THE INFLUENCE OF ARTICULAR SURFACE GEOMETRY OF FEMORAL CONDYLES ON CONTACT PRESSURE DISTRIBUTION

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The objective of this study is to determine the changes of the load on the femoral condyles, depended on the geometry of the articular surfaces. On this purpose MRI scans of 18 individuals (6 females, 12 males) were used (age 41.55±12.8 years, min 17 max 63 years). The subjects had no complains about chronic pain of the knee joint and underwent the MRI scan after an acute injury which did not affect the articular surface. The distance between the slices was 2.5mm. They were digitized and by the use of a computer program (TableCurve3D) the best fitting equation was found. The accuracy ranged between 0.99 and 0.97. In respective parts of the surfaces the applied load was compared. The applied force was assumed to be of the same magnitude and direction in all cases. The force was resolved in three components (normal and tangent to the articular surface). The resolution is a function of the angles formed between the tangent plane and the direction of the applied force. The analysis revealed an increase up to 8% of the normal component in respective parts of the articular surface, which indicates that the cartilage is more loaded. The results of this study can be applied on the prediction of the degeneration of the articular surface.

ELECTROMYOGRAPHIC ANALYSIS OF THE DOMINANT UPPER LIMB DURING THE GOLF SWING

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Purpose: The identification of neuromuscular patterns is an important cue for the management of muscular development, skill improvement and injury prevention. The main purpose of the present study was to characterize muscular coordination patterns in the dominant upper limb in the different phases of golf swing in experienced golfers.

Methods: Three low-handicap golfers (handicap lower than five) performed six full swing movements with a pitch iron. Surface electromyography (EMG) was recorded from 12 muscles: anterior (AD), middle (MD) and posterior (PD) deltoids, pectoralis major (PM), latissimus dorsi (LD), infraspinatus (IS), vastus lateralis (VL) and long portion (LP) of triceps brachii, biceps brachii (BB), brachioradialis (BR), wrist flexors (WF), and wrist extensors (WE). The EMG signals were sampled at 1000 Hz, full wave rectified, low pass filtered (second order Butterworth filter at 12 Hz) and normalized using the EMG of the maximal voluntary contraction (MVC) as a reference. In synchrony with the EMG signals, a three axis accelerometer fixed at the back of the golf club head informed about ball contact time (BC). Mean EMG value was calculated separately during each phase: backswing (BS), downswing (DS) and the first 500 ms of the follow-through (FT). For the movement analysis and phase delimitation the swing was filmed with four high speed video cameras (300 Hz). The recording of EMG and cinematic data was performed with a SIMI system (SIMI Motion, Munich, Germany).

Results: The average of normalized values of all muscles of the dominant arm in the three subjects, showed that the DS exhibited the highest muscular activity (28,8% of the EMG of the MVC) compared with the FT (19,9%) and the BS (15,7%). The elbow flexors (BB – 26%, BR – 45%) and the wrist extensors (WE – 26%) presented the strongest activation during the BS to promote elbow flexion and hand extension, and silenced before the DS initiation. During the DS the shoulder adductors (LD – 53%, PM – 38%) and the elbow extensors (LP – 50%, VL – 47%) presented the highest EMG activation. These muscles were activated at the beginning of the DS but the shoulder adductors peaked earlier. The AD peaked 70 ms before the BC and its activation may contribute to the arm internal rotation during the acceleration phase. The WF peaked during or just after the BC to accelerate hand flexion. The shoulder abductors (AD – 34%, MD – 14%) and the wrist flexors (36%) showed the highest activity during the FT. The posterior and middle deltoids showed low activity in all the phases (less then 20%).

Conclusions: The results demonstrated that the most active muscles during the golf swing were the shoulder adductors and the elbow extensors, and that the downswing was the phase where muscles from the dominant upper limb presented stronger activation. The EMG patterns we found can help to design training programs to improve strength and flexibility and to reduce injury risk in the golfer's upper limb.

Poster presentation (PP)

PP1-06 Psychology 1-3 - "Exhibition Hall"

THE PROCESSES BY WHICH PERCEIVED TEACHER BEHAVIOR IN PHYSICAL EDUCATION PROMOTES LEISURE TIME PHYSICAL ACTIVITY BEHAVIOR: A TRANS-CONTEXTUAL MODEL

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Introduction

Recently, trans-contextual model on the basis of self-determination theory and the theory of planned behavior was developed by Hagger et al. (2003) to investigate the determinants of the intentional physical activity behavior among adolescents. The trans-contextual models allow to investigate the processes by which motivation for physical activity in a PE context is transferred into a leisure-time physical activity context. The roles of perceived autonomy support from teachers, parents and peers in this model have been determined. The aim of this study was to test whether the other factors such as the students' perception that they are taught by teachers to use the learning strategy and students' perception of the teacher's positive feedback will fit to the trans-contextual model of motivation characterizing the intentional physical activity behavior.

Methods

The participants were 404 (126 boys and 278 girls) students. A three-wave prospective design was used. At the first occasion of data collection (time 1), self-report measures of perceived positive teacher feedback (Koka & Hein, 2005), use of strategies (Solmon & Lee, 1997) and the perceived locus of causality in a PE context were administered. One week later (time 2), a second questionnaire containing measures of attitude and intention (components of the theory of planned behavior) and perceived locus of causality in a leisure-time physical activity context was administered. After four weeks, self-reported physical activity behavior was measured at a third point in time (time 3) using the Leisure-Time Exercise Questionnaire (Hagger et al., 2003) A structural equation modeling was used for studying the hypothesized model.