Articles

Psychological Effects of Chronic Injury in Elite Athletes

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Many athletes train in a constant state of pain or injury while meeting the demands of an elite level program. It is hypothesized that the emotional distress experienced by athletes with chronic injuries is not inconsequential. A self-report battery, the Impact of Event Scale, was administered to 280 intercollegiate athletes at a division I institution in an attempt to examine their response to chronic injury. Of the 280, 134 (48%) had been injured by study definition, with 117 (42%) meeting the criteria for chronic injury. Athletes with chronic injury scored on the Intrusion subscale of the Impact of Event Scale in the range of those who had experienced natural disasters, but scored higher \( (P < .05) \) on the Avoidance/Denial subscale. Their Avoidance subscale scores were similar to those of a group of orthopedic patients who required hospital admission with surgical fixation. Female athletes' Avoidance scores were significantly higher than those of their male peers \( (P < .05) \), but no gender differences were seen in intrusive thoughts. Subsets of athletes defined by the duration of injury showed no significant differences on subscale scores. It appears extraordinary that athletes should score in the realm of groups traumatized by natural disasters in intrusive thought and higher in avoidance thought when referring to their chronic injury. Although some attention has been focused on psychiatric intervention for acutely injured athletes or those who have undergone surgical treatment, the psychological needs of athletes struggling with chronic "minor" injuries also appear to merit consideration.

(Shuer ML, Dietrich MS. Psychological effects of chronic injury in elite athletes. West J Med 1997 Feb; 166:104–109)

Old men forget . . . but they shall bare their arms and show their battle wounds.

Henry V, Act IV, Scene iii
William Shakespeare

Successful elite athletes who reach the ranks of a Division I National Collegiate Athletic Association (NCAA) program have been heavily socialized in the mores of the sports world. This culture glorifies heroism, strength, speed, and courage. It emphasizes such adages as "no pain, no gain," "hurt is temporary, pride is forever," and "you can't make the club while sitting in the tub." Accompanying these maxims are the unspoken rules of the game: injury is not allowed, pain is ignored and unacceptable, and there are no complaints about "minor disabilities" until they interfere with training programs to such a degree that it is apparent to coaches and teammates alike. The numerous psychosocial ramifications of injury, including the disruption of social support networks, a compromised relationship with coaches, and a possible change in playing position and team hierarchy, weigh heavily on the minds of injured athletes.

Not only does an injury temporarily incapacitate, but it places an athlete in a world with no guarantees or predictable outcomes. Injured athletes are relegated to a rehabilitative netherworld. Although modern technology has increased the speed of physiologic recovery, no equivalent inroads have been made in the psychological or psychiatric treatment to facilitate mental health recovery. The emotional "rehabilitation" of elite athletes, most specifically those with chronic-overuse injuries, has not been adequately addressed by medical or athletic establishments.

Research has explored acute and chronic injury in athletes from an orthopedic and etiologic perspective. Studies have examined athletes who appear to be at risk for injury, especially in the area of stressful life events and predictability. Some work has assessed mood states in injured and healthy athletes. Nonetheless, the psychological sequelae of elite athletes who continue to train and compete with chronic injuries have not been extensively investigated.

In this study, we examine the level of emotional distress in athletes who engage in active training while acknowledging a musculoskeletal injury. We think this is the first self-report study conducted on athletes in training without the prerequisite visit to an athletic trainer or physician to be classified as injured. Unlike previous research, this sample includes an even gender balance, thus allowing the examination of differences in gender...
with respect to self-reported injury.

This population, because of its particular socialization, resists seeking psychiatric treatment or admitting a need for help. Trained from early childhood to endure musculoskeletal pain as well as aerobic and anaerobic discomfort, elite athletes have difficulty distinguishing the pain of conditioning from pain signaling the onset of a possibly serious injury.\textsuperscript{3,13} Psychiatric ramifications of injury and rehabilitation, the foremost being those of denial, distortion, and minimization, present a grave threat to the well-being and integrity of athletes, especially those who define most of their identity through their athletic prowess.\textsuperscript{13}

Chronic injury is exceedingly difficult for elite athletes to tolerate. There is usually no physical manifestation of the injury such as plaster or crutches, and they may at times question whether they are really injured. In the early stages of discomfort, only the athletes know they are injured. Initially the pain may decrease during a training session, and the athletes believe they have “worked through” the pain. At times when pain retreats, athletes gladly endorse a false assumption that their initial pain was “imaginary.” When pain becomes progressively more intense, they are forced to communicate their injured state to their coach. Usually this is done with great reluctance and minimization and only when it becomes impossible to train at the expected intensity level. At this point, they have lost control of their decision-making autonomy regarding training and competition.\textsuperscript{14}

Athletes with chronic-overuse injuries appear to be suffering from a type of prolonged stress-response syndrome.\textsuperscript{19} While not meeting strict criteria for a psychiatric diagnosis, these athletes can be compared with persons who have experienced trauma.\textsuperscript{14,21} In addition to these issues, we discuss the psychological ramifications of continuing to train in an injured state.

\textbf{Subjects and Methods}

\textbf{Subjects}

Participants in this study included 280 elite Division I NCAA athletes at a private institution representing 15 men’s and women’s intercollegiate teams. Student-athletes from men’s and women’s tennis, swimming, volleyball, track-and-field, and water polo were joined by men in freshman football, gymnastics, and baseball, and women in softball, field hockey, and lacrosse. The sample averaged 19.5 years of age. Slightly more than half of the participants were female (51%). Within the total sample of athletes, 26% were on full scholarship (including room, board, and tuition), and 20% were on partial scholarship.

Coaches were notified of the study and expressed interest in having their teams take part. Participation was voluntary, and teams with the exception of men’s gymnastics included all team members. After approval by the institutional review board, the subjects consented to the study. They were then administered the questionnaire battery. Anonymity from coaching staff and the athletic administration was guaranteed.

Other traumatized groups, including victims of the Oakland-Berkeley (California) fire, the Loma Prieta earthquake (also in California), and orthopedic patients, were referenced against our sample. These groups are fully described elsewhere.\textsuperscript{16–18}

\textbf{Instrument}

The Impact of Event Scale (IES) is a 15-question instrument that measures “current subjective distress for any life event.”\textsuperscript{23} In this study, the event was the injured condition. The IES contains a Likert-type scale in which subjects grade individual items on the following scale: not at all (0), rarely (1), sometimes (3), and often (5). The items in the two subscales of Intrusion and Avoidance were then scored and analyzed. The IES is well known for its use with victims of natural disasters, bereavement, personal injury, and cancer.\textsuperscript{16–21} Past validation research has found that item-endorsement patterns and measurements of subjective distress are similar despite the types of stressors.\textsuperscript{13,21} The severity of the stressor is noted by the magnitude of the value reflected in individual items as well as the subscale.

The two subscales of the IES—Intrusion, “an involuntary entry into awareness,” and Avoidance, “a conscious attempt to divert thoughts”—were used to quantify various symptoms of the injury.\textsuperscript{22,23} Intrusion examines “unbidden thoughts and images, troubled dreams, strong pangs or waves of feelings, and repetitive behaviors.” Items to be endorsed on the Intrusion subscale include “I thought about it when I didn’t mean to” and “Other things kept making me think about it.” The Avoidance scale measures “ideational constriction, denial of the meaning of the consequences of the event, blunted sensation, behavioral inhibition or counterphobic activity, and an awareness of emotional numbness.” The Avoidance subscale references the issues of psychological numbing, attempts to actively remove thoughts from consciousness, and the avoidance of situations that remind the person of the traumatic event.\textsuperscript{23} The authors of the instrument have chosen to name this scale “avoidance” because this term captures the ability to describe the felt consequences such as numbness, dissociation, and the active defensive maneuvers rather than the unconscious aspects of the denial process.\textsuperscript{24–26} The Avoidance subscale statements include “I avoided letting myself get upset when I thought about it or was reminded of it.” “I tried not to talk about it,” and “I stayed away from reminders of it.”\textsuperscript{22}

\textbf{Statistical Analysis}

Central tendency statistics were calculated for the sample of injured athletes, for gender groups in the athlete sample, and for the duration of injury—<7 days, <30 days, <365 days, or ≥365 days. These statistics were
also calculated for the group of firestorm victims, and published reports of central tendency statistics were used for the earthquake victims and orthopedic accident victims. Analyses of variance were used to analyze the significance of differences between means, and when necessary, the Tukey Honestly Significant Difference (HSD) test statistic was used for post hoc analyses of significant mean differences. Differences between proportions were analyzed using the Pearson χ² statistic. The SPSS [Statistical Package for the Social Sciences] software was used for statistical analysis.27

Results

Of the 280 athletic subjects sampled, 134 (48%) were classified as injured. An injury was defined as a musculoskeletal injury that rendered the athletes “less than 100%” the day they consented to the study. This definition was used to include athletes who might minimize the extent of injury. Of the 134 who indicated an injured state, 17 (13%) related they had been injured for less than a week or had recently had surgical treatment. They were included in the acute sample. Because of their injury duration, the remaining 87% (117) were deemed to have chronic injuries. Most of the injured subjects were actively training (some engaging in modified sessions) and present at practice. The acutely injured group had an even gender balance (9 men and 8 women) while the chronically injured group contained 62% (72) women and 38% (45) men.

The highest percentage of injuries was reported as shoulder (29%), followed by knee (20%) and ankle (11%). Other injuries of soft tissue, back, elbow, foot, wrist, hand, neck, shin splints, and hip disorders accounted for the other 40%.

Descriptive statistics of the IES Intrusion and Avoidance scores for each of the traumatized groups—chronically injured athletes and fire and earthquake victims—are shown in Table 1. The results of the analysis of variance suggested that the Intrusion scores reported by the earthquake victims were significantly greater than those for the chronically injured group of athletes (F [2,417] = 8.86, P < .001; Tukey HSD, P < .05). The Intrusion scores for the chronically injured athletes were not statistically different from those obtained for the fire victims. Conversely, Avoidance scores assessed for the chronically injured were significantly greater than those for both groups of fire and earthquake victims (F [2,417] = 8.77, P < .001; Tukey HSD, P < .05).

Descriptive statistics of the IES Intrusion and Avoidance scores for the hospitalized orthopedic accident victims and acutely and chronically injured athletes are given in Table 2. An analysis of variance of these groups’ scores revealed that the Intrusion scores reported by the chronically injured group of athletes were significantly less than those for the orthopedic patients (F [2,179] = 10.64, P < .001; Tukey HSD, P < .05). The Intrusion scores for the acutely injured athletes were not significantly different from those of the chronically injured group. The IES Avoidance scores for these three groups were not statistically different.

As shown in Table 3, the Avoidance scores for the group of female athletes within the chronically injured sample (13.14 ± 8.02) were statistically higher (10.00 ± 7.93) than for their male counterparts (F [1,115] = 4.28; P < .05). No significant differences between the gender groups’ Intrusion scores were seen.

The Intrusion and Avoidance scores for groups of athletes with differing levels of injury duration are shown in Figure 1. A two-way analysis of variance of the scores revealed no significant main effect of gender or duration of injury, nor was there a significant effect for gender-by-duration interaction.

Discussion

To our knowledge, this is the first study of its kind to examine self-reports of chronic injury and the psychological ramifications among elite athletes. Striking in its finding is the level of distress uncovered in this group. Athletes at times are considered “superheroes,” and the general public rarely sees the emotional pain associated with injury and vulnerability.28 Although the traumatized groups of victims of the Oakland-Berkeley fire, the Loma Prieta earthquake, and orthopedic patients in need of hospital admission and surgical fixation were not cohorts, it was noteworthy to compare the levels of distress experienced by athletes as revealed by the IES subscale scores. As demonstrated, their scores were in the

![Table 1](image1.png)

![Table 2](image2.png)

![Table 3](image3.png)
reassess their long-term goals and to contend with their sudden change in status and abilities. The acute stage is characterized by a constant flooding of thoughts of the injury and painful reminders of the event. These memory reenactments may take the form of nightmares or flashbacks. This acutely intrusive mental state is also found in the victims of natural disasters closely proximate to the event.25

In chronically injured athletes in whom denial was prevalent, the athletes continued to minimize the extent and nature of the injury, denying its long-term sequelae. The results indicate that chronically injured athletes may be “frozen” in the avoidant state, as shown by the lack of a significant decrement in the Avoidance score with the passage of time. This would suggest that athletes do not have the psychological tools required to adequately process the serious effects of the event, due to its highly personal meaning, and, thus, remain in denial.26

By attempting to reduce the painful memories and feelings of the injury, the athletes likely try to compartmentalize thoughts regarding the event. This was shown by 81% of the injured athletes, who endorsed “I avoided letting myself get upset when I thought about it or was reminded of it.” This compartmentalization is an active defensive or protective strategy.27 Because of daily training and routine, this attempt at actively avoiding places, people, and events associated with the injury is difficult. It enhances cognitive dissonance as a result of the inability to avoid evocative stimuli.

It has been theorized that when the initial intrusive states are experienced, they are extremely painful. Athletes without a psychiatric diagnosis are able to “dose” themselves with manageable levels of intrusive thought before shifting toward the avoidant end of the spectrum. When persons are capable of processing the
intrusive flooding and able to oscillate between the intrusive and avoidant states, it is thought that these oscillations decrease in magnitude, and slowly injured persons are able to integrate the trauma into their personal cognitive reality.24 Because of individual coping mechanisms and methods of adjusting to trauma, athletes can be “stuck” in intrusion or avoidance. If item endorsement and value remain elevated over a prolonged period of time, this may signal an inability to reach “adaptive completion,” which may herald a pathologic response to trauma.24

While the athletes are attempting to heal, they visit the training room, receive rehabilitative care, and continue to train just below the pain threshold. Sometimes they use nonsteroidal anti-inflammatory medications, cortisone injections, and at times narcotics to contend with the inflammation and pain. Some medical care may be given with or without the direct supervision of a physician in a determined attempt to enable the athletes to continue to train and compete. This behavior, accepted in the athletic milieu as a short-term solution, can create long-term problems both physically and emotionally, as evidenced by the high percentage of self-reported injuries in this study. Not only are the athletes risking further injury, but the psychological manifestations of training under these conditions exacerbate the initial distress.

Chronic injury is debilitating from psychiatric, sociologic, and physiologic perspectives. All too often when athletes complete their rehabilitation and reintegrate into a training program, they are expected to assume a full workload in a relatively short period of time. They may be reluctant to train with full intensity for fear of reinjuring themselves; they may also protect the site of past injury and thus create an overuse injury on the previously healthy side.25 Specific plays or similar situations that serve as reminders of the initial occurrence of the injury may be avoided. They may also have problems reintegrating into team dynamics.

This research was conducted during a year when this group won three NCAA championships and eight conference titles. It is interesting to speculate on their possible level of performance if they had been both physically healthy and psychologically less distressed. As demonstrated by their ability to continue to perform under conditions of chronic injury, athletes are tremendously resilient.

These results illustrate the need for an extensive educational program directed toward athletes, coaching staff, administrators, and involved physicians and parents. Treatment indications, including cross-training options for elite athletes who continue to train in the face of chronic injury, are needed. A change in basic beliefs regarding injury and mental toughness is required, as is a public acceptance of the reality of injury and its possible long-term sequelae. The accolades and rewards given for “playing hurt” reinforce these beliefs and need to be reassessed.

The problem of training and competing while injured is systemic and far-reaching. Psychiatrists have not been usual members of multidisciplinary sports medicine teams; perhaps their presence would be helpful. The level of distress shown by this group is noteworthy and should not be dismissed. By allowing an early processing of the injury in individual or group therapy, goals and priorities could be reframed. An accompanying attempt at destigmatizing numerous issues surrounding injury and rehabilitation would further the recovery process. Thus, elite athletes, who are predisposed not to ask for help, may be assisted with their recovery both physiologically and psychologically.

Acknowledgment
Cheryl Koopman, PhD, assisted with the preliminary work on this project. The students of Human Biology contributed with the field research, adding invaluable ideas and comments. Also, the coaches and athletes gave generously of their time and of themselves in participating in this study.

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Scars

We lie side by side through the longest night
The radio whispers *deep and dreamless sleep*.

Your fingers read my body Braille, stop each time
At the ridge of scar sketched across my flesh.

As the absent tooth draws the tongue, my fingers find
The thin line stretched from your hip to thigh.

After years proud flesh settles into silver seams
And the memory of pain is not pain itself.

I remember a street deeply muffled in cold
And the luminous glow of stars on snow,

The soft crunch of one man walking alone,
Each foot breaking the frozen skin of snow.

In your dark streets shine wet cobblestones,
You think of a street narrowed by twisted stone,

Where a distant lamp spills a smudge of light
And the silent stars above are dimmed.

We lie scar to scar, your curves fit mine
As if there is no space for memory or pain.

Your street is not my street, your scar not mine
But we agree to live as if they were the same.

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