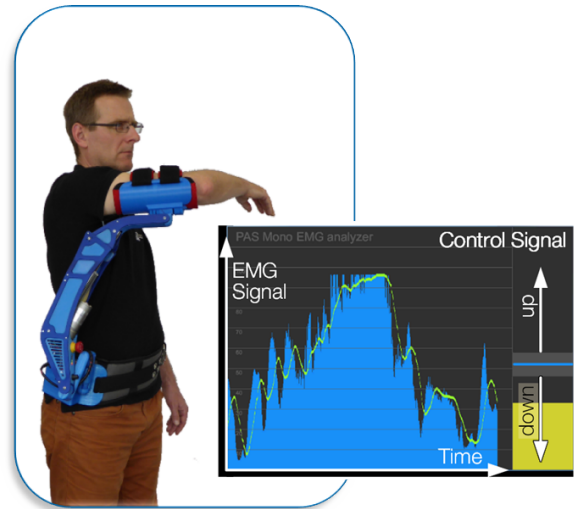


Biomechanical Engineering: Patient Assistive System for the Shoulder Joint

The mobility of the upper extremity is crucial for activities of daily living and independent housekeeping. A patient assistive system (PAS) can be helpful for people with an impaired shoulder joint to compensate for reduced muscle function and limited range of motion.



The PAS assists the patient in moving the arm against gravity but without replacing the existing muscle forces. In order to successfully cope activities of daily living, the PAS has to be completely portable, whereas a therapy device can be stationary. Besides patient specific adaptability ease of use, low weight and an appealing design are essential for the acceptance of a PAS.

Current Prototype: PAS Mono

The prototype is worn by the patient using a hip belt and the upper arm of the affected side is strapped to a brace. The system supports up to 120° of flexion and abduction. The prototype is driven by only one motor and controlled by surface electromyography (EMG). The system detects the muscle activity of the deltoid muscle and adjusts the level of assistance accordingly. The system is powered by battery and thus completely portable at a weight of 2.5 kg.

Further Steps

The activities of shoulder muscles and the movement of the upper extremities of shoulder patients during functional tasks will be analyzed. In addition, the PAS is presented to the patients and they are asked about their opinion on the device. The results of the study will be used for the further development.

For the continuation of the project, industrial partnerships for KTI applications are going to be evaluated for a commercial realization of a PAS.

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