

To Determine the Association of Lower Cross Syndrome with Postural Change and Low Back Pain Caused by Different Type of Foot Wear

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Abstract: Lower crossed syndrome (LCS) is a musculoskeletal imbalance characterized by specific patterns of muscle weakness (Abdominals and Gluteus Maximus) and tightness (iliopsoas and spinal extensors). In this study we aim to find how footwear affects body posture and causes muscle imbalance. A total of 81 participants were included in the study. A Positive correlation was noted between females wearing high inches heels and lower cross syndrome. As most of population focus on style rather than comfort the height of heels also play a significant role in positively increasing the imbalance and causing Lower Cross Syndrome.

Keywords: Footwear, Core muscle, Lower cross, motor Control, recruitment

1. Introduction

Body posture is defined as the alignment of body segments which is considered as an important health indicator. Normal human posture is the characteristic of the vertical position which relies on spinal alignment and its position over the patient's head and pelvis [1, 2].

It is an active posture controlled by the CNS according to an anatomically defined movement system while respecting biomechanical principles, muscular activity, against the effects of external and internal forces. The muscles actuate the postural function. Thus, the body requires their interplay within certain muscle groups to maintain balance in the gravitational field. Ideal posture is the correct alignment of body parts supported by the right amount of muscle tension against gravity. Without posture and the muscles that control it we would simply fall to the ground.

Poor posture can lead to excessive strain on our postural muscles and ligaments and may even cause them to relax when held in certain positions for so long.. The individual posture is influenced and shaped by endogenous factors of biological origin. This means the current state of health and genetic predisposing factors, overcoming accidents, diseases, congenital or acquired deformities, aetiology and others. Furthermore, there are exogenous factors such as unilateral load, insufficient or excessive physical activity, prolonged sitting and standing, inappropriate shoes, permanent tension, and long-term stress, etc. Combination of several factors can lead to severe postural disorder [1,13,14].

Normally we do not consciously maintain normal posture. Instead certain muscles do it for us and we don't have to think about it. Several muscle groups, including the hamstrings and large back muscles are critically important in maintaining good posture. Good posture helps us keep joints in correct

alignment so that our muscles are used correctly, decreasing the abnormal wearing of joint surfaces that could result in degenerative arthritis and joint pain.

Many doctors and therapists, research on causes of foot pain due to high heels. High heel shoes causes' increased lumbar lordosis and the body must compensate for the heel. The high heel has higher compensation, such compensation is thought to take place in the lumbar region and therefore to increase forward and downward tilt of the pelvis [7]. Postural disorders caused by high-heeled shoes not only harm the musculoskeletal system but also disturb occupational health and activities of daily living [10].

Lower Crossed Syndrome is a common muscular imbalanced condition of the lower torso. Posture pattern in lower body variation is often termed as "lower crossed syndrome". In Lower cross syndrome there is over activity and hence tightness of hip flexors and lumbar extensors. Along with this there is under activity and weakness of the deep abdominal muscles on the ventral side and of the gluteus maximus and medius on the dorsal side. The hamstrings are frequently found to be tight in this syndrome as well. This imbalance results in an anterior tilt of the pelvis, increased flexion of the hips, and a compensatory hyperlordosis in the lumbar spine. (19)

Janda noticed that due to prolonged static postures, such as sitting at a desk all day, the hip flexors become shortened or tight. Therefore, the brain will automatically start to shut down or inhibit the glutei muscles which are on the opposite side. Now, the imbalance pattern promotes increased lumbar lordosis because of the forward pelvic tilt and hip flexion contracture, and over activity of the hip flexors compensating for the weak abdominals (27).

This research focuses on which type of footwear (heels or flat) that causes lower cross syndrome which will further cause low back pain. Number of women wearing heels is increasing day by day. Heels cause positive heel inclination which decreases lumbar curve. In India people are not aware about which type of foot wear is good for them and enough research is available to prove this in Indian population. So our research is important for awareness and to avoid any musculoskeletal postural faults as a result of improper footwear. The need of research is that we will be checking for lower cross syndrome and its possible relationship to the type of footwear and its related muscular imbalances.

2. Review of Literature

Data for the Jaros and Lomnicka and the evaluation by Silhouette Posture Analysis, were assessed based on photos. These were taken perpendicular to the frontal and sagittal plane to avoid distortion of the results. The field of view represented the top of the head to the sole of the foot. The pictures were taken of the overall posture from a distance of 150 cm from the subject. Sepa-rate anatomy, such as head and neck, chest, chest to knee and entire lower limbs were photographed from a distance 80 cm from the subject. The results suggest that it would be necessary and appropriate to continue the study with a larger number of subjects. It would also be appropriate to investigate the view of clinical practice to the practical application of both methods. The presented topic is highly current due to the confirmed impact of shoe selection to the health of the all population. Das S et al in the year 2017 studied about weakness of abdominals and hip extensors muscles and tightness of hip flexors and spinal extensors muscles were measured on 200 healthy adults (117 male, 83 female). Results: SPSS version 23 was used for data analysis and result suggests that females are more prevalent to develop lower crossed syndrome than male of the same age group. 30 female volunteers out of 83 volunteers and 14 male volunteers out of 117 volunteers have LCS. Results: SPSS version 23 was used for data analysis and result suggests that females are more prevalent to develop lower crossed syndrome than male of the same age group. 30 female volunteers out of 83 volunteers and 14 male volunteers out of 117 volunteers have LCS. Prevalence of developing lower crossed syndrome among young females is more than young males of same age group.

3. Methodology

Purpose of this study

To determine posture change and back pain/discomfort caused by different type of foot wear and to spread awareness regarding same in females.

Need of Study

- In this era of fashion, many number of women wearing heels increasing day by day. High heels altered the normal angle of foot. Lumbar lordosis decreased, Whole biomechanics of body get altered. This will cause back pain, sometime pain becomes so severe that it can hamper ADLs.
- So Through this research we can spread awareness about how the type of footwear affects our posture. This gathered information helps society to live healthy life and promote quality of living.

Objectives

- To determine the influence of footwear on posture
- To make people aware about footwear's effect on posture and lifestyle
- To determine relation between footwear and lower cross syndrome

Nature of the study

Study design

- cross sectional Observational study
- Females of age group 18-28 years
- Sample size is 81

Sampling method

The females will be selected through convenient google forms involving an informed consent within it. And that Google form will be circulated through social media groups.

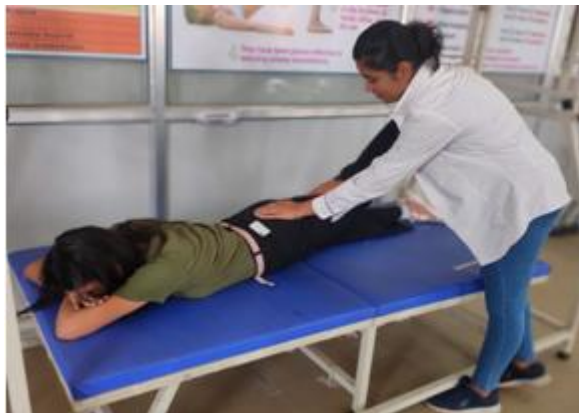
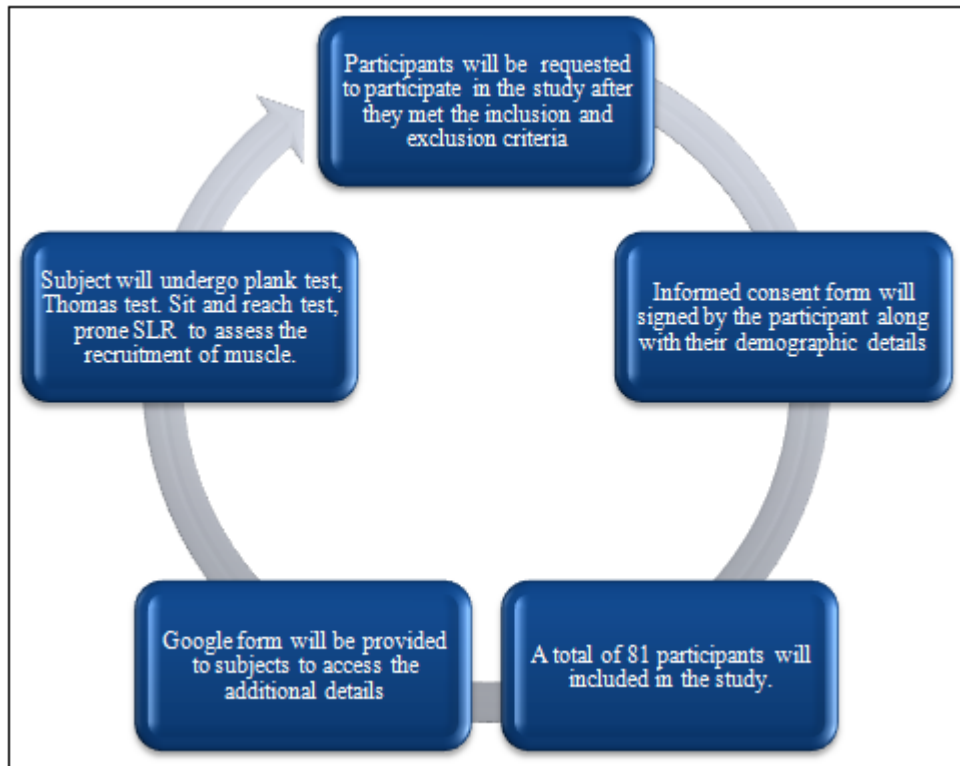
Inclusion Criteria

- Females of 18 to 28 years of age
- Females from Haryana, Delhi
- Willing to participate in the study by using informed consent

Exclusion Criteria

- Surgery
- Pregnant female
- Wedge vertebrae
- Ankylosing spondylitis
- Female beyond the selected age group

4. Protocol



5. Result/ Discussion

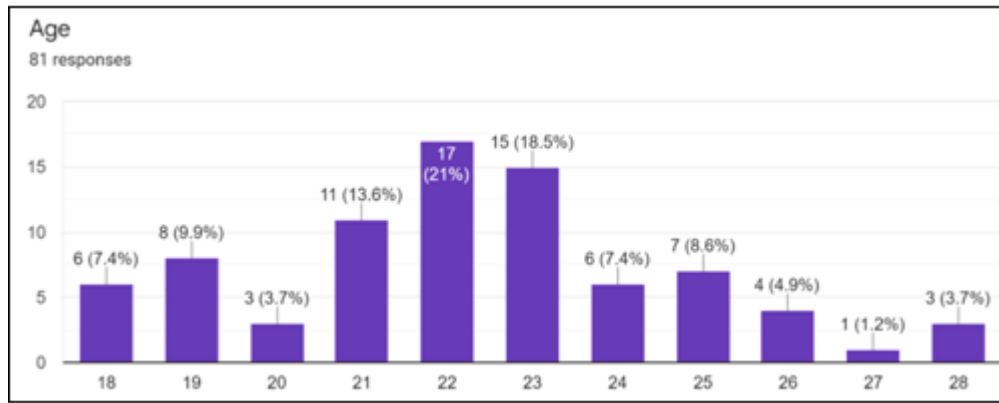


Figure 1: Age Specified

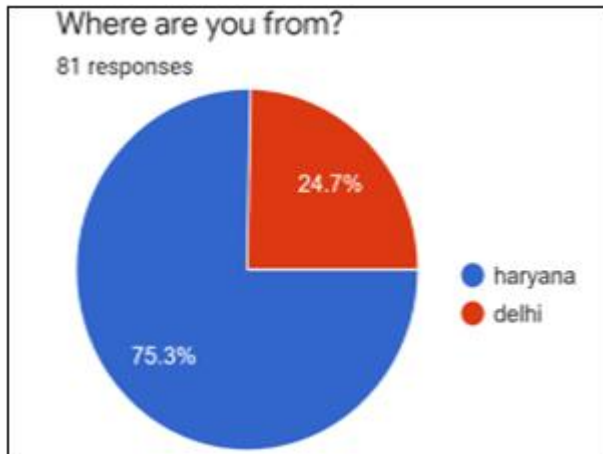


Figure 2: Population

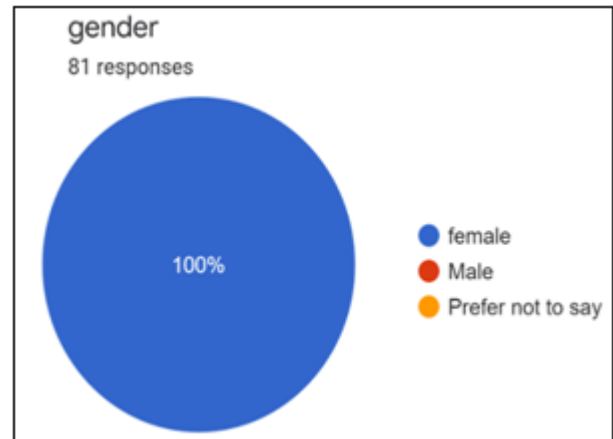


Figure 3 Gender



Figure 4: Occupation



Figure 5: Size of Heel

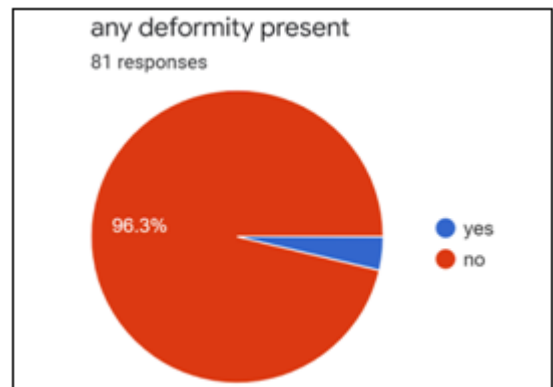


Figure 8: Deformity

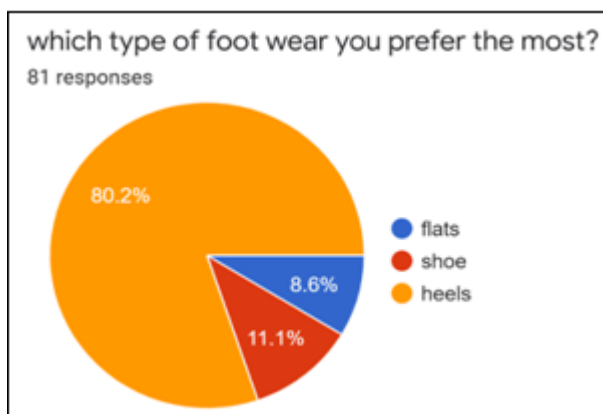


Figure 6: Type of Foot Wear

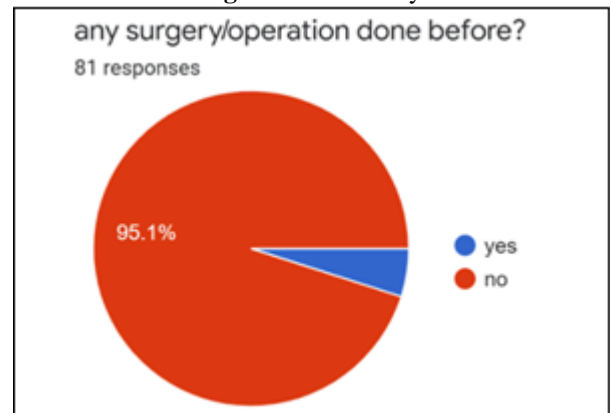


Figure 9: Surgery

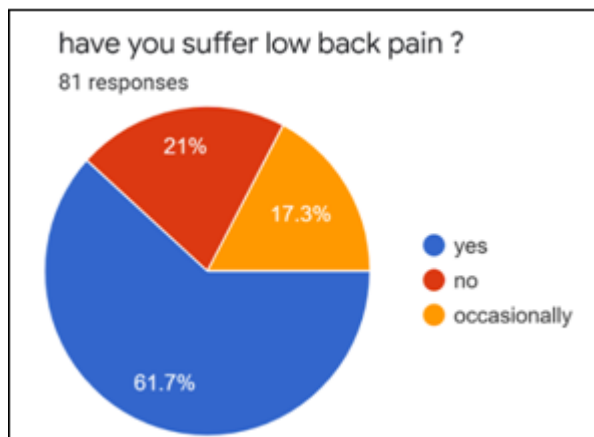


Figure 7: Population Suffering Low Back Pain

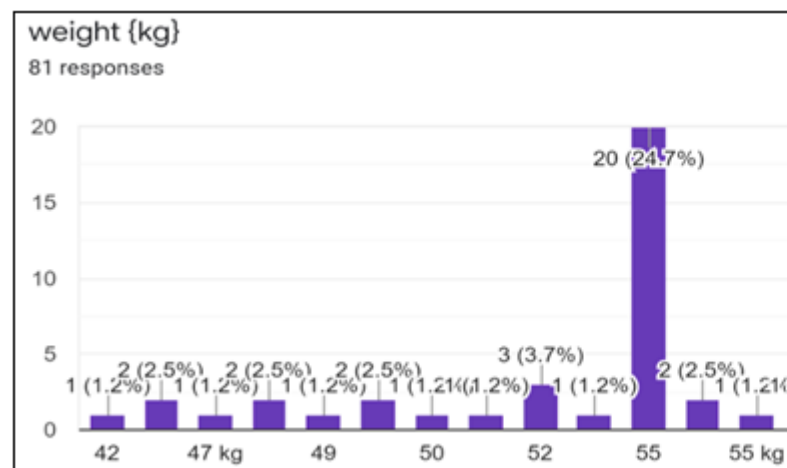


Figure 10: Weight

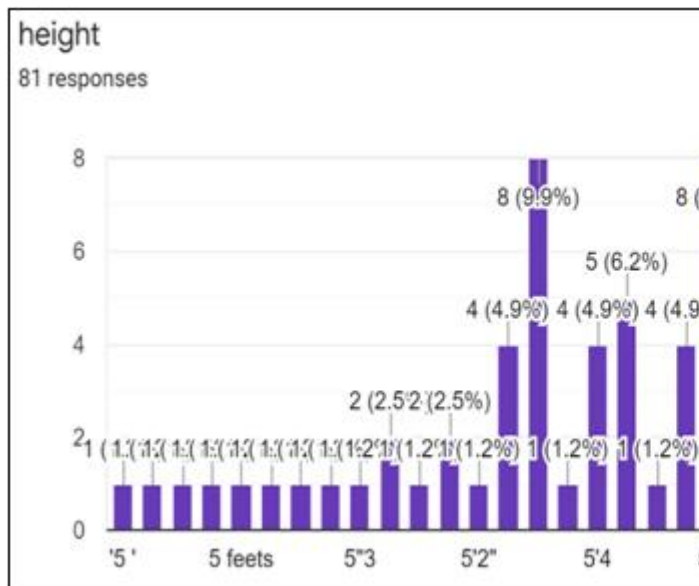


Figure 11: Height

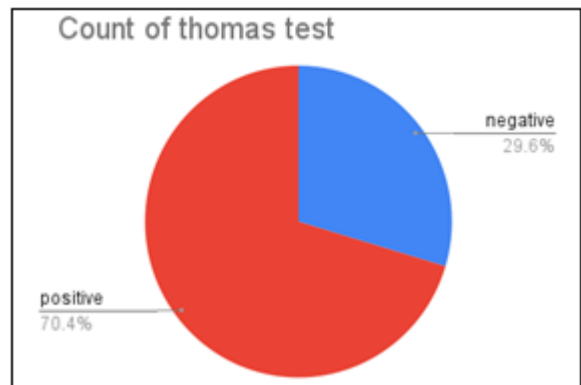


Figure 14: Thomas Test

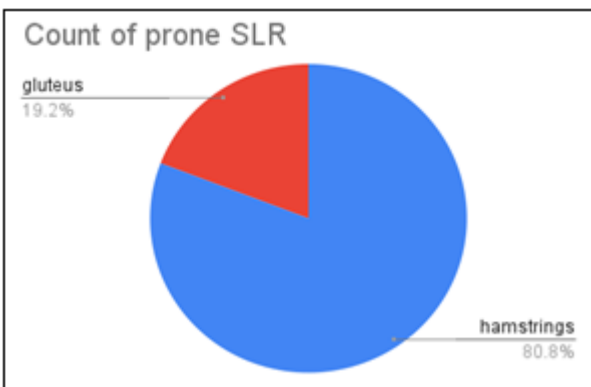


Figure 15: Prone SLR

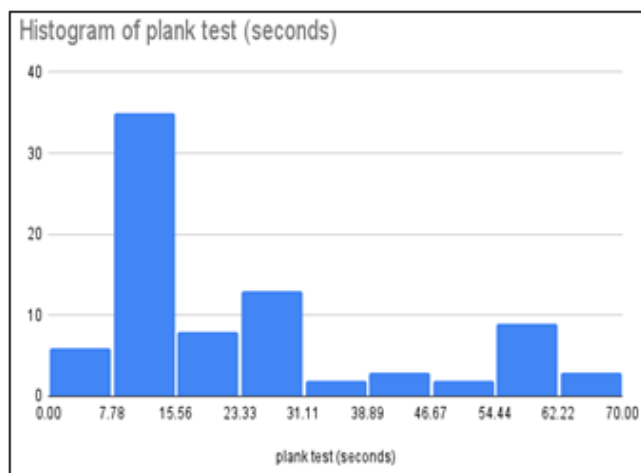


Figure 12: Plank Test

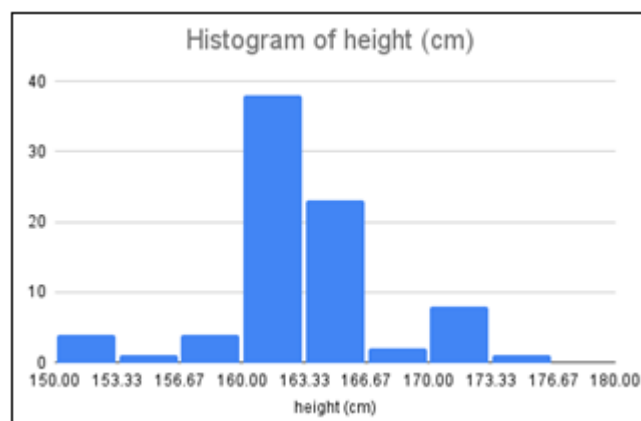


Figure 13: Height (CM)

The study subject comprises 81 females under the age group of 18-28 year in which we consider the population from Haryana and Delhi. Our study focus on the awareness of wearing heels for long period of time believe to have lower cross syndrome eventually in future through our study we are trying analyse the with absence of musculoskeletal deformity and correlating it with BMI, Thomas test, plank test, prone SLR, sit and reach flexibility test . We finally noted that there is positive correlation between females wearing high inches heels and lower cross syndrome. Female wearing high inches heel have muscle tightness of iliopsoas, erector spinae and weakness of core (multifidus, transverse abdominus) and gluteus maximus muscle.

Our study correlates low back pain and presence of postural deformity and compares it with heel height for postural deformity assessment we are using subjective method as given in “Criterion related validity of the sit-and-reach test”(22) . “The Effect of the quad-core training on core muscle strength and endurance” (20) The heel height and normative value were taken as the article research till take focus on height of heel and footwear type rather than correlating with it posture. Hence through our study we are focusing on forming a correlation between height of heel and posture abnormality by assessing lower cross syndrome as given by janda “association of upper cross syndrome with prolonged sitting among young adults” (26).

Gluteus maximus and erector spinae both get weak and tight depending on the type of heel height as we have analysed

through our research and iliopsoas and core(transverse abdominalis , multifidus) muscle are further analyse to form lower cross syndrome with the clinical influence of more the height more the issue with lower cross syndrome.

6. Conclusion

Society will benefit from our result as most of the population focuses on style rather than comfort when choosing one's footwear whereas not only the type or time worn is important but height of heels also play a significant role in positively increasing the postural abnormality and causing lower Cross Syndrome in future in our young female population at large.

7. Future Scope

Our study focuses on the height of the heel and its correlation to all the cardiovascular fitness tests in different individuals with varying body type and occupation. The future scope and limitations as noted during the study was that the individual's brand of footwear and its usage analytics can also be noted to understand the pressure accumulation in specific areas of the foot intrinsic structure. As concluded, the windlass effect and its changes as seen due to varying footwear can also give the future of gait biomechanics a better dimension, because even though patients with abnormal posture are actively advised a change in footwear or are advised to do away with increased heel height but sometimes and occasionally one must be allowed to wear those and for that occasional use, a deeper in depth study on brand and its use in comparison with initiation of faulty posture is required through repeated quarterly examination.

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Author Profile



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