Arm Supports

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Disclosure

Presenters for this activity have been required to disclose all relationships with any proprietary entity producing health care goods or services, with the exemption of nonprofit or government organizations and non-healthcare related companies.

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Note

- The products presented in these slides are not intended to be inclusive of every individual with upper extremity limitations and their inclusion in this presentation does not represent a product endorsement. Information in this presentation is intended for education purposes solely.

Arm Supports

Objectives

- Name 3 physical characteristics individuals may have who would benefit from an upper extremity arm support.
- Name three diagnosis individuals may have who would benefit from an upper extremity arm support.
- List three activities of daily living that upper extremity arm supports could assist an individual.
- Match potential mounting solutions for each arm support device.
- Identify three potential funding sources for upper extremity arm supports.

Purpose for Arm Supports

Arm Supports are designed to assist an individual who has limited proximal upper extremity strength and requires assist with lifting her/his arm.

Indicated where an individual has some level of grasp, wrist supination/pronation, and elbow flexion. Individuals with greater distal upper extremity deficit were shown to use arm supports less in daily activities.

Van der Heide L., Witte L., (2016). The perceived functional benefit of dynamic arm supports in daily life. JRRD. Vol 53

Diagnosis of individuals who could benefit from an arm support

- Amyotrophic lateral sclerosis
- Muscular dystrophy
- Spinal muscular atrophy
- Spinal cord injury
- Cerebral palsy
- Stroke
- Multiple sclerosis

Optimal physical capabilities for functional use of arm support devices

- External arm supports are designed to assist with proximal upper extremity strength loss.
- The ideal strength for an individual to be able to most functionally use a mobile arm support:
  - *2/5 shoulder abduction and adduction*
  - *2/5 elbow flexion/extension*
- The use of upper extremity arm supports have not been shown to increase functional dexterity and distal control and of the upper extremity
- External supports can be used if an individual has weak supination/pronation and wrist flexion and extension to increase function

Lebrassure A., et al. (2019). Evaluation of the usability of an active actuated arm support. Assistive Technology: The Official Journal of RESNA

Upper extremity arm supports that are FDA registered in the United States

- Mechanical Arm Supports (available bilaterally)
  - Saebo MAS – table/floor
  - Jaeco Wrex and MultiLink – table/wheelchair
  - Neater Arm Support Zero - table/wheelchair
  - Kinova O110 - table/wheelchair
- Powered Arm Supports
  - Neater Arm Support Assist - floor/wheelchair
  - Kinova O540 – floor/wheelchair

Saebo MAS
Mechanical Arm Support

Saebo MAS

- Table or floor mounted mechanical arm support
- Has pronation and supination attachment available
- Wheelchair mount not available

SaeboMAS | Mobile Arm Support Device for Shoulder Stroke Rehab

Saebo MAS

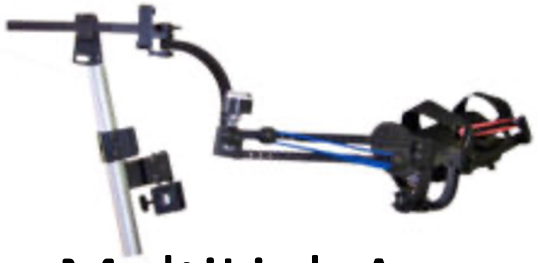
SaeboMAS mini | Mobile Arm Support & Shoulder Therapy Device

Saebo MAS

SaeboMAS

Jaeco Orthopedics
Mechanical Arm Supports

- Mechanical arm supports that use elastic resistance bands to provide assistance to elevate the forearm and upper arm (Wrex version)
- Includes forearm trough for forearm balancing without tools
- Products include: Jaeco Wrex, Jaeco Wrex pediatric and MultLink Arm



MultiLink Arm

Jaeco Wrex

Jaeco Wrex Pediatric

Mobile Arm Supports Archives | JAECO Orthopedic

Jaeco Wrex

Mobile Arm Supports Archives | JAECO Orthopedic

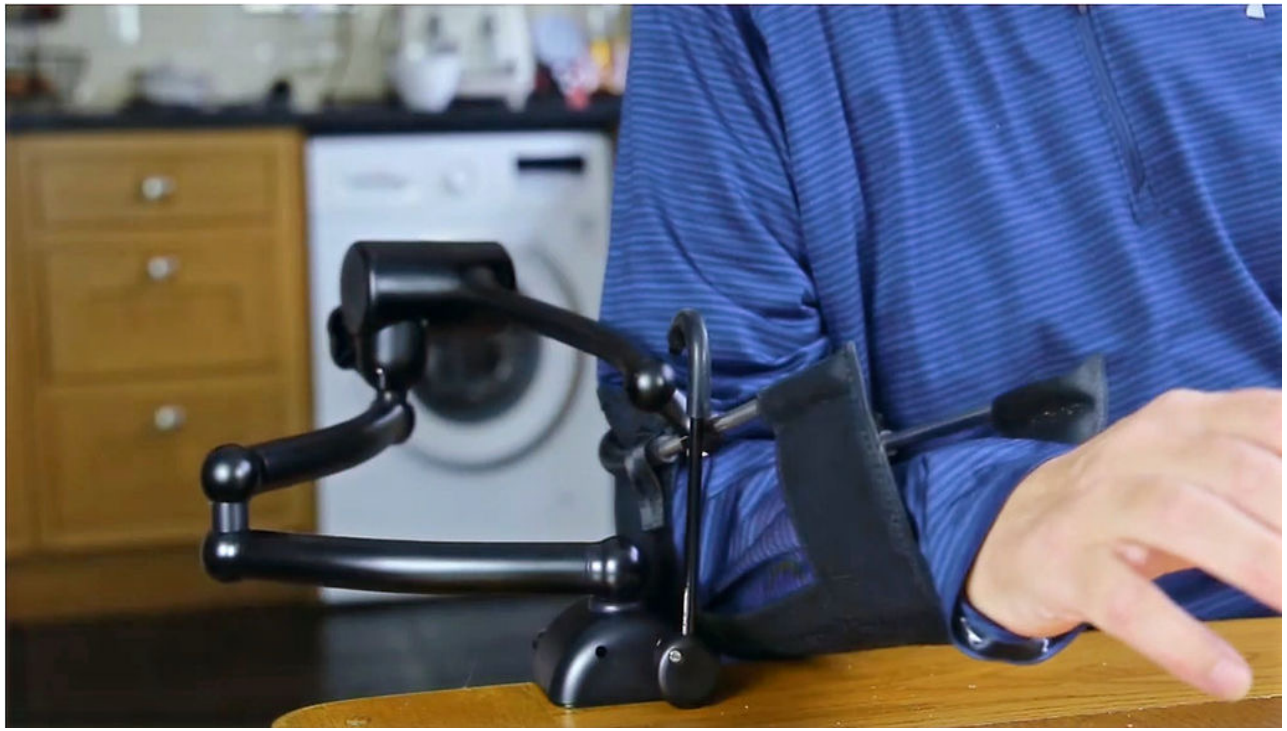
Wheelchair mount for Jaeco Wrex

Mobile Arm Supports Archives | JAECO Orthopedic

Neater

Neater Arm Support Zero

- Mechanical arm support
- Provides assistance through a spring-loaded mechanism
- Tension can be adjusted with a knob
- Includes a fold away hook for parking device when not in use



Neater Arm Support ZERO | Neater Solutions Ltd

Kinova
O110 Mechanical Arm Support

- Provides assistance through a spring-loaded mechanism
- Uses adjustable ring pull with 12 settings
- Includes parking dock when not in use
- Lifts off for storage or transfer between table and wheelchair

Table Mount of 0110

O110 Mount for Permobil Wheelchair

Neater

Neater Arm Support Assist

- Provides assistance through a motor and a spring
- Attaches to the back of a wheelchair or to a separate stand
- Tension is adjusted with a two switch system
- Angle of the frame can be adjusted to allow correct balance of support
- Additional slope piece available
- Additional Fixed Position Double Bracket to position one arm at set height

Neater Arm Support Instruction Manual

Neater

NAS Powered Arm Support

Neater Arm Support | Neater Solutions Ltd

Kinova
0540 Powered Arm Support

- Provides increased support for individuals who have a greater upper extremity weakness impairment or a heavier limb
- Individuals can adjust level of support with a six button remote, smartphone, or joystick (some wheelchairs)
- Allows user to continuously adjust the level of assistance for heavy lift or tired arm

Lebrassure A., et al. (2019). Evaluation of the usability of an active actuated arm support. Assistive Technology: The Official Journal of RESNA

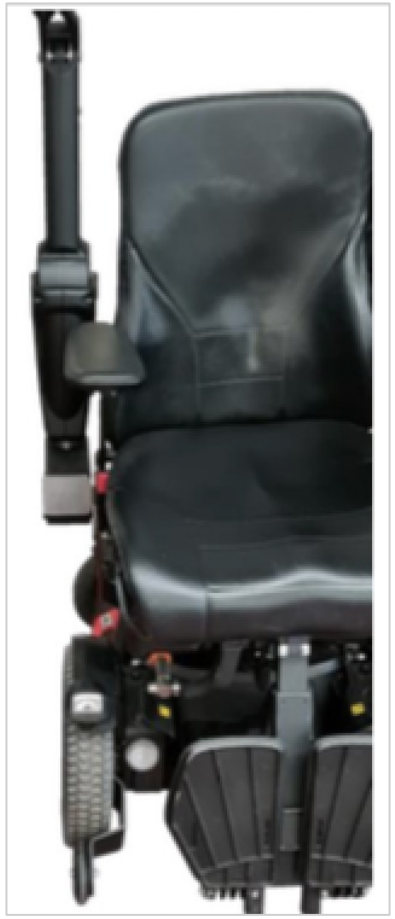
0540 Powered Arm Support

- The device can tilt anteriorly or posteriorly 25 degrees to allow for further range of motion in shoulder abduction and adduction
- Can be locked in both vertical and horizontal directions
- Uses wall power or wheelchair battery with low battery drain

O110 Arm Support - Partners in Medicine

Wheelchair Mount for 0540

O540 Arm Support - Partners in Medicine



- Attaches to seat rail – tilts with user
- Sits behind armrest
- Can mount on joystick side

Evaluation With and Without Arm Support

-Jacob Gulvason

Benefits of an arm support- *Dana Parrott*

Learning to use an arm support- *Dana Parrott*

Impacted ADL's and IADL's

- Nourishment- ability to self feed
- Hydration – bringing cup to mouth
- Medication Management (able to reach for pills and water)
- Meal preparation (opening cabinets, drawers)
- Environmental control (lights, thermostat, elevator buttons)
- Safety (using phone, pushing door plates)
- Social interaction – confidence in community engagement

Van der Heide L., Witte L., (2016). The perceived functional benefit of dynamic arm supports in daily life. JRRD. Vol 53

Funding for Arm Supports

- In the United States arm supports have been covered by commercial insurers, Medicaid, Medicare PPOs, VA, Vocational Rehab, and Workers Compensation
- Requires a device evaluation, physician's order, and letter of medical necessity written by an Occupational Therapist or Physical Therapist

Arm Support Research

Research (Bendixen)

Jaeco Wrex and Kinova O540

Study Type: Randomized Control Trial – Crossover Design

Participants: Males 14+ y/o or older with DMD and experiencing significant upper extremity weakness

Inclusion:

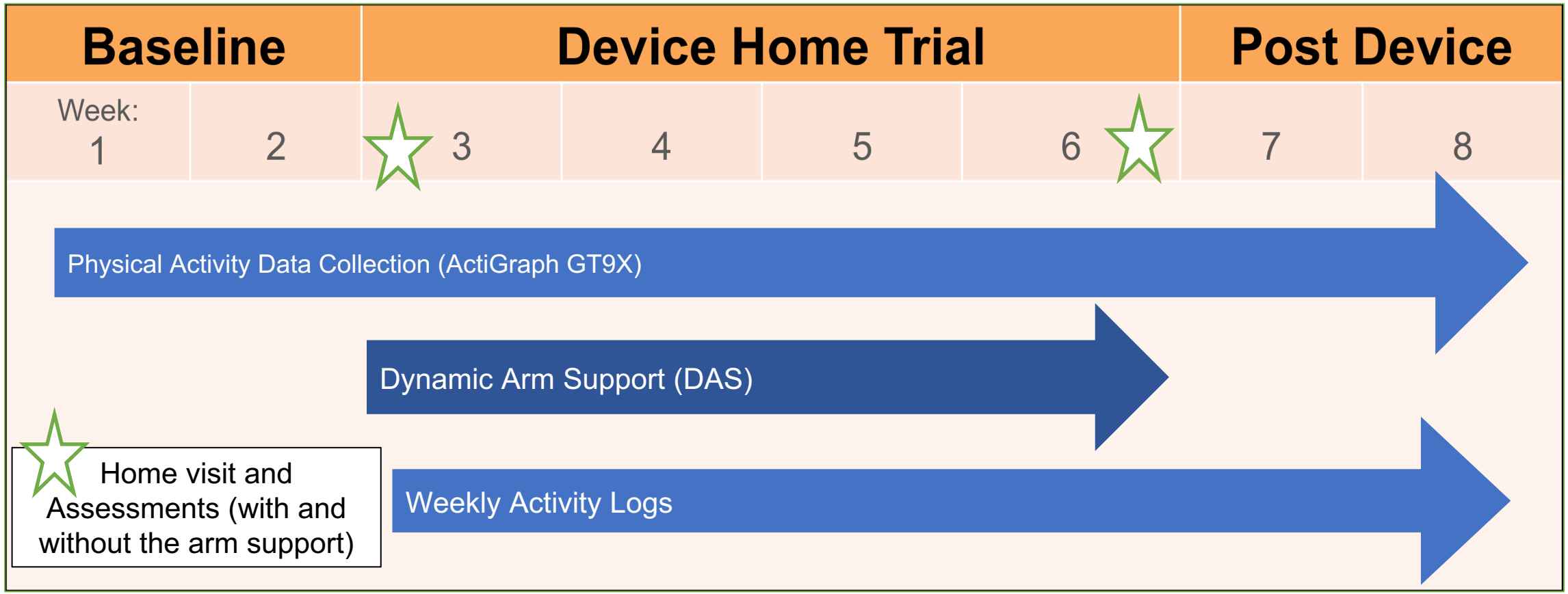
1) Needs assistance/unable to achieve independently at least 10 items on the UL ADL self-report questionnaire
2) Score between 0-4 first item of PUL

Recruitment and data collection: 2018-2020 (Clinical Trials NCT03531788)

Target recruitment: N=30 (N=19 *COVID*)

Participant Reported	Physical Performance
• Neuro Quality of Life Scale (Neuro QOL) • Activities of Daily Living Self-Report & Caregiver-Report (UL ADL) • Goal Attainment Scale (GAS) • Quebec User Evaluation of Satisfaction (QUEST)	• ActiGraph GT9X • Manual Muscle Testing • Grip and Pinch Dynamometry • Active Range of Motion • Passive Range of Motion • Performance of the Upper Limb (PUL)

Research


Baseline
Device Home Trial
Post Device
Week:
1
2
3
4
5
6
7
8
Physical Activity Data Collection (ActiGraph GT9X)
Dynamic Arm Support (DAS)
Home visit and Assessments (with and without the arm support)
Weekly Activity Logs

Goals

Research Summary

- Prior research on older dynamic arm support devices in neuromuscular disorders has shown positive influence on psychological factors, social participation, and increased independence in eating, drinking, and exercise (Cruz, Callaway, Randall, & Ryan, 2020; Essers, Murgia, Peters, & Meijer, 2020; van der Heide & de Witte, 2016).
- Research that has been conducted demonstrates that arm supports are a beneficial piece of equipment for individuals who have little to no shoulder function.
- Arm supports are shown to be of greater functional benefit and users have shown greater use of arm supports in individual's daily lives with those who have greater upper extremity deficits.
- Actively Actuated Devices (AAD) offer a motorically powered dynamic arm support option that allows users to have an active and adaptive arm support device that can meet the needs of a wider range of clients (Lebrasseur et al.; van der Heide & de Witte).

Research (Lebrassuer)

- A study conducted by Lebrassuer A, et al., 2019 on the usability of actuated arm supports which evaluates the effectiveness and usability of the GoWing powered assistive arm support
- Although there was no increased strength levels shown in participants' upper extremities post intervention, the individuals in the intervention group demonstrated increased activity tolerance and active range of motion in the elbow.
- Participants also reported a perceived increased level of independence.

Research (Van der Heide)

- A study conducted by Van der Heide A, et al., 2014 evaluated the benefits of non actuated, passively actuated, and actively actuated arm devices and functional stimulation.
- Non actuated devices assisted with tremor suppression, anti-gravity support and facilitation of elbow flexion/extension.
- Actively actuated devices provided the same functional support as non actuated devices, but assistance is provided with electrical motors. The electrical component allowed for greater assistance and the ability to better adapt to the wheelchairs base.
- Those who identified the arm support as extremely important had greater functional deficits in their upper extremities and the device was attached to a power wheelchair.

Research (Heutinck)

- Heutinck L, et al., conducted a study with males who have muscular dystrophy.
- Although there was no increased strength levels shown in participants' upper extremities post intervention, the individuals in the intervention group demonstrated increased activity tolerance and active range of motion in the elbow.
- Participants also reported a perceived increased level of independence.

Research (Ganddolla)

- A systemic review by Ganddolla M, et al, 2020 was completed to determine the effectiveness of wearable upper limb assistive devices
- Investigations included passive arm supports and active arm supports. The most commonly used passive arm support was the Wrex which was used in six studies
- Results showed the highest improvements in primary outcome measures was increased range of motion.
- Arm supports were shown to significantly increase the individual's ability to perform daily life activities
- Passive arm supports are shown to benefit those with less impairment but for severely impaired patient powered arm supports offer a higher compensation and allow them to complete larger movements with less work

Research Limitations

- Current research on arm supports is limited due to small group size, access to equipment and few number of studies conducted (mostly pilot or feasibility).
- Limitations have included the need for adequate proximal upper extremity strength to optimize functional use, the reduction in reaching capacity due to the fixed placement of the dynamic arm support on the wheelchair, and the lack of opportunity for users to control the assistance needed for variation in tasks (Cruz et al., 2020; Van der Heide et al., 2014).

Resources

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Discussion