### Cardiff School of Sport

**DISSERTATION ASSESSMENT PROFORMA:**

**Theoretical / Conceptual**

( Including: Desk-Based, Secondary Data, Meta-Analysis )

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<table>
<thead>
<tr>
<th><strong>Student name:</strong></th>
<th>Catherine Hammacott</th>
<th><strong>Student ID:</strong></th>
<th>20012186</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Programme:</strong></td>
<td>SCRAM</td>
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<tr>
<td><strong>Dissertation title:</strong></td>
<td>The role of massage in the management of athletes: A review</td>
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<tr>
<td><strong>Supervisor:</strong></td>
<td>Mike Wadsworth</td>
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<tr>
<th><strong>Comments</strong></th>
<th><strong>Section</strong></th>
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<tr>
<td><strong>Title and Abstract (5%)</strong></td>
<td>To include: A concise indication of the research question/problem. Abstract to include: A concise summary of the theoretical study undertake.</td>
</tr>
<tr>
<td><strong>Extended Introduction (20% [10%])</strong></td>
<td>To include: outline of context for the question; clear articulation and justification of the research question; indication of research expectations.</td>
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<tr>
<td><strong>Research Methods/Process (15% [10%])</strong></td>
<td>To include: justification of a secondary data collection approach; justification of inclusion and exclusion criteria and any search parameters utilised; process/procedure adopted; clear articulation and justification for the structure and development of the study.</td>
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</tbody>
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| **Critical Review (35% [50%])** | To include: a synthesised academic exposition and evaluation of:  
  - factually relevant data  
  - conceptual understanding(s)  
  - theoretical account(s)  
  - established line(s) of argument  
  in relation to the research question(s)/problem posed by the study; logical structural divisions that evidence appropriate and thorough development in critical analysis; reasoned enquiry progressing towards the formation of a justified position in relation to the research question(s)/problem posed by the study. |
| **Explicit Summary (15%)** | To include: explicit presentation of position concluded from the study; discussion of the limitations and a critical reflection of the approach/process/procedure adopted in the study; an indication of any potential improvements and future developments derived on completion of the study; an insight into any implications and a conclusion which summarises the relationship between the research question and the major findings. |
| **Presentation (10%)** | (To include: academic writing style; depth, scope and accuracy of referencing in the text and final reference list; clarity in organisation, formatting and visual presentation). |

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1. This form should be used to assess Theoretical/Conceptual dissertations. The descriptors associated with Theoretical/Conceptual dissertations should be referred to by both students and markers.
2. There is scope within CONCEPTUAL/THEORETICAL dissertations for the EXTENDED INTRODUCTION and RESEARCH METHODS/PROCESS sections to be presented as a combined section, particularly where matters of REPLICABILITY of the study are not central. The mark distribution to be used in studies of this kind is indicated in square brackets.
THE ROLE OF MASSAGE IN THE MANAGEMENT OF ATHLETES: A REVIEW

(Dissertation submitted under the discipline of SCRAM)

CATHERINE HAMMACOTT

ST20012186
THE ROLE OF MASSAGE IN THE MANAGEMENT OF ATHLETES: A REVIEW

Cardiff Metropolitan University
Certificate of student

By submitting this document, I certify that the whole of this work is the result of my individual effort, that all quotations from books and journals have been acknowledged, and that the word count given below is a true and accurate record of the words contained (omitting contents pages, acknowledgements, indices, tables, figures, plates, reference list and appendices).

Word count: 10,183
Name: Catherine Hammacott
Date: 20/03/2014

Certificate of Dissertation Supervisor responsible

I am satisfied that this work is the result of the student’s own effort.
I have received a dissertation verification file from this student

Name:
Date:

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Acknowledgements

I would like to acknowledge those who have supported and motivated me during the process of conducting this review. I would also wish to give thanks to Mike Wadsworth and Rob Meyers for their support and guidance throughout.
ABSTRACT

Background – Over the past decade sports massage has massively grown in its use within everyday sport. Athletes are now opting to include it in their training regimes as a means to enhance their performance and recovery. Massage is regularly applied in sport regardless of there being a significant lack of evidence to support its application pre and post training or competition.

Aim - The purpose of this literature review was to examine current studies and findings in order to determine the psychological and physiological influence of massage on an athlete’s performance, recovery rate, psychological mood state and injury.

Method – Articles were chosen from four chosen databases; SportDiscus, SUMMON, Medline and the Cochrane Database of Systemic Reviews. In order to ensure that only relevant material was consulted, specific key-words or phrases were used to only allow for appropriate journal articles and references to be included.

Findings – Evidence has shown positive support for the use of massage in sport, be it pre or post event. It was found that an athlete’s performance, recovery, injury and psychological state were all shown to be influenced positively after massage application.

Conclusion - The findings of this study suggested that the influence of massage had upon the athletes psychologically was much greater than its impact physiologically. The findings’ also allowed for the discussion that additional research should consider focusing more upon the physiological influence of massage application. This would be helpful for future therapists to justify why they are implementing massage within their treatment strategies.
CHAPTER 1

INTRODUCTION

Massage therapy has been defined as “the systematic manipulation of soft tissues of the body for pain reduction or other therapeutic uses” (Ernst, 2003, p.1101). This has always been considered as a therapeutic practice with its’ origins in early civilisation. In addition it has been argued that such management is one of the oldest forms in the world, having first been acknowledged in China during the second century B.C (Field, 1998).

In more recent history the newly formed “modern massage” era began in 1886 through the production of publications that classified each technique by how the bodily system was affected. Initial movements such as rubbing and kneading, which form the foundations of today’s massage techniques, arose from a natural response to pain that developed in humans. The thought process behind the movement was that rubbing a troubled area would ease any discomfort (Goats, 1994). As a result of this, research into the use of massage for medical purposes was re-stimulated and techniques began to rapidly expand as knowledge in that field grew (Goats, 1994). In the early Nineteenth century there was a desire for a much greater accuracy and understanding of the present medical science documentation. The later part of the century saw this happen with the start of academic study of massage treatment; the results of which created the foundations of the field today (Callaghan, 1993). Massage did however have a decline over the later 20th century, with some proposing that the development of the pharmaceutical industry and advancement in new technological machines aiding physical therapy were to blame (Callaghan, 1993).

As the years have progressed so too has the revival of the massage industry; becoming restored as popular method of therapy for rehabilitation and relaxation globally. With this there are surprisingly very limited adverse effects (Frey et al., 2008). Although the use of massage in hospital physiotherapy departments is now very limited, its application within both professional and recreational sport has maintained a high profile. It is now a regular and vital part of an athlete’s training regime (Callaghan, 1993). Most recently, a study based within the UK demonstrated that within the last decade sports massage was applied for 45% of the time upon individuals who were undergoing physiotherapy treatment. However a limit to this point was that these were mainly undertaken in sporting clubs and outside of hospital hours (Weerapong, Hume & Kult, 2005).
Many teams are now recruiting massage therapists as part of their medical staff to provide treatment for their athletes’ before, during and after competition (Shroff and Sahota, 2012). For example, when an athlete becomes injured during competition or training, the sports massage therapist will be a vital part of the medical team and the individual’s recovery. Their aim is to support the players’ rehabilitation demands and ensure that the goal recovery is completed in as short a time as possible (Clayton, 2011). Statistics taken from the 1983 Boston Marathon revealed that the sports massage team recruited was made up of 20 student massage therapists; providing treatment to any of the runners before or after competition. When comparing this number to the 175 therapists used at the 2001 marathon there is a clear indication as to what extent this treatment method has grown, in terms of its’ popularity and requirement to aid both the performance and recovery of the runners. The statistics also disregarded the sporting status of the individuals, indicating that both recreational and elite personnel opted to have sports massage treatment (Mickelwright, Griffin, Gladwell & Beneke, 2005). One study produced by Galloway and Watt (2003) provided very similar statistics demonstrating that 47% of treatment administered to all of Great Britain’s athletes at the 1996 Atlanta Olympic Games was sport massage.

Goats (1994, p.149) defined massage as “hand motions practiced on the surface of the living body, with a therapeutic goal.” There are many different techniques used in sports massage, with numerous hand skills falling under each heading these include; effleurage, petrissage, tapotement, dermal lifting, compressions, vibrations, frictions and stretching as well as a few others. It is important for a practitioner to establish a justification for the techniques which they apply to their client, so that they are able to meet their personal needs. To clarify this point, the choice of each technique used within a strategy can be based upon the athlete’s personal preference so may be completely individually biased to suit their needs. Each massage however should also be tailored to suit the requirements of the time in which it is being applied. For example, selection of a massage strategy would be tailored to the phase of training or competition; this may be the last hour before competition or within mid-week training.
It is generally thought that deeper, more specific techniques such as specific stretch may not be suitable for use if the massage is pre-event and should be applied with caution and only if necessary. This is because muscles may be overstretched, leading to discomfort for the athlete (Johnson, 2009). However a counter-argument could show that deeper techniques such as this may allow for a return to full range of movement. This shows that this study into the current massage literature is crucial in finding advantages and disadvantages in topics such as this.

There are numerous reported aims and objectives of sports massage as a method of treatment be it before or after competition. An example of this would be that it is believed to enhance performance if applied beforehand. Many athletes also make pre-event preparation and post-event recovery a requirement of their training throughout the week to assist in injury prevention. A large proportion of such treatment is based on the athletes’ confidence in massage providing several benefits physiologically based upon the foundations set by previous experience rather than significant research evidence of its benefits (Dinsdale, 2010). This point supports the idea that the use of massage as part of an athlete’s training programme can be somewhat psychological as well as physiological for the individual (Weerapong et al., 2005). Current literature on the whole, however, lacks the evidence needed to support this.

Current studies have found that there is a great bias towards the physiological benefits of massage upon athletic performance which suggests that attention should be turned to its efficacy upon psychological state of the athlete (Mickelwright et al., 2005). It is important to look into this subject area to determine at what point massage is most influencing on performance when talking about the psychological effects, in this case it may be before, during or after competition. Some studies have produced evidence for a reduction in anxiety levels of the individual after massage has been applied (Zeitlin, Keller, Shiflett, & Bartlet, 2000). It is suggested that massage prior to physical activity, whether it is exhaustive or recreational, can increase levels of confidence and reduction of anxiety, as well as concentration and readiness for a performance (Weinberg and Jackson, 1988). From this a foundation was set to support the psychological benefits of such a treatment. This is because the results of their study showed that massage prior to running increased the “feel good” levels of the athletes, resulting in them each being able to produce more of an optimum performance with which they were highly satisfied.
Massage post-exercise is also just as important psychologically as it allows the athlete to relax and unwind from what could have been a maximal effort in performance; they may feel that without this as part of their regime they will be more prone to fatigue and injury the next day (Arroyo-Morales et al., 2008).

In recent literature, sports massage has gained a large amount of attention in regards to enhancing recovery of an athlete post-activity (Bishop, Jones, & Woods, 2008). Many coaches and athletes recommend that regular massage post-training or post-competition has the capability to increase recovery rates and repair any muscular damage caused through exercise (Dawson, Dawson, & Tiidus, 2004). It was said that massage treatment after maximal exercise can facilitate the removal of lactate from the soft tissues as well as relieving the athlete from the delayed onset of muscle soreness (DOMS), (Martin, Zoeller, Robertson, & LePhart, 1998). Sports massage can be applied to the athletes during periods of fatigue both whilst in training and post-competition. A tired athlete is required to increase efforts to maintain their intensity. Therefore recovery between sessions is vital in order to ensure that optimum performance is reached (Arroyo-Morales, et al., 2008).

Zainuddin, Newton, Sacco, and Nosaka (2005), believed that sports massage could be widely used post-event as a form of treatment for athletes. They acknowledged that the primary reasoning for such a treatment after eccentric exercise was to facilitate and improve an individual's level of delayed onset of muscle soreness (DOMS). Hilbert, Sforzo, and Swensen. (2002 p.72) define DOMs as “the skeletal muscle pain that follows the first 24-48 hours post eccentric exercise activity.” The main focus of their study was to look at the use of massage as a treatment modality and how it reduced ones level of DOMS in order to enhance recovery. In conclusion their study suggested that when applied, massage can help to reduce the inflammatory response, thus showing its link with injury prevention. However future research would need to look at whether this in fact is detrimental to recovery as the inflammatory process is important for recovering from injury and regaining fitness.

Dorian et al., (2007) hypothesised that regular application of sports massage in a training programme can be influential in increasing muscle flexibility, whilst at the same time reducing muscle tension. Both of these factors are important influences upon injury prevention (Weerapong et al., 2005). To support this, Barlow et al. (2004) commented that massage was found to relax muscle structures and therefore increased their flexibility so
that movement economy also developed. Through this the increase allowing for injury risk to be reduced significantly. Within the authors’ writing it is also brought to attention that another study by Crosman, Chateauvert, and Weisberg (1984) demonstrated how application of massage to the hamstring aided in an increase of the passive range of each athlete’s hip joint. This statement is a prime example to show how important massage therapy can be used for pre-event. Importantly, it also suggested that massage before training or competition should never be considered as a complete replacement for a well-structured warm-up. Barlow et al. (2004) and Crosman et al. (1984) provided literature to support the choice of many sporting individuals and teams who are now ensuring that massage treatment is available where required. There is a wide-spread belief that massage will positively influence the athlete’s performance physiologically; through muscle structures being pre-warmed and stimulated for exercise (Arabaci, 2008). Through this treatment, the likelihood of the athlete becoming injured during training or competition is reduced and the individual will become psychologically prepared for the competition that lies ahead.

The study was very similar to that of Brummitt (2008) who failed to find appropriate support for the use of argument in sport. The reason for this was that the author failed to find accurate resources that focused upon the psychological influence of massage as well as physiologically. Therefore in order to develop their work, this study had the aim of finding more recent text to cover these areas. The purpose of this research article was to review and discuss the current literature that has looked at the advantages of sports massage to support its ever-growing popularity in the management of today’s professional athletes. This process covered a variety of sporting environments and level of athlete. The review focused on the impact that massage had on the outcome of performance, recovery, injury and psychological readiness of the athletes and therefore covered both its physiological and psychological advantages. It was presumed that all of the topics evaluated would be positively influenced through massage, helping the performers to achieve optimum performance.
CHAPTER 2
RESEARCH METHODS

In today's sporting industry, massage remains highly regarded as a critical part of an athlete's or sports team's training regime and has become widely used around the world. Massage is able to be applied prior, intermediate or post training and competition. The aim of this study was to evaluate how useful massage was in sport and specifically looked at the influence upon psychological readiness, performance, recovery and injury. A variety of different sporting activities, ability levels, and age of participants were examined in order to maintain the study's external validity. This helped to guarantee that any of the results found were able to be generalised to any form of athlete. The foundations of this review were based upon a similar study conducted by Brummitt (2008) and was structured in a very similar manner, in regards to sub headings and layout. It was ensured that all work and arguments contributing to the literature review were kept original in order to avoid any account of plagiarism from occurring. The process of constructing this literature review, in regards to the method of selecting the appropriate resources is explained within the following section.

2.1 Article Selection

There were four different topics chosen to be critiqued to show how they were influenced through the application of massage. These were performance, recovery, injury and psychological readiness of the sports performer as it was felt that these would cover all aspects of a sporting environment. After analysing the literature it was found that some articles fell solely into one of the four topic titles and others fell under a mix of each; for example, psychology and performance. It was ensured that when selecting appropriate articles, the results of each of them were relevant to support at least one of the four topics being evaluated.

During this process each article was colour coded to reflect the topic that they covered and there was an additional colour for those that fell under more than one of the topic
headings. Doing this ensured that the selection process remained highly organised so that it was easy to access any resources when needed.

After colour coding each article they were then read through and numbered between one and three based upon how relevant their findings were to this study. In this case three was the highest mark that each article was given. This additionally helped the organisation of this literature review as the highly relevant articles were prioritised to be used above the others, ensuring that only appropriate resources were applied. Completion of this also provided an insight into topics which were low in resources compared to those which were high.

2.2 Inclusion / Exclusion Criteria
When selecting articles to be included with the literature review there was a strict protocol maintained throughout. This was done through the use of four different electronic databases that acted as search engines. The four which were specifically chosen for use in the research process were as follows; SportDiscus, SUMMON, Medline and the Cochrane Database of Systemic Reviews. Only these four databases were chosen as they were easy to use and there were some accessibility issues with other online search facilities. It was a requirement that the articles chosen from the results of the search engines were peer-reviewed so that the quality of writing was of a high standard. Searching for literature in this manner helped to facilitate the time spent searching through different texts and it would then be guaranteed that those used within the review were valid and reliable for their purpose.

Additional resources were accumulated by manually searching the reference lists of any articles and texts identified within this to ensure that relevant literature were obtained.

Additionally it was hoped that the massage intervention that each research study used included the different techniques listed in table 1.0. This was part of the research protocol as it would have been useful to find whether specific massage techniques applied to the athlete produced different results. It was also interesting to examine whether a combination of the techniques also produced a variety of results when applied and whether they were influenced by the time of application. For example some of the pre event massage interventions used different techniques compared to that applied post event. Some studies however only referred to massage as a whole without specifying
exactly which techniques they were using, it was decided that these were to be used within the literature review if their results were useful for its’ outcome.

Only specific key-words or phrases were used when searching for appropriate journal articles and references. The number of articles that appeared when using different sets of key words can be seen in table 2.0. This was produced as a way of showing which areas have a lot of supporting literature and which needed further evaluation.

In order to be included within the study it was a specific requirement that the papers or text used were taken from a well-known textbook or from any peer-reviewed articles. It was also an additional requirement that the peer-reviewed articles were mainly taken from journals that were well known and were highly ranked in academic quality. Those articles that were not from peer-review journals were not included within the review, with the reason being that they were unable to be considered academic enough to provide valid findings that were relevant for this current study.

There was no set procedure to only include articles and texts that looked at sports participants so that results were able to be generalised. However it was ensured that most of the articles critiqued were linked to physical activity in some manner.
<table>
<thead>
<tr>
<th>Technique</th>
<th>What is it?</th>
<th>Hand Skills:</th>
</tr>
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<tbody>
<tr>
<td>Effleurage</td>
<td>The skin is stroked with pressure towards the heart; applied with hands, hand or forearm. The pressure is kept constant and the contact area mainly broad.</td>
<td>Figure of 8 / Half Moon / Flat hand / Cam and Spindle / Reverse Cam / V / Rotary V / Rake / Reverse Rake / Opposing Glide / Pisiform / Forearm Glide / Heel and Thumb / Butterfly / Reverse Butterfly</td>
</tr>
<tr>
<td>Petrissage</td>
<td>Two hands move in inwardly moving circles which intersect. The points of intersection are pinched together during the movement between finger and thumb. A “wringing” or torque is placed upon the soft tissues.</td>
<td>Wringing or kneading of soft tissues</td>
</tr>
<tr>
<td>Dermal Lifting</td>
<td>Very beneficial when there is poor movement or sticking of skin to soft tissue. The technique is performed by lifting or rolling the skin (dermal layers) and subcutaneous layers away from the muscles and skeletal structures</td>
<td>Skin rolling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin shaking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin spading</td>
</tr>
<tr>
<td>Vibrations</td>
<td>Shaking a relaxed muscle or muscle group of a limb; usually by its distal tendon. Vibrations may also mean rocking the whole body at a set frequency.</td>
<td>Body Rocking / Arms – Prone / Arms – Flexed / Arms – Supine Legs – Straight Prone / Legs Bent – Prone / Legs straight – Supine / CSP</td>
</tr>
<tr>
<td>Tapotement</td>
<td>A rapid, rhythmic movement by the hands, originating from a relaxed wrist, which strikes the body briskly and alternately, usually at a rate between 4 to 10 strikes per second.</td>
<td>Cupping / Hacking / Slapping / Pinching</td>
</tr>
<tr>
<td>Frictions</td>
<td>Cross-fibre rubbing over a muscle, tendon or ligament. The stroke is usually applied in the same direction and can be done using the thumb, fingers or knuckle</td>
<td>Finger, thumb or knuckle</td>
</tr>
<tr>
<td>Compressions</td>
<td>Direct, usually static, pressure applied by thumb, heel of hand or elbow into muscle and/or connective tissue.</td>
<td>Thumb / Heel of Hand / Elbow / Finger / Fist / Rolling Compression</td>
</tr>
<tr>
<td>Stretching /</td>
<td>Normal Stretching vary between Physiological Stretch, functional stretch and passive stretch. Specific stretch can be active or passive. Roughly held for 10s x 3</td>
<td>Shoulder / Triceps / Pecs / Hamstrings / Glutes / Quads / Calves</td>
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<td>Specific</td>
<td></td>
<td></td>
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<tr>
<td>Stretch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trigger Points</td>
<td>A compression applied to release tension in a specific area, this can be done by direct ischemic pressure and stroking.</td>
<td>Can be applied to various areas of the body</td>
</tr>
<tr>
<td>Myofascial</td>
<td>Application is dependent on the nature of the fascial problem. Can be applied via fist or flat hand.</td>
<td>Can be applied to various areas of the body</td>
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<td>Release</td>
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*(SPS Ltd, 2003) and (SPS Ltd, 2012)*
(Table 2.0) The key terms searched within each database and their findings

<table>
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<th>Key words Searched</th>
<th>Number of articles found Using in Summon</th>
<th>Number of articles found Using in SportDiscus</th>
<th>Number of articles found Using in Cochrane</th>
<th>Number of articles found Using in Medline</th>
<th>Number of articles used in Critical Appraisal</th>
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<td>3) Trigger Points</td>
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<td>4) Myofascial Release</td>
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<td>5) Sports Injury</td>
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<td>6133</td>
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<td>6) Injury prevention</td>
<td>298,642</td>
<td>8793</td>
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<td>7) Performance</td>
<td>3927,365</td>
<td>41,952</td>
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<td>8) Physiological benefits</td>
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<td>9) Recovery</td>
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<td>10) Psychological readiness</td>
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<td>11) Pre / post event</td>
<td>953,899 / 996,926</td>
<td>109 / 124</td>
<td>174 / 201</td>
<td>0 / 0</td>
<td>0</td>
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<td>1 &amp; 3</td>
<td>576</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>1 &amp; 4</td>
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<td>3</td>
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<td>10</td>
<td>1</td>
<td>8547</td>
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<td>1 &amp; 7</td>
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CHAPTER 3
CRITICAL EVALUATION

3.1 Psychology

Sports massage is commonly applied to athletes as a form of preparation in both physical and psychological forms prior to competition. Arroyo-Morales et al. (2008), suggested that single applications of massage have been reported to reduce various body and mind parameters such as anxiety, blood pressure and heart rate. In support of this Brummitt (2008), found that pre-event massage was a recommended mechanism which when applied helped to decrease pre competition anxiety and stimulate the muscles ready for physical activity. In addition, Dawson (2011), argued that with regular sports massage an athlete’s perception of themselves in competition or their ability to cope with fatigue was much higher.

A study by Weinberg and Jackson (1988) assessed the relationship between exercise, massage and the enhancement of an individual's mood. The authors’ of the study concluded that massage did have a positive influence upon performance. In the study a variety of different sports were examined by acquiring students involved in numerous activities such as jogging, swimming, racquetball and tennis, for participants. The results showed that it was the individuals who took part in jogging who showed a greater change in their psychological mood state as a result of receiving massage, compared to those involved within the other sporting activities. It should also be mentioned that alongside these students, the study involved another set of individuals who acted as a control group who were not involved in any physical activity. Both groups were required to complete a Profile of Mood States (POMS), a State Anxiety Inventory (SAI) and a general activation checklist before and after their 30 minutes of physical activity. The completion of these was a great strength to the testing protocol as each provided an in-depth approach to measuring the participants’ levels of anxiety. This was deemed important as a variety of testing protocols allowed for an increase in the validity of the research study as more data was able to be collected.

However whilst this study did prove to be useful in producing results to support the argument that the application of massage can influence the psychological state of an athlete there are many limitations within the text to threaten this. Firstly the study only considered athletes who were involved in individual sports as the chosen participants;
without any regard for those involved in team sports. From this point, the study therefore lacked the ability to be generalised to all sporting contexts. Consequently, it was questionable that the results of the three anxiety tests were biased towards that factor and it would be valuable to challenge whether the results could be generalised to team players in future studies looking for a similar outcome. A further limitation to the study conducted by Weinberg and Jackson (1988), specifically concentrating upon the massage intervention, was that only full body Swedish massage was used. The author’s provided no indication of what hand skills were used, the depth and the rate and timings each were applied. As a result of this process the study is unable to be an appropriate format for use in future studies as there was no specific massage protocol that was followed by the therapist.

Subsequently a study conducted by Zeng (2003) did exactly this, as the author evaluated the differences in anxiety levels between team and individual sports participants. It was concluded that those competing within individual sports were found to have lower anxiety levels than those involved in team sports. Based upon this finding, the original study by Weinberg and Jackson (1988) would not be useful to generalise to team sports as they may seem to score higher on the anxiety scores but achieve a significantly reduced score post- massage intervention.

A similar study produced by Micklewright et al. (2005) created a comparison of an athlete’s mood state response to massage application pre-event and assessed any influence that this may have had upon their subsequent performance. The study focused upon 16 recreational athletes who helped to maintain the validity of the study due to a reasonably sized participant group. In contrast to Weinberg and Jackson (1988) the authors’ ensured that all were taking part in activities at a similar level between two to four days a week. The study was comprised of two randomised groups, where one group received 30 minutes of massage prior to performing a 30-s Wingate test and the second received a 30 minute period of rest. Like the previous study, Micklewright et al. used a POMs scale to assess the levels of anxiety of the athletes both before and after. Their overall findings contrasted those of Weinberg and Jackson (1988) as the authors established that massage had very little impact upon mood state. However it was recognised that the massage group did show an improvement in their Wingate scores; suggesting that if one significant point could be determined by the study it would be that pre-event massage does have an important influence upon the outcome of an athletic performance. It would be useful to determine
whether the use of additional techniques within the massage protocol would have influenced the results. By using effleurage and petrissage together the results have showed a positive outcome on sports performance, (Micklewright et al., 2005). However it is questionable what exact technique caused that influence and if the study only used one of the skills would the results be any different. There also needs to be consideration for some athletes who need high levels of arousal prior to competition compared to others. Therefore it should be reinforced that the choice of massage protocol used pre-event is crucial to either maintain or reduce this (Kajbafnezhad, Ahadi, Heidarie, Askari, & Enayati, 2011). For example, massaging a rugby player compared to a gymnast before competition would be completely different environment. Therefore the surrounding “ego” of the athlete needs to be taken into consideration.

There were several strengths of the research process helping to maintain the validity of the study conducted by Mickelwright et al., (2005). The protocol for the massage intervention applied was very detailed in regards to how it was applied, as stroke rates were mentioned in the description. The massage specifically focused on the athlete’s back instead of their legs as this may have manipulated the muscles within the leg to influence the results of the performance (Micklewright et al., 2005). Additional strengths of the testing protocol were that both interventions were separately applied in the same environment; in this case the author chose a quiet room. Doing this helped to standardise the tests and reduced any external influences or distractions that may have altered the outcome of the results.

A study conducted by Arroyo-Morales et al. (2008) was extremely useful in furthering support for the influence of massage psychologically. The aim of their study was to evaluate the effect of massage on the neuromuscular recruitment, mood state and mechanical nociceptive threshold after periods of high intensity exercise. Similar to that of Micklewright et al. (2005) the study split 62 participants into two groups, performing three 30s Wingate tests before receiving one of the interventions; group one received whole body myofascial release and group two a placebo (sham ultrasound). They were both delivered for the same amount of time, in the same position and applied by the same therapist; helping to maintain the validity of the testing procedure. The authors argued that post-exercise massage generated an overall sense of wellbeing, a reduction in anxiety and an improvement in self-perception of recovery of the participants. It was discussed that the use of POMS allowed for a more clear explanation of the variance between different stimuli; in this case it was the resulting influence of the massage intervention that was
applied. The findings of this study were that the application of massage helped to change the muscle-fibre tension length relationship. This was influenced through the alteration of muscle function and it was suggested that this is took place because of a change in psychological state of the participant, moving from anxiety to relaxation. The chosen articles provided support for the influence of massage upon the psychological outcome of the sports performer before and after competition. However it was very clear that research within this area is contrasting and more specific studies that focus on certain hand skills and interventions need to be completed.

### 3.2 Recovery

Within today’s sporting culture athletes are put under great stress both physically and mentally due to the increase of intensity and demands of each activity. It has been discussed that activities which are predominantly made up of eccentric muscle contractions have a much greater potential to put the athletes at risk of injuring muscles, (Zainuddin et al., 2005). This is much greater when a certain action or technique is unfamiliar to the athlete within the training regime. Unfamiliarity to such activity has a greater potential to cause one to suffer from delayed onset of muscle soreness (DOMS) 24-48 hours post-exercise (Zainuddin et al., 2005). This point creates an important reasoning for efficient recovery protocols to be put into place after completion of physical activity.

Emphasis on recovery after both training and competition is now just as equally important as prior preparation. This means that the athletes are given valuable time to restore a feeling of well-being, thus allowing for progression and optimum performance in their next session (Delextrat, Calleja-Gonzalez, Hippocrate, & Clarke, 2013). There are many interventions that top athletes and teams have put into place within their training routines to aid recovery; with sports massage now being one of them.

A study that provided support for the use of sports massage as a recovery modality to enhance future performance is one by Ali-Rasooli, Koushkie-Jahromie, Asadmanesh, and Salesi (2012). The authors’ looked at how three different recovery interventions aided recovery and subsequent athletic performance in swimming. They found that active recovery and massage treatment were much more effective than passive recovery in improving swimming performance.
In a different study produced by Martin et al. (1998) there was discussion that various massage techniques, either used solely or in combination with each other, would aid recovery and subsequent performance through increasing the blood flow to skeletal muscle. To further this, Ogai, Yamane, Matsumoto, and Kosaka (2008) focused solely on the influence that petrissage massage had upon the fatigue levels and exercise performance following intensive cycle pedalling. The study concluded that the massage intervention had improved the participant’s levels of recovery; both from the perception of lower limb fatigue and muscle stiffness, thus increasing the level of performance in the second exercise bout. This was useful in supporting the use of massage post recovery and presenting a case where a specific technique was used on its own. However the procedure of this testing was somewhat limited in that the massage intervention was only applied for ten minutes and it could be questioned as to what effect this time period would have and whether a longer intervention with techniques combined would have provided anything contrasting. It should also be noted that the study only looked at the lower limb of the participant’s and therefore future research may need to look at the effect of massage on the recovery levels of the whole body in order to further support of these findings.

To continue support for the use of massage post-event in order to enhance recovery, Standley, Miller and Binkley (2010) discovered that massage intervention was extremely useful in facilitating post-exercise recovery. In the authors’ review it was discovered that previous studies found it most beneficial to apply the massage treatment up to two hours after exercise completion. They found that it was during this time frame massage was mostly influential in increasing in blood flow to the fatigued areas. The same review gave consideration to how different techniques applied at various stages post-exercise provided a variety of outcomes aiding overall recovery. For example, the review stated that a combination of effleurage and petrissage for fifteen minutes straight after exercise may have a greater impact upon blood lactate clearance than when applied five hours post exercise. This provided an interesting point as to how specific timing for massage application and the techniques chosen can influence the results of recovery.

A study conducted by Zainuddin et al. (2005) supported this argument and reflected upon how sports massage aided the reduction of delayed-onset muscle soreness (DOMS), swelling and the recovery of muscle function post exercise. The study looked at a group of
ten individuals who were required to perform ten sets of six maximal isokinetic eccentric actions of the elbow with each arm over a period of two weeks. One arm then received a ten minute massage three hours post exercise, whilst the other received no intervention. The research findings were extremely useful in providing a supporting argument for how massage treatment helped to decrease the outcome of DOMS post competition. The authors’ found that the massage intervention decreased the level of soreness felt by the athletes by 30% more than what was felt in the control arm. It also showed the positive impact of massage upon the muscle swelling that was experienced, this was assessed through the measurements of the participants upper arm circumference. The massage protocol that the study used was very good in that it was structured well enough to be followed by another individual if they were to re-test in the future. The therapist that was used in the study had a good three years of experience working with sports individuals and it was specifically stated that they ensured that the depth and rate remained constant. However there was a limitation to the study as there was no consideration to pain perception and thresholds being highly individual. In this case some of the participants may have perceived a higher level of DOMS if they had a low pain threshold, whereas others may have perceived a very low level DOMS, thus influencing the outcome of the research study.

The conclusion that can be made from this particular study was that massage did have an influence upon post-exercise recovery in this case delayed-onset of muscle soreness. This can be linked to the discussion of there being an optimum time for massage application. In the study it was clearly noted that the massage protocol was applied three hours post exercise. Therefore it would be highly useful to examine whether the application of massage before or after this may have produced a different outcome.

To further this point, a more recent study conducted by Delextrat et al. (2013), compared the effect of intermittent cold water emersion and massage on perceptual and performance markers of recovery by basketball players. In contrast to Zainuiddin et al. (2005) study, the massage intervention was applied to the players' immediately post competition. The results gathered found that there was an overall increase in the players' perception of recovery rather than a significant improvement in jump performance. These factors were tested 24 hours post intervention using a visual analogue scale (VAS). Such scales are used as a method for individuals to mark their perception of a certain situation, in the case of the study is was their perception of recovery (Torrance, Feeny & Furlong, 2001). This point can also make a reference to how massage has a predominant psychological
influence rather than physiologically, regardless of whether it is applied before or after exercise.

There are numerous limitations to this study however in that the participants had played different basketball matches when tested, which may have influenced their results upon the VAS scale. Additionally some may have played a whole game whereas others may have only played half of the game which resulted in varied levels of fatigue and therefore it can be argued that the testing procedure was not standardised. It can also be suggested that sports other than basketball may have provided a different outcome when using the same testing protocol. This is because basketball will place very different demands upon its players than perhaps a sport such as long distance running; which is much more focused upon continuous aerobic demand. When looking specifically at the massage intervention used within the study it was slightly limited as only effleurage and petrissage techniques were mentioned there was no discussion as to how the massage was measured to maintain its depth for each player. From this point it supports the argument previously mentioned that it may be useful to compare the effects of different techniques in future studies to see if results differ when used alone or in a combination.

An additional study conducted by Dawson et al. (2004) looked at how massage applied at various times post half marathon influenced the recovery of its athletes. Massage was delivered to twelve runners before the half marathon in order to gain a baseline for pain perception of the runner's quadriceps and hamstrings; following up treatment and testing on days one, four, eight and eleven post-event. The strength tests used for the quadriceps and hamstrings were completed through the use of isometric and dynamic peak torque obtained by a CYBEX NORM dynamometer. This linked to the discussion raised from the study of Zainuddin et al. (2005) which showed concerned for whether the time that the massage was applied post-activity had any influence upon the outcome of recovery measures. However the results contrast those of Zainuddin et al. (2005) as they found that massage had very little effect upon muscle recovery physiologically as there were no significant changes found in the strength tests of the quadriceps and hamstrings. Similar to Delextrat et al. (2013) the authors’ concluded that the runners’ perceptions of their recovery was much higher which supplies further evidence that massage significantly influences psychological readiness rather than physiological change.
It can be said that the inconclusive results of the study may have been because over half of the runners had never received massage treatment before and therefore did not feel as relaxed as the other athletes who knew the process of the intervention. An additional comment is that the participants were made up of a mix of male and female runners, which also could have influenced the results of the strength testing as males are predominantly stronger than females. To continue, participants will recover from excessive activity at different rates in relationship to their current level of fitness and therefore a standardised recovery schedule like the one used in the study may not have captured the true recovery rates of each person.

3.3 Performance

Sports massage is now often used prior to training and competition with the hypothesis that it will enhance athletic performance (Callaghan, 1993). It was discussed that the aim of pre event massage was to help to create a state of readiness for the athlete both within a psychological and physiological means (Tessier, 2005).

Current literature focusing on the physiological benefits of massage is fairly contradictory and remains an area for further investigation. However Tessier (2005) explained that pre-event massage helped to create a positive change in parasympathetic activity, which can be indicated through salivary flow rate, cortisol concentration and amylase activity. A more recent study conducted by Arroyo-Morales et al. (2009) supported the theory of parasympathetic activity being influenced through massage. Their research had the aim of determining the effect of massage on endocrine and immune functions of healthy participants after intense exercise and their results showed a significant increase in salivary protein within the massage group. However because their study looked at post event massage rather than pre-event their findings are irrelevant to the purpose of this section.

A study produced by Hopper et al. (2004) evaluated the effect of dynamic soft tissue mobilisation in comparison to massage on the hamstring length of female hockey players. The 39 participants were randomly allocated a group for each intervention and measured through straight leg raise and passive knee extension tests as a method of gathering results for hamstring length. The results were very supportive of the influence of both interventions with an improvement in the results of the passive knee extension test. This
provided an argument to support the use of massage pre event and provided an insight as to how an athlete’s performance can be improved. Additionally as flexibility and range of movement increased the risk of injury during performance decreased.

There was however a number of limitations to this study that negatively impact its validity for future use. Primarily the study focused upon the hamstring flexibility of females without any consideration to males. To expand on this point, it is well known that females have a greater range of flexibility than males and therefore the results of the study may have been very different if both genders were taken into account. Barlow et al. (2004) tested only males in a similar study where 15 minutes of effleurage and petrissage were applied. The results showed no significant change post intervention from a single massage application, thus contrasting Hopper et al. (2004). From this it can be suggested that it would be extremely beneficial to conduct a study where a standard protocol is set to test both genders. This would help to determine whether the findings of the previous studies were gender biased.

In support of the findings of Hopper et al. (2005), a study by Huang et al. (2010) focused upon short duration massage to the hamstrings musculotendinous junction. They analysed whether it induced greater range of motion; using a 30 second friction massage as an intervention. Whilst the time of application was extremely short the increase in range of motion was significantly greater in the post test. However the authors’ have suggested that a possible reason behind the increase of motion was that applying massage may decrease the ability of the muscle to detect pain, thus allowing for an increased range of movement before any discomfort was experienced. It could therefore be questioned whether the change in range of motion was effective for a long or short period of time and this could further the argument for whether it would be influencing before competition. It was also suggested that a longer intervention may have provided a different outcome for participants.

Another contradiction to the results found by Hopper et al. (2004) was an older study conducted by Sinclair and Tester (1993). The authors’ suggested that 60% of the sit and reach test was a product of one’s hip flexion with the remaining percentage from spinal flexion. They argued that if a participant had difficulty in spinal flexion due to tightness then
their results may not be a clear indication of their hamstring ability. This questions the choice of testing protocol and results which were produced.

Witkorssen-Moller, Oberg, Ekstrand, and Gillquist (1983) looked at the overall effects of general warm up, massage and stretching on ranges of motion in eight male volunteers; focusing on their quadriceps and hamstrings. Their findings showed that stretching had a greater impact upon range of motion of the areas tested however there was a very slight increase when the massage intervention was applied. It could also be added that this study was fairly old and therefore the results of something more recent would perhaps be more relevant to today’s population. Within the literature it was explained that the therapist applying the massage intervention varied the procedure for each individual based upon how tense he felt their lower limb muscles to be. This meant that the participants may have received different massage treatments and therefore lowered the standard of the massage protocol. The results of the study were unable to be generalised as they were based on the area in which the massage was applied and the protocol was used more to meet the participant’s needs rather than to standardise the testing procedure.

A study composed by Caruso and Coday (2008) examined the impact of massage treatment upon a resistance exercise programme. They briefly mentioned that a benefit of such an intervention was that blood circulation of the athlete was vastly improved, which can lead to a hastening of exercise induced metabolite transportation to tissues. The authors’ argued that an additional treatment, such as stretching or in the case of their study, elevation of a limb, regularly used alongside massage may prove valuable to the subsequent performance post-treatment. This provided a further support for its use by athletes prior to either training or competition.

However a study by Goodwin, Glaister, Howatson, Lockey and McInnes, (2007) was fairly contradictory to the use of massage pre-event. Their study looked at the influence of massage upon 30m sprint and found that there were no significant changes between the massage and the control groups. In support of this a study composed by Arabaci (2008) found that massage pre-event was detrimental to explosive and high speed motor capacities, such as vertical jump height and sprints.

This topic produced an insight into how the influence of massage upon performance remained unclear in some areas and that many of the articles are contradictory and
confusing in their findings. In many of the resources used, it was able to be suggested that there was little harm in using massage as an intervention prior to activity to enhance flexibility. Additionally they argued that massage may also be applied if they suit the psychological needs of the athletes prior to competition. However there were clear contradictions to this with studies such as Arabacie (2008) and Bradley, Olsen and Portas, (2007) who suggested that static stretching and increased flexibility of the athlete through massage was be extremely detrimental to performance.

Therefore there was confusion as to what an athlete should be completing prior to training and competition and it was clear that this area required much more future research than originally thought. Amongst this topic it was important to note that massage alone should not be used instead of or take the place of an adequate warm up as there was not enough supporting literature to allow this to happen without the risk of injury occurring.

3.4 Injury

When looking into how massage influenced the risk of injuries experienced by the athletes it was clear that the literature within this area was most limited. Many of the available texts have commented on the physiological effects of massage and its’ impact upon performance and recovery; which would help to decrease the risk of injury occurring. However there are numerous limitations to texts that state exactly how this occurs and studies that look at massage and injury specifically are fairly small.

There are now many professional individuals that work together as a team to look after athletes in terms of ensuring they remain injury free or receive adequate rehabilitation for their injuries. This team is known more formally as a multi-disciplinary team and are often made up of professionals such as physiotherapists, conditioning coaches, sports massage therapists, doctors and other medical experts. Many therapeutic modalities or rehabilitation programmes will be put into place by this team to ensure that athletes are at optimum health throughout their season or up until competition (Gazzillo & Middlemas, 2001).

It has already been stated that the application of massage has an influence over the enhancement of muscle relaxation, reduction of muscle soreness and overall promoting the healing process, helping the athlete to achieve optimum performance (Weerapong et
al., 2005). The same authors’ argued that with regular application massage had an influence over the alignment of muscle fibres which can therefore be effective in reducing tension on an area and preventing injuries such as muscle strains in the future. To further this, Frey-Law et al. (p.715, 2008) stated that “massage has been proposed to decrease tissue adhesion and promote relaxation”; thus providing a preventative measure for future injury. However they claimed that due to many previous studies measuring alternative treatments alongside massage they found it difficult to distinguish the true affect that massage had when used on its own.

Most recently a study conducted by Loghmani and Warden (2013), evaluated how instrument-assisted cross fibre massage increased tissue perfusion and micro vascular morphology of healing knee ligaments. Their study looked at applying cross fibre massage three times a week for three weeks post-injury to the medial collateral ligament (MCL) of the knee. They found that such treatment had a significant influence in the recovery of knee ligament biomechanical properties following such injury, thus supporting the view that massage can influence injury recovery rates. However this study was very limited in that it used animals as its participants and therefore the results may be exceedingly different if it were to be applied to humans. Individual rates of recovery would also need to be taken into consideration when applying this study to human participants. The massage protocol itself can also be judged as only friction techniques were applied to the chosen area. The application was also completed through the use of a tool rather than hands; it can be questioned as to what extent friction massage influenced injury recovery over any of the other massage techniques. Within the text there was no justification as to why the author’s chose to use that technique and to what depth and rate it was applied. This would have been important to include so that there was a more clear understanding of the study.

A systemic review authored by Joseph, Taft, Moskwa, and Denegar (2012) looked at different studies to assess the efficacy of deep friction massage in the treatment of a tendinopathy, in a similar fashion to that of Loghmani and Warden (2013). From reviewing numerous studies they were able to conclude that there was enough evidence to support the use of deep friction massage for tendinopathy injuries. However several limitations affected the validity of the studies that the authors’ collected their data from. They argued that it was hard to make a comparison of the results of the literature found as each study used different tendinopathy sites to apply their massage intervention. There was also
concern from the authors when additional interventions were used alongside the massage treatment as they found it much more difficult to analyse the full of the influence that the friction massage provided.

Halpin (2012) studied the effect of massage on lumbar spondyloolisthesis through the use of myofascial release techniques. Spondylolysis will normally occur first and this is a vertebral stress fracture most likely to occur at L4 and L5 due to excessive loading of that area. This injury will then progress to spondylolisthesis when there is a separation or slip at the fractured site. The authors’ found that after seven massage sessions the client who had been suffering from spondylolisthesis felt the onset of pain during walking and standing was much more delayed than normal.

Over the course of treatment the results presented a decrease in hyper-tonicity of the iliopsoas and quadratus lumborum, as well as hyper-lordosis, (Halpin, 2012). This indicated the influence that massage treatment had upon each.

An additional study authored by Preyde (2000) provided further support for massage application and looked at the effect of massage upon lower back pain. Similar to Halpin (2012) the results found that those who received the massage intervention achieved greater function, less pain and a decrease in the quality of pain compared to the control groups. However in contrast to Halpin (2012), the protocol used additional techniques such as trigger points and frictions upon the participants and this provides and argument for using more than one technique within a massage protocol. However a limitation found within the study was that the massage protocol was applied by two therapists, with no specific measure of depth and intensity for them to adhere to. It is also useful to mention that trigger point techniques can be highly individual as some may have a different reaction to it compared to others.
CHAPTER 4

EXPLICIT SUMMARY

This literature review provided a comprehensive reasoning for why the application of massage is regular in the training regimes of many athletes in sport. The review explored numerous resources and found that there were many which provided support for the use of massage in sport. It was found that there were various benefits of massage within all four of the areas that were studied; in particular their psychological mood state. This was regardless of whether the athletes were professional or recreational.

There were adequate resources and texts found to produce support for the physiological benefits of massage pre-event, however this area was somewhat inconclusive as some authors discussions were contradictory of each other. From the results found it was suggested that massage pre-event was highly individual and some athletes felt that they were much more prepared for the activity ahead after receiving treatment; regardless of the lack of evidence supporting the physiological benefits. More importantly there was great support and justification for the use of massage post-event and the literature review provided an in-depth look into how this impacted the recovery of the athlete.

4.1 Psychology

Psychologically this review found literature to support the impact that massage had upon an individual's mood state. The findings of the literature review suggested that the
outcome of a massage had the potential to be highly unique for each person to whom it was applied. The discussions found additionally claimed that there was a possibility of massage being sport specific; as differences were shown between team and individual sports.

The literature evaluated presented an argument that some sporting activities require higher levels of arousal from the performer than others. As a result, the techniques applied within a massage protocol were required to suit these needs in order to help achieve optimum performance from that team or individual. Therefore it should be suggested that in future research the application of massage should take into account the needs of the sports in which they are involved, in addition to what they are focusing upon in their study.

From the findings of the critical evaluation it can be suggested that future research to investigate how massage influences psychological state throughout an entire season may be extremely useful in offering further insight to this topic.

4.2 Recovery

In regards to recovery state following massage application, it can be summarised that there was enough support to reinforce why massage was used for the management of athletes. The studies that were analysed provided an in-depth argument to support how massage improves recovery; this was done through demonstration of how its application improved the blood flow to the designated area. As a result of this, the removal of waste products and lactic acid increased and therefore the risk of delayed onset of muscle soreness decreased; allowing optimum recovery. Many of the reviewed texts discussed a potential for there being a specific time-frame for which the intervention needs to be applied in order for optimum recovery to be achieved.

There was discussion of the use of massage alongside additional interventions such as active recovery as many of the articles claimed that this was more beneficial than when applied individually. It would be extremely beneficial in future to look at the relationship between recovery and psychology to distinguish whether massage influences the perception of recovery more than what it does physiologically. Failing to differentiate the two may lead to the risk of injury in future practice as it can be argued that a perception of
reduced pain does not indicate its’ true physiological state. The athlete may feel psychologically ready to return to play when physiologically they are not and if they were to return to training too early because of this, further injury may be caused. This point is also important to be taken into consideration by the multidisciplinary team that manages the athlete and there is certainly a space in current literature for this type of study to take place.

4.3 Performance

When summarising the influence of massage upon performance there was found support for its use pre-competition. There was clear evidence for an increased salivary flow rate and cortisol levels after receiving massage; indicating the readiness of the athlete for performance. Once again a relationship between performance and psychology was discussed as a large number of texts analysed found that massage prior to competition aided in reducing the perception of pain felt in the area applied. This consequently facilitated the following performance and additionally influenced the participants’ levels of anxiety and confidence. The literature review was fairly mixed between the two, with some authors suggesting that increased flexibility and blood flow helped to produce optimum performance. Whereas others dismissed the physiological influences, arguing that it was merely perception of the competition ahead. This leaves a gap in current literature for more efficient research to be carried out to make the relationship between the two much more clear.

Additionally whilst researchers confirmed the impact that massage had upon flexibility, there was no measurement in place to predict future performance and to also measure whether the increase was only a temporary change. Therefore future research will need to take this into consideration.
4.4 Injury

The evaluation of how massage influenced the injured athlete proved most hard as it was difficult to find appropriate academic support as this area of research was most limited. There was great difficulty in distinguishing the difference between recovery and injury literature as they were mainly interlinked. Minimal studies have been performed with the aim of assessing the role of massage during different stages of rehabilitation.

The findings of the critical evaluation in this topic suggested that massage intervention influenced the alignment of muscles fibres which aided in the decrease of tissue adhesion and therefore improved relaxation. Also there were a number of studies that looked at specific injuries and found massage treatments to these areas extremely beneficial to the athlete. However once again most of these reviews were based upon pain perception therefore there was a failure to differentiate whether this fell more under psychological influences rather than physiologically aiding the injury. Additionally there was failure to distinguish a difference between recovery and injury as a number of the sources critiqued provided support for the use of massage upon the delayed-onset of muscle soreness. However this had already been discussed when looking at recovery of the athletes and it can be argued that it was too difficult to separate the two.

4.5 Limitations

There were a number of limitations to this literature review. The structure of the essay proved difficult to maintain as many of the texts evaluated failed to fall into separate topics that were appointed, with many looking at two or more within their review. The main conclusion to be taken away from this review was that sports massage can be regarded as slightly more dominant in its psychological impact and the findings have shown that each category (performance, recovery and injury) can be influenced through this.

Another limitation to the findings of the critical evaluation was that a number of the studies used within the critique had many structural flaws to them. Mainly the massage protocols used within each study were fairly weak in there explanation of why they were applying techniques in a certain manner or why they chose the duration for application. The type of therapist delivery the massage protocol also varied within each study. This forms a plea for more vigorous protocols to take place in future studies so that validity and reliability of results are much higher.
If this review were to take place again these two limitations will need to be taken into careful consideration so that the results found are more valid to meet the aim of this study. Such limitations are challenging to the positive outcome of this literature review and may be harmful to the found support for the use of massage in sport.

4.6 Potential improvements and future developments

The desire for future research within certain topics has already been mentioned within this summary with hope that there will be more research conducted to provide an insight into the physiological effects of massage rather than the psychological. Additional developments for the current resources available should look to produce studies that are more biased towards sports massage specifically. This could potentially be done through completing a much more vigorous sports massage protocol so that the results can’t be argued to be influenced through different forms of massage application.

It is worth mentioning that massage therapists look to meet their clients’ needs rather than following a standardised protocol. Therefore as all of the studies set up a massage protocol that remained the same for each participant, the results produced may not be reflective than if each individual was treated for a particular need.

An additional improvement that may have contributed to this study is that when evaluating the studies the numbers of participants used in each were not considered. In future it would be advantageous to observe studies with a higher number of participants so that the results of the studies used can be generalised to a bigger population.

4.7 Conclusion

The aim of this study was to investigate the role of massage in managing athletes in sport, ensuring that it considered all forms of activity and individuals whether they were recreational or elite. Through careful analysis of current literature surrounding the use of massage in sport it was found that there was enough evidence to support that massage positively influenced all four topics chosen to be considered. The critical evaluation of current research provided argument for massage having more of an influence upon an athlete’s psychological state over their physiological condition. Therefore it would be beneficial for future studies to focus upon the physiological influences of massage so that
multidisciplinary teams in sport can use such findings to support their choices of treatment modality. It has also been confirmed that massage was not harmful or diminishing to the lifestyle of the athlete and it had the potential to be more of a personal preference as to whether they wished to use it within their training schedules.
REFERENCES


Sports Performance Services, portfolio notes, 2003-2012


APPENDICES

APPENDIX A

ETHICS STATUS

Date: 21.3.14

To: Catherine Hammacott

Project reference number: 13/10/03U

Your project was recommended for approval by myself as supervisor and formally approved at the Cardiff School of Sport Research Ethics Committee meeting of 16th October 2013

Yours sincerely,

Mike Wadsworth.

Supervisor