Buergers Test/Pole Test: simple clinical tests to screen the arterial perfusion before compression therapy

Buerger-Test/Pole-Test: Einfache Methoden zur Überprüfung der arteriellen Perfusion vor geplanter Kompressionstherapie

Authors
Stephan Eder¹, Joachim Dissemond², Wolfgang Vanscheidt³, Severin Läuchli⁴, Hugo Partsch⁵, Markus Stücker⁶

Affiliations
1 Schwarzwald-Baar-Klinikum Villingen-Schwenningen, Klinik für Gefäßchirurgie und Gefäßmedizin
2 Universitätsklinikum Essen, Klinik für Dermatologie, Venerologie und Allergologie
3 Freiburg, Praxis für Dermatologie
4 Universitätsspital Zürich, Dermatologische Klinik
5 Wien, Dermatologie
6 Ruhr-Universität Bochum, Klinik für Dermatologie, Venerologie und Allergologie

Key words
compression therapy, contraindication, PAD, perfusion pressure

Schlüsselwörter
Kompressionstherapie, Kontraindikation, AVK, Perfusionsdruck

received 12.09.2018
accepted 04.02.2019

Bibliography
DOI https://doi.org/10.1055/a-0865-7947
Phlebologie 2020; 49: 108–110
© Georg Thieme Verlag KG, Stuttgart · New York
ISSN 0939-978X

Introduction
How do I know whether the arterial circulation is sufficient for the indicated compression therapy? Critical limb ischaemia is a contraindication to compression therapy.

We can gain a first impression on inspection, followed by palpation of the peripheral pulses in the feet. If the tibialis posterior and dorsalis pedis arteries are easily palpated, a relevant peripheral arterial occlusive disease (PAOD) can be ruled out as a contraindication to compression therapy. If the pulses are not palpable, the next step is usually to measure the pressure with Doppler ultrasound, by determining the ankle-brachial index (ABI). The minimum requirement is an ABI > 0.5 or Doppler pressure > 60 mmHg at the ankle [1]. Unfortunately, it is often difficult to ascertain the ABI with certainty due to oedema, not possible to measure it because of severe pain from pronounced ulceration or it may be falsely high (ABI > 1.3) due to medial sclerosis (usually as a consequence of diabetes mellitus). As a result, many patients, who are suspected of having advanced PAOD, are denied the compression therapy they need. It is therefore particularly worthwhile carrying out other clinical tests in these cases.

Test procedures
Buergers test (1924)
In healthy people, who are lying down, the feet remain pink and perfused even when they are elevated by 90° and there is capillary...
refill after pressure is applied briefly to blanche the tissues of the toe. However, when there is relevant ischaemia, a noticeable pallor can be seen after 30 seconds of elevation. In these cases, the vascular angle (Buergers angle) can be determined. If the leg becomes pale at < 20°, there is critical ischaemia of the foot.

After the test, the patient sits up with the legs dependent. With normal arterial perfusion, both legs rapidly return to an unremarkable pink colour. In the case of significant PAOD, the leg reverts to the normal pink colour more slowly and passes through this stage to reactive hyperaemia, when the leg becomes markedly red due to metabolic arteriolar dilatation. Only later does the foot resume its normal skin colour [2].

This simple test is very useful in routine clinical practice and, when positive, shows a good correlation in the case of advanced ischaemia due to peripheral arterial occlusive disease [3] (Fig. 1–3).

The pole test (1994)

This clinical test is also based on the hydrostatics for pressure determination. With the patient lying down, a Doppler signal is recorded in the foot. When the leg is elevated, the Doppler signal becomes attenuated depending on the vertical height above the heart. Pascal’s law allows us to convert the perfusion pressure of the blood (density $1.06 \times 10^3$ kg/m$^3$) into the familiar mmHg (density $1.36 \times 10^4$ kg/m$^3$). In this way, the desired arterial perfusion pressure is 60 mmHg at a height of 77 cm. If a pulsatile Doppler signal can be recorded at this height, then the perfusion pressure is > 60 mmHg.

This pressure measurement on elevation showed a significantly better correlation (index) to ischaemia than the ABI measurement, when used for intraoperative checks. The result was, however, restricted to values up to 60 mmHg [4].

Further comparative studies confirm that it is a good clinical method and describe the technical details.

The toe pole test can be used to determine the arterial perfusion (up to 70 mmHg) in people with diabetes and it is more reli-
CONCLUSIONS

Buerger test and a subsequent pole test are well-validated simple test procedures to check whether there is sufficient arterial perfusion of the foot in the required range of >60 mmHg. Controlled compression therapy is possible, if a Doppler signal can be recorded from the ankle when the leg is elevated to a height of 77 cm.

Conflict of Interest

The authors declare that they have no conflict of interest.

References


The pole test: Doppler signal recorded with the leg elevated (height of 77 cm).