Kinematic Alterations In Pelvis, Hip And Knee By Wearing Low Waist Jeans In Men And Women

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ABSTRACT-
This is the era of Modernization, consequently the attire has also changed from simple ones to complex. The fashion has been changing every now and then. The use of low waist jeans is the new trend nowadays among the males and females.
Wearing the low waist jeans, has some adverse effects on the biomechanical representation of the pelvis and lower limbs. On observing the people walking wearing low waist jeans, their gait pattern is awkward with broad base and foot everted, so as to prevent falling of the jeans.
The high-rise jeans on the other hand, fits at the level of ischium and does not fall while walking and therefore, the gait pattern is maintained. Looking at the other side of the coin, there is a psychological impact, as well. The high-rise jeans, is comfortable as well gives a sense of confidence. The people feel comfortable to walk with confidence. On the other hand, people wearing low waist jeans are apprehensive while walking, thinking it may fall. The walking with broad base may cause changes in pelvic tilt, Q angle and alterations in foot complex.

Keywords- low waist jeans, pelvic tilt, broad base, foot complex, Q Angle.

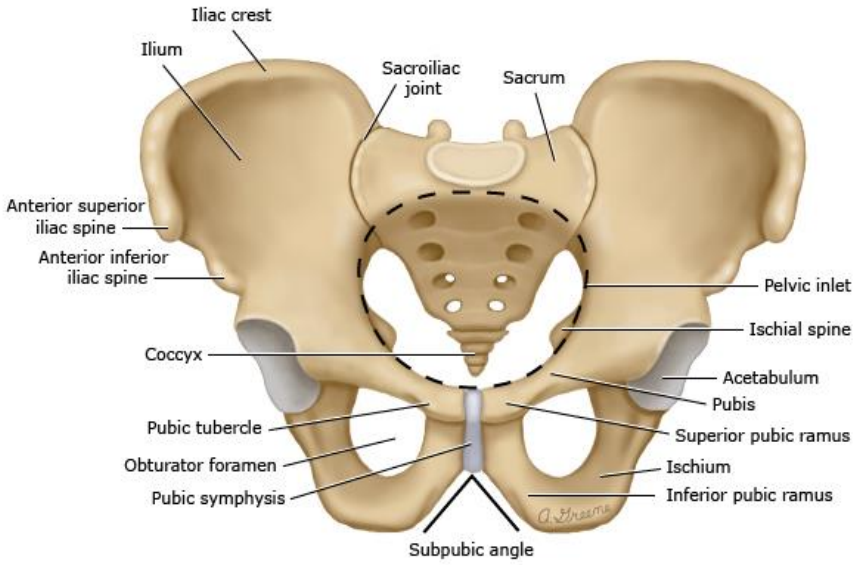
INTRODUCTION-

The pelvis is a complete irregular ring formed by the two hip bones on either sides and sacrum and coccyx, posteriorly.

The two hip bones are fused anteriorly at pubic symphysis.

The pelvic girdle articulates with the femoral heads, bilaterally to form the hip joint. The main functions of the pelvic girdle are to transmit weight from the upper body to the lower limbs while walking and standing, and to support the weight of the upper body when seated. Another important function of the bony pelvis is to provide attachment for the gluteal muscles that act on the lower limb and those muscles that support the abdominal wall.

The pelvis is responsible for supporting the weight of upper body. It is the middle part of human body between the lumbar region, superiorly and thighs, inferiorly.



BIOMECHANICS AND ALTERATIONS-

Biomechanics has been defined as the study of the movement of living things using the science of mechanics (Hatze, 1974). A balance must be maintained between the mechanical stress of the musculoskeletal system and the stress response. Imbalance causes degeneration, failure, and remodelling of the structure. The knee joint is an important joint of the lower limb as it carries all the weight of the body during different activities such as walking, running, jumping, and climbing stairs.

Normal knee biomechanics is as follows for different daily movements in the sagittal and coronal planes:

Axes of motion

JOINT	AXIS	MOTION	Closed packed position
tibio-femoral	*lateral longitudinal*	*flexion/extension tibial rotation*	*extension*
patello-femoral			

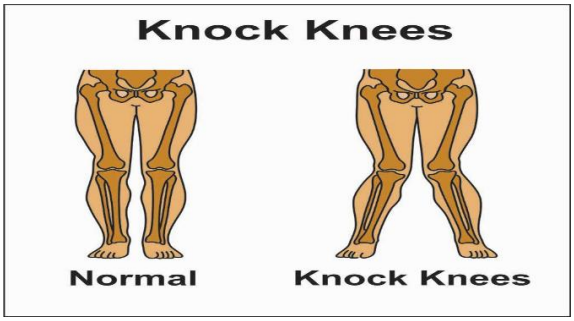
In all of the motions, the main functions of the knee joint include supporting the body weight, absorbing the shock during heel strikes, and assisting lower limbs in swing phase. The normal knee biomechanics can be discussed as:

In the sagittal plane, the femur's articulating surface is convex while the tibia in concave.

DURING KNEE EXTENSION		**DURING KNEE FLEXION**	
OPEN CHAIN	*Closed Chain*	*OPEN CHAIN*	*CLOSED CHAIN*
TIBIA GLIDES ANTERIORLY ON FEMUR	*FEMUR GLIDES POSTERIORLY ON TIBIA*	*TIBIA GLIDES POSTERIORLY ON FEMUR*	*FEMUR GLIDES ANTERIORLY ON TIBIA*
from 20º knee flexion to full extension		**from full knee extension to 20º flexion**	
Tibia rotates externally	*Femur rotates internally on stable tibia*	*Tibia rotates internally*	*Femur rotates externally on stable tibia*

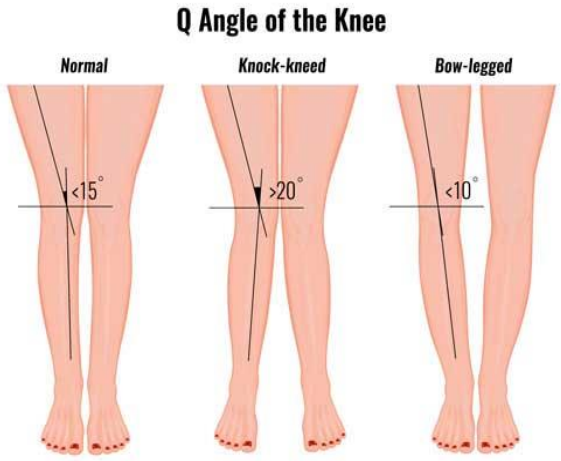
Two common changes in the biomechanics of the knee are-

Genu valgum or "knocked knees" are part of the deformations of the coronal plane of the lower limb.

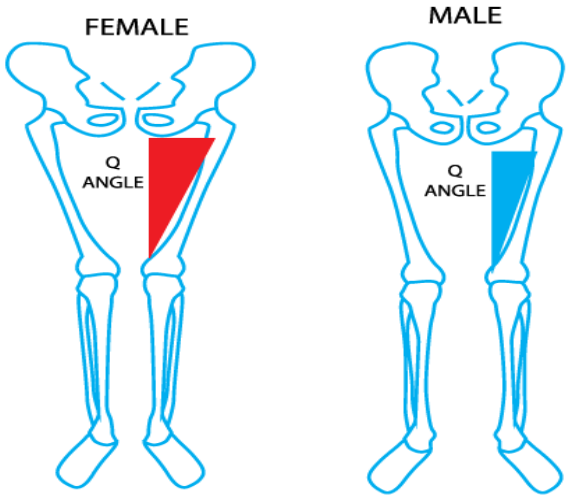


Misalignment of the mechanical axis may give rise to abnormal forces acting at the knee joint. On general observation, people wearing low waist and skinny jeans are unable to walk comfortably. They walk with a broad base to prevent the falling off of the jeans below the pelvis. To maintain the alignment, the knees need to be bent slightly and thus the complete mechanism is disturbed. The feet in turn, may supinate to further align the knee and pelvis. Genu varum, or increased deviation of the medial mechanical axis, increases force transmission and contact pressures to the medial compartment. Montana et al. investigated the effect of malalignment on knee contact forces and found that with increasing mechanical axis deviation and angle of the mechanical axis of the femur and tibia, contact forces within the medial or lateral compartment of the knee increased significantly with increasing deformity. This can further lead to knee pain, further deformity, and degenerative disease of the medial compartment joint, which can interfere with sports and recreation and activities of daily living, ultimately affecting the quality of life.

(Q-angle) is widely used as a general measurement for assessing knee position in clinical practice. This angle is formed by the intersection of the line from the anterior superior iliac spine (ASIS) to the centre of the patella and the line from the centre of the patella to the tuberosity of the tibia.



The Q-angle indicates the size of the lateral movement of the patella generated by the contraction of the quadriceps, so it is an important indicator for the alignment of the knee joint. The Q-angle is considered normal if it is between 12◦ and 20◦; males tend to be at the lower end of this range, while females tend to have higher values.

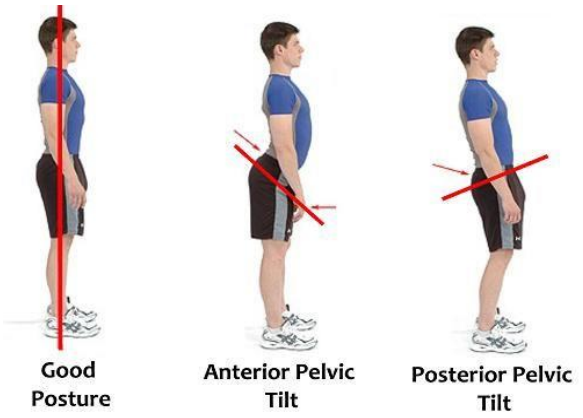


The Q-angle is usually considered excessive when the angle is >20◦. An increase in the Q-angle can alter the biomechanics of the knee and lead to lateral patellar dislocation or increased lateral patellofemoral contact pressures, which can further cause knee valgus, potential sports injuries, and pathological conditions such as patellofemoral pain syndrome or knee instability

Biomechanics of the pelvis

In the physical therapy setting, pelvic tilt usually refers to the angle formed by the horizontal line and the anterior iliac spine (ASIS) and posterior superior iliac spine (PSIS) bifurcation lines in the sagittal plane.8,12 It is commonly assessed statically, such as the individual's pelvic tilt. in a relaxed standing position. It is also sometimes assessed in an active way, such as the individual's ability to actively move as much pelvic motion as possible in an upright position. It can also be assessed during functional movements, such as the change in pelvic tilt angle during a step-down task. Although there are different descriptions of pelvic tilt, for this commentary, pelvic tilt refers to the spatial position or movement of the pelvis in the sagittal plane around the horizontal frontal axis. The pelvic tilt is when the ASIS is either lower than the PSIS in the sagittal plane (position) or rotates lower relative to the PSIS (motion). The posterior pelvic tilt is when the ASIS is higher than the

PSIS in the sagittal plane (position) or rotates superiorly relative to the PSIS (motion). Due to the compensatory posture of the body, the malignant position of the knee affects not only the lower limbs but also the position of the pelvis. On the contrary, the position of the pelvis plays a role in controlling the alignment of the lower limbs. In particular, it can be the Q-angle increase with excessive anterior pelvic tilt, femoral anteversion, knee valgus, and tibial external rotation.



LOW WAIST JEANS-

Wearing the low waist jeans is inconvenient for the person as it slips down frequently below the pelvis. Keeping the base broad prevents it from falling. Wearing the low waist and skin fit jeans cause uneasiness during walking. The excessive tight jeans tend to alter the walking pattern and likewise, the alterations in biomechanics of knee and pelvis.

The recent research says that the people wearing low cut jeans too often can be caught under meralgia paresthetica leading to numbness, tingling and burning sensations in the thighs. It compresses the nerves supplying the thigh. Obesity, weight gain and tight apparels are the top reasons for it. If one continues to wear body hugging clothes, it can lead to trauma or even surgery. Low cut jeans are particularly tight at the thighs. The tightness of the jeans may compress the thigh and the gait may also be altered to compensate the pain and paraesthesia. Consequently, there are changes in biomechanics of pelvis, foot and knee, as well.

DISCUSSION AND CONCLUSION-

The modernization has led to a drastic change in the attire of both, the males and females. The upgrading fashion has led to admiration at the cost of postural and biomechanical changes. A further study can also be done with a good number of samples, detailed measurements and comparison with the normal values.

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