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Background

A popular concept describing the process of translating basic research to clinical practice refers to a “Valley of Death”, which refers to a “virtual chasm” describing the “gigantic leap” required to take techniques, prototypes, or analyses that work well in a research institution and implement them as commercial products available to a clinic. Many have argued that there are two "Valleys of Death" associated with the translation of concepts from Basic Research to Clinical Practice, and it is this division of the concept that I will expand upon.

The first "Valley of Death" is the translation of ideas from basic research to clinical research. Often the tools used in basic biomechanical analysis of the musculoskeletal structure are not available to clinical researchers in their original form. My group has made modest progress in helping to bridge the gap in taking advanced analytical techniques that are common to biomechanics research and making them available to clinical research without “dumbing down” the analyses.

My group has tackled this issue through the technology transfer of biomechanics software from the NIH (MOVE3D) to our commercially available Visual3D software. During the 12 years of evolution in Visual3D we have recognized that it is imperative that industrial partners be intimately associated with the evolution of this translational process because consistent and continued education and delivery of analytical "tools" are essential to bridging the gap between basic biomechanics research and clinical research.

Despite the challenges of bridging this first "valley of death", it is the easier crossing. The second “valley of death” refers to the delivery of specific, verifiable, documented processes aimed directly at specific clinical applications. The biomechanics community has only made baby steps into standard clinical practice.

Objectives

Develop processes for documenting the procedures for the collection, analysis, and representation of data using language that can be communicated precisely to colleagues from different disciplines.

Encourage the synthesis of clinical research into clinical tools that can be used by competent, but not necessarily expert users. I assume that the tools used in the research laboratory are unlikely to be suitable for use in the clinic. The result is that new clinical tools must be developed that are effectively surrogates of the research tools generating data that correlates with the rich research data sets, but is cost effective, deliverable commercially, and practical in the clinical.

Recommended Actions

Develop public formats for the descriptions of models of biomechanical structures and a mapping of these structures to recorded motions.

Develop public formats for describe the processing of data as an audit trail, so that all public data contains a description of its history.

Develop secured public databases that allow extensive data mining capabilities, and encourage the community to populate these databases when the data was collected using Federal Funds.

Foster the incorporation of the NIH Toolbox, and PROMIS databases.