



NON-SURGICAL MANAGEMENT OF ACHILLES TENDINOPATHY

IMAGE GUIDED HIGH VOLUME INJECTION

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ACHILLES (*Homer 800BC*)

When Achilles' mother Thetis made her son invulnerable by submerging him in the Styx, the river separating the living world from the underworld, she held the newborn baby by the tendon bundle running from the gastrocnemius & soleus muscles to the calcaneus.

As a consequence, this was the only site of the boy's body that did not come into contact with the magic and protecting waters of the river and, it would be the tragic and inevitable fate of the great hero of the Trojan War.

He was eventually be killed by an arrow hitting him at that specific spot.

ACHILLES TENDINOPATHY

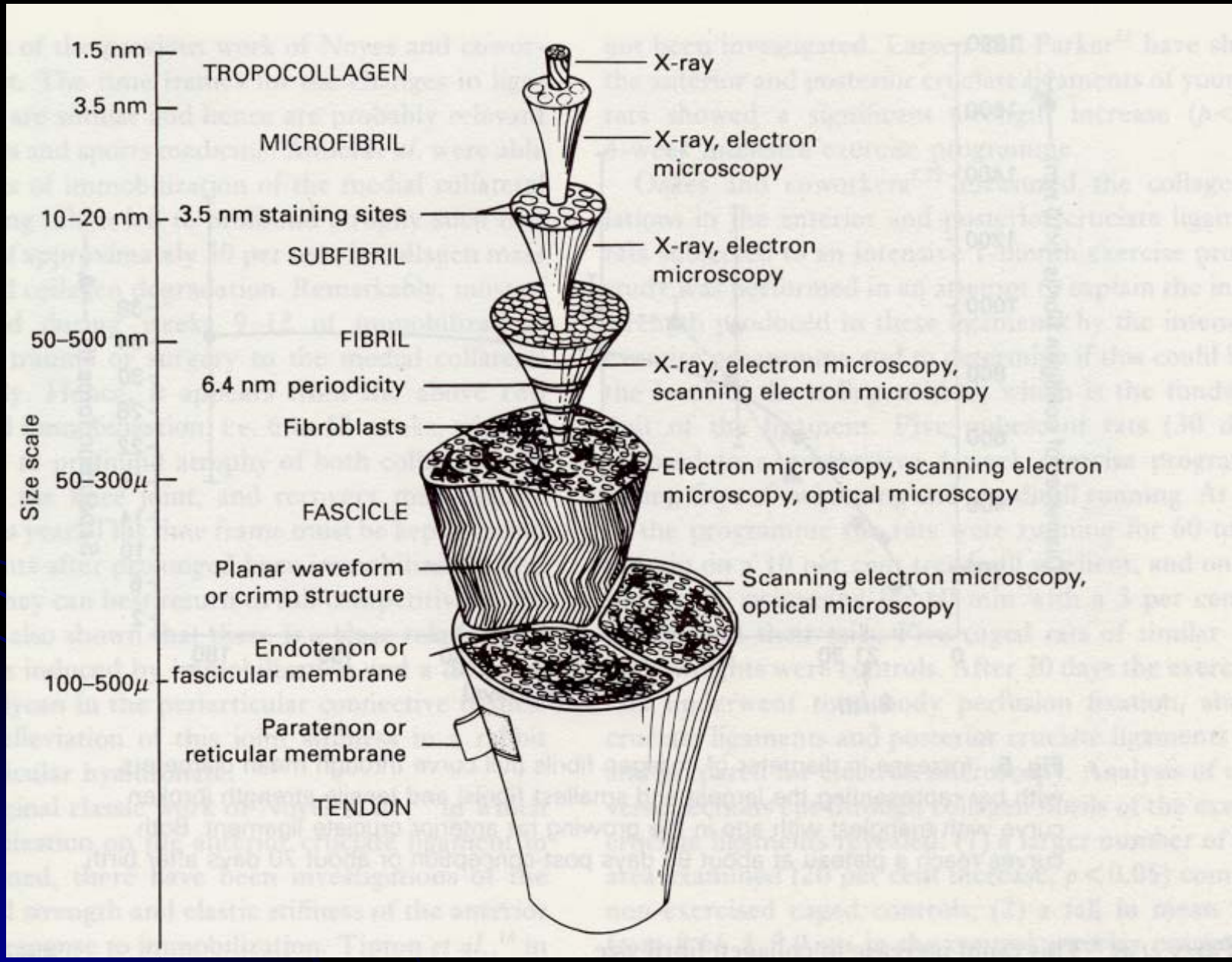
ACHILLES TENDON, TENDINOPATHY, TENDINOSIS, TENDINITIS



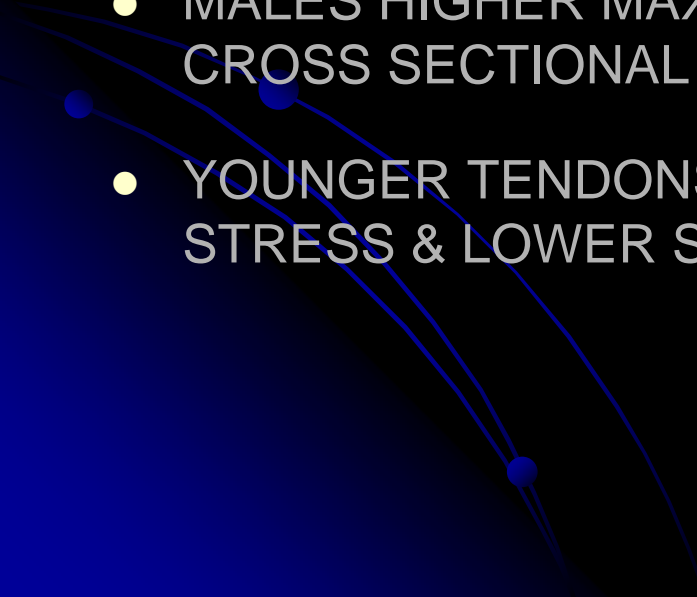
ANATOMY



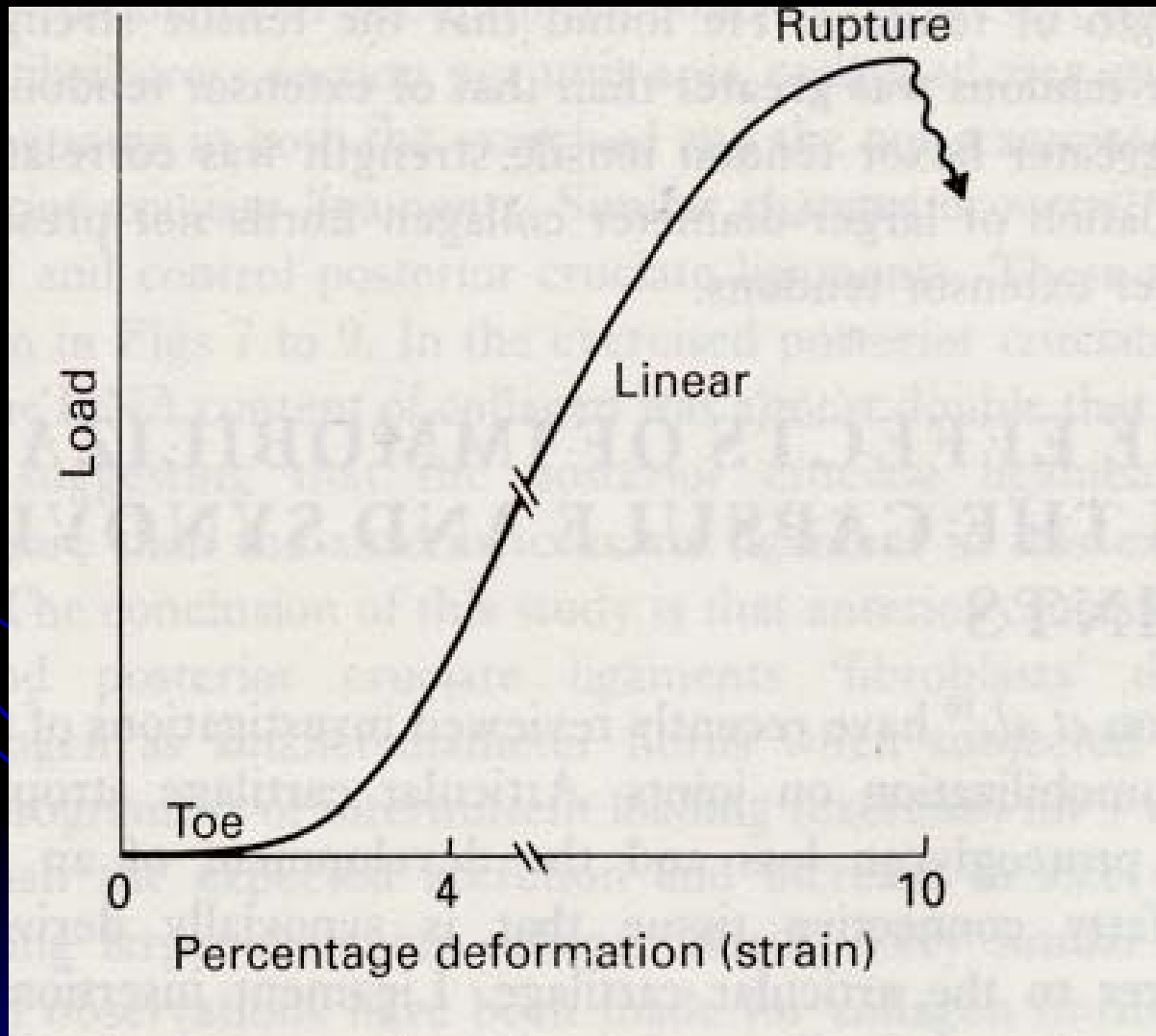
HISTOLOGY OF NORMAL ACHILLES TENDON



BIOMECHANICS OF ACHILLES TENDON

- ACTIN & MYOSIN PRESENT IN TENOCYTES (*Ippolito, 1980*).
 - STIFF & RESILIENT (*Ker, 1981, Jozsa, 1997*).
 - HIGH TENSILE STRENGTH (*Ker, 1981, Jozsa, 1997*).
 - STRETCH UPTO 4% BEFORE DAMAGE.
 - MALES HIGHER MAXIMUM RUPTURE FORCE, STIFFNESS & CROSS SECTIONAL AREA (*Thermann, 1995*).
 - YOUNGER TENDONS SIGNIFICANTLY HIGHER RUPTURE STRESS & LOWER STIFFNESS.
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BIOMECHANICS OF ACHILLES TENDON



BIOMECHANICS OF ACHILLES TENDON

PEAK LOAD ON ACHILLES TENDON

(Gregor, 1987., Komi, 1987., Komi, 1990., Komi, 1992., Movin., 1998.)

Running 9kN (Corresponding to 12.5 times body weight)

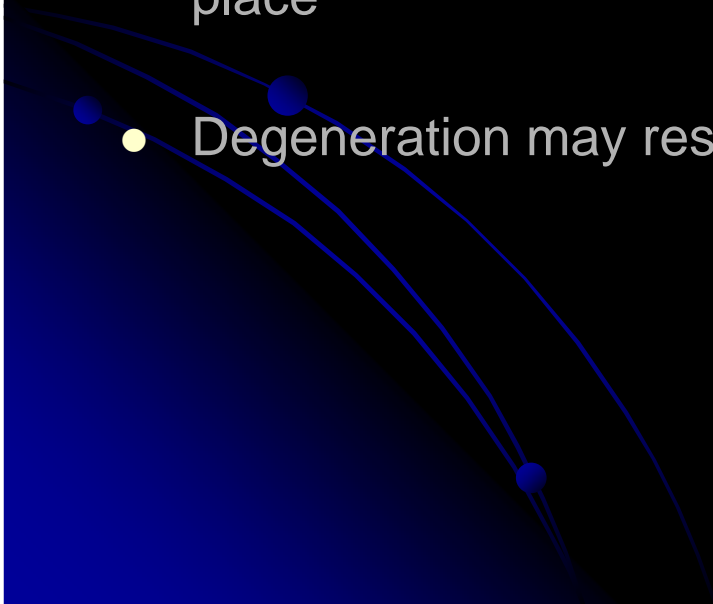
Slow Walk 2.6kN

Cycling <1kN

- ACL requires forces up to 2kN to disrupt
- Patellar tendon accepts up to 8kN.

EFFECTS OF EXERCISE

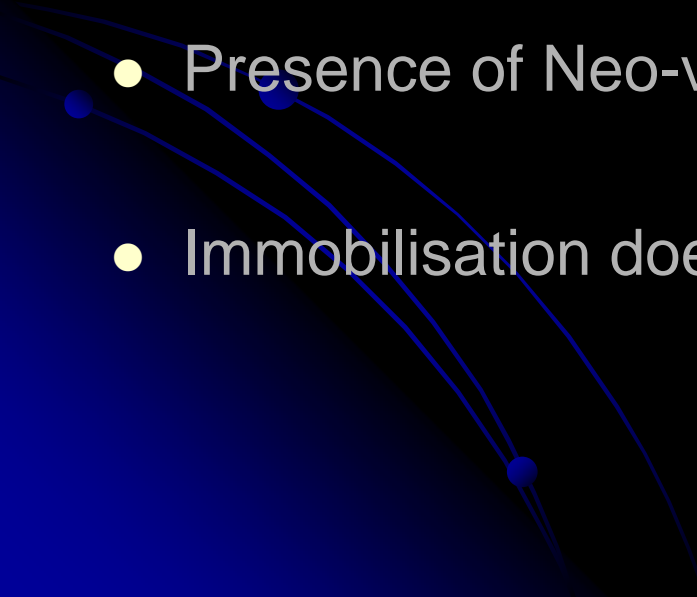
- Chronic loading in the form of physical training leads both to increased collagen turnover as well as to some degree of net collagen synthesis (*Kjaer 2006*)
- Initial effect may be damage that repairs (like DOMS)
- If loading excessive and repeated this “hyper-repair” may not take place
- Degeneration may result

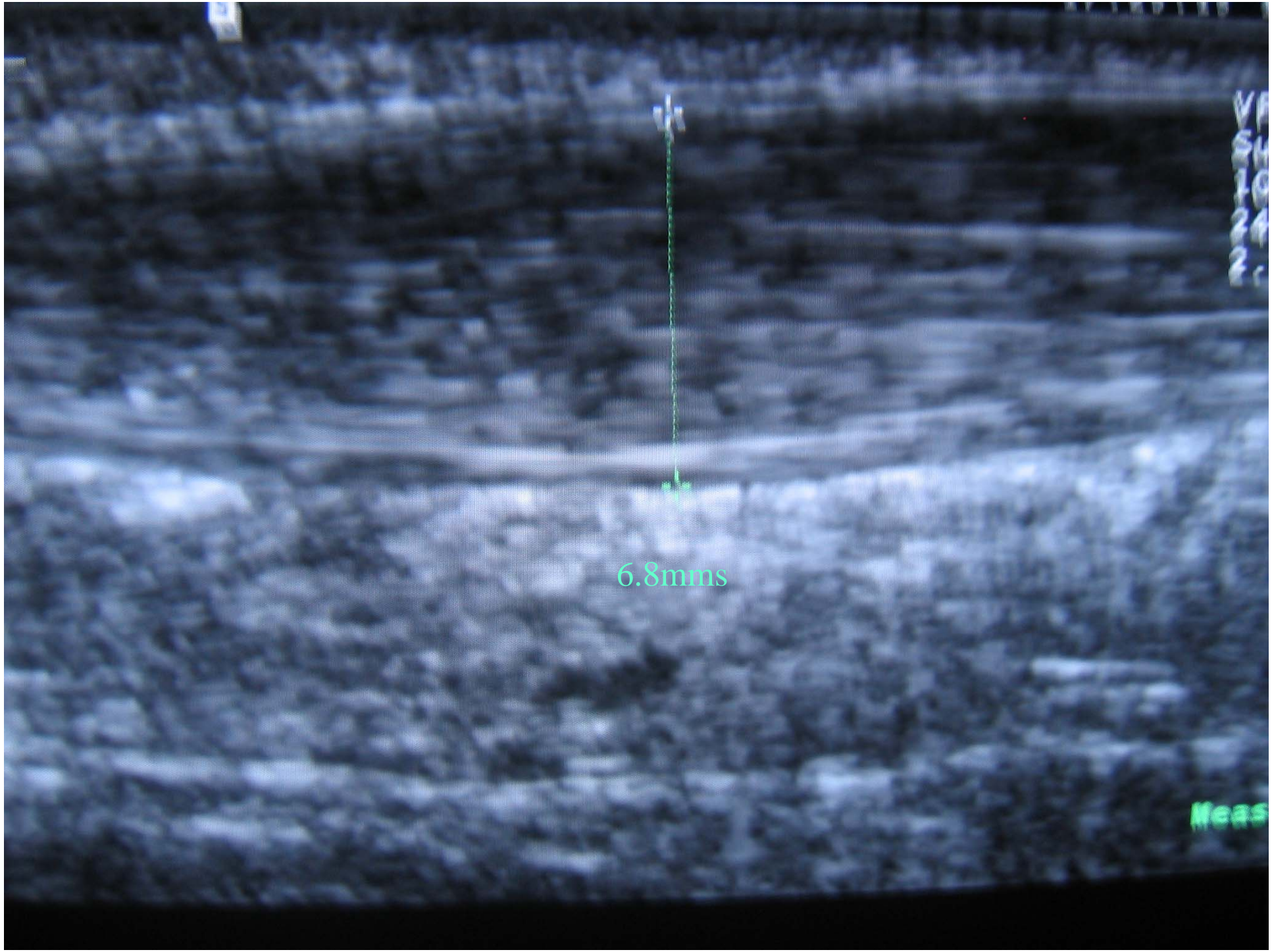


AETIOLOGY OF ACHILLES TENDINOPATHY

- UNCLEAR
- OVERUSE STRESSES (*Clement, 1994., Fahlstrom, 2002*)
- INTRINSIC FACTORS : tendon vascularity, GS dysfunction, age, sex, body weight & height, pes cavus, excessive motion of hindfoot in the frontal plane (Whipping action of AT), forefoot varus, lateral ankle joint instability.
- EXTRINSIC FACTORS : change in training method, poor technique, previous injury, footwear, surface.
- LACK OF FLEXIBILITY
- GENETIC MAKE UP
- SEX
- METABOLIC FACTORS

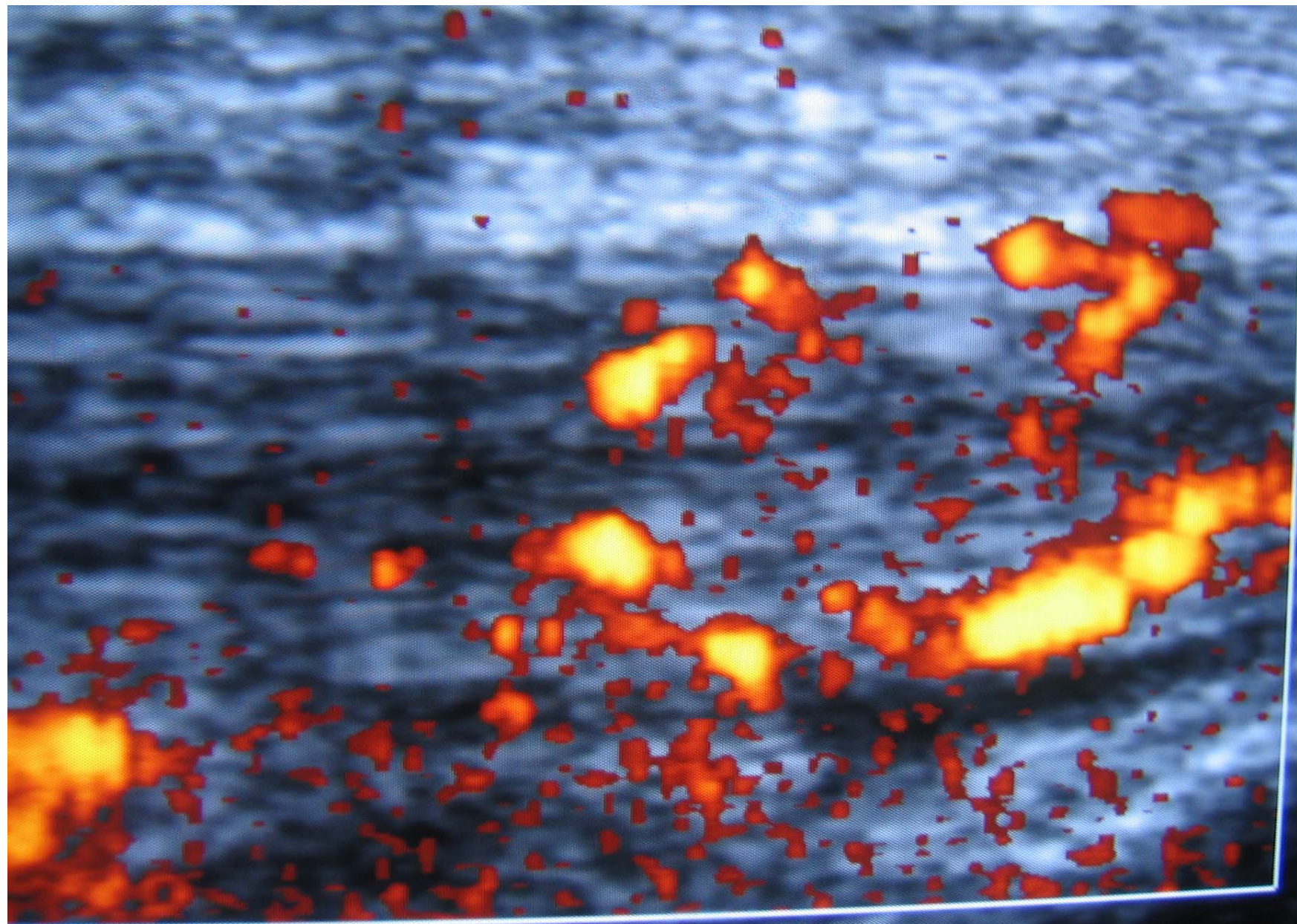
KEY FEATURES OF ACHILLES TENDINOPATHY

- Histological studies show little or no inflammation in tendons
 - Degeneration – loss of collagen structure, scarring, even cysts
 - Presence of Neo-vascularisation
 - Immobilisation does not work
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6.8mms

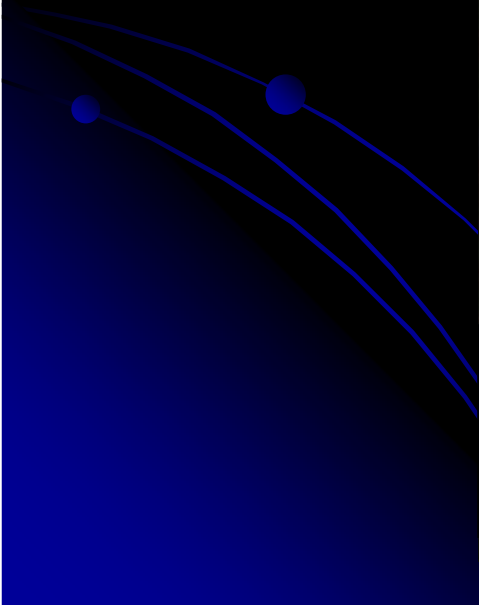
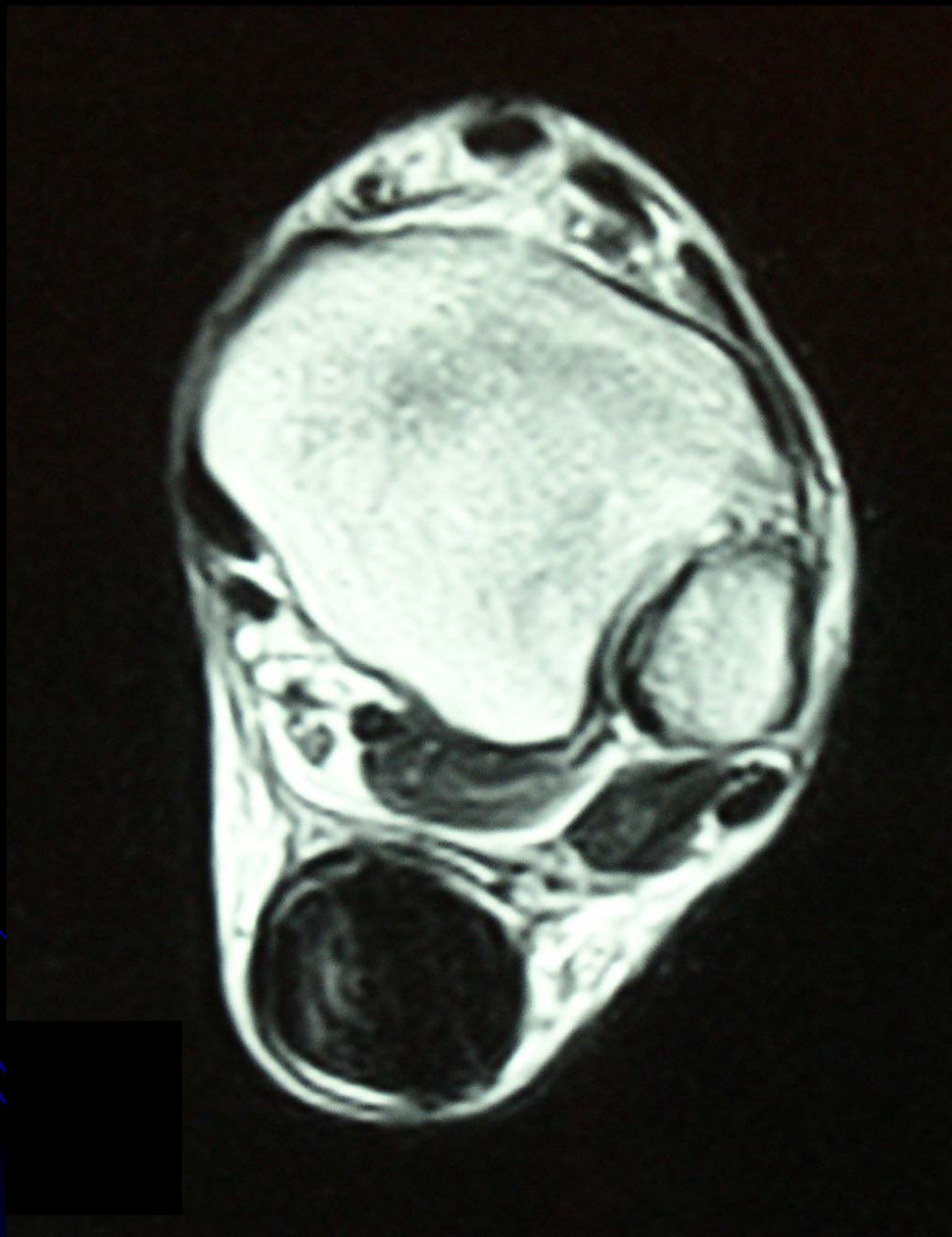
Meas



Sup
100
24d
1.5

PF9
PRF
F-M
72dB

Text





MANAGEMENT

MANAGEMENT

More an art than science (*Khan & Maffulli, 1998*)

- Prevention – sensible training programme (*Stanish, 1984*)
- Early medical attention (*Lemm, 1992., Maffulli, 1999*)
- Rest from aggravating exercise – usually high impact (*Clancy, 1980., Clement, 1984., Paavola, 2000.*)
- Modify activity (*Welsh, 1980*)
- Deep friction massage (*Cyriax, 1980*)
- Gentle static stretch (*Kvist, 1991*)
- Eccentric strengthening of gastrocnemius-soleus muscle (*Stanish, 1992., Curwin, 1986*)
- Foot orthoses (*MacLellan, 1981., Mohr, 1997., Bader, 1984.*)
- Control of symptoms – pain relief via Ice, NSAID's, Analgesia, Therapeutic US, low dose heparin, corticosteroid (*DaCruz, 1996*)
- Surgery

MANAGEMENT

- **Alfredson (1998)** took 15 patients who had failed conventional treatment (inc. physiotherapy, stretching and injection)
- Increased load progressively
- Eccentric exercises – all 15 were back to original sport in 3 months
- VAS Pain score down in all

- **Purdam & Alfredson (2004) Patella tendon**
- Similar regime for Knee – 3 sets of 15 one leg semi-squats twice daily
- 20 degree decline
- 6 out of 8 back to sport by 12 weeks

MANAGEMENT

- Alfredson looked at Neo-vascularisation & eccentric stretch.
- Neo-vascularisation not present in normal tendons
- Knobloch et al (2006) increase in microcirculation in both insertional and mid portion tendinopathy
- No abnormal vessels in controls and asymptomatic side

NEO-VASCULARISATION

- Neo-vascularisation is abnormal
- Associated with nerves
- LA to vessels removes pain
- SO REMOVE VESSELS MAY IMPROVE SYMPTOMS.

INJECTION THERAPY

SCLEROSANT (Hoksund & Alfredson, 2004)

- 3 injections of Polidocanol placed under US control
- Initially increase in vessels
- Good results in 80%

AUTOLOGOUS BLOOD (Taylor, 2002., Connell, 2006)

- Injections into the abnormal degenerate tendon.
- Safe
- Repeated injections 2-3
- Good results in 70% initially
- Requires grossly abnormal tendon