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REVIEWS

Implications of rheumatology in sports medicine

Implicații ale reumatologiei în medicina sportivă

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Abstract

Rheumatology is the branch of medicine that studies, besides autoimmune diseases, musculoskeletal pathology as well. These conditions may occur as a consequence of practicing sports or other recreational activities which involve physical overload.

The ability of rheumatologists to recognize, investigate and treat musculoskeletal conditions makes rheumatology a discipline with important applications in sports medicine. Musculoskeletal ultrasound, considered to be "the rheumatologist's stethoscope", has many uses in sports medicine.

The most frequent rheumatologic conditions in sports medicine are periarticular conditions of the shoulder, elbow, hip, knee and leg, as well as arthrosis. These include afflictions of the tendons, ligaments, bursae, joint capsule, cartilages, fasciae, muscles and peripheral nerves.

In most cases the diagnosis is clinical (+/- by ultrasound) and the treatment is conservative: pain control and rehabilitation treatment; sometimes periarticular infiltrations or surgical interventions are also required.

Most musculoskeletal conditions linked to physical overload can be prevented by observance of rest intervals, the use of correct training techniques, as well as the use of adequate sports equipment.

Keywords: rheumatology changes, athletes, sports medicine.

Rezumat

Afecţiunile musculoscheletale pot apărea ca urmare a practicării unui sport sau a unor activităţi recreacţionale care implică suprasolicitare fizică.

Abilitatea reumatologilor de a recunoaşte, a investiga şi a trata afecţiunile musculoscheletale face ca reumatologia să aibă importante aplicaţii în medicina sportivă. Ecografia musculoscheletală, considerată "stetoscopul reumatologului", are multe utilizări în medicina sportivă.

Cele mai frecvente afecţiuni reumatologice întâlnite în medicina sportivă sunt reprezentate atât de afecţiuni periarticulare ale umărului, cotului, şoldului, genunchiului şi piciorului, cât şi de boala artrozică. Acestea includ afecţiuni ale tendoanelor, ligamentelor, burselor, capsulei articulare, cartilajului, fasciilor, muşchilor şi nervilor periferici.

În majoritatea cazurilor diagnosticul este clinic (+/- ecografic), iar tratamentul este conservator: controlul durerii şi tratament de reabilitare; uneori este nevoie şi de infiltraţii periarticulare sau de intervenţie chirurgicală.

Majoritatea afecţiunilor musculoscheletale legate de suprasolicitare pot fi prevenite prin respectarea perioadelor de odihnă şi repaus, folosirea tehnicilor corecte de antrenament, precum şi folosirea de echipament sportiv adecvat.

Cuvinte cheie: modificări reumatologice, sportivi, medicină sportivă.

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Upper limb conditions

The shoulder is an extremely important joint judging by the high degree of movements it is capable to perform; it is the most mobile joint of the body, hence its high proneness to injury (Bojinca, 2007; Speed, 2005). Sports shoulder injuries occur in case of repeated arm above the head movements, as well as through direct trauma in contact sports. The main sports where shoulder injuries occur are: baseball, tennis, swimming, throwing, gymnastics and weight lifting (1); (Birkelo et al., 2003; Burkhartt et al., 2003; Seroyer et al., 2009; Bennett, 2012).

The main symptoms of shoulder injuries are pain and functional impotence. Generally, shoulder pain is a term used by patients not only for the joint per se, but also for a wide range of upper thorax and arm conditions. Joint swelling is usually difficult to notice. Movement pain is one of the most important signs for this area (Bojinca, 2007); (2).

Rotator cuff lesions (tendons of the subscapularis, supraspinatus, infraspinatus and small round muscles) are the most common shoulder condition. These are tendinitis/tendinosis, partial or total tendon ruptures. They occur due to the inflammation and wear of the rotator cuff tendons, especially the supraspinatus tendon. They are often associated with subacromial bursitis (3); (Conway et al., 2001; Fleisig et al., 1998; Kuhn et al., 1998). Pain is felt in the deltoid region, is accentuated during the night and is associated with weakness in abduction and external rotation of the shoulder, with possible crepitus or even palpable defect in case of complete rupture. Rotator cuff tendinitis is characterized by the positive "painful arc sign": The patient is asked to raise the arm laterally from 0° to 180°, pain occurring during movement within the 45° angle above and below the horizontal shoulder plane, but also during internal rotation and abduction. The "drop-arm" test shows the incapacity to actively sustain the shoulder at a 90º angle and indicates complete rupture. Incomplete rupture has similar symptomatology to that of tendinitis (Bojinca, 2007).

Radiologically, the upper migration of the humeral head and narrowing of the acromiohumeral interval in case of rotator cuff rupture are highlighted. MRI and ultrasound examinations can identify both tendinitis and tendon ruptures (Bojinca, 2007; Meller et al., 2007).

Treatment is conservative: rest, pain killer/anti-inflammatory medication, rehabilitation treatment; in case of tendon ruptures, surgical treatment is recommended. Injection of glucocorticoids in the subacromial bursa improves pain (Bojinca, 2007; Seroyer et al., 2009).

Subacromio-subdeltoid bursitis is usually associated with rotator cuff lesions, as a reactive process to it. Palpation of the deltoid area causes pain. Abduction of the arms at an over 90° angle, and especially abduction against resistance, causes intense pain (Bojinca, 2007). Ultrasound easily detects this condition. Treatment is conservative or local – infiltrations with glucocorticoids +/- anesthetics (Seroyer et al., 2009).

Bicipital tendinitis affects the passing of the biceps long head tendon through the bicipital groove. Clinically, it is characterized by pain on the anterior side of the shoulder, irradiating to the biceps. The palpation of the tendon long head in the bicipital groove causes pain. It can occur at the same time as rotator cuff lesions. Shoulder flexion against resistance with extended elbow (Speed test), active supination of the forearm against resistance with the elbow bent at a 90º angle (Yergason test), lifting the arms over the head with interlaced fingers and active arm abduction (Ludlington test) all cause pain (Bojinca, 2007). Diagnosis is clinical +/- by ultrasound, and treatment is conservative. The local injection of glucocorticoids runs the risk of iatrogenic tendon rupture (Bojinca, 2007; Seroyer et al., 2009).

Other shoulder conditions linked to physical overload are calcific tendinitis, rupture of the articular labrum, glenohumeral instability (subluxation) (Seroyer et al., 2009).

Elbow lesions occur in sports that involve repetitive use of the forearm muscles, such as tennis, golf, and throwing moves. These are lateral epicondylitis, medial epicondylitis and olecranon bursitis (posttraumatic) (Luria & Chu, 2014; Bennett, 2012).

Lateral epicondylitis ("tennis elbow"/tennis player epicondylitis) is mostly due to the damage of the tendon of the extensor carpi radialis brevis muscle. It occurs in athletes who intensively use their forearms in racket sports or sports involving throwing movements with arms above the head. It causes pain in the lateral epicondyle at local pressure or during activities that involve the use of the forearm muscles. Pain can also be inflicted by elbow extension against resistance, with bent wrist (Opris, 2007).

Diagnosis is mainly clinical. Musculoskeletal ultrasound can show swelling, hypoechogenicity and sometimes neovascularization in the insertion areas of the tendon on the median epicondyle (Opris, 2007). In chronic cases, tendinous calcifications may occur; these calcifications can also be detected during radiological examination (Bojinca, 2007).

Treatment consists of rest, avoiding forearm muscle overuse, local cold compresses, painkillers, NSAIDs (preferably topical) (3). Local infiltrations with glucocorticoids are also effective (Bojinca, 2007). In the long run, muscle toning isometric exercises and adequate training technique are important (4).

Medial epicondylitis ("golfer's elbow"/golfer's epicondylitis) is rarer and is due to the tendon damage of the flexor carpi radialis muscle. It causes pain on pressure on the medial epicondyle and flexion of the fist against resistance (Bojinca, 2007). Diagnosis and treatment are similar to those for lateral epicondylitis.

Olecranon bursitis occurs following local trauma, most often by falling on hard surfaces (volleyball, contact sports). The bursa can be swollen and painful, and aspiration can sometimes highlight sanguineous fluid (Bojinca, 2007; Opris, 2007). Diagnosis is clinical +/- by ultrasound (hypo/isoechogenic collection in the olecranon bursa) (Bojinca, 2007; Opris, 2007). Treatment is conservative: local cold compresses, pain killers/anti-inflammatory drugs (preferably topical). In case of significant collection, liquid aspiration can be necessary (Bojinca, 2007).

The radiocarpal joint (fist) and the hand

Fist and hand lesions frequently occur in sports and may affect ligaments, tendons, bones, muscles and nerves (Carlson, 2012). In many cases it is acute conditions, injuries that cause sprains, fractures – a pathology that does not involve rheumatology. Repetitive moves of the fist and finger joints may cause subacute and chronic conditions such as tendinitis, tenosynovitis, synovial cyst and carpal tunnel syndrome. These occur in sports that intensively use the fist joint (baseball, volleyball, weight throw, tennis, gymnastics), but also following trauma by falling (5).

In the tendinitis and tenosynovitis of the hand flexors and extensors, the tendons of the finger flexors (superficial and deep), flexor carpi radialis and flexor carpi ulnaris muscles can be affected. Pain in the palm of the hand occurs, accentuated by finger flexion, more frequently in the middle and index fingers. The clinical exam is based on palpation and identification of sensitive and possibly swollen areas along the tendon sheaths. The most vulnerable of extensor tendons are: the extensor carpi ulnaris, the 5th finger extensor and the index finger extensor (Bojinca, 2007). Diagnosis is mainly clinical. The ultrasound examination shows a thickened and hypoechogenic tendon, with occasional collection in the tendon sheath (tenosynovitis) (5). Treatment is conservative: rest, splints/orthoses, cold local compresses, anti-inflammatory medication administered locally or orally. Glucocorticoids injected locally in the tendon sheath can sometimes be useful (Bojinca, 2007; Chung, 2016).

De Quervain's tenosynovitis affects the thumb's short extensor and long adductor muscle tendons. It results from repetitive activities that involve gripping with the thumb, along with fist movements: golf, squash, badminton (5). Clinically, there is pain with or without swelling above the radial styloid. Pain can be triggered through the Finkelstein test: thumb flexion in the palm, followed by the passively forced ulnar deviation of the fist (Bojinca, 2007); (5). Diagnosis, ultrasound examination and treatment are similar to those for hand flexor and extensor tenosynovitis.

The carpal tunnel syndrome is a frequent cause of hand paresthesia. The medial nerve and flexor tendons pass through a common tunnel determined by the carpal bone and transverse ligament. Any process that narrows the tunnel compresses the median nerve, which innervates the thenar muscles, the radial lumbrical muscles and the skin of the radial part of the palm (fingers 1, 2, 3 and the radial half of finger 4) (Bojinca, 2007). In the case of athletes, it is most often fist flexor tenosynovitis or repetitive movements of the fist joint that cause repeated compression of the median nerve (Bianchi et al., 2013). The carpal tunnel syndrome causes pain, paresthesia and sometimes anesthesia in the mentioned area, most frequently at night; they are generally alleviated by the movement of shaking of the hand. Symptomatology can be reproduced through Tinel's sign (percussion of the transverse carpal ligament) and Phalen's sign (maximum flexion of the hand on the forearm for 1 minute) (Bojinca, 2007). Diagnosis is mainly clinical. Musculoskeletal ultrasound is useful to measure the median nerve diameter (<12 mm) and to show the possible compression causes (Opris, 2007). Nerve conduction studies are sometimes necessary. Treatment is mainly conservative: rest, use of orthoses, NSAIDs. Local cortisone infiltrations are also useful. Surgical decompression of the nerve might be necessary in chronic cases (Bojinca, 2007; Chung, 2016); (3).

Synovial cysts occur adjacently to joints or tendons. The most frequent location is the radiocarpal joint, both on the dorsal and palmar sides, followed by the base of the fingers on the palmar side. These are round or oval formations with clear liquid or gelatinous content. Their etiology is unclear, but it is possible they might be caused by repetitive local mechanical irritation. They occur in handball, tennis, racket sports players. They may grow in size or may spontaneously disappear, they can be symptomatic or not (6). Diagnosis is clinical. Musculoskeletal ultrasound shows a well-outlined hypoechogenic collection. Treatment is only necessary when these are symptomatic: NSAIDs, aspiration +/- injection of cortisone preparations; surgical excision is rarely necessary (Chung, 2016); (6).

Trigger finger

The main cause is the overload of the finger, with thickening of the fibro-connective anchorage system of the flexor tendons of the fingers. Other causes are tendinitis, tenosynovitis or local synovial cysts. The flexor tendons are stopped from properly sliding, especially during finger extensions, the tendons remaining blocked (Opris, 2007). It occurs in athletes practicing sports that involve repetitive grabbing movements, in basketball players (3). Diagnosis is clinical. Ultrasound examination highlights the cause.

The rupture of the fibro-connective anchorage system of the flexor tendons most frequently occurs during climbing. This will lead to the removal of tendons from the bone surface of the proximal or middle phalange, which can be highlighted by an ultrasound examination (Opris, 2007).

Lower limb conditions

Sports traumas of the *hip area* usually cause tendon ruptures, often with the avulsion of a bony fragment at the insertion level (Opris, 2007; Blankenbaker & De Smet, 2010; Smith et al., 2010). Overload in the hip area causes bursitis, tendinitis and sometimes a snapping hip (1); (8); (Seidenberg & Lynch, 2015; Anderson et al., 2001).

Bursitis is the inflammation of the bursae, either through direct trauma or through repetitive movements. Symptomatology mostly consists of spontaneous pain during local pressure or caused by certain movements (Bojinca, 2007; Blankenbaker & De Smet, 2010); (8). Diagnosis is clinical +/- by ultrasound. The ultrasound examination shows a hypoechogenic or transonic collection in the examined bursa. Through bursa tapping, serous or bloody fluid is extracted in case of direct trauma. Synovial proliferations and calcifications may occur in chronic bursitis (Opris, 2007). Treatment is conservative: rest, cold compresses, NSAIDs. In some cases, aspiration and glucocorticoid infiltrations are needed (Tammareddi et al., 2013).

Trochanteric bursitis is the most frequent hip bursitis. Pain is felt in the trochanteric and lateral area of the thigh. The sitting position exacerbates pain in the area concerned (Bojinca, 2007). It occurs following direct trauma, in cyclists and sports that involve running (1); (Bianchi et al., 2013).

Ischiogluteal bursitis occurs following direct trauma, sitting on hard surfaces for long periods of time or repeated micro-trauma in the ischial area. Pain is exacerbated while sitting and at pressure on the ischial tuberosity (Bojinca, 2007); (8). It occurs in athletes practicing horseback riding, cycling (8).

Iliopsoas bursitis causes pain in the inguinal area and on the inside of the thigh, accentuated on passive hip hyperextension (Bojinca, 2007). It occurs during activities that involve repetitive hip flexion, in runners and swimmers (8); (Smith et al., 2010).

The snapping hip (coxa saltans) is characterized by the presence of a sound (snap) and sometimes pain during hip movements or walking. The causes can be intra-articular, internal and external. The intra-articular snap is due to certain lesions of the hip joint; the external snap is associated with a conflict between the thickened iliotibial band or the anterior side of the large gluteus and the greater trochanter. The internal snap occurs on the slip of the iliopsoas muscle tendon over the iliopectineal eminence. Ultrasound plays a very important role in the diagnosis of these changes. This condition occurs in athletes practicing gymnastics, ballet, karate (Opris, 2007); (8).

Hip adductor tendinitis causes subpubic pain that irradiates to the inner side of the thigh and occurs when one or more hip adductor tendons are damaged (8). Clinically, it can be observed through pain during palpation of the tendon insertions on the ischiopubic ramus, during the passive abduction and abduction of the thigh against resistance. It occurs in runners, gymnasts and horseback riders. Treatment is conservative: NSAIDs, pain killers, local cold compresses (Tammareddi, 2013); (3).

The knee is the largest and most complex joint of the body and, automatically, the most prone to injuries. The knee joint bears, in some effort situations, the body weight multiplied a few times over. Knee injuries occur by overloading of the joint during performance sports or intense physical activities, but also following a fall or a wrong movement (DeHaven & Lintner, 1986; Nicolini et al., 2014); (9). Among the most frequent knee injuries are those of the crossed ligaments, collateral ligaments, articular cartilage and meniscus (Nicolini et al., 2014); (9). The symptoms are pain and reduced mobility, but mostly feeling more or less intensely the knee joint instability (1); (Bianchi, 2013).

Meniscus lesions (ruptures) occur frequently, given the shallow location of the meniscus and the fact that very high functional pressure is put on it. These cause pain in the articular interlining, accentuated by knee movements and functional impotence, especially when climbing or descending stairs. In the case of recent lesions, hydrarthrosis can also be present. They occur in any sports activity that involves running and rotating movements of the knee (4); (Bianchi, 2013). Ultrasound is a suitable imaging method for the assessment of the meniscus, especially of the external part; the internal part can sometimes be difficult to examine. Meniscus ruptures have the appearance of a large hypoechogenic line from the surface of the meniscus and an irregular external outline (Opris, 2007). MRI is the examination of choice, providing a detailed image of the lesion. Subtle or incomplete ruptures are treated in a conservative manner (orthoses/splints, NSAIDs/pain killers, cold compresses, rehabilitation treatment), while more severe lesions need surgical treatment (4); (10); (Bianchi, 2013).

The jumper's knee is proximal patellar tendinosis that occurs by overbearing of the knee extensor mechanism. It develops following certain modifications caused by repeated micro-trauma or intratendinous cortisone injections. It occurs in athletes, especially volleyball and basketball players, and is one of the most important chronic conditions of the knee (9). Clinically, pain is the main symptom. Initially it occurs right after sports activities, but in advanced stages, pain is continuous and sports performance is reduced (Opris, 2007). Diagnosis is clinical and by ultrasound – focal or nodular hypoechogenic defects, hyperechogenic fibrosis areas or calcifications, neovascularization (Opris, 2007). Treatment is mainly conservative: cortisone infiltrations are not recommended, as there is a risk of tendon rupture (1).

The Pellegrini-Stieda syndrome is a calcification area of the medial collateral ligament, adjacent to the medial femoral epicondyle (11); (Kogon et al., 1987). Until now, it was linked to old trauma, but nowadays the lesion is considered to be a heterotopic ossification (Opris, 2007); (11). It sometimes causes pain in the medial side of the knee, sometimes with progressive movement limitation. Pain is usually self-limiting and improvement occurs within a few months, with the help of rest and NSAIDs. The lesion can be detected by ultrasound, as well as by radiological exam (Bojinca, 2007).

Knee bursitis occurs in sports with overload on the knee and high risk of falling and direct trauma, such as volleyball, football and wrestling. Diagnosis is clinical +/- by ultrasound and, in case of suspicion of lesions affecting other structures, radiological and MRI examinations may be necessary. Treatment is conservative; in some cases, bursa aspiration, injection of cortisone preparations or even surgical excision is needed. In case of bursa infection, antibiotic treatment and aspiration or drainage are required (Bojinca, 2007); (3).

The prepatellar bursa is frequently damaged in knee trauma. It occurs either through direct pressure on the walls, or through repetitive overload. Being situated on a rough plane with uneven outline, the prepatellar bursa is prone to develop friction bursitis. Clinically, it has the aspect of an inflammatory reaction, with painful and distended bursa (Opris, 2007).

Infrapatellar bursitis occurs between the patellar ligament and the tibia. It can also cause pain and swelling after trauma, and is sometimes associated with the jumper's knee (Bojinca, 2007); (1).

Anserine bursitis causes pain in the medial region of the knee, approximately 5 cm under the articular interlining. Pain is exacerbated when climbing stairs and during pressure on the "pes anserinus" (the tendons of the sartorius, gracilis and semitendinosus muscles) (Bojinca, 2007).

The popliteal cyst (Baker's cyst) is caused by the inflammation of the popliteal bursa. Any knee condition that causes accumulation of synovial liquid can be further complicated by the emergence of such a cyst (like a

hernia on the posterior side of the knee). Symptomatology depends on the cyst size. The cyst can be asymptomatic, it may cause discomfort during the complete extension and flexion of the leg or, in case of rupture, it can cause the pseudothrombophlebitis syndrome (Bojinca, 2007). Diagnosis is clinical and by ultrasound - confirmation and size of the cyst, possible associated lesions; MRI is useful in order to assess the associated pathology inside the knee. Treatment is based on the size and persistence of the cyst. Some cysts can spontaneously resorb, while others need aspiration and injection of glucocorticoids. In more severe cases with associated pathology, surgery may be necessary (1).

Iliotibial band syndrome is one of the most frequent overload lesions and is commonly found in runners, cyclists, weight lifters and footballers. It causes pain on the lateral side of the knee, through friction between the iliotibial band and the external femoral condyle, causing the band's fibrillated structure to be thickened and effaced. Frequently, iliotibial bursitis is also associated. Initially, pain occurs only during physical activity and, as the lesion worsens, pain can irradiate to the external side of the thigh and sometimes the leg (Bianchi, 2013). Diagnosis is clinical, imaging being necessary only in few cases. Treatment consists of cold compresses, pain killers, stretching, local ultrasound; cortisone infiltrations run the risk of ligament and tendon lesions; surgical treatment is rarely necessary (1); (Bianchi, 2013).

The Osgood-Schlatter disease is one of the most common causes of anterior knee pain in children and teenagers (Nakase et al., 2015); (12). It is caused by traumatic rupture or overbearing of the ossification center from the tibial tuberosity (12). It occurs following actions that involve repetitive tractions of the patellar tendon (Opris, 2007; Nakase et al., 2015). Treatment is mainly conservative (Opris, 2007).

Other ligament and tendon lesions

Crossed ligament lesions frequently occur during sports activities and result from pivoting movements, single foot landing or direct trauma. They cause pain and instability in the knee. The anterior crossed ligament is more frequently affected than the posterior one. In order to assess these lesions, MRI examination is necessary. Surgery is also required (1); (9); (Bianchi, 2013).

Collateral ligament lesions usually involve a significant force, such as a fall during skiing, or direct impact on the lateral side of the knee or leg. If the trauma is very strong, the ligaments may rupture. Lesions cause pain, sometimes with swelling and hematomas. Treatment is based on the severity of the lesion: conservative, orthopedic or surgical (1); (9); (10).

The quadriceps tendon, formed by the tendinous ends of 4 muscles (rectus femoris, vastus medialis, lateralis and intermedius), may suffer partial ruptures (especially rectus femoris), or total ruptures, generally at the patellar insertion level. Sometimes the rupture is accompanied by the avulsion of a bone fragment at the base of the patella (Opris, 2007).

The patellar tendon may be totally or partially ruptured, more frequently at its proximal or distal insertion, it can be accompanied by bone avulsion, sometimes with hematoma at the rupture site (Opris, 2007).

The ankle and the foot

The ankle joint carries the entire body weight and sometimes, during certain sports activities, it supports 20 times the body weight. The most frequent ankle and foot lesions occur following trauma, being acute lesions (1); (Hsu & Anderson, 2016). Ankle sprain is the most frequent lesion, occurring during physical activities and most of the time affecting the lateral structures of the ankle (Opris, 2007; Bianchi, 2013; Hsu & Anderson, 2016). Of all chronic lesions at this level, Achilles tendinopathy and plantar fasciitis must be considered.

Achilles tendinopathy

Achilles tendon, the longest and most powerful of the human body, is frequently damaged during sports activities that involve the sudden dorsiflexion of the foot, such as track and field, football, tennis, volleyball. Retrocalcaneal or superficial bursitis is frequently associated to tendon alterations (Opris, 2007). Partial or total ruptures may also occur. Achilles tendon lesions cause pain, swelling, sometimes motion crepitus and dorsiflexion pain (Bojinca, 2007). The use of the following terminology is recommended for Achilles tendon overload pathology: tendinopathy of the middle portion of the Achilles tendon, acute paratendinopathy, chronic paratendinopathy, insertional Achilles tendinopathy, retrocalcaneal bursitis, superficial calcaneal bursitis (1); (Opris, 2007). Diagnosis is clinical and by ultrasound (Hunt et al., 2013). Treatment is conservative and orthopedic, in some cases surgery being necessary (Chinn et al., 2010).

Peroneal tenosynovitis/tendinitis manifests through pain on the lateral side of the ankle, at lateral malleolus level. Peroneal tenosynovitis is frequent in athletes, being associated with trauma by inversion and chronic instability of the ankle. Peroneal tendinosis has a chronic lesion significance. Peroneal tendon dislocations (acute or chronic recurrent), especially short peroneal tendon dislocations, are caused by sudden dorsiflexion associated with ankle eversion and peroneal retinaculum rupture (Opris, 2007). Peroneal lesions occur in runners, basketball players, dancers and athletes practicing sports that involve jumping. Diagnosis is clinical and by ultrasound, and treatment is conservative, surgery being rarely necessary (1); (Opris, 2007; Hunt et al., 2013).

Posterior tibial tendinitis causes pain behind the medial malleolus, due to trauma or excessive pronation movements (Bojinca, 2007).

Plantar fasciitis is the most frequent cause of pain in the heel. Pain is more accentuated in the morning, when switching to orthostatism. It mostly occurs in athletes, dancers, basketball players and older persons practicing sports (Opris, 2007). Diagnosis is clinical +/- by ultrasound (Hunt et al., 2016). Treatment is conservative: cold compresses, pain killers, wearing plantar support bands, shoe inserts or shock absorbing shoes, physiotherapy. Sometimes cortisone infiltration can be useful (1).

Ligament lesions

Most frequently, foot traumas result in ligament lesions.

Lateral foot ligaments (talofibular and calcaneofibular) are the most frequently affected. In ankle inversion trauma, more than half of the cases show a single lesion of the anterior talofibular ligament. Diagnosis is clinical and by ultrasound, and treatment is conservative (Opris, 2007; Hsu & Anderson, 2016).

Arthrosis in athletes

Arthrosis is a multifactorial and heterogenic degenerative arthropathy, characterized by the progressive degradation of the articular cartilage, accompanied by a hypertrophic reaction of the subchondral bone, which causes a neoformation of bone and cartilage, as well as various reactions from the other articular structures (synovia, capsule, meniscus) (Buckwalter & Lane, 1997). Arthrosis is by far the most frequent joint condition, its incidence increasing with age (Buckwalter, 2003). The most frequent location is in diarthrodial joints, such as the knee, the hip and the hand (Zeller & Sukenik, 2008; Vignon et al., 2006). The etiological factors responsible for arthrosis are: medical history, age, gender, obesity, articular hypermobility, mechanical stress and trauma (Buckwalter & Martin, 2004). Onset is insidious and evolution is slowly progressive (3). Clinically, it is characterized by mechanical pain. Diagnosis is clinical and radiological; in recent years, musculoskeletal ultrasound has been increasingly used to assess degenerative alterations, allowing extensive assessment of most articular alterations present in arthrosis. Treatment is conservative and symptomatic: painkillers, NSAIDs, chondroprotective drugs, physiotherapy, balneotherapy. Sometimes cortisone or viscoelastic solutions (hyaluronic acid) infiltrations are used. More advanced cases require surgical treatment (3).

It is well known that physical activity improves health and preserves articular function by fighting ankylosis. Also, physical activities are an important method to treat arthrosis but, at the same time, practicing sports can increase the risk of arthrosis by joint overload and high trauma risk (7).

Intense mechanical tensions on the joint surface cause micro-fractures of the subchondral bone. This process causes cartilage alterations. The absence of a recovery period may inhibit articular regeneration. Repeated accidents risk destabilizing the joint and increase friction, thus leading to the onset of arthrosis (Fodor, 2013). Traumas also contribute to it, either through a direct (rough impact) or indirect mechanism (chronic tendon and ligament lesions, articular instability, periarticular ossifications). The surgical treatment of pre-existing lesions (meniscectomy, osteosynthesis, ligament and tendon sutures/reconstructions) causes degenerative alterations of the joints (7); (Fodor, 2013).

Joint degeneration in performance sports is very common. Thus, gonarthrosis frequently occurs in football players (by affecting the peroneotibial joint), in weightlifting by flexion at 90 degrees with weights, and in any sports activity that involves running, jumping, trauma. Omarthrosis frequently affects rugby players through recurrent scapulo-humeral sprains, or tennis players through repetitive micro-traumas at this level. Due to insufficiency of the cotyloid cavity, coxarthrosis occurs in dancers. Regarding the ankle, the most "arthrogenic" sports are: rugby, football, handball, basketball, track and field (Fodor, 2013).

Conclusions

1. The risk of arthrosis in athletes seems to depend on the practiced sports, their duration, and occurring injuries.
2. Contact sports increase the risk of arthrosis through trauma and hyper-use. Lesions can be prevented by correct training techniques, use of adequate sports equipment and appropriate rest intervals.

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