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Effect of Fartlek and Interval Trainings on the Muscular Strength and Strength Endurance of Football Player's Performance

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ABSTRACT:
The sixty district level football players were selected randomly as subjects from different schools of Vadodara, Gujarat. The groups were from 16 to 19 years of age; these subjects were further divided into three groups of 20 players each, and the groups were called Experimental group I=20, Experimental group II=20 and the Control group=20. The purpose of the study was to know the effects of the study on the development of district level football players of schools. *METHODS*: - Subjects were tested under pre-test on Aapher youth fitness test and collected pre-test data, Later both experimental group were given specific training i:e Experimental group I – Fartlek training, Experimental group II- Interval training and Control Group- No training, once the trainings was completed the subjects were tested again under post-test and the data was collected for analysis and interpretation. *FINDINGS*:- 1. The calculated F-value of adjusted mean was 68.89, which was significant at 0.05 levels. 2. The calculated F-value of adjusted mean was 369.52, which was significant at 0.05 levels as it was greater than tabulated F value at 0.05 levels.

CONCLUSION:

1. After analyzing ANCOVA and LSD post hoc test for muscular strength it was observed that there was a significant improvement in the muscular strength of the subject of both the Experimental groups i.e. fartlek training group and interval training group comparatively control group.
2. After analyzing ANCOVA and LSD post hoc test for strength endurance it was observed that there was a significant improvement in the strength endurance of the subject of both the Experimental groups i.e. fartlek training group and interval training group comparatively control group.

KEY WORDS: Fartlek, Interval, Physical fitness, Muscular Strength, Strength Endurance

INTRODUCTION

The sixty district level football players were selected randomly as subjects from different schools of Vadodara, Gujarat. The groups were from 16 to 19 years of age; these subjects were further divided into three groups of 20 players each. These groups were called Experimental group I, Experimental group II and the Control group. First the pretest data was collected and later The Experimental Group I was given Fartlek Training, Experimental Group II was given Interval Training and the Control Group was not given any training. After completing training program post test data was collected and then the collected data was analyzed and interpreted to find the results.

The purpose of the study was to know the effects of the study on the development of district level football players of schools.

METHODOLOGY

TRAINING METHODS:-Sports training is a pedagogical process, based on scientific principles, aiming at preparing sportsmen for higher performance in sports competitions[1].Training has specific goals of improving one's capability, capacity, productivity, and performance**.**

EXPERIMENTAL GROUP I-

FARTLEK TRAINING: Fartlek is a Swedish term that means 'Speed play' it is usually regarded as an advanced training technique it can be done on the road, or parkland, or bush track. There is no predetermined schedule to follow. An advantage of fartlek is that the athlete can concentrate on feeling the pace and their physical response to it. For example, a structured fartlek might be: 10-15 minute warm up, 2 minutes hard, 2:30 active recoveries, 3 minutes hard, 2:30 active recoveries, 4 minutes hard, 2:30 active recoveries, 4 minutes hard, 2:30 active recoveries, 3 minutes hard, 2:30 active recoveries, 2 minutes hard, 10-15 minutes cool down. This workout is stated easier by calling it a: 2, 3, 4, 4, 3, 2, with 2:30 active recoveries. In his excellent book "Daniel's Running Formula," Coach Jack Daniels suggests the following workout when feeling lethargic: Run 10 steps (counting one foot, not both) then jog 10, run 20 and jog 20, run 30 and jog 30, and so on up to running 100 and jogging 100 (or more if you wish). This is a great way to get obtain a good workout when your body simply does not feel like exerting itself [2]

Points to be followed for planning of fartlek training are:

1. Fartlek training duration should be minimum 20 minutes
2. Intensity of the workout should be 60 -75% [3]
3. The heart rate of the athletes should be in range of 140 -180 HR/min
4. 3 days a week program (Monday, Wednesday, and Friday) [4]

Variations: -As it is unstructured so many variations can be included according to the requirement of the activity, to be added in recovery jogs.

EXPERIMANTAL GROUP II:-

INTERVAL TRAINING: -Waldemar Gerschler, a professor at the University of Freiburg in Germany, and his athletes worked closely with Dr.Hans Reindell, a physiologist, and developed interval training methods. The name of the system comes from the "Interval", or rest period, between fast runs. They would not allow the runners to begin the next repeat until their pulse rate had returned to 120 beats per minute. If this did not occur within 90 seconds of the end of the previous repeat, the workout was too difficult and had to be adjusted. Interval training involves alternating short bursts of intense activity with what is called active recovery, which is typically a less intense form of the original activity[5].

[1] Hardayal Singh, "Science of sports training, New Delhi, DVS publication", 1991
[2] https://www.kheljournal.com/archives/2015/vol2issue2/PartE/3-3-75-957.pdf
[3] Bompa, Tudor O., Buzzichelli, Carlo, 1973 "*Periodization : theory and methodology of training*", Sixth edition 2019,pg 24
[4] https://www.kheljournal.com/archives/2020/vol7issue2/PartE/7-2-42-759.pdf
[5] https://shodhgangotri.inflibnet.ac.in/bitstream/123456789/1830/2/02_introduction.pdf

Table -1 INTERVAL TRAINING PROGRAM

	1 &2 week		3&4 week		5&6 week	
	High intensity (THR*) (142and more bpm)	**Low intensity (THR) 81-110 bpm**	**High intensity (142and more bpm)**	**Low intensity 81-110 bpm**	**High intensity (142and more bpm)**	**Low intensity 81-110 bpm**
1	**Warm-up for up to 10 minutes**					
2	**20 Sec.**	**1 minutes**	**30 Sec.**	**1 minutes**	**45 Sec.**	**1 minutes**
3	**30 Sec.**	**1 minutes**	**45 Sec.**	**1 minutes**	**60 Sec.**	**1 minutes**
4	**20 Sec.**	**1 minutes**	**30 Sec.**	**1 minutes**	**45 Sec.**	**1 minutes**
5	**30 Sec.**	**1 minutes**	**45 Sec.**	**1 minutes**	**60 Sec.**	**1 minutes**
6	**45 Sec.**	**1 minutes**	**30 Sec.**	**½ minutes**	**45 Sec.**	**½ minutes**
7	**30 Sec.**	**1 minutes**	**60 Sec.**	**½ minutes**	**80 Sec.**	**½ minutes**
8	**45 Sec.**	**1 minutes**	**45 Sec.**	**1 minutes**	**60 Sec.**	**1 minutes**
9	**30 Sec.**	**1/2**	**30 Sec.**	**1 minutes**	**45 Sec.**	**1 minutes**
10	**Cool down for up to 10 minutes**					

***THR = Targeted Heart Rate**

After six weeks of experimental training treatment on respective Experimental groups, all the groups were tested again and the data collection was done as Post-Test Score, the difference of pre and post - Test Score was treated as the effects of respective experimental training treatments on the different groups. Later it was examined to get the statically significance of pre and post-test scores of different groups', appropriate statistical tools **ANCOVA** and **LSD POST HOC TEST** were used to analyzing the level of significance which were fixed at 0.05 in all cases

Table -2 DETAILS OF TESTING TOOLS

S.NO.	VERIABLES	TEST	MEASURING UNIT	NORMS
1	Muscular strength (Legs)	Standing long jump	In meters	AAPHER YOUTH FITNESS TEST
2	Strength endurance (abdominal)	Sit ups (bent knee)	In count	AAPHER YOUTH FITNESS TEST

FINDINGS:

The results of the findings to analysis of the selected physical variables i.e. muscular strength, strength endurance, were presented in the following tables

Table-3 MUSCULAR STRENGTH ANALYSIS

TEST	GROUPS			ANCOVA TABLE			
	EXP-I FARTLEK TRAINING	EXP-II INTERVAL TRAINING	Control Group	SS	DF	MSS	f- ratio

pre-test mean	2.18	2.20	2.20	.003	2	.001	0.09
				.816	57	.014	
post-test mean	2.24	2.29	2.07	.516	2	.258	17.35*
				.847	57	.015	
adjusted mean	2.25	2.28	2.07	.541	2	.270	68.89*
				.220	56	.004	

Tabulated F value at 0.05 level for DF 2, 57=3.15, for DF 2, 56=3.15

As per the data presented in the above table - the mean values of the pre-test muscular strength of Exp.-I Fartlek training, Exp.-II Interval training and Control group were 2.18, 2.20and 2.20 respectively. The calculated F value of pre-test was 0.09, which was not significant at 0.05 levels. The post-test mean of muscular strength of Exp.-I Fartlek training, Exp.-II Interval training and Control group were 2.24, 2.29, and 2.07 respectively. The calculated F- value of post-test was 17.35, which was significant at 0.05 levels. The adjusted mean of muscular strength of Exp.-I Fartlek training, Exp.-II Interval training and Control group were 2.25, 2.28 and 2.07 respectively. The calculated F-value of adjusted mean was 68.89, which was significant at 0.05 levels, as the value of calculated ANCOVA was significant, the LSD post-hoc test was used.

Table -4 LSD TEST OF MUSCULAR STRENGTH

MEAN			MEAN DIFFERENCE	CRITICAL DIFFERENCE
EXP-I FARTLEK TRAINING	EXP-II INTERVAL TRAINING	Control Group		
2.25	2.28		-0.03	0.64
2.25		2.07	0.18	
	2.28	2.07	0.21	

As per the data given in the above table the adjusted mean difference between Exp.-I Fartlek training and Exp.-II Interval training was -0.03 which was not greater then critical difference i.e. 0.64. The difference of adjusted mean of Exp.-I Fartlek training and Control group was 0.18 which was not greater then critical difference 0.64. The adjusted mean difference between Exp.-II Interval training and Control group was 0.21 which was not greater then critical difference i.e. 0.64

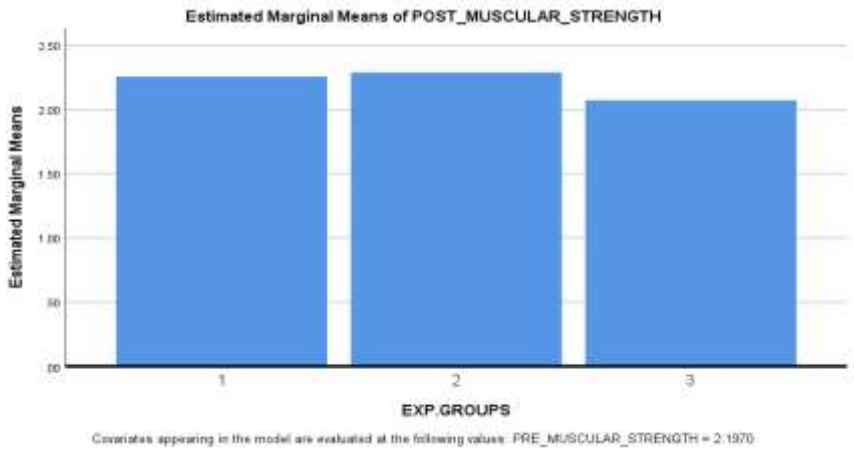


Table –5 STRENGTH ENDURANCE ANALYSIS

TEST	GROUPS			ANCOVA TABLE			
	EXP-I FARTLEK TRAINING	EXP-II INTERVAL TRAINING	Control Group	SS	DF	MSS	f- ratio
pre-test mean	25.25	25.35	24.95	1.733	2	0.867	0.39
				127.25	57	2.23	
post-test mean	32.70	32.30	24.30	898.13	2	449.06	146.60
				174.60	57	3.06	
adjusted mean	32.64	32.14	24.52	818.24	2	409.12	369.52
				62.00	56	1.11	

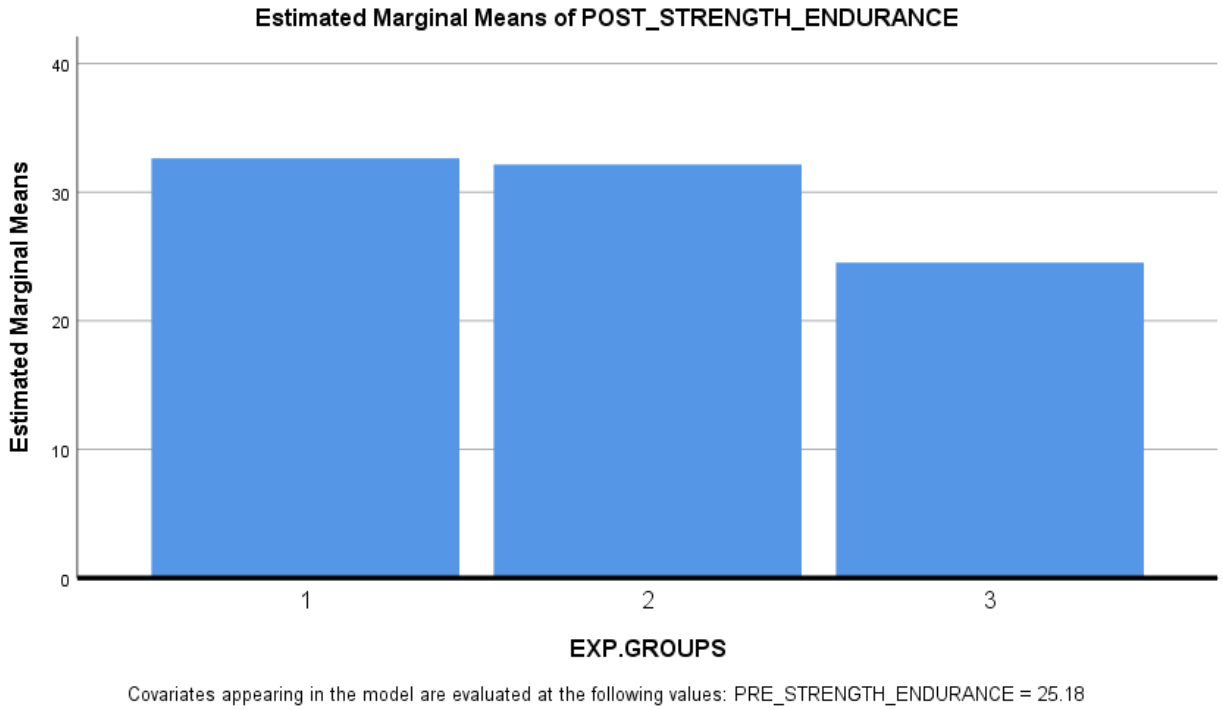
Tabulated F value at 0.05 level for DF 2, 57=3.15, for DF 2, 56=3.15

As per the data presented in the above table - the mean values of the pre-test strength endurance of Exp.-I Fartlek training, Exp.-II Interval training and Control group were 25.25, 25.35and 24.95 respectively. The calculated F value of pre-test was 0.39, as it was less than tabulated value at 0.05 levels i.e. 3.15 so it was not significant at 0.05 levels. The post means of strength endurance of Exp.-I Fartlek training, Exp.-II Interval training and Control group were 32.70, 32.30, and 24.30 respectively. The calculated F-value of post-test was 146.60 which was significant at 0.05 level as it was greater than tabulated F value at 0.05 level. The adjusted mean of muscular strength of Exp.-I Fartlek training, Exp.-II Interval training and Control group were 32.64, 32.14 and 24.52 respectively. The calculated F-value of adjusted mean was 369.52, which was significant at 0.05 levels as it was greater than tabulated F value at 0.05 levels, as the value of calculated ANCOVA was significant, the LSD post hoc test was used.

Table -6 LSD TEST OF STRENGTH ENDURANCE

MEAN			MEAN DIFFERENCE	CRITICAL DIFFERENCE
EXP-I FARTLEK TRAINING	EXP-II INTERVAL TRAINING	Control Group		
32.64	32.14		0.49	10.76
32.64		24.52	8.12	
	32.14	24.52	7.62	

As per the data given in the above table the adjusted mean difference between Exp.-I Fartlek training and Exp.-II Interval training was 0.49 which was not greater then critical difference i.e. 10.76. The difference of adjusted mean of Exp.-I Fartlek training and Control group was 8.12 which was not greater then critical difference 10.76. The adjusted mean difference between Exp.-II Interval training and Control group was 7.62 which was not greater then critical difference i.e. 10.76



CONCLUSION

MUSCULAR STRENGTH

After analyzing ANCOVA and LSD post hoc test for muscular strength it was observed that there was a significant improvement in the muscular strength of the subject of both the Experimental groups i.e. fartlek training group and interval training group comparatively control group. The reason for the same might be a specific training may have improved the factors affecting muscular strength. According to the above findings the preferential training was Interval training to improve muscular strength and then we can use fartlek training to improve muscular strength as interval training is more significant than fartlek training and control group with no training to improve muscular strength.

STRENGTH ENDURANCE

After analyzing ANCOVA and LSD post hoc test for strength endurance it was observed that there was a significant improvement in the strength endurance of the subject of both the Experimental groups i.e. fartlek training group and interval training group comparatively control group. The reason for the same might be a specific training may have improved the factors affecting strength endurance. According to the above findings the preferential training order was fartlek training then Interval training to improve strength endurance as fartlek training is more significant than interval training to improve strength endurance.

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