2147 *Board #84* **4:00 PM - 5:00 PM**

Patterns of Physical Activity. An Exploratory Study Using Twins

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The study of physical activity patterns (PAP) is still in its infancy due to methodological problems in measuring instruments of physical activity, and the lack of specific analytical tools to capture all its intrinsic issues. Moreover, it is not well known if differences among subjects are mainly due to specific environmental conditions, genetic attributes or both. This picture is more acute in children.

PURPOSE: to explore different ways of viewing and analyzing PAP in children.

METHODS: 31 twin pairs (18 MZ and 13 DZ) aged 6 to 12 years of age were monitored for 5 days (3 week-day and a week-end) with a tri-axial accelerometer (TRITRAC R3D). Count data was read in a specialized software (GEMWIZARD), was transformed in energy expenditure according to manufacturer indications, so that 4 phenotypes were derived: till 3 Mets (low PA), from 3 to 6 Mets (moderate PA), from 6 to 9 Mets (vigorous PA), and above 9 Mets (very vigorous PA). SPSS was used for all data analysis (descriptive stats, graphical dispays and correlations).

RESULTS: It is evident that most part of the days is spent in low PA, and very few episodes of vigorous or very vigorous activities. Per each hour, across days, about 56 minutes are of low PA. Per day, about 17 minutes are spent in moderate PA, and 3 to 4 minutes in vigorous or very vigorous PA. The amount of inter-individual differences in pairs of MZ and DZ twins is very high, although intra-pair range seems higher in DZ than MZ twins. Twin similarity (Pearson correlation) is as follows: low PA, rMZ=0.886, rDZ=0.772; moderate PA, rMZ=9.946, rDZ=0.880; vigorous PA, rMZ=0.636, rDZ=0.490; very vigorous PA, rMZ=0.759, rDZ=0.522).

CONCLUSIONS: In children, physical activity is mainly random. The highest frequency is for low activities (≈3 Mets), interspaced with a very low frequency of moderate to vigorous PA. In twins the intra-pair differences are higher in DZ than MZ twins, suggesting that not only environmental factors are responsible for such results. Genetic factors may be also important. Adequate intervention programs should focus on inter-individual differences and diverse responses are to be understood in the light of genetic differences. Moreover, it is also important to provide children ample opportunities for doing more frequently moderate and vigorous PA through games and formal Physical Education programs in schools.

D-26 Free Communication/Poster – **Reaction Time**

THURSDAY, JUNE 1, 2006 2:00 PM - 5:00 PM
ROOM: Hall B

2148 *Board #85* **2:00 PM - 3:00 PM**

The Influence of High Load Training on Reaction Time in Cyclists

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Overtraining syndrome (OTS) is seen as a serious threat by athletes and coaches because performance is deteriorated in OTS. Central fatigue has also been mentioned as an accompanying symptom of OTS which could possibly be measured through tasks of psychomotor speed. Since the only cure to OTS is (relative) rest, it is of utmost importance to prevent it.

RESULTS: of studies into markers have been contradictory, partly because researchers who study the effects of high load training claim to study OTS whereas these athletes were at most functional overreached (FO; Meeusen et al., In Press).

PURPOSE: The purpose of the present study is investigate whether changes in psychomotor speed are already present in early stages of overtraining.

METHODS: Fourteen cyclists have completed an incremental exercise test, two questionnaires and the finger pre-cueing task (FPT) three times: before, right after and two weeks after a training camp. Maximal work load, heart rate, oxygen uptake and mood states were used to determine training status. The FPT is a complex four-choice reaction time task in which pre-cues reduce the task to a two-choice reaction time task in three out of four conditions (Miller, 1982). A control group of fourteen age and gender matched active individuals completed the FPT at the same time as the cyclists.

RESULTS: Five out of fourteen cyclists showed performance decrements and worsened mood states and were classified as overreached. Because performance and mood states had improved two weeks after the training camp, their status was specified as FO. Seven athletes did not show differences on performance or mood states after the training camp and were classified as well-trained (WT). Two athletes showed disturbed mood states before but not after the training camp and were excluded from analys
A repeated measures ANOVA showed no significant difference between the FO, t
WT and the control group. However, the interaction between time and group sho
a trend ($F = 2,30$, $p = .079$). The FO group showed longer reaction times compa
the control group right after the training camp.

CONCLUSIONS: The results show that psychomotor slowness as an indication
central fatigue is not present in FO. This could be because FO is part of normal tr
and signs and symptoms of OTS are still mild. Future research should point out
whether psychomotor slowness is present in non-functional overreaching and/or O

Meeusen R, Duclos M, Gleeson M, et al. Prevention, diagnosis and treatment of t
overtraining syndrome. Eur J Sport Sci; In Press.Miller J. Discrete versus contin
stage models of human information processing: In search of partial output. J Exp
Psychol 1982;8: 273-96.

2149 *Board #86* **3:00 PM - 4:00 PM**

The Inverted-U Relationship between Arousal and Fractionated Reaction Time

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Several different hypotheses have been proposed to explain the relationship bet
arousal and cognitive performance. Drive theory and the inverted-U hypothesis
been the most popular for explaining the relationship. However, existing studies
designed to test these hypotheses with respect to reaction time have had limitat
such as ambiguous definitions of arousal (i.e., confounding arousal with fear or
stress), using few arousal levels, assessing arousal by self-report, using only be
subjects designs, and failing to separate the motor (peripheral) and cognitive (c
components of reaction time tasks.

PURPOSE: Therefore, the purpose of this study was to use a within-subjects d
examine the relationship between arousal and cognitive performance using fra
reaction time to identify the effects on central and peripheral components.

METHODS: Sixteen male participants aged from 20 to 30 years with no phys
disabilities were recruited. Heart rate reserve (HHR) was determined on Day 1
recording baseline HR and maximal HR during a ramped exercise protocol on
bicycle ergometer. On Day 2, participants were asked to perform the reaction t
at 8 different levels of arousal (20%, 30%, 40%, 50%, 60%, 60%, 70%, 80%,
HRR). The order of presentation of the arousal levels was randomized using a
Squares design with the limitation that the higher intensities (70%, 80%, and
were never performed back-to-back and were not performed during the first tr
At each intensity level, the resistance level on the bicycle ergometer was dete
using information from the ramped exercise protocol to get the participant's H
the target level. Participants were asked to perform 10 simple reaction time tr
they reached target HR for each level of arousal. Data were analyzed using re
measures analysis of variance with polynomial contrasts.

RESULTS: The linear trend was significant for movement time ($p<0.05$) and
significant for motor time ($p=0.07$). For both measures, latencies generally d
with increasing arousal levels. There was no significant difference in pre-mo
a function of arousal.

CONCLUSIONS: The data suggest that arousal induced by the different ex
intensities influences the peripheral components of simple reaction time and
affect the central components. In addition, the relationship tends to supports
theory instead of the inverted-U hypothesis. It is concluded that arousal influ
simple reaction time through its impact on motor function rather than having
on cognition per se, and that this relationship is linear in nature.

2150 *Board #87* **4:00 PM - 5:00 PM**

Choice Reaction Time Difference Between Gender a Using the Fractionated Reaction Time Technique

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A gender difference in choice reaction time (RT) has been reported in the li
(e.g., Adam et al., 1999; Noble et al., 1964). Noble, Baker and Jones found
females had slower choice RT than their male counterparts many years ago
study by Adam et al. also reported a faster choice RT for male participants.
Weiss (1965) introduced the measurement of RT components with electro
(EMG), pre-motor time (PMT) and motor time (MT) have been used to id
central (cognitive) and peripheral (neuromuscular) processing of the initia
voluntary movement in human performance research.

PURPOSE: To examine whether choice reaction time and its fractionated
differ between genders and dominant and non-dominant hands.

METHODS: Twenty right-hand dominant college students (10 male, 26.0
10 female, 25.4 ± 2.27 yrs) were tested for their visual-manual choice react
four consecutive days using both left and right hands. Based on the EMG a
the pronator teres and biceps brachii, fractionated RTs of pronation and sup
measured for each hand. The learning effect was identified and a reliable m