DEVICE FOR POSITION AND LUMBAR SPINE CONTROL

DESCRIPTION OF THE TECHNOLOGY

Lower back pains are one of the most common health problems in modern society. This pain leads to disabilities and to a high use of health systems.

Therapies using exercises (based on stabilisation or enhancement of body trunk) are key factors in prevention and rehabilitation processes.

Lumbar spine control is difficult because of the global and multiplanar movements.

Last years several devices for lumbar spine control have been developed. These are mechanic and electronic devices with pressure sensors that are very interesting but have important disadvantages as: unability to show curvature changes, rotation and steepness changes, some of them need a supporting point, etc.

A research team of the University of Alicante has developed a device consisting of a belt which is made of an elastic band. In its central part there are five connected sensors, corresponding to the lumbar vertebrae and twos sensors on the band sides corresponding to the back end of the body trunk.

The sensors are connected to a common electronic system, including each sensor a gyroscope and an accelerometer.

Grosso modo and as it can be seen in the images there are five sensors in the center part (7) and two sensors in the sides (6 and 8). On one hand, changes in lumbar spine angle will be registered by the sensors located on the lumbar vertebrae and the sacrum.

On the other hand, changes in the inclination and rotation will be mainly registered my side sensors (6 and 8)

In order to have a good feedback of the data registered with the device, some software has been developed: software (Android and iOS based) for PC, Tablets and other devices, etc. Hence, the device can be managed by mobile devices under the Bluetooth protocol, for example.

Regarding data processing, a management system has been developed. This system includes management of: users, data logging and online graphics, data input/output (by usb, network, radio, and other communication interfaces), etc.

For placing correctly the device, the specific parts of the lumbar spine have to be located. This location can be made following a designed method based on anatomic palpation of lumbar apophysis and iliac crest.

MARKET APPLICATION

- Health and sports.
- Physical therapy
- Fitness / Wellness Industry
- Ergonomics and postural higiene programmes and clinics
- Health and risk prevention

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MAIN ADVANTAGES AND INNOVATIVE ASPECTS

- Measuring (by segments) of lumbar spine curvation and its changes.
- Information about each segment's contribution to the lumbar spine curvation.
- It distinguishes among different actions that could lead to changes in lumbar spine curvation
- Improvement of control when changing inclination and rotation of body trunk.
- Each sensor has an accelerometer and a gyroscope.
- Displays are integrated into a textile band easy to use.
- Apps for mobile devices developed.

CURRENT STATE OF DEVELOPMENT

Prototype already available.

INTELLECTUAL PROPERTY RIGHTS

Patented: "*Dispositivo para el control de la postura y movimiento del raquis lumbar*".

- Application number: P201530361
- Application date: 18/03/2015

COLLABORATION SOUGHT

Companies for the following cooperation activities are sought.:

- License agreements.
- Setting up R&D Projects.

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RELATED IMAGES

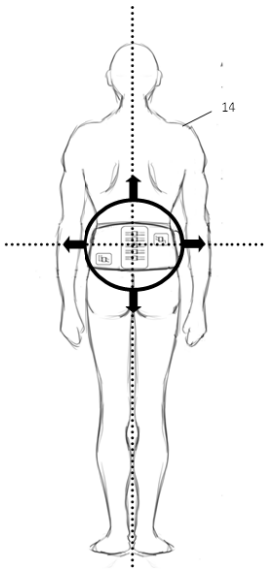

Image 1: Belt placing

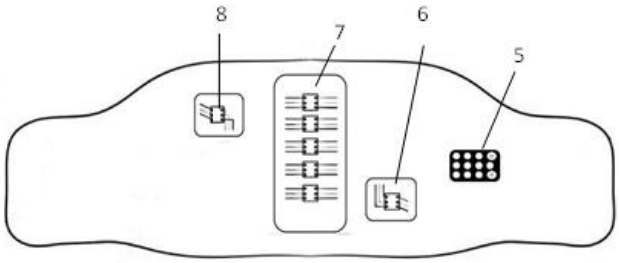

Image 2: Belt design with the 7 sensors, 5 central and 2 in the sides.

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