

Diagnostic insert for shoes

Who are we?

Łukasiewicz – Institute of Microelectronics and Photonics, based in Poland (Warsaw), is a part of Łukasiewicz Research Network – one of the largest European organizations for applied research. Łukasiewicz – IMiF operates under the formula Science is Business and its strategy is to play a central role in the innovation process towards R&D for industry and business. One of the areas of our activity is printed electronics which can be used for instance in designing systems and sensors for various types of applications or products such as diagnostic inserts or self-disinfecting keyboards etc.

Patent information

**Technology
readiness
level:**
8

Title: Diagnostic insert for shoes

Patent number: Pat.225306

Priority Date: 11.12.2012

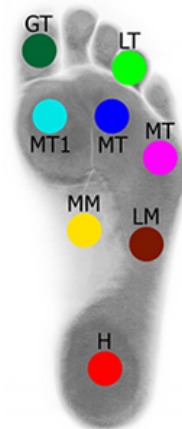
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Owners: Łukasiewicz – IMiF, Uniwersytecki Szpital Ortopedyczno – Rehabilitacyjny w Zakopanem

Jurisdictions: Poland

A diagnostic insert composed of multiple layers of flexible materials and containing pressure sensors positioned between two layers of insulating substrate which is characterized by the fact that it has insulating films on which layers of conductive paths are applied and circular contact fields between which pressure sensors provided with electrodes are positioned. In addition, each pressure sensor is in mechanical contact with the flexible shielding layer via a metal pressure concentrator and through a layer of insulating support film.

As diagnostic inserts dedicated for shoes is one of our main projects we own more patents from this area, which together form a unique product. One of such patents is Pat.229486 'Method of measuring the foot pressure on the ground' – this method is based on the fact that electrical signals from eight pressure sensors distributed at selected points of the foot designated as measuring critical zones are fed to a signal processing and transmission module and recorded in a recording device equipped with a radio signal receiver, while the transmission and recording of signals from all eight pressure sensors are carried out simultaneously and recorded as percentages relative to the maximum pressure value of one of the foot zones.



The potential behind the technology

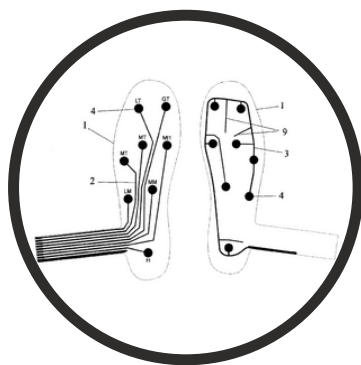
The diagnostic insert according to the invention has geometric proportions and mechanical properties similar to a typical shoe insert. The insert, when placed in footwear and connected to a portable miniature measuring system, allows dynamic testing of foot pressure distribution under any conditions, i.e. during running, walking or jumping. It is worth pointing out that, its outer surface, which has contact with the foot, is covered with leather.

Technology Advantages

The main advantage of a system incorporating the measuring insert according to the invention is the ability to conduct tests in natural non-clinical settings, such as during home activities, exercise and field stays. The low cost of manufacturing our insert means that it can be made in many sizes and large quantities, and even produced as a single-use product, which will ensure patient comfort and promote hygiene. The relatively light weight (less than 100 g) of the electronic measuring system including the transmitting device does not absorb the patient's attention or limit his perception and ability to be physically active.

Application

Diabetics and people with damaged nervous systems are particularly vulnerable to foot damage and progressive nervous system degradation because they usually do not experience pain, irritation or discomfort. This fact usually results in further deterioration and can lead to swelling and even open wounds. A device for measuring the distribution of pressure exerted by the feet used in the rehabilitation process allows for an overall assessment of a person's movement capabilities, as there is a correlation between foot fitness and defects in the knees, hips and spine. Thus, the analysis of the stresses and pressures exerted by individual fragments of the foot is useful in diagnosing and selecting the optimal rehabilitation process. To sum up, our diagnostic insert can be used in medical therapy, rehabilitation, and as monitoring or warning device during intense sports activities.



Collaboration type

License agreement or sale agreement

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