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# A SCOPING REVIEW ON: CORRELATION BETWEEN FLAT FOOT AND KNEE PAIN IN BALANCE

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## ABSTRACT

This study shows the biomechanical correlation between flat feet and knee pain in balance. Study shows that individuals with flat feet experience altered biomechanics, affecting the alignment of the knee joint during weight-bearing activities. This biomechanical shift is linked to an increased risk of knee pain, particularly in tasks requiring balance and ling standing. Muscle imbalances, gait abnormalities, and weight distribution further contribute to challenges in maintaining knee joint stability and equilibrium. Understanding these relationships is crucial for informing targeted interventions to alleviate knee pain and improve balance in individuals with flat feet, with potential implications for preventive strategies and future research directions.

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## INTRODUCTION

Pes Planus, commonly referred to as flatfoot, is a condition in which one or both feet have reduced arch, during weight bearing phase on either foot. There are three arches in the foot: two longitudinal arches (medial and lateral) and one anterior transverse arch. The tarsal and metatarsal bones that form these arches are supported by the foot's ligaments and tendons.

The interosseous, plantar, and dorsal ligaments, the small muscles of the first and fifth toes (particularly the transverse head of the Adductor hallucis), and the Peroneus longus, whose tendon spans across between the arches, all help to support the transverse arches.

Flat foot is classified into types- Flexible flat feet- When the body weight is on the feet, the arches disappear. Flexible flatfoot develops during childhood or adolescence. It affects both feet and progressively worsens with age. Tendons and ligaments in the foot arches can strain, rip, and bulge. Rigid flat feet- When standing (placing weight on the feet) or sitting (no weight on the feet), a person with stiff flat feet has no arches. This disorder usually appears during adolescence and worsens with age. Your feet may be in agony. It can be difficult to move the feet side to side or flex them up and down. Flatfoot can affect one or both feet.

Knee joint consists of the femur, tibia and patella. The ligaments in the knee include the (MCL)medial collateral ligament, (LCL)lateral collateral ligament, (ACL)anterior collateral ligament, (PCL)posterior collateral ligament, medial meniscus and lateral meniscus. The knee joint consists of 2 articulating surfaces the tibiofemoral and patellofemoral surfaces. It is known that flat foot can cause increased forces upon the knee joint due to malalignment of the foot. Factors that increase compressive and shear stress on the tibiofemoral (TF) and patellofemoral (PF) compartments can cause excessive knee loading. Planus foot morphology (flat-footedness) is posited to contribute to both TF and PF pathology

The flat foot leads to internal rotation of tibia causes an unnatural amount of compressive force and shearing force & can misalign the knee joint, which ultimately alter the biomechanics of knee joint that can lead to increase in severity of knee pain. This force causes wear and tear of soft tissues. Causing pain in activities involving the knee. To our knowledge, the current study

 

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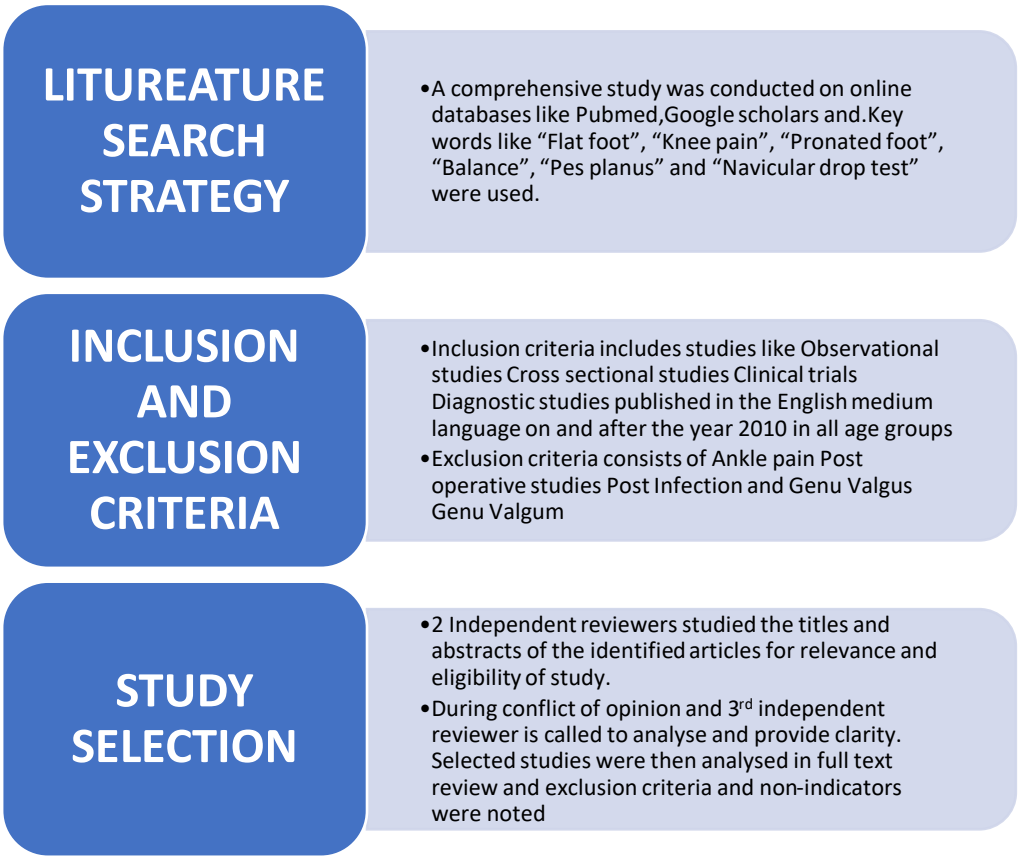
is the first to show that the presence of bilateral flat feet, but not unilateral flat feet, is associated with worse knee pain compared to no flat feet.

The neurocom balance master is an apparatus that helps analyse gait patterns, COG movements, sway velocity, weight/ Force distribution. it has 1.53 m long force plate that measures the force generated. This apparatus will help to analyse the force distribution on both the legs using the outcome measure 'weight bearing squats' and 'sit to stand'

Thus, the purpose of this study is to find a positive correlation between flat foot and knee pain in causing instability and imbalance, this will help in providing preventive care, assist in providing optimal training protocol and to avoid long term wear and tear of knee and ankle joint.

## METHODOLOGY

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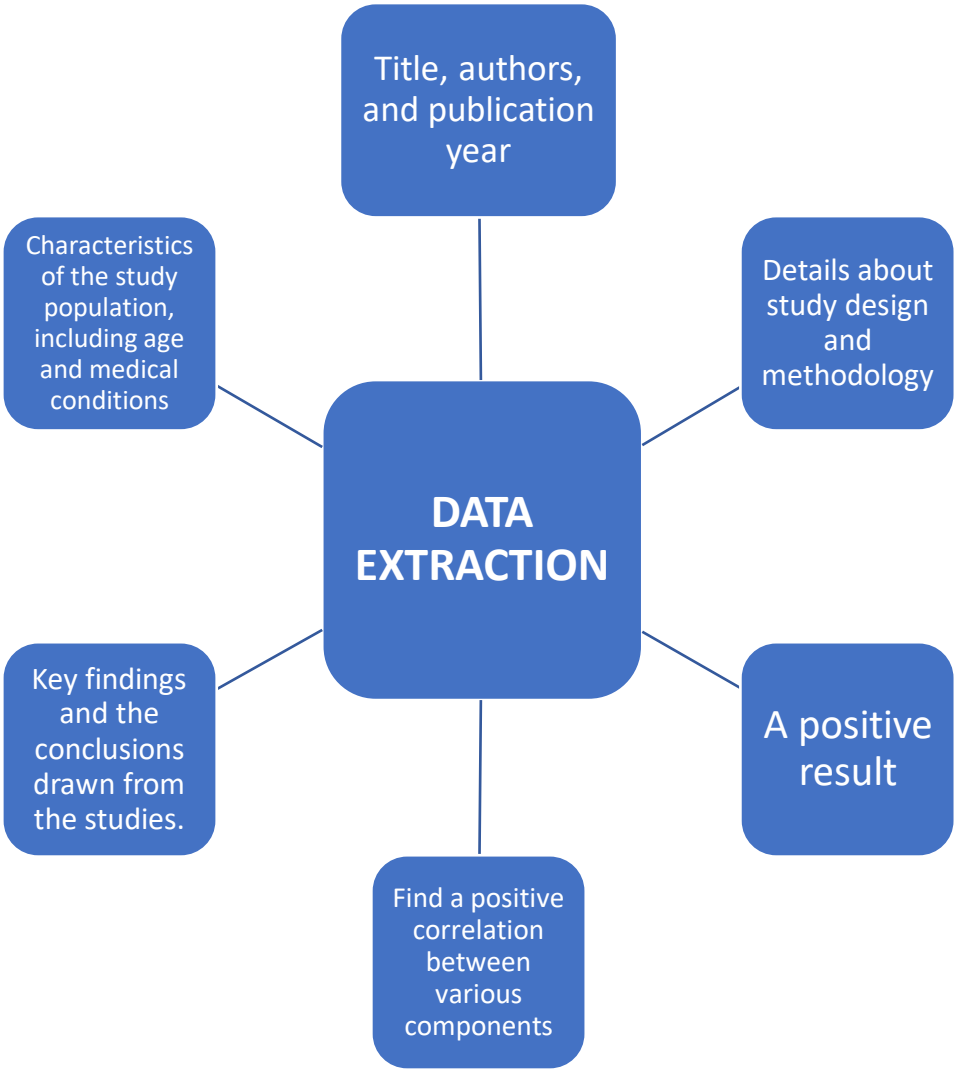


DATA SYSNTHESIS

1.Correlation between Pes Planus Foot and Knee Pain: Investigations focusing on the association between flatfoot conditions (Pes Planus) and the occurrence of knee pain.

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2.Correlation in Balance and Instability: Studies centered around the correlation between Pes Planus and issues related to balance and instability, exploring how flatfoot conditions may impact these factors. 3.Type of Mechanical Injuries: Categorization of studies based on their exploration of mechanical injuries, specifically those associated with Pes Planus, shedding light on the nature and characteristics of such injuries. 4.Soft Tissue Damage: Studies were systematically classified based on their examination of soft tissue damage in relation to Pes Planus, aiming to understand the implications and extent of such damage.

By structuring the data in this thematic manner, the scoping review aims to provide a comprehensive overview of the existing research landscape concerning Pes Planus and its correlations with knee pain, balance, mechanical injuries, and soft tissue damage.

## RESULTS

Flat Feet and Knee Pain:

Some studies suggest that individuals with flat feet may experience altered biomechanics, which can affect the alignment and movement of the lower extremities, potentially leading to knee pain.

Biomechanical Changes:

Flat feet can result in overpronation, where the foot rolls inward excessively. This, in turn, may affect the alignment of the knee joint and contribute to conditions like patellofemoral pain syndrome or other knee-related issues.

Balance and Stability:

The arch of the foot plays a crucial role in maintaining balance. Flat feet can alter the distribution of weight and affect proprioception, potentially impacting balance and stability.

Muscle Imbalances:

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Flat feet may lead to muscle imbalances in the lower extremities, affecting the muscles that support the knee joint. These imbalances could contribute to knee pain and impact overall balance.

Soft Tissue Strain:

The altered biomechanics associated with flat feet may increase the strain on soft tissues surrounding the knee, potentially leading to pain and discomfort.

Joint Loading:

Flat feet may lead to increased forces on the knee joint during weight-bearing activities. This elevated stress can contribute to conditions such as osteoarthritis in the knee.

Functional Impairments:

Understanding how flat feet influence daily activities and functional tasks is crucial. Some studies may explore the impact on activities such as standing, walking, or climbing stairs, which are fundamental to daily living.

## FUTURE SCOPE

Interventional Studies:

Explore the effectiveness of specific interventions, such as targeted exercises, orthotic devices, or surgical procedures, in addressing knee pain and improving balance in individuals with flat feet.

Biomechanical Studies:

Utilize advanced biomechanical tools, such as 3D motion analysis and dynamic imaging techniques, to gain a more detailed understanding of how flat feet affect joint movements, muscle activations, and overall biomechanics during various activities.

Impact of Footwear:

Further explore the role of different types of footwear in managing and preventing knee pain and balance problems in individuals with flat feet. This could include assessing the impact of shoe design, insoles, and other supportive features.

Interventional Research:

 

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Explore the effectiveness of specific interventions, such as targeted exercises, orthotic devices, or surgical procedures, in addressing knee pain and improving balance in individuals with flat feet.

## LIMITATIONS AND CHALLENGES

Ethical Considerations:

Ethical considerations, such as potential biases in recruitment or the appropriateness of certain interventions, can impact the design and implementation of studies in this field.

Lack of Interventional Studies:

The absence of standardized interventions for flat feet-related knee pain and balance problems makes it challenging to assess the efficacy of different treatment approaches consistently.

Self-Reporting Bias:

Reliance on self-reporting for symptoms, pain levels, and functional limitations may introduce bias, as individuals may perceive and communicate their experiences differently.

Diagnostic Challenges:

Diagnosing and categorizing flat feet can be challenging, and the lack of a universally accepted definition or classification system may lead to inconsistencies in study populations.

## CONCLUSION

The correlation between flat feet and knee pain in balance is a subject of interest and investigation. Research suggests that the biomechanical changes associated with flat feet play a pivotal role in influencing the alignment of the knee joint during weight-bearing activities. These change in biomechanics may contribute to the experience of knee pain, particularly when engaging in tasks that demand balance. Muscle imbalances in the lower extremities, often observed in individuals with flat feet, can further impact the stability of the knee joint, potentially leading to discomfort and challenges in maintaining equilibrium. Gait abnormalities, a common characteristic of flat feet, introduce changes in walking patterns that can influence joint loading and stability, contributing to both knee pain and difficulties in

 

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balance. The compromised arch structure in flat feet may affect the distribution of weight on the foot, leading to uneven forces transmitted through the knee joint and, consequently, an increased risk of pain and issues with balance. Additionally, the strain on soft tissues surrounding the knee due to altered foot mechanics in flat feet can contribute to discomfort and affect the ability to maintain stable posture. It's worth noting that the correlation between flat feet and knee pain in balance may be influenced by age, activity levels, and individual variations. Understanding these biomechanical relationships is crucial for developing effective interventions aimed at alleviating knee pain and improving balance in individuals with flat feet.

## REFERENCE

1. Iijima H, Ohi H, Isho T, Aoyama T, Fukutani N, Kaneda E, Ohi K, Abe K, Kuroki H, Matsuda S. Association of bilateral flat feet with knee pain and disability in patients with knee osteoarthritis: A cross-sectional study. Journal of Orthopaedic Research. 2017 Nov;35(11):2490-8.
2. Schwartz O, Bulis S, Olsen CH, Glasberg E, Dudkiewicz I. The association between History of an ankle sprain and traumatic meniscal injury among infantry combat soldiers in the Israeli Defense forces: A historical cohort study. Military Medicine. 2020 May;185(5-6):e748-54.
3. Patel M, Shah P, Ravaliya S, Patel M. Relationship of anterior knee pain and flat foot: A cross-sectional study. International Journal of Health Sciences and Research. 2021;11(3):86-92.
4. Aenumulapalli A, Kulkarni MM, Gandotra AR. Prevalence of flexible flat foot in adults: A cross-sectional study. Journal of clinical and diagnostic research: JCDR. 2017 Jun;11(6):AC17.
5. Aenumulapalli A, Kulkarni MM, Gandotra AR. Prevalence of flexible flat foot in adults: A cross-sectional study. Journal of clinical and diagnostic research: JCDR. 2017 Jun;11(6):AC17.

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6. Gross, K.D., Felson, D.T., Niu, J., Hunter, D.J., Guermazi, A., Roemer, F.W., Dufour, A.B., Gensure, R.H. and Hannan, M.T. (2011), Association of flat feet with knee pain and cartilage damage in older adults. Arthritis Care Res, 63: 937-944. https://doi.org/10.1002/acr.20431

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