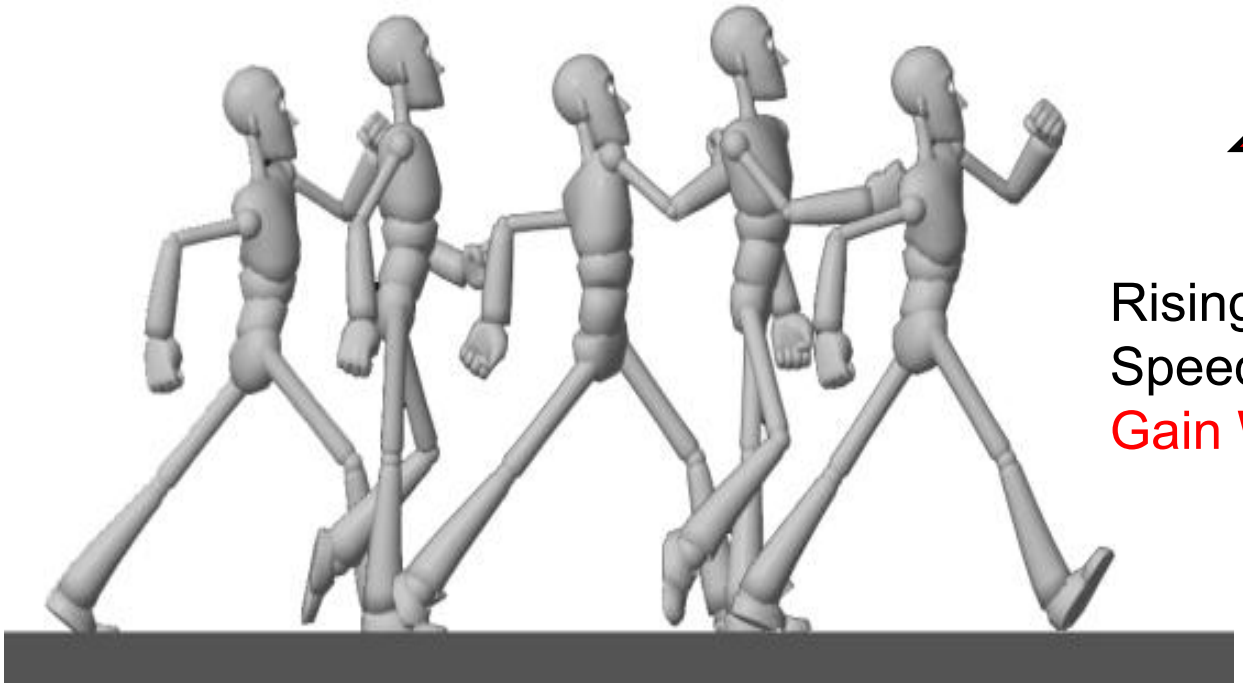
Weight Shift & Walks Part 1

Weight Shift in Walks

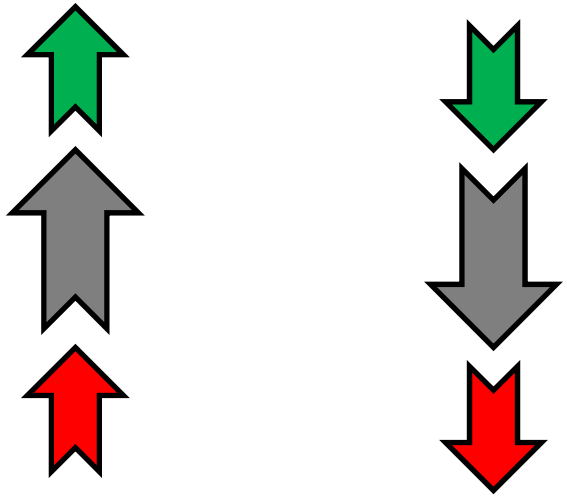
Up and down motion in a walk causes weight changes for the character.



With gravity

Rising & Slowing Down: Lose Weight

Falling & Speeding Up: Lose Weight

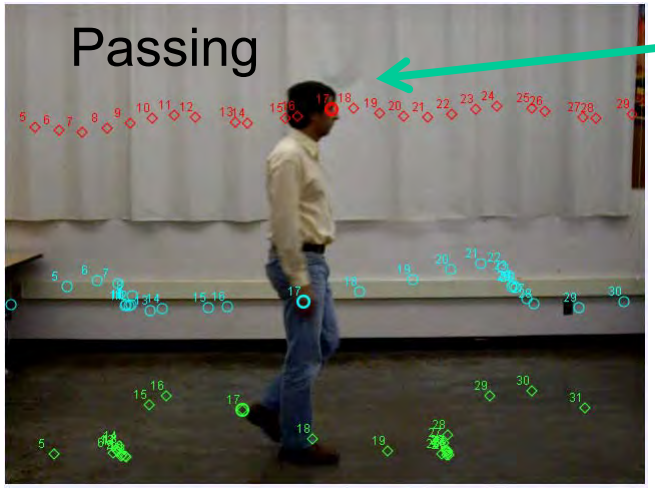


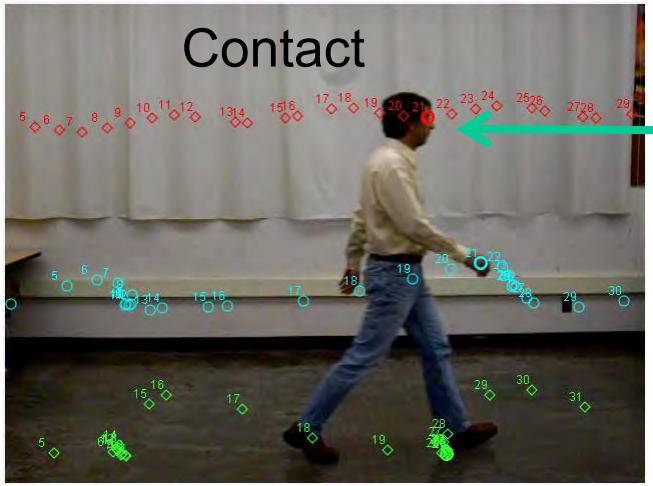
Rising & Speeding Up: Gain Weight

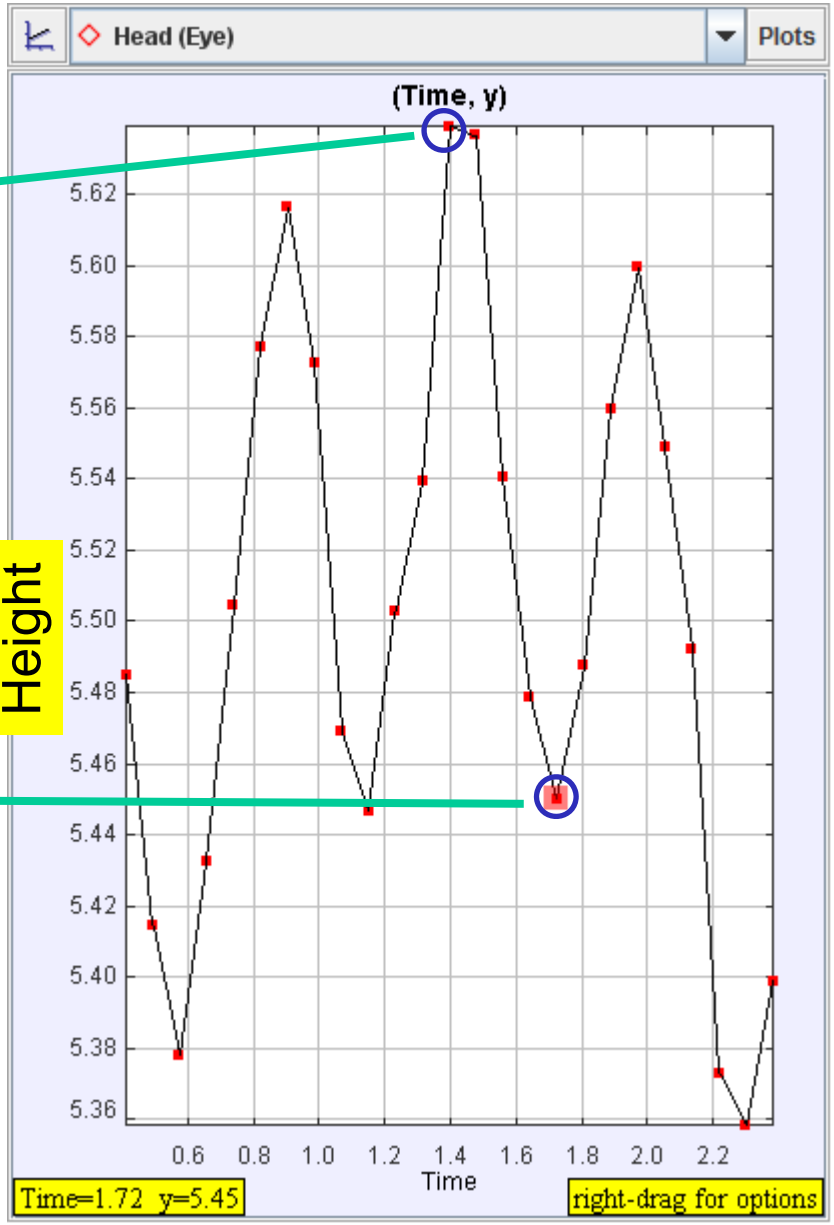
Falling & Slowing Down: Gain Weight

Against gravity

Up & Down

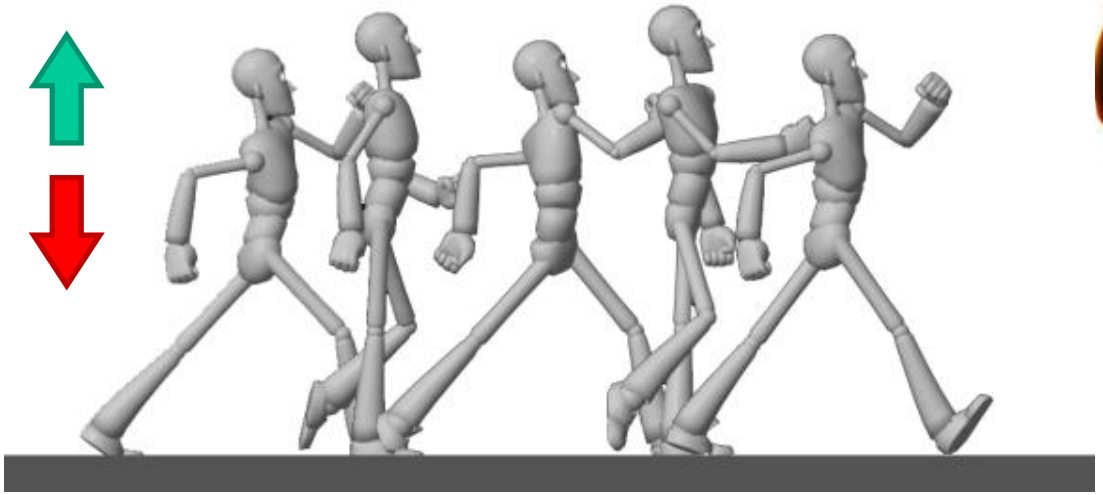

Passing

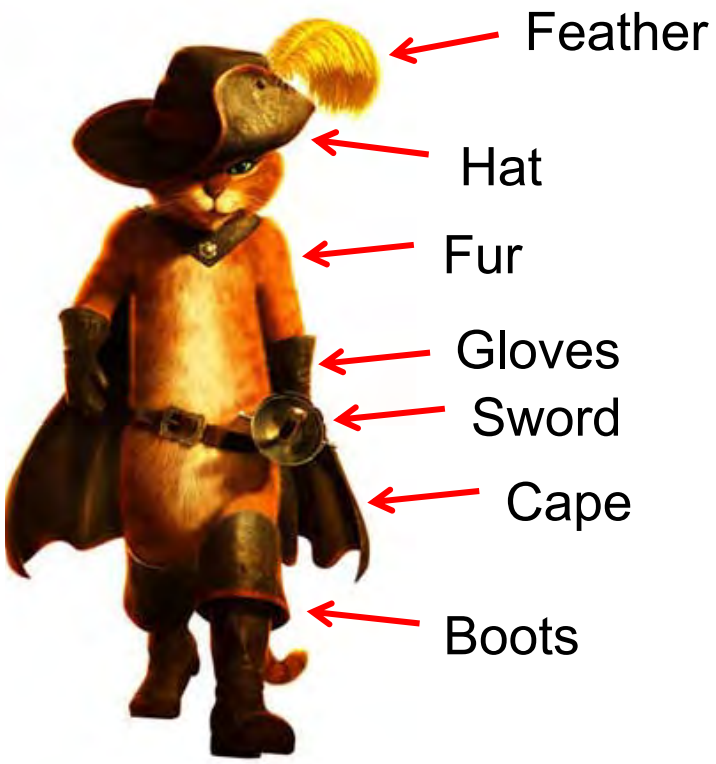

Contact


Head (Eye)
Plots
(Time, y)
Height
5.62
5.60
5.58
5.56
5.54
5.52
5.50
5.48
5.46
5.44
5.42
5.40
5.38
5.36
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
Time
Time=1.72 y=5.45
right-drag for options

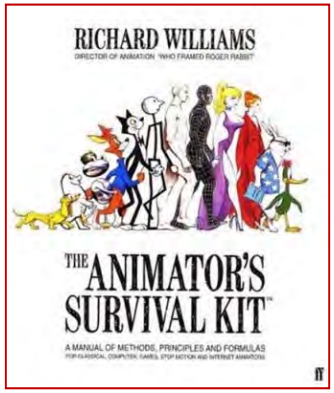
Character Effects

The weight changes due to the up and down motion in a walk is seen in character effects (CFX), such as clothing, hair, etc.

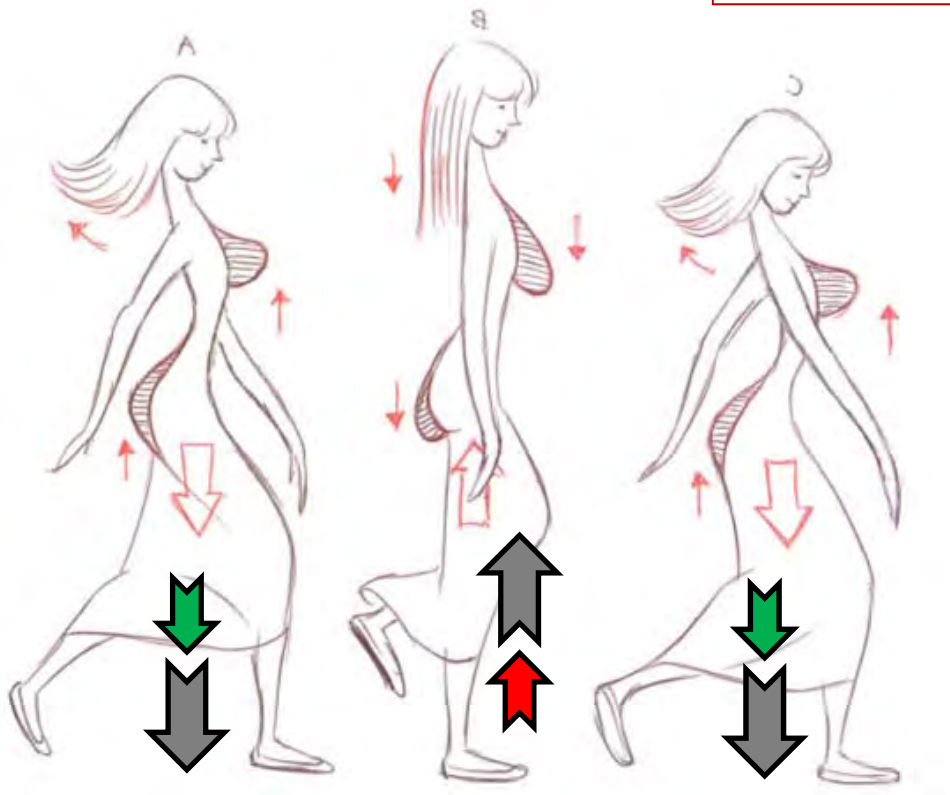




“Counteraction”



Counteraction is the name that Richard Williams calls this gain and loss of effective weight in characters.

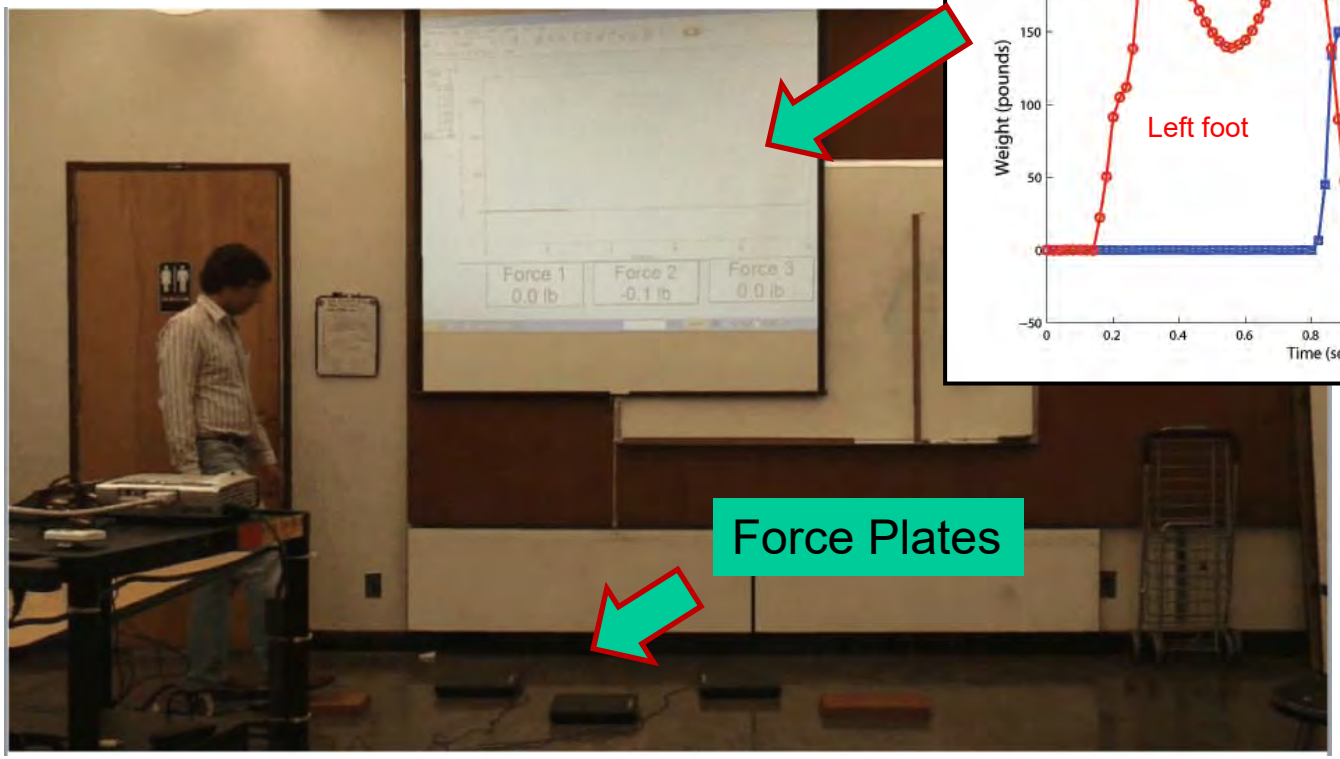


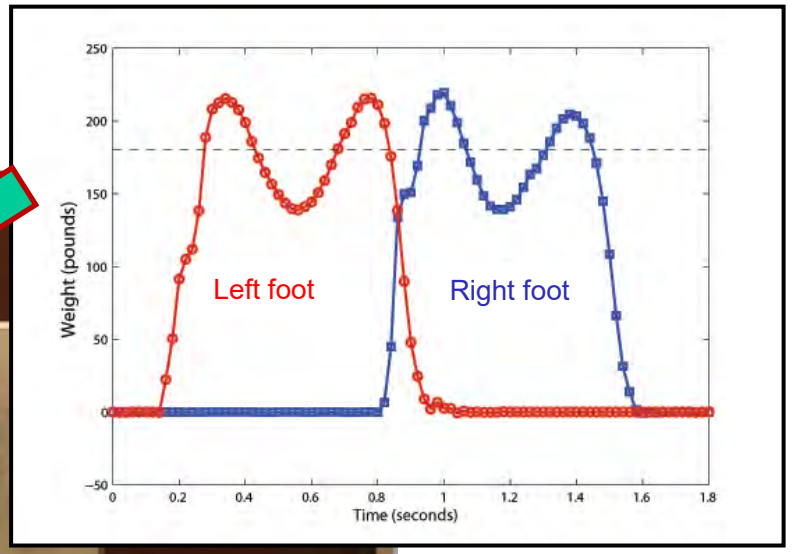
Lose Weight Gain Weight Lose Weight

Walks in Slow-Motion

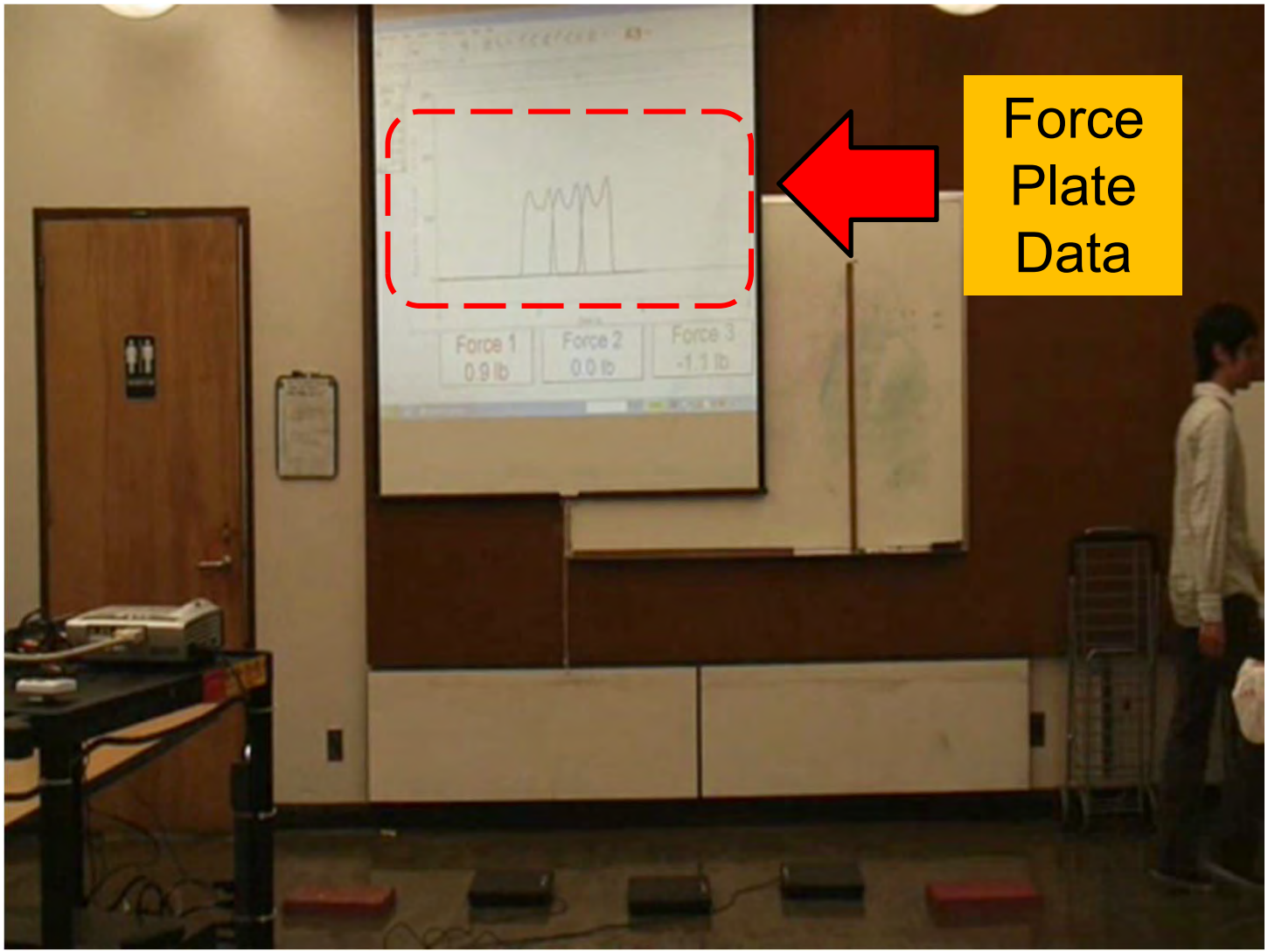
Force Plate Measurements

Force plates measure and record the weight on each foot during a walk.

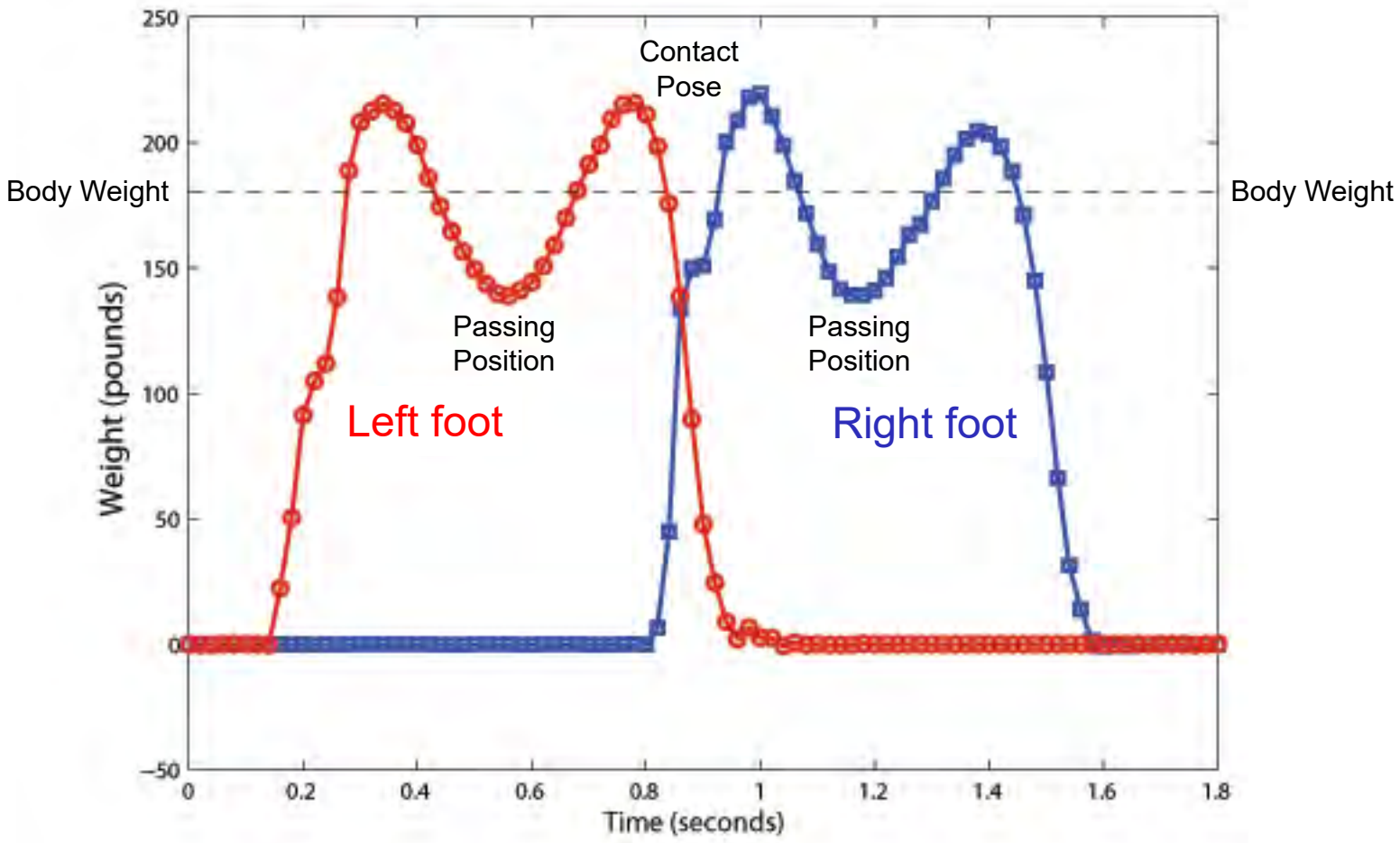




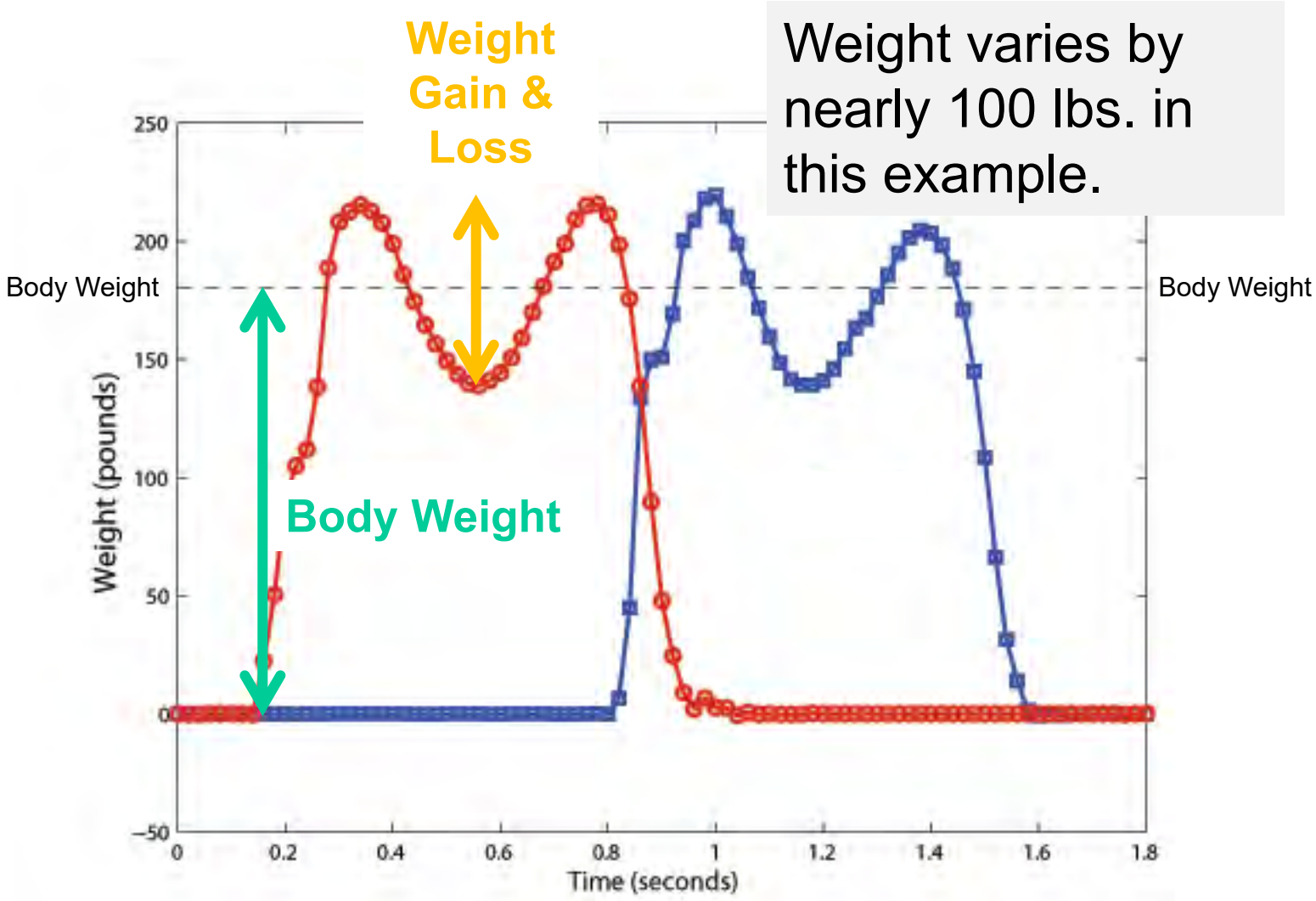
Weight Shift – Normal Walks



Force Plate Measurements



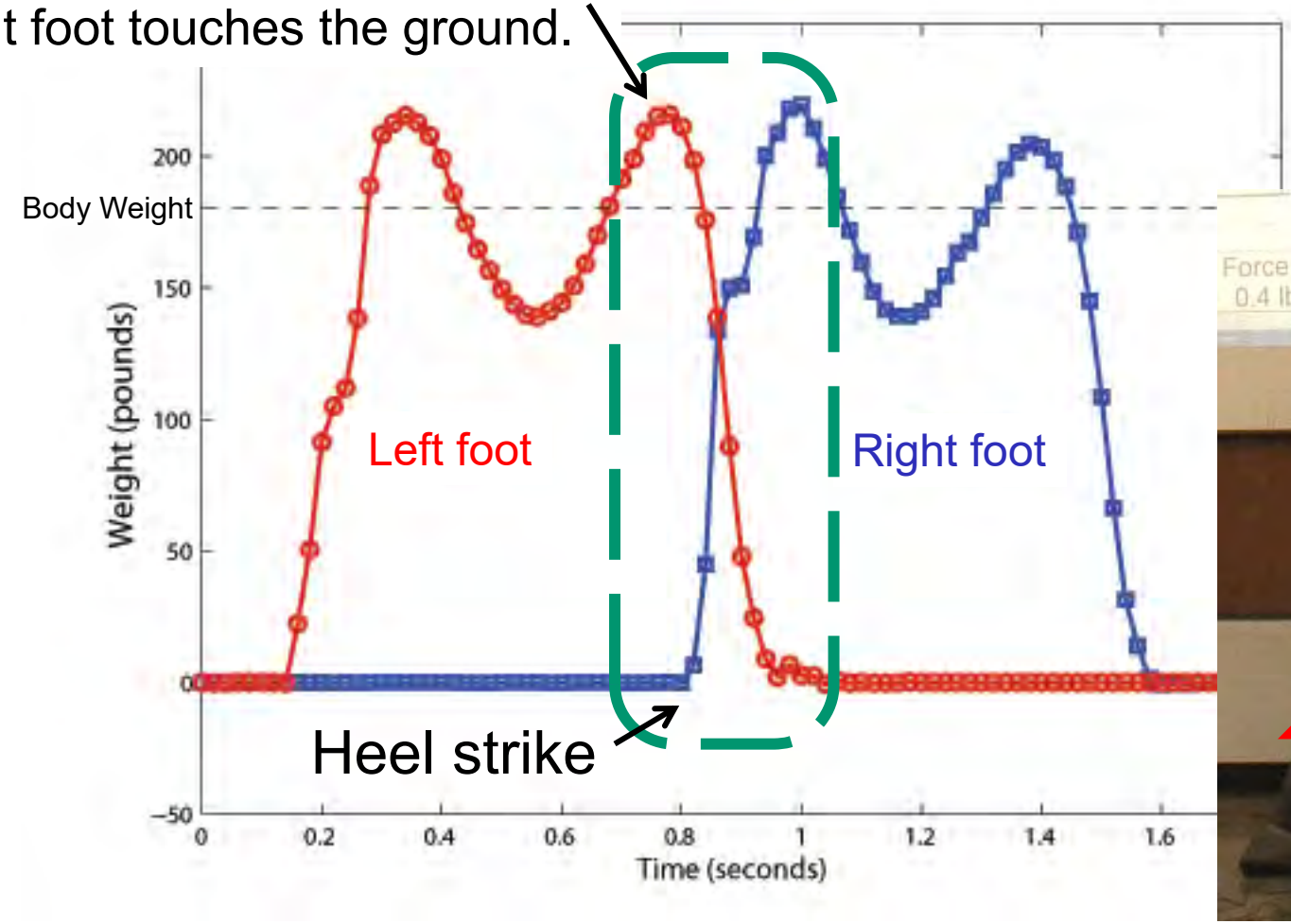
Force Plate Measurements



Weight varies by nearly 100 lbs. in this example.

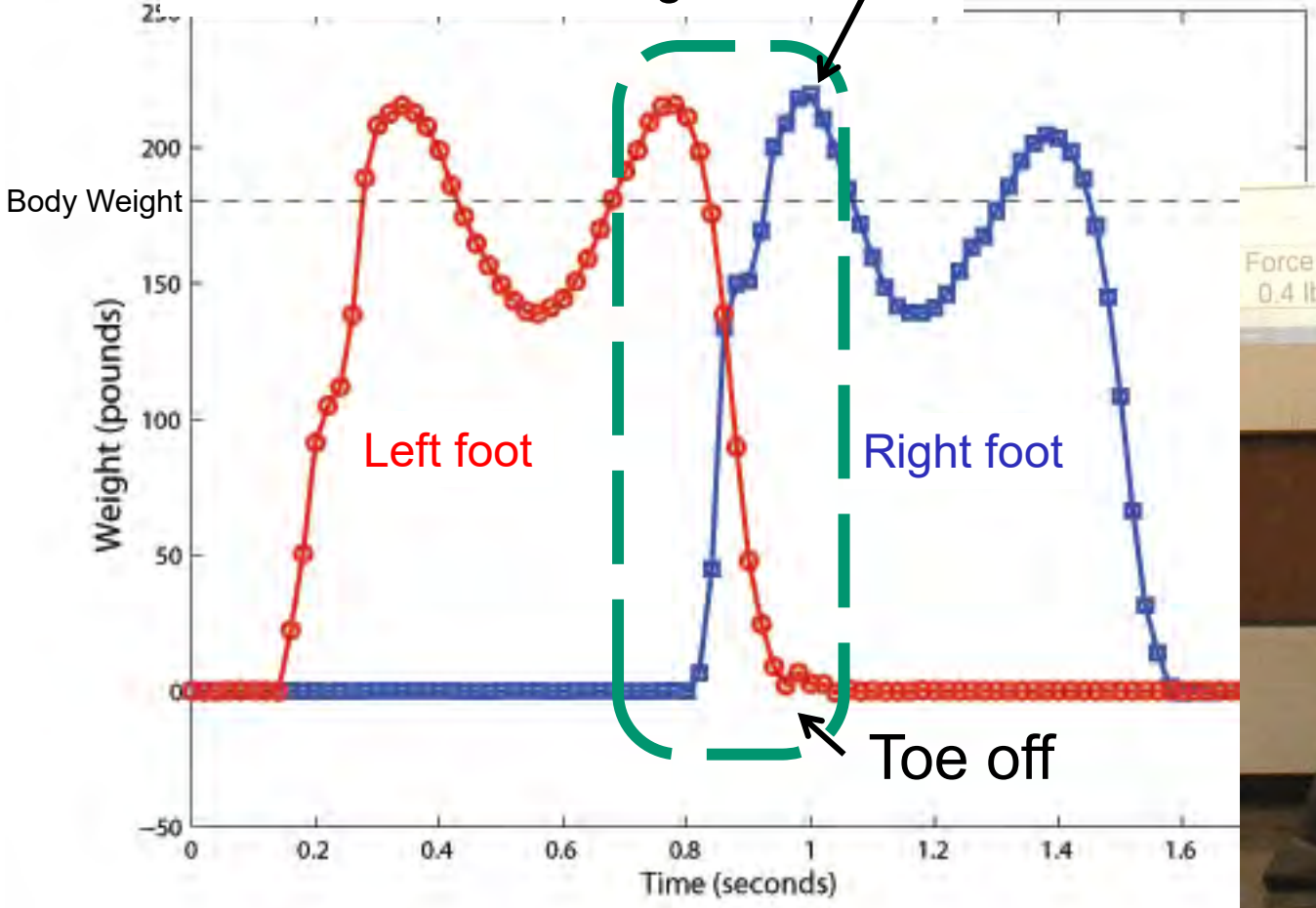
Weight Gain in Contact Pose

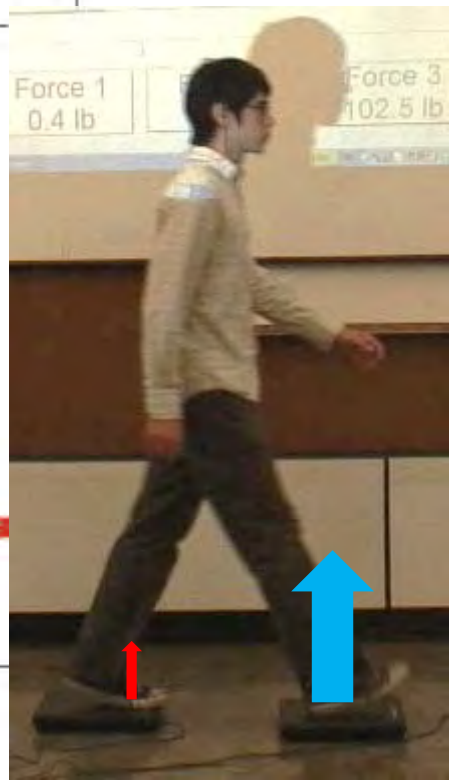
The weight on the back foot peaks just as the heel of the front foot touches the ground.



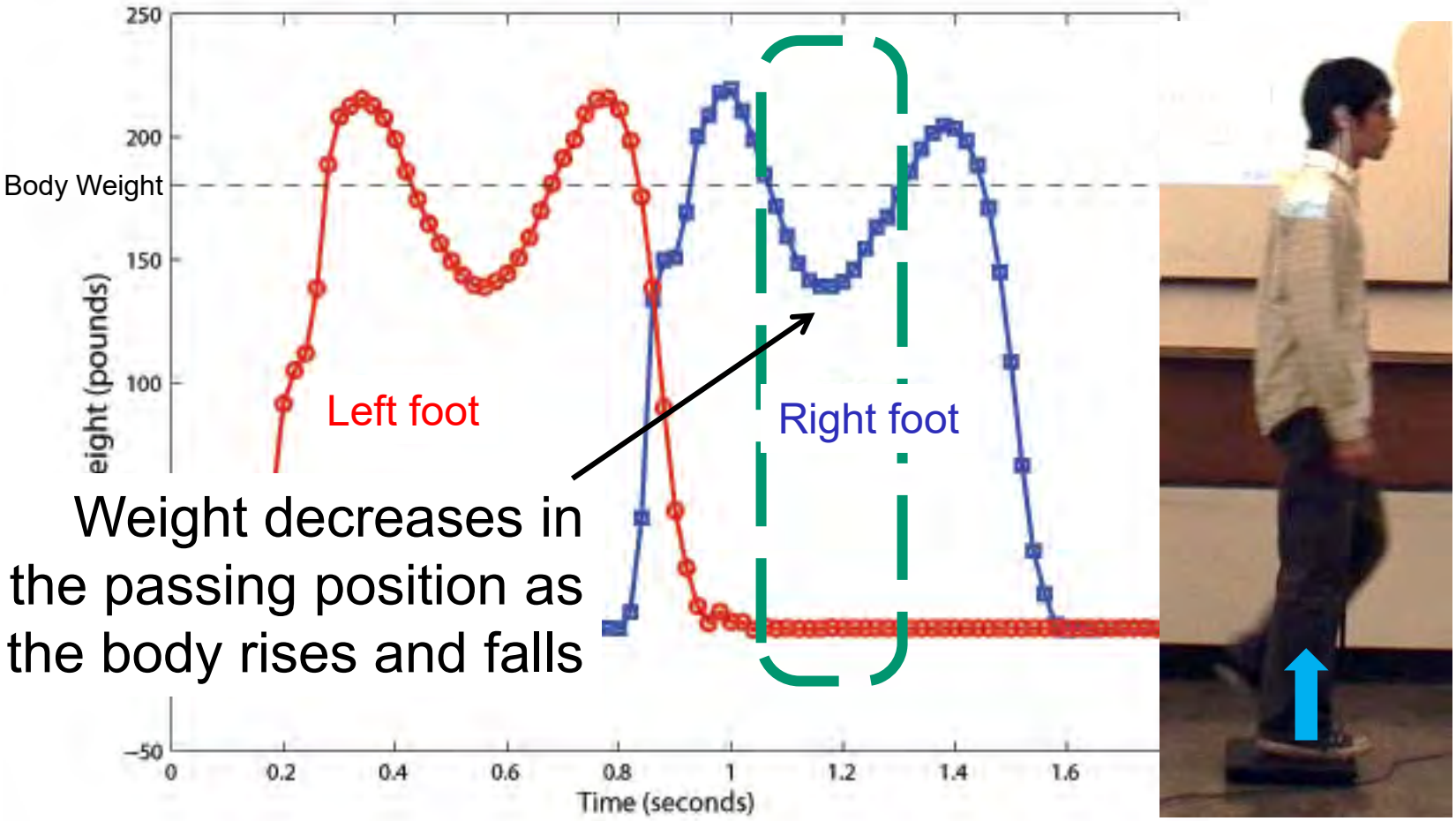
Weight Gain in Contact Pose

Moments later, the weight on the front foot is peaked just as the back foot leaves the ground.



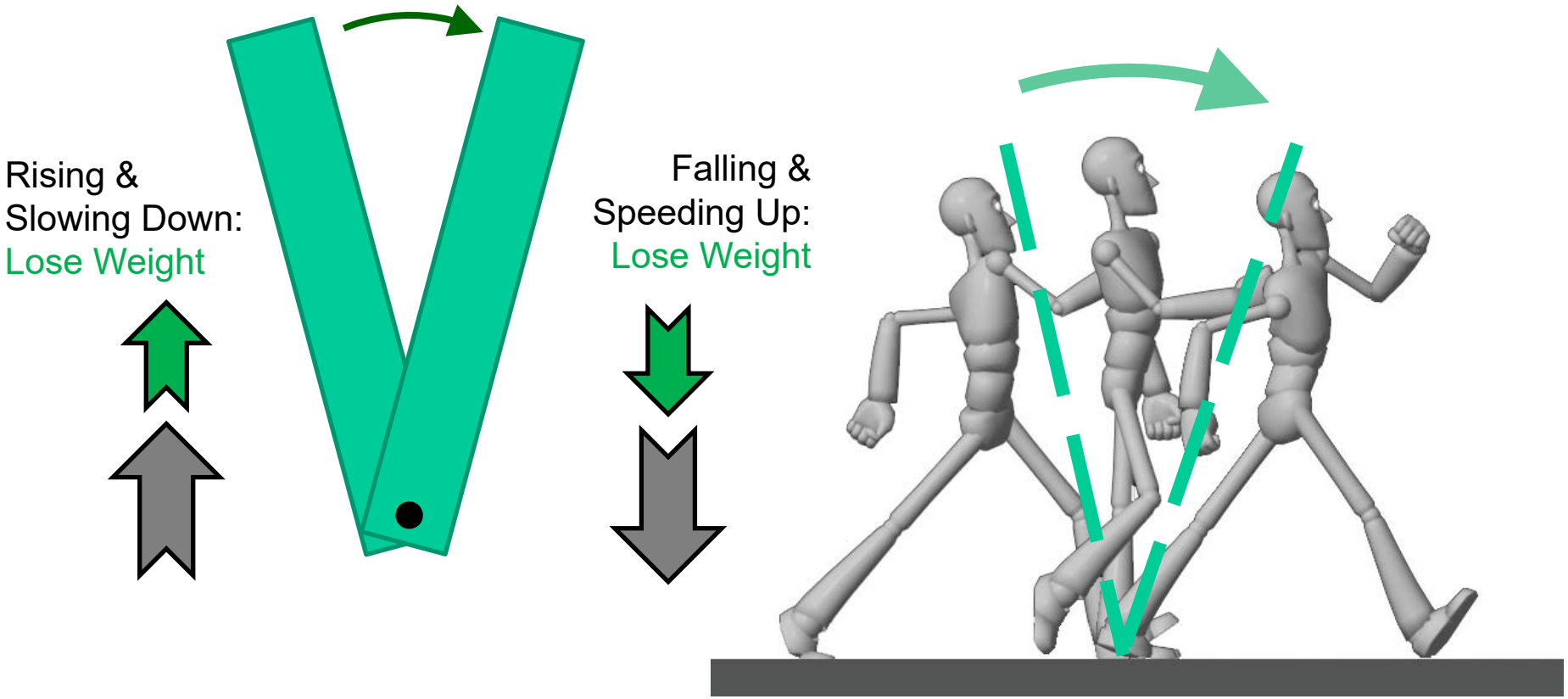


Weight Loss in Passing Position

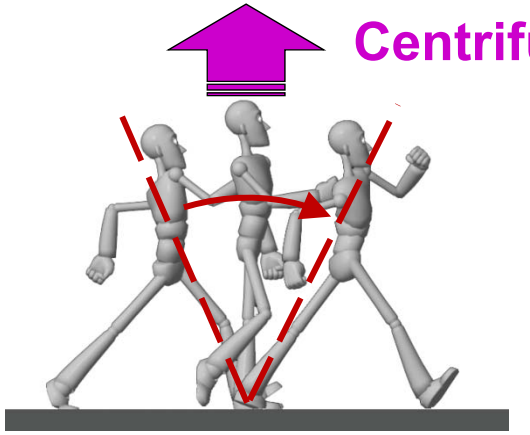


Weight Loss in Passing Position

In the passing position the whole body swings up and down, as an inverted pendulum.



Weight Shift – Normal Walks



The weight loss can also be understood in terms of a centrifugal force pulling upward on the body during the passing position causes the weight to be lower.

This effect is seen in overlapping actions, especially if a character has long hair or loose fitting clothes.

Summary

- Weight shift in a walk is noticeable in passive overlapping actions (motion of hair, cloth, etc.).
- Variation in weight also called “counteraction.”
- The effective weight change is significant; a variation of 50% of body weight is common.
- The effective total weight is greatest in the contact pose, from heel strike to toe off.
- The effective total weight is least in the passing position, as the body slows while rising and then speeds up while falling.