ANATOMY OF THE SKI RACER

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Why Study Anatomy?
What we will look at:

- Skeletal Anatomy
- Muscles
- Neuroanatomy
Skeletal Anatomy
Shoulder Girdle
Latissimus Dorsi
Knee
Ankle
Mercoledì volo... Libera

Ecco un buon motivo, una... per passare il mercoledì in Valle d'Aosta, in esclusiva per tutte le domenica!

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* Offerta valida per la stagione invernale 2011-12

Valle d'Aosta

www.lainnato.it
Pronation =
ankle dorsiflexion +
subtalar eversion +
forefoot abduction

Supination =
ankle plantarflexion +
subtalar inversion +
forefoot adduction
Muscle

Tendons

Bundle of muscle fibers

Connective tissue

Sarcolemma (plasma membrane)

Transverse tubule

Muscle fiber

Nucleus

Sarcoplasmic reticulum

Mitochondria

Z line

I band

M band
The diagram illustrates the structure of sarcomeres in skeletal muscle, showing the transition from relaxed to contracted states. The I bands remain constant in length, while the H band contracts as the muscle shortens. Key components shown include:

- **CapZ**
- **Titin**
- **Z-disk**
- **Myosin head**
- **Myosin tail**
- **Actin filament**
- **M-line**

The **CapZ** and **Z-disk** are critical components that anchor the myosin and actin filaments, respectively, facilitating muscle contraction and relaxation.
Muscle Length Tension Relationship

active insufficiency
passive insufficiency
Tension Types

- Concentric
- Eccentric
- Isometric
Concentric
Eccentric
Isometric
Neuroanatomy
Uh-oh!

A message is sent...
The message moves along a pathway.
Important Points:

- Hip flexion is desirable over spinal flexion.
- Pelvis and spine are essentially “one unit”.
- The hip flexes most in the sagittal plane.
- The upper arm is connected to the hip.
- Ankle motion for balance.
- Muscles shorten, lengthen, or stay the same length.
- Muscles are innervated with motor neurons.
Kinesiology: is the science of human movement. It focuses on how the body functions and moves.
Goals:

✓ Learn to think and describe movements in 3d space.
✓ Learn how the body moves.
Systems:

- bones
- joints
- muscles

The bones are linked by joints & moved by muscles.
Anatomical Position
So how does the body move?...
Discovering the 3rd dimension
3 Dimensions
3d, Planes: why is this important?
Sagittal Plane
Examples:
run, walk, jump
bow, kneel
arm swing, head nod

Flexion/Extension

Pressure Control Movements
Frontal Plane

Examples:
- jumping Jacks
- abduction & adduction
- trunk lateral flexion

Lateral movements

Edging Movements
Examples:
reorienting lower leg
looking left
do’in the twist

Horizontal Plane

Rotary Movements
Body movements

Anatomical Position
Body movements

Sagittal Plane

- Flexion & Extension
- Dorsiflexion
- Plantar flexion*
Body movements

Frontal Plane

- Abduction & Adduction
- Lateral Flexion
Body movements

Horizontal Plane

- Lateral & Medial Rotation
- Pronation & Supination
Pronation =
ankle dorsiflexion +
subtalar eversion +
forefoot abduction

Supination =
ankle plantarflexion +
subtalar inversion +
forefoot adduction
Practice Time...
Sagittal Plane
Sagittal
double pole?

Sagittal
Describing a Skier
1. How much leg abduction has occurred between the two images in the turn?

2. What is the hip flexion difference between the right and left?

3. How much arm adduction has occurred between this image and the gate contact image?

4. How much internal and external rotation is there in the femurs?

5. How much sagittal plane left and right arm motion has occurred from gate to gate?

6. What is the hip flexion difference between this image and the final image?

7. What is the knee flexion difference between the right and left? In absolute and relative amounts?
Questions?