

An investigation of osteopaths' attitudes and self-reported practices towards psychosocial
content in sports-injury rehabilitation

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Introduction to Thesis

Sports-injuries affect an individual physically, emotionally and socially (Edmonds & Dengerink, 2014; Erickson & Sherry, 2017; James et al., 2014) and can lead to the development of various negative psychosocial responses within an athlete, such as anxiety and fear of re-injury (Arvinen-Barrow et al., 2014; Crossman & Gayman, 2003; Evans et al., 2012; Gouttebauge et al., 2019). Negative psychosocial responses may be linked to lower levels of rehabilitation adherence and readiness to return to play, thus, influencing the recovery (Chan et al., 2017; Niven, 2007; Wiese-Bjornstal, 2010). Research has shown that medical professionals, such as physical therapists, are able to address negative psychosocial responses by utilising psychosocial interventions, which in turn, allow for a faster return to sport and positive rehabilitation outcomes to be achieved (Clement et al., 2013; Eccleston, 2001; Heaney et al., 2017; L. Schwab Reese et al., 2012; Tracey, 2008).

However, despite research supporting the use of psychosocial interventions, a number of studies have shown that healthcare professionals feel inadequately equipped to provide sufficient psychosocial support (Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017). Therefore, patients may not be receiving the most beneficial management for their injury, which could limit the extent of positive rehabilitation outcomes (Driver et al., 2019; L. M. Schwab Reese et al., 2012). While there has been increasing interest in exploring the perceptions of athletic trainers and physiotherapists in the area of psychosocial support for sports-injury rehabilitation (Clement et al., 2013; Larson et al., 1996), to date, there have been no studies investigating osteopaths' perceptions. This thesis will therefore provide insight into osteopaths' perceptions of psychosocial content in the rehabilitation of sports-injuries.

This thesis is arranged into four main chapters. Chapter 1 contains a literature review that outlines the psychosocial components and impacts of sports-injuries, the various psychosocial interventions utilised in sports-injury rehabilitation, a medical professionals' role in sports-injury rehabilitation and their attitudes and practices. The impact of sport psychology education on medical professionals, the current psychosocial education within osteopathy, and the Athletic Trainer and Sport Psychology Questionnaire (ATSPQ) is also introduced. Chapter 2 contains a methodology segment that explores the study design and setting, the ATSPQ, and the approaches

used to measure the psychometric properties of the ATSPQ. Chapter 3 contains a manuscript reporting an investigation into osteopaths' attitudes and self-reported practices towards psychosocial content in sports-injury rehabilitation, and is intended for submission to the *Journal of Sport and Health Science*. The aim of the study reported in this manuscript was to examine osteopaths' attitudes and self-reported practices towards psychosocial content in sports-injury rehabilitation via an osteopathic adaptation of the Athletic Trainer and Sport Psychology Questionnaire (ATSPQ), as well as examine internal reliability of the adapted questionnaire. Finally, Chapter 4 contains Appendices in support of the thesis.

Chapter 1: Review of Literature

Introduction to Literature Review

The purpose of this literature review is to provide a written outline of the existing research in the area of the psychosocial factors related to sports-injury, the various known psychosocial interventions and the current position of medical professionals on their attitude towards, and use of, psychosocial interventions in practice.

Sports-Injuries and Psychology

Definition and impact of sports-injury

The term sports-injury involves various types of musculoskeletal damage which can occur following sporting activity (Szabó et al., 2018). A sports-injury occurs due to an exceeding amount of energy being transferred to the body, causing human tissue damage (Baker et al., 1992). Every individual has a set of intrinsic and extrinsic factors that can influence their susceptibility to injury (Meeuwisse et al., 2007). Examples of intrinsic factors are bone strength, neuromuscular control, age, and previous injury history. Examples of extrinsic factors are equipment and environment. Both intrinsic and extrinsic factors can be altered over time, regardless of whether an injury is present or not (Meeuwisse et al., 2007).

Sports-injuries often result in a need for medical advice or treatment, and often lead to a reduction in sporting involvement. This can then lead to indirect economic effects such as loss of productive output or inability to work (Öztürk & Kiliç, 2013). Each year, New Zealand's Accident Compensation Corporation (ACC) receives on average 480,000 sport-related claims (ACC, 2018). In 2017, the most common sport-related injuries in order of prevalence were lumbar sprain, ankle sprain, sprain of the knee and leg, neck sprain, and sprain of the shoulder and upper-arm (ACC, 2018).

Sports-injuries can have devastating consequences that go beyond just affecting an individual physically. The emotional and psychological response can be just as problematic (Annear et al., 2019; Appaneal et al., 2009; Edmonds & Dengerink, 2014; Erickson & Sherry, 2017; James et al., 2014). This is recognised in the biopsychosocial model which is growing in acceptance within modern Western medicine. The term biopsychosocial was first introduced to encompass the physical, psychological and social components of health (Annear et al., 2019). Since then, the biopsychosocial model has become a foundation for various models of health (Borell-Carrió et al., 2004).

Factors affecting sports-injury rehabilitation

Brewer et al. (2002) proposed a model with biological, psychological and social elements, which describes the process of rehabilitation from sports-injury. This model identifies seven components, which are consistent with current research and which may influence the process of rehabilitation and the biopsychosocial responses of the affected athlete. These components are:

(1) injury characteristics; (2) socio-demographic details; (3) biological components, such as the immune system, nutrition, sleep, and metabolism; (4) psychological aspects, such as personality, emotional behaviour, and cognition; (5) social and contextual aspects, such as social relationships, life stressors, and rehabilitation environment; (6) intermediate biopsychological outcomes, such as range of motion, strength, pain, and endurance; and (7) recovery outcomes, such as functional performance, quality of life, satisfaction from treatment, and readiness to return to sport. (Brewer et al., 2002, pp. 41-54)

Based on the components mentioned above, sports-injuries can have potential consequences such as pain, physical impairments, incident flashbacks, missing training and competition, financial insecurity, loss of self-esteem, loss of identity, and loss of independence. Such consequences typically coincide with negative psychosocial responses from the individual such as anxiety, fear of re-injury and low levels of motivation (Bianco et al., 1999; Crossman & Gayman, 2003; Evans et al., 2000; Evans & Hardy, 1995; Gould et al., 1997; Krane et al., 1997; Vergeer, 2006).

It has been suggested that injured athletes experience specific stressors at different stages of their recovery (Bianco et al., 1999; Evans et al., 2012). After the initial injury, stressors such as injury timing, inability to perform, financial demands, and loss of independence may be experienced. This contrasts with stressors experienced during the rehabilitation-recovery process, during which time athletes may experience a lack of progress and setbacks, as well as a risk of re-injury, which may cause further psychological stress (Bianco et al., 1999; Evans et al., 2012). Evans et al. (2012) further suggest that the largest stressors that may be experienced throughout all stages of recovery are missed opportunities, social comparison, and loss of fitness. In line with this, Tracey (2003) interviewed 10 injured athletes and reported that the stressors mentioned previously, develop a negative psychological response within the athletes.

Psychological responses post-injury

The negative psychological responses that injured athletes most often experience are shock, depression, loss, helplessness, denial, anxiety, fear of re-injury, loss of security, loss of identity, low levels of motivation and feelings of frustration and anger (Arvinen-Barrow et al., 2014; Evans et al., 2012; Gouttebauge et al., 2019). Common healthcare providers who are involved in sports-injuries, such as physical therapists, have an important role in recognising these emotions and behaviours in the injured athlete (Clement et al., 2013). Arvinen-Barrow et al. (2007) for example, surveyed 361 physiotherapists and reported that on average, physiotherapists felt that injured athletes were psychologically affected 83% of the time.

The level to which negative psychological responses are experienced can vary between individuals. Kvist et al. (2005) report that 25% of injured athletes did not return to sport post-injury, due to fear of re-injury. This differs from McCullough et al. (2012), who reported that of the athletes who did not return to play, 50% experienced fear of re-injury. This suggests that the level of psychological response is definitely present but may vary greatly between individuals and populations sampled for the purpose of sports-injury studies.

Kamphoff et al. (2013) suggested that athletes commonly go through a three-stage rehabilitation process, where at each stage, the athlete may experience a vast range of psychological responses to injury. According to Kamphoff et al., the three phases of injury are: Injury onset, rehabilitation, and return to sport. In the first phase, the “injury onset phase”, athletes may react in shock, become hysterical, upset and angry. In the second, the “rehabilitation phase”, athletes may become frustrated and adopt a cautious approach to rehabilitation. In the third, the “return to play” phase, athletes generally reflect on their experience, but may have self-doubts regarding their return. Often in this last phase, athletes feel nervous and may experience fear of re-injury (Clement et al., 2015; Evans & Wadey, 2012; Tracey, 2003). Clement et al. (2015) interviewed eight previously injured athletes and reported that although the athletes responded differently to each phase, the one response that remained constant throughout the stages was to seek social support from their significant others and/or their rehabilitator.

Elite vs. recreational athletes

Compared to recreational athletes, elite athletes may experience further stressors and emotional responses to injury such as burnout, body overuse, life event stress, social stress and ethical stress (Murphy & Waddington, 2007). Elite athletes are often faced with the pressure to return to sport by coaches, teammates and other influencers before they are physically ready to return (Murphy & Waddington, 2007). In addition, elite athletes may be more vulnerable to experience depression, anxiety, mental fatigue, and lower self-esteem post-injury than recreational athletes (Leddy et al., 1994). Colvin et al. (2009) reported that after one year post-recovery, recreational athletes were eight times more likely to resume their sport than those at an elite level. This outcome may be due to the potential threat that the fear of re-injury poses to elite athletes (Kvist et al., 2005).

Fear of re-injury

Fear of re-injury is one of the most common emotional responses athletes experience post-injury (Hsu et al., 2017). Fear is defined as the “emotional reaction to a specific, identifiable and immediate threat, such as an injury” (Leeuw et al., 2007, p.77). Fear is the body’s protective

mechanism that initiates the fight or flight response (Leeuw et al., 2007). When the body perceives a stimulus as a potential threat and its likelihood it will induce pain, fear is the response. This results in a compromise of the body's psychophysiological, behavioural and cognitive systems (Leeuw et al., 2007; Lethem et al., 1983; Vlaeyen et al., 2016; Waddell et al., 1993).

The Fear-Avoidance Model suggests that behaviours such as pain-related fear, hypervigilance and eventually avoidance are initiated when pain is negatively interpreted (Leeuw et al., 2007; Lethem et al., 1983; Vlaeyen et al., 2016; Waddell et al., 1993). In addition, an individual's emotional response to injury such as fear, catastrophizing, and avoidance behaviours can influence the pain experience. Therefore, individuals with similar injuries may experience varying levels of pain depending on their emotional response to the injury (Eccleston, 2001; Lethem et al., 1983; Lumley et al., 2011; Vlaeyen et al., 2016; Waddell et al., 1993).

Psychological Responses and Rehabilitation Outcomes

Negative psychological responses within the rehabilitation process may impact rehabilitation rates, decrease an athlete's confidence in their ability and delay the athlete's return to sport (Arvinen-Barrow et al., 2014; Covassin et al., 2015; Forsdyke et al., 2016; Podlog et al., 2011; L. M. Schwab Reese et al., 2012). Keeping athletes motivated throughout the rehabilitation period has also been identified as a challenge (Bejar et al., 2019). Athletes who possess negative psychological responses to injury, such as poor motivation, lack of confidence, lack of understanding about the injury, catastrophizing beliefs, increased levels of stress, fear of re-injury, mood disturbances, and not having goals, have proven to be linked to lower levels of rehabilitation adherence (Chan et al., 2017; Niven, 2007).

Low levels of rehabilitation adherence have been associated with prolonged recovery and a lower chance of return to play (Chan et al., 2017; Niven, 2007; Wiese-Bjornstal, 2010). Therefore, it is essential that rehabilitation interventions be used to influence an athlete's responses to injury, thus, improve adherence rates (Chan et al., 2017; Covassin et al., 2015; Niven, 2007; Podlog et al., 2011). In contrast, athletes who exhibit positive responses to injury, such as a high tolerance to pain, high levels of self-motivation, being organized, taking responsibility for their injury, being

adaptable, educated, confident, tough-minded, and have high self-esteem, have been linked to higher levels of rehabilitation adherence (Niven, 2007; Podlog et al., 2011).

Physical rehabilitation outcomes

Psychological responses also influence the physical functioning and impairments of injured athletes. Responses such as fear of re-injury, and catastrophic thinking lead to decreased physical function (such as decreased range of motion), and increased pain levels (Baez et al., 2020; Chan et al., 2017; Hsu et al., 2017; Quartana et al., 2009; Rodriguez et al., 2019). Fear of re-injury has been associated with kinesiophobia (fear of movement), muscular guarding, altered muscle recruitment and decreased range of motion, leading to an increased likelihood of actual re-injury (Silbernagel et al., 2011; Hartigan et al., 2013; Heil, 1993; Kori et al., 1990; Murphy et al., 2003; Tagesson & Kvist, 2016; Walker et al., 2004; Williams & Andersen, 2008).

In addition to changes in physical functioning, psychosocial responses can influence the repair process. Emotions such as stress, depression, and anger can alter the psychoneuroimmunological pathway, resulting in a slower healing rate (Christian et al., 2007; Gouin et al., 2008; Kiecolt-Glaser et al., 1998; Walburn et al., 2009; Wiese-Bjornstal, 2010). Increased psychological stress levels activate the production of glucocorticoids and catecholamines, which may delay many aspects of the healing process. Furthermore, psychological stress has been linked with a delayed inflammatory response in wound healing (Gouin & Kiecolt-Glaser, 2011; Segerstrom & Miller, 2004). Uncontrolled levels of anger have also been associated with a higher secretion of cortisol, which results in a delayed healing process (Gouin et al., 2008).

Return to play

Finally, an athlete's psychological readiness to return to play can be influenced by high levels of negative emotional and behavioural responses following injury. As discussed previously, these responses impact both rehabilitation adherence and success rates, as well as the physical well-being of an injured athlete. For example, fear of re-injury and low confidence levels in performing well, may result in the athlete reporting lower levels of functional ability, regardless of their actual physical recovery and symptoms, therefore, delaying their return to play (Forsdyke et al., 2016; Hsu et al., 2017).

Addressing the psychosocial responses to a sports-injury could be regarded as critical in preventing negative psychosocial consequences. A faster return to sporting activities may be promoted in this way (L. M. Schwab Reese et al., 2012). To date, a wide variety of psychosocial interventions have been proposed to be useful in rehabilitation from pain generally, as well as in sports-injury rehabilitation specifically (Eccleston, 2001; L. M. Schwab Reese et al., 2012). Furthermore, psychosocial interventions are recommended as adjunct therapies to the main physical treatment regime for injured athletes (L. M. Schwab Reese et al., 2012).

Medical professionals' role in facilitating psychological support

Medical professionals such as athletic trainers, exercise physiologists, physiotherapists, sport therapists, physical therapists, sport-medicine professionals and sport physicians, may utilise psychosocial interventions. However, for many of these professions, psychosocial interventions are not included as part of their core training (Arvinen-Barrow et al., 2014; Crossman, 2012; Hamson-Utley et al., 2008; Heaney et al., 2017; Knuth et al., 2018; Tracey, 2008). If an athlete does not respond to psychosocial interventions, further psychosocial support may be needed (Roberts et al., 2016; Wagman & Khelifa, 1996). Medical professionals need to be aware of the signs suggesting a need for further support and refer to the appropriate professional, such as a counsellor or sport psychologist (Roberts et al., 2016; Wagman & Khelifa, 1996). Hemmings and Povey (2002), found that out of their population of 90 chartered physiotherapists registered in the England Eastern Region, only eight individuals had ever referred an injured athlete for counselling to assist with rehabilitation. This suggests that medical professionals, such as physical therapists,

may not have the tools to identify when further support is needed, thus, athletes may not be receiving the best possible rehabilitation in light of current evidence.

Despite the evidence for a low number of psychological referrals within the medical professions, elite athletes have easier access to a range of medical support services compared to recreational athletes, thus, may experience more psychological support (Annear et al., 2019). Recreational athletes, on the other hand, are more likely to seek support from one medical professional only (Annear et al., 2019). An example showing the differences between elite and recreational athletes is the Sport New Zealand guidelines for athletes (Cottrell, 2018). These guidelines highlight the requirement for elite athletes to be signed-up with an Employee Assistance Programme (EAP). This programme provides anonymous support for employees at their request. This means that services such as counselling and various other forms of support are freely accessible to elite athletes when in need (Cottrell, 2018). This suggests that elite athletes in the New Zealand context may attain more successful rehabilitation outcomes than recreational athletes.

Furthermore, a number of studies suggest that athletic trainers and physiotherapists exhibit low rates of referral to, and have limited access to, a clinical psychologist (Hemmings & Povey, 2002; Larson et al., 1996). Thus, if recreational athletes are more likely to seek support from only one medical professional, they may have a lower chance of being referred to a clinical psychologist if necessary. Especially if the rehabilitation professional they have chosen is ill-equipped to deal with the psychosocial aspects of the athlete's care, success rates may be reduced.

Effective psychosocial rehabilitation interventions

Effective rehabilitation interventions that are based on the action of the coach or medical professional, should include strategies such as keeping the athlete involved with the team, improving social support, creating variety in rehabilitation exercises, using short-term goals, and encouraging effective communication with medical professionals (Clement et al., 2013). Return to play success rates increase when medical professionals use interventions that positively influence the athlete's emotional responses. These strategies include encouraging positive self-

thoughts, as well as the use of mental rehearsal/visualisation, relaxation techniques, reducing depression, reducing stress or anxiety, and enhancing self-confidence. A practitioner could also conduct interventions such as ‘teaching emotional control strategies’, and ‘teaching muscular relaxation techniques’ for self-management tools (Clement et al., 2013).

Of all the psychological interventions listed above, it is suggested that the most commonly used are relaxation, goal-setting and stress management (Schwab Reese et al., 2012). These interventions help to reduce negative rehabilitation outcomes and improve the athlete’s coping skills. Therefore, reducing the athlete’s recovery period, resulting in a faster return to sport (L. Schwab Reese et al., 2012).

Psychosocial Interventions that Influence Psychosocial Reactions to Sports-Injury

As mentioned previously, there are numerous psychosocial interventions that can be utilised throughout the sports-injury rehabilitation process in order to achieve more successful rehabilitation outcomes. In the following section, these strategies will be more closely defined and studies examining their usefulness will be reviewed.

Keeping the athlete involved with the team

The strategy of keeping the athlete involved with the team may play a significant role in an athlete’s successful recovery from a sports-injury, both psychologically and physically (Yang et al., 2014). Keeping the athlete involved with the team can be achieved by getting the coach involved in the rehabilitation process early on, to ensure that the athlete is not alone (Wagman & Khelifa, 1996). Furthermore, the medical professional should encourage the team’s continuous involvement with the athlete to promote the athlete’s sense of importance and contribution to the team (Biggin et al., 2017; Podlog et al., 2011). Athletes receiving this additional support are less likely to experience a decrease in their perceived self-worth (Weinberg & Gould, 2007) and will be less likely to experience loneliness and disconnection from their sport and feelings of isolation

from teammates (Bianco, 2007). This in turn will improve the athlete's motivation levels throughout rehabilitation and allow for a faster return to sport.

Improving social support

In addition to the support that an injured athlete can gain from continuing to be involved with their team, wider social support through an athlete's network of communication can positively influence their self-esteem and self-worth (Ievleva & Orlick, 1991). There is evidence to suggest that having greater social support reduces the incidence of injuries and enhances recovery from injuries (Ievleva & Orlick, 1991). Through the cooperation of family, coaches, peers, sport psychologists, the sport medicine team, or group sessions, social support can be achieved (Ievleva & Orlick, 1991). Social support can either be emotional, instrumental or informational support (Yang et al., 2014). Some examples of these types of support are expressions of love, empathy and trust, providing service to the injured athlete, and providing information, suggestions and advice (Yang et al., 2014). By supporting the injured athlete throughout the rehabilitation process, the athlete will feel less isolated, which in turn, can reduce levels of depression and anxiety (Wagman & Khelifa, 1996; Yang et al., 2014).

Creating variety in rehabilitation exercises

Regardless of the athlete's level of recovery, regular communication between the practitioner and the athlete is necessary to adjust exercise programmes and keep the athlete engaged (Argent et al., 2018; Kraemer et al., 2009). Progressions of exercises are most effective when they take into account the tolerance level of the athlete and their ability to perform certain exercises (Argent et al., 2018; Kraemer et al., 2009). Individuals cope with injury with a variety of emotional and behavioural responses, resulting in varying recovery times (Yang et al., 2014). This indicates a need for individualised exercise prescription (Kraemer et al., 2009). Certain restrictions associated with injury may cause frustration for the athlete, thus, hindering their level of engagement in exercises. To address this, therapists may involve the patient in the forming of their exercise plan, thereby ensuring other activities are included which will enable enjoyment in other areas of the

rehabilitation, hence encouraging positive engagement (Argent et al., 2018; Kraemer et al., 2009). Additionally, educating patients on the reasoning behind the exercise prescription, has been shown to increase the patient's level of appreciation for the importance of adherence (Argent et al., 2018).

Using short-term goals

Goal-setting plays an important role in the successful rehabilitation process. Setting multiple realistic daily goals allows the athlete to continually seek and see progress (Ievleva & Orlick, 1991). It is crucial that an athlete's progress is recorded so the athlete is reminded that they are getting closer to their goals when engaging in their rehabilitation programme (Arvinen-Barrow et al., 2010; Beneka, 2007; Covassin et al., 2015; Evans & Wadey, 2012; Gennarelli et al., 2020). Not only does goal-setting improve the athlete's physical performance and healing rate (Ahern & Lohr, 1997), but it may also result in a reduction of anxiety, an increase in confidence and motivation, increased rehabilitation adherence, and an improved ability to cope with the injury (Arvinen-Barrow et al., 2010; Beneka, 2007; Covassin et al., 2015; Gennarelli et al., 2020). However, it has also been stated that in order for goal-setting to be successful, the athlete needs to play an active role in the process (Arvinen-Barrow et al., 2010). If the athlete is not involved in the process and/or the goals do not align with their desires and motives, the goals are less likely to be accepted by the athlete, and then goal-setting may be ineffective (Arvinen-Barrow et al., 2010; Covassin et al., 2015).

Encouraging effective communication skills

Athletes who have positive interactions with their medical professionals are more likely to have a better rehabilitation experience and in turn, outcomes, than those who do not (Covassin et al., 2015; Crossman, 1997; Evans & Wadey, 2012). The collaboration between the athlete and practitioner influences treatment outcomes such as improvement in symptoms, patient satisfaction and general health status (Pinto et al., 2012). To do this, the practitioner needs to engage the athlete by speaking to them in a relatable language so the athlete understands what is to be expected during the rehabilitation process (Covassin et al., 2015). As well as this, athletes who feel that the medical

professionals are taking an interest in their recovery, are more willing to adhere to the rehabilitation programme (Crossman, 1997; Pinto et al., 2012). This involves the practitioner empathizing with the athlete by actively listening to them (Covassin et al., 2015). Furthermore, it has been shown that communication between the athlete and the medical professional must be effective and genuine in order to enhance patient recall, understanding and adherence to the rehabilitation programme (Crossman, 1997; Evans & Wadey, 2012; King & Hoppe, 2013). This means that the practitioner needs to communicate in a way that is informative, yet easy to understand for the athlete. As well as this, the individual should be given the opportunity to speak and voice concerns or ask questions (Covassin et al., 2015).

Encouraging positive self-thoughts

Self-thoughts can influence the overall well-being and the rate of recovery in injured athletes (Ievleva & Orlick, 1991). Injured athletes often develop negative self-thoughts during the early stages of rehabilitation, involving critical, self-demeaning, self-defeating, counterproductive thoughts (Crossman, 2001). These negative thoughts lower self-esteem and can result in a state of helplessness (Crossman, 2001). Encouraging athletes to exhibit positive self-thoughts rather than negative, can help in directing and motivating the athlete throughout the rehabilitation process by allowing the athlete to focus on the end result and develop self-determination (Crossman, 2001; Wagman & Khelifa, 1996).

Using mental rehearsal/visualisation

Mental imagery is a psychological activity that uses one's perception to mentally simulate physical abilities the athlete does not have or cannot do (Cummings & Williams, 2014; Vines, 1988). Imagery can incorporate the five senses of vision, hearing, smell, touch, and taste (Vines, 1988). In injury rehabilitation, imagery can be used for cognitive, motivational, pain management and healing purposes (Clement et al., 2013; Driediger et al., 2006). Cognitive function involves mental rehearsal of specific skills, various strategies and plans relating to sport. When using cognitive imagery, not only should exercises be completed and rehabilitation be adhered to, but athletes

should imagine overcoming potential setbacks (Miller & Munroe-Chandler, 2019). The motivational function involves the athlete imagining themselves going through the rehabilitation process and achieving a goal such as their treatment goals and making a full recovery (Driediger et al., 2006; Miller & Munroe-Chandler, 2019). Motivational imagery encourages athletes to be confident and to focus throughout each step of the rehabilitation process. This teaches the athlete to control their anxiety and stressors related to their injury, as they can see their end goal becoming a reality (Beneka, 2007; Miller & Munroe-Chandler, 2019; Wagman & Khelifa, 1996).

The pain management function of mental imagery involves the athlete visualising pain associated with the injury, which allows for practice with different coping mechanisms. Throughout this visualisation, the athlete learns how to deal with the pain, distract themselves from the pain, or block the pain (Miller & Munroe-Chandler, 2019). The healing function involves imagining the injured body part healing and regaining its function (Beneka, 2007; Ievleva & Orlick, 1991; Wagman & Khelifa, 1996). This type of imagery has been shown to enhance physiological recovery, reduce perceived pain levels and may provide the athlete with a sense of control over their body (Miller & Munroe-Chandler, 2019; Zach et al., 2018).

Imagery can reduce perceived pain levels by generally lowering an individual's heart rate (Zach et al., 2018). By teaching the athlete and helping them to understand the physiological process of their recovery, this may lead to increased motivation and a positive attitude towards rehabilitation outcomes (Evans & Wadey, 2012). Using the technique of visualisation, the mindset of the athlete can change to a positive outlook, which reduces anxiety and stress, as well as renewing their motivation and belief in the rehabilitation process (Beneka, 2007; Rodriguez et al., 2019). Visualisation may also influence the athlete's physical well-being by decreasing pain levels and promoting healing (Clement et al., 2013; Evans & Wadey, 2012; Rodriguez et al., 2019).

Using relaxation techniques

Relaxation can be defined as a temporary withdrawal from everyday activity in aiming to reduce stress levels (Kaim & Jain, 2016; Wagman & Khelifa, 1996). In sport, relaxation is a term used to

describe a way in which an athlete can manage their psychological well-being. Mental relaxation techniques allow the mind to relax, and in turn, relax the body (Kaim & Jain, 2016; Wagman & Khelifa, 1996). Some of the techniques that may be used are autogenic training, which uses both imagery and body awareness to place the individual into deep relaxation (Audette & Bailey, 2007; Lehrer, 1996), as well as transcendental meditation, which is a self-induced state of “thoughtless awareness” facilitated by a word, sound or phrase repeated silently (Yunesian et al., 2008). Both techniques may allow the individual to reduce their levels of anxiety and to feel more in control of them (Gennarelli et al., 2020; Kaim & Jain, 2016).

Teaching muscular relaxation techniques

Many athletes fear re-injury which influences the amount of muscular tension an athlete holds, thus, increasing sensations of pain (Beneka, 2007). To reduce muscular tension, relaxation techniques such as progressive muscular relaxation technique (PMR), breath control techniques, and passive relaxation can be used (Kaim & Jain, 2016). PMR involves tensing and relaxing individual muscle groups to help develop body awareness and the ability to release muscle tension (Lehrer, 1996). Breathing techniques involve slow breathing, deep breathing, diaphragmatic breathing, and breathing meditation (Covassin et al., 2015; Kaim & Jain, 2016). These breathing techniques enable the athlete to control their levels of pain, as well as their anxiety levels by decreasing muscle tension and facilitating oxygen transport to the injury site for healing (Kaim & Jain, 2016).

Passive relaxation is suited to athletes with low to moderate levels of muscle tension. Instead of tensing and releasing muscle groups, passive relaxation uses deep breathing and imagery to picture the tension as liquid in their muscles and with every deep breath, the liquid draining away (Kaim & Jain, 2016). Changes such as decreases in heart rate, respiration rate, and blood pressure have been demonstrated as a result of relaxation techniques (Beneka, 2007). These physiological changes notably influence the rate at which the body heals itself, and copes with pain by altering the amount of hormone production within the body (Beneka, 2007). Furthermore, relaxation has been found to allow athletes to alleviate, control and cope with pain, and also control levels of

anxiety (Covassin et al., 2015; Kaim & Jain, 2016). Following relaxation, athletes' self-confidence and concentration levels have been shown to be enhanced, and a decrease in muscle tension and lowered levels of anxiety and stress are common (Ahern & Lohr, 1997; Parnabas et al., 2014).

Teaching emotional control strategies and reducing depression

Mood disorders can negatively influence an athlete's perceived progress throughout rehabilitation (Smith, 1996). Mood disorders can be defined as a psychological and/or behavioural problem that negatively influences the thoughts of an individual (Kaplan & Saddock, 1998). Common mood disorders are depression, anxiety disorder, and bipolar disorder (Baek, 2014). Being affected by a mood disorder can negatively affect rehabilitation adherence rates of athletes, as well as their rehabilitation success rate (Sáez De Heredia et al., 2004; Smith, 1996). For example, there may be a lower chance of returning to pre-injury levels of functionality as a result of depression (Gouttebauge et al., 2019; Richmond et al., 2009).

Athletes experiencing negative, self-defeating thoughts may be able to be taught to control thoughts by replacing the negative thoughts with positive thoughts (McKay & Tryon, 2017; Wagman & Khelifa, 1996). An example of this is replacing unproductive thinking patterns that may contribute to psychological distress with acceptance and change-oriented skills (McKay & Tryon, 2017). The therapist may, for example, point out to the athlete that the injury has allowed the athlete time to rest and catch up on other important aspects of life that have been neglected (Wagman & Khelifa, 1996). Further, it may be beneficial to the athlete to focus on re-evaluating priorities and enjoying the absence of constant training and competition pressures during time of injury (McKay & Tryon, 2017; Wagman & Khelifa, 1996).

Dysphoria is an emotional state that injured athletes commonly find themselves in. Dysphoria can be described as feeling uneasy, unhappy or dissatisfied for prolonged periods of time (Webster, 2019). Dysphoria must not be mistaken for depression, which is a common mood disorder that influences the amount of engagement a person may have in their normal activities and their ability to enjoy them (Richmond et al., 2009). Athletes who experience dysphoria, may also experience

depression, which is commonly characterised by emotions such as sadness, and distress, of which are also related to dysphoria (Kovacs & Yaroslavsky, 2014). Individuals experiencing depression when injured, may have difficulty in reducing these dysphoric emotions, thus, worsening their depressive state (Kovacs & Yaroslavsky, 2014).

Reducing stress or anxiety

A high level of stress can influence an athlete's rehabilitation process by narrowing their attention, causing distraction, and increasing their pain levels (Beneka, 2007; Covassin et al., 2015; Ievleva & Orlick, 1991). Therefore, it is essential that the therapist educates the athlete on what to expect in terms of their mobility and pain levels, as well as the expected components of the rehabilitation process and the rehabilitation time-frame. Furthermore, the therapist needs to support the athlete through any potential distractions to allow them to focus on the task at hand (Beneka, 2007).

Enhancing self-confidence

Confidence training starts by making the patient aware of their ability to choose confidence over being hesitant (de la Vega et al., 2017; Wagman & Khelifa, 1996). Confidence is the feeling of having power, regardless of the current situation (Ievleva & Orlick, 1991). One way of building an athletes' self-confidence is encouraging positive self-talk. Self-talk is an "internal dialogue" that athletes engage in to determine their interpretation of the situation, thus, their physical and psychological reaction to it (Ievleva & Orlick, 1991).

Encouraging the athlete to establish positive self-talk and remove any negative self-talk, is essential for the athlete to maintain motivation and to keep focus and confidence in the rehabilitation process. With confidence comes sustained effort to continue with the rehabilitation programme (Beneka, 2007; Evans & Wadey, 2012; Gennarelli et al., 2020; Ievleva & Orlick, 1991). A way in which positive self-talk can be carried out is by reading or verbalising a statement such as "I am getting stronger every day" (Ievleva & Orlick, 1991). A statement such as this allows the athlete to think positively about themselves and their recovery (Ievleva & Orlick, 1991).

Weinberg and Gould (2007) suggests that self-talk ensures bad habits are broken, action is initiated, effort is sustained, and new skills are acquired.

Beneka (2007) found that an athlete's negative attitude, feelings of anger, confusion, depression, fear and frustration, can disrupt the rehabilitation process. A positive attitude can decrease the rehabilitation time compared to a negative attitude (Ievleva & Orlick, 1991; Naseem & Khalid, 2010). Therefore, athletes need to be aware that their recovery depends on their positive attitude. One way that an athlete can maintain their positive attitude is by positive reinforcement, a similar concept to positive self-talk (Ievleva & Orlick, 1991). Even though the athlete cannot avoid the injury or the rehabilitation process, negative thoughts can be avoided and replaced with positive thoughts (Ievleva & Orlick, 1991). Mankad and Gordon (2010) provide an example of this strategy by which athletes write about their negative thoughts, emotions and feelings related to their injury, allowing the athlete to reflect on their experience of injury and take control of their emotions (Gennarelli et al., 2020; Mankad & Gordon, 2010). This form of positive reinforcement is known as a concept called 'expressive writing', developed by Pennebaker and Beall (1986). The authors conducted a study examining long-term measures of health related to writing about traumatic events (expressive writing) and reported that 'expressive writing' has a long-term benefit in reducing negative emotions and promoting physical health. Therefore, if athletes choose to review their negative experiences and then focus on replacing those with positive aspects of their rehabilitation process, their body may be more likely to respond in a manner that enhances healing (Ievleva & Orlick, 1991; Naseem & Khalid, 2010).

The Importance of Medical Professionals in Sport-Injury Rehabilitation

The combined therapy approach to rehabilitation

Many injured athletes consult various medical professionals for support and management throughout their rehabilitation process (Tracey, 2008). The role of medical professionals in managing an injured athlete could be argued to not only provide physical rehabilitation but also to

provide psychosocial support and management (Tracey, 2008). To make rehabilitation as effective as possible for the athlete, it has been suggested that combined therapy may be the best approach (Momsen et al., 2012). Combined therapy is a team approach involving many medical professionals such as a sport physician, physiotherapist, strength and conditioning coach, a sport psychologist, nutritionist, team coach, and finally, the athlete (Arvinen-Barrow et al., 2010; Crossman, 1997; Dhillon et al., 2017). Combined therapy aligns itself with the biopsychosocial approach to rehabilitation by addressing all aspects of well-being (Arvinen-Barrow et al., 2010; Dhillon et al., 2017).

Using a combined therapy approach allows for psychosocial interventions to be utilised, which may improve how an athlete copes psychologically with their injury throughout the rehabilitation process (L. Schwab Reese et al., 2012). Increased self-efficacy, confidence and self-esteem are some of the positive outcomes associated with combined intervention use (Zakrajsek & Blanton, 2017), as well as reduced anxiety (L. Schwab Reese et al., 2012) and improved general mood of the athlete (Zakrajsek & Blanton, 2017).

It has been argued that in order for the combined therapy approach to be utilised effectively, government programmes need to be introduced and supported. For instance, the 2016 New Zealand Health Strategy discusses the idea of the “one team” theme. This theme identifies the need for integration of services across the health sector and with other agencies to improve the health and well-being outcomes of the New Zealand population (Ministry of Health, 2016). Although the model of combined therapy has been well recognised as the best form of healthcare, often recreational athletes are unaware of this, do not have the funding available and have limited access to these services. Therefore, it is common that athletes seek guidance from one healthcare provider only (Annear et al., 2019).

Physical therapists' role in rehabilitation

A common healthcare provider that injured athletes seek advice and management from are physical therapists (Tracey, 2008). By definition, a physical therapist is a healthcare professional that

optimises the human body's function through hands-on care, exercise prescription and education (American Physical Therapy Association, 2014). Physical therapists have the education and knowledge to make decisions concerning the care of the injured athlete, including providing interventions throughout their rehabilitation process (Cross et al., 2011). The physical therapist evaluates, treats and rehabilitates the athlete, as well as makes decisions related to the injury severity and the return to sport timeline (Cross et al., 2011).

Physical therapists play an important role in both the physical and psychological aspects of sports-injury rehabilitation (Clement et al., 2013). To address the psychosocial aspects, physical therapists are best-suited to build rapport, educate and communicate throughout the stages of rehabilitation. Utilising such tools can influence the level of trust within a patient-practitioner relationship, which also impacts the rehabilitation process (Clement et al., 2013). Out of all the medical providers, physical therapists have been found to spend the most time with the athlete, therefore, it could be argued that they are in the best position to provide support in all areas of the athlete's rehabilitation (Tracey, 2003). Furthermore, it is more likely for a physical therapist who has been providing ongoing care to an athlete, to recognise the absence of an athlete's usual emotions and behaviours and be able to provide psychosocial support, initiate appropriate interventions, and/or refer to other practitioners when necessary (Clement et al., 2013).

To address the physical aspects of a sport-injury, physical therapists design a rehabilitation plan that is reflective of the injury. Throughout the rehabilitation process, the physical therapist alters the volume and intensity, depending on the phase of rehabilitation the athlete is at (Kraemer et al., 2009). Physical therapists' initial role is to manage pain, limit swelling and protect injured tissues (Kraemer et al., 2009). As these tissues begin to heal, physical therapists then also play a role in restoring motion and neuromuscular control of individual muscles and muscle groups (Kraemer et al., 2009; Reiman & Lorenz, 2011). Finally, after control and muscle use has been restored, physical therapists play a further role in restoring balance, reflex control, strength and endurance in the athlete (Kraemer et al., 2009; Reiman & Lorenz, 2011).

Physical therapists also play a significant role in ensuring that injured athletes receive the support necessary to achieve positive rehabilitation outcomes and a successful return to play (Heaney et

al., 2017). In order to achieve these positive outcomes, firstly, a therapeutic environment needs to be created, where the athlete feels safe to trust the practitioner enough to become vulnerable and share what they are physically having difficulty with and their emotional response to these troubles (Tracey, 2003, 2008). There is some evidence to show that athletes may not feel comfortable expressing their feelings to other support people such as their coaches (Tracey, 2008). This may be due to the athlete feeling a high level of pressure placed on them to perform, thus, resulting in hesitation to express their feelings. However, because medical professionals such as physical therapists have the most time with the athletes when away from the sporting arena, and ultimately have the best opportunity to build rapport during rehabilitation, the injured athletes will more likely appreciate feeling heard and acknowledged by these therapists. Furthermore, medical professionals are typically seen as the providers of support and advice for the athletes' recovery, thus, can be perceived to care the most about the athletes feelings. Therefore, athletes are more likely to be vulnerable towards therapists as opposed to those more directly related to play, such as coaches and teammates (Tracey, 2003).

Secondly, a physical therapist's role is to normalise the athlete's responses to injury (Tracey, 2003). Athletes need support and motivation, as well as a reality confirmation on their recovery progress. This allows the athlete and the practitioner to track progress, share expectations and plan goals accordingly. Throughout this process, the practitioner may encourage the athlete to take responsibility for their own recovery (Tracey, 2008). Thus, patient-practitioner communication is important in influencing how the athlete experiences the rehabilitation process (Bejar et al., 2019; Tracey, 2003).

Thirdly, physical therapists have a role in preparing the athlete for a return to play. This involves providing physical, psychological and social support. Once appropriate, physical therapists should reassure the athlete that they are fully recovered and competent enough to return to play, as athletes often have anxiety and fear related to this (Bejar et al., 2019; Zakrajsek & Blanton, 2017). If reassurance is not provided, these fears in the athlete can lead to a decreased likelihood of returning to sport (Tripp et al., 2011). In doing so, physical therapists could be argued to be vital in providing psychosocial support throughout rehabilitation, resulting in positive outcomes. However, many physical therapists are unaware of the important part they play in the realm of psychology in an

athlete's successful return to sport. Physical therapists also commonly feel ill-equipped to deal with the psychosocial aspects of rehabilitation, therefore, leave that aspect to psychologists and other psychological professionals (Driver et al., 2016).

Current Attitudes, Beliefs and Self-Reported Practice of Medical Professionals

As shown in the above section of the present literature review, psychological factors play a significant role in the sports-injury rehabilitation process (Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017). Medical professionals, or more specifically, physical therapists, play an important role in addressing all aspects of an athlete's recovery. As physical therapists are in regular contact with athletes, it has been suggested that it is their job to inform, educate and assist with what the athlete requires (Arvinen-Barrow et al., 2010). Physical therapists who use psychosocial techniques and strategies have been shown to produce more successful outcomes in return to sport (Arvinen-Barrow et al., 2010).

As mentioned previously, it is important for physical therapists to understand their role in the psychosocial rehabilitation of their injured athletes and provide support in this area. However, if practitioners do not have the appropriate attitudes and beliefs towards psychosocial support for injured athletes, then support will be less likely to occur.

Before determining the attitudes and beliefs of health practitioners, it is important to first define attitude and belief. Attitude is defined as a learned response to an object or situation in an approving or disapproving way (Feldman, 1966). A belief is defined as a cognitive act or state in which a statement is considered to be true (Feldman, 1966).

To date there is mixed evidence with regard to the attitudes of physical therapists towards the use of psychosocial strategies. While some studies show that physical therapists (such as physiotherapists and athletic trainers) have positive attitudes and beliefs towards the use of psychosocial techniques in sports-injury rehabilitation (Arvinen-Barrow et al., 2007; Clement et al., 2013; Hemmings & Povey, 2002), other studies such as that by Jevon and Johnston (2003) concluded that physiotherapists question the efficacy of psychological support in practice because

of the lack of formal education in that area. Ninedek and Kelt (2000) and Driver et al. (2016) have since disputed that conclusion with their findings showing that physiotherapists have positive attitudes and beliefs towards psychological intervention use in sports-injury rehabilitation. Further studies have found that many medical professionals deem treating psychological aspects of sports-injuries as important (Driver et al., 2019; Heaney, 2006) and they believe there is worth in being able to offer strategies to support athletes throughout rehabilitation (Driver et al., 2019).

Despite research suggesting the importance and value of psychosocial interventions in sports-injury rehabilitation, a number of studies have shown that many medical professionals do not feel confident enough or adequately equipped to provide psychological support for their patients (Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017). Eighty-four percent of sports physiotherapists in New Zealand and Australia, for example, reported limitations in their ability to deal with psychological factors (Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017). Driver et al. (2019) and Heaney (2006), reported that medical professionals that do use psychosocial interventions utilise a limited number of techniques. Heaney (2006) suggested that physiotherapists have a lack of understanding with regard to their role in providing psychosocial interventions, thus, are less likely to use them.

Driver et al. (2019) suggests that the most commonly used interventions are the ones that physiotherapists have the most knowledge of, with the most commonly used by Australian physiotherapists being goal-setting and positive reinforcement. This conclusion is also further supported by a preliminary study conducted by Larson et al. (1996) with athletic trainers. Similar findings have been found with other medical professionals such as athletic trainers, physical therapists and sport-medicine professionals (Arvinen-Barrow et al., 2014; Hamson-Utley et al., 2008; Knuth et al., 2018).

Perhaps this could indicate that skills, or possibly the approach in the psychological support area, are in need of development (Arvinen-Barrow et al., 2010; Driver et al., 2019). Furthermore, current research suggests that medical professionals aspire to have further training in the use of psychosocial techniques (Driver et al., 2019; Hemmings & Povey, 2002). Physiotherapists in the study by Hemmings and Povey (2002) identified the need for more knowledge on techniques

including creating variety in rehabilitation exercises, enhancing athletes' self-confidence, realistic goal-setting, enhancing physiotherapists' listening skills, encouraging positive self-thoughts, and how to reduce stress and anxiety.

The Positive Impacts of Sport Psychology Education on Physiotherapists

A large body of literature suggests that providing psychosocial support to injured athletes results in better rehabilitation outcomes such as faster recovery rates and readiness to return to play (Chan et al., 2017; Wiese-Bjornstal, 2010). However, it has also been shown that many medical professionals do not feel confident enough or adequately equipped to provide psychosocial support for their patients (Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017). Furthermore, some studies appear to suggest that medical professionals have an interest in further education and support in the use of psychosocial interventions (Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017).

Current physiotherapist research suggests that psychology education is successful in influencing the attitudes and behaviours towards psychosocial support for injured athletes (Heaney et al., 2017). Therefore, it could be said that it would be just as beneficial for other healthcare providers such as osteopaths. Furthermore, providing education on improving the healthcare provider's attitudes and behaviours can then influence the inclusion of more psychosocial strategies in the care of the athletes, and in turn this may improve rehabilitation outcomes for an injured athlete (L. Schwab Reese et al., 2012).

As various studies suggest, physiotherapists have expressed their desire to develop their knowledge through further education (Heaney, 2006; Heaney et al., 2017). While there have been studies conducted on the perceptions of athletic trainers in the area of psychological interventions in sports-injury rehabilitation (Clement et al., 2013; Larson et al., 1996), currently there appears to be no research looking at the attitudes and self-reported practices of osteopaths in the area of psychological interventions in sports-injury rehabilitation. Given the importance of psychological interventions in sports-injury rehabilitation and the growing number of osteopaths being included in the primary care of injured athletes, there is a need for a study to be conducted looking at these

aspects. The ‘Athletic Trainer and Sport Psychology Questionnaire’ (ATSPQ) has previously been used for measuring athletic trainer’s perceptions and use of psychosocial content within their practice and has promise as an instrument for collecting data in the psychosocial sphere for other professions as well.

Osteopathy and The Current Education Regarding Psychosocial Content in Sports-Injury Rehabilitation

Osteopathy is a primary healthcare solution offered throughout the world. Many osteopaths classify themselves as medical providers who are specialised in treating sport injuries. However, it appears that osteopathic training in nations such as the United Kingdom (UK), Australia (AUS) and New Zealand (NZ) currently have limited to no components focusing on psychosocial interventions. In the UK, general psychology is taught within the osteopathy syllabus which includes the emotional responses to injury and psychosocial approaches to treatment (Swansea University, 2019) but lacks the application of these methods. At an osteopathy training institute in New Zealand, the term ‘psychomotor’ is used when describing the patient-management skills taught to osteopathy students. However, there is no specific course or teaching about psychosocial rehabilitation skills, including how and when they should be applied. In Australia, psychology is not mentioned at all as a component of the osteopathy course at Southern Cross University (Southern Cross University, 2019).

As mentioned previously, various studies have suggested that healthcare practitioners such as physiotherapists, have expressed interest in developing their knowledge through further education (Heaney, 2006; Heaney et al., 2017). However, due to the lack of research reporting on osteopaths in this area, we can only assume that the conclusions made for physiotherapists are comparable with osteopaths. Therefore, there is a need for further research looking at osteopaths’ attitudes towards education in the area of sport injury rehabilitation. A measurement tool commonly used for research by athletic trainers and physiotherapists in the area of sportinjury rehabilitation is the ATSPQ.

The Athletic Trainer and Sport Psychology Questionnaire (ATSPQ)

The Athletic Trainer's Sport and Psychology Questionnaire (ATSPQ) (Appendix A) is a self-report questionnaire that measures an athletic trainer's perceptions of psychosocial content within their practice (Clement et al., 2013). The ATSPQ was first developed by Larson et al. (1996) based on the Sportsmedicine Questionnaire (Brewer et al., 1991) and the athletic trainers survey (Wiese et al., 1991). Since then, there has been considerable interest in this topic. The ATSPQ has proved to be a useful starting tool within the field of sports-injury psychology, and has been adapted to form the Physiotherapist and Sport Psychology Questionnaire (PSPQ) by Hemmings and Povey (2002), which has also been utilised in different empirical studies.

The ATSPQ covers a range of questions regarding the psychological rehabilitation process of injured athletes. As discussed previously, there are a number of factors influencing an athlete's rehabilitation process, including injury characteristics, biological components, psychological aspects, and social aspects (Brewer et al., 2002; Evans & Wadey, 2012; Podlog et al., 2011). As part of the ATSPQ, athletic trainers are asked to identify the behaviours/characteristics they see present in athletes who do and do not cope successfully with injury. They are also asked to report on their rates of referral to further health professional services (Clement et al., 2013). The ATSPQ then asks athletic trainers how often they practice specific psychological skills/techniques when managing an injured athlete, and how often they believe an athlete is psychologically affected (Clement et al., 2013). The ATSPQ also asks athletic trainers to rate how beneficial it would be for them to receive further education on psychological skills/techniques, and their perceived importance of treating the psychological aspects of an athletic injury (Clement et al., 2013).

The original ATSPQ, as well as newer variants of the questionnaire are currently affected by two limitations. Firstly, different psychosocial strategies (e.g., relaxation techniques) are enquired about with the respondent without the provision of definitions or closer explanation of any of the strategies. This is also true with regard to psychological problems (e.g., depression, anxiety) that an injured athlete may present with. Without common reference points/definitions, it is difficult to draw conclusions about participants' responses to these questions.

Secondly, details around the psychometric properties of the ATSPQ are difficult to find. Psychometric properties include different types of validity and reliability, which, will be discussed in further detail in Chapter 2 of this thesis. Clement et al. (2013) comments on internal reliability, but construct validity has been assumed by most authors rather than directly tested. Given how important psychosocial practices are in the management of sportinjuries, it is crucial that we determine the factors around their current use and how we can use psychosocial interventions to enhance our current treatment processes for the benefit of the injured person. For this reason, it is vital to have instruments that have documented validity and reliability at our disposal to examine attitudes and practice approaches (Arvinen-Barrow et al., 2014; Hemmings & Povey, 2002; Larson et al., 1996).

Conclusion

Given the importance of psychosocial interventions in providing positive rehabilitation outcomes in sports-injury rehabilitation, physical therapists should be utilising psychosocial interventions alongside the physical rehabilitation. As the research suggests, athletic trainers and physiotherapists do not feel confident in providing psychosocial support, nor do they have a wide range repertoire of interventions to utilise. For this reason, further research needs to be conducted to explore osteopaths' attitudes and self-reported practices. The study discussed within this thesis will identify the current attitudes and self-reported practices of osteopaths, in the hope of establishing the foundation for future research to be built upon.

Chapter 2: Methodology

Introduction

The aim of this chapter is to discuss the survey research method that was used in this study. Following an introduction to the survey research method, Likert scales, data collection in survey research, and attitudes as part of survey research will be discussed.

Survey Research

This study used mixed-methods survey research to explore osteopaths' attitudes and self-reported practices towards psychosocial content in sports-injury rehabilitation and establish the psychometric properties of the questionnaire used. Survey research is defined as “the collection of information from a sample of individuals through their responses to questions” (Check & Schutt, 2012, p. 160). Survey research allows for various strategies in participant recruitment, data collection and instrumentation to be utilised. Furthermore, survey research can include both quantitative and qualitative research strategies, which allow for numerically rated items and open-ended questions (Ponto, 2015). By allowing for a wide range of data to be collected, survey research is often used to explore human behaviour and preferences (Singleton & Straits, 2009), and to obtain information on individual characteristics and attitudes (Ponto, 2015). For survey research to be effective in generating meaningful results, the survey instrument needs to be designed and implemented well (Jones et al., 2013). This study utilised a cross-sectional survey design, which is a type of observational study that examines the exposure of the participants and the outcomes at a given point in time (Setia, 2016). One of the many reasons this study utilised a cross-sectional survey, is due to its fast and inexpensive design (Setia, 2016).

Questionnaire Development

Before a questionnaire can be developed, it is important to have a clear topic framework and an understanding of the topic to report on (Jones et al., 2013). For the collected data to be useful and relevant to the research topic, questions should be clear and concise, reflecting the research question (Jones et al., 2013). To identify whether a questionnaire will collect useful and relevant

data, psychometric properties such as validity and reliability must first be established (Jones et al., 2013).

Validity is defined as “the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests” (Cook & Beckman, 2006, p.8). There are two main types of validity; content and construct validity (Cook & Beckman, 2006; Mokkink et al., 2010). Content validity evaluates the representation of key concepts intending to be measured during the study with the items of the questionnaire (Mokkink et al., 2010). Face validity is an aspect of content validity that describes the emergence of validity when empirical testing is not available (Cook & Beckman, 2006). Construct validity is when only the scores reflecting a construct are used from the instrument’s scores (Cook & Beckman, 2006). There are three main sources of evidence that can support construct validity (Kyriazos, 2018). These are structural, hypothesis testing, and cross-cultural validity (Kyriazos, 2018). Structural validity in particular assesses the degree to which the constructs to be measured are reflected in scoring, and can be statistically confirmed by doing a Factor Analysis (Mokkink et al., 2010).

Reliability is when scores are reproducible and consistent between each assessment (Cook & Beckman, 2006). The two tests used to measure reliability are test-retest and split-half reliability. Using test-retest as a measure involves administering the instrument to the same person at different times to see if it produces similar results each time (Cook & Beckman, 2006). Using split-half as a measure involves observing for correlations between scores on the first and second halves of the instrument to see if all the items measure the same construct (Cook & Beckman, 2006). In addition, internal consistency, which measures how intercorrelated items within a subscale are, can be determined statistically by computing Cronbach's alpha on items that are assumed to measure similar constructs or factors (Terwee et al., 2007).

Furthermore, aspects of the questionnaire such as aesthetics and questionnaire order, are important in self-administered questionnaires to maximise response rates (Jones et al., 2013). Often piloting the questionnaire within a small sample can assist in highlighting areas needing further attention, which may improve completion rates (Jones et al., 2013).

Attitudes and Likert Scales in Survey Research

Attitude has been defined as an expression of psychological tendency, shown by a degree of favour or disfavour (Eagly & Chaiken, 1996; Phillips et al., 2002). It is of common interest to investigate attitudes as they represent an individual's beliefs, which often influence an individual's behaviour (Svenningsson et al., 2018). Furthermore, attitudes can be observed in an individual's affective, behavioural and cognitive components (Svenningsson et al., 2018). Attitudes are often measured by ranking and rating questions, one being Likert scales (Phillips et al., 2002). This is certainly the case within this study, as both attitudes and Likert scales are employed.

A Likert scale is a type of question used within a questionnaire that can measure attitudes and values by the degree to which an individual agrees or disagrees with a particular statement or question (Allen & Seaman, 2007; Johns, 2010). The Likert scale is commonly used as a 5 or 7 point scale, which allows an individual to choose which number best aligns with their beliefs or values (Allen & Seaman, 2007; Johns, 2010). Likert scales can be analysed using frequencies such as median or range, which allow for a general conclusion of the population to be made. The advantages of using a Likert scale are its simplicity, versatility, and effortlessness of construction (Allen & Seaman, 2007; Johns, 2010). However, it has been argued that due to the nature of the statements or questions asked alongside a Likert scale, they may appear persuasive (Johns, 2010). This can often be counteracted by asking a neutral or unbiased question (Johns, 2010).

Data Collection

Questionnaires can be utilised in various research contexts and have four methods of data collection. These four methods are telephone interviews, postal, online, and face-to-face interviews (Jones et al., 2013). Each method has its advantages and disadvantages, however, the most common advantages across the methods are: participants can be reached in widespread locations, visual aids can be utilised, larger target population, less expensive and less time consuming (Jones et al., 2013). As internet use and computer-mediated communication has increased, so has the use of online surveys (Wright, 2006). Online surveys have many benefits, one of which is access to widespread geographical locations and online populations. In some cases, community groups or interest-specific groups are only available online. Therefore, it is easier to target a certain population (Jones et al., 2013; Wright, 2006). Another benefit of online surveys is the minimal

cost and time spent on producing the survey and collecting the data (Jones et al., 2013; Wright, 2006). Furthermore, online surveys produce quick responses and data compilation (Jones et al., 2013; Wright, 2006). For these reasons, an online survey was employed as the data collection method in this study.

However, there are potential disadvantages to using online surveys. Online surveys can only be accessed by those who have a device or have access to a device capable of online activity. Therefore, only certain population groups can be accessed via online methods (Porter, 2004; Wright, 2006). As well as this, questionnaires produce self-reported data, which may or may not be representative of the participants' actual behaviour, therefore, biases occur. Bias is defined as a deviation from the truth throughout the research process which can lead to false conclusions (Šimundić, 2013). There are many different types of biases that can occur within research, such as instrument bias, self-selection bias, response bias, and non-response bias.

One bias that is commonly seen in online survey research is self-selection, which occurs during the participant recruitment phase of research (Pannucci & Wilkins, 2010; Šimundić, 2013). This bias occurs as a result of some individuals being more likely to enter the study than others, for reasons such as interest (Pannucci & Wilkins, 2010; Šimundić, 2013). This causes an over-representation of those who are more likely to enter the study, and an under-representation of those who are less likely to enter the study. Therefore, conclusions may be biased towards a particular group, rather than representing the general population (Pannucci & Wilkins, 2010; Šimundić, 2013). This particular bias can be reduced by selecting the participants using criteria, rather than allowing for self-selection (Pannucci & Wilkins, 2010).

Summary

In summary, this chapter discussed the methods employed in the current study. This chapter introduced the concept of survey research and its ability to capture individuals' attitudes, behaviours and characteristics. For these reasons, this study used the method of survey research for data collection. Following the introduction, an exploration into the development of a questionnaire was made, followed by an investigation into the importance of psychometric

properties in collecting useful and relevant data. Due to its importance, this study chose to have the secondary aim of establishing psychometric properties for the instrument used. The chapter then discussed the relevance of investigating attitudes, as well as the usefulness of Likert scales within survey research. Due to this study investigating attitudes, Likert scales were utilised within this study. Finally, the different methods of data collection were discussed, with online survey research being explored in further depth, considering its advantages and disadvantages. From this investigation, an online survey was chosen as the survey method for this study, as osteopaths throughout New Zealand, Australia and the United Kingdom could be easily reached through an online survey.

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Chapter 3: Manuscript

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An investigation of osteopaths' attitudes and self-reported practices towards psychosocial
content in sports-injury rehabilitation

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Abstract

Background

Psychosocial strategies may be useful in sports-injury rehabilitation by positively influencing rehabilitation outcomes. While there has been some investigation into the use of psychosocial strategies by physiotherapists and athletic trainers, there is no research concerning the views and practices of osteopaths in the area of psychosocial content.

Objective

To examine osteopaths' attitudes and self-reported practices towards psychosocial content in sports-injury rehabilitation via an adaption of the Athletic Trainer and Sport Psychology Questionnaire (ATSPQ).

Methods

An online cross-sectional survey using an adapted version of the ATSPQ was used. All respondents were registered osteopaths who have at least two years' experience, from the United Kingdom, Australia or New Zealand. Descriptive analyses of the data were undertaken.

Results

A total of 66 participants (36 male, 30 female) were included. Almost all participants (98.5%) reported that athletes were negatively psychologically affected due to their sports-injury, with the top three negative psychological responses post-injury reported as 'stress or anxiety', 'treatment compliance problems', and 'exercise addiction'. Having a positive attitude/optimism was identified as the top characteristic of injured athletes who cope successfully with injury. Poor compliance was identified as the top characteristic of injured athletes who do not cope successfully with injury. The top four psychosocial strategies used in management were 'encouraging positive self-thoughts', 'encouraging effective communication skills', 'using short-term goals', and 'enhancing self-confidence'. The top three rated psychosocial strategies osteopaths deem important to learn more about were 'using short-term goals', 'reducing stress or anxiety', and 'encouraging effective communication skills'. Of the sample, 53 osteopaths (80.3%) indicated that they have no access to an accredited sport psychologist. However, 19 osteopaths (28.8%) make

referrals to counselling services, with the average number of referrals per annum being 0.48. A further 61 osteopaths (92.4%) do not have a written procedure for referrals.

Conclusions

This study suggests that osteopaths believe injured athletes are affected psychologically. Associations found between psychosocial responses, behaviours and rehabilitation outcomes, suggest that osteopaths need to be identifying and providing psychosocial support to injured athletes. This study suggests that osteopaths desire to increase their current knowledge and understanding of psychosocial intervention use, therefore, osteopaths may benefit from further education and support in this area. Further research involving larger sample sizes should be undertaken to validate the present findings.

Key Words

Injury psychology, psychological outcomes, psychological interventions, biopsychosocial, rehabilitation, physiotherapist attitudes, athletic injury, osteopath, manual therapy.

Introduction

Sports-injuries affect an individual physically, emotionally and socially (Appaneal et al., 2009; Edmonds & Dengerink, 2014; Erickson & Sherry, 2017; James et al., 2014) and can lead to pain, physical impairments, loss of self-esteem and identity, missed opportunities, social comparison, loss of fitness, and financial insecurity. (Evans et al., 2012) These consequences are associated with various negative psychosocial responses, such as anxiety, fear of re-injury, low levels of motivation, denial, hopelessness, shock, depression, and feelings of frustration and anger. (Arvinen-Barrow et al., 2014; Crossman & Gayman, 2003; Evans et al., 2012; Tracey, 2003; Vergeer, 2006)

There is evidence to show that injury in elite athletes is associated with further stressors, including burnout, inadequate recovery intervals and even ethical-related stress. (Wiese-Bjornstal, 2010) perhaps due to facing increased pressure to return to sport. (P. Murphy & Waddington, 2007) These negative consequences may further increase the level of vulnerability to negative psychosocial consequences for elite athletes. (Leddy et al., 1994) Negative psychosocial responses such as fear of re-injury may be linked to lower levels of rehabilitation adherence. (Chan et al., 2017; Niven, 2007) and therefore, prolonged recovery and consequently a lower chance of return to play. (Chan et al., 2017; Niven, 2007; Wiese-Bjornstal, 2010)

An athlete's psychological readiness to return to play has been shown to be influenced by high levels of negative emotional and behavioural responses following injury. (Forsdyke et al., 2016; Hsu et al., 2017) By addressing an injured athlete's negative psychosocial responses, such as those highlighted above, athletes may return to sport at a faster rate and obtain positive rehabilitation outcomes. (L. M. Schwab Reese et al., 2012)

A wide variety of psychosocial interventions based on the action of the coach, physical therapist or the athlete themselves, have been shown to be useful in rehabilitating an injury successfully. (Clement et al., 2013; Eccleston, 2001; L. M. Schwab Reese et al., 2012) The combined therapy approach, which involves multiple healthcare practitioners in the management of an injured athlete's rehabilitation process, (Tracey, 2008) has been suggested to improve

rehabilitation outcomes. (L. Schwab Reese et al., 2012) Although the model of combined therapy has been well recognised as the best form of healthcare, often recreational athletes seek guidance from one healthcare provider only. (Annear et al., 2019) It has therefore been argued that physical therapists have a role in not only providing physical rehabilitation, but also psychosocial support and management.(Tracey, 2008)

As physical therapists are in regular contact with athletes, they are in the best position to build rapport, educate and communicate with the injured athlete, thus, ensuring the athlete receives support to achieve positive outcomes.(Heaney et al., 2017; Tracey, 2008) Previous research has shown that physical therapists who use psychosocial techniques and strategies have more successful outcomes in their clients' return to sport.(Arvinen-Barrow et al., 2010)

Despite the suggested importance of psychosocial interventions, several studies have shown that healthcare professionals feel inadequately equipped to provide sufficient psychosocial support.(Crossman, 1997; Jevon & Johnston, 2003; Stewart, 2019; Zakrajsek & Blanton, 2017) Furthermore, the most commonly used psychosocial interventions are the ones healthcare professionals feel confident in utilising, which potentially may not be the most beneficial for the patient, therefore, could limit the extent of positive rehabilitation outcomes.(Driver et al., 2019; L. M. Schwab Reese et al., 2012)

A good majority of healthcare professionals report being interested in gaining further knowledge and training in the area of psychosocial interventions.(Arvinen-Barrow et al., 2007; Driver et al., 2019; Hemmings & Povey, 2002; Momsen et al., 2012; Ninedek & Kelt, 2000) A recent study suggests that psychology education is successful in influencing the attitudes and behaviours of physical therapists towards psychosocial support for injured athletes.(Heaney et al., 2017) Thus, suggesting that further professional development within the psychosocial domain could be useful.

Based on the current information provided by osteopathy schools in the United Kingdom, Australia, and New Zealand, osteopaths seem to have limited training in psychosocial interventions.(Southern Cross University, 2019; Swansea University, 2019; Unitec, 2019) While there has been increasing interest in exploring the perceptions of athletic trainers and

physiotherapists in the area of psychosocial support for sports-injury rehabilitation,(Clement et al., 2013; Larson et al., 1996) to date, there have been no studies investigating osteopaths' perceptions.

The primary aim of this study was to examine osteopaths' attitudes and self-reported practices towards psychosocial content in sports-injury rehabilitation via an osteopathic adaptation of the Athletic Trainer and Sport Psychology Questionnaire (ATSPQ). To improve the questionnaire's reliability, definitions of specific terms and specific psychosocial strategies referred to within the questionnaire were provided. The secondary aim of this study was to examine the internal reliability of the adapted questionnaire.

Methods

Study Design and Setting

A cross-sectional survey design was used. An online questionnaire was created using SurveyMonkey® to ensure the maximum possible inclusion of osteopaths across New Zealand, Australia and the United Kingdom. Various social media platforms (Facebook, Instagram, LinkedIn) were used to boost survey responses. Additionally, an advertisement section was made to be sent out in a research focused email by Osteopaths New Zealand, Osteopathy Australia's Online Research News and The Osteopath magazine in the United Kingdom. Finally, personalised email invites were sent to osteopathy clinics in New Zealand by sourcing email addresses off clinic webpages. The survey was conducted over a 5½ month period, between November 1st 2019 - July 13th 2020.

In order to be included, participants had to be registered osteopaths who have been in practice for at least two years in either New Zealand, Australia, or the United Kingdom. Prior to survey commencement, participants were provided with a Participant Information Form (Appendix B). Completion of the online survey, or part thereof, was taken as implied consent. The study was approved by the Unitec Research Ethics Committee (UREC 2019-1027) (Appendix C).

Questionnaire

The Athletic Trainer and Sport Psychology Questionnaire (ATSPQ) is suggested to capture four psychological aspects of the sports-injury rehabilitation process;(Clement et al., 2013) (a) perceived psychological responses and coping behaviours athletes may present to athletic trainers, (b) psychosocial strategies athletic trainers currently use with their athletes, (c) psychosocial strategies athletic trainers deem important to learn more about, and (d) athletic trainers' current practices in referring athletes to counselling or sport psychology services. The ATSPQ has been found to show acceptable internal reliability.(Clement et al., 2013)

A composite questionnaire was composed using an osteopathic adaption of the ATSPQ, the 'Osteopath and Sport Psychology Questionnaire' (OSPQ), to measure osteopaths' perceptions of psychosocial content within their practice. The questionnaire consisted of short answer questions, forced-choice questions, and questions answered on a 5-point Likert scale. Brief reference points were provided to respondents with regard to definitions of psychological problems (e.g., depression, anxiety) (Appendix D).

Five questions additional to the ATSPQ were included in the composite questionnaire to ascertain the attitudes of osteopaths towards psychosocial content in sports-injury rehabilitation, similar to studies by Clement et al,(Clement et al., 2013) Driver et al,(Driver et al., 2019) and Hemmings and Povey.(Hemmings & Povey, 2002) The five questions were 'How beneficial do you think it is to incorporate psychosocial strategies into rehabilitation?', 'How much of a positive effect do you think psychosocial strategies can have on rehabilitation outcomes?', 'Do you have access to an accredited sports psychologist?', 'Rate your overall level of preparedness in the psychosocial strategies area', 'Thinking very generally about your overall career in osteopathy, would you say that you are satisfied?'.

Demographic data was also collected regarding age, gender, ethnicity, country of employment, qualifications, years of experience, registration status, areas of interest, the average number of sports-injury rehabilitation clients per month, additional psychology training, psychology training within osteopathy training. Information was also gathered on participants' current practice setting,

other medical professionals in the practice setting, the number of years within their current setting, and whether they referred outside of their practice setting or not.

Data Analysis

Data from the composite questionnaire was extracted from SurveyMonkey® and exported to a Microsoft Excel spreadsheet. The data was imported into SPSS (“Statistical Package for the Social Sciences”, version 25) for analysis. From the 87 respondents, 66 respondents provided meaningful responses based on the inclusion criteria. Questions with multiple columns were combined into one before the data was categorised numerically. For example, the ethnicity data was separated into multiple columns and needed to be combined before analysis could take place. Descriptive statistics (means and standard deviations) and frequencies were calculated where appropriate. General themes from the open-ended questions (22 and 23) were identified and utilised to generate frequencies. Spearman’s correlations were conducted to assess the relationship between years of experience, level of preparedness in utilising psychosocial interventions, time spent utilising psychosocial strategies, and whether osteopaths find incorporating psychosocial strategies as beneficial or not. Furthermore, Cronbach Alpha values were calculated to establish the internal reliability of the subscales of the OPSPQ and quality descriptors were applied to these results.(Cortina, 1993)

Results

A total of 66 registered osteopaths who had been practising in either New Zealand, Australia, or the United Kingdom, within the last two years participated in the study. Respondents' age ranged from 20 years to 60+ years ($M=42$), with years of practice ranging from 2 to 45 years ($M=13.8$). Of the sample population, 54.6% were male, and the most commonly represented practice location was New Zealand (69%), followed by Australia (13.6%) and the United Kingdom (16.7%). The most common ethnicities were European (60.6%), White (English, Welsh, Scottish, Northern Irish, British, Irish, Gypsy or Irish Traveller, Other) (15.2%), Other (e.g. Dutch, Japanese, Tokelauan) (9.1%), and Australian (7.6%) (see Table 1).

The study's participants practiced mainly in the setting of a private clinic with another osteopath(s) (63.6%), or within a multidisciplinary healthcare team (24.2%). Whereas three percent practiced in a medical centre and the final nine percent categorised their practice setting as 'other'. The mean number of years an osteopath within the sample population had been at their current setting was 3.88 years. Furthermore, the mean number of sports-injury patients the participants saw per month was 16.5. Those who practiced within a multidisciplinary healthcare team or 'other', generally worked with other professionals such as physiotherapists, doctors, psychologists, podiatrists, chiropractors, acupuncturists, massage therapists, and naturopaths. Within the sample of those who practiced within a multidisciplinary healthcare team or 'other', 95.8% referred outside their practice setting, mostly due to patients needing further interventions that are out of the practitioner's scope (see Table 1).

The osteopaths within the sample population gained a Masters in Osteopathy or the equivalent. The most common additional qualifications within the sample population were a Bachelor of Science, Diploma in Naturopathy, Diploma in clinical sports massage, and a Post-Graduate Certificate in Western medical acupuncture. Of the sample population, 65.2% report having no psychology content in their osteopathy education. Furthermore, only 24.2% of the sample reported having additional psychology training outside of their osteopathy education. Generally, the additional psychology training consisted of short courses on sport psychology, post-graduate studies in psychology and individual university papers in sports science. The most commonly

represented interest area within the sample population was ‘exercise-based rehabilitation’, with 73% having an interest in it. On average, the sample population were interested in at least one of these four areas (sports-injury rehabilitation, pain management, exercise-based rehabilitation, sports management) for 4.5 years.

Table 1

Participants’ Demographic Information (N = 66)

Characteristic	Value
Male	N = 36 (54.6 %)
Female	N = 30 (45.4 %)
Age (Years)	M = 42, range = 20-60+
Experience (Years)	M = 13.8, range = 2-45
Ethnicity (%)	
European	60.6
NZ European	3.0
Asian / Asian British ^a	1.5
English	1.5
Swiss & Australian	1.5
White ^b	15.2
Maori	0.0
Australian	7.6
Other	9.1
Practice Location (%)	
New Zealand	69.7
Australia	13.6
United Kingdom	16.7
Practice Setting (%)	
Private Clinic ^c	63.6
Multidisciplinary Healthcare Team	24.2
Medical Centre	3.0
Hospital	0.0
Other	9.1
Additional Psychology Training (%)	
Yes	24.2
No	75.8
Psychology Training During Osteo Training (%)	
Yes	34.8
No	65.2
Refer Outside Practice Setting (% out of 24 respondents)	
Yes	95.8
No	4.2

^a Includes Indian, Pakistani, Bangladeshi, Chinese

^b Includes English, Welsh, Scottish, Northern Irish, British, Irish, Gypsy or Irish Traveller

^c With one or more other osteopath

Internal reliability

To establish internal reliability for the three main sections of the questionnaire, Cronbach's Alpha values were calculated. High internal reliability (Cortina, 1993) was found for each of the scales. Specifically, "psychological responses athletes may present to osteopaths with" (alpha = 0.73), "psychosocial strategies osteopaths currently use with their athletes" (alpha = 0.88) and "psychosocial strategies osteopaths deem important to learn more about" (alpha = 0.95).

Psychological Effect of Sport Injuries

Simple frequency counts showed that 65 (98.5%) of the respondents reported that athletes were psychologically affected due to their sports-injury, with 25 (37.9%) respondents reporting psychological impacts all of the time. The osteopaths within the sample population indicated that the top three psychological responses that athletes experience post-injury are stress or anxiety (M = 3.88; SD = 0.814), treatment compliance problems (M = 3.24; SD = 0.878), and exercise addiction (M = 3.11; SD = 0.963; 1 = *never*, 5 = *very often*) (see Table 2).

Table 2

Psychological Responses Associated with Athletic Injuries (n = 66) ^a

Conditions Encountered	Mean	± SD
Stress or Anxiety	3.88	± 0.814
Treatment Compliance Problems	3.24	± 0.878
Exercise Addiction	3.11	± 0.963
Depression	2.86	± 0.875
Anger	2.85	± 0.949
Attention or Concentration Problems	2.58	± 0.824

^a 1 = *Never encounter condition*, 5 = *very often encounter condition*.

Athletes' Coping Characteristics During Injury

A range of psychological characteristics were identified by osteopaths for athletes who did or did not cope successfully with their injuries. An analysis of the responses identified thirteen common themes for each of the categories - successful and non-successful coping behaviours (see Table 3).

The most common themes seen amongst athletes who successfully cope with their injuries were ‘positive attitude/optimistic’ (48.5%), ‘awareness of overall health and well-being’ (48.5%), and ‘compliance’ (43.9%). The least common theme was ‘organisation’ (6.1%; see Table 3). The most common themes seen amongst athletes who do not successfully cope with their injuries were ‘poor compliance’ (34.8%), ‘impatience/unrealistic expectations’ (33.3%), and ‘unaware of overall health/well-being’ (33.3%). The least common theme was ‘anger and denial’ (13.6%; see Table 3).

Table 3

Characteristics of Athletes Who Cope and Do Not Cope Successfully with Injury (n = 66)

<i>Cope Successfully</i>		<i>Do Not Cope Successfully</i>	
Characteristic	Frequency (%)	Characteristic	Frequency (%)
Positive Attitude - Optimistic	48.5	Poor Compliance	34.8
Aware of Overall Health and Well-being	48.5	Impatience - Unrealistic Expectations	33.3
Compliance	43.9	Unaware of Overall Health/Well-being	33.3
Determination - Perseverance - Discipline	39.4	Exercise Addiction	30.3
Acceptance	33.3	Poor Mental Health and Depression	28.8
Resilience and Adaptability	22.7	Negative Attitude	27.3
Educated	21.2	Fear- Avoidance and Catastrophizing	25.8
Have a Support Network	16.7	Stress and Anxiety	24.2
Patience	16.7	Social Withdrawal and Lack of Support	22.7
Self -Efficacy	15.2	Unmotivated	21.2
Interests Outside of Sport	13.6	Unhealthy Self-Image and Lack of Confidence	18.2
Goal Oriented	13.6	Lack of Adaptability	15.2
Organisation	6.1	Anger and Denial	13.6

This was an open-ended question in which the osteopaths were asked to list the top four observed characteristics.

Use of Psychosocial Strategies

Four of the 13 psychosocial strategies listed received a mean score of 3.94 or higher for usage (1 = *never*, 5 = *100% of the time*). The strategies the sampled osteopaths reported using the most included encouraging positive self-thoughts (M = 4.18; SD = 1.108), encouraging effective communication skills (M = 4.02; SD = 1.183), using short-term goals (M = 3.95; SD = 1.073), and enhancing self-confidence (M = 3.94; SD = 1.162). The least frequently used strategy was using mental rehearsal/visualisation (M = 2.39; SD = 1.311; 1 = *never*, 5 = *100% of the time*; see Table 4).

Table 4

Frequency of Psychological Skills/Techniques Practised when Assisting an Injured Athlete in Their Recovery from an Injury (n = 66) ^a

Psychological Skills	Mean	± SD
Encouraging positive self-thoughts	4.18	± 1.108
Encouraging effective communication skills	4.02	± 1.183
Using short-term goals	3.95	± 1.073
Enhancing self-confidence	3.94	± 1.162
Reducing stress or anxiety	3.73	± 1.235
Creating variety in rehabilitation exercises	3.71	± 1.187
Keeping the athlete involved with the team	3.44	± 1.279
Teaching muscular relaxation techniques	3.20	± 1.280
Using relaxation techniques	3.08	± 1.232
Reducing depression	3.05	± 1.375
Improving social support	3.03	± 1.215
Teaching emotional control strategies	2.41	± 1.347
Using mental rehearsal/visualisation	2.39	± 1.311

^a 1 = *Never practice skill*, 5 = *Practice skill 100% of the time*.

Psychosocial Strategies Osteopaths Believe Are Important to Learn More About

The top three strategies rated by the osteopaths as important to learn more about, were ‘using short-term goals’ (M = 4.03; SD = 1.052), ‘reducing stress or anxiety’ (M = 4.03; SD = 1.109), and ‘encouraging effective communication skills’ (M = 3.97; SD = 1.037). The lowest-rated strategy was ‘using mental rehearsal/visualisation’ (M = 3.58; SD = 1.177; 1 = *not important*, 5 = *very important*; see Table 5).

Table 5

Benefit/Importance of Learning More About Psychological Skills/Techniques (n = 66)

Psychological Skills	Mean	± SD
Using short-term goals	4.03	± 1.052
Reducing stress or anxiety	4.03	± 1.109
Encouraging effective communication skills	3.97	± 1.037
Enhancing self-confidence	3.94	± 1.036
Reducing depression	3.94	± 1.201
Encouraging positive self-thoughts	3.92	± 1.127
Creating variety in rehabilitation exercises	3.91	± 1.119
Keeping the athlete involved with the team	3.77	± 1.134
Teaching emotional control strategies	3.73	± 1.259
Using relaxation techniques	3.71	± 1.134
Teaching muscular relaxation techniques	3.71	± 1.200
Improving social support	3.62	± 1.092
Using mental rehearsal/visualisation	3.58	± 1.177

^a 1 = *Not important*, 5 = *Very Important*.

Access and Referral to Counseling and Sport Psychology Services

Of the sample population, 53 osteopaths (80.3%) indicated that they have no access to an accredited sport psychologist. Furthermore, 19 osteopaths (28.8%) make referrals to counselling services, with the average number of referrals per annum being 0.48. A further 61 osteopaths (92.4%) did not have a written procedure for referrals to counselling services.

Correlations

To assess the relationship between years of experience, level of preparedness in utilising psychosocial interventions, time spent utilising psychosocial strategies, and whether osteopaths find incorporating psychosocial strategies beneficial or not, Spearman's correlations were conducted. In this sample there was no relationship (all $p > 0.05$, $\rho < 0.879$).

Discussion

A cross-sectional survey using an adaptation of the Athletic Trainer Sports Psychology Questionnaire (ATSPQ), gathered responses from 66 registered osteopaths on their views of the use of psychosocial content in sports-injury rehabilitation. Respondents had on average 13.8 years experience and worked mostly in private practices in New Zealand (NZ), Australia (AUS) and the United Kingdom (UK).

This study improved the ATSPQ by providing definitions of psychosocial interventions and conditions referred to within the questionnaire. Although the low response rate affected the values, the significance of the results are still upheld due to a similar study by Clement et al¹⁹ obtaining similar alpha similar values with 215 respondents. Therefore, the internal consistency of the measurement is upheld, showing that the adaption to the osteopathy context and the inclusion of definitions did not alter the internal reliability.

Osteopaths reported encountering various psychological responses in their injured athletes. The top three psychological responses were ‘stress or anxiety’, ‘treatment compliance problems’, and ‘exercise addiction’. The responses of ‘stress or anxiety’ and ‘treatment compliance problems’ are consistent with previous research by Clement et al (Clement et al., 2013) and Larson et al (Larson et al., 1996) in athletic trainers. The physiotherapists in the studies conducted by Hemmings and Povey (Hemmings & Povey, 2002) and Arvinen-Barrow et al (Arvinen-Barrow et al., 2007) also rated ‘stress or anxiety’ as the top psychological response in injured athletes. Current research suggests that injuries have physical and social consequences such as pain, physical impairments, missing training and competition, financial insecurity, loss of independence and identity, and loss of self-esteem, which typically coincide with negative psychosocial responses such as stress and anxiety. (Arvinen-Barrow et al., 2014; Bianco et al., 1999; Crossman & Gayman, 2003; Evans et al., 2000, 2012; Gouttebauge et al., 2019; Vergeer, 2006; Wiese-bjornstal et al., 1998) Thus, the injured athletes typically seen by the osteopaths within the sample population may be experiencing the above physical social consequences. Furthermore, increased psychological stress has been linked with delays in the wound-repair process, therefore, negatively impacting the rehabilitation process. (Christian et al., 2007; Gouin & Kiecolt-Glaser, 2011; Segerstrom & Miller, 2004; Walburn et al., 2009; Wiese-Bjornstal, 2010)

Clement et al (Clement et al., 2013) and Larson et al (Larson et al., 1996) also noted that ‘anger’ was a typical psychological response to injury, whereas this study did not. A possible reason for this is that the present study did not ask for the level of competitiveness of the injured athlete. Elite athletes have been shown to face further stressors, thus, experience further emotional responses to injury, such as anger, compared to recreational athletes. (Bianco et al., 1999; Evans et al., 2012; Leddy et al., 1994; Tracey, 2003; Wiese-Bjornstal, 2010) From this evidence, we may hypothesise that if the osteopaths within the sample population were managing a larger majority of elite injured athletes, then it is possible that anger would feature more as an emotional response to injury.

Findings from the current study support previous research finding that the most common themes seen amongst athletes who do not successfully cope with their injuries are ‘poor compliance’, ‘impatience/unrealistic expectations’, and ‘unaware of overall health/well-being’. In contrast, the most common themes seen amongst athletes who do successfully cope with their injuries are ‘positive attitude/optimistic’, ‘awareness of overall health and wellbeing’, and ‘compliance’. Similarly, Clement et al, (Clement et al., 2013) Larson et al, (Larson et al., 1996) and Arvinen-Barrow et al (Arvinen-Barrow et al., 2007), identify poor compliance as the top characteristic of an athlete who does not cope successfully with their injuries. Such results align with current research suggesting that psychological responses and behaviours of injured athletes impact rehabilitation outcomes. (Arvinen-Barrow et al., 2014; Covassin et al., 2015; Forsdyke et al., 2016; Podlog et al., 2011; L. M. Schwab Reese et al., 2012)

Athletes who possess negative psychological responses to injury, such as stress or anxiety, have been shown to exhibit lower levels of rehabilitation adherence. (Chan et al., 2017; Niven, 2007) In turn, low levels of rehabilitation compliance have been associated with prolonged recovery and a lower chance of return to play. (Chan et al., 2017; Niven, 2007; Wiese-Bjornstal, 2010) Therefore, it is essential that rehabilitation interventions be used to influence an athlete’s responses to injury, thus, improve adherence rates and then in turn, achieve a quicker return to play. (Chan et al., 2017; Covassin et al., 2015; Niven, 2007; Podlog et al., 2011) Further underlying issues such as social factors can influence the coping behaviours of injured athletes. Examples of social factors may be financial pressure, pressure to return to sport, missed opportunities, and poor support from

significant others and/or their rehabilitator.(Clement et al., 2013; P. Murphy & Waddington, 2007) These findings illustrate the importance of considering social factors when providing rehabilitation interventions.

Given the significant impact psychological responses, social influences and behaviours of injured athletes have on rehabilitation outcomes, it is important that osteopaths can identify these nuances and support their injured athletes psychosocially, as well as physically. The osteopaths within the present sample population reported utilising a wide variety of psychological strategies when working with injured athletes. The four most-favoured strategies, in order of popularity, were ‘encouraging positive self-thoughts’, ‘encouraging effective communication skills’, ‘using short-term goals’, and ‘enhancing self-confidence’. In contrast, the least frequently used strategy was using mental rehearsal/visualisation. Amongst previous research, the psychosocial strategies of encouraging positive self-thoughts and short-term goals, were also popular.(Arvinen-Barrow et al., 2007; Clement et al., 2013; Hemmings & Povey, 2002; Larson et al., 1996) Perhaps this may be due to these particular interventions being easily accessible, requiring less training to understand and utilise compared to other interventions such as mental imagery, and are easily explained and justified to the injured athlete.

The four most-favoured psychosocial strategies by osteopaths in this population, have been found in previous literature to be successful in improving rehabilitation outcomes. Encouraging positive self-thoughts, such as productive and uplifting thoughts about themselves and their recovery, has been shown to reduce psychological stress, encourage acceptance and enjoyment of the absence of athletic pressures.(McKay & Tryon, 2017; Wagman & Khelifa, 1996) Encouraging effective communication between the injured athlete and the medical professionals involved in the rehabilitation process, allows the athlete to have a deeper understanding and thus, higher rates of adherence to the rehabilitation programme.(Crossman, 1997; Evans & Wadey, 2012; King & Hoppe, 2013) This can be achieved by both parties taking a genuine interest in the recovery and clearly communicating expectations, uncertainties, or concerns.(Covassin et al., 2015; Crossman, 1997; Evans & Wadey, 2012; King & Hoppe, 2013)

Using short-term goals encourages lower levels of anxiety, increased confidence and motivation, increased rehabilitation adherence, and an improved ability to cope with the injury.(Arvinen-Barrow et al., 2010; Beneka, 2007; Covassin et al., 2015; Gennarelli et al., 2020) For short-term goals to be successful in achieving the above outcomes, the injured athlete needs to play an active role in the process by establishing goals that align with their desires and motives.(Arvinen-Barrow et al., 2010; Covassin et al., 2015) Enhancing self-confidence can direct and motivate the athlete to focus on the end result of the rehabilitation process, which encourages a faster rate of recovery. (Crossman, 2001; Wagman & Khelifa, 1996)

Osteopaths within this population also placed a high level of importance on increasing their knowledge of psychological skills/techniques in the areas of ‘using short-term goals’, ‘reducing stress or anxiety’, and ‘encouraging effective communication skills’. Interestingly, the lowest-rated strategy was ‘using mental rehearsal/visualisation’, which was also found to be the least-used psychosocial strategy in practice. Using mental rehearsal/visualisation of either game play or rehabilitation activities has been shown to be able to renew an injured athlete’s beliefs towards the rehabilitation process, decrease pain levels and promote healing, and improve game play itself, all of which are valuable outcomes.(Beneka, 2007; Clement et al., 2013; Rodriguez et al., 2019) It is interesting to note that osteopaths within this population do not use this strategy, nor do they appear to place importance on learning more about it.

A strategy that the sample population do not use regularly, but deem important to learn more about, is ‘reducing stress or anxiety’. Reducing stress and anxiety has a positive impact on pain levels and focus levels. It could therefore be argued to be paramount that physical therapists are equipped with the knowledge and skills needed to support injured athletes in this area.(Beneka, 2007; Covassin et al., 2015; Ievleva & Orlick, 1991) Although all of the psychosocial strategies mentioned have a positive impact on the rehabilitation process, it would be more beneficial for osteopaths to increase their knowledge on skills they do not commonly use, such as ‘keeping the athlete involved with the team’, ‘improving social support’, and ‘teaching emotional control strategies’. As a result, injured athletes would be provided with a wider variety of strategies, which have differing positive effects, that may enhance their rehabilitation process in various different ways.

It is well known that stress and anxiety can impact rehabilitation outcomes. Therefore, from the reported low usage of stress and anxiety-reducing tools in practice, it would be expected that osteopaths make use of supporting services to help with these symptoms. However, osteopaths within the sample population mostly reported having limited access to an accredited sport psychologist. Furthermore, the average number of referrals to counselling services per annum were less than one. Moreover, most of the osteopaths indicated not using a written procedure for referrals. These findings appear to be consistent with previous research conducted with physiotherapists and athletic trainers.(Arvinen-Barrow et al., 2007; Clement et al., 2013; Hemmings & Povey, 2002) Although the number of referrals were limited, this does not suggest that osteopaths do not recognise the psychological responses in their athletes as previous findings suggest otherwise, but rather, that osteopaths may have limited referral networks between professions.

Having a referral network between professions is important as previous research suggests that using a combined therapy, which aligns itself with the biopsychosocial approach to rehabilitation, may be the best approach.(Arvinen-Barrow et al., 2010; Dhillon et al., 2017; Momsen et al., 2012) Using a combined therapy approach allows for psychosocial interventions to be best utilised, which may improve how an athlete copes psychologically with their injury throughout the rehabilitation process.(L. M. Schwab Reese et al., 2012) Therefore, it is necessary that referral networks are built and the importance of it is taught.

Limitations and Future Directions

Although this study provides constructive insights into osteopaths' attitudes and self-reported practices towards the use of psychosocial strategies in practice, there are limitations. The response rate was low and as a result, more detailed psychometric properties for the questionnaire could not be calculated. This could be a problem as unreliable and invalid results cannot be appropriately applied to practice. Despite these consequences, poor psychometric properties are a frequent challenge in this particular area of research. However, this study did improve on previous research in the field by including definitions for psychosocial interventions and conditions, which allowed for the internal consistency of the measurement tool to be upheld.

Furthermore, the low response rate may have biased the results, as those who completed the questionnaire, may have had an interest in psychological aspects related to injured athletes. Future research should increase the sample size to ensure less biased results, as well as establish psychometric properties to a high power. Additionally, due to the self-reported nature of the questionnaire, the findings may or may not be representative of the participants' actual behaviour. To overcome this, future research would benefit by adding observations of osteopaths within a clinical setting.

Perhaps another addition to future research could also be assessing the injured athletes' perceptions of their osteopath's use of psychosocial strategies. This may be beneficial to researchers as it may identify which psychosocial strategies injured athletes find helpful, as well as their views towards their osteopath's competence levels in providing psychosocial interventions.

Furthermore, this study did not ask whether osteopaths were managing professional or recreational athletes. Nor did it ask of the severity of the athletes' injuries, or possible secondary injuries. These could be of interest to future researchers in this field because elite athletes deal with a broader range of stressors than recreational athletes, therefore, respond differently to recreational athletes. Similarly, the severity of the injury may have differing effects on the injured athlete, thus, may influence the degree of psychosocial support needed.

Conclusion

The majority of osteopaths within this sample population believe injured athletes are affected psychologically. Although osteopaths are using psychosocial strategies in their management of injured athletes, it appeared that there was not a great variety of different strategies that were commonly in use. Furthermore, osteopaths within this population acknowledged a need for further education and support in this area. Therefore, future research should look at the impact of psychosocial education on osteopaths' attitudes, self-reported practices and rehabilitation outcomes. Additionally, osteopaths have limited referral networks between professions, therefore,

networks need to be built in order to achieve a combined therapy approach, which may improve rehabilitation outcomes for injured athletes.

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Chapter 4: Appendices

Appendix A: The Osteopath and Sport Psychology Questionnaire (OSPQ)

Appendix B: Information for participants

Appendix C: Ethics approval

Appendix D: Definitions of psychosocial interventions and psychosocial conditions

Appendix A: The Osteopath and Sport Psychology Questionnaire (OSPQ)

1. Section One: Demographics

* 1. What is your age?

* 2. What is your gender?

* 3. Where is the location of your current practice?

2.

* 4. What is your ethnicity?

5.

* 7. What qualifications do you currently hold and where did you gain this/these qualifications?

Qualification 1

Qualification 2

Qualification 3

Qualification 4

Qualification 5

Qualification 6

* 8. How many years have you practiced as an osteopath?

* 9. Are you currently registered as an Osteopath in either the United Kingdom, Australia or New Zealand?

* 10. What area(s) of osteopathy do you have a particular interest in? (select all that apply)

Cranial

Clinical educating

Visceral

Paediatrics

Sport-injury rehabilitation

Exercise-based rehabilitation

Western Medical Acupuncture (WMA) and related needling techniques

Occupational health

Gerontology

Sports management

Pain management

Other

Research

I do not have an area of interest

Teaching

6.

* 11. If you do have an area(s) of interest, how many years have you been interested in this/these area(s)?

	1	2	3	4	5+
Cranial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visceral	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sport-injury rehabilitation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Western Medical Acupuncture (WMA) and related needling techniques	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gerontology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clinical educating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paediatrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise-based rehabilitation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Occupational health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sports management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.

* 12. On average how many sports-injury rehabilitation clients do you see per month?

* 13. Have you had any additional psychology training?

8.

* 14. Please specify your additional psychology training

9.

* 15. In your undergraduate and/or postgraduate study was there injury psychology content?

* 16. What is your current practice setting?

10.

* 17. What other medical professionals are you working with in your setting?

* 18. Do you ever refer clients to services outside of your current practice setting?

* 19. Why/Why not?

11.

* 20. How many years have you been in your current setting?

12. Section Two: The Osteopath and Sports Psychology Questionnaire

* 21. How often do you encounter the following conditions associated with sport injuries?

	Never	Rarely	Occasionally	Often	Very often
Stress/Anxiety -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anger -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Treatment compliance problems -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Depression -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problems with attention or concentration -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise Addiction -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 22. Please identify the top 4 behaviours/characteristics you believe to be present in athletes who cope successfully with injury.

1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>

* 23. Please identify the top 4 behaviours/characteristics you believe to be present in athletes who do NOT cope successfully with injury

1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>

* 24. Have you ever referred an injured athlete to counselling for situations related to their injuries

* 25. On average how many times per year have you referred injured athletes to counselling?

13.

* 26. Do you have a written procedure for referring athletes for counselling services?

* 27. How often do you practise the following psychological skills/techniques when assisting an injured athlete in their recovery from an injury?

	Never	25% of Time	50% of Time	75% of Time	100% of Time
Creating variety in rehabilitation exercises - see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraging effective communication skills -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraging positive self-thoughts -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhancing self-confidence -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving social support -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping the athlete involved with the team -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing depression -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing stress or anxiety -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching emotional control strategies -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching muscular relaxation techniques -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using mental rehearsal/visualisation -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using relaxation techniques -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using short-term goals - see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 28. How often do you believe an athlete is affected psychologically by an injury?

Never	25% of Time	50% of Time	75% of Time	100% of Time
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Additional comments:

* 29. Rate how beneficial it would be for you to learn more about the following psychological skills/techniques.

	Not important	Relatively important	Fairly important	Important	Very important
Creating variety in rehab exercises -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraging effective communication skills -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraging positive self-thoughts -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhancing self-confidence of the injured athlete -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving social support for the athlete -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping the athlete involved with the team -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing depression -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing stress/anxiety -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching emotional control strategies -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching muscular relaxation techniques -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using mental rehearsal/visualisation -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using relaxation techniques -- see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using short-term goals - see here --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 30. What is your perception about the importance of treating psychological aspects of an athletic injury?

Not important	Relatively important	Fairly important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 31. What is your insight about the importance of a sport psychology module in the existing osteopathic training?

Not important	Relatively important	Fairly important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Section Three: Attitudes

* 32. How beneficial do you think it is to incorporate psychosocial strategies into rehabilitation?

Not at all	Slightly	Somewhat	Moderately	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 33. How much of a positive effect do you think psychosocial strategies can have on rehabilitation outcomes?

Not at all	Slightly	Somewhat	Moderately	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 34. Do you have access to an accredited sports psychologist?

* 35. Rate your overall level of preparedness in the psychosocial strategies area.

Not prepared	Somewhat prepared	Quite prepared	Well prepared	Very well prepared
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 36. Thinking very generally about your overall career in osteopathy, would you say that you are?

Very satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Very dissatisfied
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix B: Information for participants



Participant Information Sheet Online

My name is Simone Ferguson. I am currently enrolled in a Master of osteopathy programme at Unitec, New Zealand and seek your help in meeting the requirements of research for a Thesis course which forms a substantial part of this degree.

The aim of my project is to examine osteopaths' attitudes and self-reported practices towards psychosocial content in sports-injury rehabilitation. In addition, I will also examine construct validity and internal consistency of an osteopathic adaption of the Athletic Trainer and Sport Psychology Questionnaire (ATSPQ).

If you agree to participate, you will be asked for your consent and to complete a **questionnaire** about your attitudes and practices towards psychosocial content in sport-injury rehabilitation. Completing the questionnaire should take around **15 minutes in total**.

Neither you nor your organisation will be identified in the Thesis. The results of the research activity will not be seen by any other person in your organisation without the prior agreement of everyone involved. All information collected from you will be stored on a password protected file and only you, myself, and the two supervisors will have access to this information. You are free to ask me not to use any of the information you have given, and you can, if you wish, ask to see the Thesis before it is submitted for examination.

By submitting a completed form, you are consenting that any information given on that form may be used in this research project. If you do not wish to participate, there is no need to continue with this document.

I hope that you find this invitation to be of interest. If you have any queries about this research, you may contact my supervisors at Unitec New Zealand.

My supervisors are:

Sylvia Hach, contactable at shach@unitec.ac.nz

Megan McEwen, contactable at mmcewen2@unitec.ac.nz

UREC REGISTRATION NUMBER: 2019-1027

This study has been approved by the UNITEC Research Ethics Committee from 6 September 2019 to 6 November 2020. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix D: Definitions of psychosocial interventions and psychosocial conditions

Psychosocial interventions

Creating variety in rehab exercises

Adjustment/individualisation of the exercise programme throughout all levels of recovery based on feedback from the athlete. Rehab exercises are arrived at in recognition of every athlete responding differently emotionally and behaviourally to injury.

Encouraging effective communication skills

Communicating in a genuine and positive manner with the athlete thereby conveying one's interest in their recovery.

Encouraging positive self-thoughts

Encouraging athletes to maintain positive rather than negative self-thoughts in order to direct and motivate the athlete through the rehabilitation process.

Enhancing self confidence

Making the patient aware of their ability to choose confidence over being hesitant through strategies such as positive self-talk (i.e., an "internal dialogue" employed to aide interpretation of the situation).

Improving social support

Increasing social support of the athlete includes connecting them to a sport psychologist, a sports medicine team, family, coaches, peers, or group sessions, by demonstrating empathy and trust, and by providing information, suggestions and advice about the general rehabilitation process.

Keeping the athlete involved with the team

Keeping the athlete involved with the team by involving the coach in the rehabilitation process early on and encouraging continuous team involvement.

Reducing depression

Depression is a common disorder that influences mood levels, as well as the amount of engagement a person may have in their normal activities and their ability to enjoy them. Athletes experiencing negative, self-defeating thoughts may be taught how to control these by replacing them with positive thoughts. An example of this is replacing unproductive thinking patterns that may contribute to psychological distress with acceptance and change-oriented skills (e.g., focusing on injury having allowed time to rest and catch up on other important aspects of life that have been neglected, as well as proving to the athlete they are still able to complete many activities and that they are not completely disabled as a result of their injury).

Reducing stress or anxiety

Reducing an athlete's stress levels by educating about what to expect in terms of mobility and pain levels, as well as the expected components of the rehabilitation process.

Teaching emotional control strategies

Teaching emotional control strategies include making the athlete aware that their recovery depends on their positive attitude and teaching strategies such as positive self-talk and writing about negative thoughts, emotions and feelings related to their injury.

Teaching muscular relaxation techniques

Teaching relaxation techniques to reduce the amount of muscular tension an athlete holds. This may include progressive muscular relaxation technique (PMR, tensing and relaxing individual muscle groups to help develop body awareness and the ability to release muscle tension), breathing techniques (slow breathing, deep breathing, diaphragmatic breathing, and breathing meditation) and passive relaxation (e.g., using deep breathing and imagery to picture the tension as liquid in their muscles and with every deep breath, the liquid draining away).

Using mental rehearsal/visualisation

Mental imagery is a psychological activity that uses one's perception to mentally stimulate physical abilities the athlete does not have. Imagery can incorporate the five senses and can be used for either cognitive or motivational purposes. The cognitive function involves mental rehearsal of specific skills, various strategies and plans relating to sport. Whereas the motivational function involves the athlete imagining themselves achieving a goal such as their treatment goals and making a full recovery.

Using relaxation techniques

Mental relaxation techniques allow the mind to relax, and in turn, relax the body and may include autogenic training (using both imagery and body awareness to place the athlete into deep relaxation) and transcendental meditation (self-induced state of "thoughtless awareness" facilitated by a word, sound or phrase repeated silently).

Using short-term goals

Setting and recording multiple realistic daily or weekly goals to allow the athlete to continually see progress.

Psychosocial conditions

Stress/Anxiety:

Anxiety refers to multiple mental and physiological phenomena, including a person's conscious state of worry over a future unwanted event, or fear of an actual situation. Stress can be defined as the physical, emotional and psychological pressures affecting an individual.

Anger:

Anger is defined as a common and natural emotion that is an expressive way of showing a problem or signs of frustration.

Treatment compliance problems:

Compliance is defined as persistence and maintenance of an action/process such as sticking to a therapeutic regimen. Problems with compliance could indicate low levels of persistence and maintenance throughout a regimen.

Depression:

Depression is a common mental disorder that influences mood levels, as well as the amount of engagement a person may have in their normal activities and their ability to enjoy them.

Problems with attention or concentration:

Concentration and attention are defined as the ability to focus on the task at hand while ignoring distractions. Problems with concentration or attention may include a lack of focus on tasks and easily being distracted.

Exercise Addiction:

Exercise addiction can be defined as a multidimensional, maladaptive pattern of exercise, leading to clinically significant impairment or distress. Exercise addiction can be diagnosed based on the perceived importance of exercise, tolerance of exercise, the subjective experience of the individual such as a “high”, withdrawal symptoms such as irritability, and relapses of previous extreme exercise patterns.