SHUFFLED
listen to your body

WELCOME TO THE LAB

Shuffle House collaborated with the Musculoskeletal Control and Dynamics Lab, a biomechanics lab at Stevens Institute of Technology to study the impact of shuffle dancing on the body—specifically how different weight placements in the Running Man affect the ankles, knees, and hips.

The Running Man is one of the foundational moves in shuffle dancing. While it creates the illusion of running, the dancer remains in place, continuously shifting weight from one foot to the other.

MEET YOUR LABRATS

E CRUZ

A SCHO

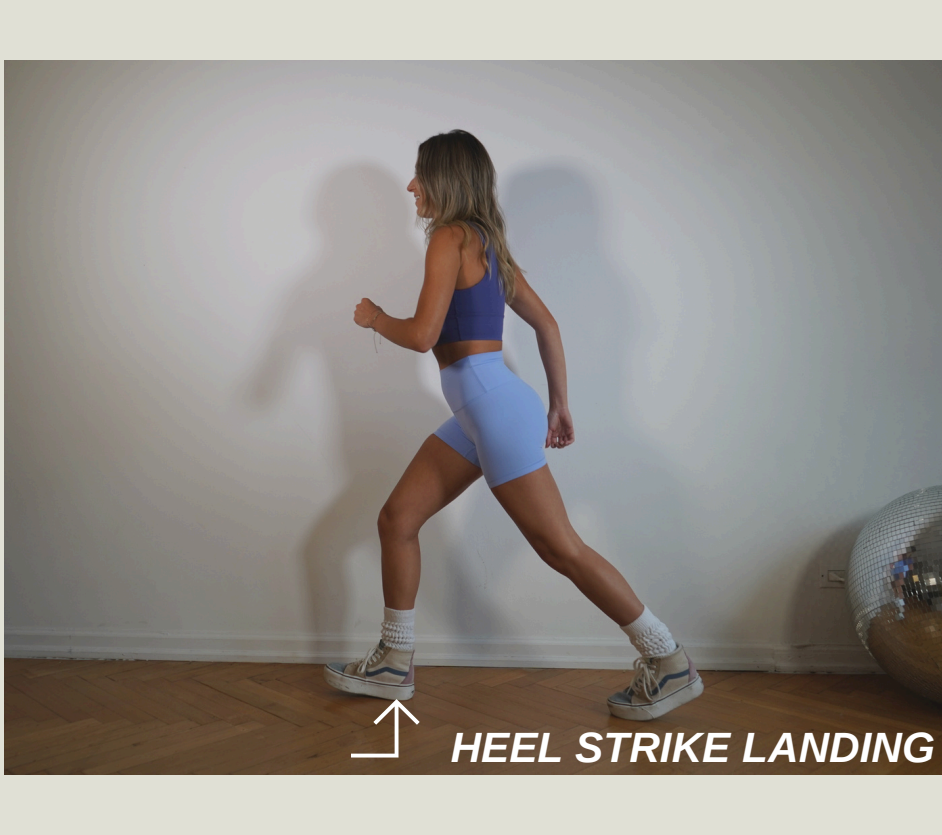
As instructors, we believe in teaching with evidence-based knowledge. Rather than labeling movements as right or wrong, understanding how different weight placements affect the body is crucial for injury prevention and longevity in dance. We aim to provide an objective perspective on how different techniques can impact your body.

The main focus of this study is to compare heel-strike vs. balanced-strike landings in the Running Man. These terms describe the different ways a dancer can land on their foot while performing this foundational move.

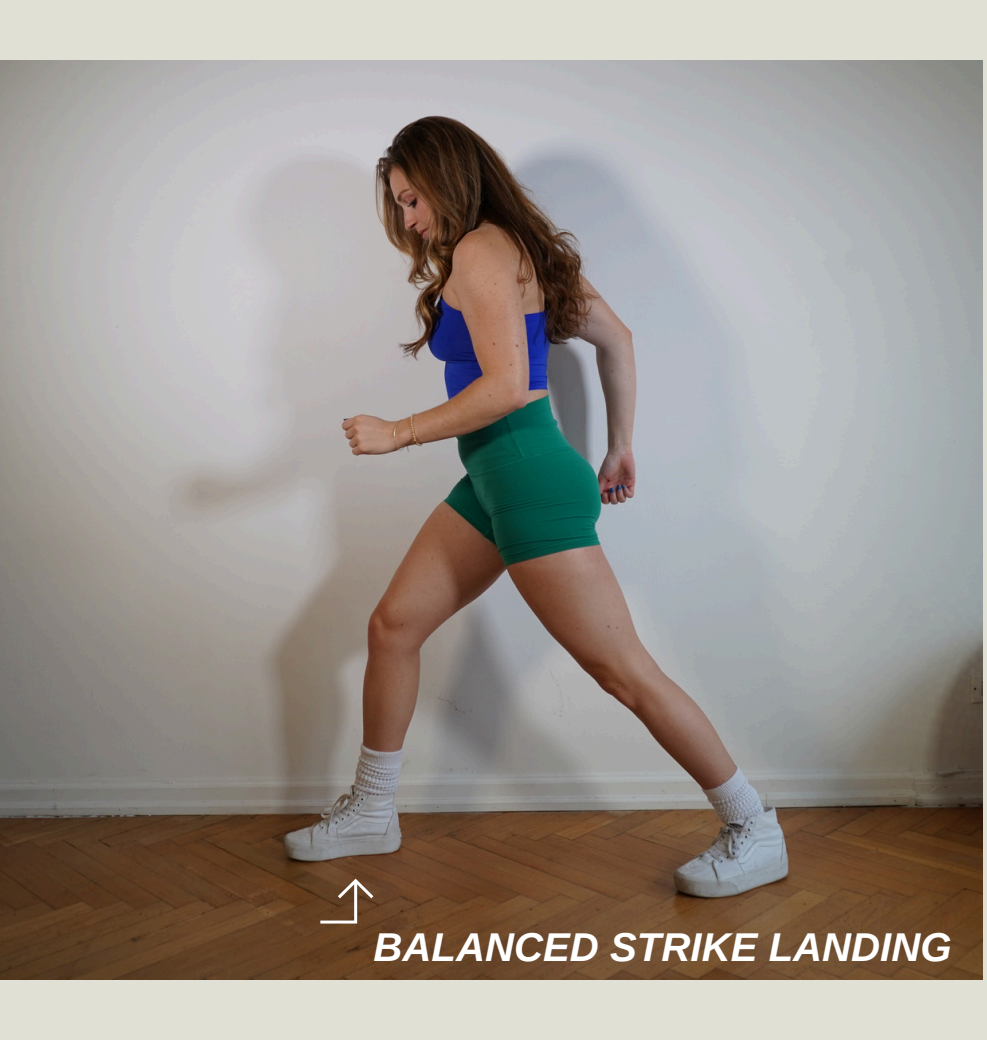
Our analysis examines the impact on the ankles, knees, and hips, while also considering the variations in individual technique. Factors such as knee and hip angles, body positioning, and movement style all influence how force is distributed across the limbs.

THE IMPACT OF HEEL STRIKES VS BALANCED STRIKE ON KNEE JOINT MOMENTS

In this section we will learn about the impact of Heel Strikes on Knee Joint Moments, as compared to balanced strikes. We will refer to the impact made on each joint, or the Net Joint Moment as the NJM for most of this article.



HEEL STRIKE LANDING



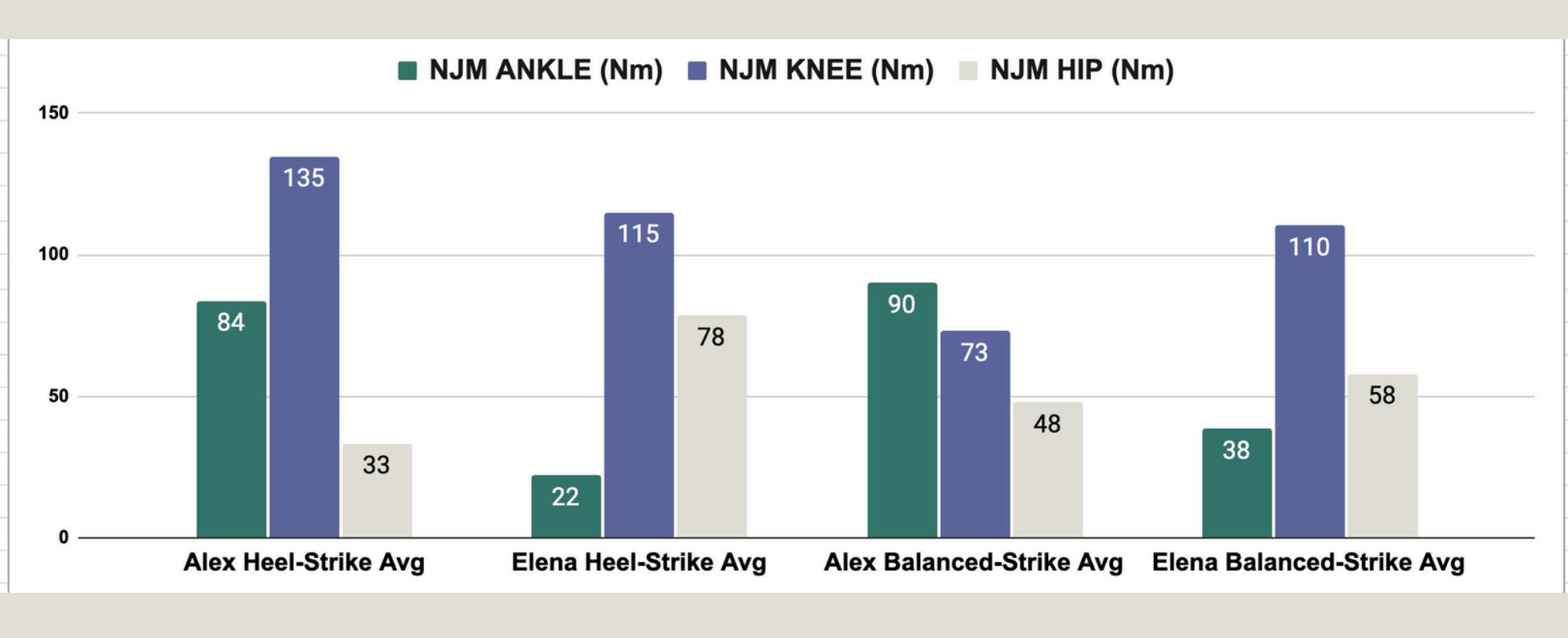
BALANCED STRIKE LANDING

Net Joint Moment (NJM) is the overall turning force or torque acting at a joint in the body during movement. It is the total effect of all internal forces, including muscles, tendons, and other structures, acting around a joint to produce the movement. The movement we are focusing on is the running man.

Alex's knee NJM in heel strikes varies between 93 Nm and 143 Nm, while in balanced strikes, it drops to a range of 48 Nm to 88 Nm. If you take the average of this range, her Heel NJM is 118 Nm, while Balanced NJM is approximately 68 Nm. A noticeable drop in moment when switching to this balanced floor strike.

Elena's knee NJM in heel strikes range from 97 Nm to 142 Nm, while in balanced strikes her range is 103 Nm to 122 Nm. Although the difference is less pronounced than Alex's, there is still a notable decrease. Her heel average being about 120 Nm and balanced strike averaging to 112 Nm.

The reason for this smaller difference in NJM is mostly due to the fact that Elena maintains a higher thigh angle, indicating a more squat-like, cushioned landing that helps distribute force. But we will get into this more in the section titled Effects of Landing Posture & Thigh Angles.



With this in mind, we can make the assumption that landing on your heel while performing the running man is associated with greater torques at the knee joint. These NJMs may be redistributed from the hip and ankle joints, as discussed later in the article. A better conclusion to draw - heel strikes tend to increase knee load, but individual biomechanics play a role in how much.

THE BENEFITS OF HEEL-STRIKES

Based on the data collection, another notable observation is that heel-strikes tend to show lower stress on the ankle for both dancers. Since force is equal and opposite, when landing in a balanced posture, you can imagine the force redirecting through the center of the ankle. Whereas a heel strike might send the force more to the knees and hips.

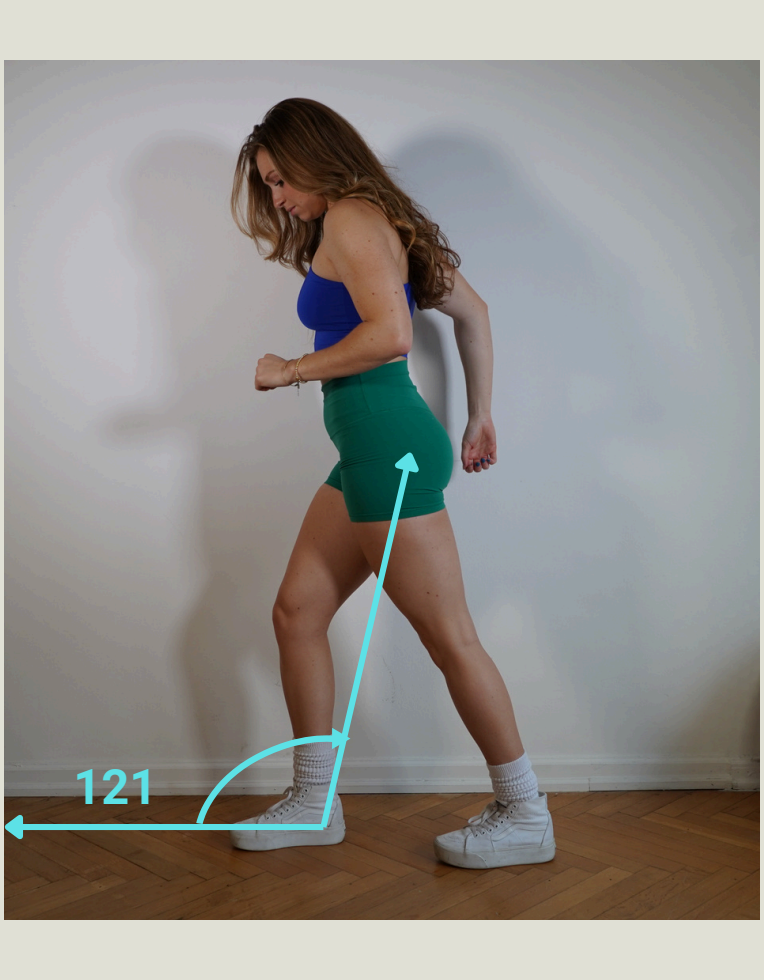
Alex had one heel strike with only 2 Nm of force in the ankle - although an outlier, this highlights the possibility of a potential benefit of heel strikes to relieve pressure from the ankle.

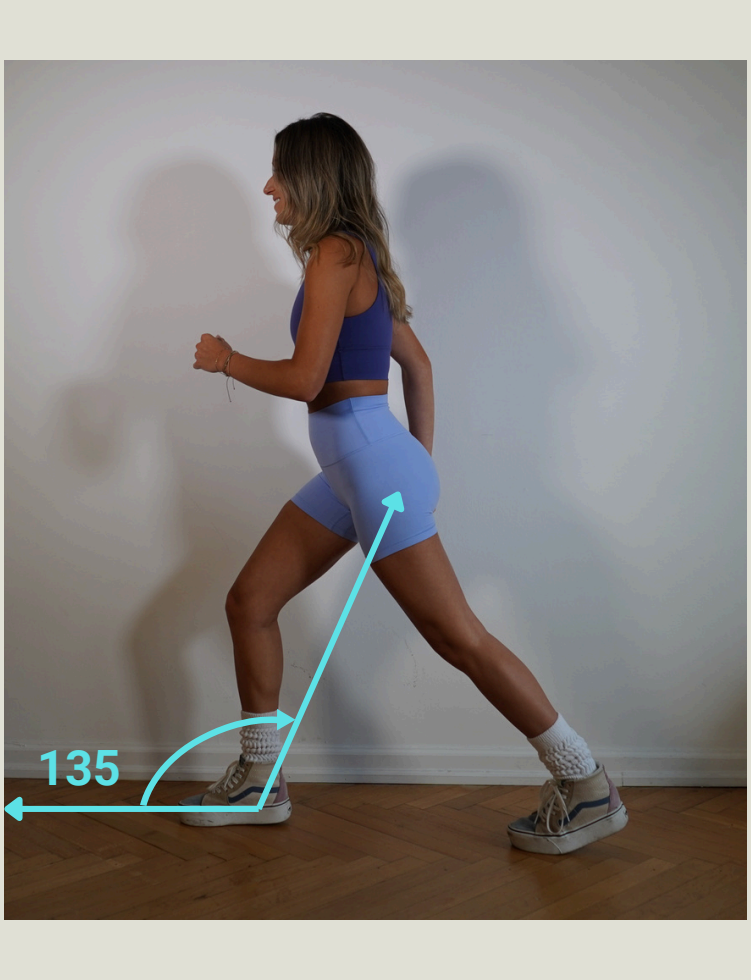
Based on our data collection, one observation is that heel-strikes consistently show lower stress on the ankle for both dancers. In more of a balanced landing, the force tends to send more stress to the ankle.

Looking at it from a different perspective, heel-strikes tend to bypass the ankle as the primary shock absorber, which redirects more of the impact to the hips.

EFFECTS OF LANDING POSTURE & THIGH ANGLES

When landing during a Running Man, the angle of your thigh plays a key role in how force is distributed across joints. Based on our observations in the biomechanics lab, a wider stance generally shows more moment distribution across joints - or in other words allows the NJM to spread evenly. In contrast, a smaller thigh angle could lead to more concentrated force on the knee joint.





Elena Maintains a higher thigh angle (130°–143°), indicating a more squat-like, cushioned landing. This technique helps her absorb impact more effectively and reduces strain on her knees. However, this also increases the load on her hips compared to a narrower stance. Although this may seem ideal, if you're someone who experiences hip discomfort, this landing style might not be your best option.

On the other hand, Alex uses lower thigh angles (around 120°–127°), which could suggest a less controlled landing and greater stress on the knees. If Alex wanted to shift some of that force to her hips and reduce knee impact, she could try widening her stance.

Ultimately, choosing your stance as a dancer depends on your body's strengths and vulnerabilities. Adjusting your landing technique can help manage joint stress and prevent injury, but it's important to remember everyone is different!

CONCLUSIONS & THOUGHTS

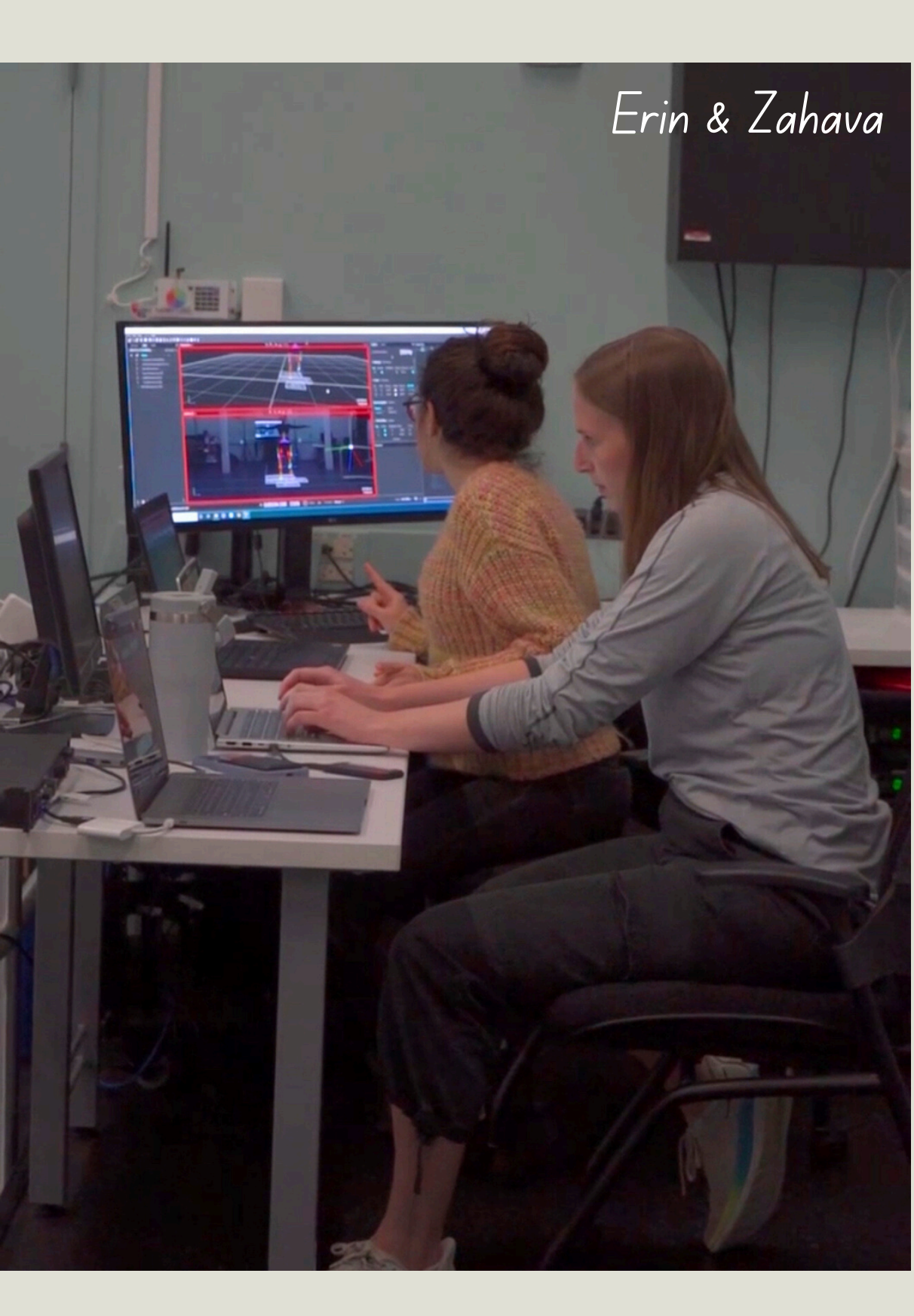
Heels Strikes tend to increase knee loads, but can lower stress on the ankle as well. Depending on your body & personal preferences whether it comes to comfort or style, to reduce the load on your knee, you can shift your weight to a more balanced strike (or flat foot) in your landing.

If you prefer a more distributed load across all joints equally, increasing your stride length can help with this. The larger the angle your hip creates, the more relief you might feel since the weight is being distributed.

LAB PICTURES & MOMENTS FROM THE STUDY!

setting up the study

DJ Adam playing Videographer Adam for the day



Erin & Zahava

Testing the Force Plates

THANK YOU FOR READING

if you made it this far, thank you for taking the time to learn about our study & take our conclusions into consideration in your everyday shuffling. We believe that listening to your body is so important, and we hope this encourages you to listen to your body & do what's best for you.