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De Haan, A., De Ruiter, C. J., Tsolakidis, E.

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16km/h) for the entire group, whatever type of foot strike a runner has. Discussion The main objective of this study was to validate a 3D method of calculating the strides parameters, focusing primarily on the contact time. Once the contact time methods are validated, other strides parameters such as fly time, reactivity, stride length and stride frequency can also be assessed, based on the same detection of event. However, it seems that the most valid method to determine foot strike differs with the type of runner. In conclusion, 3D analysis provides interesting opportunities for calculation of the stride analysis, allowing to give precise numerical feedback on athletes running strides. References Dicharry J. (2010). Clin Sports Med. 20 (3), 347-64. Larson P, Higgins E, Kaminski J, Decker T, Preble J, Lyons D, McIntyre K, Normile A (2011). J Sports Sci, 29, (15), 1665-73. Contact ddeflandre@ulg.ac.be

FORCE-CONTROLLED BITING AFFECTS POSTURAL CONTROL IN BIPEDAL AND UNIPEDAL STANCE

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Introduction Impaired postural control is associated with an increased risk of falling and, as a consequence, may lead to functional impairments concomitant with high medical treatment costs (Granacher et al., 2010). Balance training is an established measure to reduce the incidence of falls. Besides, the potential of biting to improve postural control has recently been reported (Hellmann et al., 2011). The mechanisms by which the craniomandibular system (CMS) and human posture are functionally coupled are not yet fully understood, however. The aim of this study was, therefore, to investigate the effects of force-controlled biting (FB) on postural balance and kinematics of the trunk and head in upright bipedal and unipedal stance. Methods Twelve healthy subjects randomly performed FB (150 N) and non-biting (NB, mandible at rest) during bipedal narrow stance (Bp) and unipedal stance on dominant (Up-D) and non-dominant (Up-N) legs. Bite forces were measured by using a hydrostatic system consisting of liquid-filled pads. The increase in pressure corresponded directly to the total force exerted, which was visible to the subjects as numerical real-time feedback. While balancing in bipedal or unipedal stance, center of pressure (COP) displacements and kinematics of the pelvis, thorax and head were monitored by means of a force platform and biomechanical motion analysis, respectively. Different balance and kinematic variables were calculated and compared by two-way (biting task, support condition) repeated-measures ANOVA. Results The results showed that FB significantly improved postural control in terms of reduced COP path lengths (AP: $p = 0.003$; ML: $p = 0.020$) and a decreased COP sway area ($p = 0.022$). These reductions were accompanied by decreases in oscillations of the pelvis, thorax and head, respectively. The study, moreover, revealed that COP displacements were significantly less in Bp than in Up-D and Up-N, whereas there were no differences between Up-D and Up-N, and no interaction effects between biting tasks and support conditions. Discussion The reduced COP displacements are further evidence of the functional coupling of the CMS and human posture. The study also showed, for the first time, that sway reductions during FB are concomitant with enhanced stability of the trunk and head, but no changes in coordination among the body segments were observed. To elucidate the efficiency of oral motor activity to prevent falls, however, further research addressing dynamic stability is necessary. References Granacher U, Muehlbauer T, Gollhofer A, Kressig RW, Zahner L (2010). Geron, 57, 304-315. Hellmann D, Giannakopoulos NN, Blaser R, Eberhard L, Schindler HJ (2011). J Oral Rehab, 38, 1-8. Contact Steffen.Ringhof@kit.edu

EVALUATION OF SPATIO-TEMPORAL GAIT PARAMETERS WITH AND WITHOUT A PREGNANCY BODYSUIT

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Introduction During pregnancy, various postural and biomechanical changes occur including weight gain, shifted center of gravity, anterior pelvic tilt, increase of lumbar lordosis and decrease abdominal muscle strength (Borg-Stein et al., 2005). Such changes can substantially modify the gait pattern, contributing to an overuse on the musculoskeletal system (increased demand on hip extensor and ankle plantar flexor muscles) that could cause lower limbs, hip and lower back pain (Foti et al., 2000). Therefore, the purpose of this study is to evaluate the influence of an innovative bodysuit with differentiated elasticities (ComfortBody®) designed to reorganize the augmented load from the lumbar area to the entire back, on spatio-temporal gait parameters during walking on a treadmill when compared to a placebo bodysuit in pregnant women. Methods After giving their informed consent of participation, 15 pregnant women (age: 30.6±3.8yrs; weight gain: 10.1±2.5kg) between 24th and 38th gestation week were included in a single-blind, randomized, placebo-controlled study. Participants were asked to walk 10-min on a treadmill (speed: 3km/h; slope: 0%) during 3 experimental sessions (familiarization, wearing the ComfortBody-B and placebo-P) with a 30-min recovery in between. Experimental sessions were scheduled on sessions 2 and 3 (B, P) through permuted-block randomization. At the end of B and P, participants were asked to rate the most comfortable session. Computerized stride analysis was used to measure spatial-temporal parameters of the walking pattern. Data normality was confirmed applying ShapiroWilk's test and paired t-test was used to assess differences ($p<0.05$). Results Spatio-temporal showed significant ($p<0.05$) differences in stride length (B=1.11±0.06m, P=1.10±0.06m), cadence (B=90.4±4.9steps/m, P=91.1±4.9steps/m) and stance phase (B=0.89±0.04s; P=0.88±0.04s) while no difference emerged in swing phase. Most of the subjects (73%) indicated B as the most comfortable session. Discussion ComfortBody reducing thoracolumbar and lumbosacral angle (Federico et al., 2007), generating a reduction of anterior pelvic tilt would seem to ensure a greater hip extension in late stance phase and improve knee extension during terminal swing. These changes results in an increase stride length that ensure greater anterior-posterior stability (McAndrew Young & Dingwell 2012). ComfortBody could be a useful mean for the prevention of falls and the possible development of inflammatory diseases providing comfort, security and support in pregnant women. References Borg-Stein et al., 2005. Am J Phys Med Rehabil. 84,180-92 Foti et al., 2000. J Bone Joint Surg Am. 82,625-32 Federico et al., 2007. Riv It Ost Gin. 16,707-722 McAndrew & Dingwell 2012. Gait Posture. 36,219-24

PREPARATION TIME INFLUENCES KNEE AND ANKLE JOINT MECHANICS DURING DYNAMIC CHANGE OF DIRECTION MOVEMENTS

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Introduction Ankle and knee joint injuries are the most common injuries in sports (Fong et al., 2007). High loads and extreme joint angles in the frontal plane, as reached in dynamic movements, present most danger to joint ligaments. It has been shown that reduced time to plan a change of direction increases knee abduction loading, which is known as a predictor of anterior cruciate ligament injuries (Besier et al., 2001). However, the influence of these more realistic sports situations on ankle inversion injury risk is still unknown. Therefore, the aim of this study was to analyse whether less preparation time has similar effects on the ankle joint. Methods Directed by light signals, 9