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Changes to eating habits of young men after finishing a diving course

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ABSTRACT

Juříková, J. (2014). Changes to eating habits of young men after finishing a diving course. *J. Hum. Sport Exerc., 9*(Proc1), pp.S449-S459. At the Military Academy Vyškov in the Czech Republic there are diving courses arranged for soldiers. The courses take two months. The young men coming to the courses have different eating habits that they have gained in the family and/or in the military crew. A diving training is very hard, both physically and mentally. Increased energy expenditure requires also an adequate energy dietary intake.MIt was investigated whether eating habits of soldiers have changed. The eating habits were investigated by anonymous questionnaire before opening a course and after finishing a course. Also anthropometric parameters were measured before opening and after finishing a course. It was measured: body weight, body height and body mass index that was calculated from the previous data. The physical activity of diving course participants in leisure time was identified too. The results demonstrated that the diet composition was radically changed for all investigated soldiers after finishing a diving course. The percentage of soldiers who eat for breakfast meat, dairy products, fruit and vegetables has increased. At the same time the consumption of bakery products has decreased. For lunch the consumption of meat, fat foods, potatoes, cereals orders, fruit and vegetables has increased. For dinner the consumption of meat products, fat foods, dairy products, potatoes, cereals orders, fruit and sweets has increased.After finishing a diving course the consumption of alcohol was slightly increased, participants of a diving course drank mainly beer. The diving training had no influence on smoking of cigarettes. **Key words**: SOLDIERS, DIET, BREAKFAST, LUNCH, DINNER.

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INTRODUCTION

The Military Academy in Vyškov is one of the best equipped working places of the Czech Army regarding not only the military training but also sports activities of the soldiers. The premises of the Academy includes a running track, sports hall, tankodrome, shooting range, combat simulators and other modern technical equipment. It is the only place in the Czech Republic which offers indoor training hall with a pool to train driving tanks under the water. It can also be used to train divers in difficult conditions. Soldiers who are interested in diving can enroll into a diving course which will train them in precision swimming and diving in a large sports pool. Part of the course is also training divers in a tank ford and in the water diving under the ice in natural conditions. It is very demanding to pass the course and by no means that it could be compared with hobby diving courses. More often than not it happens that not all participants finish the course.

In the past when the military service was compulsory in the Czech Republic, only soldiers under military training could enroll into the course. Nowadays, the course is open to the general public, but not many civilians are interested in it due to the difficulty and smaller attractiveness if compared with hobby sea diving. Thus, these courses are still attended by the soldiers only.

Soldiers who enter the course have their own eating habits which originated at their homes or in their army units at the time when they were not performing so demanding activities. The aim of this paper is to find out whether usual daily portions of food which is allotted in the barracks are sufficient, or whether the eating habits of the soldiers have changed and they have to buy more food or drinks with their own money.

MATERIALS AND METHODOLOGY

The courses which the soldiers enrolled in lasted for two months. Soldiers who had been selected to take part in the courses arrived from their units and they stayed in the barracks of the Vyškov unit during the whole course. They had their meals in unit's canteen and they were allowed to use both the sports equipment of the unit and of the Military Academy. They can choose their meal from 4 menus of lunch and from 2 menus of dinner and 1 snack. To fill all courses, a certain number of places were offered to soldiers of all army units of the Czech Republic. Either exactly the offered number or a smaller number of soldiers applied for the courses, therefore everyone who applied was accepted; there was no subsequent selection procedure. The only condition to enter the course was to know how to swim which did not seem to be a problem at first. Later, it was revealed that though all participants could swim their swimming technique was frequently on a very low level, therefore the beginning of the course was devoted to improving the technique of all swimming styles. When all the participants became very good swimmers, they could also become good divers. This stage of the diving training was taken by all participants. However, diving was much more demanding: after only a few lessons of diving in the pool, the divers were trained in a flooded tank, in tank ford and in rivers and lakes. This part of the diving course was very physically and psychically demanding and it happened that several participants left the course at this stage and they were not able to finish the course. Diving under the ice in the water was evaluated as the most difficult by soldiers.

The soldiers in the Czech Army are allotted different portions of food according to the difficulty of their work. These portions are divided into:

1. Basic food portion
2. Food portion for students at military secondary schools
3. Food portion for pilots

4. Food portion for paratroopers (Defense Ministry Notice No. 266/1999 Coll, 1999) (Defense Ministry Notice No. 269/1999 Coll, 1999.

Soldiers under basic military training who take part in the diving course are included in the Basic food portion. Basic food portion is provided to a soldier who does not have the right for a different food portion. A duty officer who performs the function for at least 24 hours at military schools and in air and paratroop units, which do not allot Basic food portion, gets such food portions, which is commonly allotted in the respective unit.

There are also additions to the individual food portions according to the difficulty of performed service; they include:

a) A food addition – health
b) B food addition – demanding service
c) C food addition – especially demanding service
d) D food addition – continuous military training
e) E food addition – during sports activities
f) F food addition – during sports competitions within the scope of Defense Ministry
g) G food addition – for pilots in service on the days of flying activities
h) H food addition – for pilots in service who are members of units of supersonic and subsonic airplanes equipped with weapon systems and transport planes (Defense Ministry Notice No. 266/1999 Coll, 1999)

The above food additions are allotted to professional soldiers, pilots and paratroopers (Defense Ministry Notice No. 269/1999 Coll, 1999).

Even though it appears that soldiers in the diving course should have the right for at least the E food addition – sports activities – for the duration of the course, or B or C food additions – demanding service or especially demanding service – they are not entitled to any addition. Despite having performed several researches concerning this issue, e.g. by Březina et al. (2000) and Březina et al. (2002) and despite having sent an appeal to the Defense Ministry based on the findings of the researches to provide food additions for the divers during the diving course, no additions were allotted to the divers.

Researching eating habits. The eating habits of the soldiers in the diving course were researched with a questionnaire. A part of a standardized questionnaire created at the Faculty of Medicine of Masaryk University in Brno (Czech Republic) by Brázdová & Fiala (1998) was used for the questionnaire. The questionnaire was presented to the soldiers twice: first before starting the diving course and then after finishing it. The questionnaire was anonymous. All questions were explained to the soldiers in advance, which resulted in submitting all questionnaires with complete answers and without mistakes that could be caused by misunderstanding. Thus, the return rate of the questionnaires was both before starting the course and after finishing it 100%. Before and after the course, the participants were measured for anthropometric indicators such as body weight and height and these values were used to calculate the Body Mass Index (BMI).

Measuring body weight

Body weight was measured on medical scales by Soenhle Company with precision of 0.1 kg. During weighting, the examined person was wearing only underwear and no shoes (Kleinwachterová & Brázdová, 1992). The weight of the underwear was not considered.

Measuring body height
Body height was measured with an anthropometer. The anthropometer was a part of the medical digital scales with precision of 0.1 mm. During measuring body weight and height, the examined person was standing in erect stand, heels together, the arms along the body and erect head.

Calculating the Body Mass Index (BMI)
The Body Mass Index (usually abbreviated to BMI) is a secondary indicator which is derived from body weight and height. Measuring BMI is widely used both by civilians and in the army (Juříková et al., 2001). The measured values of body weight and height were used to calculate BMI using the following formula

$$BMI = \frac{\text{body weight [kg]}}{(\text{body height [m]})2}$$

Obesity classification is presented in Table 1.

Participants of the research
All participants of the diving course were included in the research. The course took place between February and April 2000. Altogether 36 soldiers enrolled in the course out of whose 32 finished the course. This works present anthropometric indicators and eating habits only of the soldiers who finished the course. The table below shows anthropometric indicators before and after the diving course as well as the age of the researched soldiers.

Table 1. *BMI categories, obesity classification (according to WHO) and its relationship to health risks (Gauner, 2001)*

BMI	Category by WHO	Health risks
≤ 18,5	underweight	malnutrition, anorexia
18,5 – 24,9	normal weigh	minimal
25,0 – 29,9	overweight	slightly increased
30,0 - 34,9	1st degree of obesity	moderately high
35,0 – 39,9	2nd degree of obesity	high
≥ 40	3rd degree of obesity	very high

Table 2. *Shows the body physique of men according to BMI*

BMI	Men
< 18	skinny
18,0 - 23,0	slim
23,1 – 25,0	adequate
25,1 - 30,0	robust
> 30	obese

Table 3. *Body physique of men according to BMI (Kleinwachterová & Brázdová, 1992)*

Number of person	Body weight behind [kg]	Body weight after [kg]	Change of the body weight [kg]	BMI behind	BMI after	Change od BMI	Age [years]
1	66.9	64.3	-2.6	22.2	21.4	-0.8	21
2	71.0	70.1	-0.9	21.2	20.9	-0.3	19
3	72.5	69.9	-2.6	23.0	22.2	-0.8	22
4	86.5	81.9	-4.6	26.8	25.4	-1.4	20
5	83.9	83.4	-0.5	28.0	27.9	-0.1	28
6	72.0	69.9	-2.1	24.5	23.8	-0.7	26
7	74.6	71.7	-2.9	22.9	22.0	-0.9	27
8	79.2	86.9	7.7	25.1	27.6	2.5	26
9	85.1	86.9	1.8	27.3	27.9	0.6	26
10	79.7	77.0	-2.7	25.3	24.4	-0.9	28
11	84.6	83.0	-1.6	26.6	26.0	-0.6	25
12	71.9	70.3	-1.6	24.7	24.2	-0.5	21
13	66.9	67.2	0.3	21.5	21.6	0.1	18
14	78.2	76.4	-1.8	26.3	25.7	-0.6	20
15	59.2	60.6	1.4	19.7	20.1	0.4	19
16	51.0	60.1	9.1	20.8	28.6	7.8	20
17	72.1	70.1	-2.0	22.2	21.6	-0.6	19
18	81.0	79.3	-1.7	27.1	26.5	-0.6	22
19	73.8	72.9	-0.9	24.0	23.7	-0.3	19
20	68.0	69.2	1.2	21.3	21.7	0.4	19
21	68.5	67.0	-1.5	25.3	24.8	-0.5	19
22	69.9	71.1	1.2	20.5	20.9	0.4	19
23	73.4	73.0	-0.4	23.6	23.4	-0.2	19
24	76.3	79.6	3.3	21.7	22.6	0.9	19
25	89.8	90.9	1.1	27.7	28.1	0.4	18
26	68.0	69.1	1.1	20.5	20.9	0.4	23
27	62.0	62.6	0.6	19.7	19.9	0.2	19
28	69.7	71.6	1.9	21.8	22.3	0.5	19
29	66.9	68.3	1.4	23.4	23.9	0.5	18
30	88.8	86.7	-2.1	24.1	23.5	-0.6	19
31	73.6	70.8	-2.8	25.3	24.3	-1.0	22
32	62.1	64.7	2.6	20.3	21.1	0.8	18

Table 4. *The age and anthropometric indicator of the soldiers before and after the diving course*

Number of person	Breakfast behind diving course	Breakfast after diving course
1	pastry, meat products	meat, dairy products
2	pastry, dairy products	pastry, meat
3	pastry, fat products	pastry, meat products
4	meat, dairy products, vegetables	dairy products, meat products, fat food, fruit, vegetables, sweets
5	pastry, fruit	pastry, meat, fruit, vegetables
6	pastry, fruit	pastry, dairy products, sweets
7	pastry, fruit, vegetables	dairy products, fruit, vegetables
8	pastry, dairy products, fruit	pastry, dairy products, fruit
9	pastry, dairy products	pastry, dairy products, meat, meat products, fruit, vegetables
10	fruit, dairy products, vegetables	dairy products, meat, potatoes, fruit
11	pastry, dairy products, meat products, fats	pastry, fats
12	pastry, fruit, fats	pastry, dairy products, meat products, fats
13	pastry, fats	pastry, dairy products
14	pastry, fats	pastry, dairy products, meat, meat products, sweets
15	pastry, dairy products	pastry, meat products
16	pastry, fats	pastry, dairy products, sweets
17	dairy products, fruit, vegetables	meat products, fats, sweets
18	pastry, fats, fruit	pastry, dairy products
19	pastry, meat products, fruit	pastry, meat, potatoes, dairy products, meat products, fruit
20	pastry, meat, meat products, fats	pastry, fats, sweets
21	pastry, fats, fruit	pastry, meat, meat products
22	pastry, dairy products, meat products, sweets	pastry, meat products
23	pastry, dairy products, meat products	pastry, meat
24	pastry, fats	pastry, meat, vegetables
25	pastry, fats, fruit, vegetables	pastry, dairy products, meat, meat products
26	pastry, meat, fats	pastry, meat, fats
27	pastry, sweets	pastry, sweets
28	pastry, sweets	pastry, meat products
29	pastry, sweets	pastry, dairy products, vegetables, sweets
30	pastry, sweets	dairy products, fats, meat products, fruits
31	pastry, sweets	pastry, sweets
32	pastry, fats, sweets	pastry, meat products, fats

RESULTS AND DISCUSSION

The diving course was attended by 32 soldiers between the ages of 18 and 28. The average age was 21.2 (± 3.2). As can be seen in Table 3, 18 soldiers lost weight during the course; the weight loss ranged from 0.4 to 4.6 kg. 14 soldiers put on weight, from 0.3 to 7.7 kg. This change in their body weight was caused by

hard training and also by a change in their eating habits. The changes in their eating habits are presented in Table 4 - 7.

Table 5. *Kind of food eaten by researched soldiers mainly for breakfast (before and after the diving course)*

Number of person	Lunch behind diving course	Lunch after diving course
1	meat, potatoes	meat, potatoes, cereals, fruit, dairy products
2	meat, potatoes, cereals, vegetables	meat, potatoes, cereals, vegetables, fruit, meat products, fat products, dairy products, sweets
3	meat, cereals	meat, potatoes
4	meat, potatoes, vegetables	potatoes, cereals, vegetables, fruit, sweets
5	potatoes, vegetables, fruit	meat, potatoes, cereals, vegetables, fruit
6	meat, potatoes, cereals	meat, cereals, fat products
7	potatoes, vegetables	meat, potatoes, cereals, vegetables
8	meat, cereals	meat, cereals
9	meat, cereals, vegetables, fruit	meat, potatoes, cereals, vegetables, fruit, meat products, dairy products
10	cereals, fruit	meat, potatoes, cereals, vegetables, fruit
11	meat, potatoes, cereals, fats	meat, fats, sweets
12	meat, vegetables	meat, potatoes, cereals
13	meat, potatoes	potatoes, cereals, meat products
14	meat, potatoes, cereals	meat, potatoes
15	meat, potatoes, cereals	meat, potatoes, cereals
16	meat, potatoes	meat, potatoes, cereals
17	potatoes, cereals, vegetables	potatoes, fruit
18	meat, vegetables, fruit	potatoes, fruit
19	meat, potatoes, fruit	meat, cereals
20	meat, potatoes, vegetables	meat, cereals
21	meat, potatoes, cereals, fruit, sweets	meat, potatoes, cereals
22	meat, cereals	meat, potatoes, fruit
23	meat, fats	potatoes, cereals, meat products
24	meat, potatoes, cereals, meat products, fats	meat, vegetables
25	meat, potatoes	meat, potatoes, vegetables, fruit, meat products, fats, dairy products, sweets
26	meat, potatoes, cereals, meat products, fruit	meat, cereals
27	meat, cereals	cereals, sweets
28	meat, cereals	potatoes, cereals, vegetables, meat products
29	meat, potatoes, meat products	meat, potatoes, cereals, meat products

30	meat, sweets	cereals, fats, sweets
31	meat, cereals, sweets	meat, potatoes
32	meat, potatoes	meat, potatoes, cereals, fruit

Table 5 reveals that originally the most frequent food for breakfast was pastry, fruit, dairy products and fats. After finishing the diving course, the consumption of pastry lowered, even though pastry still prevailed in the composition of breakfast. The consumption of fats and fruit was also smaller while consumption of dairy products, meat and vegetables increased. Before starting the course, only one soldier stated that he often eats meat for breakfast while after finishing the course, the number of soldiers eating meat for breakfast increased to ten, which makes nearly one third of questioned persons. There was also increase in the number of soldiers who ate sweets after breakfast.

Table 6 shows that the composition of lunch did not change much during the course. Both before the course and after it, the soldiers were eating mainly lunch with potatoes or cereals. Increased consumption of meat and dairy products for lunch is a proof that after lunch the soldiers were some additional meat. Frequently, they were also buying yoghurts and other dairy products and if compared to the time before the diving course, more soldiers started to eat sweets after lunch. This information reveals that the diet composition of their lunch was not sufficient for the soldiers in the diving course.

Table 6. *Kind of food eaten by researched soldiers mainly for lunch (before and after the diving course).*

Number of person	Dinner behind diving course	Dinner after diving course
1	meat, potatoes, pastry	meat, potatoes, pastry
2	potatoes, pastry	meat, potatoes, cereals, vegetables, fruit, meat products, fat products, dairy products, sweets
3	meat, meat products, pastry, dairy products, fruit	meat, potatoes, fruit
4	meat, potatoes	meat, meat products, pastry, fruit, sweets
5	potaotes, cereals, vegetables, fruit	meat, meat products, potatoes, pastry, vegetables, fruit
6	meat, meat products, vegetables, fruit, sweets	meat, meat products, dairy products, pastry, fat products
7	potatoes, vegetables, pastry	potatoes, dairy products, pastry, vegetables, fruit
8	pastry, vegetables, fruit	meat, pastry, fruit
9	pastry, dairy products, vegetables, fruit	meat, potatoes, meat products, pastry, dairy products, vegetables, fruit, sweets
10	pastry, fruit	meat, potatoes, dairy products, pastry, vegetables, fruit
11	pastry, meat products	meat, potatoes, fats, pastry
12	pastry, meat products	meat, potaotes, meat products, pastry
13	pastry, meat products	potatoes, meat products, pastry
14	meat, potatoes, pastry	meat, potatoes, pastry, fruit
15	meat, potatoes, pastry, vegetables	meat, potatoes, pastry
16	meat, potatoes	meat, vegetables, dairy products

17	dairy products, meat products, fats	fats, meat products, potatoes, sweets
18	pastry, meat products	meat, potatoes, meat products, pastry
19	meat, potatoes, meat products, pastry	meat, meat products, pastry
20	potatoes, pastry, vegetables	meat products, potatoes, pastry
21	meat, pastry, dairy products, fruit, sweets	meat, potatoes, pastry
22	meat, pastry	meat products, pastry
23	meat producst, meat, sweets	meat, potatoes, fats
24	meat, pastry, meat products, fats	meat, potatoes, meat products, pastry, vegetables
25	meat, meat products, pastry, dairy products, fruit	potatoes, pastry, vegetables, fruit
26	meat, pastry	meat, pastry
27	meat, pastry, sweets	meat, pastry, fats, vegetables, fruit, sweets
28	meat, pastry, sweets	meat, potatoes, meat products, pastry
29	pastry, meat products	meat products, potatoes, pastry
30	meat, potatoes	fats, sweets
31	pastry, sweets	x
32	pastry, meat products, fats	meat products, potatoes, pastry

Table 7. *Kind of food eaten by researched soldiers mainly for dinner (before and after the diving course).*

Number of person	Snacks behind diving course	Snacks after diving course
1	dairy products	dairy products, meat, fruit, vegetables
2	pastry, dairy products, meat products	dairy products, meat, meat products, pastry, fruit, vegetables, sweets
3	fruit, vegetables	dairy products, fat products, fruit, sweets
4	meat products	meat, meat products
5	fruit, vegetables	fruit, sweets
6	pastry, vegetables	dairy products, meat products, pastry, vegetables
7	fruit, vegetables	fruit, vegetables
8	pastry, fruit	dairy products, meat, pastry, fruit, vegetables
9	pastry, fruit, vegetables	all
10	x	dairy products, fruit
11	pastry, fats	fruit, sweets
12	pastry, sweets	fats, pastry, sweets
13	dairy products, meat products, fats, fruit, vegetables	meat, fruit
14	x	meat, pastry
15	fruit, sweets	x
16	meat products, pastry, fruit, vegetables, sweets	dairy products, fruit, vegetables, sweets
17	dairy products, fruit, vegetables	dairy products, meat products, fats, fruit, vegetables, sweets
18	pastry, fruit, vegetables	meat products, pastry, fruit

19	x	dairy products, fruit, sweets
20	meat products, pastry	meat products, pastry, fats, sweets
21	x	pastry, sweets
22	pastry, vegetables	meat products, pastry
23	meat products, pastry, sweets	meat, meat products, sweets
24	dairy products, meat products, pastry, fruit, sweets	pastry, sweets
25	dairy products, fruit, sweets	dairy products, sweets
26	fats, sweets	pastry, sweets
27	dairy products, meets products, fruit, sweets	pastry, sweets
28	dairy products, sweets	x
29	meat, meat products	x
30	dairy products, sweets	pastry, potatoes
31	pastry, sweets	x
32	fats, pastry, fruit	x

As can be seen in Table 7, before starting the diving course, the soldiers were mainly eating meat and cereal sides for dinner. If they had just supper, they ate mainly products made of meat and pastry. After finishing the course, they preferred dinner to supper and they were eating mainly meat with potatoes and cereals. It is interesting that after dinner, smaller number of soldiers ate sweets than before the diving course. Before the course, no soldier stated that he would be eating fat food. After the course, two soldiers stated that they eat fat food both for lunch and dinner. One soldier stated that during the diving course he stopped going for dinners in the barracks and he started to buy food for his own money. The soldiers were not offered snacks during the diving course, however there was a possibility for them to buy some snack in a nearby canteen. Before starting the course, 28 soldiers were buying snack (87.5 %), after finishing the course it was by one soldier less. For snacks, they were mainly eating pastry, dairy products, fruit, vegetable and sweets. After finishing the course, there was a decrease in the number of soldiers who ate vegetable for snacks, on the other hand, the number of soldiers who were buying sweets increased, which show that the energetic need of their organisms grew during the diving course. The number of soldiers who ate dairy products and fats for snacks did not change. There was also increase in the number of soldiers who were eating meat. No soldier stated that he would be eating meat or fat food before starting the diving course; after finishing the course, seven soldiers stated that they eat meat for snacks and two soldiers that they eat mainly fat food for snacks.

During the course, there appeared a change in the body weight of the soldiers as well as in the redistribution of fat into hypodermis. Their BMI changed as well, which is shown in Table 3. Based on BMI, 15 soldiers (45.9 %) were included in the “slim” group before starting the diving course; after finishing it, it was only 14 (43.8 %), one soldier was moved to the “satisfactory” category due to increased BMI. Altogether, there were 6 soldiers (18.8 %) in the “satisfactory” category before the course, after the course it was 9 soldiers (28.1 %). 11 soldiers (34.4 %) were “robust” before the diving course, after finishing the course, this category included only 9 soldiers (28.1 %). No soldier was overweight both before and after the diving course. In case of diving training during which BMI increases because fat is deposited in hypodermis as a reaction of the organism to staying in cold water, BMI categories such as obesity or severe obesity could not be used. This is the case also in other strength sports like weightlifting or wrestling etc.

CONCLUSIONS

The results of the research show that during the diving training, the weight of the soldiers changed, which resulted also in the change of BMI: 3 soldiers (9.4 %) were moved to a group with lower BMI, 1 soldier (3.1 %) was included in a group with higher BMI. Body weight of the majority of the soldiers decreased; this was observed in 18 soldiers (56.2 %). Body weight of 14 soldiers (43.8 %) increased. As far as eating habits are concerned, it was revealed that during the course, the majority of the soldiers started to buy additional food apart from the food they were given in the barracks. The additional food included dairy products, meat and mainly sweets, which shows that their energetic expenditure was not sufficiently covered with the Basic Food Portion. Consumption of meat and dinners increased; the dinners were composed mainly from meat with cereals or potatoes.

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