



“ASSESS THE DIFFERENT PHYSIOTHERAPY MODALITIES REGARDING ULTRASOUND THERAPY FOR ANALYSING THE INJURIES AMONG PLAYERS”

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ABSTRACT

Background : Ankle sprains are the most common of all the sports injuries and 25,000 persons each day go through ankle sprains . Most ankle injuries are sprains and fractures which effects the ligaments and bones of the lower leg. The purpose of this study was to assess the different physiotherapy modalities regarding ultrasound therapy for analyzing the status of the ligament ankle injuries among players .

Methods : This research was based on groups of randomly picked, 50 people with inversion injuries , 50 people with eversion injuries and 50 people with high ankle sprains , split into 5 groups of 10 members each . Group 1 was given ultrasound ,Group 2 ultrasound with taping , Group 3 was given PNF , Group 4 was given PNF with taping and Group 5 was given a RICE routine without any extra treatment and it is considered the control group.

Results : The following were the findings that formed the result of the study. The ultrasound treatment, ultrasound therapy with Taping and PNF training substantially increased ROM and decreased swelling in patients with inversion ,eversion and high ankle sprains compared to than those in the control group.

Conclusion: The researchers discovered that PNF training with Taping outperformed PNF when used along with ultrasound therapy, in terms of increasing ROM in patients with eversion, inversion and high ankle sprain injuries.

Keywords: Ankle sprain, ligament injuries, ultrasound, Taping, PNF.

INTRODUCTION

Every athlete hopes to earn a medal, but this is only achievable for a select handful. So many components come together in sports, allowing for the articulation of exceptional motions like sprinting 100 meters in 9.58 seconds, 800 meters in 40 seconds, leaping higher and longer, basketing the ball, and so on. Physical fitness, skill development, advanced technical and tactical training, physiological and psychological adaptations are the so-called elements that determine sports performance. So, in order to succeed in athletics, a great deal of effort is required. In addition, there are a number of challenges to face, such as the need for perseverance, sacrifice, and, of course, the risks of injury that come along with participating in sports. A combination of overuse of the muscles, ligaments, and joints, and unsafe play during the game may be to blame. It is the goal of this research to examine the various approaches to treating and recovering from ankle injuries.

Playing a sport entails the risk of injury. Examples of sportsmen affected by Muscle Pull include Alexandra Stevenson, Rafael Nadal; Sportsmen affected by Shin Splints include Monica Seles; Sportsmen affected by Lower-Back-Pain include Andre Agassi; Sportsmen affected by Shoulder Impingement include Roger Federer; Sportsmen affected by Runner's knee include Serena Williams; Sportsmen affected by Tennis Elbow include Sachin Tendulkar; Sportsmen As a result, it became the norm for all athletes to get injured.

A person's ability to perform at a high level in sports is defined only by his or her ability to execute specified physical routines or processes under pressure. There are several examples, such as in volleyball, basketball, football, hockey, and other sports where the player must be able to strike the ball in the air, throw it to a long distance, leap over a cross bar, and so on. In sports, it's critical to have a high level of technical and tactical proficiency. The ability to perform better in sports may be improved via mastery of the sport's abilities. A complex interplay of physiological, psychological, and cultural variables affects how well a person performs. Regular practice and performance improvement need fitness components.

Approximately 14 percent of all sports injuries are ankle sprains, which equates to one ankle injury every 17 players each season. In high-risk sports like leaping and sprinting, this number is much greater, at 25%. It has been shown that an ankle sprain occurs more often and 24 times as frequently in the dominant limb, and that the recurrence rate is quite high (73.5 percent). The ankle is made up of three bones: the talus, tibia, and fibula, all of which articulate at the tracheae surface. About 15 to 20 percent of the body's weight is supported by the fibula. To increase ankle mobility and stability during the stance phase of running, it travels lower and laterally. Changing the position of the fibula by a few millimeters may increase joint forces by up to 40%, according to this study.

Tibia nerve injury in the posterior medial ankle seldom causes the condition known as Tarsal Tunnel Syndrome (TTS). The calcaneal or ankle joints are often linked to post-traumatic reasons. Tarsal tunnel syndrome, in contrast to carpal tunnel syndrome, is more common in middle-aged athletes and has a broader range of potential causes. The only persistent symptoms are daily and occasional soreness, as well as a burning

sensation on the sole while standing, walking, or jogging for an extended period of time. Interdigital neuromas are often misdiagnosed, leading individuals to have surgery only to have their symptoms return thereafter. The posterior tibia nerve, which splits into the medial and plantar nerves, may be studied for signs of entrapment or damage using electromyography and nerve conduction velocity investigations.

Plantar flexion and inversion are the most typical mechanisms of foot strain. Tarsometatarsal strain causes discomfort in the fourth and fifth tarsometatarsal joints in addition to the symptoms of an injured lateral ankle ligament. X-rays may reveal just chip fractures on the back. A bandage, NSAIDS, and crutches are used for treatment of the acute injury. When the player returns to the field, an ankle support may be required to aid avoid plantar inversion if physical rehabilitation includes whirlpool, power development, and usage of foot ankle exercise boards. Bone and CT scans may help rule out stress fractures and arthritis if symptoms continue. Tenderness in the sinus area is a sign of sub talar strain. A similar approach is used here.

Located posterior to the medial malleolus, the sinus tarsi is a tiny osseous canal. It runs from the lateral malleolus opening in a posteromedial orientation. Small vessels and subtalar ligaments, as well as fat and connective tissue, make up this component of the subtalar joint. As a consequence of poor biomechanics (particularly excessive pronation) or an acute ankle injury, the sinus tarsi may be injured. After a long period of aversion, such a high-jump start, it might also occur. A sprain of the ankle is one of the most common sports injuries, and it often occurs. Ankle ligaments on the outside of the ankle tend to be damaged when the ankle is rolled outwards (Sports Injury Clinic). If one or more of the ankle ligaments are ripped or partly torn, the condition is described as an ankle sprain, ankle twisted, ankle rolled, ankle floppy, or ankle damage. A person's ankles might be injured at any age. While women over 30 had greater incidence of ankle sprain than males, men aged 15 to 24 have the highest rates. Athletes are at risk for ankle sprains at least half the time. Ankle sprains occur in 25,000 persons each day in the United States. Over 1 million patients seek medical attention for ankle injuries each year. In the United Kingdom, an estimated 5,000 ankle sprains occur each day. Most ankle injuries are sprains and fractures, which affect the ligaments and bones of the lower leg. Then there's the risk of tearing or straining a tendon, as well. Ankle sprains should be treated as soon as possible after the injury and should be followed up with a comprehensive rehabilitation program to help you regain your fitness and prevent a recurrence.

When the foot and leg come together at the ankle, or the talocrural area (Moore et al., 2010), it is known as the ankle (eMedicine Dictionary). The ankle joint proper or talocrural joint, the subtalar joint, and the Inferior tibiofibular joint are all parts of the ankle joint. The foot's dorsiflexion and plantar flexion motions are controlled by this joint. The word "ankle" is often used to refer just to the ankle area. The talocrural joint is referred to as the "ankle" in medical language. However, the word "ankle" may apply to the whole area. The talus (in the foot) and the tibia and fibula (in the leg) are the two primary bones of the ankle (in the leg). One common name for the talus is "ankle bone" (Moore, et al., 2010). The distal extremities of the tibia and fibula of the lower leg are joined to the proximal end of the talus by the talocrural joint, a synovial hinge joint

(eMedicine Dictionary). When it comes to joint stability, the tibia-to-talus articulation is more important than the fibula-talus one.

Both the anterior and calcaneo-fibular ligaments firmly anchor the ankle joint in place. To the medial surface of the talus, and to the medial malleolus, the deltoid ligament attaches to the navicular tuberosity. The lateral malleolus ends of the talus in the anterior and posterior regions of the joint. In addition to the lateral malleolus, the calcaneofibular ligament is linked to the lateral surface of the calcaneus. The syndesmotic ligament contributes to the stability of the ankle, despite the fact that it does not extend across the joint itself. The syndesmosis, which refers to the articulation between the distal fibula and distal tibia, is covered by this ligament. When this ligament is injured in isolation, it's often referred to as a high ankle sprain. In dorsiflexion, the ankle joint's bony anatomy is the most stable. When the ankle is plantar-flexed, ligamentous support is more critical, which increases the likelihood of a sprained ankle. When an inversion sprain occurs, it is the anterior talofibular ligament (ATFL) that is often affected. When an ankle sprain is severe, the calcaneo-fibular ligament is another possible site of injury. A frequent athletic injury is a ligamentous injury around the ankle joint, particularly in leaping sports (e.g., basketball, volleyball, etc.). They aren't usually properly taken care of, unfortunately. It is common for associated injuries to go undiagnosed, and ligamentous injuries get insufficient therapy, leading to a high likelihood of recurrence (Khan K and Bruker P, 1998). When it comes to ankle sprains in team sports like handball and basketball, the effect is very severe. Handball players' ankles are arguably the most often injured body part, however there is no clear evidence to support this claim. Injuries that result in a player being unable to participate in their sport for an extended period of time most often occur in the ankle and knee. Ankle injuries are common among handball players, with 13.5 percent of all injuries occurring there. Seil et al., 1998 observed that ankle sprains accounted for 100% of all handball-related injuries. In handball, the frequency of ankle injuries is between 0.4% and 1.6% for every 1,000 exposure hours. Injuries are more common and more likely to occur at higher levels of play, according to recent elite-level study. This may be attributed to the increased pace and difficulty of the game, as well as the large number of games played in a short amount of time, during top level tournaments. There may also be a discrepancy in the definition of an injury, which might explain the disparity. Injuries impact players differently depending on their position on the squad, with backs suffering the most, followed by linemen. Risk factors for new injuries in handball include past injuries, with ankle sprain the most common.

It is critical to understand the signs of a sprain in order to rule out a true break in the bone. In the tissue around a sprained joint, blood vessels leak fluid. Increased blood flow is accompanied with an increase in the number of white blood cells that are responsible for inflammatory processes (Ankle Sprains Symptoms - eMedicineHealth.com). Swelling and discomfort are also felt as a result of this inflammation. This region becomes more sensitive to pressure because of the increased sensitivity of the nerves caused by the damage. As blood flow increases, so does the sensation of warmth and redness. In addition, the joint's mobility is impaired and the leg is difficult to use. The risk of a sprain is highest while playing badminton, tennis, or basketball, which all entail rapid side-to-side movement. Normal everyday activities such as stepping off a curb or getting caught in snow may also lead to ankle injuries. The ligaments may repair in a stretched posture

if they are returned to exercise before they have completely healed, resulting in decreased ankle joint stability. Chronic Ankle Instability (CAI) and an increased risk of ankle sprains may result from this. There are three grades of ankle sprains: I, II, and III (Moreira V, et al., 2008). The severity of a sprain is determined by the extent of the injury or the number of ligaments that have been injured. A Grade I sprain is described as a modest injury to a ligament or ligaments that does not result in joint instability. When the ligament is stretched to the point that it becomes loose, it is labeled a Grade II sprain. Grade III sprains are total ligament tears, resulting in joint instability (Sprained Ankle - American Academy of Orthopedic Surgeons). Ankle bruising might develop.

Damage to a ligament or ligaments of grade I does not result in joint instability. There is no macroscopic rupture, and the injuries are just sprains or ligament strain injuries. In Grade II, at least one of the ligaments is partially ruptured, resulting in a loosening of the joint. At least one of the ligaments in the afflicted joint completely ruptures in Grade III, resulting in instability. Ankle bruising might develop. New recommendations advocate the same cautious treatment for both partial and full ruptures of Grade II or III lesions in everyday practice. Following ankle injuries were taken into account in the research. The most frequent form of ankle sprain in athletics happens when the foot is inverted too far, resulting in damage to the foot's lateral side. Outer or lateral ligament damage occurs when this sort of injury occurs, and the lateral ligaments are overstretched. In this form of sprain, the anterior talofibular ligament is often injured. Inversion sprains account for 70% to 85% of all ankle sprains. The anterior talofibular and calcaneofibular ligaments are injured when the ankle is inverted. Ankle sprains of this kind are the most prevalent. An eversion injury, which affects the medial side of the foot, is a less frequent kind of ankle sprain. It's possible that the medial, or deltoid, ligament is overstretched when this happens. A sudden and forceful outward twisting of the foot, as in football, rugby, ice hockey, roller derby, basketball, volleyball, lacrosse, softball, baseball, track, ultimate frisbee, tennis, and badminton, can cause a high ankle sprain, which damages the large ligaments above the ankle that join the two long bones of the lower leg, the tibia and fibula.

The increase in blood flow to the treated region has a direct effect on speeding up the healing process. Pain from swelling and edema is reduced in the second way. Gentle massages of muscles, tendons and ligaments in the treated region are performed since there is no tension and scar tissue soften. Therapeutic ultrasound has two primary effects that result in these three advantages. Thermal and non-thermal impacts are the two sorts of effects that may occur. The thermal effects are caused by the sound waves being absorbed. These include cavitation, micro-streaming and auditory streaming in addition to thermal impacts (Steven Mo, et al., 2012). Because of the formation of small bubbles from tissue vibration, cavitation effects are produced, and these vibrations are then transmitted to the cell membrane directly. The inflammatory response's ability to repair cells seems to be enhanced by this physical stimulus (Wilkin HD, et al., 2004). Ongoing studies are needed to determine if therapeutic ultrasound is effective in the treatment of musculoskeletal injuries and soft tissue lesions. Ultrasound has been shown in studies to assist boost cells' metabolic processes. Consequently, the use of ultrasound in tissue healing, particularly in the treatment of soft tissue injuries, is beneficial

Acute trauma and repeated stress are the most common causes of sports-related injuries. Bones and soft tissue may be injured in sports (ligaments, muscles, tendons) The kind of tissue destroyed in an ankle injury (bone, ligament, or tendon) determines the severity of the injury. A person's ankles might be injured at any age. While women over 30 had greater incidence of ankle sprain than males, men aged 15 to 24 have the highest rates. Athletes are at risk for ankle sprains at least half the time. Ankle sprains are the most frequent ankle injury. In an ankle sprain, the ligaments of the ankle are partly or totally torn as a result of abrupt stretching. An ultrasound transducer or applicator that comes into direct contact with the patient's skin is used to provide ultrasound therapy. The ultrasonic waves are made easier to transmit by applying gel to the whole area of the cranium. Ultrasound compression and rarefaction at a frequency $>20,000$ cycles/second is used in physical therapy for therapeutic purposes. In athletics, taping is the use of tape in order to keep bones and muscles in a stable posture. Athletic tape is used to support damaged anatomical structures, decrease swelling, and limit movement of injured joints and soft tissues. Injuries, sickness, or mental disorders may cause an unpleasant feeling to develop in various degrees of intensity. Perceived pain, then, is the sensation of pain one has when one is experiencing physical discomfort as a result of a medical condition, together with any accompanying mental or emotional misery. Enlargement of an organ, usually due to an excess of fluid buildup. Merriam Webster's New International Dictionary, 4th Edition). There may not be much swelling or discomfort if the sprain is minor, since the ligaments are just stretched in such a case. Ligaments may be ripped, and the joint swelled, if the injury is severe. The extent to which a joint's flexion and extension may be moved (Medterms.com). There is a normal range of motion for each individual joint. To measure the range of motion of a joint, a Goniometer is used to measure degrees.

AIM AND OBJECTIVES

OBJECTIVES :

- 1.The findings of this study would be helpful to assess the present status of ligament ankle injuries among players.
- 2.The study would be helpful to classify the ligament ankle injuries into inversion, eversion and high ankle sprain injured players.
- 3.The findings of this study would be helpful to find out which of the different physiotherapy method is more helpful in treating and rehabilitation of ligament ankle injuries among players.
- 4.The findings of this study would be helpful to pin point which of the specific physiotherapy method is more helpful which of the three types of ligament ankle injuries.
- 5.The findings of this study would be helpful in finding out which of the selected variables, namely, perceived pain, swelling and range of motion is significantly influenced by selected physiotherapy methods.

HYPOTHESIS :

1. It was hypothesized that ultrasound therapy, ultrasound therapy with taping, PNF (proprioceptive neuromuscular facilitation) training and PNF training with taping would significantly reduce perceived pain, swelling and improve range of motion of the inversion ankle sprain injured players.
2. It was hypothesized that ultrasound therapy, ultrasound therapy with taping, PNF training and PNF training with taping would significantly reduce perceived pain, swelling and improve range of motion of the eversion ankle sprain injured players.
3. It was hypothesized that ultrasound therapy, ultrasound therapy with taping, PNF training and PNF training with taping would significantly reduce perceived pain, swelling and improve range of motion of the high ankle sprain injured players.
4. It was hypothesized that there would be no significant difference between different physiotherapy modalities tested, namely, ultrasound therapy, ultrasound therapy with taping, PNF training and PNF training with taping in altering reduce perceived pain, swelling and improve range of motion of the inversion, eversion and high ankle sprain injured players.

METHODOLOGY

Research Design

Methodology and experiment design will be covered in this section. Ankle sports injuries such sprained high ankles, torn inversion and eversion ligaments, and ruptured inversion and eversion ligaments will be the focus of the research, which also looked at the benefits of ultrasound therapy, ultrasound therapy combined with tape, and PNF training. This research employed a Random Group Design for its experimentation. 50 people with inversion ankle injuries, 50 people with eversion ankle injuries, and 50 people with high ankle sprains will be randomly picked from the overall population and split into five groups of 10 each. Group I received ultrasound therapy, Group II received ultrasound therapy with taping, Group III received PNF training, and Group IV received PNF training with taping. Group V was the control group, which received RICE routine and no extra treatment. Pain, range of motion and ankle edema in all participants before the experimental treatments will be recorded. It took fifteen days for the individuals to get the experimental therapies as described and overseen by an expert physiotherapist and a medical specialist. After completing fifteen days of therapy, all individuals will be assessed on a number of dependent variables, including pain, swelling and range of motion. The difference between the initial and final measures of pain, swelling, and range of motion will be regarded to reflect the impact of the indicated therapy on the injury.

Data Collection

Prior to beginning the treatments, such as ultrasound therapy, ultrasound therapy with taping, PNF training, and PNF training with taping, pre-test scores on subjective pain, swelling, and range of motion will be gathered. After fifteen days of therapy, the individuals will be given another round of tests to gauge their level of discomfort, swelling, and range of motion with the use of the VAS, flexible tape, and goniometer. As a follow-up, it will be seen as an evaluation.

Tool Used for Data Collection

- **Pain (Visual Analog Scale)**

Purpose

The purpose of this examination is to assess the level of discomfort.

Equipment required

Pencils and Paper

Procedure to Measure

Pain An objective appraisal and measurement of pain intensity are the primary goals of the Visual Analogue Scale (VAS). The diagnostic process used to determine the degree of discomfort is called the Visual Analogue Scale (VAS). A non-segmental horizontal line with the left extreme signifying 'no pain' and the right extreme indicating 'worst agony ever' is created in order to measure pain intensity. According to the diagram below, where the horizontal scale meets the vertical scale reflects how much pain a person will be experiencing at the time of the test.

Scoring

The ten-centimeter-long segmental horizontal line is used by the patient to indicate the level of discomfort. The score is based on this quantitative measure of pain intensity. Prior to and after the experiment, a score is generated.

- **Test for Swelling (Measurement)**

Purpose

Injury prevention and the ability to perform various sports activities are both made easier and safer by this test, which measures joint or body part swelling.

Equipment required

Tape measure, paper, and pencil are all you'll need.

Procedure to Measure Ankle Swelling

Method for Measuring Swelling in the Ankles Using a tape, the talar and subtalar joints may be measured for edema.

- 1) An extended sitting posture is taken by the patient
- 2) Maintaining a neutral posture for the ankle

Scoring

In order to determine the degree of swelling in a specific location, you must measure the diameter of the affected area. Centimeters are used for all measures.

- **Test for Range of Motion**

Purpose

Flexibility in a joint or section of the body is a significant factor in injury prevention and rehabilitation for sports injuries, as well as the execution of numerous athletic activities.

Equipment required

Goniometer

Procedure

When measuring the range of motion at a joint, a goniometer is placed at the joint's axis of rotation and its arms are aligned with the long axis or external reference of the bones of the neighboring segments or the long axis of a joint.

Scoring

The goniometer will be used to measure the angle in degrees, as shown on the display.

Sample size

Selection proceeded until the requisite number of candidates will be found. This study's participants included 50 players who had ankle injuries in which the ankle will be inverted, 50 players who had ankle injuries in which the ankle will be everted, and 50 players who had high ankle sprains. The participants will be between the ages of 19 and 25. Thirty-eight participants will be randomly assigned to one of three groups: those who will be wounded by inversion, those who will be damaged by eversion test, and those who will be injured by high ankle sprain. Each group will be then randomly broken into five smaller ones, each with ten people. It will be determined that Group I received ultrasound treatment; Group II received ultrasound therapy with tape; Group III received PNF training; and Group IV received PNF training with tape.

Sampling Method

Pilot research will be done to evaluate the different treatment techniques used for ankle ligament injuries. It is necessary to consult with a number of different physiotherapists in order to have an idea of the treatment approaches used at each of these facilities. As a result of conducting a pilot study, the researcher will be able to gather information regarding the various treatment options available, including ultrasound therapy, ultrasound therapy with taping, PNF training and PNF training with taping.

Statistical Tools Used

Treatment and rehabilitation of ankle injuries will be the focus of this investigation on the effects of ultrasound, ultrasound with tape, PNF (proprioceptive neuromuscular facilitation) training and PNF training in combination with taping. Selection of participants with ankle ligament damage will be done with care. The difference between the initial and final measures of pain, edema, and range of motion will be regarded to reflect the impact of chosen therapy on selected injuries of inversion and eversion ligament injuries and high ankle sprain.

To examine the statistical significance of the initial and end score discrepancies, we used analysis of covariance to compare the two groups (ANCOVA). Schfee's post hoc test will be used to discover significant differences between treatment groups when a significant difference will be found in the treatment group. At the 0.05 level of confidence, it will be determined that the results will be statistically significant in all of the instances.

EXPECTED OUTCOMES

The following findings will be formed as a result of the study's limits and limitations. Swelling in high ankle sprain injuries will be shown to be greatly decreased with ultrasound treatment, ultrasound therapy combined with taping, training in PNF (proprioceptive neuromuscular facilitation), and PNF training combined with taping. No significant differences will be seen across the treatment groups. PNF (proprioceptive neuromuscular facilitation) training and tape considerably decreased pain in high ankle sprains compared to control group, according to the results of this study. Neither did any of the treatment groups vary significantly from one another.

High ankle sprain injuries will be shown to benefit with ultrasound treatment, ultrasound therapy with taping, PNF (proprioceptive neuromuscular facilitation) training, and PNF (proprioceptive neuromuscular facilitation) training with taping, as compared to the control group. To improve the range of motion of a high ankle sprain injury, PNF (proprioceptive neuromuscular facilitation) plus tape will be shown than be considerably superior to PNF (proprioceptive neuromuscular facilitation). Swelling from inversion injuries will be greatly decreased by the use of ultrasound treatment and tape as well as PNF (proprioceptive neuromuscular facilitation) training and taping, according to the results of the study. No significant differences will be seen across the treatment groups. Training in PNF (proprioceptive neuromuscular facilitation) and

PNF (proprioceptive neuromuscular facilitation) plus taping will be shown to considerably lessen inversion injury pain when compared to a control group. No significant differences will be seen across the treatment groups.

For inversion injury patients, the range of motion will be considerably improved by the use of ultrasound treatment (with or without tape), ultrasound therapy with taping, PNF (proprioceptive neuromuscular facilitation) training, and PNF (proprioceptive neuromuscular facilitation) training with taping. Improvement in range of motion after an inversion injury will be shown to be more effective with taping-based PNF training than with traditional PNF. Swelling of eversion injuries will be considerably decreased by using ultrasound treatment with tape, ultrasound therapy, PNF (proprioceptive neuromuscular facilitation) training, and PNF (proprioceptive neuromuscular facilitation) training with taping. No significant differences will be seen across the treatment groups. When compared to a control group, ultrasound treatment, ultrasound therapy combined with taping, PNF training, and PNF training combined with taping all reduced the participants' perception of pain from eversion injuries. In the treatment of eversion injury pain, ultrasound therapy combined with taping will be shown to be superior than PNF (proprioceptive neuromuscular facilitation) training. We found that ultrasound treatment, ultrasound therapy with tape and PNF (proprioceptive neuromuscular facilitation) training with taping substantially increased range of motion in patients with eversion injuries compared to those in the control group, as well. Researchers discovered that PNF training with tape outperformed PNF (proprioceptive neuromuscular facilitation) training in terms of increasing eversion injured patients' range-of-motion capabilities.

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REVIEW OF LITERATURE

Bandyopadhyay A (2012)A. Bandyopadhyay and D. Mahapatra are the authors. A little update on sportstaping. "Journal of Human Sport and Exercise Physiology," Volume 7, Number 2, Pages 544-552, 2012. Athletic tape is a preventative or post-injury rehabilitation and prophylactic auxiliary method. Various body parts, such as the ankle, wrist, finger, etc., are correctly strapped using the tape. Taping is governed by a set of rules, norms, and standards that must be adhered to. Additionally, tape is utilized in sports for pain treatment, biomechanical impacts on balance, posture and the neuromuscular system's rehabilitation, as well as injury prevention, There is a lot of evidence that taping may be helpful in the treatment of injuries to the ankle, foot, hand and wrist, as well as in rehabilitation. For athletes with minor injuries or those recuperating from serious injuries, kinesiology tape is a cutting-edge new technique to taping that has been discovered to be a suitable modality for usage in chiropractic settings. As a result, it may aid in the development of endurance and, in certain situations, performance. Scientists have differing views on the benefits and drawbacks of taping in sports. For the benefit of athletes and athletic performance, Athletic Taping should be used with prudence.

Bot S (2015)Ankle bracing and taping have been shown to improve vertical leap, agility, running speed, and broad jump performance, according to this article. We looked for publications published between 1988 and June 2003 in MEDLINE, CINAHL, and SPORT Discus. Performance, running, jumping, agility, and speed were some of the most frequently used keywords in the article. A search of the retrieved papers' references yielded a list of further research that could be of interest. All studies that reported on the impact of ankle support on vertical jump, jogging, agility or broad jump were eligible. We only considered research that were published as complete reports in English. In the text and tables, data on the ankle support's influence on vertical leap, running speed, agility, and/or broad jump performance were abstracted. A total of 18 studies were eligible for inclusion. When several forms of ankle braces or sticky tape were tested on the vertical leap, four out of the twelve studies indicated a detrimental impact. Three studies revealed a negative impact on the time needed to finish an agility course; one indicated a negative impact on running speed. Wearing a brace has been observed to reduce broad jump performance in one research. The agility course was finished more

quickly when ankle braces were used in two tests. Ankle braces and tape have little or no influence on vertical jump height, running speed, agility and broad jump in athletes with stable ankles, according to the majority of research. More research is needed to determine whether or not wearing an ankle brace for an extended period of time affects sports performance. It's also important to look at the impact of an ankle support on those who have already had an ankle injury.

Cappellino F (2011)The return of symmetry, proprioception, edema reduction, gait training, hyperextension exercises, and even mental preparation should all be part of a comprehensive knee rehabilitation following an ACL repair. Neurocognitive rehabilitative technique based on proprioceptive exercises and optimal motor strategy choices was compared to traditional therapy in terms of baropodometric, gait, and clinical alterations. Randomized controlled trial Hospital-based Ambulatory University Center. POPULATION: Two groups of fourteen patients (ages 27.95.2) each received ACL restoration surgery. TG, a neurocognitive and perceptual rehabilitation treatment, was given to one group of participants at random, whereas a second set of participants got standard physical therapy instead (CG). Pre-intervention, one, three, and six-month follow-up measurements of the following outcomes were performed: Physical examinations include the Visual Analog Scale for Pain, the Self-Report Scale for Depression and Anxiety, the Short-Form 36-Item Health Assessment Questionnaire (SF-36), and the Manual Muscle Test (MMT). Asymmetry in load during static baropodometric (from 7 to 3 percent vs. 10 to 7 percent, interaction time per treatment: $P=0.037$) was lower in TG than CG, as were fewer broad steps during gait (effect size=1.05 vs. 0.38 for CG) and swelling (treatment effect: $P=0.012$). Only in TG for physical activity did SF-36 scores increase substantially (from 35% to 100%) ($P=0.027$). CG exhibited a significant increase in walking speed ($P=0.049$). A cognitively rehabilitative strategy might be a useful therapy for ACL reconstruction, notwithstanding the need for future investigations on bigger samples. In TG, we found a quicker load summarization, reduced step width, and a more rapid edema resolution. IMPACT ON CLINICAL REHABILITATION: Posture, gait, clinical characteristics, and quality of life may be improved via neurocognitive rehabilitation after ACL surgery.

Cheng Y, et al., (2014)The purpose of this research was to evaluate the diagnostic accuracy of ultrasonography in the diagnosis of chronic lateral ankle ligament damage. " Ultrasonography with a 5- to 17-MHz linear array transducer was used to assess 120 ankles of patients with a clinical suspicion of chronic ankle ligament damage before surgery. Ultrasonography data were compared to those obtained during surgery. Arthroscopic and surgical findings showed that the ATFL (at least 18 sprains and 24 partial and 52 full rips) and CFL (at least 26 sprains and 27 partial and 12 complete tears) were the most frequently injured ligaments. Compared to operative results, ultrasonography was 98.9% sensitive, 96.2 percent specific, and 84.2 percent accurate for ATFL injury and 93.8 percent sensitive, 90.9 percent specific, and 83.3 percent accurate for CFL injury. Ultrasonography was used to detect the PTFL tear. Acute-on-chronic and subacute-chronic patients were identified with the same accuracy. Diagnosing three levels of ATFL injuries had diagnostic accuracy that was almost identical to that of diagnosing CFL injuries. For individuals with persistent pain after an ankle injury, ultrasonography gives important information.

Choi YK, et al., (2013)Patients with stroke-induced hemiplegia were tested to see how tape affected their knee's articular angle and how it affected their ability to function. [Subjects] Patients suffering hemiplegia as a result of a stroke were the focus of this investigation. Proprioceptive neuromuscular facilitation combinations and kinesio taping were administered to the experimental group and neurodevelopmental therapy was given to the control group. [Methods] Both the paralyzed and non-paralyzed sides were measured using a goniometer to determine the joint angle. The Berg Balance Scale was used to measure participants' dynamic balance abilities. A stopwatch was used to record the time it took for a person to walk 10 meters. [Results] BBS and 10-m walking tests demonstrated statistically significant changes between the experimental group's pre- and post-test scores. Ankle dorsiflexion, BBS, and 10-m walking times were significantly different across groups. Patients who have suffered nerve injury and are undergoing physical therapy would benefit from taping the knee joint prior to starting treatment, according to our findings.

Cressman EK (2011)After mismatched visual input of the hand, goal-directed reaches are quickly modified. Proprioceptive re-calibration may also occur when the visual feedback of the hand is misaligned (i.e., realigning proprioceptive estimates of hand position to match visual estimates). To test this theory, we performed a series of tests in the university laboratory. Aiming with a misaligned cursor commonly rotated 30° clockwise (CW) with regard to the hand, we compared individuals' assessments of the location at which they believed their hand was aligned with the reference marker (visual or proprioceptive). Subjects' proprioception was found to have been re-calibrated such that their estimations of the felt location of their hands aligned with their reaches. It was also found that proprioception was retrained to a similar degree of motor adaptation (30%), regardless of how the hand was placed in the estimate trials, whether the reference marker was visual or proprioceptive, whether a right or left hand was used during reach training, whether distortion was introduced gradually or abruptly, and the age of the subjects (young or older) and the magnitude of visuomotor. A partial recalibration of proprioceptive information may accompany the sensorimotor alterations associated with reaching motions, according to these findings.

Dhillon MS, et al., (2011)Decreased knee joint proprioception is a common consequence of anterior cruciate ligament (ACL) injury along with mechanical instability. In spite of a "clinically excellent" repair and adequate ligament tension, some patients with a "anatomic" arthroscopic ACL reconstruction nonetheless complain of "functional" instability and giving way, despite the fact that the knee does not sublux on clinical tests. The intact ACL has been revealed to contain substantial receptors for the proprioceptive sense, which may play a role. Injured knees and knees that have been surgically repaired show significant disparities in proprioceptive abilities. Researchers have shown that if ACL fragments stick to or grow into the repaired ligament, the proprioceptive fibers they contain might help with functional recovery. This might be an area for future study and advancement, since conventionally, the torn remains are removed from the knee before the transplant is inserted; current surgical procedures using remnant-sparing approaches have demonstrated improved success. The sensory component of ACL deficit, namely proprioception as an essential component of functional knee stability, is examined and reviewed in this study. There is a discussion of the kinds of mechanoreceptors, their distribution, and their existence in the ACL remains, and recommendations are

offered to reduce soft tissue shaving during ACL reconstruction to guarantee a better functional result in the rebuilt knee.

Feasel J, et al., (2011) Slow gait speed and asymmetrical interlimb movement are common in many different medical conditions. During task-specific practice, current locomotor retraining methods highlight the need of receiving enough feedback. When training for rehabilitation, gait asymmetry and speed are critical factors, and this research covers the design and feasibility testing of an integrated virtual environment rehabilitation treadmill (IVERT) system that provides real-time feedback. IVERT combines an instrumented, split-belt treadmill with an immersive virtual world. An entirely new kind of adaptive control system utilizes ground reaction force data from a treadmill to dynamically alter the virtual environment's speed and direction using data from both treadmill belts. The virtual environment and the split-belt treadmill provide visual and proprioceptive feedback on gait asymmetry, respectively, in the form of variable belt speeds. During a training session, a group of five people with asymmetric gait were able to efficiently manage their locomotion pace and recognize their own gait asymmetry. Further research is needed to investigate if the IVERT may be used to help patients with asymmetric gait by giving them with congruent visual and proprioceptive input, even though only minor increases in overground symmetry were seen after a single training session.

Gehring D (2013) Preventive strategies for lateral ankle sprains must be based on a thorough knowledge of the injury process. The joint load can only be tested in a laboratory environment with unambiguous margins of safety. A biomechanics experiment went awry when an athlete hurt his ankle during a run-and-cut maneuver. In this study, we recorded and analyzed the lower-limb kinetics, 3D kinematics, and muscle activity in 16 prior experiments. In the sprain trial, the motion patterns of global pelvis orientation, hip flexion, and knee flexion diverged early in the anticipatory phase before ground contact. Within the first 150 ms following heel striking, the ankle was quickly plantar flexed (up to $1240^{\circ}/s$), inverted (up to $1290^{\circ}/s$) and internally rotated (up to $580^{\circ}/s$). As soon as the ground touches the foot, rapid neuromuscular activity bursts occur in the m. tibialis anterior and the m. peroneus longus. Peak activation occurs at 62 and 74 milliseconds, respectively. When excessive ankle displacement occurred, it is possible that neuromuscular reflexes played a significant role in joint control. The findings of this case study clearly show that lateral ankle sprains must take upper limb mechanics, pre-landing modifications, and neuromuscular involvement into account.

Gino M Kerkhoffs, et al., (2012) Injuries to the ankle are a major medical and social issue. Many individuals get a traumatic ankle injury as a consequence of playing sports, and this is the most common cause. Treatment and absence from work due to ankle issues add up quickly. Recurrence prevention may save a lot of money on medical bills. With the goal of bettering the diagnostic and treatment options available to patients with acute lateral ankle ligament injuries, a multidisciplinary clinical practice guideline was drafted. The guidelines are based on published scientific research, which was thoroughly considered by the guideline committee. Patients with ankle injuries will benefit from the information in this clinical guideline.