

Limb positioning handle in a mobile indenter system

Authors:

Mariusz Kaczmarek, Joanna Nowak

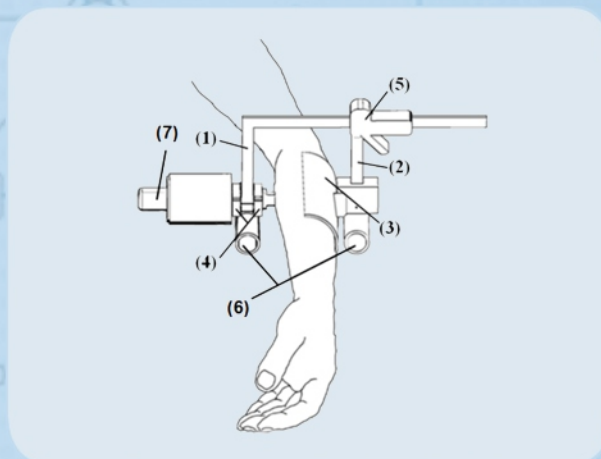
Introduction

Measurements of the mechanical properties of limb tissues are difficult due to physical and geometrical complexity of the studied materials, influence of many individual factors, and lack of simple interpretation tools (models). The oldest and simplest method of assessing mechanical properties of tissues is palpation method. Due to its subjective nature, it is a qualitative method, the results of which are difficult to precisely describe and compare. Among the developed quantitative methods for measuring the mechanical properties of soft tissues *in vivo*, indentation methods are the most frequently used, because of their simplicity and accessibility. Despite the advanced solutions of the indenter control system and force measurement, it is worth noting that the weak link of the mobile indenter systems used *in vivo* is the mounting system, which should ensure proper positioning of the apparatus in relation to the limb throughout the test. Due to the different structure of the limbs, patient movement during examinations and the need to position the measuring system in different parts of the lower or upper limb, no satisfactory solutions have been found so far. The subject of the invention is a mobile holder that enables limb stabilization during non-stationary tests with the use of a mobile indentation system to identify lymphoedema.

Main concept

Two vertical guides (1) and (2) connected to the horizontal beam enable the positioning of the system. One of them has a movable clamp stabilizing the position of the tested object (3). On the second guide, in special clamps (4), an indenter apparatus (7) is mounted, which can be moved along the guide in order to adjust it to the height of measured object. Guide with stabilizing clamp is connected to horizontal beam by means of a clutch with a handle and a release button (5), which gives a possibility to adjust the spacing of the guides (apparatus and opposite clamp) to dimensions and arrangement of tested object. Another portable diagnostic device can be mounted in place of the indenter apparatus. The cylindrical supports (6) ensure also a stable position of mobile handle.

Fig. 1 - Schematic representation of mobile holder with the mounted indentation apparatus during tests on human limb.



Application

Developed device is mainly dedicated to medical sector: patients and their families, doctors, physiotherapists in conjunction with any portable diagnostic apparatus (e.g. indentation device), in case of need to obtain independent and precise results from mechanical properties measurements on lymphedematous human limbs.

Technical advantages

- higher objectivity of the obtained results (limited role of the operator),
- the possibility of positioning the apparatus vertically and horizontally,
- no need to immobilize the limb,
- easy implementation and repetition of the tests,
- low cost of making the device,
- small dimensions.

PATENTED

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