

Anatomy

HAYAT BATCH

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lecture no : 7 (intro to muscles)

Muscles

* Muscles are characterized by contraction ^{الانقباض} which means [the capacity of the muscle fibers to contract] ^{قدرة}

* Types of muscles:

1. Skeletal muscle.
2. Smooth muscle.
3. Cardiac muscle.

muscle
↓
مكونة من
muscle fibers
↓
عندها القدرة
contraction

I. Skeletal Muscles

1. Contraction:

Voluntary. **إرادية**

2. Site:

* Main bulk of our bodies. **الجزء الأكبر من الجسم**

* Attached to skeleton (bones) eg. Muscles of limbs.

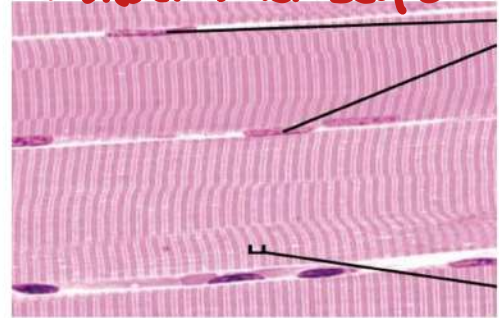
سبب التسمية →

* Produce movement of skeleton.

3. Striations:

* Striated (show alternating light & dark bands). **خطية**

Under Microscope →



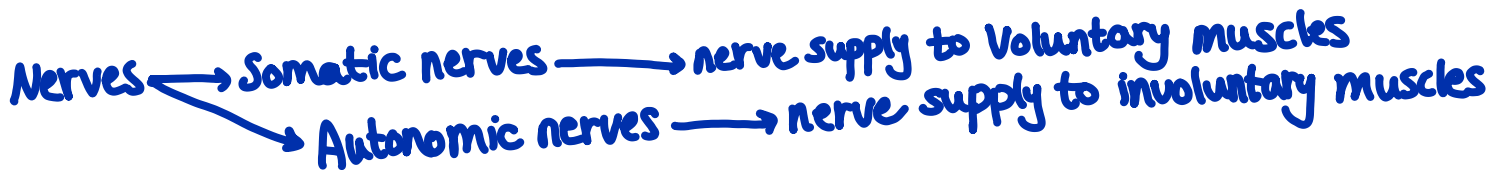
4. Nerve supply:

Somatic nerves.

5. Contraction:

Rapid.

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II. Smooth Muscles

1. Contraction:

Involuntary. **لا إرادية**

2. Site:

* Muscles in wall of viscera eg. Muscles of gastro-intestinal tract (GIT), urinary system, respiratory system, genital system & those of blood vessels.

أعضاء →

3. Striations:

Non-striated.

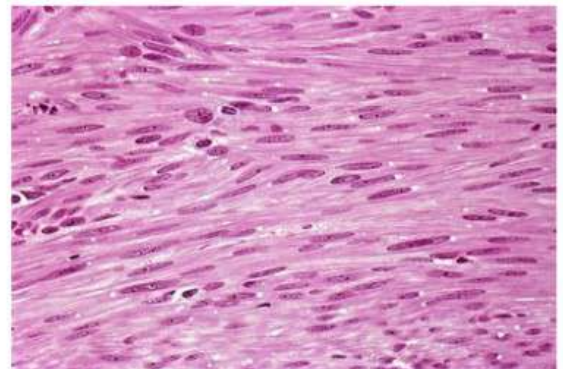
4. Nerve supply:

Autonomic nerves.

5. Contraction:

Slow.

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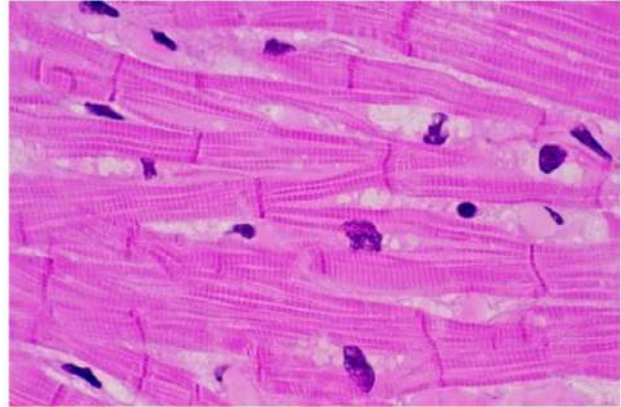
III. Cardiac Muscles

1. Contraction: **Involuntary.**
2. Site: **Myocardium of heart.**
(العينة القلبية)

3. Striations: **Striated.**

4. Nerve supply: **Autonomic nerves.**

5. Contraction: **Has a rhythm.**
تناغم



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Skeletal Muscles

* Usually each muscle has 2 attachments:

1. **Origin:** The most fixed attachment (usually proximal). ثابت

2. **Insertion:** The most mobile attachment (usually distal). يتحرك

* Usually when the muscle contracts → it gets shorter by approximating the insertion to the origin.



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Flexion → Hip bone
 Origin → lumbar
 Vertebrae
 Insertion → femur

*** Way of attachment of muscles:**

1. By **fleshy fibers**: eg. Popliteus muscle.
2. By **tendon** (a long fibrous cord): eg. Tendocalcaneus & biceps.
3. By **raphe** (a fibrous band that separates flesh muscles from each other): eg. Pharyngeal muscles & mylohyoid muscle.



Popliteus

in the back of the knee

من الجسم أوتى tendon

جذب

in pharynx

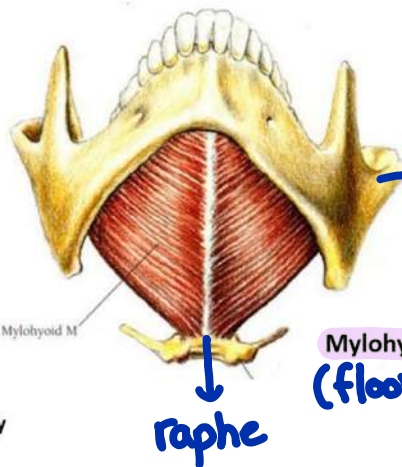


Tendocalcaneus

back of the leg

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between two muscles



Mylohyoid M

Mylohyoid muscle (floor of the mouth)

mandible

raphe

4. By **aponeurosis** (flat fibrous sheet): eg. Aponeurosis of external oblique abdominal muscle. (white)

مائلة

5. Attached to skin: eg. Facial muscles.

6. Attached to an **intermediate tendon**: A muscle may have 2 fleshy bellies & an intermediate tendon in between & so the 2 bellies are inserted into this tendon eg. Digastric muscle.

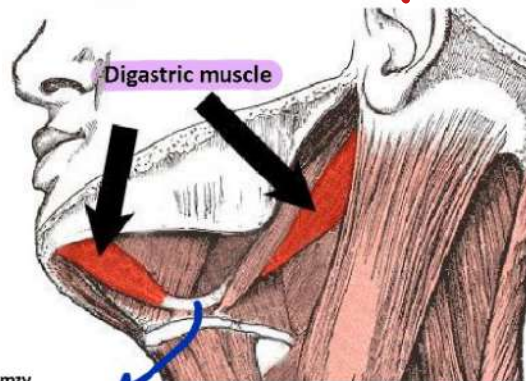
عندئذ (جزء من متعرج) ←

مدمج ←

عندئذ معوية



Aponeurosis of external oblique abdominal muscle



Digastric muscle

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intermediate tendon

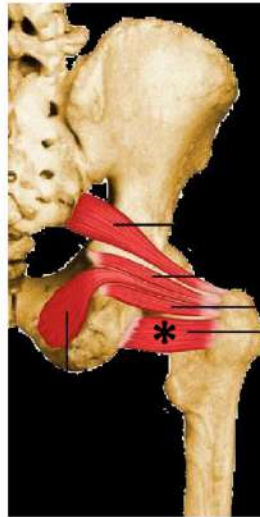
2 Bellies of same muscle

Shape of Muscles

The muscles can be classified into different types according to the shape of the muscle fibers in relation to the line of pull of the muscle.

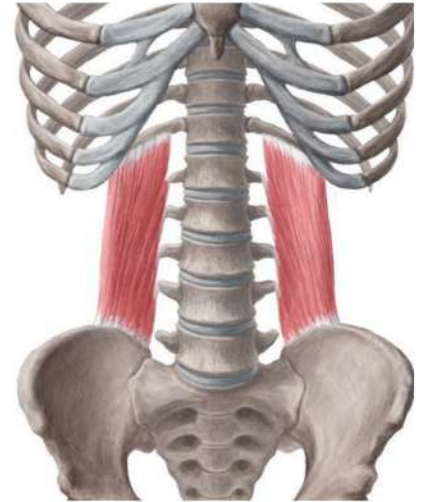
A. Parallel Fibers: → inside the muscle the fibers are parallel

1. Quadrilateral: eg. Quadratus lumborum & quadratus femoris.



Quadratus Femoris

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Quadratus Lumborum

↓
Abdomen

Quadri → رابعي
الاقتران

من عوده
دفعية ومن
نصت
insertion
لكن تخينة
من النهر

من عظمة
العنق

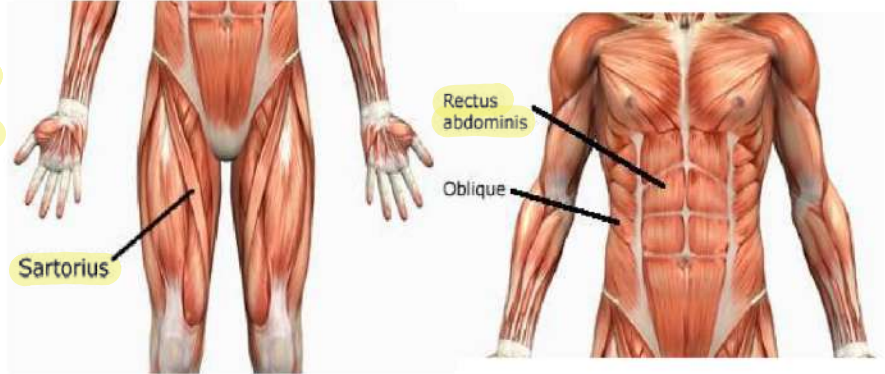
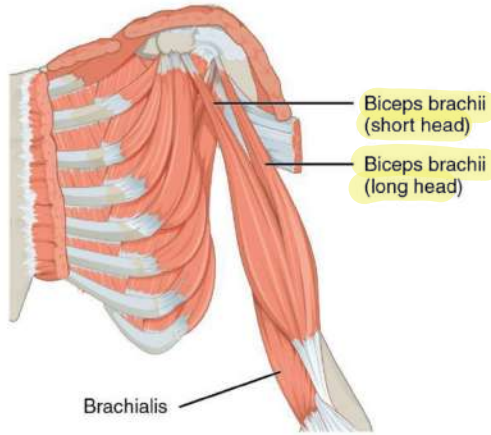
2. **Fusiform:** eg. Biceps brachii.

3. **Strap-like:** eg. Sartorius.

4. **Strap-like with tendinous intersections:** eg. Rectus abdominis.

بينها أوتار بيضاء

كالمزامير



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Brachium → Arm

B. Oblique Fibers: مائلة

1. Pennate fibers:

i. Unipennate:

* Fibers run along one side of the tendon (like half a feather).

* Example: Palmar Interossei & Flexor pollicis longus.

Flexion

ii. Bipennate:

* Tendon in the middle & fibers are attached to its 2 sides (like a complete feather).

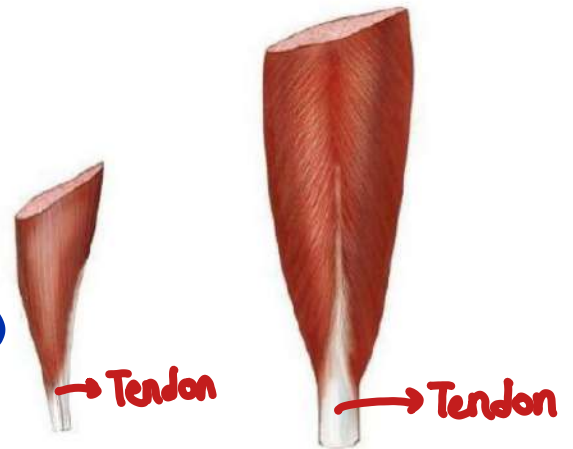
* Example: Dorsal Interossei & Rectus femoris.

femur

between metacarpal bones (Palmar Surface)

between metacarpal bones (Dorsal Surface)

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Unipennate (Flexor Pollicis longus)

Bipennate (rectus femoris)

iii. Multipennate:

* A series of bipennate fibers (several feathers beside each other).

* Example: Deltoid.

iv. Circumpennate:

* Fibers converge on a tendon to be attached to the circumference of the tendon.

* Example: Tibialis anterior.

2. Triangular fibers:

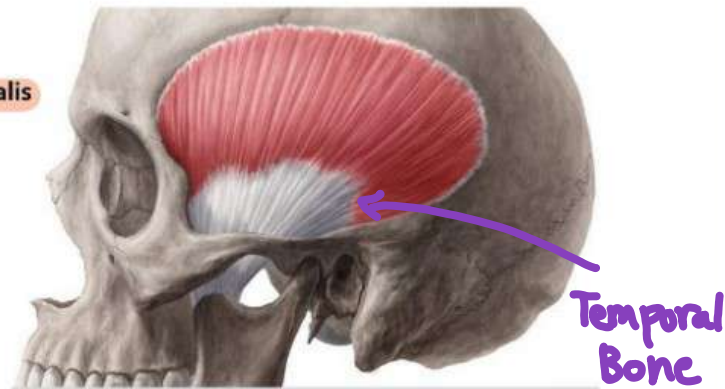
* Muscle fibers converge from wide attachment to a narrow terminal tendon.

* Example: Temporalis.



أكثر من tendon وصلات muscles

Multipennate (deltoid)



Temporalis

Temporal Bone

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طرونية

C. Spiralized Fibers:

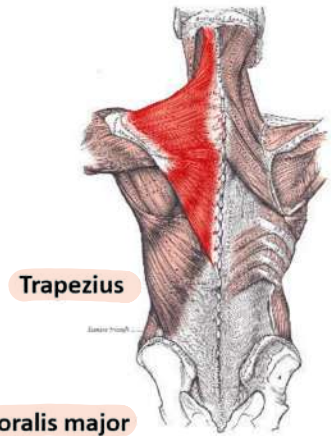
- * When the muscle contracts → the fibers become spiral.
- * Examples: Trapezius & Pectoralis major.

D. Cruciate Fibers:

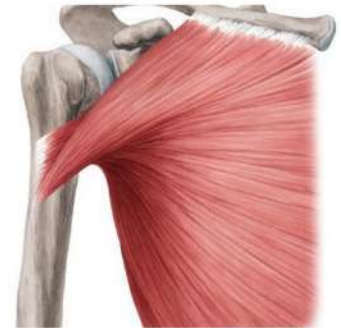
- * Muscle fibers run in different planes & directions.
- * Example: Sternocleidomastoid.

E. Circular Fibers:

- * Muscle fibers form complete circles.
- * Example: Orbicularis oculi muscle.



Pectoralis major



orbital
تجويف العين



Sternocleidomastoid

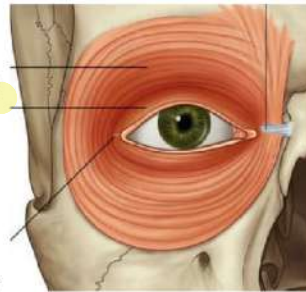
sternum

cleido → clevice

mastoid process

eye

Orbicularis oculi



Coordination within Muscle Groups

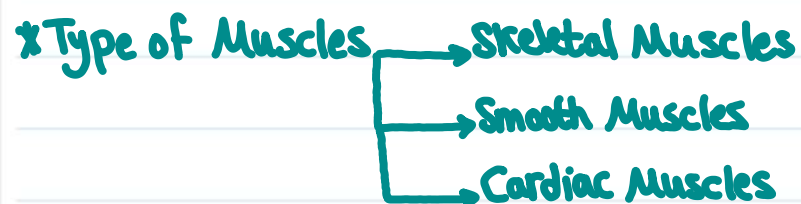
- * Movements often are the result of several skeletal muscles acting as a group rather than acting alone.
- * Most skeletal muscles are arranged in opposing (antagonistic) pairs at joints: eg. flexors & extensors; abductors & adductors, and so on.
- * Within opposing pairs, one muscle, is called the **prime mover or agonist**, which contracts (gets shorter) to cause an action while the other muscle, the **antagonist**, stretches (relaxes) to allow the movement caused by the prime mover.
- * The antagonist and prime mover are usually located on the opposite sides of the bone or joint.

front of the joint

back of the joint

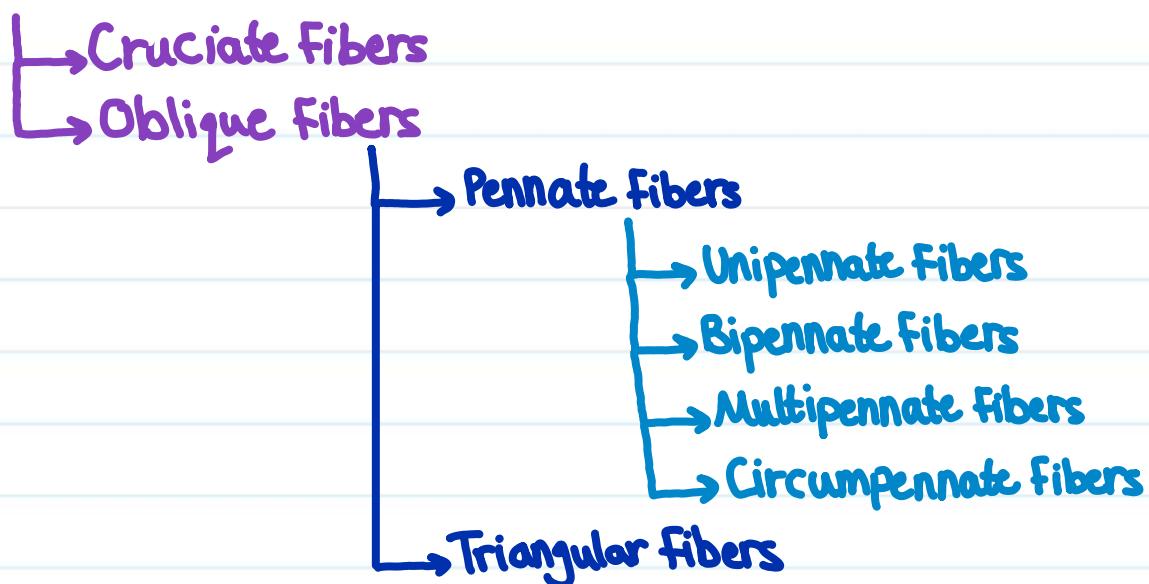
العينة الرئيسية بالحركة

	Skeletal Muscle	Smooth Muscle	Cardiac Muscle
Contraction	Voluntary Muscles	Involuntary	Involuntary
Nerve Supply	Somatic Nerve	Autonomic Nerve	Autonomic Nerve
Site	-main bulk in our bodies. -produce attachment to the skeleton. -Attached to the skeletal bones.	Wall of viscera: RS/US/GIT/GS/Blood Vessels	Myocardium of Heart
Striations	Striated	Nonstriated	Striated
Speed of Contraction	Rapid	Slow	Has a Rhythm



*Shape of muscles according to shape of muscle fibers





قليلًا مِنَ التَّفَاؤُلِ يَصْنَعُ أَلْفَ طَرِيقٍ نَحْوَ السَّعَادَةِ..
بالتوفيق



#النادي_الطبي
#معكم_خطوة_بخطوة