

Evaluation of osteomuscular symptoms in handball players of a college

Avaliação dos sintomas osteomusculares em praticantes de handebol de uma faculdade

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RESUMO | INTRODUÇÃO: Nos últimos anos está crescendo a quantidade de jovens atletas (jogadores de handebol). O handebol é uma modalidade esportiva de arremesso. Nele ocorre gesto rápido e complexo, dividido em fases diferentes como: progressão, armação do braço, passada, aceleração e desaceleração do braço. Portanto, o handebol é um esporte de alta intensidade composto por acelerações repetitivas que exige grande esforço das articulações, principalmente do ombro, onde os movimentos e posicionamentos podem gerar alto risco de lesões ligamentares, tendinosas e capsulares. **OBJETIVO:** avaliar a presença de sintomas osteomusculares desenvolvidos em praticantes de handebol. **MATERIAL E MÉTODOS:** Trata-se de estudo observacional no qual foi aplicado o Questionário Nórdico de Sintomas Osteomusculares em atletas de handebol da seleção de uma Faculdade Particular do Piauí a fim de avaliar as lesões mais prevalentes em jogadores de handebol. Foram incluídos os atletas com idade a partir de 18 anos, ativos e sem lesões no ato da pesquisa. Os dados foram analisados através de estatística descritiva com base nas frequências absolutas e relativas das queixas apresentadas. **RESULTADOS:** As regiões com maior prevalência de queixas foram joelhos 10 (50%) seguido de 9 (45%) ombros. As regiões cujas lesões impossibilitaram a realização das atividades desportivas mais frequentemente foram 4 (20%) nas regiões ombros, quadris, joelhos, tornozelo por entorses ou torções. Havendo uma maior procura por atendimento especializado nos últimos meses de 5 (25%) em joelho e tornozelo. **CONCLUSÃO:** As regiões com maior frequência de acometimentos em praticantes de handball foram ombro, joelho e tornozelo.

PALAVRAS-CHAVE: Atletas. Esporte. Sintomas. Handebol. Distúrbios músculo-esqueléticos.

ABSTRACT | INTRODUCTION: The number of young athletes (handball players) has grown in recent years. Handball is a sporting form of throwing. It occurs in a fast and complex gesture, divided into different phases such as: progression, arm, past, acceleration and deceleration of the arm. Therefore, handball is a high intensity sport composed of repetitive accelerations that requires great effort of the joints, especially of the shoulder, where the movements and positionings can generate high risk of ligament, tendinosis and capsular lesions. **OBJECTIVE:** to evaluate the presence of musculoskeletal symptoms developed in handball players. **MATERIAL AND METHODS:** This is an observational study in which the Nordic Musculoskeletal Questionnaire was applied to handball athletes from a private college in Piauí to assess the most prevalent injuries in handball players. We included athletes aged from 18 years, active and without injuries at the time of the research. Data were analyzed using descriptive statistics based on the absolute and relative frequencies of the complaints presented. **RESULTS:** The regions with the highest prevalence of complaints were knees 10 (50%) followed by 9 (45%) shoulders. The regions whose injuries prevented the performance of sports activities were more frequently 4 (20%) in the shoulder, hips, knees, ankle, or twist regions. There is a greater demand for specialized care in the last months of 5 (25%) in knee and ankle. **CONCLUSION:** The regions with the highest frequency of injuries in handball players were shoulder, knee and ankle.

KEYWORDS: Athletes. Sport. Symptoms. Handball. Musculoskeletal disorders.

Introduction

Handball is a sport of throwing and contact with the ball, which requires great effort of the articular, ligament, tendon, capsular and ligament structures. Nevertheless, it is known as the group sport with the highest prevalence of injuries^{1,2}. This is a sport whose play is long, requiring rapid movement changes, complicated landing jumps, frequent contact and collisions between players, exerting stress mainly on the knee, shoulder and ankle joints and making players susceptible both acute and chronic lesions³.

The incidence of handball injuries is widely variable and can range from 4.1 to 12.4 injuries per 1000 hours of sports practice. In addition, these high injury rates are more associated with practice than with training⁴.

Throwing in handball is one of the most requested and complex movements because it is developed quickly and is divided into different phases such as progression, arm frame, stride, acceleration and deceleration of the arm^{5,6}. Such a sporting gesture is the combination of external rotation and shoulder abduction movements, which is biomechanically unstable, and routinely associated with shoulder injury⁵. Injuries in this sport modality are especially related to the arm-building phase of the movement. To perform throwing movements, it is necessary to synchronize and coordinate the shoulder joint at high intensities, which often exceeds the physiological limit of the joint⁷.

According to Bere et al. (2015), epidemiological studies have revealed a greater predisposition to acute knee and ankle joint injuries while chronic injuries, usually associated with overuse, are more common in the knee, shoulder and thigh region^{3, 8,9,10}.

The number of young handball athletes has been growing a lot in recent years in Brazil, although in Europe Handball has been popular for decades^{3,11,4}. Given this, there is a lack of studies evaluating the prevalence of sports injuries and musculoskeletal disorders in handball players, and especially in the university and student categories that leverage the practice of Olympic sports in Brazil. Therefore, the objective of this study was to evaluate the prevalence of musculoskeletal symptoms in handball practitioners of a college selection in Teresina-PI.

Methods

This is a cross-sectional and descriptive research with quantitative data analysis. The sample consisted of the athletes that make up the handball team of a higher education institution in Teresina-PI.

The sample consisted of practitioners aged between 18 years and 30 years, male, who participated in training and games actively. Thus, athletes who participated in sporadic training or who were away from training and competition for health reasons were also excluded from this research. The application of the data collection questionnaire was applied in a classroom of that institution.

In order to carry out data collection, the research participants were invited to a private room of a Teresina higher education institution where each participant, after clarifying the research objectives, risks, and benefits, received an envelope sealed with the Musculoskeletal Symptoms Nordic Questionnaire and a pen. Initially, the researcher explained to the athletes how to respond appropriately to the questionnaires and, later, they were released to proceed with the filling without interruption of the applicator.

The Musculoskeletal Symptoms Nordic Questionnaire was validated in Brazil by Barros and Alexandre¹² and contains a diagram of a human figure in an orthostatic position, divided into nine anatomical regions. The questionnaire is aimed at detecting musculoskeletal symptoms in nine distinct regions and considering the duration or period of onset of the disease as in the last 12 months and the last 7 days and ascertaining the severity of symptoms through its association with the impossibility or withdrawal of their daily activities, or if the participant sought medical service in the last 12 months¹².

Information obtained through the Nordic Musculoskeletal Questionnaire was initially tabulated in a Microsoft Excel spreadsheet and later treated using descriptive statistics using the SPSS Statistics 9.0 program for Windows. Data are expressed in terms of absolute and relative frequency and are shown in tables.

The research began only after approval by the Research Ethics Committee - CEP through submission to Plataforma Brasil through Opinion No. 3,243,329 (CAAE 11001319.7.0000.5193). The participation of the subjects in the research was conditioned to the signing of the Informed Consent Form.

Results

In this study, 18 handball players aged between 18 and 30 years old from a university team from Teresina-Piauí were evaluated. According to the QNSO (Nordic Musculoskeletal Questionnaire) for complaints in the last 12 months, a higher prevalence was observed for the knee region (50%), followed by shoulders (45%), elbow, hand and fingers and ankle with 35% each (table 1). Interestingly, in the application of the QNSO, the subject may indicate more than one region.

Table 1. Relative frequency of complaints by body segment in the last 12 months in handball players according to data collected through the QNSO. Teresina - PI, 2019

Região	% com queixas	% sem queixas
Pescoço	20	80
Ombros	45	55
Parte superior das costas	25	75
Cotovelo	35	65
Punho, mãos	35	65
Parte inferior das costas	35	65
Quadril, coxas	30	70
Joelhos	50	50
Tornozelo, pés	35	65

In this study, the impact of musculoskeletal complaints is shown in Table 2. According to the results presented, the highest levels of absence from work, sports and leisure activities were related to knee, shoulder, ankle, thigh and elbow injuries (20% all).

Table 2. Relative frequency of impediments to work, leisure or daily activities due to body segment problems in the last 12 months in handball players according to data collected by the QNSO. Teresina - PI, 2019

Região	% com queixas	% sem queixas
Pescoço	05	95
Ombros	20	80
Parte superior das costas	5	95
Cotovelo	20	80
Punho, mãos	15	85
Parte inferior das costas	15	85
Quadril, coxas	20	80
Joelhos	20	80
Tornozelo, pés	20	80

Regarding the search for specialized care due to handball injuries, the joints of the knee and ankle (25% each), represented the main reasons that led the athletes to seek help specialized (Table 3). The shoulder, elbow, wrist and hand joints with 20% each.

Table 3. Relative frequency of seeking specialized care due to body segment problems in the last 12 months in handball players according to data collected by the QNSO. Teresina - PI, 2019

Região	% com queixas	% sem queixas
Pescoço	10	90
Ombros	20	80
Parte superior das costas	5	95
Cotovelo	20	80
Punho, mãos	20	80
Parte inferior das costas	15	85
Quadril, coxas	10	90
Joelhos	25	75
Tornozelo, pés	25	75

When assessing the percentage of complaints by region in the last 7 days, those related to elbow, ankle and knees were the most prevalent (Table 4).

Table 4. Relative frequency of complaints by body segment in the last 7 days in handball players according to data collected by the QNSO. Teresina - PI, 2019

Região	% com queixas	% sem queixas
Pescoço	5	95
Ombros	10	90
Parte superior das costas	10	90
Cotovelo	25	75
Punho, mãos	15	85
Parte inferior das costas	15	85
Quadril, coxas	15	85
Joelhos	20	80
Tornozelo, pés	20	80

Discussion

Handball practice, while promoting benefits to its practitioners, can increase the risk of various injuries. According to Sanches and Borin, (2008) these sportsmen are at risk of injury because it is a high intensity sport, repeated throws, cuts, jumps and landings, as well as frequent physical contact between players and various changes of movement and directions^{1,13,14}.

Similar results to those found here were found by Rafnsson et al. (2017) who evaluated the incidence and prevalence of injuries in professional handball players from Finland finding a higher prevalence of acute knee injuries (26%), ankles (19%), and feet (17%), but overuse injuries occurred mainly in the lumbopelvic region (39%), shoulders (21%), and knees (21%). Of the knee injuries, those associated with ACL and PCL are more common in handball practitioners, which may be associated with a tendency for more intensive training and higher level of performance, which leads to a higher frequency of injuries¹⁵.

According to Sanches and Borin, (2008) regarding the most affected sites, we found knee (26%), MMS fingers (21%), ankle (16%), shoulder (11%), lumbar region (5%), wrist (5%), hip (5%) and leg (11%), which corroborate data from Cohen and Abdalla knee (35.9%), ankle (14.8%), shoulder (12%) and lower back (7.65%)¹³. It was observed that 50% of the lesions occurred in the lower extremity and 50% in the upper extremity, different from what was seen by Seil, Rupp, Tempelhof and Kohn, (1998) who found in their study an involvement in 37% of upper extremity cases. and 54% of the lower extremity¹⁶.

The shoulder joint, the second with the highest incidence of injuries in the last 12 months, is traditionally more studied and approached in relation to handball due to its intrinsic association with the sports pitch gesture. The movement of the pitch with abduction and maximal lateral rotation (RL), changes in the shoulder range of motion (ROM) and can be considered adaptive of the sport practice, with increased lateral rotation range of motion (ROM). along with a loss of medial rotation (MRI) of the dominant shoulder when compared to the non-dominant one. This loss of medial rotation (MR) is called GIRD (Glenumeral internal rotation deficit) and is considered a change that has functional implications from 20 degrees¹⁷.

Moller et al. (2017), for example, evaluated the shoulder injury rate in 679 young handball practitioners for 31 weeks and concluded that training load increases the risk of injury in individuals with normal range of motion characteristics by 60%. and shoulder strength. In addition, they also observed an increased risk of injury in players with decreased external rotator shoulder strength and scapular dyskinesia; however, there was no difference in risk of injury among practitioners with normal shoulder characteristics¹⁸.

Aashein et al. (2018) found similar results to those presented in this study by assessing for 10 months the prevalence of overuse injury in 145 handball players aged 16 to 18 years and observed a general prevalence of 36% considering all In the anatomical regions, the shoulder injuries (38%) were the most common and the knee injuries (36%) the ones that resulted in the removal of the most impacting activities. The overall incidence of injury was 91%¹.

Traditionally, studies have evaluated the relationship between glenohumeral joint range of motion, scapular dyskinesia, and shoulder muscle strength in the prevalence of joint injury¹⁸. In a prospective study of 206 elite handball athletes from Norway, researchers found a significant association between Weak external rotator musculature, scapular dyskinesia, range of motion for external shoulder rotation, and injury to this joint¹⁰. For the authors, such studies are important because they enable the discovery of intrinsic factors associated with the onset of injuries that can be countered decrease the prevalence of injuries.

Forthomme et al. (2018), for example, evaluated the relationship between external rotator musculature strength through isokinetic dynamometry in 108 professional handball players and shoulder injuries, and found no relationship between the analyzed variables¹⁸. Corroborating these results, another study performed with 329 handball players of both sexes found no association between total shoulder rotation amplitude, external shoulder rotation amplitude, and shoulder scapular dyskinesia in such athletes, but there was a positive correlation between shoulder overuse and greater internal rotation. of the same joint¹⁹.

A systematic review by Fong et al. (2007) showed that ankle injuries occupy the second position among the most prevalent handball-related injuries and that the most common type is sprains which are often related to landings and changes in direction²⁰.

These findings partially corroborate the results of Giroto et al. (2015) who evaluated the incidence of injuries in 339 professional handball athletes from Brazil and found a higher prevalence of traumatic ankle injuries (19.4%) followed by knee (13.5%)¹⁴. During the World Handball Championship held in Qatar in 2015, a total injury incidence of 104.5 injuries per 1000 hours of play was reported, with the highest risk athletes being the line players and the most commonly injured places being the ankle, thigh and knee³. These results partially corroborate those presented in this study in which the ankle joint was the third with the highest prevalence of complaints. The divergences in the results may perhaps be explained by the heterogeneities of the analyzed groups as well as the data collection instruments.

Most importantly, the detection of the most prevalent complaints is the impact that such injuries generate on athletes' lives. From the sports point of view, the departure from training and competitive activities is the main aspect. Studies corroborate the fact that shoulder, knee and ankle injuries are often impeding factors for sports^{3,19}.

When asked through the Nordic questionnaire about seeking medical assistance for the evaluation and treatment of injuries (Table 3), the most cited regions were knee and ankle (25%). In fact, as previously mentioned, the most common knee and ankle injuries related to handball sports are ligament injuries, ACL, PCL and sprains, respectively. Such injuries have greater severity and due to the impediment of sports practice and many ADLs generate greater urgency in the search for assistance^{21,15,14}. According to Riffel, Mann and Kleinpaul, (2016) among the related anatomical sites in the injuries occurred, nine distinct sites were presented, being the knee with the largest number totaling six (25%) of the athletes, followed by shoulder and ankle with four (17. %). To demonstrate the type of injury 14 (56%) athletes had sprains as injuries, most of them followed by acute non-specific pain with 5 (20%) athletes with complaints²¹.

When evaluating the places where there is a major complaint in the last week (Table 4), the results corroborate with the literature, in which the knee, ankle and elbow injuries are often triggered acutely.

According to Silva, (2010) lateral epicondylitis is a specific pathology of the lateral epicondyle muscles, often caused by overload, in which micro lesions are caused in the region of the insertion of the extensor tendons of the wrist, fingers and, to a lesser extent, the extensor. carpal radialis, besides the anterior portion of the common extensor of the fingers²². Medial epicondylitis are injuries that can disrupt the athlete's life. As they may require long-term treatment, especially in sports where potent throwing is required (tennis serve, baseball throw, volleyball attack, among others).

Despite presenting dubiousness in their presentation, either in the upper or lower limbs, previous studies have shown no difference in the prevalence of upper and lower limb injury among handball players when evaluated in the last 6 and 12 months².

In addition, more important than the site of injury or complaint presented by athletes, diagnosis and prevention of these injuries are imperative since a prospective study of 30 young adult handball players, Slodownik, Gonowska-Slodownik and Morgulec-Adamowicz, (2018) observed that the presence of injury in the last 12 months is an important factor for the appearance of new injuries in handball players so that those who had suffered some kind of injury in the last 12 months had a 13.7 times greater risk of injury. within the next 6 months after the assessment². In terms of injury prevention, Achenbach et al. (2017) implemented a neuromuscular training program comprising periarticular knee muscle strengthening exercises, proprioception, plyometric exercises and jump and landing exercises, observed a decrease in the prevalence of knee injuries in young practitioners (16 to 18 years) of both genders¹¹. The program was held 2-3 times a week for 10-12 weeks before the start of the season and once a week during the competition period.

Although the sample presented by this study was small, the findings found here are in agreement with those presented by the international literature on handball injuries. Further studies are needed with larger samples and more robust statistical analysis and especially from national studies, since the national literature is lacking research with well-defined methods and samples on this subject.

Conclusion

In this research, a higher prevalence of injury in the shoulder, knee, ankle-foot and elbow regions was observed. The regions that demanded the most care in the search for specialized help were knee and ankle and the regions with complaints that led athletes to withdraw from work, leisure and sports activities most frequently were knee, shoulder, hip, thigh and ankle.

Author contributions

Cunha FVM participated in the conception, study design, data collection, statistical analysis and interpretation of the results, writing of the scientific article. Braga ES participated in the data collection and interpretation, and writing of the scientific article.

Conflicts of interest

No financial, legal or political conflict involving third parties (government, companies and private foundations, etc.) has been declared for any aspect of the work submitted (including but not limited to grants and funding, advisory board membership, study design, preparation manuscript, statistical analysis, etc.).

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