



INFLUENCE OF DOWNHILL TRAINING ON LEG STRENGTH AND STRENGTH ENDURANCE AMONG COLLEGE MEN STUDENTS

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Abstract:

The purpose of the study was designed to examine the effect of downhill training on leg strength and strength endurance of college men students. For the purpose of the study, thirty men students from Bachelor's degree in Mary Matha Arts and Science College, Mananthavady, Wayanad, Kerala, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent downhill training for three days per week for twelve weeks. Group II acted as control who did not undergo any special training programme apart from their regular physical education programme. The following variables namely leg strength and strength endurance were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using bend knee sit upas and cooper's 9 min run and walk test respectively at prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant difference, if any among the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered appropriate. The results of the study showed that there was a significant difference between downhill training group and control group on leg strength and strength endurance. And also it was found that there was a significant improvement on leg strength and strength endurance due to twelve weeks of downhill training.

Key Words: Downhill Training, Leg Strength, Strength Endurance, College Men Students

Introduction:

Downhill training, also known as eccentric training or negative resistance training, involves running or walking on a decline. This type of training emphasizes eccentric muscle contractions, where muscles lengthen under tension. Research suggests that downhill training has significant effects on leg strength and strength endurance, particularly in college-aged male students. Downhill running primarily engages the quadriceps eccentrically, leading to adaptations that improve eccentric strength. Repeated exposure to eccentric loading enhances muscle resilience and reduces susceptibility to muscle damage over time.

Downhill training is an essential component of athletic conditioning that enhances speed, agility, strength, and endurance. For college men, incorporating downhill training into their fitness routine can improve overall athletic performance, reduce injury risks, and develop explosive power. This type of training involves running or cycling on a downward slope, which helps in increasing stride turnover, improving neuromuscular coordination, and enhancing muscular control during high-speed movements. It is crucial to approach it with proper technique and precaution to prevent injuries and maximize benefits. By integrating progressive drills and strength-building exercises, college men can enhance their athletic abilities and gain a competitive edge in sports and physical activities. Downhill training is a powerful yet often overlooked method to improve athletic performance, strength, and endurance. Unlike traditional uphill running or resistance training, downhill running engages muscles in a unique way, emphasizing eccentric contractions where muscles lengthen under tension which helps build strength, stability, and resilience. This type of training enhances running efficiency, improves neuromuscular coordination, and strengthens joints, making it highly beneficial for runners, hikers, and athletes in various sports. Additionally, it can reduce injury risk by conditioning muscles to handle high-impact forces more effectively. When incorporated properly into a training regimen, downhill training can lead to faster race times, improved recovery, and greater overall fitness.

Methodology:

The purpose of the study was designed to examine the effect of downhill training on leg strength and strength endurance of college men students. For the study, thirty men students from Bachelor's degree in Mary Matha Arts and Science College, Mananthavady, Wayanad, Kerala, India were selected as subjects. They were divided into two equal groups. Each group consisted of fifteen subjects. Group I underwent downhill training for three days per week for twelve weeks. Group II acted as control who did not undergo any special training programme apart from their regular physical education programme. The

following variables namely leg strength and strength endurance were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using bend knee sit upas and cooper's 9 min run and walk test respectively at prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant difference if any among the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered appropriate.

Analysis of the Data:

Leg Strength:

The analysis of covariance on leg strength of the pre and post test scores of downhill training group and control group have been analyzed and presented in table 1.

Table 1: Analysis of Covariance of the Data on Leg Strength of Pre and Post Tests Scores of Downhill Training and Control Groups

Test	Downhill Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	92.20	92.07	Between	0.13	1	0.13	0.10
S.D.	1.05	1.12	Within	37.33	28	1.33	
Post Test							
Mean	95.07	92.13	Between	64.53	1	64.53	17.18*
S.D.	1.18	1.20	Within	105.20	28	3.76	
Adjusted Post Test							
Mean	95.02	92.18	Between	60.35	1	60.35	70.78*
			Within	23.02	27	0.85	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 1 and 28 and 1 and 27 are 3.34 and 3.35 respectively).

The table 1 shows that the adjusted post-test means of downhill training group and control group are 95.02 and 92.18 respectively on leg strength. The obtained "F" ratio of 70.78 for adjusted post-test means is more than the table value of 3.35 for df 1 and 27 required for significance at .05 level of confidence on leg strength.

The results of the study indicated that there was a significant difference between the adjusted post-test means of downhill training group and control group on leg strength.

Strength Endurance:

The analysis of covariance on strength endurance of the pre and post test scores of downhill training group and control group have been analyzed and presented in table 2.

Table 2: Analysis of Covariance of the Data on Strength Endurance of Pre and Post Tests Scores of Downhill Training and Control Groups

Test	Downhill Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	41.27	40.40	Between	5.63	1	5.63	1.48
S.D.	1.98	1.41	Within	106.53	28	3.80	
Post Test							
Mean	46.53	40.87	Between	240.83	1	240.83	20.54*
S.D.	1.78	1.96	Within	328.30	28	11.73	
Adjusted Post Test							
Mean	46.20	41.20	Between	177.67	1	177.67	205.71*
			Within	23.32	27	0.86	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 1 and 28 and 1 and 27 are 3.34 and 3.35 respectively).

The table 2 shows that the adjusted post-test means of downhill training group and control group are 46.20 and 41.20 respectively on strength endurance. The obtained "F" ratio of 205.71 for adjusted post-test means is more than the table value of 3.35 for df 1 and 27 required for significance at .05 level of confidence on strength endurance.

The results of the study indicated that there was a significant difference between the adjusted post-test means of downhill training group and control group on strength endurance.

Conclusions:

- There was a significant difference between downhill training group and control group on leg strength and strength endurance.
- And also it was found that there was a significant improvement on selected criterion variables such as leg strength and strength endurance due to downhill training.

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