Quintic Biomechanics

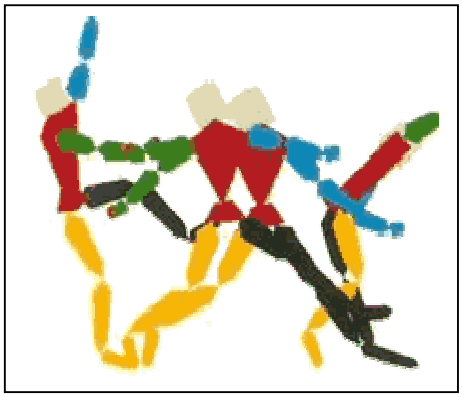
What is Biomechanics?

The word 'biomechanics' is derived from the Greek bios meaning life and mekhaniki meaning mechanics, so that biomechanics may said to be the study of the mechanics of life forms. The extent of this subject area is evident in research of plants, insects, reptiles, dinosaurs, birds, fish, whales, elephants, kangaroos and humans. In the biomechanics of humans, topics range from the mechanics of bone, tooth, muscle, tendon, ligament, cartilage, skin, prostheses, blood flow, air flow, eye movement, joint movement to whole body movement. In human movement biomechanics, topics include injury, clinical assessment, rehabilitation, ergonomics and sport.

Sports biomechanics uses the scientific methods of mechanics to study the effects of various forces on the sports performer. It is concerned, in particular, with the forces that act on the human neuromusculoskeletal system, velocities, accelerations, torque, momentum, and inertia. It also considers aspects of the behavior of sports implements, footwear and surfaces where these affect athletic performance or injury prevention. Sports biomechanics can be divided up into two sections:

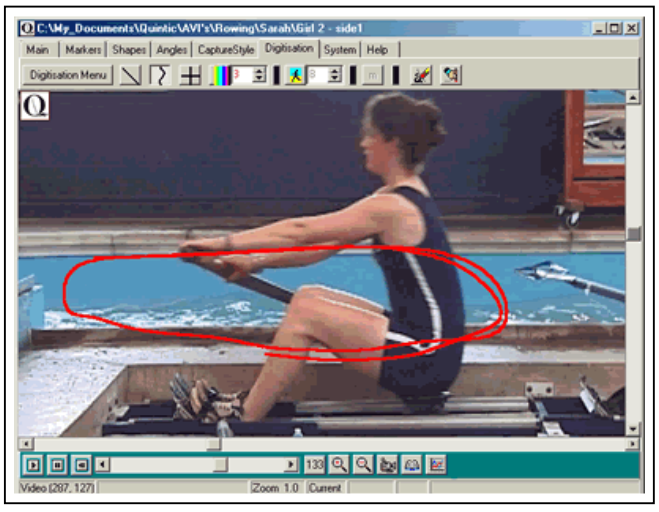
Performance Improvement & Injury Prevention

With the help of Quintic, we aim to provide answers to performance related topics. What is the best run-up for a high jumper? How should they knee angle be modified for the delivery stride of a fast bowler in cricket? What is the velocity of the swimmer after the tumble turn? These questions are of the form: What is done? How is it done? Why does it work? The answers to What? How? and Why? are important to the athlete, coach and scientist, respectively...



"Biomechanics is the science concerned with the internal and external forces acting on a human body and the effects of these forces..."

Example of Quintic Biomechanics in Rowing:



From video footage of rowing tank training, the Quintic software enabled techniques of different rowers to be analysed and compared. Further to that, the Quintic Biomechanics enabled the velocity of the oar handle to be monitored and compared for the different rowers.

The figure above shows a Quintic trace of the oar handle through 2 strokes. The analysis program calculates velocities and accelerations along this line which can be directly analysed. The velocity and

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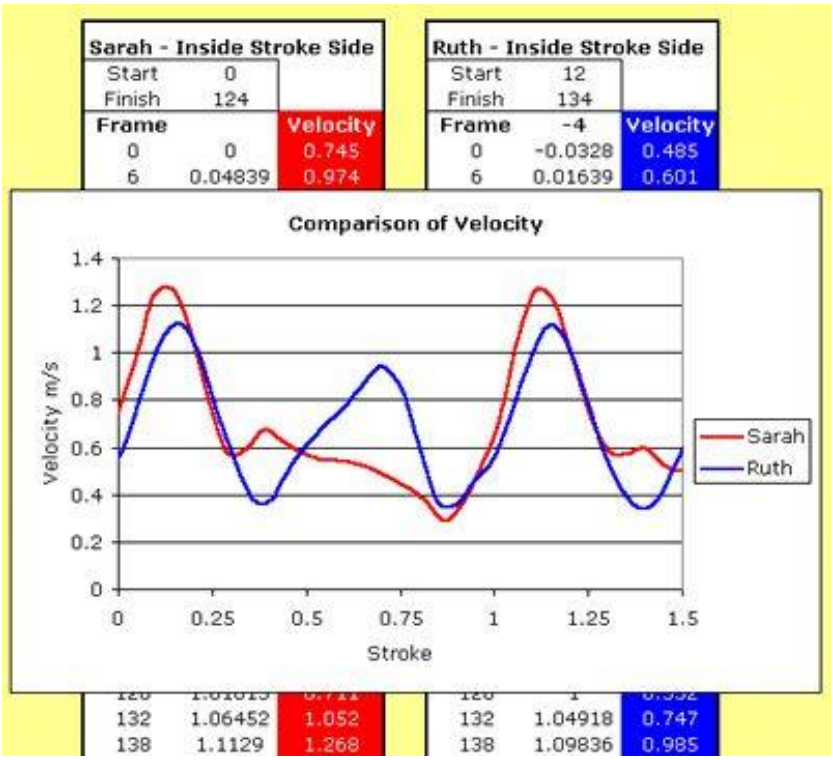
acceleration data displayed in the analysis program can be exported into a spread sheet. This allows a more detailed and specific analysis to be conducted.

The figure below shows an example of this. Two velocity traces of two different rowers, working at different stroke rates are compared below. The velocity traces are shifted in time so that the beginning and end of each stroke coincides. This enabled the direct comparison of velocity and acceleration. The velocity graphs below, generated from the Quintic Analysis program, show the higher speeds generated by Sarah in the driving phase of the stroke, and the significant difference in the velocities in the return phase.



For further information regarding biomechanics please contact:

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