Intra-Individual Variability in Novel Footwear Associated with Injury in Distance Runners Agresta, CE, Southern, EK, Kessler, SE, Goulet, GC, Zernicke, RF, Deneweth, JM
University of Michigan (Ann Arbor, MI, USA)

Introduction: Running footwear and its influence on injury has been debated. Some runners can successfully transition into a novel shoe without injury while many others become injured.

Objective: To examine the initial adaptive response, via intra-individual variability, to a novel zero heel-to-toe drop drop shoe

Hypothesis: Runners who have more variability will adapt better to the novel shoe (i.e., not become injured)
Methods:

- Experienced Rearfoot Uninjured Runners
  - 15 Male, 15 Female

1. Session 1: Strength Measurements & $\text{VO}_{2,\text{max}}$, Treadmill Test in HAB
2. Session 2: Dynamic Foot Posture & Treadmill Run to Exhaustion in HAB
4. Randomly assigned Intervventional Shoe (MIN or MAX)
5. 4 Week Training Period in Intervential Shoe
6. Online Logging of Training Data
7. Session 4: Treadmill Run in HAB & Novel Shoes

4 Week Training Period

**NEW BALANCE MINIMUS**
- 11 mm midsole thickness
- Weight: 167 g, 144 g
- Zero heel-to-toe drop

**ALTRA PARADIGM**
- 25 mm midsole thickness
- Weight: 289 g, 260 g
- Zero heel-to-toe drop
Results:

26% of runners became injured or had to stop running completely
*All from MIN group*

Runners who went on to get injured had an increased amount of variability (ST DEV) \((p = 0.09)\)

Runners who went on to get injured had a decrease in their dynamical degrees of freedom \((\alpha)\) \((p = 0.09)\) in the MIN shoes
Conclusion:

Investigating variability patterns may help predict who can better adapt to novel footwear without injury.

Acknowledgements: adidas AG provided funding for this study.