

# The importance of separate measurements of lower limbs in posturography

Mariusz Strzecha<sup>1,2</sup>, Henryk Knapik<sup>3,4</sup>, Paweł Baranowski<sup>5</sup>, Jan Pasiak<sup>6</sup>,

<sup>1</sup> Department of Physical and Health Education, the Technical University of Radom, Poland

<sup>2</sup> Faculty of Health Sciences, the Higher School of Social and Technical Sciences in Radom, Poland

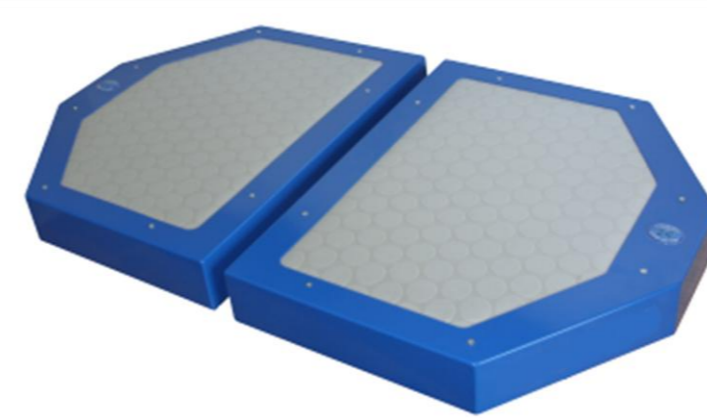
<sup>3</sup> Department of Special Physiotherapeutic Methods and Sport for the Disabled Persons, the Academy of Physical Education, Katowice

<sup>4</sup> Faculty of Health Sciences, the Radom Higher School, Poland

<sup>5</sup> M. Weiss STOCER Centre for Rehabilitation, Konstancin – Jeziorna, Poland

<sup>6</sup> Department of Operational Research and Econometrics, the Technical University of Radom, Poland

## Metods



Picture 1. Two platform stabilograph

Each of the examined persons had to stand on two-platform stabilographic scale barefoot in individual relaxed standing position. One foot rested on one plate of the posturograph while the other on second plate. Both limbs were straightened. Width of lower limb and the angle between feet was unconstrained, contrary to the situation in posturographic examinations. The test comprised two trials 30 seconds each

During first trial (relaxed standing with eyes open) each person was supposed to maintain stable standing position with eyes focused on still image displayed on the screen. In second trial (relaxed standing with eyes closed) the task was to maintain the same 'natural' position. During the whole test the examined person did not change the adopted body position.

## Materials & Results

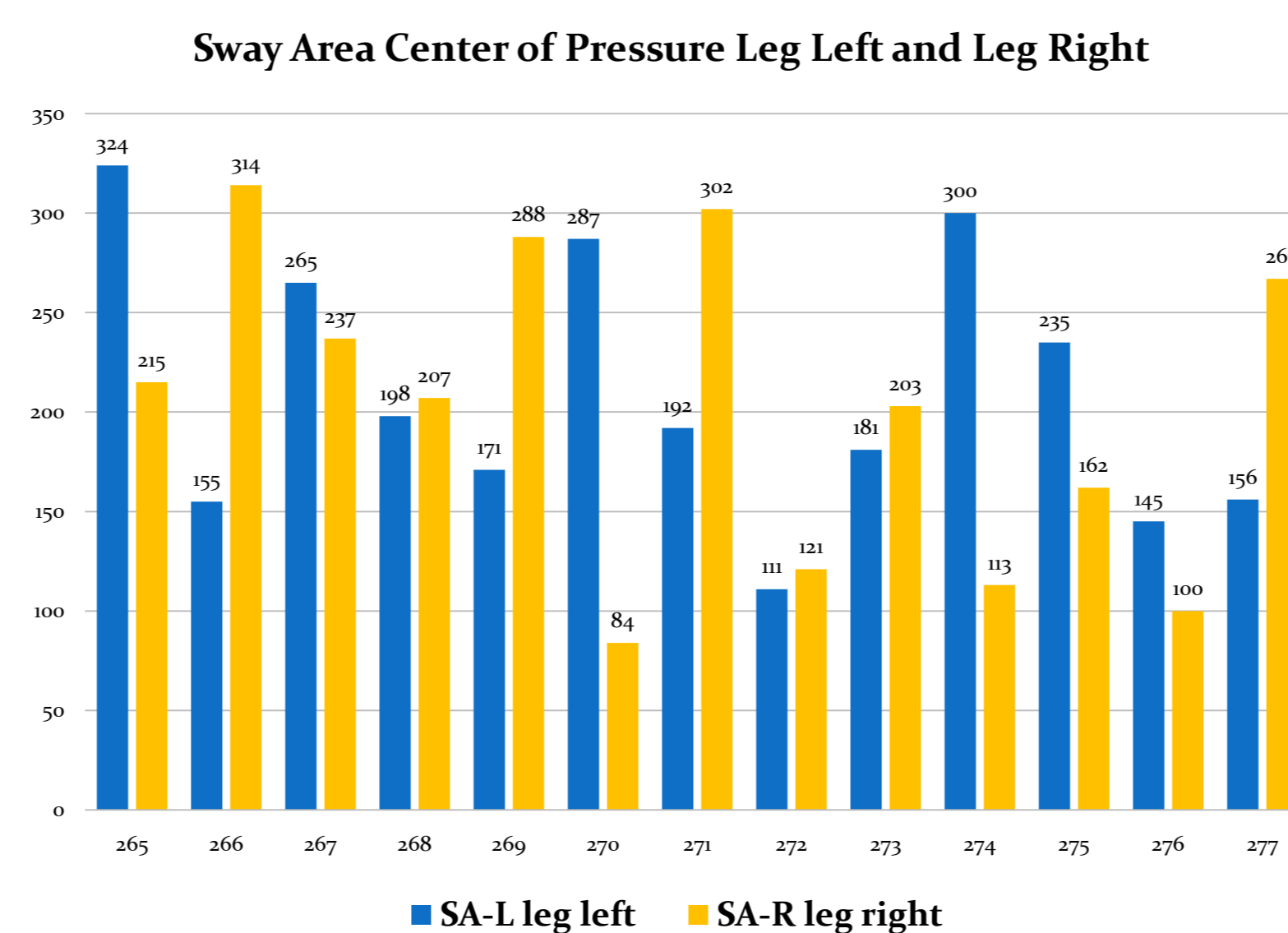
Research material comprised the group of 444 persons including 193 women and 251 men.

Average age of the examined persons:  $21 \pm 4.11$  years

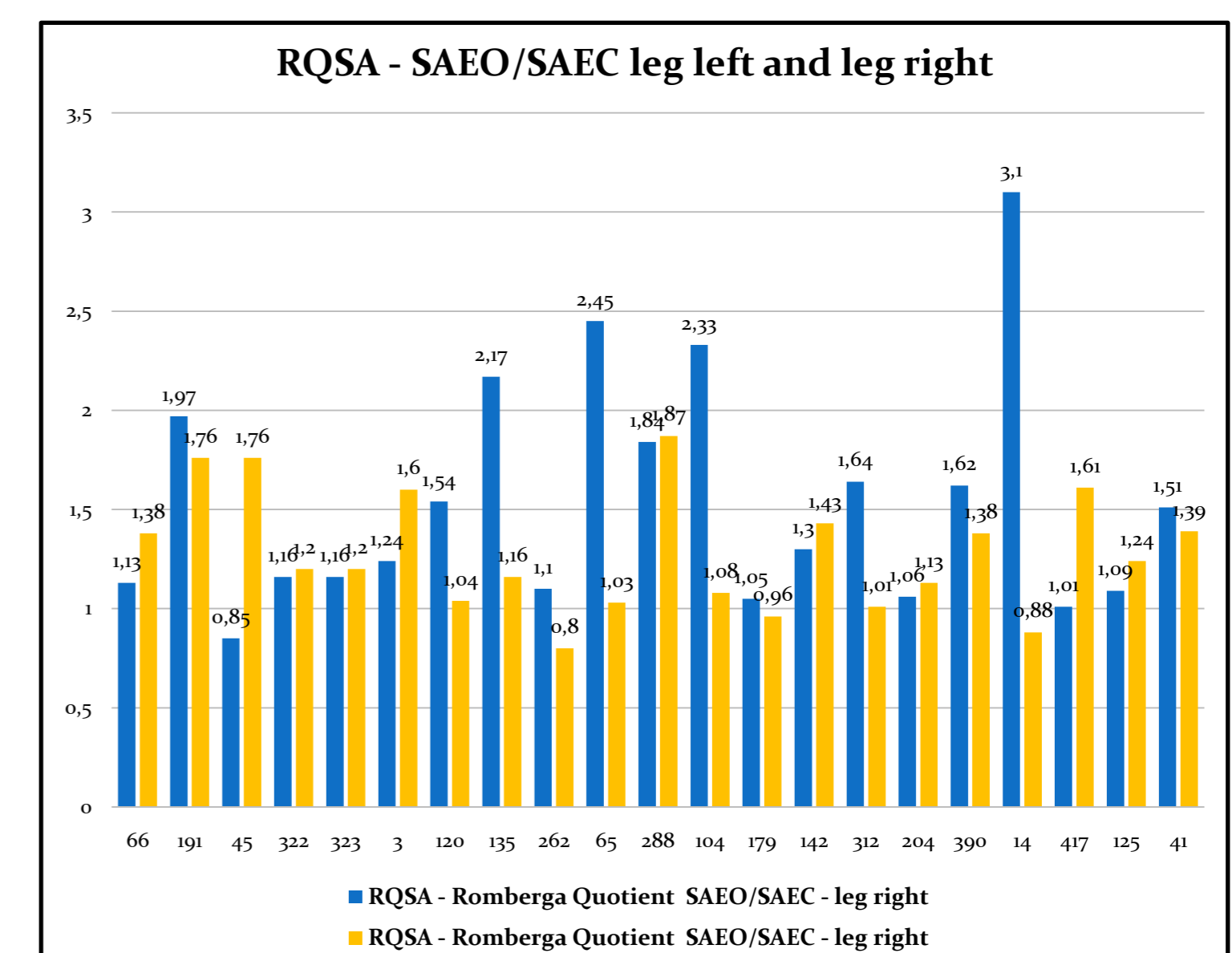
Average weight:  $68.3 \pm 15.6$  kg

The examined persons included:

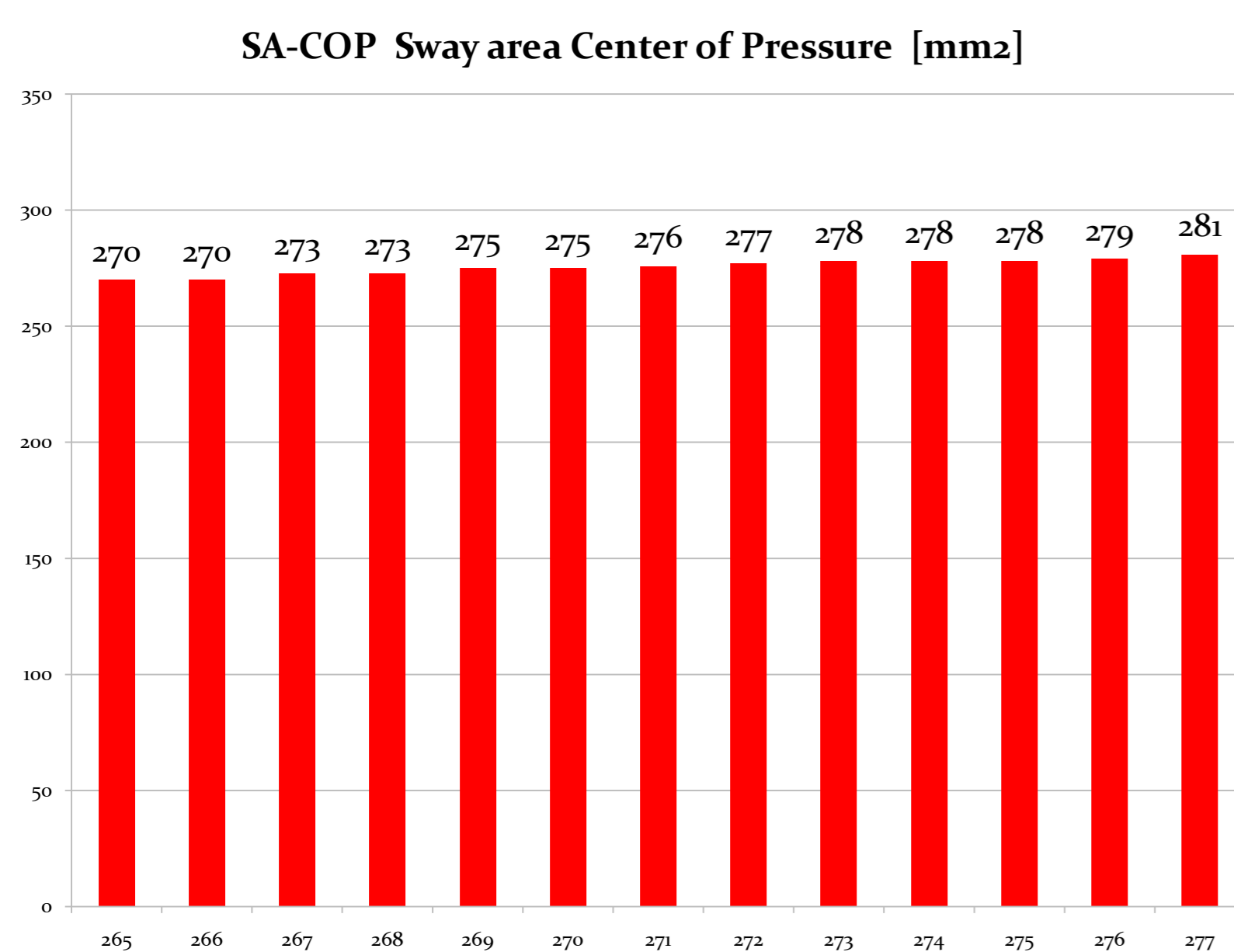
primary school students, young persons from special care educational centre for people with impaired hearing and sight, students, sportsmen from different disciplines (wrestling, table tennis, archery, biathlon, judo). The tests were carried out from August 2007 to August 2009.



13 persons were qualified to group A, a uniform group selected according to the procedure described above.

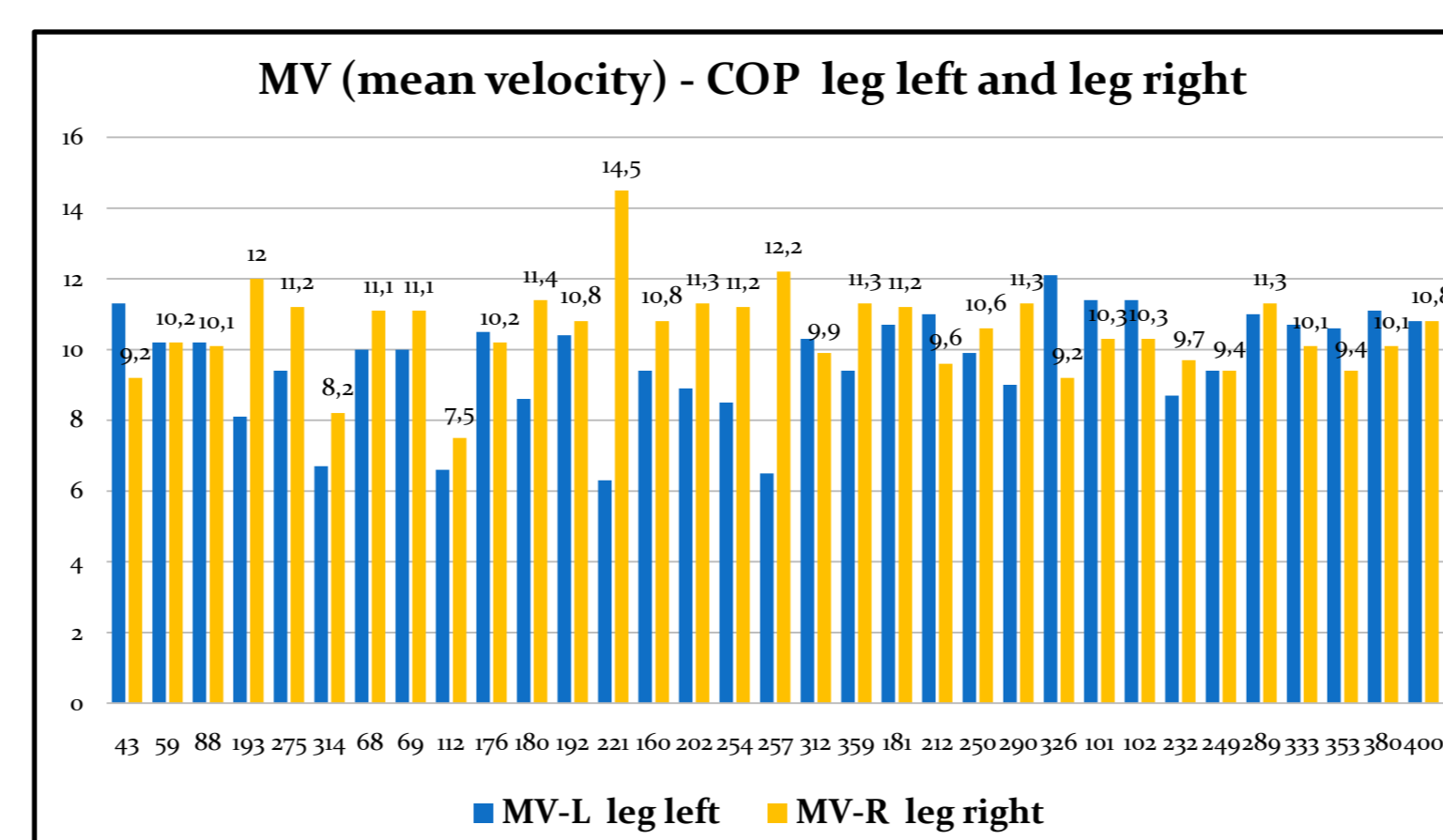


This is group B (21 persons) Persons with RQ-SA value which did not differ by more than  $\pm 2.5\%$

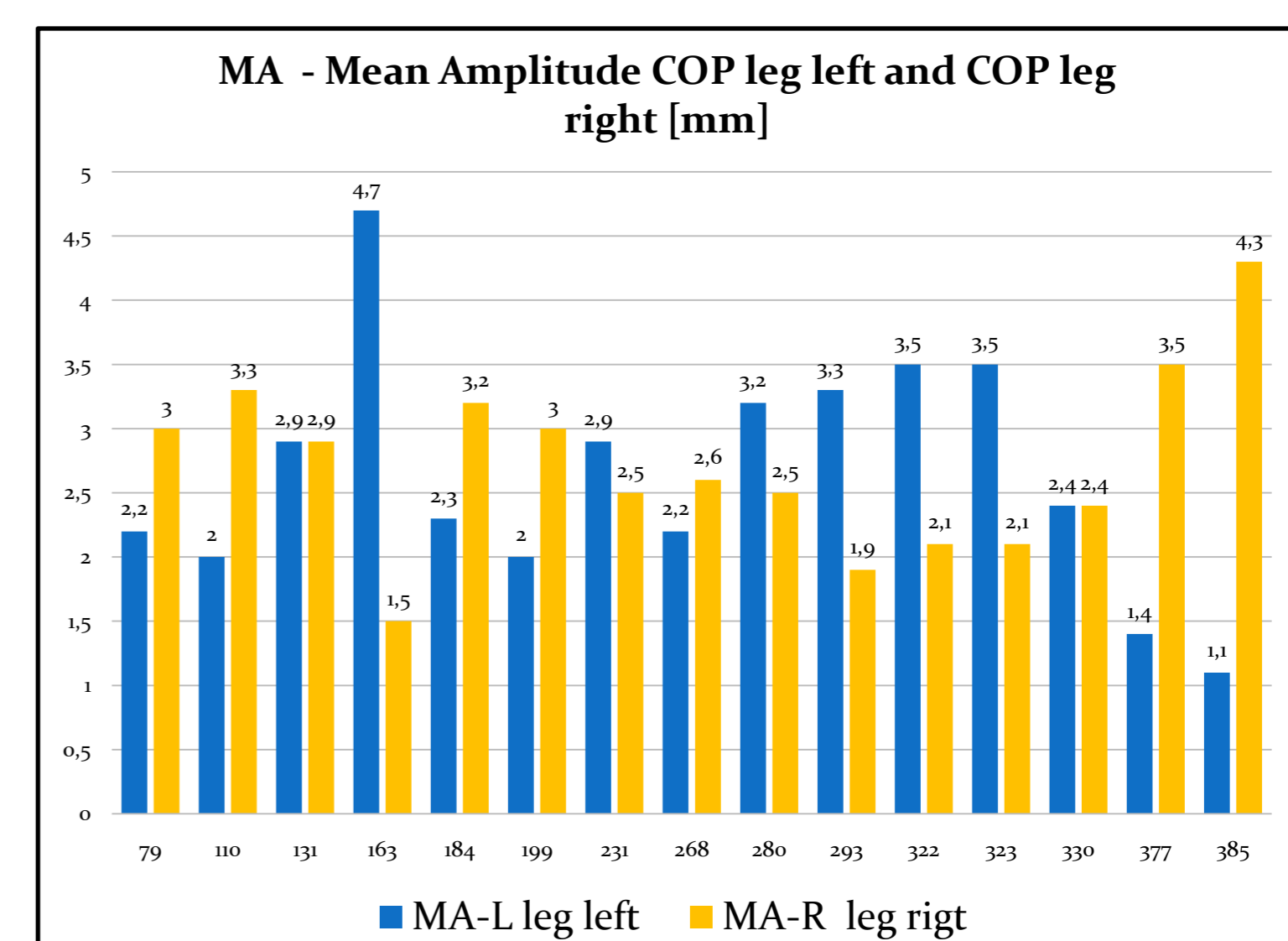


6 groups (A,B,C,D,D,E) separated from 444 persons

In order for the in-depth analysis of significance of measurement of SA-COP surface area to be carried out for evaluation of balance, a group was separated to include persons whose SA-COP values do not differ by more than  $\pm 2.5\%$  from mean SA-COP value among the examined population of 444 persons.



This is group D (33 persons) Persons whose COP velocity was the same and did not differ by more than  $\pm 2.5\%$  from the mean value for 444 persons



This is group (15 persons) Persons whose mean COP amplitude was equal

## Conclusions

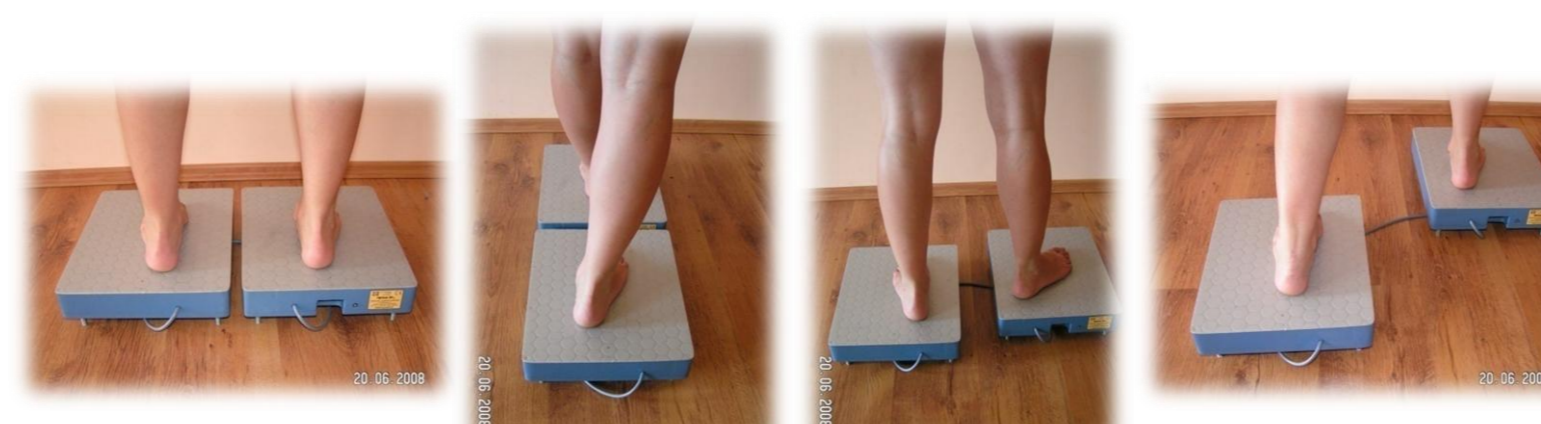
Separate concurrent measurements carried out for each limb allowed to show considerable differences (in balance parameters) between persons who obtained similar results in single-platform posturographs.

The present paper presents new cognitive opportunities connected with implementation of new measurement techniques into stabilography in the form of two-platform stabilographic scales.

Such a development in measurement opportunities for stabilography offered by two-platform posturograph might contribute to verification of a number of views existing in this field.

Separate concurrent measurements carried out for each limb allowed to show considerable differences (in balance parameters) between persons who obtained similar results in single-platform posturographs.

The presented results point to the need for stabilographic investigations of transfer of COP using concurrent and independent measurement of transfer of COPLL and COPLR and the registration of changes in balance.



More information about posturograph can be found at [www.koordynacja.com.pl](http://www.koordynacja.com.pl)

The authors can be contacted at: e-mail: [strzecha@konto.pl](mailto:strzecha@konto.pl) tel.: (48) 606-592-153