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Biomechanics has become the leading method for assessment of movement pathologies. However, typical biomechanics assessment is limited to passive methods such as motion capture to describe motion and infer possible causes of the pathology. I believe that new methods of testing and assessment are needed to actively probe the biomechanics of an individual to understand the underlying causes of the pathology. Furthermore, these new methods can lead to better technologies for assessment and rehabilitation. We need to address the following issues in order to improve assessment and biomechanics technology.

RECOMMENDATION 1:

Develop technologies that provide systematic, repeatable methods for probing biomechanical responses.

Motion capture systems have become ubiquitous in biomechanics research and have significantly advanced the capabilities of clinicians and researchers. These systems provide a snapshot of the current state of an individual's movement pathology. In order to gain better insight into movement pathologies, I believe the next step is to develop technologies to actively probe the biomechanics on an individual during movements such as walking and reaching. To do so, new technologies are needed that can systematically perturb the biomechanics to gain a fundamental understanding of the nature of the movement pathology.

RECOMMENDATION 2:

Establish formalized testing methods and procedures for biomechanical assessment.

Technology alone is not enough to improve biomechanical assessment. New testing methods and procedures must be developed to determine the critical parameters for biomechanical probing. For example, individuals with gait pathologies are more susceptible to falls due to poor balance, muscle weakness, or other impairments. To determine the underlying cause of a fall, the individual's biomechanics can be probed through various means such as perturbing lateral balance, actively loading the individual systemically during the gait cycle, or other parameters. Additional research is needed to determine these critical parameters and how to systematically adjust them to assess movement pathologies.

RECOMMENDATION 3:

Foster translational research to improve assistive device design and biomechanical assessment tools.

Both assistive device design and biomechanical assessment tools can be improved through biomechanics research. I believe that we need to foster translational research that incorporates the results of fundamental research into device design. The effects of this are two-fold. First, better devices can lead to better patient outcomes. Second, better devices can lead to better assessment tools for researcher, which in turn lead to a better understanding of movement pathologies.

In summary, I believe that new technologies and methods for biomechanical probes are needed. The potential impact on biomechanics research and patient outcomes is significant. The biomechanics priorities conference is the first step in this process and I look forward to the opportunity to participate in this important meeting.