

# AssistOn-Arm Exoskeleton



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AssistOn-Arm is a self-aligning powered exoskeleton for robot-assisted upper extremity rehabilitation. AssistOn-Arm can eliminate the physical burden of repetitive movement therapy, enable safe and versatile training with increased intensity, allow quantitative measurements of patient progress, and increase the reliability, accuracy, effectiveness via evidence-based personalized therapies.

Automatically aligning its joint axes, AssistOn-Arm can provide an ideal match with patient movements, guaranteeing ergonomics and comfort throughout whole human workspace. It can restrict compensatory movements and provide targeted joint movements. Additionally, its adjustment free design takes only few seconds to don, significantly reducing setup times.

AssistOn-Arm can deliver a comprehensive set of upper-extremity exercises, including glenohumeral mobilization, in addition to typical reaching exercises. Consequently, it extends the types of therapies that can be administered using upper-extremity exoskeletons.

AssistOn-Arm has a passively backdriveable design. As a result, the patient/therapist can move the device transparently, without much interface of the device dynamics on natural movements. AssistOn-Arm's force control architecture not only reduces the cost while improving interaction performance, but also enhances patients' safety.

The interaction controllers of AssistOn-Arm ensure the coordination of and the synchronization among various joint movements, while letting the patients take control of the speed of exercises. Furthermore, assistance forces can be provided as-needed to enable patients to complete their tasks, while maximally engaging them.

AssistOn-Arm features an explainable AI component, for personalized evidence-based physical therapies. It consults therapists via an intelligent, interactive human-computer interface, guides therapies and patients by warnings or recommendations based on patient specific measurements and provides explanations.

## Properties

- **Increased intensity**  
eliminates physical burden of repetitive therapies
- **Self-aligning and ergonomic**  
provides ideal match to shoulder complex
- **Easy to wear and use**  
adjustment free attachment
- **Large workspace**  
covers the whole arm workspace for ADL
- **Comprehensive**  
extends the types of robot-assisted therapies
- **Safe**  
transparent and force controlled
- **Assists-as-needed**  
ensures motivation, coordination and synchronization
- **Evidence-based and personalized**  
provide explainable AI recommendations

