

Aim:- To analyze gait pattern of normal walking using force platform.

Apparatus Required:-

- 1) Multiaxial force platform (Kistler)
- 2) Bioware software.

Theory:-

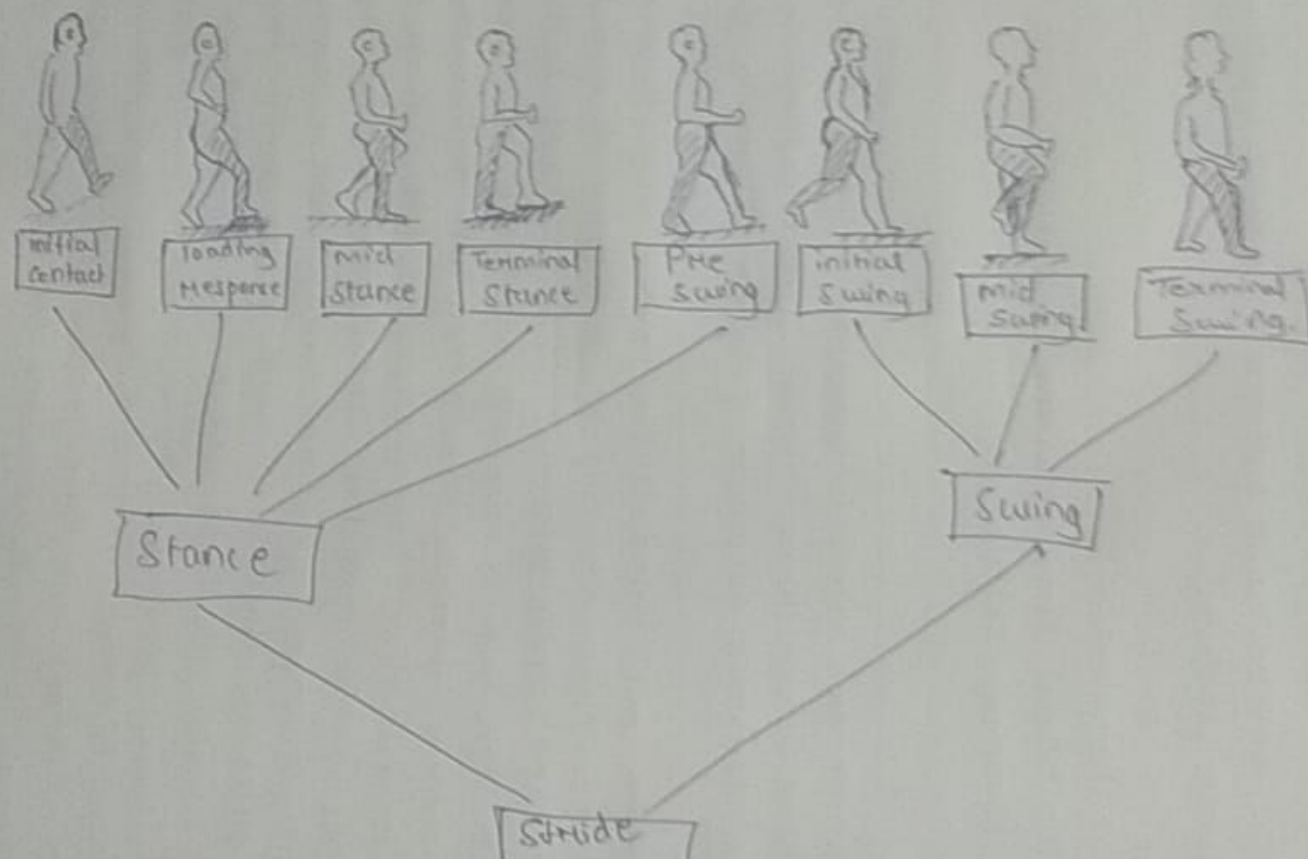
Human gait refers to locomotion achieved through the movement of human limbs. Human gait is defined as bipedal, biphasic forward propulsion of center of gravity of the human body.

Human gait refers to the various ways in which a human can move, either naturally or as a result of specialized training. There are gender differences in human gait patterns: females tend to walk with smaller steps width and more pelvic movement. Gait analysis generally takes gender into consideration.

The gait cycle begins when one foot contacts the ground, and ends when that foot contacts the ground again. Thus each cycle begins at initial contact with a stance phase and proceeds through a swing phase until the cycle ends with the limbs next initial contact.

Stance phase of gait is divided into four periods: loading response, midstance, terminal stance, and pre-swing. Swing phase is divided into three periods: initial swing, midswing and terminal swing. The beginning and ending of each period are defined by specific events.

## Gait Cycle :

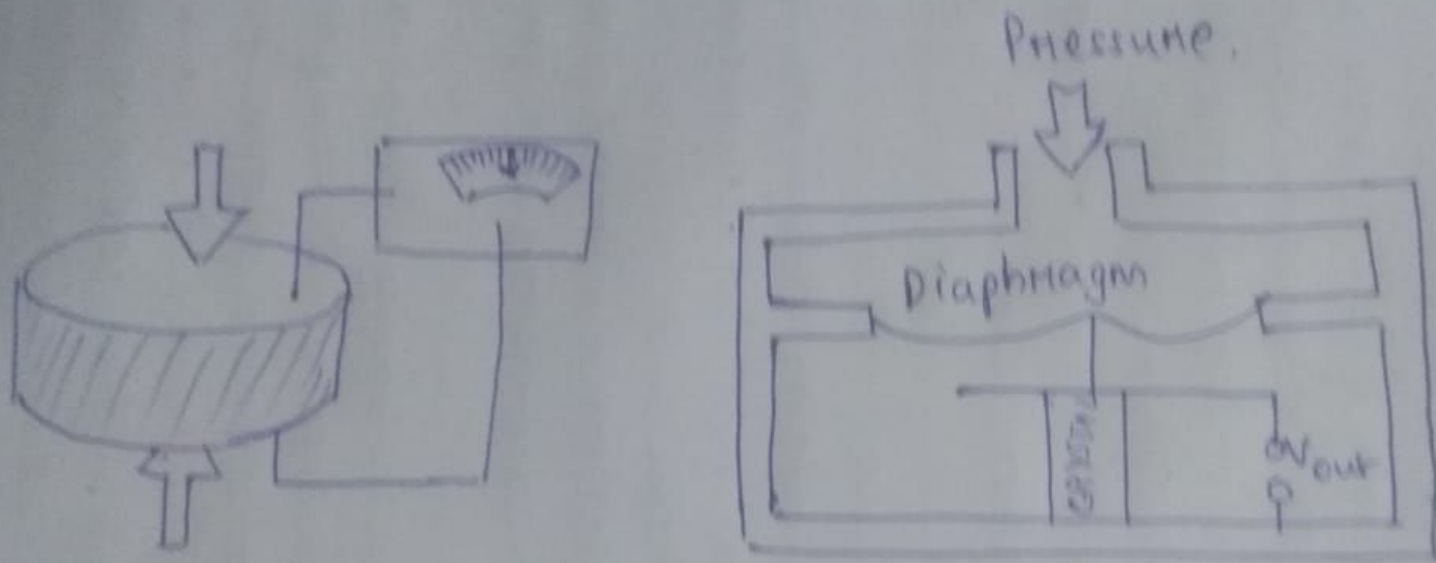


### Stance Phase:

- 1) Heel Strike - It begins with touching the ground.
- 2) Loading Response - begins with initial contact, the instant the feet contact the ground.
- 3) Midstance - It is the phase of gait where weight bearing on this limb supports the entire body weight.
- 4) Terminal stance - defined as the heel rise until the other limb makes contact with floor.
- 5) Toe off - the limb is rapidly off loaded and the load is transferred to the other limb.

### Force Plate:

- Force platform are measuring instruments that measure the ground reaction forces generated by a body standing on or moving across them.
- The Multiaxial force platform is a metal plate consisting of force transducers which measure the force exerted on it.
- Here the force platform is having force act across transducer (piezoelectric sensor). It is a device that uses the piezoelectric effect to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electric charge. The prefix 'piezo-' is Greek for 'press' or 'squeeze'. Piezoelectric materials are materials that have the ability to generate internal electric charge when applied mechanical stress.



(Piezoelectric pressure sensor)



## PROCEDURE

- 1) Switch ON the system, 30 minutes prior to the start of the experiment in order to neutralize any kind of drifts occurring on the system.
- 2) Make sure that the force platform is not reading any kind of object load.
- 3) After this initialize the Bioware software by double clicking on the Bioware soft ware icon on the desktop.
- 4) Now a page will pop-up containing respective icon toolbar.
- 5) From the icon toolbar, select acquire trial and measure the body weight of the subject so that the force applied during gate can be computed with proper calibration.
- 6) Click on advanced acquisition set up and select necessary options.
- 7) Set the time duration according to the experiment to be performed.
- 8) Similarly standardize the sampling frequency according to the requirement of the experiment.
- 9) Next start the process by clicking the start button on the pop-up page.
- 10) Wait until the system finishes reading the offset voltage.
- 11) Now perform gait activity by clicking enter to the heading offset voltage.
- 12) Save the gait activities under a filename with an extension .dat.
- 13) Now study the saved file for ground reaction force, friction, moment and centre of pressure.

14) Other performance parameters like acceleration, velocity etc. can also be computed by entering correct initial velocity, acceleration and displacement.

### RESULT :

The characteristics graph was obtained and evaluated.