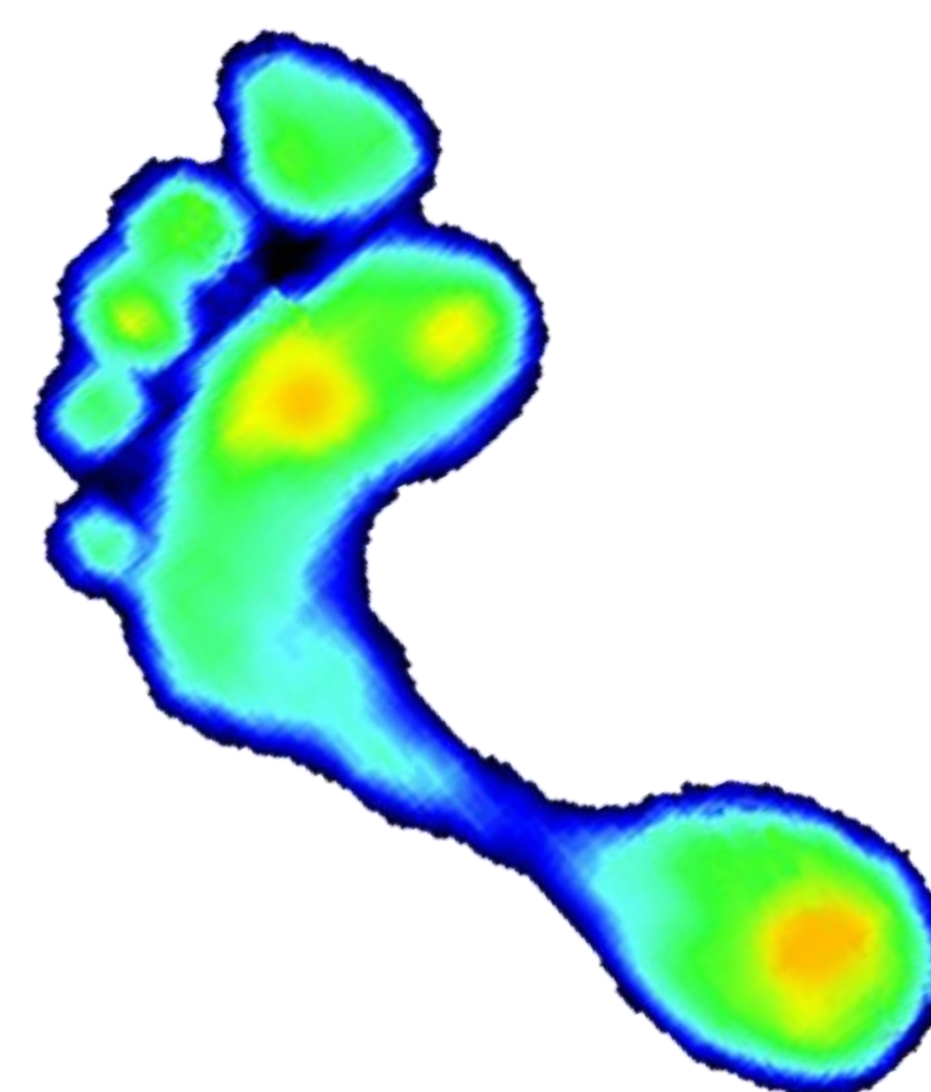


# Biomechanical foot analysis in clinical practice in Flanders, a survey

## INTRODUCTION

In Flanders, foot analyses can be performed by medical doctors, CPOs and podiatrists. It is well known that there is no standardization of clinical methods to analyze foot biomechanics. Methods range from functional analyses to investigation of a static footprint, plantar pressure measurements and even dynamic video analyses. The purpose of this study was to investigate to what extent foot experts in Flanders differ in biomechanical foot analyses and to determine which of the examined foot features are the most reliable.



## METHODS

3 podiatrists, 5 CPOs and 1 foot surgeon performed a biomechanical analysis of the left foot of 77 healthy adult subjects. There were 40 male and 37 female subjects, average age 33 (range 19 – 61). All experts used the techniques they normally use in clinical practice and took between 5 and 25 minutes per subject.

The results of the analyses were filled in on a specially developed form, containing 65 multiple choice questions:

- 11 on mobility parameters
- 31 on static parameters
- 23 on dynamic parameters

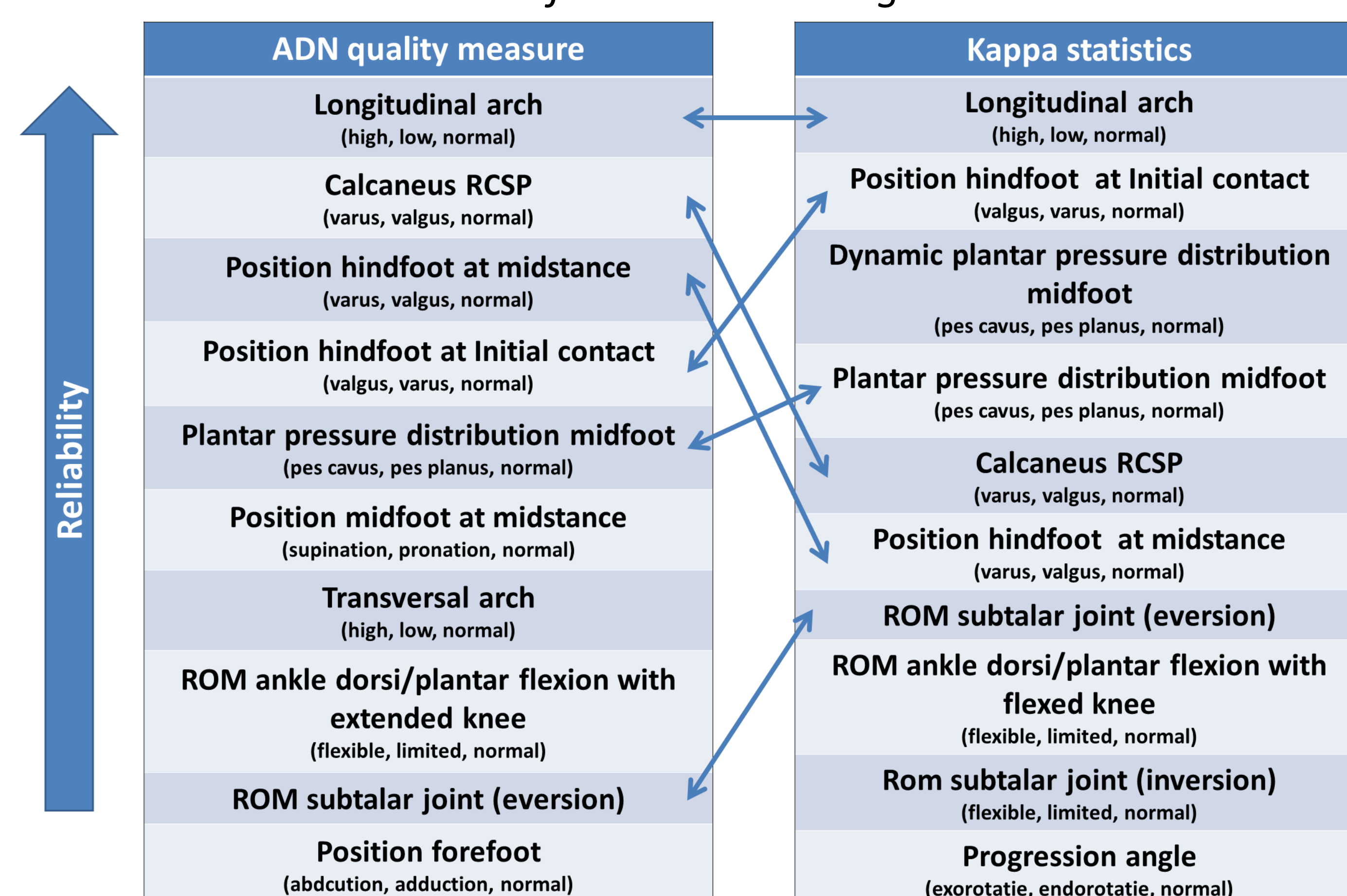
Experts were free to choose which questions to fill in.

The reliability of each feature was determined using 2-way-kappa statistics and a self defined quality measure; the ADN. The ADN quality measure is based on the agreement between experts, the distinctiveness of a feature and the number of experts that examine a certain feature.

### Example of the assessment form

|                                 |                          |           |                          |           |                          |        |
|---------------------------------|--------------------------|-----------|--------------------------|-----------|--------------------------|--------|
| ROM ankle dorsi/plantar flexion | <input type="checkbox"/> | Flexible  | <input type="checkbox"/> | Limited   | <input type="checkbox"/> | Normal |
| Calcaneus (in RCSP)             | <input type="checkbox"/> | Varus     | <input type="checkbox"/> | Valgus    | <input type="checkbox"/> | Normal |
| Width forefoot w.r.t. heel      | <input type="checkbox"/> | Wide      | <input type="checkbox"/> | Narrow    | <input type="checkbox"/> | Normal |
| Longitudinal arch               | <input type="checkbox"/> | High      | <input type="checkbox"/> | Low       | <input type="checkbox"/> | Normal |
| Position forefoot               | <input type="checkbox"/> | Abduction | <input type="checkbox"/> | Adduction | <input type="checkbox"/> | Normal |

### The 10 most reliable features according to both methods



## RESULTS

The 10 most reliable features according to both methods are shown in the figure above. The two methods give slightly different results, but 6 out of 10 features belong to the 10 most reliable features in both methods. The height of the longitudinal arch is the most reliable feature.

Features that are examined by only a few experts result in a lower ADN score. This is the case for the 'Dynamic plantar pressure distribution midfoot' feature which was examined by less than 33% of all experts.

Less distinctive features also result in a lower ADN score. An example of a less distinctive feature is 'ROM ankle dorsi/plantar flexion with flexed knee'. For this feature, more than 74% of subjects was labeled as normal.

## CONCLUSION

Nine different foot experts examined the feet of 77 subjects. A total of 65 different foot features were analyzed by a varying number of experts. The reliability of all features was assessed using 2-way-kappa and the ADN quality measure in order to determine which features are the most reliable.

These findings can be a first step towards a more standardized clinical method to analyze foot biomechanics.

