ANALYSIS AND VISUALISATION OF SHOT PUT USING ROTATIONAL TECHNIQUE

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INTRODUCTION: The aim of the present project is to develop methods to analyse and visualise a shot put using a rotational technique. Trainers and athletes will benefit from this, by allowing them, in collaboration with the researcher, to obtain data that is pre-processed and easily understandable. In our opinion, one of the major problems in using biomechanical analyses in elite sports performance optimization is the translation of the recorded data to athlete-specific guidance. The solution in this study includes a full-scale animation of the athlete's performance combined with quantification of selected parameters.
Optimising performance in this type of movement is a combination of both physiological and technical factors. The physiological factors are related to muscle function and overall physique of the athlete and is mainly altered by strength training. The technical factors are more diffuse; overall, the athlete should use the optimal movement pattern given his or her mechanical capacity.

METHOD: One subject was analysed, an Olympic athlete with a mass of 135 kg and a height of 1.83 m.
An 8 camera opto-electrical video system was used to determine the position of 40 markers placed on the subject (Qualisys Medical AB, Göteborg, Sweden). The markers were placed in order to enable a full-body 3D kinematical analysis using Visual3D (C-motion, Inc., Rockville, USA). Before the actual measurement, a standing trial was recorded, with 12 additional markers. The position of the joint centers segments were obtained by combining the data from the standing trial with the position of the markers during the measurement.
Knowledge of the position of each segment during the movement enables an animation of a model. A model was built using Blender (Open Source Software, Blender Foundation, Amsterdam, The Netherlands), in which the surface of the model resembles the athlete, i.e. it was built from static photographs of the athlete.
The model is to be animated in full-scale in a panorama cinema (a stereo-scopic 3D 150° display cinema). The trainer and athlete will then be able to view the recorded motion from any angle and at any speed. This can be combined with graphs of selected data.

RESULTS: As this is "work in progress", no progressed data is yet available. At the conference in Salzburg, we will present the visualisation and analysed data.

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