




Université Claude Bernard
Lyon 1






Jumper's knee: etiology, diagnosis, classification

Pr Elvire Servien, MD PhD;
Dr H Gokhan KARAHAN




Centre Albert Trillat
Hôpital de la Croix-Rousse
Val d'Isère knee course 2012



Hôpitaux de Lyon
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Jumper's knee ? Definition

- Blazina et al : 1973
used the term jumper's knee used
(patellar « tendinopathy », patellar
« tendinosis », patellar « tendinitis »)
- insertional tendinopathy seen in
skeletally mature athletes



Blazina ME et al; Jumper's knee. *Orthop Clin North Am.* Jul 1973;4(3):665-78.

Jumper's knee: etiology

- the most common overuse injury
- volleyball (28%)
- 40% of professional players have experienced
symptoms of jumper's knee during their careers

Jumper's knee: etiology

- Repetitive stress on the patellar or
quadriceps tendon during jumping
- an injury specific to athletes
participating in jumping sports
(basketball, volleyball, or high or long
jumping)



• Cook JL et al. Anthropometry, physical performance, and ultrasound patellar tendon abnormality in elite junior basketball players: a cross-sectional study. *Br J Sports Med.* Apr 2004;38(2):206-9
 • Cook JL et al. Reproducibility and clinical utility of tendon palpation to detect patellar tendinopathy in young basketball players. Victorian Institute of Sport tendon study group. *Br J Sports Med.* Feb 2001;35(1):65-9.

Jumper's knee: etiology


- Functional overload
- Repetitive load on the extensor tendon
apparatus, during takeoff and landing

• Cook JL et al. Anthropometry, physical performance, and ultrasound patellar tendon abnormality in elite junior basketball players: a cross-sectional study. *Br J Sports Med.* Apr 2004;38(2):206-9
 • Cook JL et al. Reproducibility and clinical utility of tendon palpation to detect patellar tendinopathy in young basketball players. Victorian Institute of Sport tendon study group. *Br J Sports Med.* Feb 2001;35(1):65-9.

Jumper's knee: etiology

jumping sports

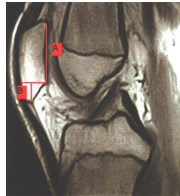
- Volleyball , Basketball , High jump, long jump and triple jump**
- Running, Handball, Soccer, Climbing
- Tennis
- Gymnastics
- Weight-lifting
- Cycling
- Skiing ,Ballet dancing



Intrinsic § Extrinsic risk factors

Jumper's knee: Intrinsic risk factor

- inflexibility of the hamstrings and quadriceps
- morphotype
- increased Q angle
- patella alta /baja
- limb-length discrepancy



The influence of the lower patellar pole in the pathogenesis of chronic patellar tendinopathy

Olaf Lorbach · Andreas Diamantopoulos ·
Klaus-Peter Kammerer · Hans H. Paessler

Jumper's knee: Intrinsic risk factor

- Patellar hypermobility , Abnormal patella tracking , Increased length of the patella, Impingement of the inferior pole of the patella, long patellar tendon
- Hyperlaxity syndrome
- Reduced ankle dorsiflexion range, hyperpronation of the foot
- Iliotibial band tightening
- Knee instability
- Pelvis and hip disease
- Muscular imbalance or insufficiency
- Increased rotation of femur and tibia

Jumper's knee: Extrinsic risk factor

- Hard court surfaces
(Beach volley /"indoor" volleyball)
- excessive training volume, overtraining

Jumper's knee: Extrinsic risk factor

- Hard Playing on hard surface
- More than four training sessions per week
- Height and weight: Increased height, increased weight , increased BMI
- Excessive load on the body (type of movement, speed of movement, number of repetitions, footwear)
- Training errors :too long distance, too high intensity, too fast progression, and too much hill work
- Monotonous, asymmetric and specialized training only

Diagnosis Physical Examination

- tenderness at the inferior patellar pole
- Functional strength examination subtle weakness
- Pain (during active quadriceps contraction) : extension of the knee against resistance

Diagnosis Physical Examination

- Hamstring and quadriceps tightness
- Normal ligamentous stability of the knee during testing
- Normal knee range of motion
- Normal hip and ankle examination

Differential Diagnosis

- Sinding-Larsen-Johannson's disease
- Osgood-Schlatter's disease
- Chondromalacia patella
- prepatellar or infrapatellar bursitis
- Synovial plicae

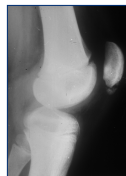
Diagnosis

Imaging is not necessary to make the diagnosis

- Plain x-ray
- Colour Doppler US
- Ultrasonography
- MRI

Radiological signs

- **Profile view** : non-specific abnormalities
- soft-tissue swelling
 - periosteal reaction
 - calcification in the patellar tendon
 - elongation of the inferior pole of the patella



Diagnosis

- Colour Doppler US : signs of hypervascularity
- Ultrasonography tendon abnormalities in both symptomatic and asymptomatic athletes

Fritschy D, de Gautard R. Jumper's knee and ultrasonography. Am J Sports Med. 1988 Nov-Dec; 16 (6):637-

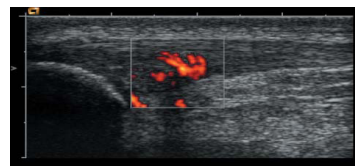
US § PD

- Ultrasonography (US) is a good method to study the tendon structure
- Power Doppler (PD) and colour Doppler techniques can be used to study blood flow in the tendon

Jumper's knee : tendonitis

neovascularisation in the area with structural tendon changes.

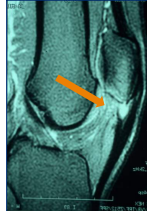
neovessels = deterioration of the condition ?



The MRI signs

➤ signs of patellar tendonitis abnormalities

➔ Abnormal signal +++



Classification

- Depending on the duration of symptoms
- 4 Stages
- Blazina / Leadbetter

Blazina Classification

Classification of patellar tendonitis according to Blazina et al (1973)

- Stage 1 : Pain only after sports
- Stage 2 : Pain at the beginning of sports disappearing after a warm-up but reappearing with fatigue
- Stage 3 : Constant pain at rest and with activity
- Stage 4 : Complete rupture of the patellar tendon

Blazina ME, Kerlan RK, Jobe FW, Carter VS, Carlson GJ. Jumper's knee. Orthop Clin North Am 1973;4:665-78.

Blazina's classification modified by Lian et al.

- Stage I – Pain at the infrapatellar or suprapatellar region after practice or after an event.
- Stage II – Pain at the beginning of the activity, disappearing after warm-up and reappearing after completion of activity
- Stage III a – Pain during and after activity, but the patient is able to participate in sports at the same level
- Stage III b – Pain during and after activity and the patient is unable to participate in sports at the same level
- Stage IV – Complete rupture of the tendon

Leadbetter's Classification

- Stage 1 – Pain occurs more than activity, spontaneously regresses within several hours, present for less than 2 weeks, normal activity, normal tests results
- Stage 2 – Pain during and after activity which does not regress, present for 2 to 6 W, localized pain, few or no signs of inflammation
- Stage 3 – Persistent pain several days after activity stops, reoccurs rapidly when activity begins again, seriously limiting functional capacities and present for more than 6 W with signs of inflammation
- Stage 4 – Constant pain affecting daily activities, preventing all athletic activity

* Leadbetter, W.B. : "Cell-matrix response in tendon injury", Clin Sports Med, 11 : 533-578, 1992

Classification *Leadbetter et coll.*

Stage	Pain	Fonction	Duration	Clinical Exam
Stage I	after activity < 24H	=	< 2 W	Normal
Stage II	During and after activity	+/-	2-6 W	localized pain
Stage III	Persistent several Ds after activ.	Limited	> 6 W	Pain signs of inflammation
Stage IV	Constant	Sport impossible	> 6 W	local & regional sign (atrophy, weakness)

Conclusion

Prevention
Athlete's education
Diagnosis is clinical