Golf biomechanics and how 3-d motion capture can help physical therapists treat golfers for golf performance and injury prevention.

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Disclosure

- Lindsay Becker has no relevant financial relationship with the devices we discuss today.
- Jon Rhodes, sits on the advisory board of K-Vest Motion Interactive Inc. but receives no financial compensation for his role there or for discussing this device here today. He is actively involved with beta testing of new hardware for the company and as a result receives products from them at no charge.
Session Learning Objectives

• Understand the differences in 2-d swing analysis and 3-d swing analysis
• Understand the concept of swing efficiency and kinematic sequence
• Name the proper order of sequencing for an efficient downswing
• Describe the concepts of X-factor and X-factor stretch
• Describe how physical limitations can lead to swing inefficiencies.
• Be able to predict potential injuries based on graphs
Proposed Outline

10 min - Introduction to the material, 2-D analysis vs. 3-D analysis.

5 min - Understand and discuss 3-D motion capture basics including: Coordinate systems, right hand rule, reference frames, and 6 degrees of freedom vs. 3 degrees of freedom

5 Min - Review of Capture methods
  - Manual digitizing
  - Electromagnetic systems
  - Optical
  - Inertial sensors
  - Emerging technologies

15 min - Understand and discuss the Kinematic Sequence including the following:
  - Overview of kinematic sequence
  - Literature review of kinematic sequence
  - Calculation methods used to measure the kinematic sequence
  - Key parameters measured in the kinematic sequence
  - Examples of good and bad sequences
  - X-factor and X-factor stretch discussion
Proposed Outline

30 Min - Real life demo of a 3-D motion capture system
  Show ease of use
  Show how immediate feedback can benefit a PT and a patient
  Development of an exercise program using 3-D biofeedback

30 min - Practical applications
  Review of the common swing faults in golfers
  Review of how to identify those faults on a 3-d system
  How to read 3-d graphs and find the faults that will lead to injuries if not addressed and fixed.

10 min - Discuss the following: minimal power, segmental weakness, mobility
  Restrictions, proximal stability, poor mechanics, and moment of inertia

5-10 min - wrap up and questions.
References