

# Effect of Dissimilar Surface Running on Girth Measurement of Fast Bowlers

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**Abstract – The purpose of the study was to measure effect of dissimilar surface running on girth measurement of fast bowlers. Thirty-six (36) Club Level fast bowlers was taken from three different Cricket Clubs from Uttar Pradesh. The subjects were divided in to three equal groups (G-A,G-B,G-C) having twelve subjects in each group. A six weeks self-made training program, three days in a week on dissimilar running surface was given to the subjects. Such as Group –A were assigned to Tread Mill running, Group- B were assigned to Natural Track running whereas no training was administrated to Group –C, considered as control group.**

**Pretest and posttest was taken before and after the administration of six weeks training program and data were calculated using descriptive & one way analysis of co-variance statistics with 0.05% of confidence. As a Girth measurement of the lower legs Hip, Thigh & Calf circumference were measured using a “flexible metallic Steel tape” in nearest cm respectively. Finding showed that Hip circumference was not significant in pretest phase (2.14<3.30), however post & adjusted posttest phases (4.94 & 15.74>3.30 at 0.05 level) were found significant differences and mean of the Treadmill surface is reasonably better than Natural surface. Thigh circumference in all pre, post & adjusted posttest phases (4.05, 18.01, 19.64>3.30 at 0.05 level) were found significant differences and mean of the Natural surface was found better than treadmill surface. Calf circumference was not significant in pretest phase (0.12<3.30), however post & adjusted posttest phases (5.69 & 8.79>3.30 at 0.05 level) were found significant differences and mean of the Natural surface was found better than treadmill surface. It is concluded that Natural surface running is more effective for thigh & calf circumference whereas treadmill surface is quite good for hip circumference of fast bowlers.**

**Key Words- Natural Surface, Lower Extremities**

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## INTRODUCTION

Pace bowling is an important and excel to the international game of cricket. Pace bowlers Pace bowling is an important and exciting element to the international cricket. Pace bowler represents the majority of the “bowling attack” against opposition batters. They are typically required to bowl pace, accurate, and consistent throughout a bowling spell (series of 6 deliveries per over for multiple over’s) or repeated spells, in attempt to dismiss opposition batters. Unfortunately, pace bowlers are at greatest risk of injury compared with batters, wicket-keepers, and spin bowlers. Poor physical preparation, along with unsafe body posture minimal or excessive bowling work- load is likely to predispose a pace bowler to injury. Strength of both legs of fast bowlers has must important for quick bowling. In the quest to enhance pace bowling skill, Elite pace bowlers and coaches believe that it is necessary to possess athleticism and Girth measurement such as Hip, Thigh & Calf circumference of the cricketer. Pace bowling strength and conditioning programs and

guidelines are evident however; the associations between physical qualities and pace bowling skill are not well researched.

Ball release speed is a major contributor to fast bowling success, reducing the time the batsman has to assess the path of the ball and make decisions regarding which shot to play. The fastest bowlers release the ball at speeds in Running is a pawing movement. The body is propelled forward by the force of the push backward of the feet against the ground. The surfaces on which athletes run on can play a large role in determining how well they perform - and how likely they are to get injured. To understand why this is so, it's important to realize that running is essentially a series of collisions between our body and the ground (Uppal, et al. 2004). As our right foot makes impact with the surface on which we are running, the muscles in our right leg contract and reverse the downward velocity of our body, accelerating usupward and forward. Less than a half-second later, as our left foot hits pay dirt, the muscles in our left leg contract and turn

the tables on our descending acceleration again. These collisions and velocity reversals occur at a high rate - about 180 times per minute for the average runner, or over 37,000 times in all during a three and a-half hour marathon (Hawley 1978).

Most fast bowlers believe that running on natural surfaces (grass, sand) is easier on the body and protects them from jarring and impact injuries. However research evidence that natural surfaces such as grass, sand, gravel or dirt tracks are beneficial to runners, but some time natural surfaces may lead to more injuries such as twisted ankles, knees and pulled muscles especially if the surfaces are uneven rather than smooth (Janderson99). The reviews of the literature show that there are definitive comparative studies tracking the relative injury rates for large numbers of people running on natural or artificial surfaces. Most people assume the obvious that the forces and impacts on our feet, knees, hips and legs will be much less on dirt or grass than on hard concrete or synthetic surface. The limited studies that have been done suggest that the body adjusts to different surfaces automatically to even out the impact. Researchers in the 1990s found that when runners were faced with various running surfaces with different stiffness, they responded by changing the stiffness and flexibility in their legs to compensate for the differences (Babar et. al. 1994). In the present study the subjects were running on synthetic track surface and treadmill surface for practice. A treadmill is a device for walking or running while staying in the same place. Treadmills were introduced before the development of powered machines, rather than the user powering the mill, the machine provides a moving platform with a wide conveyor belt driven by an electric motor or a flywheel. The belt moves to the rear requiring the user to walk or run at a speed matching that of the belt. The rate at which the belt moves is the rate of walking or running. Thus, the speed of running may be controlled and measured (www.runnersworld.com/beginners/).When running on a treadmill, "the belt pulls our leg through, resulting in a relatively passive extension of the hip. Passive [hip] extension would then minimize the contribution of the primary hip extensors. Running overground, on the other hand, requires that we pull your leg through, therefore involving active hip extension (Paul M. Juris 1996). Therefore, it would be interesting to see how six weeks running program on these two surfaces create impact on girth measurement of Club Level Fast bowlers.

**METHODOLOGY**

In order to measure effect of dissimilar surface running on girth measurement of fast bowlers, was selected thirty- six (36) Club Level fast bowlers from three different cricket clubs from Uttar Pradesh during the summer training camp held at Kanpur in 2016. The subject's ages were ranges from 16-22 years. The subjects were divided in to three equal

groups (G-A, G-B, G-C) having twelve subjects in each group. A six weeks self-made training program, three days in a week on dissimilar running surface was given to the subjects. Such as group –A were assigned to Tread Mill running, group- B were assigned to Natural Track running whereas no training was administrated to Group –C, considered as control group. A pretest was taken before the treatment period and immediate after the completion of the six weeks training program the post test was held on a day on all three groups at the club premises. The selected test was demonstrated and explained to the subject by the researcher himself. After that, subjects were asked to give the test and the data were recorded. As a criterion measures Girth measurement such as Hip circumference, Thigh circumference & Calf circumference of dominant leg were measured using a "flexible metallic Steel tape" in nearest cm., (Nelson & Johnson 2007) respectively.

**STATISTICAL PROCEDURE**

The pre-post data were analyzed through analysis of Co-variance (ANCOVA) statistics. Beside this post hoc test (L.S.D) was used in order to investigate significant difference between the pair group means. The level of significance was set at 0.05 level of confidence.

**TRAINING PROGRAM**

Following training were given separately to the artificial & natural surface running groups up to

Six weeks. Tread mill running was given in a multi gym complex where as Natural running was given in the ground.

Treadmill running Group-A		Natural Track Running Group-B	
Monday (Morning)	10 min. running without grade of sloping &with 7km.p/h	Monday (Morning)	10 min. running with 70% intensity.
Wednesday (Morning)	12 min running without grade of sloping & with 7km p/h	Wednesday (Morning)	12 min running with 70% intensity.
Friday Morning	15 min running without grade of sloping & with 7km p/h	Friday (Morning)	15 min running with 70% intensity.

**RESULT OF THE STUDY**

**TABLE- I- ANCOVA OF HIP CIRCUMFERENCE AMONG TWO EXPERIMENTAL GROUPS AND ONE CONTROL GROUP**

	Mean	Treadmill	Natural	Control	Source of Variance	Df	SS	MSS	'F' ratio
Pre-test	93.16	94.92	93.33		Among	2	22.39	17.16	2.14
					Within	33	172.25	5.21	
Post-test	90.25	92	92.75		Among	2	39.5	19.75	4.95*
					Within	33	132.5	4.01	
Adjusted Post-test	90.72	91.71	93.10		Among	2	37.45	18.73	15.74*
					Within	32	38.12	1.19	

F<sub>01</sub> (2, 33) = 3.30, F<sub>05</sub> (2, 32) = 3.30) A = among means variance, W = within group variance.

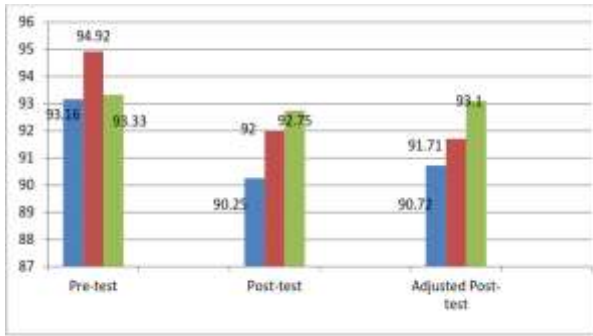


Figure 01-

The table 01& figure 01 clearly revealed no significant difference in hip circumference ('F'=2.14<3.30 at 33 degree of freedom at 0.05 level) in pretest phase. However the 'F' value in posttest & adjusted posttest phases revealed significant difference in hip circumference among two experimental group and one control group, because calculated 'F' value in posttest& adjusted posttest Phases (4.95& 15.74 respectively) were found to be higher than that of required 'F' ratio value 3.30 to be significant at 0.05 level of confidence.

TABLE- II- PAIRED GROUP MEAN DIFFERENCES (AS PER ADJUSTED POST-TEST MEANS) OF HIP CIRCUMFERENCE

Treadmill	Natural	Control group	Mean Difference	Critical value At 5% level
90.72		93.10	2.38*	0.91
90.72	91.71		0.99*	0.91
	91.71	93.10	1.39*	0.91

\*The mean difference is significant at the 0.05 level

Table 02 revealed that significant difference exist between Group-A & Group-B, Group-A & control group, Group-B & control group. It is therefore concluded that both surface running is quite effective but if a choice has to be made out of two treatments A & B treatment 'A' should be preferred because mean of treadmill surface is reasonably better than Natural surface.

TABLE- III- ANCOVA OF THIGH CIRCUMFERENCE AMONG TWO EXPERIMENTAL GROUPS AND ONE CONTROL GROUP

Mean	Treadmill	Natural	Control	Source of Variance	Df	SS	MSS	'F' ratio
Pre-test	43.58	45	42.08	Among	2	51.17	25.59	4.52*
				Within	33	186.76	5.66	
Post-test	46.76	48.08	42.91	Among	2	172.62	86.31	18.01*
				Within	33	158.22	4.79	
Adjusted Post-test	46.74	46.93	41.75	Among	2	50.28	25.14	19.64*
				Within	32	41.60	1.28	

$F_{05}(2, 33) = 3.30$ ,  $F_{05}(2, 32) = 3.89$  A = among means variance, W = within group variance.

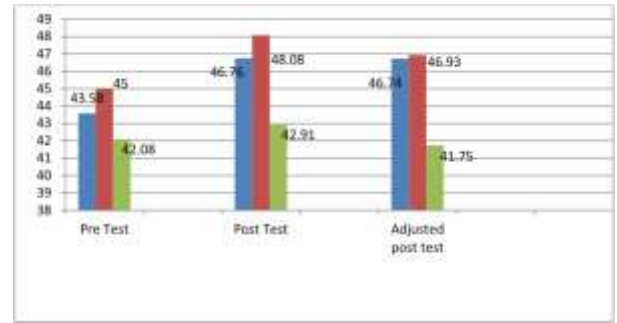


Figure 02

In the table 03 & figure 04'F' ratio values of the pre, post & adjusted posttest phases revealed significant difference in Thigh Circumference among two experimental groups and one control group. The 'F' value in pre post & adjusted posttest phases (4.52, 18.01 & 19.64) were found to be higher than that of required 'F' ratio value 3.30 at 0.05 level of significant. The post hoc-test of paired adjusted final means among three groups was applied which is presented below in the table02

TABLE- IV, PAIRED GROUP MEAN DIFFERENCES (AS PER ADJUSTED POST-TEST MEANS) OF THIGH CIRCUMFERENCE

Treadmill	Natural	Control group	Mean Difference	Critical value At 5% level
46.74		41.75	3.99*	0.93
46.74	46.93		0.19	0.93
	46.93	41.75	5.18*	0.93

\*The mean difference is significant at the 0.05 level

Table 04 reveled that significant difference exist between Group-A & control group, Group-B & control group but no significant difference exist between Group-A & Group -B. It is therefore concluded that both surface running is quite effective.

TABLE-V- ANCOVA OF CALF CIRCUMFERENCE AMONG TWO EXPERIMENTAL GROUPS AND ONE CONTROL GROUP

Mean	Treadmill	Natural	Control	Source of Variance	df	SS	MSS	'F' ratio
Pre-test	34.92	35.58	35	Among	2	3	1.5	0.12
				Within	33	456	13.18	
Post-test	37.67	38.58	36.57	Among	2	22.06	11.03	5.69*
				Within	33	64.25	1.94	
Adjusted Post-test	37.74	38.47	36.47	Among	2	18.82	9.41	8.79*
				Within	32	34.44	1.07	

$F_{05}(2, 33) = 3.30$ ,  $F_{05}(2, 32) = 3.30$  A = among means variance, W = within group variance.

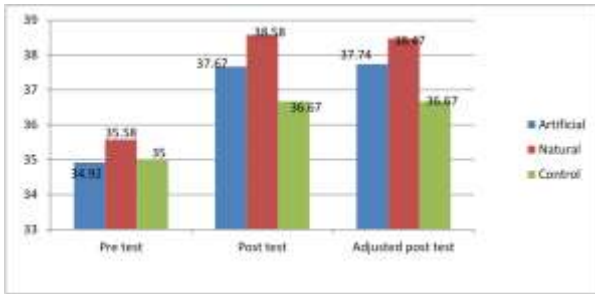


Figure 03-

In the table 05 & figure 03 clearly revealed no significant difference in Calf circumference ( $F=0.2 < 3.30$  at 33 degree of freedom at 0.05 level) in pretest phase. However the 'F' value in posttest & adjusted posttest phases revealed significant difference in Calf circumference among two experimental group and one control group, because cal 'F' value in posttest & adjusted posttest Phases (5.69 & 8.79 respectively) were found to be higher than that of required 'F' ratio value 3.30 to be significant at 0.05 level of confidence.

TABLE- VI-PAIRED GROUP MEAN DIFFERENCES (AS PER ADJUSTED POST-TEST MEANS) OF CALF CIRCUMFERENCE

Treadmill	Natural	Control group	Mean Difference	Critical value At 5% level
37.74		36.67	1.07*	0.85
37.74	38.47		0.73	0.85
	38.47	36.67	1.08*	0.85

\*The mean difference is significant at the 0.05 level

Table 06 revealed that significant difference exists between Group-A & control group, Group-B & control group but no significant difference exists between Group-A & Group -B. It is therefore concluded that both surface running is quite effective.

**DISCUSSION OF FINDINGS**

The outcomes of this study revealed that the application of dissimilar running programs resulted in significant improvement in Hip, Thigh and Calf circumference of both treatment groups. The implication of this finding is that an individual with excessive hip circumference, weak thigh & calf circumference would be benefited from both running programs, but treadmill running is greater benefited than natural surface in case of hip circumference, otherwise both treatments are equally effective for improvement of thigh and calf circumference.

The major fact that in treadmill running our upper body is not moving forward, it's our feet that are moved backwards by the running belt. This creates a different bio-motor pattern of the movement basically on lower extremities such as buttock muscles hip

muscle and calf muscles (Romanov 2005). On the treadmill, our main concern is to not release the upper body and keep the feet moving according to the moving belt, here the muscles (buttock) are involved regular way therefore a stress has been felt by the runner on buttock muscle which leads to reduce excess fat of the buttock muscles (Jhung2008) as a result significant decrease of hip circumference of the treadmill running group. Running is good for enhancing endurance and speed, but it is great for burning calories as well (Luff 2011). The more calories burned, the more fat is burned throughout the body, including gluts muscle (Waehner 2012). Technique is crucial to getting a tight, firm buttock (body building .com). So as per the technique the subjects were kept the arms pumping while running also, try to kick the ground by driving knee up quickly and stepping down powerfully. This may give a firm and tight buttock of the subjects.

In the study tread mill running and Natural running has equal significant effect on thigh muscle and calf muscle of both groups. The research said that only fast running can improve leg muscle circumference (Bruen 2010). In this study subjects were running with nearly high speed so that running force create high resistance that assists in triggering muscle fibers of the both groups which may leads to thigh muscle and calf muscle hypertrophy and ultimate development of their circumference. Another researcher said leg muscles can be developing by lifting heavy weight (Walker 2010). In this study the subjects were carried their natural body weight with run, so it could be positive effect on their thigh muscle and calf muscle circumference.

**CONCLUSIONS**

1. There was significant improvement of Hip circumference of both training groups of fast bowlers.
2. Both treadmill and Natural running are equally effective for both thigh circumference and calf circumference for both groups of fast bowlers.
3. There was no significant improvement of Girth measurement in control group of fast bowlers.

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