better underwater accuracy than all previous papers reported in literature. Both methods provided similar and highly accurate results, providing promising alternatives for underwater 3D motion analysis.

**KEY WORDS:** nonlinear camera calibration, 3D underwater analysis.

## Poster Presentations

P11.1 - ID 488

### CONSTRUCTION AND CALIBRATION OF A LOW-COST FORCE PLATE FOR HUMAN BALANCE EVALUATION

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Force Plates are dynamometers instruments extremely useful in biomechanical evaluations used for gait and balance assessment, also used for jump height measure, for example. There is a shortage in Brazilian market of products with affordable prices and quality resolution for professionals, which makes necessary to develop force plates with lower cost. The scope of this study was to build a low cost force plate, proposed a calibration procedure for stabilometric assessment based in strain gauges. We conclude that the characteristics of the instrument compared to other systems developed and reported in the scientific literature, are within the values found for sensitivity in the state of art of this field of knowledge.

**KEY WORDS:** Force plate, human balance, instrument calibration, dynamometry, stabilometry

P11.6 - ID 411

### VALIDATION WITH videometry OF AN INTEGRATED SYSTEM TO assess horizontal intra-cyclic velocity with a mechanical speed-meter

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The aim of this paper was to: validate an integrated system (i.e., software application and hardware after calibration) to assess human's horizontal intra-cyclic velocity with a mechanical speedo-meter. System validation was done for a set of land-based human locomotion techniques (from slow walk to maximal running) in four subjects and comparing it with a videometric system (i.e. APAS). There were no significant differences between pair wise data (speedo-meter versus APAS data) using student's t-test for both velocity coefficient of variation and maximal velocity. Linear regression models were very high for both the velocity coefficient of variation and maximal velocity. More than 80% of the Bland-Altman plots were within 1.96 standard-deviations.

**KEY WORDS:** validate, evaluation, instrument, speed fluctuation, locomotion

P9.10 – ID 393

### RELATIVE JOINT MOMENT CONTRIBUTION TO THE POWER GENERATED IN A MARTIAL ARTS KICK – INFLUENCE OF SKILL LEVEL

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The purpose of this study was to analyse whether athletes of different skill level present different relative joint moment contributions to the power generated in a martial arts kick. This investigation was carried out using the induced power analysis, a method based on the dynamic coupling inherent to multiarticulated systems. The comparison was done among three male karatekas, considered to be experienced, intermediate and novice. The results show that the hip extension moment was the major contributor in the production of mechanical energy in the kicking foot at impact. Similarly the hip internal rotation and ankle dorsiflexion moments worked to build up the foot's energy for most of movement. The experienced athlete seems to benefit more from these by potentiating the moments produced in these joints.

**KEY WORDS:** induced power analysis, roundhouse kick, karate, biomechanics.

P11.8 – ID 456

### WALKINSENSE VALIDATION: PRELIMINARY TESTS OF MOBILITY PARAMETERS

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The purpose of this study was to perform a preliminary validation of a new electronic instrument for human movement and performance assessment in sports. Measurements of distance, walking speed, step length and frequency were acquired, for a small sample of 15 subjects in a track of 10 m length, and compared to reference data. Results show good repeatability and data agreement across several trials at three different self-selected walking speeds.

**KEY WORDS:** gait parameters, repeatability, measurement agreement.