

The Relationship of Stress, Competitive Anxiety, Mood State, and Social Support to Athletic Injury

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Study Objective: We examined the role of stress, competitive anxiety, mood state, and social support in athletic injury. Specifically, we hypothesized that athletes reporting high levels of stress, high competitive trait anxiety, negative mood state, and low social support would exhibit greater incidence of injury and injury severity.

Design and Setting: Correlational analysis. Major Canadian university.

Subjects: Voluntary sample, 55 male varsity athletes (42 football, 81% of the football team, and 13 rugby, 74% of the rugby team), ages 19–28 yr (\bar{x} = 22).

Measurements: The inventories Sport Competition Anxiety Test (SCAT), Social Support Scale, Social Athletic Readjustment Rating Scale (SARRS), and Profile of Mood States (POMS) were administered. Internal consistency of the self-report measures was tested using Cronbach's alpha coefficient. Injury rate and severity were recorded by the head student therapist throughout the season.

Results: Correlational analyses performed using Pearson correlational coefficient revealed that competitive anxiety (r = .29, p = .03) and tension/anxiety mood states (r = .43, p =

.001) were related to injury frequency, and that tension/anxiety (r = .44, p = .008), anger/hostility (r = .30, p = .02), and total negative mood state (r = .28, p = .038) were related to injury severity. Individually, the two sports yielded somewhat different results: for football, injury frequency and injury severity were related to tension/anxiety (r = .43, p = .004 and r = .47, p = .002, respectively). Vigor/activity was found to be significantly related to injury rate (p = .02), but since the internal consistency of vigor/activity was less than .70 on the Cronbach alpha scale, this significant finding was disregarded. In rugby, injury frequency was related to tension/anxiety (r = .58, p = .04) and depression/dejection (r = .57, p = .04).

Conclusions: These findings are useful for athletic trainers in identifying athletes who may possess psychological factors predisposing them to athletic injury. Subsequently, athletic trainers can instruct these athletes or refer them for assistance in psychological preventive interventions.

Key Words: Sport Competition Anxiety Text, Social Support Scale, Social Athletic Readjustment Rating Scale, Profile of Mood States.

The purpose of this study was to investigate the relationship among stress, competitive anxiety, mood state, social support, and athletic injury. Specifically, it was hypothesized that football and rugby varsity athletes reporting high levels of stress and competitive trait anxiety would exhibit greater incidence of injury and injury severity. It was also hypothesized that high competitive trait anxiety and negative mood states would contribute to the increase of injury rate and/or severity. Moreover, it was hypothesized that a healthy social support system would aid in dealing with life stress and, therefore, decrease the rate and severity of injury.

Sport injury can be one of the most traumatic events a competitive athlete faces during his or her career. Athletic trainers are responsible, not only for rehabilitation of the athlete, but also for prevention of injury. Therefore, athletic trainers should identify possible causes of athletic injury. Many factors can attribute to athletic injury such as environment, equipment, and physical condition of the athlete.⁷ There is a growing realization that psychological factors, such as stress and anxiety, may also play a role in the frequency and extent of injury.^{2,7,8,11} For this reason, it is important for athletic

trainers, in an attempt to prevent injury, to identify the psychological factors that are related to athletic injury.

Based on the history of research in this field Andersen and Williams¹ proposed a model of stress and athletic injury that attempts to incorporate all possible intervening factors. This model suggests that when an athlete is faced with a potentially stressful athletic situation, there is a resultant stress response.¹ The body's response to the potentially injurious situation is a cognitive appraisal of the demands, resources, and consequences, followed by physiologic and attentional changes.¹ These physiologic and attentional changes may include increased muscle tension, narrowing of the visual field, and increased distractibility, which may have a negative impact on the stress-injury response.^{1,13} The stress-injury response can be influenced by personality, coping resources, and psychological interventions, such as cognitive restructuring, distraction, desensitization, and relaxation skills.^{1,5,8}

METHOD

Subjects

A total of 55 male varsity athletes from a major Canadian university participated in the study. The group comprised 42 varsity football players and 13 varsity rugby players, ranging in

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age from 19 years to 28 years, with a mean age of 22 years. The relatively small sample size was due to the voluntary nature of the study. Eighty-one percent of the football team and 74% of the rugby team participated.

Procedure

The study was explained to all participants and then informed consents were signed. The inventories—Sport Competition Anxiety Test (SCAT),⁹ Social Support Scale,⁶ Social Athletic Readjustment Rating Scale (SARRS),³ and Profile of Mood States (POMS)¹⁰—were administered before the end of the season. Due to the voluntary nature of the study and an attempt to obtain a greater sample size, inventories were accepted throughout the season. SCAT and POMS are general inventories that measure traits and do not fluctuate as immensely with life events as SARRS or the Social Support Scale.^{3,6,9,10} Therefore, time of administration of the SCAT and POMS inventory is not as sensitive as the SARRS or Social Support Scale. Optimally, to allow for changes in life events, inventories should be administered before the season, at the time of injury, and at the end of the season.

Injury Recording

Recording of injuries for both sports was performed by the head student therapist of each sport according to Reid's¹² classification of injuries, specifically, Grade I, Grade II, and Grade III injuries. Contact with the student therapists for minor treatments such as blisters and prophylactic taping was not recorded. All other Grade I, Grade II, and Grade III injuries were included in the study. Some of the previous research in this field^{5,7} measured injury severity by number of days missed practicing or in games, but these can be influenced by individual differences in physical and emotional responses to injury. Reid's classification of injury takes the actual injury severity into account rather than simply days of practice missed. The classification system used in this study is representative of each specific injury and attempts to rule out other possible factors that may influence days missed.

Self-Report Measures

Competitive Trait Anxiety. Competitive trait anxiety was measured by Martens'⁹ Sport Competition Anxiety Test (SCAT). The SCAT is a 15-item inventory with scores ranging from 10 (low) to 30 (high). A higher score represents a higher level of trait anxiety. The SCAT has been found to have a high internal consistency ($r = .95$). Concurrent validity for SCAT is difficult to measure due to the inability to relate to other sport anxiety measures versus general anxiety ($r = .28$ to $.46$).

Social Support. Social support was measured by the Social Support Scale.⁶ The seven items of the questionnaire include parents, other family members, friends, coaches, sport injury staff, instructors/professors, and teammates. Subjects determine satisfaction of perceived social support ranging from 1–5 on a Likert-type scale. A higher score represents a greater degree of satisfaction with social support.

Life Stress. The Social Athletic Readjustment Rating Scale (SARRS) was used to measure life stress.³ SARRS lists 57 life events, giving different weighting depending on the severity of the stressor, ranging from 0–100. A total SARRS score is derived by summing all different stressors experienced during the last 12 months. The SARRS score reflects the amount of readjustment required by the subject to adapt to the life change. A higher score indicates a higher level of stress in the life of the subject. The SARRS does not distinguish eustress from distress. Internal consistency is relatively low ($r = .42$).

Mood State. Mood state was measured by the Profile of Mood States (POMS) inventory.¹⁰ POMS measures six mood or affective states: tension/anxiety, depression/dejection, anger/hostility, vigor/activity, fatigue/inertia, and confusion/bewilderment. A total mood score, either negative or positive, can be determined by summing all the scores. Sixty-five, five-point Likert-type scales describe the mood states. Internal consistency is very high ($r = .90$).

RESULTS

A number of statistical analyses were conducted to address the research questions of the study. First, the internal consistency of the self-report measures used in the present study was tested using Cronbach's⁴ alpha coefficient. Second, all injury data for the 1993–94 school year for the involved athletes were tabulated. Third, correlational analyses were performed using a Pearson correlational coefficient.

Reliability of Measures

The internal consistency reliability of SCAT and POMS were evaluated using Cronbach's⁴ alpha coefficient. An alpha value of .70 or higher is considered to be an acceptable indication of scale reliability.⁴ Therefore, only those scales with alpha values of .70 or higher were retained for further analysis. Both SCAT and POMS total negative mood states were found to have acceptable internal consistency. SARRS and the individual measures of vigor/activity and confusion/bewilderment of POMS were found to have unacceptable internal consistency; therefore, these results were disregarded.

Injury Data Analysis

Throughout the season, a total of 67 injuries were recorded for the football and rugby athletes who participated in the study. A total of 54 injuries were reported for football. Ten athletes (24%) were injury free, 16 athletes (38%) sustained only one injury, 10 athletes (24%) sustained two injuries, and six athletes (14%) sustained three or more injuries. Seventeen injuries were classified as Grade I, 11 injuries were classified as Grade II, and only four injuries were classified as Grade III. Most of the injuries were a result of direct contact (contusions, brachial plexus stretches, knee ligament sprains) followed by overuse-type injuries (shin splints, tendonitis, and muscular strains).

A total of 13 injuries were reported for rugby. Five athletes (38%) did not sustain any injuries, four athletes (31%) sus-

tained only one injury, three athletes (23%) sustained two injuries, and one athlete (8%) sustained three or more injuries. Four injuries were classified as Grade I, three injuries were classified as Grade II, and only one injury was classified as Grade III. As with football, most of the injuries were a result of direct contact followed by overuse-type injuries. The frequency and grade of injury between the two sports of rugby and football were relatively comparable.

Correlational Analysis

Correlation analysis was performed using a Pearson correlation coefficient. Significant findings were obtained for football and rugby combined and individually.

Injury rate was significantly correlated to SCAT ($r = .29$, $p = .03$). This correlation is considered weak at $r = .29$. In this study, a higher score on SCAT was related to a higher rate of injury. Those athletes exhibiting high competitive trait anxiety had a higher rate of injury.

Injury rate was also significantly related to tension/anxiety on the POMS scale ($r = .43$, $p = .001$). This correlation was moderate at $r = .43$. A reported higher degree of tension/anxiety was significantly related to a higher rate of injury. Those athletes reporting high tension/anxiety had a higher rate of injury.

Severity of injury was significantly related to tension/anxiety ($r = .44$, $p = .008$) and anger/hostility ($r = .30$, $p = .02$) and total negative mood state ($r = .28$, $p = .038$) on the POMS. Tension/anxiety was moderately correlated at $r = .44$ and the correlation of anger/hostility and total negative mood state was weak at $r = .30$ and $r = .28$, respectively. A higher degree of tension/anxiety, anger/hostility, and total negative mood state was significantly related to higher severity of injury. Thus, those athletes reporting greater tension/anxiety, greater anger/hostility, and negative mood state experienced greater severity of injury.

Social support was significantly negatively related to tension/anxiety ($r = -.32$, $p = .027$) on the POMS. This correlation was moderate at $r = -.32$. The greater the satisfaction the athlete felt with social support, the lower the degree of tension/anxiety. This finding is quite significant due to the correlation found between tension/anxiety and injury. A greater satisfaction with social support may have an indirect effect on injury rate, due to influence on tension/anxiety mood state. Confusion was also found to be significantly related to social support at $p = .03$, but due to the unacceptable internal consistency as measured by Cronbach alpha, these findings were disregarded.

SCAT was significantly related to tension/anxiety ($r = .30$, $p = .027$), anger/hostility ($r = .37$, $p = .004$), and total mood state score ($r = .31$, $p = .02$). These correlations were moderate at $r = .30$ for tension/anxiety and $r = .37$ for anger/hostility. A high SCAT score was significantly related to a high tension/anxiety, anger/hostility, and total negative mood state score. Thus, those athletes exhibiting high competitive trait anxiety also had a greater degree of tension/anxiety, anger/hostility, and total negative mood state.

Individually, the sports of rugby and football were found to have similar results. For football, consistent with the findings of both sports combined, tension/anxiety was significantly related to injury rate and severity of injury ($r = .43$, $p = .004$ and $r = .47$, $p = .002$, respectively). These correlations were considered moderate. Vigor/activity was also found to be significantly related to injury rate ($p = .02$), but since the internal consistency of vigor/activity was less than .70 on the Cronbach alpha scale, this significant finding was disregarded. A higher rate and severity of injury was significantly related to a reportedly higher degree of tension/anxiety. Those football players who were under greater tension/anxiety experienced a greater frequency and severity of injury.

For rugby, the rate of injury was significantly related to tension/anxiety ($r = .58$, $p = .04$), but severity of injury was not significantly related to tension/anxiety as was found with football and both sports combined. Rather, depressed/dejected mood state was significantly related to rate of injury ($r = .57$, $p = .04$), which was not found in football or both sports combined. These correlations were considered moderate. A higher rate of injury was significantly related to a higher degree of tension/anxiety and depressed/dejected mood state. Those rugby players under greater tension/anxiety and a depressed/dejected mood state experienced a higher frequency of injury.

DISCUSSION

In support of Andersen and Williams¹ model, high competitive trait anxiety and tension/anxiety were found to be significantly related to rate of injury, while tension/anxiety, anger/hostility, and total negative mood state were significantly related to severity of injury. High competitive trait anxiety (SCAT) also played a significant role in the degree of tension/anxiety, anger/hostility, and total negative mood state recorded by POMS.

The fact that no relationship was found between life stress and athletic injury may be due to SARRS, the inventory used to assess life stress. The Spearman rank-order correlation coefficient of SARRS reported by Bramwell et al³ is quite low ($r = .42$). SARRS was altered from SRRS in 1975 to better fit the athletic population. Even in 1975 there were shown to be significant differences in the individual's perception of adjustment for certain life events, particularly between ethnic populations.³ SARRS was designed over 20 years ago, and since that time views toward many life events such as marriage, divorce, and discrimination have changed dramatically. It is suggested that SARRS may not be the ideal inventory to assess life stress. Rather, due to multicultural and societal differences, an inventory should allow the individual to assess how much adaptation he or she feels is required for specific events that have been encountered.

The differences between the sports of football and rugby were not dramatic. Football players under greater tension/anxiety as measured by POMS experienced a greater frequency and severity of injury. Rugby players under greater tension/anxiety and a depressed/dejected mood state experienced a higher frequency of injury, but not a greater severity of injury. It is suggested that the lack of significance found with severity

of injury can be explained by the typical “downplaying” of injury by rugby players in order to stay in the game.

Social support alone did not significantly alter frequency and severity of injury, but expression of greater satisfaction with social support correlated with a lower degree of depression/dejection as measured by POMS. This finding is quite significant given the fact that depression/dejection was found to be positively related to injury rate in rugby players. With a sound base of social support there is a reported lower degree of depression, which may have had a protective effect.

The effect of tension/anxiety, depressed/dejected mood state, anger/hostility, total negative mood state, and competitive anxiety on increased frequency and severity of injury can be interpreted in light of Andersen and Williams’ model.¹ Andersen and Williams suggest that physiologic responses to stress and anxiety, such as increases in muscle tension and physical fatigue, may heighten the relationship between psychological stress and physical injury. This may also be expanded to include tension/anxiety, anger/hostility, depressed/dejected mood state, and total negative mood state. A higher total negative mood state may also contribute to increased muscle tension and physical and mental fatigue, which may promote the relationship between psychological stress and physical injury.¹

PRACTICAL IMPLICATIONS

These findings add information to a growing body of literature that points to the contribution of psychological factors in the incidence of athletic injuries sustained in university sport. Thus, a new dimension can be added to the Andersen and Williams¹ model. Andersen and Williams¹ emphasize that information gained from research into the stress-injury response should not be used to label athletes as “injury-prone.” Rather, as found by Davis,⁵ the findings should serve to allow identification of high-risk athletes who may be aided by psychological intervention such as mental imagery and relaxation techniques.

It is very difficult to conduct a study including all possible variables that may influence rate and severity of injury. All research performed in the realm of the stress-injury response contributes to the Andersen and Williams¹ model. Although many causal factors have been suggested, further research in the stress-injury relationship is needed to support past findings, identify new determinants, and identify psychological intervention techniques.

Athletic trainers, medical personnel, coaches, and athletes should recognize possible psychological predisposing factors of injury and aim to instruct or refer the athlete for assistance in methods outlined in the Andersen and Williams¹ model. Psychological interventions such as cognitive restructuring, thought stoppage, and relaxation skills may be instrumental in reducing the incidence of injury in sport.^{5,7}

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