Dynamic Biplane X-Ray System

ID 1554

Background

It is estimated that over 20 million Americans are plagued by the effects of osteoarthritis (OA) and that over 75% of the population will have radiographic evidence of OA by the age of 65, although only 50-60% of those will be symptomatic. As of today, there are no reliable and effective mechanisms available to detect OA in its early and potentially treatable stages.

Technology Description

This invention is composed of a system that facilitates examination of a subject using high-speed, three-dimensional (3D) motion at an extremely high resolution. The system enables examination of the subject on two different planes (bi-plane) which effects high speed 3D imaging of skeletal motion. These captured bi-plane images can then be used in combination with the information provided from computed tomography (CT) scans to reconstruct individual-specific joint motion.

Applications

• In-vivo assessment of joint function
  o Includes knees, hips, shoulders, spine, hips, ankles and feet
• Pre-op screening
  o Determines need for surgery after injury
• Predicts clinical outcome following surgery
  o Determines who will do well

Advantages

• Provides accurate measurement (+/- 0.1 mm) assessment and direct 3D visualization of dynamic joint function
• Can overcome the limitation of conventional gait or motion analysis

Stage of Development

• In vitro data, in vivo data, animal studies
• Prototype system constructed and fully functional

Provisional Patent Application Filed

Inventor
Scott Tashman, PhD
Department of Orthopedic Surgery
With the assistance of UPMC and the School of Medicine, the University of Pittsburgh has recruited Scott Tashman, PhD from the Henry Ford Hospital, Detroit, to build a new Orthopaedic Biodynamics Laboratory for computational evaluation of joint motion and function through the use of high speed cineradiography, which will allow in-vivo evaluations for knees, shoulders, spine, hips, and ankle and feet. Dr. Tashman brings an internationally recognized expertise in joint biomechanics using high-speed bi-planar radiography. Dr. Tashman’s work has been recognized by NIH research funding including a recent successful competitive renewal research proposal.

**Research Interests**

- Osteoarthritis
- Three-dimensional motion of joints and inter-bone distances
- Mechanics that guide and constrain the skeletal architecture of the human knee joint
- Biomechanics of abuse, misuse and trauma that results in cartilage damage and osteoarthritic joints

**Publications**


**Contact Information**

Brian Copple MBA
Technology Licensing Manager
Physical Sciences
412-648-2208
bcopple@otm.tt.pitt.edu

Office of Technology Management
200 Gardner Steel Conference Center
Pittsburgh, PA 15260
412-648-2206
www.otm.pitt.edu