Towards quantitative functional balance

ASSESSMENT AND TRAINING

Equimetrix
by tecnalia

BUSINESS OPPORTUNITY
Instrumental equipment providing functional balance assessment and training, filling the current gap between functional clinical tests and quantitative instrumental measurements.

Proposal

Equimetrix is a technology to:
- **Measure** either:
  - the relative 3D position of Centre of Mass (CoM) and Base of Support (BoS).
  - the relative 3D position of CoM and Centre of Pressure (COP) of humans.
- Compute a **Stability Index** based on features extracted from CoM and BoS/CoP relative positions.

Equipment

- A **motion sensing belt** equipped with a camera and an inertial measurement unit and positioned as close as possible to the CoM (lower part trunk).
- A **platform at the level of the feet** that measures the BoS or CoP.
- A **processing unit** for sensor fusion and stability index computation.
- A **Graphical User Interface** providing real-time feedback to both patient and healthcare professionals.

Functionalities

Two main functionalities are available in Equimetrix:
- **Assessment**: The software supports various assessment procedures during which a stability index is recorded (see Figure 1) among other features such as CoM statistics (velocity, acceleration, maximum velocity, maximum acceleration), CoP statistics (similar to stabilogram information) or foot placement (Base of Support dimensions) if available.
- **Training**: The software offers the possibility to perform various training tasks or games. Figure 2 presents the “follow the spiral” game. The goal of this game, after guiding the user on proper foot placement on the pressure distribution platform, is to virtually drive the representation of the user’s Centre of Mass (CoM) over the spiral drawn on the screen. The execution time as well as the time spent by the CoM outside of the spiral are recorded for further analysis.

Equimetrix might be complementary technology for current equipment:
- Baropodometric devices.
- Sensorized walking pathways.
- Force platforms.
- Sensorized treadmill.

And might be combined with computer for visual feedback, EMG or virtual reality devices.

Our Competitive Advantage

- Portable solution combining two relevant biomechanical parameters.
- Realistic measurements in dynamic conditions.
- Low-cost technology.
- Add-on to existing equipment.
- Compatible with current clinical tests.
- For both assessment and training.
- Fast and easy to put on and take off.
- Wireless.

Potential Markets

- **Neurorehabilitation**: Parkinson’s disease, Multiple sclerosis, Stroke.
- **Physiotherapy**: Knee/hip replacement, Coordination, Osteoarthritis.
- **Podiatry**: Geriatric podiatry, Orthopaedic insoles.
- **Otorhinolaryngology**: Chronic ear infection, Labyrinthis, Meniere’s disease.
Why Together with TECNALIA

TECNALIA is the first privately funded applied research centre in Spain and one of the leading such centres in Europe. With a workforce of more than 1,400 highly qualified people, a 102 million Euros turnover and a portfolio with over 4,000 clients, TECNALIA focuses its activity towards transforming knowledge into GDP to improve people’s quality of life, by creating business opportunities for companies.

TECNALIA is committed to future greatest challenges as it is, among others, the improvement of the quality of people’s lives, particularly in terms of ageing.

Its international and multi-disciplinary team is made up by 130 researchers specialised in the fields of health-oriented biotechnology, biomaterials, robotics and ICTs; this allows to provide solutions to many health challenges from different perspectives such as healthcare, food or medical devices.

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