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## Correlation of BI-acromial, BI-iliocrystal and BI-epicondylar breadths of Indian elite male high jumpers with their performance

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### Abstract

Along with the sports training, biomechanics, the body's size, shape and proportion is having great role for improving performance of high jumpers. The purpose of the study was to find out the co-relationship of bi-acromial, bi-criystal and bi-epicondylar breadths of high jumpers with their performance. For the purpose of the study 25 elite male high jumpers were randomly selected from various national level competitions. The anthropometric rode was used to assess the bi-acromial, bi-iliocrystal, humerous and femors bi-epicondylar. Their performance was recorded from the competition results. For analyzing the correlation ship Pearson's product moment coefficient correlation technique was used. The findings of the study reveled that bi-acromial breadths of high jumpers was positively correlated with their performance. Whereas the negative correlation was observed between performance of high jumpers with their biiliocrystal and bi-epicondylar breadth of humerous and femurs.

**Keywords:** Biacromial breadth, bi-iliocrystal breadth, humerous bi-epicondylar, femurs bi-epicondylar breadth, Indian elite male high jumpers

### Introduction

There are various fundamental activities which are used for surviving for mankind. Jumps are also fundamental activities used by human being for catering food and safety needs from ancient times. Later on many techniques and styles has been developed. The competitive jumps were included in Olympic Games since its inception right from very start in Athens 776 BC.

The high jump is an event of track and field in which a jumpers have to clear the measured of cross bar which has been placed at a particular height with the help of uprights. The high jump has been a part of Olympic games from ancient Greece. As the time and years passes, the competitors adopt various effective techniques for increasing height in competition. Current form of high jump first become popular in 19<sup>th</sup> century through which various professional players cleared over 6 feet height of cross bar.

Along with the sports training, biomechanics, the body's size, shape and proportion is having great role for improving performance of high jumpers. The study of estimation of size, shape and proportion is known as physique, which is a prime factor to know how much caliber an individual have for becoming top class high jumpers.

The researches of Cureton, (1973) <sup>[5]</sup> and Tanner, (1964) <sup>[14]</sup> aimed usefulness of physique for appropriate physical activity during main competition. They also concluded that hurdlers were having short trunk and long legs compare that others. Longer legs are good enough for taking longer stride and cutoff the time of flight enable to better performance of jumpers also.

The body physique varies person to person in several ways. This can be investigated by diagnosing size, shape and form of sport men. For investigating the physique selected anthropometric measurements were taken.

With the help of anthropometrical estimation, the determination of lean body mass, fat percentage of athletes and physical fitness level determination make easy. That signifies the critical role in the top level performance during competition. Tanner (1964) <sup>[14]</sup> conducted a study on Olympic athletes for evaluation their body composition and physique at Rome, and he stated in his study that the athletes might be both "*born and made*".

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The proportionality and body measurements are plays important role to performance of sports activities. The measurements taken by trained anthropometrist are more reliable and objective oriented for the development of performance among sports person. Malina “revealed that the physiological importance of various dimensions has not yet been adequately established”. The Top level performance during competition required special type body build, composition. De Garay *et al.* (1974) revealed in their study that top performers in sports required a specific body build and shape. (Hirata, 1996) [8] Concluded that small body size sports person are best for weight lifting, boxing, long distance running and gymnastics like as Japanese. Whereas the American athletes are best suitable for basketball, swimming, long jump, volleyball and short distance races causing they are having lean and large physique.

The athletes wish to attain high level performance in competition should be compare them self with Olympic athletes (Carter, 1982) [3]. If there body build is similar to Olympians it mean they might be achieve top level performance considering to other factors too.

Most of the games which are included jumping activity having their long lower extremities and tall stature such as basketball, volleyball, high, long & triple jumps and goalkeeping. Probably longer lower extremities assists the body to lift higher and increasing the time of flight during jumps.

The performance of jumping activities are unaffected for lifting the center of gravity. The size seems no role in high jumps or pole vaults like activities, whereas the transfer of center of gravity is most important factor for jumping activities. That’s why players of gymnastics are small compare to jumpers (Cureton T. 1951) [6]; (Hirata K. 1966) [8]. A high jumpers has to cross the many steps to attain top level of performance in competition. This research may be assists to increase understating correlation between the anthropometrical breadths and performance of Indian elite male high jumpers. The conclusion of this study may provide better guideline and knowledge for boosting the potential or

inherited talent. This may fulfill our dream of producing word class high jumpers.

**Methodology**

**Selection of subject**

Retreating the objective of this study twenty five (n = 25) top level male High jumpers were randomly selected from various national level competitions, Sports hostels of State and SAI. The selected subjects represents most of Indian States.

**Selection of variables**

**Anthropometrical parameters**

Bi-acromial, Bi-iliocrystal and femur & humorous Bi-epicondylar Breadths.

**Performance**

The subject was achieving the best performance or distance during the jumping competition or sports trials.

**Statistical procedure**

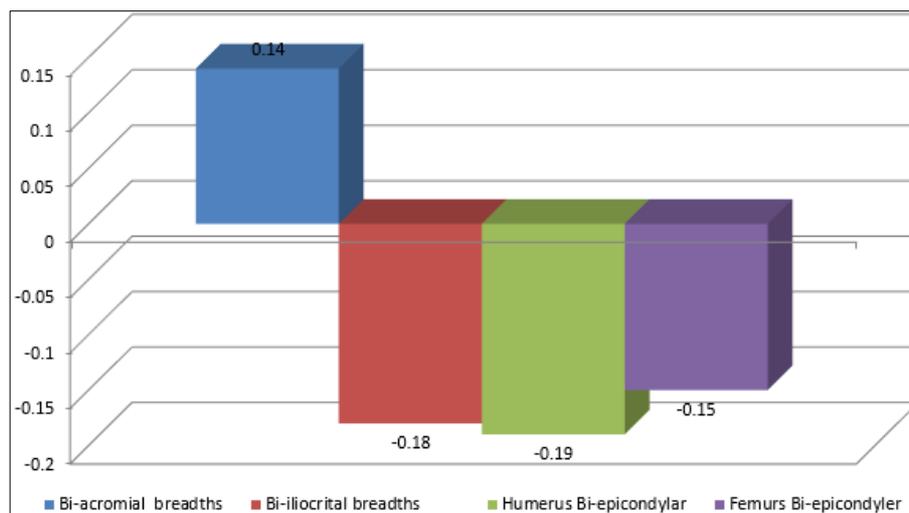
For obtaining the objectives of this study Pearson’s product moment correlation was applied on gathered data to find out the relationship of biacromial, biiliocrystal and biepicondylar breadths measurements and performance of Indian elite male high jumpers.

**Results and Discussion**

Table 1: Coefficient Correlation of Performance of elite level Male High Jumpers with their bi-acromial, biiliocrystal and bi-epicondylar breadths.

**Table 1:** Coefficient Correlation of High Jumpers’ Performance with Different Anthropometrical Variables

Variables	Mean Value of Variables	Mean Performance	Correlation
Bi-acromial breadths	41.64	2.03	0.14
Bi-iliocrystal breadths	27.19	2.03	-0.18
Humerus Bi-epicondylar	6.56	2.03	-0.19
Femurs Bi-epicondylar	8.39	2.03	-0.15



**Fig 1:** Correlation of Bi-acromial, Bicristal and Bi-epicondylar breaths with the performance of High Jumpers

The Product Moment Correlation Technique shows that the positive correlation were observed between the high jumpers performance with their biacromial breadths (0.14). The greater the upper body breadths signifies the higher amount of muscle cross sectional area for higher counter force

generation (Kukić, Petrović, Greco, Cataldi, & Fischetti, 2022) [9].

Whereas the negative correlation were observed between the performance of high jumpers’ with their biiliocrystal [Mean 27.19] (negative correlation-0.18), humerous bi-epicondylar

(-0.19) and femerus bi-epicondylar breadths (-0.15). Similar to our studies (Atwater, 1990) revealed that the mean bicristal breadth of athletes are 28 cm for both sexes, whereas it was slightly lesser (27 cm) in case of elite athletes.

### Conclusion

On the basis of findings of the study researcher may be able to conclude that positive correlation of biacromial breadth (0.14) with the performance of high jumpers signifies the greater muscular cross sectional area which enable elite high jumpers to generate greater counter force to propel jumpers in to the air and increasing flight phase. Whereas the biiliocrystal and bi-epicondylar breadths shows negative correlation with their performance that means the greater the bone density might be a caused of increasing body weight which might be negative effect of performance of Indian elite male high jumpers.

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