International Journal of Health Sciences and Research
Vol.13; Issue: 7; July 2023
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

A Comparative Study of Weight Bearing Status Between Dominant and Non-Dominant Lower Extremity in Normal Individuals

Dr. Aditi Vinay Pandya[1], Dr. Nidhi Suthar[2]

[1]First Year MPT Student, [2]Assistant Professor;
JG College of Physiotherapy, Gujarat University, Ahmedabad, India

Corresponding Author: Dr. Aditi Vinay Pandya

DOI: https://doi.org/10.52403/ijhsr.20230708

ABSTRACT

Background and need of study: Many individuals tend to exhibit unequal weight bearing on both the lower limbs. There is a need to check the total weight distribution on the dominant and the non-dominant lower extremity. More weight distribution on one extremity can cause certain changes due to overweight.
Purpose: Purpose of this study is to compare the amount of weight bearing given by an individual on the dominant lower extremity with the non- dominant lower extremity.
Methodology: Individual lower extremity weight bearing checked by making a person stand keeping one lower extremity on the weight machine and the other on the wooden block kept at the distance of 3 inches from the weight machine and subtracting the redeem from the total weight of the person. Ethical clearance has been taken.
Result: Statistical analysis done by using SPSS version 20. There is significant difference between the weight bearing on the dominant and non-dominant lower extremity. There is significantly more weight bearing on the dominant lower extremity in normal individuals. Level of significance (p=0.00). Amount of weight bearing on the dominant lower extremity is 4.22% more than the non-dominant lower extremity.
Conclusion: the result of the study suggests that weight bearing on the dominant lower extremity is more than the non-dominant lower extremity in normal individuals.

Keywords: weight bearing status, dominant lower extremity, non-dominant lower extremity.

INTRODUCTION

Weight bearing and forward propulsion are mainly the functions of lower extremity. In all the functions performed by the lower extremities both the lower limbs are equally involved, there are no such activities in which more use of one foot is more. However, leg dominance may affect activities like stability and mobility.[1]

Individuals normally have a basic tendency to bare more weight on one of the lower extremity or having a minor or major differences between the weight bearing on both the dominant and non-dominant lower extremities.

Dominant limb is defined as the limb showing more dynamic control because of an imbalance of muscular strength between both the lower limbs as well as the recruitment patterns.[2,3,4].

The concept of more powerful dominant side in the upper extremity is found still the researchers count both the lower extremities as equal.

This asymmetry can adversely affect both the lower limbs. There can be increased stress or overload on the joints of the

dominant lower limb, also can result in weakness of the non-dominant limb and decrease the ability to perform vigorous activities as there is reduction in capacity to absorb large forces.[3]

weight bearing and non-weight bearing both the lower extremities have the incidence of OA Though the limb having more weight bearing are involved more easily. Which may increase the rate and need of joint replacement on the joint bearing more weight. [5]

other then various risk factors causing osteoporosis, like risk of falls due to disturbance in equilibrium or dementia, decreased bone mineral density and unequal weight bearing also can be included.[6] To reduce the risk or prevent osteoporotic changes therapeutic exercises which are effective to stop the reduction of bone mineral density and prevent the risk of fall as well as promote equal weight bearing to reduce weight-bearing trabeculae.[6]This study is oriented to calculate the difference between the weight given on each lower extremity to avoid such chances or risk factors of osteoporotic changes.

Pedobarographic measurements got unsuccessful results because of weight distribution on both the lower extremities. There are mainly two types of weight bearing.[7]

When the comparison was made between both the lower limbs, various authors found their results contradictory which are non-conclusive. some of these studies showed that both the dominant and non-dominant limbs have no difference in the terms of postural balance.[8]

In some other studies conducted specially on healthy individuals and athletes, there were different results found which showed that in the case of postural balance both the dominant as well as the non-dominant limbs shows noted differences.[8]

MATERIALS & METHODS

244 individuals were included in this study according to the inclusion and exclusion criteria. Individual were aged between 18 to 55 years, both males and females, people who have right and left both dominancy also participant who were willing to participate included in this study. Subject who have any arthritic changes or LLD, any fracture and trauma in past 6 to 8 months, any type of postural deformity, any type of Neurological disorder like CP, Epilepsy, Stroke, any kind of psychological disorder and unable to follow the commands were excluded from the study. Individual limb weight bearing was checked by making the person stand with one lower extremity on the weight machine and the other on a wooden block kept at a distance of 3 inches. Ethical clearance was taken. Figures shows the method properly.

FIGURE 1

FIGURE 2

FIGURE 1 & 2: Shows the demonstration of the method used.

RESULT

From the 244 individuals the gender ratio found as per explained in the pie chart in figure 3, there were 67% males and 33% females who participated in the study. Statistical analysis done by using SPSS version 23. By using Mann Whitney U test the data obtained were analysed. The mean

values of both the dominant and non-dominant side weight bearing are shown in the graph in figure 4, the mean value obtained for the dominant side weight bearing was 55.42 and the mean value for non-dominant side weight bearing was 45.2. Result shows, There is significant difference between the weight bearing on the dominant and non-dominant lower extremity. There is significantly more weight bearing on the dominant lower extremity in normal individuals. thus, Level of significance (p=0.00). Amount of weight bearing on the dominant lower extremity is 4.22% more than the non- dominant lower extremity.

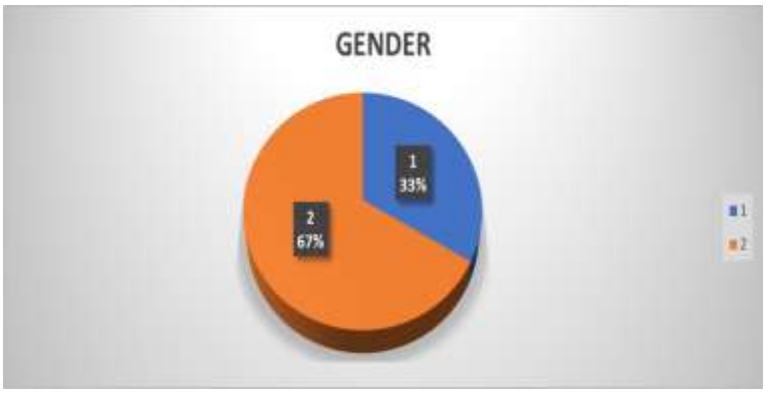

FIGURE 3: Pie chart shows gender distribution males (67%) and females (33%).

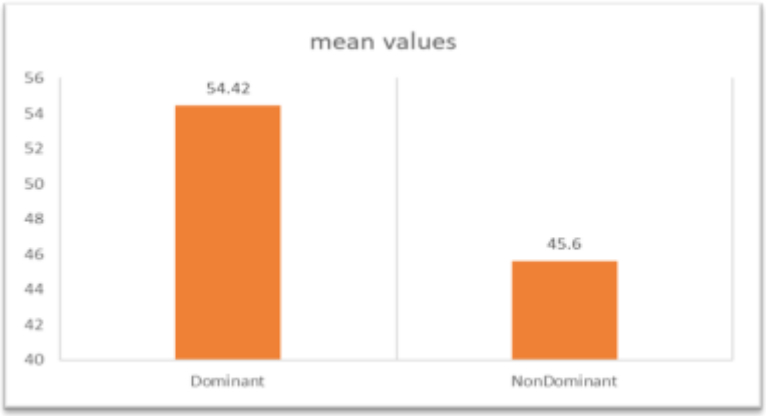

FIGURE 4: Graph shows mean values of weight bearing on dominant and non-dominant side.

INTERENCE: Out of 244 individuals according to the mean values 54.42% had more dominant side weight bearing and 45.6% had more non-dominant side weight bearing.

DISCUSSION

Numerous authors have investigated the interlimb postural comparison, i.e., the comparison of the dominant leg and the non-dominant leg, but their findings are conflicting and do not lead to a consensus. Some research determined that there is no difference in postural balance between the dominant and non-dominant leg, however others concluded that the dominant and non-dominant leg have distinct postural balance in healthy participants and athletes [9]

The dominant leg in right or left leg dominant subjects was not the stronger of the two legs using isokinetic testing, and the preference of leg by either right or left leg dominant subjects was dependent on the type of activity, manipulative or weight-bearing.[10]

Individuals with acute stroke can benefit from the forced body weight shift approach. A digital weighing scale (Scale-Tronix, 5005 Stand-On Scale) was used to evaluate weight bearing. During the assessment, the

subject stood with his or her affected leg on the scale's platform and the unaffected leg on a wide wooden block (length 0.51 m, height 0.06 m, and width 0.29 m, which matched the dimensions of the weighing scale platform) adjacent to the scale's platform. The person was then placed on the scale's platform, and the total body weight was recorded. Three times, the measurements were taken. Each subject's weight bearing on the afflicted side was calculated as a percentage of the entire body weight.[11]

According to the study's findings, typical people use their dominant extremity more for weight bearing.

CONCLUSION

It could be concluded that normal individuals tend to have more weight bearing on the respective dominant lower extremity as compared to the non-dominant lower extremity. The weight bearing on the dominant lower extremity is 4.22% more than on the dominant lower extremity.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: The senior professors who assisted us are all truly appreciated by the authors. And a sincere thanks you to everyone who took part in the research for their immense support and active involvement.

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Bhise SA, Patil NK. Dominant and non-dominant leg activities in young adults. International Journal of Therapies and Rehabilitation Research. 2016;5(4):257-64
2. Ford KR, Myer GD, Hewett TE. Valgus knee motion during landing in high school female and male basketball players. Med Sci Sports Exerc. 2003; 35:1745–1750. [PubMed] [Google Scholar]
3. Hewett TE, Myer GD, Ford KR. Prevention of anterior cruciate ligament injuries. Curr Women's Health Rep. 2001; 1:218–224. [PubMed] [Google Scholar]
4. Knapik JJ, Bauman CL, Jones BH, Harris JM, Vaughan L. Preseason strength and flexibility imbalances associated with athletic injuries in female collegiate athletes. Am J Sports Med. 1991; 19:76–81. [PubMed] [Google Scholar]
5. King LK, March L, Anandacoomarasamy A. Obesity & osteoarthritis. Indian J Med Res. 2013;138(2):185-93. PMID: 24056594; PMCID: PMC3788203.
6. Miura T, Sugiura H. [The frequent areas, risk-factors and protective methods for the fracture in osteoporosis]. Nihon Rinsho. 1994 Sep;52(9):2430-4. Japanese. PMID: 7967093.
7. Winkler H, Kelaridis T. Helal's metatarsal osteotomy. Indication and technic with reference to shape and function of the foot. Zeitschrift fur Orthopadie und Ihre Grenzgebiete. 1989 Sep 1;127(5):556-60.
8. Paillard T, Noé F. Does monopedal postural balance differ between the dominant leg and the non-dominant leg? A review. Human Movement Science. 2020 Dec 1; 74:102686.
9. Paillard T, Noé F. Does monopedal postural balance differ between the dominant leg and the non-dominant leg? A review. Human Movement Science. 2020 Dec 1; 74:102686.
10. Velotta J, Weyer J, Ramirez A, Winstead J, Bahamonde R. Relationship between leg dominance tests and type of task. InISBS-Conference Proceedings Archive 2011.
11. Mohapatra S, Eviota AC, Ringquist KL, Muthukrishnan SR, Aruin AS. Compelled body weight shift technique to facilitate rehabilitation of individuals with acute stroke. International Scholarly Research Notices. 2012;2012.

How to cite this article: Aditi Vinay Pandya, Nidhi Suthar. A comparative study of weight bearing status between dominant and non-dominant lower extremity in normal individuals. *Int J Health Sci Res.* 2023; 13(7):51-54. DOI: *https://doi.org/10.52403/ijhsr.20230708*

******