Load Distribution Between Right and Left Foot by Using Podata Postural Stabilometric Footplate in Undergraduate Students of Pakistan

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Research Article

Keywords: Load Distribution, PoData, Stabilometric, Gait Analysis, Undergraduate Students

DOI: https://doi.org/10.21203/rs.3.rs-116096/v1

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Abstract

Objective: The objective was to assess the load distribution between right and left foot by using PODATA Postural Stabilometric footplate in undergraduate students of Pakistan.

Study design: Cross sectional study.

Place and Duration: This study was conducted from the different medical institutes of Pakistan.

Methodology: Ethical committee's clearance was acquired from the University of Lahore before this research's ritualistic starting point. A cross-sectional study was conducted on 145 undergraduate students having age years. For data collection, empowerment from patients was started by taking compile agreement from the university's management. Informed consent was taken from the study participants. All questions in the questionnaire were validated through previous literature. Questionnaires were provided and abstracted to the respondents as a pamphlet. After collection, data was saved in a secure place to avoid any biases.

Results: Out of 145 students, 115(75.9%) students were females, and 30(24.1%) students were males, 76 students had normal body weight, The mean weight on the right foot was 2.29 ± 0.92 kg by accessor 1, 2.29 ± 0.93 kg by accessor 2 & the mean weight on the left foot was 0.57 ± 0.33 kg by Accessor 1, 0.57 ± 0.34 kg by Accessor 2; hence, there is a significant difference in weight on right & left foot by accessor 1 & accessor 2 during open eyes as the p-value was significant. (value <0.00001**).

Conclusion: It was concluded that the load distribution is not the same as the right foot and the left foot. The right foot is dominant; changing the accessor doesn't matter the foot's dominancy, and if someone has right-hand dominance, it's not necessarily that their right foot Will be dominant. Their left foot can also be dominant. Load distribution between foot also depends on the total body weight.

Introduction

A biokinetic chain is that which links the pelvis to the spine's lower appendage. However, the foot is one of its parts. It has been suggested that the foot curve and its stacking can affect sections of the chest region during standing and strolling. The longitudinal and transverse curves in a typical, solid foot offer the foot's ideal stacking and legitimate strength appropriation. Nonetheless, modifications to the foot curve can prompt auxiliary changes and affect its heap dissemination besides.(1) The stances and engine exercises of patients with hip osteoarthritis (OA) show that these patients think it's hard to stack their influenced leg. Critically, patients with joint pathologies create ongoing versatile walk procedures and show particular development to dump their included appendage.(2) In the current examination, we researched the vertical stance's support in a situation where one leg is remaining on a smooth floor and the other on a spike tangle (SM).(3) The body weight is evenly disseminated between the legs in ordinary standing. The two legs are similarly associated with creating the torque for body influences from a harmonious position. When the weight conveyance between the legs is asymmetric, the focus of weight
(CP) of the stacked leg moves more noteworthy than the CP of the emptied leg. Keeping up balance during standing is completed in various places of the body. Note that the vertical position systems are adjusted to both bodies turns and load circulation changes between the legs. This examination was led to decide the impact of PNF on the Influence of the spine and the adjusting capacities of female idiopathic scoliosis understanding in the mid-20s and give the essential information expected to the games recovery investigations of youthful female scoliosis quiet. What's more, the lumbar spine's spinous procedure was confronting the right side when seen from behind the subject. Mechanized baropodometric examination records plantar engravings and ground response powers during upstanding calm standing. the patient's foot pressure was collected and displayed at four feet (front/back/left and right). With the distal 60 percent of the foot length as forefoot, proximal 40 percent as back foot, the outcome of free movement 2.0 naturally achieved this. This makes it possible to guarantee the percentage of weight held by each foot and the balance between them. In the three anatomical planes, this research discusses numerous scoliosis distortion parameters of the thoracic, lumbar, and pelvis that can enhance equalization brokenness in the three anatomical planes that can enhance the representation of AIS equalization brokenness. Foot structure and biomechanics establish a fundamental association between the human body and the ground. Along these lines, the foot assumes a basic job keeping up the lower furthest points' biomechanical capacity. Postural control and step designs were analyzed right now diminishes of these are realized hazard factors for lower leg sprains (particularly a diminished parity control) and stress breaks (particularly an individual walk design and an alignment of the lower extremity). A relationship between the masticatory framework and pointers of postural control or plantar weight appropriation is seriously talked about in writing. In various productions, a relationship has been demonstrated to exist between the mandibular temporal framework and postural control by investigating distinctive dental malocclusions and jaw positions. The absence of heel-to-toe turn over example is a trademark highlight of neonatal venturing. Besides, babies normally apply vertical powers supporting part (∼30–40%) of their weight. Nevertheless. Measuring the all-out stacking on the hand is an appropriate marker of injury dangers at the wrist. The greatest constraints applied to hand that ought not to cause wounds have been accounted for as 4 kg/cm² (for ladies) and 10.4 kg/cm² (for men). Studies exist in which the weights on the lower arm shaft, hand and shoulder were legitimately estimated or determined in LC clients nonetheless, there are no examinations which decided the heaps brought about by the particular development examples of amputee football. Irregular advancement of the body poses not just influences the working of the upper piece of the body and causes torment yet, also, brings about misshapenness of the whole musculoskeletal framework and vital issue, particularly inside the storage compartment muscles. Scoliosis is the most widely recognized sort of spinal deformation. The three-dimensional disfigurement of the spine causes a geometric asymmetry of the chest area and impacts the direction of the head. During pregnancy, the female body experiences numerous eight hormonal and anatomic changes that can influence the musculoskeletal framework. The study's rationale was to assess the load distribution between right and left foot by using PODATA postural stabilometric footplate in undergraduate students of Pakistan.

**Methodology**
The ethical committee's clearance was acquired from the University of Lahore before this research's ritualistic starting point. To collect data, Pakistan's undergraduate students' empowerment was started by taking compile agreement from the university's management. Informed consent was taken from the study participants. All questions in the questionnaire were validated through previous literature. Questionnaires were provided and abstracted to the respondents as the pamphlet. After collection, data was saved in a secure place to avoid any biases. This Study Population includes male and female undergraduate students of Pakistan; we examined the load distribution between right and left foot by using PODATA postural stabilometric footplate in Pakistan's undergraduate students.

Name of department: Department of Physical Therapy

Title of the study: load distribution between right and left foot by using PODATA postural stabilometric footplate in Undergraduate students of Pakistan.

Description of the research and your participation:

You are invited to participate in a research study conducted by ADNAN HASHIM The purpose of this research is to find the load distribution between right and left foot by using PODATA postural stabilometric footplate in undergraduate students of Pakistan.

Risks and discomforts: There are no known risks associated with this information.

Potential benefits: This research aims to explore the Correlation of Poor Posture and exam period in Undergraduate students of Lahore. So that this short questionnaire can be used to detect load distribution between right and left foot by using PODATA postural stabilometric footplate in the undergraduate students of Pakistan.

Protection of confidentiality:

We will do everything we can do to protect your privacy. Your identity will not be revealed in any publication resulting from the study.

Voluntary participation:

Your participation in this research study is voluntary. You may choose not to participate, and you may withdraw your consent to participate at any time. You will not be penalized in any way should you decide not to participate or to withdraw from this study.

Contact information:

If you have any questions and concerns about this study or any problems, please contact the University of Lahore at 0092-42-111-865865 ext-2802. If you have any questions or concerns about your rights as a research participant, please contact the University Institutional Review Board.
Consent:
I have read this consent form and have been allowed to ask questions. I give my consent to participate in this study.

Study Design: Cross-sectional study

Setting: Data was collected from an average population of Pakistan

Duration: The study was completed within 3 months after the approval of the synopsis

Sample size: 145

\[ n = \frac{N}{1 + N(e^2)} \]

Total No. of Population (N) = 227

Margin of error (R) = 5%

Expected sample (n) = 145

Sample Technique: Non-Probability, purposing sampling was used to collect data.

Sample selection criteria

Inclusion Criteria:
- Undergraduate Students of Pakistan.
- Males and Females.
- 18-30 Years Old.

Exclusion Criteria:
- Significant neck or head injury in the past three years
- Active neurological disorder
- Mental disorders
- Significant scoliosis or kyphosis

DATA ANALYSIS:
After taking informed written consent, the primary demographic was collected using a self-administered Questionnaire and include age, sex, self-reported weight, and height (from which Body Mass Index (BMI) was calculated as weight in kg divided by height in meters squared) and smoking. It was analyzed using
SPSS (version 25). For qualitative data, frequency and a percentage were taken out, and bar charts were formed. The mean and standard deviation was analyzed for the quantitative type of data, and the histogram was used. Paired sample T-Test was applied, P-value <0.00001** was significant.

Results

145 undergraduate students from different medical institutes of Pakistan participated in this study. According to Figure 1, Students’ mean age was 22.54 ± 2.24 years, with minimum and maximum ages of 16 and 29. According to Figure 2, Out of 145 students, 115(75.9%) students were females, and 30(24.1%) students were males. According to Figure 3, Students’ mean weight was 58.81 ± 12.75 kg, with minimum and maximum values as 37 and 100 kg.

According to Table 1, The mean weight on the right foot was 2.29 ± 0.92 kg, & the mean weight on the left foot was 0.57 ± 0.33 kg by Accessor 1. Hence, there is a significant difference in weight on the right & left foot by accessor one during open eyes as the p-value was significant. (value <0.00001**)

According to Table 2, The mean weight on the right foot was 2.29 ± 0.93 kg, & the mean weight on the left foot was 0.57 ± 0.34 kg by Accessor 2; hence, there is a significant difference in weight on the right & left foot by accessor two during open eyes as the p-value was not significant. (p-value <0.00001**).

Table 1: Descriptive Statistics for Weight of Right & Left foot by Accessor 1 during open eyes

| Weight of foot during open eyes | Mean  | N    | Std. Deviation |
|--------------------------------|-------|------|----------------|
| Right foot (Kg) Accessor 1     | 2.2935| 145  | .92721         |
| Left foot (Kg) Accessor 1      | .5710 | 145  | .33998         |

t-value: 30.377

p-value <0.00001**

The mean weight on the right foot was 2.29 ± 0.92 kg, & the mean weight on the left foot was 0.57 ± 0.33 kg by Accessor 1. Hence, there is a significant difference in weight on the right & left foot by accessor one during open eyes as the p-value was significant. (value <0.00001**)

Table-2: Descriptive Statistics for Weight of Right & Left foot by Accessor 2 during open eyes

| Weight of foot during open eyes | Mean  | N    | Std. Deviation |
|--------------------------------|-------|------|----------------|
| Right foot (Kg) Accessor 2     | 2.2980| 145  | .93731         |
| Left foot (Kg) Accessor 2      | .5702 | 145  | .34234         |

t-value: 29.52
The mean weight on the right foot was 2.29 ± 0.93 kg, & the mean weight on the left foot was 0.57 ± 0.34 kg by Accessor 2. Hence, there is a significant difference in weight on the right & left foot by accessor two during open eyes as the p-value was not significant. (p-value <0.00001**)

Discussion

The previous research was carried out in 2019. The purpose of this research was to examine the effect of excessive arching of the feet (symmetrical and asymmetrical) on plantar weight appropriation and support arrangements for the pelvis, spine, and shoulder. Eighty-one women (20-40 years of age, 61 +/- 12 kg, 165 +/- 5 cm) were isolated into three meetings according to the foot curve file (Group 1-with frequently angled feet, Group number 2 with perfectly curved one foot and high-curved the other, Group number 3 with high-curved two feet). Plantar weight conveyance was measured for the forefoot, midfoot, and rearfoot, separately and body pose between privilege and left foot. A slight increase in the foot's longitudinal curve caused the whole body to be influenced by changes in the circulation of loads of the feet between the appendages and between the forefoot and rearfoot. The imbalance of lower appendage load and the shoulder support's stature resulted from lopsided high-curving of the feet. (1) While in the present study, the mean weight on the right foot was 2.29 ± 0.92 kg, with minimum and maximum weight as 0.70 and 4.49 kg by Accessor 1, and the mean weight on the Left foot was 0.57 ± 0.33 kg, with minimum and maximum weight as 0.05 and 1.26 kg by Accessor 1, The mean weight on the right foot was 2.29 ± 0.93 kg, with minimum and maximum weight as 0.70 and 4.49 kg by Accessor 2, the mean weight on Left foot was 0.57 ± 0.34 kg, with minimum and maximum weight as 0.05 and 1.26 kg by Accessor 2, the mean weight on the right foot was 2.29 ± 0.92 kg, & the mean weight on the left foot was 0.57 ± 0.33 kg by Accessor 1. Hence, there is a significant difference in weight on the right & left foot by accessor one during open eyes as the p-value was significant. (value <0.00001**).

Another study was conducted in 2016 on the Iban population of Malaysia. This study aimed to generate regression conditions to decide living body weight from foot layout length. The examination included 200 (100 males, 100 females). The foot plots were gathered trailed by bodyweight estimations and were recorded for investigation. The data collected was broken down by PASW 20 PC programming. For both genders (male & female) and pooled measures, the correlation coefficient (R) between the foot plot lengths and body weight was resolved. Thirty relapse conditions were established in light of the foot blueprint and body weight, 10 for males, 10 for females, and 10 for pooled tests / obscure sexual preference. Strong and measurably notable were the relationship coefficient (R) values. It is reasoned that the current analysis gave relapse conditions. In either case, where incomplete foot impressions are available in wrongdoing scenes, these conditions may be used to assess body weight. (20) While in the present study, the mean weight on the right foot was 2.29 ± 0.93 kg, & the mean weight on the left foot was 0.57 ± 0.34 kg by Accessor 2; hence, there is a significant difference in weight on the right & left foot by accessor two during open eyes as the p-value was not significant. (p-value <0.00001**).
Declarations

Ethics approval and consent to participate

The ethical committee's clearance was acquired from the University of Lahore before this research's ritualistic starting point. To collect data, Pakistan's undergraduate students' empowerment was started by taking compile agreement from the university's management. Informed consent was taken from the study participants. All questions in the questionnaire were validated through previous literature. Questionnaires were provided and abstracted to the respondents as the pamphlet. After collection, data was saved in a secure place to avoid any biases. This Study Population includes male and female undergraduate students of Pakistan; we examined the load distribution between right and left foot by using PODATA postural stabilometric footplate in Pakistan's undergraduate students.

It is clarified that the University of Lahore has an ethical committee to approve the study on humans; Ethical Letter will be provided on demand.

It is confirmed that all methods were performed by the relevant guidelines and regulations

Consent for publication

Not Applicable

Availability of Materials:

The datasets used and/or analysed during the current study will be made available from the corresponding author on reasonable request.

Competing Interest:

None

Funding:

I can assure you that I have no funding available for research..

Author Contributions:

Conception and design: Adnan Hashim

Collection and assembly of data: Faiza Sharif, Samia Sarmad

Analysis and interpretation of the data: Asif Hanif

Drafting of the article: Adnan Hashim

Critical revision of the article for important intellectual content: Ashfaq Ahmad
Acknowledgements:

"TO HIM BELONGS THE DIMENSION OF THE HEAVENS AND THE EARTH, IT IS HE WHO GIVES LIFE AND DEATH, AND HE HAS POWER OVER ALL THINGS." (AL-QURAN)

All acclamations are to ALLAH, the Most Merciful, and the Compassionate, who have empowered me to accomplish this task. I offer my most profound veneration to The Holy Prophet Hazrat Muhammad (Peace Be Upon Him) who is, forever a torch of guidance and knowledge for humanity.

I like to express my deepest gratitude to our worthy Dean, Prof. Syed Amir Gilani, for allowing me to do this research and providing all the necessary facilities. I wish to extend my most significant appreciation and thankfulness to our Head of Department, University Institute of Physical Therapy & my Supervisor Prof. Dr. Ashfaq Ahmad, for their suggestions, guidance, support, and encouragement to complete this thesis.

I am heartily thankful to my Grandfather and my parents Mr. and Mrs. Hashim Ali, who encouraged me at every step during my study, and to my Siblings, who gave me the confidence to fulfill my work. I am also indebted to my Friends and class fellows who gave their valuable suggestions when they were most needed.

Finally, I tender my thanks to all my respected and worthy teachers for their active cooperation, moral support, and sincere help to make my research headway. I acknowledge the invaluable guidance extended to me during my entire research process by them.

Thank you.

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Figures

Figure 1
Descriptive statistics of age Students' mean age was 22.54 ± 2.24 years, with minimum and maximum age of 16 and 29.

**Figure 2**

Descriptive Statistics for Gender The total number of male students was 35, and the total number of female students was 105
Descriptive Statistics for Weight Students' mean weight was 58.81 ± 12.75 kg, with minimum and maximum value as 37 and 100 kg.

Figure 3

Descriptive Statistics for Weight Students' mean weight was 58.81 ± 12.75 kg, with minimum and maximum value as 37 and 100 kg.