c21-THE DEVELOPMENT OF TOPURAK (TOTOK-PUKUL-GERAK) MANIPULATION MODEL

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THE DEVELOPMENT OF TOPURAK (TOTOK-PUKUL-GERAK) MANIPULATION MODEL FOR KNEE JOINT REPOSITION

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Abstract

Objectives: This study aims to develop the manipulation model of "Topurak" (Totok, Pukul, Gerak) for the repositioning of knee joints. In 2016 Topurak manipulation model has been developed for upper body, and the most effective results occurred on shoulder and neck reposition, with the effectiveness value of 96.7% and 82.3%, respectively. The duration of manipulation for each joint were approximately 4 minutes (average 3'49''). Topurak manipulation model was developed for the repositioning of the knee joints in 2017, due to high prevalent injuries at those joints in the community.
Methods: Research and Development Methods were used in this study with the initial stages: Development of Draft Model Manipulation Topurak generated from literature review, especially about pressure manipulation (emphasis on trigger point), beating, and motion of joint repositioning, integrated with the results of field studies. The draft model has been developed consisting of 12 stimulation points on the limb with supine position, and 6 points in the facial position, followed by beatings using hand grip on the entire surface of the leg and followed by 15 movements. The draft model was then validated by expert manipulative therapy and exercise therapy through Focus Group Discussion (FGD). The input from the experts becomes the revision material, which will then be tested on a small group (8 people) to see the feasibility of the Model. Feasibility will be seen from the ease, duration, safety, comfort, and effectiveness in healing both subjectively and objectively.
Results: After the revision taking into account the results of small group testing, the Draft model only consisted of 7 movements that were most instrumental for repositioning especially for ligaments and tendons in the knee, while for accupoint and tapotement were appropriately targeted so that there was no change. Furthermore, a large group trial (20 people), which is also used to determine the effectiveness of the model in curing knee injury. Range of Motion (ROM) knee joint data, level of pain scale and scale of function taken before and after manipulation, to determine the effectiveness level of manipulation. Different test from mean of pre test and post test and its significance is used to show the level of effectiveness of Topurak manipulation. Different test results in the large group showed an increase in ROM by 42%, and the functional scale by 36%, and a decrease in the pain scale by 58%, and all of which were significant (<0.05%).
Conclusions: The final product was defined as Topurak manipulation model for knee joint repositioning consisting of 18 points of stimulation, tapotement throughout the lower limb surface, and 7 repositioning movements, with a duration of 8 min.

Keywords: manipulation therapy, knee joint reposition

INTRODUCTION

Knee jointis the largest and most complex synovial joint in the human body. Many movements and activities are supported by the knee joint (Roberts, 2011). The knee supports half the weight, which makes it at high risk for injuries and trauma during activity and exercise. Injuries that occur in soft tissues in the knee, will followed by bleeding and exudate exit to the tissue, so the cause of swelling. Blood flowed more into the bed to support healing, but it will add to the swelling, and the red appearance. Metabolism in the knee will increase, causing heat (warm) at the site of injury. The occurrence of the swelling causes pressure on the tissues and will feel pain and stiffness. The pain will also be added by the substance of pain (illness) released by the injured tissue. These four mechanisms will lead to reduced knee function (Markis, 2011).

The human skeleton consists of bone and joint. The joints are consist of ligaments and muscle tendons which attached to the bones. There are connective tissue that form a joint capsules.

Excessive and / or repetitive movements, or long-standing static positions, can trigger dispositions in ligaments, tendons, and even joints. All of that can happen both at work and exercise. Musculoskeletal disorders (bone and muscle) is often complained by employees and athletes. Disturbances in the knee joint are more often complained of because the task of sustaining body weight (Lumongga,2004). At the bottom of the knee there is the tibia, which meets with the femur to form the tibiofemoral joint. The tibiofemoral joint has a thick cushion that forms a hinge joint, and together with joint capsules and some ligaments will hold the knee joints. The muscles of the lower limbs are the strongest muscles in the human body. Four large muscles in the front of the femur are called quadriceps femoris muscles. Hamstring muscles in the back of the femur consist ofsemitendinosus muscle, semimembranosus, and biceps femoris muscle, which attach to the pelvis and upper thigh bone to end in the posterior tibia.

Tendons connecting muscles to bones. They consist of a connective tissue that that allows high resistance to direct tensile loads when the muscles contract. Based on the composition of collagen, the tendon has a power about two times larger than the muscles attached to it. Joints capsule is a membrane that wraps the joints, and serves to hold the bone in place. The inner layer of the capsule consists of a synovial membrane, which secretes synovial fluid as a lubricant in the articular capsule of the synovial joint. There are medial and lateral Meniscuses that have a smooth surface to coat joint movement, and muffle the beat (Anderson, 2009). The triangular patella lies between the two femoral condylus to form a patellofemoral joint. The ligament is a rope that connects the bone with the bone in a joint, and is composed of connective tissue that forms a solid bundle of collagen fibers. Ligaments contain more elastin than tendons, making it more elastic. The knee joint has four major ligaments connecting the tibia and the femur. Four ligaments work together as a team, each helping each other according to its function. Two ligaments are outside the joint capsule vertically, called the Medial Collateral Ligament (MCL) attached to the femur and tibia, while the Lateral Collateral Ligament (LCL) attaches to the femur and the fibula head. Both ligaments serve as a support for knee joint stability (Roberts, 2011). The other two major knee ligaments are the Anterior Cruciate Ligament (ACL) and Posterior Cruciate Ligament (PCL) which play an important role in stabilizing the knee. Anterior Cruciate Ligament (ACL) extends from the anterior fossa surface of the intercondyloid tibia toward the superoposterior surface of the lateral condyles of the femur.

Injury to the knee occurs due to movements with an over-repeated submaximal load, or lack of rest time that allows recovery and adaptation of the body. Injuries can involve muscles, tendons, bones, bursa, and neurovascular structures. Overuse injuries often occur in young athletes who are still growing, and causing apophyseal injuries (DiFiori, 2014). More knee injuries are experienced by women because women have larger pelvis, and more adduction, resulting in internal rotation of the pelvis and abduction of the knee (McDaniel, 2010). In addition, Smith H.C (2012) identifies estrogen and progesterone receptors in ACL, and establishes the hypothesis that female sex hormones have an effect on the metabolism, composition, and biomechanical properties of ACLs. The aging process will lead to decreased muscle strength around the joints, decreased joint flexibility, cartilage calcification and decreased chondrocyte function. This situation will cause knee injury in the elderly (Maharani, 2007). Obesity causes abnormal joint load and changes in the composition, structure and properties of articular cartilage. Obesity will specifically reduce muscle mass and strength, as well as increase systemic mechanical stress and inflammation over time. Many adipose tissues of the knee joint are suppressed, and cause an inflammation in joint tissues (Vincent, 2012).

Knee Jumper is a knee injury due to repetitive knee activity, excessive, or eccentric position, which mainly occurs when walking and sports jump, such as volleyball and basketball. Subluxation of the patella, patellofemoral stress syndrome, and other conditions may also overload the patellar tendon that aggravates the patellar tendinitis condition. Extrinsic factors that can cause these conditions include exercise frequency, playing length, playground surface, exercise type, stretching, heating, and the type of shoe worn. Some of the intrinsic factors that may have a role in contributing to this condition include lower extremity malalignment, foot length difference, muscle imbalance, muscle length, and muscle strength. Osteoarthritis is a type of arthritis due to articular degeneration of cartilage in joints. Individuals with osteoarthritis will feel pain in the knee joint with

limited movement. Osteoarthritis has a multifactorial etiology, which occurs due to the interaction between systemic and local factors. Many factors cause osteosrthritis, such as ongoing stresses during physical activity, joint trauma, overuse, and aging (Markis, 2011). Many teenagers have osteoarthritis because of the multifactorial (Heidari, 2011). Chondromalacia patellae (CMP) is a gradual degenerative change that occurs in cartilage under the kneecap and on the surface of the femoral bone. This degeneration is caused by acute trauma, and recurrent microtrauma in the patella. Patella is supported by four muscles in the quadriceps. If muscle strength is not balanced in every direction, make the patella be pulled to the edge of the groove, rather than centering, causing irritation known as CMP. Bursitis is an inflammation of the synovial bursa which can be caused by excessive stress or tension in the bursa.

Returning a person to a safe state to participate in an exercise program is divided into four stages: inflammatory control, restore range of motion (ROM), restore muscle strength, power, and endurance, and return to sport or work activities. Some conditions such as edema, hemorrhage, muscle spasm, atrophy, or infection, can inhibit the healing process and delay the achievement of short-term treatment goals. Periodic measurements for ROM components, muscle strength, muscle endurance, joint flexibility, and cardiovascular fitness will determine the progress of therapy. The main objective of rehabilitation is to restore the condition of injured patients to activity in a pain-free and fully functional condition. According to Roberts (2011), the modalities that used properly, can reduce pain, inhibit swelling, reduce seizures, when used properly can minimize recovery time. This is very important to understand when applying physical modalities. If the modality is used improperly, it will aggravate the condition, so it needs to be considered indications and contra indications on the therapeutic modalities.

Massage has been used in the treatment of illness and injury for thousands of years by health practitioners. Chinese writings from the book of Kong Fu in 2500 BC illustrate the use of massage modalities for various medical purposes, such as musculoskeletal injuries, cancer, stress, relaxation, and pregnancy (Brumitt, 2008). By manipulation of the joint, a massage therapist can facilitate reduction of inflammation and increase range of motion. The range of motion will also be enhanced by regular, active, passive exercises. Massage is primarily intended to place the joints in anatomical positions. The massage therapy is followed by an exercise therapy that aims to return the injured patient to a pain-free and fully functional activity. To achieve this, attention should be focus on modulating pain and restoring wide range of joint motion (ROM), kinematics, flexibility, muscle strength, endurance, coordination, and control. Furthermore, cardiovascular endurance and strength in injured limbs should be maintained (Clover, 2007).

Tapotement is a light blow technique or rhythmic percussion aimed to triggering skin reflexes, causing vasodilation, and improving the sensitivity response of muscle contraction. Manipulation of tapotement can relaxing the muscles and reduce swelling, which will accelerate the healing. There were several tapotemant techniques, but the most common and easy to use is "clapping" with a hollow-shaped palm done on a large muscle area, "hacking" with the ulnar hand axis, "beating" with loose fingers. The repositioning movement involves the direction of movement that can be performed by the knee joint, are flexion, extension and slight endo or eksorotation. Due to high incidence in knee inury, this research aims to develop a Topurak Manipulation Model for the repositioning of knee joints.

METHODS

Research and development design were conduct in this study, and which done with the following stages:1) Developing Topurak Manipulative Model Draft.The development is done by reviewing the literature about the various theories, concepts, and models of Totok therapy (Accupressure, Accupoint, Trigger Point) which have been developed and applied in various Therapeutic Centers, and the theories, concepts, and models of Tapotement (beating) and Motion Therapy that have been developed and applied in society. The three models (accupressure, beating, and motion therapy)are

then mixed into a model of fast, safe, convenient and effective therapeutic manipulation, especially focused on the repositioning of the knee joint, although there is no denying involvement of the hip and ankle joint; 2)Expert Validation and Revision:Draft model that has been developed in the previous stage, then validated by the expert of Manipulative Therapy and expert of Exercise Therapy. Validation is done by Focus Group Discussion (FGD) which includes aspects of manipulation type, manipulation volume, and duration of manipulation both in terms of ease, security, convenience, and effectiveness of manipulation. Furthermore, FGD results with experts are used to refine Topurak manipulation model;3)Model Feasibility Test and Revision:The revised results from Stage 2 were then tested on a small sample with 8 cases of knee injuries which be examined in the Lab / Therapeutic Sports Clinic and UNY Health Services Unit. The feasibility of the Topurak manipulation model is seen from its ease of doing, the duration of treatment, safety, patient comfort, and effectiveness of injury healing by subjective and objective assessment with a focus on inflammatory markers and joint functional improvement for daily activities; 4)Model Effectiveness Test and Revision: In this test will be carried out on 20 cases of knee joint sprain. The data taken are the Range of Motion (ROM) of the knee joint, both flexion and extension, swelling, warm palpation, and redness of the knee through observation. In addition, it is also assessed the level of subjective pain felt by the patient, using pain scale, and functional level of the knee using functional scale. All data were taken before treatment (pre test) and after treatment (post test). Different test from mean of pre test and post test and its significance is used to show the level of effectiveness of Topurak manipulation model as a treatment.

RESULT AND DISCUSSION

The first draft model that has been developed from the field studies and literature reviews, consisting of 12 stimulation points on the leg with supine position, and 6 points in the facial position, followed by beatings using hand grip on the entire surface of the leg and continued by 15 reposition movements. Experts validationthrough Focus Group Discussion with manipulative therapy experts and exercise therapy experts generate the revision of stimulation points location and a series of 10 reposition movement as a second draft.There are 5 movements that are considered redundant with the other reposition movements,so it suggested choose one of two movements that is easier and more proper.The second draft will have been tested on a small group (8 people) to see the feasibility of the Model.

Feasibility criteria will be seen from the ease, duration, safety, comfort, and effectiveness in healing both subjectively and objectively. After the revision taking into account on the results of small group testing, the draft model only consisted of 7 movements series that were most proper for repositioning the knee, especially for ligaments and tendons be arround the knee, while for accupoint and beating were appropriately targeted so that there was no change about the location of accupoint. Furthermore, a large group trial (20 people), used to determine the effectiveness of the model in curing knee injury. The data of knee joint range of motion (ROM), level of pain scale and scale of function taken before and after manipulation, to determine the effectiveness level of manipulation. Different test from mean of pre test and post test and its significance is used to show the level of effectiveness of Topurak manipulation. Different test results in the large group trial showed an increase in the ROM by 42%, and the functional scale by 36%, and a decrease in the pain scale by 58%.All of which were significant (<0.05%), so the final product was defined as Topurak manipulation model for knee joint repositioning consisting of 18 points of stimulation, beating throughout the leg surface, and 7 repositioning movements.The duration of entire manipulation is 8 minutes.

As a used principle, the process of joint repositioning consists of muscle relaxation, the loosening of tendo, and connective tissue around the joint, and then followed by a reposition movement to restore the joint in its anatomis position. Actually knee shifting does not always occur in the joints, but can also occur only on the tendons and ligaments, so the movement according to ROM, can make the joint return itself easily.

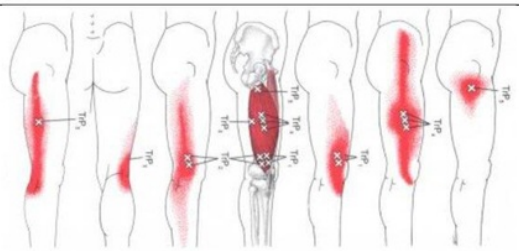
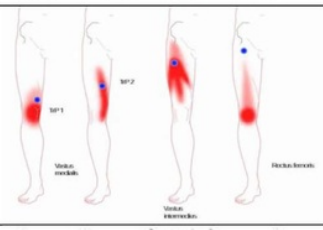
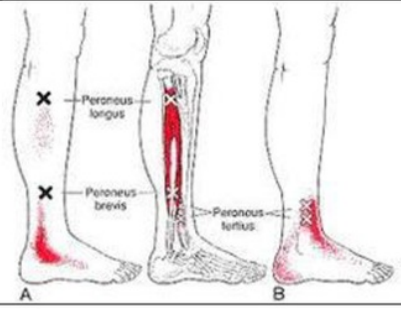
The results studies of Ambardini and Kushartanti (2016) about Topurak Manipulation Model for repositioning the neck and shoulder concluded that the press on "trigger point" (totok) would accelerate muscle relaxation. Tapotement (beating) will increase the relaxation, thus reducing the pain at the time of movement. The self-directed movement performed by the patient itself will be able to safely reposition the joints. Trigger point is a hypersensitive nodule that mainly occurs in contracting muscles (Lucas, 2007). Pain that occurs is often referred to as myofascial pain because it comes from myofascial trigger point (muscle and fascia surrounding). Pain will ocuured when the trigger point is pressed or touched (Anderson, 2009). According to Dommerholt, Jan (2006: 205) trigger point is described as a hyperirritable place in skeletal muscle associated with hypersensitive nodules when palpation in a tight muscle. The emergence of myofascial trigger points can be triggered by severe trauma, overuse, overloading, or psychological stress (Schmidt, 2014). The trigger points can occur along the muscle path. Trigger points are described as prominent or occasionally concave, local, and hyperirritable points, which are usually located in the origo and insertion of skeletal muscle.

Pressing the "trigger point" (totok) or stimulation point will accelerate muscle relaxation. Tapotement (beating) will enhance muscle relaxation, thereby reducing pain during do the reposition movement. The self-directed movement performed by the patient, will be able to safely reposition the joints, due to adapt the stiffness and the perceived pain. The advantages of this model are:Fast, because rapid muscle relaxation will be obtained by accupressure and beating;Safe: due to guaranteed by the involvement of the patient in repositioning motion with the guidance of the therapist, so the motion is not excessive because it is limited and controlled by the pain and stiffness felt by the patient, and not less because of the guidance of the therapist; Convenient: Comfortable feeling is achieved because all processes are adjusted to the patient's pain level and tolerance; Effective: The effectiveness of results is guaranteed by processes that are in accordance with scientific principles and previous empirical findings, and are carried out quickly, safely, and comfortably.Finally,the Topurak Manipulative Model which isl consist of Totok-Pukul-Gerak, can applied to repositioning the knee joint quickly, safely, comfortably, and effectively.
The applied pressure and beating can be seen in the following table

Table 1. Topurak Movement For Knee Reposition.

Number	Description
1	With supine sleeping position, bend your knees up to the limit of pain, and move your knees toward the chest. Press both limbs by hand in the bending position, and keep for 3 counts.
2	Align the lower limb upwards and pressing the kneecap, form a 90 degree angle with the body, and return to the bent knee position.
3	Straighten one leg flat, and the other legs crosswise in the knees bent. Press the knees, while chest stay up. Do it for the other side, before returning to the supine position with both knees bent and the two legs close together.
4	Bent the limb left and right to form the butterfly wings, and swing both legs up and down the knees, before returning to knees bent position and the two legs far apart.
5	Alternately, rest the limbs inwards repeatedly for 4 times and end with straightening the limbs flat.
6	Move your legs up and down, rotate right and left, and rotate in the same direction or counterclockwise. Do the same thing, but with the position of the leg lifted up to form a 90 degrees angle with the body.
7	Bend back the knee and do the kick alternately in the air, four times for each limb before being returned to the bend position of the knee.

Table 2. Topurak Pressure and Beating For Relaxing The Limb Muscle

Number	Location	Description
1		Press 6 points on the side of the upper limb, from the pelvis up to the top of the knee and continue with the beating across the side surface of the leg
2		Press 4 points on the front surface of the upper limb and 4 points on the inner surface of the upper limb, and then continue with the beating on the fornt and inner surface of the upper limb.
3		Press 4 points on the side surface of the lower limb, and continue with the beating on the entire lower limb.

CONCLUSION AND SUGGESTION

It was concluded that Topurak manipulation model for knee joint repositioning consisting of 18 points of stimulation pressure, beating throughout the lower limb surface, and 7 repositioning movements, with a 8 min of duration.In the basically, pressure and beating will be delivered on the entire surface of lower limbs, because the knee injury will affect the entire muscle on the above and below the knee.

REFERENCES

Ambardini and Kushartanti, 2016. *The Development of Topurak Manipulation Model for repositioning Neck and Shoulder.* Yogyakarta: Sport Science Faculty Yogyakarta State University.

Anderson M.K., Parr G.P., Halls.J, 2009, *Foundation of Athletic Training: Prevention, Assesment, and Management*. USA, Baltimore: Lippincott Williams and Wilkins.

Brumitt, J. (2008). "The Role of Massage in Sports Performance and Rehabilitation: Current Evidence and Future Direction". *Journal School of Physical Therapy.Vol. 3, No. 1.*pp : 7-21.

Clover, Jim. 2007. "Sports Medicine Essentials : Core Concepts in Athletic Training & Fitness Instruction". *2nd Edition.* USA.

DiFiori, J.P. 2014. "Overuse Injuries and Burnout in Youth Sports: A Position Statement from the American Medical Society for Sports Medicine". *Journal Clin J Sport Med*. *Vol. 24, No. 1*. pp. 3-20.

Dommerholt, Jan. 2006. "Myofascial Trigger Points: An Evidence-Informed Review". *The Journal of Manual & Manipulative Therapy. Vol. 14, No. 4*. pp: 203 – 221.

Eka Pratiwi Maharani. 2007. "Faktor-Faktor Risiko Osteoartritis Lutut (Studi Kasus di Rumah Sakit Dokter Kariadi Semarang)". *Tesis*. UNDIP: Semarang.

Fitriani Lumongga. 2004. *Sendi Lutut*. FK Universitas Sumatera Utara : Sumatra Utara.

Heidari, B.(2011). "Knee osteoarthritis prevalence, risk factors, pathogenesis and features: Part I". *Jurnal Caspian J Intern Med*volume 2 No. 2. pp: 205-212.

Lucas, R.K. 2007. "The Effects of Latent Myofascial Trigger Points On Muscle Activation Patterns During Scapular Plane Elevation". *Tesis.* Australia : Royal Melbourne Institute of Technology.

Makris, E.A. 2011. "The knee meniscus: Structure function, pathophysiology, current repair techniques, and prospects for regeneration". *Jurnal Biomaterials,* volume 32. pp: 7411-7431.

McDaniel. L.W. 2010. "Reducing The Risk Of ACL Injury In Female Athletes". *Journal Contemporary Issues In Education Research*. *Vol. 3, No. 3*. pp: 15-20.

Roberts. C.F. 2011. *Introduction to Sports Medicine and Athletic Training Second edition*. USA : Clifton Park, NY.

Schmidt. J.P. 2014. "The Effect of 4 Weeks Manual Compressive Therapy On Latent Myofascial Trigger Point Pressure Pain Thresholds". *Tesis.* Texas : Graduate Council of Texas State University.

Vincent, H.K. 2012. "Weight Loss and Obesity in the Treatment and Prevention of Osteoarthritis". *Journal Author Manuscript*. *Vol. 4 No. 5*. pp: 59 – 67.

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