Lower limb nerve entrapment syndrome in athletes

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Keywords: Nerve entrapment; Sport

Practicing sports can trigger or reveal a neurological entrapment syndrome. In the lower limbs, all nervous trunks can be concerned, from the thigh to the ankle and the foot. Some of these cases were frequently described, like the common fibular nerve or the tarsal tunnel syndrome. Other lesions are much rarer, or of more difficult to diagnose like inguinal nerves or the sural nerve. In all the cases, the diagnosis the physical examination suggests, must be established by an objective evaluation. Typically, patients experience exercise-related generally unilateral localized pain which resolves gradually after several weeks accompanied by episodes of pain at night. Partial motor deficit (readily immediately after exercise), or sensorial disorders are also observed. Electrophysiology is sometimes uncontributive in particular when the entrapment concerns sensorial nerves. In certain cases, ultrasound or MRI can reveal an objective cause (cyst, fibrous scar, accessory muscle...). Cinematographic analysis of sports gestures can sometimes be of great interest. In all cases the treatment includes rest from sports associated with a modification of the sports gesture. Injections are often effective. In case of an anatomical compression, surgery is generally the only solution.


Lower limb arterial disease in sports medicine

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Introduction.– The arterial origin of lower limb pain during exercise often remains undiagnosed in young or middle-aged subjects frequently resulting in prolonged diagnostic delays. One reason is that a vascular origin of pain is often unsuspected, and even when suspected, difficult to prove, at least with conventional techniques.

Results.– Here we (i) propose a classification of lower limb arterial disease in sports medicine based on whether arterial lesions are revealed by exercise (congenital, acquired) or induced by exercise training or practice (injuries or non-traumatic lesions); (ii) review some of the diagnostic problems of lower limb arterial lesions in athletes and discuss investigations at rest (Ultrasound, Doppler; MRI, ankle to brachial index) or at exercise (ankle to brachial index, transcutaneous oxymetry, near infra-red spectrometry); (iii) discuss treatment issues relating to arterial diseases in sports.

Conclusion.– Although less frequent than bone and joint disease, vascular disease in athletes should always be suspected in case of exercise-induced pain, specifically if pain is absent at rest. A better knowledge of vascular disease in sports medicine should decrease the diagnostic delays and the risk of useless (or potentially deleterious) investigations and treatments resulting from the undiagnosed arterial origin.


Piriformis syndrome in two professional cyclists

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Keywords: Piriformis muscle; Sport; Entrapment; Syndrome

Introduction.– Piriformis syndromes are at the origin of sciatic clinical signs, which are often underestimated, and of delayed diagnosis. The association of neurological and gluteal pain is reproduced by active and passive piriform tenion revealed during external hip rotation. After excluding other conditions, sciatic nerve suffering appears to be related to stretching or compression mechanisms occurring notably during the practice of sports and favored by muscular abnormalities.

Observation.– Two subjects practicing high level cycling presented pain at the pelvis with an unsystematized distribution in the lower limb. Pain was provoked by sports practice and aggravated by the sitting position. In one patient, a calf muscle atrophy was present. Radicular conflict, visceral or vascular diseases were eliminated by different explorations. After several months, the MRI of the pelvis showed a pyramidal muscular hypertrophy with T2 hypersignal of the muscle favoring a sciatic nerve compression and suggesting the diagnosis of piriform syndrome.

Discussion.– Diagnostic difficulties are discussed with the problem of the link between the clinical signs and the abnormalities observed on MRI. Diagnostic delay seems long but could be explained by the ability of pursuing sports in spite of pain. Treatment is based on correction of positional factors, stretching, medical treatments (NSAID, corticosteroids and botulinum toxin injection), and surgical treatment can be discussed. The piriform syndrome must be evoked when sciatic pain related to certain sports such as cycling.

Farther readings

Exercise-induced compartment syndrome treated by botulinum toxin

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Keywords: Exercise-induced compartment syndrome; Chronic compartment syndrome; Botulinum toxin; Leg; Sport; Intramuscular pressure

Introduction.– Exercise-induced compartment syndrome (ECS) of the lower limb results in leg pain at exercise. Currently, the only treatment is surgical fasciotomy. Botulinum toxin A (BTA) has been successfully used in the treatment of muscle hypertrophy and the treatment of myofascial pain, but it has never been used to treat ECS. The aim of this work was to test the hypothesis that BTA is an effective treatment for ECS to avoid surgery.

Methods.– This was an open trial. After excluding other conditions, lateral anterior ECS was confirmed among runners by measuring the intramuscular pressure (IMP). BTA (Dysport®) was injected into each of the muscles of the pathological compartment(s) under electrical stimulation guidance. Exercise-induced pain, strength of injected muscles and IMP were assessed. Twenty-five patients were included. Six patients were treated twice because of recurrence. Typical IMP in the anterior compartment was 63 mmHg one minute after stopping exercise and 41 mmHg at 5 minutes. In the lateral compartment the IMP was 58 mmHg at 1 min and 48 mmHg at 5 minutes.

Results.– Exercise-induced pain disappeared in 68% of the patients during the first month and in all the others between 1 and 5 months, excepting 1 patient. In 4 patients, a slight weakness that disappeared between 1 and 5 months was noted. The sensation of slight instability disappeared before 3 months in 84% of the cases and never inhibited early resumption of running. Three months after treatment, the IMP were normalized: in the anterior compartment 21.4 mmHg at 1 min and 14.5 mmHg at 5 min; in the lateral compartment 19.7 mmHg and 9.9 mmHg. The efficiency of the treatment was 10 months on average. Exercise-induced pain recurred in 8 patients in 6 to 30 months.
Conclusion.— Inframuscular injections of BTA is an effective treatment for ECS of the anterior and/or lateral leg compartments and can be an alternative to fasciotomy. These first results must be confirmed in long-term. The best dose of BTA needs to be defined in order to avoid the muscular weakness.


Introduction.— The aim of our study was to determine whether a platelet-rich plasma (PRP) injection could improve the healing process of ruptured Achilles tendons of rats.

Material and methods.— A 5 mm defect was surgically produced in the Achilles tendon of 120 rats. Sixty rats received post-surgery, a PRP or PBS injection in situ. Twenty rats of both groups were sacrificed after 5, 15 and 30 days. Fifteen collected tendons were immediately submitted to a biomechanical tensile strength test until rupture using a clamping “cryo-jaw” device and then used for transcriptomic analyses. Histological and biochemical analyses were performed on five tendons in each group.

Results.— Tendons in the PRP group were more resistant to rupture at 15 and 30 days than those in the control group. The tendon transverse area was significantly higher in the PRP group at day 5 and 15. The tendon constraint was significantly increased in the tendon in the late phase of the healing. Histological analysis showed an increased staining for fibrillar collagen at day 5 confirmed by a biochemical analysis showing an increased collagen concentration in the callus. The expression of tenomodulin, a tenocyte differentiation marker, was significantly higher in the PRP-treated tendons at day 5. No significant difference in terms of mRNA for type III collagen and matrix metalloproteinase 9 was observed at any time in the PRP-treated tendons at day 5. No significant difference in terms of mRNA expression was significantly higher in the PRP group at day 5 and 15.

Conclusion.— A single PRP injection in ruptured Achilles tendon at the time of surgery influences the early phase of healing and results in an ultimate stronger mechanical resistance.


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