Barefoot Running V's Shod Running

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Abstract: *Runners are frequently used to worn various shoes during a training season. This study try to measure the significant disparity between barefoot running and normal shoes running conditions of sprinters in order to find out information about the potential effects of footwear on competitive runners. To achieve this purpose 26 male state/ inter-collegiate level of their age range 17 to 25 years were purposively selected as subjects from Haryana State, India. To collect the data different running related test has conducted i.e., 100Mts & 200 Mts. race to find out bare foot running and normal shoes running conditions effects, acceleration ability by 30Mts. race, stride frequency by high knee action for one minutes, explosive leg strength for standing broad jump and force by using formula (f=ma) were measured in both bare foot and shod running conditions of sprinters. To analyze the data of present study Statistical Package for the Social Science (SPSS 11.5) computer software was used and on the bases of mean score of the data it revealed that in 100Mts., 200Mts. race and standing broad jump in condition of normal shoes performed better, whereas performance were better in condition of bare foot in acceleration ability, force and stride frequency. But there exist insignificant mean difference between both conditions in all variables.*
Keywords: *Barefoot, shod running and sprinters.*

I. Introduction

Humans have been walking and running bare foot for millions of years, but recently there is increasing interest among runners to run bare foot, and the media, and the sports medicine community also highlighting it. Although we are little scientifically about barefoot running, many different opinions have been expressed on the topic. It attracts the attention of people frequently. At one end of the coin, supporters of barefoot running argue that running without shoes is more relax, natural and better for you and that shoes with thick sole cause injury. At the other end of the coin, antis argue that barefoot running is a dangerous and typical ''fad'' to be avoided. Other lobby expressed opinions are that barefoot running is unhealthy because the foot needs cushioning, protection, support, gripping and motion control; that barefoot running may be safe on a sand or a grass but hazardous on hard surfaces such as road and concrete; and that only exceptional who are God gifted biomechanically should run without shoes. One also hears a wide range of other passionate views but mostly doubts, confuse and many questions. Doesn't it hurt? Why are so large lobby of people interested in barefoot running? Is barefoot running condition better for you than shod running condition? How should people transition? What is the best way to run barefoot? What are the advantages and disadvantages of barefoot?

Running has also been mentioned in the myth and legends of ancient civilizations, such as Greece and Egypt. Professional messengers ran between cities carrying news of importance. In the year of 490 BC the Persians attacked the Greek city of Marathon. The courier Pheippides ran from Marathon to Sparta (240 km) in call for aid. When the battle was won Pheippides ran to Athens (40 km) with the news of victory, but he died delivering the massage according to ancient Greek storyteller Herodotus (**Christensen et. al., 2009**)

In the 1960 Olympic Games, an Ethopian barefoot runners named Abebe Bikila won the Marathon gold with a time 2:15:16. This set the marathon world record, and is considered a respectable time to this day. This was probably one of the first accounts in modern times of someone winning a major competition while running completely without shoes. Zola Budd is another barefoot runner that won recognition by setting a world record at 5000 m in 1985, finishing at 15:01:83.

This is question that many have sought to answer. One recent trend is the interest in barefoot running. There are many voices on the Internet that believe it may be more beneficial to run barefoot than the standard practice of running in cushioned shoes (**Barefootrunner, 2012**). Manufactures of bare foot sports shoes currently state that wearing their shoes will stimulate and strengthen muscles in the feet and lower legs, improving general foot health and reducing the risk of injury. Further stimulate neural function important to balance and agility. The shoes would even help you to unleash your optimal running stride.

The impact force has been a major concern for shoe designers and manufacturers, as one of the primary roles for running shoes is to provide shock absorption (**Cavanagh, 1980; Nigg, 1986**). Additionally, for

improving the athlete performance the total weight of the shoe has been reduced. Hence, racing tracks, shoes and spikes have been developed to help facilitate optimal performance **(Cavanagh, 1980; Denton, 2005)**.

In comparison to most running shoes, spikes and racing track surface have less cushioning and a flat, thinner heel to produce a lighter shoe for tournaments and practice/training sessions. While competitive footwear has its time and place, it is assumed that this type of shoe should be used with alertness and awareness of the possible increased injury risks **(Denton, 2005)**.These researchers, also conducted similar study on athletes i.e. **Cook, et.al. (1985), Denton, (2005), DeWit, (2000), Divert, (2005)** and **Weyand, (2000).**

A big question arise on the minds of many athletes, coaches, trainers, physical therapists, and physicians is whether running barefoot or the shod running better for athletes or not. In present study we try to find out answer of this question by experimental research.

II. Material and Methods

Selection of Subjects:

For the purpose of the present study, Twenty-six (N=26), Male Haryana Inter-Collegiate and State level runners between the age group of 17-25 years were selected as subject in the present study. The subjects were purposively selected (n=26) and tested two times for each variables in different conditions of running i.e., barefoot and shod running.

Selection of Variables:

The variables were selected according to the running activities i.e., 100Mts & 200 Mts. race to find out bare foot and normal shoes conditions effects on athletes, acceleration ability by 30Mts. race run, stride frequency by high knee action for one minutes, explosive leg strength for standing broad jump and force by using formula (f=ma) were measured in both bare foot and shod running conditions of sprinters.

400Mts. grassy standard track and grassy surface were used by subjects for collection of data. The subjects were used their own routine training shoes. The subjects were belongs to semi rural area so they usedto to do running in bare foot, shod running and running with spikes.

Statistical Technique Employed:

The data were analyzed by applying 't' test to find out significant mean difference between bare foot and shod running condition of sprinters with the help of Statistical Package for the Social Science (11.5) computer software.

III. Results & Discussion

Table 1: Significant difference between the bare foot and Shod running conditions of sprinters.

Sr. No	Variables	Bare Foot		Normal Shoes		T Test Values for Equality of Means
		Mean	S.D.	Mean	S.D.	't' Ratio
1	**100 Mts race (Seconds)**	13.053	0.559	13.0365	0.422	0.0870
2	**200 Mts race (Seconds)**	26.871	2.279	26.657	1.884	0.5343
3	**30 Mts race (Sec) Acceleration run Ability**	4.423	0.033	4.432	0.051	0.168
4	**High Knee Action (Stride frequency)**	25.923	9.514	25.385	10.806	0.609
5	**Standing Broad Jump (Legs Explosive Strength)**	2.517	0.016	2.579	0.022	1.629
6	**Force=ma**	25.932	8.907	25.984	9.291	0.061

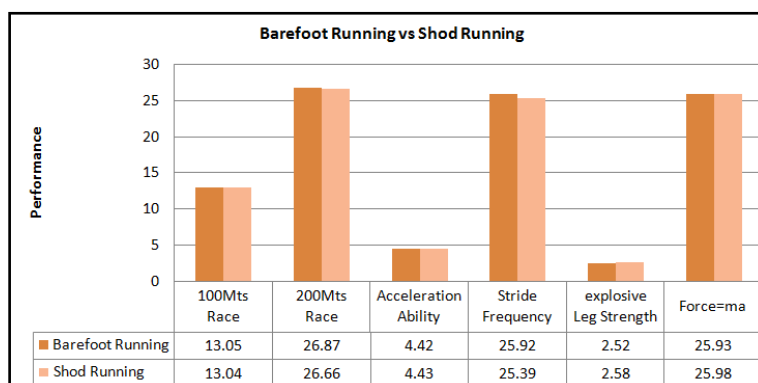****Significant at 0.01 level of significance; *Significant at 0.05 level of significance**

Here: N = 26   **d.f. = 50**   CI= Confidence Intervals

Required value for being significant at 0.01 level of significance= 2.682 and significant at 0.05 level of significance= 2.010.

Barefoot Running vs Shod Running

	100Mts Race	200Mts Race	Acceleration Ability	Stride Frequency	explosive Leg Strength	Force=ma
Barefoot Running	13.05	26.87	4.42	25.92	2.52	25.93
Shod Running	13.04	26.66	4.43	25.39	2.58	25.98

As Table and graphical presentation shows, Mean, S.D. and 't' ratio between bare foot and normal shoes conditions of sprinters. Results indicates that the 't' ratio of 100 Mts. race, 200Mts. race, acceleration ability, stride frequency and force are differ insignificantly. It clear that these variables have no significant difference between bare foot and normal shoes conditions of sprinters. Further the mean values of 100Mts, 200Mts. race and stride frequency in normal shoes conditions are less as compare to bare foot conditions, as we know since time variables is inversely related to performance hence decrease in value of time indicates higher the performance and vice-versa. Whereas, mean values of acceleration ability and force in barefoot condition are better as compare to normal shoes condition, while explosive leg strength of sprinters in normal shoes condition are better than that of barefoot condition.

As mean value indicates that in case of 100Mts., 200Mts. race athletes performed better in condition of shod running as compare to bare foot it is because runners running with footwear have a wide stride length (longer flight phase); and lower strides frequency (slower turnover) and a longer contact time with ground. In it complete body leads by upper body. Footwear enables the body's ability to absorb the shocks and forces, and protects the foot from trauma and injuries, whereas mean values shows that in case of acceleration run ability, force and stride frequency runners performed better in barefoot running condition it is due to in case bare feet, runners leads on the outside middle of the foot and the initial force peak occurs very rapidly, while in shoes, runners heel often strikes first with ground and it increases the time taken for the initial force peak. Shoes also add mass to the foot, which slowing down the runners. Athletes running with bare foot also have a shorter stride length (Less flight phase); but higher stride frequency (faster turnover) and a shorter ground contact time. The fight phase of running is also lower. Mean value is also indicates that in case of explosive leg strength athletes performed better in shod running condition as compare to bare feet it is due to better grip with ground surface and ground reaction force.

There is no authentic evidence that barefoot running has negative effects on performance. To be sure, most elite athletes prefer to use shoes because they protect the foot and allow one to run on rough surfaces without worrying about foot placement and protection, but barefoot runners such as **Abebe Bikila** and **Zola Budd** have set world records in the marathon and shorter distance races. The world record holders for almost every long distance running event are Fore Foot Strike runners who race bare foot and sometimes train in racing flats or other kinds of minimal shoes. In addition, economy seems to be improved by being barefoot or in minimal shoes sole.

IV. Conclusion

A perusal of summary of results in table-I mean values shows that in condition of shod running the runners performed better in 100Mts., 200Mts. race and standing broad jump as compare to barefoot running condition, whereas in condition of bare foot acceleration run ability, stride frequency and force were better than that of condition of shod running. But there exist insignificant difference between both bare foot and shod running conditions. It implies that with footwear have a wide stride length; and minimum stride frequency and a longer ground contact time, whereas in condition of bare feet, runners leads on the outside middle of the foot and the initial force peak occurs very rapidly, while in shoes, runners heel often strikes first it increases the time taken to the initial force peak. Shoes also add mass to the foot, slowing down the runners. Bare foot runners have a shorter stride length; but higher stride frequency and a less ground contact time. Further in case of explosive leg strength athletes performed better in shod running condition as compare to bare feet it is due to better grip with ground surface and ground reaction force.Similar result reported by **Cavanagh, 1980; Nigg, 1986; Cavanagh, 1980; Denton, 2005** and **Divert, (2005)**.

Vin Lananna (U.S.A.Track & Field ,Athens distance coach) believes that "athletes that trained barefoot run faster and have fewer injuries". T**he legendary New Zealand coach Arthur Lydiard** also preferred his athletes to run barefoot. The eccentric **Australian Athletics coach of Herb Elliot, Percy Cerutty** got his athletes to train barefoot in the sand dunes of Portsea, Victoria.

This data may be helpful for physical education teachers, coaches, researchers to increase the performance by using both bare and shod running conditions.

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