

# INTRODUCION TO SPORTS THERAPY

## Theory –Inverse Stretch Reflex

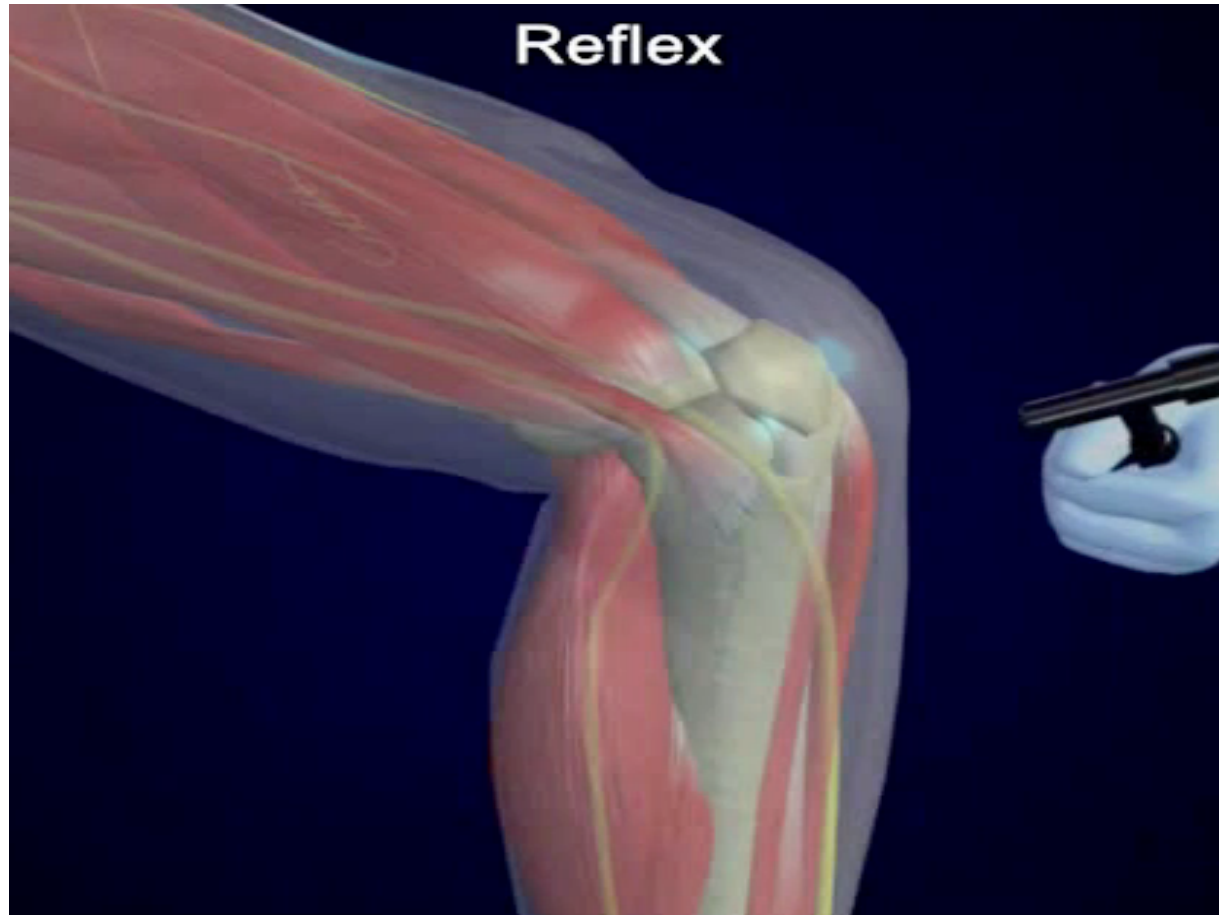
# Learning Outcomes

- By the end of this session students should be able to:
- Describe and apply the inverse stretch reflex to treat trigger points

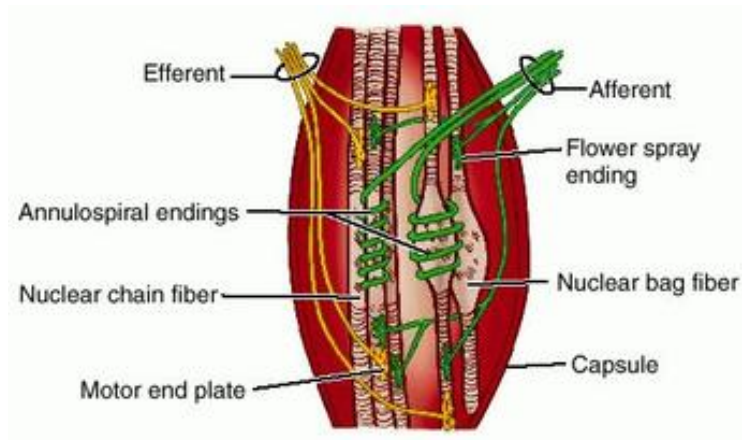
# Recap

- What are TrPs?
- Causes of TrPs?
- Local Twitch Response (LTR)
- Compression
  - Rolling
  - Torque

# Reflex actions

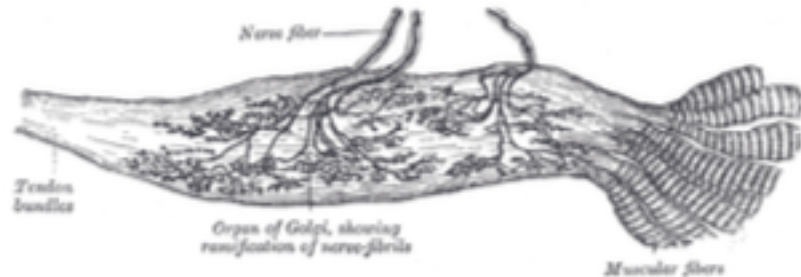
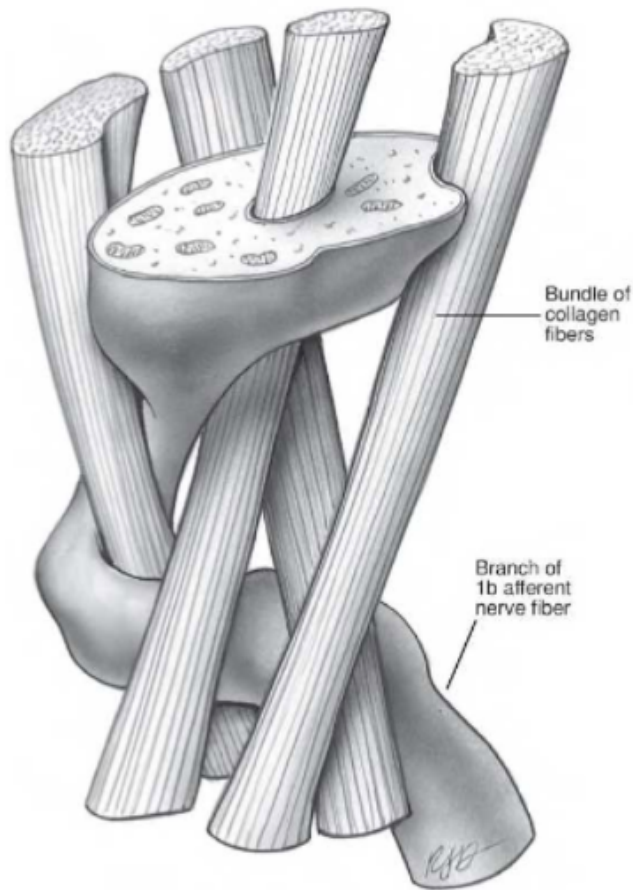


# The Muscle Spindle



Muscle spindles are sensory receptors within the belly of a muscle that primarily detect changes in the length of the muscle. CONTRACTION.

# Golgi Tendon Organ



GTO's are a proprioceptive sensory receptor organ that is at the origins and insertion of skeletal muscle fibers into the tendons of skeletal muscle. They sense changes in muscle tension  
RELAXATION

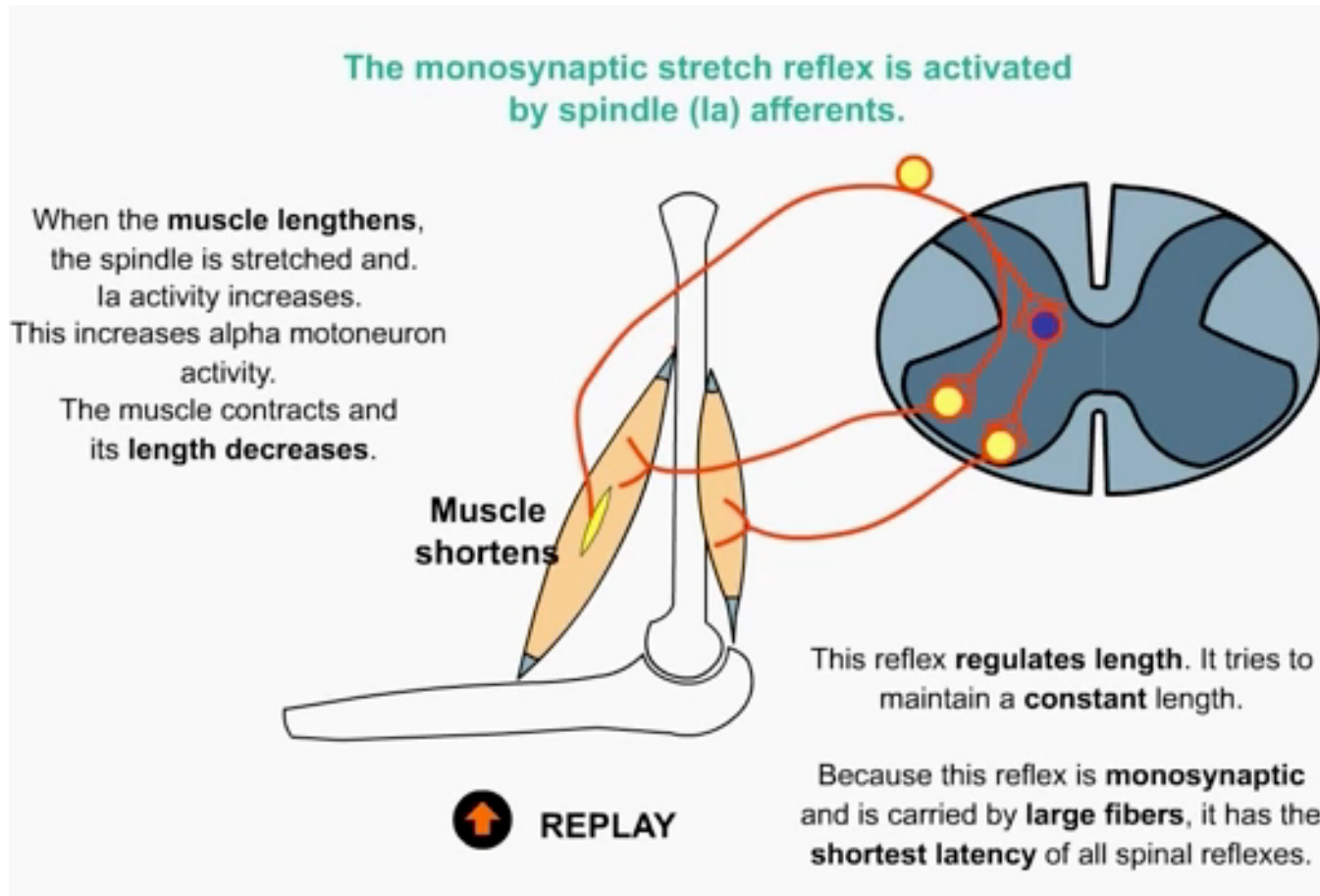
# The Stretch Reflex

- Not a massage concept!
- When the muscle is stretched, so is the muscle spindle
- The muscle spindle records the change in length (and how fast) and sends signals to the spine
- This triggers the 'stretch reflex' which attempts to resist the change in muscle length by causing the stretched muscle to **contract**.
- The more sudden the change in muscle length, the stronger the muscle contractions will be
  - Plyometric, or "jump", training is based on this fact
- This basic function of the muscle spindle helps to maintain muscle tone and to protect the body from injury.

# The Inverse Stretch Reflex

- When muscles contract (possibly due to the stretch reflex), they produce tension at the point where the muscle is connected to the tendon, where the GTO is located.
- The GTO records the change in tension, and the rate of change of the tension, and sends signals to the spine
- When this tension exceeds a certain threshold, it triggers the lengthening reaction which **inhibits** the muscles from **contracting** and causes them to **relax**.
- Other names for this reflex are the **autogenic inhibition**.
- This basic function of the golgi tendon organ helps to protect the muscles, tendons, and ligaments from injury.
- The lengthening reaction is possible only because the signaling of GTO to the spinal cord is powerful enough to overcome the signaling of the muscle spindles telling the muscle to contract.

# The Stretch & Inverse Stretch Reflex



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# Take Home Message

- If you apply a force to a muscle QUICKLY you will stimulate the muscle spindle and trigger a protective STRETCH REFLEX
- However if you apply the same amount of force GRADUALLY , you will stimulate the Golgi Tendon Organs and initiate an Inverse Stretch Reflex

# Compression Application RECAP

- Use thumb, finger, heel, fist or elbow
- Gently apply pressure over 8-10 seconds
- VAS up to 7/10
- Obey the inverse stretch reflex!
- Autogenic inhibition
- Stretch (compression) = relaxation