ZNAČAJ MULTIDISCIPLINARNOG DIJAGNOSTIČKOG I TERAPIJSKOG PRISTUPA SINDROMU BOLNE SIMFIZE SPORTISTA

THE IMPORTANCE OF A MULTIDISCIPLINARY DIAGNOSTIC AND THERAPEUTIC APPROACH TO PAINFUL SYMPHYSIS SYNDROME IN ATHLETES

Katarina Vukosavljević1,2, Miloš Bojović2, Dragana Drlijačić2, Kristina Vukušić2

1 Univerzitet u Beogradu, Medicinski fakultet, Beograd, Srbija
2 Visoka sportska i zdravstvena škola, Beograd, Srbija

1 University of Belgrade, Faculty of Medicine, Belgrade, Serbia
2 College of Sports and Health, Belgrade, Serbia

SAŽETAK
Sindrom bolne simfize sportista (pubalgija) je specifična povreda, bolno stanje i disfunkcija femoro-ingvinalne regije, koje nastaje usled disproporcije snage mišića trbušnog zida i mišića donjih ekstremiteta. Cilj ovog rada jeste da se teorijski razmotri značaj multidisciplinarnog dijagnostičkog i terapijskog pristupa sindromu bolne simfize sportista. U literaturi je izneto više od 70 uzroka nastanka pubalgije, pri čemu su oni koji su uslovljeni sportskim činiočima najzastupljeniji. Aktivnosti koje uključuju ponavljajuće snažne udarce nogama, pokrete rotacije, cirkumdukcije i torzije predstavljaju faktore rizika. Sindrom je najpre registрован kod fudbalera, a uglavnom se javlja kod sportista muškog pola, mladih od 40 godina. Postavljanje dijagnoze je teško zbog složene anatomije i preklapanja simptoma među različitim povredama prepona. Terapijski pristup je uslovljen slabim ili normalnim oporavkom, nakon kojeg je neophodno sprovesti odgovarajući rehabilitacioni program, u skladu sa bolom i dinamikom oporavka. Najveći broj sportista se nakon dva do tri meseca vraća na teren, pri čemu recidivi nakon operativnog lečenja praktično nisu registrovani. No, s obzirom na to da kod nastanka pubalgije dolazi do onesposobljavanja u sportskim aktivnostima u prolongiranom periodu, posebnu pažnju treba posvetiti prevenziji nastanja ovog bolnog sindroma. S tim u vezi, s prevenzijom treba započeti u najranijim uzastopima, sprovodjenjem svakodnevnog programa vežbi sa posebnim akzentom na kose i poprečne trbušne mišiće.

Ključne reči: pubalgija, sportske aktivnosti, povreda, rehabilitacija.

ABSTRACT
Painful symphysis syndrome (pubalgia) in athletes is a particular injury, a painful condition, and dysfunction of the femoroinguinal region, which occurs due to the disproportion in strength between the abdominal wall muscles and the muscles of the lower extremities. This study aims to theoretically analyze the importance of a multidisciplinary diagnostic and therapeutic approach to painful symphysis syndrome in athletes. More than seventy causes of pubalgia have been presented in literature, most commonly linked to sports factors. Activities that include repetitive strong kicks, rotational movements, circumduction, and torsion, are risk factors. The syndrome was first registered in football players, and it mostly occurs in male athletes under the age of forty. Establishing a diagnosis is difficult, due to the complex anatomy and the overlapping of symptoms between different groin injuries. The therapeutic approach depends on the complexity of the injuries and the dynamics of the patient's recovery. It entails observing the principles of initiating treatment with minimally invasive modalities, and in the case of severe cases, surgical treatment as the final therapeutic option, after which it is necessary to conduct an appropriate rehabilitation program, tailored to the pain and the dynamics of recovery. Most athletes resume their sports activities after two to three months, with no recurrence of pubalgia after surgical treatment. However, bearing in mind that the occurrence of pubalgia prevents the patients from participating in sports activities over a prolonged period, special attention should be directed towards the prevention of this painful syndrome. Taking this into consideration, prevention should begin at the earliest age, through a daily program of exercises for strengthening the muscles of the anterior abdominal wall, with special emphasis on the oblique and transverse abdominal muscles.

Key words: pubalgia, sports activities, injury, rehabilitation.

Corresponding author:
Katarina Vukosavljević
College of Sports and Health
11 Toše Jovanovića Street, 11030 Belgrade, Serbia
E-mail: katarina.vukosavljevic@vss.edu.rs
INTRODUCTION

Painful symphysis syndrome in athletes was, in detail, first described by Spinelli, in 1932, but literature also shows that, in the 1990s, Gilmor named this syndrome Gilmore’s groin. Other synonymous names for the condition, also found in literature, are as follows: symphysis syndrome, pubalgia, athletic pubalgia, pubic inguinal pain syndrome, sports-men’s groin, footballers groin injury complex, hockey player’s syndrome, athletic hernia, and inguinal disruption [1].

Athletic pubalgia is a particular anatomical injury, and not a broad category of findings, which is why it must be emphasized that a pathological diagnosis, such as inguinal hernia, does not exclude the presence of this syndrome. Terms such as athletic hernia or sports-men’s hernia, used customarily in professional circles today, cause problems in distinguishing amongst anatomical injury patterns and findings in the diagnostic process. The syndrome was first registered in footballers (known as ‘footballers groin’) and, with time, it was described in other athletes, especially in those whose activities require the excess use of the lower abdominal wall muscles and the proximal musculature of the lower extremities.

Viewing pubalgia from the clinical and anatomical aspect, the significance of the skeleton-muscular anatomy of this region becomes evident. In addition to the bones (both femoral bones, the sacral and coccygeal bones), the muscles of the anterolateral abdominal wall (m. obliquus externus abdominis, m. obliquus internus abdominis, m. transversus abdominis, m. rectus abdominis), as well as the inner thigh muscles – the adductors (m. pectineus, m. gracilis, m. adductor longus, m. adductor brevis, m. adductor magnus) have the greatest importance in maintaining the stability of the pelvis in the sagittal plane [2,3].

Bearing in mind that groin injuries are a frequent occurrence in athletes, as well as the fact that they account for 6% of all sports injuries [4], and, at the same time, taking into account the fact that these injuries are relatively frequently misinterpreted, the aim of this paper is the theoretical analysis of the significance of a multidisciplinary diagnostic and therapeutic approach to the painful symphysis syndrome in athletes.

ETIOLOGIJA I ETIOPATOGENEZA

U literaturi je opisano više od 70 uzroka pubalgije. Na osnovu klasifikacije, koju je, 1999. godine, predložio Benaco (Benazzo), uzroci pubalgije mogu se donosile proizvoljno grupisati, prateći koristan metodološki stup, počevši od pubalgije uzrokovane preopterećenjem pubične simfize (engl. rectus adductor symphysis syndrome), čija učestalost iznosi približno 40%. Nadaže slede pubalgije uzrokovane parietoabdominalnom

ETIOLOGY AND ETIOPATHOGENESIS

More than 70 causes of pubalgia have been described in literature. Based on the classification proposed by Benazzo, in 1999, the causes of pubalgia may be grouped, somewhat arbitrarily, by applying a useful methodological approach, starting with pubalgia...
slabošću (sportska kila), sa učestalošću od oko 40% i, konačno, pubalgije uzrokovane patološkim procesima, koje zahvataju susedne organe (karlicu i urogenitalni trakt), koje čine oko 20% slučajeva [5]. Sportski uzroci su najzastupljeniji u etiologiji ovog sindroma. Kod fudbalera, sindrom se javlja zbog ponavljanja napornih treninga, utakmica i nemogućnosti dobre restauracije. Zastupljen je i kod igrača hokeja na ledu, igrača ragbi-ja, trkača na duge staze, igrača australijskog fudbala, igrača kriketa, itd. Navedeni sportovi podrazumijevaju ponovljene snažne udarce nogom, pokrete rotacije, cirkumdukcije, torsije, i sl. Svi navedeni pokreti predstavljaju faktore rizika za pojavu sindroma bolne simfize [6].

Sportisti sa dijagnozom sindroma bolne simfize su uglavnom muškarci mladi od 40 godina. Uopšteno, to se može objasniti činjenicom da se pripadnici muškog pola češće bave gore nabrojanim sportovima, koji nose veći rizik za nastanak ovog bolnog sindroma. Drugi razlozi leže u anatomskim razlikama između muške i ženske karlice. Žene uglavnom imaju veći i robušniji kaudalni m. rectus abdominis na stidnoj simfizi, karlica im je šira i ima veći potpurični ugao, što može rezultirati boljim usmeravanjem sila dalje od pubične regije. Stoga, anatomskim i biomehaničkim razlikama u strukturi ženske karlice mogla bi se objasniti bolja stabilizacija stidne regije i smanjeni rizik od pubalgije, u žena [3].

Načelno gledano, do bula pri ovom sindromu dolazi zbog disproporcije snage mišića trbušnog zida i mišića donjih ekstremiteta, kao i elastičnosti pubične simfize, koja joj omogućava kretanje do 2 milimetra i rotaciju do 3 stepena [3]. Ova neravnoteža dovodi do osećaja bula u dubini prepona. Na temelju toga, ovaj se entitet mogao preimenujati u „sindrom mišićne neravnoteže prepona“, a sportska kila mogla bi se smatrati nalazom uključenim u ovaj sindrom [7]. Mehanizam nastanka simptoma se objašnjava stalnim silovitim kontrakcijama koje se prenose na pripoje mišića u ovim regijama, stvarajući oštećenje subkondralne vaskularizacije u predelu pubične kosti, što potenci- nalno posledično uslovljava nastanak njene aseptične neroke. Ovaj proces, u daljem toku, izaziva nespecifično zvijanje. Ukoliko se ovaj proces zadrži, može doći do peščenjka i prepojstvarivanja pubica, pri čemu se simptomatologija ishodno redovno javlja po stranim terenima. Sportista, caused by pubic symphysis overtraining, i.e., rectus adductor symphysis syndrome, occurring in 40% of the cases; followed by pubalgia caused by parietoabdominal weakness (sports hernia), occurring in 40% of the cases; and finally, pubalgia caused by pathological processes, which involve the surrounding organs (pelvis and urogenital tract), and which account for 20% of cases [5]. Sports causes are the most frequent in the etiolo-gy of this syndrome. In footballers, the syndrome occurs as the result of repeated strenuous workout and training sessions and football matches, as well as the players’ inability to have sufficient rest and recuperation in between these activities. The syndrome is also present in ice hockey players, rugby players, long-distance runners, players of Australian football, cricket players, etc. The above-mentioned sports include repeated strong kicks, rotation, circumscription and torsion movements, etc. All of these movements represent risk factors for the development of painful symphysis syndrome [6].

Athletes with the diagnosis of painful symphysis syndrome are mainly men under the age of 40. Generally speaking, this can be explained by the fact that men more often engage in the sports listed above than women, and these sports carry a greater risk for the development of this painful syndrome than other sports. Other reasons originate from the anatomical differences between the male and female pelvis. Women usually have a larger and more robust caudal m. rectus abdom-inis on the pubic symphysis, their pelvis is wider, and it has a wider subpubic angle, which may result in better transfer of forces away from the pubic region. There-fore, the anatomical and biomechanical differences in the structure of the female pelvis may be the explana-tion regarding the better stabilization of the pubic re-gion and the decreased risk of pubalgia in women [3].

Generally speaking, the pain occurring in this syn-drome, occurs due to a disproportion between the strength of the abdominal wall muscles and the mus-cles of the lower extremities, as well as the elasticity of the pubic symphysis, which enables movement of up to 2 mm and rotation of up to 3 degrees [3]. This im-balance leads to the sensation of pain, deep in the groin. Based on the above stated, this entity could be re-named as ‘muscular groin imbalance syndrome’, while athletic hernia could be considered as a finding includ-ed in this syndrome [7]. The mechanism of the develop-ment of symptoms is explained by constant powerful contractions, which radiate to the muscular insertions in these regions, creating damage to the subchondral vaskularization in the area of the pubic bone, which potentially causes the consequential development of its aseptic necrosis. This process further causes nonspe-cific inflammation, primarily in the muscular insertions.

**SIMPTOMI I KLINIČKI ZNACI**

Većina bolesnika sa pubalgijom ima simptome meseci-ma ili godinama pre postavljanja prave dijagnoze. Prvi simptomi se obično javljaju nakon izvesnog napora i naknadnog odmora bolne regije. Bol se uglavnom ma-nifestuje prilikom hoda po strmim terenima. Sportista,
Most patients with pubalgia experience symptoms for months or even years before they get the correct diagnosis. The first symptoms usually occur after a certain amount of strain and subsequent rest of the painful region. The pain mainly manifests when walking on steep terrains. The athlete, when walking in such a way, is forced to assume the antalgic gait, with hips in flexion. The pain in the symphysis area may occur and/or become worse upon defecation, sneezing or coughing. In the beginning, the pain is mostly tolerable, while as the condition develops, it may completely incapacitate the player. The patients usually complain of unilateral deep and sharp pain in the lower abdomen and in the frontal part of the groin. The pain may radiate proximally to the thighs, lower back, but also to the muscles of the lower abdomen, to the perineum, or the scrotum [9]. A number of studies have shown that, prior to the occurrence of pain, most players had played in three to four challenging games in one week, without enough time to rest in between these matches. After an intense game or training session, the athlete has difficulty walking, especially when climbing stairs. When in bed, the athlete usually lies on their side, with hips flexed and knees bent, with a disturbed sleeping rhythm. Standing up from a chair or from the bed is very painful [10].

SYMPTOMS AND CLINICAL SIGNS

Diagnosing pubalgia is difficult due to the complex anatomy and the overlapping of symptoms of different groin injuries. The clinical examination and the medical history are of the utmost importance. The physician must take into account the fact that athletes with groin pain may have more than one diagnosis and that the presence of one of these related diagnoses does not necessarily exclude pubalgia. The recommendation is to approach this entity from a multidisciplinary aspect, since literature so far does not offer the appropriate diagnostic studies and recommendations for the proper treatment to be applied in these patients [7]. A classification of symptoms pertaining to the groin area into three major categories of clinical syndromes has been proposed (Figure 1) [11].

The first step in establishing the diagnosis is taking the appropriate and detailed anamnesis on the reported pain (when it occurs, how long it lasts, the exact localization of the pain, pain propagation, pain intensity, associated symptoms, etc.). The physical examination of
istezanja aduktora. Adukcija i abdukcija u kuku su bolne. Aktivno podizanje noge u spoljašnjoj rotaciji sa kolenom u punom ekstenziji vrlo je bolno i obično nije izvodljivo [10].

Opisani su i specifični testovi provokacije za mišić koju se abdukuju u kuku i u fleksiji od 80 stepeni. Test je pozitivan ako pacijent, dok je leži na leđima sa kukovima u abdukciji i u fleksiji od 80 stepeni, prouzrokuje oštru duševnu crvenost. Ovo je značaj multidisciplinarnog dijagnostičkog i terapijskog pristupa sindromu bolne simfize sportista [11].

The testing of the adductors is of great importance for the physical examination at the site of the potential injury sites. Palpable tenderness can be detected through physical examination at the site of the insertion of the adductors of the thigh, at the insertion of Poupart’s ligament, as well as at the meeting point of the two pubic bones. In the inguinal canal, lymph nodes can also be palpated and they are extremely painful to the touch. During the contraction of the abdominal wall, when the patient is standing or lying down, it is possible to note the signs of weakness of the oblique and transverse abdominal wall muscles as well as of the abdominal wall aponeurosis — Malgaigne’s sign. This sign is represented by the presence of a spindle shaped bulge extending from the pubis to the anterior superior iliac spine (lat. spina iliaca anterior superior). At the same time, this sign indicates the weakness and atonia of the transverse muscle fibers of the anterior abdominal wall [8].

The abduction of the hip joint is limited by the pain arising from the stretching of the adductors. The abduction and adduction of the hip are painful. Active lifting of the leg in external rotation with the knee in full extension is very painful and usually not possible for the patient [10].

Particular muscle provocation tests for adductors of the anterior abdominal wall have been described. The testing of the adductors is of great importance...
Vukosavljević K. i sar.  

THE IMPORTANCE OF A MULTIDISCIPLINARY DIAGNOSTIC AND THERAPEUTIC APPROACH TO PAINFUL SYMPHYSIS SYNDROME IN ATHLETES

DIFERENCIJALNA DIJAGNOZA

Iako se pod pojmom sportiste najčešće podrazumeva zdrava mlada osoba, ne treba zanemariti ozbiljna stanja koja pokazuju sličnu simptomatologiju (aneurizma bolnih kostiju na jednoj ili obe strane, erozije na rubovima pubičnih kostiju, diastaza simfize (pubic crest), asimetrija simfize, hipertrofija stidnih grebenova, pojava regionalnih slobodnih koštanih talo, zero domaćinske slike i preklapajućih simptoma između pub- i femoritis, m. sartorius, rectus abdominis) palpiraju se na pubičnom segmentu, raskostrivost i prisustvo kile [15]. Zbog svega do sada navedenog, kao i zbog specifi- 
njih koja pokazuju sličnu simptomatologiju (aneurizma bolnih kostiju na jednoj ili obe strane, erozije na rubovima pubičnih kostiju, diastaza simfize (pubic crest), asimetrija simfize, hipertrofija stidnih grebenova, pojava regionalnih slobodnih koštanih talo, zero domaćinske slike i preklapajućih simptoma između pub- 
ku unutrašnjosti abdomena i mogućnost istovremenog stička procedura jeste laparoskopija, koja objedinjuje sli- 
ko unutrašnjosti abdomena i mogućnost istovremenog stička procedura jeste laparoskopija, koja objedinjuje sli- 
Kinesiološkom analizom, kod svih pacijenata je ustanovljena slabost prednog trbušnog zida (i to spe- 
cijalno košijevih trbušnih mišića i druge uzroce boli [4,16]. Mogu biti od kori- 

Zbog svega do sada navedenog, kao i zbog specifične kliničke slike i preklapajućih simptoma između pu- 

DIFERENCIJALNA DIJAGNOZA

Iako se pod pojmom sportiste najčešće podrazumeva zdrava mlada osoba, ne treba zanemariti ozbiljna sta-

for the physical examination. In this test, the patient is lying supine with the hips in abduction and flexed at 80 degrees. The test is positive if the patient, while attempting to pull the legs against the resistance in the other direction (exerted by the doctor), feels sharp pain in the groin [12]. On the other hand, Kachingwe et al. made a classification comprising the following five clinical signs that may indicate athletic pubalgia: 1) subjective discomfort caused by pain deep in the groin/pain in the lower abdomen; 2) pain which increases with the increase of exertion (sprouting, crunches/sit-ups) and decreases with rest; 3) palpatory sensitivity of the pubic ramus at the insertion site of the m. rectus abdominis and/or the insertion tendon; 4) pain when resistance is exerted in hip adduction with a flexion of 45 and/or 90 degrees; 5) pain when offering resistance during the rotation of the abdomen [13,14].

The regional examination is exceptionally important in narrowing down the differential diagnosis. The lumbar segment of the spinal column, the sacroiliac joints, and the hip joints must be functionally tested. At the same time, the symphysis is tested for instability and sensitivity, as pubic bone osteitis is a relatively frequent finding in the population of athletes. Muscle insertions (including adductors, as well as m. rectus femoris, m. sartorius, rectus abdominis) show painful sensitivity to palpation. In order to elicit symptoms, the same muscles are tested for resistance. The patient is examined both in the standing position and when lying down, in order to determine the presence of inguinal or femoral hernia. In female patients a gynecological examination may be necessary as well [15].

Kinesiological analysis has found, in all patients, a weakness of the anterior abdominal wall (especially oblique abdominal muscle weakness), while a manual muscle test score of two out of five (MMT = 2/5). Hip adductors are also weakened in these patients, but primarily due to the lack of activity [8].

Due to all that has been stated so far, but also due to the particular clinical presentation and the overlapping of the symptoms of pubalgia and the symptoms of other conditions involving groin pain, it is useful to carry out one of the diagnostic imaging techniques, in order to exclude other causes of pain [4,16]. The following techniques may be useful: radiography, ultrasound, magnetic resonance imaging (MR), as well as computed tomography (CT). The following evolution of bone change can be detected on radiographic images: unilateral or bilateral bone proliferation, erosion on the rims of the pubic bones, diastasis symphysis pubis (pubic symphysis separation), symphysis asymmetry, hypertrophy of the pubic crest, the presence of regional loose bodies, demineralization and condensation zones.
abdominal wall, disc herniation, nutrient defect, compressive as well as retropubic, iliac, and femoroacetabular mobilization of soft tissues in the case of muscle, zone. Treatment usually consists of rest, active return to play, and the duration of sports is individual and based on the level of training that allows it. However, treatment should be based on the therapeutic approach (when pain and functional status improve, neuromuscular swelling, acupuncture, laser therapy, galvanic currents, gnetotherapy, ultrasound, transcutaneous electrical nerve stimulation. It most often involves physical agents such as manual therapy for most patients in this group. Treatment is usually started at the same time [13].

DIFFERENTIAL DIAGNOSIS

Although athletes are most commonly young healthy individuals, serious conditions displaying similar symptoms (abdominal aortic aneurysm; disc hernia at the level of the L2 vertebra, which produces pain that radiates into the groin; prostate cancer; metastatic lesions in the structures of the lesser pelvis; ovarian cysts; ectopic pregnancy; compressive fractures of the lumbar vertebrae, etc.) must not be overlooked. Establishing the precise diagnosis is important for several reasons. The first and most important one is that, if the diagnosis is serious (such as malignancies or abdominal aortic aneurysm) the patient should not waste precious time but be treated immediately. As the symptoms usually seem harmless and usually bearable at the start, athletes do not want to waste time and miss out on important competitions and training sessions. However, due to all the above stated, the diagnosis must not be rushed, nor should certain procedures be omitted, as the consequences of the wrong therapeutic approach may be irreparable. As a part of the differential diagnosis, the following diseases/conditions may be considered: osteitis pubis, osteomyelitis, osteoma, osteochondroma, tuberculosis, sarcoidosis, hemochromatosis, rheumatic disease, traumatic injury to the symphysis, intraarticular/extraarticular pathology of the hip and the intraabdominal space, femoroacetabular impingement (FAI), acetabular labral tear, injury to the adductor muscles, etc. [10,17].
TREATMENT PRINCIPLES

Only after establishing a definitive diagnosis can treatment be started. There are two treatment approaches – conservative treatment and surgical treatment. Within conservative treatment, resting, i.e., cessation of training is the most important. This measure can last from 3 to 12 months, depending on the severity of the injury and the rate of recovery. Localized and systemic pharmacotherapy combined with physical therapy is applied to treat the inflammation and pain.

PHYSICAL THERAPY AND REHABILITATION PROGRAM

Gradual physical therapy in combination with pharmacotherapy (antiinflammation drugs and myorelaxants) is effective in most cases. Rehabilitation is the treatment of first choice for most of the patients in this group. It most commonly involves physical agents such as magnetotherapy, ultrasound, transcutaneous electrical nerve stimulation, laser therapy, galvanic currents, neuromuscular taping, acupuncture, and kinesitherapy (when pain and the functional status of the patient allow it). However, treatment needs to be individualized and based on the level of fitness of each athlete, the time period necessary for the athlete to return to their sports activities, as well as the duration of the sports season. The treatment primarily comprises of rest, active mobilization of the soft tissue in case of muscle tightening, as well as of articular manipulations of the pelvic, sacroiliac, and hip joints, which can be useful in the alleviation of pain linked to dysfunction [13,18]. Therapeutic ultrasound treatment, cold tubs, and deep tissue massage of the groin can also be useful.

Next to pain alleviation, one of the first goals is working on the recovery and improvement of the scope of movement. Following this, treatment consists of exercises for strengthening central musculature, which are primarily directed towards the abdomen, lumbar spine and hips. Exercises of stretching and strengthening the adductor muscles, the muscles of the abdominal wall, the m. iliopsoas and m. quadriceps femoris, and of the associated tendons are included. The aim of the treatment is establishing a balance amongst the stabilizer muscles of the hip and pelvis.

The next crucial part of rehabilitation is neuromuscular reeducation, focused on the adductors and abdominal muscles. It starts with controlled contractions of the m. transversus abdominis. Along with these, exercises for pelvic and gluteal muscles are added, as well as exercises for the m. multifidus (postural stabilizer). It is exceptionally important to train the adductors in the open and closed kinetic chain, thus improving
slučaju povoljniji. Kod operativnog lečenja, potrebno je ujednačiti sile obe mišićne regije, što je poznato kao metoda mišićno-aponeurotične terapije, kojom se ojačava trbušni zid i rasterećuju pripoji na pubisu. Jedna od najpoznatijih tehnika operativnog lečenja sprovodi se po metodi Plastica telmentis abdominalis et canalis inguinalis secundum Bassini cum modificati-
one Nešović, koja omogućava usklađivanje snage pelvifemoralne lože mišića, posebno aduktora, i mišića prednjeg trbušnog zida. Ovu tehniku je, 1967. godine, uspešno predstavio dr Branislav Nešović (Beograd, Srbija) mođifikujući do tada poznatu klasičnu tehniku operacije ingvinalne kile po Basiniju [8]. Pri operacij-
i je potrebno zatvaranje ingvinalnog kanala i pravljenje novih prolaza za neurovaskularne elemente u ovoj regiji [21].

POSTOPERATIVNA REHABILITACIJA

Rehabilitacija nakon hirurškog zahvata podrazumeva postupnu vertikalizaciju i jačanje ciljnih mišićnih grupa. Ukoliko oporavak ide po planu, fudbaleri se najčešće vraćaju na teren nakon pet nedelja, pri čemu je najbolji pokazatelj oporavka izostanak bola. Recidivi na po operativnom lečenju praktično nisu registrovani, tako da se postignuti rezultati mogu smatrati potpuni uspehom u lečenju bolnog sindroma u regiji simfize [10]. Za svakog pacijenta, posebno za sportistu, važno je da kardiovaskularna izdržljivost ostane na istom nivou ili da ona bude u poboljšanju nakon ponovnog testiranja. Shodno tome, svaka sesija treba da započ-

**Figure 2. Therapeutic algorithm of athletic pubalgia (modified according to Cohen, Kleinhenz, Schiller, Tabaddor) [19]**

**Slika 2. Terapijski algoritam atletske pubalgije (modifikovano prema: Cohen, Kleinhenz, Schiller, Tabaddor) [19]**

propiroception, as well as to train the execution of co-contractions of the postural muscles, in order to establish an equilibrium. Autogenous stretching has a twofold function – relaxation of narrow muscles and support in proprioception [13,14,18]. Coordination and stabilization are of vital importance for enabling the patient to resume sports and everyday activities [18]. If these measures do not produce the desired effect, infiltrating local anesthetics and corticosteroids at the site of the pain should be considered. All of the described forms of treatment may be applied in the form of monotherapy, or they may be combined as per the doctor’s instructions. The therapeutic algorithm for pubalgia in athletes, recorded in literature (Figure 2), indicates the different therapeutic approaches that should be considered regarding this syndrome [19]. If none of the conservative procedures, applied for at least three months, does not yield the appropriate effect, the most invasive therapeutic approach – surgery, should be considered [20]. There are different surgical techniques for treating pubalgia, and for most of them satisfactory results have been recorded. The principles of surgical treatment include the procedures of strengthening the posterior wall and the fixation of the m. rectus abdominis or its insertion tendon. Another type of surgical treatment is laparoscopic surgery (fixation of a total extraperitoneal mesh behind the pubic bone and/or the posterior wall of the inguinal canal). Paajanen et al. reported that, in their study, laparoscopic surgery of pubalgia in athletes was more efficient than non-operative treatment [21]. After the surgery,
ne određenim kardiovaskularnim vežbama. Program aktivnog treninga superioran je u fizioterapijskom lečenju [14].

PREVENCIJA

Zbog uvida u složenost terapijskog pristupa sindromu bolne simfize, neophodno je sprovoditi prevenciju već u najranijim sportskim uzrastima. Ona se ogleda u sprovođenju vežbi jačanja mišića prednjeg trbušnog zida i to po programu svakodnevnog treninga, uz poseban akcenat na vežbe za kose i poprečne trbušne mišiće. Veoma su značajne i kontrakcije mišića bez opterećenja. Ukoliko dođe do pojave bolnog sindroma, potrebno je što ranije započeti konzervativnu terapiju uz odgovarajući fizikalni tretman.

ZAKLJUČAK

Sindrom bolne simfize je značajno kliničko stanje za sportiste, sa posebnim akcentom na igrače fudbala. Etiologija razvoja bolova, treba imati na umu značaj pravovremene i specifične duže staze. No, ako i uprkos tome dođe do pojave nova i temelj zaštite sportista od ovog bolnog stanja, mora se imati u vidu prevencija, kao osnovni element za adekvatno aktivno učešće u treninzu i odgovarajući terapijski pristup.

Sukob interesa: Nije prijavljen.

LITERATURA / REFERENCES

1. Elattar O, Choi HR, Dills VD, Busconi B. Groin Injuries (Athletic Pubalgia) and Return to Play, Sports Health. 2016 Jul;8(4):313-23. doi: 10.1177/1941738116653711.
2. Meyers WC, Yoo E, Devon ON, Jain N, Horner M, Lauencin C, et al. Understanding “sports hernia” (athletic pubalgia): the anatomic and pathophysiologic basis for abdominal and groin pain in athletes. Operative techniques in sports medicine. 2008. 20(1):33-45.
3. Omar IM, Zoga AC, Kavanagh EC, Koulouris G, Bergin D, Gopez AG, et al. Athletic pubalgia and “sports hernia”: optimal MR imaging technique and findings. Radiographics. 2008 Sep-Oct; 28(5):1415-38.
4. Dimitrokapoulou A, Schilders E. Sportsman’s hernia? An ambiguous term. J Hip Preserv Surg. 2016 Feb 24;3(1):16-22. doi: 10.1093/jhips/hnv083.
5. Balconi G. US in pubalgia. J Ultrasound. 2011 Sep;14(3):157-66. doi: 10.1016/j.jus.2011.06.005.
6. Cavalli M, Bombini G, Campanelli G. Pubic inguinal pain syndrome: the so-called sports hernia. Surg Technol Int. 2014 Mar;24:189-94.
7. Morales-Conde S, Socas M, Barranco A. Sportsmen hernia: what do we know? Hernia. 2010 Feb;14(1):7-15. doi: 10.1007/s10029-009-0613-z.
8. Jevtić M, Vanić K, Žečević M. Rehabilitacija posttraumatskih i ortopedskih bolesnika. Kragujevac-Beograd: Medicinski fakultet univerziteta u Kragujevcu, 1995.
9. Garvey JF, Read JW, Turner A. Sportsman hernia: what can we do? Hernia. 2010 Feb;14(1):17-25. doi: 10.1007/s10029-009-0611-1.
10. Nesovic B. The painful symphysis syndrome in athletes and treatment possibilities Reflection on the topic after 20 years of personal experience. Aspetar Sports Med J. 2012 Dec; 3:254–7.
11. Gerhardt MB, Brown JA, Giza E. Occult groin injuries: athletic pubalgia, sports hernia, and osteitis pubis. Practical orthopedics, sports medicine and arthroscopy, ed. DA Johnson and RA Pedowitz 2006. Baltimore, MD: Lippincott Williams & Wilkins, 531-45.
12. Janković S, Delimar D, Hudetz D. Sindrom bolne prepone: The groin pain syndrome. Arh Hig Rada Toksikol. 2001 Dec; 52(4):421-8.
13. Kachingwe AF, Grech S. Proposed algorithm for the management of athletes with athletic pubalgia (sports hernia); a case series. J Orthop Sports Phys Ther. 2008 Dec;38(12):768-81. doi: 10.2519/jospt.2008.2846.
14. Ellsworth AA, Zoland MP, Tyler TF. Athletic pubalgia and associated rehabilitation. Int J Sports Phys Ther. 2014 Nov;9(6):774-84.
15. Swan KG Jr, Wolcott M. The athletic hernia: a systematic review. Clin Orthop Relat Res. 2007 Feb;455:78-87. doi: 10.1097/BL0.0b013e31802e3ea.
16. Minnich JM, Hanks JB, Muschawek U, Brunl LM, Diduch DR. Sports hernia: diagnosis and treatment highlighting a minimal repair surgical technique. Am J Sports Med. 2011 Jun;39(6):1314-9. doi: 10.1177/0363546511402807.
17. Koutsierimpas C, Ioannidis A, Konstantinidis MK, Makris MC, Antonakopoulos F, Mazarakis A, et al. Insights in clinical examination and diagnosis of Athletic Pubalgia. G Chir. 2020 Jan-Feb;41(1):131-5.
18. Serner A, van Eijck CH, Beumer BR, Hölmich P, Weir A, de Vos RJ. Study quality on groin injury management remains low: a systematic review on treatment of groin pain in athletes. Br J Sports Med. 2015 Jun;49(12):813. doi: 10.1136/bjsports-2014-094256.
19. Cohen B, Kleinhenz D, Schiller J, Tabaddor R. Understanding Athletic Pubalgia: A Review. R I Med J (2013). 2016 Oct 4;99(10):31-5.
20. Kajetanek C, Benoît O, Granger B, Menegaux F, Chereau N, Pascal-Mousselard H, et al. Athletic pubalgia: Return to play after targeted surgery. Orthop Traumatol Surg Res. 2018 Jun;104(4):469-72. doi: 10.1016/j.otsr.2018.01.012.
21. Paajanen H, Brinck T, Hermunen H, Aro I. Laparoscopic surgery for chronic groin pain in athletes is more effective than nonoperative treatment: a randomized clinical trial with magnetic resonance imaging of 60 patients with sportsman’s hernia (athletic pubalgia). Surgery. 2011 Jul;150(1):99-107. doi: 10.1016/j.surg.2011.02.016.

CONCLUSION

Painful symphysis syndrome is a significant clinical state for athletes, with special emphasis on football players. The etiology of the development of pain in the groin stems from the conflict between the uneven muscular strength of neighboring regions – the anterior abdominal wall and the lower extremities, as well as from the disproportion of the strain endured by the different insertions in the symphysis region. As the result of the development of pubalgia, the athlete becomes incapacitated to perform sports activities for a longer period of time. In order to avoid such a state and enable the athlete to actively participate in training sessions and games in an adequate manner, the importance of prevention, as the basis and foundation of protecting the athlete’s health from this painful condition in the long run, must be emphasized. However, if even with all the precautions, pain still develops, the importance of timely and specific diagnostics directing the doctor towards the most effective approach, must not be overlooked.

Conflict of interest: None declared.