KIN 335 Biomechanics

Fall 2003

Instructor: Peter F. Vint, Ph.D.

TA : Young Kwan Kim (YK)

General information

- Office Hours
  - M, F 7:30-8:30 am in the classroom
  - by appointment
- Phone Numbers
  - Cell: 480-215-9614
  - Lab: 480-965-7528
- Web Page: http://www.public.asu.edu/~usavb/KIN335

On-line

- http://www.public.asu.edu/~usavb/KIN335
  - syllabus materials
  - updated calendar
  - lab handouts
  - practice problems
  - e-mail me with questions or problems
  - bonus assignments (perhaps)

Course overview

- Objectives
- Textbook and assigned readings
- Evaluation: 400 points
  - Three exams (including final): 100 pts each
  - Quizzes: 60 pts total (best 6)
  - Written lab assignments: 40 pts (10 pts each)
  - Any bonus points will be added to your earned point total

Grading

- Straight 90-80-70-60-below scale
- Penalties for late work:
  - 5% deduction per day for assigned work
  - 100% deduction for missed lab quiz
- Exam and quiz format
- Lab procedures

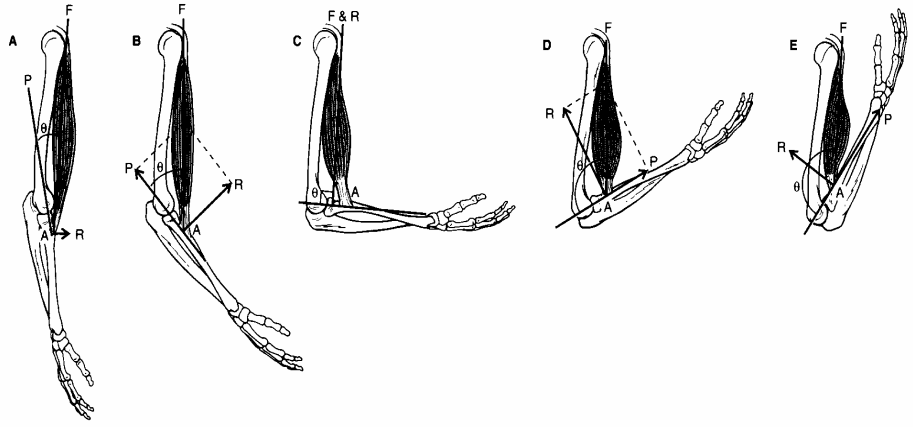
What is biomechanics?

- Bio = “life”
- Mechanics = “motion”
  - Kinematics: descriptors of motion
    - linear and angular displacement
    - linear and angular velocity
    - linear and angular acceleration
  - Kinetics: causes of motion
    - force
    - torque

Why study biomechanics?

- Improve performance
  - Technique analysis
  - Equipment design
  - Training
- Prevent injury and improve rehabilitation
  - Technique analysis
  - Equipment design

Example: Factors affecting “strength”



Example:
Technique analysis

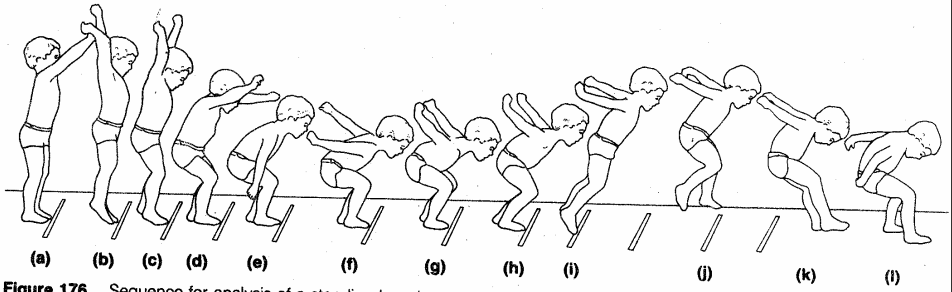
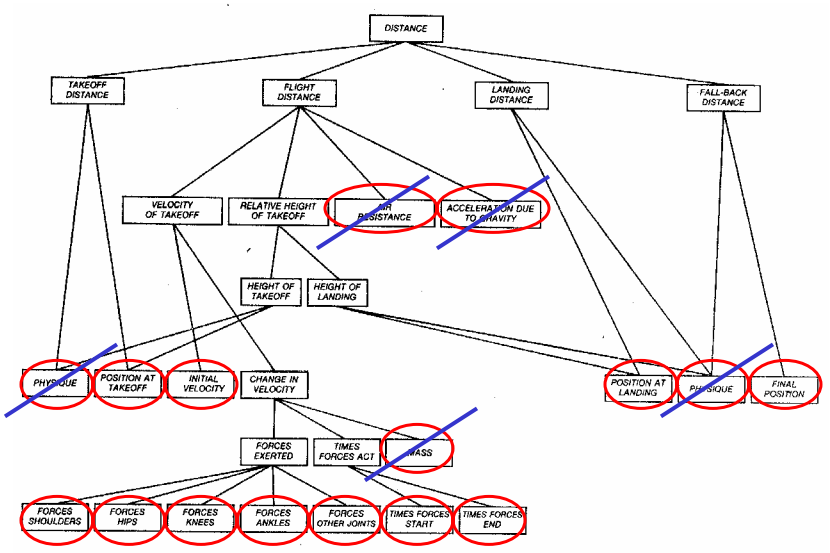


Figure 176. Sequence for analysis of a standing long jump.



Example: Long jump

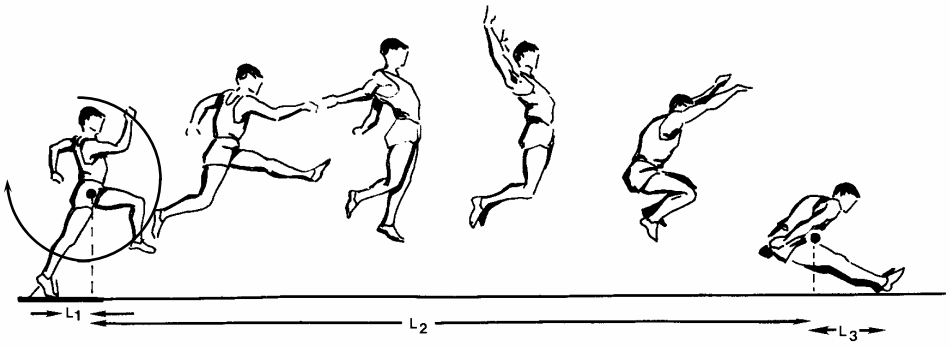


Figure 16-1. Contributions to the length of a hang-style long jump.

Amaze your friends!

- "…Important insights and tips into Plyometrics and POWERmetrics, as well as how quick and how high you jump are used to improve your efficiency of motion and decrease gravitational resistance."
- "…Arms and legs can *slightly* influence the direction of your center of gravity once you are airborne by kicking and swimming around to change your body position in mid-flight".

Nerd Quest

- Did Sammy Sosa benefit by corking his bat?
- Should all athletes attempt to reproduce the techniques of star athletes?
- Why do we have so many bi-articular muscles?
- What do the arms do when running, walking, or jumping?
- Can the effects of surgery be predicted before the operation?