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Review Article

An anatomic overview to “manspreading” campaign

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Abstract

There is a campaign called “manspreading”. The campaign which started to draw attention to men's making passengers uncomfortable by sitting with open legs in public transportation, attracted too much attention. When we glance through communal living spaces, we see men mostly sitting with their legs open. Can there be a morphological background of this sitting position?

Basically, the pelvis of men and women are different from each other. Angulus subpubicus is bigger in women. In women, the femur head is located to lateral due to excess angulus subpubicus. However, the lower end of femur has to direct to medial to adjust with tibial condyle, that is, it gets closer to midline. Anteversion angle of acetabulum is higher in women. Anteversion with a higher angle means more anteriorly located acetabulum. That is, both femurs have to be more located to the midline. In women, the collodiaphyseal angle and femur neck length is smaller than men. Both of these situations cause femurs to be located close to the midline. Q angle which is used in the assessment of the mechanic and situation of knee joint is higher in women. High Q angle means that femur lower ends are close to the midline.

Due to anatomical differences listed above, women's femurs are located closer to the midline, while the femurs of men are located more laterally. This difference is also reflected in the way they sit.

Keywords: Gender; Acetabular Anteversion; Q Angle; Sitting Difference.

As far as we could follow from the press, there is a campaign called “Keep your legs together, don't take up my space” which started first in our country and became widespread in the whole world a short while later with the name “manspreading”. The campaign which started to draw attention to men's making passengers uncomfortable by sitting with open legs in public transportation, attracted too much attention and for example, it was officially adopted in Spain and special signs about the issue were prepared and put on public transportation vehicles.

The issue is quite important in terms of social living system. Since we are social beings, we live and interact with other people. In every area of life, we deal with rules which are made to organize these interactions. While these rules allow us to live freely, at the same time they limit us in some issues. Communal living spaces can be problem-free and peaceful as long as these rules are obeyed. In this sense, it is not possible to approve of sitting with legs overly open in a way that will annoy the person opposite in all areas where social life continues, especially in public transportation.

However, as a general observation, when we glance through such public living spaces, we see men mostly sitting with their legs open, while on the contrary we see women sitting neatly and with their legs closed. It does not seem very probable that all of the men sitting with their legs open like this have moral weakness and that they are indifferent to social sensitivity and values.

For such a difference in sitting, one justification can be the fact that boys are raised more freely since the beginning, while girls are raised under more pressure. Another argument which can show men more justified is the positioning of their external genital organs and that they keep their legs open to prevent them from being pressed while sitting.

Can there be an anatomical basis or a morphological background of this difference in sitting between men and women?

During activities such as walking, running or standing, the hip joint supports the weight of the head, upper extremities and the body and transfers the load coming from these areas to lower extremities. This transfer takes place at art. coxae, which is a spheroid joint between caput femoris and acetabulum. Art. coxae, which completely covers

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the joint and which is supported by lig. iliofemorale, lig. pubofemorale, lig. ischiofemorale, lig. transversum acetabuli and lig. capitis femoris ligaments, is the most moving joint of the body together with art. humeri. It allows for all flexion, extension, abduction, adduction, inner rotation and outer rotation moves (1).

Long ago, the thought that pelvis bones parted from each other and allowed for the baby's coming out during the birth was replaced with the truth that basically the pelvis of men and women are different from each other.

In women's pelvis, ala osis ilii is more leaning outside and spina iliaca anterior superior on both sides are away from each other. Pelvis minor is also shorter and wider in women. In women, tuber ischiadicum is more outward.

Another important difference is related with angulus subpubicus and this angle is greater in women (2). (Figure 1)

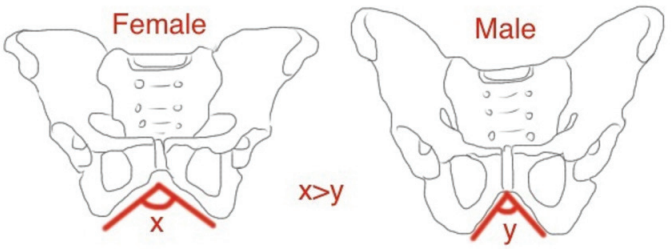

Figure 1. Differences between male and female angulus subpubicus

While female pelvis is wider and lower due to this construct, male pelvis is higher and narrower (3). In this case, the femur head should be located to lateral due to excess angulus subpubicus because acetabulum is more to the lateral. While the head of femur gets away from the midline like this, the body of femur gets away from the midline due to the femur neck. As a result of this removal, the symmetry between femur condyle and tibial plateau is disrupted.

Normally, femur condyles and tibial plateau should counterpoise each other. However, due to excessive angulus subpubicus in female pelvis, when the head of femur is located outward, the lower tip of femur has to face the lateral. When the lower tip of the femur faces the lateral, tibial plateau and femur condyles cannot counterpoise each other. This is because while femur medial condyle is larger, lateral condyle is smaller and there is a difference in level between the medial and lateral side. Lower tip of the femur, which is the different in level between tibial plateau and condyle, has to face the medial on both sides in order to be able to counterpoise.

Acetabulum in the mid and outer part of os coxae, is forms in the joint of os ilium, os ischium and os pubis bones. This triple bone structure in acetabulum provides a strong support to the head of femur, especially on the posterior and superior (4). Acetabulum and head of the femur have been joined in a ball-socket type of structure (5). Normally, acetabulum has an anteversion angle of 17±6° (6). (Figure 2)

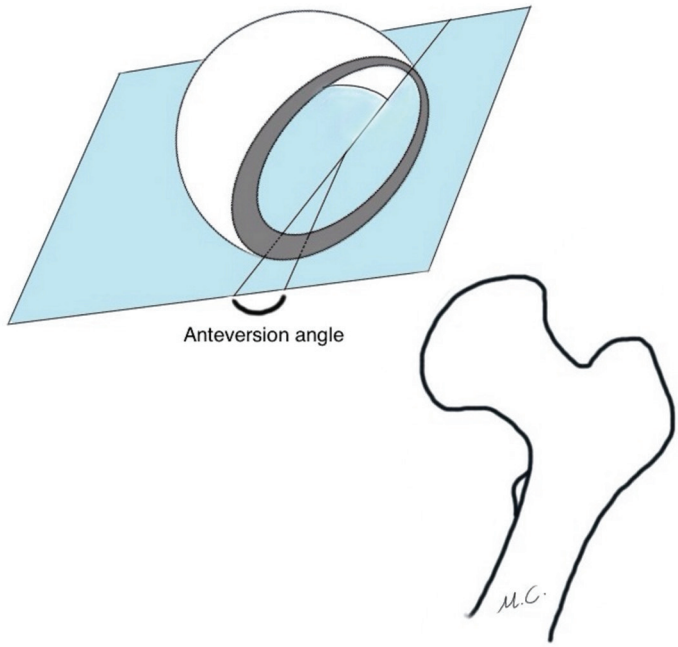

Figure 2. Anteversion angle

Anteversion of acetabulum is the positioning of the acetabular fossa on which the head of femur is placed towards the anterior. There is also difference between men and women in antreversion angle.

A great number of studies have shown that anteversion angle of acetabulum is higher in women when compared with men (7-10). That is, when the acetabulum is to the more lateral of the pelvic skeleton in men, it is more anterior and closer to the midline in women. Thus, the femur will be positioned accordingly and it will be closer to the midline in women. (Figure 3)

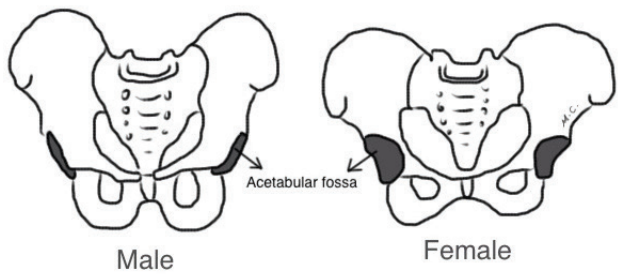

Figure 3. Actabular fossa places more anteriorly in women than men

Body of the femur is bound to the pelvis skeleton with collum femoris. There is an angle of approximately 125° between the body of femur and collum femoris called collodiaphyseal angle.

This angle is lower in women (1, 11). Studies have shown that women's femur neck lengths are lower than those of men's (12-15). Thus, short femur neck and lower collodiaphyseal angle will cause body of the femur and femur lower tip to be located closer to the midline. (Figure 4)

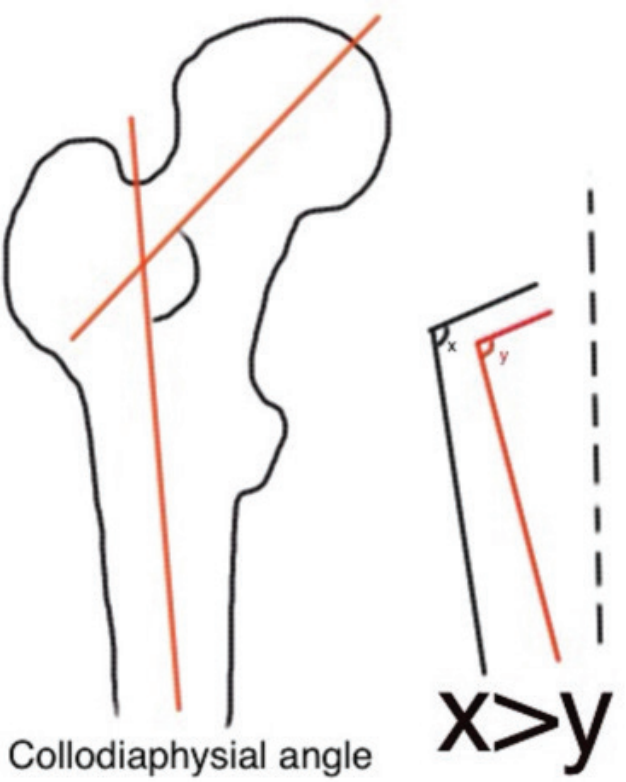

Figure 4. Lower collodiaphysial angle and short femur neck bring the femur closer to the midline

For a healthy upright position and load transfer, lower extremity bones should be appropriately lined. While referring to the appropriateness of this sequence, rather than the anatomical axes of bones, a mechanical axis defined at frontal plan used to transfer the load on them is used. This axis passes by head of the femur centre, knee joint centre and ankle centre. Some methods have been developed to assess this sequencing of the lower extremity. One of the most commonly used of these is Q angle. Q angle is the angle between the line to the patella center from spina iliaca anterior superior and the line to the patella centre from tuberositas tibia (11,16).

It is an important parameter used in the diagnosis of diseases related with the knee, in the assessment of the state of post-surgery knee joint, in studies conducted about the mechanics of the knee joint and in prosthesis applications (17, 18). A great number of studies have shown that Q angle is higher in women (19-21). Higher Q angle in women means that femur lower tips are closer to the midline. (Figure 5)

It is out of question to approve of an exaggerated and disrespectful way of sitting which will make people opposite uncomfortable. As a conclusion, it seems that one of the reasons for the difference between the sitting ways of men and women is the changes in their anatomical structure. Having information about human anatomy or getting information from people who know about human anatomy will present us simple solutions and explanations about many problems in daily life.

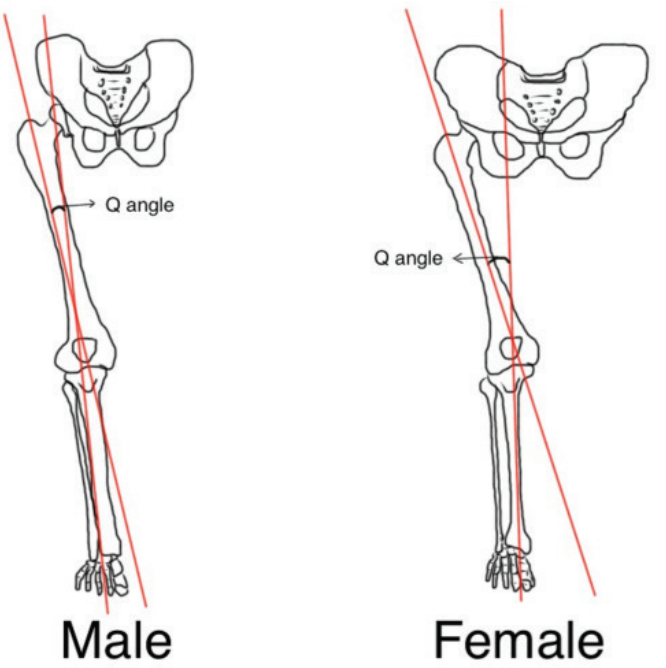

Figure 5. Q angle and gender differences

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