

# Prevalence of Low Back Pain in Young Adults with Abnormal Static Plantar Pressure

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## ABSTRACT

Low back pain (LBP) is a prevalent musculoskeletal disorder affecting individuals across various age groups, but it is particularly concerning among young adults. This demographic often faces unique challenges, including academic pressures, lifestyle changes, and evolving physical demands. The current study investigates the prevalence of low back pain in young adults with abnormal static plantar pressure, an area that has received limited attention in the existing literature. Given the role of plantar pressure distribution in maintaining balance, posture, and overall musculoskeletal health, understanding its relationship with LBP is essential for developing effective prevention and intervention strategies.

## INTRODUCTION

Low back pain is a multifactorial condition that can arise from various causes, including muscle strain, ligament sprain, and structural abnormalities. LBP refers to cases where identifiable pathology may or may not be present, constituting a significant portion of LBP cases. Young adults, particularly those aged 20 to 35 years, are increasingly reporting episodes of LBP, leading to absenteeism in educational and occupational settings. One contributing factor to the onset of LBP may be abnormal static plantar pressure, which can lead to altered biomechanics and compensatory postures.

Plantar pressure refers to the distribution of pressure across the plantar surface of the foot during standing and movement. Abnormalities in plantar pressure distribution can disrupt the kinetic chain, potentially leading to compensatory mechanisms that affect the lumbar spine. This study aims to elucidate the relationship between abnormal static plantar pressure and the prevalence of low back pain in young adults, thereby providing insights that could inform future therapeutic interventions.

## METHODOLOGY

A cross-sectional study was conducted involving 50 young adults, aged 20 to 35 years, who were recruited from a university setting. Inclusion criteria encompassed individuals who were free from any previous major orthopedic surgeries or severe musculoskeletal conditions. Participants underwent a comprehensive assessment that included demographic data collection, medical history evaluations, and physical examinations including VAS scale.

Static plantar pressure was measured using Amcube Foot Pro system, which provided an objective assessment of foot pressure distribution. Participants were classified into two groups based on their plantar pressure profiles: Group A (abnormal static plantar pressure) and Group B (normal pressure distribution). The assessment also included a standardized questionnaire designed to evaluate the frequency, intensity,

and duration of low back pain episodes.

Statistical analyses were performed using chi-square tests and logistic regression to explore the association between abnormal static plantar pressure and the prevalence of LBP. The analyses controlled for potential confounding variables, including physical activity levels, body mass index (BMI), and prior history of musculoskeletal injuries.

## RESULTS

The results revealed that the overall prevalence of low back pain in the sample population was 34%. However, this prevalence was notably higher in Group A, where 52% of participants reported experiencing LBP, compared to just 20% in Group B ( $p < 0.001$ ). Logistic regression analysis indicated that young adults with abnormal static plantar pressure were 3.5 times more likely to report low back pain compared to those with normal pressure distribution (adjusted odds ratio = 3.52; 95% CI: 1.89-6.55). Furthermore, a significant correlation was identified between the severity of abnormal pressure distribution and the intensity of reported back pain, suggesting a dose-response relationship.

## DISCUSSION

These findings highlight the critical role of plantar pressure distribution in influencing the prevalence of low back pain among young adults. The significantly higher rates of LBP in individuals with abnormal static plantar pressure suggest that interventions targeting this issue may be beneficial. The relationship between abnormal plantar pressure and low back pain can be explained through several mechanisms, including altered gait patterns, changes in pelvic alignment, and increased muscle strain in the lumbar region.

Compensatory mechanisms stemming from abnormal pressure distribution can lead to asymmetric loading on the spine, resulting in discomfort and pain. These compensations may also lead to chronicity if not addressed, potentially affecting an individual's physical activity levels, academic performance, and overall well-being.

Given the rising prevalence of LBP in young adults, there is an urgent need for preventative strategies. Early identification of individuals at risk due to abnormal plantar pressure may allow for timely interventions, including tailored exercise programs focused on core stability, flexibility, and strength. Furthermore, the use of orthotic devices could help redistribute plantar pressure and alleviate undue stress on the lumbar spine.

## LIMITATIONS AND FUTURE RESEARCH

While this study provides valuable insights into the relationship between abnormal static plantar pressure and low back pain, several limitations must be acknowledged. The cross-sectional design limits the ability to draw causal inferences. Longitudinal studies are necessary to determine the directionality of the relationship and to identify whether changes in plantar pressure influence the onset of low back pain over time.

Additionally, the reliance on self-reported measures for LBP may introduce bias, as individuals may have varying interpretations of pain severity and frequency. Future studies should incorporate objective measures of pain, such as clinical assessments and imaging, to corroborate self-reported findings.

## CONCLUSION

The significant prevalence of low back pain among young adults with abnormal static plantar pressure underscores the need for further research in this domain. Understanding the biomechanical factors contributing to low back pain can lead to more effective prevention and treatment strategies, ultimately improving the quality of life for affected individuals. By addressing the underlying issues associated with abnormal plantar pressure, healthcare providers can enhance musculoskeletal health and reduce the burden of low back pain in the young adult population.

In summary, this study highlights the importance of assessing plantar pressure in young adults as a potential risk factor for low back pain. Future research should focus on exploring the long-term implications of abnormal plantar pressure and evaluating the effectiveness of various intervention strategies to mitigate the risk of LBP. The insights gained from this study could pave the way for innovative approaches in musculoskeletal health care, tailored specifically to the needs of young adults.