

ARION Annual Movement Report

2023

The Annual Movement Report examines a range of brand and shoe models, conducted through a comprehensive analysis using ARION Smart Insoles. It aims not to simply judge generic shoe performance but to highlight the uniqueness of **Human Movement** and the array of potential benefits specific running shoes can bring to individual runners.

REPORT HIGHLIGHTS

16

Runners

15

Shoe models

6550

Steps Recorded

In collaboration with:



Tested shoes



GT-2000 11
Stability Shoe
Drop: 8mm



GT-2000 12
Stability Shoe
Drop: 8mm



Gel Cumulus 24
Neutral Shoe
Drop: 8mm



Gel Cumulus 25
Neutral Shoe
Drop: 8mm



Torin 6
Neutral Shoe
Drop: 0mm



Via Olympus
Neutral Shoe
Drop: 0mm



Spire 6
Neutral Shoe
Drop: 9mm



Meraki 5
Neutral Shoe
Drop: 8mm



Centauri
Neutral Shoe
Drop: 9mm



Kairos
Stability Shoe
Drop: 8mm



Kairos 2
Stability Shoe
Drop: 8mm



Nemesis 3
Stability Shoe
Drop: 9mm



Cloudrunner
Stability Shoe
Drop: 9mm



Cloudmonster
Neutral Shoe
Drop: 6mm

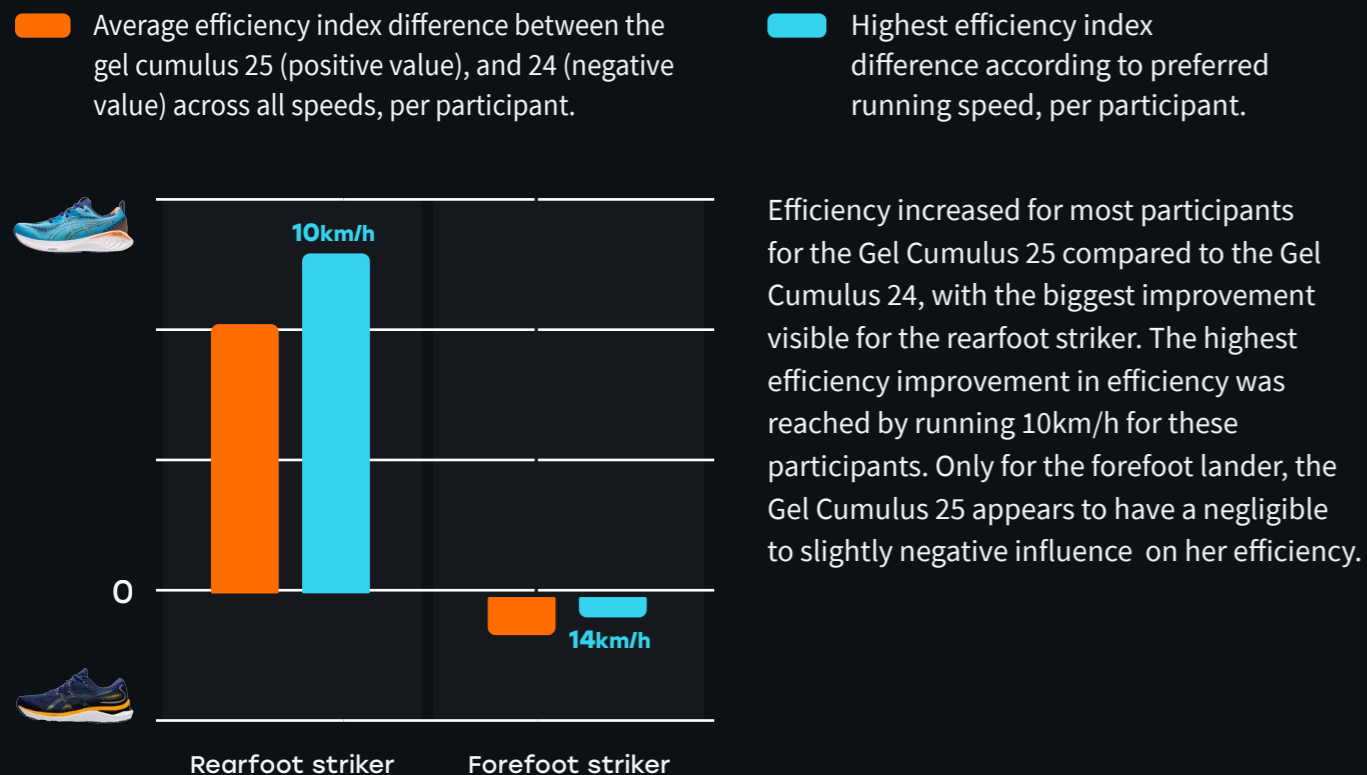


Cloudsurfer
Neutral Shoe
Drop: 10mm

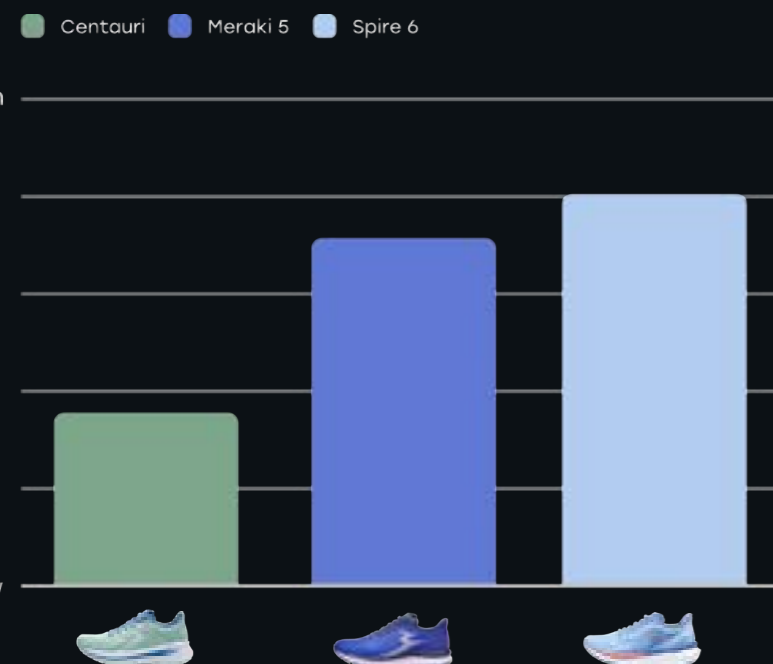
Efficiency Index

The efficiency index indicates the amount of energy used by the runner, where a high efficiency index indicates a lower energy consumption.

ASICS - Gel Cumulus Efficiency Comparison

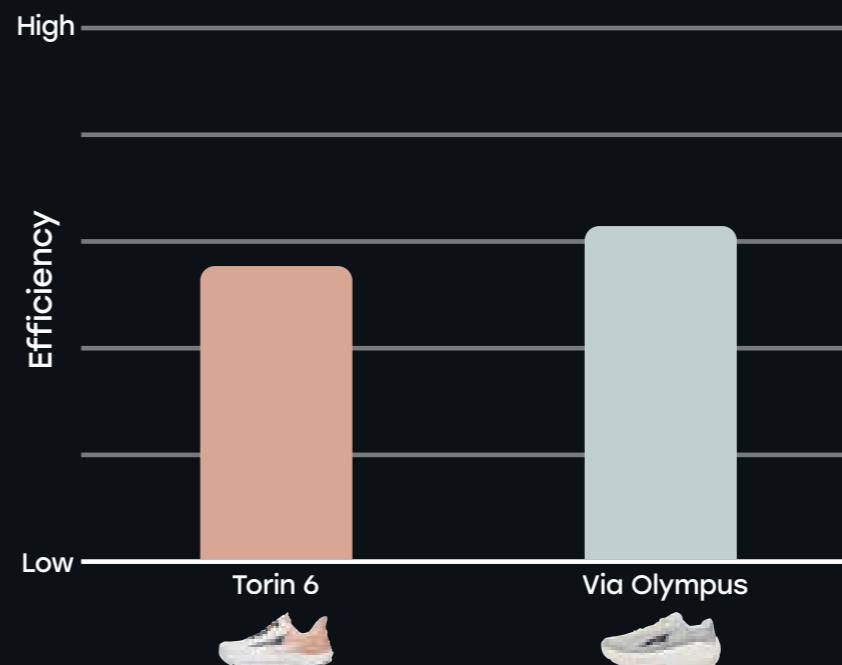


361° - Neutral Shoes Efficiency Index



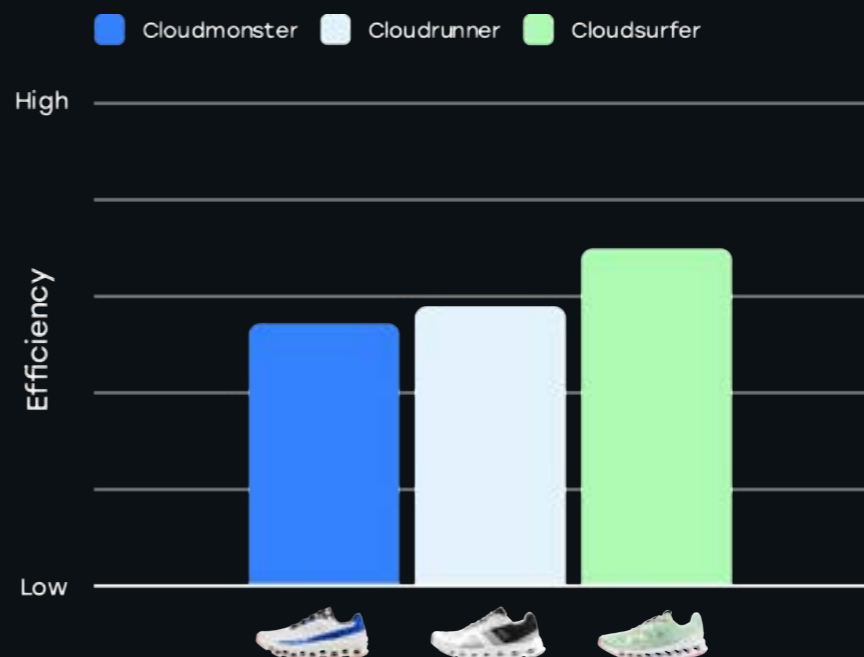
When comparing the overall efficiency index for the neutral shoes averaged over the group of participants, we clearly see how the speed technologies, such as plates and quikspring+, bring performance benefits.

ALTRA - Efficiency Index Overall



On average across all speeds, overall, the via Olympus had a higher efficiency compared to the Torin 6. Possibly due to the additional energy return foam, rocker and higher shoe stiffness.

ON - Efficiency Index Overall



On average, overall, the Cloudsurfer had the higher efficiency index, possibly due to its light weight and responsive design.

Significant differences should be expected at an individual level based on personal biomechanics.

Safety Index

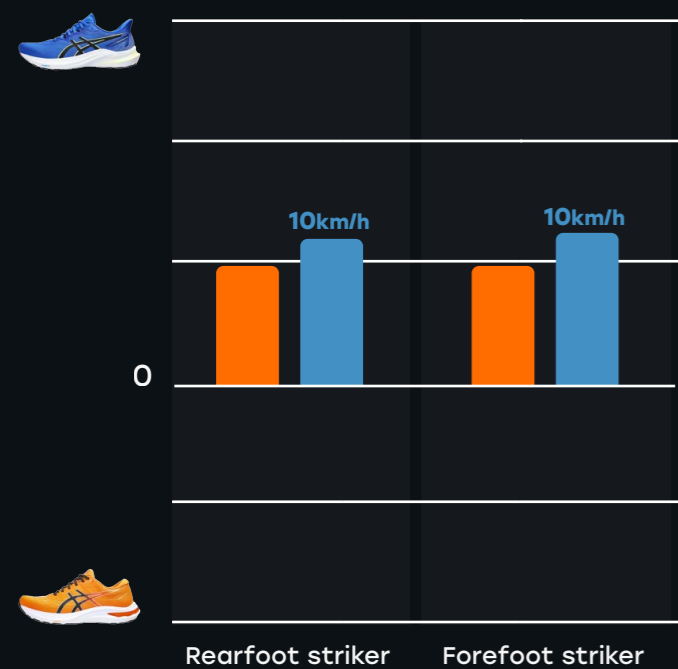
The safety index, or injury risk index indicates how 'safe' the shoe is when you run, where a high index indicates lower risk of developing an injury.

ASICS - GT-2000 Safety Comparison

Average safety index difference between the GT-2000 12 (positive value) and 11 (negative value) across all speeds, per participant.

Highest safety index difference according to preferred running speed, per participant.

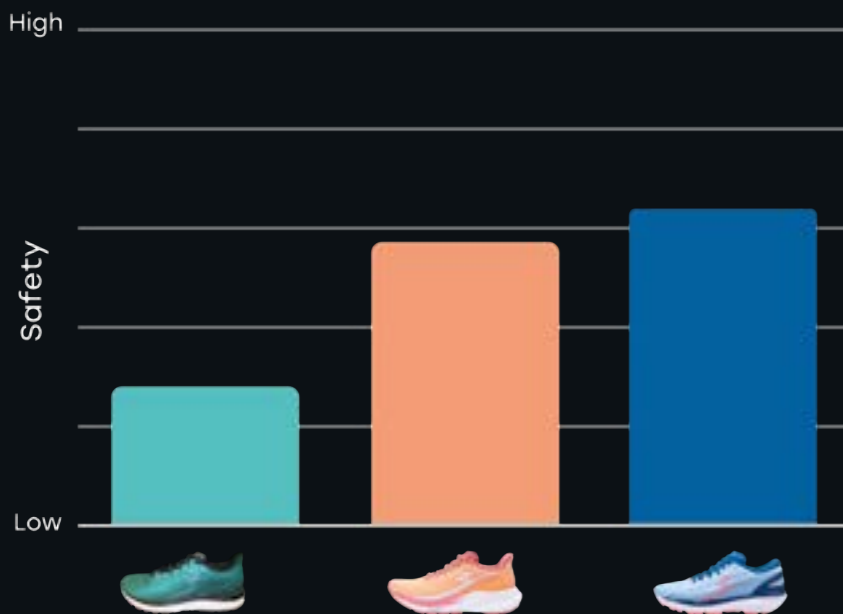
Overall, the safety index increased for all participants in the GT-2000 12 compared to the GT-2000 11. Underlying data showed even more benefits at higher speeds experienced by heel landers.



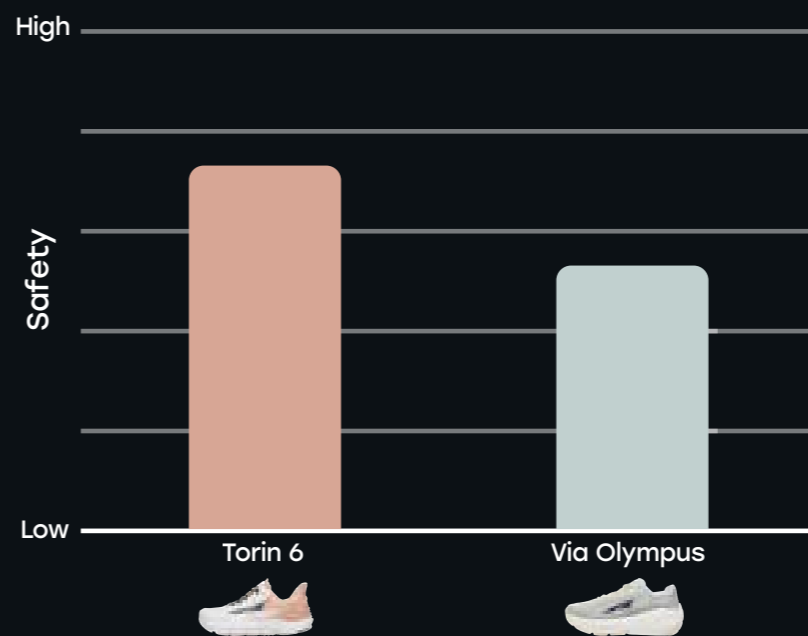
361° - Stability Shoes Safety Index

Kairos Kairos 2 Nemesis 3

When comparing the safety index averaged over all tested runners, the dual density foam of the Nemesis 3 resulted in the highest overall safety index. Closely followed by the single density foam and increased stack height from the Kairos 2, compared to the previous Kairos model.



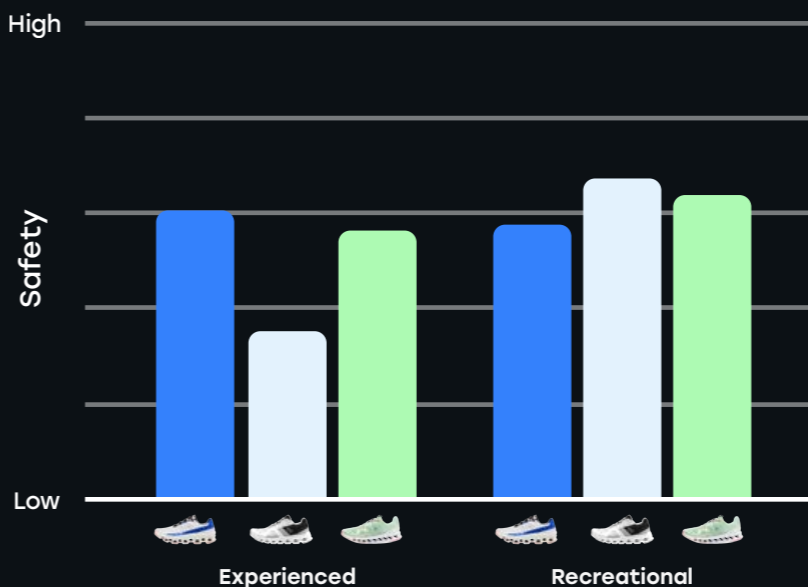
ALTRA - Safety Index Overall



Torin 6 had the highest safety index overall. Potentially due to the low-drop profile, flexible design and wide toe box, facilitating a natural gait pattern.

ON - Safety Index Breakdown

Cloudmonster Cloudrunner Cloudsurfer

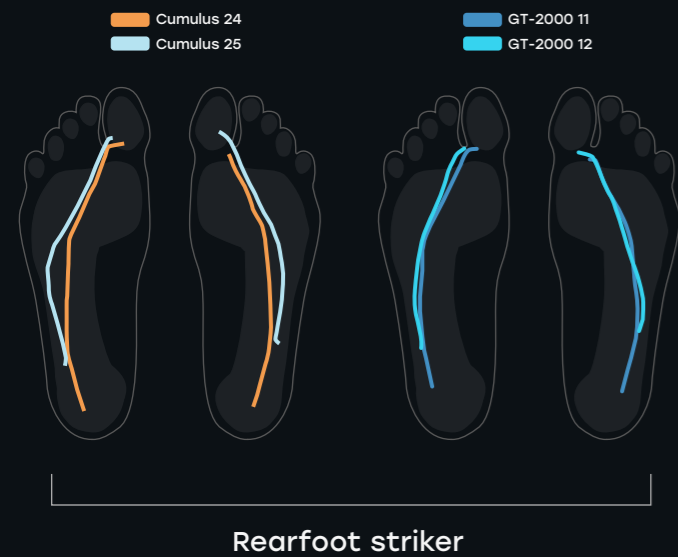


From our tests, experienced runners had the most benefit from the Cloudmonster, closely followed by the Cloudsurfer, possibly due to the responsive cushioning and maximalist design. The less experienced recreational runners had more benefit from the additional support of the Cloudrunner.

Gaitlines

The gaitline represents the roll of the foot, visualizing the dynamics of the foot during each step. It can be considered as a representation of the way in which the foot moves through the shoe during a step.

ASICS



From our tests, the rearfoot striker lands with the back of the heel first, with the foot rolling through to the forefoot. During the mid stance, the phase where the body decelerates and moves over the foot, the gaitline remains more lateral or on the outside of the foot. Notably, in the newer shoe models, the foot lands further away from the heel in this example.

361°

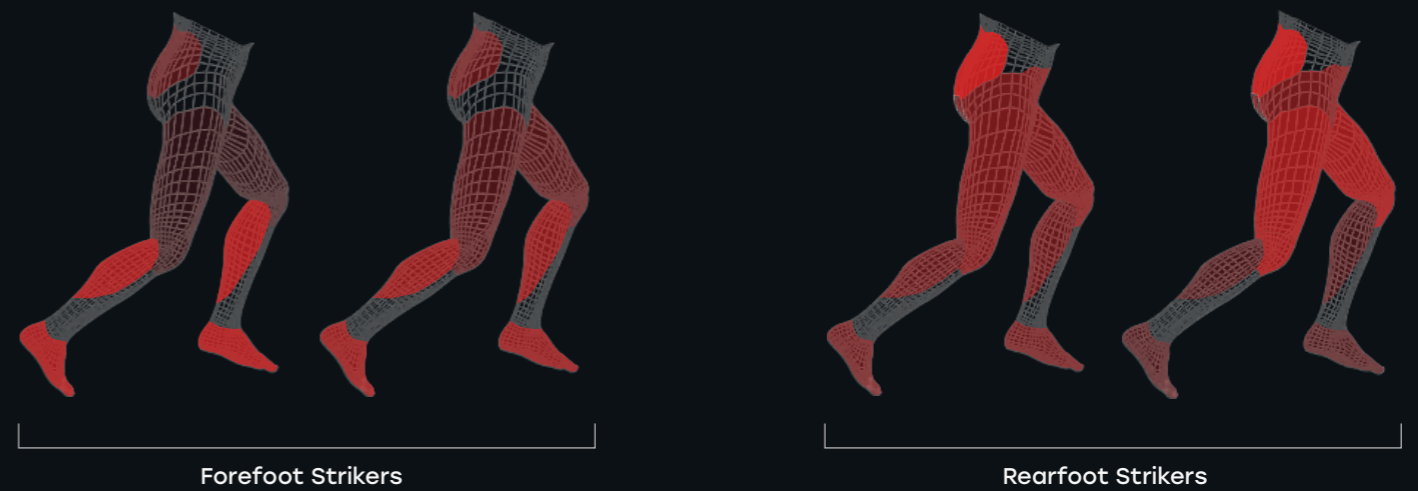


This particular runner seems to relax back into the plush cushioning, landing back towards the heel in the Centauri. With the plate in the Meraki 5, the runner appears to be encouraged or 'pushed' towards the forefoot. For the Spire 6, the runner seems to have a more balanced mid/forefoot landing, still with a more 'positive/aggressive' strike but not so extreme as the Meraki 5.

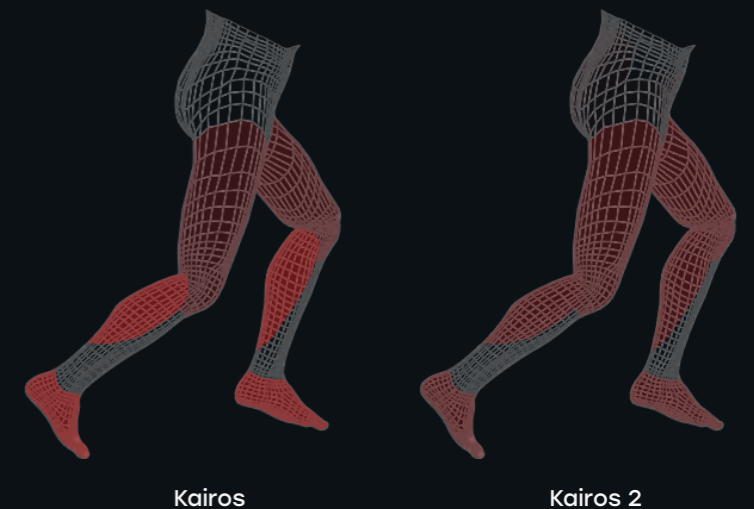
Bioload

The bioload represents what parts of the body are experiencing more, or less, loading. The deeper the red, the more load on the associated body part. From our extensive database, we can see that all runners have their own unique loading profile.

Four examples of the bioload of our tested runners, two forefoot strikers and two rearfoot strikers, are shown below. Both forefoot strikers experience more loading in their feet, calves and compared to their upper legs and back. The second forefoot striker experiences slightly more loading on the upper legs compared to the first forefoot striker. For the rearfoot strikers, it is clear that the loading is more located in the lower back and upper legs. The second rearfoot striker shows slightly more loading on the upper legs than the first rearfoot striker.



Shoes can influence the loading of any individual runner. This specific example from one runner wearing different 361° shoes, shows that the Kairos 2 has a more evenly distributed bioload compared to the previous Kairos model, with a clear decrease in loading on the lower leg and foot.

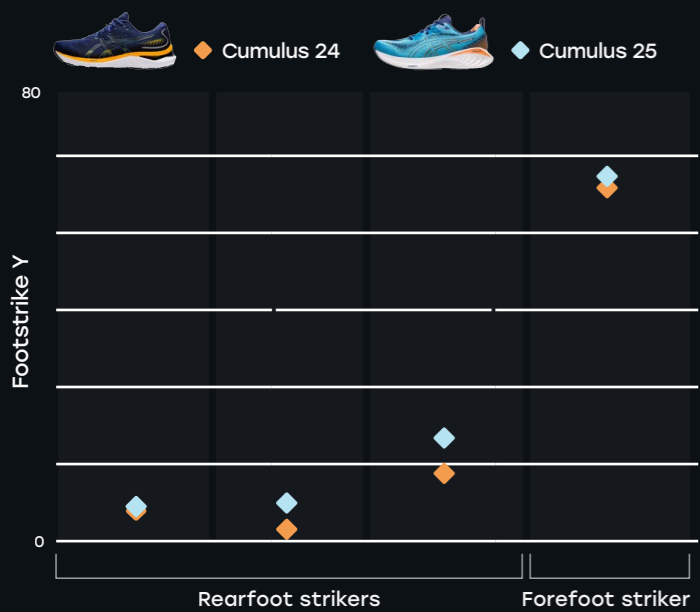


Additional Insights

ARION's AI is able to capture a variety of metrics, generating key insights into an individual's running technique and movement. Diving deeper into the world of biomechanics, visualizing every step we take to understand more of our body.

ASICS- Footstrike Y

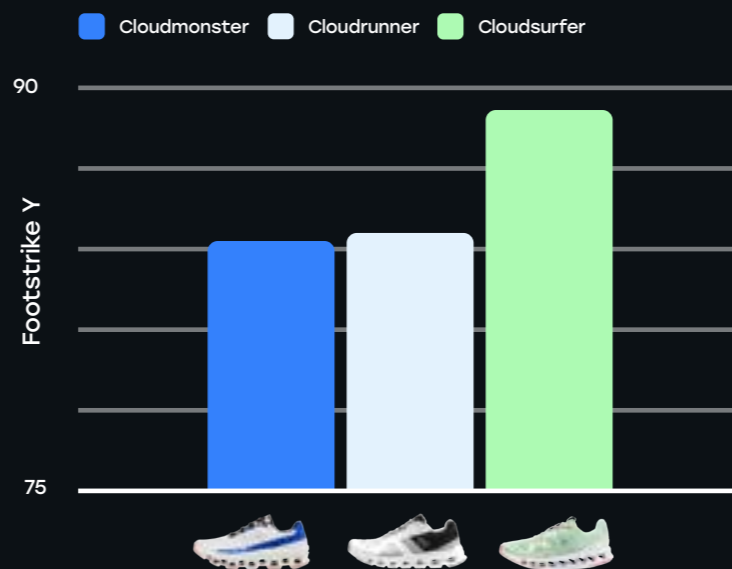
Footstrike Y refers to how the foot is placed on the ground at initial ground contact, with lower values indicating contact closer to the heel and higher values indicating contact closer to the toe.



Footstrike Y increased for all participants in the Gel Cumulus 25 compared to the gel Cumulus 24, with the most pronounced differences seen in rearfoot strikers. This might suggest the Gel Cumulus having a softer midsole or is allowing the runner to reduce the contact angle slightly, which might be an affect of a lighter weight shoe.

ON - Toe Off

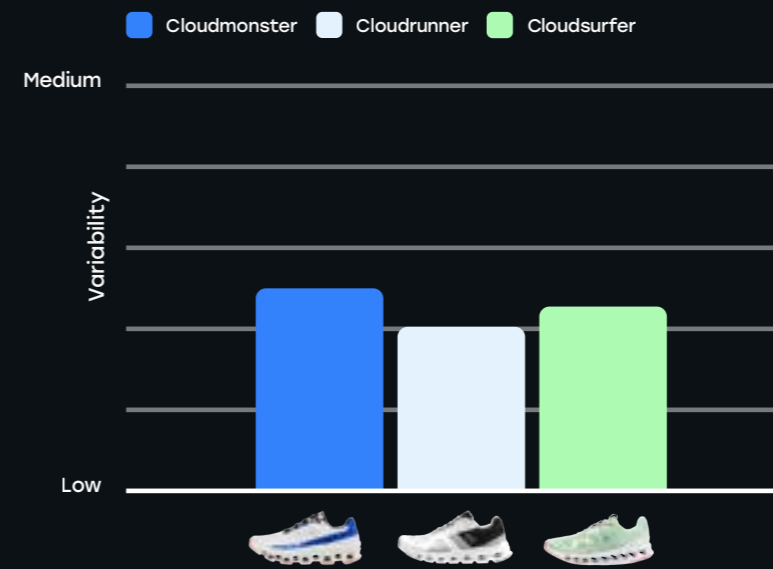
Toe-off is the moment and location at which the foot leaves the ground at the end of a step. Higher values means the last contact is closer to the toes.



On average, overall, the Cloudsurfer showed the highest toe-off values, possibly due to the accentuated rocker shape and higher drop.

ON - Variability Index

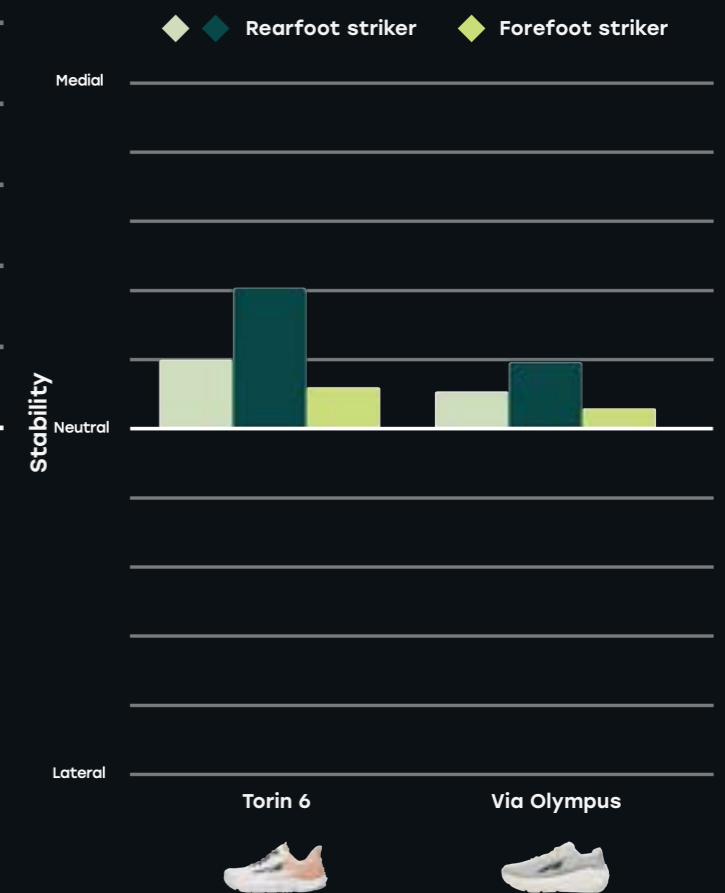
Variability indicates how consistently the foot is placed on the ground.



On average, overall, there was higher variability between steps when using the Cloudmonster and Cloudsurfer, and less variability with the Cloudrunner. In general, it's possible that stronger more experienced runners may benefit from the more natural and varied gait allowed by the Cloudmonster and the Cloudsurfer, whereas less experience recreational and/or less stable runners may benefit from the additional support of the Cloudrunner.

ALTRA - Stability

Stability indicates the lateral/medial motion within the shoe.



The underlying data showed that the stability was more medial focused for all types of runners at higher speeds for both shoes. With the exception of the tested forefoot strikers for which the Via Olympus resulted in less medial/more neutral stability at higher speeds.

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**We decode human movement
to accelerate breakthrough
innovations that move the
world forward.**

Would you like to get in touch?



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