THE EFFECTS OF KINESIO TAPE ON PAIN
AND RANGE OF MOTION OF THE SHOULDER

A Report of a Senior Study
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The purpose of this study was to determine the effects of Kinesio tape on the pain and range of motion (ROM) during shoulder rehabilitation. Four participants were placed in one of two protocol groups. The group in protocol one were not taped with Kinesio tape during the first three physical therapy treatments, and they were taped with Kinesio tape during the second set of three physical therapy treatments. The second group was Kinesio taped during the first set of treatments and not Kinesio taped during the second set of treatments. Pain was measured using the Shoulder Pain and Disability Index (SPADI), and ROM was measured by a physical therapist with a standard goniometer. The results showed that the SPADI scored decreased for three of the four participants overall. The scores decreased for all participants while no Kinesio tape was used and decreased in only one participant by a larger margin while Kinesio taped than when using no Kinesio tape. The ROM measurements showed an increase in flexion in three of the four participants overall. Three of the four participants showed an increase in flexion while using no Kinesio tape, and all four participants experienced an increase in flexion while Kinesio taped. While the results are not conclusive, it can be determined that physical therapy and time are contributing factors to increased ROM and decreased pain.
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CHAPTER I

INTRODUCTION

The shoulder is one of the most moveable joints in the human body, and with this mobility there is a significant sacrifice of stability. Due to this mobility and lack of stability, the shoulder is very prone to injuries. The most common causes of shoulder injuries are overuse and trauma. Overuse is a major contributor to tendonitis, bursitis, and impingement issues. Fractures and dislocations are the most common traumatic injuries. Shoulder injuries are common in various populations and of course to varying degrees. One of the main populations that complain of shoulder pain is collegiate athletes. Especially those that play a sport involving an over-head swinging or throwing motion because they need the laxity to receive the most power, so they must rely heavily on the support of the rotator cuff muscles. The most common injuries seen in these individuals are supraspinatus impingement and rotator cuff tendonitis. Both of these injuries stem from an overuse problem. Another large group of people with shoulder injuries is the geriatric population. Many of these problems come as a result of a fall or sudden jar of the shoulder. This may cause a dislocation or
a tearing of the supporting ligaments of the shoulder joint (Donovan & Paulos, 1995).

The shoulder is composed of two major parts, the shoulder girdle and the glenohumeral joint. The shoulder girdle is composed of two bones, the clavicle and scapula; two main joints, the acromioclavicular and sternoclavicular joints; and five primary muscles, the pectoralis minor, serratus anterior, trapezius, rhomboid (major and minor), and the levator scapula. All of these components work in tandem to move the scapula. When looking at the shoulder joint, also known as the glenohumeral joint, there are three major bones, the scapula, clavicle, and humerus. There are also nine main muscles of the shoulder joint the pectoralis major, coracobrachialis, deltoid, latissimus dorsi, teres major, and the rotator cuff muscles, which includes the subscapularis, teres minor, infraspinatus, and supraspinatus. All of these muscles, along with those of the shoulder girdle, work together to give the shoulder the full range of motion. Because of this wide capability of movements, stability is compromised. This lack of stability is one of the major drawbacks of the ball and socket style joint. This type of joint has a head that fits into a socket, but the socket is not very deep. In the socket is where common injuries, such as shoulder dislocation or labrum tears, occur (Floyd, 2009).

There are many different treatment options for those with shoulder injuries. A lot of the time, the injury or pain becomes so debilitating that the patient must undergo surgery to reconstruct the shoulder joint or the muscles surrounding it. More recently, doctors are turning to physical therapists to attempt to rehabilitate
the shoulder back to full mobility before they resort to surgery. Among physical therapists, there has been a recent rise in the use of a specific type of tape called Kinesio tape that is being applied during therapy to help the patient during their therapy (Thelen, Dauber, & Stoneman, 2008). Previously, therapists and athletic trainers would automatically apply a non-elastic tape generally seen in athletics, but now the interest in Kinesio tape and its efficacy is causing many therapist and other specialists to turn to this new therapeutic elastic taping style.

As stated before, Kinesio tape is very new to both the rehabilitation and sports world. It was first popularized in the 2008 Olympic games by many professional athletes including sand volleyball player Kerri Walsh and water polo player Lauren Wenger (Williams, Whatman, Hume, & Sheerin, 2012). It was at that moment that many Americans saw the odd black markings on Walsh’s shoulder, and their curiosity took over. During the mid-1970s, Dr. Kenso Kase, a Japanese chiropractor and acupuncturist, became fed up with the rigid, white athletic tape most commonly used to tape athletes, so he decided to develop a product that would somehow mimic the skin. The tape is close to the thickness of the epidermis, can stretch between 30% and 40% longitudinally, and works with the body to aid in the healing process. He goes as far as to claim that this new elastic taping technique would re-educate the neuromuscular system, reduce pain, optimize performance, prevent injury, and promote improved circulation and healing (Kinesio, 2010). This tape is different from the other types of elastic tapes on the market because of the special weave and viscosity that allows a freedom of motion and ventilation to maximize comfort (Huang, Hsieh, Lu, & Su, 2011).
Being very new, the little research that is available does not seem to back these bold claims, but if you ask the patients, they do give it merit. An initial thought is that this tape elicits a placebo effect, but there are many pilot studies that are testing this alleged affect as well as many other cases. Some studies test the white athletic tape versus the Kinesio tape like the study done by Lins and colleagues on the femoral quadriceps, and yet some other researchers test Kinesio taping versus no taping at all (Lins, Neto, Carlos de Amorim, Macedo, & Brasileiro, 2013). Many researchers are simply trying to find a good place to begin this study on such a new product that is becoming so prevalent within both the therapy and sports worlds. Another concern with the research is that most studies are performed on healthy individuals instead of those for which Kinesio tape was designed. Kinesio tape was originally geared more towards those that are recovering from an injury and need some outside assistance to aid in the healing process.

The tape manufacturers also claim that a major role in the efficacy of the tape is in the application. They recommend that someone who is trained and certified in all of the therapeutic taping techniques perform the application. Different taping techniques produce different results. Another major factor in placing the tape in the most effective way is to have a sound knowledge of the anatomy of the shoulder and the nature of the injury (Kinesio, 2010).

Kinesio tape is a new technique being used in the rehabilitation of shoulders, but that is not the only nor is it even the body part where the tape is used most often. There are therapeutic taping techniques for nearly all of the
body. It is commonly used on the foot for plantar fasciitis, the knee for providing stability and reducing pain from patellofemoral tendonitis, the gastrocnemius and quadriceps to promote muscle activity, the lower back to relieve pain, and the ankle to provide stability. In a study on the ankle, the researchers compared a treated group using Kinesio tape and an untreated group with out any taping. They did not find any significant difference in the proprioception of the ankle when Kinesio tape was used (Halseth, McChesney, DeBeliso, Vaughn, & Lien, 2004). There were however significant improvements seen when Kinesio tape was used on the lower trunk to increase range of motion, but these improvements were only seen in the flexion movement (Yoshida & Kahanov, 2007). The problem with most of the present studies is that most of the research is done on healthy individuals, so the difference should not be significant. As stated earlier, Kinesio tape is designed to help those that have a specific problem needing to be treated.

It is reported that nearly 7% to 36% of the population have a lifetime of shoulder pain, so these types of injuries are a great place to begin looking at the effects of Kinesio tape on injured rather than healthy individuals (Thelen, Dauber, & Stoneman, 2008). The purpose of this study is to determine how using Kinesio tape during rehabilitation of a shoulder injury will affect pain and range of motion as opposed to not using tape. Pain will be measured using a predetermined scale and survey that will be given to the patient. The range of motion will be measured by the licensed physical therapist using a goniometer. In a very similar study done by Thelen, Dauber, and Stoneman (2008) on the efficacy of Kinesio
tape on shoulder pain, they found that initially, the pain was decreased when using a therapeutic style of Kinesio taping versus a sham style. Then, over time, there seemed to be no significant difference.
CHAPTER II

LITERATURE REVIEW

Shoulder injuries are some of the most common injuries reported in the United States. It was estimated in 2006, that approximately 7.5 million people made a doctor’s visit concerning some type of shoulder pain. Rotator cuff problems were the main cause of these visits. The culprits for these types of shoulder injuries are the reoccurring overhead motion performed by so many athletes and the traumatic falls suffered by the older population. The injuries that are being treated involve the tendons, ligaments, and muscles more so than injuries directly to the bones (Ortho Info, 2009).

There are many different types of shoulder injuries that can occur at the glenohumeral joint or are related to the shoulder girdle. Among the most common types of injuries are tendonitis and rotator cuff problems (Donovan & Paulos, 1995). This may include impingement or tearing that is a result of the pressure or constant rubbing of the anterior edge of the acromion and the coracoacromial ligament. This injury is usually described in three stages. Stage I is most commonly referred to as reversible inflammation. Stage III is a full-thickness tear of the tendon. The partial-thickness tears, also known as stage II, are the most
common, and often patients with this type of injury do not respond well to outpatient therapy or other conservative treatment methods. Rotator cuff impingement is often seen before the age of 50, but tears are more often seen later in life (Nutton, McBirnie, & Phillips, 1997).

Another common injury of the shoulder is an acromioclavicular dislocation. This injury occurs in more than 10% of patients complaining of shoulder pain. The most common cause of this injury is a fall where the shoulder hits the ground and causes the scapula to move anterior to the clavicle. This causes a stretching or tearing of the ligaments that are stabilizing the shoulder girdle. This type of injury is also divided up into categories. Type I is a sprain of the acromioclavicular ligament, but the coracoclavicular ligament remains undamaged. Type II is a rupture of the acromioclavicular ligament and a sprain of the coracoclavicular ligament. Type III results in a ruptured coracoclavicular and acromioclavicular ligament. The muscles may also become detached in this type. A type IV has a displaced acromioclavicular joint, and the clavicle may have severed the trapezius muscle. Type V occurs when the ligaments, joints, and muscles are all completely stripped, and the scapula is no longer supported and may droop. The most rare acromioclavicular injury is a type VI injury where the lateral end of the clavicle is moved inferior to the acromion or coracoid process. The main reason for determining between the different types is to decide if the injury requires surgery (Antonio, Cho, Chung, Trudell, & Resnick, 2003).

Oyama, Myers, Blackburn, and Colman (2011) investigated the effects on the infraspinatus cross-sectional area and the range of motion after repetitive
movements that involved eccentric external rotator contraction. This study is important because the infraspinatus is a part of the rotator cuff and is an important stabilizer of the glenohumeral joint. The rotator cuff is also a very commonly injured portion of the shoulder. The majority of rotator cuff injuries stem from impingement, which happens below the coracoacromial arch. The study showed an increase in the infraspinatus cross-sectional area both immediately after exercise and 24 hours after exercise. There was also a decrease in the range of motion of internal rotation and horizontal adduction. These motions are crucial for overhead athletes because it is part of the arm deceleration phase. When this motion is restricted, the possibility of sustaining other injuries around the glenohumeral joint increases.

There are many treatments being studied and used to help with shoulder injuries and pain. A thorough assessment and diagnosis must be done first, and from this point it is usually beneficial to both prescribe non-steroidal anti-inflammatory drugs (NSAIDs) and apply ice in order to decrease the inflammation. Once these initial precautions have been taken, the treatment and rehabilitation process may vary widely depending on the type of injury suffered, but most injuries require physician referral. For severe acromioclavicular joint injuries, an orthopedic referral is preferred and surgery probable. For impingement, the initial treatment of NSAIDs and ice are recommended, and once the initial swelling is gone, the future treatment can be determination. If impingement leads to a rotator cuff tear, referral to a physician is appropriate. For severe injuries, surgery
becomes the best option, but physicians prefer to attempt a more non-invasive treatment before surgery (Donovan & Paulos, 1995).

One of the most common non-surgical treatments is physical therapy. Depending on the seriousness of the injury, often the doctor will let the therapist attempt to repair the injury before they decide to operate. This is a means of prevention or rehabilitation so that the patient does not have to undergo surgery. Naturally, preventative and post-operative rehabilitations are conducted differently. Successful rehabilitation should be based on the re-establishment of normal shoulder functioning. Some major factors of normal shoulder function include a decrease in pain, an improvement in the range of motion of the shoulder joint, and an improvement of muscular function and stabilization. In a study done by Ginn, Herbert, Khouw, and Lee (1997), they found that when using a therapy treatment, there was an improvement in pain-free abduction and flexion. They also found that the therapy technique used did in fact improve shoulder functionality.

For patients who suffer from impingement syndrome, the most common treatment is non-operative physical therapy. Most of these programs include specific exercise programs designed to stabilize the scapular movement and restore the natural shoulder movements and muscle activity patterns. The scapular movement is heavily influenced by the lower trapezius and serratus anterior. Poor shoulder function often goes hand in hand with impingement syndrome. Kaya, Zinnuroglu, and Tugeu (2011) created a study to compare the use of Kinesio tape to physical therapy modalities on patients with shoulder
impingement syndrome. They divided the participants into two different groups. Group one was therapeutically taped with Kinesio tape and given a home exercise program to administer as well. This program included isometric and range of motion exercises, strengthening and stretching, and relaxation. The second group was given a daily program of physical therapy modalities, such as transcutaneous electrical nerve stimulation, ultrasound, exercise, and hot packs, and the same home exercise program as group one. They measured function and pain at night, rest, and with active movements using a visual analog scale (VAS) and The Disability of Arm, Shoulder, and Hand (DASH) scale before treatment, after one week of treatment, and after two weeks of treatment. They determined that while the DASH and VAS scores were lower in both groups, the scores were significantly lower after two weeks of treatment in the Kinesio tape group.

More recently, Kinesio tape is used as a treatment for shoulder pain and edema. It is relatively new to the medical and sports worlds, and very few researchers have been able to conduct studies on the efficacy of this new therapeutic device. Dr. Kase created the tape in Japan in 1973 to help with the functionality of the body and its natural healing process. The makers of the tape have made claims about the tape and how it does what it does. One claim is that the tape can improve voluntary control and coordination by influencing the cutaneous receptors of the sensorimotor system. For example, the elasticity, small biomechanical factors, and proprioceptive input may in fact enhance the proprioception. Callaghan, Selfe, Bagley, and Oldham (2002) reported that
Kinesio tape did not exhibit any effects on the proprioception of the knee in healthy individuals, but when it was used on individuals with poor proprioception, the tape appeared to help increase their levels of proprioception (as cited by Yasukawa, Patel, & Sisung, 2006). Murray and Husk (2001) demonstrated that Kinesio tape provided significant improvement on the proprioception in the early stages of a lateral ankle sprain in non-weight bearing positions where the ligament mechanoreceptors were not active. This study was performed on participants with an age of 20-49 with no current ankle instability or injury or foot deformity.

There is a significant amount of pain that is related to shoulder injuries. Thelen, Dauber, and Stoneman (2008) investigated whether there was a significant difference between a therapeutic type of taping compared to a sham taping style. Participants were college-aged students with a diagnosis of rotator cuff tendonitis/impingement. The therapeutic style of taping included different types of maneuvering and stretching the tape, while the sham style of taping simply placed the unstretched tape over the spots with the most pain. They measured three variables, Shoulder Pain and Disability Index (SPADI), pain-free active range of motion (ROM), and a 100-mm visual analogue scale (VAS). They saw immediate improvements on pain in shoulder abduction after applying a therapeutic style of tape, but the improvement lessened as the days went by. By the sixth day, there seemed to be little to no change from the baseline. They also discovered that there was not a significant difference in the range of motion or disability scores.
In another study on the utilization of Kinesio tape for shoulder pain by Frazier, Whitman, and Smith (2006), they found that there were significant improvements in function and disability scores in a male only population age 41-55 years old with a complaint of shoulder pain or previous injury. The authors saw the patients two to three times per week and were attempting to determine the efficacy of Kinesio tape when used in conjunction with a comprehensive physical therapy program. A trend of reduced pain was shown over time, and the patients felt that the tape was working to help them improve, but the authors address that this may be due to other factors than the taping.

In a case study done on a 20-year-old swimmer suffering from myofascial pain in the shoulder, Kinesio tape was applied in the attempt to reduce pain. The tape was placed in a Y shape along the deltoid, with an additional strip at the myofascial trigger points. Pre and post treatment measurements were performed as well as an additional assessment two days after treatment and following removal of the tape. Between pre and post treatment, there was a difference in abduction, the superior Apley’s scratch test, and the Jobe’s test. Between pre treatment and two days after treatment, at tape removal, there was an increase in abduction and flexion, the superior Apley’s scratch test, the Jobe’s test, the palm up test, the anterior deltoid test, the painful arc test, and a decrease in VAS at motion and rest. These results suggest that using Kinesio tape for the treatment of myofascial trigger points is highly affective (Garcia-Muro, Rodriguez-Fernandez, & Herrero-de-Lucas, 2009).
When looking at the effects that Kinesio tape has on lumbar muscle influences in patients with low back pain, it was shown that Kinesio tape does reduce pain after treatment and over a short follow-up period. This study was designed to investigate the immediate effects of Kinesio tape on pain and flexion-relaxation normalization and to determine the efficacy of Kinesio tape when used in tandem with an exercise program after a short follow-up period. Pain was measured using VAS and the Roland Morris Disability Questionnaire (RMDQ). A classification system of responders versus non-responders was used, and the qualifications for a responder were a 30% decrease in pain using VAS and a 50% decrease in pain using the RMDQ. The participants were asked to complete a four second bend forward, hold it for four seconds, and then return to an upright position for four seconds. The results showed that the VAS score was significantly lower after applying Kinesio tape. (Paoloni, Bernetti, Fratocchi, Mangone, Parrinello, Cooper, Sesto, Sante, & Santilli, 2011).

A study done by Paoloni and colleagues (2011) examined the effects of Kinesio tape on chronic low back pain, disability, and lumbar muscle function. The study was divided into two different phases. The first phase was a pre/post-test measurement of pain and disability. During phase II, the subjects were randomly placed one of three categories: Kinesio tape and exercise group, Kinesio tape group, or exercise group. After the treatment, they measured the pain and function of the participants clinically, using the visual analog scale (VAS) and the Roland Morris Disability Questionnaire (RMDQ), and instrumentally, using surface electromyographic signals in flexion-relaxation exercises. This
study was performed on 39 patients with chronic low back pain. The results showed a significant reduction in pain after treatment from all three groups, and the exercise only group demonstrated a reduction of disability. Normal lumbar function was achieved in 28% of patients.

Kinesio tape is a common treatment for patients with patellofemoral pain syndrome. A study was done to determine the efficacy of Kinesio tape in the treatment of patellofemoral pain syndrome. The authors tested the effects of Kinesio tape alongside a muscle strengthening and soft tissue stretching exercise program. The comparison being made was against a control group that administered the same strengthening and exercise program but did not apply Kinesio tape. This study was performed on 31 women, ages 17-50, with patellofemoral pain syndrome over a span of six weeks. The Kinesio tape group received taping at four-day intervals for the entire six-week period. Functional performance and pain intensity were measured using the Anterior Knee Pain Scale/Kujala Scale and visual analog scale respectively. Both iliotibial band, tensor fascia lata, and hamstring muscle tension and the mediolateral location of the patella were measured at a baseline and after the third and sixth week. The results showed that there were significant improvements by both groups in the pain, soft tissue flexibility, and functional performance, but the shift of the patella was unchanged. There was significant improvement exhibited in hamstring flexibility by the Kinesio-tape group following three weeks. This study concluded that the application of Kinesio tape along with an exercise program does not
significantly improve results of patients with patellofemoral pain syndrome (Akbas, Atay, & Yuksel, 2011).

Another claim that the tape manufacturers make is that it corrects muscle function by strengthening weakened muscles. Kinesio tape is most widely and commonly used in orthopedics and sports medicine. Fu and colleagues (2008), observed the effects of Kinesio tape on muscle strength in athletes. They specifically examined the strength of the quadriceps and hamstrings under three different conditions: without tape, immediately after taping, and 12 hours after taping. The results of this study only showed a significant difference in the peak torque during concentric contraction of the quadriceps at 180 degrees per second after 12 hours of taping. The initial claim was that the tape, when placed along the muscle fibers, would increase muscle strength, but this was not exhibited in young healthy individuals (Fu, Wong, Pei, Wu, Chou, & Lin, 2008).

Slupik, Dwornik, Bialoszewski, & Zych (2007) placed Kinesio tape on the medial head of the quadriceps and recorded bioelectrical activity of the muscle. The authors tested the patients after 24 hours of tape application and noticed a significant increase in the peak torque, which is controlled by an increase in the recruitment of the muscle’s motor units. Then they looked at the patients 72 hours after application, and there were significant increases in the bioelectrical activity, but these differences were not as significant as those of the 24-hour mark. Therefore, it was concluded that Kinesio tape does increase the bioelectrical activity of the quadriceps muscle within 24 hours of the tape
application and then another 48 hours after tape removal, but the effects may not last as long as the manufacturers suggest.

Hsu, Chen, Lin, Wang and Shih (2009) investigated the effects of elastic tape on scapular kinematics and muscle performance. They limited the participants to baseball players that had shoulder impingement syndrome. This study was designed to compare elastic taping and a placebo taping over the trapezius muscle. All participants received both treatments. The tests were done three days apart to avoid accumulation of taping effects. The reason that the scapular movements were investigated is because there is a link between upward rotations and posterior tilt of the scapula and widening of the subacromial space, which is the location of shoulder impingements. The authors measured three-dimensional scapular movement and electromyographic activities of the upper and lower trapezius and the serratus anterior muscles during arm elevation. The results showed that there was significant improvement when using Kinesio tape instead of the placebo on the lower trapezius muscle activity when the arm was 30-60° during the arm lowering phase and also when increasing scapular posterior tilt at 30-60° while raising the arm. This study showed positive results on the scapular motion and muscle performance when using Kinesio tape as opposed to a placebo.

Kinesio tape is commonly used to treat ankle sprains by promoting muscle activity of the fibularis longus. This was tested in a study on 30 athletes using surface electromyography during a sudden inversion perturbation. These 30 participants were chosen because they were 15 highest and 15 lowest scores on
the Star Excursion Balance Test out of 51 participants. During the actual study, there were three different conditions of testing: ankle taped with non-elastic tape, ankle taped with Kinesio tape, and no ankle taping. The authors were observing the differences in mean muscle activity, measured peak muscle activity, and time to peak muscle activity. The results of this study showed that there was no significant difference between the non-elastic tape and Kinesio tape groups, but when comparing these groups versus the no tape group, there was a significantly greater mean muscle activity in the participants with the tape. There was no significant effect on the time to peak muscle activity in any of the three groups. Ultimately, it can be concluded that Kinesio tape had little to no effect on muscle activation of the fibularis longus (Briem, Eythorsdottir, Magnusdottir, Palmarsson, Runarsdottir, & Sveinsson, 2011).

As shown by Callegari, Cordova, and Dunievitz (2012), Kinesio tape does not produce a change in short-term shoulder strength in healthy individuals. The study was performed on 29 healthy college-aged participants. They took two baseline measurements using isokinetic dynamometry to determine shoulder strength during external rotation. The comparison being studied was a strengthening program versus the same strengthening program with Kinesio tape. The treatment lasted three weeks, and measurements were taken after each week. The results show that there was no significant change in peak torque values for concentric or eccentric external rotation of the shoulder in either group. These findings do not support the claim that Kinesio tape, used with a training program, can increase muscle strength.
In a study designed to determine the effect that Kinesio tape has on the performance differences in isokinetic knee function, it was found that there was not a significant improvement in comparison to the no tape method. Participants with no prior joint pain in the last 12 months were chosen. The authors were measuring max concentric knee extension and flexion with an isokinetic dynamometer. The participants were tested while seated with their hip at a 100-degree angle, and the leg hanging even with the lever arm that was attached to measure the angle of movement. The range of motion was 0-100 degrees, with 0 degrees being fully extended. Each participant was required to attend two different testing days with ample time in between, so as to avoid carry over effects. One trial, the participant wore no tape and during the second trial, the participant wore Kinesio tape. Each trial consisted of 10 repetitions, and the peak torque, total work done, and time to peak torque were all determined from those. The results of this study show that there was no significant difference between kinesio tape and no tape when looking at extension peak torque, flexion peak torque, normalized work done. The time to peak torque between those participants with Kinesio tape was shortened in knee extension, but the time to peak torque during flexion was unchanged (Wong, Cheung, & Li, 2012).

Currently, there is also research investigating the claim that Kinesio tape may improve the circulation of blood and lymph by eliminating the tissue fluid or bleeding beneath the muscle, but this claim is more difficult to test than the other more functional claims. In a study of the effect of Kinesio tape in replacing a bandage therapy for breast-cancer related lymphedema, they found that there
was no significant improvement when using the Kinesio taping method versus the bandage method that is more widely used in treatment. They did find that Kinesio tape improved excess circumference and excess water composition and that it was more readily accepted by patients because it can be worn longer and it increased the convenience of the patient (Tsai, Hung, Yang, Huang, & Tsauo, 2009).

Kinesio tape is a very good alternative to non-elastic tape because of the elasticity that it provides. This element is very important when performing overhead motions or other movements that require a greater range of motion. During rehabilitation, one of the main goals is to regain or even improve the presurgical range of motion, but this cannot be achieved if overhead movements cannot be performed. It has been shown that elastic tape is the best alternative to non-elastic tape for fine movement control and upper extremity movements (Hsu, Chen, Lin, Wang, & Shih, 2009).

One of the main limitations of many of the studies being conducted is that they are being conducted on healthy individuals. Kase was not making these claims about the efficacy of Kinesio tape with individuals that are functioning properly; rather, he believes that it helps those that have a problem in which the body needs assistance with the healing process. Another drawback to studying this tape is determining what comparison is going to be made. There are endless possibilities, as you have seen in the variety of studies. Some test Kinesio tape against no tape, while others will test a therapeutic taping style versus a sham style or a physical therapy program. At the present time, there is limited research
that demonstrates a significant positive effect of Kinesio tape. There is some promise in the research, and as the use of Kinesio tape continues, more data can be collected regarding its effectiveness. Despite significant finding in the research, there is numerous anecdotal evidence to support its efficacy.
CHAPTER III

METHODS

A total of four individuals, both male and female, between the ages of 15-55 years old were recruited from the Tuscaloosa community. These participants were required to be attending physical therapy at an outpatient clinic for a post-operative shoulder at a doctor’s referral. Participation in this study was voluntary. No special rewards were offered to participants, and there was no penalty for refusal to participate. Institutional Review Board approval from Maryville College was granted prior to the start of the study.

Upon the participant’s initial arrival to the physical therapy clinic, the protocol was thoroughly explained both verbally and in written form. Each participant and parent/guardian, if necessary, voluntarily signed the informed consent form following explanation of the protocol. All participants were coded numerically to maintain confidentiality.

The demographics of the participants were gathered, and this included gender, age, height, weight, date of surgery, and type of injury. The demographic information was reported by the participant and collected from medical charts. Body mass index (BMI) was calculated using the presented demographic...
information. BMI is a weight-to-height ratio that can be used to determine the obesity risk factor. It was calculated using the weight in kilograms divided by the height in meters squared (Kaminsky, 2010).

Participants were assigned to one of two groups. The first group was not Kinesio-taped for their first set of three treatments of therapy, but they were Kinesio-taped by a licensed physical therapist assistant who was certified in Kinesio taping for their second set of three treatments. The second group was Kinesio-taped by the same physical therapist assistant during their first set of three treatments of therapy, but they were not Kinesio-taped during their second set of three treatments. There were two participants in group one and two participants in group two. All participants were taped in a way that was appropriate for their specific injury and would facilitate healing the quickest, and all participants followed rehabilitation protocol specific to their shoulder surgery and physician orders. The specific Kinesio-taping technique can be seen in Figures 3.1-3.5.

Figure 3.1. Location of Kinesio tape for participant 1.
Figure 3.2. Second location of Kinesio tape for participant 1.

Figure 3.3. Location of Kinesio tape for participant 2.
Figure 3.4. Location of Kinesio tape for participant 3.

Figure 3.5. Location of Kinesio tape for participant 4.
The methods of measurement being used are the Shoulder Pain and Disability Index (SPADI) and range of motion (ROM). The SPADI has been studied extensively and shown to be a valid and reliable instrument of measuring pain that is responsive to change (Thelen, Dauber, & Stoneman, 2008). The SPADI is a self-administered questionnaire dealing with pain and disability. The participants mark on a 0-10 scale for each question with 0 being no pain or difficulty and 10 being worst pain imaginable or so difficult it requires help. The scores are then translated into a percentage. A percentage of 0 would be the best and 100 would be the worst.

The shoulder ROM measurements that were taken were flexion, internal rotation, external rotation, and abduction. Flexion is described as the bending movement that brings two bones together and results in a decrease in the angle of a joint. Internal rotation is a rotary movement of a bone toward the midline. External rotation is a rotary movement of a bone away from the midline. Abduction is a lateral movement away from the midline of the body (Floyd, 2009). These measurements were taken in a supine position using a standard goniometer by the same licensed physical therapist. The external rotation measurement was taken at both 45° and 90° of abduction, but this position depended on the progress of the participant.

Participants were asked to participate in three data collection sessions for this study. The baseline measurement was done during the participant’s first treatment date and included initial SPADI and ROM measurements. The first protocol was applied to each group accordingly, and after three therapy
treatments, the SPADI and ROM were measured again upon arrival to the fourth treatment date. The second protocol will be applied starting on the fourth treatment date, and it also lasted for three therapy treatments. The SPADI and ROM were measured again upon arrival to the seventh treatment date.
The purpose of this study was to determine the effect of Kinesio tape on pain and range of motion during rehabilitation of a shoulder injury. There were four participants between the ages of 15-44 years old including three females and one male. They ranged in height from 62-69 inches and in weight from 138-240 pounds. The Body Mass Index (BMI) ranged from one healthy participant (22.04) to three obese (25.24 - 35.44). All had surgery on their dominant shoulder. Participants started treatment between 5-33 days and after surgery.

The Shoulder Pain and Disability Index (SPADI) score was reported at three different times: baseline, after treatment one, and after treatment two. The scores of the patients can be seen in Table 4.1. The differences in scores based on being Kinesio taped and not being Kinesio taped can be seen in Table 4.2.
Table 4.1. SPADI scores from all participants.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline</th>
<th>Treatment 1</th>
<th>Treatment 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>61.5</td>
<td>56.9</td>
<td>39.2</td>
</tr>
<tr>
<td>2</td>
<td>42.3</td>
<td>31.5</td>
<td>43.8</td>
</tr>
<tr>
<td>3</td>
<td>91.5</td>
<td>76.2</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>12.3</td>
<td>6.9</td>
</tr>
</tbody>
</table>

Table 4.2. The differences in SPADI scores based on Kinesio tape or no Kinesio tape.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Δ After Kinesio Tape</th>
<th>Δ After No Kinesio Tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.6</td>
<td>17.7</td>
</tr>
<tr>
<td>2</td>
<td>-12.3</td>
<td>10.8</td>
</tr>
<tr>
<td>3</td>
<td>6.2</td>
<td>15.3</td>
</tr>
<tr>
<td>4</td>
<td>27.7</td>
<td>5.4</td>
</tr>
</tbody>
</table>

There were findings associated with the SPADI. The scores decreased for three of the four participants while using Kinesio tape. The score decreased for all participants while no Kinesio tape was used. The score of one participant showed a larger decrease while using Kinesio tape versus no Kinesio tape.

Shoulder range of motion (ROM) was also taken at three different times: baseline, after treatment one, and after treatment two. Flexion was the only consistent measurement taken, but others can be compared among participants as well. The measurements of ROM can be seen in Table 4.3. The flexion measurements increased in three of four participants from baseline to the end of treatment two. The flexion measurements of all four participants either remained the same or increased while using Kinesio tape. Three of the four participants’
flexion measurements increased while using no Kinesio tape. Participant 1 and 2 were in different treatment groups, so the internal rotation measurements can be compared. Both participants' measurements increased from baseline to the end of treatment two. The measurements show an increase in ROM of both participants while using Kinesio tape, but only one participant showed an increase while using no Kinesio tape.

Table 4.3. Range of motion measurements taken including flexion, extension, internal rotation, external rotation, and abduction on all participants.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Flexion</th>
<th>Internal Rotation</th>
<th>External Rotation</th>
<th>Abduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Baseline</td>
<td>158</td>
<td>43</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Tape</td>
<td>160</td>
<td>61</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>No Tape</td>
<td>148</td>
<td>55</td>
<td>-</td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexion</th>
<th>Internal Rotation</th>
<th>External Rotation</th>
<th>Abduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Baseline</td>
<td>130</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>No Tape</td>
<td>152</td>
<td>55</td>
<td>35</td>
</tr>
<tr>
<td>Tape</td>
<td>180</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexion</th>
<th>Internal Rotation</th>
<th>External Rotation</th>
<th>Abduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Baseline</td>
<td>146</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>No Tape</td>
<td>170</td>
<td>-</td>
<td>52</td>
</tr>
<tr>
<td>Tape</td>
<td>170</td>
<td>-</td>
<td>55</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexion</th>
<th>Internal Rotation</th>
<th>External Rotation</th>
<th>Abduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Baseline</td>
<td>150</td>
<td>-</td>
<td>35</td>
</tr>
<tr>
<td>Tape</td>
<td>164</td>
<td>61</td>
<td>82</td>
</tr>
<tr>
<td>No Tape</td>
<td>175</td>
<td>-</td>
<td>95</td>
</tr>
</tbody>
</table>
CHAPTER V

DISCUSSION

The purpose of the study was to examine the effects that Kinesio tape has on pain and range of motion during shoulder rehabilitation. There were four participants that participated in a two-part study. Each were placed into one of two groups. The first protocol group was not taped with Kinesio tape for the first three treatments, but they were taped with Kinesio tape during the fourth, fifth, and sixth treatments. The second protocol group was Kinesio taped during the first three treatments, and they were not Kinesio taped during the last three treatments. Both quantitative and qualitative measurements were taken using range of motion (ROM) and the Shoulder Pain and Disability Index (SPADI) respectively.

From the results that were put together, it can be gathered that time and physical therapy are both effective treatments for someone recovering from shoulder therapy. This claim was also shown by previous studies. Frazier, Whitman, and Smith (2006) examined the effects of physical therapy used in tandem with Kinesio tape. They found that there were significant improvements in function and disability scores, but they also address that this may be due to
factors other than the Kinesio taping. In another study done by Kaya, Zinnuroglu, and Tugeu (2011), shoulder pain and disability were compared when using a home exercise program and Kinesio tape versus the same home exercise program and physical therapy. They found that both treatments lowered pain and disability, but that the Kinesio tape treatment was provided a significant decrease in pain and disability. This claim that Kinesio tape decreases pain and ROM during rehabilitation that was shown by Kaya, Zinnuroglu, and Tugeu, was not evident in all participants of this study, but there were some significant findings and trends that need to be addressed. This study alone was not able to prove any significant advantages to using Kinesio tape during rehabilitation, although, there was one participant that requested the used of Kinesio tape after the completion of the study.

Although the SPADI has been shown to be both valid and reliable, the SPADI scores are subjective, and this could have affected the scores. The participants could have wanted to make themselves seem to be getting better by making sure the scores decreased every time the survey was taken. The participants could have also been influenced by outside factors such as pain from excess activity or mental exhaustion. The participants could have pushed themselves harder to heal faster, which could have in turn caused more pain. All of these should be taken into consideration when examining the results from these scores.

The results showed an overall decrease in SPADI scores for three of the four participants. There was a larger decrease in SPADI scores after using no
Kinesio versus after using Kinesio tape in three of the four participants. The overall improvements in SPADI scores show that the tape did not affect the physical therapy or healing. Only one participant’s score increased while using the tape. This could have come as a result of the previously mentioned subjective problems with the survey.

ROM measurements are objective and are not as dependent on outside factors. It was suggested that the physical therapist take measurements of flexion, internal rotation, external rotation, and abduction. Not all of these were taken for each patient at each measurement time. This is due to different circumstances. Flexion and external rotation are very common measurements taken and used by physical therapists. Internal rotation and abduction are not as common, so the therapist was not as inclined to take those measurements. The external measurements cannot be compared among all participants because not all measurements were taken, but also because some measurements were taken at 45° of abduction and others were taken at 90° abduction. This difference depended on the progress of the patient. As the shoulder gains more ROM, 90° of abduction is used because the patient is able to perform this movement.

Flexion was the only consistent ROM measurement taken among all of the participants. Flexion increased overall in three of four participants. Flexion after being Kinesio taped either stayed the same or increased in all four participants. Flexion after using no Kinesio tape increased in three of the four participants. The internal rotation for participants 1 and 2 can be examined because they were in different protocol groups. Both participants had an increased ROM overall.
Both participants’ internal rotation increased after Kinesio tape, but only one participant had an increase in ROM after using not Kinesio tape. The findings were similar to those found in a study done by Thelen, Dauber, and Stoneman (2008). They used SPADI, ROM, and a 100-m visual analog scale (VAS) to compare a therapeutic and a sham style of Kinesio taping on individuals with shoulder injuries. They found no significant difference in ROM or SPADI.

As seen throughout the study, the data was not conclusive, but there are some findings to take note of when examining the effects of Kinesio tape on pain and ROM of the shoulder during rehabilitation. The self-report of wanting to continue use of the Kinesio tape is motivation to continue the study of this new style of taping. For future research, the placebo effect could be examined. This is a major question in the research of Kinesio tape. I would also suggest a study that takes place prior to shoulder surgery that would look into the effects on pain and ROM as well.
REFERENCES


APPENDIX A

SHOULDER PAIN AND DISABILITY INDEX
Shoulder Pain and Disability Index (SPADI)


The Shoulder Pain and Disability Index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional activities. The pain dimension consists of five questions regarding the severity of an individual's pain. Functional activities are assessed with eight questions designed to measure the degree of difficulty an individual has with various activities of daily living that require upper-extremity use. The SPADI takes 5 to 10 minutes for a patient to complete and is the only reliable and valid region-specific measure for the shoulder.

Scoring instructions

To answer the questions, patients place a mark on a 10cm visual analogue scale for each question. Verbal anchors for the pain dimension are ‘no pain at all’ and ‘worst pain imaginable’, and those for the functional activities are ‘no difficulty’ and ‘so difficult it required help’. The scores from both dimensions are averaged to derive a total score.

Interpretation of scores

Total pain score: ________ / 50 x 100 = %
(Note: If a person does not answer all questions divide by the total possible score, eg. if 1 question missed divide by 40)

Total disability score: ________ / 80 x 100 = %
(Note: If a person does not answer all questions divide by the total possible score, eg. if 1 question missed divide by 70)

Total Spadi score: ________ / 130 x 100 = %
(Note: If a person does not answer all questions divide by the total possible score, eg. if 1 question missed divide by 120)

The means of the two subscales are averaged to produce a total score ranging from 0 (best) to 100 (worst).

Minimum Detectable Change (90% confidence) = 13 points
(Change less than this may be attributable to measurement error)
Shoulder Pain and Disability Index (SPADI)

Please place a mark on the line that best represents your experience during the last week attributable to your shoulder problem.

**Pain scale**

**How severe is your pain?**

Circle the number that best describes your pain where: 0 = no pain and 10 = the worst pain imaginable.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>At its worst?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>When lying on the involved side?</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaching for something on a high shelf?</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Touching the back of your neck?</td>
<td></td>
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<tr>
<td>Pushing with the involved arm?</td>
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</tr>
</tbody>
</table>

**Disability scale**

**How much difficulty do you have?**

Circle the number that best describes your experience where: 0 = no difficulty and 10 = so difficult it requires help.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washing your hair?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing your back?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Putting on an undershirt or jumper?</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Putting on a shirt that buttons down the front?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Putting on your pants?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placing an object on a high shelf?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Carrying a heavy object of 10 pounds (4.5 kilograms)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removing something from your back pocket?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
APPENDIX B

DATA COLLECTION SHEET
Data Collection Sheet

Gender: Male / Female

Age: ______________________

Height: _____ Feet _____ Inches

Weight: _________ lbs.

Date of Surgery: ______/______/__________

Date of First PT Visit: ______/______/__________

Type of Injury/Surgery:

--Investigator’s Use Only--

BMI: ________________

Treatment Group: Group 1 / Group 2
Baseline:

SPADI Score: ____________

ROM Measurements:

Flexion ____________  Extension ____________  Internal Rotation ____________

External Rotation ____________  Abduction ____________

Treatment 1: Tape / No Tape

SPADI Score: ____________

ROM Measurements:

Flexion ____________  Extension ____________  Internal Rotation ____________

External Rotation ____________  Abduction ____________

Treatment 2: Tape / No Tape

SPADI Score: ____________

ROM Measurements:

Flexion ____________  Extension ____________  Internal Rotation ____________

External Rotation ____________  Abduction ____________
APPENDIX C

INFORMED CONSENT
Informed Consent Statement

The Effects of Kinesio Tape on Pain and Range of Motion of the Shoulder

The purpose of this study is to determine the effect of Kinesio tape on pain and range of motion during rehabilitation of a shoulder injury. Pain will be measured using a predetermined scale and survey that will be given to the patient. The range of motion will be measured by the licensed physical therapist using a goniometer.

**Information**

My name is Hannah Montgomery, and I am a senior at Maryville College. I am an Exercise Science major, and I am completing my senior thesis.

You are invited to participate in my data collection process. There will be three data collection sessions. The first will be a baseline measurement upon your first physical therapy visit. The second will be after one week of Treatment 1, and the third will be after one week of Treatment 2. You will be placed in one of two groups. Group 1 will have no tape for Treatment 1 and Kinesio tape applied for Treatment 2. Group 2 will have Kinesio tape applied for Treatment 1 and no tape for Treatment 2.

Measurements taken will be range of motion (ROM) in flexion, extension, internal rotation, external rotation, and abduction. This is normal protocol for any physical therapy visit, and the measurements will be taken by the licensed physical therapist using a goniometer. The second measurement will be the Shoulder Pain and Disability Index (SPADI). This is a survey of the intensity of your pain and disability at the present.

Other information taken will include gender, age, height, weight, date of surgery, date of first physical therapy visit and the type of injury or surgery. This information will be collected to observe any trends based on other factors than the Kinesio tape.

**Risks**

The risks of this study are believed to be minimal due to the fact that this technique is currently being practiced by numerous physical therapists. Also, the ROM measurements will be obtained by the physical therapist regardless of if the participant is a part of this study. The SPADI is a written survey that is non-invasive. Possible skin irritation could come from use of the tape, but the participants are able to stop the study at any time.

**Benefits**

Kinesio tape is about the thickness of the epidermis and can stretch between 30% and 40% longitudinally. This tape works with the body to aid in the healing process. The tape makers claim that Kinesio tape can re-educate the neuromuscular system, reduce pain, optimize performance, prevent injury, and promote improved circulation and healing (Kinesio, 2010). This tape is different from the other types of elastic tapes on the market because of the special weave and viscosity that allows a freedom of motion and ventilation to maximize comfort (Huang, Hsieh, Lu, & Su, 2011).
Confidentiality
Your information will remain confidential during and after the study. Your information will be coded during analysis and in the written report. Only the investigator, faculty advisor, the clinical physical therapist, and you will have access to your information and data.

Contact
If you have any questions at any time about the study or the procedures, you may contact Hannah Montgomery at (205) 344-0668 or my senior thesis advisor, Traci Haydu, PhD at (865) 405-2528.

Participation
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from this study at any time without penalty. If you withdraw from the study before data collection is completed, your data will be destroyed.

Consent
I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Participant’s signature ___________________________ Date _____________
Investigator’s signature ___________________________ Date _____________
APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL AND NATIONAL INSTITUTE OF HEALTH CERTIFICATION
Identification of Project

A. Principal Investigator

Hannah Montgomery
Exercise Science
Professor Exercise Science
Maryville College
(205) 344-0668
hannah.montgomery@my.maryvillecollege.edu

B. Division: Division of Education – Exercise Science

C. Title of Project: The Effects of Kinesio Tape on Pain and Range of Motion of the Shoulder

D. Starting Date: Upon IRB Approval

E. Estimated Completion Date: May 2014

II. Project Objectives

Shoulder pain is common among collegiate athletes, particularly those who play a sport requiring overhead movement. These athletes need the laxity to receive the most power, but they rely heavily on the rotator cuff muscles for stability. Another population that is susceptible to shoulder injuries is the older generations. Many of these problems come as a result of a fall or sudden jar of the shoulder (Donovan & Paulos, 1995). It is reported
that nearly 7% to 36% of the population have a lifetime of shoulder pain, these types of injuries are a great place to begin looking at the effects of Kinesio tape on injured rather than healthy individuals (Thelen, Dauber, & Stoneman, 2008).

Kinesio tape is about the thickness of the epidermis and can stretch between 30% and 40% longitudinally. This tape works with the body to aid in the healing process. The tape makers claim that Kinesio tape can re-educate the neuromuscular system, reduce pain, optimize performance, prevent injury, and promote improved circulation and healing (Kinesio, 2010). This tape is different from the other types of elastic tapes on the market because of the special weave and viscosity that allows a freedom of motion and ventilation to maximize comfort (Huang, Hsieh, Lu, & Su, 2011).

Murray and Husk (2001) demonstrated that Kinesio tape provided significant improvement on the proprioception in the early stages of a lateral ankle sprain in non-weight bearing positions where the ligament mechanoreceptors were not active. Fu et al. (2008), observed the effects of kinesio tape on muscle strength in athletes. The results of this study show that there was some improvement in the quadriceps and hamstring muscles. Currently, there is research investigating the claim that Kinesio tape may improve the circulation of blood and lymph by eliminating the tissue fluid or bleeding beneath the muscle, but this claim is a little more difficult to test than the other more functional claims. When looking at circulation improvement, the effect of Kinesio tape in replacing the bandage for therapy for breast-
cancer related lymphedema was investigated. They found that there was no significant improvement when using the Kinesio taping method versus the bandage method that is more widely used in treatment. They did find that Kinesio tape improved excess circumference and excess water composition and that it was more readily accepted by patients because it can be worn longer and it increased the convenience of the patient (Tsai, Hung, Yang, Huang, & Tsauo, 2009). Thelen, Dauber, and Stoneman (2008) investigated the efficacy of Kinesio tape on shoulder pain, they found that initially, the pain was decreased when using a therapeutic style of Kinesio taping versus a sham style.

The purpose of this study is to determine the effect of Kinesio tape on pain and range of motion during rehabilitation of a shoulder injury. Pain will be measured using a predetermined scale and survey that will be given to the patient. The range of motion will be measured by the licensed physical therapist using a goniometer.

III. Description and Source of Research Participants

A total of ten individuals (18-55 YO) will be recruited as potential participants from the Tuscaloosa community. These participants will already be attending physical therapy at a doctor’s referral, and will be present with a post-operative shoulder with no preference to the side of injury. The population will be male and female. Participation in this study is voluntary. No
special rewards will be offered to potential participants, and there will be no penalty for refusal to participate.

IV. Methods and Procedures

Upon the participant's initial arrival to the physical therapy clinic, the protocol will be explained verbally and in written form. The informed consent form voluntarily signed, following explanation of the protocol. The demographics of the participant will be gathered, and this includes gender, age, height, weight, date of surgery, and type of injury. The demographic information will be reported by the participant.

Participants will be assigned to one of two groups. The first treatment group will not be taped for their first week of therapy but will be taped by a licensed physical therapist certified in Kinesio taping for their second week. The second treatment group will be taped by the same physical therapist for their first week of therapy but will not be taped for their second week.

The methods of measurement being used are the Shoulder Pain and Disability Index (SPADI) (see attached) and range of motion (ROM). The SPADI has been studied extensively and shown to be a valid and reliable instrument of measuring pain that is responsive to change (Thelen, Dauber, & Stoneman, 2008). The shoulder ROM measurements that will be taken are flexion, extension, internal rotation, external rotation, and abduction. These will be taken using a standard goniometer by a licensed physical therapist.
Participants will be asked to participate in three data collection sessions for this study. The baseline measurements will be done upon the participant’s first visit to the physical therapy clinic and will include initial SPADI and ROM measurements. The first treatment will be applied to each group, and after one week, the SPADI and ROM will be measured again. The second treatment will be applied, and after one week, the SPADI and ROM will be measured again.

V. Specific Risks and Protection Measures

The risks of this study are believed to be minimal due to the fact that this technique is currently being practiced by numerous physical therapists. Also, the ROM measurements will be obtained by the physical therapist regardless of participation in this study. The SPADI is a written survey that is non-invasive. Possible skin irritation could come from use of the tape, but the participants are able to stop the study at any time.

Subject information will remain confidential during and after the study. Participants will be coded numerically and referred to by subject code and not by name. Identity of the participants will be held in strict confidence through the use of coded subject numbers in data collection, analysis, and in all references made to data, both during and after the study.
VI. Benefits

Kinesio tape works will the body to aid in the healing process, and can be considered a very useful aid in physical therapy. As previously stated, the tape works to re-educate the neuromuscular system, reduce pain, optimize performance, prevent injury, and promote improved circulation and healing (Kinesio, 2010). This, alongside the therapy exercise, should help to improve healing of the shoulder.

VII. Methods for Obtaining “Informed Consent” from Participants

A written informed consent will be obtained from all participants prior to participation in this study (see attached). Procedures of the experiment will be provided in both verbal and written formats, in a non-technical, easy to understand manner by the principal investigator. Participants will have the opportunity to discuss any questions and concerns, which may arise prior to or during any phase of the study. Volunteers will be informed that they are under no obligation to participate in the investigation and may withdraw from the study at any time.

VIII. Qualification of the Investigator(s) to Conduct Research

David Breedlove, physical therapist, is certified in Kinesio taping and will be performing all ROM data gathering and placing Kinesio tape on his patients.
IX. Facilities and Equipment to be Used in the Research

All data will be gathered at Champion Sports Medicine in Tuscaloosa, AL. The clinical director, David Nix, and physical therapist, David Breedlove, have agreed to collect data pending Maryville College IRB approval.

Principal Researcher ___________________________ Date ___________

Faculty Supervisor ___________________________ Date ___________

Committee Approval ___________________________ Date ___________
References


Principal Researcher: Hannah Montgomery
Faculty Supervisor: Dr. Traci Haydu
Division: Education-Exercise Science
Title: “The Effects of Kinesio Tape on Pain and Range of Motion of the Shoulder
Protocol#: 10.04.13.01
Approval Status: APPROVED

April 21, 2013

Dear Ms. Montgomery:

The Maryville College Institutional Review Board (IRB) has carefully considered your proposal referenced above. The proposed procedures afford reasonable protection to the human participants involved and therefore you are granted approval for the study.

Your approval is effective April 21, 2013 and will expire one year from this date. Thereafter, continued approval is contingent upon submission of a progress report that must be reviewed and approved prior to the expiration date.

Approval is contingent upon your agreement to obtain informed consent from your participants, to abide by the protocol summarized in the approved IRB application, and to keep appropriate records concerning your participants.

You are required to submit to the Maryville College IRB for review any changes in procedures involving human participants prior to the implementation of such changes.

If you have any questions concerning this approval or regulations governing human participant activities, please contact Dr. Crystal Colter, Chair of the Maryville College IRB, by e-mail at crystal.colter@maryvillecollege.edu or by phone at 865.981.8269.

Sincerely,

Dr. Geoff Mitchell
Institutional Review Board
Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that Hannah Montgomery successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 04/01/2013
Certification Number: 1154868