

The Importance of a Stronger Presence of Sport Psychology in Exercise Therapy

Marlene Van Niekerk¹, Terry Jeremy Ellapen¹, Gert Lukas Strydom^{2,*}

¹Tshwane University of Technology, Department of Sport Rehabilitation and Dental Sciences, Faculty of Science, Pretoria West, South Africa

²Retired Senior Professor

***Corresponding Author:** Gert Lukas Strydom, Retired Senior Professor, south Africa, E-mail: EllapenTJ@tut.ac.za.

Citation: Marlene Van Niekerk, Terry Jeremy Ellapen, Gert Lukas Strydom (2023) The Importance of a Stronger Presence of Sport Psychology in Exercise Therapy. J Anaesth Ther 4:101

Abstract

Background: Athletic injuries involve both physiological and psychological challenges, thereby requiring exercise therapy and psychological counselling simultaneously.

Objective: To present a unique commentary that highlights how psychological counselling therapies and strategies can help improve the success of exercise therapy, thereby encouraging a stronger presence of sport psychology.

Method: An electronic literature search using the PRISMA directive in Science Direct, PubMed, Web of Science and Sabinet search engines was completed, concentrating on literature during the period of 2000-2020. Key search words: *sport psychology, exercise rehabilitation and adherence*.

Results: Eight hundred and sixteen (816) records were identified, which was ultimately reduced to five. The quality of the studies was assessed according to the Downs and Black Appraisal Scale. Only records reviewing the collaborative benefit of sport psychology together with exercise rehabilitation were included in the commentary. The mean rating of the studies according to the Downs and Black Appraisal Scale was 80% (good).

Conclusion: Athletic injuries propose both a physiological and a psychological challenge, which must be simultaneously managed. A stronger presence and/or collaboration with Sport Psychology during rehabilitation will increase success.

Keywords: sport psychology, exercise rehabilitation

Introduction

Sport Psychology has developed into a transdisciplinary therapeutic science which has incorporated knowledge from Kinesiology (the study of human movement) and Psychology encompassing two fundamental goals[1]. One of the goals of Sport Psychology involves the investigation of psychological influences on human movement (Kinesiology), while the second goal examines how participation in physical activity, exercise and sport influence the athlete/person's psychological development [2]. The importance of Sport Psychology as an integral educational component of an exercise therapist's tertiary education is widely recognized [1,2]. Sport Psychology empowers the exercise therapist to better comprehend the emotional challenges that the injured athlete is experiencing, during their injury recovery progress [2]. Contemporary literature has illustrated that musculoskeletal injuries augment a person's life-stress, anxiety to re-injury, perception of loss and poor temperament [3]. Successful rehabilitation of an injury partly revolves around the patient's psychological coping skills (Rees et al., 2010). Patients who have better coping strategies and psychological support are able to successfully recover from injuries and pathologies (Rees et al., 2010). The aforementioned reasons are suggestive that during exercise rehabilitation process, patients may benefit from the supplementary support of a sport psychologist and the appreciation of the tenants of therapeutic Sport Psychology. The appreciation of Psychology is fundamental to any therapist understanding of the rehabilitation process [1,4].

Methods

Protocol

An electronic literature exploration adopting the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) benchmark was completed [5]. The PRIMSA checklist guided the definitions for participants, interventions, comparisons, outcomes, and study designs (PICOS) [6]. The participants were literature relating to the value of sport psychology to increase adherence to exercise therapy. The themes generated included: the various sport psychology theories explaining the adherence and/or lack of adherence to the exercise rehabilitation process, and the various sport psychology interventions to improve patient adherence to exercise rehabilitation.

Registration

This review protocol was not registered with the International Prospective Register of Systematic Reviews.

PICO Search Strategy Protocol

Patient/Problem: What is the value of Psychology during exercise rehabilitation?

Intervention: The use of different psychological interventions and/or strategies to increase patient adherence to the rehabilitation process

Comparison: None

Outcome: Psychology plays an important role during the exercise rehabilitation of injured athletes (patients). There are various psychological theories, which can be applied to the exercise rehabilitation process that provides insight into the emotions that the injured athlete is experiencing. Further there are psychological intervention and/or strategies which can be employed during the rehabilitation process to enhance the injured athlete's emotional state, thereby enhance their adherence to the exercise rehabilitation process.

Write out your question: What is the value of Psychology during exercise rehabilitation?

The study design of this review: randomized control trials and experimental research articles

Literature Sources

An electronic inspection of peer-reviewed literature within the search engines of Science Direct (n=521), PubMed (n=73), Web of Science (n=20) and Sabinet (n=202) was instituted for the period of 2000-2020 (Figure 1).

Study Selection Processes

The primary keywords in the literature search were *sport psychology*. The authors instituted the auxiliary keywords, *exercise rehabilitation* and *adherence*. The selection yardstick of literature was accomplished through the three successive phases: title review, abstract review, and then full text review. Literature search was conducted from February 2021 until September 2021. The authors (MVN and TJE) screened the records, adopting the aforesaid three stages thereby gathering a list of records to be synthesized into the commentary. Disagreement in opinion among authors as to the addition or rejection of a record, resulted in the authors examining the record in question based on the implementation of the inclusion and exclusion criteria.

Inclusion criteria

Participants were academic literature relating to the value of sport psychology to rehabilitation adherence. The authors reviewed all literature related to sport psychology exercise rehabilitation adherence. Records describing the importance of sport psychology to exercise rehabilitation was only included. The authors selected the period of 2010 to 2020 to ensure the newest literature was synthesized into this commentary.

Exclusion criteria

Records preceding the year 2010 relating to the relationship between sport psychology and exercise rehabilitation, literature exclusively describing psychological rehabilitation, literature exclusively describing exercise rehabilitation and non-English papers were rejected. The authors' primary objective was to synthesis literature describing how sport psychological theories and interventions can increase injured athletes' adherence to rehabilitation.

One search

Authors completed a search in the Science Direct database under the categorization Medicine and Health. The preliminary search words used were "*sport psychology*" followed by "*exercise rehabilitation adherence*" and this search yielded 521 records. The 521 records were divided into Psychology of Sport and Exercise (n=49), Archives of Physical Medicine and Rehabilitation (n=47), Review articles (n=67), research articles (n=259), encyclopaedia (n=33), book chapters (n=125) and Clinical Psychology Review (n=30).

Title review identified seven relevant papers, which led to abstract review, yielding five relevant studies. These five studies underwent a full text review, which resulted in them being synthesized into the review (Figure 1).

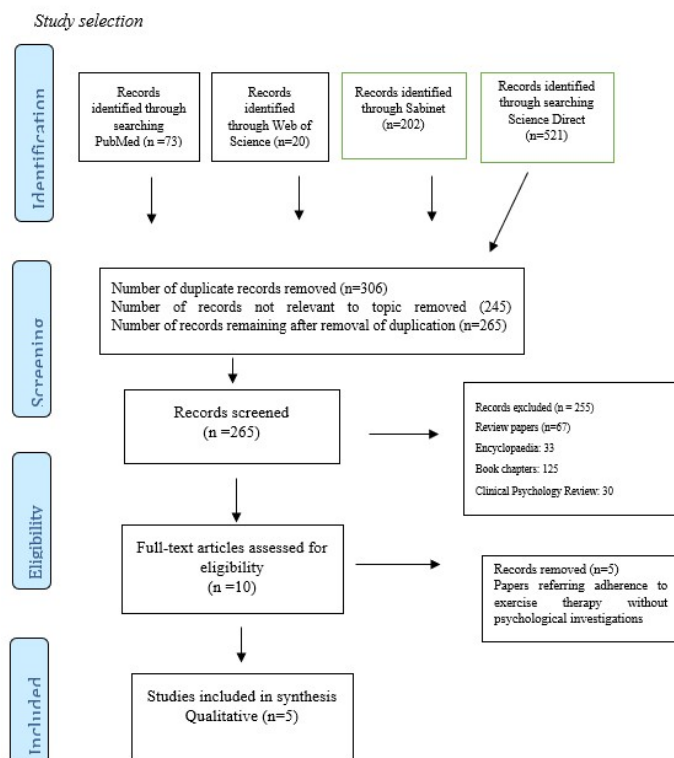


Figure 1. Conceptualisation of the review process (Figure adapted from [5])

Valuation of Records

Records were evaluated based on their suitability of the title and compliance with the aforementioned inclusion criteria. The value of each record was reviewed by adopting a modified Downs and Black Appraisal Scale, which examines the merit of randomized controlled trials and non-randomised papers (Downs & Black, 1998) (Table 1). The modified Downs and Black Appraisal Scale was implemented as not all the questions on the original checklist were related to this study as underlined by (Grober *et al.* (2007). These practices were employed to avoid any researcher prejudice. The modified checklist comprises eight questions with a maximum of eight points. A score of either 0 (no) or 1 (yes) were given for each answer. The questions adopted from the modified Downs and Black Appraisal Scale were 1, 2, 3, 6, 11, 12, 20, and 27. These questions are classified into four sections, which evaluate the whole merit of each record (Table 2). The classification considered the reporting prowess (n= 4 questions), external validity (n= 2 questions), internal validity (n= 1 question), and power of significance (n= 1 question) of each publication (Downs & Blacks, 1998). All authors were permitted to question the scoring of each record, which then lead to a discussion on the scoring. This process facilitated a mutually accepted score. The accumulative score of each record was subsequently converted into a percentage thereby appraising the overall merit of the individual records (Downs & Black, 1998). The overall merits of the records were further classified into the following scale: < 50% (weak), 50-69% (fair), 70-79% (good) and <80% (very good) (Downs & Black, 1998). The mean rating of the selected papers was 80.0% (very good).

Table 1. The questions modified Downs and Black Appraisal Scale (adapted from Downs and Black, 1998)

Question	Yes (Score =1)	No (score =2)
REPORTING		
1. Is the hypothesis/aim/objective clearly described?		
2. Are the main outcomes to be measured clearly described in the Introduction or Methods sections?		
3. Are the characteristics of the patients included in the study clearly described?		
6. Are the main findings of the study clearly described?		
EXTERNAL VALIDITY		
11. Were the subjects asked to participate in the study representative of the entire population from which they were recruited?		
12. Were those subjects who were prepared to participate representative of the entire population from which they were recruited?		
INTERNAL VALIDITY BIAS		
20. Were the main outcomes measures used accurately? (Validity and reliability)		
POWER OF SIGNIFICANCE		
27. Did the study have sufficient power to detect clinically important effect		

Table 2: Evaluation of records pertaining to application of sport psychology to increase patient adherence to exercise rehabilitation (n=5)

Authors	Modified Downs and Black Appraisal Scale					
	Reporting (n=4)	External Validity (n=2)	Internal Validity (n=1)	Power (n=1)	Total (n=8)	Grading % = $x/8 \times 100$
Malherbe et al. (2003) [7]	4	2	1	1	8	100
Harding & Williams (2009) [8]	2	0	1	1	4	50
Fleig et al. (2011) [9]	4	2	1	1	8	100
Santi & Pietrantoni (2013) [10]	3	0	1	1	5	62.5
Zielinski (2018) [11]	4	1	1	1	7	87.5

Results

Results are described in Table 3.

Table 3. Chronological description of records associating sport psychology to increase patient adherence to exercise rehabilitation

Author/s	Aims	Methods	Conclusion
Malherbe et al. (2003) [7]	This study evaluated the value of Bandura's self-efficacy theory to predict exercise adherence.	Newly enrolled members of a health and wellness gymnasium was assessed on a Physical Self-Efficacy Scale, an Adherence Efficacy Scale, and an Outcome Expectancy Scale. The dependent variable, was the exercise adherence, which was assessed by monitoring the intended and actual frequency of attendance to the gymnasium.	Physical self-efficacy was an important predictor of exercise adherence for the cohort, confirming Bandura's self-efficacy theory.
Harding & Williams (2009) [8]	To examine the value of the cognitive behavioural psychological approach to enhance the success of physiotherapy.	The paper described the flaws of the traditional medical model adopted by most physiotherapists. The cognitive-behavioural psychological approach is presented as an alternative interdisciplinary therapeutic approach to increase the success of the physiotherapy.	The cognitive-behavioural approach does address the emotional challenges that the patient undergoes during the exercise rehabilitation process.
Fleig et al. (2011) [9]	How does the exercise rehabilitation experience influence the patient's adherence to habitual exercise post rehabilitation	At the beginning and at the end of cardiac and orthopaedic rehabilitation, 248 patients filled in a computer-based questionnaire assessing exercise experiences, satisfaction, planning, and behaviour.	Evidence contends that focusing on patient's experiences during rehabilitation influence their exercise adherence post rehabilitation.
Santi & Pietrantonio (2013) [10]	The aim of the paper was to provide an accurate account of the psychology strategies that an exercise therapist can adopt during sport injury rehabilitation	Initially the rationale of the pertinent theoretical psychological approaches relating to sport injury rehabilitation is presented. Using this foundation, then the potential psychological strategies, which can positively impact the outcome of sport injury physiotherapy is presented.	The paper highlights the value of psychological strategies that would improve sport injury physiotherapy
Zielinski (2018) [11]	The central aim was to identify how physical therapy (physiotherapy) influences an injured athlete's decision to return to play and exercise.	Eleven studies were reviewed, comprising of 983 athletes, who experienced various psychological challenges. Psychological factors such as motivation, self-confidence, anxiety and the rapport between the injured athlete and physiotherapist significantly influences their return to sport and exercise post physiotherapy.	The relationship between the injured athlete and the physiotherapist has great influence over whether the athlete returns to sport and exercise. Motivation, self-confidence, and low anxiety aided in the successful return to sport and exercise post physiotherapy.

Discussion

The discussion will comprise of the various psychological models that can be employed to understand the emotional stress that the injured athlete is experiencing during the rehabilitation process. Thereafter the discussion moves to the psychological strategies that can be used to help the injured athlete during the rehabilitation process. Finally, the sub-section on the interdisciplinary team approach during final phase injury rehabilitation describes the value of the interaction of sport psychologists and exercise therapists during rehabilitation.

Psychological Models for Sport Injury Rehabilitation

There are numerous psychological models which have been proposed to enhance the rehabilitation process following injury, disease and/or disability. These models include the biopsychosocial (Brewer, 2009), cognitive appraisal and the stage model [9]. The subsequent sections will review the aforementioned psychological models illustrating their therapeutic value to the rehabilitation process.

(i) The Biopsychosocial Model

The biopsychosocial model is composed by several categories, which include, socio-demographic, injury, biological, social, psychological, the intermediary between the biological and psychological influences and injury rehabilitation process. The socio-demographics include the patient's age, ethnicity, gender, and socio-economic status. These socio-demographic factors has an influence on the patient's physiological (biological), psychological, and their common biopsychosocial intermediary [9]. The injury profile includes the anatomical site, type of injury (muscle, ligament, nerve, and bone), pathomechanism and/or pathophysiology of injury (aetiology). The injury profile also included the patient's injury history, which explores the patient's previous injury history and exercise and/or training history. The intermediary influence of the neuro-musculoskeletal injury impacts the progression of the rehabilitation process, which includes functional performance, readiness to return to sport and recreational exercise and physical activity and quality of life after injury. A fundamental element in this model is the reciprocal relationship with biological (physiological and anatomical) and psychosocial factors, which impacts the common intermediary influencing the rehabilitation process [9].

(ii) The Cognitive Appraisal Models

The original cognitive appraisal models proposed by [12] examined the detailed psychological associations and emphasized how cognition plays a fundamental role in influencing the person's reactions to the injury, pathology, and disability. [12] proposed that the patient's personal and situational factors affect their cognitive appraisal. The cognitive appraisal provides an explanation of the patient's emotional response, such as anger to the injury, anxiety to re-injury and depression. These emotions affect the patient's behaviour, which ultimately influences their adherence to the rehabilitation process. Weise-Bjornstal et al (1998) revised this model and subsequently proposed the integrated model of psychological response to the sport injury and rehabilitation process. The integrated cognitive appraisal model includes the patient's personality, which influences the final rehabilitation outcome (Weise-Bjornstal et al., 1998).

(iii) Stage Models

The stage models provide a succession of emotions and attitudes occurring following sport injury that explains the various psychological stages of rehabilitation. [13] proposed one of the initial clinical psychological stage models. This model stages considers the emotions experienced by the patient when injured: denial, anger, bargaining, depression, and acceptance [13]. Sport injury rehabilitation research has not found evidence to corroborate this model (Brewer, 2007). As such [14] have proposed a revised model, which proposes three emotional responses to injury and disease (denial, distress, and coping). This model is known as the "*affective cycle of injury*" [14]. In the denial stage the person may refuse to accept the injury, or its severity and its consequences on their life, which can negatively influence rehabilitation adherence. This model distinguishes between positive thoughts from emotional denial of the pathology. The exercise therapist may forecast a return to sport in 18 months, but the patient proposes 12 months. In this scenario the patient is not denying the injury but displaying positive thought (self-confidence) to complete recovery. Emotional denial generally is observed during the initial stages of rehabilitation, straightaway after injury. [14] recommend that if emotional denial continues during the later stages of rehabilitation, inhibiting the success of rehabilitation, psychological intervention is needed. Distress is manifested as anger, depression, fear, and helplessness. Distress is commonly experienced during the initial stages of the rehabilitation process but can be evident in later stages. Exercise therapist can use

emotional distress to establish a rapport based on trust. Determined coping stage is evident when the patient has progressed beyond denial and distress. The hallmark events of this stage involve evaluating resources, setting realistic rehabilitation goals (muscle strength, endurance, flexibility and aerobic improvements with specific time frames), and preserving adherence to the rehabilitation process. A hallmark characteristic of this model is its flexibility because it does not provide a predetermined sequence when it may occur.

(iv) Motivation-based Models

Motivation is an essential component of the rehabilitation process, which secures patient adherence facilitating successful attainment of rehabilitation goals [15,16]. Exercise therapist should unconsciously apply the following motivational models: self-determination theory [17] and trans-contextual model [14].

Self-determination model contends that human behaviours are continuously intrinsically motivated and demotivated [17]. Human behaviour is externally motivated and/or demotivated by external regulation, identified regulation, introjected regulation and integrated regulation. External regulation involves positive and/or negative reinforcement. It is important for the exercise therapist to positively reinforce behaviour and attainment of minor rehabilitation goals to increase patient motivation leading to rehabilitation adherence. Introjected regulation is a motivation of human behaviour, which has been partially, but not entirely internalised (for example the injured athlete is adhering to the rehabilitation programme to avoid feeling guilty for not doing it) [17]. Identified regulation refers to patient's volunteer selection (free choice). Integrated regulation is assimilated human behaviour involving needs or values as part of the patient's personal identity. Another characteristic of self-determination is the patient's intrinsic motivated (regulated) behaviour, which is characterized by internal gratification of participation in sport and physical activity. This type of motivation is observed when a patient is eager to return to sport, exercise, and physical activity because they really enjoy it.

Self-determination model proposes the idea that the self-directed motivated behaviour is encouraged by the patient's needs for autonomy, competence, and relatedness. Autonomy is the desire to be in control of events. The patient may consider that successful recovery is based on their individual behaviour, which motivates rehabilitation adherence. Competence can be defined as an individual's sense of efficacy in regard to a specific action, behaviour and/or motor skill. The injured athlete wants to recover to pre-injury sport performance status, which motivates the patient to adhere to the rehabilitation process. Relatedness is considered to be the amount of assimilation of the patient within their social environment. Patient may experience a sense of segregation from his/her teammates and training partners. This emotional segregation intrinsically motivates the patient to adhere to the rehabilitation process to quickly return to practice. Conversely, it may increase feelings of alienation, which the exercise therapist must be alert to identify.

Trans-contextual model proposes that motivation is transportable from a situation to another one [18]. The trans-contextual model is a derivative of Vallerand's hierarchical model of motivation [19]. [19] identified three levels of transferability: specific, contextual, and global. In the specific level, the injured athlete's self-directed motivation augments their adherence to the rehabilitation process. The injured athlete may consider that by properly executing the rehabilitation exercises as an opportunity for a quicker return to sport, exercise, and physical activity. This motivates strong adherence to the rehabilitation process. The contextual level involves the interaction of social agents influence on the injured athlete's perception and behaviour. If injured athlete perceives genuine sincere support from the exercise therapist, this may increase the athlete's self-directed motivation and adherence to the rehabilitation process. At the global level, the causality orientation of an injured athlete governs their motivation. The internal locus of control governs the injured athlete's self-directed motivation and their perception of sincere support received from the exercise therapist [16,15,9].

Psychological Interventions

The aforementioned theoretical models serve to provide a detailed understanding of the various factors influencing the injured athlete's participation in the rehabilitation process. This knowledge is used to apply the following strategies to help patients be successfully rehabilitated. There are a variety of psychological interventions, which can be employed during the rehabilitation process to ensure successful re-entry of the athlete to exercise, physical activity and competitive sport. These psychological interventions include goal setting, educational interventions, self-talk, imagery, social support, and biofeedback. This knowledge must lead the exercise therapist to implement the following psychological strategies or alternately refer the injured athlete to a sport psychologist.

Educational interventions

Education increases the injured athlete's mindfulness of their pathological and social context. Many injured athletes do not have a clear perception of the holistic rehabilitation process, which produces demotivation and poor adherence to the rehabilitation process [14]. Injured athletes who have a clear understanding of the rehabilitation process are able to set realistic rehabilitation goals and reduce anxiety and demotivation [20]. Education involves a clear and simple description of the pathophysiology, pathomechanics, injured anatomical sites, physiological and kinesiological dysfunction, injury symptoms (muscle soreness, increased nerve sensitivity or decreased nerve sensitivity), injury signs (inflammation, discolouration, abnormal gait) and the ill side effects of excessive pharmaceutical medication [21]. Injured athletes should also be counselled on elevated levels of depression, anger, mood swings and frustration. It is of paramount importance that the injured athlete understands their role, as well as the role of the exercise therapist, sport psychologist, medical physician, coach, exercise scientist, family, and friends in the rehabilitation process [14,9].

Goal setting interventions

The establishment of rehabilitation goals increases the injured athlete's confidence and rapport with their self-directed motivation and commitment to the rehabilitation process [22, 23]. [24, 25] concurred that goal settings strategies have been positively associated with the successful return of injured athletes to physical activity, exercise, and sport. [26] proposed that the goal setting must be specific, measurable, objective, realistic and time related. The goal setting process must incorporate input from the injured athlete, physician, physiotherapist, exercise therapist, sport psychologist, exercise scientist and sport coach, in an attempt to satisfy the needs of all concerned [27]. It is imperative to include both short-term and long-term goals, to provide a holistic but clear picture of the rehabilitation process. Goal setting gratifies the athlete, coach, and exercise therapist's mutual desire to manage the athlete's return to sport, avoiding impractical over-expectations [27, 28] proposed that goal setting is an effective technique to reduce the injured athlete's anxiety and increase adherence to the rehabilitation process. It is also important for the athlete, coach, exercise scientist and sport psychologist to set new goals once the athlete has returned to sport to avoid unrealistic expectations to achieve. This interdisciplinary rehabilitation approach reduces the anxiety and helps the athlete to return to pre-injury and/or optimal sporting performance.

Imagery

Imagery is a popular sport psychology intervention, which has tremendous value in sport [29]. Imagery is stratified into several classifications, which include perspective (external vs. internal) and types of sensations (kinaesthetic, visual, auditory, and olfactory). Injured athletes are requested to visualize themselves performing successfully from an external perspective (as a spectator). Injured athletes are also taught to visualize their kinematics from their own eyes when performing a motor skill (internal perspective). Visual imagery denotes to observable information, while auditory refers to sounds. Kinaesthetic imagery denotes the athlete's proprioceptive memory, blood pressure and pulse [30]. Imagery can be employed for both sport performance enhancement, as well as rehabilitation [31]. The use of positive imagery can help increase the injured athlete's confidence and

help the athlete to remain relaxed and be less tense.

Self-talk-based interventions

This psychological intervention involves positive thinking, cognitive restructuring of negative thoughts and persistent self-monitoring [32]. Cognitive interventions post sport injury, involves the expression of one's emotions about their injury, consequences of the injury to their athletic and academic career, finances and social environment. During this time the sport psychologist adopts supplementary psychological interventions to self-talk such as active listening, clarification, and reflection. Cognitive interventions also identify negative thoughts concerning the injury and its consequence on their life. A difficult component of cognitive intervention is persuading the injured athlete to find positive aspects of the injury, which could be used to transform the negative emotions into positivity. Injured athletes are often encouraged to identify positive thoughts and write them on a paper, which they read to the sport psychologist, and after practice repeat these statements to themselves [32].

Interdisciplinary approach

The interdisciplinary approach to manage athletic injuries involves a multidisciplinary team that includes the injured athlete, sport medical physician, physiotherapist, exercise therapist, sport psychologist, coach, exercise scientist and family and friends. In the interdisciplinary medical strategy, there's an overlay in practice among the clinicians towards a shared goal within the singular amalgamated management plan. As opposed to the multidisciplinary approach, each clinician builds on the other's proficiency to achieve shared success [33]. [22, 18] contends that involvement of the multidisciplinary support team increases the injured athlete's self-confidence and adherence to the rehabilitation process. It is of paramount importance that sport medical physician, physiotherapist, exercise therapist, sport psychologist, coach, exercise scientist and nutritionist understand, appreciate, and respect each other's role in supporting the athlete to complete successful recovery. The exercise therapist form close bonds with the injured athlete, who must understand the pivot role that they play in the physiological and psychological recovery of the injured athlete. Therefore, it is fundamental that interdisciplinary sport rehabilitation education is provided at tertiary education [34, 35].

Conclusion

This communication presented literature stressing the value of Sport Psychology to the athletic injury rehabilitation process. Psychological strategies help the exercise therapist to gain a better understanding of the emotional challenges that the athlete is experiencing during the rehabilitation process. This communication aims to increase the exercise therapist's understanding and appreciation of Sport Psychology during the rehabilitation phase. The authors are of the opinion that a stronger presence of Sport Psychology is needed in the educational curriculum. This stronger presence will broaden the perspective of prospective exercise therapist to appreciate the emotional challenges the patient is undergoing during the athletic injury rehabilitation process.

References

1. ADLING RB (2017) Importance of Sports Psychology in Physical Education and Sports. *International Journal of Yoga, Physiotherapy and Physical Education*, 2: 215-18.
2. WEINBERG R, GOULD D (2017) *Foundation of Sport and Exercise Psychology (7th Edition)*. Human Kinetics.
3. NAOI A, OSTROW A (2008) The effects of cognitive and relaxations interventions on injured athletes' mood and pain during rehabilitation. *The Online Journal of Sport Psychology*, 10.
4. PAUL Y, SWANEPOEL M, ELLAPEN TJ, STRYDOM GL, WILDERS C (2018). International comparability of health professions: Bridging the gap between Biokinetics and Kinesiotherapy. *African Journal for Physical Activity and Health Sciences*, 24: 370-83.
5. MOHER D, LIBERATI A, TETZLAFF J, ALTMAN DG (2009) 'Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement', *PLoS Med* 6: e1000097.
6. MILLER SA (2001) PICO worksheet and search strategy, US National Centre for Dental Hygiene Research.
7. MALHERBE DG, STEEL HR, THERON WH (2003) The contribution of self-efficacy and outcome expectations in the prediction of exercise adherence. *South African Journal for Research in Sport, Physical Education and Recreation* 25, (1): 71-82
8. HARDIN V & WILLIAMS, C (2009) Applying Psychology to enhance Physiotherapy Outcomes. *Physiotherapy and Practice*.
9. FLEIG L, LIPPKE S, POMP S, SCHWARZER R (2011) Exercise maintenance after rehabilitation: How experience can make a difference. *Psychology of Sport and Exercise*, 12: 293-99.
10. SANTI G, PIETRANTONI L (2013) Psychology of sport injury rehabilitation: a review of models and interventions. *Journal of Human Sport and Exercise*, 8: 1029-44.
11. ZIELINSKI J (2018) The Impact of Physical Therapy on an Athletes Decision to Return to Sport. Bridge Water State University. Published thesis. United States of America.
12. BREWER BW (1994) Review and critique of models of psychological adjustment to athletic injury. *Journal of Applied Sport Psychology*, 6: 87-100.
13. KUBLER-ROSS E (1969) *On Death and Dying*. London: Routledge.
14. O'CONNOR E, HEIL J, HARMER P, ZIMMERMAN I (2005) Injury. In J. Taylor, & G. Wilson (Eds.), *Applying Sport Psychology*. Champaign, IL: Human Kinetics.
15. CHAN DKC, HAGGER MS, SPRAY CM (2011). Treatment motivation for rehabilitation after a sport injury: application of the trans-contextual model. *Psychology of Sport and Exercise*, 12: 83-92.
16. PODLOG L, EKLUND RC (2007) The psychosocial aspects of a return to sport following serious injury: A review of the literature from a self-determination perspective. *Psychology of Sport and Exercise*, 8: 535-66.
17. RYAN R, DECI EL (2000) Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychology*, 55: 68-78.

18. HAGGER MS, CHATZISARANTIS NLD, BARKOUKIS V, WANG CKJ, BARANOWSKI J (2005) Perceived autonomy support in physical education and leisure-time physical activity: a cross-cultural evaluation of the trans-contextual model. *Journal of Educational Psychology*, 97: 376-90
19. VALLERAND RJ (2000) Deci and Ryan's self-determination theory: a view from the hierarchical model of intrinsic and extrinsic motivation. *Psychology Inquiry*, 11:312-18.
20. FRANCIS SR, ANDERSEN MB, MALEY P (2000) Physiotherapists' and male professional athletes' views on psychological skills for rehabilitation. *Journal of Science and Medicine in Sport*, 3: 17-29.
21. TAYLOR J, TAYLOR S (1998) Pain education and management in the rehabilitation from sports injury. *Sport Psychology*, 12: 68-88.
22. Arvinen-Barrow M, Penny G, Hemmings B, Corr S (2010). UK chartered physiotherapists' personal experiences in using psychological interventions with injured athletes: an interpretative phenomenological analysis, *Psychology of Sport and Exercise*, 11(1), pp.58-66.
23. FILBY WCD, MAYNARD IW, GRAYDON JK (1999) The effect of multiple-goal strategies on performance outcomes in training and competition. *Journal of Applied Sport Psychology*, 11: 230-46.
24. HAMSON-UTLEY JJ, VAZQUEZ L (2008) The comeback: Rehabilitating the psychological injury. *Athletic Therapy Today*, 13: 35-8.
25. VITALE F (2011) Recupero e prevenzione dell'infornio sportivo: una ricerca sul contributo della pratica mentale (imagery). *Giornale Italiano di Psicologia dello Sport*, 10: 42-7.
26. WEINBERG (2009). Motivation. In BW Brewer (Ed.), *Sport Psychology*. Chichester, UK: Wiley-Blackwell.
27. PODLOG, L. & EKLUND, R.C. (2009). High-level athletes' perceptions of success in returning to sport following injury. *Psychology of Sport and Exercise*, 10: 535-44
28. CARSON F, POLMAN R (2012) Experiences of professional rugby union players returning to competition following anterior cruciate ligament reconstruction. *Physical Therapy in Sport*, 13: 35-40.
29. OLMEDILLA A, ORTEGA E, ABENZA L, BOLADERAS A (2011) Lesiones deportivas y psicología: una revisión (2000-2009). *Cuadernos de Psicología del Deporte*, 11: 45-57.
30. HALE BD, SEISER L, MCGUIRE EJ, WEINRICH E (2005) Mental Imagery. In J. Taylor, & G. Wilson (Eds.), *Applying Sport Psychology*. Champaign, IL: Human Kinetics.
31. WEINBERG R, GOULD D (2011) Imagery. In R. Weinberg and D. Gould (Eds.) *Foundations of sport and exercise psychology* (5th ed.) Champaign, IL: Human Kinetics.
32. PODLOG L, DIMMOCK J, MILLER (2011). A review of return to sport concerns following injury rehabilitation: Practitioner strategies for enhancing recovery outcomes. *Physical Therapy in Sport*, 12: 36-42
33. JORDAAN A, ELLAPEN TJ, SWANEPOEL M, PAUL Y (2021) The Interprofessional Clinical and Therapeutic Team Strategy to manage Spinal Cord Injuries, in *Spinal Cord Injuries and Physical Therapy*. InTech Publishers.

34. FORD IW, GORDON S (1993) Social support and athletic injury: the perspective of sport physiotherapists. *Australian Journal of Science and Medicine in Sport* 25: 17-25
35. GORDON S, POTTER M, FORD IW (1998) Toward a psychoeducational curriculum for training sport-injury rehabilitation personnel. *Journal of Applied Sport Psychology*, 10: 140-56
36. RYAN AJ (1984) Lessons from the past. In H.M. Eckert & H.J. Montoye (Eds.), *Exercise and health: The American Academy of Physical Education*, Champaign, IL: Human Kinetics 17: 3.