*Biofeedback*

AS-0125

**DEVELOPMENT OF A BESPOKE MOTION CAPTURE SYSTEM ALLOWING REAL-TIME BIOFEEDBACK OF MOVEMENT FOR USE IN THE CLINICAL ENVIRONMENT.**

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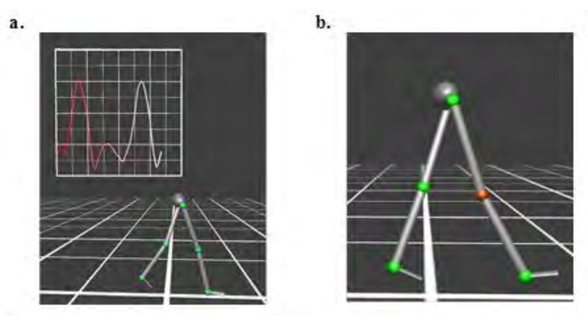
**Introduction and Objectives:** The feedback of information to patients in the clinical environment is a key aspect to achieving a desirable outcome following a treatment intervention[1]. Biofeedback may be provided in many different ways. It has been suggested that providing patients with augmented visual feedback may have a positive effect on functional outcomes[2]. One of the easiest ways to provide this type of feedback is through motion capture technology. However, a high level of technical expertise is often required to operate motion capture systems and distil useful information from the results. Further, feedback to patients is limited by the technical nature of such systems and the data that they provide. This has limited their widespread use in the clinical environment to date[3,4]. The current study aims to develop a motion capture system which overcomes these issues and is capable of providing biofeedback to patients and clinicians in a clear and accessible manner.

**Methods:** A bespoke pelvis and lower limb cluster marker set combined with strategically placed anatomical markers was designed and implemented. Marker trajectory data was captured and labelled using Vicon hardware and acquisition software (Vicon Motion Systems, Oxford, UK). This data was streamed in real-time to an object-orientated application development package, D-Flow (Motek Medical, Netherlands). Bespoke scripting modules written in Lua programming code were used to create an avatar from tracked markers and calculated joint centres. The method described by Grood and Suntay[5] was used to calculate inter-segmental kinematics (figure 1). A colour coded joint system was developed to allow real-time feedback regarding hypermobility and pathological movements (figure 1).

**Results:** A biomechanical model was developed which removes an aspect of the technical inaccessibility of current commercially available motion capture systems. The model allows output of kinematics and visual feedback of movement to the patient and clinician. Currently, flexion/extension, internal/external rotation and ab/adduction angles can be displayed for all joints. Shank/thigh to vertical angle and pelvic, tilt, obliquity and rotation can also be displayed.

**Figure 1.** Biofeedback during walking. **a.** Avatar and knee flexion angle **b.** Hyperextension of the knee causes joint to turn red.



**Conclusion:** The need for technical expertise in motion capture is greatly reduced with the use of this model. Cluster markers reduce the need for accurate marker placement and visualisation and data feedback can be given in real-time. The use of real-time biofeedback will hopefully lead to increased patient understanding and an improved clinician-patient dialogue.

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**Disclosure of Interest**: None Declared