A.S. Macdonald, D. Loudon, P.J. Rowe. Visualisation of biomechanical data to assist therapeutic rehabilitation. Gerontechnology 2010. **Purpose** The biomechanics community have to date had limited success in communicating complex biomechanical data and analyses outside of their field. The authors have created an innovative prototype software tool to visualise objective dynamic movement data captured from older adults undertaking activities of daily living (ADLs). Evaluation of this tool has shown it to be a successful way of communicating the complexity of older adult mobility data in an accessible manner for non-biomechanical specialists and lay audiences[1,2]. **Methods** A software tool was developed, which generates a 3D animated human 'stick figure', on which the biomechanical demands of ADLs are represented visually at the joints as a percentage of each individual's maximum capability using a continuous colour gradient from green at 0%, amber at 50%, through to red at 100% (Figure 1). The tool was evaluated using a qualitative methodology of interviews and focus groups, where older adults and professionals viewed a series of visualisations of dynamic movement data[3]. **Results and discussion** Analysis of focus group discussions facilitated by the visualizations revealed new kinds of dialogues about biomechanical issues. The method of visualising and presenting the data clearly enabled people without training in biomechanics, both professionals and lay older people, to access and interpret the biomechanical information, based on their background, knowledge of a field or their personal experience. Further, the common visual medium enabled the sharing of different insights without recourse to specialist terminology or knowledge. New kinds of dialogues occurred in focus groups between older people and professionals about their experiences, based on real understanding of where the mobility problems were occurring. New dialogues also emerged between professionals from a range of different disciplines, crucial for different aspects of the care, wellbeing or design of the built environment for older people. Neither of these would have been possible using current conventions of presenting biomechanical data. The visualisations also appear to allow a deeper understanding of the issues within professions, both in healthcare and in design. These findings have led to new research with five discrete yet complementary studies covering a range of clinical applications of this method for: i) mobility and exercise advice for the healthy older adult; ii) falls prevention; iii) rehabilitation of total knee replacement; iv) to enhance early mobilisation of acute stroke patients and v) to enhance biomechanical diagnosis and fitting of ankle foot orthoses (AFO) in late stage stroke.

References

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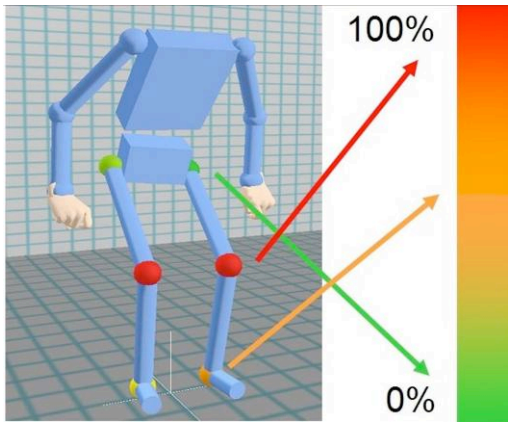

Figure 1. Still frame from visualization tool showing biomechanical demand as a percentage of each individual's maximum capability using a continuous colour gradient from green at 0%, amber at 50%, through to red at 100%