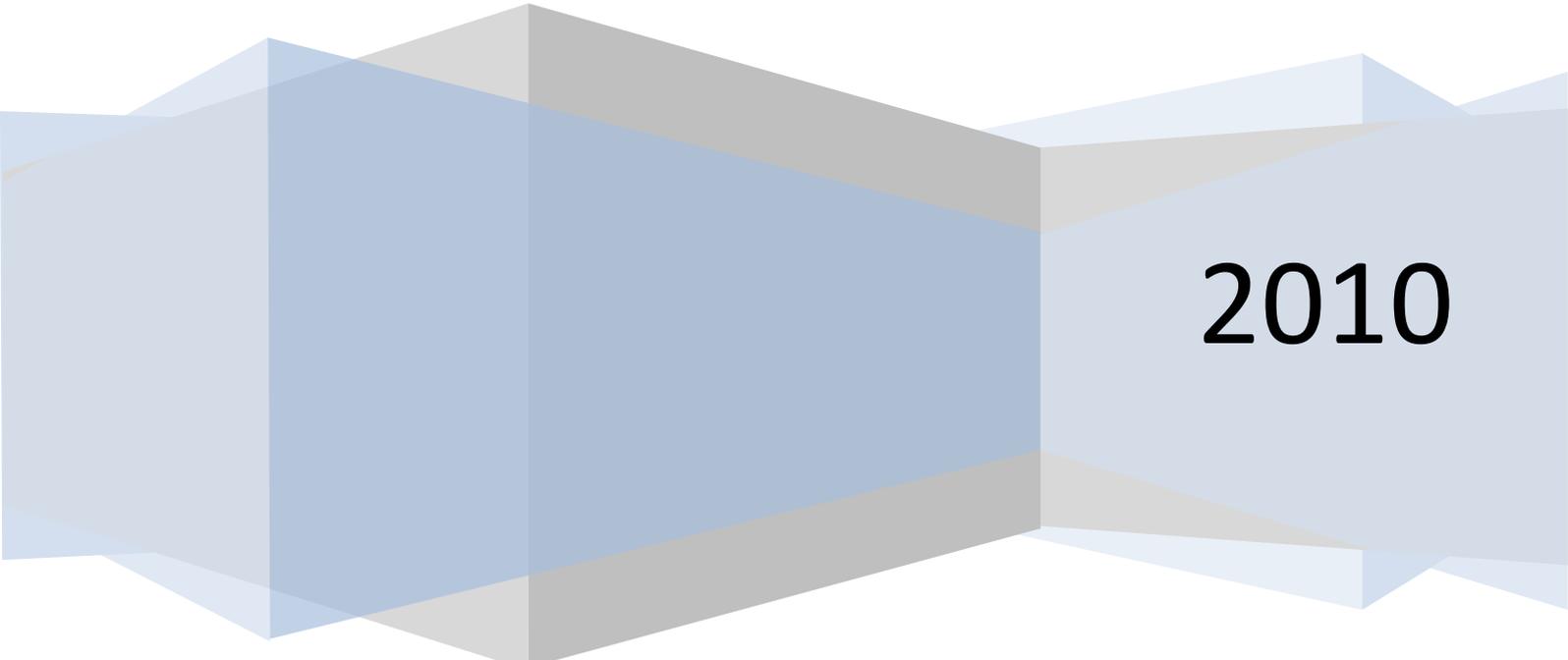


Hogeschool van Amsterdam

# Navicular Drop Test

User Guide and Manual

Sabrina Jayne Charlesworth and Stine Magistad Johansen



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## Introduction

The ND test was first described by Brody (1982) who used it in evaluating the amount of pronation in a runner's foot. The ND measurement protocol for the study is based on the description by Brody (1982) because he was the first to describe the test and many previous researchers use the ND test explained by him.

## Measurement



The subject will be placed in a sitting position with their feet flat on a firm surface and with the knees flexed to 90° and ankle joints in neutral position.

The most prominent point of the navicular tubercle while maintaining subtalar neutral position will be identified and marked with a pen.



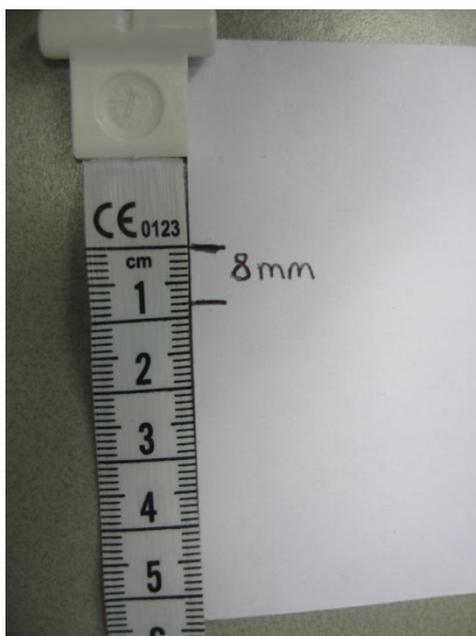


Subtalar neutral position will be established when talar depressions are equal on medial and lateral side of the ankle.

While one assessor maintains subtalar neutral position, another assessor places an index card on the inner aspect of the hindfoot, with the card placed from the floor in a vertical position passing the navicular bone. The level of the most prominent point of the navicular tubercle will be marked on the card.



The individual will then be asked to stand without changing the position of the feet and to distribute equal weight on both feet. In the standing position, the most prominent point of the navicular tubercle relative to the floor will again be identified and marked on the card.



Finally, the difference between the original height of the navicular tubercle in sitting position and weight bearing positions will be assessed with a tape measure rendering the ND amount in millimetres.

The ND will be calculated for both feet. Brody reported values of ND under 10mm as normal and values over 15mm as abnormal. Another study on individuals with and without lower extremity injuries concluded that a ND of 6-9mm was considered to be within the normal range and that a ND of greater than 10mm was considered abnormal (Loudon et al. 1996).

## Reliability

Vauhnik et al. (2006) reported a moderate to good intra-reliability of the ND test. Mean values of 0.5 cm in ND for right foot and 0.6 cm in ND for left foot were found, with intraclass correlation coefficients of 0.78 for the right leg and 0.88 for the left leg. In this study there was 1 examiner who examined 14 healthy women. The examiner regularly used the ND test in clinical setting. Mueller et al. (1993) reported good intrarater reliability.

Picciano et al. (1993) first investigated interrater reliability of ND measurements and reported poor to moderate intratester and poor intertester reliability. Examiners used in the study by Picciano et al. were relatively inexperienced physiotherapist students and they only undertook a 2-hour training session prior to main data collection. In addition, they examined 15 subjects and treated each foot independently, therefore, analyzing data from right and left foot together. This might cause differences in the reliability results between their and the present study. The intraclass correlation coefficient was found to be 0.57.

Sell et al. (1994) found good intrarater and interrater reliability. They evaluated the reliability of measuring ND in 30 healthy subjects and reported a mean value of 0.6 cm in ND. Intraclass correlation coefficient for intra and inter-rater reliability were found to be of 0.73 and 0.83.

The ND test was moderately to well correlated ( $r = 0.61 - 0.89$ ) with x-rays. When compared to x-ray examination of the foot the ND measurement showed good intratester reliability (ICC = 0.82- 0.93) and moderate inter-tester reliability (ICC = 0.68 - 0.89) (Hanningan-Downs et al. 2000).

The major limitation of the navicular drop test is the capability of measuring displacement only in the sagittal plane, while in actual fact motions of the navicular bone actually take place in all three planes simultaneously (Mueller et al. 1993).

The physiotherapists involved in the study will have to be competent with using the method of ND measurement and use it in their daily practice for at least the past 2 years. This is because reliability will be greatly improved.

## References

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