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The physical activity patterns of international level cross-country skiers in training camp and at home

Rahvusvahelisel tasemel murdmaasuusatajate kehalise aktiivsuse näitajad treeninglaagris ja kodus

Master Thesis

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LÜHIÜLEVAADE

Eesmärk: Antud magistritöö eesmärgiks oli uurida rahvusvahelisel tasemel murdmaasuusatajate kehalist aktiivsust ja kehalist inaktiivsust treeninglaagris ja kodus treenides.

Metoodika: Seitsmeteistkümne suusataja (23.5±5.15 a; 74.6±4.8 kg; 1.81±0.07 m; KMI 22.5±1.1 $kg \cdot m^{-2}$; 652.8±131.2 tundi aastas) kehaline aktiivsus (KA) mõõdeti aktseleromeetritega (ActiGraph wGT3X-BT) seitsme päeva jooksul, kui sportlased viibisid treeninglaagris ja kodus treenides. Keha koostis mõõdeti DXA meetodil. Kõik mõõtmised toimusid sportlaste ettevalmistus perioodi jooksul.

Tulemused:

Uuringus leiti, et treening välisel ajal oli sportlaste MTKA oluliselt kõrgem kui kodus treenides (p=0.004) ja lisaks leiti ka treening välise MTKA osa olevat suurem kodus kui laagris (p=0.030). Treening väline aeg ja treeningute aeg ei erinenud koduste tingimuste ja treeninglaagri olude vahel (p=0.551 ja p=0.095). Lisaks leiti, et 57±5.4 % treening välisest ajast veedeti inaktiivselt treeninglaagri tingimustes, kui kodus olles oli antud osa 53±7.7 % (p=0.012). Kõigist meessportlastega mõõdetud kehakoostise näitajates tuvastati, et suurem rasva mass on seotud väiksemate päevaste sammude arvuga (r=-0.714, p=0.020). Lisaks leiti, et suurem laagri aegne unetundide arv suurendab rasva protsenti ja kodune suurem unetundide arv suurendab rasva massi. Erinevust treeninglaagri ja koduste unetundide arvus ei leitud (p=0.653).

Kokkuvõte: Kuna, kõrgel tasemel vastupidavussportlaste päevane KA ja MTKA on treeninglaagri tingimustes kõrged ning treening väline MTKA on kodus kõrgem nagu ka inaktiivsuse osakaal treeninglaagris on kõrgem, sellest tulenevalt on sportlaste kõrgem kehaline aktiivsus kompenseeritud madalama kehalise aktiivsusega treening välisel ajal.

Märksõnad: murdmaasuusatamine, keha koostis, treeninglaager, kehaline aktiivsus, aktseleromeeter

ABSTRACT

Aim: To investigate physical activity and sedentary time of elite level cross-country skiers in training camp and at home in different day segments and associations with body composition parameters.

Methods: The physical activity (PA) of 17 cross-country skiers (23.5±5.15 yr; 74.6±4.8 kg; 1.81±0.07 m; BMI 22.5±1.1 kg·m-2; 652.8±131.2 h per yr) was measured with accelerometer (ActiGraph wGT3X-BT) during 7-day period both in training camp and at home. Body composition was measured using DXA. All measurements were carried out on the preparation period.

Results: Significantly higher non-training time MVPA was identified on training camp compared to home (p=0.004) and additionally higher MVPA proportion was found at home than on training camp during non-training time (p=0.030). Non-training time and training time PA did not differ between at home and on training camp (p=0.551 and p=0.095). Additionally, 57±5.4 % of non-training time was spent as sedentary during training camp compared with 53±7.7 % in home environment (p=0.012). Out of all body composition parameters investigated with male athletes, the fat mass was positively and strongly correlated with overall number of steps (r=-0.714, p=0.020) and higher sleep time on training camp was associated with higher fat percent. At home, higher sleep time was associated with higher fat mass. Athletes sleep time did not differ between at home and on training camp conditions (p=0.653).

Conclusion: As elite cross-country skiers whole day PA and MVPA was higher on training camp and as non-training time MVPA was higher at home as well as sedentary time on training camp was higher, athletes compensate their higher training camp PA and MVPA with lower PA on non-training time.

Keywords: cross-country skiing, body composition, training camp, physical activity, accelerometer

1. LITERATURE OVERVIEW

The epidemic of excess body weight and obesity has attracted scientific interest during the last decades. Physical activity (PA) measurements in general population has been well investigated and number of scientists have reported significant increase in sedentary activities (e.g. watching TV, time spent in computer etc.) (Koster et al., 2012; Ojiambo et al., 2013; Owen et al., 2010). Athletes are highly physically active due to spending high amounts of training time in moderate and vigorous physical activity (MVPA) (Judice et al., 2014; Tønnessen et al., 2014). Previous research has reported high training loads from elite level athletes (Tønnessen et al., 2014; Vogt et al., 2005), however there has been no differences in PA of athletes and non-athletes (Almeras et al., 1991; Carlsohn et al., 2011).

There is a tendency that athletes spend a lot of their annual training days on training camps. Additionally, there is some indications that PA of athletes is much higher in training camp compared with home conditions (Trappe et al., 1997; Vogt et al., 2005; Drenowatz et al. (2013). Vogt et al. (2005) noted that professional cyclists completed ~30 h (5:15 h and approximately 160 km per day) of trainings per week in training camp preparing for the Tour de France. As, there is a lack of comparative investigation with elite level athletes in training camp and at home this cap needs to be filled as, the better understanding of athletes PA segments and conditions may give advantages.

In addition to MVPA, sedentary behaviour is considered an independent health risk factor (Koster et al., 2012; Owen et al., 2010). As for the sedentary behaviour of athletes, it has been shown that English Premier League players spent 79% of their awake hours as sedentary (Weiler et al., 2015). Additionally, there has been reported high levels of sedentary time of endurance trained athletes on high volume week 76.9 % and 72.9 % on low volume week (Drenowatz et al., 2013). Moreover, Clemente et al. (2016) found that college aged amateur athletes and non-athletes had similar sedentary and light PA patterns. As the previous investigations had shown high levels of sedentary behaviour of athletes and as sedentary behaviour is considered a health indicator, the investigation with elite level winter sport athletes might show similar sedentary behaviour and, therefore this question needs to be answered.

Furthermore, sedentary time has been associated with higher levels of adiposity in the non-athletic population (Grund et al., 2001; Vandelanotte et al., 2010; Wagner et al., 2012) while MVPA has been identified as a preventative remedy against adiposity (Gonzalez-Gross & Melendez, 2013; Maher et al., 2013). It can be argued that there seems to be a complex interaction between sedentary time, MVPA and adiposity (Saunders et al., 2013). Another study (Ross et al., 2000) with non-athletic participants explained disassociation between sedentary behaviour and adiposity with selective effect of exercise, which means that higher moderate-to-vigorous physical activity may have diminished the quantity of sedentary behaviour. In addition, there has been found evidence that MVPA levels decreased when body mass index (BMI) increased and that the amount of sedentary time increased together with increase in BMI (Scheers, Philippaerts & Lefevre, 2012). Investigation with male athletes have shown significant association with sedentary behaviour and adiposity as higher sedentary time was related with higher values of trunk fat mass, despite that athletes showed high values of trainings (Judice et al., 2014).

Sleep is considered as one of the essential factors for recovery (Adam & Oswald, 1984; Dattilo et al., 2011; Halson, 2008). Due to the high training loads (Drenowatz et al., 2013; Trappe et al., 1997; Tønnessen et al., 2014; Vogt et al., 2005) there is a need for increased recovery time between trainings and thus for extra sleep. The question arises whether there is a difference in the sleeping pattern in training camp and at home. The shorter night-time sleep of athletes is frequently compensated with the increased daytime naps (Lastella et al., 2015) and short after lunch sleep is considered to positively affect athletic performance (Waterhouse et al., 2007). Previous investigations with endurance athletes have shown an average of 5.4–7.1 h of sleep per night (Lastella et al., 2015; Leeder et al., 2012; Sargent et al., 2014). Unfortunately, there is a lack of investigations with elite level athletes (Halson, 2013). Skein et al. (2011) showed reduced sleep time to negatively affect endurance performance with team sport athletes.

To date there are few studies with endurance athletes where training and non-training time PA have been measured (Drenowatz et al., 2013). Yoshida and colleagues (2014), in the study with female lacrosse players and gymnasts showed similar whole day PA non-training time PA, but gymnasts had longer trainings and their training amounts were higher. Additionally, longer training time predicted shorter non-training time PA. Furthermore, no observed changes in the proportion of light PA and sedentary time, between two sport groups were noted. As the non-training time PA affects recovery (Del Coso et al., 2010; Tufano et al., 2012) it could be assumed that non-training time PA might decrease in order to prepare for the next training session (Carlsohn et al., 2011). Given the importance of training and non-training time PA and lacking research in this field with elite level athletes we compared whole day, training and non-training time PA comparison in training camp and at home conditions.

The purpose of the current study was to investigate physical activity patterns and connections between body composition parameters and additionally to determine sleep of elite level endurance athletes at home and in training camp.

2. AIM

The purpose of the current study was to investigate physical activity of elite level cross-country skiers in training camp and at home conditions.

The specific aims were as follows:

1. To compare the PA of whole day, during training and non-training time between training camp and home conditions.
2. To investigate the sleeping patterns of elite endurance athletes on training camp and at home.
3. To explore the associations between the PA, sedentary time and body composition of male elite level cross-country skiers.

3. METHODS

3.1.Participants

Participants were 17 national and international level competing cross-country skiers who were regularly guided by coach in training camps. Data inclusion criterion were: 1) participation in trainings at least 5 times a week; 2) athlete is in good health and do not use any drugs; 3) regular racing on previous or current season. Possible risks and the procedures were explained to athletes before they signed informed consent to participate in the study. Study procedures and protocols were approved by the Ethics Committee of the University of Tartu (approval no. 260/T-17, issued 13.06.2016) and conformed to the Declaration of Helsinki.

3.2.Procedures

After giving a written informed consent, athletes filled short questionnaire concerning training background. Additionally, physical activity of the two seven-days-period was objectively measured using ActiGraph wGT3X-BT (Penascola, USA) accelerometer. Devices were worn during one week in training camp and second week at home on the hip. All measurements were performed on the preparation period in summer and in early autumn. Also, body composition was measured using DXA method in the institutes laboratory after subjects had worn accelerometers.

3.3.Physical activity measurements with accelerometers

It has been suggested to use accelerometry as it can supply accurate data about the intensity, the frequency, the total amount and the duration of the daily PA (Plasqui & Westerterp, 2007). Participants were instructed to: a) wear the accelerometer on their hip throughout the day and remove it only for water-based activities (e.g. swimming, showering, etc.); b) to retain their usual activity patterns. The selection of the weeks when accelerometers were worn, were selected so that there were no competitions as competitions affect habitual PA patters in training camp.

Accelerometers were fastened on to the hip with elastic rubber band like the way it would not disturb athletes daily and trainings activities. All participants had to keep a daily accelerometer diary where they marked: a) the beginning and end times of the school/work day; b) sleep time; c) the beginning and end times of the trainings; d) non-wear time. The data from accelerometers were recorded by an accuracy of 1 second. The data were downloaded from accelerometers and processed using ActiLife software version 6.11.2 (ActiGraph LLC, Penascola, FL, USA). For better data interpretation, the collected data from accelerometers were summarised into one minute epochs (Kim et al., 2012). In case there were no movements on different axis for 60 minutes, such time period was considered as non-wear time. Accelerometers had to be worn a minimum of 6 hours per day (awake hours) to be included into the study and also there had to be available data minimum for 4 days. For analysing data on non-training time and training time, there had to be at least 1,5 hours and 3 hours of data. On trainings, the devices had to be worn not less than 75% from the training time, otherwise the training were excluded. For the result of data treatment, minutes spent as sedentary, in light physical activity (LPA), MVPA and the number of steps was calculated using Freedson cut-points for adults (Freedson et al., 1998) Sedentary time was considered less than 100 (cpm), LPA 100-1951 (cpm), MVPA more than 1952 (cpm) (Freedson et al., 1998). The activity diaries were used for extracting training and non-training time.

3.4.Anthropometry and body composition measurements

The height (Seca height rod 225, Seca GmbH & Co, Hamburg, Germany) and body mass (A&D Instruments Ltd., Oxfordshire, UK) of the participants were measured to the nearest 0.1 cm and 0.05 kg, respectively.

Body composition was measured with Dual Energy X-ray Absorptiometry (DXA) (Hologic QDR Discovery, Hologic Inc., Bedford, USA). Participants were asked to avoid alcohol for 24 h, and retain their normal eating habits the day before the measurement. The two sections (lean, fat) were measured with the participant in the supine position (Hetland et al., 1998) wearing minimal clothes and without the shoes. Measurements were executed by the same technician every time. Participants were positioned and scanned according to the operator's manual using the standard analysis protocol. By the lack of female participants who were measured with DXA the interactions between anthropometrical data and PA at home and on training camp were calculated only for male subjects.

3.5.Statistical analysis

Statistical analysis was performed using IBM-SPSS Statistics for Windows version 20.0, 2012 (SPSS Inc., an IBM Company, Chicago IL, USA). Descriptive analysis included means ± standard deviation (SD) for all measured variables. To evaluate the associations between PA, sedentary time and the main body composition variables for the male athletes Pearson correlation was used. Data for the calculations were summarised data, from training camp time and at home time, from whole day activity. Finding the associations between the PA patterns and body composition variables, average PA values from home and training camp week were used. Repeated measures ANOVA were used to compare PA, sedentary time and sleep time in training camp and at home when controlled for gender interactions.

4. RESULTS

The characteristics of participants are presented in Table 1. Whole day PA on training camp was significantly higher compared to home conditions (p=0.020). The PA of non-training time as well as training time did not differ between home and training camp conditions (p=0.511 and p=0.095, respectively). There was a significant difference in average duration of training between home and training camp conditions for male (109.4±13.4 and 151.2±9.2 min respectively, p=0.009) but not for female athletes (115.7±18.2 and 102.5±12.4 min respectively, p=0.492). The whole day MVPA and training time was significantly higher (p=0.005 and p=0.028) on training camp compared with home conditions (Tabel 2). There was statistically significant interaction in training time MVPA between gender and training conditions (p=0.020) – male athletes acquired significantly more training time MVPA in training camp compared to home condition (103.4±24.9 and 67.2±24.4 min respectively, p=0.04), while there was no difference for female athletes (60.5±16.1 and 67.2±29.0 min respectively, p=0.638).

Table 1. The characteristics of participants by gender (mean± SD)

	Males (n=11)	Females (n=6)
Age (y)	24.9±5.9	21.2±2.2.5
Height (m)	1.83±0.05	1.76±0.05*
Mass (kg)	77.4±4.9	67.5±4.8*
BMI ($kg\cdot m^{-2}$)	22.8±1.0	22.1±1.2
VO_2max (ml·min-1·kg-1)	75.6±7.8	56.3±1.0*
Fat mass (kg)	9.4±1.6	-
Fat%	12.5±1.7	-
Fat free mass (kg)	66.1±4.1	-
Training experience (y)	12.7±8.6	13.0±2.9
Training volume per year (h)	682.5±137.5	593.5±109.5*

BMI – body mass index.

* statistically significant difference between gender, p<0.05

Statistically significant interaction was found between gender and the proportion of whole day MVPA (p=0.012) and sedentary time (p=0.001). The male athletes had a greater proportion of the whole day MVPA ($p<0.001$) and smaller proportion of daily sedentary time ($p=0.001$) in training camp compared to home, while there was no difference present for female athletes neither in the proportion of daily MVPA ($p=0.486$) nor sedentary time ($p=0.359$). According to a correlation analysis, training time MVPA was negatively associated with non-training sedentary time at home ($r=-0.277$, $p=0.037$) but not in training camp ($r=-0.09$, $p=0.387$). There was no association between training time MVPA and non-training time MVPA neither at home ($r=-0.210$, $p=0.117$) nor in training camp ($r=0.037$, $p=0.713$).

Tabel 2. Physical activity, sedentary time and number of steps of whole day, during and outside trainings at home and in training camp (mean ± SD)

	Whole day		Training time		Non-training time	
	Home	Training camp	Home	Training camp	Home	Training camp
Sedentary time (min)	359.4±91.7	360.1±69.6	9.3±9.4	8.9±7.9	319.7±94.2	333.2±74.1
Light (min)	282.1±66.7	273.1±57.1	35.1±21.8	36.9±15.0	235.2±66.6	217.3±40.8
MVPA (min)	94.3±38.2	151.0±46.1*	67.2±25.2	88.2±30.2	41.5±18.6	28.6±10.5*
Steps	12681±3416	18817±4771*	7246±2774	9662±3459	6941±1681	5464±1149*

MVPA – moderate to vigorous physical activity

* – significant difference in training camp conditions, when controlled for gender ($p<0.05$)

Although there was a trend that athletes sleep more during the day while being in training camp compared to home ($p=0.080$), no difference was present in the overall daily sleep time between home and training camp (592.0±83.0 and 584.0±51.3 min, p=0.653prespectively, $p=0.653$). Additionally, athletes tended to take daily nap more often on training camp than at home.

Out of all body composition parameters investigated, the fat mass of male athletes was strongly correlated with overall number of steps in training camp and at home ($r=-0.714$, $p=0.020$) (Table 3).

Table 3. Associations between physical activity, sedentary time and number of steps, and body composition parameter on training camp in male athletes

	Fat mass	Lean mass	Fat free mass	Fat%
MVPA (min)	-0.581	-0.566	0.214	-0.483
Light (min)	-0.457	-0.508	-0.477	-0.359
Sedentary (min)	-0.456	0.199	-0.580	-0.372
Steps	-0.714*	-0.466	-0.472	-0.494
Sleep time at home (min)	0.664*	-0.02	-0.055	0.603
Sleep time in training camp (min)	0.611	-0.395	-0.406	0.776*

* – significant difference between indicators (p < 0. 05)

At home, the proportion of whole day light physical activity and MVPA of non-training time was significantly higher (p=0.022 and p=0.010 respectively) compared to training camp (Figure 1). At training camp athletes had greater proportion of whole day MVPA and sedentary time of non-training time (p=0.028 and p=0.009 respectively) compared to home.

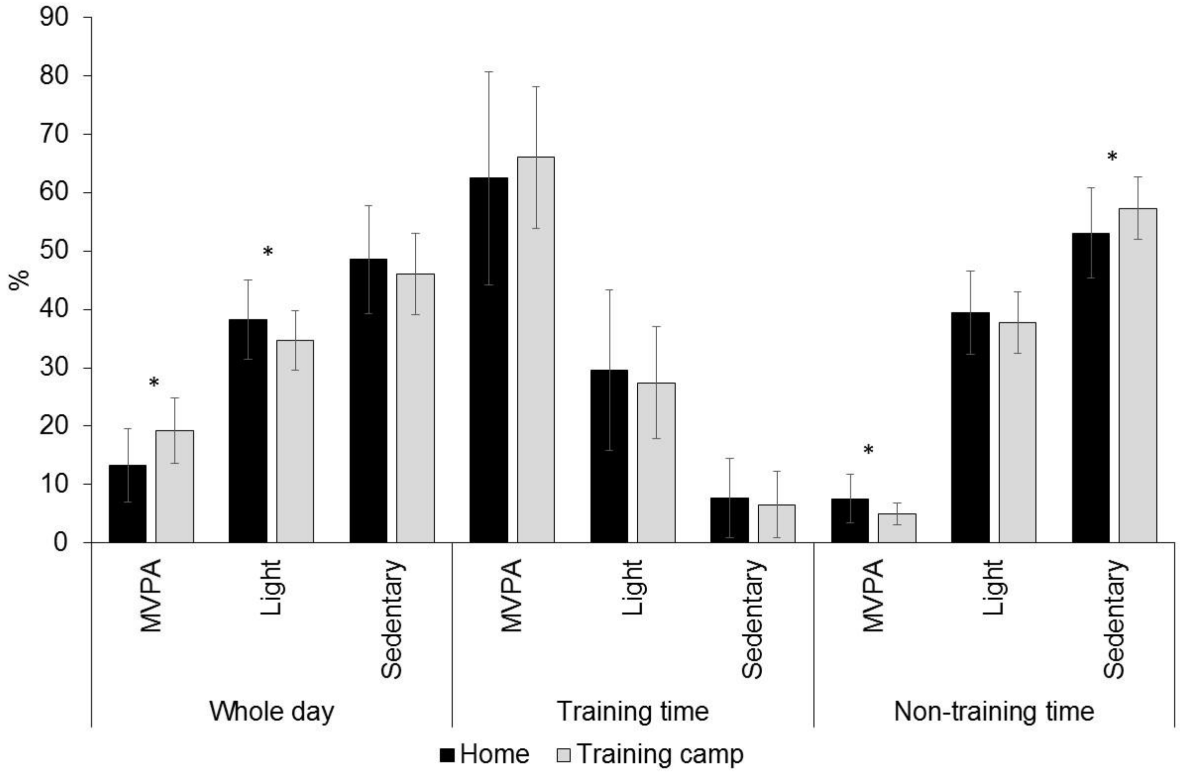

Figure 1. The proportion of moderate to vigorous physical activity, light physical activity and sedentary time of whole day, during and outside trainings at home and in training camp (mean ± SD). * - statistically significant differences between home and training camp conditions, when controlled for gender, p<0.05.

5. DISCUSSION

To the author knowledge, this is the first study where elite level cross-country skiers physical activity patterns at home and in training camp situation have been evaluated. The main findings of the study were that elite level cross-country skiers presented higher non-training MVPA and lower sedentary time at home conditions compared to training camp. Additionally, whole day MVPA was lower and light activity higher at home conditions.

5.1.Whole day

On whole day athletes showed significantly higher proportion of light PA and lower MVPA at home compared to training camp, but no differences were noted in sedentary behaviour. Lower MVPA at home condition is possibly due to shorter and/or smaller number of trainings. However significantly higher light PA at home is indicating that athletes are spending more energy on everyday activities between the trainings and are not resting as much as in training camp. The present values for sedentary time are considerably lower than previously reported 79% of whole day sedentary behaviour for football players (Weiler et al., 2015). Additionally, Drenowatz et al. (2013) have shown sedentary behaviour of 72.9 % at high volume week and 76.9 % at low volume week with endurance trained athletes. In minutes, athletes spent 6 hours as sedentary both at home and on training camp, which is considered less than 7.7 hours presented in Judice et al. (2014) in a study with different sport athletes (gravitational sports, weight category sports, non-weight category sports). It has been explained (Judice et al., 2014) that higher levels of MVPA might be compensated with the higher values of sedentary behaviour among athletes. Lower whole day MVPA time was found at home compared with training camp conditions. One important finding of current study was that on whole day athletes showed significantly higher number of steps during training camp than at home (18817 ± 4771 vs. 12681 ± 3416 step). Unfortunately, no comparative data from literature was found. However according to the Tudor-Locke & Bassett (2004) recommendations for non-athletic population to take 10 000 steps daily, we can conclude that elite level endurance athletes showed significantly higher numbers of daily steps than suggested threshold of 10 000 steps per day (Tudor-Locke & Bassett, 2004).

5.2.Training time

Participants showed similar training time PA at home and on training camp (Table 2 and Figure 1). Therefore, differences seen in whole day physical activity patterns are most likely due to the activities in non-training time. In current study, association between training time

MVPA and sedentary time on non-training time at home was observed (p=0.037), as on the condition at home, higher training time MVPA predicted lower value of sedentary behaviour, while no such association was found on training camp (p=0.387). Yoshida et al. (2014) had also payed attention to the issue, that higher training PA levels were compensated with lower non-training time PA. According to Zaryski & Smith (2005) training volume is justified to achieve sufficient recovery, adaptation and performance.

Looking the results of training time steps, showed that athletes took more steps on training camp than at home (9662 ± 3459 vs 7246 ± 2774 step), but the difference controlled for gender did not show difference between two conditions.

5.3.Non-training time

Elite level cross-country skiers presented significantly higher non-training time MVPA at home compared to training camp (p=0.004). Current results might be caused by the issue that on training camp athletes were more sedentary and at home athletes might be more occupied with non-sport activities, working etc. those estimations are confirmed as cross-country skiers showed higher values of non-training time steps at home than on training camp (6941 ± 1681 vs. 5464 ± 1149 step; $p<0.05$).

As the training time in training camp was longer than at home (p=0.009) and the training time MVPA was on the same level between home and training camp weeks, the trainings in training camp are considered to be less intensive. Same findings were presented in Drenowatz et al. (2013) study with endurance trained athletes.

5.4.Sleeping patterns

Additionally, in current study we found the trend (p=0.080) in sleeping patterns with subjects, which showed more day time sleep on training camp than at home. There was no difference between sleep time at home and on training camp. In some previous studies (Lastella et al., 2015; Leeder at al., 2012; Sargent et al., 2014) with endurance trained athletes has shown less sleep time than in current study. Difference between results in those investigations is considered to be due to sport level of athletes, as in current study athletes were high level endurance athletes and they have higher amounts of trainings and therefore they need more sleep to recover (Adam & Oswald, 1984; Dattilo et al., 2011).

5.5.Connections between body composition and PA

Among male athletes some PA patterns showed to be associated with body composition characteristics. Results showed interactions between fat mass and the number of daily steps on whole day as, the lower number of steps was negatively associated with the fat mass (r=-0.714). Previous study with non-athletes have showed similar results (Morizawa et al., 2017). Additionally, male athletes showed sleep time to be associated with fat percent on training camp (r=0.776). Also, there was association with fat mass and sleep time at home (r=0.664). Previous studies have demonstrated association between sedentary behavior (Grund et al., 2001; Vandelanotte et al., 2010; Wagner et al., 2012) and MVPA (Gonzalez-Gross & Melendez, 2013; Maher et al., 2013) with body composition parameters. Judice et al. (2014) showed sedentary behavior to be related with trunk fat mass, however present results with elite level cross-country skiers do not confirm Judice et al. (2014) findings. Possible reason for the differences with previous studies is the level and athletic background of the present subjects. Participants of the present study are endurance athletes, participating in sports for a long period of time (training experience was 12.7 yr) which have produced specific long term adaptions (VO_{2max} 75.6±7.8 $ml \cdot min^{-1} \cdot kg^{-1}$) to the body composition.

5.6.Strengths and weaknesses of the study

Current study gives a big number of novel information about cross-country skiers PA on training camp and at home as previously there are not comparative investigations with cross-country skiers and few studies with other sport categories (Drenowatz et al 2013). The study shows that elite level cross-country skiers compensate their high training loads with lower PA on non-training time witch due to a need of recovery seems to be highly important. Study also shows no differences in sleeping patterns between training camp and at home conditions. Like the study with elite cross-country skiers showed interactions between body composition parameters and PA patterns, the study gives practitioners some suggestions to monitor athletes PA patterns.

Current study measured body composition parameters with male athletes and therefore the questions how body composition with female athletes is influenced by the PA patterns. As, previously showed, body composition to plays important role with female cross-country skiers (Larsson et al., 2013). Current study gives answers about one week periods in training camp and at home, further research with elite level endurance athletes should be carried out taking into account higher period of time as this might give more accurate results.

6. CONCLUSION

1. Elite level cross-country skiers whole day MVPA was higher on training camp compared with at home conditions. Additionally, non-training time MVPA at home was higher than on training camp also, on non-training time athletes spent less time sedentary at home than on training camp.
2. Elite level cross-country skiers sleeping time did not differ between at home and on training camp conditions. However, elite level cross-country skiers showed trend to sleep more during the day while being in training camp compared to home conditions.
3. The number on steps and sleep patterns affected adiposity of elite level male cross-country skiers as higher number of steps predicted lower fat mass additionally, higher amount of sleep on training camp predicted higher fat percent and higher sleeping time at home predicted higher fat mass.

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APPENDIX

Appendix 1. Used activity dairy

TARTU ÜLIKOOL

Sportlaste kehaline aktiivsus treeningutevahelisel ajal

Kood:

Liikumisanduri päevik

Palume täita **iga** liikumisanduri kandmise päeva kohta järgnevad **kellaajad**:

Kuupäev		I	II	III	IV	V	VI	VII
Mis kell tõusid hommikul üles?								
Mis kell algas koolipäev/tööpäev?								
Mis kell lõppes koolipäev/tööpäev?								
Treening	Algus							
	Lõpp							
Treening	Algus							
	Lõpp							
Treening	Algus							
	Lõpp							
Lõunauinak	Algus							
	Lõpp							
Mis kell läksid õhtul magama?								

Palume siia märkida tegevuse, siis kui **Te ei kanna liikumisandurit**. Nt. tegevused, mille ajal on seadet ebamugav kanda või on kandmine keelatud (nt. ujumine, pesemine). Vajadusel kasutage lisalehte.

Kuupäev	**Liikumisanduri eemaldamise kellaaeg**	**Liikumisanduri pealepaneku kellaaeg**	**Tegevus liikumisanduri mittekandmise ajal (va. öine uni)**	**Tegevuse intensiivsus liikumisanduri MITTE kandmise ajal (skaalal 1 - 4) ***	**Tegevuse kestus minutites liikumisanduri MITTE kandmise ajal**

* SKAALA:

1 – Ei olnud kehalist pingutust/aktiivsust – tegevused, kus Te ei kandnud liikumisandurit ning samas ei olnud ka kehaliselt aktiivne (nt. lugemine, istumine).

2 – Kerge kehaline pingutus/aktiivsus – tegevus, mis ei pane Teid hingeldama ja/või higistama (kõndimine/jalutamine, nõudepesu jne).

3 – Mõõdukas kehaline pingutus/aktiivsus – tegevus, mis paneb Teid tavapärasest kiiremini hingama ja/või natuke higistama (nt. sörkjooks, kiire kõnd, aeglane rattasõit, aiatööd, rahulik ujumine).

4 – Tugev kehaline pingutus/aktiivsus – tegevus, mis paneb Teid tugevalt hingeldama ja/või tugevalt higistama (nt. kiire jooks, rattasõit, intensiivne ujumine).

Appendix 2. Used questionnaire

Kood:

Küsimustik

Vanus:____________a

Pikkus:___________cm

Kaal:____________kg

Spordiala:

1. Kui vanalt alustasid regulaarsete treeningutega?___________________________.

2. Kui vanalt alustasid praeguse eriala treeningutega?_________________________.

3. Milline oli eelmise hooaja treeningmaht (tunnid ja/või kilomeetrid):

    ____________tundi

    ____________km

4. Mitu korda nädalas keskmiselt treenid? _____________________

5. Milline oli viimase 3 kuu kõige tugevama treeningnädala maht (tunnid ja/või kilomeetrid)?

    ____________tundi

    ____________km

6. Mitu minutit teed treeningute alguses staatilisi venitusharjutusi? __________________

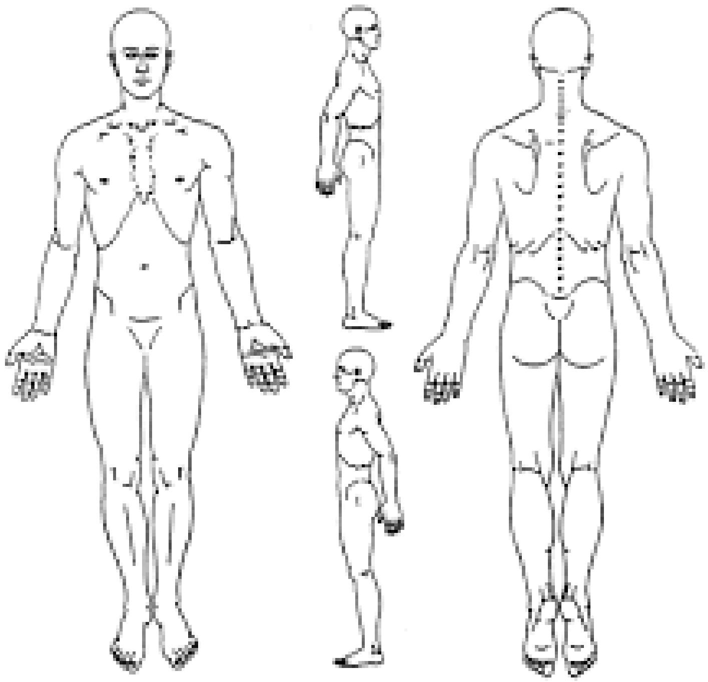
7. Mitu minutit teed treeningute lõpus staatilisi venitusharjutusi? ___________________

8. Mitu korda oled viimase 6 kuu jooksul käinud füsioterapeudi/ massööri vastuvõtul? __________________________

9. Millal käisid viimati spordiarsti vastuvõtul koormustesti tegemas? ________________

    a. Kui kõrge oli maksimaalse hapnikutarbimise näitaja (VO_2max)?______________

10. Palun märgi alljärgnevale joonisele, millises piirkonnas on sul viimase 12 kuu jooksul vigastusi esinenud!



Vigastus	Kaua viibisid vigastuse tõttu eemal tavapärastest treeningutest?

AITÄH!

Lihtlitsents lõputöö reprodutseerimiseks ja lõputöö üldsusele kättesaadavaks tegemiseks

Mina ________________________Eno Vahtra____

(sünnikuupäev: ______________8.09.1990____)

1. annan Tartu Ülikoolile tasuta loa (lihtlitsentsi) enda loodud teose

The physical activity patterns of international level cross-country skiers in training camp and at home,

mille juhendajad on Martin Mooses, Kerli Mooses,

1.1. reprodutseerimiseks säilitamise ja üldsusele kättesaadavaks tegemise eesmärgil, sealhulgas digitaalarhiivi DSpace-is lisamise eesmärgil kuni autoriõiguse kehtivuse tähtaja lõppemiseni;
1.2. üldsusele kättesaadavaks tegemiseks Tartu Ülikooli veebikeskkonna kaudu, sealhulgas digitaalarhiivi DSpace´i kaudu kuni autoriõiguse kehtivuse tähtaja lõppemiseni.

2. olen teadlik, et punktis 1 nimetatud õigused jäävad alles ka autorile.

3. kinnitan, et lihtlitsentsi andmisega ei rikuta teiste isikute intellektuaalomandi ega isikuandmete kaitse seadusest tulenevaid õigusi.

Tartus ________8.05.2017________