HADMÉRNÖK

VI. Évfolyam 2. szám - 2011. június

Kende György
gyorgy.kende@zmne.hu

Juhász Zsolt
juhaszzsolt@gmail.hu

EXAMINATION OF THE CONNECTIONS BETWEEN MOTION FORMS AND CONSTITUTIONAL FACTORS IN THE CIRCLE OF THE HUNGARIAN ARMY'S STAFF APPLYING FOR FOREIGN SERVICE
(01.01.2007 – 31.12.2010.)

Absztrakt

A fizikai erőnléti állapot következetes és rendszeres vizsgálata a különböző külföldi beosztások eltérő sajátosságai, valamint az emberi szervezetre gyakorolt eltérő jellegű és mértékű negatív hatásai miatt, egyre nagyobb jelentőséggel bír. Jelen munkában mindezek tükrében a külszolgálatokra jelentkező személyi állomány négy év alatti felmérésük során alkalmazott mozgásformák és az alkati tényezők, valamint az életkor és a fizikai teljesítőképességük közötti összefüggéseket kerestük és azok segítségével, a teljesség igénye nélkül igyekeztem egy átfogó képet adni a magyar haderő 2007 és 2010 között megvizsgált külszolgálatra jelentkező állományának fizikai erőnléti állapotáról.

A consistent and regular test of physical condition owing to the different characteristics of diverse foreign military posts, as well as to their negative effects of different kinds and grade taken on human body is being of more and more importance. In this study all these facts will be investigated. It was looked for a connection between the motion forms and constitutional elements used during its survey, as well as for a connection between the age-groups and physical performance of the staff applying for foreign service measured during four years. By dint of all these figures a comprehensive picture of the physical condition of the Hungarian Army's staff applying for foreign service in the period of 2007-2010 was guiven, without aiming at completeness.

***KKulcsszavak**: alkati tényezők, mozgásformák, fizikai teljesítőképesség, külszolgálat ~ constitutional elements, motion forms, physical performance, foreign service*

INTRODUCTION

It is always the character of the motor activities and the complex of the environmental conditions that determine what kind of conditioning faculties can be talked about and whether their developmental stage is sufficient or not. For this reason it is most optimal to carry on the training and drilling under conditions closest to the missionary circumstances in the last phase of the preparations. In this way the staff is able to get adopt to stimulus effects gradually and expediently, under the influence of which their toughness rises onto a higher and higher level both psychologically and physically, and will become firm. Up to the possibilities it is always thecharacter of the missionary activity in question and the local climatic conditions to be taken into consideration, and then taking as its starting point the most suitable methods, exercises and equipments for development of faculties should be chosen.

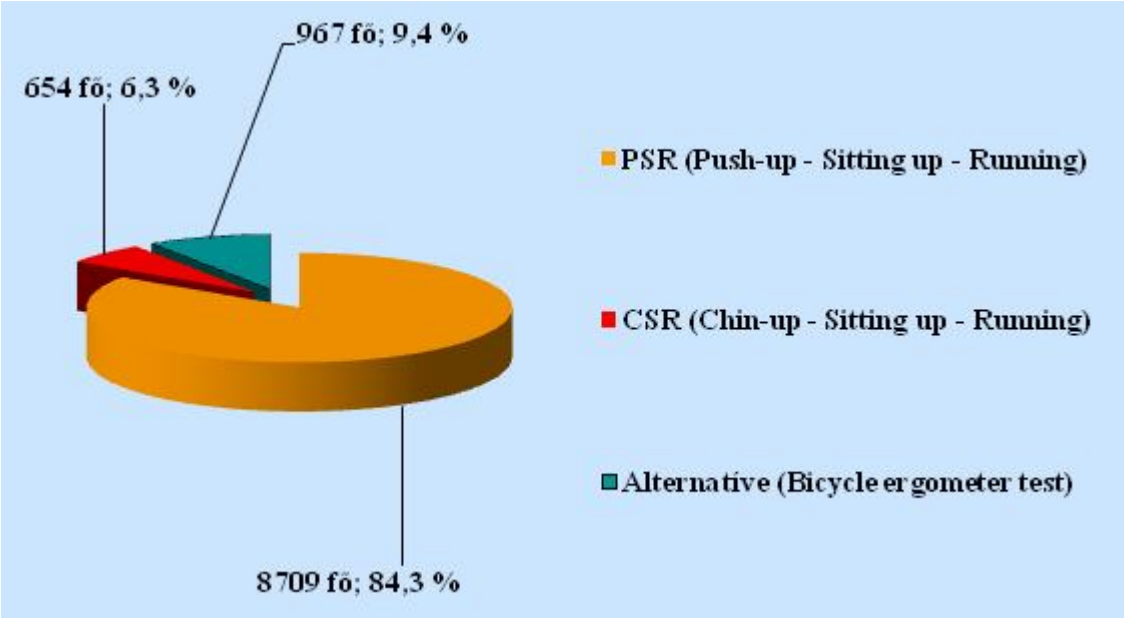
It is striking and is to be explained by existing reduced anthropometrical indexes that a more considerable part of the tests under laboratory conditions falls to soldiers marked *„T3”*, which might be brought into connection with health problems due to obesity.

In the following, results obtained on the physical aptitude test in both categories (T3, T4) were compared to eachother in case of identical motion forms. Results of the groups were compared to each other both under field and laboratory conditions, as well as it was also examined anthropometrical differences between soldiers choosing pulling up and push-up.

EXAMINATION OF THE CONNECTIONS BETWEEN MOTION FORMS AND CONSTITUTIONAL FACTORS

In duties requiring „extended” (T3) physical condition it was 76,6% the ratio of those persons who were tested under field conditions and who chose the motion form group „Pushing up-Sitting up-Running” (hereinafter called PSR) or the motion form group „Pull up Sitting up and Running” (hereinafter called PSR), and *23,4%* of them were able to prove their fitness for service under laboratory circumstances. In case of *„T4”* there were more than *90%* of those who were tested under field conditions, and less than *10%* who underwent the psychical aptitude test under laboratory circumstances. (Figures 1-2.)

1. figure. Distribution of the missionary military male staff „T3” loaded on the basis of motion form groups, between 01.01.2007–31.12.2010. (n=1.593 persons) [1]



2. figure. Distribution of the missionary military male staff „T4" loaded on the basis of motion form groups between 01.01.2007–31.12.2010. (n=10.330 persons) [2]

Compared the staff marked *„T3"* to that marked *„T4"* there were *73,1%* that is *84,3%* of those persons who chose the exercise group *Push-up - Sitting up - Running (PSR)*, that is to say there were *3,5%* that is *6,3%* of them who chose *Chin-up - Sitting up - Running (CSR),* and there were only *23,4%* that is *9,4%* of them who were loaded by bicycle-ergometer tests, which was to be attributed to reasons of health. (Figures 1-2.)

		Chin-up (piece)	**Point**	**Sitting up (piece)**	**Point**	**3200 m running (minute, sec.)**	**Point**	**All scores**
T3 CSR (Fit) n=53	Average	**15**	**86**	**56**	**76**	**941**	**139**	**301**
	Dispersion	6	17	11	14	102	21	37
T4 CSR (Fit) n=596	Average	**16**	**87**	**60**	**77**	**901**	**146**	**310**
	Dispersion	5	15	11	14	88	18	32
t-test		ns.	ns.	p<0,05	ns.	p<0,01	p<0,01	p<0,05

		Push-up (piece)	Point	Sitting up (piece)	Point	3200 m running (minute, sec.)	Point	All scores
T3 PSR (Fit) n=916	Average	**46**	**69**	**51**	**71**	**982**	**134**	**274**
	Dispersion	11	16	10	14	94	18	29
T4 PSR (Fit) n=6275	Average	**52**	**74**	**56**	**74**	**931**	**141**	**290**
	Dispersion	11	15	10	13	81	15	25
t-test		p<0,001	p<0,001	p<0,001	p<0,001	p<0,001	p<0,001	p<0,001

1. table. Distribution of the military male staff T3+T4 fit on the missionary tests CSR (Chin-up Sitting up - Running) and PSR (Pus-up - Sitting up - Running) on the basis of their performance indexes between 01.01.2007–31.01.2010. (n=7.840 persons) [3]

Average performance of the 53 persons marked *„T3"* qualified „physically fit" who had chosen the exercise group *Chin-up-Sitting up-Running (CSR)* was as regards *chin-up 15* ± 6, as regards *sitting up* it was *56* ± 11, recurrent number (piece), and they covered the prescribed course of 3.200 m in 941 ± 102 seconds (sec.). (Table 1.)

Average performance of the 596 persons marked *„T4"* also qualified *„physically fit"* who had chosen the exercise group *Chin-up-Sitting up-Running (CSR)* was as regards *chin-up* already *16* ± 5, regarding *sitting up* it was *60* ± 11, recurrent number (piece), and they covered the prescribed course of 3.200 m in *901* ± 88 seconds (sec.). (Table 1.)

As for the scores, the *average* values of *„T3"* were in *chin-up* was *86* ±17, in *sitting up* it was *76* ± 14, in *running 139* ±21 scores, and *altogether* it was *301* ± 37 scores. (Table 1.) *Average* score-values of *„T4"* were in *chin-up 87*± 15, in *sitting up* were **77** ± 14, and in *running 146* ± 18, *altogether* it was *310* ±32 scores. (Table l.)

Average values of staff of higher number chosen the exercise group *Push-up - Sitting up - Running (PSR)* were, as follows: average performance of 916 persons marked *„T3"* qualified *„Physically fit"*, chosen the exercise group *Push-up - Sitting up - Running (PSR)* was in *push-up 46* ±11, in sitting up it was 51 ± 10, recurrent number (piece), and they ran the prescribed course of 3.200 m in *982* ± 94 seconds (sec). (Table 1.) Average performance of 6274 persons marked *„T4"* qualified also „physically fit" chosen the exercise group *Push-up - Sitting up - Running (PSR)* was considering *push-up 52* ±11, considering *sitting up* it was *56* ±10, recurrent number (piece), and they ran the prescribed course of 3.200 m in *931* ± 81 seconds (sec). (Table 1.)

As for the scores the average values of the staff *„T3"* were in *push-up 69* ±16, in *sitting up* it was *71* ±14, in *running* it was *134* ±18, altogether it was *274* ±29 scores. (Table number 1.) Average score values of *„T4"* were in *push-up 74*± 15, in *sitting up* it was *74* ±13, in *running 141* ±15, and *altogether* it was *290* ±25 scores.(Table 1.)

According to the performance-indexes documented during 4 years for both motion groups of PSR and PSR tied to field conditions it can be seen well that independent of a motion form group, soldiers marked „T4" were able to do a better performance than those marked „T3". (Table 1.) For each motion form group there was a considerable difference between the two „T"-categories shown by the exercise Push-up - Sitting up - Running (PSR). (Table 1.)

		Push-up (piece)	**Point**	**Sitting up (piece)**	**Point**	**Bicycle (watt/kg)**	**Point**	**All scores**
T3 PSC (Fit) n=357	Average	**39**	**64**	**43**	**64**	**3,00**	**144**	**270**
	Dispersion	12	18	13	17	0,35	19	32
T4 PSC (Fit) n=811	Average	**44**	**65**	**49**	**66**	**3,18**	**148**	**279**
	Dispersion	12	16	11	14	0,33	15	25
t-test		p<0,001	ns.	p<0,001	p<0,01	p<0,001	p<0,01	p<0,001

2. table. Distribution of male military staff T3-T4 fit on missionary test in PSC (Pushing up - Sitting up - Cycling) according to the performance-indexes between 01.01.2007–31.12.2010. (n=1.168 persons) [4]

Average performance of the 357 persons marked *„T3"* qualified *„Physically fit"* chosen the exercise group *Push-up - Sitting up - Cycling (PSC)* was as regards push-up *39* ± 12, as regards *sitting up* it was *43* ± 13, recurrent number (piece), and they cycled to be loaded up to *3,00* ± 0,35 watt/kg. (Table 2.)

Average performance of 811 persons marked *„T3"* also qualified *„Physically fit"* chosen the Exercise group *Push-up - Sitting up - Cycling (PSC)* was as regards *push-up* already *44* ± 12, as regards *sitting up* it was *49* ± 11, recurrent number (piece), and they reached a performance of *3,18* ±0,33 watt/kg. (Table 2.)

As for the scores the *average values* of the staff *„T3"* were in *push-up 64* ± 18, in *sitting up* it was *64* ± 17, and in cycling 144 ± 19, and it was altogether 270 ± 32 scores. (Table 2.)

Average score values of *„T4"* were in *push-up 65* ± 16, in *sitting up* it was *66* ± 14, in *cycling* it was *14 6*± 18, altogether: 279 ± 25 scores. (Table 2.)

Average values of the smallest staff chosen the exercise group Chin-up - Sitting up - Cycling (CSC) were the following.

Average performance of the staff marked *„T3"* of 6 persons qualified „physically fit" chosen the exercise group *Chin-up - Sitting up - Cycling (CSC)* was as regards *chin-up 15* ±4, as regards *sitting up* it was *52* ±10, recurrent number (piece), and they reached a performance of *3,42* ± 0,38 watt/kg. (Table 3.)

Average performance of the staff marked *„T4"* of *31* persons also qualified *„Physically fit"* chosen the exercise group *Chin-up - Sitting up - Cycling (CSC)* was, however, considering *chin-up* already *14* ± 3, considering *sitting up* it was *52* ± 16, recurrent number (piece), and they reached a performance of *3,37* ± 0,37 watt/kg. (Table 3.)

As for the scores the *average* values of *„T3"* were in *chin-up 98* ± 4, in *sitting up* it was *78* ±19, in *cycling* it was *156* ± 11, and *altogether* it was 332 ± 33 scores. (Table 3.)

Average score values of *„T4"* were in *chin-up 78* ± 18, in *sitting up* it was *68* ± 20, in *cycling 152* ± 13, altogether it was *298* ± 29 scores. (Table 3.)

		Chin-up (piece)	Point	Sitting up (piece)	Point	Bicycle (watt, kg)	Point	All scores
T3 CSC (Fit) n=6	Average	**15**	**98**	**52**	**78**	**3,42**	**156**	**332**
	Dispersion	4	4	10	19	0,38	11	33
T4 CSC (Fit) n=31	Average	**14**	**78**	**52**	**68**	**3,37**	**152**	**298**
	Dispersion	3	18	16	20	0,37	13	29
t-test		ns.	p<0,01	ns.	ns.	ns.	ns.	p<0,05

3. table. Distribution of male military staff T3-T4 fit on missionary test in CSC (Chin-up - Sitting up - Cycling) on the basis of performance-indexes between 01.01.2007–31.12.2010. (n=37 persons) [5]

There was no difference between the performance-indexes of the motion form groups Chin-up - Sitting up - Cycling (CSC) under laboratory conditions documented for four years, higher scores obtained by „T3" arose from the age of life (age of „T3": 37,6 ±10,3 years; age of „T4": 29,9 ± 5,5 years; p<0,01). (Table 3.)

EXAMINATION OF THE CONNECTION BETWEEN AGES AND PHYSICAL CAPACITIES

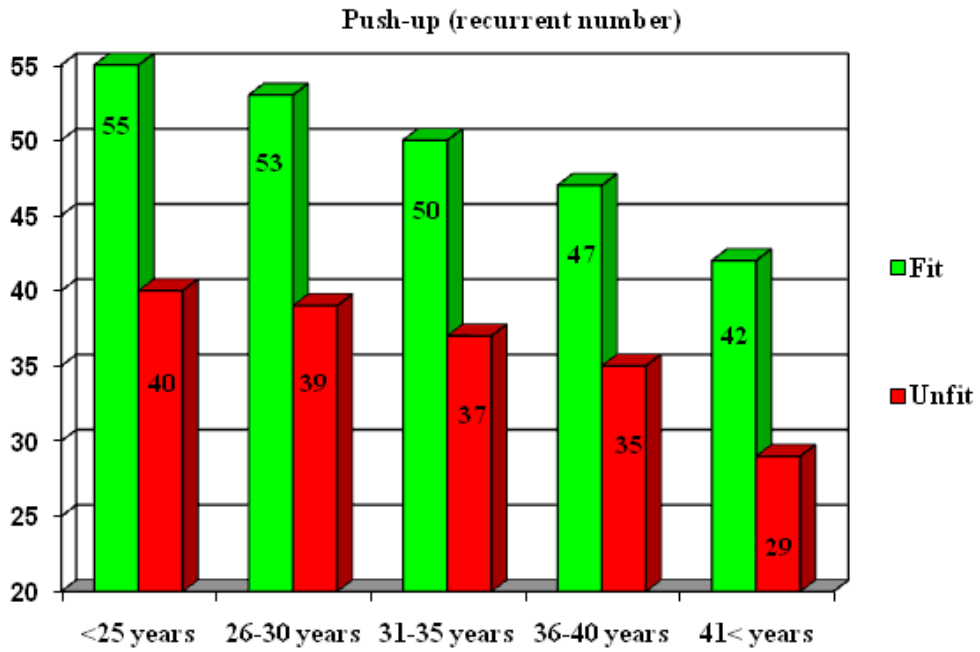
Of the persons applying for different missions during the last 4 years the results of those soldiers were underlined who belong to the category *„T4"* with the requirement to be trained on the highest-level, considering that nearly 85% of the staff (8.709 persons) had chosen the exercise group *Push-up - Sitting up - Running (PSR)*. The almost 9000-strong staff was suitable that the results obtained in this way taken as a function of the age group characteristics could be examined, as well, and so by dint of the representative results for each motion form and age group we could get an objective picture of the Hungarian Missionary Staff's condition of physical preparation.

Average pushing up performance of 6.275 persons marked *„T4"* qualified *„Physically fit"* chosen the exercise group *Push-up - Sitting up - Running (PSR)* broken down by age groups was < under 25 years *55*± 11, 26–30 years it was *53* ±11, 31-35 years it was *50* ± 11, 36-40 years *47* ± 10, and over 41< years it was *42* ± 10 recurrent number (piece). (Figure 3.)

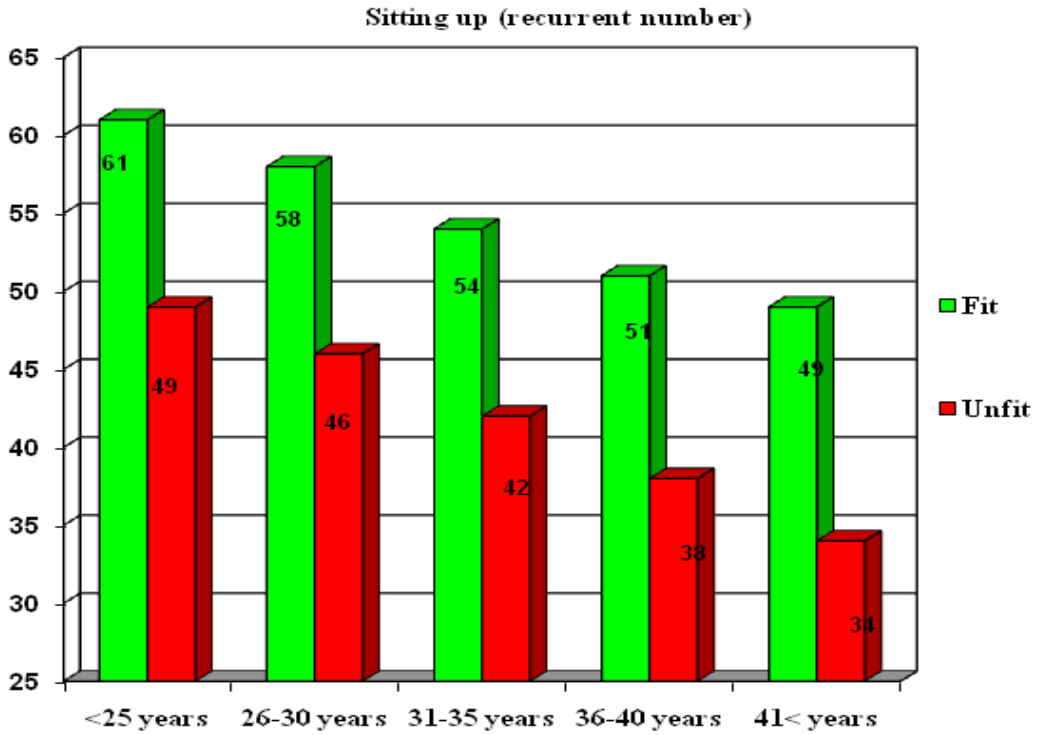
Average pushing up performance of 2.434 persons marked *„T4"* qualified *„Physically unfit"* chosen the exercise group *Push-up - Sitting up - Running (PSR)* broken down by age

groups was <25 years *40* ± 9, 26-30 years it was *39* ± 9, 31–35 years it was *37* ±9, 36-40 years *35* ± 8, and over 41< years it was *29* ± 7 recurrent number (piece). (Figure 3.)

After processing the data of the 4 years and following breaking down by age groups it came into view that the performance-indexes for average push-up show a gradually declining tendency in view of the advanced age. There is a negative connection between the age of life and the push-up performance values. Average performance-indexes for push-up of the *„Unfit"* are significantly lower (p<0,001) compared to those of the *„Fit"*.



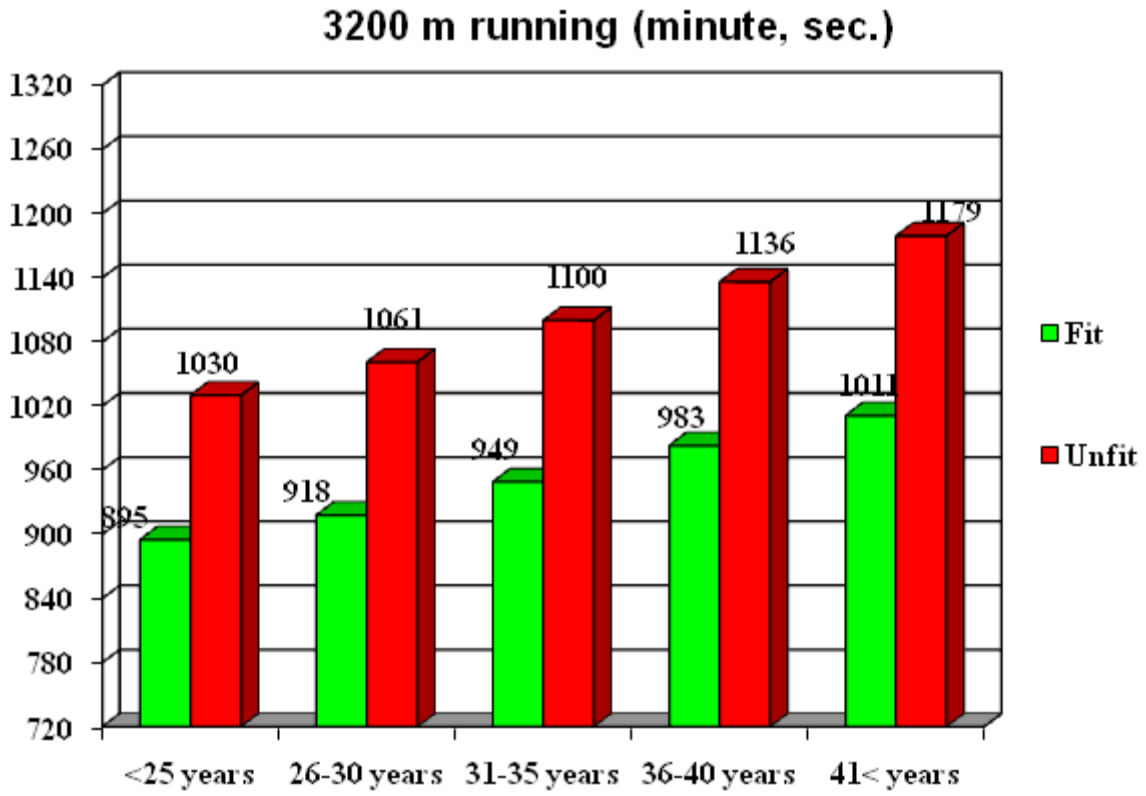
3. figure. Distribution of performance values of the staff „T4" for the motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [6]



4. figure. Distribution of performance values of the staff „T4" for the motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [7]

Average sitting up performance of 6.275 persons marked *„T4"* qualified *„Physically fit"* chosen the exercise group *Push-up - Sitting up - Running (PSR)* broken down by age groups was <25 years *61* ± 10, 26-30 years it was *58*± 9, 31-35 years *54* ± 9, 36-40 years *51*± 10, and over 41< years it was *49* ± 11 recurrent number (piece). (Figure 4.) *Average sitting up performance* of 2.434 persons marked *„T4"* qualified *„Physically unfit"* chosen the exercise group *Push-up - Sitting up - Running (PSR)* broken down by age groups was under <25 years *49* ±10, 26–30 years it was *46* ± 10, 31-35 years *42* ± 10, 36–40 years *38* ± 11, and over 41< years it was *34* ± 9 recurrent number (piece). (Figure 4.)

After processing the data of the 4 years and following breaking down by age groups it came into view that the performance-indexes for average push-up show also a gradually declining tendency in view of an advanced age. There is a negative connection also between the age of life and the performance values of pushing up. Average performance-indexes for push-up of the *„Unfit"* are significantly lower (p<0,001) compared to those of the *„Fit"*.

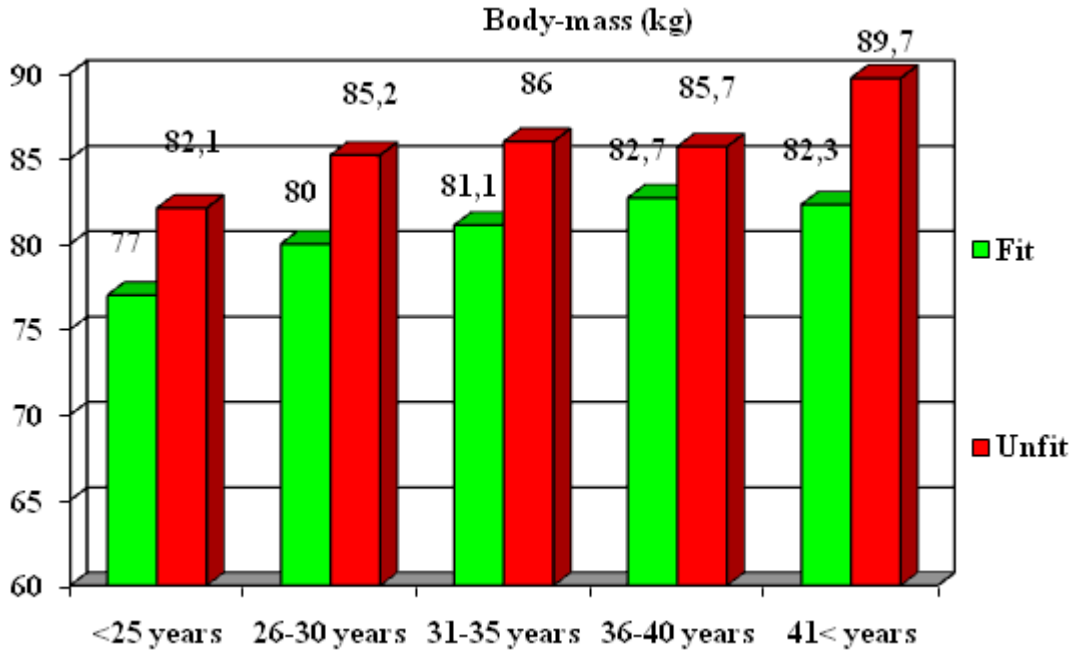


5. figure. Distribution of performance values of the staff „T4" for motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [8]

Average running performance of 6.275 persons marked „T4" qualified „physically fit" chosen the exercise group Push-up - Sitting up - Running (PSR) broken down by age groups running time was under <25 years 895 ± 69 sec., 26-30 years it was 918 ± 72 sec., 31–35 years 949 ± 76 sec., 36–40 years it was 983 ±87 sec., and over 41< years it was 1011±20.

Average running performance of 2.434 persons marked „T4" qualified „Physically unfit" chosen the exercise group Push-up - Sitting up - Running (PSR) broken down by age groups running time was under <25 years 1030± 92 sec., 26–30 years it was 1061 ±97 sec., 31–35 years 1100 ± 97 sec., 36–40 years 1136 ± 96 sec., and over 41< years it was 1179 ± 124 sec. (Figure 5.)

After processing the data of the 4 years and following breaking down by age groups it came into view that the average running time increases. There is a positive connection between the age of life and the running time. Average running time in the group of the „Unfit" is ignorantly higher ($p<0,001$) compared to that of the „Fit".

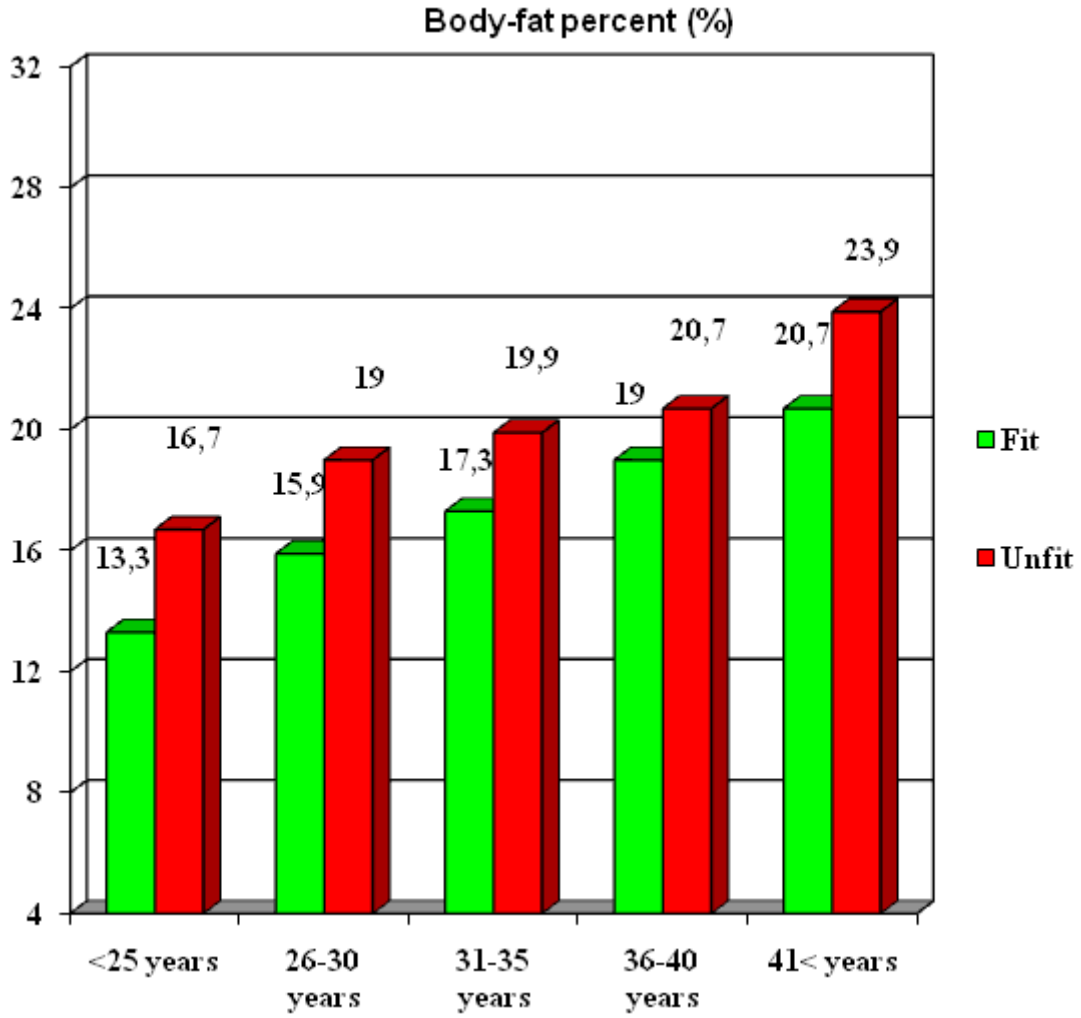


6. figure. Distribution of the average body mass of the „fit" and of the „unfit" of the staff marked „T4" for the motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [9]

In the course of the examinations of anthropometrical indexes then after their processing also it came into view that there is an expressed and quantifiable difference also inside the categories of examination. Independently of the fact whether the population of the *„Fit"* or that of the *„Unfit"* is taken as a starting point it is the *„Unfit"* staff for both „qualifications" that shows a higher body mass values, which is to be brought with a life-style short of motion into connection.*Average body-mass* of the staff qualified *„Fit"* marked *„T4"* belonging to the motion form group PSR (Push-up -Sitting up - Running) broken down by age groups was <25 years *77,0* ±10,2 kg, 26–30 years *80,0* ± 10,8 kg, 31–35 years it was *81,1* ± 11 kg, 36–40 years *82,7* ± 11, and over 41<years it was *82,3* ± 10,3 kg. (Figure 6.)

Average body-mass of the staff qualified *„Unfit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups was under <25 years *82,1*± 11,9 kg, 26–30 it was *85,2*± 12,1 kg, between 31–35 years it was *86,0* ± 12,6 kg, 36–40 years *85,7* ±12,8 kg, and over 41< years it was *89,7* ± 10,5 kg. (Figure 6.)

After processing the data of the 4 years, and following breaking down by age groups it came into view that the average body mass increases gradually in view of an advanced age. There is a positive connection between the age of life and the average body mass values. Average body-mass values of the *„Unfit"* are signicantly higher (p<0,001) compared to those of the *„Fit"*.

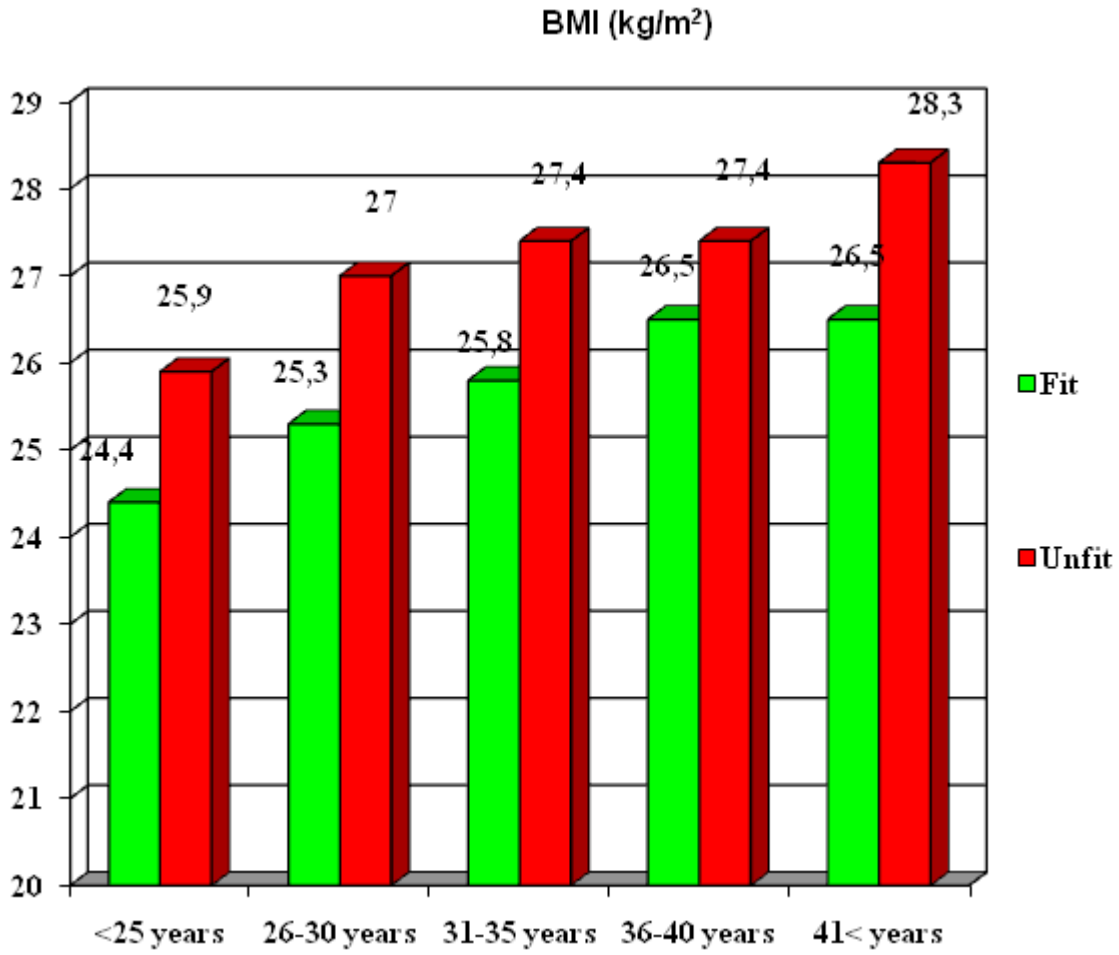


7. figure. Distribution of the average body-fat percent of the „fit" and of the „unfit" of the staff marked „T4" for the motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [10]

Average body-fat percent of the staff qualified *„Fit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups was under <25 years *13,3* ± 4,9%, 26–30 years it was *15,9* ± 4,8%, 31–35 years 17,3 ± 4,9%, 36–40 years *19,0* ± 4,7%, and over 41< years it was *20,7* ± 4,4%. (Figure 7.)

Average body-fat percent of the staff qualified *„Unfit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups was under <25 years *16,7* ± 5,6%, 26-30 years it was *19,0* ± 5,2%, 31 – 35 years *19,9* ± 4,9%, 36–40 years *20,7* ± 4,7%, and over 41< years it was *23,9* ±3,5%. (Figure 7.)

After processing the data of the 4 years and following breaking down by age groups it came into view that the average body-fat percent shows a gradual upward tendency in view of an advanced age. There is a negative connection between the age of life and the average body-fat percent values. Average body-fat % values of the *„Unfit"* are ignorantly higher ($p<0,001$) compared to the *„Fit"*.

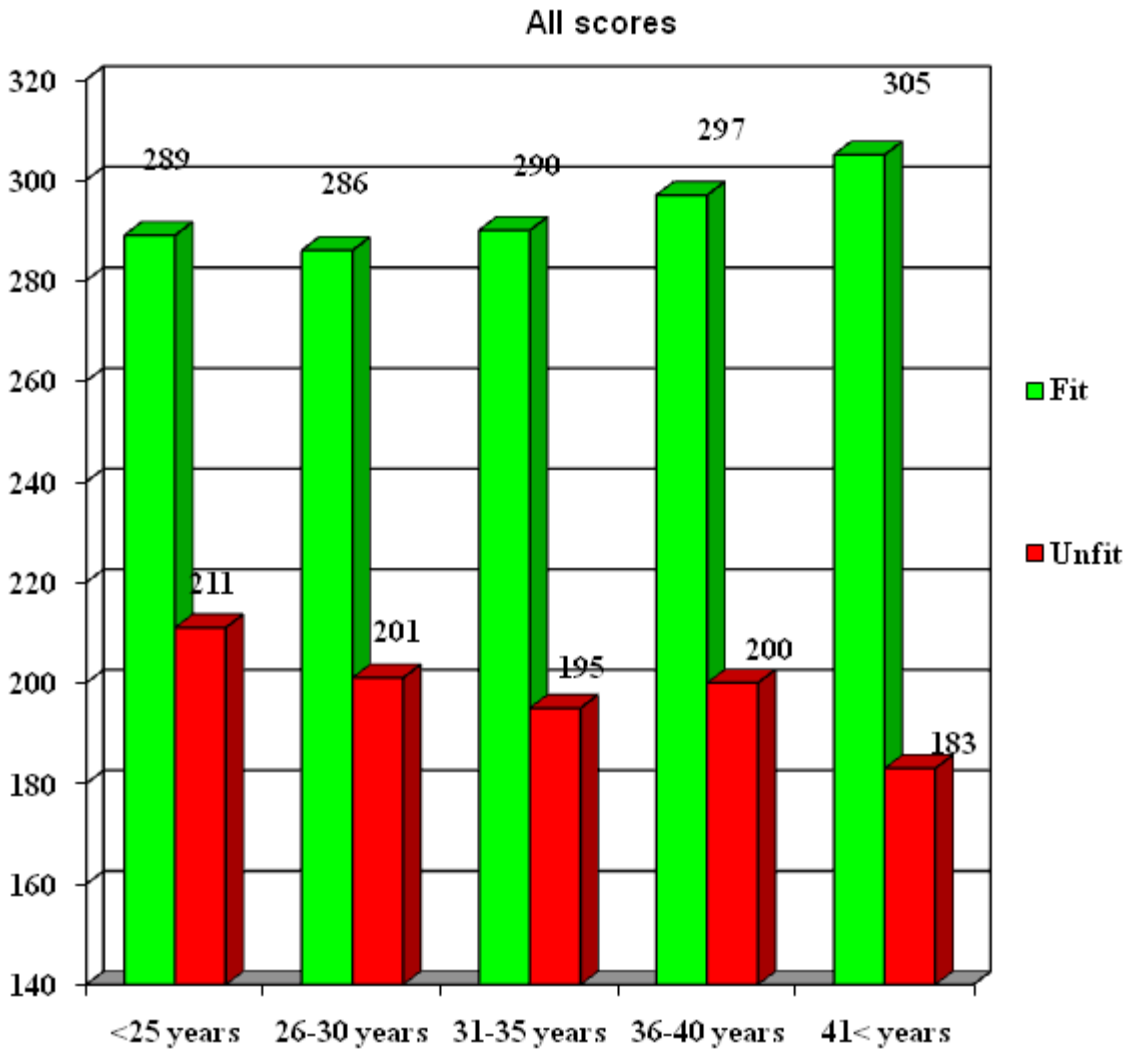


8. figure. Distribution of the average BMI of the „fit" and the „unfit" of the staff marked „T4" for the motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [11]

Average BMI values of the staff qualified *„Fit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups were under <25 years *24,4* ± 2,8%, 26–30 years it was *25,3* ±3,0 , 31–35 years *25,8* ± 2,9, 36–40 years *26,5* ± 2,9, and over 41< years it was *26,5* ± 2,9. (Figure 8.)*Average BMI values (kg/m²)* of the staff qualified *„Unfit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups were under <25 years *25,9* ±3,6, 26-30 years it was *27,0* ±3,4 , 31–35 years *27,4* ± 3,3 , 36–40 years *27,4* ± 3,4 , and over 41< years it was *28,3* ± 2,6. (Figure 8.)

The average BMI values show a gradual upward tendency in view of an advanced age. There is a positive connection between the age of life and the BMI values. Average BMI values of the *„Unfit"* are signicantly higher (p<0,001) compared to those of the *„Fit"*.

Average all scores of the staff qualified *„Fit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups were under <25 years *289* ±24 scores, 26-30 years it was *286* ±22 scores,31–35 years *290* ± 25 scores, 36–40 years *297* ± 28 scores, and over 41< years it was *305* ±31 scores. (Figure 9.)



9. figure. Distribution of performance values of the staff „T4" for the motion form group PSR (Push-up - Sitting up - Running) broken down by age groups between 01.01.2007–31.12.2010. (n=8.709 persons, male) [12]

Average all scores of the staff qualified *„Unfit"* marked *„T4"* belonging to the motion form group PSR broken down by age groups were under <25 years *211* ± 49 scores, 26–30 years it was *201* ± 53 scores, 31–35 years *195* ± 56 scores, 36–40 years *200* ± 53 scores, and over <41 years it was *183* ± 65 scores. (Figure 19.) The average all scores shows a gradual upward tendency in case of the „fit" in view of an advanced age. In case of the „unfit", however, is a declining tendency to be observed.

CONCLUSION AND SUMMARY

In the course of the scientific activities during four years the load-diagnostically measuring tests under field and laboratory conditions were destined for examining the partial local muscular strength endurance of the shoulder girdle and of the trunk, and the long-term stamina.

In general I found that according to the results measured and documented during four years as well as on the basis of my personal experiences the performance indexes of the Hungarian

Army's physical condition show - if not in a spectacular way but – an improving tendency both as for qualitative and as for quantitative values.

On the basis of the data measured during four years it was unambiguously to be proved that in view of an advanced age the constitutional indexes declined significantly and it was also closely related to the decrease of the missionary staff's physical performance.

Almost 88,7% of the in fact loaded staff testified under field conditions to their preparedness. It was 11,3% of them who took part in cycle-loading test as they fought against some health problems (locomotor diseases, cardiovascular problems or metabolic disturbances), which made a continuous check-up at loading necessary.

Performance of the unfit soldiers is identical with that of the fit soldiers over 41 years. It applies to their body mass, too. By advancing in age the anthropometrical indexes and the performance get worse – it is a normal physiological process - , but when these indexes are already in young days bad then it is to be expected even a worse performance at an older age.

Resources

[1-12] The author's own illustrations