EVALUATION OF PHYSICAL PERFORMANCE IN SURFSKATING

Anastasia Kulikova\(^1\), Miguel Sanches\(^3\), Márcio Borgonovo-Santos\(^2\,4\)

1 Institute of Sport and Exercise Sciences, University of Münster, Horstmarer Landweg 62, 48149 Münster, Germany
2 Bio Boards Surf Skate Ltda, 4450-718, Porto, Portugal
3 Riedel Communications GmbH & Co. KG, R&D Hub Portugal, 4450-718 Porto, Portugal
4 Centre of Research, Education, Innovation and Intervention in Sport (CIRF2D), Faculty of Sport and Porto Biomechanics Laboratory (LABIOMEP-UP), University of Porto, 4200-450 Porto, Portugal

BACKGROUND

Olympic movement arises interest in physical performance in surfing considering specific demands of sport and applying technologies for athlete’s evaluation. Surfskating naturally replicates surfing movements and shares the same fundamental abilities, skills, and movement patterns as surfing. Surfskate could be a valuable training tool to improve surf technique any time of the year.

OBJECTIVES & METHODS

1. Identify practitioner’s performance level by extracting key performance indicators (KPI) through time-motion analysis and kinematic analysis
2. Characterize surfskate maneuvers
3. Automatic maneuver recognition with kinematic data

Equipment:
- Surfskate Moon (Bio Boards™, Portugal)
- System acquiring information on the kinematics
- Video camera

Methods to identify KPI:
- Time-motion analysis of time demand on movement patterns (duration, frequency, and ratio)
- Analysis of kinematic data (acceleration, velocity, displacement, Euler angles)

GROUPS OF LEVELS

The initial selection was based on the number of completed tasks and mistakes*:
- **Level I**: beginners; could complete only two tasks: “Step up” and “Pumping”
- **Level II**: more experienced participants in surfskating; completed all three tasks: “Step up”, “Pumping” and “Snap frontside and backside” but the last one with poor technique in most cases
- **Level III**: more advanced participants; completed all three tasks and for “Snap backside and frontside” had a correct technique in most trials

* falls, loss of balance, the maneuver was not completed, fails to execute the maneuver

PRIMARY RESULTS OF TIME-MOTION ANALYSIS

- In task “Step up,” the initial movement pattern “Place foot on the skate” is associated with the level of expertise, as more advanced participants spend less time on this activity
- In task “Pumping”, the duration of the movement pattern “Pumping” increased with the level of expertise
- In task “Snap frontside and backside,” the presence of “Post snap phase” and its longer duration are associated with a higher level of performance
- All mentioned above movement patterns could be considered as KPI

\(^{1}\)Institute of Sport and Exercise Sciences, University of Münster, Horstmarer Landweg 62, 48149 Münster, Germany
\(^{2}\)Bio Boards Surf Skate Ltda, 4450-718, Porto, Portugal
\(^{3}\)Riedel Communications GmbH & Co. KG, R&D Hub Portugal, 4450-718 Porto, Portugal
\(^{4}\)Centre of Research, Education, Innovation and Intervention in Sport (CIRF2D), Faculty of Sport and Porto Biomechanics Laboratory (LABIOMEP-UP), University of Porto, 4200-450 Porto, Portugal

Fig 1. Mean proportion of total time spent on different activities in the task “Step up” among groups.

Fig 2. Mean proportion of total time spent on different activities in the task “Pumping” among groups.

Fig 3. Mean proportions of total time spent on each phase of maneuver “Snap backside” among groups.

anastasia.kulikova@uni-muenster.de