

A SYSTEMATIC REVIEW ON THE MOST COMMON INJURIES IN HANDBALL

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ABSTRACT

High performance in sports requires lots of training and a good knowledge of training techniques, characteristics of physical training, mechanisms of lesion occurrence and methods of prevention sports pathology. Handball specific requirements are very important in order to avoid specific trauma, and in this matter specific literature is very important for specialists.

This paper aimed to find how many relevant papers were published from 2018 to present regarding handball injuries and prevention of handball injuries, in two databases, PUBMED and Library Genesis (libgen.li.). For this matter there were used three equations to find results in the two databases selected, and for each of them there were quantified the number of scientific papers that were relevant to this study.

Also, in this paper we presented inclusion/exclusion criteria, the results we found, and also, the analysis of each paper's quality, for the papers that were a match to the inclusion criteria.

For each paper we evaluated the quality of content using 5 relevant questions that help us understand the missing aspects that need further study, being applied individually for the two databases.

The results we found revealed a very poor literature regarding injuries in handball and also prevention of injury in handball.

INTRODUCTION

Physical and anthropometric characteristics of performance athletes are key factors in success in team sports, along with specific characteristics of the game's structure. (Mihăilă I., 2019) Handball is a complex team sports, where players have high physical demands (Barič A., Hlebš S., Novak S., Brumat P., 2021), as changes of direction, throws, accelerations and jumps, causing a high prevalence of injuries of both upper and lower limbs. (Asker, M., Waldén, M., Källberg, H., Holm, L. W., & Skillgate, E., 2017)

Although female sex is considered a risk factor, studies show that injury rates are different in fact for male and female players. (Zech, A., Hollander, K., Junge, A., Steib, S., Groll, A., Heiner, J., Nowak, F., Pfeiffer, D., & Rahlf, A. L., 2022). Some other studies reveal the need to adjust recovery protocols to the particular injury or tissues affected. (Martín-Guzón, I., Muñoz, A., Lorenzo-Calvo, J., Muriarte, D., Marquina, M., & de la Rubia, A., 2021) A study regarding sports-related concussion reveals that in the last few years prevention evolved, but it is still a great need of prevention in professional handball. (Sturesson V., Marforio P., Reuter A., Johansson K., Ageberg E., 2024). Research show a higher rate of injuries in pelvic and shoulder areas than other regions of the body. (Rafnsson, E. T., Valdimarsson, Ö., Sveinsson, T., & Árnason, Á., 2019). Some researchers studied specific training methods of hamstrings to evaluate efficiency of training. (Vácsi M., Fazekas G., Pilissy T., Cselkó A., Trzaskoma L., Sebesi B., Tihanyi J., 2022). Another studies claim that shoulder and knee are some of the most overused joint in handball players. (Asker M., Hägglund M., Waldén M., Källberg H., Skillgate E., 2022) Female athletes showed improvements after programs of specific muscular strength exercises. (Hammami M., Gaamouri N., Wagner H., Pagaduan J.C., Hill L., Nikolaidis P.T., Knechtle B., Chelly M.S., 2022) Gluteal muscles strengthening reduced absence due to burden in the lumbar spine. (Raya-González J., García-Esteban S., Hume P., Castillo D., 2021)

In overhead athletes, glenohumeral internal rotation deficit is considered a chronic adaptation, for example. (Keller, R. A., De Giacomo, A. F., Neumann, J. A.,

Limpisvasti, O., & Tibone, J. E., 2018) Special attention is needed for the acromioclavicular distance, when it comes to shoulder health of handball players. (Carolin Rentz, Kirsten Legerlotz, 2022). A study from 2020 indicates that improvements are needed regarding ball-handling skills and more focusing on sprains in the lower limb is necessary. (Asai, K., Nakase, J., Shimozaki, K., Toyooka, K., Kitaoka, K., & Tsuchiya, H., 2020).

It is very important to be aware of the most recent studies that have been conducted regarding different aspects of the game, such as aspect of performance and profile of the injuries that occur during the training sessions or competitions. (Andersson, S. H., Bahr, R., Clarsen, B., & Myklebust, G., 2016) Studies show that it is known very little still about shoulder prevention for professional players. (Østerås H., Sommervold M., Skjølberg A., 2015). It is very important to consult scientific papers regarding the newest information about treating injuries, their mechanism of occurrence, their incidence, and of course, how injuries can be prevented.

Aiming to prevent injuries, one of the most important aspects in this research field is to identify the profile of injuries that occur in handball game and to come to knowledge of their prevalence and incidence (Giroto, N., Hespanhol Junior, L. C., Gomes, M. R. C., & Lopes, A. D., 2015). Related to this issue, we need to understand the risk factors, the mechanism of producing the lesions, age and sex of players, level of performance, etc. Internal and external rotator shoulder muscles can be predictors for shoulder injury risk studies report. (Hadjisavvas, S., Efstathiou, M. A., Malliou, V., Giannaki, C. D., & Stefanakis, M., 2022) Although it is clear that injuries in handball differ according to player's position, it is not clear if the characteristics of these injuries also differ. (Mashimo, S., Yoshida, N., Takegami, A., Suzuki, K., & Onishi, S., 2022).

This knowledge will allow us to develop better training techniques in order to increase sports performance, but also will help us develop strategies of prevention of the injuries in order to increase quality of life for athletes and improve level of game performance. (Vila H., Barreiro A., Ayan C., Antunez A., Ferragut C., 2022) Therefore, further studies are needed to lead to a better understanding and to improve performance in handball.

These are the reasons why the aim of the study is to identify the most studies regarding the most common injuries in handball game, involving both upper and lower limbs.

MATERIALS AND METHODS

The source of the data we collected was accessed via Internet the database PUBMED and Library genesis (libgen.li), searching scientific literature regarding

specific topic we are discussing about in this paper: the most common handball injuries.

For an accurate searching we used key words and combinations of them to find as many scientific papers as possible on the topic. The first equation of searching was “handball injuries”, the second one was “prevention injuries” and “handball”, and the third one was “injury prevention in handball”. These searching equations were used in both databases in order to identify as many papers as possible.

SELECTION CRITERIA

The period we chose for the research was 2018 – 2023 – five years– in order to take into consideration only the most recent papers. The research included both male and female teams.

Table 1. – Selection criteria for the study.

| Criteria for study selection | |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inclusion criteria | Including both male and female players Describing injuries during both training and competition Including handball <u>injury</u> no matter of player’s age Describing the location of the injury English language Definition of injuries Minimum 10 players involved in study Date of publication starting January 2022 |
| Exclusion criteria | Other sports than handball Insufficient information Different topic Reviews No definition of injury No full text accessible |

The results were extracted reading the original articles and establishing the type of paper, and running through all the criteria above mentioned, the papers were included or excluded from this study.

Also, for a better understanding of the level of studies, the papers found relevant in this research were assessed regarding their quality by answering to

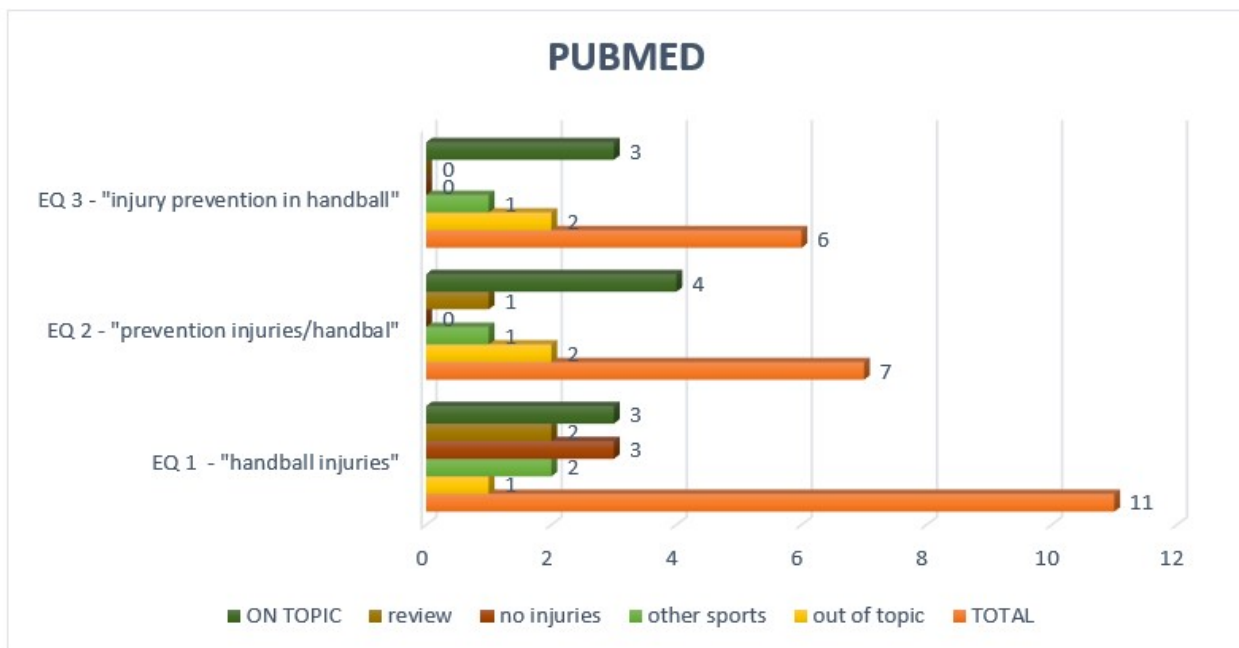
particular questions we considered relevant. The questions has to be answered YES/NO – YES being scored with 2, NO – being scored with 1. Maximum of score was 10 – meaning the highest level of quality, minimum was 5 – the lowest level of quality.

The quality was assessed by 3 evaluators to ensure the accuracy of information.

RESULTS

For the first database we searched in, PUBMED, the results follow the diagram I:

1. For the first search equation “handball injuries”, the total amount of papers was 11, from which 2 were excluded for other sports present in the studies, 3 of them were excluded for not regarding any injuries, 2 of them were excluded because they were “review” type of paper, and 1 paper was excluded because it was out of the topic. The final result were 3 articles matching the type of study we were researching.
2. The second equation resulted a total of 7 papers, of which 2 were excluded being out of topic, 1 was excluded for regarding other sports, one was excluded being a review, and 3 papers were a match to our research.
3. The third equation found 6 articles, from which 1 was excluded because it regarded another sport, 2 were excluded being out of topic, and 3 were a match to our study.

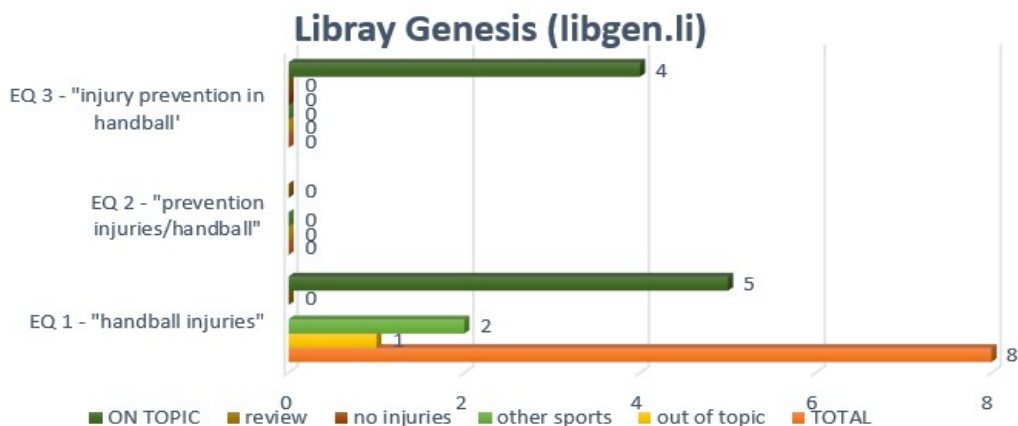


Graph 1. – Results found on PUBMED database.

For the second database we conducted our research in, LIBRARY GENESIS, the results were not very different, the values being as it follows in diagram II:

1. For the first equation, a total of 8 articles were found for the selected period. 2 of them were ruled out because they regarded other sports and 1 was excluded because it was out of topic. Only 5 papers were a match to our topic.
2. The second equation did not find any result in this database.

3. Third equation found a total of 4 papers, all of them corresponding to out



inclusion criteria.

Graph 2. – Results found in Library Genesis (libgen.li) database.

In order to evaluate the quality of the papers we found matching to our inclusion criteria, we scored the papers with 1 point for the negative answer, and 2 points for positive answer. The results look as it follows in table 2:

Table 2. – Quality assessment for PUBMED results.

| Questions/ studies | Study 1 | Study 2 | Study 3 |
|------------------------------------------------------------------------|----------|----------|----------|
| Is the period of the study mentioned? | YES | YES | YES |
| Are the group studies well defined? | YES | YES | YES |
| Is the injured segment of the body mentioned? | YES | YES | YES |
| Is the mechanism of producing the lesion described? | YES | NO | NO |
| Is the missing period from sports activity caused by injury mentioned? | NO | NO | NO |
| Total | 9 | 8 | 8 |

It is important to mention that the 3 relevant articles found in PUBMED database were the same for each equation, as it is the case for Library Genesis (libgen.li) database.

Also, we found the following result for Library Genesis (libgen.li) as in table 3:

Table 3. – Quality assessment for Library Genesis (libegen.li) results.

| Questions/ studies | Study 1 | Study 2 | Study 3 | Study 4 | Study 5 |
|------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| Is the period of the study mentioned? | YES | YES | YES | NO | YES |
| Are the group studies well defined? | YES | YES | YES | YES | YES |
| Is the injured segment of the body mentioned? | NO | YES | NO | YES | YES |
| Is the mechanism of producing the lesion described? | YES | YES | NO | NO | YES |
| Is the missing period from sports activity caused by injury mentioned? | NO | NO | NO | NO | NO |
| Total | 8 | 9 | 7 | 7 | 9 |

DISCUSSIONS

According to the results we discovered in PUBMED and Libgen.li databases, very few scientific papers on topic "the most common injuries in handball" have been found. Out of all the papers found, very few of them answer to the questions mentioned above, which is an important criteria to evaluate their quality. None of the papers had the maximum score, answering to all the questions, only 3 of them having 9 score, being the most complete papers we could find in these two databases.

This conclusion is a starting point for further investigation on the topic, trying to answer to as many questions as possible about handball injuries and the risk factors, mechanisms of producing, how can we reduce their incidence. In these papers it is impossible to take into consideration as many details as possible about the players, and the condition of producing the lesions, so the papers would be as complete as possible.

The details as period of the study, what kind of group we are investigating, how long the experiment will last, what kind of lesion we are investigating, what kind of consequences is this lesion producing for the players, how long a player needs

to be absent from sports activity, what costs the recovery involves, etc., are important matters that need to be further investigated. Also, one of the most important factor is what kind of strategy can we use to reduce the incidence of lesions in performance sports.

CONCLUSIONS

As it can be observed above, there are very few studies regarding handball injuries and prevention of handball injuries, on the 2 databases we assessed, PUBMED an Library Genesis (libgen.li) for the period 2018-present.

This remark leads to more attention regarding prevention of injuries in handball and further study in this direction. More scientific papers could help specialists understand better handball trauma occurrence and could help them develop better strategies of prevention and treating the existing lesions.

The aim of these studies is to improve knowledge about handball trauma during competitions and training sessions, and to develop better strategies for preventing the occurrence of lesions.

We recommend the improvement of specific literature with further studies regarding mechanism of lesions appearance, improvement of basic training, introducing prevention programs for each team, and also individually for each member of the team, according to it's position in the field.

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