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**Muscle Actions**

- **Muscle Action**—neuromuscular activation of muscle contributing to movement or stabilization
  - **Isometric**: Moment of force of muscle or muscle group (active and passive components) is equal to the moment of the resistance—negligible joint motion
  - **Concentric**: Muscle moment is larger than the moment of the resistance—whole muscle shortens
  - **Eccentric**: Muscle moment is less than the moment of the resistance—whole muscle actively lengthens, essentially acting as a brake

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*Slide by D. Knudson for educational use only*  
Knudson (2003)
Anatomy and its Limitations

- **Anatomy**—Study of the **structure** of the human body
- **Anthropometrics**—study of dimensions/properties of body

Decreasing Peak Force—Prospective ↓ in Injuries

*Slide by D. Knudson for educational use only*

*Hume & Potts (1999); Quarrie et al (2007)*
Multi-Segment Transfers & Passive Dynamics

Functional Anatomy should be used with **EXTERME** caution in multi-segment movements

*Muscles have acceleration actions on all segments of a linked segment system—joint forces transfer force/energy between segments (passive dynamics)

*Bi-articular muscles can create actions opposite of torque created

*Muscle actions best described as **synergies**

*Muscle action is task/goal dependent

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Qualitative Movement Diagnosis Model

- Four Task Model of QMD
  - Integrate knowledge from all subdisciplines of kinesiology, however biomechanics is most important in technique-centric activities
  - More holistic that superficial error detection-correction
  - Avoids “Paralysis by Analysis”

Watch the ball, bend your knees, that’ll be $20 please!

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Slide by D. Knudson for educational use only Knudson & Morrison (2002)