Cleveland Clinic Innovations

Image-based Determination of Joint-Specific Movement Capacity and Motion Signature

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PRODUCT
Software for determining joint-specific movement capacity and motion signature.

INDICATION
Orthopaedics.

VALUE PROPOSITION
- Comprehensive, automated and highly efficient kinematic analysis of a joint including movement capacity and motion signatures.
- Individualized evaluation of a joint's movement bounds and movement patterns.
- Personalized diagnosis, prognosis and treatment planning.

DEVELOPMENT STAGE
Software tested at the Cleveland Clinic.

INTELLECTUAL PROPERTY
Patent Pending.

CONTACT INFORMATION
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UNMET NEED
Volumetric imaging (CT and MRI) is increasingly used in musculoskeletal care. Each joint has unique mechanics that affect mobility, capacity to withstand injury, pathological degradation, and recovery after an intervention. These mechanics can be characterized by metrics that describe different biomechanical states and functions of the joint. For example, "movement capacity" (the permissible bounds of motion) is an inherent property and an indicator of biomechanical stability and performance, i.e., how much the joint can move; and "motion signature" (habitual movement patterns) is an indicator of physical activity preferences and motion styles, i.e., how the joint does move. However, current experimentation and modeling strategies are neither practical nor comprehensive for determination of joint-specific movement capacity and motion signature to enable personalized diagnosis, prognosis and treatment planning.

SOLUTION
Cleveland Clinic investigators have developed a software for personalized quantified analysis of a joint based on CT or MRI images. The software produces joint metrics including movement capacity and motion signature that support personalized diagnosis, prognosis, and treatment planning.