



ISAKOS
CONGRESS
2023



Boston
Massachusetts
June 18–June 21



João Vitor de Castro Fernandes

 joaovcf@gmail.com

Welcome

isakos.com/2023 • [#ISAKOS2023](https://twitter.com/ISAKOS2023)

2023



ISAKOS
CONGRESS
2023



Boston
Massachusetts
June 18–June 21

Clinical results of surgical treatment for athletic pubalgia

Authors:

Andre Pedrinelli

João Vitor de Castro Fernandes

Carlos Guilherme Dorilêo Leite Filho

Adriano Marques de Almeida

Tiago Lazzaretti Fernandes

Arnaldo José Hernandez

Affiliation:

Sports Division

Institute of Orthopedics and Traumatology

Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo,
São Paulo, Brazil.

IOT HC FMUSP

Disclosure:

The authors declare that they have no conflict of interest.



Athletic Pubalgia

Pain in the inguinal region which keeps **5 to 10%** of soccer athletes **away from the activity** of athletes away from competitive physical activities, and it is very frequent in soccer. Associated with **micro traumas** in athletes presenting **risk factors**, such as pelvic muscle imbalance, joint movement restriction, pubic anteversion, hyperlordosis, varus thigh.

(Nielsen et al 1989; Smodlaka et al 1990)

According to FIFA, Athletic Pubalgia, is considered to be a **severe injury**, due to the time athletes are forced to be away from sport activities. A well known study from Ekstrand estimates a **cost per athlete** about **500.000 Euros** when involves coaches, facilities, the cost of the player and administrative staff.

(Dvorak et al 2009, Ekstrand et al 2003)

The first choice treatment for etiology based on overload and muscle imbalances in the hip is **physical rehabilitation**, leaving surgical treatment for specific cases as: femoroacetabular impingement, occult hernia or tendinopathies and the few cases of clinical treatment failure.

(Ekstrand et al 2013; Santili et al 2013; Souza et al 2005)



Aim

Present a cross-sectional study about Athletic Pubalgia comparing the outcome of **surgical treatment of athletic pubalgia** with myotendinous etiology **releasing the anterior rectus abdominis tendon** along the pubic symphysis in association with a **proximal tenotomy of the long adductor tendon**.

Methods

The study scope is a historical retrospective **cohort analysis**. Medical records analyzed between **01/01/2002 and 31/12/2016** focused on the records of patients complaining of pubic pain of myotendinous etiology diagnosed by **clinical examination** and **imaging exams** and submitted to **surgical intervention**.

For proper diagnosis, a standardized clinical-radiological evaluation was applied. The patients who did not improve after clinical treatment with rehabilitation underwent surgery, and then were followed up by the designated researcher.



ISAKOS
CONGRESS
2023



Boston
Massachusetts
June 18–June 21

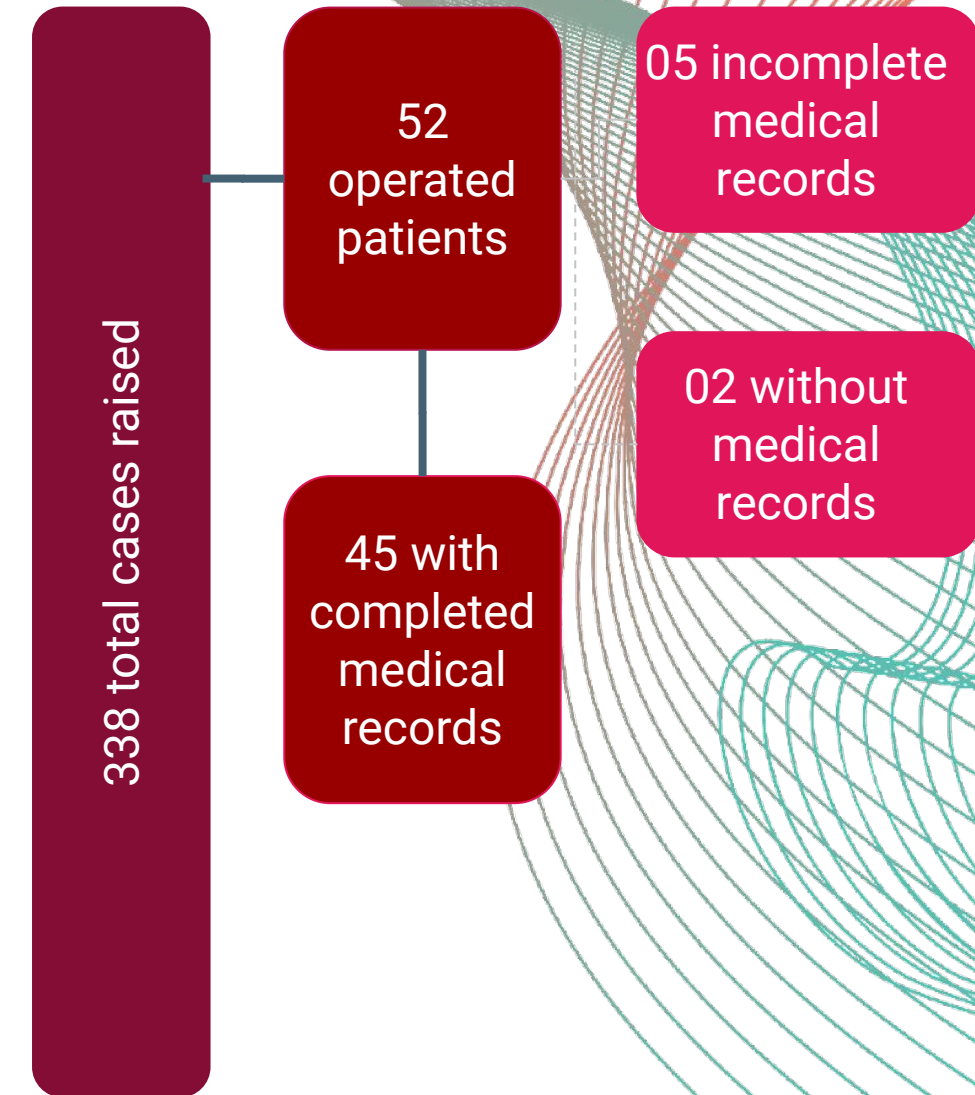
Methods

Inclusion criteria

Active professional or amateur athlete aged between 18 and 40 years old; Complaint of pain or functional limitation in pubic symphysis region with Myotendinous etiology, restricting or preventing the athlete's sports performance; Medical treatment and physical therapy failure after, at least, three months; Surgery undergone at the institution.

Exclusion criteria

Treatment abandonment; Infection not related to the performed surgical procedure; Bone tumor; Lower limb muscle injury intervening in rehabilitation process; Fracture of the dorsal and lumbar spine, pelvis or lower limbs; Death not connected to intervention or loss of sequence before 6 months of follow-up.



Diagnosis

Clinical criteria used for athletic pubalgia diagnosis

- a) Inspection and palpation of the pubic symphysis in search for local or irradiated pain;
- b) Measurement of lower limbs. Shortening lower than 1 (one) cm were not considered for non-inclusion;
- c) Active, passive and resistance muscle maneuvers: iliopsoas, rectus abdominis, abdominal oblique, transverse abdominis, adductors, and hip abductors;
- d) Research of hips and lumbar spine movement amplitude;
- e) FADIR and FABER tests;
- f) Inspection and palpation of the inguinal ligament region, followed by Valsalva maneuver to detect inguinal hernia;
- g) Grava Maneuver;
- h) Squeeze test;

Radiography	AP projection of the pelvis in dual support: search for signs of hip impingement, discrepancies in limbs length, sacroiliac alterations, and other alterations with no clinical suspicion; Flamingo view: pelvic instability.
Ultrasonography	Dynamic evaluation of true inguinal, femoral and sports hernias.
Magnetic Resonance Imaging (MRI)	<ul style="list-style-type: none"> - At least one T1-weighted sequence: morphological structural evaluation, bone marrow infiltrative processes (infection, tumors, etc.); - Sagittal T2-weighted sequence with fat suppression (including femoral head): evaluation of labral lesions and rectus abdominis/adductor longus aponeurosis injuries. - Coronal/axial T2-weighted sequence with fat suppression: bone (pubic osteitis) and soft parts edema, muscle and tendon injuries, rectus abdominis/adductor longus aponeurosis injuries, and other pelvic alterations; - Oblique, axial, T2-weighted sequence: rectus abdominis muscle attachment and muscles origins of the adductor compartment; - Coronal T2-weighted sequence with fat suppression (large FOV, reveals other conditions manifesting inguinal pain.)

Surgical Technique



Patient's position on the operating table

1) A Pfannenstiel-type median transverse incision about 10cm long is made directly over the pubic bone; **figure 2**.

2) After dissecting the subcutaneous planes, the spermatic cords are located and isolated;

3) As the pyramidalis muscle is identified, a transverse incision is made over the pubic symphysis using an electric scalpel;

4) The pubic symphysis is identified by placing a thick bevel needle (30x9cm) inside it to ensure its correct location and serve as anatomic and symmetric parameters for the procedures performed.



Pfannenstiel's incision



Needle position in pubic symphysis

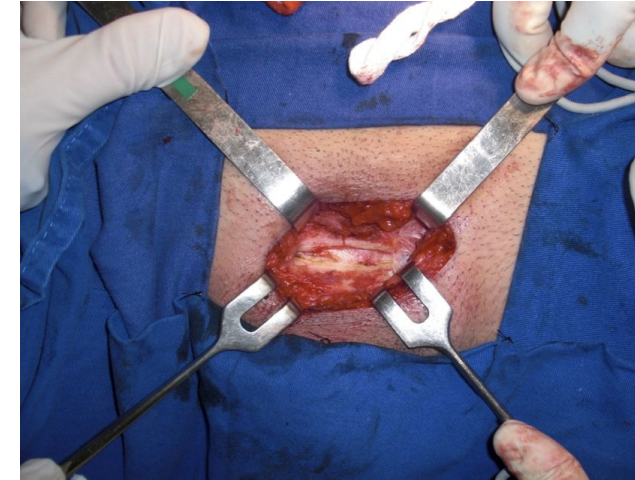
Surgical Technique

5) After opening the fascia, the superficial portion of the rectus abdominis tendon is located. A prior disinsertion is done with the use of electrocautery, being careful to preserve both inferior and posterior pubic ligaments;

6) After the disinsertion, approximately 2cm of the proximal portion of the tendon is detached;

7) The same incision allows the bilateral visualization of the long adductor muscle tendon.

8) After opening the peri-tendon, a tendon hook is applied to separate the long adductor tendon from its muscle portion and other adjacent muscles;



Pubic symphysis detachment

9) Tenotomy is performed while the assistant abducts the hip by pushing the ipsilateral knee down.

10) Hemostasis are made, as well as cleaning with saline. Subcutaneous planes and skin were closed after placement of a 3.2mm deep aspiration drain. The wound was occluded with a compressive dressing.

Results

The date of the athlete's first unrestricted training was used as the definition of return to sport.

Variables	Classification	Number	Frequency (%)
Gender	Male	45	100
	Female	0	0
Sport	Athletics	2	4.4
	Firefighter	1	2.2
	Soccer	4	75.6
	Futsal	5	11.1
	Physical Education Teacher	1	2.2
	Rugby	1	2.2
	Volleyball	1	2.2
Category	Amateur	10	22.2
	Professional	35	77.8
Position	Striker	11	24.4
	Center Back	2	4.4
	Goalkeeper	3	6.7
	Winger	4	8.9
	Midfielder	8	17.8
	Professional	1	2.2
	Defender	11	24.4
	Others	5	11.1
Dominance	Right	42	93.3
	Left	3	6.7
Affected side	Central	1	2.2
	Right	8	17.8
	Right and Left	30	66.7
	Left	6	13.3
Affected side	Unilateral	14	31.1
	Bilateral	31	68.9
Pain intensity	Progressive	28	62.2
	Limiting	14	31.1
	Omitted	3	6.7

Variables	Classification	Number	Frequency (%)
Trauma	No	37	82.2
	Yes	6	13.3
	Omitted	2	4.4
Pain site	Adductor	14	31.1
	Adductor/pubis symphysis	7	15.6
	Adductor/rectus abdominis	15	33.3
	Rectus abdominis	1	2.2
	Pubic symphysis	6	13.3
	P.S. + perianal region	1	2.2
	Omitted	1	2.2
Infiltration procedure	No	31	68.9
	Yes	11	24.4
	Omitted	3	6.7
Infiltration number	One	9	20
	Two	2	4.4
	Omitted	34	75.6
Associated disease	No	41	91.1
	Yes	2	4.4
	Omitted	2	4.4
Which one?	Asthma	1	2.2
	Dyslipidemia	1	2.2
Complications	No	42	93.3
	Yes	3	6.7
Which one?	Adductor pain	1	2.22
	Adductor partial injury	1	2.22
	Pneumonia	1	2.22
Reoperations	No	42	93.3
	Yes	3	6.7



Our research illustrated that amateur players take a longer time to recover after surgical procedure.

Discussion

We consider this condition to be **multifactorial** and related to the increment of physical activity and that local previous injuries, increased training intensity, decreased hip mobility and inadequate levels of specific training are relevant risk factors

(Weir et al 2015; Sa et al 2016)

From our perspective, the symphysis responds to forces acting on it, thus in most cases it is not the problem source, but rather its consequence.

None of the techniques described handled the joint tendon, which is the continuity of distal rectus abdominis and long adductor fibers. These procedures promoted a strength rebalancing of the pubic structure and reduced the stress over it, particularly when it comes to efforts for turning, changing directions abruptly and kicking.

We found a low complication index, of 6.7%. All cases requiring revision involved re-tenotomy of the long adductor. The symptom **resolution rate was 93.3%**, which makes us believe that the procedure is adequate to solve the addressed problem.



Future prospects

Detailed study of patient examinations findings, besides better quantifying or qualifying data on force balance and adductors symmetry by modifying the Squeeze test, perhaps with the use of a manual dynamometer, as suggested by Mosler et al 2018.

The validation of Copenhagen hip and groin outcome score (HAGOS), may add greater reliability to the data, since the usage of scales on which patients express their perception of results is a current trend.

(Thorborg et al 2011)

Conclusion

The procedure outcome took place 94 days (median) for professional athletes, showing a positive relation to the game position (striker), with 93.7% good results, thus proving to be a good treatment option for this disease.



References

1. Nielsen, AB, Yde, J. Epidemiology and traumatology of injuries in soccer. *Am J Sports Med.* 1989;17(6):803-7.
2. Williams, JG. Limitation of hip joint movement as a factor in traumatic osteitis pubis. *Br J Sports Med.* 1978;12(3):129-33.
3. Smoldlaka, VN. Groin pain in soccer players. *Phys Sportsmed.* 1980;8(8):57-61.
4. Weir, A, Brukner, P, Delahunt, E, Ekstrand, J, Griffin, D, Khan, KM, Lovell, G, Meyers, WC, Muschaweck, U, Orchard, J, Paajanen, H, Philippon, M, Reboul, G, Robinson, P, Schache, AG, Schilders, E, Serner, A, Silvers, H, Thorborg, K, Tyler, T, Verrall, G, de Vos, RJ, Vuckovic, Z, Hölmich, P. Doha agreement meeting on terminology and definitions in groin pain in athletes. *Br J Sports Med.* 2015;49(12):768-74.
5. Queiroz, RD, Carvalho, RT, Queiroz, SPR, Janovsky, C, Cohen, M. Return to sport after surgical treatment for pubalgia among professional soccer players. *Rev Bras Ortop.* 2014;49(3):233-39.
6. Dvorak, J, Junge, A, Grimm, K, editors. F-MARC: football medicine manual. Zurich: Fédération Internationale de Football Association; 2009. p.24-149.
7. Ekstrand, J. Keeping your top players on the pitch: the key to football medicine at a professional level. *Br J Sports Med.* 2013;47(12):723-4.
8. Hölmich, P. Long-standing groin pain in sportspeople falls into three primary patterns, a "clinical entity" approach: a prospective study of 207 patients. *Br J Sports Med.* 2007;41(4):247-52.
9. Häggglund, M, Waldén, M, Magnusson, H, Kristenson, K, Bengtsson, H, Ekstrand, J. Injuries affect team performance negatively in professional football: an 11-year follow-up of the UEFA Champions League injury study. *Br J Sports Med.* 2013;47(12):738-42.
10. Santilli, O, Tripoloni, D, Demarchi, Lucilli, N, Lamy, R. Hernias del deportista nuestra experiencia. *Rev Argent Cir.* 2013;104(2):55-61.
11. Sousa, JPG, Fallopa, F, Siqueira Júnior, D, Cruz, ARSS. Tratamento cirúrgico da pubalgia em jogadores de futebol profissional. *Rev Bras Ortop.* 2005;40(10):601-7.
12. Delahunt, E, Thorborg, K, Khan, KM, Robinson, P, Hölmich, P, Weir, A. Minimum reporting standards for clinical research on groin pain in athletes. *Br J Sports Med.* 2015;49(12):775-81.
13. Lynch, TS, Bedi, A, Larson, CM. Athletic hip injuries. *J Am Acad Orthop Surg.* 2017;25(4):269-79.
14. Philippon, MJ, Maxwell, RB, Johnston, TL, Schenker, M, Briggs, KK. Clinical presentation of femoroacetabular impingement. *Knee Surg Sports Traumatol Arthrosc.* 2007;15(8):1041-7.
15. Hegedus, EJ, Stern, B, Reiman, MP, Tarara, D, Wright, AA. A suggested model for physical examination and conservative treatment of athletic pubalgia. *Phys Ther Sport.* 2013;14(1):3-16.
16. Nunes, RB, Amaral, DT, Oliveira, VS. Radiological propedeutics of femoroacetabular impingement in times of computed tomography and magnetic resonance imaging: what a radiologist needs to know. *Radiol Bras.* 2011;44(4):249-255.
17. Giancarlo, R, Utro, F. Speeding up the Consensus Clustering methodology for microarray data analysis. *Algorithms Mol Biol.* 2011;6(1):1.
18. Scheidt, RB, Galia, CR, Diesel, CV, Rosito, R, Macedo, CAS. Prevalence of 366 radiographic markers of femoroacetabular impingement in asymptomatic adults. *Rev Col Bras Cir.* 2014;41(1):36-42.
19. Polesello, GC, Nakao, TS, Queiroz, MC, Daniachi, D, Ricioli Júnior, WR, Guimarães, RP, Honda, EY, Ono, NK. Proposta de padronização do estudo radiográfico do quadril e da pelve. *Rev Bras Ortop.* 2011;46(6):634-42.
20. Djuric-Stefanovic, A, Saranovic, D, Ivanovic, A, Masulovic, D, Zuvela, M, Bjelovic, M, Pesko P. The accuracy of ultrasonography in classification of groin hernias according to the criteria of the unified classification system. *Hernia.* 2008;12(4):395-303.
21. Kim, B, Robinson, P, Modi, H, Gupta, H, Horgan, K, Achuthan, R. Evaluation of the usage and influence of groin ultrasound in primary and secondary healthcare settings. *Hernia.* 2015;19(3):367-71.
22. Pawlak, M, Niebuhr, H, Bury, K. Dynamic inguinal ultrasound: a diagnostic tool for hernia surgeons. *Hernia.* 2015;19(6):1033-4.
23. Sa, D, Hölmich, P, Phillips, M, Heaven, S, Simunovic, N, Philippon, MJ, Ayeni, OR. Athletic groin pain: a systematic review of surgical diagnoses, investigations and treatment. *Br J Sports Med.* 2016;50(19):1181-6.
24. Hölmich, P. Groin injuries in athletes: development of clinical entities, treatment, and prevention [thesis]. Copenhagen: University of Copenhagen; 2014.
25. Oliveira, AL, Andreoli, CV, Ejnisman, B, Queiroz, RD, Pires, OGN, Falótico, GG. Perfil epidemiológico dos pacientes com diagnóstico de pubalgia do atleta. *Rev Bras Ortop.* 2016;51(6):692-96.
26. Hölmich, P, Uhrskou, P, Ulnits, L, Kanstrup, IL, Nielsen, MB, Bjerg, AM, Krogsgaard K. Effectiveness of active physical training as treatment for long-standing adductor-related groin pain in athletes: randomised trial. *Lancet.* 1999;(9151):439-43.
27. Grace, JN, Sim, FH, Shives, TC, Coventry, MB. Wedge resection of the symphysis pubis for the treatment of osteitis pubis. *J Bone Joint Surg Am.* 1989;71(3):358-64.
28. Mulhall, KJ, McKenna, J, Walsh, A, McCormack, D. Osteitis pubis in professional soccer players: a report of outcome with symphyseal curettage in cases refractory to conservative management. *Clin J Sport Med.* 2002;12(3):179-81.
29. Mehin, R, Meek, R, O'Brien, P, Blachut, P. Surgery for osteitis pubis. *Can J Surg.* 2006; 49(3):170-6.
30. Waldén, M, Häggglund, M, Ekstrand, J. The epidemiology of groin injury in senior football: a systematic review of prospective studies. *Br J Sports Med.* 2015;49(12):792-7.
31. Mosler, AB, Weir, A, Eirale, C, Farooq, A, Thorborg, K, Whiteley, RJ, Hölmich, P, Crossley, KM. Epidemiology of time loss groin injuries in a men's professional football league: a 2-year prospective study of 17 clubs and 606 players. *Br J Sports Med.* 2018;52(5):292-7.
32. Thorborg, K, Hölmich, P, Christensen, R, Petersen, J, Roos, EM. The Copenhagen Hip and Groin Outcome Score (HAGOS): development and validation according to the COSMIN checklist. *Br J Sports Med.* 2011;45(6):478-91.

