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## Effect of mountaineering training on muscular endurance of moderate altitude inhabitants

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### Abstract

Working out is a philosophy, or budding in one's self or other, any talent and awareness that associated to unambiguous use complete competencies. Working out has precise ambition of humanizing once potential, aptitude, efficiency and performance. The intention of the study was to find out the effect of mountaineering training on muscular endurance of moderate altitude inhabitants. For the purpose of the study fifty male students were selected as subjects form the Jawahar Institute of Mountaineering and Winter Sports Phalgam Anantnag (J&K). The age of the students which serve as subject was 18 - 26 years which is confirmed from institute record. All subjects belongs to moderate altitude. The subjects were divided into equal groups Group A- Experimental (N =25) and Group- B as Control Group (N=25). All the subjects were informed about the aim and methodology of the study. The experimental group was given special training of mountaineering for twelve weeks. The control group was not given any training rather than their daily work routines. The data was collected and administering with the ANCOVA test and was analyzed in SPSS with the help of statistical procedure in which Standard Deviation, Mean and "t" ratio were employed. The level of significance was set at 0.05 level. The result of the study showed that mountaineering training program make significant improvement on muscular endurance of moderate altitude inhabitants.

**Keywords:** Mountaineering, muscular endurance, moderate altitude inhabitants

### Introduction

Mountaineering as a hobby consists as effort to reach the maximum point of unclimbed big mountains. It has branched in specialization that addresses different aspects of the mountain and consists of three areas: rock-craft, snow-craft, and skiing. Mountaineering is often called Alpinism, especially in European language which implies climbing with difficulty such high and often snow and ice-covered mountains as the Himalayan Mountains. A mountaineer with such great skill is called Alpinist. Mountaineering as a sport consists of Ascending and descending mountains under the climber's own power, at one end or other, the relatively gentle climb for which climbers need little equipment. The world's highest and most daunting peaks require months and years of preparation for climbing to the peaks. Mountaineering as sports, is rock climbing simultaneously recreational and competitive. They are recreational in the sense that most climbers climb for love of the sports, but competitive when climbers seek to climb first, highest, or by a new route. In recent years, both men and women have adapted mountaineering and rock-climbing techniques to indoor-sports climbing on vertical surface. The sport of rock climbing evolved from this ancient tradition of climbing mountains. Climbing skills and techniques were developed by making mountaineering training programs through many institutions.

### Endurance Training

Endurance training is known to improve muscular strength and power, because hypertrophy and can even improve muscular endurance (Kraemer & Ratamess, 2004) [2]. These various outcomes of training are brought about as a result of manipulating certain variables including the number of sets performed, the intensity of each set and the entire workout, as well as the rest periods between sets and exercises (Campos *et al.*, 2002) [1]. Muscles are constantly involved in exerting the forces required to perform everyday regular activities (Macaluso, *et al.*, 2003) [3] and therefore certain levels of strength and power are required for functional

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Movements. Certain sports (e.g. *weightlifting and sprinting*) strength and power can often play a large part in determining success (Tan, 1999) [4]. When endurance training is performed by athletes it is generally categorized as either sport specific or non-specific. These terms describe how closely the training movements match the actual muscle actions performed during the sporting event. Thus, for optimal improvement, recruitment patterns performed during resistance training should match the recruitment patterns performed during the sporting event as closely as possible.

**Materials and Methods**

The intention of the study was to examine the effect of mountaineering training on muscular endurance of moderate altitude inhabitants. To full fill the aim fifty male students of

Jawahar Institute of Mountaineering and Winter Sports Phalgam Anantnag (J&K) were selected which serves a subjects and belongs the moderate altitude. The fifty male students were divided in two equal groups named as Group - A, experimental group which is in number twenty five and other Group- B is named as control group which is also in number twenty five. The simple random sampling was applied to select the subjects for the study. The age of the students was between 18 to 26 years.

**Result and Discussion**

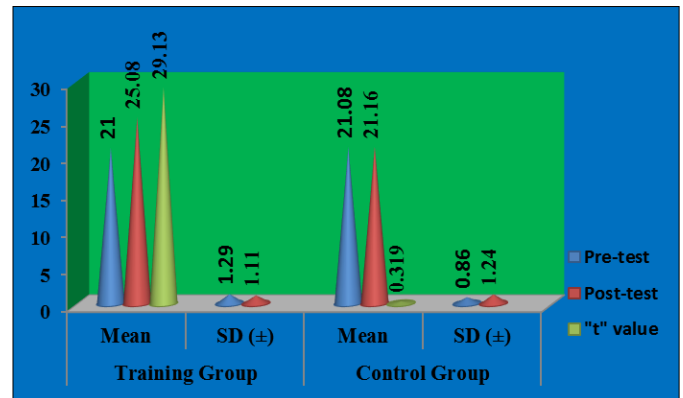
The analysis of dependent "t"-test on the data obtained for muscular endurance from pre-test and post-test means of Mountaineering training group and control group have been analyzed and presented in table-1.

**Table 1:** The summary of mean and dependent "t" test for pre and post tests on muscular endurance of mountaineering training group and control group

Tests	Training Group		Control Group	
	Mean	SD (±)	Mean	SD (±)
Pre-test	21.0	1.29	21.08	0.86
Post-test	25.08	1.11	21.16	1.24
"t" value	29.13		0.319	

\*Significant at 0.05 level of confidence. Table value required for "t" test df 1 and 24 is 1.71

From the table above, the dependent "t"-test values between pre and posttest means of mountaineering training group were 21.0 and 25.08, and from control group per and posttest means were 21.08 and 21.16, while, the obtained "t" value from training group was 29.13, which is greater than the required table value 1.71 with df 1 and 24 at 0.05 level of confidence, it clears that training group has significant improvement on muscular endurance. However, the obtained "t" value from control group was 0.319 which is lesser than the table value 1.71 with df 1 and 24 at 0.05 level of confidence, which clears that no significant improvement occurred in control group on muscular endurance, because they were not taking any specific training other than their habitual practice. The pre and posttest mean values of experimental and control groups on muscular endurance are graphically represented in the figure 1



**Fig 1:** Pre and Post Test Mean Values of Mountaineering Training Group and Control Group on Muscular Endurance

**Table 2:** Analysis of covariance on muscular endurance of Experimental group and control group

	Training Group	Control Group	SoV	SS	df	MS	"F" Ratio
Pre-Test Mean SD (±)	21.20	21.08	BG	0.18	1	6.18	0.14
	1.29	0.86	WG	57.84	48	1.20	
Post-Test Mean SD (±)	25.08	21.16	BG	129.08	1	192.08	137.20*
	1.11	1.24	WG	67.20	48	1.40	
Adjusted Posttest Mean	25.04	21.20	BG	183.80	1	183.80	206.34*
			WG	41.86	47	0.89	

\*Significant at 0.05 level of confidence. Table value required for F ratio for df 1 and 48 is 4.00, for 1 and 47 is 3.99

As result shows in above table, the pre-test mean on muscular Endurance of mountaineering training group is 21.20 with standard deviation ± 1.29 and control group is 21.08 with standard deviation ±0.86. The obtained F ratio 0.14 is lesser than require table value 4.00 for df 1 and 48 at the 0.05 level of significance. It is clear from the result of the table, that there is no significant variation among experimental group and control group before the beginning of training programme. The result presented in the same table shows, that the posttest mean on muscular endurance of mountaineering training group is 25.08 with standard deviation ±1.11 and control group is 21.16 with standard deviation ±1.24. The obtained F ratio 137.20 is greater than the require table value

4.00 for df 1 and 48 at the 0.05 level of significance. It is clear from the result of the table, that there is significant variation among experimental group and control group after 12 weeks of the commencement of training programme. The adjusted posttest mean on muscular endurance of mountaineering training group is 25.04 and control group is 21.20. The obtained F ratio 206.34 is greater than the require table value 3.99 for df 1 and 47 at the 0.05 level of significance. It is clear from the result of the table that 12 weeks training have considerable develop the muscular endurance of the subjects as compared to the control group. The adjusted posttest mean of Muscular Endurance of mountaineering training group and control group is graphically represented in the figure 2.

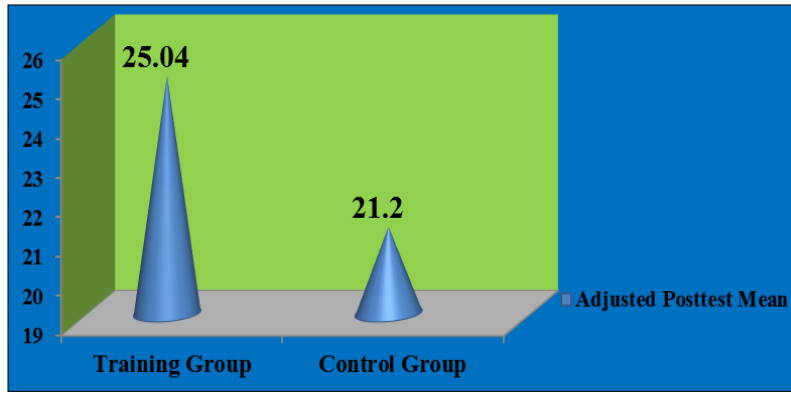


Fig 2: Adjusted post-test mean on muscular endurance of mountaineering training group and control group

**Conclusion**

Analysis of percentage on muscular endurance between

mountaineering training group and control group of moderate altitude inhabitants shown in table 3

Table 3: Analysis of Percentage on Muscular Endurance between the Groups

Physical Fitness Variable	Pre and Post Tests	Experimental Group	Control Group	% of Training Group	% of Control Group
Muscular Endurance	Pre Test	21.20±1.29	21.08±1.12	18.30%	0.37%
	Post Test	25.08±1.11	21.16±1.12		

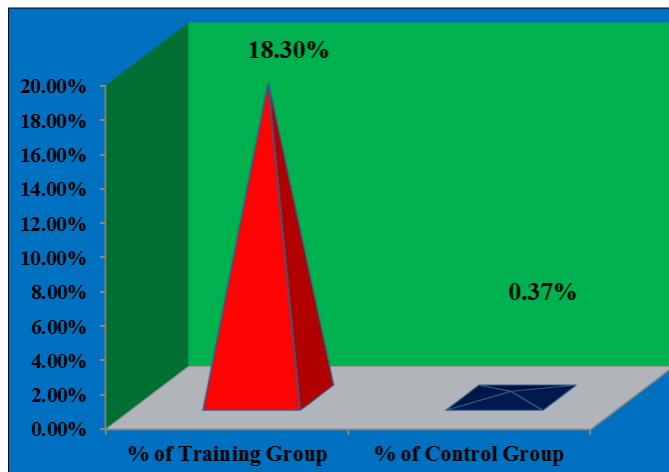


Fig 3: Percentage on Muscular Endurance of Training Group and Control Group

From the analysis of the data showed in the figure 3 the conclusions was drawn out that the experimental group has achieved significant improvement of 18.30% on muscular endurance due to twelve weeks of mountaineering training on moderate altitude inhabitants. While no improvement was shown in the control group and remain on 1.46%, which is almost negligible.

Hence mountaineering training program of twelve weeks was adequate for physical fitness variables muscular endurance. It was also concluded that the mountaineering training is one of the best training methods for improving physical fitness variables.

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