psychological preparation of handball players and the reduction of injuries.

One notable instance of field handball's resurgence occurred during the COVID-19 pandemic when health regulations prioritised outdoor, well-ventilated or isolated training environments (Ilić et al., 2023c). Due to the large playing area of field handball and the inherent spacing between players, it was an ideal method for maintaining training continuity while adhering to social distancing measures. This demonstrates that field handball can serve as a valuable tool even in special circumstances.

Training outdoors, particularly on natural surfaces, offers a host of mental and physical benefits (Pereira et al., 2024). Exposure to sunlight and fresh air improves mood, mental health, and cognitive functioning while fostering social connection. Training in nature also boosts vitamin D levels and attention capacity, which may indirectly contribute to better athletic performance (Valtueña et al., 2014; Krzywanski et al., 2016). Aerobic and anaerobic activities, which are dominant to field handball, enhance the cardiovascular and respiratory systems. Playing on large, uneven outdoor fields promotes greater muscular engagement, particularly for the legs and core, improving joint stability and reducing the risk of injuries over time.

Altitude training, often utilised by athletes seeking to improve aerobic capacity, can be easily integrated into field handball sessions. Moderate altitude training, commonly conducted at elevations of 1000-1500 meters, forces the body to adapt to lower oxygen levels, thereby enhancing oxygen transportation and boosting endurance (Hamlin et al., 2018). The result is improved blood flow, muscle oxygenation, and metabolic efficiency, all of which are vital for elite athletic performance (Billaut et al., 2012). Training in the outdoor environment introduces external variables, such as temperature, humidity, and altitude, which compel the body to adapt to fluctuating levels of oxygen and atmospheric pressure (Aughey et al., 2013). Incorporating field handball into a preseason high-altitude training program can bolster endurance and cardiovascular health. Athletes who train at higher altitudes often experience physiological adaptations that translate into better performance in low-altitude environments, providing an additional performance edge during the competitive season (Brocherie et al., 2015).

Field handball also offers relief from the monotony of repetitive indoor training sessions. By engaging in diverse and dynamic training on large, open fields, players avoid overuse injuries caused by repetitive movements. The unpredictability of outdoor conditions challenges players to constantly adjust, improving agility, balance, and coordination, which are crucial for optimal performance in modern handball (Spasic et al., 2015; Chaabene et al., 2021).

A key advantage of field handball training is its impact on ball handling and passing skills. The grassy surface, which is less predictable and offers higher resistance than indoor courts, challenges players to focus on precise ball control, passing, and catching. The absence of adhesives like glue forces players to develop superior hand-eye coordination and tactile ball control (Ilić et al., 2023a). The larger field dimensions increase the distance between teammates, requiring more powerful and accurate throws (Ilić et al., 2023b). The specific demands of field handball help players refine their technique, throwing power, and tactical awareness.

From a psychological standpoint, field handball creates unique cognitive challenges for players. The larger playing surface and different environmental stimuli require players to solve tactical problems quickly, enhancing their decision-making and spatial awareness (Ilić, 2016). Additionally, the stress-reducing effects of outdoor training, combined with the cognitive demands of the larger playing pitch, foster improved focus, creativity, and mental resilience.

Field handball training has also been shown to reduce the risk of ankle and knee injuries. Teams that incorporate outdoor grass-field training in their preseason preparation report fewer joint-related injuries compared to teams that primarily train indoors. Grass surfaces provide a natural, softer landing, which, combined with the uneven terrain, strengthens the muscles and tendons surrounding the joints. This reduces the strain placed on joints during movement, effectively lowering injury rates over time.

POTENTIAL RISKS OF THE FIELD HANDBALL TRAINING IMPLEMENTATION

While field handball offers numerous advantages, it is essential to recognise and mitigate potential risks. Excessive exposure of players to field handball training, especially during the competitive season, may lead to the deterioration of technical and tactical abilities specific to indoor handball, such as spatial awareness and timing on a smaller court. Training too frequently on large fields can reduce the efficiency of group and team tactics.

Environmental factors, such as excessive sun exposure, present another risk (Snyder et al., 2020). Direct sunlight during training can lead to skin and eye damage (Kohmura, 2021). To minimise this risk, training sessions should be scheduled during periods of lower solar intensity, and athletes should be encouraged to wear protective gear (Jablonski & Chaplin, 2010). Additionally, high humidity levels may exacerbate the physiological strain during intense outdoor training sessions (Popović Ilić & Ilić, 2022). Finally, outdoor environments may expose athletes to allergens, which can impair respiratory function and overall performance (Helenius et al., 2000; Katelaris, 2000).

CONCLUSION

The handball training process remains a key determinant of success in modern handball. A well-structured, properly implemented training program significantly improves player performance and reduces injury risk. Field handball, with its specific situational training methods, can serve as an effective tool during physical preparation. The inclusion of field handball not only diversifies training stimuli but also offers a range of physical and psychological benefits. Training in nature enhances functional and motor skills, improves mental health, refines technical abilities, and reduces the occurrence of injuries. By thoughtfully incorporating field handball into the training process, handball teams can improve player development while optimising both individual and team performance.

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