Footprints In the Sand

Student Activity Page 2D

Activity Introduction:

Have you ever noticed your footprints as you walk along the beach? The pattern created by the prints reveals your individual style of walking which is as unique as your personality. You have already performed the ***Gauge Your Gait*** lab, so you know that the way a person walks is also known as **gait**. Studying your gait can tell you more than just your velocity, cadence, and stride length. During this lab, you will study your footprints and calculate your **line of progression**, **base of support**, and **foot angle**.

Gait Parameter Definitions:

- **Base of Support** is the distance between parallel lines intersecting the midpoint of each heel print (See ***Figure 1***).
- **Line of Progression** is a line located approximately at the center point between both feet along the walker's path of progression (See ***Figure 1***).
- **Foot Angle** is the angle formed by the intersection of the line of progression and a second line, which is drawn through the midpoint of the heel and the space between the second and third tarsal (See ***Figure 1***).

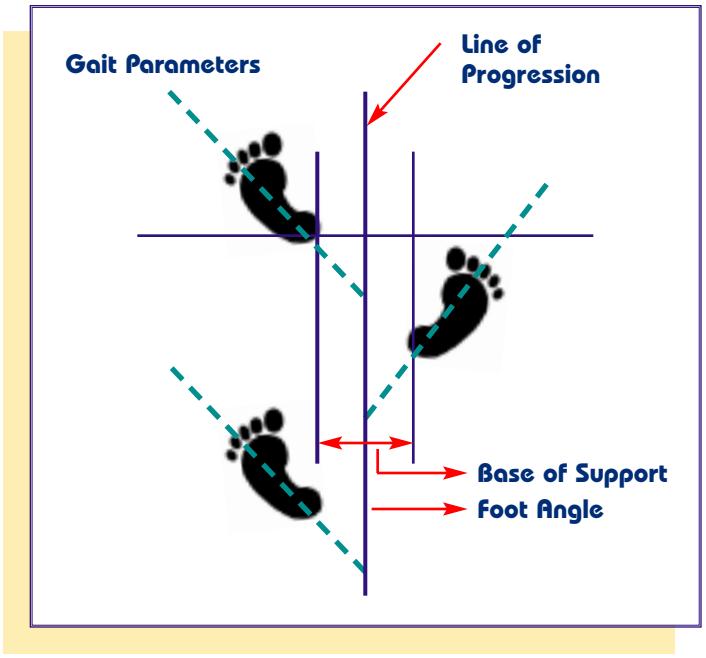


Figure 1

In addition to measuring the gait values listed above, you will also be asked to calculate and record the following:

- **Mean:**
  The mean of a collection of numbers is their arithmetic average, computed by adding them up and dividing by their number.
- **Median:**
  The middle value of a set of values.
- **Mode:**
  The most frequently occurring value of a group of values.
- **Range:**
  The set of all values, from lowest to highest

Activity Materials:

- 2 meters dark colored butcher paper
- Talcum powder to fill a shallow tray
- Shallow tray
- Masking tape
- Protractor
- Meter stick
- Calculator
- Copy of ***Student Activity Page***
- 1 copy of ***Student Data Page*** *for each student*

Activity Instructions: (Check off each step as it is completed.)

❒ 1. Mark off a section of dark butcher paper 2 meters in length. At one end, mark your starting point. At the other end, mark your finish line.

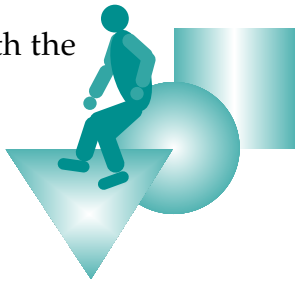
❒ 2. One member of your group will take off his/her shoes and socks and carefully step into the talcum powder tray. He/she should then carefully walk over to the starting line.

Figure 2 Creating Footprints

❒ 3. From the starting line, he/she should begin to walk at a normal pace until he/she crosses the finish line.

❒ 4. After crossing the finish line, he/she will need to clean his/her feet and put on his/her shoes and socks.

5. Using a meter stick, a second group member must draw a dotted line perpendicular to the starting line through the center of the heel of both the left and right footprint. These lines should be labeled A and B.
See ***Figure 3*** Marking the Footprints:



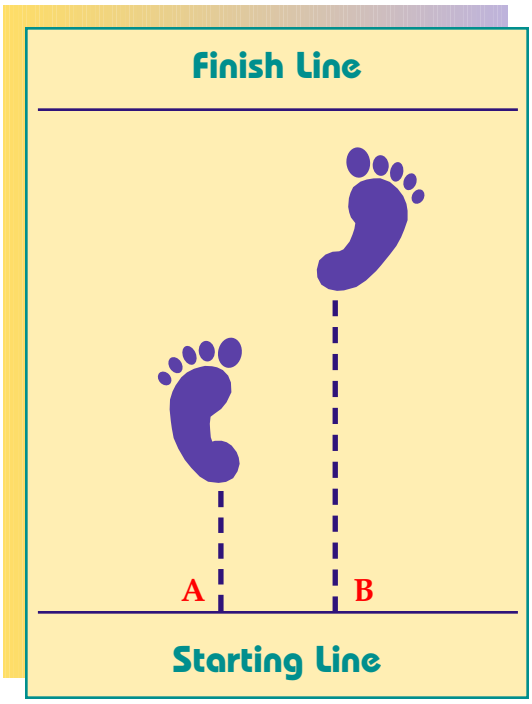


Figure 3 Marking the Footprints

6. Next, draw a line connecting lines A and B beneath the first heel strike. This line represents the **base of support**. Measure the distance of this line and label the center point C. See ***Figure 4*** Marking Base of Support:

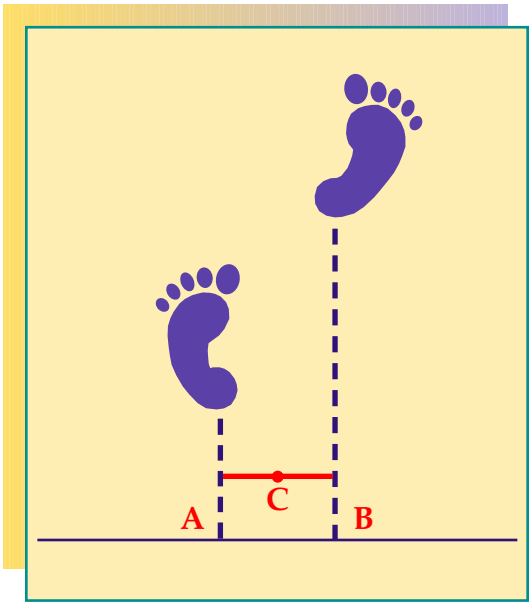


Figure 4 Marking Base of Support

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❒ 7. Draw a line parallel to lines A and B through the point labeled C. This is the *line of progression*. See ***Figure 5*** Marking Line of Progression:

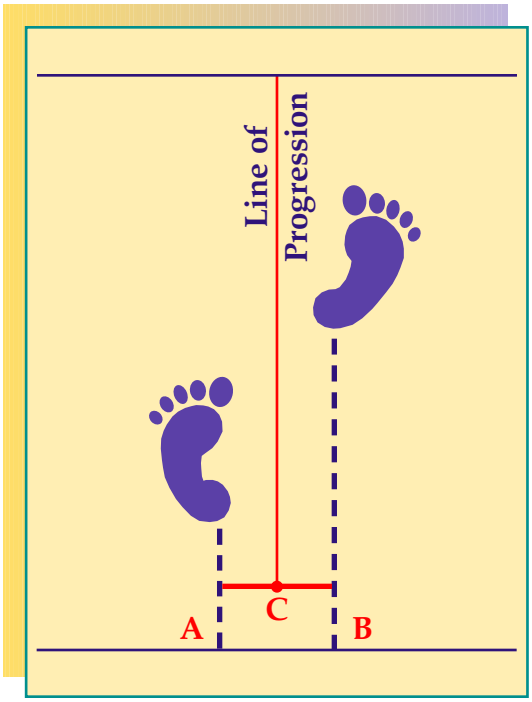


Figure 5 Marking Line of Progression

❒ 8. Find the midpoint of each heel strike. Draw a line from the midpoint of the heel that runs through the second and third tarsal (toe). Extend the line until it intersects with the line of progression. See ***Figure 6*** Marking the Footprints:

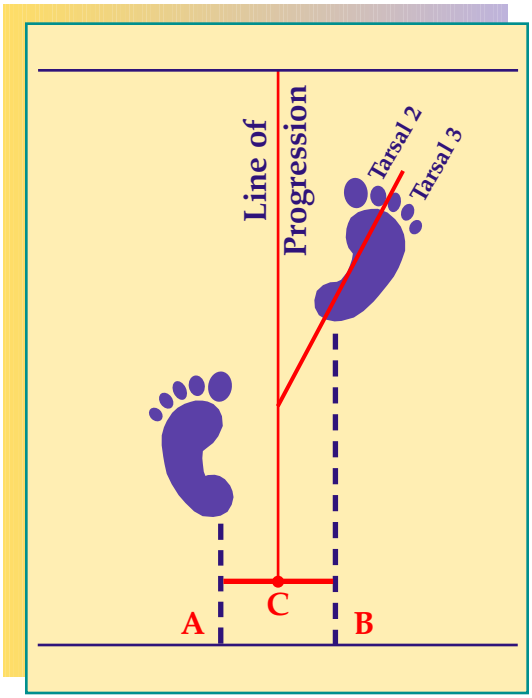
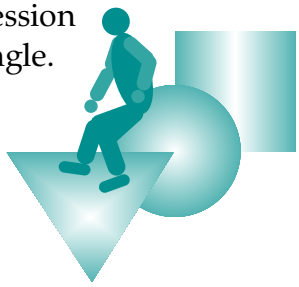


Figure 6 Marking the Footprints

9. The angle formed at the intersection of this line and the line of progression is the **foot angle.** *You will need to use a protractor to measure this angle. See ***Figure 7*** Measuring Foot Angle:



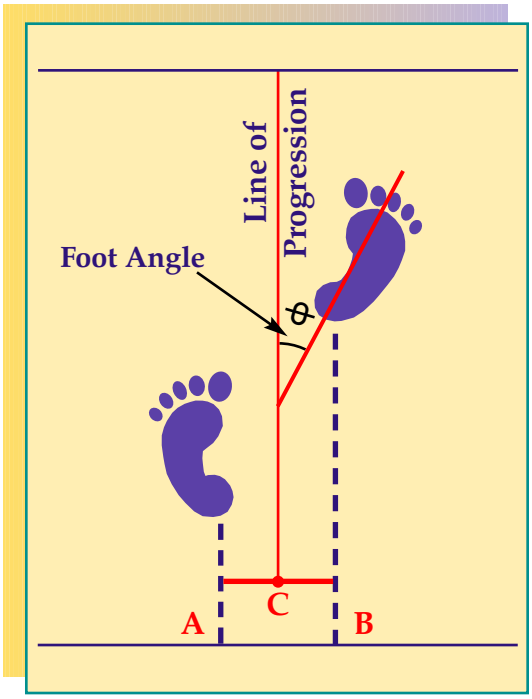


Figure 7 Measuring Foot Angle

10. Record the base of support and the foot angle measurements in the data table provided.

11. Repeat steps 1-10 for each group member.

12. After all members have completed the lab, determine the mean, median, mode, and range for base of support and foot angle for your group. Post your results on the class data chart. After all groups have posted their results, determine the mean, median, mode, and range for your entire class. Compare your group data with the class data. Were there any differences? If so, hypothesize reasons for these differences.

13. Once class data have been collected, use the table of typical gait values on the ***Student Data Page*** to compare your results with those of average adults. Note any differences you may have observed.