EFFECTIVENESS OF MASSAGE AND EXERCISE THERAPY ON HEALING CHRONIC HIPS, KNEE, AND ANKLE INJURIES

SUPERVISOR:

DR. dr. BM. WARA KUSHARTANTI, M. S

BY:

JAPHET NDAYISENGA

NIM. 18711259001

SPORT SCIENCES: SPORT AND HEALTH CONCENTRATION

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ABSTRACT

JAPHET NDAYISENGA**:** Effectiveness of Massage and Exercise Therapy in Healing Chronic Hip, Knee and Ankle Injuries. **Thesis Yogyakarta: Graduate School, Yogyakarta State University, 2020.**

Chronic hip, knee, and ankle injuries are very common in the whole world. Musculoskeletal disorder hampers the development in several sectors including training and athletes' performance. Social, industrial, economic, and education decline are often caused by poor muscular-articular problems.

This research aims to reveal the effectiveness of massage and exercises therapy in: (1) the treatment of chronic hips, knee and ankle injuries; (2) improving and increasing the low limb strength and flexibility; (3) reducing the chronic pain of degenerative diseases; (4) improving the physical and mental wellbeing of human body; (5) increasing motor or sensory function; (6) increasing athlete's performance.

This research is quasi-experimental with the mixed method: quantitative and qualitative approaches. The sample of this study is 20 patients with chronic hips, knee and ankle injuries, established using the quota sampling technique. The data were collected using a questionnaire and through observation, and analysed using the descriptive statistics, independent sample t-test of SPSS, paired sample t-test of SPSS, and correlation among items using SPSS.23.

The result shows that there is a significant difference between the result of the pre-test and that of the posttest of strength measurement ($0.003<0.05$) and there is a significant difference between the result of the pre-test and that of the posttest of all kinds of movement flexibilities with the P value smaller than 0.05. There is a strong correlation between massage and exercise therapy to the chronic knee, knee, and ankle with the r **value** smaller than 0.5 ($r >0.5$). In conclusion, massage and exercise therapy are found to be a vital part to improve human body health and it can be used by everybody.

Keywords: effectiveness, exercise therapy, healing chronic, low limbs injuries, massage

ABSTRAK

JAPHET NDAYISENGA: Efektivitas Masase dan Terapi Latihan pada Penyembuhan Cedera Kronis Punggung, Lutut, dan Pergelangan Kaki. **Tesis Yogyakarta: Program Pascasarjana, Universitas Negeri Yogyakarta, 2020.**

Panggul, lutut, dan pergelangan kaki cedera kronis adalah masalah yang sangat umum di seluruh dunia. Gangguan muskuloskeletal menghambat perkembangan di beberapa sektor termasuk pelatihan dan kinerja atlet. Kemunduran sosial, ekonomi industri, dan pendidikan disebabkan oleh otot-artikular yang buruk. Penelitian ini bertujuan untuk mengungkapkan efektivitas terapi masase dan terapi latihan dalam: (1) memulihkan panggul, lutut, dan pergelangan kaki cedera kronis; (2) meningkatkan kekuatan dan fleksibilitas anggota tubuh bawah; (3) mengurangi rasa sakit kronis dari penyakit degeneratif; (4) meningkatkan kesejahteraan fisik dan mental tubuh manusia; (5) meningkatkan fungsi motorik atau sensorik; dan (6) meningkatkan kinerja atlet.

Penelitian ini adalah semi-eksperimental dengan mixed method: pendekatan kuantitatif dan kualitatif. Sampel penelitian ini adalah 20 pasien dengan pinggul, lutut dan pergelangan kaki cedera kronis yang ditentukan secara quota sampling. Pengumpulan data menggunakan kuesioner dan melalui observasi. Analisis data menggunakan statistik deskriptif, *independent sample t-test SPSS, Paired sample t-test SPSS,* dan korelasi antara item menggunakan SPSS.23.

Hasil penelitian menunjukkan bahwa ada perbedaan yang signifikan antara *pre-test* dan *posttest* dari *strength measurement* (0,003 <0,05); ada perbedaan yang signifikan antara *pre-test* dan *posttest* dari semua jenis fleksibilitas gerakan dengan nilai P lebih rendah dari 0,05. Ada korelasi kuat dari terapi pijat dan terapi latihan untuk pinggul, lutut, dan pergelangan kaki dengan r lebih besar daripada 0,5 (r> 0,5). Kesimpulannya terapi pijat dan terapi latihan merupakan bagian penting untuk memulihkan dan meningkatkan kesehatan tubuh manusia dan dapat digunakan oleh semua orang.

Kata Kunci: cedera extremitas bawah, efektifitas, masase, terapi latihan penyembuhan kronis,

STATEMENT OF AUTHORRSHIP

The undersigned,

Name and Surname of Student : Japhet NDAYISENGA

Student Number : 18711259001

Program of study : Sport Sciences: Sport and Health

Concentration

I certify that this thesis is definitely my personal work and has no longer been submitted for a degree in any university. I am responsible for the contents. Other writers' opinions or findings included in this thesis are quoted or noted in the reference.

Yogyakarta, March, 2020

Japhet NDAYISENGA

NIM: 18711259001

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Dedication

This thesis is dedicated to my mom Cornalie BARINZIGO, my father Léonidas BUYOYA and Bapak Suhono who have continually been a regular supply of guide and encouragement for the duration of the challenges of my whole find out. It is also dedicated to my brothers, sisters and aunts whom i am virtually grateful for having in my life.

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JAPHET NDAYISENGA

NIM: 18711259001

This thesis is written to fulfill a partial of the requirements for a Magister degree

In Sport Sciences: Sport and Health Concentration

Approved by the supervisor to be submitted for the thesis examination

Supervisor

DR. dr. BM. WARA KUSHARTANTI, M. S

Head of Sport Sciences

Department

Prof. Dr. Suharjana, M. Kes.

NIP: 196108161988031003

Graduate School

Yogyakarta State University

Director

Prof. Dr. Marsigit, M.A.

NIP: 19570719 198303 1 004

RATIFICATION PAGE

EFFECTIVENESS OF MASSAGE AND EXERCISE THERAPY ON HEALING CHRONIC HIPS, KNEE, AND ANKLE INJURIES

JAPHET NDAYISENGA

NIM: 18711259001

Defended in Front of the Thesis Examiner Team of Graduate School at Yogyakarta State University on 16th of March, 2020

Board of Examiners

Dr. dr. B.M. Wara Kushartanti, MS. 20/03/2020

(Supervisor/Examiner)

Dr. Bambang Priyonoadi, M.Kes. 20/03/2020

(Reviewer/Examiner)

Yogyakarta, 28-3-20

Graduate School

Yogyakarta State University

Prof. Dr. Marsigit, M.A.

NIP: 19570719 198303 1 004

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CHAPTER I

INTRODUCTION

A. Background

Chronic hips, knee, and ankle instability are very common issue in the whole world. This common problem takes origin from many sources: first daily activities such as sports for athletes and coaches, second degenerative disease, and it is noted that the aging is the one of factors which causes the chronic hips, knee, and ankle instability. Next the unbalance between input and output has a high average in causing the later problem (Liu, Wan, Zhou, Feng, & Shang, 2017), in time-honored work or expert associated with posture and long-time taken at some point of working are several reasons of persistent hips, knee, and ankle instability (Morden, Jinks, & Bie Nio Ong, 2011). Knee and ankle disorders can lead to a discount in useful ability, increased dependency, decreased participation in fundamental every day things to do and extensive fitness two many exclusive researches have been carried out to make up proper how the nature of work or career is very severe on the appearing of the sickness of hips, knee, and ankle (Rugg, Kadoor, Feeley, & Pandya, 2018). The continual ankle and knee injuries are among the most common accidents sustained and they are additionally among the most severe. Neuromuscular dysfunction of the leg and thigh musculature, along with lowered power and postural control, is common in sufferers with continual ankle instability (McLeod, Gribble, & Pietrosimone, 2015). Nevertheless Osteoarthritis (OA) is a growing public fitness hassle across the globe, affecting more than half of of the

over sixty five population. In the past, OA was viewed a wear and tear disease, leading to the loss of articular cartilage and joint disability (Musumeci et al., 2015). Ankle strain and sprain are very a whole lot common each in the wearing activities and the everyday community. Ankle sprain is mentioned to be among the most frequent recurrent injuries. About 20% of acute ankle sprain patients boost chronic ankle instability. The failure of useful rehabilitation after acute ankle sprain leads to the development of continual ankle instability (Al-Mohrej & Al-Kenani, 2016). A number of posture taken in the course of working in an every field existing a distinct risk of harm due to the excessive exposure to bent postures (Nurkertamanda, Adiputra, Tirtayasa, & Adiatmika, 2017). Low back pain (LBP) is one of the very best incidence issues of public health. Low back pain (LBP) influences up to 85% people worldwide. Somebody will be affected at much less in one point of his life. LBP symbolize an full-size economic burden on society; its complete value includes: direct scientific costs, work absenteeism, insurance, misplaced manufacturing and disability advantages. Low back pain (LBP) is the most frequent incapacity worldwide and turning into Chronic low returned pain which its regular is already elevated (Hoy et al., 2012). Musculoskeletal disabilities are established and their affects are pervasive. They are the most common cause of severe longterm ache and physical disability, and they have an effect on heaps of millions of humans around the world.

Aging is additionally a strong component of the most common websites for musculoskeletal disorder of continual knee and ankle. In 2010, The European

Agency for Safety and Health at Work (OSHA) said that Musculo-Skeletal Disorders (MSDs) had been the most frequent work related fitness hassle in Europe, affecting tens of millions of workers (Collins & O'Sullivan, 2015). In the learn about executed with its objectives to check the incidence and depth of musculoskeletal pain as a danger thing for decreased work ability. With sampling 1449 workers participated in the study, 64% had been youthful workers (<45 years old, M 31.4); 36% had been getting old employees (>45 years old, M 50.3), The outcomes of the find out about confirmed that even though in the each groups, i.e., younger and growing older workers, the occurrence and depth of ache in decrease lower back muscle mass two have been a full-size component which decreased work ability intensity, in growing older workers only the occurrence of pain in the lower again generated greater risk elements for reduced work potential (WAI < 37) (Bugajska & Sagan, 2014). Musculoskeletal issues (MSDs) are a significant and increasing occupational health issues in the workplace worldwide. The causes of work-related MSDs are normally multifactorial including physical, ergonomic, and psychosocial factor. According to the ageing knee is the most physique phase affected by using musculoskeletal issues like many diseases, the occur disorder and pathogenesis of osteoarthritis (OA) are multidimensional Anterior cruciate ligament (ACL) injuries are common, extreme knee injuries that result in a excessive chance of growing knee osteoarthritis (OA) in the affected individuals. As proof of excessive influence forces applied to cartilage and bone at the time of injury, tense bone marrow lesions and osteochondral fractures, positioned

predominantly in the lateral tibiofemoral compartment, are oftentimes related with an ACL injury. The subsequent danger of OA may be intently associated with the knee harm mechanism and the panorama of accidents in the knee sustained at the onset of injury (Musumeci et al., 2015).

Daily activities are the most cause of chronic injuries and generative chronic injuries. Treatment of chronic injuries is important because chronic injury at early age or aging brings on two types of consequences on physical and mental health. For example, an early sports chronic injury can hinder physical activity for the rest of life and can also affect attitudes toward sport and physical activity. But also it can make severe the physical condition and psychological, so the wellbeing of human body will considerably decrease. With strong participation in the different field : sports and work, the need for injury treatment becomes paramount. In order to reduce sports chronic injuries, work chronic injuries and generative chronic injuries, it is necessary to identify and describe the nature.

However musculoskeletal issues (MSDs) are a predominant health troublesome among human beings of Klaten, and the prevalence is specially excessive on every age. But in Klaten, there is no statistics on hand among fitness professionals. There is a need for treatment research to heal human against the potential negative consequences from work or degenerative diseases. A prerequisite for the development of treatment strategies is a sufficient understanding of the incidence and determinants (risk factors) work and degenerative injuries. The most the number of participants in every field

increases, the most risk of chronic injury increases. Thus, the control of intrinsic and extrinsic factors associated with work and generative injuries have to be suggested because the chronic injury rate and the demands of the daily activities (sports, work… etc.,) are high, a rehabilitation program should include massage, exercises therapy that will train the participant as a whole and reduce the pain of further injury, increase flexibility and strength.

B. Problem Identification

From the background above, the problem of chronic hips, knee, and ankle can be defined as follow:

1. In Klaten area people (youth, men, women and old) have become sufferers from chronic hips, knee and ankle injury.
2. Most of people can't walk more than 30 minutes.
3. Service absence was considerably enough raised because of the severe of hips, knee and ankle musculoskeletal disorders.
4. Degenerative disease, posture taken during the work and some kinds of sports are the cause of chronic hips, knee and ankle injury of Klaten people.
5. The body status of same of them allows the appearance of hips, knee and ankle injuries (Obesity)
6. The aging was the cause of chronic hips, knee and ankle injuries for some of Klaten people.

C. Problem Restrictions

Based on the time and ability of this study, this study will examine how to treat chronic hips, knee and ankle injuries from different daily human activities of Klaten people.

D. Focus and Problem Formulation

From the background of the problem identification above, this research focused on the matter how chronic hips, knee, and ankle injuries can get treatment. To reach the objective problem formulation can be set as follow:

1. Does massage contribute for healing chronic hips, knee and ankle injuries from different case?
2. Does exercise therapy allow chronic hips, knee and ankle healing?
3. Do massage and exercise therapies improve and develop strength and flexibility for low limbs?

E. Research Objective

The good physical body condition of people is one of the most factors which allows human to attend sustainable goals and successful performance during the competition for the athletes. In general this research aims are:

1. To show the effectiveness or contribution of massage, exercises therapy in the process of healing or treatment of chronic joint injuries like hips, knee and ankle that often appear on human and athletes during training and competition periods.

2. Improving and increasing the strength and flexibility of low limbs of human body.
3. To show the effectiveness of massage and exercises therapy on the chronic joint injuries which often occur during ball sports such as: basketball, soccer, handball, volleyball and rugby ... etc.
4. To reduce and improve the chronic degenerative joint injuries which occur on early age and on aging
5. Improving the physical and mental wellbeing of human body by reducing the pain.
6. Increasing motor or sensory function, increasing independence, reducing of medication, reducing of hospital visits, and increased overall health.

F. Research Benefits

This research is very useful for demonstrating a new multidiscipline approach to treating, reducing joint injuries. Degenerative injuries and injuries that often appear during sports such as: athletic, basketball, soccer, handball, volleyball, and rugby ... etc. The good health is the foundation of development in every field like: sportive area, public and private service we can't except the progress when human living the bad fitness.

CHAPTER II

LITERATURE REVIEW

A. Massage Therapy

Massage is a recuperation method that uses the movements of the arms or equipment towards tender body tissues. Massage is the artwork of hand actions that intention to get pleasure and maintain physical health. The phrase rub down comes from the Arabic word "Mash" which skill to press gently or from the Greek phrase "Massien" which capacity massaging or melting. Actors for guys are referred to as masseur; actors for women are referred to as masseuse (Piper et al., 2016). Purpose of massage basically, massage goals to treat, forestall injury and nerve function. Besides rubdown can improve blood circulation, helps absorb (absorption), secretion, improves muscle tone, and helps the distribution of strength and nutrients into the network (Field, 2014).

1. Main Benefits of Massages

Massage remedy can be a vital part of your health preservation, the massage's benefits are following: (1) reducing or casting off pain; (2) reducing muscular tension; (3) improving joint mobility; (4) improving lymphatic (S. Kumar, Beaton, & Hughes, 2013). Massage remedy can be used for the therapy of each acute and chronic condition. Registered massage therapist (RMT) can work with a wide range of patients, of all ages, in the remedy of illness, injury rehabilitation and disability (Gasibat et al., 2017).

Massage therapists today use their know-how of physiology and anatomy to mix ordinary Swedish and current rub down remedy methods with different treatment options to deal with and forestall acute and persistent injuries. There has been a wide variety of research, posted in peer reviewed journals, proving the advantages of rubdown therapy for various conditions. The following is a listing of prerequisites for which rubdown therapy, when provided by using a registered massage therapist, can prove beneficial. This list is no longer exhaustive however covers many common prerequisites: (1) stress; (2) upper limbs injuries and pain; (3) strain and sprain; (4) Kyphosis and Scoliosis; (5) Osteoarthritis in the knee and take off the rheumatoid arthritis pain (Hongsuwan, Eungpinichpong, Chatchawan, & Yamauchi, 2015; Moran, Hauth, & Rabena, 2018; BINGÖL & YILMAZ, 2018).

Massage Therapy can also be used as section of a preventative care program. This includes sports activities training; harm prevention, on-going stress management, and more! Together, you and your therapist will improve a treatment diagram based on your needs. The treatment design can be modified at any time and you have no duty to bear any part of treatment. Your cure begins after you've given your informed consent.

Massage remedy may also help the body in many ways. Massage can loosen up muscle tissue, which may additionally lead to

diminished nerve compression, increased joint space, and vary of action. This can also lead to reduced ache and accelerated function. Massage therapy may also enhance circulation, which enhances the shipping of oxygen and nutrients to muscle cells and helps eliminate waste products. These circulatory consequences of rubdown may have cost in the cure of some inflammatory conditions, such as arthritis or oedema (an immoderate accumulation of fluid in physique tissues, which may be reduced using manual lymph drainage). Massage therapy is additionally idea to set off a relaxation response, which lowers the coronary heart rate, respiratory rate, and blood pressure; boosts the immune gadget (Nair, Kahlenberg, & Hsu, 2015) ; and normally decreases the physical effects of stress. These outcomes advise that rubdown may additionally be beneficial for a large vary of conditions. Two some of these are listed below.

Massage is found as a strong tool to improve health. It decreases headaches pressure, muscles pains and injuries. It also helps pregnancy to avoid the low back pain, increases the athlete performance (Schroeder, Doig, & Premkumar, 2014; Kennedy, Patil, & Trilk, 2018):

Every manipulation or grip of massage has a certain influence on body tissues. Besides the pressure, the direction of movement, the number of repetitions and the rhythm also determine the influence. The success of massage is also determined by the skill of the

experience of the person himself. The effect of massage on tissue is mechanical, reflector and khemis (Twigg, Geelhoed, Bremner, & M. Duffield, 2013; Perlman et al., 2012).

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2. Types of Massage

In fact, there are extra than 200 one-of-a-kind strategies and types, all of which tackle exceptional desire and grant different benefits. Let's damage it down. Here are nine of the most famous kinds of masks and when you can pick them. There are countless types of rubdown that focus on exclusive parts of the body or strategies of healing. Massage is a practice of rubbing and rubbing the physique with hands. During the massage, the relief specialist will observe extreme or intense pressure to the muscle groups and joints to relieve ache and tension. A rubdown therapist is anyone who is trained to offer a massage.

The common popular massage therapy used in treating injuries is the following: (1) Swedish massage; (2) Hot stone massage; (3) Chair massage; (4) Sports massage; (5) Thai Massage; (6) Prenatal massage; (7) Reflexology; (7) Shiatsu massage; (8) Couples massage; (9) Soft

tissue release, and (10) Deep tissue massage. Even though all the type of massage therapy have great important on the improvement of the human life, we cannot apply all. For this student, the researcher will focus only on four types of massage therapy amongst: (a) Swedish massage; (b) Deep tissue massage; (c) Soft tissue release, and (d) Sport massage therapy (Piper et al., 2016).

a. Swedish massage

The type of alleviation presented in many clinics, gyms, emotional centers and well-being centers, the Swedish massage is totally linked to massage therapy. Swedish rub down is based totally on Western concepts of anatomy and physiology, in contrast to the most energy-consuming style of Asian massage types. Piper et al., (2016) said that Swedish massage was based on five (5) strokes like: (1) Effleurage (long smooth stroke), effects of stroking were carried out like improving venous return, make good lymphatic and hormones; (2) Petrissage (kneading); Kneading makes use of stretching, kneading and compression strategies to improve blood circulation, relieve knots and muscle spasms and enhance muscle function. A kneading rubdown can be really helpful to deal with delayed onset muscle pain, relieve tension and improve recovery. It also helps to make interchange of fluid's tissue, and increasing mobility of the joints. (3) Friction (circular movement); the cause of deep friction rubs down is to preserve mobility within the tender tissue constructions of the

ligament, tendon and muscle and to prevent the formation of adherent scars. (4) Tapotement (beating, hacking, and percussion), it increases neighborhood blood circulation, which, in turn, helps to warm and soften the underlying tissue. The skin will experience heat to the contact and appear flushed. (5) Vibration is a massage approach in which muscle tissue is pressed and released in an "up and down" movement. It is a form of muscle tremor applied the usage of the palm surfaces or sincerely with the fingertips of one or both hands. This shape helps chase away pain and relax muscles (Gasibat & Suwehli, 2017).

Swedish rub down treatment is very beneficial, among different matters for sprains, strains, fractures and muscle tears. The one-of-a-kind rubdown methods used can stretch the tightness and loosen the scar tissue. Using rubdown as section of damage rehabilitation can extend restoration rate and shorten restoration time some strategies like pass friction can assist prevent the formation of scar tissue adhesions and even pace healing. Soft tissue rub down is the pleasant choice for targeting injuries to muscles, tendons and ligaments. Massage remedy is used to relieve muscle tension. This comfort helps stop smooth tissue pain. It also will increase flexibility whilst merchandising quicker recuperation of soft tissue and different injuries, normally Swedish rub down is very fine in treating ankle, knee, and hip accidents due to these physiological benefits. Swedish

massage is a precise way to make the pelvic girdle individuals wholesome (Mustafa, Furmanek, Knapik, Bacik, & Juras, 2015).

Using lotion or oil, massage therapists generally begin with everyday rub down movements, then modify particular actions to unravel the problems (Weerapong, Hume, & Kolt, 2005). There are 5 simple traits and / or patterns in the Swedish mass: (1) Strength (long strokes, slippery and slippery); (2) Sliding (bending, twisting and lifting), bending); (3) Download (by urgent the soundtrack); (4) Friction (with fibers or fibers crossed or small circular movements); (5) Shake / Shake and shake movements (Oliver, 2013).

These five stroke strategies are used to limit moderate to extreme muscle pain, and the severity of every stroke reflects the diploma of tightness that is constructed into the muscle. More specifically, the name "Swedish massage" is used only in English and Dutch - all different nations call it "regular massage". In this way, this approach was developed, albeit incorrectly, by way of Per Henrik Ling. However, it used to be a Dutchman by means of the title of Johann Georgia Mezger who coined the French phrases for simple massage style traits (Sangam et al., 2015).

Swedish massage has been proven to help reduce: Joint stiffness, Reduce the pain, Osteoarthritis, decrease lower back pain, Stress administration / reduction. Swedish massage can final 30 to ninety minutes, except in special cases, and can be made on anyone.

However, if the individual has already suffered from pain, pain or trauma, it is high-quality to inform the masseuse earlier than proceeding with rub down therapy. Swedish rubdown is a gentle structure of full physique massage, best for people who: is new to massage, have a lot of tension, touchy to touch.

It can assist launch muscle fibers and is additionally a correct choice when you desire to totally loosen up at some point of mass.

With this massage, you will remove your clothes, although you can select to put on your underwear. You will be protected with paper when you lie on a mass table. The massage therapist will pass the paper round to expose the areas the place they are working hard.The rub down therapist will use a mixture of: kneeling, long, flui, movements closer to the heart, deep round motion, vibrations and blows, Joint motion techniques. Swedish rubdown typically lasts 60 to 90 minutes.

b. Deep tissue massage

deep tissue rub down is a targeted therapeutic rub down that objectives muscle knots (also referred to as "adhesions") and specific problem areas in the deep layers of muscle mass and connective tissue. Manipulation of Deep tissue massage: The technique used in deep tissue massage is pressure using the forearms, elbows, and hands clenched fist. Deep pressure on the muscle tissue, so that the muscle

become more relaxation. that pressure used in deep tissue massage slower and stronger.

Deep Tissue Massage is designed to relieve tension muscles, stress and discomfort in the muscles. Deep tissue massage in its application has three types of manipulation that often used namely effleurage, petrissage, and friction (Balletto, 2019). In addition, the manipulation technique is then combined by using a clenched fist, elbow, and forearm in soft tissue in an effort to expedite blood flow. In addition, deep tissue massage techniques are also combined with stretching movements.

Deep tissue massages technique as follows. This slow and strong pressure is intended to hit deeper network.Using deliberate and gradual actions or rubbing thru the grain of the muscle, the therapist treats the anxious or painful continual muscles, repetitive efforts, postural troubles or injuries. This type of massage is mainly recommended for people suffering from chronic ache or power injuries that reason limited mobility. It is high quality in treating repetitive stress injuries such as tennis elbow or carpal tunnel syndrome and can be useful in lowering the signs of osteoarthritis. Deep tissue rubdown makes use of extra pressure than Swedish massage. The rubdown will closing from 60 to 90 minutes (Romanowski et al., 2017).

c. Soft Tissue Release (STR)

Soft tissue rubs down entails direct bodily motion on the muscle and other smooth tissues of your body. Soft tissue techniques such rub down ambitions your muscles; tendons, ligaments, or different connective tissue such as fascia (Balletto, 2019). STR is a technique whereby the therapist actively stretches muscle fibers, tendons and fascia. It includes over and over and rapidly stretching small areas of gentle tissue by using applying precise stress to the muscle and then shifting it to stretch it.

Manual techniques including myofascial and position release, trigger point therapy, use of stainless-steel tools, and various movements (both passive and active) with pins and stripping of focal adhesion, "gravity, bolsters have been used to improve alignment and posture. Back pain Chronic and plantar fascitis is also treated with deep tissue release (Gasibat & Suwehli, 2017).

d. Sports massage

Designed to forestall and treat injuries, enhance flexibility and improve athletic performance, sports rubdown can be used through athletes of all capabilities to prepare for or get better from sporting or wearing events. The various massage techniques that are most commonly used in sports massage treatments including, effleurage, petrissage, friction, tapotement (A. Kumar, 2018). Manipulation techniques used include, namely: effleurage, petrissage, shaking or

kniding, tapotement, friction, walken, vibration, stroking, skin-rolling, and chiropractic

Even if you are not an athlete, sports rubdown can relieve muscle ache or restriction the range of movement (Nunes et al., 2016). This kind of massage can assist extend blood flow, extend range of motion, and enlarge flexibility. In sports massage, the strokes are usually quicker than a standard Swedish massage. The therapist may also include compression, strain factor therapy, friction, and joint mobilization. Sports rubdown is a true alternative if you have a repetitive harm to a muscle, like what you can get by means of taking part in a sport. In addition, sports activities rub down can be used to relieve pain, anxiety and muscle tension.

A sports activity rubs down can be carried out as a full body rub down or the massage therapist can focally point on the parts of the body that need the most attention. Deep strain can be alternated with soothing movements as needed. The massages will remain from 60 to 90 minutes. Sports massage is a massage cure that offers with the physical and psychological aspects for athletes. This can be used earlier than or after sports activities. If used earlier than exercise, it will be very useful in lengthening and loosening the tender tissue. Massage refers to the systematic manipulation of the body's gentle tissue for therapeutic and blood circulation purposes. Sports massage is the science and art of making use of rubdown and strategies related

to retaining the health of athletes and enhancing sports activities performance. Massages have been used as a recuperation and relaxation technique for lots of years. By manipulating the tissues and muscle tissues of a recipient the usage of a combination of pressure, friction, caressing, and even heat, a number of health advantages have been observed (Vigotsky & Bruhns, 2015). Therefore, the masseur need to have understanding carefully associated to massage, including: (1) Anatomy Sports (2) physiology (3) Kinesiology (4) Sports health.

Sports rub down can play a necessary function in the life of any athlete or woman, whether or not injured or not. Massage has many physical, physiological and psychological benefits: it can assist keep the body in a better usual state, stop injuries and loss of mobility, heal and fix the mobility of injured muscle tissue, enhance overall performance and lengthen the typical lifestyles of your sport (Giamberardino, Affaitati, Fabrizio, & Costantini, 2011).

Sometimes areas of tightness in muscle tissue, known as trigger points, can purpose ache in different parts of the body. By focusing on relieving set off points, this type of rubdown can decrease ache (Majlesi & Unalan, 2010). The set off point rubdown uses wide, fluid movements that are gentle and enjoyable combined with stronger, deeper pressure. The massage will encompass work all over your body, although your therapist will center of attention on the unique

areas of your physique that need to be released. You can wear light apparel for the massage or be thoroughly or partly undressed. This type of rub down normally lasts from 60 to 90 minutes. (Nurkertamanda et al., 2017)

e. Hot stone massage

Hot stone massage as its name suggests, hot stone rub down makes use of hot stones. The therapist locations heated and smooth stones on particular points of the body and also retains the hot stones while giving the massage. The stones are typically basalt (a volcanic rock which retains warmness well).

The warmness of the stones can be relaxing and can relax traumatic muscle groups so that the therapist can shortly reach areas of muscle tension. If you have certain scientific prerequisites such as high blood pressure, diabetes, coronary heart disease or varicose veins, you ought to test with your health care company if you are planning to get a hot stone massage.

Likewise, if you are taking blood thinning medications, be positive to get scientific advice first. The warm stone massage is best for people who have muscle ache and anxiety or who just prefer to relax. This type of therapeutic rubdown is similar to a Swedish massage, only the massage therapist uses heated stones instead of or in addition to their hands. It relieves muscle tension, improves blood

circulation and relieves ache through the use of heated stones (Hainline et al., 2017 ; Nasiri & Mahmodi, 2018)

f. Reflexology

According to Nazari, Soheili, Hosseini, & Shaygannejad (2016), reflexology is fantastic for people who are looking to relax or repair their natural strength levels. It is also a desirable choice if you are now not cost being touched all over your body. Reflexology uses gentle, company pressure on distinct stress points on the feet, palms and ears. You can wear loose, cozy apparel that gives access to your legs. A reflexology rubdown lasts 30 to 60 minutes (Embong, Soh, Ming, & Wong, 2015).

g. Shiatsu massage

Shiatsu is a physical and realistic remedy designed to guide and stimulate the body's natural ability to heal and balance itself. Shiatsu massage goals to enhance the fitness of the whole person, together with physical, emotional and psychological well-being. Shiatsu is frequently used as a preventive remedy or can be used in addition to traditional treatment (Robinson, Lorenc, & Liao, 2011).

Shiatsu capacity "finger pressure" in Japanese, however Shiatsu rubdown techniques can encompass a therapist the use of more than their fingers. Shiatsu rub down therapists can additionally use their

palms, elbows, knees and toes to follow pressure (Marques, Santo, Berssaneti, Matsutani, & Yuan, 2017).

Shiatsu massage is first-rate for people who choose to loosen up and relieve stress, pain and tension. It is Japanese massage which: (1) promotes emotional and bodily calm and relaxation, (2) helps relieve stress, nervousness and depression; (3) can relieve headaches; (4) reduces; and you can be entirely dressed throughout this massage. Shiatsu massages usually closing 60 to ninety minutes muscle tension (Schitter, Nedeljkovic, Baur, Fleckenstein, & Raio, 2015).

h. Thai Massage

Thai massage is ideal for human beings who choose a greater active structure of massage and who prefer to decrease and relieve ache and stress It can also help improve: flexibility, circulations, and trength levels. A special blend of assisted yoga, passive stretching and pressing massage movements, Thai rub down is greater energizing than different forms of massage. It's a bit like yoga besides doing the work, because the therapist moves and stretches you in a sequence of postures, generally on a mat on the floor, and the Thai massage lasts from 60 to 90 minutes (Fitri, Nurkholis, & Mintarto, 2017).

i. Prenatal massage

Holz (2017) defined that prenatal massage can be a protected way for ladies to get a massage all through pregnancy. It can assist decrease physique aches at some stage in pregnancy, decrease stress

and relieve muscle tension. You can get a rubdown at any time at some point of your pregnancy. However, many facilities, especially in the United States, do not provide massages to ladies during their first trimester due to the threat of miscarriage all through this period.

Prenatal rub down uses gentle strain similar to Swedish massage. The therapist will focus on areas such as the decrease back, hips and legs. You can be completely or partially undressed depending on your comfort level. During the massage, you will lie on your facet or on a table in particular designed with a cutout for your belly. If you have pain in your calf or different components of the leg, consult a physician earlier than having a massage. The massage will remain from 45 to 60 minutes.

j. Couples massage

A couple rub down is a rub down that you do with your partner, pal or household member in the equal room. It brings all the benefits of a regular massage and occasionally gives you access to the hot tubs, saunas and different spa services (Xie et al., 2015). Other remedies such as pedicures, facials and body scrubs are from time to time offered as phase of a package. You can normally pick out the kind of rubdown you want to receive, and you and your associate can each get a one-of-a-kind kind of rubdown primarily based on your preferences and spa offers.

k. Chair massage

A chair rub down is best for humans who favor a quick massage targeted on the neck, shoulders and back. A chair massage can also be a way to get commenced with rub down if you have in no way had one before. Chair rub down also helps relieve stress and promote relaxation. This type of rub down uses mild to medium pressure (Turkeltaub, Yearwood, & Friedmann, 2014). During the massage, you will continue to be utterly clothed and sit on a mainly designed chair. You will trip the chair so that your chest enters the again of the chair, which will allow the rubdown therapist to have get entry to your back. These massages typically ultimate from 10 to 30 minutes.

3. Contraindications of massage

Contraindication to rubdown is a cause for no longer presenting a rub down to someone. A contraindication is something with which rub down can have interaction negatively, for instance a fever or extreme pain. There is a lengthy list of contraindications for massage. In simple terms, if a affected person has an absolute contraindication, in no case a massage be performed (Batavia, 2004). For example, contagious diseases, vomiting, diarrhoea, fever, extreme pain, kidney ailment or a records of thrombosis are all considered absolute contraindications to massage. The therapist can massage but not over any areas affected by: bruising, wound, veins affected by high

varicosity, high hypertension, severity of anaemia, high lupus, broken bones (Chapple, 2005)

B. Exercise Therapy

Exercise therapy is the science of treating people with one of a kind bodily needs (or these who may boost physical disabilities), to assist them reduce and/ or keep fundamental purposeful skills (for example, s sit, stand, walk) and limit their progress (Yousefzadeh, Shadmehr, Olyaei, Naseri, & Khazaeipour, 2018).

Exercise therapy is a weight loss program or physical pastime format designed and prescribed for unique therapeutic purposes. Its motive is to work to restore ordinary musculoskeletal characteristic or limit ache above and below the damage website prompted by using illnesses or injuries by neuro-rehabilitation, coaching in walking and therapeutic activities (Naz Jamali, Solanky, Ahmad, & Tayagi, 2016). It is quite repetitive and intensive in nature, requiring time and dedication on the section of the patron to motivate neuroplasticity. Therapy is supplied by way of authorities with coaching in workout science, exercising physiology or another similar qualification.

Others have created names for exercising remedy such as activity-based therapy, activity-based recovery therapy, neuro-based therapy, restorative remedy or a variant of these words. Some claim to "invent it" or to be "world leaders(Grant & Chait, 2011)". Whatever its name, workout remedy has been a vital, long-standing prescribed remedy for a long time and is practiced all over the world, simply as physiotherapy is practiced worldwide (a unique therapy). Exercise therapy is based totally on the principles of exercising science and

when tailor-made to the client with neurological conditions, emphasizes healing of feature above and beneath the website from the injury (Tejani, Middleton, Huang, & Dimeff, 2019).

Clients who participate in an exercising therapy program may also advantage from multiplied motor or sensory function, increased independence, reduced medication, reduced clinic visits and better average health. Exercise remedy objectives to relieve ache and enhance motor skills for exercise and day by day activities, by using strengthening the muscles, joints, flexibility and stability of your body (Marshall, Donovan-Hall, & Ryall, 2012).

Occupational therapists investigate and treat people with illnesses, injuries, cognitive impairment, psychosocial dysfunctions, intellectual illness, developmental or studying disabilities, bodily disabilities or other special wants or conditions. Assessment and intervention focuses on the stage of characteristic of an individual and involves an evaluation of performance areas, overall performance factors and overall performance contexts. The intervention entails the use of focused activities to develop, improve, preserve or repair functions in areas of performance including, but no longer constrained to: life skills, work performance, school performance and leisure.

a. The goal of exercise therapy

In general the goal of exercise therapy is to prevent malfunction, develop, correct, restore and maintain: (1) Strength of muscles, (2) Endurance and cardiovascular fitness; (3) Mobility and flexibility; (4)

Stability; (5) Relaxation; (6) Coordination, balance and functional abilities (Thompson, Scott, Loghmani, Ward, & Warden, 2016; Whittaker et al., 2019), showing the therapeutic techniques of the exercises and movements used can be classified as follows: active movement, voluntary movement, assisted active movement, free active movement, assisted-resisted active movement, resisted active movement, Involuntary movement.

b. Understanding Stretching

When going to start a sports activity, stretching (stretching) or better known by people with the term warm-up (warm-up) is very necessary. Stretching is a form of stretching or stretching in the muscles in each limb so that in every exercise there is readiness and to reduce the impact of injuries that are prone to occur (Baxter, Mc Naughton, Sparks, Norton, & Bentley, 2017). Stretching benefits are the following:

- Increases blood flow through active muscles.
- Increases the heart rate so that it can prepare for the operation of the cardiovascular system (cardiovascular).
- Increase the level of energy released by the body's metabolism.
- Increase the exchange (binding) of oxygen in haemoglobin.
- Increase the speed of travel of nerve signals that govern body movements.

- Increases efficiency in the reciprocal innervation process, making it easier for muscles to contract and relax more quickly and efficiently.
- Increasing physical work capacity.
- Reduces tension in the muscles.
- Improve the ability of connective tissue in elongated or stretched movements.
- There is an increase in psychological condition of the body.
- Can improve physical fitness.
- Can optimize capture power, training, and appearance in various forms of trained movements.
- Can improve mental and physical relaxation.
- Can increase the development of body awareness.
- Can reduce the risk of joint sprains and muscle injuries (cramps)
- Can reduce the risk of back injury
- Can reduce muscle soreness.
- Can reduce painful torture during menstruation for women.
- Can reduce muscle tension (Mayorga-Vega, Merino-Marban, Manzano-Lagunas, Blanco, & Viciana, 2016).

c. Active stretching

Active stretching is done by using your muscles without getting help from external forces. One example of this active stretch: Stand upright and slowly lift one leg towards a 45 degree angle. Active stretching is

important because it will actively build muscle flexibility, which has been known to have a higher correlation with exercise performance than passive stretching. The main disadvantages of this active stretch are that this stretch can initiate stretch reflexes, and this stretch may be ineffective due to certain disturbances in your body and also injuries such as acute sprains, inflammation or fractures (fractures) (Gartley & Prosser, 2011)

d. Dynamic Stretching

Dynamic stretching is a stretching motion carried out by involving the muscles and joints; this stretching motion is carried out slowly and controlled with the base of the movement is the base of the joints. The key and emphasis on this stretch is the slow and controlled way of doing it. As for the slow motion, which is done in a smooth and not jerking way? Whereas the movement is controlled, meaning the movement is carried out to reach the width of the space of movement of the joints that are subject to training (Polat, Cetin, Yarim, Bulgay, & Cicioglu, 2018)

The goal of dynamic stretching is to nourish and enhance joint joints, tendons, ligaments and muscles. The differences that occur between static and dynamic stretches, especially when doing movements and targets that are subject to training. Movement on static stretching after achieving pain (discomfort) is maintained for some

time, whereas on dynamic stretching is the opposite. That is stretched actively as wide as the space for the joints being trained. The goal of static stretching is flexibility (muscle elasticity), while dynamic stretching is joint flexibility.

e. Passive stretching

Passive stretching is a stretching technique where you are relaxed and without contributing to the movement area. In fact, external power can be generated by tools either manually or mechanically. Among the benefits that can be obtained from basic stretching are: This technique is effective when the muscle agonist (i.e. the main muscle that plays a role in the movement that occurs) is in a condition that is too weak to receive a movement response (Chaitow, n.d.). This technique is effective if the experiments do not succeed in blocking the tight muscles (antagonist muscles). The direction of practice when stretching and its intensity can be measured. Can advance team cohesiveness when stretching is done together with other athletes (Majlesi & Unalan, 2010). The main disadvantage of passive stretching is the risk of pain or injury (injury) is greater, if your friend uses external energy improperly. Furthermore, this technique can lead to stretch reflexes, if they are carried out quickly, and the increased likelihood of injury (injury) due to the greater difference between active and passive stretching areas. But the use of this technique can also build your active flexibility (یفاطم, 1395).

f. Ballistic Stretching

Ballistic stretch according to Page (2012) the shape is the same as calisthenics, which is a form of passive stretching, carried out by active movements. Characteristics of ballistic stretching are carried out actively and their movements are reflected, meaning that the same muscle movements and joints are performed repeatedly (Colson, 1975).

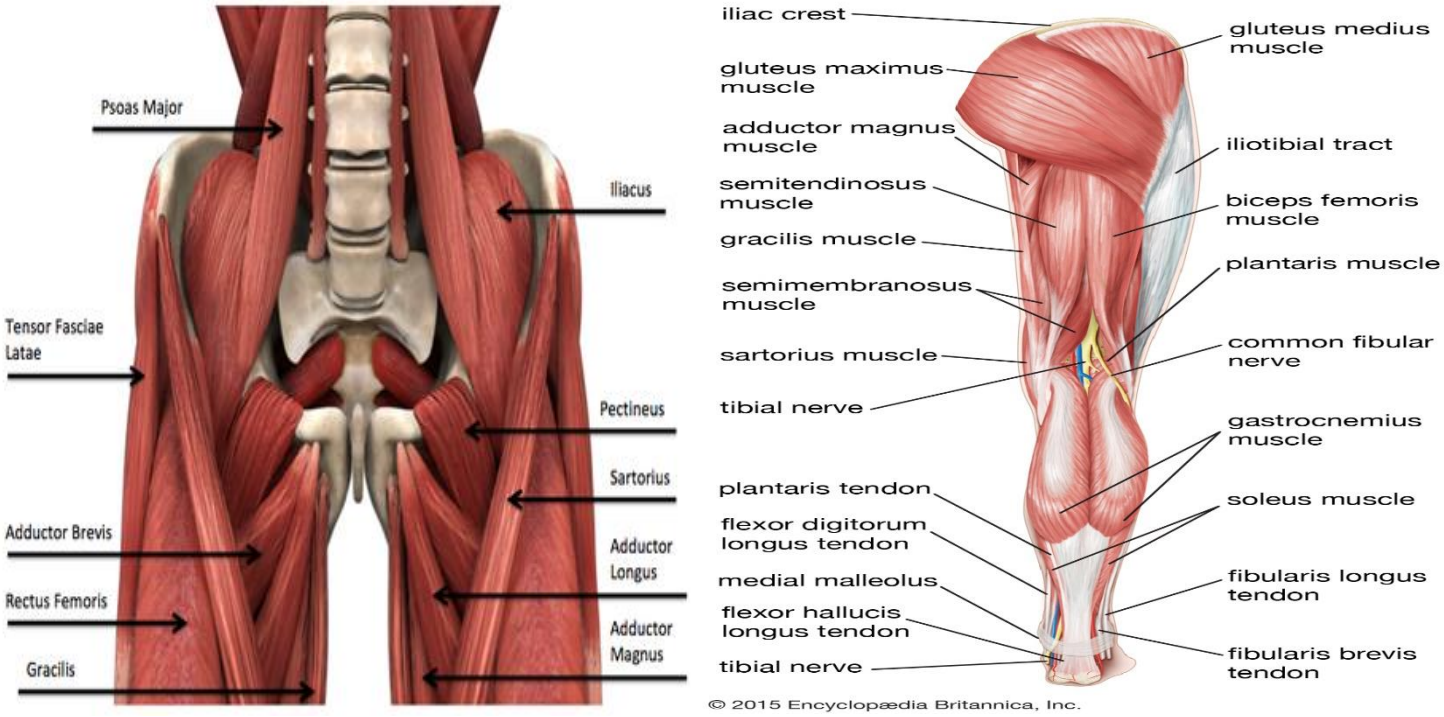
Example: the kissing motion of the knee is repeated over and over, with sitting both legs straight forward, and when both hands try to reach both ends of the leg the knee must remain attached to the floor. The movement of kissing knees is slowly coming from fast to fast, with the width of the motion space of the back joints about only reaching 80%, here are some examples of pictures of exercise movements to increase flexibility by stretching ballistic stretching.

g. Static Stretching

Static stretching is a stretching motion in the muscles that is carried out slowly until tension occurs and achieves pain or discomfort in the muscle. Henceforth the position of the discomfort is maintained for a while. The length of time holding the uncomfortable position is 20-25 seconds. The goal of static stretching is to increase and maintain flexibility (elasticity of the muscles being stretched)

C. Descriptive Anatomy of HipS, Knee and Ankle

a. Hips



(Miller, 2006; Moreno-Pérez, Ayala, Fernandez-Fernandez, & Vera-Garcia, 2016).

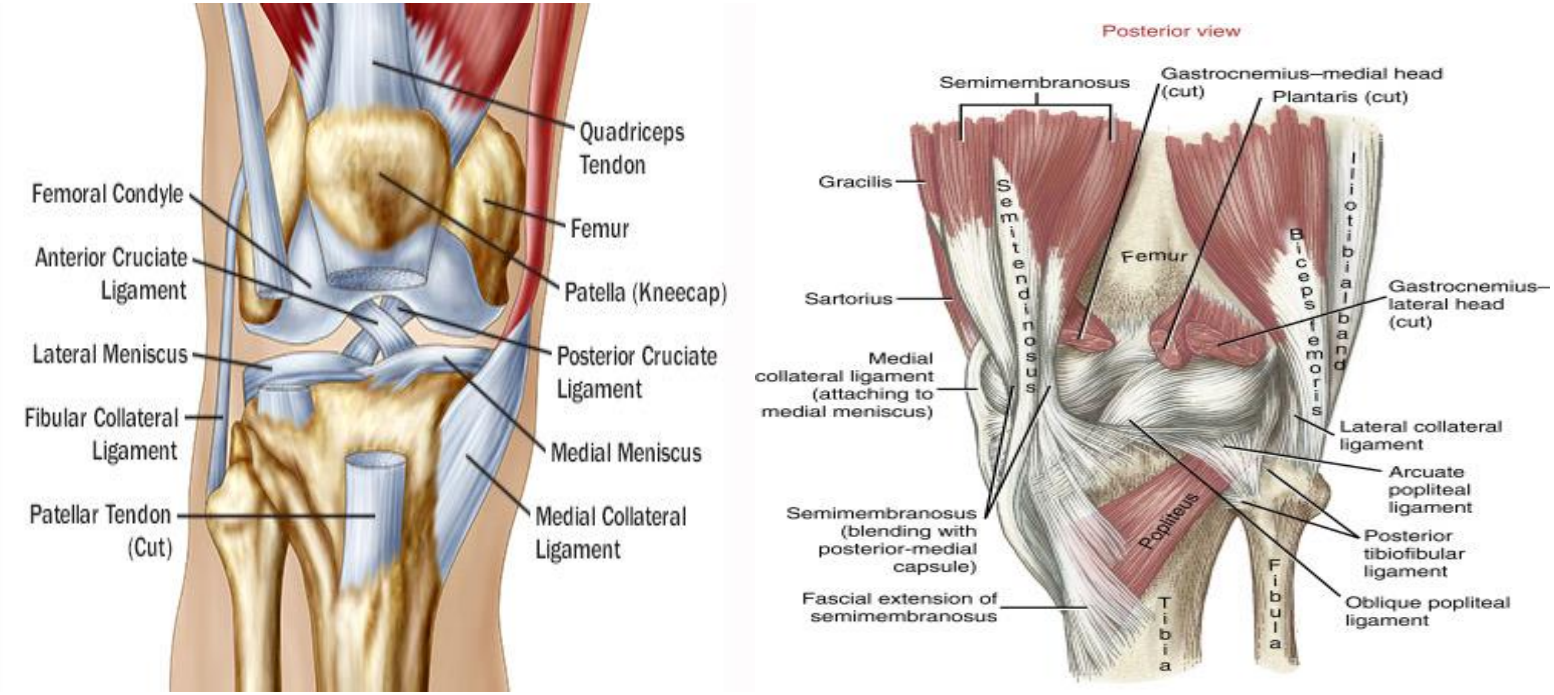
The hip joint (see picture above) is a ball-and-socket synovial joint: the ball is the femoral head and the socket is the acetabulum. The hip joint is the joint of the pelvis with the femur, which connects the axial skeleton to the lower end. The grownup coxae, or hip bone, is shaped by way of the fusion of ilium, ischium and pubis, which takes place in late adolescence. The 2 hip bones structure the bony pelvis, as well as the sacrum and the coccyx, and are united anteriorly by using the pubic symphysis (Mumford, 2009).

In the human anatomy, the muscle groups in the hip joint are the muscular tissues that motive motion in the hip. Most contemporary anatomists outline 17 of these muscles, even though some extra muscle mass can now and again be considered. These are often divided into four companies according to their orientation round the hip joint: the gluteal group; the crew of lateral rotators; the adductor group; and the ilio-psoas group.

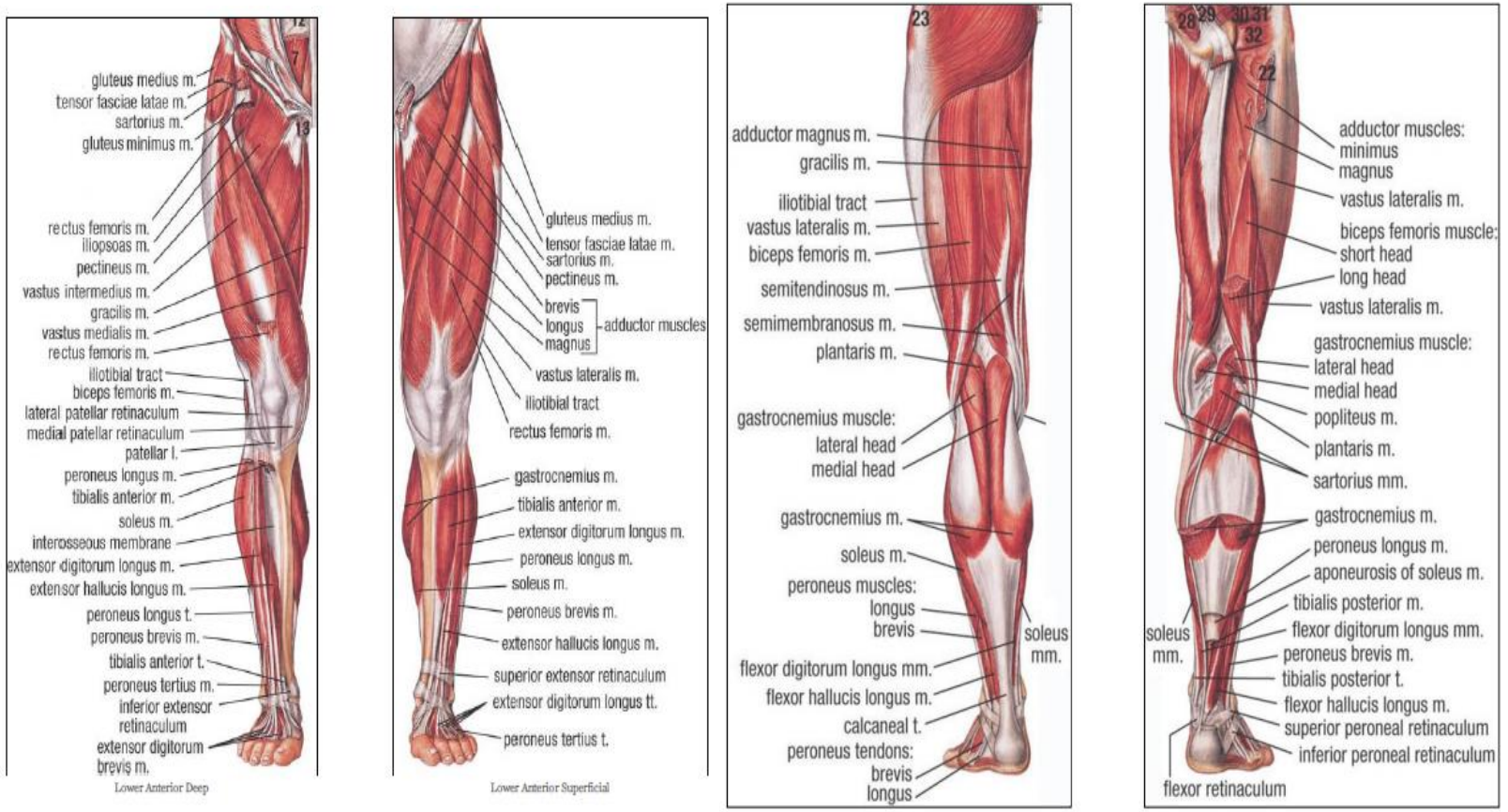
The gluteal muscular tissues encompass the maximus gluteus, the center gluteus, the minimus gluteus and the tensor fasciae latae. They cover the lateral floor of the ilium. The maximus gluteus, which forms most of the buttock muscle, comes generally from the ilium and the sacrum and is inserted on the gluteal tuberosity of the femur as properly as on the iliotibial tract, an area of strong fibrous tissue that runs along the thigh lateral up to the tibia and fibula. The gluteus medius and the gluteus minimus predate the gluteus maximus on the ilium and are each inserted on the increased trochanter of the femur ([Maureen_Abson]_Healing_Massage_An_A-Z_Guide_for_M(z-lib, n.d.). The

tensor fasciae latae shares its origin with the gluteus maximus at the level of the ilium and additionally shares the insertion at the degree of the iliotibial tract

b. Knee



(Abulhasan & Grey, 2017)



(Kattadiyil, Parciak, Puri, & Scherer, 2014)

The knee joint is positioned between the other two joints of the decrease limb; hip and ankle. The proximal quit of the tibia and the distal cease of the femur structure the medial and lateral tibia-femoral compartments. The patella and the anterior phase of the distal femur shape the femoral-patellar joint. Together, these joints form the knee joint (Vincent et al., 2012).

High needs are placed on the knee joint and it has numerous functions which are necessary for human beings to walk, run and jump. It commonly permits flexion-extension of the lower limb in the sagittal plane. In extension, full or shut to full, the knee ought to be able to withstand.

The strong forces imposed on the knee through gravity. In flexion, the rotation at the knee lets in the leg to position the foot earlier than lying. Small actions in the various/valgus route are also feasible at the knee joint, however solely when the knee is bent (Claes et al., 2013). Joint steadiness at some point of motion is finished through the form of joint surfaces, collateral and cruciate ligaments. The anterior cruciate ligament the anterior cruciate ligament (ACL) has two useful bundles that join the femur and the tibia; the anterior-medial and poster lateral bundles, named after their insertion sites on the tibia. These bundles join the posteromedial component of the lateral condyle and the medial tibia plateau the place they are inserted subsequent to and in front of the tibia spines.

The ACL has an intra-articular location, but it is separated from the synovial fluid by using a synovial lining. The fundamental blood grant comes from the femur and in specific from the central geniculate artery (Rustagi,

Gopal, Ahuja, & Arora, 2017). Pacinian corpuscles, Golgi tendon organs and Ruffing endings are mechanoreceptors existing in the ACL which make a contribution to the proprioceptive sense. The function of the ACL is to grant tibia-femoral joint balance in anterior-posterior translation and in internal-external rotation (Mccarty, Marx, Maerz, Altchek, & Warren, 2008).

The ACL additionally restricts movement in the varus-valgus direction. The anterior-medial and poster lateral bundles of the ACL act in synergy to stabilize the knee joint in all its range of motion. In flexion, the anterior- medial bundle is greater tense; in extension, the poster lateral bundle is tenser. The combination of valgus and inside rotation of the tibia has been proven to expand ACL anxiety extra than the charge of motion on my own or extreme osteoarthritis tends to be higher in knees reconstructed by way of ACL (Neri et al., 2018).

a) Cartilage

The knee joint has two kinds cartilage inside the joint. One of the kinds of cartilage is known as joint cartilage. Joint cartilage varieties the smooth layer of the joint that covers the bony ends. ... The meniscus is an exceptional kind of cartilage that forms a shock absorber between the bones. The proximal tibia, distal femur and patella are included with a thin layer of hyaline cartilage, forming the articular surfaces of the knee joint (Macchi et al., 2016). Normal cartilage is avascular, aneurysm, without lymphatic vessels and the only mobile phone kind observed in cartilage, the chondrocyte, obtains its nutrition commonly by way of passive diffusion from

the synovial capillaries (see below). In ordinary knee joint cartilage, only 1 to 3% of the moist weight tissue is made up of chondrocytes. Some 70% of the tissue is made up of water, whilst 20% of the wet weight is collagen (mainly kind II; collagen forming fibrils of cartilage) and about 5% is agree can (Wadhawan et al., 2013). The principal function of cartilage is to distribute the load utilized to the underlying bone and to permit low friction movements at the knee joint.

b) Synovium

The non-bony cavity of the knee joint is closed by way of the synovium. It consists of the intima, a non-stop layer of macrophages and specialized synovial fibroblasts (synoviocytes), and the sub intima, which is the underlying tissue. The sub intima is a fibrous ECM the place the blood and lymphatic vessels, nerves, stationary fibroblasts and immune cells reside. Synovial fibroblasts have a wonderful phenotype to precise significance for the joint environment, they endure a excessive recreation of an enzyme which converts glucose UDP into glucoronate UDP, an indispensable issue for the synthesis of hyaluronic (Belluzzi et al., 2019).

In addition, synovial fibroblasts, as well as chondrocytes in the superficial area, produce lubricant, which is mainly vital for borderline lubrication of cartilage. The essential dietary pathway to avascular cartilage is passive diffusion from the capillaries of the synovium. They are located in the sub-intima, just beneath the intima. The capillary endothelial cells structure a selective barrier in accordance to the size allowing the drift of

water, nutrients and proteins in the joint cavity. The synovial fluid / plasma ratio of plasma proteins decreases as the molecular radius of the protein increases. It is essential to notice that the cells of the intima are loosely related and that there is no basement membrane. As a result, the interstitial synovial fluid and the synovial fluid form an uninterrupted continuum. The efflux of molecules from the knee joint happens by drainage by the lymphatic vessels for molecules of ~ 2 to ~ 10 nm. Smaller molecules, for instance positive cytokines, can additionally enter the circulation by means of diffusion in the capillaries. Larger molecules, such as hyaluronan and large agree can fragments; can be limited to efflux through the lymphatic vessels. At excessive intra-articular pressures, these massive molecules may want to create a filter cake, growing resistance to flow through the synovia and limiting fluid leakage from the joint.

c) The meniscus

The meniscus is a crescent-shaped fibro-cartilaginous tissue rich in type I collagen. The molecular elements of the meniscus are very exclusive from these of cartilage. For example, in contrast to the hyaline cartilage of the knee joint, the collagen fibrils are thin, the amount of agree can and chondro adhering is low, whilst the quantity of aspirin is excessive (Abulhasan & Grey, 2017). The feature of the menisci is linked to the circumferentially oriented collagen fibres woven with radial fibres.

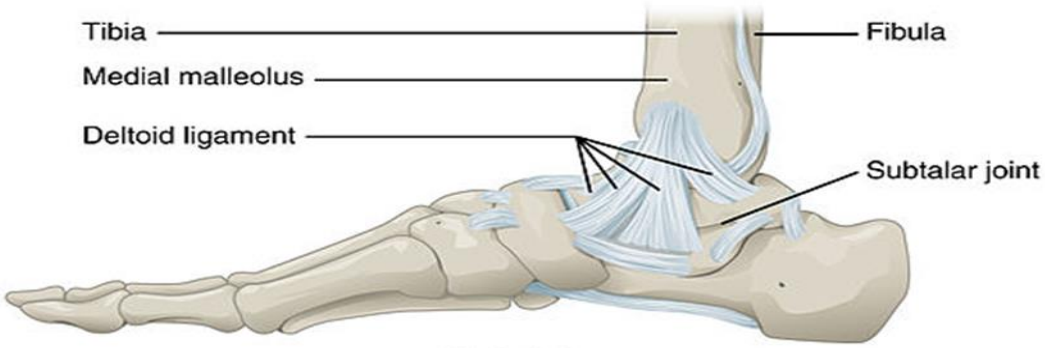
In principle, the menisci play a necessary function in reducing the cartilage masses by distributing the load between the femur and the tibia over a larger area. The compromise of this function, as in the case of a torn meniscus or a meniscus, leads to an amplify in maximum and common masses on the tibia femoral cartilage and an excessive hazard of osteoarthritis. The increase in tibia cartilage load is intently associated to both the amount and kind of medial meniscectomy (anterior, posterior, or longitudinal) ([Darlene_Hertling,_Randolph_M._Kessler]_Management(z-lib.org).pdf.opdownload, n.d.). The long-term outcome of ACL damage is intently associated to the integrity of the menisci.

However, topics with an ACL tear (isolated or combined) exhibit the first radiographic signs and symptoms (narrowing of the joint space) of cartilage degradation about ten years earlier than subjects with an isolated meniscal tear ([Mel_Cash]_Sports_And_Remedial_Massage_Therapy(z-lib, n.d.). Not solely the reputation of the menisci at the index injury level, however additionally the danger of secondary meniscus damage is necessary for the risk of future tibia femoral osteoarthritis after an ACL injury. Meniscal damage also appears to be extensive when it comes to creating patella femoral osteoarthritis. The menisci and more in particular the medial meniscus can contribute to joint stability and hinder anterior translation in the knee deficient in ACL but not in the knees with intact ACL. This makes the medial meniscus inclined to ACL-deficient knee tears and has been advocated as a necessary cause for performing ACL reconstructive surgery.

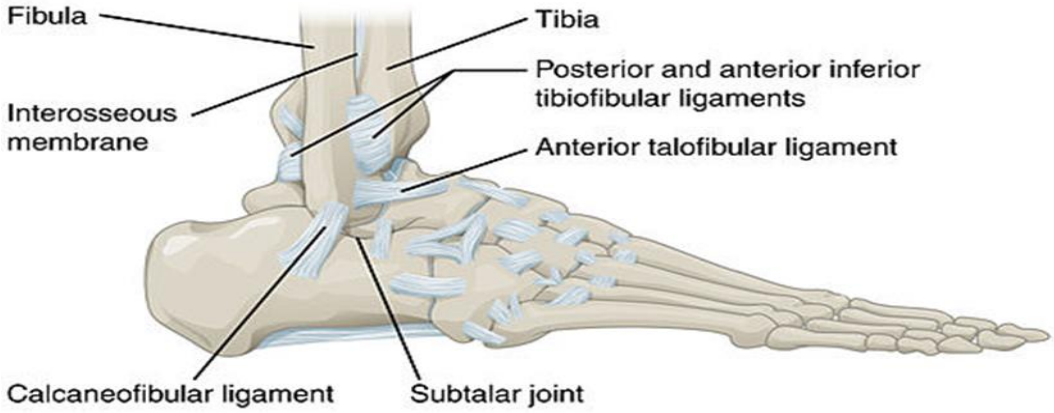
d) Bone

Abulhasan, and al. (2017), explained that the bony parts of the knee joint, the femur, the tibia and the patella, have a dense and compact exterior structure, cortical bone and a porous inside structure, the trabecular bone. In the knee, the trabecular bone and cartilage are separated

c. Anatomy of the Ankle



Medial view



Lateral view

The ankle is a complicated mechanism. What we generally suppose of as the ankle is actually made up of two joints: the subtalar joint and the

genuine ankle joint. The real ankle joint is made up of three bones, seen from above from a front or anterior view: the tibia which types the internal or medial phase of the ankle; the fibula which types the lateral or exterior part of the ankle; and the embankment below. The real ankle joint is accountable for the up and down movement of the foot. The ends of the bones of these joints are covered with articular cartilage (Tol & Niek Van Dijk, 2004).

The important ankle ligaments are: the anterior tibiofibular ligament (2), which connects the tibia to the fibula; the lateral collateral ligaments (3), which connect the fibula to the calcaneus and supply the ankle lateral stability; and, on the medial aspect of the ankle, the deltoid ligaments (4), which connect the tibia to the talus and calcaneus and grant medial stability.

These elements of your ankle, along with the muscle groups and tendons in your lower leg, work collectively to manipulate the stress your ankle endures when you walk, run, and jump. Under the true ankle joint is the second part of the ankle, the subtalar joint, which consists of the talus above and the calcaneus below. The subtalar joint lets in lateral motion of the foot.

There are two fundamental sets of ligaments, which come from each malleolus (Yamaguchi et al., 2018): (1) Medial ligament: (or deltoid ligament) is connected to the medial malleolus (a bony protrusion

protruding from the medial aspect of the distal tibia). It consists of 4 ligaments, which lengthen from the malleolus, attaching to the talus, calcaneus and navicular bones. The main motion of the medial ligament is to resist overeversion of the foot; (2) the lateral ligament comes from the lateral malleolus (a bony prominence protruding from the lateral face of the distal fibula). It resists excessive inversion of the foot and consists of three awesome and separate ligaments: first anterior talofibular-extends between the lateral malleolus and the lateral face of the talus, second posterior talofibular - extends between the lateral malleolus and the posterior surface of the talus, last calcanofibular - extends between the lateral malleolus and the calcaneus.

D. Diagnostic of injury

Injury is a damaged trauma to the muscle structure, tendon, ligament or body function due to coercion, physical or chemical pressure.

1. Types of Injuries

Injuries are classified in three cases: (1) minor injury; (2) moderate injury, and (3) severe injury.

a. Minor injury (Level 1)

People with minor injuries do not experience difficult or serious complaints, but can interfere with the athlete's appearance, for example: abrasions, bruises, and mild sprain (Harsanti & Graha, 2014).

b. Moderate injury (Level 2)

Injuries being is characterized by damaged pronounced tissue, can affect athlete performance, complaints can include pain, swelling, impaired function (signs of inflammation) for example: muscle width, muscle strains, ligament tear (sprain grade II) (Harsanti & Graha, 2014)

c. Severe injury (Level 3)

Severe injuries are characterized by complete or near complete tear of ligament or bone fracture. At this level of injury athletes need intensive treatment, complete rest and may need surgery, there are (Kasahara, Martin, Humberstone, Yamamoto, & Nakamura, 2015)

2. Sprain

Mueller-Wohlfahrt et al (2013) said that Sprain is an injury involving a ligament injury. Sprain can be divided into 4 levels, namely:

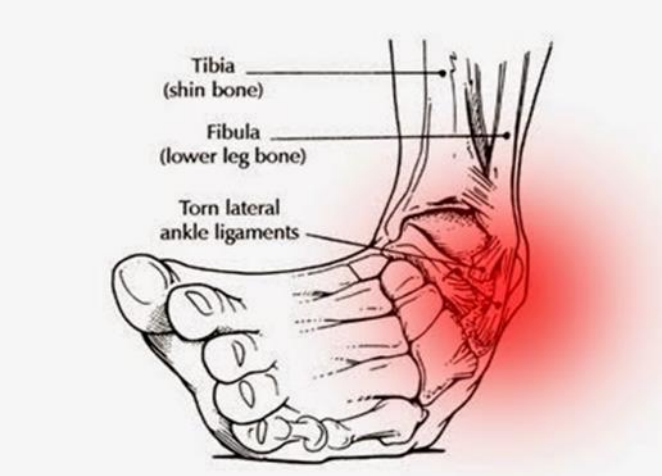
a. Mild (Level 1)

This level 1 injury only tears the ligament fibers that have a small hematoma inside the ligament and there is no impairment of function.

b. Medium (Level 2)

This level 2 sprain injury occurs in wider tears, but 50% is still good. This is already a malfunction, protection measures must be taken to enable healing. Immobilization takes 6-10 weeks to be completely safe and may take 4 months. It often happens to athletes to force them

before the completion of the recovery time is not over and as a result there will be a new injury again, if it doesn't be treated.



c. Severe Injury (Level 3)

This level 3 sprain injury results in a total tear or ligament release from the attached site and its function is totally disrupted. It is very important to immediately place the two ends of the tears close together.

3. Sprain fracture (Level 4)

This level 4 sprain injury results from a torn ligament where the attachment is to the bone followed by partial removal of the bone. Figure 2. Sprain on the ankle.

4. Sprain Recovery

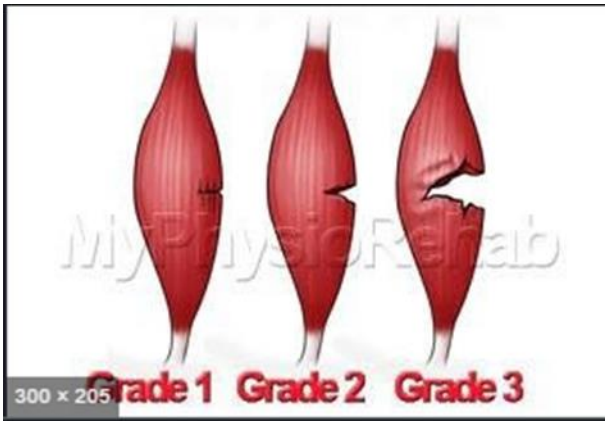
There are a number of steps that can be taken at home to help overcome a sprain. The first treatment is abbreviated as PRICE (De Bie, De Vet, Van Den Wildenberg, Lenssen, & Knipschild, 1997) (protect, rest, ice, compression, elevation): (1) Protect. For example, protecting the ankle

by wearing shoes that are taller than the ankle (boots); (2) Rest the joint for 2-3 days after injury. If necessary, use a stick to help walk; (3) Ice Compress the sprained area immediately after injury. Do it for 15-20 minutes every 2-3 hours, up to 2-3 days. Don't forget to wrap the ice in a plastic bag or towel before compressing. This step can reduce pain, inflammation and bruising; (4) Compression (bandaging). To reduce swelling, bandage the sprained area with an elastic bandage for up to 2 days after injury. Don't use a bandage that is too tight to keep the blood flowing smoothly. Please consult a doctor to get the right size bandage. Remember to take the bandage off before going to sleep; (5) Elevation (raise). Lift your ankles to the same height as your hips when sitting, don't leave them hanging down. If a sprain occurs on the wrist, use the arm sling for 1-2 days. Raising the injured part can reduce swelling.

5. Strain and Symptoms that Occur

Muscles attach to the joints with the help of connective tissue called tendons. Injury to the tendon or to the muscle itself is called a strain. Calves, groin, and hamstring are areas that are usually strained.

Those affected by the strain will experience: (1) Pain; (2) Swollen; (3) Feeling stiff; (4) Reduction of the ability or function of injured body parts is related to a muscle or tendon injury (Xu, Wang, Jia, Ren, & Wang, 2019). Strains can be divided into three levels, namely:



a. Mild (Level 1)

This level of strain is not torn only there is a mild inflammatory condition, although there is no decrease in muscle strength, but in certain conditions quite annoying athletes. For example strains of the 10 hamstring muscles (spinal muscles) will affect sprinter athletes, or on baseball pitchers that are quite disturbed by strains of the upper arm muscles even though only mild, but can reduce endurance (endurance) (Rysman, Claud, & Delanoe, 2017).

b. Medium (Level 2)

Strains at level 2 have damage to the muscles or tendons, which can reduce athlete's strength.

c. Severe Injury (Level 3)

Strains at level 3 have occurred more severe until complete rupture; at level 3 surgery is needed (repair) to physiotherapy and rehabilitation. The picture above. Torn Achilles Strain / Tendo (Gulliver, 2017)

6. How to Handle Strains

Olson, (1987) said that people who experience strains are given the following treatment: (1) Place the patient in a comfortable position, resting the injured part. Immediately stop doing all activities, the adage "no pain no gain" adopted by some sportsmen cannot be justified in this case. Excessive activity on the affected body part will lead to further complications. (2) Elevate the injured area. The goal is to reduce excessive swelling. (3) Give a cold compress, for 30 minutes, repeat every hour if necessary.

When a new injury progresses, there will be a rupture of a blood vessel resulting in the release of the "contents" of the blood vessel to the surrounding tissue so that the swelling, blood vessels around the injury site will also dilate (dilate) in response to inflammation. Giving cold compresses / ice will "narrow" dilated blood vessels so as to reduce swelling. Cold compresses can be done 1-2 times a day, not more than 20 minutes because it would interfere with blood circulation. Conversely, when the injury is chronic, signs of inflammation such as swelling, red color, severe pain are gone, and then the principle of giving a warm compress can be done. (4) Pressure bandage and keep elevating. Compress / emphasis on the injury, can be done with a bandage / bandaged. Do not be too tight, the aim is to reduce swelling and keep the emphasis elevated. Press on the injured area until the pain disappears (usually 7 to 10 days for minor injuries and 3 to 5 weeks for severe injuries. (5) Elevate the injured area. The goal is to reduce excessive swelling. (6) If needed, use a walking stick when walking. (7) If in doubt

treat as a fracture do X-rays and refer to a health facility. And avoid HARM, namely H: Heat, giving heat will actually increase bleeding, A: Alcohol, will increase swelling, R: Running, or exercise too early will worsen the injury, M: Massage, should not be given in the acute period because it will damage the tissue (Ellsworth, Zoland, & Tyler, 2014).

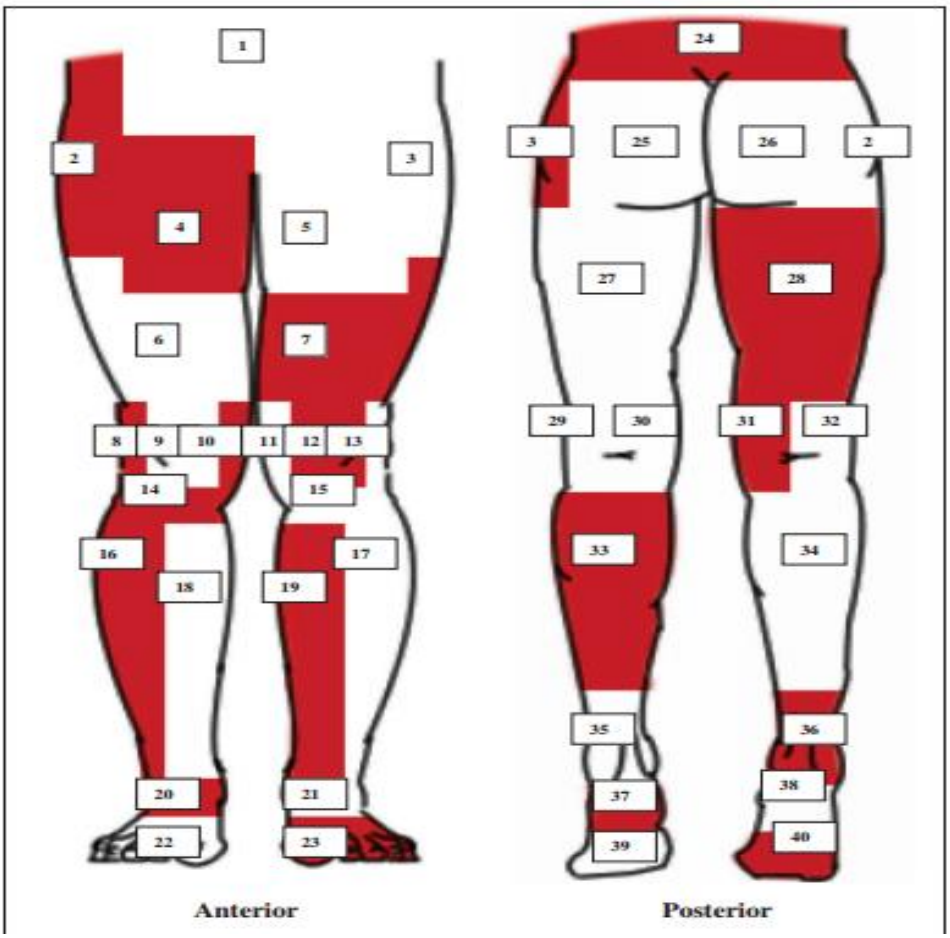
7. Treatment of Strains in General

First degree injuries usually heal quickly with rest, ice, compression and elevation (RICE). Exercise therapy can help restore strength and flexibility. The second-degree injury is the same treatment except that immobilization is added to the injured area. And the third degree is usually done immobilization and the possibility of surgery to restore its function. The key to healing is early evaluation with medical professionals. Once an injury has been determined, a therapeutic plan can be developed. With proper care, most strains will heal without side effects (Rice et al., 2019).

8. Pain

Pain can be described as an unpleasant sensation that occurs when we experience an injury or damage to our body (Assa, Geva, Zarkh, & Defrin, 2019). Pain can be painful, hot, trembling, tingling like burning, stabbed, or stabbed. There are three main types of acute pain-nociceptive, inflammation, and neuropractic (Fett, Trompeter, & Platen, 2019). Examination of pain in this case the parameter used is the Verbal Descriptive Scale (VDS)(Teixeira, Lunardi, da Silva, Lopes, & Carvalho, 2016). VDS is a method of measuring pain levels using seven rating scales, namely: (1) scale 1 = no pain; (2) scale

2 = very mild pain; (3) scale 3 = mild pain; (4) scale 4 = pain is not so severe; (5) scale 5 = quite severe pain; (6) scale 6 = severe pain; (7) scale 7 = pain is almost unbearable. The patient is asked to indicate the level of pain felt as explained by the therapist



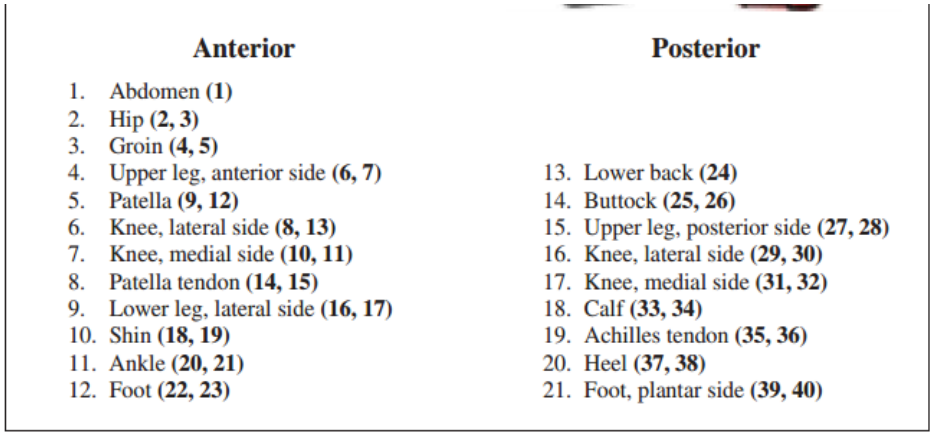
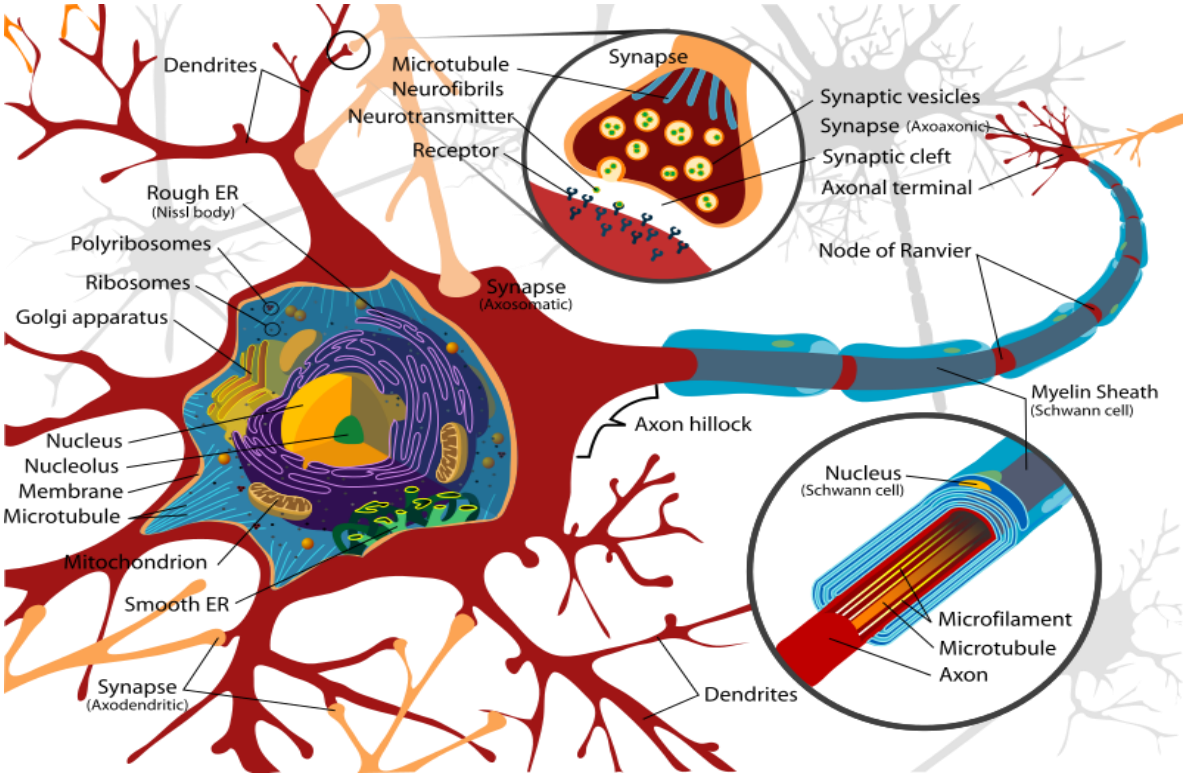


Figure 1. The manikin (with 21 RRI sub-locations) (Buist et al. 2010). Red/white colors are only for lay-out.

(Buist et al., 2010)

E. Nervous

A nerve corresponds to an organ of the peripheral nervous system, composed of neurons often grouped in ganglia and projecting their axons through the tissues. They allow communication between the central nervous system (brain and spinal cord) and the rest of the body (muscles, glands) (Ludyga, Gronwald, & Hottenrott, 2016).



Neuron (Merkel & Molony, 2012)

Neurons are the main cells of the nervous system; whose role is to carry and process information in the body. There are billions of them in our bodies. They are composed of a nucleus surrounded by star-shaped structures, called dendrites, and a long extension that can measure several tens of centimeters, called the axon. Among neurons, some have a role in movement; others in the perception of sensations, still others belong to the vegetative nervous system, responsible for automatic functions (Merkel & Molony, 2012).

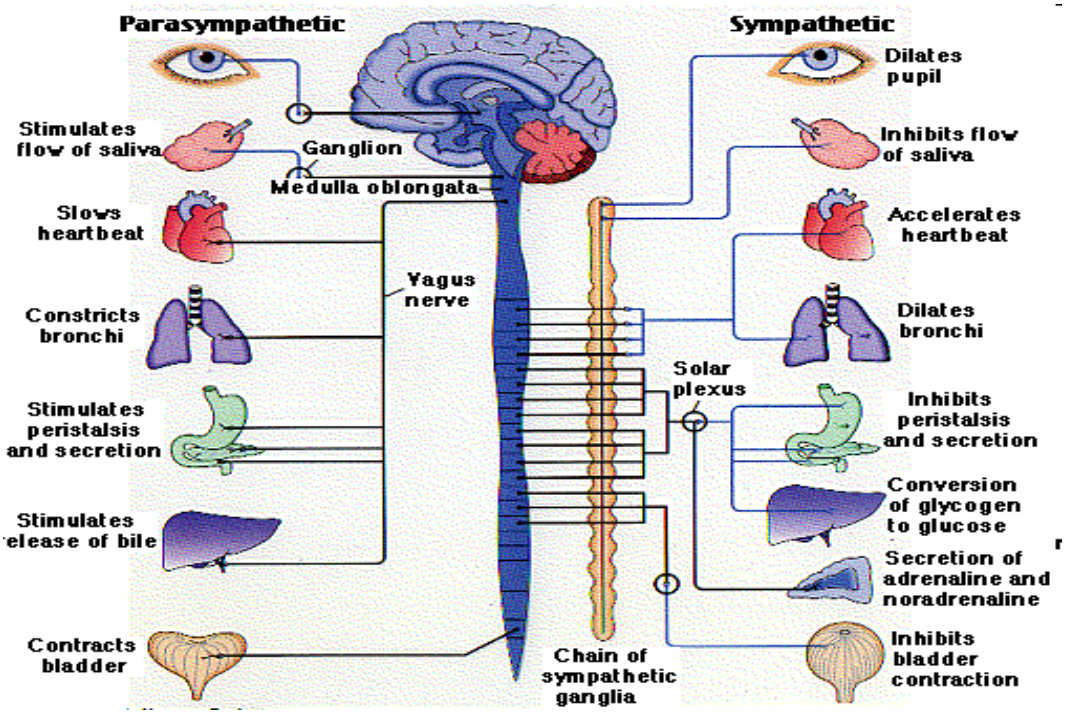
To simplify, the motor neurons from the central nervous system transmit orders via the nerve impulse which is propagated through these neurons. Communication between a neuron and another neuron is called a synapse and is

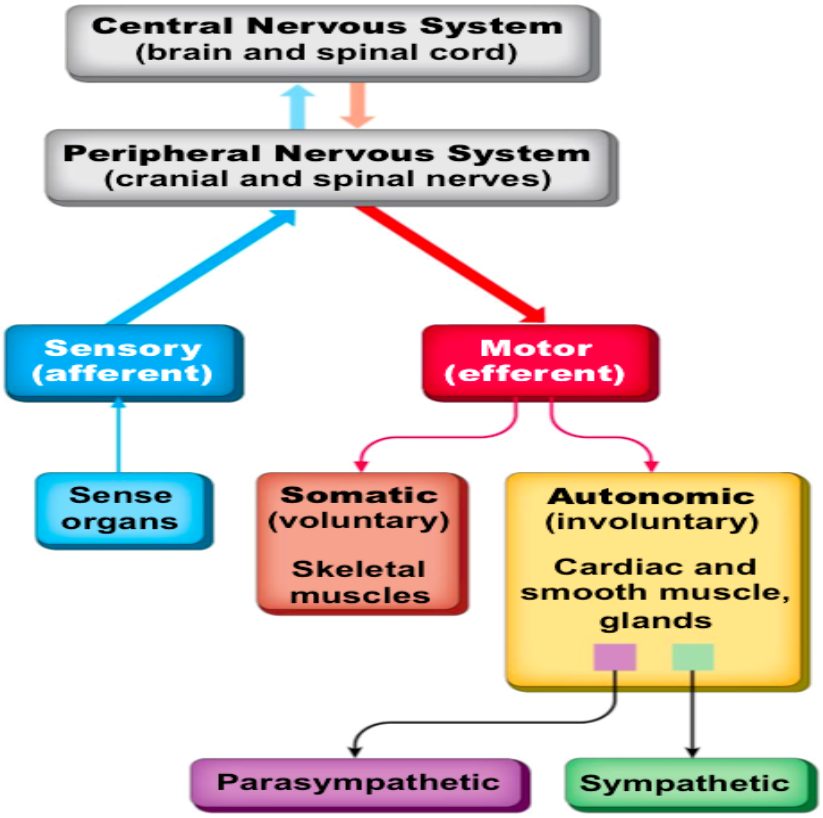
done by the release of a substance called neurotransmitter or neuromediator which will be taken up by the receptors of the underlying neuron (Page, 2012).

The information at the terminal part can also be understood by a so-called effector cell like the muscle cell, in which the "commanded" action will take place. At the sensory level, a stimulus (stimulating factor) will cause an "excitation" of a neuron, which will transmit information by mechanisms similar to the motor pathway to the brain where it will be interpreted (B. W. Brewer, 2010).

1. **Sympathetic and Parasympathetic Nervous**

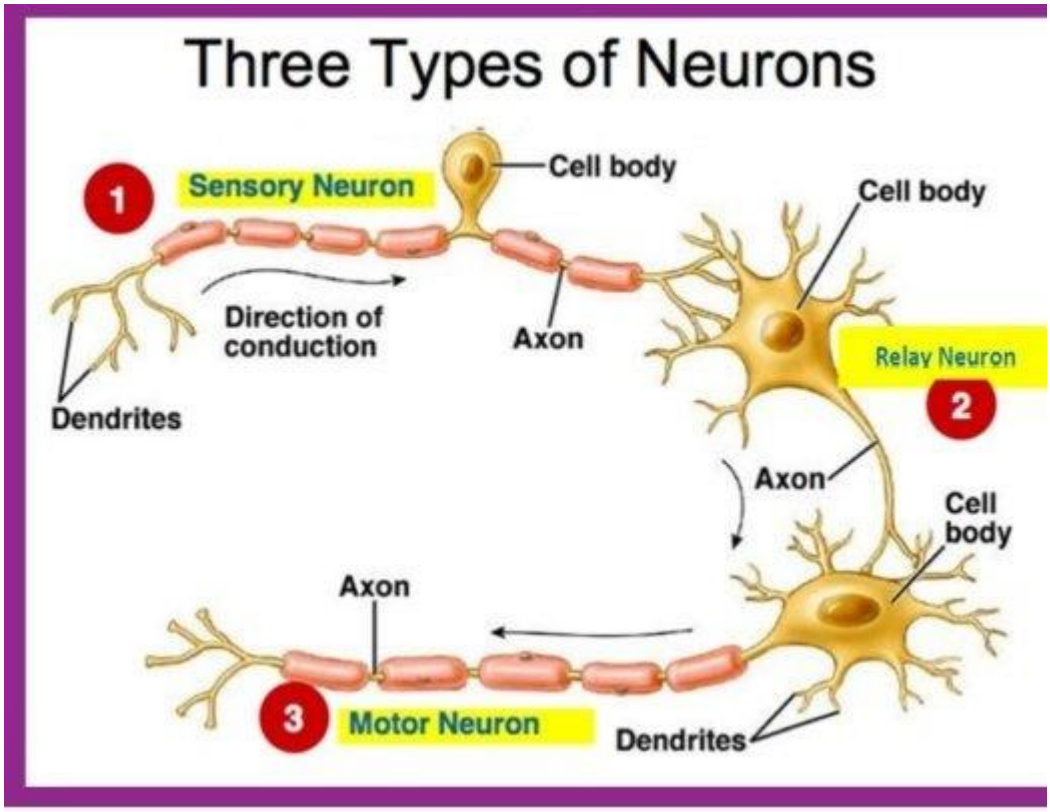
   The nerves of the sympathetic and parasympathetic nervous systems constitute the autonomic (or vegetative) nervous system that regulates all bodily processes that occur automatically, such as blood circulation (heart rate, blood pressure), respiration, digestion, maintenance of temperature (sweating…) (Purkayastha, Stokes, & Bell, 2019).


Parasympathetic
Sympathetic
Stimulates flow of saliva
Ganglion
Medulla oblongata
Slows heartbeat
Vagus nerve
Constricts bronchi
Stimulates peristalsis and secretion
Stimulates release of bile
Contracts bladder
Chain of sympathetic ganglia
Solar plexus
Dilates pupil
Inhibits flow of saliva
Accelerates heartbeat
Dilates bronchi
Inhibits peristalsis and secretion
Conversion of glycogen to glucose
Secretion of adrenaline and noradrenaline
Inhibits bladder contraction


Central Nervous System
(brain and spinal cord)
Peripheral Nervous System
(cranial and spinal nerves)
Sensory
(afferent)
Motor
(efferent)
Sense organs
Somatic
(voluntary)
Skeletal muscles
Autonomic
(involuntary)
Cardiac and smooth muscle, glands
Parasympathetic
Sympathetic

2. Types of Nervous

Based on its function, nerve cells can be divided into 3 groups, namely: sensory nerve cells, motor nerve cells, and intermediate nerve cells (associations) (Article & Franjic, 2019).



https://www.quora.com/What-are-the-different-types-of-nerve-cells

a. Sensory Neurons

Sensory neurons are clustered cell neurons that will form ganglia, the axon part is short but the dendrite part is long. Sensory neurons have a direct bond with the senses as a process of receiving stimuli. These nerve cells have

the main function of delivering nerve impulses that sense organs continue to the brain or spinal cord, so these nerve cells are often referred to as sensory neurons (Xia, Grašič, Huang, & Romanovski, 2019).

b. Motor Neurons

Motor neurons are neurons that have relatively short dendritic parts and relatively long axons. Dendrites are directly related to other axons, while axons are directly related to the effector parts in the form of muscles or glands. The function of motor neurons is to carry impulses from parts of the brain / parts of the spinal cord and then they are transmitted to the muscles / glands of the body. Thus, these neurons are often called driving neurons (Ni & Zhang, 2019).

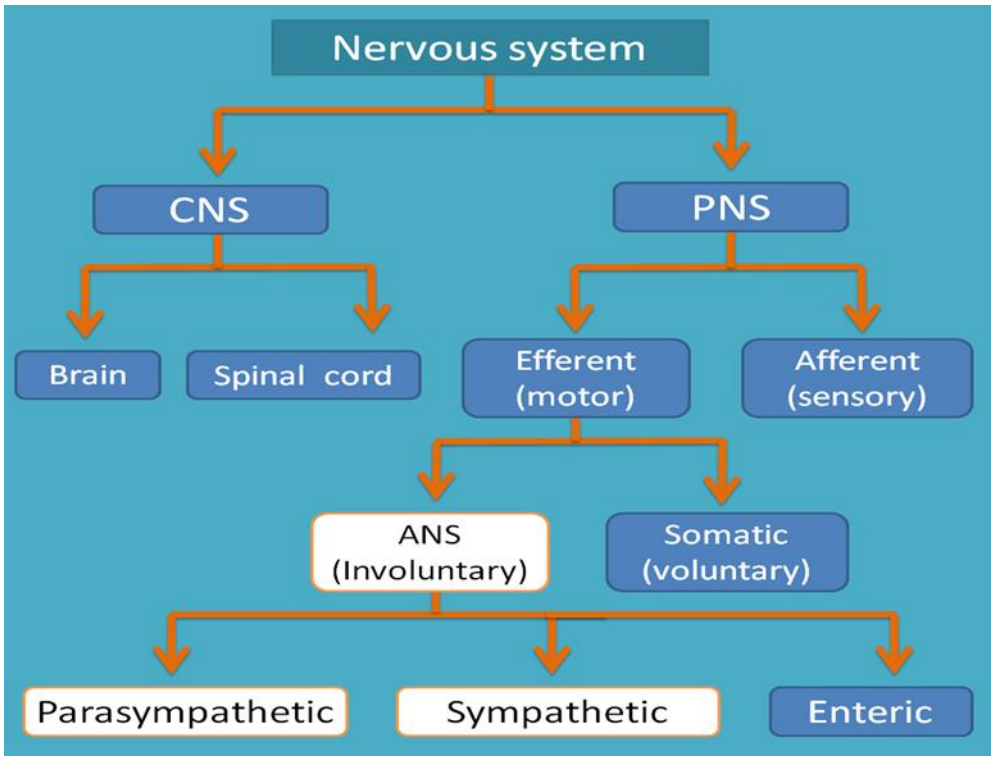
c. Neuron Connectors / Interneurons

Connector neurons are multipolar and have short dendrites, relatively large numbers and relatively long and short axons. The other end of the nerve dendrites forms a synapse. These neurons are often found in the spinal cord. Then in the part of the brain that has the main function in continuing stimulation from the sensory neurons to the motor neurons (Segev, Curtis, Jung, & Chae, 2016).

3. Classification of Nervous

The nerves are classified into two groups according to their function and finally according to their structure. The nervous system of vertebrates (including humans) is divided into the central nervous system (CNS) and the peripheral nervous system (PNS). The (CNS) is the major division, and

consists of the brain and the spinal cord. The spinal canal contains the spinal cord, while the cranial cavity contains the brain (Kornthong et al., 2014)

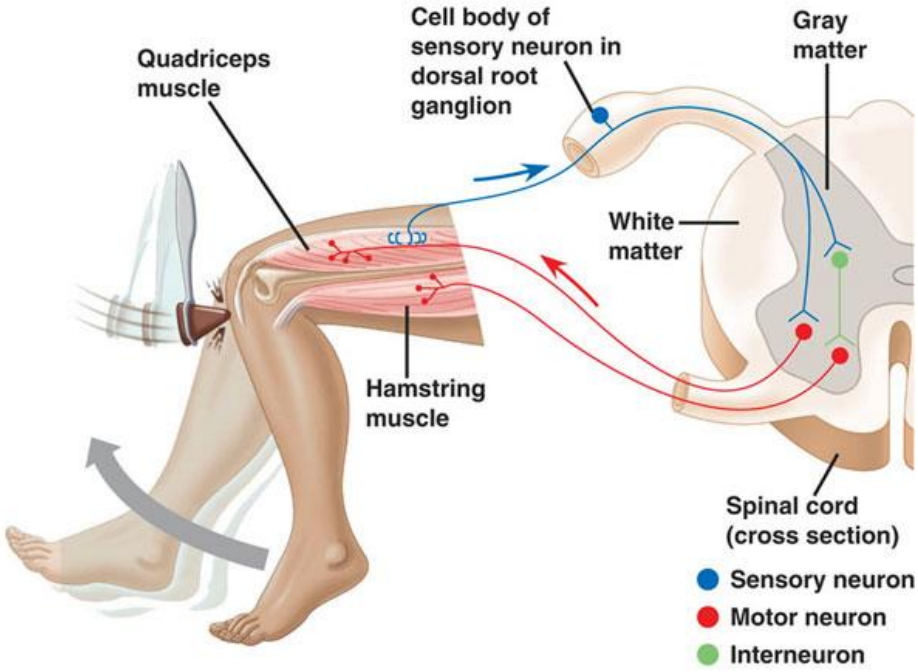


(Kornthong et al., 2014)

The anxious device performs a position in almost each element of our health and well-being. It guides day-to-day activities such as waking up; automatic activities such as breathing; and complex approaches such as thinking, reading, remembering, and feeling emotions. The apprehensive system controls: Brain growth and development, Sensations (such as touch or hearing), Perception (the intellectual process of interpreting sensory information).Thought and emotions, Learning and memory, Movement, balance, and coordination, Sleep, Healing and rehabilitation, Stress and the body's responses to stress, Aging, Breathing and heartbeat, Body temperature, Hunger, thirst, and digestion, Puberty,

reproductive health, and fertility. Neuroscientists learn about these and other anxious system functions in both healthy and diseased states. Studying and appreciation the anxious machine is necessary because it affects so many areas of human fitness and well-being.

4. Hip, Knee, and Ankle Connection Nervous



In general, the nerves will allow information to be transmitted, when you have pain, musculoskeletal disorders, and musculotendinous and ligament trauma, it is thanks to the sensation of the nerves that the benefits of massage or exercise treatment Therapies are used to relieve the body and ensure rapid healing. With the help of the different mechanisms applied by the physiotherapist to the different cases of trauma, the curative and preventive manipulation begins with the sensory nerve which in turn is linked to the association nerve. From the association nerve which is directly the transient to the motor nerve, the

information will be processed in the brain. In the end, for example for trauma to the hips, knees, and ankle, recovery will be quick.

The common injuries of the lower limbs are the following:

1. Achilles Tendonitis / Tendinitis
2. ACL Injury
3. Adductor Tendinopathy
4. Anterior Ankle Impingement
5. Avascular Necrosis of the Femoral Head
6. Back Muscle Pain
7. Bicep Tendonitis
8. Bulging Disc
9. Bursitis Knee
10. Bursitis Shoulder
11. Calf Muscle Tear
12. Chondromalacia Patella
13. Compartment Syndrome
14. Corked Thigh
15. Cramps
16. Degenerative Disc Disease
17. DOMS - Delayed Onset Muscle Soreness
18. Facet Joint Pain
19. Fat Pad Syndrome
20. Femoroacetabular Impingement (FAI)

21. Gluteal Tendinopathy
22. Greater Trochanteric Pain Syndrome
23. Groin Strain
24. Hamstring Strain
25. Heel Spur
26. High Ankle Sprain
27. Hip Arthritis (Osteoarthritis)
28. Hip Labral Tear
29. Hip Pointer
30. ITB Syndrome
31. Knee Arthritis
32. Knee Ligament Injuries
33. Lateral Collateral Ligament
34. Medial Collateral Ligament Sprain
35. Meniscus Tear
36. Metatarsalgia
37. Morton's Neuroma
38. Muscle Strain
39. Olecranon Bursitis
40. Osgood Schlatter's
41. Osteitis Pubis
42. Overuse Injuries
43. Patella Tendonitis (Tendinopathy)

44. Patellofemoral Pain Syndrome
45. PCL Injury
46. Peroneal Tendonitis
47. Pes Anserinus Bursitis & Tendinitis
48. Pes Planus - Flat Feet
49. Pinched Nerve
50. Piriformis Syndrome
51. Plantar Fasciitis
52. Plica Syndrome
53. Poor Hip Core
54. Posterior Ankle Impingement
55. Posterolateral Corner Injury
56. Retrocalcaneal Bursitis
57. Rotator Cuff Calcific Tendinitis
58. Rotator Cuff Syndrome
59. Rotator Cuff Tear
60. Sacroiliac Joint Pain
61. Sciatica
62. Severs Disease
63. Shin Splints
64. Shoulder Impingement
65. Shoulder Tendonitis
66. Sinding Larsen Johansson Syndrome

67. Spondylolisthesis
68. Sprained Ankle
69. Stress Fracture
70. Stress Fracture Feet
71. Tarsal Tunnel Syndrome
72. Temporomandibular Joint Pain (TMJ)
73. Thigh Strain
74. Thumb Sprain
75. Tibialis Posterior Tendinopathy
76. Trochanteric Bursitis
77. AC Joint Injury

(Vanderlei et al., 2013; perlman, 2012)

F. Relevant Research Studies

In the lookup entitled `` Treatment of arthritis of the knee and quadriceps insufficiency after restore of the patellar tendon: a case report together with the use of the Graston Black approach " produced through Black (2010) has proven that arthro fibrosis of the knee is a surgical complication that can restrict range of motion, inhibit muscle activity and limit affected person function.

No greatest conservative care has been hooked up in the literature, leaving a medical doctor with restricted evidence for treatment planning. Described here is phase of a route of rehabilitation care for patients with arthro fibrotic barriers after restore of the medial substance of the patellar tendon with augmentation. The marked limits of knee flexion and quadriceps activity are

treated using the Graston method to manage soft tissue adhesion; Traditional physiotherapy redress is additionally offered. A marked make bigger in the vary of motion and the activity and feature of the quadriceps was once recorded for 5 treatments for 1 month. Care approaches and clinical reasoning are proposed to enhance perception and facilitate future investigations. This study indicates that the trouble of knee injuries is pretty complex because it requires new stressors to forestall the appearance of injuries.

Carried out a research learn about titled `` Effect of Personalized Orthotics and Rehabilitation on the Post-Achievement Program ankle and heel fusions ". As the fit are a broadly used section in many activities, the modern-day warfare in Iraq (Operation Iraqi Liberation) and Afghanistan (Operation Enduring Freedom) has the lowest death charge of any modern-day conflict. Multiplied has played a necessary position in improving survival. However, the higher and decrease limbs remain vulnerable. Substantially unavoidable soft tissue damage accompanies complex fractures of the upper and lower extremities and axial framework poly-trauma.

Mobarakeh, Omar, & Hafidz (2015) carried out research entitled "Effect of the friction approach on the treatment of grade II ankle sprains". The end result showed that ankle sprains are the most frequent injuries in sports. When this happens, an accurate analysis ought to be taken care of. Failure to do so will reason ligament stretch, instability and loss of balance, particularly when walking. This learns about examined the effect of the sprained ankle approach (class II). Friction is one of the most appropriate massage techniques to get rid

of adhesion. 24 young athletes with category II ankle sprains have been selected from one hundred patients on the basis of the MRI test. Patients are divided into two groups. The experimental crew obtained a sports massage. Another group is the manipulate team or the untrained group. Each team consisted of 12 sufferers with Class II ankle sprains. The massage group received a mild rubdown and scraped for 15 minutes on their ankles managed by a specialist in sports rehabilitation and expert massage. The control crew makes use of an ankle brace. The touching approach used to be used as a heating part. Data were analyzed the usage of the paired t-test. The consequences confirmed that the cure team (massage) had a significant affect (P value < 0.05) in contrast to the manipulate group. The implications of this study offer this protocol as the most tremendous therapy for Class II3 ankle sprains.

Carried out a research entitled `` International Committee Consensus Statement Olympic Pain Management The management of elite athletes " Pain is a common problem amongst elite athletes and is regularly linked to sports injuries. Pain and pain negatively affect the performance of elite athletes. Currently, there are no factual or consensus pointers for the administration of illnesses in elite athletes. Pain administration generally consists of ache relievers, rest, and physical therapy. Specifically, care strategies should reflect on consideration on all contributors to pain, which consists of underlying pathophysiology, biomechanical abnormalities and psychosocial problems, and

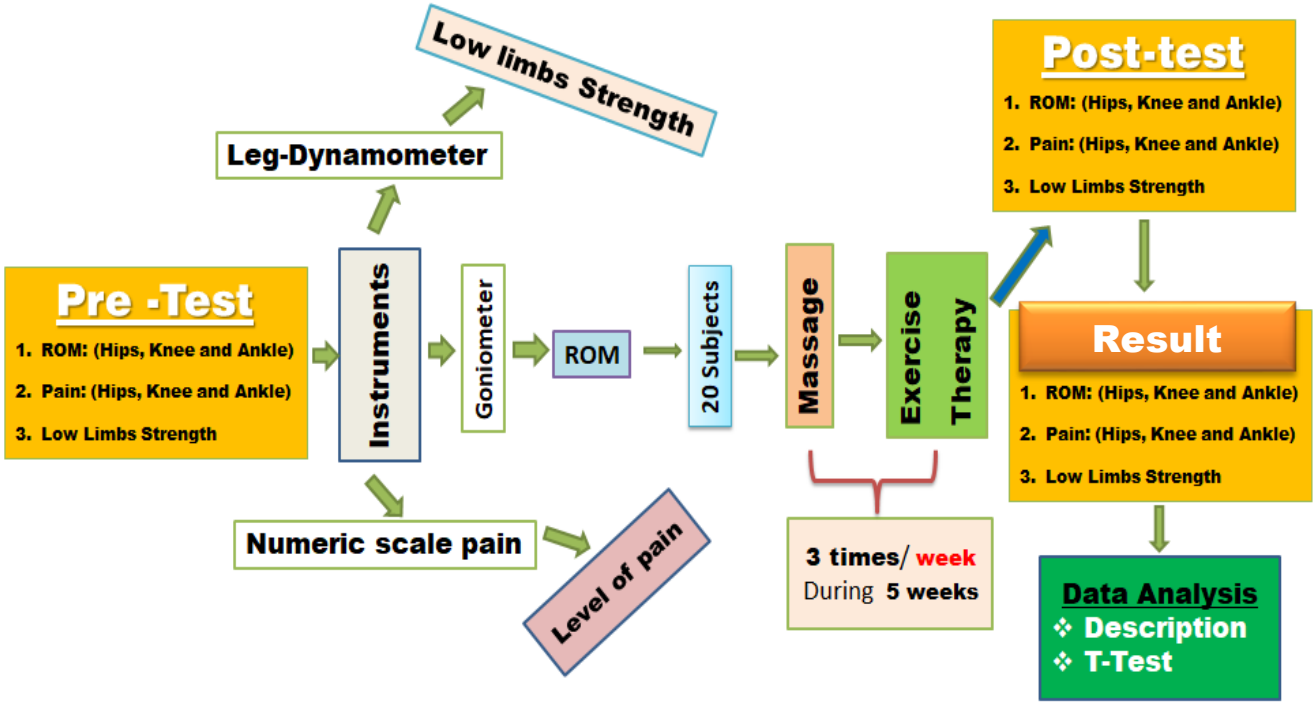
the use of treatments has the most appropriate benefits and harm. Minimal .(Hainline et al., 2017)

Their research entitled `` Impact of stretching on the performance and injury hazard of long-distance runners " The end result showed that stretching, each before exercise or at the end, or both, is usually done by using everybody involved in sports, whether or not elite athletes or Hobbies. The many forms of stretching accessible to athletes, whether passive or active, have lengthy been regarded to enhance performance, decrease injury and usually benefit athletes. This evaluate discusses the present day state of the literature and assesses what athletes can do and have to do with this controversial subject matter (Baxter et al., 2017)

G. Conceptual framework

Chronic hips, knee, and ankle instability are very common issue in whole world. This common problem takes origin from many sources: first daily activities such as sports for athletes and coaches, second degenerative disease. The aging is the one of factors which causes the chronic knee and ankle instability; next the unbalance between input and output has a high average in causing the later problem then the research need to make up a framework of thinking to resolve the later issue, consequently a pre-test post-test plan is an experiment where measurements are taken earlier than and after treatment. The design ability that you can see the outcomes of a certain kind of treatment on a group. The post-test pretest models can be quasi-experimental, which means that the individuals are not randomly assigned,

alternatively a post-test pretest is a quasi-experiment the place the individuals are studied before and after the experimental manipulation. This can be hindered via the ripple effect, defined as an influence on the overall performance of the preceding experience, the reason why researches are dynamic.



Conceptual framework

H. Research Hypothesis and/or Research Questions

Based on the problem formulation and theoretical framework, the research come out the following research questions:

1. Does massage contribute for healing chronic hips, knee and ankle injuries from different case?
2. Does exercise therapy allow chronic hips, knee and ankle healing?
3. Do massage and exercise therapies improve and develop strength and flexibility for low limbs?

CHAPTER III

RESEARCH METHOD

A. Research Type

This research is a quasi-experimental with mixed method: quantitative and qualitative approaches. Quasi-experimental lookup includes the manipulation of an unbiased variable besides the random venture of individuals to prerequisites or orders of conditions. Among the necessary kinds are non-equivalent corporations designs, pretest-posttest. Quasi-experimental designs perceive a contrast crew that is as similar as viable to the cure crew in terms of baseline. An advantage of the use of quasi-experimental approves researchers to take gain of real-world opportunities, enable researchers to decorate external validity, allows researchers to push aside interior validity (White & Sabarwal, n.d; Okano et al., 2006; Gasparrini & Lopez Bernal, 2015; Bunselmeyer & Schulz, 2019).

The sampling of this study was 20 patients with chronic hips, knee, and ankle injuries taken by quota sampling. Quota Sampling is a non-probability sampling technique in which researchers can shape a pattern involving persons that characterize a population and are chosen in accordance to characteristics or qualities. This type of sampling is clearly employed with the aid of each qualitative and quantitative researchers, however because it is a nonprobability method, we are going to talk about it in this section. When conducting quota sampling, a researcher identifies classes that are important to the learn about and for which there is likely to be some variation (Etikan & Bala, 2017;

Taherdoost & Group, 2017; Górny & Napierała, 2015; Sarstedt, Bengart, Shaltoni, & Lehmann, 2017)

The sample was located in Klaten area especially at private physiotherapy man. After identification of the problem, the subjects accompanied the pre-test in order to comprehend greater the fitness status of subjects, sufferers have to follow three steps: first the pre-test is carried out by way of the usage of a dynamometer to assess the strength of the low limbs as well as power is a biometric skills wished for every work, no power no movement.

In the same step the goniometer as used to reach the range of motion (ROM), the aim of goniometer was to decide the extent of joint movements. Flexibility is precise to a specific movement or joints, and the degree of flexibility can vary round the body. It additionally refers to the mobility of your muscles, which permits for extra motion around the joints. Flexibility is an vital element of physical health due to the fact it increases range of motion, which lets in you to perform exercises greater safely and helps to improve your health level. For the second segment sufferers have been given massage and exercise therapy corresponding to case of injury.

Next, rub down used to be associated with a group of workout therapy to allow the restoration of the persistent hips, knee and ankle injuries. The last step was once post-test. A posttest layout is easy and straight forward. This type of layout can be done with one crew (no contrast group) or two agencies

(with a assessment group) of participants. Participants acquire an intervention and are tested afterwards.

B. Research Setting

This study will be conducted in Klaten one area of Yogyakarta in Indonesia with mixed patients: youth, men, women and elder. The characteristics of sampling were 18-85 age, and 41- 85 weigh and 150-165 cm taller; in conclusion several number of the sampling was obesity. The time of this study is three months (3 months): One month has been used to identify problems in the field. The two months again were used for treatment and post-test.

C. Subjects of Research

The study population was patient from Klaten one area of Yogyakarta in Indonesia with mixed patients: youth, men, women and elder. The sampling validity with (Michael, 2015)of certain populations with an error rate of 1%, 5%, and 10%. Total population 20 and with the sample calculation formula mentioned above, all were taken to 20 subjects.

D. Variables of Research

The variables of this study are four: two independent variables and three dependent variables.

Independent variables: 1). Massage

2). Exercise Therapy

Dependent variables: 1) Hips, Knee, and Ankle Flexibility

2) Hips, Knee, and Ankle strengthen

3) Hips, Knee, and Ankle pain

E. Data collection Techniques

Technique of data collection using survey (questionnaire) and field. Survey lookup is the series of facts attained by means of asking humans questions either in person, on paper, by phone or online. Survey research is used to collect the opinions, beliefs and feelings of chosen organizations of individuals, frequently chosen for demographic sampling (E. W. Brewer & Torrisi-steele, 2015). Questionnaire was an effective way to gather information about health status like history of disease, nutrition, environment, and age. The instruments used were (1) Dynamometer to measure the strength of the low limbs muscles and joint strength. (2) Meter to measure body height, (3) Scale to weigh the patient's weight. (4) Goniometer to measure the extent of joint movements (5) numeric scale was used to know the level of injury, (6) tension meter to assess the pressure, (7) thermometer to evaluate the temperature of the body before, during, and after treatment.

F. Research Instruments

Research Instruments are size tools (for example, questionnaires or scales) designed to acquire information on a subject matter of activity from lookup subjects (Taherdoost & Group, 2017b). As it is mentioned below instruments used in this research are already known and obvious, the collect of data involves a variety of instruments such as: (1) questionnaire, (2) leg

dynamometer, (3) Electronic Scale vs. Beam Scale, (4) Goniometer, (5) Roll meter, (6) tension-meter, (7) thermometer and (8) Oil massage. The measuring instruments were accompanied by a specific program of massage and therapeutic exercises. Both methods massage therapy and therapeutic exercises have been the pillars for treating lower limb problems. To reach the data the researcher first used (1) combined massage therapy, and (2) Therapeutic exercises.

1. Combined Massage Therapy

A combination massage therapy is used to fight against various cases of pathology of the lower limbs. The treatment association was formed by: (1) Swedish massage, (2) Deep Tissue, (3) Soft Tissue Release, (4) Sport Massage. Manipulation with Swedish massage is an alternative method to care out some muscle disorders (Kumar et al., 2013; Holub & Smith, 2017), however deep tissue is some used to treat chronic pain (Takei, 2001; Majchrzycki, Kocur, & Kotwicki, 2014; Yadollahpour & Rashidi, 2017), in addition soft tissue release and sport massage are also used to improve the human health (van den Dolder, Ferreira, & Refshauge, 2015; Fitri et al., 2017; Romanowski et al., 2017; Balletto, 2019).

The researcher combined the four methods to allow very rapid and efficient recovery since there is not a single method which is completed in such a way that it can be effective and very beneficial for the

treatment of the lower limbs. Reason why a combination of curative methods was necessary. Hence the object of this research.

1.1. Hips, Knee, and Ankle Hips Massage Therapy

Hips, Knee, and Ankle Massage Therapy				
Principles	**Type of Exercise / Component**	**Examples**	**Volume, intensity, frequency, duration, set, rest**	**The benefits**
1. Readiness Principle 2. Individual Principles 3. Adaptation Principles 4. Overload Principle 5. Progressive (Enhancement) Principle 6. Principle of Specification 7. Principle of Variation 8. The principle of heating 9. Principles of Long Term Training 10. The Reversibility Principle 11. The Principle of Over-moderation (Moderate) 12. Systematic Principles	**1. Swedish Massage** **2. Deep Tissue** **3. Soft Tissue Release** **4. Sport Massage**	**<u>Swedish Massage</u>** a. Longitudinal Gliding. Longitudinal gliding b. Kneading. c. Myofascial Releases. d. Trigger Point Therapy. e. Transverse Frictions. f. Compression Massage. g. Cross-Fibre Massage **2. Deep Tissue** **3. Soft Tissue Release** **4. Sport Massage**	**3 times / week** **20 minutes / session** **Starting with a low intensity, moderate**	•Improved mood •Reduced anxiety •Lower stress levels •Lessening of depression •Reduced anger and aggression •Improved sleep patterns and decreased sleep disturbance •Reduced fatigue •Enhances immune system •Improves athletic performance and enhances recovery • Joint stiffness • Pain reduction • Osteoarthritis • Low back pain • Stress management / reduction • Pain reduction • Reduce muscle tension

The table above includes a model or a treatment plan to fight against musculoskeletal problems. This new approach is based on the principle of training. When planning training, it is important to apply and adhere to the following training principles: (1) Overload: Training, to produce a chronic effect, must require an effort to adapt to the body (like a vaccine) and cause physical fatigue which can vary in its magnitude (2) Overcompensation: Following the overload, it is necessary to take a rest period to allow the body to adapt and reach a higher level of fitness than initially (3)Alternation: We must alternate the periods of work and rest. This principle applies to a session, a week, a month and a year, to allow overcompensation. If the principle of alternation is not respected, there is a risk of overtraining, (4) Specificity: The chronic adaptations of the training are specific to the parameters chosen. Example: Do not exercise if the goal is to improve speed, (5) Progression: The training must present a progression in duration, intensity and frequency of training and go from general to specific, (6) Individualization: The parameters of training must be consistent with the objectives, needs, assessment and trainability of the individual, (7) Variability: To produce optimal results, we must vary the parameters of the prescription, otherwise there will be no more overload and therefore no improvement, (8) The weak link: During the evaluation, it is important to identify the limiting factors which could hinder the normal course of training, or the achievement of a goal, and to remedy it, (9) Trainability: The improvement rate varies according to gender, age and initial level of training. It must be taken into account when prescribing (the more you train, the less you improve), (10) Motivation and pleasure: You get the benefits of physical activity

Training if you do it regularly. So you have to be motivated and have fun when you do physical activity (Abdullah & Ampofo-boateng, 2011; Morgans, Orme, Anderson, & Drust, 2014; Downing, 2017; Capp, 2018; Kasper, 2019)

1.2. Manipulation and Volume of Hips, Knee, and Ankle Massage Therapy

	Volume and Massage Therapy Manipulation			
Manipulation	**Instructions**	**Volume**	**Intensity**	**Duration: 20 minutes**
Swedish Massage Effleurage Petrissage Friction Tapotement: ▪ cupping ▪ Hacking ▪ Beating	• From back layer position: apply effleurage from toes up to abdomen muscles • Laying down: apply effleurage from toe foot point up to scapula muscles • Apply petrissage on the whole hips, knee, and ankle muscles • Apply friction on the specific muscle pain or injury • Cupping technique to overall blood flow, promote cell repair, and create new blood vessels to the tissue • Hacking to stimulate nervous and blood flow • Apply beating on adipose muscles like gluteus, quadriceps and hamstring to destroy myogelosis	20-25 floating (1 set) 20-25 floating (1 set) 25-30 strokes (1 set) 25-30 strokes (1 set) 40-80 strokes (1 set) 40-80 strokes (1 set) 40-80 strokes (1 set)	Low-moderate Low-moderate Moderate Moderate High High High	2 min 2 min 2 min 2 min 40 secs 40 secs 40 secs
Deep Tissue ▪ Petrissage ▪ Friction	Apply deeply petrissage and friction again for strains and sports injuries.	25-30 strokes (1 set) 25-30 strokes (1 set)	High High	2 min 2 min
Soft Tissue Release ▪ Petrissage ▪ Friction	Apply petrissage and friction with soft tissue release to stimulate large nervous, tendon, ligament, increase endorphin, and ROM	25-30 strokes (1 set) 25-30 strokes (1 set)	Moderate Moderate	1.5 min 1.5 min
Sport Massage ▪ Effleurage ▪ Vibration	Apply effleurage and Vibration to remove waste product, increase healing, and recovering	25-30 strokes (1 set) 25-30 strokes (1 set)	Moderate Moderate	1.5 min 1.5 min

1.3. Program for relieving Hips, Knee, and Ankle Injuries, and Increasing Strength and Flexibility

Lower Extremity during 20 minutes X 3 t X 5 W

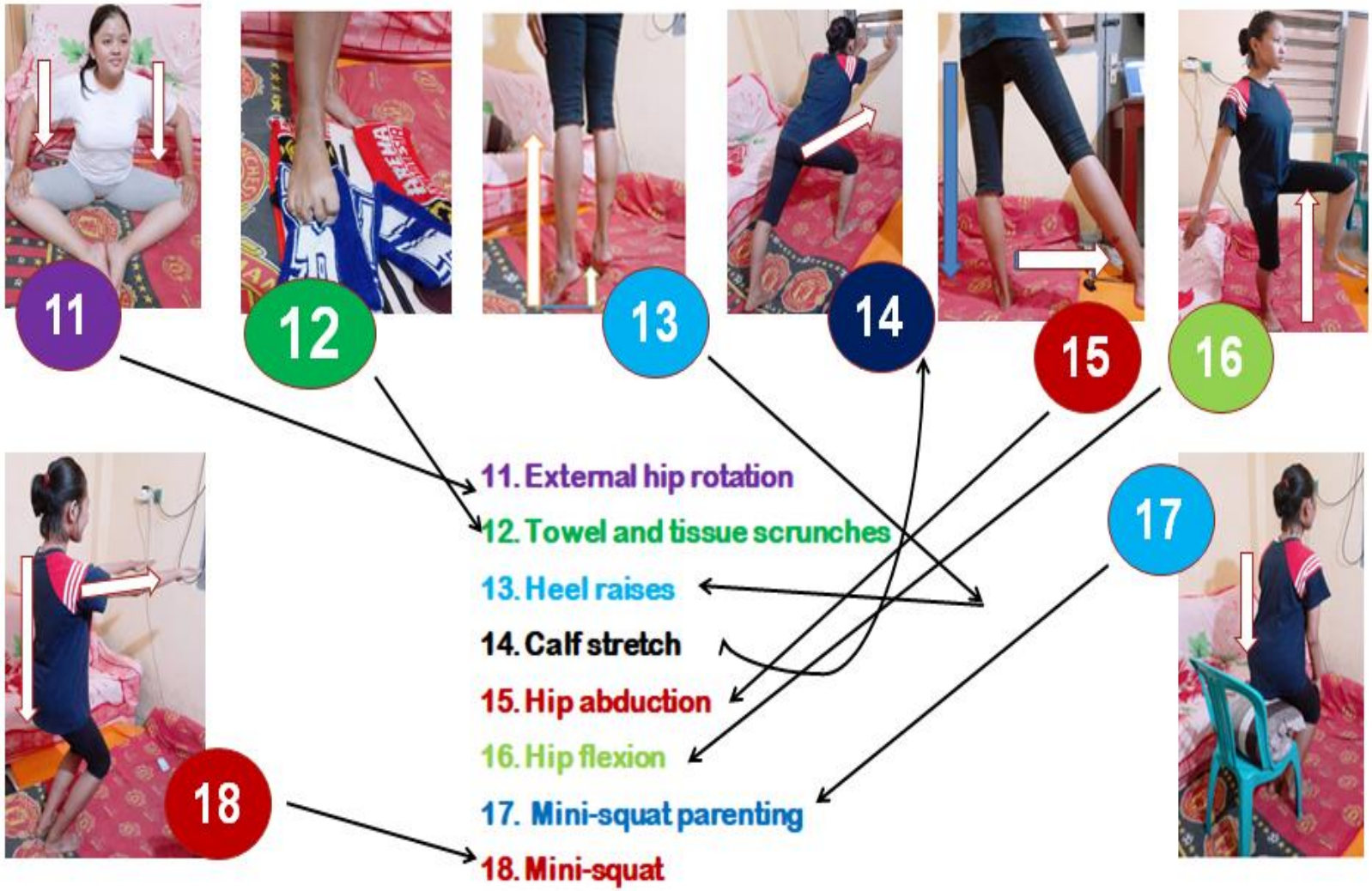
Hips, Knee, and Ankle hips Massage Therapy				
Principes	**Type of Exercise / Component**	**Instructions**	**Volume, intensity, frequency, duration, set, rest**	**The benefits**
1. Readiness Principle 2. Individual Principles 3. Adaptation Principles 4. Overload Principle 5. Progressive (Enhancement) Principle 6. Principle of Specification 7. Principle of Variation 8. The principle of heating 9. Principles of Long Term Training 10. The Reversibility Principle 11. The Principle of Over-moderation (Moderate) 12. Systematic Principles	1. Knee lift 2. Hip and low back stretch 3. Double hips rotation 4. Hips swinging 5. Squeeze 6. Muscle cladding 7. Hamstring stretch 8. Bridging 9. Side leg raises 10. Prone straight leg raises 11. External hip rotation 12. Towel and tissue scrunches 13. Heel raises	Apply exercise number one to seven [1-7] in laying position. Do yourself of with partner. Number three and four you are oblige to be parenting. Apply it on each side or on each member concerned. Three times for concerned member Hold it during 10 sec for one repetition Do one set Maximum duration: one minute for each exercise From exercise number 8-11 Two times for each member Hold it during 15 sec for one repetition Maximum duration: one minute for each exercise From exercise number 12-18 10 repetitions Four times	2x3x10 sec/session Volume: One set Repetition: Three (3) 2: Two members or two size Duration : one menite (1 min) Rest: 10 sec between one exercise and other 3times /week during 5 weeks 2x2x15sec/session Duration : one minute (1 min) Rest: 10 sec between one exercise and other 2x2x10x10 sec 2 sets	▪ Relaxing muscle tension ▪ Relaxing tendon ▪ Relaxing ligements ▪ Relaxing joints ▪ Increasing flexibility ▪ Increasing blood circulation ▪ Decreasing cortisol hormone ▪ Increase insulin sensitivity ▪ reduce muscle fatigue ▪ Reduces anxiety ▪ Soothes headache ▪ Decreasing muscle soreness: ▪ Improving posture ▪ Decreasing stress relief ▪ Improving endorphins hormone ▪ Strengthen muscle and tendons

	14. Calf stretch 15. Hip abduction 16. Hip flexion 17. Mini-squat parenting 18. Mini-squat		2 times 10 repetitions time 10 sec rest time repetition: 5 sec rest time between set 10 sec	▪ Lowered injury risks. ▪ Strengthened mental health ▪ Controlled blood sugar levels ▪ Better cardiovascular health ▪ Maintaining Muscle Tissue ▪ Increased Strength ▪ Improved Bone Health. ▪ to protect your joints from injury ▪ maintaining flexibility and balance ▪ remain independent ▪ endocrine system

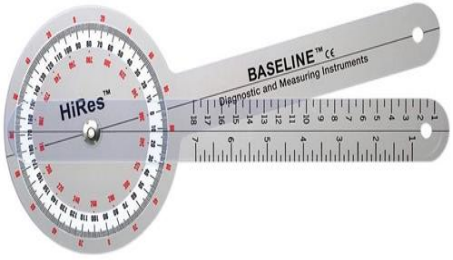
The therapeutic exercise program was also based on the training principle. The model proposed by the researcher is made up of 18 exercises which were carried out in sequence. These exercises are very effective for the treatment of muscular skeletal disorders of the hip, knee, and ankle. Most exercises combine three joints at the same time, so one exercise is beneficial for three segments of the lower limbs. The therapy model was constituted by: (1) Knee lift, (2) Hip and low back stretch, (3) Double hips rotation, (4) Hips swinging, (5) Squeeze, (6) Muscle cladding, (7) Hamstring stretch, (8) Bridging, (9) Side leg raises, (10) Prone straight leg raises, (11) External hip rotation, (12) Towel and tissue scrunches, (13) Heel raises, (14) Calf stretch, (15) Hip abduction, (16) Hip flexion, (17) Mini-squat parenting, (18) Mini-squat. The therapeutic exercise program can be summarized in 18 exercises accompanied by pictures to facilitate the reader to

understand the mechanism. The program does not require a large space. It is enough to have a space two meters out of two, and does not require sophisticated materials. It is a very simple program to understand and much more effective and beneficial for the treatment of muscular disorder

1.4. Therapeutic Exercise


11
12
13
14
15
16
17
18
11. External hip rotation
12. Towel and tissue scrunches
13. Heel raises
14. Calf stretch
15. Hip abduction
16. Hip flexion
17. Mini-squat parenting
18. Mini-squat

1.5. Research instrument

Type of Instrument	Pictures	The benefits
1. Leg-Dynamometer		Measurement of leg strength pre-test, mi-test and posttest
2. Balance		Measurement of human weight to determine the level of obesity
3. Goniometer		Measurement of joint flexibility

4. Zeitun Oil Massage Oil		Encouraging the Relaxation Process. Smooth breathing. Relax the stiff muscles. Blood circulation reduce spasms, aches, muscle aches, sprains, and swelling. Helps damage the skin Fight against dry skin
5. Tensionmeter		Measurement of Heart Rate and Blood Pressure before and during exercise
6. Scale Pain		Know the level of pain

7. Thermometer		Knowing body temperature before and during exercise
8. Roll meter		Height measurements are correlated with body weight to determine the level of obesity
		To assess cholesterol, glucose, and uric acid

G. Validity and Instrument Reliability

The instruments used in this study: tools for measurement, the massage therapy program, and the therapeutic exercise have meet validation and reliable. Both of them they have been validated. The validity and reliable used two methods: focus discussion and Aiken's formula for content validity (Aiken, 1980; Alumran, Hou, & Hurst, 2012; Md Ghazali, 2016; Taherdoost & Group, 2017b; Zogara, Woro, & Handayani, 2018), the validation was made up of nine people including three professors from the faculty of sports

science, three doctors from Yogyakarta university who had knowledge in sport and health, three massage and therapeutic exercise practitioners but they had certificates and seniority of more than 5 years on average.

H. Data Analysis Techniques

After 16 times conducting treatment, 3 times per week during 5 weeks, a post-test was conducted to evaluate the effectiveness of massage, exercises therapy on chronic knee and ankle injuries. Data were analysed using Independent sample t-Test to assess the different between pre-test and post-test, One-Sample Kolmogorov-Smirnov for test normality, Anova one way to check the homogeneity, paired sample to assess the mean of variables with SPSS Amos 23.

CHAPTER IV

RESEARCH FINDINGS AND INTERPRETATION

A. Data Description

In this chapter finding are described and explained. Data were analysed by T-Test student and compared means in order to know how better massage is and exercise therapy according to the different body injuries of the subjects treated. At the beginning the subjects were 20, but at the following test 5 were absent.

Table1: Low limbs Pre-test, Mi-Test, and Posttest Strength Measurements

Subjects	Strength in N/Kg		
	Pre-T	M-T	Posttest
1	23	38	55
2	30	35	40
3	50	60	70
4	55	65	75
5	85	122	122
6	60	85	85
7	40	37	90
8	25	50	55
9	30	23	45
10	20	60	70
11	65	65	115
12	50	50	55
13	35	35	55
14	45	45	55
15	25	35	40

After subjects injury diagnostic, it has been conducted a strength pre-test to know before how strong were muscles, ligaments, and the joints of the low extremity, the result was between 23-85 N/Kg, after three weeks of treatment the mi-test has been afforded, the result showed that there is a small improvement whether result was between 23-122N/Kg. The last test or post-

test has been conducted after five (5) weeks and the result was between 40-122 N/Kg. If we analyse visual the three data we should directly that there was a positive progress. In other way the treatment used was very effective in increasing the low limb strength.

Table2: Pre-Test and Posttest of the Knee Range of Motion (ROM)

Subjects	Knee Range of Motion (ROM)							
	Right Flexion		Left Flexion		Right Extension		Left Extension	
	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest
1	35	29	35	34	8	14	10	14
2	35	30	30	30	10	20	15	22
3	35	30	28	28	8	10	10	10
4	30	30	27	27	7	22	10	15
5	30	22	45	40	7	9	15	18
6	25	17	40	34	12	24	10	12
7	40	33	45	40	8	10	8	8
8	35	30	65	60	10	20	15	18
9	35	30	35	28	7	10	10	10
10	20	13	35	35	7	13	15	20
11	20	20	40	35	8	10	10	15

For the above test only 11 subjects who participated, others were totally absent

Before applying the treatment of patients, the pre-test of ROM has been done to evaluate the knee flexibility but also to determine the pain level. As the results are presented in the table2 showed that there was right flexion between 20-40^0; its post-test was between 17-30^0. For the left flexion result was included between 27-65^0 during pre-test, at the post-test result was 27-60^0. For the two first results there is different between the pre-test and the post-test. The more the knee flexion angle is small the better is the flexion of the knee. For those who have a high knee flexion has been caused by a lack of flexibility or a high pain level which limited them. Those connotations have been observed while pre-test is being done. After getting treatment: massage and exercise therapy there was a positive improvement. Four patients (Nr 2, 3, 4, 10, and 11) didn't improve the flexibility but they have increased the strength.

Next the right and left extension have measured, the results were respectively: 9-15; 8-15^0 for the pre-test, and for the post-test the results were consecutively: 9-20^0; 8-22^0. Nevertheless Nr 3, 5, 7, and 9 the is no improvement of knee extension. The causes were the following: (1) for Nr 3 his was in the elder condition which means that the five weeks were not sufficient to increase knee extension. (2) for number five there is no right improvement knee extension caused the genetic muscle the same was to number 11. (3). For Nr 7 and 10; the results were influenced by genetic and elder aged.

Table3: a) Pre-Test and Posttest of the Ankle Range of Motion (ROM)

Subjects	Right back flexion		Left back flexion		Right Plantar		Left Plantar	
	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest
1	10	20	10	19	60	85	85	85
2	30	30	10	10	55	70	70	70
3	30	30	30	10	60	80	80	80
4	10	26	22	32	65	81	75	85
5	10	15	10	15	60	80	80	80
6	20	20	20	20	60	80	80	80
7	16	21	16	17	50	65	75	80
8	15	24	15	25	60	65	80	75
9	10	30	10	22	65	74	65	85
10	10	20	10	15	70	80	70	85
11	15	30	10	22	60	85	50	60
12	10	25	5	20	60	65	60	75
13	5	20	5	10	60	80	80	80
14	10	20	10	24	50	65	55	75
15	10	12	10	12	55	60	70	80

For the above test only 15 subjects who participated, others were totally absent. The ankle articulation is very complex and has more- less than four articulations: Plantar, back flexion, inversion and eversion flexion. At the beginning the back-flexion result was between $5\text{-}30^0$; the last test showed the following result: $12\text{-}30^0$;

the result showed that there is different adaptation among subjects according to the treatment: massage and exercise therapy, this is very understanding because they have different pain level the reason while their values are different. Three patient didn't improve left back flexion among as number 2, 3, 6 for them they have low movement coordination in the left member. It can be concluded that the coordination is an influenced factor for flexibility.

The right and left plantar flexion were found very improved after the treatment. The pre-test was consecutively presented as: $50\text{-}85^0$; $55\text{-}85^0$. Their post-test were the following: $65\text{-}85^0$; $60\text{-}85^0$. Three factors were proved as main causes: (1) massage which improve the blood flow and make flexible muscles, (2) Exercise therapy to take off joint pain and to increase flexibility, (3) the crossed leg position which is one of the cultures of Indonesia people, that position positively influenced the ankle flexibility.

Table3: b) Pre-Test and Posttest of the Ankle Range of Motion (ROM)

Subjects	Ankle Range of Motion (ROM)							
	Right Inversion		Left Inversion		Right Eversion		Left Eversion	
	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest
1	21	65	21	70	21	65	22	65
2	18	18	25	25	41	41	50	50
3	10	10	30	10	20	20	20	20
4	45	80	45	70	55	70	30	60
5	82	82	65	65	45	45	55	55
6	40	70	40	70	25	60	25	60
7	30	65	30	65	30	50	30	70
8	30	70	30	70	30	50	30	30
9	20	55	20	70	20	60	20	65
10	20	70	20	55	20	60	20	60
11	40	60	40	57	30	40	15	20
12	50	70	40	70	12	55	12	50
13	50	75	50	75	45	65	45	65
14	40	55	50	70	28	50	28	32

For the above test only 14 subjects who participated, others were totally absent. The result from the above table showed that from the pre-test up to the post test for each item there was visual effect from the treatment: massage and exercise therapy. For 14

subjects surveyed showed a great improvement of ROM, but the cause factors still the same as the last on the table3: a). the results in the pre-test were respectively: 10-82^0(right inversion); 21-65^0(left inversion); 21-55^0(right eversion); 12-55^0(left eversion). Their post-test were consecutively: 10-82^0(right inversion), 10-75^0(left inversion), 20-70^0(right eversion), and 20-70^0(left eversion).

Only number three has a particular on inversion and eversion because he didn't join two sessions which showed that less than five meeting there is no right and left inversion and eversion improvement for someone who has chronic ankle injury.

Table4: Pre-Test and Posttest of the Hips Range of Motion (ROM)

Subjects	Hips Range of Motion (ROM) in Degree							
	Flexion Right Leg		Flexion Left Leg		Extension Right Leg		Extension Left Leg	
	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest	Pre-Test	Posttest
1	100	145	84	110	30	26	20	26
2	105	130	105	130	20	30	25	30
3	111	130	112	132	35	40	30	35
4	107	120	111	131	20	25	40	45
5	110	135	109	135	30	35	25	30
6	110	123	100	117	14	20	10	20
7	130	140	100	120	45	50	35	40
8	100	135	104	109	25	30	35	40
9	116	130	105	110	27	32	18	23
10	106	130	100	122	35	40	30	35
11	112	140	110	115	15	20	55	60
12	100	130	105	110	27	32	18	23

For the above test only 12 subjects who participated, others were totally absent

The following table showed that there is an improving for each variable.

Table5: Pre-Test and Posttest of the Hips, Knee, and Ankle Pain

Subjects	Pain evaluation	
	Pre-test	Pposttest
1	[7-9]	0
2	[7-9]	3
3	[7-9]	0
4	[7-9]	3
5	[7-9]	0
6	[7-9]	0
7	[7-9]	0
8	[7-9]	0
9	[7-9]	0
10	[7-9]	0
11	[7-9]	0

For the above test only 11 subjects who participated, others were totally absent. According to the scale pain: pain was classified in interval. So, with [0-3] null pain; [4-5] mild pain; [6-9] chronic pain; and] 9-10 unsupportable pain. The last surveyed showed that all subjects have chronic pain.

B. Findings

1. Analyze Strength Measurements

The data analyze was done first by Kolmogorov-Smirnov test to test normality of the distribution because normality test is a conducted test with the aim to assess the distribution of data in a group of data or variables, whether the data distribution is normally distributed or not. Normality Test is useful for determining data that has been collected in normal distribution or taken from a norm population. Next the mean

comparison has been afforded; comparison of potential checks helps you decide if your agencies have comparable means. There are many cases in statistics the place you may choose to evaluate means for two populations or samples. ... They are many ways of comparing capability from records that is assumed to be commonly allotted are: Independent Samples T-Test.

Table6: Normality and homogeneity variances test of pre-test and posttest of low limbs strength (N/kg)

Pre-test and Posttest low limbs strength		**Unstandardized Residual**
N		15
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	15.02485722
Most Extreme Differences	Absolute	.169
	Positive	.169
	Negative	-.127
Test Statistic		.169
Asymp. Sig. (2-tailed)		.200[c,d]
Test of Homogeneity of Variances		.315

a. Test distribution is Normal.
b .Data are homogeny.

Normal distribution and homogeneity are used in various distributions in statistics, and hypothesis testing assumes the normality and homogeneity of data. The normal distribution and homogeneity are one of the probability distributions that important in statistical analysis. This distribution has parameters in the form of mean and standard deviation. From the data above it can conclude that the population was normal distributed with p value superior than 0.05 (Asymp. Sig. (2-tailed): P(0.200>0.05). The data are also homogeny with P value superior to 0.05 (P = 0.315 > 0, 05).

Table7: Compared Mean Pre-test and Posttest Strength Measurement

	Classes	N	Mean	Std. Deviation	Std. Error Mean
Test	Pre-test	15	42.5333	18.45406	4.76482
	Posttest	15	68.4667	25.20450	6.50777

The evaluate ability t-test is used to compare the mean of a variable in one team to assess the similarity or different in one or more groups. The null speculation for the difference between the corporations in the population is set to zero. We test this speculation using sample statistics. In this study the hypothesizes were:

1. There is no different between pre-test and posttest (H_0)

2. There is significant different between pre-test and posttest (H_1)

Table8: Independent Samples Test Pre-test and Posttest Strength Measurement

	Levine's Test for Equality of Variances	t-test for Equality			95% Confidence interval of different
	F	Sig.	t	t	Sig. (2-tailed)
Test Equal variances assumed	1.048	.315	-3.215	28 25.659	.003 .004
Equal variances not assumed			-3.215		

From the data on the table8, it is seen that Levine's test showed P value superior than 0.05(P: 0.315>0.05). In statistics, Levene's check is an inferential

statistic used to check the equality of variances for a variable calculated for sample. Thus, the null hypothesis of equal variances is rejected and it is concluded that there is a difference between the variances in the population. In this study the null hypothesis was there is no different between pre-test and posttest is rejected and the alternative hypothesis that there is different between the data before and after treatment was automatically accepted. Test Equal variances assumed (0.003) and Equal variances not assumed (0.004) all them are inferior to 0.05 which support that the null hypothesis is rejected and the second hypothesis which means that there is significant different between the pre-test and posttest data. Massage and exercise therapy were very benefit in increasing low extremity strength. Massage was very great by improving blood flow, muscle relaxation, decreasing the muscle, ligament pain and by the way it allow the facility of strengthen exercise.

2. Findings Knee Range of Motion

In this case two types of articulations were analyzed for each leg. There were (1) right flexion, (2) left flexion, (3) right extension, and left extension. According to the different injury severe of the muscles and ligaments of the two members, there was different adaptation to massage and exercise therapy as its treatment. The reason why we have to analyze case by case for each leg.

Table9: Normality and homogeneity variances test of pre-test and posttest knee flexion and extension (ROM)

Variables: Right, Left knee flexion and extension			Pre-test Right Flexion	Posttest Right Flexion	Pre-test Left Flexion	Posttest Left Flexion	Pre-test Right Extension	Posttest Right Extension	Pre-test Left Extension	Posttest Left Extension
N			11	11	11	11	11	11	11	11
Normal Parameters[a,b]	Mean		30.9091	25.8182	38.6364	35.5455	8.3636	14.7273	11.6364	14.7273
	Std. Deviation		6.64010	6.63051	10.68899	9.27754	1.62928	5.65846	2.73030	4.47417
Asymp. Sig. (2-tailed)			.018[c]	.002[c]	.200[c,e]	.052[c]	.003[c]	.048[c]	.000[c]	.200[c,e]
Monte Carlo Sig. (2-tailed)	Sig.		.273[d]	.182[d]	.818[d]	.455[d]	.182[d]	.455[d]	.091[d]	1.000[d]
	99% Confidence Interval	Lower Bound	.000	.000	.519	.068	.000	.068	.000	.658
		Upper Bound	.619	.481	1.000	.841	.481	.841	.314	1.000
Test of Homogeneity of Variances										
Test of Homogeneity of Variances							.072			

Kolmogorov-Smirnov and Levene Test were used to assess normality and homogeneity test. Both of them are used in more than a few distributions in statistics, and hypothesis trying out assumes the normality and homogeneity of data. The everyday distribution is one of the likelihood distributions that is vital in statistical analysis. This distribution has parameters in the structure of suggest and popular deviation. Right Flexion Pre-test (0,273); Right Flexion Posttest (0,182); Left Flexion Pre-test (0,818); Left Flexion Posttest (0,455); Right Extension Pre-test (0,182); Right Extension Posttest (0,455); Left Extension Pre-test (0, 091); Left Extension Posttest (1.00). In statistics, the Kolmogorov - Smirnov take a look at is a nonparametric take a look at of the equality of one-dimensional continuous probability distributions which can be used to examine a sample with a reference likelihood distribution, or to evaluate two samples, the table so excessive that with the Kolmogorov check - Smirnov does not exhibit this distribution nicely because of the statistics which is extreme reason why we did popular data by using Monte Carlo. By Monte Carlo the statistics is distributed norma.From the information above it can conclude that the population used to be normal dispensed with p value top of the line than 0.05 (Asymp. Sig. (2-tailed) unstandardized or Monte Carlo Sig. (2-tailed) were consecutively: .273; .182; .818; .455; .182; .455; .091; 1.000. Both of them they were distributed normal with P>0.05. The homogeneity test was verified with P value superior to 0.05 (P = 0.072 > 0.05).

Table10: Descriptive statistics of pre-test and posttest knee flexion and extension (ROM) by Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test (Right Flexion)	30.9091	11	6.64010	2.00207
	Posttest (Right Flexion)	25.8182	11	6.63051	1.99917
Pair 2	Pre-test (Left Flexion)	38.6364	11	10.68899	3.22285
	Posttest (Left Flexion)	35.5455	11	9.27754	2.79728
Pair 3	Pre-test (Right Extension)	8.3636	11	1.62928	.49125
	Posttest (Right Extension)	14.7273	11	5.65846	1.70609
Pair 4	Pre-test (Left Extension)	11.6364	11	2.73030	.82322
	Posttest (Left Extension)	14.7273	11	4.47417	1.34901

Table11: Comparison of pre-test and posttest knee flexion and extension (ROM) by Paired Samples Test, 95% Confidence Interval difference

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Pre-test - Posttest	5.09091	2.77325	.83617	3.22782	6.95400	6.088	10	.000
Pair 2	Pre-test - Posttest	3.09091	2.84445	.85763	1.17998	5.00184	3.604	10	.005
Pair 3	Pre-test - Posttest	-6.36364	4.69623	1.41597	-9.51860	-3.20867	-4.494	10	.001
Pair 4	Pre-test - Posttest	-3.09091	2.38556	.71927	-4.69355	-1.48827	-4.297	10	.002

a. Paired Samples Statistics Pre-test and Posttest right Knee flexion (ROM)

The result showed that the mean of pre-test was high (30.9091^0), which mean that the more the angle of flexion is high the more the right knee flexibility is not better. The posttest mean (25.8182^0) was small referring to the pre-test mean. The standard deviation respectively for the pre-test and the posttest (6.6401; 6.63051) were approximately the same, which means that at the beginning patients have different level of pain and the adaptation was different from one to other this argument is confirmed by the high SD before and after the treatment massage and exercise therapy.

b. Paired Samples Test Pre-test and Posttest right Knee flexion (ROM)

To evaluate the effectiveness of massage and therapy we applied the mean comparison to assess if there is any similarity or different. The assumption was based on the following hypothesis:

1. There is no different between pre-test and posttest right flexion (H_0)
2. There is significant different between pre-test and posttest right flexion (H_1)

After five weeks of treatment assessment test has been done and showed that P (0.000) value is inferior than 0.05, it can be concluded that the first hypothesis is rejected and accepted the alternative hypothesis "there is significant different between pre-test and posttest right flexion

c. Paired Samples Statistics Pre-test and Posttest Left Knee flexion (ROM)

The following result confirmed that the mean of pre-test used to be excessive (38.6364), which mean that the greater the perspective of flexion is high the more the right knee flexibility is now not better. The posttest suggest

(35.5455^0) was small referring to the pre-test mean. The trendy deviation respectively for the pre-test and the posttest (10.68899; 9.27754), were approximately the same, which capacity that at the commencing patients have special stage of pain and the adaptation was once distinctive from one to different this argument is validated by the high SD before and after the therapy rubdown and exercising therapy.

d. Paired Samples Test Pre-test and Posttest left Knee flexion (ROM)

To consider the effectiveness of rubdown and therapy we applied the suggest contrast to investigate if there is any similarity or different. The assumption was once primarily based on the following hypothesis:
1. There is no one-of-a-kind between pre-test and posttest right flexion (H0)
2. There is substantial distinct between pre-test and posttest proper flexion (H1)
After five weeks of treatment assessment check has been performed and confirmed that P (.005) fee is inferior than 0.05, it can be concluded that the first hypothesis is rejected and general the alternative speculation " there is significant unique between pre-test and posttest proper flexion

e. Paired Samples Statistics Pre-test and Posttest right Knee Extension (ROM)

The means from the above table10 are visual different, as they are respectively presented (8.3636; 14.7273). Their standard deviations are also different; the first (1.62928) showed that the patients have approximated the same level of chronic knee injury. The posttest standard deviation is high (5.65846) which mean that the patients have a different adaptation according to the treatment given.

f. Paired Samples Test Pre-test and Posttest right Knee Extension (ROM)

After giving the treatment during five weeks, it was necessary to assess the progress from the massage and exercise therapy. Before we start to determine the effect or benefit we suggest the following hypotheses:

1. There is no different between pre-test and posttest left knee extension (H_0).
2. There is significant different between pre-test and posttest left knee extension (H_1). The population was normal distributed as it has been showed at the beginning. Summary P value (0.001) from the result was inferior to 0.05, which means that the null hypothesis which said there is no different before and after treatment was rejected and the accepted assumption was that confirmed the existence of different between the pre-test and posttest. It can be conclude that massage and exercise therapy are very helpful in taking off the chronic knee pain but also they contribute in increasing the knee extension flexibility.

g. Paired Samples Statistics Pre-test and Posttest left Knee Extension (ROM)

The capability from the above table are visual different, as they are respectively (11.6364; 14.7273). Their trendy deviations are additionally different; the first (2.73030) showed that the patients have approximated the same level of persistent knee injury. The post-test standard deviation is high (4.47417) which capacity that the patients have a exceptional adaptation according to the treatment given.

h. Paired Samples Test Pre-test and Posttest left Knee Extension (ROM)

After giving the treatment during five weeks, it used to be integral to check the progress from the massage and workout therapy. Before we begin to

decide the impact or gain we recommend the following hypotheses: 1. There is no one-of-a-kind between pre-test and post-test left knee extension (H0). There is large exclusive between pre-test and post-test left knee extension (H1). The populace used to be regular disbursed as it has been confirmed at the beginning. Summary P value (0.002) from the result used to be inferior to 0.05, which means that the null speculation which said there is no specific before and after cure used to be rejected and the well-known assumption used to be that confirmed the existence of one-of-a-kind between the pre-test and post-test. It can be conclude that rubdown and workout therapy are very helpful in taking off the chronic knee pain but additionally they make contributions in growing the knee extension flexibility.

Table12: Regression Test of massage and therapeutic program on the Knee Range of Motion (ROM) with ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	367.253	1	367.253	44.875	.000[b]
	Residual	73.656	9	8.184		
	Total	440.909	10			

a. Dependent Variable: Tests

b. Predictors: (Constant), Classes

Regression analysis in statistics is one method for determining the causal relationship between one variable and another variable (s). Regression analysis is widely used to make predictions and predictions. Referring to the result obtained P value is inferior to 0.05. The explanation of that means that massage and exercise therapy can predict the improvement of knee flexibility but also thy are used to caring knee from pain and injuries.

3. Findings Ankle Range of Motion

The ankle is known as a complex articulation which included more than four joints. By the way they have been analyzed for every leg because its particularity. Ankle articulations are (1) back flexion, (2) Plantar flexion, (3) Inversion flexion, and (4) eversion flexion. According to the exclusive injury extreme of the muscular tissues and ligaments of the two members, there used to be specific adaptation to rubdown and exercise remedy as its treatment. The reason why we have to analyze case by case for each leg.

Table13: Normality and Homogeneity Variances Test of Pre-Test and Posttest Ankle back flexion and plantar (ROM)

Variables: Right, Left back	flexion and plantar		Pre-test Right back Flexion	Posttest Right back Flexion	Pre-test Left back Flexion	Posttest Left back Flexion	Pre-test Right Plantar Flexion	Posttest Right Plantar Flexion	Pre-test Left Plantar Flexion	Posttest Left Plantar Flexion
N			15	15	15	15	15	15	15	15
Normal Parameters[a,b]	Mean		14.07	22.87	12.87	18.20	59.33	74.33	71.67	78.33
	Std. Deviation		7.382	5.630	6.717	6.372	5.300	8.474	10.293	6.726
Asymp. Sig. (2-tailed)			.000[c]	.200[c,e]	.000[c]	.200[c,e]	.002[c]	.002[c]	.146[c]	.006[c]
Monte Carlo Sig. (2-tailed)	Sig.		.090[d]	.712[d]	.055[d]	.995[d]	.148[d]	.153[d]	.584[d]	.207[d]
	99% Confidence Interval	Lower Bound	.082	.700	.049	.993	.139	.143	.571	.197
		Upper Bound	.097	.724	.061	.996	.157	.162	.597	.218
Test of Homogeneity of Variances						**.059**				

To carry out the operation of knowing if there is a difference between the pre-test and the posttest it is necessary that the population is normal distribution and made homogeneity test, for this case with Kolmogorov-Smirnov Test, it seems that this

distribution is not so visible reason why we used Monte Carlo and therefore this distribution was verified. The following data showed the P value of each item: Pre-test Right back Flexion (0.090); Posttest Right back Flexion (0.712); Pre-test Left back Flexion (0.055); Posttest Left back Flexion (0.995); Pre-test Right Plantar Flexion (0.148); Posttest Right Plantar Flexion (0.153); Pre-test Left Plantar Flexion (0.584); Posttest Left Plantar Flexion (0.207). It can conclude that were normal distributed but the homogeneity test was carried out with P value superior to 0.05 ($P = 0.59 > 0.05$). Those values allow the research to continue to carry out the similarity and difference between the variables.

Table 14: Descriptive statistics of pre-test and posttest Ankle back flexion and plantar (ROM) by Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test Right back Flexion	14.07	15	7.382	1.906
	Posttest Right back Flexion	22.87	15	5.630	1.454
Pair 2	Pre-test Left back Flexion	12.87	15	6.717	1.734
	Posttest Left back Flexion	18.20	15	6.372	1.645
Pair 3	Pre-test Right Plantar Flexion	59.33	15	5.300	1.369
	Posttest Right Plantar Flexion	74.33	15	8.474	2.188
Pair 4	Pre-test Left Plantar Flexion	71.67	15	10.293	2.658
	Posttest Left Plantar Flexion	78.33	15	6.726	1.737

Table15: Comparison of pre-test and posttest Ankle back flexion and extension (ROM) by Paired Samples Test , 95% Confidence Interval difference

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-test - Posttest	-8.800	6.570	1.696	-12.439	-5.161	-5.187	14	.000
Pair 2	Pre-test - Posttest	-5.333	8.633	2.229	-10.114	-.553	-2.393	14	.031
Pair 3	Pre-test - Posttest	-15.000	6.876	1.775	-18.808	-11.192	-8.448	14	.000
Pair 4	Pre-test - Posttest	-6.667	8.165	2.108	-11.188	-2.145	-3.162	14	.007

a. Paired Samples Statistics Pre-test and Posttest right Ankle back flexion

The functionality from the above table are visual different, as they are respectively (14.07; 22.87). Their latest deviations are moreover different; the first (7.382) showed that the sufferers have not approximated equal level of persistent knee injury. The post-test general deviation is high (5.630) which tasted that the patients have a terrific adaptation according to the therapy given.

b. Paired Samples Test Pre-test and Posttest right Ankle back flexion

After giving the cure in the course of 5 weeks, it is very supportive to check the progress from the rubdown and exercise therapy. Before we start to figure out they have an impact on or attain we advised the following hypotheses:

1. There is no one-of-a-kind between pre-test and post-test right back flexion ankle (H0).

2. There is giant extraordinary between pre-test and post-test right back flexion ankle (H1). The populace used was ordinary disbursed as it has been confirmed at the beginning. Summary P value (0.000) from the end result was not superior to 0.05, which ability that the null hypothesis which said there is no particular earlier and after remedy was rejected and the ordinary assumption verified the existence of one-of-a-kind between the pre-test and post-test. It can be conclude that rubdown and exercise therapy are very useful in taking off the persistent ankle pain however they make contributions in growing the ankle extension flexibility.

c. Paired Samples Statistics Pre-test and Posttest left Ankle back flexion

The performance from the above desk are visual different, as they are respectively (12.87; 18.20). Their brand new deviations are moreover different; the first (6.717) confirmed that the sufferers have no longer approximated equal stage of chronic knee injury. The post-test common deviation is excessive (6.372) which tasted that the patients have a remarkable adaptation according to the remedy given

d. Paired Samples Test Pre-test and Posttest left Ankle back flexion

After giving the therapy in the route of 5 weeks, it is very supportive to check the progress from the rubdown and exercise therapy. Before we start to determine out if they have an affect on or achieve, we suggested the following hypotheses:

1. There is no one-of-a-kind between pre-test and post-test left back flexion ankle (H0).

2. There is massive exquisite between pre-test and post-test left back flexion ankle (H1). The populace used was once ordinary disbursed as it has been verified at the beginning. Summary P value (0.031) from the top result used to be not most fulfilling to 0.05, which potential that the null hypothesis which said there is no unique before and after treatment has been rejected and the normal assumption validated the existence of one-of-a-kind between the pre-test and post-test. It can be conclude that rubdown and exercising remedy are very beneficial in taking off the power ankle pain alternatively they make contributions in growing the ankle extension flexibility.

e. Paired Samples Statistics Pre-test and Posttest right plantar flexion (ROM)

The capability from the above desk are seen different, as they are respectively (59.33; 74.33). Their manufacturer new deviations are in addition different; the first (5.300) validated that the victims have approximated the different stage of power knee injury. The post-test

favored deviation is high also (8.474) which showed that the patients have a great adaptation in accordance to the remedy given.

f. Paired Samples Test Pre-test and Posttest right plantar flexion (ROM)

The remedy has been given in the route of 5 weeks; it is very supportive to check the progress from the rubdown and exercising therapy. Before we start to determine out if they have a have an effect on or achieve, we suggested the following hypotheses:

1. There is no one-of-a-kind between pre-test and post-test right plantar flexion ankle (H0).

2. There is large top notch between pre-test and post-test right plantar flexion ankle (H1). The populace used was as quickly as everyday disbursed as it has been validated at the beginning. Summary P charge (0.000) from the pinnacle give up result used to be now not most pleasurable to 0.05, which achievable that the null hypothesis which stated there is no special earlier than and after treatment has been rejected and the everyday assumption validated the existence of one-of-a-kind between the pre-test and post-test. It can be conclude that rubdown and exercising cure are very really helpful in taking off the energy ankle agony on the other hand they make contributions in creating the ankle extension flexibility

g. Paired Samples Statistics Pre-test and Posttest left plantar flexion (ROM)

The findings above are seen different, as they are respectively (71.67; 78.33). Their producer new deviations are in addition different; the first (10.293) validated that the victims have approximated the exclusive

stage of electricity knee injury. The post-test liked deviation is excessive additionally (6.726) which confirmed that the sufferers have an extremely good adaptation in accordance to the remedy given.

h. Paired Samples Test Pre-test and Posttest left plantar flexion (ROM)

The remedy was given in 5 weeks; it is very useful to check the progress of friction and exercise therapy. Before we begin to determine whether they have an effect or an effect, we have suggested the following hypotheses:

1. There is no single piece between the pre-test and post-test (H0) left plantar flexion ankle.

2. There is a large upper cut between the pre-test and post-test left plantar flexion ankle (H1). The population used was disbursed as quickly as every day because it was validated at the start. Finally load P (0.007) of the pinnacle abandons the result which was no longer the most pleasant at 0.05, which allows that the null hypothesis which declared that there is no special before and after the treatment was rejected and the daily hypothesis validated the existence of one of a kind between the pre-test and the post-test. We can conclude that the friction and the exercise of cure are very useful to eliminate the energy agony of the ankle; on the other hand, they contribute to create the flexibility of left of the ankle.

Table16: Normality and homogeneity variances test of pre-test and posttest Ankle inversion and eversion (ROM)

pre-test and posttest Ankle inversion and eversion			Pre-test Right Inversion	Posttest Right Inversion	Pre-test Left Inversion	Posttest Left Inversion	Pre-test Right Eversion	Posttest Right Eversion	Pre-test Left Eversion	Posttest Left Eversion
N			14	14	14	14	14	14	14	14
Normal Parameters[a,b]	Mean		35.43	60.36	36.14	60.14	30.14	52.21	28.71	50.14
	Std. Deviation		18.484	21.252	13.381	19.082	12.184	13.045	12.916	17.373
Asymp. Sig. (2-tailed)			.200[c,d]	.012[c]	.200[c,d]	.001[c]	.067[c]	.200[c,d]	.021[c]	.079[c]
Monte Carlo Sig. (2-tailed)	Sig.		.898[e]	.266[e]	.712[e]	.101[e]	.453[e]	.854[e]	.313[e]	.477[e]
	99% Confidence Interval	Lower Bound	.891	.254	.701	.093	.441	.845	.301	.464
		Upper Bound	.906	.277	.724	.109	.466	.863	.325	.490
Test of Homogeneity of Variances								**.668**		

Normal distribution and homogeneity are used in a number of distributions in statistics, and speculation testing assumes the normality and homogeneity of data. The everyday distribution and homogeneity are one of the chance distributions that essential in statistical analysis. This distribution has parameters in the structure of mean and standard deviation. From the facts above it can conclude that the population was once normal dispensed with p value most desirable than 0.05 (Asymp. Sig. (2-tailed) are respectively the following corresponding to the items above in the table 16: 0.898, 0.266, 0.712, 0.101, 0.453, 0.854, 0.313, 0 .477. The facts are also homogeny with P value fore most to 0.05 (P = 0.668 > 0, 05).

Table 17: Descriptive statistics of pre-test and posttest Ankle back flexion and plantar (ROM) by Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test Right Inversion	35.43	14	18.484	4.940
	Posttest Right Inversion	60.36	14	21.252	5.680
Pair 2	Pre-test Left Inversion	36.14	14	13.381	3.576
	Posttest Left Inversion	60.14	14	19.082	5.100
Pair 3	Pre-test Right Eversion	30.14	14	12.184	3.256
	Posttest Right Eversion	52.21	14	13.045	3.487
Pair 4	Pre-test Left Eversion	28.71	14	12.916	3.452
	Posttest Left Eversion	50.14	14	17.373	4.643

Table 18: Comparison of pre-test and posttest Ankle inversion and eversion (ROM) by Paired Samples Test, 95% Confidence Interval difference

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-test - Posttest	-24.929	16.550	4.423	-34.485	-15.373	-5.636	13	.000
Pair 2	Pre-test - Posttest	-24.000	19.663	5.255	-35.353	-12.647	-4.567	13	.001
Pair 3	Pre-test - Posttest	-22.071	16.170	4.322	-31.407	-12.735	-5.107	13	.000
Pair 4	Pre-test - Posttest	-21.429	18.924	5.058	-32.355	-10.502	-4.237	13	.001

a. Paired Samples Statistics Pre-test and Posttest right inversion flexion (ROM)

The above result tasted different, as they are consecutively presented (35.43; 60.36), their producer new deviations are in addition different; the first (18.484) validated that the victims have exclusive different level stage of ankle injury. The post-test

Liked deviation (21.252) is excessive very high which confirmed that the sufferers have an extremely good adaptation in accordance to the remedy given.

b. **Paired Samples Test Pre-test and Posttest right inversion flexion (ROM)**

The treatment was administered in 5 weeks; it is very beneficial to test friction growth and exercise therapy. Before starting to decide whether or not they have an impact or an effect, we proposed the following hypotheses:

1. There is no single piece between the pre-test and post-test (H0) straight reversal bending pin.

2. There is a greater reduction between the right pre-test and post-test inversion flexion ankle (H1). The population used was once disbursed as quickly as every day because it was validated at the start. Finally the load P (0.000) of the pinnacle abandons the final result which was no longer the highest quality at 0.05, which allows to reject the null speculation which declared that there is no difference before and after the remedy and everyday speculation validated the existence of a form between the pre-test and the post-test. We can conclude that friction and hardening exercises are very beneficial in dissipating ankle pain; on the other hand, they help create the right flexibility of the ankle

c. Paired Samples Statistics Pre-test and Posttest left inversion flexion (ROM)

The above result tasted different, as they are consecutively (36.14; 60.14), their producer new deviations are in addition different; the first (13.381) validated that the victims have special distinctive degree stage of ankle injury. The post-test liked deviation (19.082) is immoderate very high which proven that the victims have an extraordinarily properly adaptation according to the given treatment.

d. Paired Samples Test Pre-test and Posttest left inversion flexion (ROM)

The remedy was given in 5 weeks; it is very useful to check the progress of friction and exercise therapy. Before we begin to determine whether they have an effect or an effect, we have suggested the following hypotheses:

1. There is no single piece between the pre-test and post-test (H0) right plantar flexion ankle.

2. There is a large upper cut between the pre-test and post-test right plantar flexion ankle (H1). The population used was disbursed as quickly as every day because it was validated at the start. Summary The load P (0.000) of the pinnacle abandons the result which was no longer the most pleasant at 0.05, which allows that the null hypothesis which declared that there is no special before and after the treatment was rejected and the daily hypothesis validated the existence of one of a kind between the pre-test and the post-test. We can conclude that the friction and the exercise of cure are very

useful to eliminate the energy agony of the ankle; on the other hand, they contribute to create the flexibility of inversion of the ankle

e. Paired Samples Statistics Pre-test and Posttest right ankle eversion (ROM)

The result tasted that there was different, as they are consecutively (30.14; 52.21), The SD are strongly different; the first (13.045) validated that the victims have special distinctive degree stage of ankle injury. The post-test liked deviation (12.916) is immoderate very high which proven that the victims have an extraordinarily properly adaptation according to the given treatment

f. Paired Samples Test Pre-test and Posttest right eversion flexion (ROM)

The remedy was given in 5 weeks; it is very useful to check the progress of friction and exercise therapy. Before we begin to determine whether they have an effect or an effect, we have suggested the following hypotheses:

1. There is no single piece between the pre-test and post-test (H0) right ankle eversion

2. There is a large upper cut between the pre-test and post-test right ankle eversion (H1). The population used was disbursed as quickly as every day because it was validated at the start. Summary The load P (0.001) of the pinnacle abandons the result which was no longer the most pleasant at 0.05, which allows that the null hypothesis which declared that there is no special before and after the treatment was rejected and the daily hypothesis

validated the existence of one of a kind between the pre-test and the post-test. We can conclude that the friction and the exercise of cure are very useful to eliminate the energy agony of the ankle; on the other hand, they contribute to create the flexibility of eversion of the ankle

g. Paired Samples Statistics Pre-test and Posttest left eversion flexion (ROM)

The findings above are viewed different, as they are respectively (28.71; 50.14). Their producer new deviations are in addition different; the first (12.916) validated that the victims have approximated the unique stage of electrical energy knee injury. The post-test preferred deviation is immoderate additionally (17.373) which proven that the sufferers have an extraordinarily desirable adaptation in accordance to the remedy given.

h. Paired Samples Test Pre-test and Posttest left eversion ankle (ROM)

The treatment was administered in 5 weeks; it is very important to examine the development of friction and exercise therapy. Before we begin to determine if they have an effect, we have suggested the following comments:

1. There is not a single point between the pre-test and the post-test (H0)

2. There is a big gap between the pre-test and the right foot test (H1). The number of people served was distributed as quickly as daily as it was first verified. The summary of the tower load P (0.001) leaves a result which was not statistically significant at 0.05, which allows a broader hypothesis which declared no specific rejection before and after treatment and the daily theory confirmed the presence of one of the types in the pre-test. And

Post-test. We can conclude that friction and therapeutic use are very important in relieving the agony of spastic energy; on the other hand they contribute to the flexibility of bending the ankle.

4. Finds Hips Range of Motion

Table 19: Normality and homogeneity variances test of pre-test and posttest hips flexion and extension (ROM)

		Pre-test right leg hip flexion	Posttest right leg hip flexion	Pre-test left hip flexion	Posttest left hip flexion	Pre-test right hip extension	Posttest right hip extension	Pre-test left hip extension	Posttest left hip extension
N		12	12	12	12	12	12	12	12
Normal Parameters[a,b]	Mean	108.92	132.33	103.75	120.08	26.92	31.67	28.42	33.92
	Std. Deviation	8.404	7.127	7.533	9.765	8.969	8.742	11.996	11.301
Most Extreme Differences	Absolute	.190	.212	.226	.182	.116	.151	.125	.136
	Positive	.190	.212	.137	.182	.116	.151	.125	.136
	Negative	-.144	-.205	-.226	-.178	-.087	-.091	-.109	-.109
Test Statistic		.190	.212	.226	.182	.116	.151	.125	.136
Asymp. Sig. (2-tailed)		.200[c,d]	.144[c]	.092[c]	.200[c,d]	.200[c,d]	.200[c,d]	.200[c,d]	.200[c,d]
Test of Homogeneity of Variances							.581		

Table 20. Descriptive statistics of pre-test and posttest Ankle back flexion and plantar (ROM) by Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test right leg hip flexion	108.92	12	8.404	2.426
	Posttest right leg hip flexion	132.33	12	7.127	2.057
Pair 2	Pre-test left hip flexion	103.75	12	7.533	2.175
	Posttest left hip flexion	120.08	12	9.765	2.819
Pair 3	Pre-test right hip extension	26.92	12	8.969	2.589
	Posttest right hip extension	31.67	12	8.742	2.524
Pair 4	Pre-test left hip extension	28.42	12	11.996	3.463
	Posttest left hip extension	33.92	12	11.301	3.262

Table 21. Comparison of pre-test and posttest Ankle inversion and eversion (ROM) by Paired Samples Test, 95% Confidence Interval difference

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-Test - Posttest	-23.417	10.335	2.983	-29.983	-16.850	-7.849	11	.000
Pair 2	Pre-Test - Posttest	-16.333	8.784	2.536	-21.914	-10.753	-6.442	11	.000
Pair 3	Pre-Test - Posttest	-4.750	3.108	.897	-6.725	-2.775	-5.294	11	.000
Pair 4	Pre-Test - Posttest	-5.500	1.446	.417	-6.419	-4.581	-13.176	11	.000

a. Paired Samples Statistics Pre-test and Posttest right leg hip flexion (ROM)

The findings above are viewed different, as they are respectively (108.92; 132.33). Their producer new deviations are in addition different; the first (8.404) validated that the victims have approximated the unique stage of electrical energy knee injury. The post-test preferred deviation is immoderate additionally (7.127) which proven that the sufferers have an extraordinarily desirable adaptation in accordance to the remedy given.

b. Paired Samples Test Pre-test and Posttest right leg hip flexion (ROM)

To evaluate the effectiveness of rub down and therapy we utilized the mean evaluation to assess if there is any similarity or different. The assumption was once primarily based on the following hypothesis:

1. There is no unique between pre-test and posttest right flexion (H0)

2. There is large specific between pre-test and posttest right flexion (H1)

After five weeks of remedy assessment check has been done and showed that P (0.000) fee is inferior than 0.05, it can be concluded that the first hypothesis is rejected and accepted the alternative speculation “there is giant one-of-a-kind between pre-test and posttest right flexion

c. Paired Samples Statistics Pre-test and Posttest left hip flexion (ROM)

The findings above are viewed different, as they are respectively (103.75; 120.08). Their producer new deviations are in addition different; the first (7.533) validated that the victims have approximated the special stage of electrical strength knee injury. The post-test desired deviation is

excessive moreover (9.765) which tested that the sufferers have a noticeably appropriate adaptation in accordance to the treatment given.

d. Paired Samples Pre-test and Posttest left hip flexion (ROM)

To consider the effectiveness of rub down and therapy we utilized the imply comparison to verify if there is any similarity or different. The assumption was once as soon as especially based totally on the following hypothesis:

1. There is no unique between pre-test and posttest left flexion (H0)

2. There is large unique between pre-test and posttest proper left flexion (H1)

After 5 weeks of treatment evaluation take a look at has been accomplished and confirmed that P (0.000) price is inferior than 0.05, it can be concluded that the first hypothesis is rejected and conventional the choice speculation “there is giant one-of-a-kind between pre-test and posttest right flexion

e. Paired Samples Statistics Pre-test and Posttest right hip extension (ROM)

The findings above are viewed different, as they are respectively (26.92; 31.67). Their producer new deviations are in addition different; the first (8.969) validated that the victims have approximated the unique stage of electrical energy knee injury. The post-test preferred deviation is immoderate additionally (8.742) which proven that the sufferers have an extraordinarily desirable adaptation in accordance to the remedy given.

f. Paired Samples Pre-test and Posttest right hip extension (ROM)

To consider the effectiveness of rub down and remedy we utilized the mean evaluation to verify if there is any similarity or different. The assumption was once chiefly primarily based on the following hypothesis:

1. There is no special between pre-test and posttest proper flexion (H0)

2. There is large unique between pre-test and posttest proper flexion (H1)

After 5 weeks of remedy assessment test has been achieved and showed that P (0.000) rate is inferior than 0.05, it can be concluded that the first speculation is rejected and general the choice hypothesis “there is large one-of-a-kind between pre-test and posttest proper flexion

g. Paired Samples Statistics Pre-test and Posttest left hip extension (ROM)

The findings above are viewed different, as they are respectively (28.42; 33.92). Their producer new deviations are in addition different; the first (11.996) validated that the victims have approximated the unique stage of electrical energy knee injury. The post-test preferred deviation is immoderate additionally (11.301) which proven that the sufferers have an extraordinarily desirable adaptation in accordance to the remedy given.

h. Paired Samples Pre-test and Posttest left hip extension (ROM)

To think about the effectiveness of rub down and treatment we utilized the mean evaluation to confirm if there is any similarity or different. The assumption used to be once chiefly especially based on the following hypothesis:

1. There is no distinctive between pre-test and posttest ideal flexion (H0)

2. There is massive unique between pre-test and posttest suitable extension (H1)

After 5 weeks of treatment evaluation check has been achieved and confirmed that P (0.000) price is inferior than 0.05, it can be concluded that the first speculation is rejected and usual the desire hypothesis “there is large one-of-a-kind between pre-test and posttest applicable extension

Table 22 Evaluation of Massage and Therapeutics Exercise Program.

Paired sample/Correlation	Correlation
Massage&function	.516
Massage& Physical&Mental	.389
Exercise Therapy& Flexibility	.516
Pearson Correlation	.671*
Exercise Therapy&Pain	1.000**
Exercise Therapy& Strengthen	.418
Exercise Therapy& Social	.671*
Exercise Therapy& Physical&Mental	

After the posttest the researcher conducted a survey to know how massage and therapeutic exercise are benefic on the patients. The result carried out was: (1) there was a strong correlation between massage and human function with r = 0.516. In another hand it means that massage therapy can restore the functions of human like to improve motor skills. Massage therapy was found as a strong tool to improve wellbeing, it increases the physical and mental (r = 0.389). Flexibility of joint and

muscle were influenced by therapeutic exercise with r = 0.516. The last correlation showed that coach trainer and athletes could use the last proposed model to reach performance. The muscle pain is a strong obstacle which blocks the performance but with therapeutic exercise the pain can be take off. The study showed a positive correlation r = 0.671. For everybody needs force (N/Kg) to move, because no force no movement. People who are suffering from chronic injuries have a really problem of movement caused by the lack of strength. At the end of this study it was found that therapeutic exercise increasing strengthen with r = 1.000. This correlation is total which showed that therapeutic exercise is very benefic on the improving the physical fitness. Therapeutic exercise has many benefits to the patients, it helped people meet each other, and they were very motivated in doing exercise. Next it increased the physical and mental or human wellbeing with r = 0.671. Massage and therapeutic exercise are strong tools to improve physical fitness of human, they allow athlete to increase performance, not only athlete who receives advantages from them but also everyone could improve his own tasks if his body still fit.

C. Discussion

This research focussed on the treatment of chronic hips, knee, and ankle injuries for athletes and no athletes. Nevertheless, the finds or the product from this study will be applied for everyone who would have on of the last Problems or both of them. The researcher made the following discussion:

The population surveyed has different cases of injuries located on hips, knee, and ankle. The injuries were chronic in other word more than six weeks old. Combined massage (classic massage, soft tissue, and deep tissue massage) was applied. To afford this is statement; the explanation is based on the main hypotheses.

1. Does massage contribute for healing chronic hips, knee and ankle injuries from different case?

Most of the subjects have low back pain; it was very difficult to apply some movements like: right flexion, left flexion, flexion-extension of the hips. The treatment was firstly effleurage to allow the blood flow. Massage can grant a number of benefits to the body. These consist of accelerated blood flow, reduced muscle pressure (Gasibat & Suwehli, 2017). Secondly Petrissage (kneading, rolling, and lifting), kneading)

Technique was used to relaxing the muscle tension. Petrissage is assumed to impact circulation as nicely as interstitial drainage of each superficial and deep tissue(Mine, Lei, & Nakayama, 2018). The Tapotement (percussion rhythmic tapping) technique was applied and it procured the wellbeing and relieved the muscle pain. Myofascial pain

syndrome was treated with Friction (with fibres or cross-fibres wringing or small circular movements), while Vibration / Shaking rocking and shaking movements.

The balance of the knee joint is maintained via four ligaments, thick bands of tissue that stabilize the joint. The medial collateral ligament (MCL) and lateral collateral ligament (LCL) are on the facets of the knee and prevent the joint from sliding sideways. The anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) shape an "X" on the internal of the knee and prevent the knee from sliding returned and forth. These boundaries on knee motion enable the knee to listen the forces of the muscular tissues on flexion and extension. Trigger point massage and soft tissue massage were applied to take off the knee chronic injuries. During five weeks of treatment the result showed that there was a significant different according to the Range of Motion of the hips, knee but also the ankle ROM has increased. The P value of the following movements(right flexion hips, left flexion hips, right extension hips, left extension hip, right and left knee flexion; right and left knee extension; right and left back flexion ankle; right and left plantar ankle; right and left back inversion ankle; right and left eversion ankle) was inferior to 0.05. The last P value meant that there was a significant different. Massage was very benefit in healing chronic hip, knee, and ankle. Many researches have been done to show how massage is effective to the treatment of injuries. Swedish massage regimen was used to relieve Osteoarthritis of the Knee (OA)

during 8 weeks (Perlman et al., 2012). For the combined massage in five weeks the pain was almost fixed. The research done showed that manipulation of body tissues with rhythmical pressure and stroking for the purpose of advertising health and well-being (Standley, Miller, Binkley, & Cscs, 2010). Massage is defined as systematic manual manipulation of the body via movements such as rubbing, kneading, pressing, roll, slap and tap for therapeutic purposes. These actions promote blood and lymphatic circulation, muscle relaxation, pain relief, restoration of metabolic balance and various physical and mental benefits (P, S, & K, 2017). In conclusion the hypothesis which was structured that "Does massage contribute for healing chronic hips, knee and ankle injuries from different case?" was verified. Combined massage is a strong tool to treat or healing chronic hips, knee, and ankle injuries

2. Does exercise therapy allow chronic hips, knee and ankle healing?

After massage the patients flowed the therapeutic exercise, because of the longue time of the injuries, some human parts are not totally used, at the end the muscles fibres lost their capacity. To reach the second hypothesis the researcher applied a pre-test to know before the weakness of muscles and joints. Firstly a group of exercise like: (1) Knee life, (2) Hips and lower back stretch, (3) Double hips rotation, (4) Bridging, (5) External hips rotation, (6) Chair stand, (7) Hips abduction, (8) Hips flexion. Those exercises have been used to increase flexibility and strength muscle of the hips. The treatment has been done three times per

week during five weeks. The moderate intensity was used; the time used was six minutes (6 min) for the hips, for whom has both of injuries (hips, knee, and ankle), after the first session a rest of one minute (1 min) has been taken before applying the knee and ankle treatment during seven minutes each other, but a rest of one minute must be respected between the sessions.

The whole time of treatment was 20 minutes. In the research done by Sangam showed that Stretching of hamstring and strengthening of quadriceps muscle can enhance the pain and energy of the muscle mass (Sangam et al., 2015). Hip injuries was associated with age, life activities, but a therapeutic exercise of myofascial muscle could decrease pain (Palazzo, Nguyen, Lefevre-Colau, Rannou, & Poiraudeau, 2016). In the study done by Gay showed that Highlight the position of patient schooling about bodily exercise and exercise in the treatment of hip and knee osteoarthritis (OA). Methods: Systematic literature overview from the Cochrane Library, PubMed and Wiley Online Library databases. A whole of one hundred twenty five objects have been identified, together with eleven guidelines from discovered societies interested in OA and 45 randomized managed trials addressing treatment training and activity/ exercise for the remedy of hip and knee osteoarthritis (Gay, Chabaud, Guilley, & Coudeyre, 2016).

In this research the proposed exercises are very benefit because they increased the hip, knee flexion and strength at the same time.

Secondly a game of exercise like: (1) Hamstring stretch, (2) Straight leg raise, (3) Quad set, (4) Pillow Squeeze, (5) Prone Straight leg raises, (6) Side leg raise, (7) One leg balance, (8) Wall Squats. The different exercises used were respected during five weeks, three times per week. The time was seven minutes. It was found that those exercises were very easy and helpful in increasing strength and knee flexibility. The study by Page showed that Human movement is dependent on the amount of range of motion (ROM) reachable in synovial joints. In general, ROM might also be confined by means of 2 anatomical entities: joints and muscles. Joint restraints include joint geometry and congruency as well as the capsule ligamentous structures that encompass the joint(Page, 2012). Next a group of exercise like: (1) Ankle alphabet (2) Towel tissue scrunches, (3) Heel raise, (4) Heel-to-buttock exercise, (5) Elastic band pull, (6) Calf Stretch, (7) One-leg balance, the previous exercises were applied on ankle injuries. It was found that there was an increasing of strength and ankle flexibility. Analyze of the pre-test and posttest data from the hips, knee, and ankle showed that the was a significant different between them before and after the treatment. In other word therapeutic exercise was very benefit on healing chronic hip, knee, and ankle injuries. Sprain and strain can be relieved by soft tissue massage but we need to complete the recovering with strength exercise (Tyler, Fukunaga, & Gellert, 2014). At the end the posttest of strength and have been done and the outcomes showed that there was an improving of them

comparing to the pre-test data. In conclusion based on the result and the relevant studies the second hypothesis which was entitled ‘‘Does exercise therapy allow chronic hips, knee and ankle healing?’’ was total confirmed.

3. Do massage and exercise therapies improve and develop strength and flexibility for low limbs?

Massage therapy was found as a basic of the treatment because its benefits to the patients like: (1) Reducing or removing pain, (2) Reducing muscular tension (3) Improving joint mobility, (4) Improving lymphatic drainage. Massage remedy can be used for the therapy of both acute and chronic conditions. Therapeutic exercise improved inefficient muscles and regain regular joint motion besides slowing down the effort to reap a functioning and efficient movement. Advancing the capability of present patients to be able to carry out actions that characteristic and aim, so that they can return to ordinary activities. The combination of therapeutic massage and exercise therapy is a very efficient new approach to managing chronic hip, knee and ankle pain / injury for sportsmen, athletes and non-athletes as well as people.

The combination method of massage therapy and exercise therapy is very easy to apply in the field as a guide to help patients with chronic hip, knee and ankle pain. The combination of massage and exercise therapy can (1) restore pain / chronic injury, (2) launch blood bleeding, (3), increase muscle and ligament strength, (4) increase joint flexibility.

With a combination of therapeutic massage and therapeutic exercises the patient lives healthy and fit. Based on the result from first hypothesis and the second hypothesis the conclusion deduced that the third hypothesis was totally confirmed.

D. Research Limitation

The purpose of this research was to treat musculoskeletal problems related to the hips, knees, and ankles which are in a chronic or critical condition. The treatment was based on the combination of three types of massage with therapeutic exercises lasting 20 minutes three times a week for five weeks.

The limits of this research: the researcher did not manage to treat the area of the upper body in other terms musculoskeletal problems of the lower limbs. The means at the disposal of the researchers do not allow us to highlight a few factors such as controlling the patients all the period of treatment in terms of daily activities, nutrition, the environment or the latter may influence the results.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

A. Conclusion

This chapter presents the summary of the research findings, implication, and some of recommendations that were made in order to better implement the effectiveness of massage and exercise therapy on healing chronic hips, knee, and ankle injuries. Before putting down a summary concerning this work, the researcher first wants to remind you of the main titles of this project. At the very beginning, the philosophy of this research stems from ontology, therefore a problem which was raised: (1) In Klaten place human beings (youth, men, women and old) have emerge as victims from persistent hips, knee and ankle injury. (2) Most of human beings can't stroll extra than 30 minutes. (3) Service absence was once substantially enough raised due to the fact of the extreme of hips, knee and ankle musculoskeletal disorders. (4) Degenerative disease, posture taken during the work and some kinds of sports are the reason of persistent hips, knee and ankle harm of Klaten people. (5)The body status of identical of them approves the look of hips, knee and ankle accidents (Obesity). (6) The getting old used to be the cause of persistent hips, knee and ankle accidents for some of Klaten people.

The research hypotheses were the following: (2) Does massage contribute for healing chronic hips, knee and ankle injuries from different case? (2) Does exercise therapy allow chronic hips, knee and ankle healing?

(3) Do massage and exercise therapies improve and develop strength and flexibility for low limbs? These hypotheses were verified on epistemological bases therefore by scientific means we came to know the causes of musculoskeletal problems and on the other hand we proposed a new method to remedy muscular disorder. A new approach to treatment was formed by three types of massage and therapeutic exercises to quickly treat muscle and joint pathologies. This new method as it represented in chapter three was applied for five weeks three times a week. Moderate intensity is used with a 20-minute session which was divided into three stages: six minutes for the treatment of the hips, seven minutes for the recovery of the knee, and seven minutes for the treatment of the ankle.

This research had five variables: two independent variables and three dependent variables, on the side of the variables on massage and therapeutic exercises as independent variables. Joint flexibility, lower limb strength, and pain level of musculoskeletal disorder. After the five-week treatment the results were as follows: A very significant improvement in mobility or flexion of the hips, knee, and ankle was found between the pre-test and post-test data. A very huge reduction in pain from the parts listed above. An increase in the strength of the lower limbs was noted. The benefits of massage and therapeutic exercises are many, among others, some subjects had gout, excess stomach acid, very high blood sugar, highest blood pressure and cholesterol, all these challenges are attenuated or reduced, generally speaking, and they renormalized themselves. This new

approach: massage and therapeutic exercise was found to be very reliable and affordable. This method will be very effective in fixing the musculoskeletal problems of athletes and non-athletes.

B. Implication

This lookup is very beneficial for demonstrating a new multidiscipline approach to treating, decreasing joint injuries. Degenerative injuries and accidents that frequently appear at some point of sports activities such as: athletic, basketball, soccer, handball, volleyball, and rugby ... etc. The suitable fitness is the foundation of development in each and every field like: sportive area, public and private provider we can't except the development when human dwelling the bad fitness. Massage reduces muscle tension, contributes to shaping the shape, brings a better state of health and helps to fight against many serious diseases. The benefits of massage can be classified on several levels: physical benefits and psychological benefits. helps take care of the body. The different techniques applied help to provide a better silhouette and perfect curves. It also acts on the skin and helps to treat skin imperfections.

The main benefits of massage on the body are:The reduction of pain in the neck, back, head, feet and sciatic nerve, the relief of lower back pain, reduction of tension and relaxation of muscles, the evacuation of toxins and fats that cause cellulite. A toned body. A softening of the skin. A millennial therapeutic medium, massage has exceptional virtues and brings indisputable benefits to the body. So, massage: Promotes sleep, acts on

constipation by improving digestion, allows better blood and lymphatic circulation, helps prevent disease, chases away fatigue, improves energy circulation, contributes to the treatment of serious diseases such as cancer, helps to better treat asthma, facilitates childbirth.

By acting on the body, massage has positive effects on the mind, attention and awareness of emotions. It brings new energy to the patient by: giving him total well-being.The relaxant. Bringing relaxation and good humor. Helping him to fight against stress, anxiety and depression.The combined effects of different types and techniques of massage offer a more than satisfactory result. However, one must know how to choose the type of massage in harmony with the needs of the body.

C. Recommendations

Before closing this work the researcher wants to suggest some recommendations. It is recommended that all coaches and athletes apply this new method to fix musculoskeletal problems. it is suggested that all the competent authorities can promote and develop massage practices in view of its benefits for the health of athletes and non-athletes. The researchers who will be interested in continuing studies on massage and therapeutic exercise to do another combination of massage or exercises, then the study was based on the combination of three types of massage (classic massage, soft tissue, and deep tissue massage) and types of exercises that were proposed in the third chapter. For future work it is suggested that it would be better to highlight the following factors: age, food, environment, profession and in the

end to control the subjects well. Massage is one of the best ways we can relax, unwind and release all of our physical and mental tensions. Massage is a millennial discipline that has developed over time. Indeed, each type of massage brings particular benefits, some are more energetic and others more relaxing. Their difference lies in the techniques and parts of the body that are used and the position in which you must stand (sitting or lying, dressed or stripped).

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APPENDIX

KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telp. Direktur (0274) 550835, Asdir/TU (0274) 550836 Fax. (0274)520326
Laman: pps.uny.ac.id Email: pps@uny.ac.id, humas_pps@uny.ac.id

Nomor : 6140 /UN34.17/LT/2019 21 Mei 2019
Hal : Izin Penelitian

Yth. Pak Suhono
Bayat, Klaten, Jawa Tengah

Bersama ini kami mohon dengan hormat, kiranya Bapak/Ibu/Saudara berkenan memberikan izin kepada mahasiswa jenjang S-2 Program Pascasarjana Universitas Negeri Yogyakarta:

Nama	: NDAYISENGA JAPHET
NIM	: 18711259001
Program Studi	: Ilmu Keolahragaan
Konsentrasi	: Kesehatan Olahraga

untuk melaksanakan kegiatan penelitian dalam rangka penulisan tesis yang dilaksanakan pada:

Waktu	: Juni s.d Agustus 2019
Lokasi/Objek	: Bayat, Klaten
Judul Penelitian	: Effectiveness of Massage and Exercise Therapy in Healing Chronic Knee and Ankle Injuries
Pembimbing	: Dr. dr. BM. Wara Kushartanti, M.S.

Demikian atas perhatian, bantuan dan izin yang diberikan, kami ucapkan terima kasih

Wakil Direktur I,

Dr. Sugito, MA.
NIP 19600410 198503 1 002

Tembusan:
Mahasiswa Ybs.

KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 550835, 550836 Fax. (0274) 520326
Laman: pps.uny.ac.id, Email: pps@uny.ac.id, humas_pps@uny.ac.id

Nomor : 6502 /UN34.17/TU/2019 10 Juni 2019
Hal : Permohonan Peminjaman Alat

Yth. Dekan Fakultas Ilmu Keolahragaan
Universitas Negeri Yogyakarta

Bersama ini kami mohon dengan hormat, Bapak berkenan memberikan izin kepada mahasiswa Program S-2 Program Pascasarjana Universitas Negeri Yogyakarta:

Nama	: Ndayisenga Japhet
NIM	: 18711259001
Program Studi	: Ilmu Keolahragaan
Konsentrasi	: Kesehatan Olahraga

untuk meminjam alat di Fakultas Ilmu Keolahragaan Universitas Negeri Yogyakarta dalam rangka penelitian tesis:

Judul Tesis	: *Effectiveness of Massage and Exercice Therapy in hèaling Chronic Knee and Ankle Injuries*
Dosen Pembimbing	: Dr. dr. BM. Wara Kushartanti, M.S.

Adapun alat yang akan dipinjam untuk penelitian tersebut adalah:

a. 1 buah Dynamometer
b. 1 buah Goniometer
c. 1 buah Meteran
d. 1 buah Timbangan

Alat tersebut akan digunakan dalam rangka penelitian tesis pada:

a. Waktu Penelitian : 1. Periode I pada bulan Juni 2019 (*Pre-Test*)
2. Periode II pada bulan Agustus 2019 (*Post-Test*)
b. Tempat Penelitian : Klaten, Jawa Tengah

Alat yang dipinjam untuk penelitian ini menjadi tanggungjawab mahasiswa yang bersangkutan.

Demikian atas perhatian, bantuan dan izin yang diberikan kami ucapkan terima kasih.

Direktur

Prof. Dr. Marsigit, M.A.
NIP 19570719 198303 1 004

Tembusan:
1. Kasubag TU PPs
2. Mahasiswa ybs.

KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 550835, 550836, Fax (0274) 520326
Laman: pps.uny.ac.id E-mail: pps@uny.ac.id, humas_pps@uny.ac.id

Nomor : 10202 /UN34.17/LT/2019 30 Agustus 2019
Hal : Izin Validasi

Yth. Bapak/Ibu dr. Novita Intan Arovah MPH., Ph.D.
Dosen Universitas Negeri Yogyakarta

Kami mohon dengan hormat, Bapak/Ibu bersedia menjadi validator program latihan bagi mahasiswa:

Nama	: Japhet Ndayisenga
NIM	: 18711259001
Prodi	: Ilmu Keolahragaan
Pembimbing	: Dr. dr. BM. Wara Kushartanti M.S.
Judul	: *Effectiveness Of Massage and Exercise Therapy on Healing Chronic Hips, Knee and Ankle Injuries*

Kami sangat mengharapkan Bapak/Ibu dapat mengembalikan hasil validasi paling lama 2 (dua) minggu. Atas kerjasama yang baik dari Bapak/Ibu kami sampaikan terima kasih.

Wakil Direktur I,

Dr. Sugito, M.A.
NIP 19600410 198503 1 002

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UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 550835, 550836, Fax (0274) 520326
Laman: pps.uny.ac.id E-mail: pps@uny.ac.id, humas_pps@uny.ac.id

Nomor : 10207 /UN34.17/LT/2019 30 Agustus 2019
Hal : Izin Validasi

Yth. Bapak/Ibu Prof. Dr. Siswantoyo S.Pd.,M.Kes.
Dosen Universitas Negeri Yogyakarta

Kami mohon dengan hormat, Bapak/Ibu bersedia menjadi validator instrumen penelitian bagi mahasiswa:

Nama	: Japhet Ndayisenga
NIM	: 18711259001
Prodi	: Ilmu Keolahragaan
Promotor	: Dr. dr. BM. Wara Kushartanti M.S.
Judul	: *Effectiveness Of Massage and Exercise Therapy on Healing Chronic Hips, Knee and Ankle Injuries*

Kami sangat mengharapkan Bapak/Ibu dapat mengembalikan hasil validasi paling lama 2 (dua) minggu. Atas kerjasama yang baik dari Bapak/Ibu kami sampaikan terima kasih.

Wakil Direktur I,

Dr. Sugito, M.A.
NIP 19600410 198503 1 002

KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 550835, 550836, Fax (0274) 520326
Laman: pps.uny.ac.id E-mail: pps@uny.ac.id, humas_pps@uny.ac.id

SURAT KETERANGAN VALIDASI

Yang bertanda tangan di bawah ini:

Nama : dr. Novita Intan Arovah, MPH, PhD
Jabatan/Pekerjaan : dosen Jurusan Pendidikan Kesehatan dan Rekreasi
Instansi Asal : FIK UNY

Menyatakan bahwa instrumen penelitian dengan judul:

Effectiveness Of Massage and Exercise Therapy on Healing Chronic Hips, Knee and Ankle Injuries

dari mahasiswa:

Nama : Japhet Ndayisenga
Program Studi : Ilmu Keolahragaan
NIM : 18711259001

(sudah siap/~~belum siap~~)* dipergunakan untuk penelitian dengan menambahkan beberapa saran sebagai berikut:

1. Perlu disusun kerangka berpikir yang menjelaskan peran teknik masase dan exercise therapy dapat memperbaiki ROM dan mengurangi nyeri.
2. .....

Demikian surat keterangan ini kami buat untuk dapat dipergunakan sebagaimana mestinya.

Yogyakarta, 14- November 2019

Validator,

Arovah.

dr. Novita Intan Arovah, MPH, PhD

*) coret yang tidak perlu

KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 550835, 550836, Fax (0274) 520326
Laman: pps.uny.ac.id E-mail: pps@uny.ac.id, humas_pps@uny.ac.id

SURAT KETERANGAN VALIDASI

Yang bertanda tangan di bawah ini:

Nama : Prof. Dr. Siswantoyo, SPd., Kes., AIFO
Jabatan/Pekerjaan : Dosen Ilmu Keolahragaan
Instansi Asal : FIK UNY

Menyatakan bahwa instrumen penelitian dengan judul:

Effectiveness Of Massage and Exercise Therapy on Healing Chronic Hips, Knee and Ankle Injuries

dari mahasiswa:

Nama : Japhet Ndayisenga
Program Studi : Ilmu Keolahragaan
NIM : 18711259001

(sudah siap/belum siap)* dipergunakan untuk penelitian dengan menambahkan beberapa saran sebagai berikut:

1. alat ukur timbangan BB perlu di kalibrasi / tera
2. .....

Demikian surat keterangan ini kami buat untuk dapat dipergunakan sebagaimana mestinya.

Yogyakarta, 14 November 2019

Validator,

Prof. Dr. Siswantoyo

*) coret yang tidak perlu

KEMENTRIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS NEGERI YOGYAKARTA
PROGRAM PASCASARJANA
Alamat: Jl. Colombo no.1 Karangmalang 55281, telp: 0274-55083, fax: 0274-520326
Laman: pps.uny.ac.id, email: pps@uny.ac.id

FORMULIR KOREKSI ABSTRAK TESIS MAHASISWA

Nama	:	NDAYISENGA JAPHET
Jurusan/Angkatan	:	Ilmu Keolahragaan (S2) / 2018
Judul Tesis	:	EFFECTIVENESS OF MASSAGE AND EXERCISE THERAPY ON HEALING CHRONIC HIPS, KNEE, AND ANKLE INJURIES
Tanggal diserahkan	:	12/03/2020
Tanggal selesai	:	12/03/2020

Mahasiswa ybs

JAPHET NDAYISENGA

Korektor

Suhaini

ABSTRACT

JAPHET NDAYISENGA: Effectiveness of Massage and Exercise Therapy in Healing Chronic Hip, Knee and Ankle Injuries. **Thesis Yogyakarta: Graduate School, Yogyakarta State University, 2020.**

Chronic hip, knee, and ankle injuries are very common in the whole world. Musculoskeletal disorder hampers the development in several sectors including training and athletes' performance. Social, industrial, economic, and education decline are often caused by poor muscular-articular problems.

This research aims to reveal the effectiveness of massage and exercises therapy in: (1) the treatment of chronic hips, knee and ankle injuries; (2) improving and increasing the low limb strength and flexibility; (3) reducing the chronic pain of degenerative diseases; (4) improving the physical and mental wellbeing of human body; (5) increasing motor or sensory function; (6) increasing athlete's performance.

This research is quasi-experimental with the mixed method: quantitative and qualitative approaches. The sample of this study is 20 patients with chronic hips, knee and ankle injuries, established using the quota sampling technique. The data were collected using a questionnaire and through observation, and analysed using the descriptive statistics, independent sample t-test of SPSS, paired sample t-test of SPSS, and correlation among items using SPSS.23.

The result shows that there is a significant difference between the result of the pre-test and that of the posttest of strength measurement ($0.003<0.05$) and there is a significant difference between the result of the pre-test and that of the posttest of all kinds of movement flexibilities with the P value smaller than 0.05. There is a strong correlation between massage and exercise therapy to the chronic knee, knee, and ankle with the r **value** smaller than 0.5 ($r >0.5$). In conclusion, massage and exercise therapy are found to be a vital part to improve human body health and it can be used by everybody.

Keywords: effectiveness, exercise therapy, healing chronic, low limbs injuries, massage

LEMBAR PEMERIKSAAN TESIS

Nama Mahasiswa : NDAYISENGA JAPHET
No. Mahasiswa : 18711259001
Judul Tesis : EFFECTIVENESS OF MASSAGE AND EXERCISE THERAPY ON HEALING CHRONIC HIPS, KNEE, AND ANKLE INJURIES
Pembimbing : Dr. dr. BM. Wara Kushartanti

HASIL PEMERIKSAAN

No	Komponen	Penilaian*	Rekomendasi
1	Rumusan Masalah	✓	Konsisten → Bagus
2	Sumber Asing :		
	a. Textbooks	✓	
	b. Artikel jurnal ilmiah/hasil penelitian	✓	> 50 jurnal → Bagus
3	Metode	✓	
4	Temuan	✓	Baru → Bagus
5	Kesimpulan	✓	
6	Daftar Pustaka	✓	

*) diisi dengan ✓ serta komentar singkat

Keterangan:

1. Konsisten antara perumusan masalah, pertanyaan penelitian/hipotesis dan kesimulan
2. Sumber untuk membahas konsep per variabel:
   a. Minimal 5 textbooks
   b. Minimal 10 artikel jurnal ilmiah atau hasil penelitian
   *Keduanya berbahasa Inggris/Asing terbaru yang terbit dalam 8 tahun terakhir
3. Metode Penelitian
   a. Kuantitatif : (1) penentua populasi dan sampel, (2) bukti validitas dan reabilitas instrumen, (3) teknik analisa data
   b. Kualitatif : (1) jenis data, (2) sumber data, (3) teknik pengumpulan dan analisa data, (4) keabsahan data
4. Bab IV
   a. Temuan
   b. Pembahasan
   c Keterbatasan
5. Bab V memuat
   a. Kesimpulan: 1-2 halaman memuat jawaban masalah penelitian
   b. Implikasi
   c. Saran berdasar kesimpulan
6. Daftar pustaka yang ditulis harus dikutip, dan semua kutipan harus ada dalam daftar pustaka.

Penilaian dilakukan terhadap persayaratan administrasi bukan subtantif

Yogyakarta, 2/03/20
Pemeriksa

Menyetujui Perbaikan
Pembimbing

Dr. dr. BM. Wara Kushartanti

Dr. Bambang Priyonoadi

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS NEGERI YOGYAKARTA
PASCASARJANA
Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 550835, 550836 Fax. (0274) 520326
Laman: pps.uny.ac.id Email: pps@uny.ac.id, humas_pps@uny.ac.id

SURAT KETERANGAN
No. 1171/UN34.17/JP/2020

Bidang publikasi Program Pascasarjana Universitas Negeri Yogyakarta menerangkan bahwa:

Nama	: Ndayisenga Japhet
NIM	: 18711259001
Program Studi	: (S-2) - Ilmu Keolahragaan
Pembimbing	: Tomoliyus, Prof. Dr., MS.

Telah melakukan publikasi sebagai **syarat yudisium** dengan rincian sebagai berikut:

Judul Artikel	: THE PERCEPTION OF INTERNATIONAL STUDENTS ON FACILITY AND SPORT TOURISM EVENT MANAGEMENT
Tempat Publikasi	: SPORT MONT
Terindeks	: Scopus,
Tanggal Submitted	: 25 Januari 2019
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Tanggal Accepted	: 13 April 2019
Status Publikasi	: Publish (terlampir)

Judul Artikel	: EFFECT OF SERVICE QUALITY AND RATES ON SATISFACTION AND LOYALTY OF CUSTOMER BEHAVIOR AT FITNESS
Tempat Publikasi	: INTRENATIONAL JOURNAL OF HUMAN MOVEMENT AND SPORTS SCIENCES
Terindeks	: Scopus,
Tanggal Submitted	: 11 Desember 2018
ID/Code Artikel	: doi: 10.13189/saj.2019.070202
Tanggal Accepted	: 10 Januari 2019
Status Publikasi	: Publish (terlampir)

Demikian surat keterangan ini untuk dapat digunakan sebagaimana mestinya.

Yogyakarta, 28 Februari 2020
Koordinator Publikasi PPs UNY

Erna Andriyanti, Ph.D.
NIP.19710319 199903 2 002