

PHYSICAL FITNESS RELATED WORK ABILITY INDEX OF FIRE FIGHTER OF DIFFERENT AGE GROUPS IN FLORIANÓPOLIS, SC - BRAZIL

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Abstract

The present study evaluated the current level of physical fitness related with work ability of fire fighters in different age groups. The subjects were 127 randomly selected male fire fighters from the age groups of 20-24, 30-34 and 40-44. The statistical analysis was done by EXCEL – 7.0 and the data were describe by means, standard deviations and extreme values. The results indicated that main values of WAI were 40 (33-46) in the age group of 20-24 years. The corresponding values in the age groups of 30-34 and 40-44 years were 36.04 (27-44) and 35.24 (26-45) respectively. Differences in the WAI were significant ($p < 0.05$) between the youngest and the two oldest age groups, with work ability declining significantly with the increase of age. Differences in the physical fitness index were significant between the younger and the older groups. There is evidence that work ability and physical fitness decrease with ageing.

Key words: Physical Fitness; Work Ability Index; Aging.

1 INTRODUCTION

The purpose of this study was to evaluate the current level of physical fitness related with work ability of fire fighters in different age groups.

The Fire Department is the organ of the Police Enforcement of the Santa Catarina State responsible for the combat actions of fire, search, ransom, rescue and attendance in emergence trauma.

The work of fire fighters happens in a very diversified atmosphere, face its characteristic of performance: earth, sea and air, where a specialised professional performance is demanded and of precision, in a fast and effective action in the attendance of any occurrence. They can't make any mistakes, because that can be the difference between life and death to other people and sometimes themselves.

The Fire Department acts basically in two ways: preventively, by inspecting construction sites, giving educational lectures in the communities and schools, being ostensibly present on the State coast, acting in the lifeguard service and operationally by attending emergency situations, such as: fire fighting, emergence trauma rescuing and in search actions, ransom and rescue (1).

2 Material and Methods

The subjects were 127 randomly selected male fire fighters from age groups of 20-24, 30-34 and 40-44 years. Physical fitness assessment included the determination of maximal oxygen consumption (VO₂ max) by the 12 min test, and the evaluation of dynamic muscle performance: sit-ups (reps/30s), pull-up (max. reps), speed (50 m) and agility (shuttle run). Also, height, body weight and the body mass index were measured. The work ability of the subjects was assessed with the Work Ability Index (WAI) (2). The statistical analysis was done by EXCEL – 7.0 and the data were described by means, standard deviations and extreme values. The relationships between the variables were evaluated with Pearson's correlation coefficients. The significances of the differences between the groups were tested with the ANOVA / One-Way, ($p < 0.05$).

3 Results

3.1 characteristics of physical fitness:

Table 1: Characteristics of the maximum aerobics power of fire fighters in the different age groups.

Variables	Descriptive Statistics	Group I 20-24 years old	Group II 30-34 years old	Group III 40-44 years old
VO ₂ max (ml/kg/min)	Mean	48,4	47,2	41,9
	Standar Dev.	6,5	5,3	7,6
	> Value	58,1	61,2	64,3
	< Value	33,7	32,3	26,1
VO ₂ max (l/min)	Mean	3,3	3,5	3,2
	Standar Dev.	0,6	0,5	0,6
	> Value	5,0	5,0	5,0
	< Value	2,3	2,2	2,0

Analysing the data of the table above, it was possible to verify that the average of maximum consumption of VO₂ of the firemen, in the different age groups, is above 3 l/min. Consulting the literature, these levels of VO₂ max would be attributed to people with capacity to accomplish extremely heavy work (3;4). Some studies specifically developed with firemen, indicate that the VO₂ minimum for a good accomplishment of these professionals' mission would be in the strip between 39 and 42 ml/kg/min (5;6) or larger of 3 l/min (7;8).

Figure 1 Quantitative percentage of firemen with VO₂ max below 3

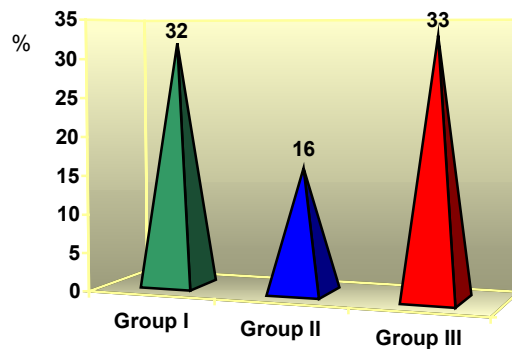


Figure 1 shows the percentage of fire fighters in each group that present the VO₂ max. According to the evaluation of (9), the acquired values (3 l/min) are high, corresponding to 1/3 of the work force in groups I and III. The consulted literature suggests that the medium values, mainly of the groups II and III, are below the values found in the aforementioned literature.

3.2 Work ability index:

In this section data associated to the fire fighters' work will be presented and discussed.

Figure 2 - Percentage classification of the work ability index for the fire fighters' work in the different age groups.

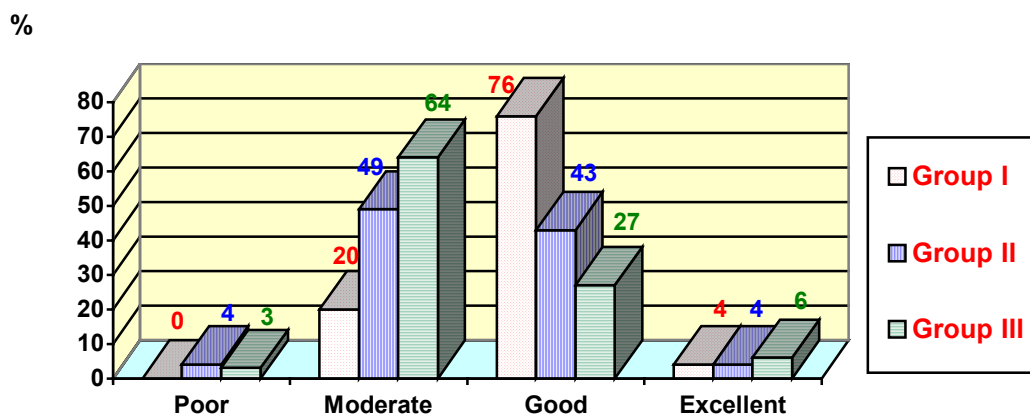


Figure 2 shows the percentage of fire fighters, in different age groups on what refers to the work ability index. It is noticeable that the weak and great indexes, in the three groups, don't suffer a relevant alteration, keeping a low incidence. However, the moderated and good values describe a variation inversely proportional, thus, the moderate index increases for the older age groups, while the percentage of good decreases. Statistically, these differences are significant between groups I and II ($p < 0.01$), group II and III ($p < 0.5$) and between groups I and III ($p < 0.001$), demonstrating a significant reduction in the work capacity among groups I, II and III. Comparing groups II and III to the corresponding ones in the study of (10). It was verified that the sum among the good and great indexes is practically the half of the values obtained in the research with firemen in Finland.

Table 2:

Groups Variables	Descriptive Statistics	Group I 20-24 years old	Group II 30-34 years old	Group III 40-44 years old
Work Ability Index	Main	40	36	35
	Standard Dev.	3,05	4,46	4,45
	> Value	46	44	45
	< Value	33	27	26

These results indicate that the main values of WAI were 40 (33-46) in the age group of 20-24 years. The corresponding values in the age groups of 30-34 and 40-44 years were 36.04 (27-44) and 35.24 (26-45) respectively. Differences in the WAI were significant ($p < 0.05$) between the youngest and two older age groups, with work ability declining significantly within the increase of age. Differences in the physical fitness index were significant between the younger and the two older groups.

Table 3: Association level among the variables of the study (r) *

Variables	Group I (n=25)	Group II (n=49)	Group III (n=33)
VO ₂ max			
X	0,2216	0,16	0,2488
Work ability index			

* Correlation linear of Pearson / ** $p < 0,05$

$r \cong < \pm 0,30$ (poor) $r \cong \pm 0,30$ a $0,70$ (moderate)

$r \cong \pm 0,70$ a $0,90$ (hight) $r = > \pm 0,90$ (very hight)

CONCLUSION

There is evidence that work ability and physical fitness decrease with ageing. A suggestion is to establish an individual program for increasing and maintaining physical fitness; to offer continuous information about a healthy life-style and promote professional training. One of the main reasons for changing these situations is the improvement of fire fighters' quality of life and service productivity.

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