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Surgery for Groin Pain in Athletes

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Coverage

Surgical treatment of groin pain in athletes **is considered experimental, investigational and/or unproven**.

Policy Guidelines

Groin pain in athletes may also be identified as the following: athletic pubalgia, Gilmore groin, osteitis pubis, pubic inguinal pain syndrome, inguinal disruption, slap shot gut, sportsmen groin, footballers groin injury complex, hockey groin syndrome, athletic hernia, sports hernia, or core muscle injury.

Description

Sports-related groin pain, commonly known as athletic pubalgia or sports hernia, is characterized by disabling, activity-dependent, lower abdominal and groin pain not attributable to any other cause. Athletic pubalgia is most frequently diagnosed in athletes, particularly those

who participate in sports that involve rapid and repetitive twisting and turning while moving, such as soccer, hockey, and football, etc. For patients who fail conservative therapy, surgical repair of any defects identified in the muscles, tendons, or nerves has been proposed.

Groin Pain in Athletes

Despite the myriad of terms used to describe this condition, the underlying pathophysiology of sports hernias remains elusive, as no single anatomical structure is consistently implicated in its development. This lack of consensus has led to diagnostic challenges and varying treatment approaches. Alternative names include Gilmore groin, osteitis pubis, pubic inguinal pain syndrome, inguinal disruption, slap shot gut, sportsmen groin, footballers groin injury complex, hockey groin syndrome, athletic hernia, sports hernia, and core muscle injury. In a systematic review involving 1571 patients, Kraeutler et al. (2021) found that the most common terminology used to describe the diagnosis was "athletic pubalgia," followed by "sports hernia." (1) A 2015 consensus agreement has recommended the more general term *groin pain in athletes*, with specific diagnoses of adductor-related, iliopsoas-related, inguinal-related, and pubic-related groin pain. (2)

Some believe the groin pain is an occult hernia process, a pre-hernia condition, or an incipient hernia, with the major abnormality being a defect in the transversalis fascia. However, the term “sports hernia” is a misnomer because of the **absence** of a hernia on physical examination or imaging, and a hernia is **not** revealed during surgery. Athletic pubalgia is considered an overuse injury in which the external oblique muscle and surrounding tendons and/or the transverse abdominis or internal oblique muscles are worn down or partially torn.

When diagnosing sports hernias or athletic pubalgia, it is crucial for clinicians to consider a range of possible differential diagnoses. These conditions may present with similar symptoms, such as groin pain or discomfort, but require different management and treatment approaches. Some of the key differential diagnoses to consider include inguinal or femoral hernia, hip adductor strain, rectus abdominis strain, femoroacetabular impingement (FAI), osteitis pubis, bursitis, and snapping hip syndrome.

<u>Diagnosis</u>

A diagnosis of groin pain in athletes is based primarily on history, physical exam, and imaging. The clinical presentation will generally be a gradual onset of progressive groin pain associated with activity. A physical exam will not reveal any evidence for a standard inguinal hernia or groin muscle strain. Imaging with magnetic resonance imaging (MRI) or ultrasound is generally done as part of the workup. It is important to note that while imaging tests like MRI can be helpful in evaluating potential causes of groin pain, a diagnosis of athletic pubalgia primarily relies on a thorough physical examination and patient history and cannot be ruled out by any single imaging study.

In addition to exclusion of other sources of lower abdominal and groin pain (e.g., stress fractures, FAI, labral tears), imaging may identify injury to the soft tissues of the groin and abdominal wall.

Treatment

Conservative

Many injuries will heal with conservative treatment, which includes rest, icing, and nonsteroidal anti-inflammatory drugs for a six- to eight-week period, followed by at least six weeks of rehabilitation exercises and a gradual return to sports activity. A physical therapy (PT) program that focuses on strength and coordination of core muscles acting on the pelvis may improve recovery. In a 1999 study, 68 athletes with chronic adductor-related groin pain were randomized to 8 to 12 weeks of an active training program PT that focused on strength and coordination of core muscles, particularly adductors, or to standard PT without active training. (3) At 4 months post-treatment, 68% of patients in the active training group had returned to sports without groin pain compared with 12% in the standard PT group. At 8- to 12-year follow-up, 50% of athletes in the active training group rated their outcomes as excellent compared with 22% in the standard PT group. (4) For in-season professional athletes, injections of corticosteroid or platelet-rich plasma, or a short corticosteroid burst with taper have also been used.

Surgical

Laparoscopic and open surgical procedures have been proposed for treating athletic pubalgia that is unresolved after failed conservative treatments. Laparoscopic approaches may include totally extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) repair for mesh placement, whereas open surgical techniques include both suture and mesh repair. Procedures may also include muscle or nerve release. There are many concerns when considering surgical treatment for athletic pubalgia: there is no standard definition or terms for the symptom complex in elite athletes; there is no standard defined successful response to conservative treatments and/or surgical exploration and repair; and there is variance in the proposed surgical procedures as well as results in the various surgical approaches.

Regulatory Status

Treatment of sports-related groin pain is a surgical procedure and, as such, is not subject to regulation by the U.S. Food and Drug Administration.

Rationale

Medical policies assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. Randomized controlled trials are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

Sports-related groin pain has a variable natural history, with an uncertain time course of the disorder. In addition, pain and functional ability are subjective outcomes and, thus, may be particularly susceptible to placebo effects. Because of these factors, controlled trials are essential to demonstrate the clinical effectiveness of surgical treatment of athletic pubalgia compared with alternatives such as continued medical management.

In 2015, a consensus report called the Doha agreement recommended use of specific diagnoses of adductor-related, iliopsoas-related, inguinal-related, or pubic-related groin pain in place of athletic pubalgia or sportsman's hernia. (2) However, these terms have yet to be routinely used in the published literature. Because it is not possible to determine which patient subgroups were studied, the terminology from the published reports is used. The only validated patient-reported outcome measure for pain and dysfunction in the groin area in young and middle-aged patients that were identified in the Doha report is the Copenhagen Hip and Groin Outcome Score (HAGOS). (5)

Laparoscopic and open surgical procedures have been proposed for treating athletic pubalgia that is unresolved after failed conservative treatments. There are many concerns with this proposed treatment: there is no standard definition or terms for the symptom complex in elite athletes; there is no standard defined work-up or defined successful response to conservative treatments and/or surgical exploration and repair; and there is variance in the proposed surgical procedures as well as results in the various surgical approaches. There is a paucity of well-designed evidence evaluating athletic pubalgia surgery compared with conservative treatment as well as studies comparing various proposed surgical techniques. It is difficult to compare one study to another when evaluating the published literature because each study uses different terminology and assigns different definitions to terms such as athletic pubalgia and sports hernia. Serner et al. (2015) reported 33 different terminologies used in 72 studies. (6) Despite the prevalence of the condition, the literature contains contradictory information regarding the etiology, presentation, diagnosis, and management of groin pain in the athletic patient.

Kraeutler et al. (2021) performed a systematic review of reported terminologies, surgical techniques, preoperative diagnostic measures, and geographic differences in the treatment of core muscle injury (CMI)/athletic pubalgia/inguinal disruption. (1) PubMed, the Cochrane Library, and Embase were searched to identify clinical studies or articles that described a surgical technique to treat CMI refractory to nonoperative treatment. The search phrase used was "core muscle injury" OR "sports hernia" OR "athletic pubalgia" OR "inguinal disruption." The diagnostic terminology, country of publication, preoperative diagnostic measures, surgical technique, and subspecialty of the operating surgeons described in each article were extracted and reported. Thirty-one studies met the inclusion and exclusion criteria, including 3 surgical technique articles and 28 clinical articles (2 Level I evidence, 1 Level II, 4 Level III, and 21 Level IV). A total of 1,571 patients were included. The most common terminology used to describe the diagnosis was "athletic pubalgia," followed by "sports hernia." Plain radiographs and magnetic resonance imaging of the pelvis were the most common imaging modalities used in the preoperative evaluation of CMI/athletic pubalgia/inguinal disruption. Tenderness-to-palpation testing was the most common technique performed during physical examination, although the specific locations assessed with this technique varied substantially. The operating surgeons were general surgeons (16 articles), a combination of orthopaedic and general surgeons (7 articles), or orthopaedic surgeons (5 articles). The most common procedures performed were open or laparoscopic mesh repair, adductor tenotomy, primary tissue (hernia) repair, and rectus abdominis repair. The procedures performed differed on the basis of surgeon subspecialty, geographic location, and year of publication. Researchers determined there are A variety of diagnostic methods and surgical procedures that have been used in the treatment of a CMI/athletic pubalgia/sports hernia/inguinal disruption. These procedures are performed by orthopaedic and/or general surgeons, with the procedures performed differing on the basis of surgeon subspecialty and geographic location. (Level of Evidence: V, systematic review of Level I to V studies)

Randomized Controlled Trials (RCTs)

A RCT by Ekstrand and Ringborg (2001) randomized 66 male soccer players to hernioplasty plus neurotomy (n=17), physical therapy (n=14), strength training of abdominal muscles (n=18), or a no treatment control (n=17). (7) All patients had an incipient hernia determined by herniography and/or positive nerve block test of the ilioinguinal or iliohypogastric nerves. The VAS scores for pain were assessed at 3- and 6-months during coughing, sit-ups, jogging, kicking, and sprinting. The VAS scores for pain in the control, physical therapy, and training groups were generally unchanged at 3 and 6 months, although results were analyzed using nonparametric tests instead of the more appropriate repeated-measures or mixed-effects analysis. The VAS scores improved significantly more for the surgery group than for the 3 other groups ($p<0.01$). Strengths of this study included the active comparison groups and careful selection of patients. However, results are difficult to interpret due to the combined surgical procedure of hernioplasty plus neurotomy.

Paajanen et al. (2011) reported on a multicenter RCT comparing surgical treatment with conservative therapy in 60 athletes who had a suspected sports hernia. (8) Of the 60 athletes (including 31 national-level soccer players), 36 (60%) were totally disabled from their sport and

24 (40%) had a marked limitation in training and competing. For inclusion in the trial, the location of pain had to be rostral to the inguinal ligament in the deep inguinal ring at palpation or at the insertion point of the adductor tendons. Exclusion criteria were isolated tendonitis of the adductor muscles or tendons without groin pain rostral to the inguinal ligament, obvious inguinal hernias, or suspicion of inguinal nerve entrapment. Participants had to have the desire to continue sports at the same level as before the groin injury. Pubic bone marrow edema was identified by magnetic resonance imaging (MRI) in 58% of patients. For participants (38%) who had a normal MRI in the pubic area, the pain was attributed to insufficiency of the posterior wall of the inguinal canal. After at least 3 months of groin symptoms, patients were randomized to surgical or conservative treatment groups. Conservative treatment included at least 2 months of active physical therapy (PT) that focused on improving coordination and strength of core muscles, along with corticosteroid injections and oral anti-inflammatory analgesics. Surgical treatment consisted of laparoscopic total extraperitoneal repair with mesh placed behind the pubic bone and/or posterior wall of the inguinal canal. Ten percent of the patients also underwent open tenotomy of the adductor magnus or longus. Of the 30 surgically treated athletes, 27 (90%) returned to sports activities by 3 months compared with 8 (27%) of the nonoperative group. At 1, 3, 6, and 12 months after treatment, visual analog scale (VAS) scores for pain were significantly lower in the surgically treated group ($p<0.001$). At 12 months, mean VAS scores for pain were less than 2 in both groups. However, among the 30 patients assigned to the conservative treatment group, 7 (23%) crossed over to surgery after 6 months with successful return to sport, 4 (13%) discontinued their sport of choice, and 16 (53%) were left with disabling symptoms after 12 months but chose not to undergo surgery.

Both open and laparoscopic surgical repairs have been described for treatment of groin pain in athletes, but there are no comparative studies. The hypothesis here was that relief of pain would be achieved earlier in patients treated with open minimal suture repair (OMR) than totally extraperitoneal (TEP) repair. A randomized multicenter trial in four European countries was conducted in 2019 by Sheen et al. to compare OMR with TEP. The primary endpoint was complete relief of pain VAS score 20 or less on a scale from 0 to 100 mm) at 1 month. (9) Secondary endpoints included complications, time to return to sporting activity, and number of patients returning to sport within 1 year. A total of 65 athletes (92% men) with a median age of 29 years were enrolled (31 OMR, 34 TEP repair). By 4 weeks after surgery, median preoperative VAS scores had dropped from 70-80 to 10-20 in both groups ($P<0.001$). Relief of pain (VAS score 20 or less) during sports activity 4 weeks after surgery was achieved in 14 of 31 patients after OMR and 24 of 34 after TEP repair ($P=0.047$). Return to full sporting activity was achieved by 16 and 18 patients respectively after 1 month ($P=0.992$), and by 25 versus 31 after 3 months ($P=0.408$). Reviewers determined this RCT comparing OMR with TEP repair for the treatment of chronic pain due to sportsman's hernia showed that both procedures improved pain and allowed return to sporting activities. TEP repair had a slight advantage over OMR for the primary outcome, complete relief of pain at 1 month, but there were no differences in secondary outcomes such as analgesic consumption, complications, time to resumption of low-level and full training, and pain up to 1 year.

Systematic Review

In 2022, Serafim et al. assessed the time required to return to sport (RTS) after conservative versus surgical treatment in athletes for pubalgia. (10) All the studies found by September 2022 investigating the time to RTS after conservative versus surgical treatment in athletes for pubalgia were included. In total, 33 studies were selected for full text assessment, and 10 studies were included in the qualitative analysis. Seven studies reported data on conservative management, two on surgical management and one compared both. A total of 468 subjects were included for analysis; 58.7% (275 of 468) were soccer players, 5.9% (28 of 468) runners, and 3.8% (18 of 468) hockey players. Two studies did not specify the type of sport. Researchers found that individuals undergoing surgery for pubalgia may return to sport three weeks earlier than those receiving conservative treatment. The rate of RTS in athletes who underwent surgery was 90% to 100%, while it ranged from 14% to 100% in those who underwent conservative management, showing great differences in rates of RTS between the different conservative management regimens. However, clinical trials reporting the outcome of surgery are lacking while the investigations on conservative management are more articulated and include more and better validated outcome measures. (Level of Evidence: IV)

Hatem et al. (2021) investigated the outcomes of surgery for chronic groin pain (CGP) in athletes based on surgical technique and anatomic area addressed. (11) Authors found that controversies remain regarding the surgical treatment of inguinal-, pubic-, and adductor-related CGP in athletes. The PubMed and Embase databases were searched for articles meeting inclusion criteria of level 1 to 4 evidence, mean patient age >15 years, and results presented as RTS, pain, or functional outcomes. Quality assessment was performed with the CONSORT (Consolidated Standards of Reporting Trials) statement or MINORS (Methodological Index for Non-randomized Studies) criteria. Techniques were grouped as inguinal, adductor origin, pubic symphysis, combined inguinal and adductor, combined pubic symphysis and adductor, or mixed. Overall, 47 studies published between 1991 and 2020 were included. There were 2737 patients (94% male) with a mean age at surgery of 27.8 years (range, 12-65 years). The mean duration of symptoms was 13.1 months (range, 0.3-144 months). The most frequent sport involved was soccer (71%), followed by rugby (7%), Australian football (5%), and ice hockey (4%). Of the 47 articles reviewed, 44 were classified as level 4 evidence, 1 study was classified as level 3, and 2 randomized controlled trials (RCTs) were classified as level 1b. The quality of the observational studies improved modestly with time, with a mean MINORS score of 6 for articles published between 1991 and 2000, 6.53 for articles published from 2001 to 2010, and 6.9 for articles published from 2011 to 2020. Return to play at preinjury or higher level was observed in 92% (95% CI, 88%-95%) of the athletes after surgery to the inguinal area, 75% (95% confidence interval [CI], 57%-89%) after surgery to the adductor origin, 84% (95% CI, 47%-100%) after surgery to the pubic symphysis, and 89% (95% CI, 70%-99%) after combined surgery in the inguinal and adductor origin. Authors concluded their analysis showed that RTP at preinjury or higher level is more likely after surgery for inguinal-related CGP (92%) in comparison with surgery for adductor-related CGP (75%). However, the majority of studies on the surgical treatment of CGP in athletes was methodologically of low quality because of the lack of comparison groups. Future research on the surgical treatment of CGP in athletes should utilize quantitative and validated functional scores to facilitate comparison among surgical techniques. (Level of Evidence: IV)

The most effective treatment for longstanding groin pain with no hernia present has not been designated. Jorgensen et al. (2019) performed a systematic review to assess whether surgical or conservative treatment are the most effective in reducing pain and thereby returning patients to habitual activity. (12) PubMed, Embase, and Cochrane were searched. They included adults diagnosed with longstanding groin pain with no hernia. Treatment included inguinal hernia repair, tenotomy, and nonsurgical management. Outcomes included return to habitual activity, pain, patient satisfaction, re-operations for the operated patients, and shift to surgery for the non-operated patients. The authors included randomized controlled trials and observational studies with more than 10 participants. In total, 72 studies with 3629 patients were included. Only five studies used a comparison group. After inguinal hernia repair, 94% returned to habitual activity after median 10 weeks, 92% became pain free, and 92% were satisfied with their treatment. After adductor tenotomy, 90% returned to habitual activity after median 12 weeks, 90% became pain free, and 84% were satisfied. After combined inguinal hernia repair and adductor tenotomy, 97% returned to habitual activity after median 10 weeks, 92% became pain free, and 91% were satisfied with their treatment. After nonsurgical management, 80% returned to habitual activity after median 12 weeks, 67% became pain free, 56% were satisfied, and 21% shifted to surgery.

Serner and colleagues (2015) acknowledged that groin pain in athletes is frequent and many different treatment options have been proposed. (6) Currently, the level of evidence for the efficacy of these treatments is unknown. Authors systematically reviewed the literature on the efficacy of proposed treatments for groin pain in athletes. Nine medical databases were searched in May 2014. Inclusion criteria included treatment studies in athletes with groin pain; randomized controlled trials, controlled clinical trials or case series; n>10; outcome measures describing number of recovered athletes, patient satisfaction, pain scores or functional outcome scores. One author screened search results, and two authors independently assessed study quality. A best evidence synthesis was performed. Relationships between quality score and outcomes were evaluated. Seventy-two studies were included for quality analysis. Four studies were high quality. There is moderate evidence that, for adductor-related groin pain, active exercises compared with passive treatments improve success, multimodal treatment with a manual therapy technique shortens the time to return to sports compared with active exercises and adductor tenotomy improves treatment success over time. There is moderate evidence that for athletes with sportsman's hernia, surgery results in better treatment success then conservative treatment. There was a moderate and inverse correlation between study quality and treatment success ($p<0.001$, $r=-0.41$), but not between study quality and publication year ($p=0.09$, $r=0.20$). Authors determined only 6% of publications were high quality. Low-quality studies showed significantly higher treatment success and study quality has not improved since 1985. They state there is moderate evidence for the efficacy of conservative treatment (active exercises and multimodal treatments) and for surgery in patients with adductor-related groin pain; there is moderate evidence for efficacy of surgical treatment in sportsman's hernia.

Observational Studies

Nonrandomized comparative and uncontrolled studies can sometimes provide useful information on health outcomes but are prone to biases such as noncomparability of treatment groups, the placebo effect, and variable natural history of the condition. A number of observational series have reported on surgical outcomes. (13-20) However, these studies enrolled variable patient populations and used different surgical techniques. All studies reported that a high percentage of patients returned to full sports activities, but there were no control groups for comparison.

Kopelman et al. (2016) reported on a prospective series of 246 male patients with chronic groin pain. (21) All patients underwent an ultrasound, and 98 also underwent an MRI. Of the 246 patients, 209 underwent conservative treatment with rest and non-steroidal anti-inflammatory drugs (NSAIDs), after which 51 (21%) of 246 underwent inguinal surgery. Another 37 (15%) patients were diagnosed by imaging with non-inguinal pathologies such as inflammation of the pubic bone and symphysis pubis, rectus abdominis muscles, and hip joint pathologies. Of the 51 who underwent surgery (mesh repair, oblique aponeurosis release, neurolysis), a direct or indirect hernia was observed in 18 (35%) patients. In the remainder (65%), no abnormalities were found. There were 2 surgical failures, and all other patients returned to full sports activity within 4.3 weeks. In this series, most patients did not require surgery, and the authors commented that pubic and suprapubic symptomatology should be differentiated from inguinal and adductor complaints.

In 2020, Gill et al. performed a case series cohort study to evaluate return to sport and performance in National Collegiate Athletic Association (NCAA) Division I football players and National Football League (NFL) players who had undergone an adductor longus tendon release with or without sports hernia repair by 1 of 2 fellowship-trained orthopaedic surgeons between May 1999 and January 2013. (22) All patients reported groin pain below the inguinal ligament and localized to their adductor longus. Symptoms lasted longer than 10 weeks and limited their ability to effectively perform during sport, as assessed by their coach and self-assessment. Questionnaires were given to all 26 patients to assess long-term surgical outcomes. A subgroup analysis was performed for NFL players, in which “performance scores” were calculated according to individual player statistics while playing. Scores obtained before the diagnosis of chronic adductor longus tendinopathy or strain were compared with those after surgery. Patients with prior abdominal or pelvic surgery, radiographic evidence of degenerative joint disease of the hip, labral tears, or femoral acetabular impingement, prostatic or urinary tract disease, or nerve entrapment of the ilioinguinal, genitofemoral, or lateral femoral cutaneous nerves were excluded from the study. A total of 32 athletes underwent an adductor longus tenotomy during the study period. Of these patients, 28 were college- or professional-level athletes who underwent an adductor longus tenotomy, with a mean ± SD follow-up time of 6.2 ± 4.2 years (range, 12-178 months). Of the 32 patients, 20 had a concomitant sports hernia repair in addition to an adductor longus tenotomy. Thirty-one patients (97%) were able to return to their previous sport, and 30 (94%) were able to return at their previous level of play. Thirty patients (94%) reported that they were satisfied with their decision to have surgery. No player complained of weakness or a decrease in running speed or power. Mean return to play was 12 weeks from date of surgery. In the subgroup analysis of 16 NFL players, there were no

statistically significant differences for the pre- versus postoperative comparisons of the athlete performance scores (P = .74) and the percentage of the games started versus played (P = .46). After separation of players who had a concomitant hernia repair from players who did not, there was no statistically significant difference in performance scores or percentages of games started. In this study of elite athletes, adductor longus tenotomy with or without a concomitant sports hernia repair provided overall acceptable and excellent results. Athletes were able to return to their previous level of athletic competition and performance with consistent relief of groin pain. Return to play in an NFL game averaged 12 weeks following surgery.

Authors acknowledge some limitations of this study, including its retrospective design. They used a previously published scoring system for NFL players that allowed each player to serve as his own control. While the NFL players studied were evaluated with a performance score metric, offensive linemen could not be analyzed given the limits of the game statistics used in the calculation. However, surgery did not adversely affect the percentage of games started in this group. Subjective outcomes for nonprofessional athletes were obtained, and future directions are aimed at evaluating objective outcomes for these patients, including strength measurements. (Level of evidence IV)

In a retrospective case series, Gerhardt et al. (2020) examined the outcomes of a limited surgical intervention, consisting of neurolysis, inguinal wall repair, and/or adductor debridement of adhesions based on intraoperative findings. (23) Fifty-one athletes were included in the study with an average follow-up of 4.42 years (range 2.02–7.01). The average age was 24.2 years (range 16–49) and consisted of 94.0% males and 6.0% females. Nerve entrapment was demonstrated in 96.2% of cases with involvement of the ilioinguinal in 92.5%, the iliohypogastric in 30.8% and the genitofemoral in 13.2%. Attenuation of the posterior inguinal wall was present and repaired in 79.3% of cases. Scar tissue was present around the adductor origin and required debridement in 56.7% of cases. Forty-nine (96.1%) athletes returned to sport at the same level of play at an average of 5.9 weeks. Two athletes required a revision surgery. High rates of return to sport were achieved after surgery for inguinal-related groin pain that addresses the varying pathology and associated nerve entrapment.

Limitations of this study are similar to those of other studies that report on surgical outcomes for groin pain. The most significant limitation stems from discussing outcomes of surgical treatment for a clinical entity that includes varying combinations of injured abdominal wall, pelvic and proximal thigh structures. Therefore, the specific details of each procedure vary, making it difficult to present a homogeneous group of athletes. This reverberates the point that groin injuries vary widely in the constellation of pathology and therefore surgical repair involves a variety of techniques. Researchers believe that the visualized pathology should dictate the surgical technique to be employed. This differs from many previous reports in which the same surgery is performed regardless of clinical presentation. The inclusion of patients' post-hip arthroscopy is a limitation to this study as the condition can overlap. However, all patients previously treated with hip arthroscopy for FAI had fully recovered and returned to competitive sports before presenting with new symptoms. Additionally, as a retrospective review, this study is inherently subject to selection bias. Last, this series mixes all levels of athletes, which allows

readers to make generalizations that are applicable to everyday clinical practice, but less so to specific athletic populations. (23)

With Institutional Review Board (IRB) approval, Le and colleagues (2020) retrospectively reviewed the charts of all patients who underwent adductor tenotomy and inguinal hernia repair for the treatment of athletic pubalgia at Mount Sinai Medical Center, Miami Beach FL. (24) Parameters gathered included basic demographics, past medical and surgical history, athletic activity, length of surgery, length of time between surgery and follow-up, intraoperative and postoperative complications, and time to return to athletic activities. A total of 93 patients underwent inguinal hernia repair with adductor tenotomy. These procedures were all performed by a single surgeon at two academic institutions. The average age of patients was 23.4 years. Athletic activities reported by the patients were as follows: American football (n=36), soccer (n=18), triathlon (n=11), track and field (n=8), and baseball (n=5). Less-represented activities included swimming (n=3), tennis (n=2), lacrosse (n=1), golf (n=1), and other (n=8). Mean operative time was 72.4 min. Most patients were found to return to athletic activity in 28 days following a standardized physical therapy regimen (92.5%). Postoperative complications included recurrence of pain/symptoms (7.5%, n=7), urinary retention (2.2%, n=2), pain along the adductor magnus/brevis muscle group with more extraneous activity (1.1%, n=1), and adductor brevis hematoma 3 months following surgery and rehabilitation (1.1%, n=1). Of the patients with recurrent pain, two of the 7 reported contralateral pain. Reviewers report that total extraperitoneal laparoscopic inguinal hernia repair with adductor tenotomy appears to be a relatively quick and safe procedure with few postoperative complications. The majority of treated athletes are able to return to full athletic activities within 28 days of operation. While a return of symptoms has been seen in some patients, it is frequently observed on the contralateral side.

UpToDate

A 2024 UpToDate review article discussing sports-related groin pain or 'sports hernia' notes that evidence is limited to uncontrolled, observational studies and states "Surgical exploration and repair is the most common treatment for sports-related groin pain, although few controlled trials have been performed to confirm the effectiveness of this approach…When symptoms do not resolve with rest and appropriate physical therapy, we suggest surgical repair for athletes seeking to regain their preinjury level of performance (Grade 2C). For high-performance athletes unwilling to accept the lengthy delays in return to play required for appropriate rest and physical therapy, early surgical referral is appropriate. Both laparoscopic and anterior approaches have been used with equivalent outcomes." A Grade 2C recommendation is a very weak recommendation where benefits and risks are closely balanced and/or uncertain; other alternatives may be equally reasonable. (Low-quality evidence: Evidence from observational studies, unsystematic clinical observations, or from randomized trials with serious flaws). (25)

Summary of Evidence

For individuals who have sports-related groin pain who receive surgical treatment, the evidence includes RCTs, systematic reviews, case studies, and observational studies. Relevant outcomes

are symptoms, functional outcomes, and treatment-related morbidity. There is limited evidence that compare the effectiveness of surgical intervention to conservative management of AP. While some studies found that open or laparoscopic surgery may provide successful outcomes in treating this condition, these studies were usually of low quality and did not appropriately compare the effectiveness of athletic pubalgia (AP) surgery to conservative management. Furthermore, there is a lack of consensus regarding the etiology, diagnosis, and treatment of AP; more research is needed to ascertain the clinical value of surgical treatment for AP. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Practice Guidelines and Position Statements

American Academy of Orthopaedic Surgeons (AAOS)

Reviewed in 2022, the AAOS has an online educational website article on 'Sports Hernia (Athletic Pubalgia).' (26) The Academy indicates that a sports hernia is a painful strain or tear of any soft tissue that occurs in the groin area. The Academy advised patients that: "In many cases, 4 to 6 weeks of physical therapy will resolve any pain and allow an athlete to return to sports. If, however, the pain comes back when you resume sports activities, you may need to consider surgery to repair the torn tissues."

American College of Occupational and Environmental Medicine

The American College of Occupational and Environmental Medicine (ACOEM) released a guideline on hip and groin disorders in 2019. (27) For the treatment of groin strains, sports hernias, or adductor-related groin pain, the ACOEM recommends the following:

- Work and activity modifications (strength of evidence [SOE]: Recommended, Insufficient Evidence; level of confidence [LOC]: Moderate),
- Nonsteroidal anti-inflammatory drugs (SOE: Recommended, Insufficient Evidence; LOC: Moderate),
- Ice or heat or wraps (SOE: Recommended, Insufficient Evidence; LOC: Low), and
- Therapy (SOE: Recommended, Evidence; LOC: Moderate).

Ongoing and Unpublished Clinical Trials

A search of ClinicalTrials.gov in December 2023 did not identify any ongoing or unpublished trials that would likely influence this policy.

Coding

Procedure codes on Medical Policy documents are included **only** as a general reference tool for each policy. **They may not be all-inclusive.**

The presence or absence of procedure, service, supply, or device codes in a Medical Policy document has no relevance for determination of benefit coverage for members or reimbursement for providers. **Only the written coverage position in a Medical Policy should be used for such determinations.**

Benefit coverage determinations based on written Medical Policy coverage positions must include review of the member's benefit contract or Summary Plan Description (SPD) for defined coverage vs. non-coverage, benefit exclusions, and benefit limitations such as dollar or duration caps.

CPT Codes	27299, 49659, 49999
HCPCS Codes	None

*Current Procedural Terminology (CPT®) ©2024 American Medical Association: Chicago, IL.

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Centers for Medicare and Medicaid Services (CMS)

The information contained in this section is for informational purposes only. HCSC makes no representation as to the accuracy of this information. It is not to be used for claims adjudication for HCSC Plans.

The Centers for Medicare and Medicaid Services (CMS) does not have a national Medicare coverage position. Coverage may be subject to local carrier discretion.

A national coverage position for Medicare may have been developed since this medical policy document was written. See Medicare's National Coverage at <https://www.cms.hhs.gov>.

Policy History/Revision	
Date	**Description of Change**
10/15/2025	Document updated with literature review. Coverage unchanged. References 6, 9-12, 19-20, and 22-25 added; others updated/removed.
12/01/2023	Document updated with literature review. Coverage unchanged. Added/updated reference 2, 18, and 19; others removed.
05/15/2022	Reviewed. No changes.
07/15/2021	Document updated with literature review. Coverage unchanged. References updated, none add
06/15/2020	Reviewed. No changes.
10/01/2019	Document updated with literature review. Coverage unchanged. Added the following reference: 17.
06/15/2018	Reviewed. No changes.
07/15/2017	Document updated with literature review. Editorial change to Coverage statement: from “athletic pubalgia” to “groin pain in athletics”. Title changed from: Surgery for Athletic Pubalgia.
07/15/2016	Reviewed. No changes.
07/01/2015	New medical document. Surgical treatment of athletic pubalgia (also known as Gilmore groin, osteitis pubis, pubic inguinal pain syndrome, inguinal disruption, slap shot gut, sportsmen groin, footballers groin injury complex, hockey groin syndrome, athletic hernia, sports hernia or core muscle injury) is considered experimental, investigational and/or unproven**.**