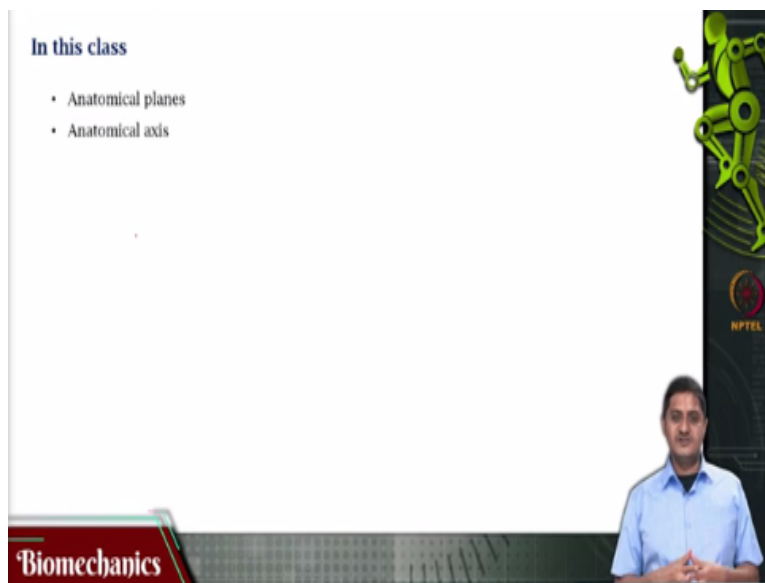


Biomechanics
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Lecture - 11
Anatomical Planes and Axis

Welcome to this lecture on biomechanics. We have been looking at the human body as a biomechanical system and some basic terminologies.

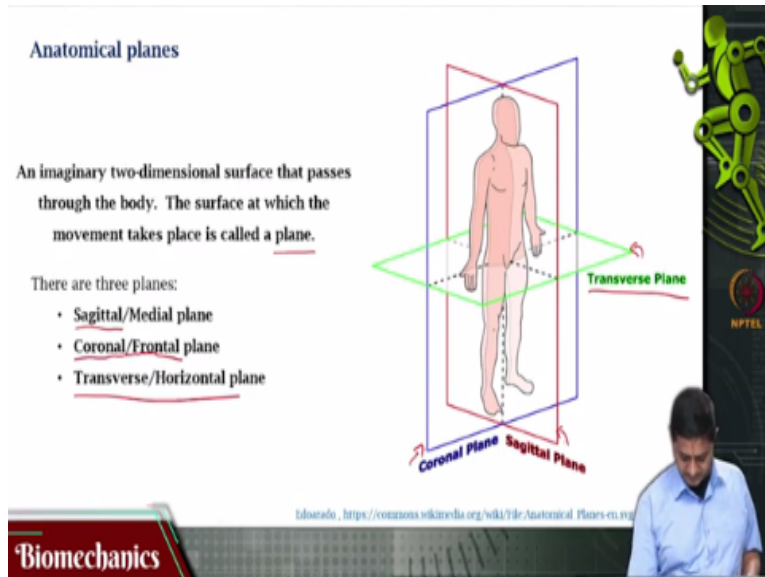
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In this video we will be looking at planes or anatomical planes and axis that are perpendicular to these planes are anatomical axis. These are used frequently in describing specific movements and in discussing or in communicating a particular movement in a non-ambiguous manner. So, in other words when an expert in the field is speaking about the about a particular movement the listener will be able to exactly understand what that person is speaking if these terms are consistently used.

So, the key is to understand these terms and use them consistently. So, that the other person understands exactly what is it that you are referring to. So, from that point of view this reference planes or the anatomical planes and the anatomical axis play an important role.

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So, what are these anatomical planes? It is an imaginary 2D surface that passes through the body. So, this surface within which the movements are taking place is called the plane. There are three such planes that are discussed within biomechanics. One that divides the body into the left side and the right side this is called as the sagittal plane. Sagittal plane is that plane that is passing through my head and through my body that divides my body into two sides not necessarily two halves.

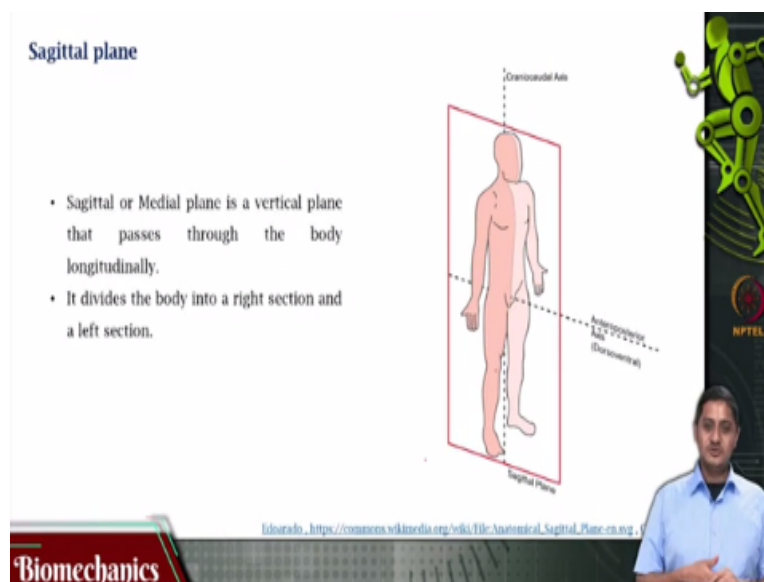
The particular sagittal plane that divides my body into two equal halves is called as the mid sagittal plane. Note that there can also be a sagittal plane that passes just through my shoulder but not through my head that is a different sagittal plane. It just has to divide the body into two parts a left part and a right part. So, a sagittal plane divides the body into a left part and a right part are two sides of the body sagittal plane.

Then that plane which passes through the body and divides the body into a front part and a back part, not necessarily two halves a front part and a back part that plane is called coronal plane or frontal plane. Remember again there can be many coronal planes that can be one that passes at the beginning of the head and there can be one that passes at the middle of the centre of the head. That plane that divides the body into two parts front and the back is called as a coronal pain.

Then there are three dimensions. So, we have done two the other one must be so one that divides like this left and right the one that divides front and back. Then what must be the other one? The one that divides into a top and a bottom, not necessarily two halves. So, not plane which divides the body into a top portion and into a bottom portion is called as a transverse plane or the horizontal plane.

So, these are the planes that are under ah discussion. So, the transverse plane is shown in green here. So, that is the transverse plane sagittal plane is shown in red and coronal plane is shown in blue. Coronal plane divides the body into front and back, sagittal plane divides it into left and right, transverse plane divides it into top and bottom.

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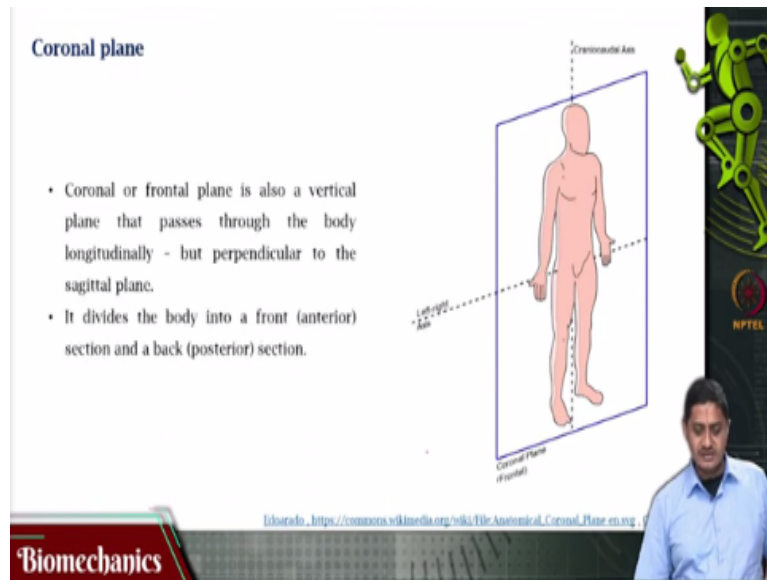


So, to review the sagittal plane is a vertical plane that passes through the body longitudinally, it divides the body into a right section under left section as shown in this picture. And the axis that passes from the top to the bottom or from the head to the tail is called as a cranial chordal axis and the axis that passes from the front and the back this is called as Antero posterior axis. Now a question is what would be an axis that would be perpendicular to the sagittal plane?

How would it go? The sagittal plane divides my body into a left and right part if it is going to be like this. If an axis passes perpendicular to that would be a medial lateral axis that would go that

would go from medium middle to the side right medial lateral axis. Something to remember we will see that in more detail.

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Then you have the coronal plane that divides the body into the front portion and the back portion is also a vertical plane that passes through the body longitudinally. But this is perpendicular to the sagittal plane. Remember this is the sagittal plane and this is the coronal plane or the frontal plane these two are perpendicular to each other divides the body into a front or the anterior portion and the back and the posterior section.

And this has two axes within it one is the left right axis or the medial lateral axis and top bottom axis are the craniocaudal axis. The axis that goes from the front to the back are the axis that is perpendicular to the frontal plane. What would it be? The axis that is perpendicular to the coronal plane is the anterior posterior axis.

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Transverse plane

- Transverse or horizontal plane is perpendicular to both the sagittal plane and the coronal plane, and parallel to the ground.
- It divides the body into an upper (superior) section and a lower (inferior) section.

Transverse Plane (Axial)

Anteroposterior Axis (Dorsoventral)

Left/Right Axis

[Edwazda https://commons.wikimedia.org/wiki/File:Anatomical_Transverse_Plane.en](https://commons.wikimedia.org/wiki/File:Anatomical_Transverse_Plane.en)

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Then you have the transverse plane which is a horizontal plane this is perpendicular to both the sagittal plane and the coronal plane like this but it is parallel to the floor. It divides the body into a upper part and a lower part not necessarily two halves. Within this plane you will have a left right axis or the medial lateral axis and an anteroposterior axis. So, you will have anteroposterior axis and medial lateral axis.

What would be an axis that would be perpendicular to this plane that would be the axis that goes from the top to the bottom like this are the craniocaudal axis.

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Anatomical axes

Craniocaudal or longitudinal axis

Anteroposterior or dorsoventral or sagittal axis

Left/Right or horizontal or frontal axis

An imaginary axis of rotation around which the movement takes place.

There are three axes:

- Mediolateral/frontal axis
- Anteroposterior/sagittal axis
- Longitudinal/vertical axis

https://commons.wikimedia.org/wiki/File:Anatomical_axes.svg, CC BY-SA 3.0

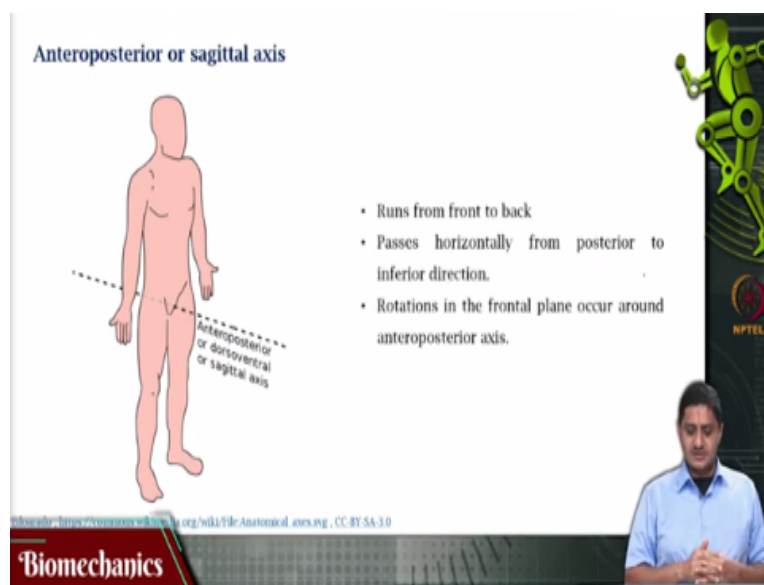
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So, let us look at the axis with the bit more detail. What is an axis? The anatomical axis under discussion these are imaginary axis of rotation around which a movement takes place. There are three axis one is the mediolateral axis or the axis in the frontal plane now the frontal axis to avoid ambiguity it is called mediolateral axis that is it goes from the middle of the body to the side of the body the mediolateral axis or the left right axis.

Then you have that axis that goes from the front to the back this is the anteroposterior axis. Then you have the axis that is passing through the head from the head to the tail from the top to the bottom. This is the longitudinal axis are the craniocaudal axis. Let us remember this that the axis that is going from left to right or from the middle to the side is called as a mediolateral axis, the one that goes from the front to the back is called as the anteroposterior axis.

And the one that is perpendicular to the head or in the longitudinal is called as a longitudinal axis are the craniocaudal axis.

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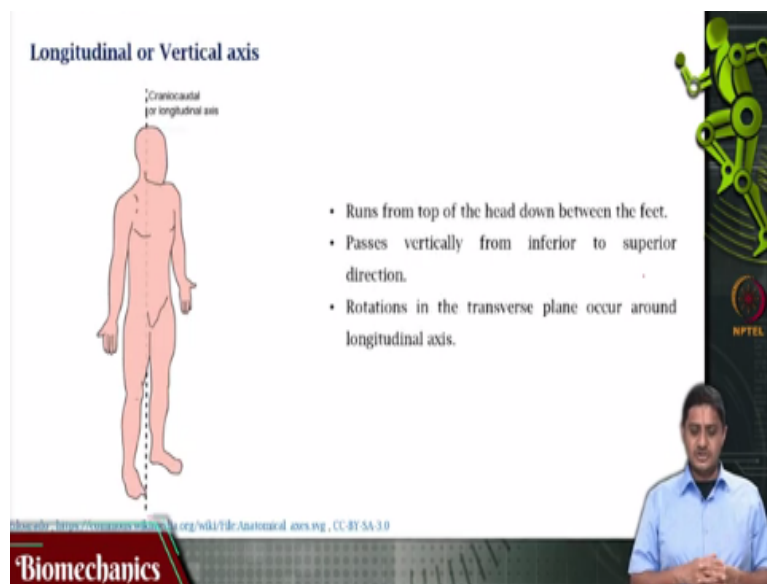


So, the mediolateral axis runs from side to side, it passes horizontally from left to right direction. Now remember that any movement that happen in a sagittal plane will happen about this axis. Because the sagittal plane is this plane that which divides the body into two sides then left side and the right side, any moment that happens within this plane in 2D if there is any movement that is happening a rotation that is happening that will happen about that axis.

And what is that axis? That axis is the axis that goes from the left to the right or from the middle to the side or the mediolateral axis. Then you have the anteroposterior axis this runs from the front to the back it passes horizontally from the posterior; posterior means the back to the anterior direction. So, any movements that happen in the coronal plane in the frontal plane that will happen about this axis.

Because this is the frontal plane and an axis that is perpendicular to this about this the rotation will happen that axis is the anteroposterior axis.

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Then you have the longitudinal or the vertical axis. This is the one that goes from the top of the head to the space between the feet or to the tail bone passes vertically from inferior direction to superior direction or from superior direction to inferior direction. Any movement that happen in this plane the horizontal plane will happen above the top down axis about this axis. Any moment that happens in this plane will happen about this axis or the rotation that happens the transverse plane happen about the longitudinal or the vertical axis.

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Summary

- Anatomical planes
- Anatomical axis



With this we come to the end of this lecture. So, in this lecture we saw anatomical planes and anatomical axis and we took some time to define and repeat more than once these terms. Why is this important? Because this will be used very frequently in future lectures and in future classes and in problem questions. So, that you will be in a position to remember and understand what is being said in the future classes.

That is the purpose of spending a few minutes on this topic and repeating it more than once. Thank you very much for your attention.