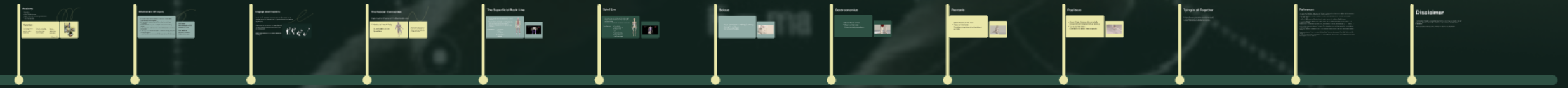


# ACL Injury Prevention: The Missing Link

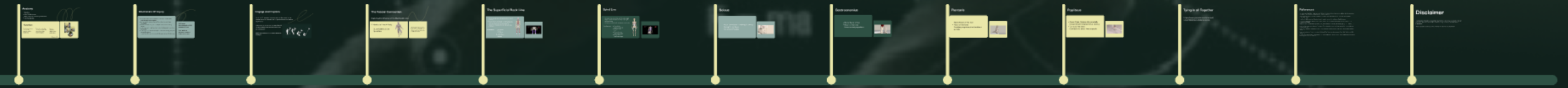
Innovative Approach  
to Reduction of ACL Injuries



Presented by: Veronica Dilzer  
March 2024

# ACL Injury Prevention: The Missing Link

Innovative Approach  
to Reduction of ACL Injuries



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# Disclaimer

In compliance with continuing education requirements, I do not have any direct or indirect financial or other associations with companies or people that are mentioned in this presentation.

I have no actual or potential conflict of interest in relation to this presentation.

# Anatomy

- Structure
- 25 to 35 MM in length
- Higher cross section at bony attachments
- Two Fiber Bundles

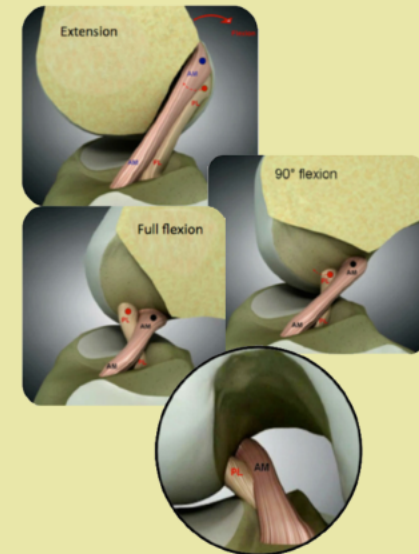
## Function:

Provides resistance to externally applied anterior tibial force.

Assists in controlling the displacement that may occur during flexion activities.

Resists rotational forces to limit axial rotation.

References: 1,2



# Mechanics Of Injury

- Excessive adduction movement at the knee in frontal plane coupled with internal rotation
- A combined increase in Ground Force Reaction and valgus movement
- Sudden deceleration prior to change of direction or landing motion
- Lack of eccentric qualities that control decelerating forces (local and global)
- Lack of gross contractile strength to overcome supra-gravity and momentum events
- Hyperflexion/Hyperextension with the application of tibial torque

600 (most documented) to 2300 newtons of force

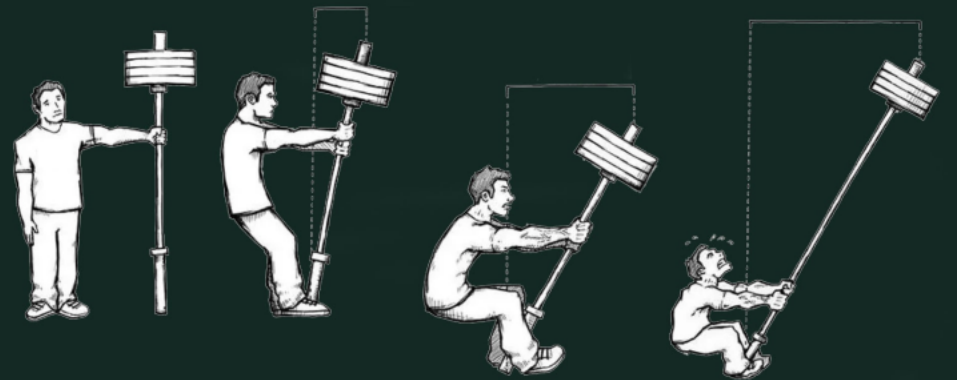
Intra-articular placement creates such a short lever

# Engage and Explore

How is the ACL supposed to create a lever arm big enough to stop forward momentum of the tibia with a ligament that has intra-articular attachments?

What other external contractile tissues help with the same mechanisms to decrease excess load on the knee joint?

What is not considered in our current treatment paradigm?

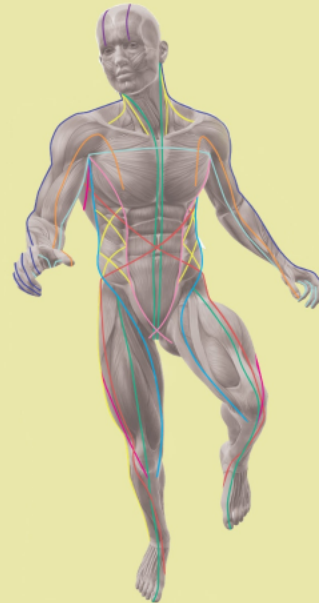


# The Fascial Connection

## Exploring the Influence of the Myofascial Lines

### 12 Myofascial Lines in Body

- Superficial Back Line
- Spiral Line



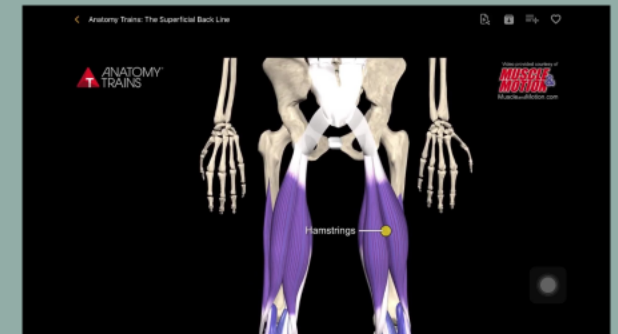
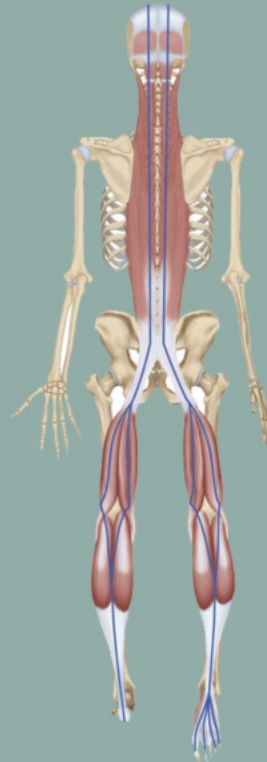
The goal of rehabilitation and sports performance should be to have these myofascial lines, work harmoniously together to produce a holistic system of integrity and function.

# The Superficial Back Line

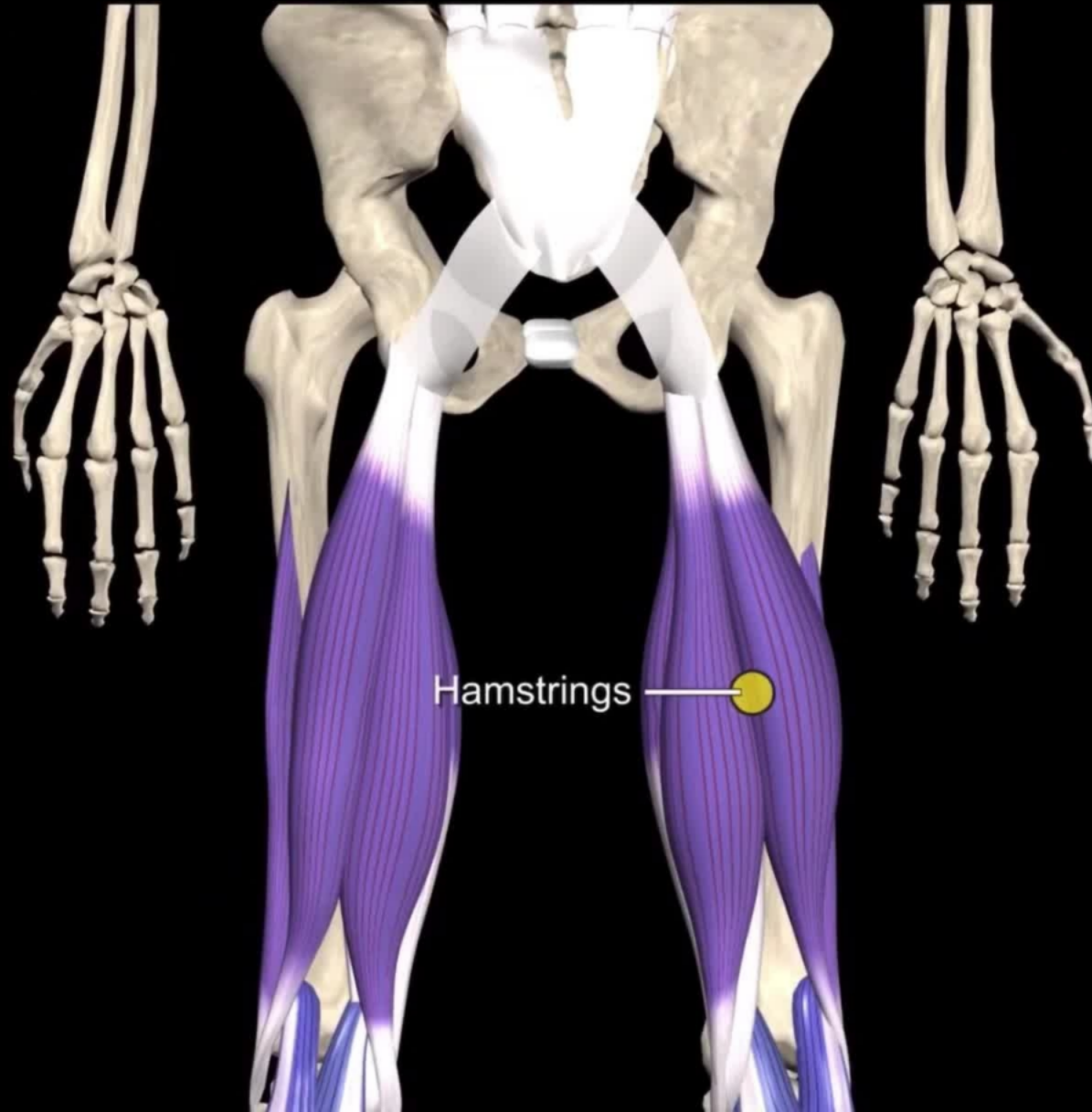
- Connects and protects the entire posterior side of the body
- Responsible for maintaining our upright, extended posture as well as movements in the sagittal plane
- When the knee is bent, the myofascial line functions in two pieces; toes to knees and knees to browline

## Key Structure

- Plantar fascia
- Achilles
- Tricep Surae
- Hamstrings
- Erector Spinae
- Occipitals







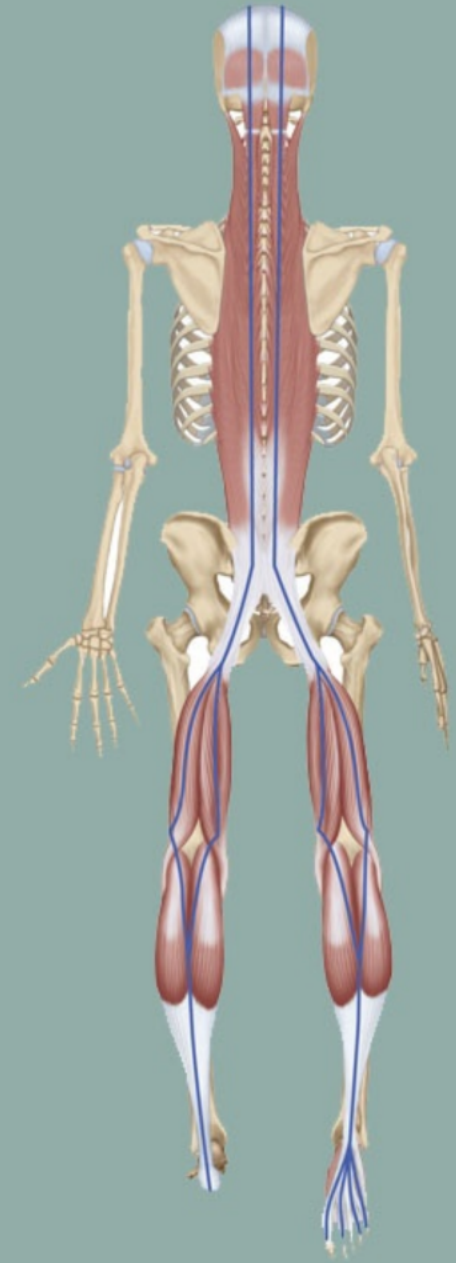
Video provided courtesy of  
**MUSCLE & MOTION**  
MuscleandMotion.com



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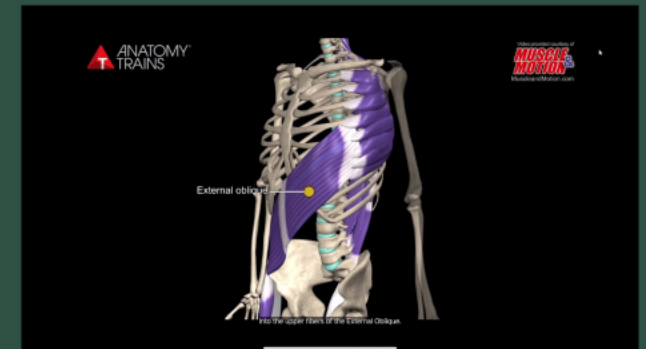
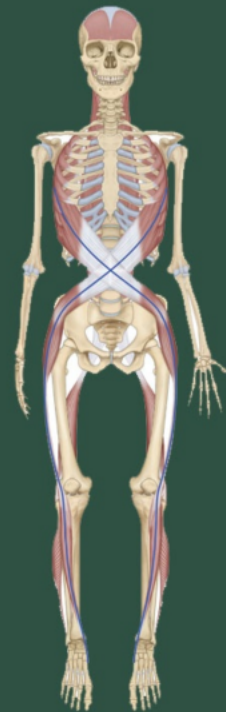


# Spiral Line

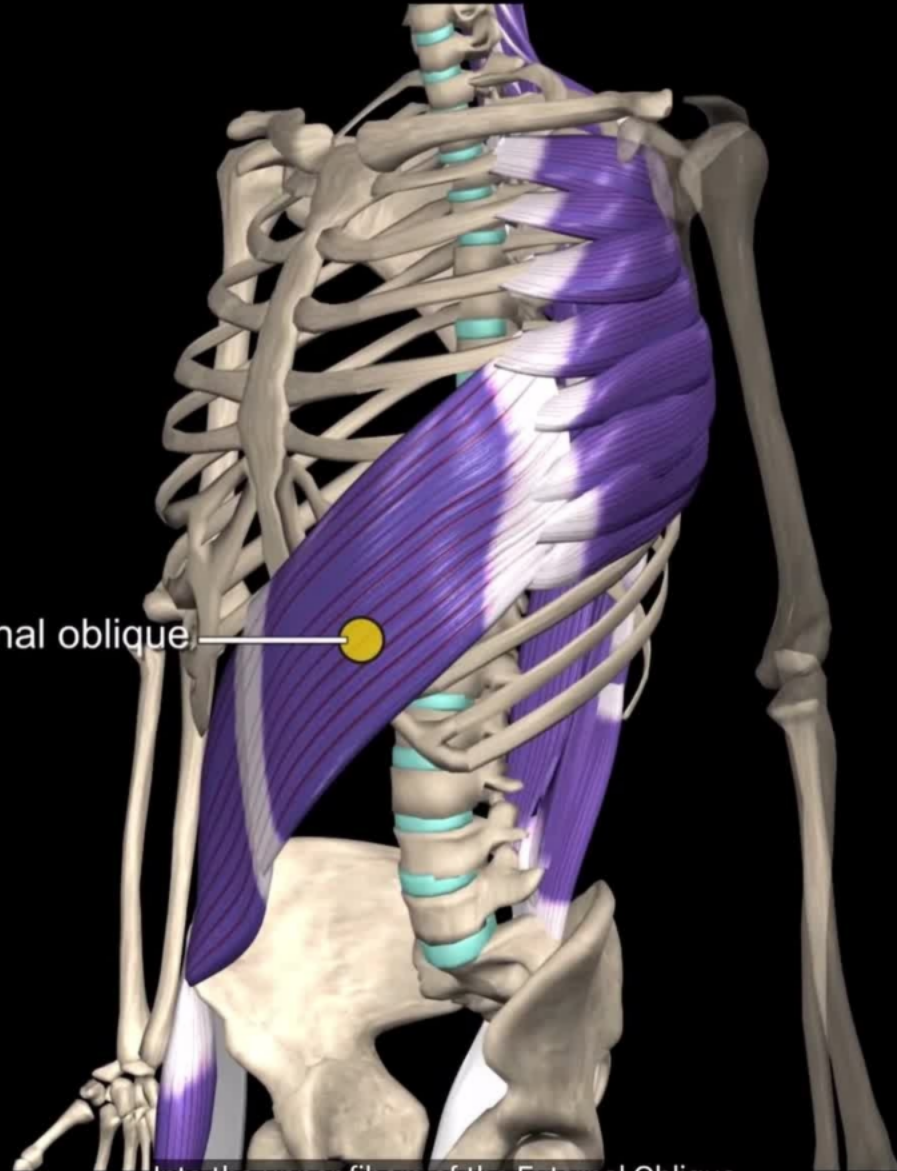
- Connects the foot arches with the pelvic angle
- Helps to determine efficient knee-tracking in walking/running
- Influences contralateral patterning across body

## Key Structure

- Rhomboids
- Serratus Anterior
- Oblique Track
- TFL
- Tibialis Anterior
- Peroneus Longus
- Bicep Femoris
- Peroneus Longus



External oblique



Into the upper fibers of the External Oblique.

- Connects the foot arches with the pelvic angle
- Helps to determine efficient knee-tracking in walking/running
- Influences contralateral patterning across body

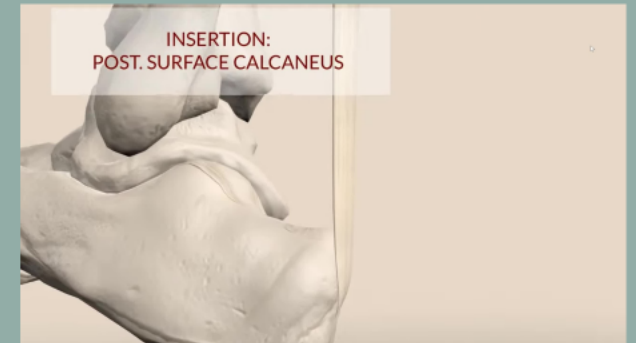
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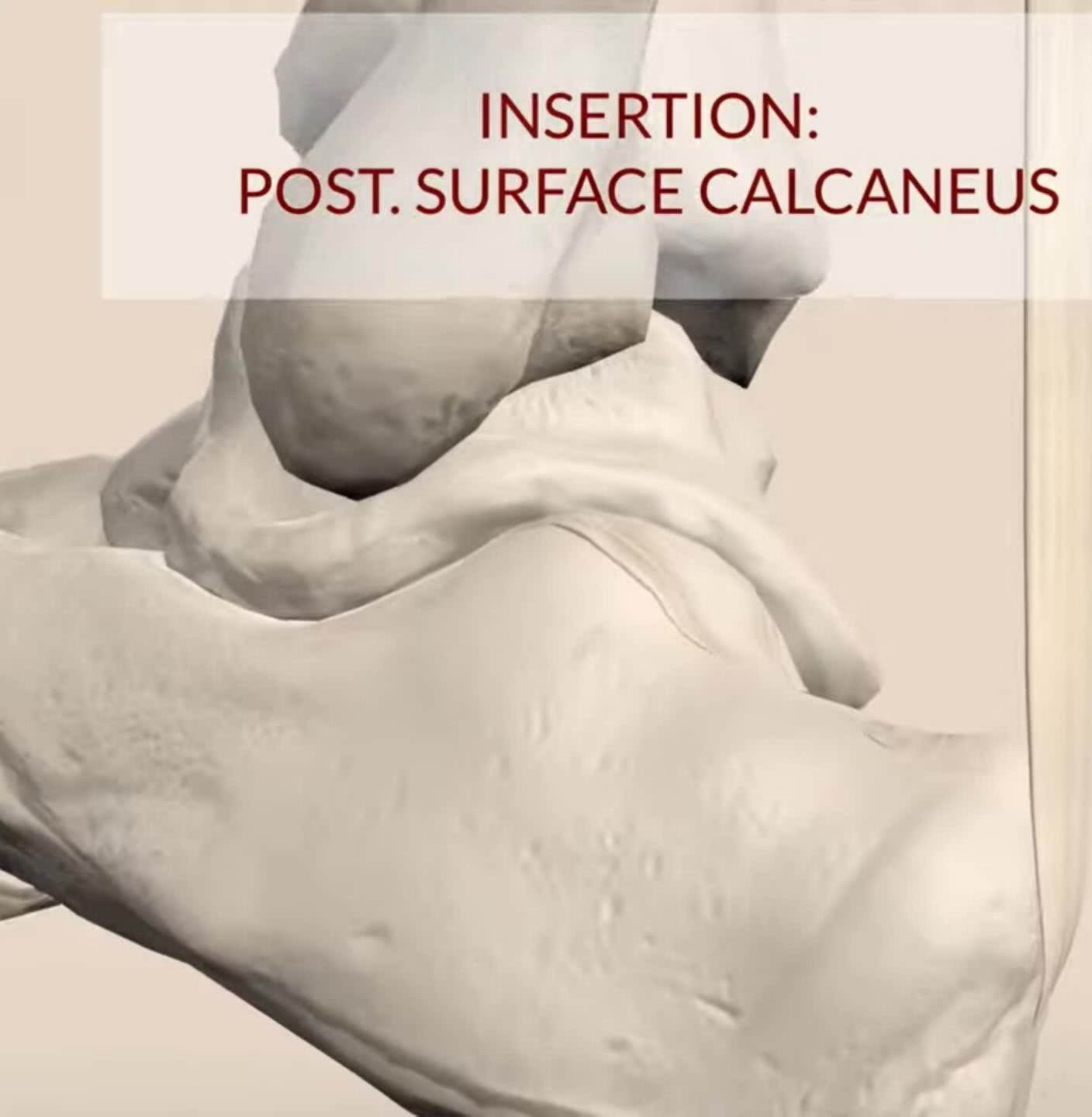


# Soleus

- Major contributor in walking / running
- Strong Plantarflexor
- Antigravity Muscles



**INSERTION:  
POST. SURFACE CALCANEUS**



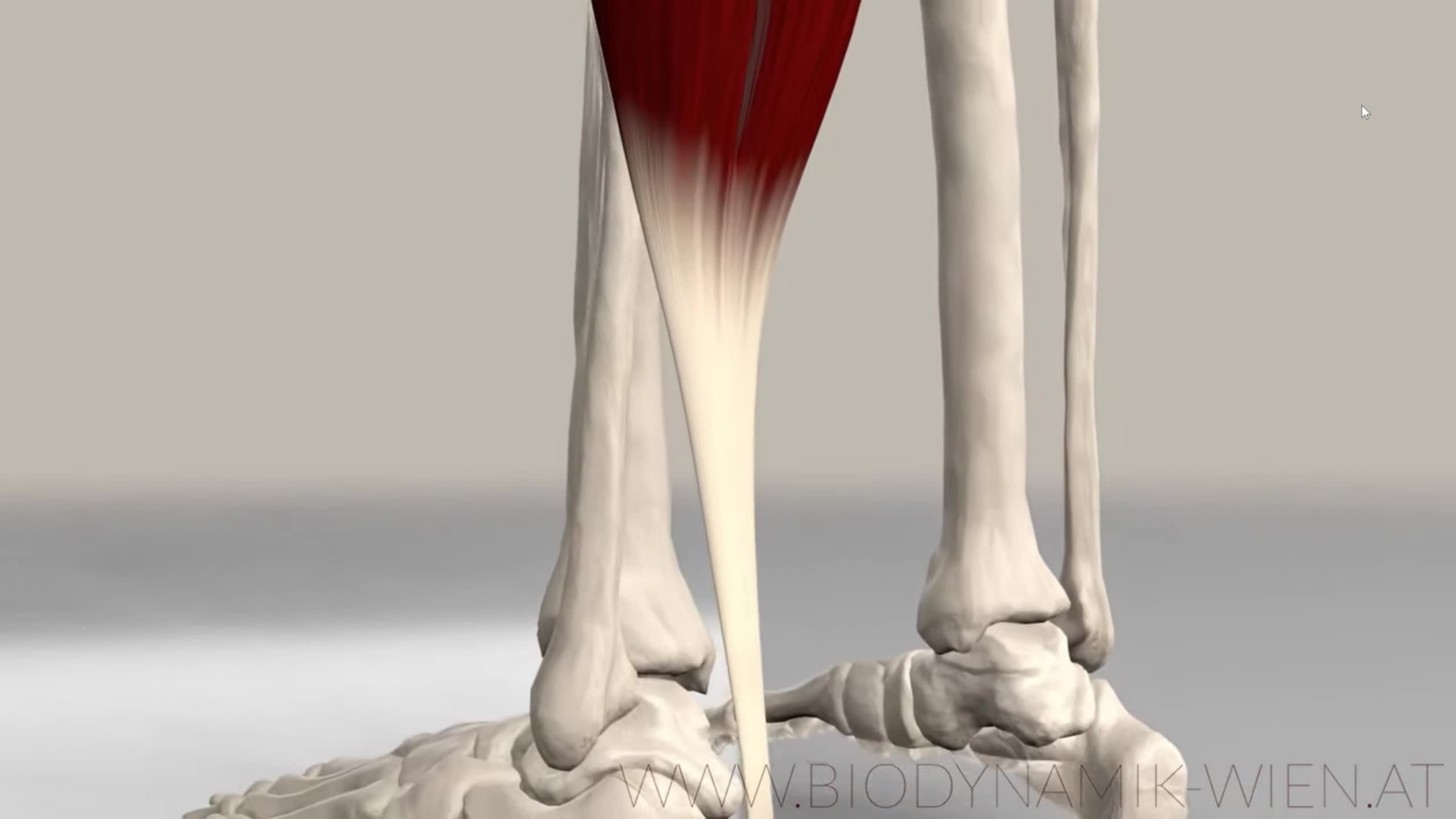
- Major contributor in walking / running
- Strong Plantarflexor
- Antigravity Muscles



# Gastrocnemius

- Plantarflexor of foot
- Flexor of the knee
- Force behind propulsion





- Plantarflexor of foot
- Flexor of the knee
- Force behind propulsion

# Plantaris

- Plantarflexor of the foot
- Flexor of the knee
- Provides proprioceptive feedback to CNS





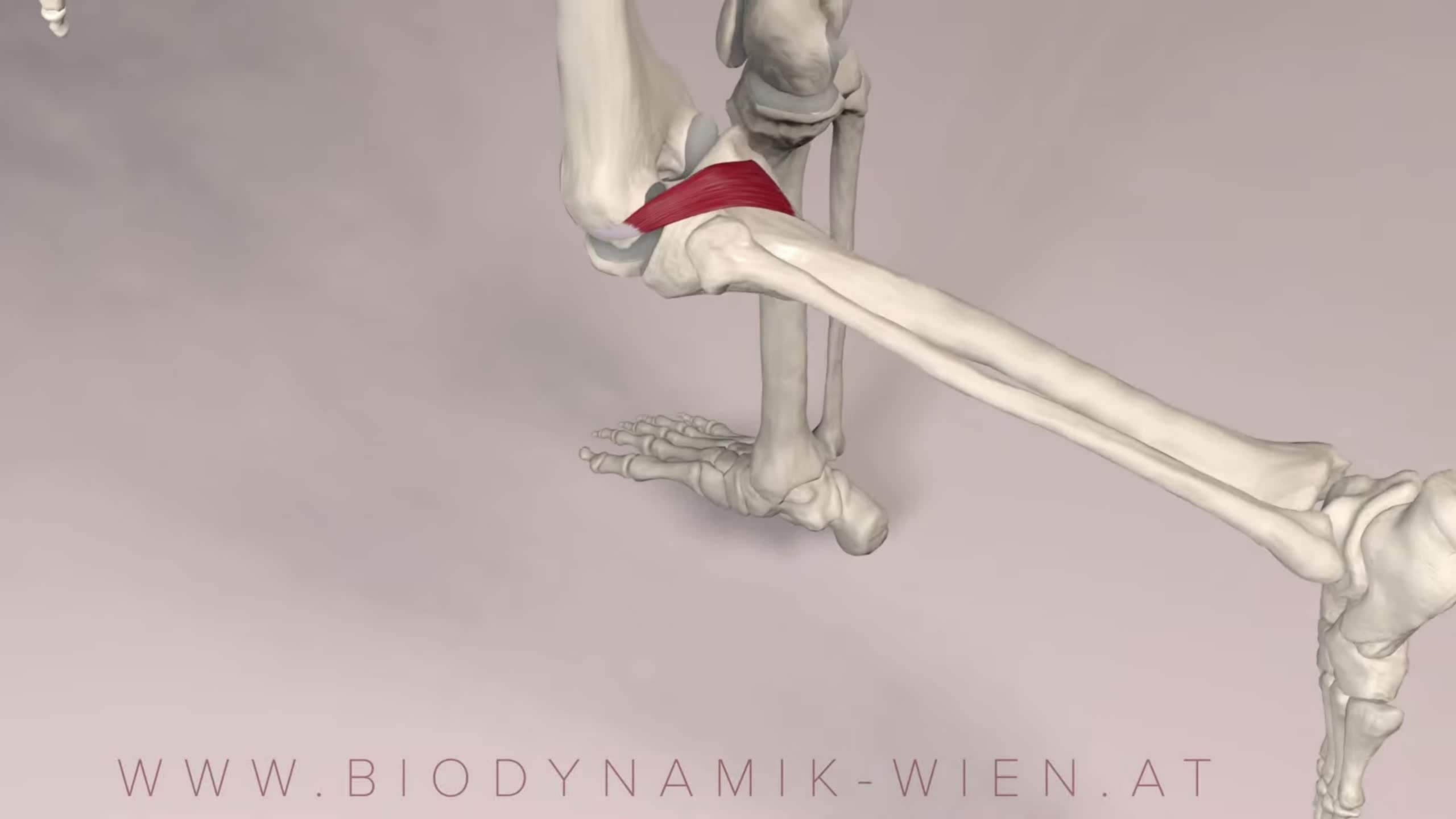
[WWW.BIODYNAMIK-WIEN.AT](http://WWW.BIODYNAMIK-WIEN.AT)

- Plantarflexor of the foot
- Flexor of the knee
- Provides proprioceptive feedback to CNS

# Popliteus

- Open Chain: Rotates tibia medially
- Closed Chain: Rotates femur laterally
- "Unlocks" the knee
- Connects to lateral knee capsule





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- Open Chain: Rotates tibia medially
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# Tying in all Together

<https://www.youtube.com/channel/UCAtYMiSEZA3-fK98m1LmVSA>



$F = ma$

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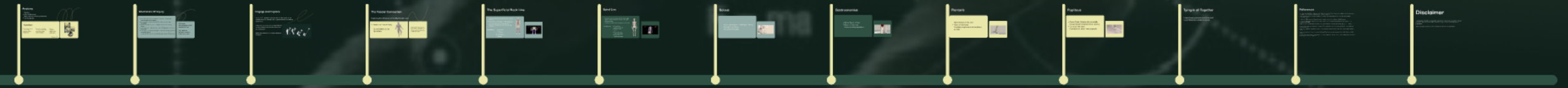
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