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Sports-Injury Recovery Through Psychological Interventions

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Abstract

The biomechanics of an injury is the typical focus of athletic trainers and coaches. Surgery is often the result of sports injury and is routinely followed by a rehabilitation plan. This plan usually includes physical therapy and focuses on the return of mobility and function of the injured anatomical structure (Rodriguez et al., 2019). Athletic trainers are usually not properly trained on the psychological aspects of injury recovery (Bennett et al., 2016). Sometimes the involvement of a sports medicine professional (SMP) or sport psychology consultant (SPC) is necessary to help the athlete fully recover. Because there is a psychological change for every physical change (Green, 1992), the application of psychological interventions should be used throughout the rehabilitation process. Some of the most commonly used interventions to help improve and maintain athletic performance are goal setting, positive self-talk, and mental imagery (Arvinen-Barrow et al., 2015). The use of such psychological interventions is thought to have a positive impact on recovery efficiency and how effectively athletes return to play.

Keywords: biomechanics, goal setting, positive self-talk, mental imagery

Professional athletes dedicate most of their lives to practicing and perfecting their individual sport abilities. Athletes may go on specific diets, travel long distances, and tend to put their sport as the number one priority in their lives. Athletes also run the risk of injury every day when practicing or performing, and unfortunately, sports injury is almost inevitable. Under some conditions, the recovery process for an athlete can be timely; in other cases, the return to normal function after injury can be a long process. Sometimes, just when an athlete believes that they have recovered and are ready to play after months of inactivity, they become injured again, whether it be a strained hamstring, an ACL tear, or a dislocated shoulder. Over 17 million reported sport injuries occur annually in the United States (Cupal, 1998), and many different factors can contribute to injury, including physical aspects, equipment malfunction, overuse during training, and more (Fernandes et al., 2014). Thus, athletic trainers who are capable of helping an athlete recover quickly are in high demand.

A sport injury is any physical damage caused by participation in an athletic activity (Almeida et al., 2014). The recovery process typically involves a focus on biomechanics and physiological factors. Biomechanics is the science of how the muscles, tendons, bones, etc. work together to create movement. Athletic trainers and coaches are trained on how to help athletes recover from an injury by prioritizing different physiological and biomechanical factors. Their main focus is to help the injured part of the body heal properly. This usually consists of surgery or physical therapy. Much of the scientific literature on sports injuries involves the study of how the biomechanics of an injury can help athletes in the recovering process. Over the years, researchers have also identified a mental aspect to the healing process and are striving to better understand the combination of physiological and emotional aspects of sport injury (Cupal, 1998). Combining both elements of the healing process may lead to more effective and efficient recovery processes for injured athletes.

Many different mental and emotional approaches can be applied to enhance the recovery of an injured athlete, such as goal setting, positive self-talk, and mental imagery. Goal setting is the most

common psychological intervention used in the healing process; it is used by the majority of athletes and taught by trainers (Arvinen-Barrow et al., 2015). The main idea is that athletes should set healthy and realistic goals along their recovery process (Fernandes et al., 2014). The goals they set should focus on how far they will push their body during different steps of recovery. Their goal should include imagining where they are physically going to be and how their performance will be at different times throughout the process.

Functioning as an athlete can be stressful, as their performance is constantly monitored by others. Being injured only deepens that stress and can affect an athlete's emotional and behavioral responses (Almeida et al., 2014). Additionally, positive self-talk is thought to help an athlete maintain a positive outlook on their situation and reduce stress levels, because it focuses on the elimination of words such as "I can't" and "I won't," which often helps injured athletes change their attitudes and improve their recovery process (Zakrajsek et al., 2017). Goal setting, together with eliminating negative language and thoughts, may help athletes perform better and recover quickly.

Imagery intervention is the process of using all of your senses to perform a specific skill within one's mind without any observable actions (Rodriguez et al., 2019). This may involve the process of healing from the injury and the different steps of future rehabilitation, or it can be focused on one particular step of the healing process (Rodriguez et al., 2019). Using imagery, athletes focus on their mental state and the emotions that they might feel throughout the process. Their main focus should be on the desired outcome, which is to heal and to fully return to playing their sport. Reese et al. (2012) underscored the importance of applying mental aspects, such as imagery, in the healing process. Imagery is important because it prepares both the mind and body to return to full function. The application of these concepts from their study resulted in athletes showing an improvement in their mood (Reese et al., 2012). These findings indicate that the use of imagery among athletes is important within the healing process and may thus help improve the ability of athletes to return to play. Through these means, athletes may be able to control emotions and maintain focus on performing to their best

ability. Although athletic trainers and coaches tend to mainly focus on the biomechanics of athletic injury recovery, such professionals should place more emphasis on associated mental aspects (post-injury), because psychological interventions, such as the use of goal setting, positive self-talk, and mental imagery, are thought to directly enhance how efficiently and effectively athletes return to play.

Psychological Interventions

Injury is an inevitable, life-disrupting factor for athletes. Injury can be defined as “a source of stress that an individual may perceive as threatening, which then leads to subsequent emotional, behavioral, and physical responses” (Madrigal & Gill, 2014, p. 277). Sport-related injuries are caused by anatomical, environmental, physiological, and physical factors which include things like overtraining, physical fatigue, faulty sports equipment, or bad facilities (Fernandes et al., 2014). These factors affect the players and may cause them to go through intense emotions as they process what has occurred. Some of the emotions that athletes may feel are anger, depression, sadness, loneliness, or hostility. Lynch (1988) observed how these emotions can wreak havoc on the body. The stress from injury can cause the body to have muscle spasms or vasoconstriction (i.e., restriction of blood flow to the injured area), which puts the body on defense and makes it more susceptible to being reinjured. Being reinjured can cause secondary-stress syndrome, which intensifies pain and causes muscles to tense (Lynch, 1988). One of the most common injuries and reinjuries among athletes is an anterior cruciate ligament (ACL) injury. Only 44% of athletes return to a competitive level after ACL injury. Twenty-four percent of athletes do not return to play due to fear of reinjury and possible pain (Rodriquez et al., 2019). Such injuries can be a determining factor for the remainder of an athlete’s career. For many athletes, the sport they play defines them; it is a part of their identity (Lattimore, 2017). Thus, an injury could be the greatest hardship they face and may cause them to lose this core identity. Because injury can affect the emotional state of an athlete and negatively impact their sense of identity, it is important that athletes are given psychological means by which to heal.

Sports-Injury Recovery

Most sports teams are equipped with an athletic trainer (AT) or a sports-medicine team. It is the job of those teams to be equipped with the knowledge required to help athletes recover from injuries. Once an athlete has been injured, it is important for them to seek medical attention and other assistance from a parent, coach, sports-psychologist, or anyone on their sports-medicine team. This way, the athlete can have multiple sources of support as they are beginning the recovery process. Injured athletes should discuss the entire rehabilitation plan with their trainer and anyone else who will be involved with the athlete's recovery process (Green, 1992). This involves discussing physical and mental attributes, as well as who will make the final decision on whether the athlete is ready to return to play. An AT is the gatekeeper to an athlete's rehab experience (Zakrajsek et al., 2016); this professional has the proper training to help an athlete have a positive experience. However, many ATs are not properly trained in the mental aspect of injury recovery. A psychological approach is often not incorporated in sports-injury rehabilitation, which may be due to limited resources and not using a sports psychologist (Arvinen-Barrow et al., 2015). ATs may require the assistance of either a sports-medicine professional (SMP) or a sports-psychology consultant (SPC). SMPs and SPCs are properly trained in how to help athletes manage the mental aspects of their recovery. SMPs are required to use psychological skills and strategies in the rehabilitation of athletes. The proper training of ATs and the use of SPCs as an integral part of a sports-medicine team may be effective in helping athletes psychologically heal from sports-related injuries.

Sports-medicine teams' main focus is typically the biomechanics of an injury, which is important in the recovery process. With many sports-related injuries, surgery is involved. The ability to return to a full range of function and motion while improving strength is the focal point of surgery (Rodriguez et al., 2019), and the use of medical techniques is usually implemented over psychological procedures (Green, 1992). The implementation of psychological interventions may help sports-medicine team members have a better understanding of what is going on in the athlete's mind as well as their bodies during

the recovery process.

Professionals (and other individuals) working to support the injured athlete should be trained on the mind-body aspect of sports-related injury. The mind-body concept views the human being as a package that consists of mental functions as well as physiological functions (Green, 1992). ATs often support the use of psychological strategies in the rehab process, although these cognitive strategies are not always recognized as much as they should be. For “every physiological change that occurs in the body, there is an appropriate change in the mental-emotional state” (Green, 1992, p. 417). Therefore, rehabilitation is not thought to be complete without experiencing emotional recovery (Lattimore, 2017). Madrigal and Gill (2014) found that athletes showed less mental toughness, hardiness, and optimism from the time of injury to part-way through the rehabilitation process. It is important to understand the physiology behind an injury so that an athlete can heal properly physically, but an athlete’s mental state should also be monitored and rehabilitated. Because the mind and body work together, ATs should use strategies from both areas to help athletes make a full recovery.

Goal Setting

Goal setting is a psychological intervention that may help with sports-related injuries. Goal setting is also one of the most commonly used techniques among athletes and ATs. Arvinen-Barrow et al. (2015) reported that 72% of injured athletes indicated that the use of mental skills helped them to recover faster, and 46.8% of those used goal setting in the recovery process. Similarly, Cupal (1998) found that athletes who were most satisfied by recovery results and reacted most quickly, applied goal setting during their rehabilitation process. Thus, the use of goal setting appears to have a positive impact on the recovery process and should be routinely implemented in the recovery of injured athletes.

Additionally, goal setting is important for the injury recovery process because it helps athletes to stay involved and motivated. As discussed previously, it is common for athletes to feel discouraged and hopeless while they are going through rehabilitation. Setting

Sports-Injury Recovery

short-term goals with the athletes may help them to see progress as well as have a better sense of their accomplishments. Having short-term goals may also help the athletes to see the bigger picture as one cannot go from 10% to 100% too quickly (Zakrajsek et al., 2017). Evans et al. (2000) observed the use of performance and process goals in the rehabilitation process. Performance goals are highly motivational and focus on the training activities necessary to return to play. Process goals are more flexible and help athletes to focus their attention and execute the minor details of performance, for example, to emphasize the correct angles of running (Evans et al., 2000). The use of outcome goals can be discouraging for athletes, as the end goal may be changed from return to play to healing from injury. Further, performance goals do not involve interpersonal comparison, which may affect the rehabilitation process.

It is important for goals to be evaluated periodically and adjusted accordingly; goals should push an athlete while still being reasonable. Evaluating reasonable goals and adjusting them when needed helps the athlete to stay motivated and keep a positive outlook. If a goal is too hard and not adjusted accordingly, it may become a setback in the recovery process (Evans et al., 2000). These findings indicate that using goal setting as a psychological intervention may help athletes to stay more motivated and focused during the recovery process. Specifically, focusing on performance and process goals rather than outcome goals may have a more effective outcome.

Positive Self-Talk

Like goal setting, positive self-talk can help with injury recovery because the mind can have a powerful influence over the body. What an athlete thinks about themselves and their injury can affect their recovery. Positive self-talk is one of the top four mental skills used by athletes, and Arvinen-Barrow et al. (2015) found that 32.2% of those who used mental skills in their recovery applied positive self-talk. Positive self-talk includes the tone, attitude, and way athletes talk to themselves and can affect their approach to injury recovery (Zakrajsek et al., 2017). ATs using positive self-talk as a mental skill in the recovery process do not always use all aspects as they tend to

focus on how they speak to an athlete, which means they try to stay positive around them. Only maintaining a positive attitude around the athletes may not help as much as the athletes applying positive tones and attitudes themselves. ATs should also teach an athlete the use of reframing and countering thoughts. These skills will likely help refine the way an athlete communicates within themselves and may be healthier for their mental health throughout the recovery process (Zakrajsek et al., 2017). Reframing and countering thoughts involves changing one's thoughts to be more positive. The correct usage of positive self-talk may help athletes refine their thought patterns into thinking more positively, which may in turn help athletes to positively view their recovery process and help them to return to play quickly and efficiently.

An important part of positive self-talk is acceptance. Acceptance is a part of the natural grieving process, and athletes tend to go through something similar during their recovery. Athletes going through the grief cycle may experience a lot of anger and denial at the beginning of their recovery before they reach acceptance (Zakrajsek et al., 2017). Athletes may find it hard to accept the fact that they were injured. The ability to control their thoughts about the injury and recovery process can help them come to acceptance (Ilevelva & Orlock, 1991). It is normal for athletes to feel grief, but the recovery process may be easier with the implementation of positive self-talk.

In a study done by Ilevelva and Orlock (1991), positive self-talk was found to be one of the top three most used psychological interventions in the sport-injury recovery process (along with goal setting and healthy imagery). Those who recovered faster from sports injury had a more positive attitude overall through their recovery process. This positive thinking gave them a higher sense of control over their injury. Their study showed the correlation between those who healed quickly, taking five weeks or less to recover, and those who healed slowly, taking over 12 weeks to recover (Table 1). Those who healed faster tended to use positive self-talk more than those who had a slower recovery rate. The use of positive self-talk can improve and quicken recovery rate and therefore should be applied more consistently within the recovery plan for athletes.

Mental Imagery

Seeing one's self return to play can be helpful in the recovery process. The use of imagery in the recovery process may help an athlete cope with pain and lessen stress (Green, 1992). The use of imagery also helps with anxiety, tension, and pain while encouraging the healing process (Rodriguez et al., 2019). Imagery can be defined as a way of executing different skills in one's mind by using the different senses (touch, feel, vision, smell) without actually performing the actions (Rodriguez et al., 2019). Stress hormones can delay the recovery process through pro-inflammatory cytokine activity, but the utilization of imagery helps reduce factors involved with stress (Rodriguez et al., 2019). Visualization helps to eliminate the negative images brought on by stress, helps with blood flow, and combats vasoconstriction (Lynch, 1988). Thus, imagery is a useful psychological intervention for the recovery process, because it reduces the stress on an athlete and therefore helps them to recover faster.

Developing a visualization and understanding of one's injury may help an athlete better comprehend and accept their situation. When an athlete is injured, they may not fully appreciate the extent of their injury. A thorough explanation of the injury and rehabilitation process, step by step, is important. X-rays, pictures, and/or other visual aids should be utilized so athletes can better understand what is happening to their bodies. The understanding of the possible surgical procedures and the recovery time should be clearly specified for the injured athlete so they can better imagine the healing process throughout their rehabilitation (Green, 1992; Zakrajsek et al., 2017). The level of understanding an athlete possesses regarding the process of the injury and recovery will likely be beneficial in applying mental imagery techniques.

Mental imagery should be combined with the use of physical therapy. A physical-rehabilitation program combined with imagery is thought to be more effective in the healing process (Cupal, 1998). When athletes have the opportunity to practice mental imagery and physical therapy, they may feel that they have better control over physiological factors as well as psychological factors. The use of imagery helps athletes act as active agents in their own recovery

process, which may lead to better physiological outcomes (Cupal, 1998). Thus, the combination of physical therapy and mental imagery may help an athlete recover better from injury, and the ability of an athlete to be active in their personal recovery also benefits them, as they feel more in control of the situation.

An athlete can practice mental imagery in the rehabilitation process in a variety of ways. Imagining the completion of specific movements involved in their sports is one such method. It is particularly important that the athlete practice movements that are similar to the way that they were injured. Evans et al. (2000) studied a rugby player who was injured making a tackle. It was hard for the athlete to make tackles when returning to play due to fear of reinjury. However, once an athlete is able to imagine doing such tasks correctly, the next step may be to go out and physically perform them, which represents significant progress (Green, 1992). Puig et al. (2012) further indicated that gaining insight of or picturing the challenge ahead helped participants to reach their goal. According to Green (1992), part of this process involved imagining possible emotions that may be felt along the recovery path because an athlete may feel many different extreme emotions throughout the rehabilitation process. The emotions that they feel are thought to be beneficial to the recovery process (Green, 1992). These findings suggest that the ability to imagine the emotions that are felt along the recovery path, as well as the ability to imagine different tasks that will be performed throughout an athletic event, will likely help an injured athlete to recover properly. The mind will likely be better prepared to face possible setbacks and return to play with less fear of possible reinjury.

Conclusion

ATs, coaches, sports-medicine teams, and other supportive individuals have the responsibility to be properly trained on how to best help an athlete recover from sports injuries. An AT can help an athlete recover physiologically as well as psychologically and should have a healthy relationship with the athlete (Bennett et al., 2016). Although their focus is typically on the biomechanics of an athlete's injury, ATs and others involved should be trained in their grad classes

Sports-Injury Recovery

on the mental aspects of athletic injury and rehabilitation. The concept of focusing on the psychological aspect of injury recovery is somewhat new for ATs and coaches, and this lack of training should be addressed (Zakrajsek et al., 2016). In some cases, it is necessary to seek help from SPCs. ATs should seek help when necessary to support injured athletes' recovery and return to play. Given that ATs are in charge of an athlete's rehabilitation, they should consider both physiological and psychological interventions when putting together an injury-recovery plan.

Several psychological interventions can be used throughout the injury recovery process to help improve rehabilitation of injured athletes. The application of goal setting plays an important role in the recovery process. Goal setting is the most commonly used psychological skill by athletes; the ability for an athlete to see progression in the recovery process is thought to help relieve stress and keep an athlete motivated (Arvinen-Barrow et al., 2015; Zakrajsek et al., 2017). Goal setting helps athletes envision steps one at a time to avoid becoming overwhelmed by the recovery process (Zakrajsek et al., 2017). Goals should be adjusted throughout the rehabilitation of an injury to best guide an athlete (Evans et al., 2000). Goal setting should be implemented in the recovery process due to its ability to reduce stress and success in maintaining motivation in athletes.

Another important technique to be used throughout the recovery process is positive self-talk. An athlete's thoughts can become negative as they become overwhelmed with the stresses involved with injury, and positive self-talk can help change those thoughts. Positive self-talk is more than just an AT talking positively to an athlete and encouraging them to speak and think the same way to themselves; it also involves the ability to reframe and counter one's negative thoughts (Zakrajsek et al., 2017). This technique has been found to effectively quicken the recovery process.

Above all of the different stressors that an athlete might face throughout their sports career, injury is one of the most damaging. The use of mental imagery has proven effective in helping to reduce such stress and in improving athletic performance (Arvinen-Barrow et al., 2015; Rodriguez et al., 2019). The use of imagery also helps

athletes to accept the condition that they are in and imagine the positive outcomes of injury. Ultimately, it helps them to visualize performing at their full capacity, which typically leads to faster and more effective recovery (Green, 1992). Injury is an unavoidable risk that athletes face in their careers. The application of psychological interventions, such as goal setting, positive self-talk, and mental imagery, combined with physiological interventions, may help athletes recover and return to play quickly and efficiently.

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Sports-Injury Recovery

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Appendix**Table I****Means, Standard Deviations, t Tests, and Healing Variable-Recovery Time Correlations for all Data**

Variable	Fast (M)	Slow (M)	Fast (SD)	Slow (SD)	r	t
Goal setting	26.2	14.8	2.0	7.1	-.864	6.41
Positive self-talk	8.7	2.7	3.6	3.6	-.668	3.24
Healing Imagery	5.3	2.2	4.9	3.0	-.407	1.67
Outlook	12.3	7.8	8.3	8.3	-.130	0.49
Attitude	27.4	42.3	1.8	1.8	-.084	0.32
Support	8.0	8.1	2.3	2.3	.032	0.10
Stress	2.0	0.7	4.6	4.6	.000	0.00

Note 1. Study of those who healed faster from sport injury in relation to those who healed slowly. Top psychological interventions used during the healing process. Adapted from “The Sport Psychologist,” (Ievleva & Orlick, 1991).