Device and Process to Aid in the Interpretation of Force Plate Data

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EXTENDED ABSTRACT

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Biomedical engineers use force plates for the analysis of moments and forces generated through motion. The interpretation of data received from the force plate requires that the user have a clear understanding of how the force plate is oriented relative to the forces that are being applied. If the plate is in an assembly or has been rotated for maintenance or another experiment, there is no precise way for an inexperienced user to check this. The purpose of this project was to develop a device and a process to help users understand the orientation of the force plate and to interpret the results. The device must provide users with both static and dynamic forces in the x-, y-, and z-planes as well as moments about the x-, y-, and z-axes.
Procedure:
The procedure used in this experiment was to first assemble a quadrapod for use in testing the force plate. A weight will be suspended from the center of quadrapod. For the force plate, the simulation of the force is read from the plate into the computer and then is output by the simulation program. This weight can then be swung in x-, y-, and z-planes as well as combined planes and rotated in clockwise and counter-clockwise directions. For the force plate, the simulation of the force is read from the plate into the computer and then is output by the simulation program. This data can be understood in two ways: the basic change in force on the plate as force components of the x,y,z coordinate plane, and more specific changes in force due to acceleration, velocity, and angles involved in the motion of the weight. The module is designed to allow a beginner to progress from the first type of data to the second, which is more useful for researching.
Future work on this experiment would be to design a full biomechanics assembly of modules and devices that would act as introductions into measurement sensors and simulations.