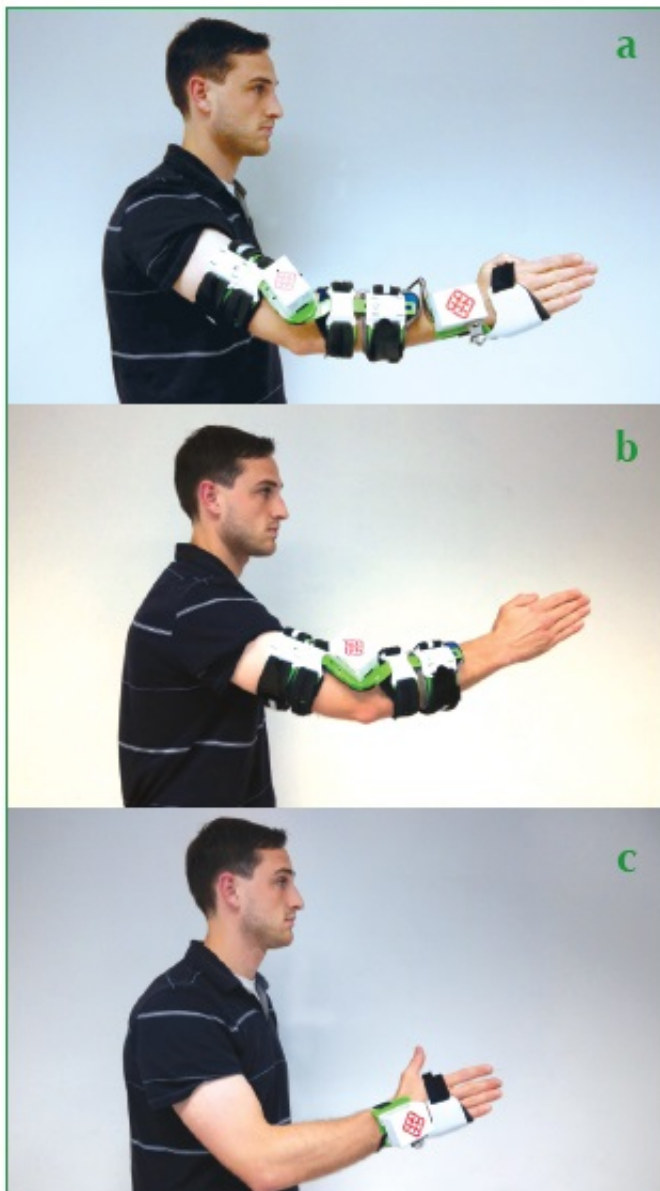


A wearable robotic sleeve for upper limb rehabilitation

May 14 2015



Modules of the rehabilitation sleeve can be worn together or separately:a) the

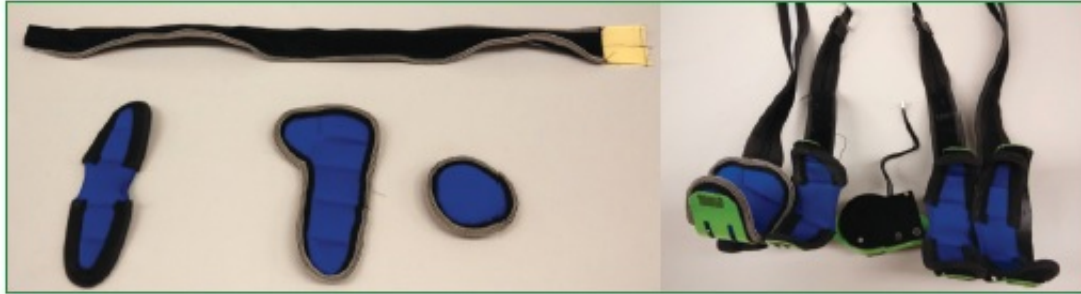
elbow and wrist /hand modules on the upper limb; b) the elbow module; c) the wrist/hand module. Credit: Hong Kong PolyU

A wearable FES-robot hybrid training system has been designed for multi-joint upper limb rehabilitation. With successful combination of the two technologies' advantages, recovery achieved by the hybrid system was more prominent than using either technology alone in pilot clinical trials.

The training [device](#) contains a novel bracing system with the function of moisture and pressure management to improve the wearing comfort of the device for long-term usage. The device can also translate the user's motions into mouse inputs and interact with computers. When coupled with various computer applications, it can diversify rehabilitation training programmes and enhance the patients' interest in the process, thus yielding better results.

Special Features and Advantages:

- **Faster recovery:** Not only can the FES-robot hybrid training system assist the elbow and wrist joints to move using electric motors, but can also enhance neuroplasticity recovery by inducing additional muscular practice at the elbow, wrist and hand/fingers through electrical stimulation.
- **Comfortable wearing:** The bracing system manages the pressure and moisture levels of the skin during training.
- **Interesting training programme:** The training system can act as a computer [input device](#), enabling the combination of training tasks with interactive computer games and applications.



復康袖的綁帶系統
The bracing system

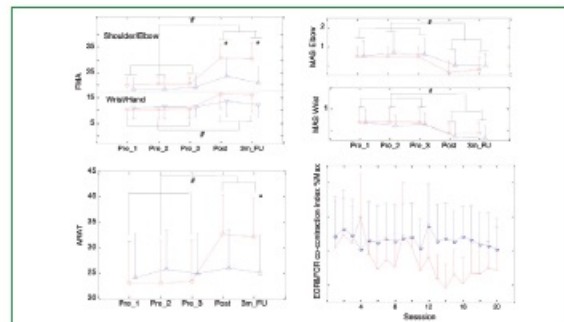
Modules of the rehabilitation sleeve can be worn together or separately: a) the elbow and wrist /hand modules on the upper limb; b) the elbow module; c) the wrist/hand module. Credit: Hong Kong PolyU

Applications:

- The device provides a novel [training](#) method for paralyzed persons to improve their upper limb functions.
- The device can be used in hospitals, clinics, health centres and at home.



互動訓練模式：圖中的病人正在透過屈伸手腕指代替發出滑鼠指令來玩電腦遊戲。病人也可把瀏覽互聯網及操作其他電腦程式納入復康訓練中。
The interactive training programme: The subject is playing a computer game by extending and flexing his wrist/hand, where such movements are interpreted as mouse inputs. Subjects also surf the web and perform other computer operations as part of the training.



在中風後腕關節復康訓練中，復康袖（即電刺激機械自動化整合系統）比單純機械系統無電刺激的訓練方式更有效，主要表現為更快的康復進程。紅線和藍線分別代表復康袖及純機械系統取得的康復進程。Training effectiveness of the FES-robot on the upper limb, in comparison with training assisted by robot only. Faster recovery can be observed in FES-robot assisted training (The FES-robot training is indicated by the red lines, and the robot-only training is indicated by the blue lines).

Modules of the rehabilitation sleeve can be worn together or separately: a) the elbow and wrist /hand modules on the upper limb; b) the elbow module; c) the wrist/hand module. Credit: Hong Kong PolyU

Provided by Hong Kong Polytechnic University

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