



Effectiveness of Adductor Muscle Stretching Exercises Combined with Conventional Physiotherapy in Groin-Injured Male Athletes: A Randomized Controlled Trial

Shourav Kanti Dey^{1*} and Md Mostafijur Rahman²

Abstract

Background: Groin injuries are common among athletes involved in sports requiring sprinting, kicking, and rapid changes of direction. Adductor muscle tightness and reduced hip range of motion are considered important contributing factors.

Objective: To determine the effectiveness of adductor muscle stretching exercises combined with conventional physiotherapy compared with conventional physiotherapy alone in groin-injured male athletes.

Methods: A randomized controlled trial was conducted among 12 male athletes with groin injuries at Bangladesh Krira Shikkha Protishtan (BKSP), Savar, Dhaka. Participants were randomly allocated into an experimental group (n=6) receiving adductor stretching exercises plus conventional physiotherapy and a control group (n=6) receiving conventional physiotherapy only. Both groups received six treatment sessions. Pain intensity was assessed using the Visual Analogue Scale (VAS), and hip range of motion (ROM) was measured using a goniometer.

Results: The experimental group demonstrated greater pain reduction than the control group in all assessed activities. Mean reductions in pain scores were 4.3 vs 1.8 during rest, 3.5 vs 2.1 during standing, 3.2 vs 1.5 during walking, and 3.5 vs 1.5 during running. Improvements were also greater during hip flexion, extension, abduction, and adduction movements. The experimental group demonstrated significantly greater improvements in hip range of motion across all measured movements.

Conclusion: Adductor muscle stretching exercises combined with conventional physiotherapy were more effective in reducing pain and improving hip ROM than conventional physiotherapy alone in groin-injured male athletes.

Keywords: Groin injury; Adductor stretching; Physiotherapy; Athletes; Hip range of motion

Introduction

Groin injuries are among the most common lower-limb musculoskeletal injuries in athletes, particularly in sports requiring sprinting, kicking, rapid acceleration, deceleration, and frequent changes of direction. They account for approximately 5–18% of all sports-related injuries and are especially prevalent in football, soccer, cricket, hockey, rugby, basketball, tennis, and ice hockey [1,2]. In addition, athletes participating in running-based sports such as track and field are also at considerable risk of developing groin injuries due to repetitive loading of the hip and pelvic musculature [3].

Affiliation:

¹Specialist Physiotherapist, Noorjahan Hospital Pvt. Ltd., Sylhet, Bangladesh

²Senior Physiotherapist, Vision Physiotherapy Center, House 42 Lake Drive Rd, Dhaka 1230, Bangladesh

*Corresponding Author:

Shourav Kanti Dey, Specialist Physiotherapist, Noorjahan Hospital Pvt. Ltd., Sylhet, Bangladesh.

Citation: Shourav Kanti Dey, Md Mostafijur Rahman. Effectiveness of Adductor Muscle Stretching Exercises Combined with Conventional Physiotherapy in Groin-Injured Male Athletes: A Randomized Controlled Trial. Journal of Orthopedics and Sports Medicine. 8 (2026): 245-248.

Received: July 19, 2026

Accepted: July 24, 2026

Published: July 31, 2026

Groin injury, commonly referred to as an adductor strain or groin pull, involves stretching, partial tearing, or complete rupture of one or more muscles of the hip adductor group. These muscles originate from the pelvis and insert along the femur, playing a vital role in hip adduction, pelvic stability, and lower-limb movement during sporting activities [4]. Injury typically occurs during forceful eccentric contraction or excessive stretching of the adductor muscles, particularly during sudden lateral movements, kicking, or rapid acceleration from a stationary position [5].

Athletes with groin injuries often present with pain, tenderness, reduced hip range of motion (ROM), muscle weakness, and impaired functional performance. Pain may be localized to the adductor region or may radiate to the lower abdomen, pubic symphysis, hip joint, or lumbar spine, making diagnosis and management challenging [6]. Persistent groin pain can substantially affect athletic performance, increase time away from sport, and predispose athletes to recurrent injuries if not appropriately managed.

Several intrinsic and extrinsic risk factors have been associated with groin injuries. Reduced hip ROM, adductor muscle weakness, muscle stiffness, previous groin injury, strength imbalance between the hip adductor and abductor muscles, inadequate preseason conditioning, and poor flexibility have all been identified as potential contributors [5,7]. Although preventive programs targeting these risk factors have been implemented in many sporting settings, groin injuries continue to represent a significant clinical challenge [8].

Conservative physiotherapy remains the first-line treatment for most adductor-related groin injuries. Common interventions include therapeutic exercise, stretching, strengthening programs, manual therapy, soft-tissue mobilisation, cryotherapy, therapeutic modalities, and progressive return-to-sport rehabilitation [2]. Among these interventions, stretching exercises are frequently prescribed because they improve muscle extensibility, joint flexibility, and hip range of motion while reducing muscle tension and facilitating normal movement patterns [9]. Adequate flexibility of the adductor muscles may also decrease mechanical stress on the musculotendinous unit and reduce the likelihood of recurrent injury.

Despite the widespread clinical use of stretching exercises, evidence regarding their additional benefit when combined with conventional physiotherapy remains limited, particularly in low- and middle-income countries. In Bangladesh, published research investigating the effectiveness of adductor muscle stretching in athletes with groin injuries is scarce. Consequently, physiotherapists often rely on international evidence, which may not fully reflect the characteristics of local athletes or rehabilitation practices.

Therefore, this study aimed to evaluate the effectiveness of adductor muscle stretching exercises combined with conventional physiotherapy compared with conventional physiotherapy alone in male athletes with groin injuries. The findings of this study may contribute to evidence-based physiotherapy practice, assist clinicians in selecting effective rehabilitation strategies, and improve functional recovery and return-to-sport outcomes among athletes in Bangladesh.

Methods

This randomized controlled trial (RCT) with a pre-test/post-test design was conducted at Bangladesh Krira Shikkha Protishtan (BKSP), Savar, Dhaka, Bangladesh. Twelve male athletes with clinically diagnosed groin injuries were randomly allocated to an experimental group ($n = 6$) or a control group ($n = 6$) using an odd-even number sequence. Eligible participants were active BKSP athletes who sustained groin injuries during sports activities, completed six physiotherapy sessions, and provided written informed consent. Both groups received six sessions of conventional physiotherapy, including manual therapy, deep transverse friction massage, accessory mobilization, myofascial release, cryotherapy, therapeutic ultrasound, and soft-tissue techniques. The experimental group additionally performed adductor muscle stretching exercises, progressing from 10-second to 30-second static holds, three repetitions daily. Pain intensity was measured using the Visual Analogue Scale (VAS), and hip range of motion was assessed with a universal goniometer before and after treatment. Data were analyzed using descriptive statistics and independent-samples t -tests, with statistical significance set at $p < 0.05$. Ethical approval and written informed consent were obtained from all participants.

Results

A total of 12 male athletes with groin injuries participated in the study and completed the intervention. Six participants were allocated to the experimental group (adductor muscle stretching plus conventional physiotherapy) and six to the control group (conventional physiotherapy alone). The mean age was 17 years in the experimental group and 16 years in the control group.

Pain Outcomes

Both groups demonstrated reductions in pain intensity following six treatment sessions. However, the experimental group showed greater improvements across all functional activities than the control group (Table 1). The greatest reduction was observed during resting (mean difference = 4.3 vs. 1.8), followed by hip adduction (3.8 vs. 1.3), hip abduction (3.7 vs. 1.7), standing (3.5 vs. 2.1), running (3.5 vs. 1.5), walking (3.2 vs. 1.5), hip flexion (3.3 vs. 2.0), and hip extension (3.2 vs. 1.5).

Table 1: Mean reduction in VAS pain scores after treatment.

Outcome	Experimental (n=6)	Control (n=6)
Pain at rest	4.3	1.8
Pain during standing	3.5	2.1
Pain during walking	3.2	1.5
Pain during running	3.5	1.5
Pain during hip flexion	3.3	2
Pain during hip extension	3.2	1.5
Pain during hip abduction	3.7	1.7
Pain during hip adduction	3.8	1.3

Hip Range of Motion

Participants in the experimental group demonstrated greater improvements in hip range of motion than those in the control group. Independent-samples *t*-test showed statistically significant differences between groups for all measured hip movements (Table 2).

Table 2: Between-group comparison of hip range of motion.

Hip movement	t value	p value
Flexion	5.15	<0.001
Extension	4.23	<0.005
Abduction	5.95	<0.001
Adduction	10.2	<0.001
Medial rotation	5.61	<0.001
Lateral rotation	7.71	<0.001

Overall, the addition of adductor muscle stretching exercises to conventional physiotherapy resulted in greater reductions in pain intensity and significantly greater improvements in hip range of motion compared with conventional physiotherapy alone.

Discussion

This randomized controlled trial evaluated the effectiveness of adductor muscle stretching exercises combined with conventional physiotherapy in male athletes with groin injuries. The findings demonstrated that participants who received adductor stretching in addition to conventional physiotherapy experienced greater reductions in pain intensity and greater improvements in hip range of motion (ROM) than those who received conventional physiotherapy alone.

Pain intensity decreased in both groups after six treatment sessions; however, the reduction was consistently greater in the experimental group. The largest improvements were observed during rest, hip adduction, and hip abduction, indicating that adductor stretching may effectively reduce pain associated with functional activities. Improved muscle flexibility may

decrease tension within the adductor musculotendinous unit, thereby enhancing movement efficiency and reducing mechanical stress during sports activities.

The experimental group also demonstrated significantly greater improvements in hip ROM than the control group. Statistically significant differences were observed for hip flexion ($t = 5.15, p < 0.001$), extension ($t = 4.23, p < 0.005$), abduction ($t = 5.95, p < 0.001$), adduction ($t = 10.20, p < 0.001$), medial rotation ($t = 5.61, p < 0.001$), and lateral rotation ($t = 7.71, p < 0.001$). These findings suggest that incorporating adductor stretching into rehabilitation programs may improve hip mobility and functional recovery.

The present findings are consistent with previous studies reporting that flexibility and stretching interventions improve hip function and reduce pain in athletes with groin injuries. Improved flexibility of the adductor muscles may restore normal movement patterns, reduce muscle stiffness, and decrease the risk of recurrent injury. Previous research has also emphasized that combining stretching with conventional rehabilitation provides better functional outcomes than conventional treatment alone [2,4].

This study has several limitations. First, the sample size was small ($n = 12$), limiting the generalizability of the findings. Second, the intervention period consisted of only six treatment sessions over two weeks, preventing assessment of long-term outcomes and recurrence rates. Third, participants were recruited from a single sports institution, which may limit external validity. Future studies should include larger multicentre samples, longer follow-up periods, and functional outcome measures such as return-to-sport performance and quality of life to further evaluate the effectiveness of adductor stretching programs.

Conclusion

This randomized controlled trial found that adductor muscle stretching exercises combined with conventional physiotherapy were more effective than conventional physiotherapy alone in reducing pain and improving hip range of motion among male athletes with groin injuries. Participants in the experimental group demonstrated greater improvements in pain during functional activities and hip mobility after six treatment sessions. These findings suggest that adductor stretching may be a valuable adjunct to conventional physiotherapy for groin injury rehabilitation. However, the small sample size and short intervention period limit the generalizability of the results. Further large-scale randomized controlled trials with longer follow-up are recommended.

Recommendations

Future studies should include larger sample sizes, multicentre recruitment, longer follow-up periods, and

blinded assessments to confirm the effectiveness of adductor muscle stretching exercises. Incorporating functional outcome measures and return-to-sport evaluation will strengthen the evidence for rehabilitation of athletes with groin injuries.

References

1. Tyler TF, Silvers HJ, Gerhardt MB, et al. Groin injuries in sports medicine. *Sports Health* 2 (2010): 231-236.
2. Serner A, van Eijck CH, Beumer BR, et al. Study quality on groin injury management remains low: A systematic review on treatment of groin pain in athletes. *British Journal of Sports Medicine* 49 (2015): 813-818.
3. Caudill P, Nyland J, Smith C, et al. Sports hernias: A systematic literature review. *British Journal of Sports Medicine* 42 (2008): 954-964.
4. Morelli V, Weaver V. Groin injuries and groin pain in athletes: Part 1. Primary Care: Clinics in Office Practice 32 (2005): 163-183.
5. Ibrahim A, Murrell GAC, Knapman P. Adductor strain and hip range of movement in male professional soccer players. *Journal of Orthopaedic Surgery* 15 (2007): 46-49.
6. Machotka Z, Kumar S, Perraton LG. A systematic review of the literature on the effectiveness of exercise therapy for groin pain in athletes. *BMC Sports Science, Medicine and Rehabilitation* 1 (2009): 5.
7. Thorborg K, Hölmich P, Christensen R, et al. The Copenhagen Hip and Groin Outcome Score (HAGOS): Development and validation according to the COSMIN checklist. *British Journal of Sports Medicine* 45 (2011): 478-491.
8. Sedaghati P, Alizadeh MH, Shirzad E, et al. Review of sport-induced groin injuries. *Trauma Monthly* 18 (2013): 107-112.
9. Hölmich P, Amager AC. Groin injuries in athletes: Development of clinical entities, treatment, and prevention. PhD Thesis. University of Copenhagen, Denmark (2014).



This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC-BY\) license 4.0](https://creativecommons.org/licenses/by/4.0/)