為患初期脊椎側彎青少年研發的生物反饋智能背心

An Innovative Tank-Top with Biofeedback System for Adolescents with Early Scoliosis
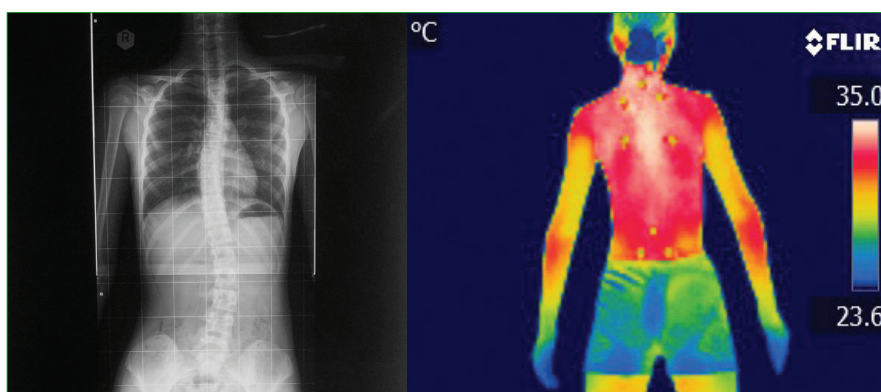
香港理工大學
THE HONG KONG POLYTECHNIC UNIVERSITY

恢復背部肌肉活動的平衡及控制脊柱側彎情況
Restore balance in back muscle activity and control spinal deformity

專利申請編號: CN105748037A (中國), US2016/0220174 A1 (美國)

青少年原發性脊椎側彎是最常見的三維脊柱變形疾病,本項目旨在為早期患者設計一件生物反饋智能背心。智能背心配備了多個傳感器,能為患者提供背部肌肉及個人化姿勢訓練。

另外,專為智能背心而特別設計的手機應用程式可實時監察使用者的姿勢,並於姿勢不正確時發出即時提示。透過生物反饋訓練,患者逐步學習適當地運用肌肉,以保持正確姿態。患者亦可利用手機把數據上傳至雲端,以檢查訓練進度和進行分析。智能背心讓患者主動地改善運動協調,在日常生活中保持良好的姿勢,從而控制脊柱側彎的情況,減少惡化 。

特色與優點

- 為患初期脊椎側彎的青少年提供個人化的生物反饋訓練
- 配備多個傳感器的智能背心記錄個人最優化的姿勢
- 使用輕巧而無線的慣性測量組單元
- 手機應用程式監察使用者的姿勢,於姿勢不正確時發出即時提示,亦可上傳至雲端用作檢查訓練進度和分析

應用

- 為患初期脊椎側彎青少年提供姿勢訓練和控制脊柱側彎情況
- 為一般人提供改善運動協調和日常姿勢的訓練
- 為運動員提供姿勢訓練,減低他們受傷的機會
- 為老人家提供姿勢訓練,舒緩因肌肉退化所引起的痛楚

獎項

- 第45屆瑞士日內瓦國際發明展 - 評判特別嘉許金獎 (2017年3月)
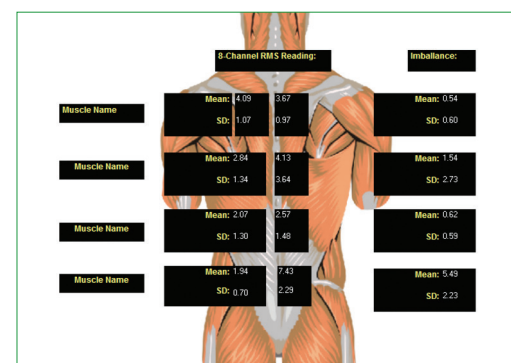- 羅馬尼亞創新科技協會特別獎(2017年3月)

脊椎側彎例子
Scoliosis case (x-ray and infra-red image)

舒適塑身背心
Body mapping tank top

生物反饋應用程式
Biofeedback system design

肌電圖訓練
Electromyography training

Patent Application No.: CN105748037A (China), US2016/0220174 A1 (US)

Adolescent idiopathic scoliosis (AIS) is the most common 3-dimensional spinal deformity in youths. An innovative tank-top, which features a biofeedback system with multiple sensors, has been invented to provide back muscle and customized posture training for scoliosis patients.

In addition, the tank-top is used with a specially designed mobile app which records the user's postures in real time and provides instant feedback. With progressive biofeedback training, users gradually learn to maintain upright torso posture by controlling back muscles. The data is also uploaded to cloud storage for tracking and analysis. The tank-top can therefore motivate patients to take an active part in improving their movement coordination and daily posture as well as controlling their spinal deformity.

Special Features and Advantages

- Personalized biofeedback training for adolescents with early scoliosis
- Body-mapping tank-top with multiple sensors to record optimized posture
- Lightweight and wireless inertial measurement units
- Mobile app that records posture in real time, provides instant feedback and uploads the records to cloud storage for tracking and analysis

Applications

- Posture training and controlling spinal deformity for patients with mild scoliosis
- Posture training to general public to improve their movement coordination and daily posture
- Sports training for athletes to prevent injuries
- Pain relief and posture training for elderly individuals

Awards

- Gold Medal with the Congratulations of Jury – 45th International Exhibition of Inventions of Geneva, Switzerland (Mar 2017)
- Special Merit Award – Romanian Association for Nonconventional Technologies, Romania (Mar 2017)

Access More info via mobile

Principal Investigator
Dr Joanne YIP
Institute of Textiles and Clothing
Contact Details
Institute for Entrepreneurship
Tel: (852) 3400 2929   Fax: (852) 2333 2410   Email: pdadmin@polyu.edu.hk