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RESEARCH ARTICLE

EFFECT OF TAPING TECHNIQUE FOR ANTERIOR CRUCIATE LIGAMENT SPRAIN OF KNEE JOINT

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ABSTRACT

Background: There are many treatments given for anterior cruciate ligament sprain which includes Anti-inflammatory Drugs, ultra sound therapy, cyrotherapy however, studies involving taping technique for management of anterior cruciate ligament sprain are limited to this date.
Objective: To find outeffect of taping technique for anterior cruciate ligament sprain of knee joint.
Study design: Quasi experimental study design.
Subjects: 30 subjects with anterior cruciate ligament sprain age group 20-40 years of males.
Intervention: 15subjects in the Group A received taping technique with conventional therapy pre and post-test and 15 subjects in Group B received Conventional Physical therapy with pre and post-test.
Outcome measure: Numeric pain rating scale, Anterior Cruciate Ligament Quality Of Life Questionnaire.
Results: Statistical analysis was done by using Paired't' test which showed significant improvement in both group.
Conclusion: taping technique with conventional therapy has significant result in the reduction of pain and functional activity in patients with anterior cruciate ligament sprain.

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INTRODUCTION

Dynamic knee stability is affected by both passive (ligamentous) and active (neuromuscular) joint restraints. Among the contributors to knee joint stability, the anterior cruciate ligament (ACL) has long been considered the primary passive restraint to anterior translation of the tibia with respect to the femur (Butler *et al*., 1980; Kiapour *et al*., 2013). Moreover, the ACL contributes to knee rotational stability in both frontal and transverse planes due to its specific orientation (Levine *et al*., 2013; Quatman *et al*., 2014). The ACL has been the focus of many biomechanical/anatomical studies and is among the most frequently studied structures of the human musculoskeletal system over the past decades. Injuries to the ACL are one of the most common and devastating knee injuries mainly sustained as a result of sports participation (Hewett *et al*., 2013). These injuries often result in joint effusion, altered movement, muscle weakness, reduced functional performance, and may lead to the loss of an entire season or more of sports participation among young athletes (Hewett *et al*., 2013). ACL injuries are also associated with long-term clinical sequelae that include meniscal tears, chondral lesions and an increased risk of early onset post-traumatic osteoarthritis (OA) (Levine *et al*., 2013; Chu *et al*., 2011; Lohmander *et al*., 2004; Nebelung and Wuschech, 2005; von Porat *et al*., 2004; Quatman *et al*., 2011). The ACL has long been thought to have poor healing capacity, with a substantially high rate of failure (40% to 100%), even after surgical repair using suture (Feagin and Curl, 1976; Kaplan and Wickiewicz, 1990; Marshall *et al*., 1979; O'Donoghue *et al*., 1971; Sandberg *et al*., 1987; Sherman and Bonamo, 1988; Strand *et al*., 2005). The unsatisfactory outcomes of the ACL primary repair have led to unanimous abandonment of suture repair and widespread adoption of ACL reconstruction. ACL reconstruction has remained the gold standard of care for ACL injuries, especially for young individuals and athletes who aim to return to high-level sporting activities (Hewett *et al*., 2013; Musahl *et al*., 2011). However, current surgical treatment of ACL injury is costly, with variable outcomes (Hewett *et al*., 2013) and is associated with high risk of post-traumatic OA within two decades of injury (von Porat *et al*., 2004; Murray *et al*., 2012). While few athletes are able to resume sports at the same level without surgery (Hewett *et al*., 2013), the surgical reconstruction is also not always successful at returning patients to their pre-injury activity level (Ardern *et al*., 2011). Furthermore, those athletes who successfully return to activity are at high risk of a second knee injury (Shelbourne *et al*., 2009) with notably less favourable outcomes (Spindler *et al*., 2011). Although patellar taping is readily used by physiotherapists in the treatment of

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patients with patellofemoral pain syndrome (PFPS), doubts still exist regarding the mechanism for its success. McConnell (Butler *et al*., 1980) originally described patellar taping as part of a treatment program for PFPS and theorized that this technique could alter patellar position, enhance contraction of the vastus medialis oblique muscle, and hence, decrease pain. Studies thus far on patients with PFPS have been inconclusive regarding patellar taping enhancement of vastus medialis oblique contractions (Kiapour *et al*., 2013) and taping realignment of patellar position (Levine *et al*., 2013). However, some studies have shown that patellar taping helps to decrease pain in patients with PFPS (Kiapour *et al*., 2013) and in patellofemoral osteoarthritis (Quatman *et al*., 2014), although the mechanism for this symptomatic improvement remains unknown. Some investigators have speculated that patellar taping may perform a role in providing a sense of mechanical stability to the patella (Hewett *et al*., 2013; Chu *et al*., 2011).

Objectives

Aim of the study is to find the effect of taping technique for anterior cruciate ligament sprain of knee joint.

MATERIALS AND METHODS

Study design : Quasi - Experimental design.
Study type : Pre and Post type.
Sample size : 30.
Sampling method : Convenient sampling.
Study duration : 2 weeks.
Study setting : YMCA

Inclusion Criteria

- Age group 20-40 years.
- Individual who would have not sought physiotherapy treatment following acl injury.
- Numeric pain Rating Scale 4-7.

Exclusion Criteria

- Grade 3 ACL injury
- Systemic and psychiatric illness.
- Degenerative changes.

Outcome measures

- Numeric pain rating scale.
- Anterior Cruciate Ligament Quality Of Life Questionnaire.

Procedure

Patients who are referred to Physiotherapy Outpatient department for ACL injury are screened for possible inclusion criteria. The purpose of the study was explained to the subjects and signed printed informed consent form was taken. A group of 40 subjects with a history of ACL were selected conveniently and divided them in to two groups as Group-A and Group-B. All the subjects are included in the study with a history of ACL. At each session the Group-A have received taping and conventional therapy. Group-B have received the conventional Physical therapy. The procedure is repeated for 3 days per week for 2 weeks for Group-A and Group-B. The treatment, eithertaping and conventional therapy alone or conventional therapy, is applied to the affected side. A pre-test and post-test result ofAnterior Cruciate Ligament Quality Of Life Questionnaire, NPRS is taken for both the groups.In group –a the subject is made to stand on a stool or chair with a roll of tape under the heel of injured leg and the knee in 40 degree of flexion position. Then the treatment area is made clean and dry the skin to be taped, apply padding and lubricant to the popliteal fossa and hamstring tendon. Apply skin toughner, peowrap, and anchors. Apply adhesive elastic X over the medial joint line using moderate tension and repeat the same on lateral side, to form a check resin, apply the first restraining strips vertically from the lower to the upper anchors with adhesive tape, keep the flexed at 40 degree and stretch this strip maximally between the anchors. Compelte the posterior restraining strip with an X directly over the back of the knee. Reanchor these strips with adhesive tape from mid thigh to mid calf, reinforce the medial adhesive Xwith white tapeXs, overlapping the second one slightly anteriorly to the first. Reinforce the lateral side adhesive X in a same way. Taping followed with conventional theapy for acl injury.Group B is treated with conventional theapy, knee strengthing exercises, hamstring strengthing exercises.

DISCUSSION

Treatment of postoperative pain and swelling is important during the rehabilitation of ACL reconstruction. This is because the swelling causes a decrease in the quadriceps strength through arthrogenic muscle inhibition and the pain complicates exercising.Taping may pull the skin upwards and increase the lymphatic drainage through blood circulation, and therefore reduce edema and relieve the pain by removing the pressure on the subcutaneous pain receptors. Taping is commonly used in pain treatment (O'Donoghue *et al*., 1971). Various neurological and non-neurological mechanisms have been defined for the pain effect of Taping, A previous study has shown that postoperative edema and pain were reduced with a 28-day Taping treatment in patients with ACL reconstruction (Murray *et al*., 2012). In addition, postoperative Taping treatments performed by using the lymphatic correction technique have been reported to be effective in controlling pain and edema. In this study, significant decreases were observed in pain severity after the first five days of Taping treatment. Comparisons conducted at the final follow-up showed that the swelling on the operated knee was reduced significantly in the experimental group. Despite this decrease in swelling, no significant increase occurred in the quadriceps strength of the operated leg. Various reasons may have played a role in this result: (1) the duration of Taping treatment was short and full recovery was not obtained in swelling around the knee, (2) it failed to apply sufficient tension during the Taping application on the rectus femoris due to acute conditions, (3) graft types protecting the quadriceps muscles were used in surgery and the Taping method was not effective in increasing the quadriceps strength under healthy conditions, and (4) in order to protect the graft, measurements of isometric muscle strength were conducted at 30° of knee flexion. However, the maximum isometric strength of the quadriceps muscle is determined through measurements performed at 60° of knee flexion for the optimal correlation between force and height (Myklebust *et al*., 1998). (5) In addition, atrophy developing after ACL injury and surgery leads to a loss in the quadriceps strength (Renstrom *et al*., 2008). It was found that atrophy could not be prevented

through Taping treatment applied in the early rehabilitation period of ACL repair (Murray *et al*., 2012).

The inhibition Tapingtechnique increased knee flexor moment, decreased knee power (i.e., eccentric activity of the hamstrings) during the terminal swing phase, and decreased knee flexion during walking. However, the mechanism behind this Taping application technique is largely unknown. Slupik *et al*. suggest that the inhibition. Taping application increases motor unit recruitment in asymptomatic individuals several hours after Taping is applied, which would justify the lack of biomechanical changes resulting from this method of Taping. Runners often use Taping to manage overuse injuries. We propose that the inhibition Taping application technique improves minor soft tissue injury recovery and prevents overuse injuries in the joint of interest. Inhibition Tapingapplication had a positive effect on knee kinetics and kinematics compared with the no-tape condition in our study. Inhibition. Taping application with physical therapy rehabilitation treatment in the acute phase or with orthotic treatment may be valuable, and it may also help control knee hyperextension in paralytic patients with knee-ankle foot orthosis (KAFO) without the need for orthotic popliteal straps. Also, patients with equinus have prevalent knee hyperextension and may benefit from inhibition Tapingapplication along with ankle-foot orthosis (AFO). There were several limitations in this study. First, the study had small sample sizes, which may limit the translatability of our findings to other populations. Second, placebo effects may have contributed to the observed differences because we did not apply placebo taping to eliminate the psychological effect of the tape. Further research is recommended to examine the association between sports performance with therapeutic tape and the acute and chronic effects of Taping on the function, balance, and neuromuscular performance of patients under a rehabilitation program.

Conclusion

The study concluded that Group-A and Group-Bshowed significant improvement in pain and functionin knee pain. But comparing both the groups Group-A and Group-B the Group-A is significantly improved than Group-B. Hence, the results show that the Group-A is yielded statistically more improved than Group-B.

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