Músculos. Fisiologia. Função do músculo esquelético

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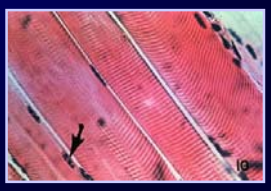
Músculos

- Unidade estrutural = célula muscular ~ fibra muscular
- Contração - movimento
- Tipos de músculos:
  - Estriado
  - Liso
  - Cardíaco
- Função: promover movimento
  - Contrai através de mecanismo ativo e relaxa passivamente
  - Só contrai após estimulação

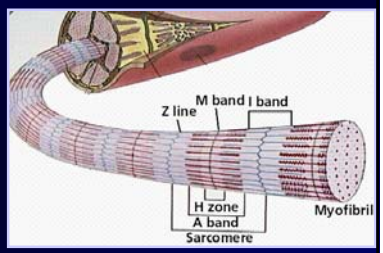
Músculo esquelético

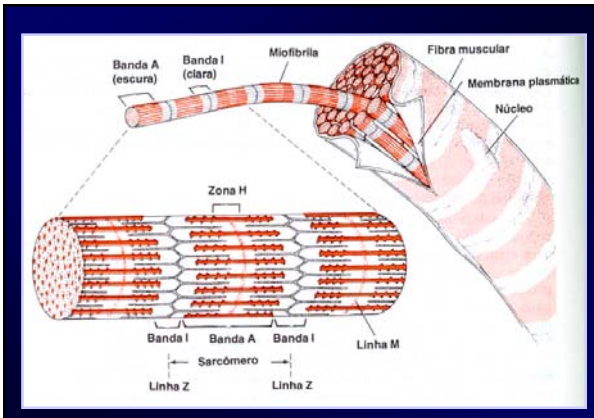


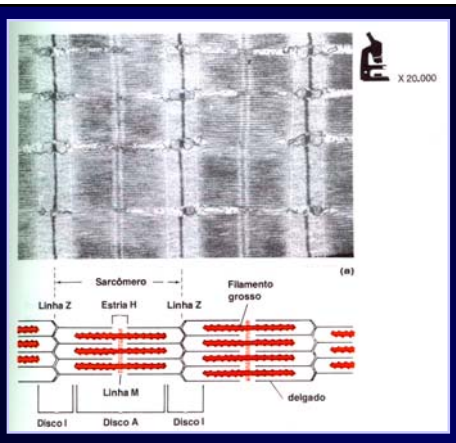
- Estriado – contém bandas claras e escuras
- Células alongadas e multinucleadas
- Controle voluntário
- Fixado aos ossos do esqueleto
- Inervado pelo Sistema nervoso somático

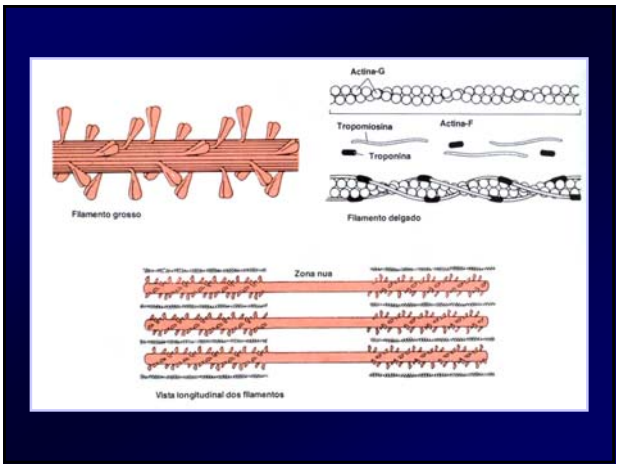
Estrutura da célula muscular

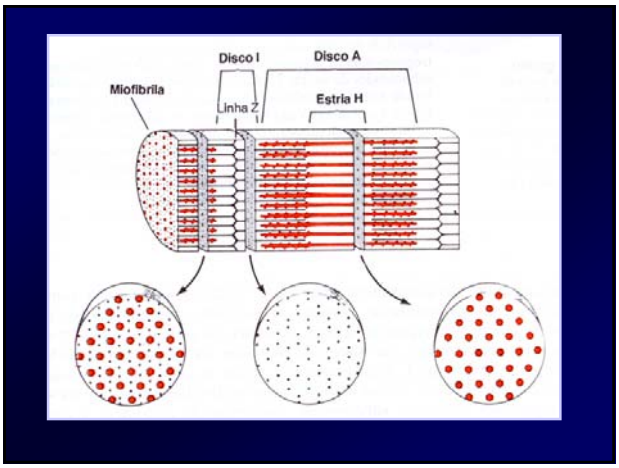
- Células multinucleadas
- Diâmetro entre 10 a 100 micra
- Comprimento: cm
- Várias centenas a milhares de miofibrilas

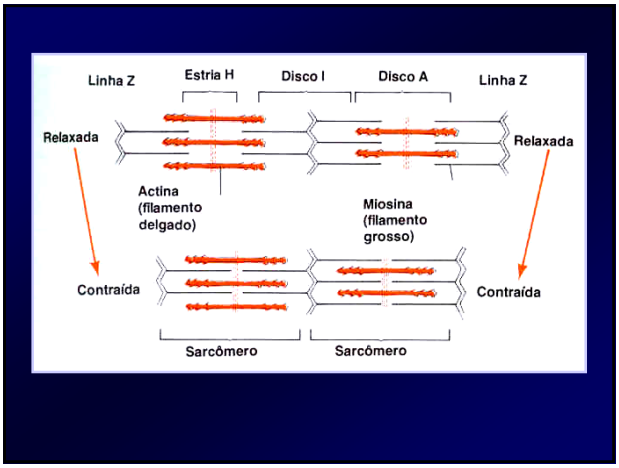


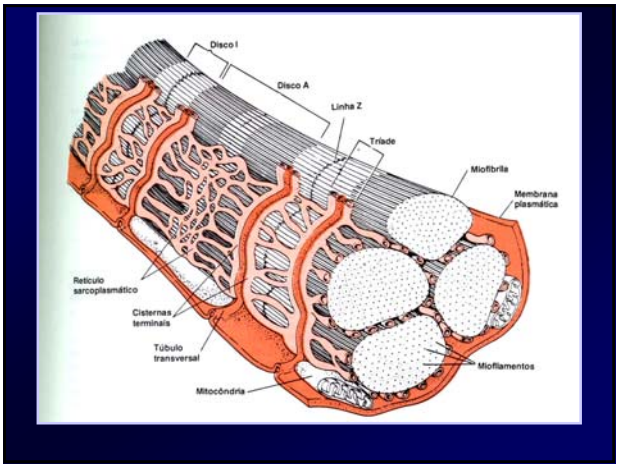




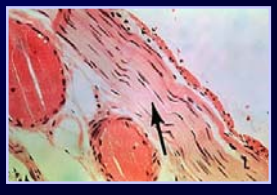








Músculo liso



- Não estriado
- Involuntário
- Também chamado visceral

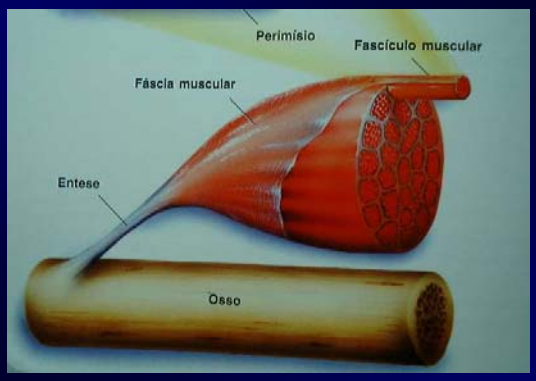
Músculo cardíaco

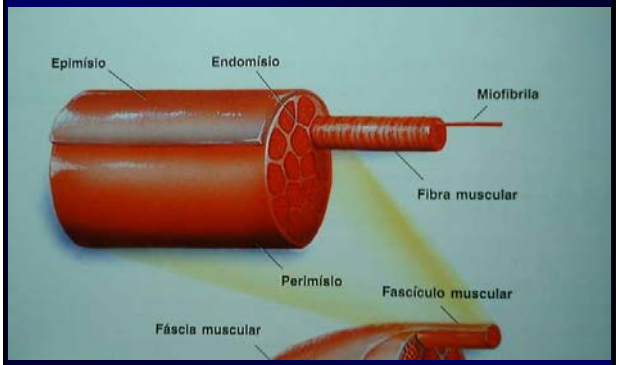
- Estriado
- Involuntário

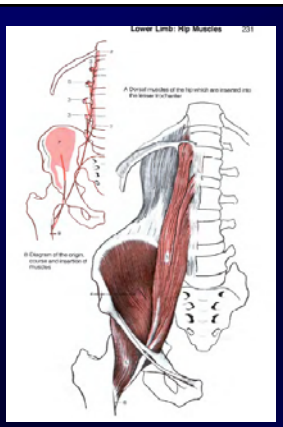
Comparação entre os 3 tipos de tecido muscular			
Característica	**Esquelético**	**Liso**	**Cardíaco**
Localização	Ligado ao esqueleto	Paredes do estômago, intestino,...	Paredes do coração
Tipos de controle	Voluntário	Involuntário	Involuntário
Formato das fibras	Alongadas, cilíndricas, extremidades rombas	Alongadas, extremidades pontiagudas	Alongadas, cilíndricas, fibras que ramificam
Estriações	Presentes	Ausentes	Presentes
Número de núcleos por fibra	Muitos	Um	Um ou dois
Posição do núcleo	Periférico	Central	Central
Velocidade de contração	A mais rápida	Mais baixa	Intermediária
Habilidade para permanecer contraída	Menor	Maior	Intermediária

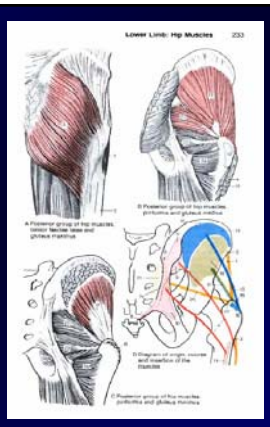
Anatomia macroscópica

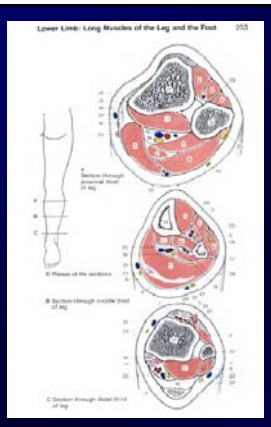
- Componentes: célula muscular = fibra muscular > fascículos > músculo
- Envoltórios de tecido conectivo:
  - Fáscias: endomísio, perimísio e epimísio
- Fixações
- Forma

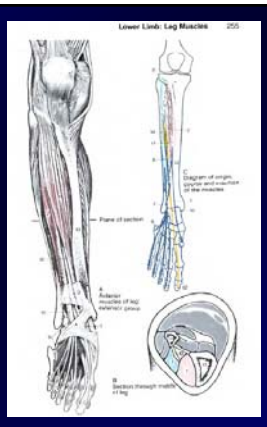


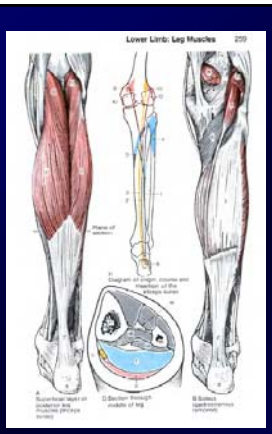
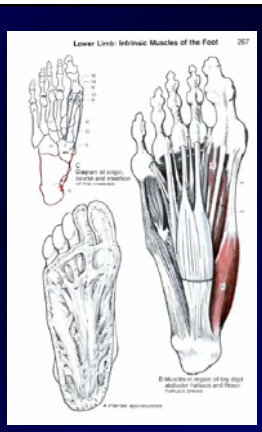


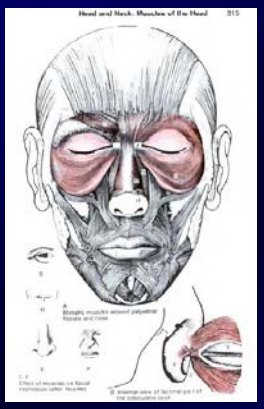


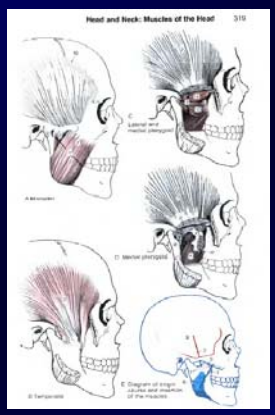


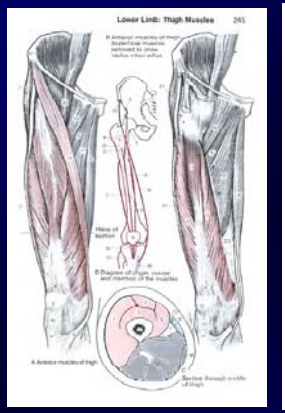
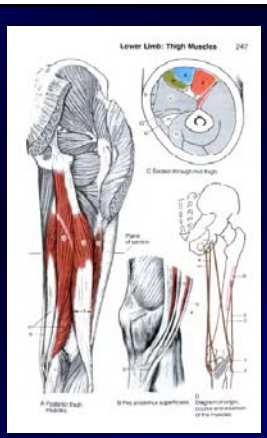


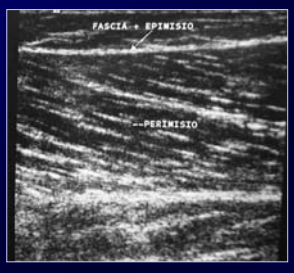






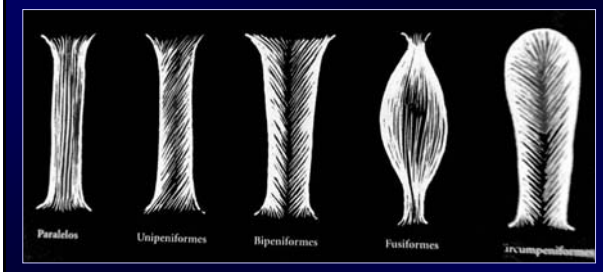
Longitudinal Transversal

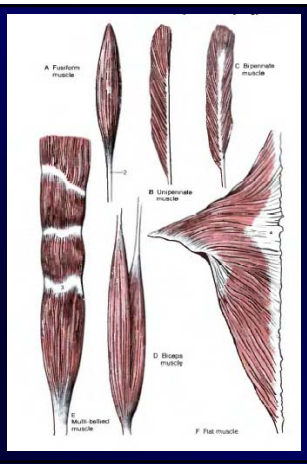
Anisotropia

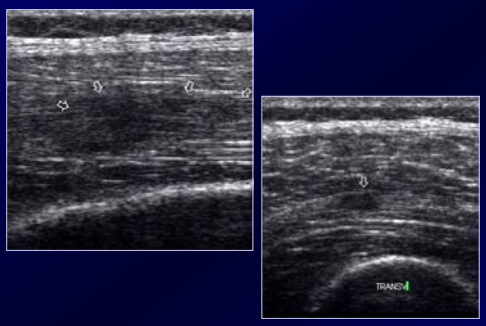


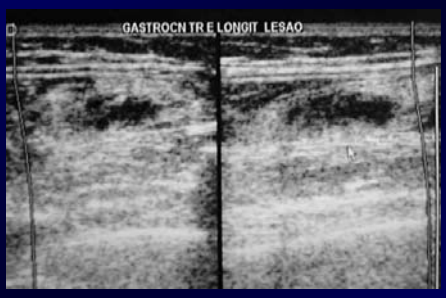
Multipenado
Triangular
Bipenado
Longitudinal
Unipenado

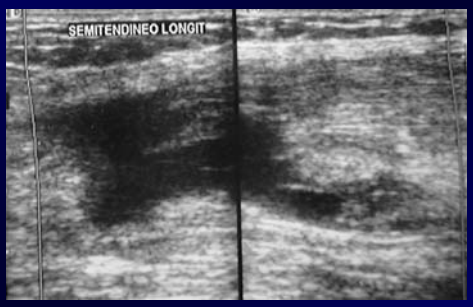
Forma

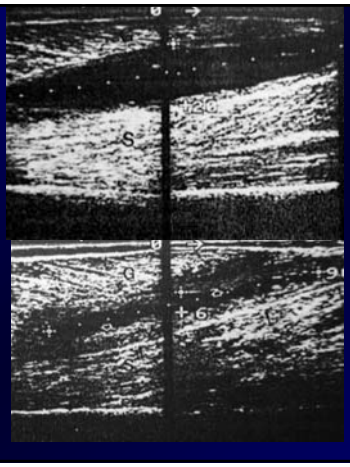

Paralelos
Unipeniformes
Bipeniformes
Fusiformes


A Fusiform muscle
C Bipennate muscle
B Unipennate muscle
D Biceps muscle
E Multi-bellied muscle
F Flat muscle


TRANSV


GASTROCN TR E LONGIT LESAO


SEMITENDINEO LONGIT



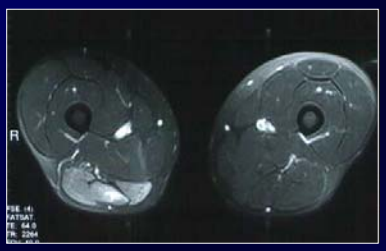
Controle evolutivo da lesão

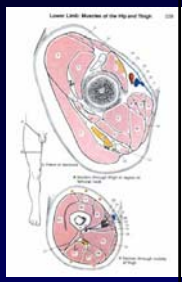
DOMS

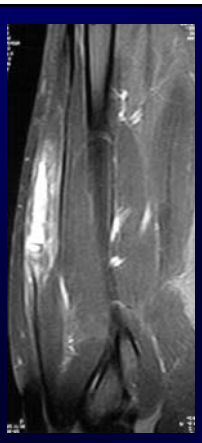
Musculoskeletal MRI - Saunders
KAPLAN, HELMS

Edema
pós exercício

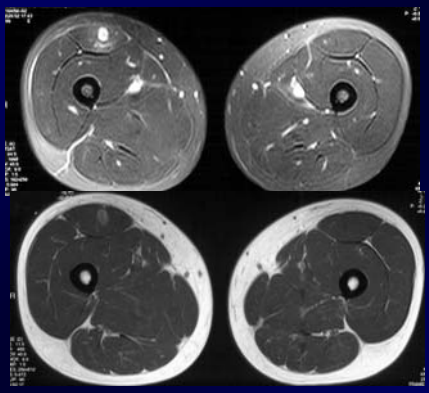
Magnétic Resonance Imaging in Orthopaedics & Sports Medicine
Lippincot Raven, David Stoller





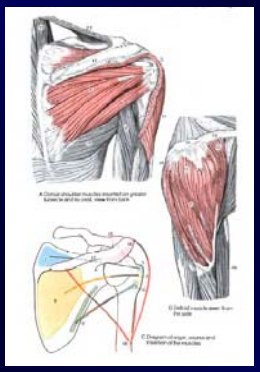


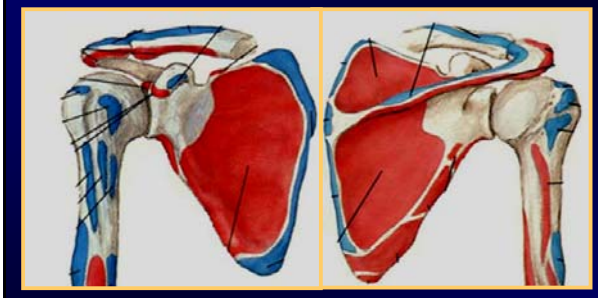
Reto femoral



Fixações

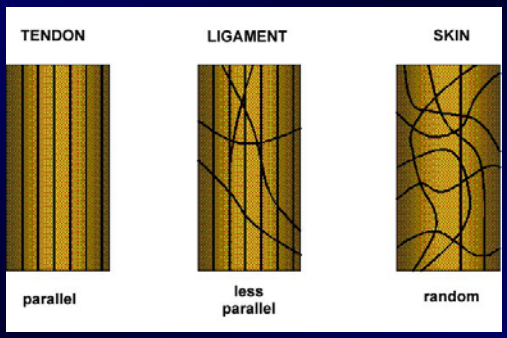
- Tendões / aponeuroses
- Origem do músculo = extremidade menos móvel e geralmente proximal
- Inserção do músculo = extremidade mais móvel e geralmente distal
- <ventre> entre a origem e a inserção

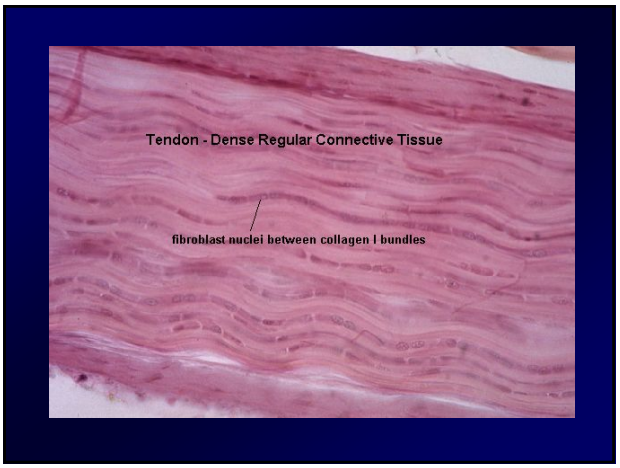


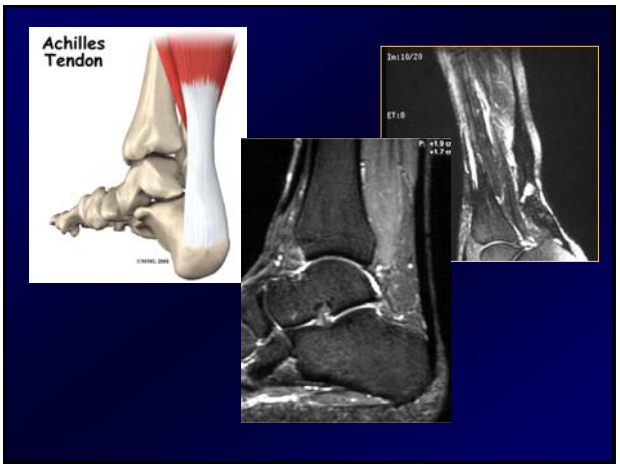


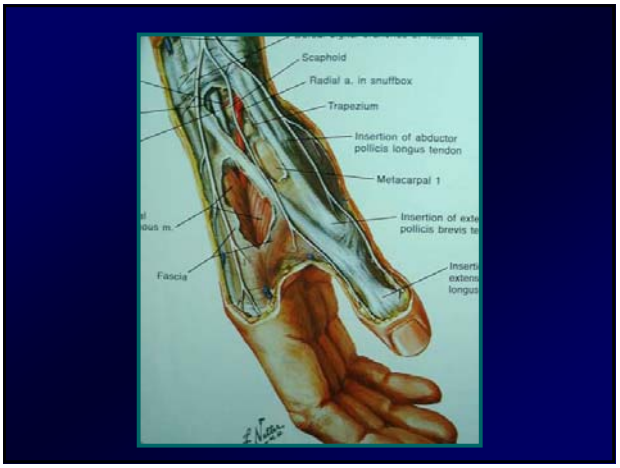
Inserção de músculo ao osso

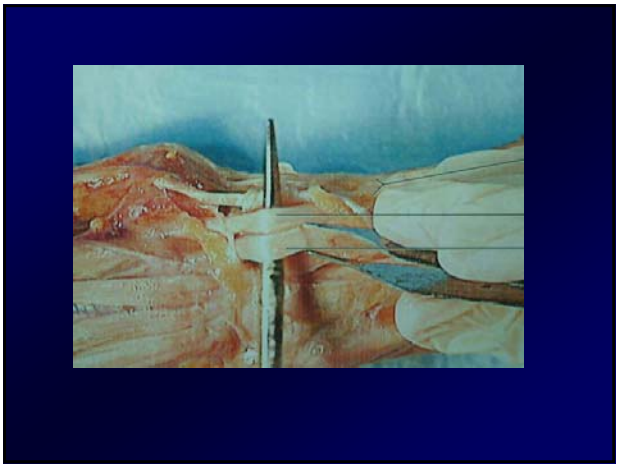
- ✓ tendão alongado em forma de corda
- ✓ aponeurose larga e fina

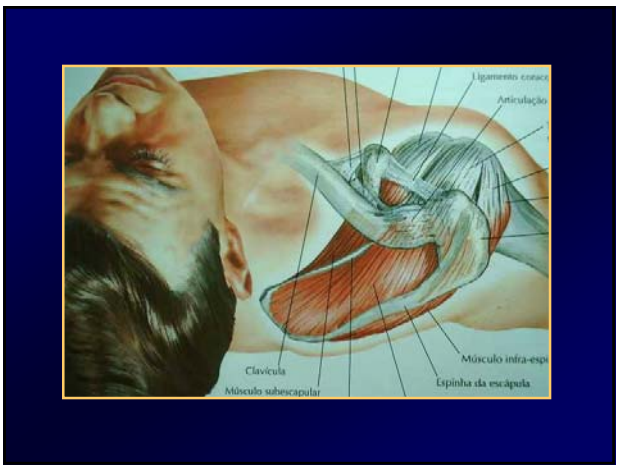


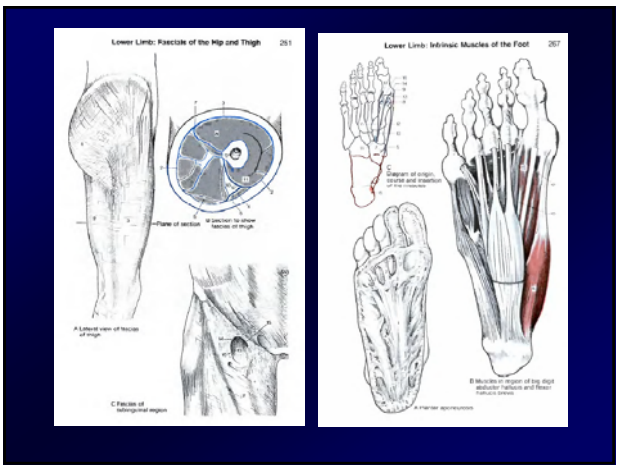

Tendon - Dense Regular Connective Tissue
fibroblast nuclei between collagen I bundles

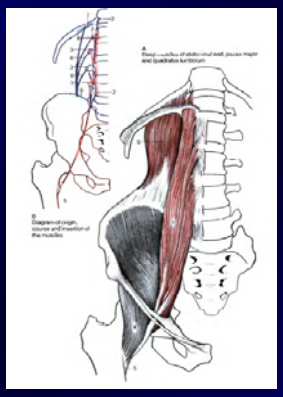

Achilles Tendon

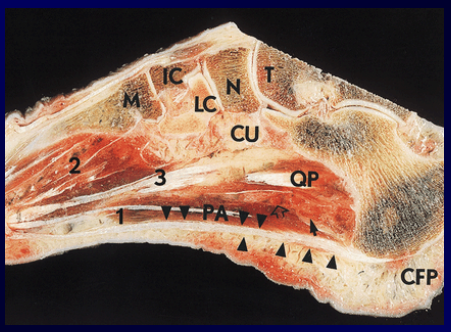

Scaphoid
Radial a. in snuffbox
Trapezium
Insertion of abductor pollicis longus tendon
Metacarpal 1
Fascia

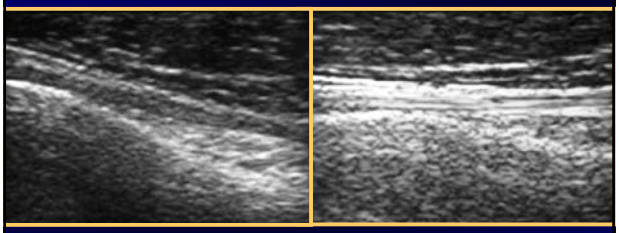



Clavícula
Músculo subescapular
Espinha da escápula


Lower Limb: Fascias of the Hip and Thigh 251
Lower Limb: Intrinsic Muscles of the Foot 267



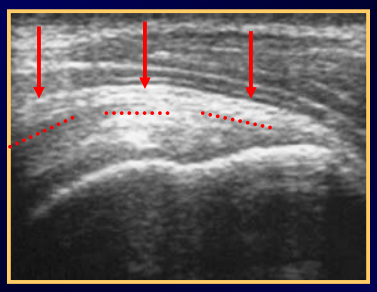




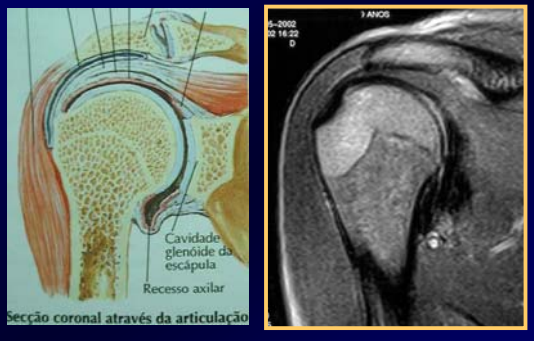
Anisotropia : artefato hipoecóico
ângulo (feixe us - fibras tendão) > 7graus *

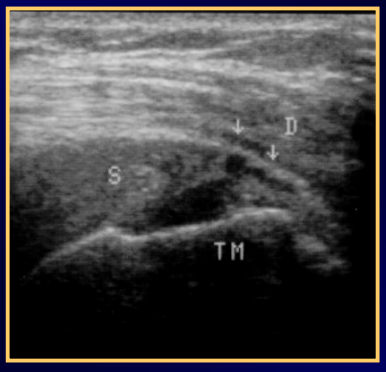
The Hypoechoic normal Tendon: a pitfall
Bruno D Fornage - ***J Ultrasound Med 6 p.19 1987***

** Tendon echogenicity: ex-vivo study*
Crass, Vegte & Harkavy – ***Radiology 167 p.499 1988***



Exame dinâmico
- reorientar repetidamente o transdutor de forma a avaliar as fibras de forma perpendicular nas diferentes porções do tendão





Bainha sinovial

Em algumas regiões os tendões correm em túneis osteofibrosos, como na mão e no pé

Nestes pontos os tendões são recobertos por bainhas sinoviais de duas camadas