

Sports medicine and sports-related trauma

A MEDICINA DO ESPORTE E O TRAUMA ESPORTIVO

RICARDO MUNIR NAHAS^{1*}

¹Sports Medicine Physician and Orthopedist, Editor-in-Chief of the *Journal of the Brazilian Society of Sports and Exercise Medicine*, Brazilian Society of Sports and Exercise Medicine (SBMEE). Coordinator of the Sports and Exercise Medical Center at Hospital 9 de Julho, São Paulo, SP Brazil. Tenured Full Professor and Orthopedic Residency Preceptor at Hospital Ipiranga, São Paulo State Health Department, Scientific Director of the South American Confederation of Sports Medicine (Cosumed). President of the Board, Brazilian Society of Sports and Exercise Medicine, in the biennium 2003-2005, São Paulo, SP Brazil

*Correspondence: mnahas@uol.com.br

<http://dx.doi.org/10.1590/1806-9282.62.01.10>

The high frequency of injuries in the practice of physical activity, exercise and sports is the reason why the locomotor system occupies a great deal of the time and knowledge of those who choose sports medicine as a specialty.

On account of such high incidence, trauma is also the main responsible of temporary (or definitive) interruptions in physical activity, especially in cases related to sports. Sometimes injuries can force purely and simply a change in the modality practiced, as they involve restricted, specific disabilities, even in high performance sports.

In this brief report, some of the most frequent occurrences in sports will be discussed, showing the non-specialist a few particularities of this vast and complex specialty.

SPORTS-RELATED TRAUMA

Caused by action with considerable magnitude of energy in short periods of time, acute injuries have strong symptoms and rapid progression. These are the ones that stand out the most because they are often dramatic, although not exclusive and, caused accidentally, they do not express the sportive nature of trauma (Figures 1 and 2).

Unlike acute injuries, chronic injuries are long lasting, and have to do with the execution and exhaustive repetition of specific movements in a sport, for technical improvement.

This relationship is so close that sometimes the disease is named after the sport, as in “tennis elbow”, “golfer’s elbow”, “jumper’s knee”, “swimmer’s shoulder”, and more (Figures 3 and 4).

Despite their multiple causes, these diseases are directly related to fatigue that takes place when the limit of adaptation and recovery of different tissues forming the locomotor system is exceeded. Fatigue leads to command error, which is always voluntary, affecting the automatism obtained during sports training.

Clinically, these injuries develop insidiously, with slow progression. The main symptoms observed since the beginning and throughout the development of the disease are pain and functional impairment. This is reflected in sports by reduced performance and worsening of execution, without the usual precise technique.

If these warning signs are not observed, progression can have disastrous consequences.

MUSCULAR INJURIES

Although not exclusive, muscular injuries have significantly higher occurrence in sports compared to other professional and everyday activities.

Acute injuries, caused by direct trauma, lead to contusion with muscle tears that prevent physical activity for a period of time depending on severity.



FIGURE 1 Fracture-dislocation of the ankle in a recreational soccer player, caused accidentally by direct trauma.



FIGURE 2 Photo of an event similar to the case above, obtained during a professional game.

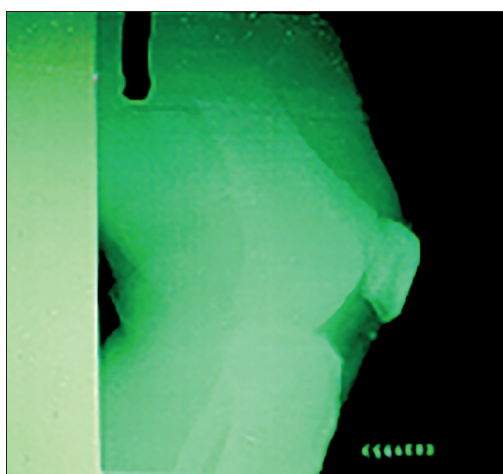


FIGURE 3 Knee lateral x-ray view showing calcification of the patellar ligament. Patient diagnosed with “jumper’s knee” underwent several physiotherapy sessions and infiltrations to treat pain and impossibility to practice a sport of choice.

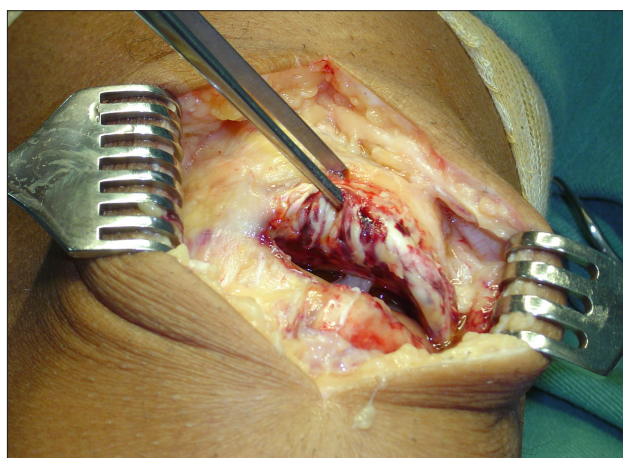


FIGURE 4 Surgical specimen of the same patient, after tearing of the patellar ligament by indirect trauma. The degenerative aspect reflecting chronicity of the injury is remarkable.

These injuries occur frequently in soccer, as a result of kicks to the thigh and calf muscles.

Acute injuries by indirect trauma occur when the volunteer command by nerve stimulation to the contraction of an effector muscle movement is counteracted, canceled or interrupted.

The different causes predisposing to these lesions, such as age, hydration state, physical fitness, and more, manifest more clearly when fatigue and exhaustion are present, causing the muscular contraction and relaxation mechanism of automatism to be interrupted either by external force (ball “stolen” at the moment of kicking, for example) or a voluntary command to change the movement (individual voluntarily stops a motion of knee extension and hip flexion, switching the command to hip flexion and knee extension, for example).

Due to the characteristics of trauma, the most affected muscles are those that cross two joints to perform opposite movements.

Classified in degrees according to the percentage of muscle tissue affected, which also determines the severity and duration of interruption in sporting activity, both muscular contusions and indirect tears are treated conservatively with exercises favoring muscle contraction. They cause no functional *sequelae*, as a rule.

SPONTANEOUS RUPTURE OF THE CALCANEAL TENDON

Spontaneous rupture of the calcaneal tendon is the most common tendon rupture in sporting activity, although not exclusive. It occurs in healthy, asymptomatic young people with genetic predisposition, which increases the chance of bilateralism.

In sports traumatology, there is no room for conservative treatment in this case, due to the high incidence of recurrence and significant loss of functional capacity of the muscles it serves.

There are several surgical repair techniques, with or without immobilization, with or without support and early movement, minimally invasive, or open with the injury fully exposed.

Regardless of the surgeon’s preferred method, the end result will not be an elongated tendon, as there is significant functional loss, and repair should be strong enough to prevent recurrence.

KNEE

For many, this is the joint most often affected while practicing different sports. The occurrences include especially meniscal lesions, alone or in combination, anterior cru-

ciate ligament tears, posterior cruciate ligament injuries, multiligament knee injuries, patellofemoral instability, articular cartilage lesions, and osteoarthritis.

In Brazil, where soccer is the most played team sport, contact-free injuries of the anterior cruciate ligament, i.e. with no direct trauma, have a high incidence due to a peculiarity of unstable support on one leg with frequent changes in direction, which is unique to the only sport that is practiced exclusively using the feet.

For active young people who practice high performance sports, this ligament tear is treated surgically. There are several techniques and materials that can be used, and no consensus.

The options begin with graft selection. They can be bone-tendon-bone (patellar ligament) from knee flexors (goose foot tendons), from the quadriceps tendon in the same or contralateral leg, or from graft banks (corpse). In addition to this decision, there are the positions of the tunnels, the number of bands, the time of surgery, and treatment with or without rehabilitation.

The only certainty when it comes to anterior cruciate ligament injuries is prevention, which is a responsibility of the physician and the whole multidisciplinary team assisting high performance athletes. This is achieved by incorporating neuromuscular training to the routine of specific exercises for each sport mode.

INJURIES OF THE ANKLE LIGAMENTS

These are the most frequent acute injuries of a joint related to sports. Out of them, the complex of ligaments on the lateral side of the ankle is the most affected.

Prevention is widely known but rarely practiced. Neuromuscular and proprioceptive exercises should be part of the training routine, as well as the use of external protectors ("braces") to prevent accidental abnormal movements that can hurt the joint in sports.

As a rule, these injuries are treated conservatively with proprioceptive exercise to promote joint stabilization.

Note that tibiofibular syndesmosis injuries, which show a high incidence in sports, often go undiagnosed. They are joint injuries and, therefore, treated surgically with the purpose of regaining the compromised tibio-tarsal integrity and stability. Negligence is incompatible with sports and leads to early degeneration of the joint.

FINAL CONSIDERATIONS

Medicine applied to exercises and sports is as fascinating as it is complex. The need to achieve maximum performance makes athletes and the professionals who assist them to always seek the shortest path to stardom. This decision could mean the end of many dreams.

The search for alternatives produces new practices that may or not be incorporated into the expert arsenal, in the light of scientific evidence it produces.

Take for example the application of platelet-rich plasma (PRP). Its use in muscles, tendons, ligaments and cartilage still arouses heated discussions in scientific circles, without any consensus. Currently, PRP use is restricted by the Brazilian Federal Medical Board (CFM), making it an experimental procedure.

It must be said that no method stands out as the best tool for proper planning and training in a season. That is impossible without the knowledge of sports medicine.

Last, I want to make a comment that I consider very relevant when it comes to sports. Although traumatic injuries apparently do not require confidentiality, as they often occur in public events, recorded by television cameras, the doctor-patient relationship established for the care and treatment of the athlete should always be in mind.

Professional ethics must be respected in all specialties. It is not different in this case.

RECOMMENDED READING

1. Tanksley JA, Werner BC, Ma R, Hogan MV, Miller MD. What's new in sports medicine. *J Bone Joint Surg Am.* 2015; 97(8):682-90.
2. Hulin BT, Gabbett TJ, Lawson DW, Caputi P, Sampson JA. The acute:chronic workload ratio predicts injury: high chronic workload may decrease injury risk in elite rugby league players. *Br J Sports Med.* 2016; 50(4):231-6.
3. Quinn RH, Sanders JO, Brown GA, Murray J, Pezold R. The American Academy of Orthopaedic Surgeons Appropriate Use Criteria on the management of anterior cruciate ligament injuries. *J Bone Joint Surg Am.* 2016; 98(2):153-5.
4. Hegedus JH, McDonough S, Bleakley C, Cook CE, Baxter GD. Clinician-friendly lower extremity physical performance measures in athletes: a systematic review of measurement properties and correlation with injury, part 1. The tests for knee function including the hop tests. *Br J Sports Med.* 2015; 49(10):642-8.
5. Sonnery-Cotter B, Daggett M, Gardon R, Pupim B, Clechet J, Thauinat M. Surgical management of recurrent musculotendinous hamstring injury in professional athletes. *Orth J Sports Med.* 2015; 3(10):2325967115606393.
6. Kearney RS, Achten J, Lamb SE, Plant C, Costa ML. A systematic review of patient-reported outcome measures used to assess Achilles tendon rupture management: What's being used and should we be using it? *Br J Sports Med.* 2012; 46(16):1102-9.
7. Bell KJ, Fulcher ML, Rowlands DS, Kerse N. Impact of autologous Impact of autologous blood injections in treatment of mid-portion Achilles tendinopathy: double blind randomised controlled trial. *Br J Sports Med.* 2014; 48:1334.
8. Luria A, Chu CR. Articular cartilage changes in maturing athletes: new targets for joint rejuvenation. *Sports Health.* 2014; 6(1):18-30.