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Psychiatric and functional evaluation of professional athletes following anterior cruciate ligament reconstruction

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Objective: The aim of this study is to evaluate early phase depression and anxiety in the proffessional athletes who underwent anterior cruciate ligament (ACL) reconstruction and compare them with the functional improvement of knee.

Methods: Thirty-eight patients (35 males, 3 females; mean age±SD: 26.84±8.03) were included in this study. Measurements were obtained immediately following the operation and at Week 6 of postoperative rehabilitation. Depression and anxiety symptoms were evaluated by the Hospital Anxiety and Depression Scale (HADS), and knee function was evaluated by Lysholm Knee Scoring Scale (LKSS).

Results: Change in total LKSS scores from the time of admission (56.4±20.2) to the end of the sixth week (78.7±13.8) was significant (t=–8.21, p<0.001). Neither the HADS depression nor the HADS anxiety scores were above the cutoff values in the 2 assessments. Significant difference was noted in HADS anxiety scores between the time of admission (6.21±3.50) and at the sixth week (5.33±3.33) (t=2.02, p=0.05). However, HADS depression scores were not statistically different between the 2 evaluations (5.95±3.68 and 5.35±3.50 at admission and Week 6 week, respectively) (t=1.07, p=0.29). Changes between the 2 LKSS and HADS anxiety assessments were negatively correlated (r=–0.49, p=0.002), but there no correlation was detected between the total LKSS and HADS score changes.

Conclusion: The decline of the signs of anxiety and depression at the sixth week of rehabilitation indicate that proper rehabilitation positively affects the emotional status of ACL reconstruction patients.

Keywords: ACL reconstruction; anxiety; depression; sportive rehabilitation.

Level of Evidence: Level III Therapeutic Study

While the increase in sports participation in Turkey is favorable, this increases the number of sports injuries as well. As the duration, intensity, and complexity of athletic activity increases, more serious injuries arise as a consequence. The primary restraint of joints is ligaments. The anterior cruciate ligament (ACL) is the pri-

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mary restraint of anterior displacement of the tibia in the knee joint.[1] Insufficiency of the ACL causes instability, pain, and degenerative developments in the knee joint due to impaired knee kinematics.[2] ACL injuries are serious sports injuries which may end athletic participation.

In the USA, 200.000 new ACL injuries are diagnosed every year.[3] ACL reconstruction operations are widely applied to provide mechanical stability and optimal knee function.[4] Nevertheless, functional results of reconstructions vary, and in 60% of cases, the patient cannot return to his or her preinjury levels of athletic activity.[5] Reduced knee function postsurgery has been attributed to numerous residual impairments, including knee symptoms such as swelling, pain or instability, loss of knee motion, and thigh muscle weakness.[4]

Although some authors have speculated that altered psychosocial factors, such as elevated fear of reinjury, can reduce functional level, this area of research has not been explored extensively.[4]

As evidence linking fear of pain and reinjury with functional outcome in musculoskeletal conditions continues to grow, interest in understanding the contribution of psychosocial factors to reduced functional level following ACL reconstruction is growing.[4]

Several authors have investigated the possible reasons for emotional responses to sports injuries. Being an athlete means to be devoted, determined, and most importantly, passionate. For an athlete, sport is a part of his or her life and personal identity.[6]

Athletes usually experience fear of reinjury and anxiety stemming from the thought of not being able to participate competitively following ACL reconstruction, as well as the long, arduous rehabilitation period ahead. Consequently, complete physical recovery does not always guarantee the ability to return to preinjury levels of competition.[7] Whilst in the past the primary focus of sports rehabilitation was on the physical problem with the aim of returning the athletes to competition as soon as possible, the focus has been shifting to the psychological aspects of the return to competition following serious injury.[8]

Even if the psychiatric criteria of depression and anxiety are not completely met, the below-threshold symptoms may still negatively affect the process of regaining knee function following ACL reconstruction. The objective of this study is to measure the signs of anxiety and depression at the early stages following ACL reconstruction and to investigate the effects of these symptoms on knee function in the follow-up period.

Patients and methods

Thirty-eight professional athletes (35 males, 3 females; mean age±SD: 26.84±8.03) who underwent ACL reconstruction were included in this study. Patients who had psychiatric or neurologic impairment, alcohol and substance abuse, concomitant knee pathology (medial, lateral, or posterior ligament injury or meniscal or chondral lesions), or were currently taking psychotropic medications were excluded. Additionally, patients who experienced complications such as infection or rerupture of the graft were excluded in order to eliminate any possible observational bias. All patients were operated on arthroscopically and reconstructed with autologous hamstring tendon grafts. General information of the participants is presented in Table 1.

All participants of this study followed a standard rehabilitation protocol. Two subsequent evaluations were given to the patients, the first immediately after ACL reconstruction and just prior to beginning the rehabilitation program, and the second 6 weeks later. Knee function was evaluated by the Lysholm Knee Scoring Scale (LKSS), and intensity of the depression and anxiety symptoms were evaluated by the Hospital Anxiety and Depression Scale (HADS).

The LKSS was developed by Lysholm in 1982, and its validity and reliability are proven.[9] LKSS is designed to measure functional outcomes following ligament and meniscal injuries of the knee. The test consists of 8 questions, scored between 0–100, with a score of 95–100 points indicating an excellent outcome.

HADS is presented as a reliable instrument for screening clinical depression and anxiety in patients attending a general medical clinic. This scale has been demonstrated to be a valid measure of the severity of these disorders. It was developed by Zigmond and Snaith in 1982[10] and interprets not only emotional but also cognitive features of depression and anxiety. The scale includes 14 questions, 7 of which focus on symptoms of depression, while the other 7 target symptoms of anxiety.[11] The validity and reliability of the Turkish version of the scale were documented by Aydemir et al. The authors calculated the cutoff values for depression and anxiety as and 7/8 and 10/11, respectively.[12]

Table 1. General information of study participants (n=38).

Age		26.84±8.03
Gender	Male	35
	Female	3
Height (cm)		174.55±7.23
Weight (kg)		76.44±11.54

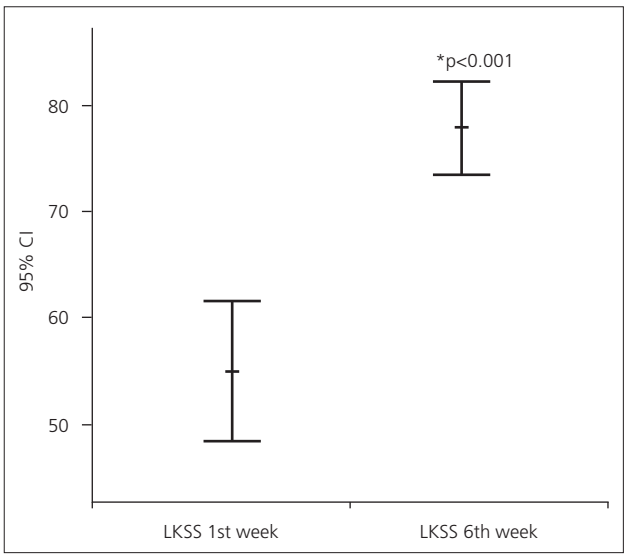

Fig. 1. Change in Lysholm scores from baseline to postoperative Week 6.

Paired t-test was utilized to evaluate the difference in functional status following ACL reconstruction and psychiatric symptoms at admission time and 6 weeks after the rehabilitation period. LKSS scores and depression and anxiety subscale scores at admission time were compared with the sixth week results. Pearson's correlation tests were applied to detect any relationships between the changes in LKSS and HADS scores at admission and at the sixth week of rehabilitation. All analyses were double-tailed.

Results

There were no complications requiring dismissal of any patients. All patients completed LKSS and HADS tests. The change in total LKSS scores from the time of admission (56.4±20.2) to the end of the sixth week (78.7±13.8) were significant (t=−8.21, p<0.001) (Figure 1). Neither the HADS depression nor the HADS anxiety scores were above the cutoff values in the 2 assessments. Significant difference was noted in HADS anxiety scores between the time of admission (6.21±3.50) and at the sixth week (5.33±3.33) (t=2.02, p=0.05). However, HADS depression scores were not statistically different between the 2 evaluations (5.95±3.68 and 5.35±3.50 at admission and the sixth week, respectively; t=1.07, p=0.29) (Figure 2). The changes between the 2 LKSS and HADS anxiety assessments were negatively correlated (r=−0.49, p=0.002), but no correlation was detected between the total LKSS and HADS score changes.

Discussion

Treatment and rehabilitation of sport accidents is a developing area of medicine due to increasing involvement in sportive activities over the last 2 decades and the associated sports injuries.[13] Psychological factors were shown to contribute to sport accidents as well as treatment of such conditions.[14] Return to sportive activities after ACL repair is associated with several factors such as postoperative knee function, social support, fear of reinjury, and loss of income in the case of professional athletes.[7] However, psychological factors associated with recovery during rehabilitation were not previously assessed in detail.[15] This study aimed to investigate the association of knee function with subclinical symptoms of depression and anxiety during a 6 week rehabilitation program after ACL repair.

The significant change in Lysholm Knee Scoring Scale (LKSS) scores between the 2 assessments sug-

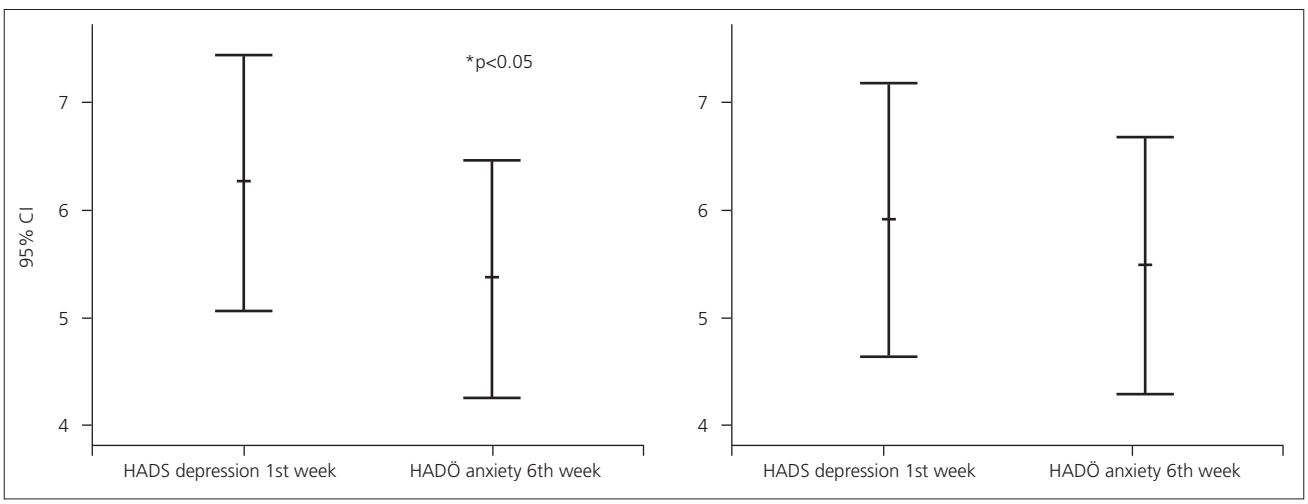

Fig. 2. Change in HADS depression and HADS anxiety scores from baseline to postoperative Week 6.

gested that there was a significant improvement in knee function during the study period. We detected that levels of depression and anxiety were below the diagnostic cutoff values in both assessments. This is a rather unexpected finding since ACL injury is a very serious injury that threatens professional sports careers. Nevertheless, sportive accidents are not exceptional conditions among professional athletes, many of whom have developed successful coping mechanisms for such accidents. Tripp et al. showed that in comparison with adults, adolescents are prone to experience higher levels of anxiety 24 hours after ACL repair.[16] Furthermore, the authors showed that adolescents experience more pain, affective distress, and negativism after ACL repair. [14] These findings might be associated with the limited development of coping strategies among adolescents. On the other hand, professional athletes may be expected to develop more adaptive strategies. It should be noted that the study was carried out in a distinguished rehabilitation center, and the hope of recovery in such a setting might have contributed to lower levels of depression and anxiety.

Oztekin et al. assessed symptoms of depression and anxiety among amateur and professional athletes and showed that symptoms of depression but not anxiety significantly decline within the first 3 weeks after ACL repair.[17] However, we showed that symptoms of subclinical anxiety decline in 6 weeks during rehabilitation. The difference between the 2 studies may stem from different follow-up intervals. Nevertheless, our results suggest that anxiety may have state characteristics during rehabilitation. Anxiety is a psychophysiological reaction to probable negative consequences. High scores of anxiety during the initial evaluation may suggest a reactive process to injury, but as knee function is improved, a corresponding decline in anxiety scores can be expected.

Langford et al. found that decline in negative emotionality is associated with improvement in knee function after ACL repair. Likewise, we found a correlation between improvement in knee function and decline in scores of both depression and anxiety. This finding supports that these subclinical symptoms were reactive to injury and rehabilitation on its own is sufficient to overcome negative reactive psychological consequences of the injury, without the need for additional psychiatric support.

The primary patient desire after ACL injury is to return to sportive activities as soon as possible. Six weeks of rehabilitation is effective in improving both knee function and psychological state. In the present study, none of the subjects had clinical depression or anxiety. However, early assessment of psychiatric symptoms may be valuable in detecting patients in need of additional psychiatric care.[8] Subjects with depression and/ or anxiety scores above the cutoff should be provided additional psychiatric care in order to enable a more efficient rehabilitation and earlier return to sports.[18]

Limitations of this study are, the limited number and lack of long term follow-up of the patients. Although there are a number of studies, which evaluated postoperative anxiety, and depression signs of ACL reconstructed patients, this is the first study using HADS scale. This might be regarded as the priority of our research.

Initiation of rehabilitation following ACL reconstruction surgery should better to include a psychiatric evaluation. This evaluation would provide an early awareness and intervention chance, which eventually positively effect rehabilitation and return to sports processes.

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Conflics of Interest: No conflicts declared.

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