the inclinations 0°, 6° and 12 with a speed of 1.1 m/s. Kinematic data were analysed with an 8 camera motion capture system (Vicon, 250Hz). Temporo spatial gait parameters, maximal vertical ground reaction force (vGRF) and sagittal knee angle and joint moment were statistically analysed using a 2 factor ANOVA (weight x inclination). Kinetic data was normalized to bodyweight. Results Inclination had a significant effect on all parameters except step width, while the obese adolescents showed significantly longer relative stance times, higher peak absolute vGRF (peak 1 and 2), but lower relative vGRF (peak 2). Additionally higher knee flexion angles were observed in all inclinations for obese participants. However, the relative sagittal knee joint moment was similar between both weight groups. Discussion Ehlen et al. demonstrated that walking uphill with equal metabolic cost results in lower walking speed, but also lower knee joint moments for obese adults. This study demonstrates, that using the same gait velocity, obese adolescents walk uphill with higher knee flexion angles (approx. 10°) than their normal weight peers, but that their relative knee joint moment was equal to their normal weight counterparts. This supports the theory of DeVita & Hortobágyi (2003) from level walking that obese individual can reorganize their neuromuscular function during gait to maintain skeletal health, even though the strategy chosen differed in this study's population. References DeVita P. Hortobágyi, T. (2003). J Biomech, 36, 1355-62. Ehlen, K.A., Reiser, R.F., Browning, R.C. (2011). Med & Sci Spo & Exerc, 43, 1251-1259. Shultz, S.P., Anner, J., Hills, A.P. (2009). Obes Rev,10, 576–582. Contact Gerda.strutzenberger@sbg.ac.at

DAILY CHANGES OF INDIVIDUAL GAIT PATTERNS

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Introduction Biomechanical diagnoses and clinical interventions typically assume nearly constant movement patterns in their subjects. Clinical gait analysis often seeks to evaluate intervention related changes in walking by averaging the data from a number of trials and compare these average values to control subjects that did not undergo an intervention or to previous measurements in a pre-post-design. Despite the knowledge of continuous changes in living systems, movement variability without an intervention is neglected as insignificant in many approaches of movement analysis (Newell et al., 2006). The aim of this study is to look for the reliability of gait patterns from different test days by means of support vector machines. Methods Eight healthy and physically active subjects (23.5 ± 2.3 years) performed 15 gait trials at a self-selected speed on each of the eight test days within two weeks under barefoot conditions. For each trial, the continuous ground reaction forces (Kistler, 1000 Hz) and lower body joint angles (Qualisys, 250 Hz) of one gait cycle were analyzed. An eight-day-classification and one-on-one-classification of support vector machines were carried out for each subject individually. The classification rates were provided by the Liblinear Toolbox 1.4 (Fan et al., 2008) using a leave-one-out cross-validation. Results The mean classification rates for the eight-day-classification are sagittal (71.4 ± 10.4%), frontal (90.7 ± 8.4%), coronal (92.1 ± 8.2%) and combined (95.9 ± 5.8%) joint angles. The mean classification rates for the eight-day-classification are fore-aft (49.6 ± 9.2%), medial-lateral (49.5 ± 9.9%), vertical (48.4 ± 8.7%) and combined (60.1 ± 9.2%) ground reaction forces. The mean classification rates for the one-on-one-classification are sagittal (88.7 ± 5.7%), frontal (95.9 ± 2.2%), coronal (96.9 ± 2.1%) and combined (98.1 ± 1.1%) joint angles. The mean classification rates for the one-on-one-classification are fore-aft (82.5 ± 7.7%), medial-lateral (80.9 ± 6.1%), vertical (83.2 ± 8.2%) and combined (86.1 ± 6.7%) ground reaction forces. Discussion The eight-day-classification rates of 95.9% and 60.1% clearly differ from a random classification of 12.5% and show natural differences between the gait patterns of different days. Hence, changes in gait patterns appear naturally without a specific intervention between the test days. Additionally, the one-on-one-classification points out a general problem of studies with pre-post-design. References Fan RE, Chang KW, Hsieh CJ, Wang XR, Lin CJ (2008).Journal of Machine Learning Research, 9, 1871-4. Newell KM, Deutsch KM, Sosnoff JJ & Mayer-Kress G (2006). Movement system variability, 3-23. Human Kinetics, Champaign (Ill). Contact horst@uni-mainz.de

A KINEMATIC COMPARISON OF NON-MOTORIZED TREADMILL AND OVERGROUND WALKING

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Introduction Motor-driven treadmill is often used in gait analysis and gait training. Many researchers compared gait parameters such as step frequency and step length as well as kinematic and kinetics during gait on treadmill to normal gait on ground. Recently, curve-shaped non-motorized treadmill was developed for walking. However, the special configuration (curve-shape) which gives to human body during walking movement has not well understood. The purpose of this study was to compare the kinematic parameters during walking on curve-shaped non-motorized treadmill (TM) to those of obtained from normal overground (OG) at identical speed condition. Methods Ten health young subjects (age: 25.0±3.7yrs, BH: 172.3±3.5cm, BW: 68.9±7.8kg) walked 12m walkway at preferred speed. Motion capture (VIOCN MX20 Oxford: 200fps) and force plate data (Kistler: 1000Hz) for full gait cycle were recorded. The average walking speed of OG trials was used for the TM trials (Curve: Woodway) and TM belt speed were visual feedback to a subject. Spatio-temporal parameter, lower limb joint angle and joint angular velocity data were compared with between TM and OG conditions. Results and Discussion Walking speed of both conditions were quite similar. Significant higher stride frequency and shorter stride length on TM walking was indicated compare with OG condition ($p<0.001$). Flexion angles at hip and knee were significantly different between TM and OG walking during swing phase ($p<0.05$). Peak angular velocities at hip and knee were higher in TM than OG ($p<0.05$). Conclusions Curve-shaped non-motorized treadmill was characterized as higher stride frequency as well as higher flexion angular velocities at hip and knee during swing phase. Reference Alton F, Baldey L, Caplan S, Morrissey MC. (1998). Clin Biomech, 13, 434-440. Riley PO, Paolini G, Della Croce U, Paylo KW, Kerrigan DC. (2007). Gait Posture, 26, 17-24. Contact [tomoyahirano@outlook.jp]

USE OF MOTION CAPTURE SYSTEM IN RUSSIAN TEAMS TRAINING FOR SOCHI OLYMPIC GAMES

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Introduction A Qualisys Motion Capture System was part of a testing complex used by the Russian national teams during their preparation for the Winter Olympic games 2014. Methods The test complex consisted of 18 cameras Oqus 300 (AB Qualisys, Sweden), two AMTI force plates (AMTI, USA), and Cortex gas analyzer (Cortex, Germany), extra-wide treadmill (Fitnex, USA). Top Russian athletes, candidates for National Olympic teams in cross-country skiing (n=18), bobsleighing (n=24), ski jumping (n=8), Nordic combined (n=8), freestyle skiing moguls (n=18), curling (n=6), luge (6), biathlon (12), speed scating (8), curling (6). As a rule, testing was done at the end of each stage of a year-long training cycle. Testing procedures were adjusted taking into account specificity of every sport discipline. Specific software pack-