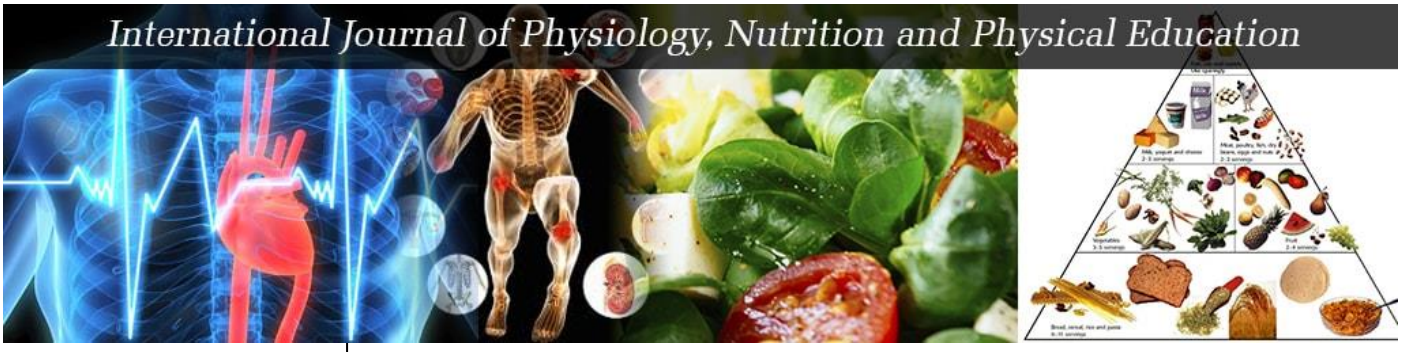

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Biomechanical analysis of anisomelia among the young children's in Puducherry

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Abstract
The aim of the study was to determine the anisomelia deformities status among school boys in Pondicherry. Now a day's most of the children's have back pain and functional spinal deformities due to many reasons. Whether anisomelia deformities play a vital role for finding answer there are 1719 school students are selected from various zone in Pondicherry. There age range between 9-12 years as per the record. Their leg length was measured in millimeter to centimeter. The findings of the present study strongly indicated that the most of the children are affected anisomelia deformities especially pre teenage boys. Hence, it is advised that the stake holders should pay more attention to the mechanics of the leg.

Keywords: Biomechanics, anisomelia, analyze, delta Leg, school boys

Introduction
Inequality of the lower limp or leg length is called anisomelia or Leg Length Discrepancy (LLD) it is usually appear in childhood or as a result of an injury or illness that causes damage to the growth plate. Most people have some degree of leg length discrepancy, but larger differences can affect well-being and quality of life by keeping you from participating in the activities you like (Reach Your Height). Un-equalized lower limb length discrepancy leads to posture deformation, gait asymmetry, low back pain and discopathy. If anisomelia < 2 cm is a static disorder (Jan W. Raczkowski, 2010) [1]. Many study proved that the LLD associated with functional scoliosis and low back pain (Jan W. Raczkowski 2010) [1].

Classification of leg length discrepancy (LLD)
- **Structural (SLLD) or anatomical:** Differences in leg length resulting from inequalities in bony structure
- **Functional (FLLD) or apparent:** Unilateral asymmetry of the lower extremity without any concomitant shortening of the osseous components of the lower limb.

Common causes of anisomelia
Leg length discrepancy has many causes, which can be divided into four main groups:
- **Congenital:** With congenital cases, a leg length discrepancy is apparent at birth. Generally, the length of the discrepancy is greater, and it increases progressively over time.
- **Developmental:** Caused by childhood illness or a growth plate injury, developmental cases result in a discrepancy that appears over time, as the injury or illness slows the growth of one leg.
- **Post-traumatic:** Fractures and other traumatic injuries to the bone may heal incorrectly, causing one leg to be shorter than the other; however, in some cases, these injuries can also speed up the growth of the injured leg.
- **Bone tumors:** Both bone tumors and the treatments designed to eradicate them can affect bone growth. This is especially true if the illness happens in infancy.

In some cases, the cause of leg length discrepancy is "idiopathic," or unknown. While the exact cause of the condition may not be known, a healthcare professional who specializes in leg length discrepancy can still work with you or your loved one to decide what treatment, if any, is best for your situation (Reach Your Height).

Material and Methods

The study was conducted in Pondicherry 32 Government Schools in various zones. There are 1719 school students are analyzed for this study. There age range between 9-12 years as per the school records. The anisomelia was analyzed by using the model delta leg which was constricted by chine sports.com as per the reference the researcher also used the model delta leg as per the specification what they mentioned.

The Delta Leg is a non-invasive manual instrument for evaluating the heterometry of lower limbs without any load bearing. It consists of a bar with two orthogonal footboards: one is stationary, while the second moves along the longitudinal axis of the bar and is equipped with a pointer indicating the positive or negative numeric value of the heterometry on a millimetric scale on the upper surface of the bar. The "zero" value is set with reference to the stationary footboard. The precise structure of the instrument, the mobile footboard's accurate sliding system and the millimetric scale allow fast and reliable measurement of the differences in length of the lower limbs with a margin of error of just a few millimetres. The instrument comes with a manual.

Description

The subjects were asked to sit in a supine position and the Delta Leg was placed in between the subject's legs in horizontal plane. Then their legs were positioned in orthogonal fixed foot, while the second one moves alongside the longitudinal axis of the tool and is geared up with a pointer indicator that gives positive or negative numeric values on a millimeter scale on the surface of the tool. The "zero" value is the point of position of stationary foot board.

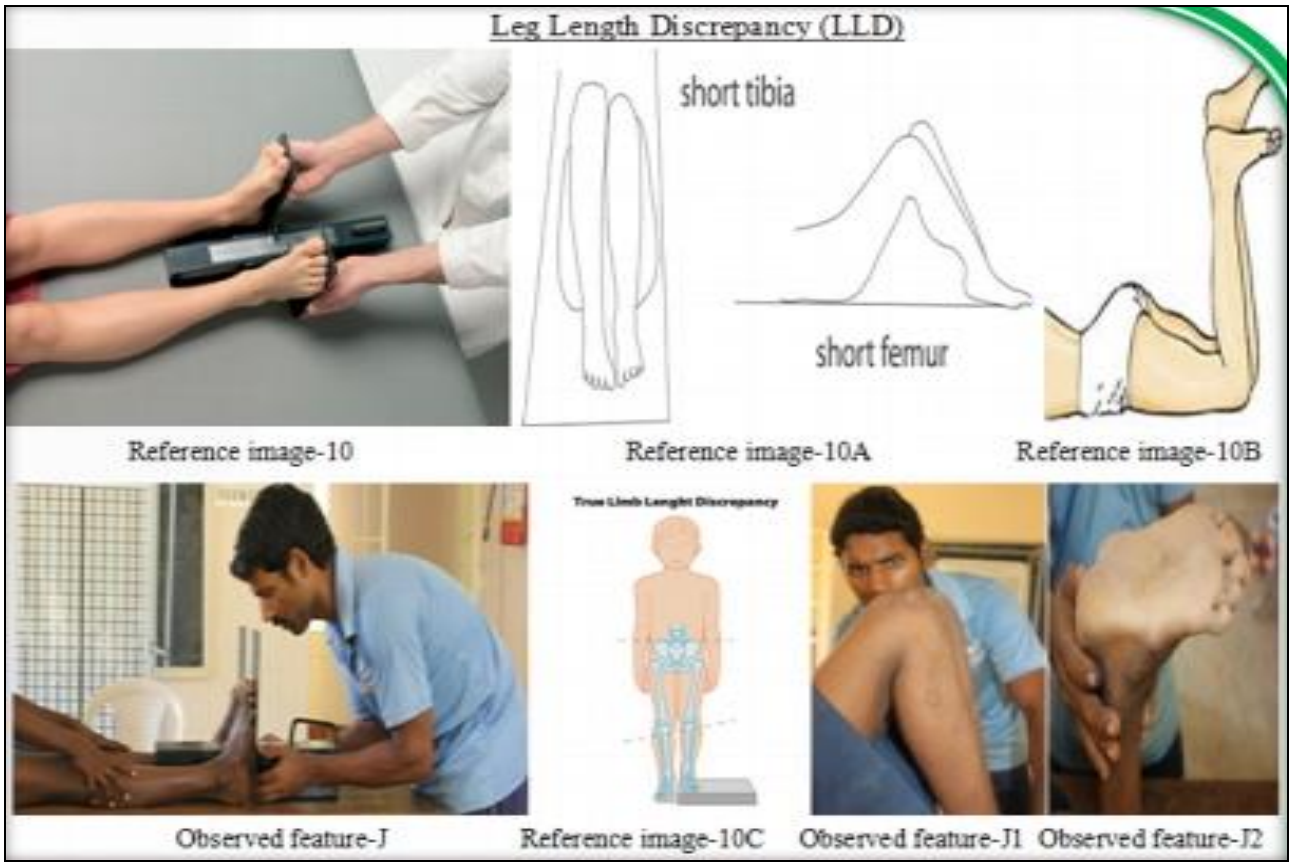


Fig 1: Shows the methods of measuring Leg Length Discrepancy (LLD)

The particular shape of the tool, the moveable foot board's correct sliding system and the millimetric scale allow speedy and dependable measurement of the differences in length of the lower limbs.

Leg length discrepancy (LLD) detection

If both the orthogonal foot boards are stationed at "zero" value it was considered normal any difference in the position of the boards was considered abnormal and any difference of more than 3cm indicated clinical treatment.

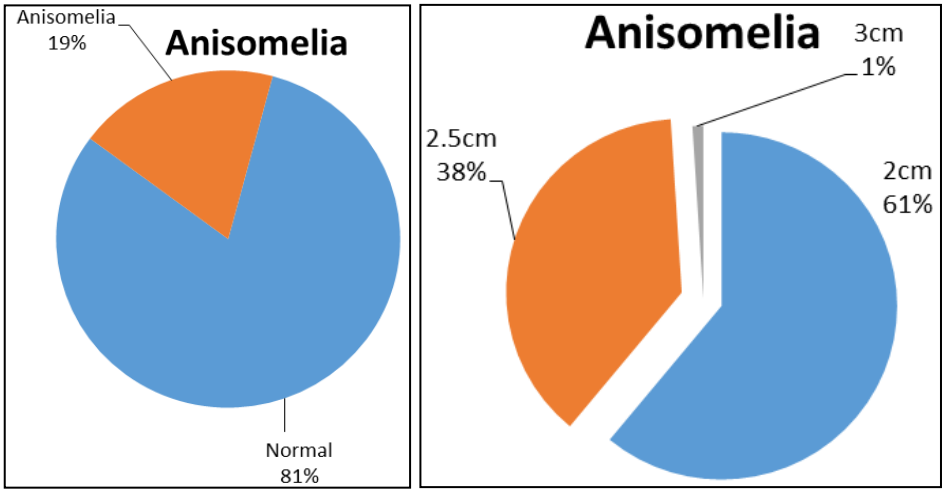
Results

Through delta leg the leg length was measured. The below table showed the number of students affecting Anisomelia according to affecting stage.

Table 1: illustrates the percentage of postural deformities in leg length discrepancy (LLD)

Deformities	No of Participants	Percentage of Participants
Normal Leg	1389	81%
Anisomelia or Leg Length Discrepancy (LLD)	330	19%
2cm	202	61%
2.5cm	124	38%
3cm	4	1%

Among 330 children the discrepancy of 2 cm was observed in 202, 2.5 cm in 124 and 3 cm in 4 children. Out of the 1719 subjects there are 330(19%) subjects are affected anisomelia at the same time the overall mean was less than 2cm but among 330 subjects there are more students are more than 2 cm, as the research say if anisomelia < 2 cm is a static disorder (Jan W. Raczkowski).



The pie diagram showing the anisomelia according to percentage and stage wise

Discussion

Reach Your Height state that anisomelia or Leg Length Discrepancy (LLD) it is usually appear in childhood or as a result of an injury or illness that causes damage to the growth plate. This results showed that out of 1719 (100%) subjects, there were 330(19%) who were affected by anisomelia deformities and also the study shows that if anisomelia < 2 cm is a static disorder (Jan W. Raczkowski, 2010) [1] and this study result also shows that 330(19%) of the students are deformed in more than 2cm so that remaining also some of them affected less than 2 cm may be its reduce means no issue if its increase there will be remarkable one.

Conclusion

The anisomelia is a continues process of one another like if the anisomelia occur its lead to pelvic tilt if pelvic tilt automatically the spine more curvature will occur this curvature leads to discomfort and automatically back pain will occur and also posture alignment will change. So that According to the result it was concluded that anisomelia deformities were notably high among the selected students from Pondicherry schools. Improper care and wrong habits could cause undesirable weight distribution on the leg. Improper footwear could also be a contributing reason. Hence, it is advised that the stake holders should pay more attention to the mechanics of the leg. Any remedial action warranted should be taken without any delay and monitoring should be done on a regular basis. This will enable proper posture for a prolonged healthy lifestyle.

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