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### The Overlooked Aspect of the Psychological Effect of Injuries on the Rehabilitation Process

The mind and body are closely connected. Although the amount of research is limited involving this topic, exercise science is advancing rapidly, and a clearer connection is beginning to become apparent. Until the 1960s, exercise science as a field was largely unprecedented. Exercise science took a major step forward in those years upon the publication of a study by Professor Franklin Henry, titled, "Physical education: an academic discipline" which paved the way towards exercise science as we know it today. Exercise scientists are important to both athletic and clinical populations as they provide individuals to the workforce who are skilled in evaluating health behaviors and risk factors, conducting fitness assessments, and writing appropriate exercise prescriptions (Chicago, 2022). These prescriptions are intended to boost an individual's athletic capabilities, improve health outcomes, and prevent injury. No one is immune to injury and even with tactful implementation of exercise prescription, sometimes it is simply unavoidable. There are many different kinds of injuries, but they can all be classified into two categories: acute, and chronic. When an injury is an acute injury, it happens all at once, like a broken bone from falling, or a bruising from sustaining a blow. Chronic injuries, on the other hand, occur as a result of overuse of a body part and can typically linger around longer. How long depends on the severity of the injury. Severe injuries like an anterior cruciate ligament

(ACL) tear can take anywhere around 6-9 months to fully recover, while something like a muscle strain only will take around 1-6 weeks depending on the severity. After sustaining such an injury, an individual only has a few options: do nothing, surgical intervention, physical therapy, or a mix of the two. It is typically seen that people with severe injuries go the surgical route, while people with less severe injuries either wait it out or go to physical therapy, but that is not always the case. There are cases of severe injury where people forego surgery such as an ACL tear and go onto live normal lives, but it is less common than the surgical route and requires lengthy amounts of physical therapy. Physical therapy is a practice where the goal is to restore or improve movement and reduce pain of bodily ailment through exercise and less invasive ways. Typically, when a person goes to physical therapy, they will get looked at by a Physical Therapist to assess what the problem is and how they are going to prescribe certain exercises to fix it. The patient will spend an hour, at most, with the therapist and then will be prescribed an “at-home” routine of exercises and stretches that they should perform based on the number of days the therapist recommends. As with anything, physical therapy has both strengths and limitations as a practice. Some of its strengths include its effectiveness to relieve pain, noninvasiveness, and affordability with proper health insurance. However, this comes with the limitations of physical therapy outcomes being largely dependent of the effort one puts into doing their exercises, often times strict requirements of getting a referral in order to be allowed to go to physical therapy, and also the neglect of the psychological impact of injuries on the recovery process. One of the primary effects of getting injured is depression. Studies have shown that athletes who sustained an injury during the previous year reported significantly higher depression symptom scores than athletes who had not been injured in the past year

(Appaneal et al., 2009). This is where a physical therapist should step in and provide care to both the physical problems, as well as the emotional problems, from the injury, however, the ladder is often forgotten. Whoever it may be who got injured has to now deal with the problems that come with being injured: fear of pain and fear of reinjury. These problems lead to some questions when discussing injury and psychology. For example, does psychology have a bigger influence on clinical outcomes than we think? Are there interactions between the physiology of recovery and the thought process? Should physical therapists be required to have some sort of degree or education in psychology to provide the most holistic care? The answers to these questions remain in the air, but with the research that has been done, one can begin to answer these questions for themselves. Based on the latest research, it seems that psychology may play a greater role in rehabilitation than previously believed. When treating patients who experienced any bodily injury, psychology should be implemented into an effective rehabilitation process in order to achieve maximal results in physical recovery and mental readiness to return to life post-injury.

When sustaining an injury, individuals cope with it in distinct stages that should be addressed differently by a physical therapist in order to facilitate the best possible recovery. There are three stages in which an athlete must go through before returning back to baseline from injury. The stages are the reaction to injury stage, reaction to rehabilitation stage, and reaction to return to sport stage (Clement et al., 2015). In the first stage, the athlete feels predominantly negative and is seeking emotional support. This would be a good time for a physical therapist to intervene and provide the athlete with the emotional support they need, whether that be reassurance that they will be able to treat them or some sympathy for the

hard time they are enduring. The next stage is reaction to rehabilitation, which is when the athlete begins consistently going to physical therapy and is now adjusting to this life. The research shows that the athlete feels frustrated and is questioning the rehabilitation process. In this stage, the most ideal thing a physical therapist could do would be to address their frustrations, but also keep reminding them that they are on track and that it will all come together. Finally, there is the reaction to return to sport stage. The athlete feels a mix of positive and negative emotions as they have finally gotten to a place where they can get back to playing their sport. However, it is in this stage that the athlete is most fearful of reinjury (Clement et al., 2015). Fear of reinjury is detrimental to an athlete's overall success when coming back from an injury. In a meta-analysis study, 63% of athletes returned to play after ACL reconstruction at their preinjury level, and fear of reinjury is the most frequently cited reason for reduction in sports participation (Hsu et al. 2017). Not only is fear of reinjury associated with negative sport outcomes in terms of performance, but as shown, it is the leading factor that prevents the athlete from even participating after they are fully healed physically. However, the most notable thing that research has discovered is that the fear of reinjury may also cause altered muscle recruitment strategies, which increases the likelihood of actual reinjury (Hsu et al. 2017). So, if an athlete does manage to successfully rehab an injury, if they are fearful of reinjuring themselves, they might favor certain movement patterns or recruit certain muscles into play more that ultimately can put them at greater risk of actually reinjuring themselves. An effective way to have an athlete return to their sport with less fear would be to use psychology to the advantage: more specifically, the self-determination theory, which is what researchers Podlog and Eklund looked into with a study involving Australian footballers coming back to their

sport after suffering severe injury. Their findings suggest that more self-determination results in more positive athlete appraisal and emotions (Podlog & Eklund, 2010). In their study, the athletes who got to choose when they were ready to participate in sports, rather than being told when, had these positive appraisals and emotions. The study did not go into the actual results of whether the athletes who had the more positive appraisals to their situation experienced more positive outcomes when coming back to the sport. However, by combining this research with Hsu's, one can infer that more self-determination is correlated with less fear of reinjury and thus less actual reinjury. The practical use of this information in the field of physical therapy would be for the physical therapist to provide the patient with occasional "check-ins" throughout their rehabilitation in order to ensure that they are psychologically on track. Physical therapists need to make sure their athletes are developing this strong sense of self-determination, and that by the time it is time for them to be discharged, it is almost like the athlete is doing it on their own whims and is eager to get back out to the field or everyday life. All of this research suggests that a physical therapist needs to be aware of the cognition of their patient or athlete in order to give them what they need at the proper time in their recovery. These psychological tools are simply an additional research therapists can use when giving their physical care and may end up being just as effective.

The next important topic involving the importance of psychology when it comes to injury rehabilitation is how one's mindset and self-efficacy can dictate a successful recovery. Mindset can play a key role into how much one gets out of their physical therapy treatment. In a recent study done with military cohorts dealing with musculoskeletal injury, groups with elevated kinesiophobia at the final visit had smaller positive improvements in physical function

compared with groups without elevated kinesiophobia at the final visit by 12 weeks (Chimenti et al., 2022). As previously discussed with the fear of injury, kinesiophobia, which is the fear of movement, also negatively impacts the end result. It is crucial for patients to trust in their physical therapists to provide them with what they need, and not execute their exercise prescriptions with fear because it ends up giving worse outcomes. As much as it is the physical therapist's job to encourage their patient that they can do it themselves, a patient must develop some individual sense of self-efficacy, or "I can do it" mindset. Self-efficacy has proven to be a useful tool in developing better long-term functional changes rather than short-term, but nonetheless, should be considered in any effective rehabilitation program. Increased self-efficacy beliefs may primarily serve to enhance long-term effects of rehabilitation. Patients who participated in a rehabilitation program showed a general pattern of gains in functioning and reductions in subjective pain over the course of treatment. However, treatment gains were more likely to be maintained at the 6-month follow-up visit by patients who showed the greatest increases in self-efficacy beliefs during the rehabilitation program (Altmaier et al., 1993). Overall, the mindset of the patient during and after treatment plays a greater role in the end result than previously thought for injury rehabilitation.

To better treat their patients, physical therapists need to be able to understand what an athlete or injured person is thinking after experiencing a significant injury. After all, different injuries do carry different psychological problems, and a good physical therapist should be able to put themselves in the shoes of the athlete and structure their approach accordingly. For severe injury like an ACL tear, research shows that following ACL reconstruction, fear of movement or reinjury improves more slowly than pain catastrophizing and self-efficacy for

rehabilitation (Chmielewski et al., 2011). As previously shown, failure to treat this discrepancy in improvements to one's psychological status has negative physical outcomes as well. In a study of 164 participants, less than 50% returned to their preinjury sport or recreational activity after ACL reconstruction. There were many reasons for why an athlete experiencing such a traumatic injury like this would not return to preinjury status, but one key factor that did facilitate those who did return. Psychological readiness to return to sport and recreation was the factor most strongly associated with returning to the preinjury activity (Ardern et al., 2014). This goes to show that although physical readiness to return to play does matter, psychological readiness is just as important. When more than 50% of people who experience an ACL tear report being not psychologically prepared for return to play, something is not being done correctly in the field of physical therapy. Psychological preparedness should be a focus in treatment, especially when an athlete is dealing with a particularly serious injury such as an ACL tear. Physical therapists need to really consider the gravity of what the athlete is experiencing after a severe injury, and not just see it as an everyday occurrence for them since they might get desensitized after treating a large number of patients with injuries so regularly. This is called "compassion fatigue" and occurs when a healthcare worker is constantly exposed to people undergoing stressful situations so much so that they lose compassion for them. Compassion fatigue needs to be addressed because these patients and athletes are going through an extremely tough time emotionally and need to be treated with emotional care as well. The solution this problem would either lie in more education and awareness on this topic or even a decrease in the amount of patients a therapist fits in each workday so that each patient is getting the attention they deserve. Athletes who experience a severe injury reported, for the

first 24-48 hours, a sense of enjoyment of the attention they received for their injuries such as people's care and holding doors for them. However, as time went on, they began to feel frustrated with their predicament and felt like a burden to those around them. Even worse, once they recovered past the initial stages, when faced with the question of sitting out at practices or not going at all, many chose to not go as it was too emotionally difficult and those who did choose to go felt alienated from the team (Tracey, 2003). It is quite apparent that those who are forced to undergo these emotional times should receive some sort of psychological treatment, whether that be the physical therapist themselves, or an external counselor or cognitive-behavioral therapist.

Another route regarding the psychology behind injury and rehabilitation is the role that gender plays. The research is limited, but the findings that have been discovered are rather intriguing. To begin, there is a significant difference between males and females with their coach-athlete relationship post-injury. 15/16 females reported feeling ignored by their coaches after being injured, and only 3/15 males felt that they were being ignored (Granito, 2002). Additionally 8/15 males spoke about receiving emotional support from a significant other while none of the females talked about any significant other. Finally, with this study of collegiate athletes, females (7/16) seemed more concerned about the future implications of their injuries than the males, where only one made a small comment regarding the future (Granito, 2002). Although the sample size of this study was relatively small (n=31), it provides relevant information about an interesting concept that previously had not been analyzed. This particular research suggests that the females experiencing injury should have an extra focus on their emotional state throughout their recovery, as they have less social support outlets, and are



more focused on long-term problems from their injuries. An additional difference between males and females was observed in a different study where females throughout their injury duration had more “avoidance” thoughts. What classified something as an “avoidance” thought was “a conscious attempt to divert thoughts.” (Shuer & Dietrich, 1997). Based on this knowledge, it is safe to assume females experience a lot more anxiety-related thoughts during an injury recovery than males, since females are having a notable amount of these avoidance thoughts to stop other thoughts. This could be a presumptuous claim, and males are experiencing the same negative thoughts that females are trying to avoid and simply are not doing anything about it. Either way, females seem to try to intervene with their cognitive thoughts more so than men. These differences are certainly not where the list ends, but the research is very limited in this particular subsection of exercise science, despite providing some rather practical knowledge for practitioners attempting to help patients of different sexes.

One of the most common and effective ways to successfully recover from an injury is to seek out physical therapy and work with a physical therapist. While it is true that the general population, even the athletic population, will benefit from physical therapy as a result of getting given a certain exercise prescription, there are even more important psychological benefits as well. One often overlooked thing about physical therapy is that the patient is being given an alliance with another person who is more than knowledgeable on what treatment the patient needs. The relationship the patient has with their physical therapist can help shape a successful recovery. In a study involving 6 musculoskeletal injury physical therapy patients, the importance of a physical therapist and client alliance was shown. Significant positive associations were found between the alliance and the patient's global perceived effect of

treatment, change in pain, physical function, patient satisfaction with treatment, depression, and general health status (Klaber Moffett & Richardson, 1997). This highlights the importance of fostering a good relationship with the patient, as it can alleviate some of the negative aspects of being injured. One should always leave a physical therapy appointment feeling a new sense of motivation rather than despair. Going to a physical therapist should be like a beacon of hope, not a dreaded chore. If people see it as such, they are less likely to attend their sessions and are only further pushing themselves backwards in terms of recovery. One study found that 14% of physiotherapy patients did not return for follow-up outpatient appointments. Another suggested that non-adherence with treatment and exercise performance could be as high as 70% (Jack et al., 2010). These are alarmingly high statistics that show that physical therapists need to do a better job of explaining to the patients the importance of doing their exercises and also creating a better patient-therapist relationship to encourage less no-shows. After all, a person is typically only in the physical therapist's care for 1-2 hours a week. The real recovery comes from doing the prescribed exercise when nobody is watching. It is easy to go in for an appointment and do the exercise when the physical therapist is providing supervision, but one needs to be prepared to these exercises on their own. The real question that beckons is still: what is preventing these non-adherent patients from their routines? Research on this found strong evidence that low levels of physical activity at baseline or in previous weeks, low in-treatment adherence with exercise, low self-efficacy, depression, anxiety, helplessness, poor social support or activity, greater perceived number of barriers to exercise and increased pain levels during exercise are barriers to treatment adherence (Jack et al., 2010). Physical therapists need to combat this with feasible psychological implementations into their treatment styles so

that their patients see the results that they desperately want to see. It would be a good start to inform the patients that results take time to be seen, and just because it has been a week and no change has occurred yet, does not mean that physical therapy is not an effective option for them. Additionally, physical therapists should look to improve their first impressions on their patients to encourage follow-up visits, and also instill a sense of self-efficacy from the start. These general guidelines of focus on the therapist-patient relationship will help create a more positive environment for the patient and encourage them to keep coming back; this is good not only financially, but also for the patient's success in their recovery.

Psychology has a bigger role in physical outcomes than previously thought, therapists need to understand this and apply it to their rehabilitation programs practically. Some research has been done on this topic to discover what are some effective, but purely cognitive ways physical therapists can improve their treatment. Research found that psychological interventions utilizing guided imagery, goal setting, or relaxation are often associated with decreased negative psychological consequences, improved coping, and reduced re-injury anxiety (Schwab Reese et al. 2012). For guided imagery, a physical therapist could instruct their patient to imagine the injured body part healing itself or be asked to imagine their body doing a movement pain-free. These thoughts in theory and in practice help lower anxiety and could even reduce muscle tension, aiding in some physical relief. Relaxation most likely would consist of instructing a patient to perform some deep diaphragmic breathing, which has been linked with lowering stress and anxiety. Finally, goal-setting might be a practical consideration due to its link with increasing self-efficacy and self-confidence throughout the rehabilitation process (Schwab Reese et al. 2012). As mentioned previously, anything that would increase a patient's

self-efficacy has a significant carry-over when it comes to increasing positive physical outcomes from rehabilitation. These factors should be included one way or another into a physical therapy program, however, it depends on which method works the best for the individual.

To conclude this discussion, in order to achieve maximal results in physical recovery and provide mental readiness to return to life before injury, psychological intervention should be implemented into an effective rehabilitation process when treating patients who experienced a bodily injury. Psychology plays a more important role than previously thought and going forward should be a consideration during rehabilitation. The effectiveness of a particular physical therapy treatment can be helped by physical adherence to the program, but also psychological adherence. It is not completely out of the picture to one day envision a physical therapist providing psychological drills for patients to do at home alongside their physical exercises. Some key takeaways from the research that has been done would be that overall, a negative mindset equals negative results, and the opposite is true. Study after study stresses the importance of maintaining a positive mental status so that healing can be more effective. The research involving the direct relationship as to why positive attitudes end up producing better physical results is inconclusive, but the end result remains the same. There are some proposed physiological mechanisms as to why psychological intervention can affect one physically, like reducing stress hormones which negatively impact tissue recovery, but it is uncertain. Ultimately, it does not matter, if something proves to be effective, it should be implemented to provide the most effective care. Physical therapy is a relatively new field and there are new pieces of research being brought to light constantly. It is important for these physical therapists in the workforce to stay up to date on this research and start using it to their

own practices in ways that they see best fit. When it comes to physical therapy, it is like a puzzle, trying to figure out each person that comes in, and finding the pieces that will fit together to give them the best outcome as quickly as possible. Up until recently, psychology has not been a consideration as a possible piece to the puzzle, however that needs to change and should change with times to come. When it comes to being a practitioner in the field of exercise science, and in this case, physical therapy, the more tools in the toolbox, the easier it is to fix a problem. Psychology is a broad field but there are things to be learned from it that can carry over into other fields like exercise science. There is still plenty more research that needs to be done on this topic and so far, only the tip of the iceberg has been grazed. Hopefully in the future, this topic gets the attention that it deserves, and physical therapists can finally provide the most holistic and effective care possible.

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