



Lesões tendinosas no desporto

Actualidades terapêuticas

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'Tendon disorders are a nemesis to both the athlete and the physician'
(Douglas B Clement, Olympic athlete and sports medicine professor)
American Journal of Sports Medicine 1984;12:179



Lesões tendinosas no desporto

- Rotura traumática
- Lesão microtraumática
 - “tendinite”; tendinose; tendinopatia
- Luxação tendão



Tendões

- Estruturas de tecido conjuntivo que unem um músculo a um osso, transmitindo a força gerada pelo músculo à estrutura óssea



Tendões

- Fibras de colagénio
 - Colagénio tipo I (95%)
 - Colagénio tipo III e IV
- Fibras elásticas
- Matriz extra-celular
- Tenócitos





Modificações do tendão com a idade

- **Histológicas**
 - Diminuição progressiva do número de células
 - Aumento do diâmetro das fibras de colagénio
 - Diminuição das fibras elásticas
- **Bioquímicas**
 - Diminuição do conteúdo de água
 - 75% no recém-nascido
 - 53% na 7ª década de vida
 - Diminuição das glicoproteínas



Cicatrização/reparação

- Rotura traumática
 - Lesões de avulsão óssea
 - Rotura junção mio-tendinosa
- Traumatismo indirecto
 - Vascularização
 - Doença inflamatória associada
 - Idade
 - Localização anatómica
- Lesão microtraumática de sobrecarga



Tendinite

Current concepts review, tendinosis of the elbow (tennis elbow): clinical features and findings of histological, immunohistochemical, and electron microscopy studies

Kraushar BS, Nirschl RP

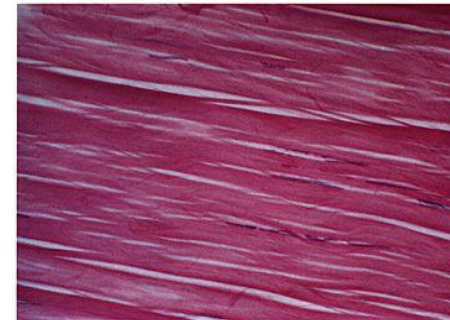


Fig. 1 Photomicrograph of a specimen of normal tendon, showing parallel bundles of uniform-appearing collagen oriented along the long axis of the tendon. The matrix, which is composed primarily of proteoglycans, glycosaminoglycans, and water, is stained evenly. No vascular structures are apparent within the tendon (hematoxylin and eosin, x 100).

J Bone Joint Surg [Am] 1999; 81-A; 259-78



Tendinose

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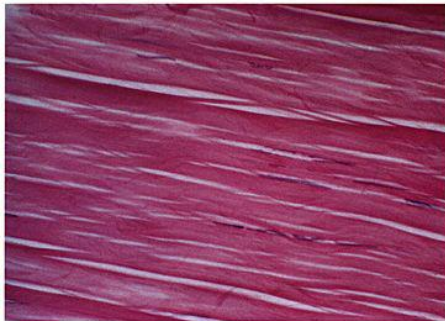


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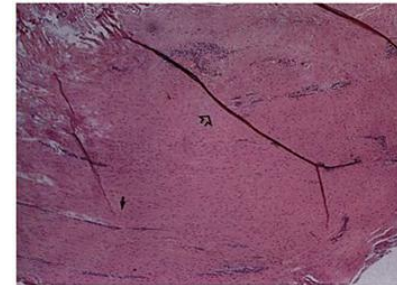


Fig. 2 Photomicrograph demonstrating tendinosis of the extensor carpi radialis brevis tendon. The entire specimen appears to be hypercellular, with focal areas that are densely cellular. Some of the hypercellular regions are parallel to the tendon fibers (solid arrow), whereas others are not (open arrow). There is no evidence of an inflammatory response, as indicated by the absence of polymorphonuclear leukocytes, lymphocytes, and macrophages (hematoxylin and eosin, x 20).

J Bone Joint Surg [Am] 1999; 81-A; 259-78

J Bone Joint Surg Am. 1999 Feb; 81-A(2):259-278.



Diagnóstico patológico	Macroscopia	Histologia
Tendinose	Degeneração intra-tendinosa (frequente com a idade, microtraumatismos, compromisso vascular)	Desorientação fibras de colagénio, aumento da presença de substância mucoide, necrose focal, aumento da proliferação celular
Tendinite/rotura parcial	Degeneração sintomática dos tendões com rotura irrigação sanguínea e resposta inflamatória de reparação	Alterações degenerativas, evidência de rotura. Proliferação fibroblástica, hemorragia e tecido de granulação
Paratendinite	'Inflamação' da zona mais periféria do pertendão	Degeneração mucoide. Infiltrado disperso de células mononucleares, com ou sem exsudato.
Paratendinite com tendinose	Paratendinite associada a alteração degenerativ intra-tendinosa	Alterações degenerativas encontradas na tendinose e presença de infiltrado inflamatório na região do pertendão



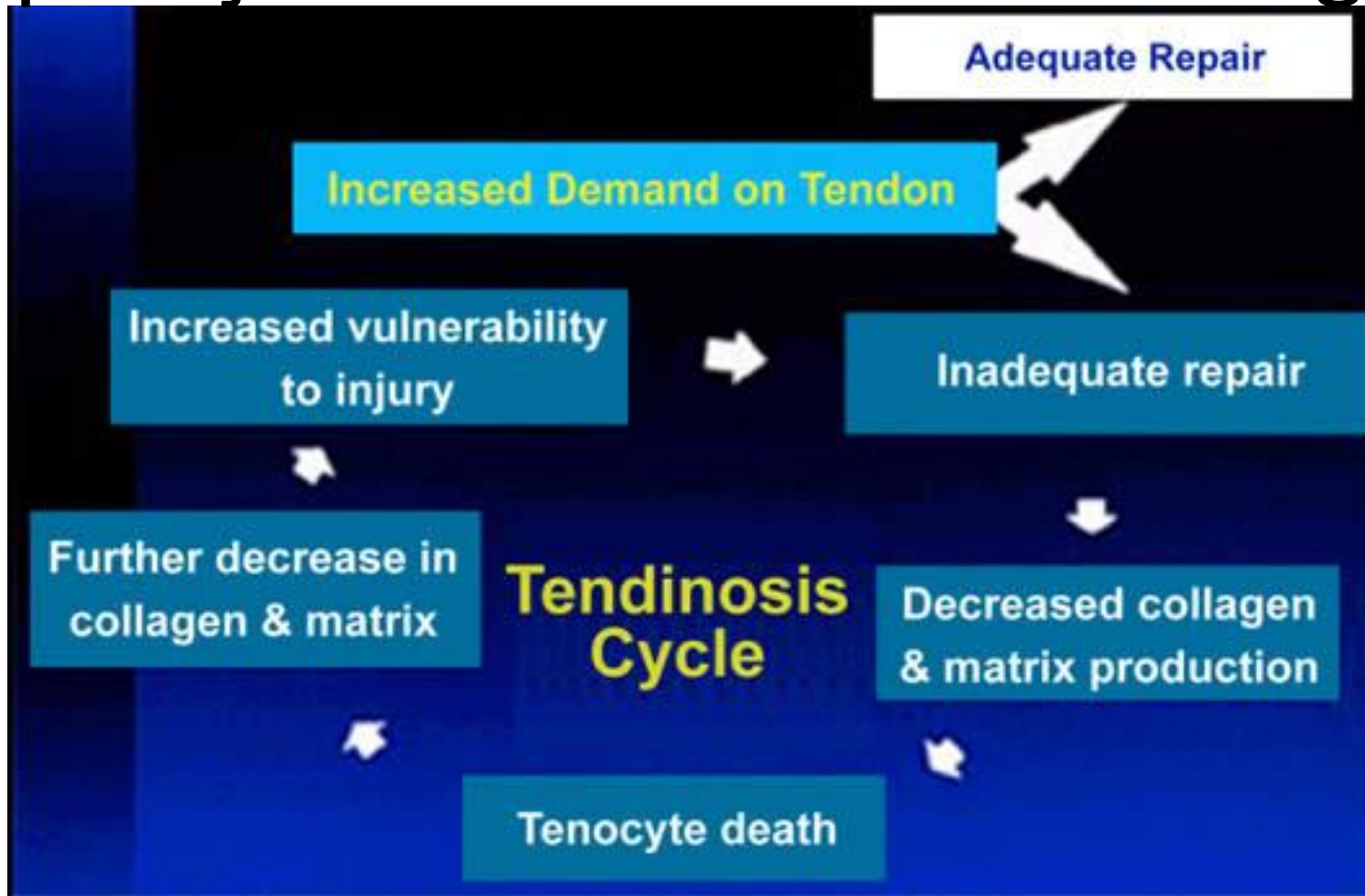
Normal



Sobrecarga



Reparação em lesão de sobrecarga





Factores associados

- **Intrínsecos**
 - Alinhamento
 - Pronação excessiva tornozelo
 - Joelho valgo/varo
 - Anteversão do colo femoral
 - Dismetria membros
 - Desiquilíbrios musculares
 - Hipermobilidade
 - Rigidez muscular
- **Extrínsecos**
 - Erros no treino
 - Intensidade
 - Técnica
 - Fadiga
 - Piso
 - Calçado e equipamento



Outros factores

- Idade
 - Apofisites
 - Osgood-Schlatter
 - Sever
- Género
- Localização anatómica
 - Joelho
 - Pé (tendão Aquiles)
 - Cotovelo



Tratamento



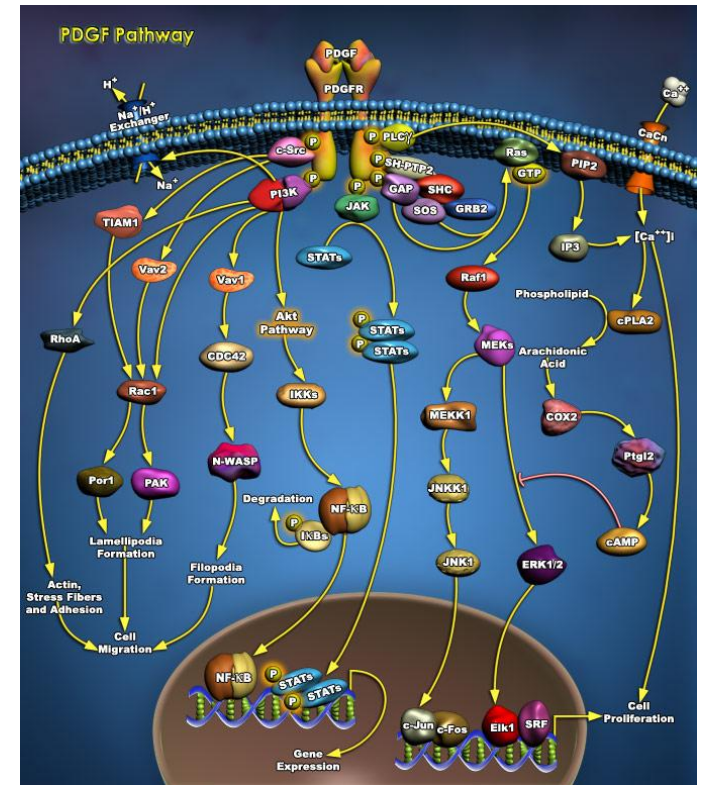
- O tratamento conservador continua a ser o padrão básico de tratamento das tendinopatias
 - Repouso activo
 - Infiltração com corticóides
 - Alteração do gesto técnico
 - Preparação física adequada



Outras alternativas



- Utilização de PRP





Comparison of Surgically Repaired Achilles Tendon Tears Using Platelet-Rich Fibrin Matrices

Mikel Sánchez,* MD, Eduardo Anitua,[†] MD, DDS, Juan Azofra,* MD, Isabel Andía,[†] PhD, Sabino Padilla,[‡] MD, PhD, and Iñigo Mujika,^{‡§} PhD

*From the *Arthroscopic Surgery Unit, USP–La Esperanza Clinic, Vitoria-Gasteiz, Basque Country, Spain, the [†]BTI Biotechnology Institute, Vitoria-Gasteiz, Basque Country, Spain, and the [‡]Department of Research and Development, Medical Services, Athletic Club Bilbao, Basque Country, Spain*

Background: Platelet-rich fibrin matrices release a natural mixture of growth factors that play central roles in the complex processes of tendon healing.

Hypothesis: Application of autologous platelet-rich matrices during Achilles tendon surgery may promote healing and functional recovery.

Study Design: Case-control study and descriptive laboratory study; Level of evidence, 3.

Methods: Twelve athletes underwent open suture repair after complete Achilles tendon tear. Open suture repair in conjunction with a preparation rich in growth factors (PRGF) was performed in 6 athletes and retrospectively compared with a matched group that followed conventional surgical procedure. The outcomes were evaluated on the basis of range of motion, functional recovery, and complications. Achilles tendons were examined by ultrasound at 50 ± 11 months in retrospective controls and 32 ± 10 months in the PRGF group. In the laboratory portion of the study, PRGF treatment was characterized by the number of platelets and concentration of insulin (IGF-I), transformed (TGF- β 1), platelet-derived (PDGF-AB), vascular endothelial (VEGF), hepatocyte (HGF), and epidermal (EGF) growth factors in patients affected by musculoskeletal traumatic injuries.

Results: Athletes receiving PRGF recovered their range of motion earlier (7 ± 2 weeks vs 11 ± 3 weeks, $P = .025$), showed no wound complication, and took less time to take up gentle running (11 ± 1 weeks vs 18 ± 3 weeks, $P = .042$) and to resume training activities (14 ± 0.8 weeks vs 21 ± 3 weeks, $P = .004$). The cross-sectional area of the PRGF-treated tendons increased less ($t = 3.44$, $P = .009$). TGF- β 1 (74.99 ± 32.84 ng/mL), PDGF-AB (35.62 ± 14.57 ng/mL), VEGF (383.9 ± 374.9 pg/mL), EGF (481.5 ± 187.5 pg/mL), and HGF (593.87 ± 155.76 pg/mL) significantly correlated with the number of platelets (677 ± 217 platelets/ μ L, $P < .05$).

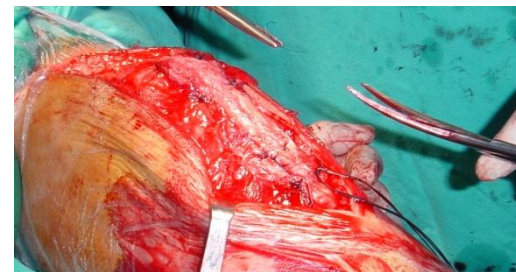
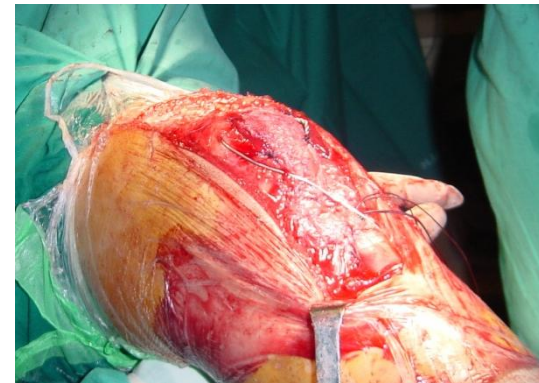
Conclusion: The operative management of tendons combined with the application of autologous PRGF may present new possibilities for enhanced healing and functional recovery. This needs to be evaluated in a randomized clinical trial.

Keywords: sports; platelets; growth factors; surgical repair; Achilles tendon



ABI (Autologous blood injection)

Utilização sobretudo em situações de
rotura traumática aguda como
complemento à terapêutica cirúrgica





Estudos tipo RCT

Technique	Species	Tissue-type	Study Details	Results	Type
Autologous Blood Injections (ABI)	Animal	Tendon Ligament	Taylor 2002 ²⁷ – Rabbit – normal Patella Tendon	No harmful effects	Crossover
	Human	Tendon Ligament	1) Edwards 2003 ³¹ – Lateral Epicondylitis 2) Connell 2006 ³⁰ – Medial Epicondylitis 3) Connell 2006 ³⁰ – Lateral Epicondylitis	1) 79% patients complete pain relief 2&3) No pain at 6 months	Cohort
Autologous Conditioned Serum (ACS)	Animal	Muscle	Wright-Carpenter 2004 ²⁸ – Mice Gastrocnemius	Increased satellite cells & myofibres	Controlled Trial
	Human	Muscle	Wright-Carpenter 2004 ²⁹ – Human Skeletal Muscle	Improved recovery 22.3 v 16.6 days	Controlled Trial
Platelet-Rich Plasma (PRP)	Animal	Tendon Ligament	Aspenberg 2004 ³³ – Rat Achilles tendon rupture	30% improved strength at 1 week	Cohort
		Muscle	Carda 2005 ³² – Skeletal Muscle tears	Improved healing at 6 days	Cohort
	Human	Tendon Ligament	1) Mishra 2006 ⁷ – Elbow tendinopathy 2) Sanchez 2005 ³⁵ – Achilles tendon rupture 3) Sanchez 2007 ²⁷ – Achilles tendon rupture	1) 60% ↓VAS at 8/52 v 16% ↓ control 2&3) full recovery 14 weeks v 21	1) Controlled Trial 2) Case Report 3) non-randomised Trial
		Muscle	Sanchez 2005 ³⁶	Full recovery in ½ time v controls	Case series
Suramin	Animal	Muscle	Chan 2005 ⁴³ – Mice Gastrocnemius	↓scar tissue ↑tetanic strength	Controlled Trial
Relaxin	Animal	Muscle	Negishi 2006 ⁴⁵ – Mice Skeletal Muscle	↓fibrosis ↑myofibre regeneration	Crossover



TITLE: Platelet-Rich Plasma Injection for Achilles Tendinopathy

AUTHOR: Jeffrey A. Tice, MD
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Division of General Internal Medicine
Department of Medicine
University of California San Francisco

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PLACE OF PUBLICATION: San Francisco, CA

CONCLUSION

Overuse injuries of the Achilles tendon are common, particularly among runners. Many patients' injuries can be managed conservatively, but recovery is often slow and prolonged. The limited blood supply to the tendon may contribute to slow or stalled healing. The growth factors in PRP are hypothesized to jump start the healing process for patients with chronic Achilles tendinopathy.

One case report highlighted the rapid recovery of a competitive athlete from a partial tear of the Achilles tendon that was treated with PRP injections. Additionally, one case series of 14 patients with mid-portion Achilles tendinopathy reported dramatic improvements on two validated scales of Achilles tendon pain and function within three months of therapy and sustained through eighteen months. No significant complications were reported.

However the one high quality, double-blinded, sham-controlled randomized trial found no benefit to PRP injections compared with sham injections. The trial was relatively small, so it may have been underpowered to detect small improvements from PRP injection. There are also alternative approaches to processing and activating PRP. It may be that the approach used in this trial was not effective, but other approaches will be effective. However, based on the current evidence, PRP injection, added to the standard eccentric exercise therapy, does not appear to be an effective approach to the treatment of Achilles tendinopathy. A search of ClinicalTrials.gov indicates that there are at least 41 trials testing PRP for a variety of musculoskeletal and orthopedic conditions, so more data should be available in the near future.

RECOMMENDATION

It is recommended that use of platelet-rich plasma injections for the treatment of non-insertional Achilles tendinopathy does not meet CTAF TA Criterion 3 through 5 for improvement in health outcomes.



Utilização de radiofrequência



Tratamento por RF

Treatment of chronic tendinosis with bipolar radiofrequency stimulation Arthroscopy

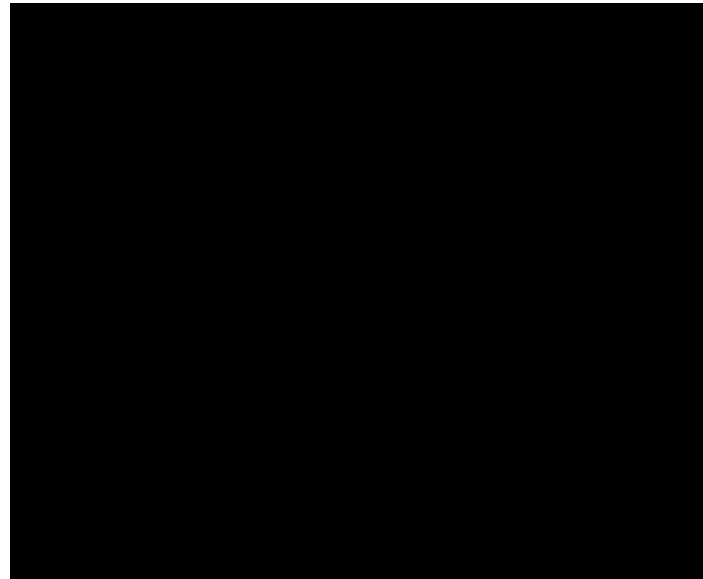
July-August 2003, Supplement 1 • Volume 19 • Number 6 • p81 to p81

James P. Tasto, William C. Evesb, Renee Valeuc, Wendy Wintersd, Shay Shabate, Y. Herzonif, David Morgensterng, Naama Constantinih, Meir Nyskai





Tratamento por RF





Tratamento por RF

Results: Ninety two percent of patients had significant improvement in their pain and function at 6 months. The post-operative VAS pain scores were decreased by 55% at 7–10 days post operative, 75% at 4 weeks, and 85% at the 6 month evaluation. There was significant improvement ($p < 0.05$) in the SF-36, IKDC, Upper Limb DASH, and the AOFAS scores. Seventy-five percent of the pre-operative MRI's had changes consistent with tendinosis. Post surgical and tendinosis changes were observed in 96% of patients at 4 weeks. At 6 months, only 21% had tendinosis changes on their MRI.

Conclusion: Bipolar radiofrequency stimulation appears to be a safe and effective treatment of chronic tendinosis. Further research is needed in this area to better understand the biochemical processes by which bipolar radiofrequency stimulation leads to pain relief and potential tendon repair.





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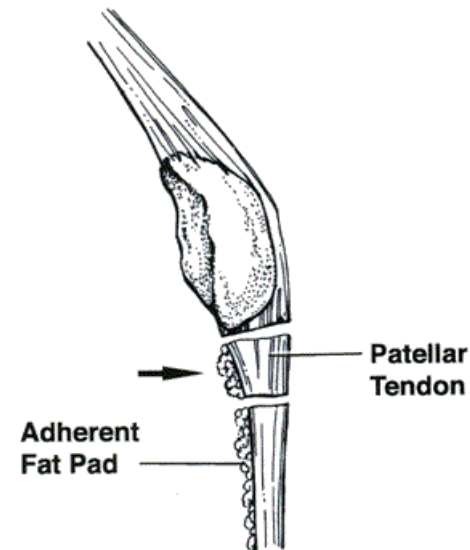
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Fasciculação



Fasciculação tendão

- Pretende realizar uma inflamação controlada
 - Com desenvolvimento de tecido de fibrose
 - Excisão de tecido inflamatório ou necrótico local





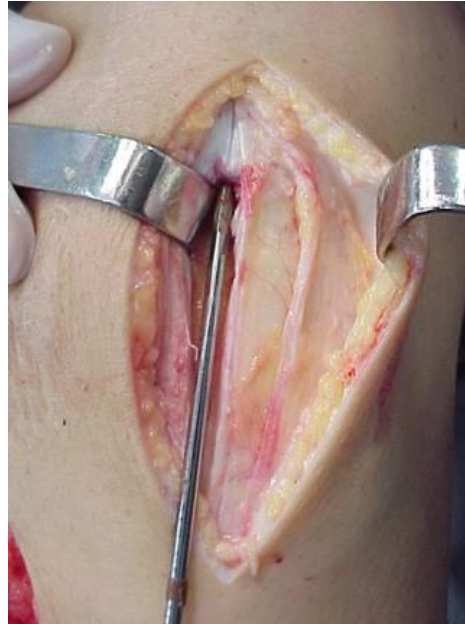
“Jumper’s knee”





Técnica M. Amatuzzi

Reforça da zona central do tendão patelar com autoenxerto livre tendinoso (m. semitendinoso)





Técnica M. Amatzuzi





Patellar tendinosis: a follow-up study of surgical treatment. **Ferretti A, Conteduca F, Camerucci E, Morelli F.**

BACKGROUND: Patellar tendinopathy (jumper's knee) is an overuse syndrome that frequently affects athletes. A retrospective study was done to analyze the results at a minimum of five years after the performance of a surgical technique in competitive athletes. **METHODS:** From 1985 to 1995, thirty-two patients (thirty-eight knees) affected by patellar tendinopathy were treated surgically after failure of nonoperative treatment. All knees were operated on by the same surgeon using the same surgical technique: longitudinal splitting of the tendon, excision of any abnormal tissue that was identified, and resection and drilling of the inferior pole of the patella. The results in twenty-seven patients (thirty-three knees), including twenty-two athletes (twenty-seven knees) who were still involved in sports activities (or wished to still be involved) at a competitive level at the time of final follow-up, were reviewed at a mean of eight years postoperatively. The results were evaluated according to symptoms and the ability to return to full sports activities. **RESULTS:** The result was excellent in twenty-three knees (70%), good in five, fair in one, and poor in four at the time of the long-term follow-up. Eighty-two percent of the patients who tried to pursue sports at their preinjury level were able to do so, and 63% of those knees were totally symptom-free.

CONCLUSIONS: The outcome of the described surgical treatment appears to be satisfactory; however, the results are less predictable in volleyball players.

J Bone Joint Surg Am. 2002 Dec; 84-A(12):2179-85

J B J S





Mensagem a reter

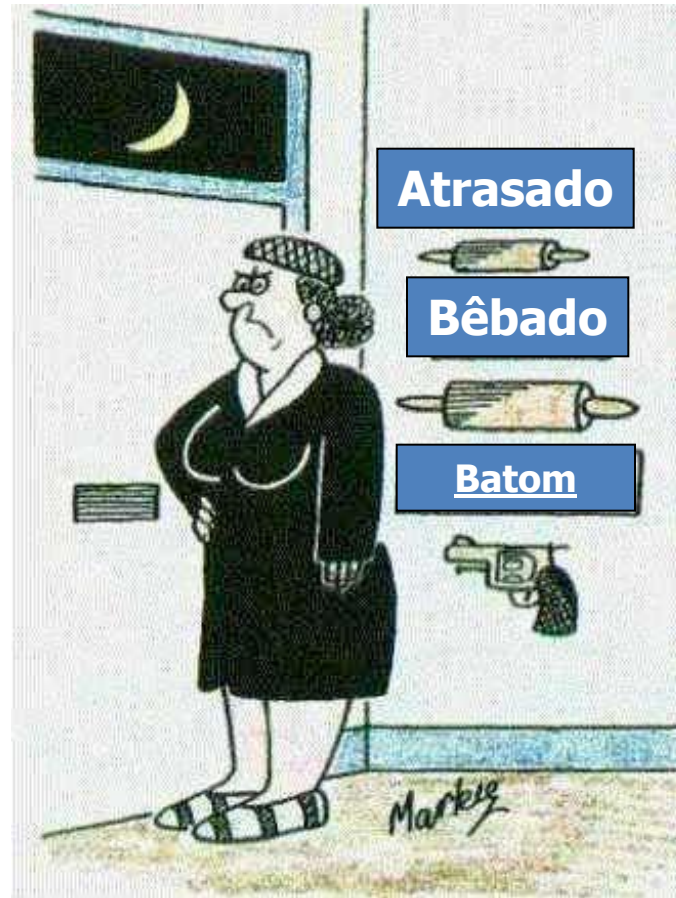
- As tendinopatias são lesões de sobrecarga cujo melhor tratamento é a prevenção
- Quando instituídas a primeira e grande opção é o tratamento conservador
- A cirurgia deve ser sempre uma opção de recurso!



Escolha a ferramenta mais adequada para cada situação



Escolha a ferramenta mais adequada para cada situação





Muito obrigado

