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Biomechanics research is an ideal field to lead innovation through multidisciplinary approaches. At its core, biomechanics blends knowledge of biological behavior and principles of mechanics. As such, many of the leaders in the area of biomechanics research are advocates and leaders in the area of cross-disciplinary research. Technical advancements in the area of tissue engineering, medical imaging and computational modeling have all opened new avenues of research to our community. However, with these new tools, it is imperative to remain focused and set key priorities for biomechanics research to ensure that we are building upon what we already know and moving towards a comprehensive assessment of the interrelationship of mechanics and biology.

RECOMMENDATION 1:
Determine and outline the normal response of biological tissues to normal mechanical behavior.
While some of this information is available, a comprehensive assessment of a wide variety of tissues, such as bone, muscle, cartilage, tendon, etc. to varying physiologic loading conditions remains lacking. Advancements in tissue mechanical property evaluation and quantitative imaging will allow for better behavior characterization. Building strong collaborations with investigators on the side of technology development will be important. Completion of a large database, accessible to the biomechanics community of normal biomechanics data will allow for cross-comparisons between institutions.

RECOMMENDATION 2:
Determine and outline the response of normal biological tissue to abnormal mechanical behavior and the response of diseased biological tissue to normal mechanical behavior.
Moving forward in a challenging funding climate, it will be imperative to demonstrate our ability to detect and monitor the response of abnormal biomechanics. Through investigations of the normal response to abnormal mechanical behavior, such as unloading in the case of space flight, or normal mechanical behavior in diseased tissues, such as analyzing ground reaction forces during running is subjects with recurrent stress fractures, the biomechanics community has the tools and breadth of knowledge to take large strides forward in these areas over the next decade.

RECOMMENDATION 3:
Evaluate our ability to intervene on the disease process through biomechanically-based prevention and rehabilitation strategies.
Understanding the biomechanical determinants of tissue adaptation, both beneficial and detrimental, is critically important. However, exploration of these findings through translational, multi-disciplinary investigations into disease prevention and rehabilitation must remain a top priority. There is great potential to reveal important findings regarding the impact of biomechanical variables on pathogenesis and disease progression. We must strive to remain focused in our efforts to combat disease. Our input will be a critical piece of the puzzle toward intervening on numerous orthopaedic and neurologic pathologies.

In summary, I believe we are entering exciting times for the biomechanics community. Numerous advancements in technology have opened the doors for profound investigations into disease prevention and rehabilitation. Our unique contribution to the understanding of the relationship of biological systems and mechanics will be invaluable moving forward in translational efforts. However, to maximize our potential, we must come together and establish core priorities to focus our efforts over the upcoming years.