

Running Biomechanics

A person is running away from the camera on a dirt path. The sun is low on the horizon, creating a strong lens flare and casting a warm, golden light over the scene. The sky is a mix of blue and white clouds. The runner is wearing a light-colored tank top and dark leggings. The path is surrounded by tall grass and trees.

The SAM Runners Clinic

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**“A run begins
the moment you forget
you are running.”**

-Adidas

Objectives:

- Discuss modifiable biomechanics of running
- SAM Runners Clinic
 - Return from/prevent Injury
 - Improve performance



Running Analysis Views



Biomechanical Analysis of Running

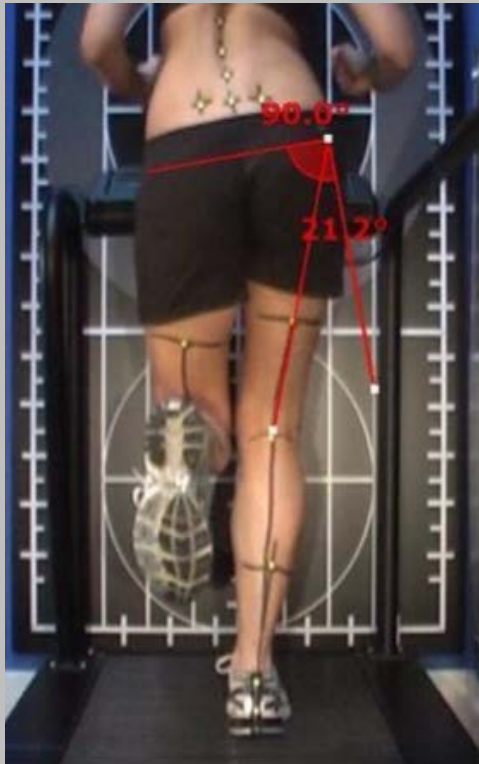


- Different body = different running form = different modifications
- Running form IS modifiable
- Running injuries
 - Over striding
 - Excessive Compliance

Over Striding (pogo stick)



Excessive Compliance



Phases of Running



Sagittal Plane “side view”

Initial Contact

- Foot Strike Pattern

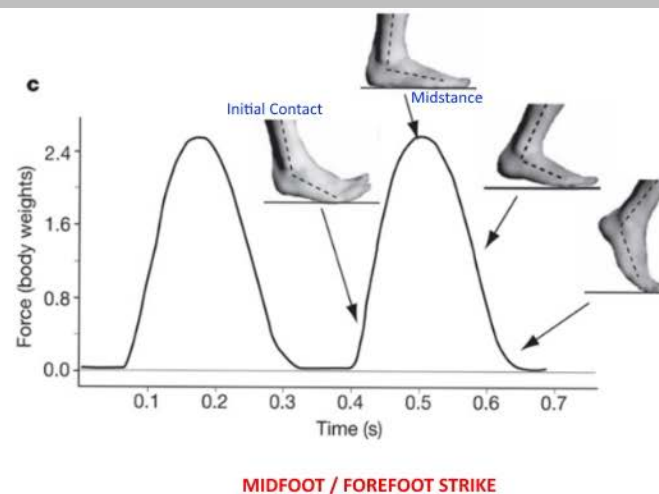
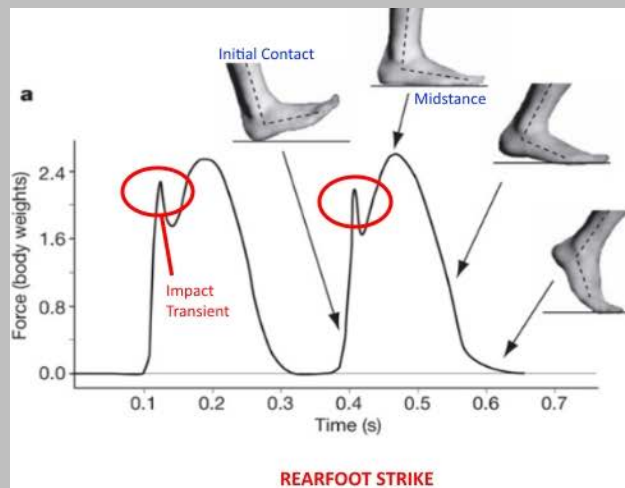
- Angle between the sole of the foot relative to the running surface

- Heel-strike

- Rear foot

- Midfoot

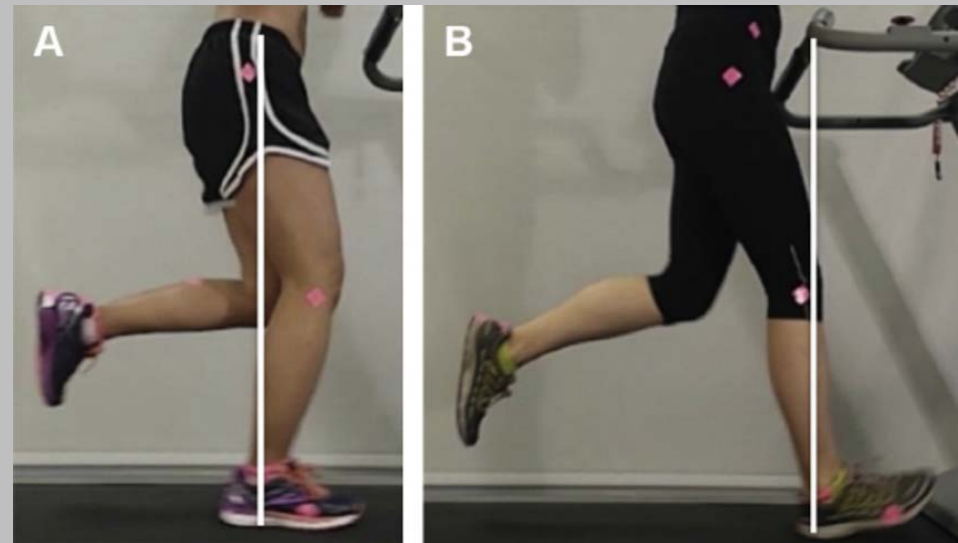
- Forefoot land on forefoot



Sagittal Plane “side view”

Initial Contact

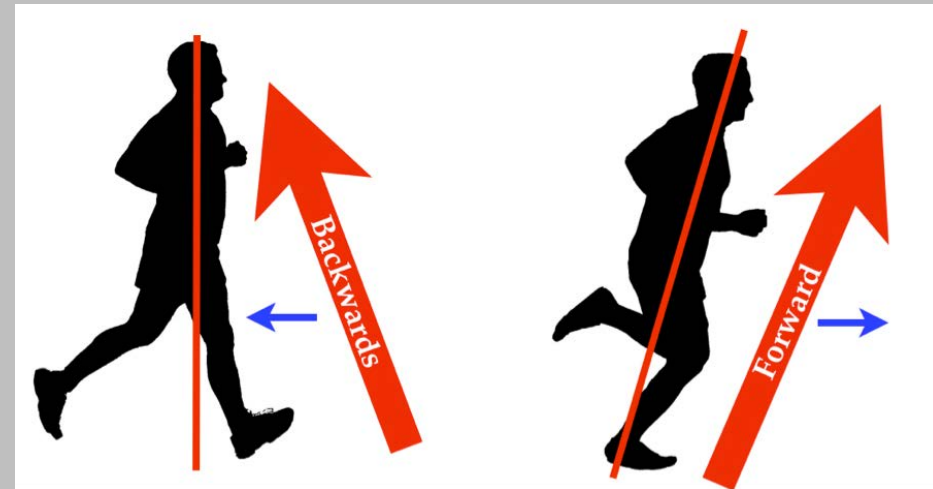
- Tibial inclination
 - Within 5 deg of vertical-midline of the shank relative to true vertical



Sagittal Plane “side view”

Initial Contact

- Knee Flexion angle
 - angle between midline of thigh and midline of shank



Sagittal Plane “side view”

Mid-stance

- Ankle Dorsiflexion
- Knee Flexion Angle



Push Off

- Hip Extension
- Pelvic Tilt
- Lumbopelvic position



Frontal Plane “rear view”

Mid-stance

- Trunk side bend
- Lateral pelvic drop
- Knee center position
- Knee separation
- Foot-COM position
- Rearfoot position
- Forefoot position



Additional Features

- Trunk Rotation
- Arm Swing
- Heel height



How can SAM Runners Clinic help?



Why modify running form?

- Decrease external forces acting on the body



The SAM Runners Clinic

performance vs. injury



Gait Retraining

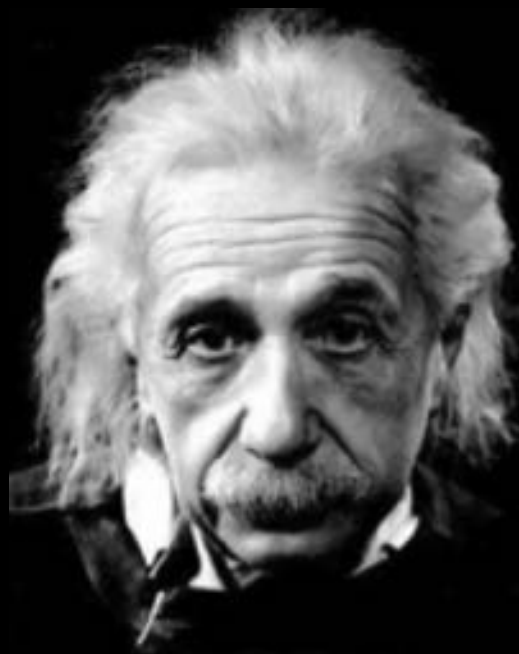
- Auditory
- Visual
- Verbal

Increased Step Rate

- Increased step rate:
 - Reduces Heel to COM distance
- Corrects Over-Striding
 - Reduces COM vertical displacement
- Corrects Over-Striding & Bouncing
 - Increases lower extremity stiffness
- Corrects Excessive Compliance

Summary

- Mechanics are modifiable
 - Can be verbal
 - Can be auditory



“The definition of insanity is doing the same thing over and over again and expecting different results.”

Albert Einstein