THE EFFECT OF CORE STABILITY TRAINING PROGRAM IN MANAGEMENT OF ACUTE HAMSTRING STRAIN

A Thesis
Submitted in partial fulfillment for the Requirement of the Master Degree of physical therapy for Musculoskeletal Disorder and it's Surgery

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2009

تأثير برنامج تدريب الثبات الجذعي في علاج التمزق الحاد للعضلة الخلفية بالفخذ

توطئة
للحصول على درجة الماجستير في العلاج الطبيعي
لاضطرابات الجهاز العضلي الحركي

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تأثير برنامج تدريب الثبات الجذعي في علاج التمزق الحاد للعضلة الخلفية بالفخذ ، خالد محمد نبيل علي ، المشرفون : أ.د/ سلوى فضل عبد المجيد، د/ محمد محمد إبراهيم علي ، د. عماد صوئيل بولس ساويرس. درجة الماجستير ٢٠٠٩.

المستخلص

يهدف هذا البحث إلى دراسة التأثير المشترك لبرنامج تدريب الثبات الجذعي والبرنامج التقليدي في علاج التمزق الحاد للعضلة الخلفية بالفخذ وقد أجريت هذه الدراسة علي عينة مكونة من ثلاثين مريضاً تم تقسيمهم عشوائياً إلي مجموعتين متساويين، **المجموعة الأولي (أ):** مجموعة البرنامج التقليدي **والمجموعة الثانية (ب):** مجموعة البرنامج التقليدي إلي جانب برنامج تدريب الثبات الجذعي. تم علاج كل لاعب من وقت حدوث الإصابة لمدة١٢ جلسة خلال فترة أربع أسابيع وقد تم تقييم شدة الألم والزمن اللازم لاختفاء الألم– والزمن اللازم لإستعادة المدى الحركي الكامل للفرد الذاتي للركبة– والزمن اللازم للعودة إلي المنافسات ومدى الأداء الوظيفي بعد العودة إلي المشاركة في التمرينات.

توصلت الدراسة إلي أن كلاً من البرنامج التقليدي والتأثير المشترك لبرنامج تدريب الثبات الجذعي والبرنامج التقليدي طرق فعالة في علاج التمزق الحاد للعضلة الخلفية بالفخذ مع عدم وجود أفضلية لأيهما علي الآخر.

الكلمات الدالة :برنامج الثبات الجذعي –التمزق الحاد للعضلة الخلفية –البرنامج التقليدي

الملخص العربي

الهدف من هذا البحث هودراسة التأثير المشترك للبرنامج التقليدي وبرنامج تدريب الثبات الجذعي في مقابل البرنامج التقليدي في علاج التمزق الحاد للعضلة الخلفية . وقد أجري هذا البحث علي ثلاثين مريضاً تم تقسيمهم عشوائياً إلي مجموعتين متساويين.

المجموعة الأولي: (مجموعة البرنامج التقليدي) وتكونت من ١٥ مريضاً متوسط أعمارهم ٢٤.١٣ ± ٤.٩ تم علاجهم ببرنامج تقليدي مكون من الثلج وتمارين الاطالة والموجات الصوتية وتمارين التقوية.

المجموعة الثانية: (مجموعة تدريب الثبات الجذعي) وتكونت من ١٥ مريضاً متوسط أعمارهم ٢٤.٩ ±٥,٧ تم علاجهم بالبرنامج التقليدي السابق إلي جانب برنامج تدريب الثبات الجذعي.

تم علاج كل مريض من وقت حدوث الإصابة لمدة أربع أسابيع بمعدل ثلاث جلسات في الأسبوع وقد تم قياس شدة الألم والوقت اللازم لإختفاء الألم والزمن اللازم لاستعادة مرونة العضلة والزمن اللازم للعودة للمشاركة في التدريبات والأداء الوظيفي بعد العودة للمشاركة في التمرينات.

وقد أظهرت النتائج تحسناً ملحوظاً في كلا المجموعتين مع عدم وجود فروق ذو دلالة إحصائية واضحة تبين أفضلية أي برنامج عن الأخر.

Acknowledgements

First of all thanks to Allah who guide us in the way to gain more knowledge and information.

I would like to express may deep thanks to **Prof. DR. Salwa Fadl** professor of physical therapy for Musculoskeletal Disorders Cairo university for her kind and continuous guide, support and valuable advice and information, she was a strong guide for this work to be fulfilled in this way no word can give her what she is worth.

Also especial thanking to DR. Mohamed Ibrahim lecturer of physical therapy for Musculoskeletal Disorders Cairo university who always encourage me throughout this work, he was more than doctor he was a real human I can't find enough words to thank him.

DR Emad Samuel Saweeres, Consultant Orthopaedic in El Sahel Teaching Hospital was a great and wonderful director helped me alot to express my thoughts and to put it practically through our continues and valuable discussion.

My great mother, father and brothers your love is the wind over which my wings can fly.

There are many persons who supported and encouraged me, I need hundred of pages to enumerate and thank them but really I thank you all may colleague in hospital, faculty, club and all my patient for whom I studied and learned in order to be worth their confidence and respect.

The effect of core stability training program in management of acute hamstring strain. Khaled Mohamed Nabil Ali- Supervisors: **Prof. Dr. Salwa Fadl Abdel Mageed, DR.Mohamed Mohamed Ibrahim Ali, DR. Emad Samuel Boles Saweeres**. Master degree.2009.

Abstract

Purpose: To investigate the combined effect of core stability training program and traditional program in treatment of acute hamstring strain. **Subjects:** Thirty patients diagnosed with grade II acute hamstring strain. **Methods:** Patients were distributed randomly into two groups. The first experimental group consisted of 15 patients with a mean age of 24.1 (±4.9) years; received traditional program consisted of (ice followed by ultrasound therapy, static stretching, and strengthening exercise). The second group consisting of 15 patients with a mean age of 24.9 (±5.7) years; received core stability training program in addition to traditional treatment. Treatment was given 3 times per week, each other day, for 4 consecutive weeks. Patients were evaluated pre-treatment and post-treatment for pain severity and functional scale. In addition time needed for equalization of active knee extension (AKE) and recovery time were measured. **Results:** patients in both groups show significant improvement in all the measured variables without significant difference for any program in favor to the other. **Conclusions:** Both traditional program and combined traditional and core stability training program had significant effect in management of acute hamstring strain without significant difference between both groups

Key words: core stability training, acute hamstring strain, traditional program.

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list of abbreviation

TLF	Thoracolumbar fascia
SIJ	Sacroiliac joint
ECM	Extra cellular matrix
MTJ	Myotendinous junctions
PSLR	Passive straight leg raise
AKE	Active knee extension
VAS	Visual analogue scale
MRI	Magnetic resonance imaging
PRICE	Protection – rest – ice – compression – and elevation
SMT	Spinal manipulative therapy
LLTQ	Lower limb task questioner
ROM	Range of motion
MVC	Maximum voluntary contraction
CST	Core strength training

Chapter I

Introduction

Muscle injuries are the most common injury in sports, their incidence varying from 10 to 55% of all injuries sustained in sport events (Järvinen and Lehto, 1993; Garrett, 1996). The majority of muscle injuries (more than 90%) are caused either by contusion or by excessive strain of the muscle. Distraction strain occurs in a muscle on which an excessive pulling force is applied, resulting in over stretching. Strain injuries are especially common in sports that require sprinting or jumping (Crisco et al., 1994; Garrett, 1996). These injuries are often located near the myotendinous junction (MTJ) of the superficial muscles working across two joints, such as the rectus femoris, hamstring, and gastrocnemius muscles (Garrett, 1996).

Acute hamstring strains are a common injury in sports involving sprinting. Strain injuries are characterized by observable disruption of the musculotendon junction (Koulouris and Connell, 2003), with postinjury remodeling involving both scar tissue formation and muscle regeneration (Kääriäinen et al., 2000). The injury can cause an athlete to miss a few days to a few weeks of sport. More problematic is the high recurrence rate, with approximately one in three athletes reinjuring within a year of returning to sport (Orchard and Best 2002). These observations highlight the prevalence of hamstring strain injuries and the challenge in preventing the initial injury and subsequent reinjury.

Hamstring muscle injuries invariably result from the interaction of several modifiable and non-modifiable risk factors (Worrell, 1994; Croisier, 2004). Suggested non-modifiable risk factor include older age, previous hamstring and other lower limb muscle injuries; suggested modifiable risk factors include fatigue, strength imbalance between the hamstring and quadriceps muscles, insufficient warm-up, greater training value (time and frequency of training session), poor muscle flexibility or compliance, cross-pelvic posture (characterized by an anteriorly tilted pelvis and increased lumbar lordosis), and poor lumbopelvic strength and stability (Brooks et al., 2005).

Sherry and Best (2004) stated that as the pelvis is the origin attachment site for the hamstring muscles, neuromuscular control of the lumbopelvic region, including anterior and posterior pelvic tilt, is needed to create optimal function of the hamstring in sprinting and high speed skilled movement. Changes in pelvic position could lead to changes in length-tension relationship or force-velocity relationships. This has led some clinicians to utilize various core stability and progressive agility exercises for hamstring rehabilitation programs (Bennell et al., 1999). Core stability and neuromuscular control exercises have also been shown to be effective in promoting return to sports in athletes with chronic hip adductor pain (jonhagen et al., 1994). Clark (2008) also reported that Core stability and strength training has received a great deal of interest in recent years, and appears to provide benefits for reducing the risk of hamstring injury.

Hoskins and Pollard (2005-C) stated that there is paucity of literature about the role of aberrant lumbar-pelvic biomechanics as an etiological factor predisposing to hamstring injury. It is tempting to speculate that this may explain why hamstring injuries have the highest recurrence rate of any injury in the Australian football league. Thirty three per cent of injured players are likely to re-injure their hamstring on return to competition and miss subsequent matches (Orchard and Seward, 2002). A significant risk of injury recurrence exists in the first few weeks following return to play, with the cumulative risk of recurrence for the reminder of the season being 30.6% (Orchard and Best, 2002). No significant change in recurrence rates has been noted over the last seven years, while players are missing more time on average due to injury (Orchard and Seward, 2002).

In the Australian football league recurrence rates of other injuries have decreased considerably over this time frame (Orchard and Seward, 2004). This suggests that players are being managed more conservatively with regard to return to competition from hamstring injuries and there appears to be no change in the treatment protocol if recurrence rates have yet to decline. This may suggest the possibility of a biomechanical factor that may require a differing approach that has yet to be introduced. No prevention effort will be successfull without understanding the etiological factors predisposing to hamstring injury (Hoskins and Pollard, 2005-C).

There is a lack of clinical research regarding the effectiveness of various rehabilitation programs for acute hamstring strain (Sherry and Best, 2004). Not surprisingly, a lack of consensus also exists in the content of these rehabilitation programs. Most research on hamstring strains has focused on preventive measures and treatment of chronic hamstring strain (Orchard, 2001 Croisier et al., 2002).

Statement of the Problem:

The current treatment principles for injured skeletal muscle lack a firm scientific basis (Järvinen et al., 2007). The diagnosis and treatment of hamstring injuries have evolved through empiricism rather than through objective outcome based research (Hoskins and Pollard, 2005-B).

Sihvonen (1997) concluded that restricted movement through the lumbar spine or pelvis may cause the hamstrings to be overloaded through