עורכת: ד"ר מיכל אהרונוביץ

אישורים לפרסום התקצירים התקבלו מההוצאות לאור של כתבי העת.

NeuroRehabilitation. 2013 Jun 18.

## The associations between motor ability, walking activity and heart rate variability parameters among children with cerebral palsy and typically developed controls.

**Kholod H[1], Jamil A[2], Katz-Leurer M[1].**

[1]Sackler Faculty of Medicine, Department of Physical Therapy, School of Health Professions, Tel-Aviv University, Tel-Aviv, Israel

[2]San-Vincent Hospital Nazareth, Pediatric Department, Child Development Center, Ruth and Bruce Rappaport Faculty of Medicine, Technion, Israel

### Abstract

**AIMS:**

To measure heart rate (HR) and heart rate variability (HRV) at rest, during and after walking among children with cerebral palsy (CP) as compared to age matched typically developed (TD) controls. The second aim was to describe the association between HRV and motor performance in children with CP.

**METHODS:**

Twenty six children with CP (age 8-14 years) and sixteen TD children matched for age assessed during rest, walking and after walking. HR and HRV parameters include: time domain parameters: standard deviation of the R-R interval (SDNN), square root of the mean squared differences of successive R-R differences (RMSSD).

**RESULTS:**

Children with CP demonstrated higher mean HR values at rest; 98.4 ± 13.9 bpm vs 83.0 ± 11.5 bpm in controls, ($p < 0.05$) and significantly lower time domain measures of HRV; RMSSD was 52.0 ± 19.1 ms and 87.0 ± 39.8 ms respectively ($p < 0.05$). Significant interaction effects were noted for HR and time domain HRV parameters. HR increased and SDNN and RMSSD decreased when children change their activity level from rest to walking and HR decreased and SDNN and RMSSD increased again after walking for TD children but not for children with CP ($p < 0.05$). No association was noted between HRV and motor performance in children with CP.

**INTERPRETATION:**

The findings of this study suggest that among children with CP, the cardiac autonomic mechanism is less efficient at rest and less adaptive to exercise and activity as compared to TD children.

Gait Posture. 2014 Jan;39(1):558-62.

## Referent body weight values in over ground walking, over ground jogging, treadmill jogging, and elliptical exercise.

**Kaplan Y[1], Barak Y[1], Palmonovich E[2], Nyska M[2], Witvrouw E[3].**

[1]Physical Therapy and Sports Medicine Institute, Lerner Sports Center, Hebrew University of Jerusalem, Israel.

[2]Department of Orthopedic Surgery, Meir Hospital, Kfar Saba, Israel.

[3]Department of Rehabilitation Sciences & Physiotherapy at the Ghent University, Ghent, Belgium.

### Abstract

**OBJECTIVES:**

I. To evaluate average percentage body weight (APBW) values and weight-bearing distribution percentages (WBDP) between four common sports activities in a referent adult population.
II. To suggest clinical implications.

**DESIGN:**

Original research study.

**SETTING:**

Lerner Sports Center, Hebrew University, Mount Scopus, Jerusalem, Israel.

**PARTICIPANTS:**

Seventy-five asymptomatic volunteers, mean age=33.5 (19-72) years SD=15.1, mean weight (kg)=70.7 (43-113) SD=14.1.

**INTERVENTIONS:**

Four tests were conducted: 1. Overground walking (OGW) over a 20m distance, 2. Overground jogging (OGJ) over a 20m distance, 3. Treadmill jogging (TJ) at a constant speed of 8.5km/h for a 15-second interval and 4. Elliptical exercise (EE) for a 20 second period at a resistance and incline level of 10, and a steady pace within the range of 70-95 steps/min.

**MAIN OUTCOME MEASURE:**

The Smartstep™ weight-bearing gait analysis system.

**RESULTS:**

The APBW value on the entire foot in OGW was 112% (SD=15.57), in OGJ, 201% (SD=31.24, in TJ, 175% (SD=25.48) and in EE, 73% (SD=13.8). Regarding WBDP, the swing phase in OGJ and TJ was significantly longer than the stance phase ($p<0.05$). OGW resulted in significantly less swing phase compared to OGJ and TJ ($p<0.05$).

**CONCLUSIONS:**

EE significantly reduces weight-bearing as compared to other common functional and sporting activities. These findings may assist the rehabilitation team when considering returning individuals back to early activity following certain bony or soft tissue pathologies or lower-limb surgical procedures. This information is also useful from a repetitive loading standpoint (to prevent overuse injury) or for exercise recommendations for those at greater risk for exacerbating chronic joint pathology.

J Basic Clin Physiol Pharmacol. 2013 Oct 11:1-6

## Measuring cardiopulmonary parameters during dual-task while walking.

**Kodesh E[1], Kizony R[2,3]**

[1]Department of Physical Therapy, Faculty of Social Welfare and Health Sciences, University of Haifa, Mount Carmel, Haifa, Israel.

[2]Department of Occupational Therapy, Faculty of Social Welfare and Health Sciences, University of Haifa, Mount Carmel, Haifa, Israel.

[3]Department of Occupational Therapy, Sheba Medical Center, Tel Hashomer, Israel.

### Abstract

**ABSTRACT BACKGROUND:**

The purpose of the present study was to examine the metabolic cost of dual-task performance of a cognitive task while walking under two conditions: comfortable and fast gait speed.

**METHODS:**

Twenty-five healthy young adults (25.7±3.05 years) walked over-ground at a comfortable self-selected speed and on a treadmill at a fast speed with and without performing a cognitive task. Cardiopulmonary parameters were measured by the metabolic K4b2 system, gait parameters were measured with GaitRite and cognitive performance was expressed as percentage of correct answers to a set of riddles.

**RESULTS AND CONCLUSIONS:**

During rest, cognitive load resulted in a metabolic cost indicated by a significant increase in VO2 ($p<0.01$). Breathing rate increased significantly during dual-tasking in both walking conditions ($p<0.01$ for both). Fifty-two percent of the participants decreased gait speed during the dual-task condition while walking over-ground, accompanied by a significant decrease in tidal volume ($p<0.01$) without a decrease in breathing and heart rates. More than 70% of the participants improved or maintained their cognitive performance while walking (over-ground, 72% and treadmill, 75%), independently from the alterations in gait speed. The current findings confirm that mental processing increases energy demands while sitting. In addition, the results contribute new insight into dual-task paradigm research, by showing that breathing rate is sensitive to an additional cognitive load while walking, even in young healthy adults. Moreover, the participants were able to adjust the strategy they used to cope with cognitive load while walking over-ground when gait speed was imposed.