

## RESEARCH ARTICLE

# Mental Health of Former Athletes in the Field of Orthopedics: A Systematic Review

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## Abstract

This study aimed to use a systematic review approach to identify the post-retirement mental health of former athletes in the field of orthopedic surgery and provide suggestions for building support for former athletes. This systematic review was conducted according to the Minds Practice Guidelines Development Manual 2020 ver. 3. The search engines that were used were the Central Journal of Medicine Web, PubMed, CINAHL/MEDLINE, Cochrane Library, and PsycINFO. Three articles met the eligibility criteria at primary and secondary screening and were reviewed by two investigators to assess the mental health of former athletes after retirement from competition. Although the orthopedic diagnoses of the former athletes included in the studies differed, retirement under unacceptable conditions, such as sudden retirement advice, had a greater impact on post-athletic mental health when transitioning from active to competitive retirement than retirement, which reflected the former athlete's wishes. Athletic injuries are also considered a major factor that has a negative impact on mental health after retirement from athletics, and it is necessary to build long-term support not only for the process of retirement from athletics but also for physical follow-up.

**Keywords:** Orthopedics, Sports, Athletes, Cognitive Behavioral Therapy, Systematic Review

## 1. Introduction

In recent years, sports medicine has focused not only on interventions for physical disorders but also on mental health care for athletes<sup>1-7</sup>. Mental health problems faced by active athletes include “overtraining syndrome”<sup>8</sup>) and “burnout”<sup>9-10</sup>) caused by excessive sport and training, and many athletes have mental health problems. In addition, sports athletes are at risk of retiring from competition due to the effects of injuries and other factors, and it has been highlighted that this may have a long-term negative impact on mental health after retirement from competition. Although former athletes have formed an image of being mentally tough<sup>11</sup>), an American College of Sports Medicine<sup>12</sup>) survey found that following their retirement from competition, sports athletes may experience anxiety and depression, engage in behaviors that negatively impact their mental health,

such as drinking, smoking, and drug use, and develop sleep and eating disorders. Unlike active athletes, one factor that causes mental health problems in former sports athletes who have retired from competition is the transition from active sports to an environment in which they cannot return to competition. Recently, an adaptation model for athletes' retirement from competition has been proposed<sup>13</sup>), and the importance of mental care for both active athletes and former athletes after retirement from competition has been highlighted. However, the methodology for mental care has not yet been established, and the establishment of support is an urgent issue.

However, research in this field is still in its early stages, and it cannot be said that support for focusing on athlete's mental health after they retire from competition has been sufficiently verified. Therefore, in this study, a systematic review of the mental health

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of former sports athletes in the field of orthopedic surgery was conducted to provide basic data for building support for sports athletes after they retire from competitions.

## 2. Methods and Materials

This systematic review was conducted in accordance with the Minds Practice Guidelines Development Manual 2020 ver. 3.0<sup>14</sup>.

### Clinical Question Formulation and Literature Selection Criteria

The clinical question was, “What is the mental health of former athletes in the field of orthopedic surgery?”

#### 2.1 Literature Search and Selection

A comprehensive literature search was conducted using the Central Journal of Medicine Web, PubMed, CINAHL/MEDLINE, Cochrane Library, and PsycINFO databases. The search terms used were “sports,” “orthopedics,” and “mental health care.” The search terms were limited to articles describing the mental health of former athletes in the field of orthopedic surgery, and no other search terms were set to conduct a comprehensive search (last checked on March 4, 2024). Literature was extracted using the

following search terms and criteria: (1) not related to orthopedic surgery, (2) not related to sports, and (3) not targeting retired ex-sport athletes. The literature selected in the exhaustive search was independently screened by two researchers as a primary screening; articles that did not meet the clinical questions of the study from the title and abstract, and those with similar themes and researchers’ names were considered duplicate literature and excluded from the target literature. In the secondary screening, two researchers independently read the full text, selected articles that met the selection criteria, collated the results of the two researchers and, if the two researchers disagreed, a third opinion was considered to determine the articles to be selected.

#### 2.2 Ethical Considerations

Every effort was made to protect the copyright of the literature covered in this study, and the results were extracted by two researchers to ensure that the content of each article was not compromised. The authors declare no conflict of interest.

## 3. Results

### 3.1 Literature Search Results

The results of the literature search are shown in Fig.1 Eight references were retrieved from the Central

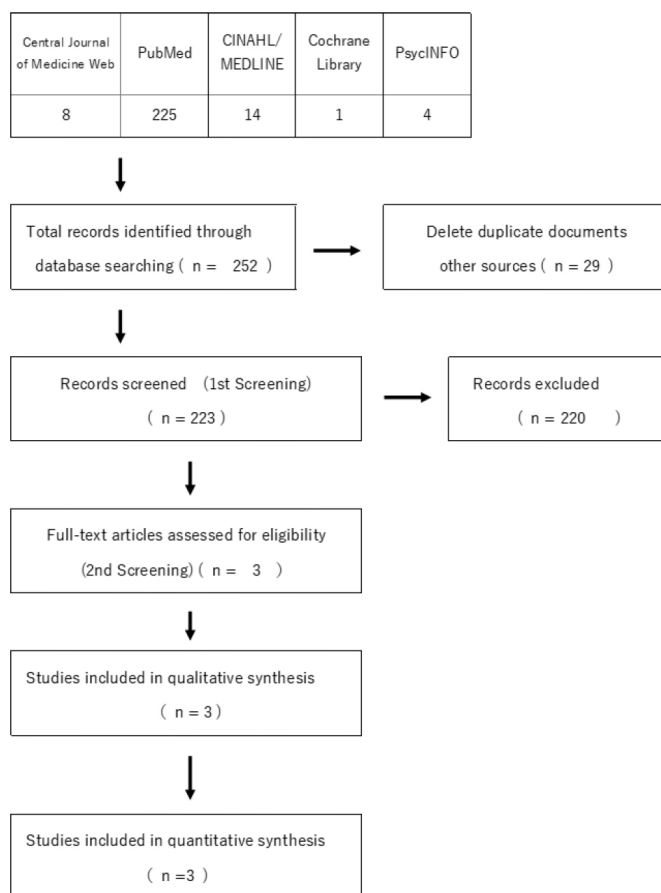


Figure 1. literature Search Flowchart

Journal of Medicine Web, 225 from PubMed, 14 from CINAHL/MEDLINE, 1 from the Cochrane Library, and 4 from PsycINFO. Duplicate references and references that met the exclusion criteria established

for this study were removed, and three references confirmed by the researchers to meet the eligibility criteria were included in the analysis.

**Table 1.** Subjects selection information

No	Author, Year of publication	Recruitment destination	Types of sports	Subjects	Targeted orthopedic diagnosis	Competition suspension status	Number of years elapsed since suspension of competition	Blinding	Inclusion criteria · Exclusion criteria
1	Gouttebarge V., et al., 2017	ice hockey national players' unions	Ice hockey	1. baseline questionnaire [number of persons] 258 current players 135 retired players 123  2. follow-up questionnaire [number of persons] 158 current players 81 retired players 77  [Age] current players 26 ± 5 retired players 35 ± 8	musculoskeletal injuries * One of the survey items (not included in the inclusion criteria)	not voluntarily (24%)	6 ± 5	<p>● The responsible researcher provided instructions and random numbers to the involved ice hockey national players' unions in order to select potential participants at random.</p> <p>● The national ice hockey players' unions invited them in the study, procedures being blinded to the responsible researchers for reasons of privacy and confidentiality</p>	<p><b>[Inclusion criteria]</b> (i) member as an active or retired professional ice hockey player of the national ice hockey players' unions from Denmark, Finland, Norway and Switzerland, which means committing (current player) or have committed (retired player) significant time to ice hockey training and competing (current player) or have competed (retired player) at professional ice hockey level; (ii) age of 18 up to 50 years; (iii) male (because of the nature of the sport and in order to allow comparisons with previous studies focusing on male athletes); (iv) able to read and comprehend texts fluently in English; and (v) owning an email address</p> <p><b>[Exclusion criteria]</b> NA</p>
2	Schuring N., et al., 2017	a member of the national rugby union players' associations, the national footballers' unions, national ice hockey players' associations, South African cricketers' association or Gaelic players' association from Finland, France, Ireland, Norway, South Africa, Spain, Sweden and/or Switzerland	rugby, football, ice hockey, Gaelic sports and cricket	[number of persons] 624 rugby players (n=295, 47%) football players (n=220, 35%) ice hockey players (n=61, 10%) cricket players (n=27, 4%) Gaelic sport athletes (n=21, 3%)  [Age] 36.7 ± 6.3	osteoarthritis	not voluntarily (42%)	6 ± 5	<p>The invitation procedures were blinded to the responsible researchers for reasons of privacy and confidentiality of the former elite athletes</p>	<p><b>[Inclusion criteria]</b> (i) age of 50 years or younger, (ii) male, (iii) able to read and comprehend texts fluently in either in English, French or Spanish, and (iv) a member of the national rugby union players' associations, the national footballers' unions, national ice hockey players' associations, South African cricketers' association or Gaelic players' association from Finland, France, Ireland, Norway, South Africa, Spain, Sweden and/or Switzerland.</p> <p><b>[Exclusion criteria]</b> NA</p>
3	DeFreese J.D., et al., 2022	contact information provided by the NFL Alumni Association, as well as individual teams	american football	[number of persons] 1,784 Non-Hispanic (n=1,041, 58.4%) American Indian or Alaska Native (n=4, 0.2%) Asian (n=1, 0.1%) Black (n=636, 35.7%) Mixed race/ethnicity (n=99, 5.6%) Native Hawaiian or Pacific Islander (n=12, 0.7%) Other (n=6, 0.3%)  White (n=1,053, 59.0%) Missing/not reported (n = 13, 0.7%)  [Age] 52.3 ± 16.3	repetitive head impact exposure  ● Lifetime concussion history 0 (n=234, 13%), 1-2 (n=313, 18%), 3-5 (n=425, 24%), 6-9 (n=366, 21%), and 10+ (n=446, 25%)	22% (n=395) of 39% (n=697)  [Athletes' views not reflected]	24,05 ± 15,56	<p>—</p>	<p><b>[Athletes' views reflected]</b> (having any degree of input into their discontinuation decision) 22% (n=395) of 39% (n=697)  <b>[Athletes' views not reflected]</b> cut from the team/not offered a contract (Just over half of participants)</p>

### 3.2 Mental Health of Former Athletes in the Field of Orthopedics

#### 3.2.1 Participant Information

The participant information for each literature is shown in Table 1

The method of participant recruitment is clearly described in all references. The sports played by the former athletes varied from ice hockey (No.1); rugby, football, ice hockey, Gehrig’s sport, cricket, and other sports (No.2); to American football (No.3).

Orthopedic diagnoses considered to be a factor in retiring from playing included musculoskeletal injuries (No.1), osteoarthritis (No.2), and repeated head impact exposure (No.3). Regarding the circumstances leading to the athlete’s retirement from the competition, 24% (No.1) and 42% (No.2) of the participants had not

retired from the competition by the athlete’s own choice. Although the exact percentage was not stated in the remaining target literature (No.3), athletes’ intentions were not reflected in athletic retirement, as more than half of the participants retired with a notice of dismissal.

Two studies (No.1-2) used a blinding method for the survey of participants. The inclusion criteria for participant selection were clearly stated in two studies (No.1-2). The exclusion criteria were not mentioned in any of the references.

#### 3.2.2 Mental Health of Former Athletes

The results of the survey on the mental health of ex-sport athletes after retirement from competition are shown in Table 2. Two studies (No.1-2) used the same scale to measure the mental health of ex-sport athletes

**Table 2.** Research methods and results

No	Author, Year of publication	Purpose	Rating scale	Result
1	Gouttebarge V., et al... 2017	(i) determine the prevalence, comorbidity and 6-month incidence of symptoms of CMD (distress, anxiety/depression, sleep disturbance, adverse alcohol use, eating disorders) among current and retired professional ice hockey players  (ii) evaluate the potential relation between potential stressors (severe musculoskeletal injuries, surgeries, recent life events, career dissatisfaction) and symptoms of CMD	The 12-item General Health Questionnaire (GHQ-12)  ※measured at baseline (previous four weeks) and at follow-up (previous six months).	<p><b>【Current】</b></p> <ul style="list-style-type: none"> <li>●Distress : prevalence 13.4 (8.6-20.3), incidence 5.6 (&lt;0.1-27.7)</li> <li>●Anxiety/depression : prevalence 24.1 (17.6-32.0), incidence 16.7 (5.0-40.1)</li> <li>●Sleep disturbance : prevalence 15.0 (9.9-22.2), incidence 11.1 (1.9-34.1)</li> <li>●Adverse alcohol use : prevalence 7.6 (4.0-13.5), incidence 5.6 (&lt;0.1-27.7)</li> <li>●Eating disorders : prevalence 17.6 (10.2-28.5), incidence 22.2 (8.5-45.8)</li> </ul> <p><b>【Retired】</b></p> <ul style="list-style-type: none"> <li>●Distress : prevalence 11.7 (6.8-19.1), incidence 8.3 (&lt;0.0-37.5)</li> <li>●Anxiety/depression : prevalence 19.4 (13.0-28.0), incidence 8.3 (&lt;0.0-37.5)</li> <li>●Sleep disturbance : prevalence 16.7 (10.7-24.9), incidence 25.0 (8.3-53.9)</li> <li>●Adverse alcohol use : prevalence 28.7 (21.0-37.9), incidence 16.7 (3.5-46.0)</li> <li>●Eating disorders : prevalence 23.8 (14.9-35.7), incidence 8.3 (&lt;0.0-37.5)</li> </ul> <p><b>【The (4-week) prevalence of symptoms of CMD】</b></p> <p>distress 12% adverse alcohol use 29%</p> <p>At baseline, around 13% of the retired professional ice hockey players reported two simultaneous symptoms of CMD, 10% three simultaneous symptoms of CMD and 1% four simultaneous symptoms of CMD.</p> <p><b>【The (6-month) incidence of symptoms of CMD】</b></p> <p>distress, anxiety/depression and eating disorders 8% sleep disturbance 25</p> <p>※retired professional ice hockey players exposed to a higher number of surgeries and/or higher level of career dissatisfaction are 7-8 times more likely to report symptoms of CMD by comparison those less or unexposed ※almost one out of three retired players reported that symptoms of CMD had influenced negatively their post-career quality-of-life</p>
2	Schuring N., et al... 2017	to explore the association between OA and the occurrence and comorbidity of symptoms of CMD (distress, anxiety/ depression, sleep disturbance, adverse alcohol use) among former elite athletes from rugby, football, ice hockey, cricket and Gaelic sports (football and hurling)	The 12-item General Health Questionnaire (GHQ-12)	<p>With OA (n=200)</p> <ul style="list-style-type: none"> <li>●Distress 28.6 ●Anxiety/depression 30.8 ●Sleep disturbance 33.2 ●Adverse alcohol use 33.8</li> </ul> <p>Without OA (n=402)</p> <ul style="list-style-type: none"> <li>●Distress 18.8 ●Anxiety/depression 25.3 ●Sleep disturbance 23.9 ●Adverse alcohol use 22.5</li> </ul>
3	DeFreese JD., et al... 2022	To examine associations among transition-related psychosocial factors and current mental health outcomes in former National Football League (NFL) players	Depression and Anxiety Short-Form subscales from the PROMISR-29 Profile (version 2.0)	<p><b>【lifetime depression diagnosis】</b> 20% (n=357) <b>【lifetime anxiety diagnosis】</b> 19% (n=333)</p> <p>having an involuntary discontinuation decision and no transition plan prior to discontinuation were significantly associated with reporting higher (less adaptive) depression and anxiety scores</p>



after retirement from competition, and one (No.3) used the same survey items for depression and anxiety, although the rating scale was different from that of the other two (No.1-2). Apart from the depression and anxiety survey items, sleep and drinking status were also surveyed in two cases (No.1-2) and eating disorders in one case (No.1).

Regarding the mental health survey of former athletes, the study comparing active and retired former athletes (No.1) found that, although active athletes had greater levels of distress, depression, and anxiety, the degree of sleep disturbance, drinking status, and rate of eating disorders were significantly higher in former athletes. The prevalence of common mental disorders (CMD) symptoms at four weeks was higher with the harmful use of alcohol; however, after six months, the prevalence of sleep and eating disorders increased. Among professional ice hockey players, those who have had many surgeries or had a high level of career dissatisfaction are seven to eight times more likely to report symptoms of CMD, and approximately one in three retired players of the respondents said that their CMD symptoms negatively impacted their quality of life (QOL) after retirement. In a previous study comparing the mental health of participants with and without knee osteoarthritis (No.2), participants with knee osteoarthritis were found to be more likely to experience distress, depression, anxiety, and sleep disorders and alcohol dependence; the values were high for all items. Although no control participants were set, the literature targeting former athletes (No.3) found that

decision-making regarding retirement from playing was not reflected in the athletes themselves and that the process from active participation to retirement was not reflected in the athletes themselves. Not being provided with a transition plan increased the levels of depression and anxiety.

## 4. Discussion

### 4.1 Environmental Changes And Psychology of Former Sports Athletes

#### 4.1.1 Process of Retirement from Competition

All the target articles mentioned whether athletes' wishes were reflected in the transition from active participation to competitive retirement. Many of the participants in the literature do not reflect athletes' wishes in their transition to retirement from competition, and athletes not only find it difficult to make the decision to stop playing on their own,

but also face sudden changes in their lives after the cessation of competition. I can imagine that this job will force you to face numerous challenges. Previous research has demonstrated that retiring from competition is equivalent to "social death"<sup>15-16</sup>, and that top athletes who have looked to sports as a source of identity during adolescence and young adulthood must rebuild their identity<sup>17</sup>. A lack of preparation or planning for retirement from competition is also said to be a factor that causes psychological difficulties<sup>13,18-19</sup>, and an experience similar to social death due to a sudden suspension of competition or the experience of suddenly losing one's identity as an athlete can lead to psychological difficulties. This can have a significant negative impact on health. Recently, there has been talk about the need to view the retirement of sports athletes not as an issue but as a career transition<sup>20-22</sup>. Retirement recommendations may require considerable time and support to recover from the sense of loss.

However, the effects on the mental health of athletes whose wishes were not reflected in the transition from active to retired athletes have not been sufficiently examined, and further research is required.

#### 4.1.2 Mental Health of Former Sports Athletes

All articles included in this study measured the levels of anxiety and depression, and one article (No.1) compared active athletes with musculoskeletal injuries to athletes who had retired from playing. One study (No.1) compared athletes who had retired from competition based on whether they had osteoarthritis, and another study (no.3) focused only on athletes who had retired from competition. However, although there were differences in the attributes of the participants, including their orthopedic diagnoses, this suggests that anxiety and depression are major mental health issues for athletes after they retire from competition. In addition, two studies (No.1-2) also investigated alcohol dependence and sleep disorders, and one study (No.1) investigated eating disorders. Retirement from competition is seen as a negative factor that causes negative emotions associated with loss of identity<sup>18,23</sup> and loss of status and goals<sup>25</sup>, resulting in depression, alcoholism, drug dependence, and suicide attempts. It has also been highlighted that there is a possibility that it may lead to a crime<sup>18-19,26-27</sup>. In many of the participants of the literature targeted in this review, there were many cases in which athletes' wishes were not reflected in the transition from active participation to retirement from competition. If there is a strong commitment to the sport or if one is forced to retire

from it unwillingly or unexpectedly, it may cause a loss of interest or a traumatic experience<sup>23</sup>). The participants of the literature covered in this review were professional athletes, and it can be said that many of them were a group with a strong commitment to sports, resulting in excessive loss of identity and psychological trauma. Consequently, in addition to an excessive loss of identity, traumatic experiences may have had a strong negative impact on mental health, including anxiety, depression, sleep disorders, and alcoholism, even after retirement.

It is said that the period for former athletes to recover their mental health and adjust emotionally takes six months to a year<sup>28</sup>) or, on average, two years<sup>29</sup>). It has been reported that even after more than two years have passed, patients continue to have problems due to a lack of emotional adjustment<sup>28</sup>), and it may take a significant amount of time to recover their mental health after retiring from competition. The participants of this review are those who have sustained some kind of injury in the field of orthopedics, and it is not possible to simply focus on the negative impact of retiring from competition on mental health. These patients also need to recover their physical health, and the longer the physical aftereffects last, the more likely it is that the negative impact on their mental health will also be prolonged; therefore, it is essential to consider long-term support.

It is said that whether or not a plan for the future after retiring from competition is implemented before retiring from competition will affect life satisfaction after retirement from competition<sup>30</sup>), and it is necessary for athletes to recognize retirement from competition as inevitable. It can be said that it is important to take preparatory actions that will lead to early recovery of mental and physical health in order to prevent crisis situations associated with retirement from competition. However, the mental health of former athletes in the field of orthopedic surgery has not been sufficiently examined, nor has the process of transition from active to retired athletes and the establishment of long-term support after retirement, considering physical after-effects. Therefore, it is necessary to conduct further studies.

#### 4.2 Limitations of Research and Future Prospects

In this study, we conducted a systematic review of previous research focusing on the mental health of former athletes after retiring from sports with the aim of creating basic materials that will lead to building support. However, it is debatable whether the mental health of former athletes has been sufficiently examined

in the field of orthopedics. This is due to factors such as differences in the eligibility and exclusion criteria in selecting participants, whether blinding was used, and a lack of relevant literature.

## 5. Conclusion

We used a systematic review to clarify the mental health of former athletes in the field of orthopedics. However, due to the paucity of previous research, it cannot be argued that the mental health of former athletes has been adequately verified, and the accumulation of research remains a challenge.

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