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Sports injury anxiety in American football players: The role of demographic and training variables

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Abstract

This study aimed to investigate sports injury anxiety levels among American football players in relation to demographic and training variables. Thirty-five athletes from Sakarya participated in the study, and data were collected using the Sports Injury Anxiety Scale (SIAS). The Shapiro–Wilk test was used to assess normality, and the Mann–Whitney U and Kruskal–Wallis tests were used for group comparisons. The results indicated that sports injury anxiety differed significantly according to the level of play and years of sports participation. Professional athletes reported higher levels of pain anxiety than amateur athletes ($p < 0.05$). Players with fewer than three years of participation reported greater “Anxiety of Losing Social Support” than those with longer experience ($p < 0.01$). No significant differences were observed in terms of training frequency, education level, or surgical history ($p > 0.05$). These findings highlight the need to consider the psychological and physical consequences of injuries and emphasize the importance of integrating psychological support into rehabilitation programs for American football players.

Keywords: Sports injuries, anxiety, American football, psychology, rehabilitation

Introduction

American football is a sport that involves high contact and emphasizes physical endurance. During games, athletes are frequently exposed to physical contact, which increases the risk of injury [1,2]. Lower extremity injuries and head and neck trauma are among the most common types of injuries in American football. Some of these traumas, especially cervical spine and head injuries, can lead to serious neurological damage and even fatal outcomes [3-5]. Athletes who experience such injuries are affected both physically and psychologically. The rehabilitation process can be more effective if psychological factors are considered [6]. In recent years, concussions and musculoskeletal injuries in contact sports have been shown to have profound physical and psychological effects [7-9]. Symptoms of anxiety, posttraumatic stress disorder (PTSD), and depression are observed more frequently in athletes, especially after lower extremity injuries and concussions [8,10]. In football players, anxiety has been shown to persist independently of physical recovery and negatively affect performance during

return to sport after injury [7].

Anxiety is one of the most common psychological effects experienced by athletes after sports injuries. In the post-injury period, concerns such as loss of ability, fear of re-injury, and loss of social support can negatively affect athletes’ rehabilitation processes [11-13]. It is frequently emphasized in the literature that these anxiety levels are higher, especially in professional athletes, and that anxiety levels increase with the risk of ending their sports careers [14,15]. In contact sports such as American football, failure to address these concerns can complicate the return to play and negatively affect performance [16].

Recent studies have reported that implementing psychological support programs during rehabilitation increases recovery rates and athlete motivation [9,17]. In particular, anxiety management and rehabilitation adaptation training provided by sports psychology specialists make the return-to-sport process healthier and more effective. Recent findings indicate that injuries in contact sports entail not only physical harm but also significant psychological consequences for injured athletes.

CITATION

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A recent consensus statement summarizing 50 years of sports injury psychology research emphasized the need to integrate psychological support throughout the rehabilitation process [9].

This study examined sports-injury anxiety among American football players, controlling for demographic and training-related factors. The Sports Injury Anxiety Scale (SIAS) was used to assess these levels, taking into account level of play, years of participation, training frequency, and surgical history, with emphasis on the physical and psychological consequences of the injuries.

Material and Methods

Research Group

This study was conducted with a sample of 35 male athletes who played in American football teams in Türkiye. The participants' ages ranged from 20 to 24 years, with the majority in the 20–23 age range. Of the participants, 65.7% competed at the professional level, and 34.3% competed at the amateur level (level of play).

Power Analysis

A priori sample size calculation was performed using G*Power 3.1 (Faul et al., 2009) to ensure adequate statistical power. The calculation was based on the nonparametric two-independent-samples Mann–Whitney U test (test family: t-tests, two-tailed), with a significance level of $\alpha=0.05$, desired power of 0.80, and medium effect size ($d=0.5$). The analysis indicated that at least 30 participants were required to detect a medium effect. In the current study, 35 athletes participated, exceeding the recommended sample size and providing sufficient power to detect meaningful differences between the groups.

Data Collection Tools

Personal Information Form

Participants completed a Personal Information Form created by the researchers to collect demographic and training-related variables. They reported their age (categorized as 18–19, 20–21, 22–23, and 24+ years), weekly training frequency (1–3, 4–5, and 6–7 days), years of playing American football (0–1, 2–3, 3–4, 4–5, and 6+ years), education level (high school, associate, bachelor's, master's, and doctorate), level of play (amateur/professional), injury duration (1–7, 8–14, 15–21, and 22+ days), surgical history (yes/no), and injured body region (head, upper extremity, lower extremity, and trunk; multiple answers allowed).

Sports Injury Anxiety Scale (SIAS)

SIAS was used to assess athletes' anxiety related to sports injuries. The scale consists of 18 items rated on a five-point Likert scale (1=strongly disagree, 5=strongly agree), with higher scores indicating greater anxiety related to injury. The items are grouped into six subscales: Anxiety of Losing Ability, Anxiety of Being Perceived Weak, Pain Anxiety, Anxiety of Disappointment, Anxiety of Losing Social Support, and Anxiety

of Re-injury. Each subdimension contained three to four items. The SIAS was originally developed by Rex and Metzler [18] and adapted to Turkish by Caz et al. [19], demonstrating adequate reliability and validity for assessing injury-related anxiety among athletes. Detailed information on all items on the scale is available from the source.

Data Analysis

The normality of the data distribution was assessed using the Shapiro–Wilk test. Descriptive statistics, including means, standard deviations, medians, interquartile ranges, and percentages, were calculated. Group comparisons were performed using the Mann–Whitney U and Kruskal–Wallis tests, as the data did not meet the normality assumptions. All analyses were performed using SPSS version 29 (IBM Corp., Armonk, NY, USA).

Descriptive statistics for the demographic and training variables and SIAS scores are presented in Table 1.

Graphical representations of the SIAS subscale distributions and group comparisons are shown in Figures 1–3.

Ethics Committee Approval

The study protocol was reviewed and approved by the Non-Interventional Clinical Research Ethics Committee of Sakarya University, Faculty of Medicine (approval no. 192, Date: 27 June 2024). This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, and all participants provided written informed consent before participation.

Results

The median total score on the SIAS was 48 (IQR: 42–54), corresponding to a mean item score of 2.53 (IQR: 2.32–2.78). Among the subscales, the highest median was observed in Anxiety of Re-injury (AR, range 0–12; 3 [IQR: 2–4]), followed by Pain Anxiety (PA, range 0–12; 3 [IQR: 2–4]), and Anxiety of Losing Ability (ALA, range 0–12; 3 [IQR: 2–4]). These findings indicate that concerns about the risk of re-injury are more pronounced than worries about the loss of ability or social support among athletes.

Educational Level

The participants were divided into high school ($n=4$) and undergraduate ($n=31$) groups. No statistically significant differences were detected in the total or subdimension scores of the SIAS between the two groups (p -values ranged from 0.12 to 0.21; Table 1).

Surgical History

A comparison between athletes who had undergone surgery ($n=6$) and those who had not ($n=29$) revealed no significant differences across the SIAS subscales or total scores (p -values ranged from 0.08 to 0.41; Table 1).

Table 1. Median (IQR) and effect sizes of SIAS total and subdimension scores by demographic and training variables

Variable	Group	ALA median (IQR)	APW median (IQR)	PA median (IQR)	AD median (IQR)	ALSS median (IQR)	AR median (IQR)	Total SIAS median (IQR)	p (r)
Education	High school (n=4)	3 (2–4)	2 (1–3)	2 (1–3)	3 (2–4)	2 (1–3)	3 (2–4)	15 (12–18)	0.21 (0.12)
	Undergraduate (n=31)	3 (2–4)	2 (1–3)	2 (1–3)	3 (2–4)	2 (1–3)	3 (2–4)	15 (12–18)	
Surgical history	Yes (n=6)	3 (2–4)	2 (1–3)	2 (1–3)	3 (2–4)	2 (1–3)	3 (2–4)	15 (12–18)	0.41 (0.08)
	No (n=29)	3 (2–4)	2 (1–3)	2 (1–3)	3 (2–4)	2 (1–3)	3 (2–4)	15 (12–18)	
Level of play	Amateur (n=12)	3 (2–4)	2 (1–3)	2 (1–3)	3 (2–4)	2 (1–3)	3 (2–4)	15 (13–17)	0.04* (0.32)
	Professional (n=23)	3 (2–4)	2 (1–3)	3 (2–4)	3 (2–4)	2 (1–3)	3 (2–4)	15 (13–17)	
Years of participation	≤3 years (n=33)	3 (2–4)	2 (1–3)	3 (2–4)	3 (2–4)	2 (1–3)	3 (2–4)	15 (13–17)	–
	>3 years (n=2)	2 (2–3)	1 (1–2)	2 (2–3)	2 (2–3)	1 (1–2)	2 (2–3)	12 (12–13)	

ALA: Anxiety of losing ability (range 0-12); APW: Anxiety of being perceived weak(range 0-12) ; PA: Pain anxiety (range 0-12); AD: Anxiety of disappointment (range 0-12); ALSS: Anxiety of losing social support (range 0-12); AR: Anxiety of re-injury (range 0-12); Total SIAS (range 0-72). Mann–Whitney U test used for two-group comparisons (r=effect size). Values are presented as median (IQR: 25th–75th percentile). No p-values were reported for sports years owing to highly unequal group sizes (n=33 vs. n=2)

Level of Play

A significant difference was found only in the Pain Anxiety subscale. Professional athletes reported higher levels of pain-related anxiety than amateur athletes (PA: median 3 [IQR 2–4] vs. 2 [IQR 1–3], p=0.032 ; Table 1, Figure 1). No other subscales or total SIAS scores were significantly different.

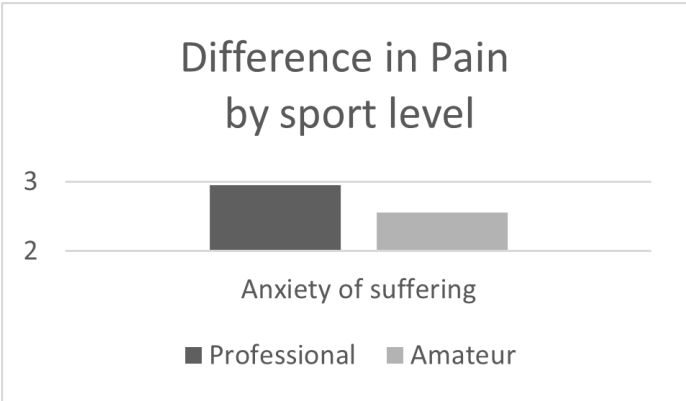


Figure 1. Difference in pain anxiety by sport level

Years of Sport Participation

A comparison between athletes with 3 years or less of sports participation (n=33) and those with > 3 years of participation (n=2) showed higher scores on Anxiety of Losing Social Support (ALSS, range: 0–12) and Total SIAS (range: 0–72) among athletes with shorter participation times. Owing to the very small number of athletes with >3 years of experience, only descriptive statistics are presented (medians: ALSS=2 vs. 1; Total SIAS=15 vs. 12) without p-values (Table 1, Figure 2, and 3).

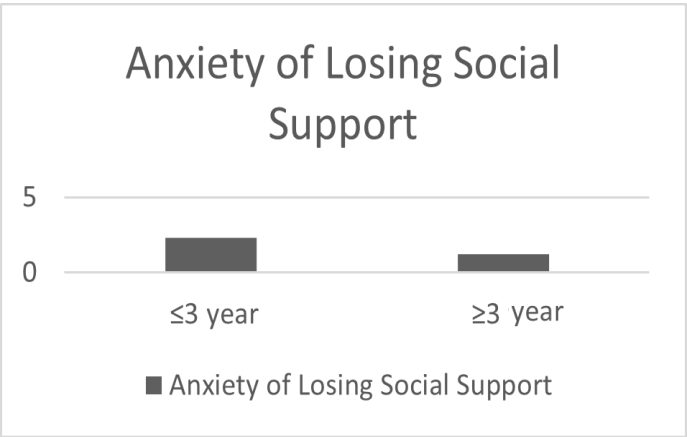


Figure 2. Difference in anxiety of losing social support according to years of sport participation

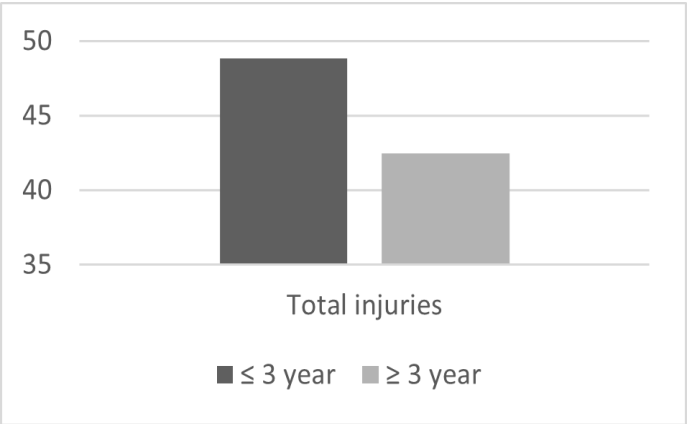


Figure 3. Total anxiety score difference by years of sport participation

Duration of Disability

No significant differences were observed in the SIAS scores based on injury duration (1–7, 8–14, 15–21, and ≥ 22 days) (p-values ranged from 0.15 to 0.62; Table 1).

Training Frequency

Weekly training frequency (1–3, 4–5, or 6–7 days) was not associated with statistically significant differences in the SIAS total or subscale scores (p-values ranged from 0.10 to 0.54; Table 1). Athletes who trained 1–3 days per week showed slightly higher medians in anxiety of losing social support and anxiety of disappointment, although the differences were not significant.

Discussion

This study examined how sports injury anxiety levels differ according to demographic and training variables in a high-contact sport, such as American football. The results indicated that athletes' anxiety levels were significantly influenced by their level of competition and years of sports experience.

In our study, re-injury anxiety was more dominant than the loss of physical performance in athletes. This finding is consistent with previous studies [1,2]. The absence of a significant relationship between educational background or surgical history and anxiety levels indicates that psychological responses may operate independently of these variables. However, the importance of postoperative psychological support has been emphasized in the literature [20].

Our findings align with the growing body of literature that highlights the physical and psychological consequences of sports-related injuries [11,14,17].

The finding that the level of “pain anxiety” in professional athletes is significantly higher than that in amateur athletes is consistent with factors such as competitive pressure, performance expectations, and the effect of career injury [8,11]. Professional-level athletes may experience the negative consequences of injury more deeply because they earn their livelihood and status from sports [21]. Because pain tolerance and the frequency of traumatic injury are higher, especially in contact sports, “anticipatory anxiety about pain” is felt more intensely in this group [3]. This finding is supported by extensive research on sports injury psychology [12,22].

Higher anxiety scores—particularly regarding the fear of losing social support—among participants with less than three years of sports experience may reflect an underdeveloped sense of team belonging and a fragile athletic identity. Qualitative evidence also suggests that new athletes worry about being ostracized or ignored by their teammates in the event of an injury [15,17]. This outcome may be interpreted through the lens of athletic identity theory, suggesting that individuals with an underdeveloped sports identity tend to exhibit lower

levels of psychological resilience [21]. In a recent study by Brewer and colleagues [23], it was shown that the patterns of change in sports identity that emerged over time in athletes who underwent anterior cruciate ligament reconstruction directly affected the psychological process of returning to sports [23]. Similarly, factors such as years of sports participation, sex, and injury history have been shown to affect athletes' perceptions of health and well-being [24].

In this study, no significant differences were found in factors such as training duration, education level, history of surgery, and injury duration. This finding indicates that psychological effects are shaped not only by structural factors but also by personal and social factors [11]. Although there was no significant difference, especially in athletes who had undergone surgery, some studies have emphasized that symptoms such as depression, fear, and loss of motivation can be observed if adequate psychological support is not provided in the postoperative period [8,20].

In addition, anxiety following a sports injury can delay an athlete's return to sports and limit their performance. Fear of re-injury is one of the most prominent psychological barriers to this process [13]. Therefore, it is important to support both physical and psychological recovery processes [7,13,15]. This view was also emphasized in a comprehensive consensus report summarizing the findings of the last 50 years in the field of sports injury psychology, which stated that psychological interventions in rehabilitation processes, especially anxiety management, attentional focus restructuring, and social support mechanisms, facilitate return to sports [9]. Similarly, sports psychology practices in young athletes are critical for both pre-injury prevention and a healthy return to sports [16].

A limitation of this study is its relatively small sample size ($n=35$), which may reduce the statistical power and limit the generalizability of the findings. Future studies with larger and more diverse cohorts are warranted to validate these results.

Limitations

This study has some limitations. The limited number of participants ($n=35$) limits the generalizability of the findings. In addition, excluding female athletes prevented the examination of sex differences. Only a self-report scale was used for the measurements, and no qualitative data were collected. In addition, some subgroup comparisons involved very small sample sizes (e.g., sports participation >3 years, $n=2$), which may have limited the reliability of these specific findings. Therefore, these results should be interpreted with caution, and future studies with larger and more balanced subgroup distributions are warranted.

Conclusion

The study demonstrated that in high-contact sports, such as American football, anxiety related to sports injuries differs based

on athletes' competitive level and years of sporting experience. It was found that anxiety about suffering was more prominent in professional athletes, and anxiety about losing social support was more prominent in athletes with less experience. This shows that sports injuries involve both physical and psychological factors.

Psychological support programs should be systematically integrated into the rehabilitation process to enhance athletes' recovery and performance.

Sports clubs should organize anxiety management programs, especially for young and beginner athletes.

Future studies should be conducted across different sports disciplines and supported using qualitative methods.

The psychological state of athletes should be regularly monitored after injury to prevent long-term mental health issues.

Interdisciplinary rehabilitation teams involving psychologists can improve athletes' return-to-sport outcomes.

Ethical Approval

Approved by the Non-Interventional Clinical Research Ethics Committee of Sakarya University, Faculty of Medicine (No: 192; Date: 27 June 2024).

Patient Consent

Informed consent was obtained from all participants.

Conflict of Interest

The authors declare no conflict of interest.

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