

Reference values for children's pulse wave velocity and central blood pressure using the Mobilograph device.

Wendt U. (1), Hacke C. (2), Ketelhut K. (3), Ketelhut S. (4), Schlesner C. (1), Kozlik-Feldmann R. (1), Mueller G.C. (1)

Paediatric Cardiology, University Heart Centre Hamburg, Germany (1)

Institute of Medical Biometry and Epidemiology, University Medical Centre Hamburg, Germany (2)

Department of Sport Sciences, Martin-Luther-University Halle-Wittenberg, Germany (3)

Department of Medical Education, Fachhochschule für Gesundheit Gera, Germany (4)

Objectives: The pulse wave velocity (PWV) and the central systolic blood pressure (cSBP) as indicators for arterial stiffness are of increasing interest for the determination of adults' cardiovascular risk. Although children exhibit a very low absolute risk of experiencing a cardiovascular event, this risk starts developing at a young age. Especially children with congenital heart disease, e.g. after the repair of a coarctation, are subject to an increased risk of developing hypertension and atherosclerosis. Therefore the risk assessment during childhood is an important factor for the prevention of cardiovascular events in later life.

The aim of the study was to establish reference values for PWV and cSBP for children aged between 3 and 5 years.

Methods: The PWV and the cSBP of 128 children (52.3% girls; age 4.77 ± 0.74) were measured with the oscillometric cuff-based mobilograph device (I.E.M. Stolberg, Germany). Reference values and percentiles were calculated with the LMS method.

Results: The mean PWV is 4.32 ± 0.24 m/s and 4.28 ± 0.30 m/s in the male and female subgroup. The cSBP average is 92.15 ± 6.68 mmHg among the boys and 91.67 ± 7.55 mmHg among the girls. Both parameters show no significant differences between the sexes (PWV $P = 0.379$; cSBP $P = 0.708$).

The mean PWV in 3-3.99-year-old children is 4.23 ± 0.34 m/s, 4.32 ± 0.26 m/s in 4-4.99, and 4.3 ± 0.26 m/s in 5-5.99-year-olds. The cSBP ranges from 90.39 ± 8.91 mmHg (3-3.99 years), 92.7 ± 6.36 mmHg (4-4.99 years) to 91.81 ± 7.01 mmHg for the group of 5-5.99-year-olds. The smoothed percentiles of the reference values are presented based on height and age.

Conclusion: The PWV and cSBP were measured for our population of 3- to 5 year old children with the Mobilograph device in order to define reference percentiles. In particular for children with congenital heart disease and an increased risk for cardiovascular events both parameters are expected to be of great prognostic value.