Proximal hamstring avulsions in professional footballer

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Complete avulsion of tendon

- Diagnostic problems
- Therapeutic problems
- Prognosis
From the field.....
Muscle fibres are difficult to repair and may cause fibrous scarring.

Complete rupture of a tendon never heals and can be responsible for a major functional deficit.
Complete avulsions of the hamstrings

- Localisation (proximal or distal)
- Acute / Chronic

• Full Recovery / Short return to game
Complete Hamstring Avulsion

- Hamstring weakness
- Residual Pain / Sciatica +++
- Chronic recurrent hamstring injury
- Low rate of return to sports

Treatment of proximal hamstring rupture-a systematic review.

Functional results and outcomes after repair of proximal hamstring avulsions.

Functional outcome after repair of proximal hamstring avulsions.
• Lower Limb

Hamstrings:
- Bi-articular
- Flexors of the Leg
- Rotators of the Knee

Very important for football!
Anatomy

1. Semitendinosus
2. Biceps femoralis
3. Semi membranosus

Insertion to the lateral side of the ischium
Sciatic Nerve

Gluteus Maximus

Common hamstrings Tendon

Sciatic N
Traumatic +++

- Acceleration and Sudden stop
- Hip & Knee extension
  - Chronic Tendonitis
  - Steroid Injections

Musculotendon peak force and strain for BF, ST, and SM occurred during terminal swing = this period are at greatest injury risk

Mechanics of the human hamstring muscles during sprinting.
Schache AG et al. Med Sci Sport Exerc 2012
Acute Proximal Avulsion

- Rare Lesion !!

Prospective Study in England
91 Football Clubs in 2 seasons,
2376 players league 1, 2 & 3
796 muscles injuries with 12 % hamstring (Biceps F++)

Only 3 Proximal Avulsion

The Football Association Medical Research Programme: an audit of injuries in professional football--analysis of hamstring injuries.
Diagnostic

• Clinical inspection +++
Diagnostic

• Clinical examination +++
Investigations
Sonography

• Dependent of the Radiologist +++
  – Haematoma not the tendon
  – Mainly diagnosed incorrectly (Partial Tears ++)
• 42 % false negative in proximal avulsion

Evaluation of the hamstring muscle complex following acute injury.
MRI = Emergency
MRI = Emergency
MRI = Emergency
Proximal Hamstring Avulsion
Surgical Treatment

- Before 2 weeks
- Trans osseus suture
- +/- Neurolysis of sciatique nerve

Avulsion of the proximal hamstring origin. Surgical technique.
To the O.R.
Acute Surgical Treatment
Rehabilitation

1st Stage: 0 to 4 Weeks

• Partial WB 50%
• Seated prohibited
• Knee flexed at 45°
• Hinged knee brace with passive mobility from 30 to 110°

Total proximal hamstring ruptures: clinical and MRI aspects including guidelines for postoperative rehabilitation
Rehabilitation

2nd Stage: 4 to 12 Weeks

- Work without resistance
Rehabilitation

3rd Stage: After 12 Weeks
Isokinetic +++

- Decreased strength and EMG activation suggested a change in neuromuscular control when prior HI.
- Lengthened range assessment of isokinetic eccentric flexor torque may be useful

Selective strength loss and decreased muscle activity in hamstring injury.
8 months later....
50 Danish male soccer teams (942 players)
- 461 players with Nordic Curl / 481 players followed their usual training
  15 injuries (12 new – 3 recurrent) / 52 injuries (32 new – 20 recurrent)

= Additional eccentric hamstring exercise decreased the rate of hamstring injuries.

Preventive effect of eccentric training on acute hamstring injuries in men's soccer: a cluster-randomized controlled trial.
Chronic Hamstring Avulsion

- Neglected Ruptures:
  - Sciatalgia
  - Chronic pain
  - Hamstring weakness
  - Chronic recurrent tears

Nerve entrapment after hamstring injury

Foot drop in a marathon runner from chronic complete hamstring tear
Chronic Hamstring Avulsion

Proximal Avulsion

Fatty Degeneration

Tendon retracted
Chronic Hamstring Avulsion

- Resection of the tendon
- Reconstruction with Allograft

Sciatic Nerve ++++

Allograft reconstruction for symptomatic chronic complete hamstring tendon avulsion.
Marx RG et al. Knee Surg Traumatol Arthrosc 2009
Surgical repair of chronic complete hamstring tendon rupture in the adult patient.
Surgical Indication

- **Acute:** Almost Always
- **Chronic:** Residual Pain

Successful outcomes for acute and chronic repairs with higher functional scores in Acute repairs

**Functional results and outcomes after repair of proximal hamstring avulsions**

**Endoscopic Proximal Hamstring Repair and Ischial Bursectomy**
Dierkman et al. *Arthroscopy Techniques* 2012
Distal Semi-tendinosus avulsion

Centre Orthopedique Santy
Lyon
FRANCE
Distal Semi T Avulsion

- Semi tendinosus
  17 patients
  - 12 managed conservatively: 5 failures with recurrent lesions
  - 5 surgical resections: no failure, return to sport 6-8w

Cooper DE, Conway JE. Am J Sports Med. 2010
Imaging

Sonography

MRI
Tendon resection
Distal Semi T avulsion
A complete tendon avulsion:

- Rare but career threatening INJURY
  We must to think of it as an indication for "emergency" surgery
- Diagnosed clinically
- Confirmed on MRI

Surgical treatment should be discussed
Conclusion

- Functional Problem
- Fibrous scar with recurrent muscle injury
  
  = Inability for a tendon to heal with surrounding muscle

  - Repair for the proximal Hamstring
  - Resection for the distal Hamstring
A esperança... 2014