WebLog Journal of Physical Medicine

Research Article
Published: 24 Oct, 2026

Prevalence of Athletic Pubalgia Among Recreational College-Going Male Football Players

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Abstract

Background: Athletic pubalgia is a common cause of lower abdominal and groin pain in athletes performing repetitive running, kicking, cutting and rapid changes of direction. Recreational college-going players may be at risk because of variable training and conditioning.

Objective: To determine the prevalence of athletic pubalgia among recreational college-going male football players aged 18-24 years and assess hip and groin function among those classified as having it.

Methods: A cross-sectional study of 96 recreational male football players from colleges in North Bengaluru, recruited by purposive sampling. Participants meeting three or more of five clinical criteria were classified as having athletic pubalgia: history of groin or lower abdominal pain, positive adductor squeeze test, pain exacerbated by activity, tenderness over the pubic symphysis or adductor tendon region, and pain during the abdominal curl test. Hip and groin function was assessed using the Copenhagen Hip and Groin Outcome Score (HAGOS).

Results: Athletic pubalgia was observed in 42 of 96 participants (43.8%; 95% CI: 33.6%-54.3%). In an exploratory comparison, participants classified as having athletic pubalgia reported higher weekly playing frequency (median 3.5 *vs.* 2.0 days/week; $p = 0.044$). Among these participants, the lowest mean HAGOS domain score was for Pain (40.65 ± 7.12) and the highest for hip and groin-related Quality of Life (47.88 ± 10.12).

Conclusion: Athletic pubalgia was observed in 43.8% of recreational college-going male football players in this purposively sampled group. Those classified as having it reported higher weekly playing frequency and hip and groin symptoms, mainly pain.

Keywords: Athletic Pubalgia; Groin Pain; Football; HAGOS; Recreational Athletes

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Received Date: *09 Oct 2026*
Accepted Date: *22 Oct 2026*
Published Date: *24 Oct 2026*

Citation:
Arunkumar KV, Chinmayi Rangaraju, Devadhan KD, Malavika TN. Prevalence of Athletic Pubalgia Among Recreational College-Going Male Football Players. WebLog J Phys Med. wjpm.2026.j2405. https://doi.org/10.5281/zenodo.23880194

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Introduction

Athletic pubalgia is a condition characterized by persistent groin and lower abdominal pain or pain that is precipitated by activity. It has been known by various terms, including sports hernia, sportsman's hernia, sportsman's groin, sports pubalgia, Gilmore's groin and inguinal disruption [2-4]. This wide range of terminology reflects the difficulty in defining the condition as a distinct entity. Current clinical practice focuses on localizing the source of groin pain, which may be the adductor muscles, the iliopsoas muscles, the pubic area or the inguinal region. Groin pain associated with the inguinal region is most closely related to the condition traditionally known as sports hernia, although a true hernia is not always present, and some clinicians now prefer the term inguinal disruption [2-4].

Athletic pubalgia is believed to be caused by repetitive mechanical stress and imbalanced pelvic muscle function [5, 6]. An imbalance between the abdominal and hip adductor muscles can lead to reduced stability of the pelvis, which can increase the stress on the groin during demanding sporting movements [5, 6]. The pubic area acts as a point of force transfer between these muscle groups. Movements such as kicking, trunk rotation, turning, sprinting, acceleration, deceleration and rapid changes of direction can cause irritation and pain in the groin [5, 6]. Football players perform many of these movements, which places them at risk of such pain. Inadequate recovery, muscle imbalance, reduced flexibility or sudden increases in training intensity can add to this stress and lead to persistent groin pain [5, 6].

Clinically, athletic pubalgia usually presents as gradually developing discomfort in the groin or lower abdomen, which is exacerbated by sport and improved by rest [5, 7]. It is often experienced around the lower abdomen, the pubic region or the proximal adductor area, and may be unilateral. Sometimes it radiates to the other side or into the scrotum [5, 7]. Movements such as starting and stopping, kicking, twisting, turning, side-to-side movement and rapid changes of direction can provoke symptoms [5, 7]. Activities that elevate intra-abdominal pressure, such as coughing, sneezing, sit-ups or the Valsalva maneuver, can also provoke the pain [5, 7]. A thorough assessment should rule out hip joint problems, such as impingement, labral pathology and adductor injury, which are associated with similar groin pain [5, 7, 8].

Athletic pubalgia is under-recognized among recreational college-going football players. Most studies are on elite or professional athletes, and little is known about the prevalence or impact of this problem in college students [1, 9, 10]. Recreational players may experience inconsistent training loads, conditioning and access to sports medicine, which may increase the chance of undetected groin issues [1, 9, 10]. Early signs may be overlooked, leading to delayed identification, persistent pain, reduced performance, prolonged time off sport and increased risk of the problem becoming chronic [1, 6, 10].

Simple tests such as the adductor squeeze test and abdominal curl test, and a standardized multi-criteria assessment, may aid early detection and reduce the impact of such symptoms on sport and daily life [5, 7, 8]. Kachingwe and Grech described a set of five clinical findings associated with athletic pubalgia [13]. These were the basis for the clinical criteria used in this study. This study was conducted to estimate the prevalence of athletic pubalgia among recreational college-going male football players, and to assess hip and groin function among those classified as having it, using the Copenhagen Hip and Groin Outcome Score (HAGOS) [11].

Materials and Methods

Study design

A cross-sectional study was conducted to estimate the prevalence of athletic pubalgia among recreational college-going male football players.

Sample size

The sample size was calculated using the single-proportion formula, assuming an expected prevalence of 50%, 10% absolute precision and 95% confidence. The formula used was $n = Z^2P(1-P)/d^2$, where $Z = 1.96$, $P = 0.50$ and $d = 0.10$. The required sample size was 96 participants. Accordingly, 96 recreational college-going male football players were included in the study.

Study setting and participants

The study was conducted in colleges in North Bengaluru. A total of 96 recreational male football players were recruited by purposive sampling over six months, including data collection.

Inclusion criteria

1. Male recreational football players aged 18-24 years.

2. Students who played football at least once a week.

3. Participants willing to provide written informed consent.

Exclusion criteria

1. History of hip, pelvic or groin surgery.

2. Recent fracture or acute injury of the hip, pelvis or lower limb.

3. Diagnosed neurological disorders or systemic musculoskeletal conditions affecting the lower limb.

Data collection procedure

Ethical approval was obtained from the Institutional Ethical Committee of Acharya's NR Institute of Physiotherapy, Acharya Institutes, Bengaluru, India (Approval No.: AI/IEC/04/ANRIPT-06/2026).

A. College-level football players were informed about the objectives and procedures of the study.

B. Participants were screened against the inclusion and exclusion criteria.

C. Written informed consent was taken from those who met the criteria and were willing to take part.

D. Each participant was assessed for athletic pubalgia using the five clinical findings described by Kachingwe and Grech [13]:

1. History of groin or lower abdominal pain.

2. Positive adductor squeeze test.

3. Pain exacerbated by physical activity.

4. Tenderness over the pubic symphysis or adductor tendon region.

5. Pain during the abdominal curl test.

E. For this study, participants who met three or more of the five criteria were classified as having athletic pubalgia. Those who met fewer than three were classified as not having it.

F. Participants classified as having athletic pubalgia then completed the HAGOS questionnaire to assess hip and groin symptoms and function [11].

G. Demographic, clinical and questionnaire data were recorded and entered for statistical analysis.

Assessment tools

Adductor squeeze test: The participant lay supine with the hips flexed to 45° and the knees flexed to 90°. The examiner placed a fist between the knees, and the participant was asked to squeeze the knees together against resistance. The test was positive if it reproduced pain in the groin or pubic area [8, 13].

Abdominal curl test: The participant performed a curl-up while the examiner observed for pain in the groin, lower abdomen or pubic area. The test was positive if it reproduced the participant's usual symptoms [13].

Outcome measure

The Copenhagen Hip and Groin Outcome Score (HAGOS) was used to assess hip and groin symptoms and function. It has six domains: Symptoms, Pain, Activities of Daily Living, Function in Sport and Recreation, Participation in Physical Activities, and hip and/or groin-related Quality of Life. Each domain is scored from 0 to 100, where 100 means no problems and 0 means extreme problems [11].

Statistical analysis

The data were analyzed using IBM SPSS Statistics. Normality was checked with the Shapiro-Wilk test. Continuous variables were summarized as mean ± standard deviation for descriptive purposes. As the data were non-normally distributed, the Mann–Whitney U test was used to compare participants classified with and without athletic pubalgia, and results were reported as median and Interquartile Range (IQR). Categorical data were shown as numbers and percentages. Prevalence was calculated as the proportion of participants who met three or more of the five criteria. A *p*-value <0.05 was considered statistically significant. Group comparisons were unadjusted and are considered exploratory.

Results

A total of 96 recreational college-going male football players were included in the study. The results are presented under the following sections: prevalence of athletic pubalgia, sample characteristics, comparison between participants classified with and without athletic pubalgia, HAGOS domain scores among participants classified as having athletic pubalgia, and clinical findings among participants classified as having athletic pubalgia.

Prevalence of athletic pubalgia

Athletic pubalgia was observed in 43.8% of participants (42/96; exact 95% CI: 33.6%-54.3%) (Table 1).

Sample characteristics

The mean age of the participants was 21.30 ± 1.61 years, with a mean BMI of 22.46 ± 3.26 kg/m^2. Participants had a mean of 9.01 ± 3.21 years of football-playing experience, played football on 3.17 ± 1.34 days per week, and had a mean session duration of 81.04 ± 27.89 minutes (Table 2).

Comparison between athletic pubalgia groups

Participants classified as having athletic pubalgia demonstrated a significantly higher weekly playing frequency than those classified without athletic pubalgia (median 3.5 *vs.* 2.0 days per week; $p = 0.044$). No statistically significant differences were observed between the two groups with respect to age, BMI, years of playing football, or duration per session (Table 3).

Table 1: Prevalence of athletic pubalgia among recreational college-going male football players (n = 96).

Athletic pubalgia	n	%
Present	42	43.8
Absent	54	56.2
Total	96	100.0

Table 2: Sample characteristics of the study participants (n = 96).

Variable	Mean ± SD
Age (years)	21.30 ± 1.61
Height (cm)	173.93 ± 7.59
Weight (kg)	67.98 ± 10.92
BMI (kg/m^2)	22.46 ± 3.26
Years of playing football	9.01 ± 3.21
Playing frequency (days/week)	3.17 ± 1.34
Duration per session (minutes)	81.04 ± 27.89

Table 3: Comparison between athletic pubalgia groups.

Variable	AP present, Median (IQR), (n = 42)	AP absent, Median (IQR), (n = 54)	p-value
Age (years)	21.0 (20.0-22.0)	21.0 (20.0-22.0)	0.674
BMI (kg/m^2)	21.80 (20.10-24.50)	22.22 (20.25-24.10)	0.626
Years of playing	10.0 (7.0-11.5)	10.0 (6.0-11.0)	0.225
Playing frequency (days/week)	3.5 (3.0-4.0)	2.0 (2.0-4.0)	0.044*
Duration per session (minutes)	90.0 (60.0-90.0)	60.0 (60.0-90.0)	0.467

Abbreviations: AP = Athletic Pubalgia; IQR = Interquartile Range
*p <0.05 was considered statistically significant (Mann-Whitney U test).

HAGOS domain scores among participants classified as having athletic pubalgia

Among participants classified as having athletic pubalgia, the Pain domain showed the lowest mean score (40.65 ± 7.12), and the hip and groin-related Quality of Life domain showed the highest mean score (47.88 ± 10.12). The difference between domains was small relative to the variability within each domain, and no formal comparison between domains was made. HAGOS was not administered to participants without athletic pubalgia, so no comparison group is available (Table 4).

Clinical findings among participants classified as having athletic pubalgia

All 42 participants classified as having athletic pubalgia reported a history of groin or lower abdominal pain and pain exacerbated by physical activity. A positive adductor squeeze test was observed in 38 participants (90.5%), tenderness over the pubic symphysis or adductor tendon region in 36 participants (85.7%), and pain during the abdominal curl test in 31 participants (73.8%) (Table 5).

Discussion

This study estimated the prevalence of athletic pubalgia among recreational college-going male football players and compared demographic and exposure characteristics between those classified with and without athletic pubalgia. Out of 96 participants, 42 met three or more of the five clinical criteria, giving a prevalence of 43.8% (95% CI: 33.6%-54.3%).

Football movements like sprinting, kicking, cutting, pivoting and sudden changes of direction can place stress on the groin that may

Table 4: HAGOS domain scores (n = 42).

HAGOS domain	Median (IQR)	Mean ± SD
Symptoms	45.0 (40.0-50.0)	45.28 ± 7.29
Pain	40.0 (35.0-45.0)	40.65 ± 7.12
Activities of daily living	45.0 (40.0-50.0)	44.65 ± 6.86
Sport and recreation	45.0 (37.5-50.0)	44.25 ± 9.80
Participation in physical activities	43.0 (37.5-50.0)	43.65 ± 8.50
Hip and groin-related quality of life	45.5 (40.0-55.0)	47.88 ± 10.12

Table 5: Clinical findings among participants with athletic pubalgia.

Clinical finding	%
History of groin or abdominal pain	100
Positive adductor squeeze test	90.5
Pain exacerbated by physical activity	100
Pubic symphysis or adductor tendon tenderness	85.7
Pain during abdominal curl test	73.8

lead to pain, especially if recovery, conditioning or load management is inadequate [5, 6].

Participants classified as having athletic pubalgia reported playing more often each week than those not classified as having it. In the classified group, the median was 3.5 playing days per week, compared with 2.0 in the group without athletic pubalgia (p = 0.044). This finding is exploratory, since it is based on unadjusted comparisons of several variables and overlapping interquartile ranges. It may indicate that greater cumulative football exposure is associated with athletic pubalgia [5, 6]. Since this is a cross-sectional study, it cannot be determined if a higher playing frequency contributed to symptoms or if other factors, such as previous injury, playing position or competitive level, explain the association. Future prospective studies that objectively monitor training load are needed to clarify this relationship. In this sample, weekly playing frequency was the only variable that differed significantly between the two groups.

All participants classified as having athletic pubalgia reported groin or abdominal pain that was aggravated by physical activity. A positive adductor squeeze test was observed in 90.5%, tenderness of the pubic symphysis or adductor tendon in 85.7%, and pain during the abdominal curl test in 73.8%. These findings support the use of a comprehensive clinical assessment based on multiple criteria rather than a single test [5, 7, 8].

The HAGOS questionnaire showed hip and groin-related symptoms across all six domains in participants classified as having athletic pubalgia [11]. The Pain domain had the lowest mean score, whereas the hip and groin-related Quality of Life domain had the highest. However, the differences between domains were small compared with the spread within each domain. No comparison group or normative reference was available, so these scores should be interpreted descriptively [11].

A clinical examination including history of activity-related pain, adductor squeeze test, abdominal curl test and palpation of the pubic symphysis and adductor region may help identify recreational football players with groin pain [5, 7, 8]. Recording how often a player plays each week may also be useful when assessing football-related groin symptoms.

Strengths and Limitations

This study focused on a recreational college-going population that is underrepresented in athletic pubalgia research, and used a standardized multi-criteria clinical classification, a prespecified sample size calculation and the validated HAGOS questionnaire [11]. Limitations are the cross-sectional design and purposive sampling. HAGOS data were collected only from participants classified as having athletic pubalgia, and group comparisons were not adjusted for factors such as previous groin injury and playing position.

Future Research

Future research should track participants longitudinally to investigate the relationship between football exposure, the emergence of symptoms and athletic pubalgia. Researchers should also include objective monitoring of training load, testing of adductor strength and, where appropriate, imaging. To establish whether early detection and targeted rehabilitation can lessen the burden of athletic pubalgia among recreational football players, controlled trials of screening programs and preventive exercises are required [12]. Future research should include female players and those competing at other levels to determine whether these findings apply more broadly.

Conclusion

Athletic pubalgia was identified in 43.8 % of the recreational college-going male football players, according to this study. In the exploratory analysis, those classified as having athletic pubalgia also reported playing more frequently each week, whereas age, BMI, years of football experience, and session duration showed no significant differences between the groups. Participants classified as having athletic pubalgia reported hip and groin-related symptoms across all HAGOS domains, with the Pain domain showing the lowest mean score. These results highlight the importance of early identification and thorough clinical assessment of groin pain within this population.

Acknowledgements

The authors thank Acharya's NR Institute of Physiotherapy, Acharya Institutes, Bengaluru, for institutional support, and all football players who participated in this study.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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