# The Influence of Running Shoe Foot Arch Support and Bending Location on Biomechanics and Running Economy

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The primary aim of this study is to investigate the effect of four different degrees of arch support on arch compression and running economy. Moreover, as a secondary aim, this study also examines the effect of bending location on running economy....

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|---|---|
| **Ethical review** | Not available |
| **Status** | Pending |
| **Health condition type** | Tendon, ligament and cartilage disorders |
| **Study type** | Observational non invasive |

## Summary

### ID

NL-OMON57484

**Source**
Onderzoeksportaal

**Brief title**
The Influence of Running Shoe Foot Arch Support and Bending Location on Biomechanics and Running Economy

### Condition

- Tendon, ligament and cartilage disorders

**Synonym**
nvt

**Research involving**
Human

### Sponsors and support

**Primary sponsor:** Universiteit Maastricht
**Source(s) of monetary or material Support:** Decathlon

## Intervention

- Other intervention

**Explanation**

N.a.

## Outcome measures

**Primary outcome**

Running economy and navicular drop

**Secondary outcome**

n.a.

# Study description

**Background summary**

The effect of arch support in running shoes on arch compression and running efficiency is unclear. The effect of the construction location is still unclear

**Study objective**

The primary aim of this study is to investigate the effect of four different degrees of arch support on arch compression and running economy. Moreover, as a secondary aim, this study also examines the effect of bending location on running economy. Finally, we will explore whether the effect of higher arch support is influenced by static foot shape and stiffness. By addressing these research questions, this study aims to contribute to a more comprehensive understanding of how footwear design influences running biomechanics, potentially informing future innovations in shoe technology and personalized footwear solutions.

**Study design**

Cross-over

**Intervention**

Running shoes

**Study burden and risks**

We consider the risk of harm across all categories to be very low, as the test conditions closely align with the athletes' regular training routines. For example, in the second session, the participants will run a total of 48 minutes at 95% of the VT1 with breaks in between, which is easily manageable for trained athletes as the speed is individualized (i.e., 95% of VT1). Clear safety instructions will be given prior to all procedures, and the measurements will be conducted by experienced staff. Finally, the amount of time and energy that participants will be asked to invest by participating is minimal. Altogether, participant preparation, measurements and removal of markers will maximally take 4.5 hours for both sessions combined.

# Contacts

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# Trial sites

## Listed location countries

Netherlands

# Eligibility criteria

**Age**
Adults (18-64 years)

## Inclusion criteria

You are between 18 and 35 years of age

- You are healthy (i.e., you do not have a fever, a chronic disease, or any other underlying diseases at the time of participation)
- You have a Body Mass Index of <25
- You are a trained athlete who runs the following limits;

marathon: men <3:10, women <3:30,

half marathon: men <1:30, women <1:40

10 kilometers: men <40, women <45

## Exclusion criteria

- You are free of any moderate (for the previous 3 months) or minor (for the previous 1 month) musculoskeletal injuries

# Study design

## Design

| | |
|---|---|
| Study phase: | N/A |
| Study type: | Observational non invasive |
| Intervention model: | Crossover |
| Allocation: | Non controlled trial |
| Masking: | Open (masking not used) |
| Control: | Uncontrolled |
| Primary purpose: | Other |

## Recruitment

NL

| | |
|---|---|
| Recruitment status: | Pending |
| Start date (anticipated): | 01-03-2025 |

| | |
|---|---|
| Enrollment: | 56 |
| Duration: | 1 months (per patient) |
| Type: | Anticipated |

### Medical products/devices used

| | |
|---|---|
| Product type: | N.a. |

### IPD sharing statement

**Plan to share IPD:** Yes

**Plan description**
Following completion of the study, the de-identified data will be made public in line with Open Science practices. All encoded data will be stored and might be re-used in future studies in which the main or secondary investigator of the current project is involved. Any personal information will be removed from the files prior to storage, such that it will not be possible to identify participants from the data.

## Ethics review

Not available

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|---|---|
| Date: | 07-03-2025 |
| Application type: | First submission |
| Review commission: | Validatie nWMO registratie door CCMO |

## Study registrations

### Followed up by the following (possibly more current) registration

No registrations found.

### Other (possibly less up-to-date) registrations in this register

No registrations found.

## In other registers

| Register | ID |
| --- | --- |
| Research portal | NL-009399 |