



Effectiveness of physical therapy for groin injury among athletes and protocol for groin pain according to phase

Shahinoor Bente Khan

Lecturer (Physiotherapy), Department of Physiotherapy Bangladesh Health Profession Institute (BHPI), CRP, Savar, Dhaka, Bangladesh

Abstract

The purpose of the study was to identify the effectiveness of physical therapy for groin injury in athletes and to identify which one is more effective in some studies included Randomized control trial and cross sectional study. In the body of text part author selected main five articles and synopsis those articles and also compare contrast were done with all the studies. There was difference in intervention sample size time duration and intervention procedure. There was group allocation in some studies and also was experimental group and control group. In the result section there was difference in some studies and found similar result in some studies. In the discussion session there was also found some limitations and recommendation. All the studies were intentionally selected with similarities. Some studies showed significant difference and some studies showed no significant difference at all. Some studies fulfill the PEDro criteria and score were 7/10 and some studies score was not so good like 3/10 and some were 5/10 or 6/10.

It can be concluded that the physical therapy or exercise is more effective for groin strain injury among athletes. The trial's methodology offers a model for the feasibility of translating neuro scientific experiments into a RCT to develop evidence-based rehabilitation practices.

Keywords: physical therapy, groin injury, athletes

Introduction

Groin strain is a most common injury in sport related person during sport. And also it is the common injury in world wide. Now day's athletes are more conscious about injury, cause of injury, injury prevention, and also injury management. Groin strain is a muscle injury that can be painful and delayed in healing. Groin strain affects the adductor muscle in the inner thigh. It usually a muscle tear or from a sudden movement. Groin strains are graded with number I to III. Grade I causes some pain and tenderness, but the stretch or muscle tear is minor, Grade II causes pain, tenderness, weakness, and sometimes bruising, Grade III is a severe tear of the muscle, causing bruising and a lot of pain. The most common athletes to get groin strain are soccer players and ice hockey players, basket ball, football, rugby, tennis player etc (Lisa, 2017). Football is a popular game in the world and 200 million individual playing this game also they are at a high risk of injuries than industry worker (Yamaner, Gumusdag, Kartal, Gumus, Gullu & Imamoglu, 2011). Groin pain is most common complaint and about 5% to 6% of all sports injuries. Sports-related injuries to the hip and groin region occur most commonly in athletes participating in sports involving side-to-side cutting, quick accelerations and decelerations, and sudden directional changes. The onset is more commonly gradual but can also be acute. Groin pain can originate from bones, joints, bursa, muscles, tendons, facial structures, and nerves. In addition, the spectrums of conditions that can cause groin pain include not only musculoskeletal conditions but also

urological and general surgery concerns. Therefore, a team approach with many different specialties is usually the best one in the treatment and rehabilitation of the athlete, particularly for enabling the athlete to return to the sport. Key sports that experience greater number of this type of injury include soccer ice hockey, football, and basket ball swimming. Prevalence of groin strain in worldwide in soccer payers 10-18% and 5-9% in secondary school students. In football players 10 to 18 cases have groin pain. Incidence of sprain in hockey players is 3.2 cases for 1000 players. Risk factors including muscle imbalance, previous injury, sports related injury, sports specific training, incomplete rehabilitation, poor running or foot wear and increase mileage (Alison, 2010).

The most common risk factors for adductor muscle strains include stiffness, previous history and an imbalance of hip adductors to abductors strength (Ibrahim *et al.*, 2007). Incidence of groin injuries in sport is significant with chronic hip and groin pain accounting for 10% of all sports injuries (Tyler *et al.*, 2010) [11]. A 12% incidence of groin and thigh injuries has been reported in football, soccer and ice hockey. Groin injuries alone can account for 5% to 18% of injuries in footballer. A yearly groin injury incidence rate in recreational runners has been reported as being as high as 70% (Quinn, 2010) [7]. Many treatments have been employed in the management of groin injury few have been proven to be effective in randomized controlled trials (Serner *et al.*, 2015) [9]. Non-steroidal anti-inflammatory drugs, icing, soft tissue release, physical therapy modalities and specially stretching

exercises can be listed among the most common non-surgical approaches to treat groin injuries (Eustace & Johnston, 2007)^[3]. According to classification for groin strain, adductor strains are classified as a first grade strain if there is pain with minimum loss of strength and mobilization. A second-grade sprain is when there is an organic injury that suppresses the strength of the muscle while it does not include absolute loss of strength and motion. With the same rationale a third-grade strain is when there is an absolute collapse of the muscular tendinous unit and complete loss of functional capabilities (Sedaghati *et al.*, 2013)^[8]. In the body of text part author included here article synopsis of main five articles. A study conducted by Holmich *et al.*, 1991. The aim of the study is to compare an active training program with a conventional physiotherapy program in the treatment of severe incapacitated adductor related groin pain in athletes. *the study design was randomized control trial. Sample size was 68 and the location of the study is Denmark. Intervention including jogging, cycling, strenthenig of hip adductor, abductor (isometric isokinetic exercise), abdominal strengthening balance training. Duration of the exercise was 90 min and 3 times a week for 8 to12 weeks.* 23 patients in the Adductor Training group and four in the Physiotherapy Training group returned to sports without groin pain. The effect of the treatments showed a significant ($p=0.006$). Adductor Training with a programmed aimed at improving strength and coordination of the muscles acting on the pelvis, in particular the adductor muscles, is very effective in the treatment of athletes with long-standing adductor-related groin pain. Holmich *et al.* (1999) showed that therapeutic exercise is better to reduce pain and return o sports. Here therapeutic exercise including hip and abdominal muscle strengthening and physiotherapy exercise including stretching, TENS, DTFM, and laser therapy. The treatment duration in the study to return to sports activity is 18.5 weeks. Though the recovery time period is too long for athletes it is quite difficult because they have lots of pressure. *Another study was conducted by abbas yusufzadeh et al, 2018. The aim of the study is to evaluate the effect of therapeutic exercise on long standing adductor related groin pain in athlets modified holmich protocol. They evaluated a modified Holmich protocol to resolve the possible limitations intrinsic to the Holmich protocol in terms of the rate of return to sport and the recovery period for athletes with LSAGP. The study followed a single-blind, before/after study design, where 15 athletes with LSAGP performed a 10-week modified Holmich therapeutic exercise protocol. Outcome scores related to pain, hip adductor and abductor muscle strengths, and the ratio of maximum isometric and eccentric hip adduction to abduction strength increased significantly. Likewise, hip abduction and internal rotation ROM improved significantly compared to that at baseline. Furthermore, functional records showed significant improvement after treatment. Finally, 13 athletes successfully returned to sports activity in a mean time of 12.06 weeks (SD = 3.41). The findings of this study objectively show that the modified Holmich protocol may be safer and more effective than the Holmich protocol in athletes with LSAGP in promoting their return to sports activity. They gave no therapy other than the therapeutic exercise and they did not allow any athletic activity during the treatment.*

The minimum duration of treatment was 10 weeks, however, the athletes could continue their treatment for up to 12 weeks if necessary. During the first two weeks, the participants performed part 1 of our protocol three times a week. From the third week on, they performed part 2 of the protocol three times a week (on even or odd days) and carried out the exercises from part 1 every other day. The duration of each session was approximately 120–150 min. ***in phase1 they*** had participants do isometric hip adduction using elastic bands. The subject moved his body in harmony with adduction and coming back to the reference position in order to prevent concentric and eccentric adductors contractions as much as possible. The time under tension for the isometric adduction was 10 sec In the second phase of the treatment, the participants performed hip adduction-abduction exercises using elastic bands in three consecutive phases of concentric, isometric, and eccentric contractions, as Jensen *et al.* showed in their study In the second phase of the treatment, the participants performed hip adduction-abduction exercises using elastic bands in three consecutive phases of concentric, isometric, and eccentric contractions, as Jensen *et al.* showed in their study *Another study conducted by Surov, 2010.* The purpose of this study was to evaluate the effectiveness of adductor muscle stretching exercises among groin injured male athletes. In this experimental study 10 patients with groin pain were randomly assigned to the experimental group and to the control group. Among these 12 patients, 6 patients were included in the experimental group who received adductor muscle stretching exercises with conventional physiotherapy and the rest of the 6 patients were included in the control group, who received conventional physiotherapy only. Each group attended for 6 sessions of treatment within two weeks in the physiotherapy department of Bangladesh Krira Shikkha Protishtan (BKSP) in order to demonstrate the improvement. The outcome was measured by using visual analogue scale for pain intensity in different functional position, and goniometry for measuring ROM. This study showed that adductor muscle stretching exercises with conventional physiotherapy is capable to produce beneficial effect with groin injured athletes. The treatment used in experimental group may be beneficial to increase range of motion and has effects on reducing pain than conventional physiotherapy alone for athletes with groin injury. Outcome showed significant improvement at the end of the study. Another study was conducted by Beijsterveldt *et al.*, 2012^[2]. The aim of the study is to investigate the effect of the ‘The11’ injury prevention program on injury incidence and injury severity in adult male amateur soccer players. The study design was randomized control trial. Teams were randomly assigned by two groups one is intervention and others is control group. In intervention group including (n=11 teams, 223 players) and control group (n=12 teams, 233 players). The intervention group was instructed to perform The11 in each practice session during one soccer season. The11 focuses on core stability, eccentric training of thigh muscles, proprioceptive training, dynamic stabilization and plyometrics exercises with straight leg alignment. The11 included the following exercises: the bench, sideways bench, hamstrings, cross-country skiing, chest passing in single-leg stance, forward bend in single-leg stance, figures-of-eight in single-leg stance, jumps over a line, zigzag shuffle and bounding. All participants of the control group continued their practice sessions as usual. For players who are familiar with the exercises, the program takes about 10–15 min. In total, 427 injuries were recorded, affecting 274 of 456 players (60.1%). Compliance with the intervention program was good (team

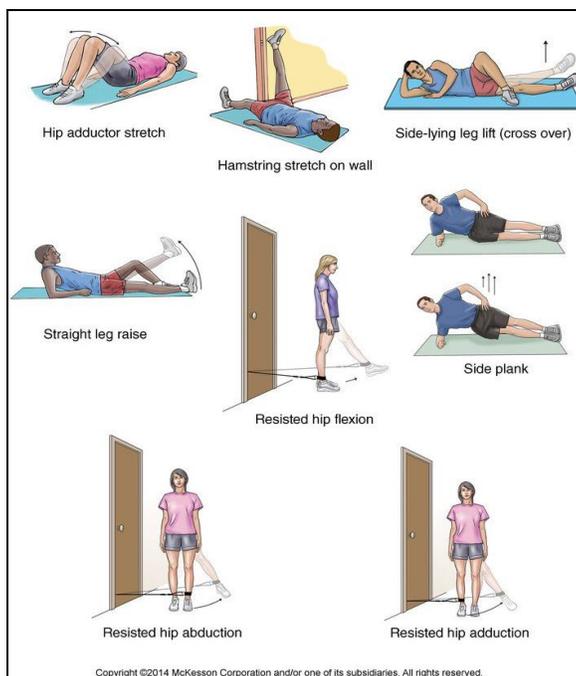
compliance=73%, player compliance=71%). Contrary to the hypothesis, injury incidences were almost equal between the two study groups: 9.6 per 1000 sports hours (8.4–11.0) for the intervention group and 9.7 (8.5–11.1) for the control group. No significant differences were found in injury severity, but a significant difference was observed in the location of the

injuries: players in the intervention group sustained significantly less knee injuries. This study did not find significant differences in the overall injury incidence or injury severity between the intervention and control group of adult male soccer players.

Table 1: Treatment guideline for groin pain in according to phase

Phase	Exercise	Dose
Acute phase	RICE (Tyler <i>et al.</i> , 2010) ^[11]	After 48 hours
	Rest (Tyler <i>et al.</i> , 2010) ^[11]	2 weeks
	Ice (Tyler <i>et al.</i> , 2010) ^[11]	2 weeks
	Compression (Tyler <i>et al.</i> , 2010) ^[11]	2 weeks
	Elevation (Tyler <i>et al.</i> , 2010) ^[11]	2 weeks
	Massage (wolin & Lovel <i>et al.</i> ,	10-16weeks
	NSAIDs (Rodreguize <i>et al.</i> ,	3-10 weeks
	TENS (Tyler <i>et al</i> 2010) ^[11]	
	UST (Wollin & Lovel <i>et al</i>	10-16 weeks
	Isometric adduction (Wolinn & Lovel <i>et al</i>	10-16 weeks
	Hip strengthening exercise (Rodriguez <i>et al</i> 2001)	3-10weeks
	Trunk control (holmich <i>et al.</i> , 1999)	8-12 weeks
	Strengthening exercise for U/L and L/L (Veral <i>et al.</i> , 2007)	12 weeks
		Warm up
Sub Acute phase	Cycling, jogging (Holmich <i>et al.</i> ,1999)	8-12 weeks
	Squatting (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks
	Concentric adduction (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks
	Weight bearing exercise (Verrel <i>et al.</i> , 2007)	12 weeks
	Tilting trunk control (Verel <i>et al.</i> , 2007)	12 weeks
	Balance training (Holmich <i>et al.</i> ,1999)	8-12 weeks
	General flexibility program (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks
Chronic phase	Sub Acute phase exercise with increase load (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks
	Skating (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks
	Running drills (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks
	Slide board (Tyler <i>et al.</i> , 2010) ^[11]	8-12 weeks

Note: It may be changed according to condition.



Note: Some other exercise of groin pain

Fig 1: Groin Strain Rehabilitation Exercises

Author found articles through the PEDro, Cochrane library, Google Scholar and PubMed databases. It was challenging to find very recent study from database but finally got five articles. Author decided on these five articles out of the few was able to find, as they were the most current to date and similar to author's key components of physical therapy is effective for groin strain among athletes.

Anderson *et al.* (2001) ^[1] showed that a research where flexion, extension, abduction and adduction in the intervention group did not have as great an improvement during the treatment period as reference group did. Intervention group however, continued to improve after the treatment and during the follow-up period. The intervention group received this treatment however they were also dealing with the effects of teaching their muscles. Muscle dysfunctions (pain, inhibition) may cause a decrease in range of motion (ROM).

Tyler *et al* were able to demonstrate that strengthening the adductor muscle group could be an effective method for preventing adductor strains in professional ice hockey players. These players were placed on an intervention program consisting of strengthening and functional exercises aimed at increasing adductor strength. Phase 1 is acute and phase 2 is sub acute 3 is sports specific training and program included fist 48 hours after injury RICE (Rest, ice, Compression and elevation), non steroid anti inflammatory drug, steroid, TENS, ultrasound, sub maximal isometric adduction with knees bent, hip passive range of motion in pain free range, upper body and trunk strengthening, contra lateral lower extremity strengthening, flexibility program for non involved muscle, bilateral balance board, bicycling swimming, squat, single limb stance, concentric adduction with weight against gravity, standing with involved foot on sliding board moving in frontal plane, bilateral adduction with sliding board moving in frontal plane, standing resisted stride length on cable column to stimulate skating, slide board, on ice kneeling adductor pull together, lunges in all plane, correct or modify ice, skating technique. Maybe this protocol ought to be followed in our clinical settings and it may be benefited for our clinical physiotherapist and also it may help our sports persons. Every exercise should be done for 10 to 15 repetitions with warm up and cool down sessions for 8 to 12 weeks.

Conclusion

Groin pain is totally curable by taking physiotherapy treatment. In the perspective of our country it should be develop to make guideline of all the sports injury for athletes. But it is quite difficult due to lack of research in our country. But it is important to develop research based evidence of physiotherapy practice. Physiotherapist's practice which is evidence based in all aspect of health care. There are few studies on sports and sports injures in Bangladesh. So, it is recommended that the next generation of physiotherapy members should continue study regarding this area. This may involve use of large sample size and participants from different districts of Bangladesh. However, this exercise protocol, if learned properly in a clinical setting by an educated instructor or physiotherapist should not entail any major risk. So it can be applicable in our clinical setting for the betterment of groin strain related condition for athletes. It

can be concluded that physical therapy including exercise is effective and if it is used combindly with other therapy we can get a better response by that.

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