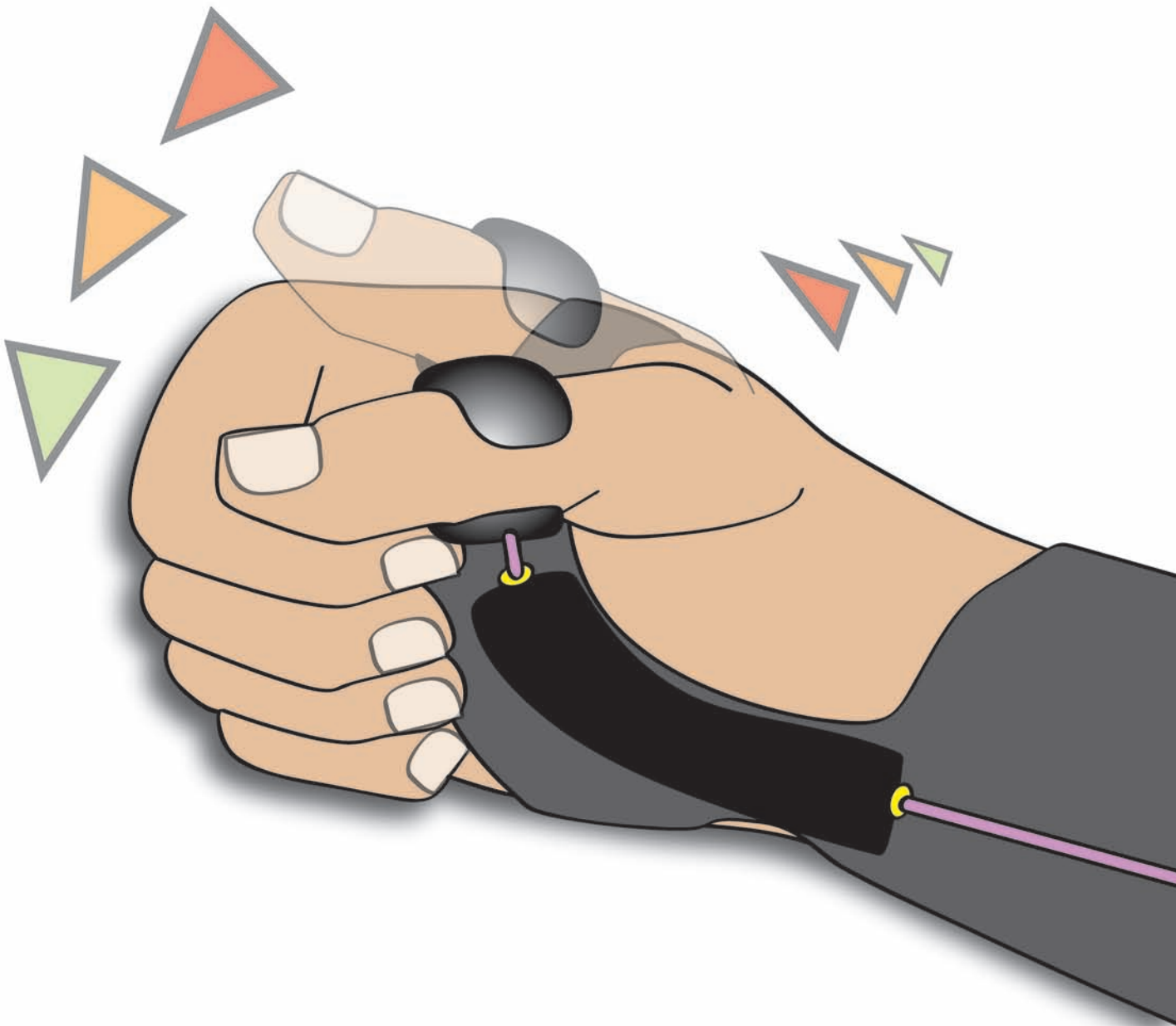


axs SYSTEM



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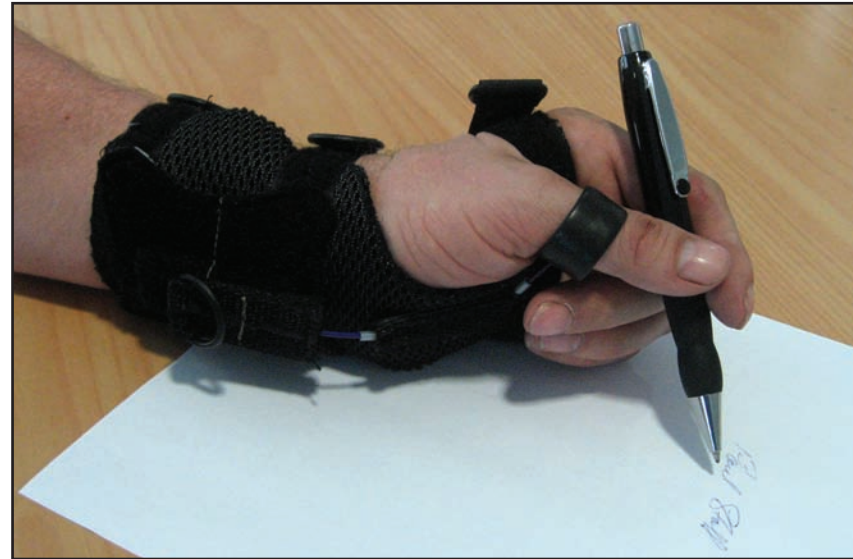


The world's finest wrist driven active tenodis grip orthosis & ADL therapy kit.



What is the AXS System?

The AXS (access) System comprises of a unique Wrist Driven Hand Finger Orthosis (WDHFO) coupled with a clinically proven Activities of Daily Living (ADL) hand therapy kit. This novel patented orthosis can dramatically augment the natural tenodesis (key pinch) grip to provide true power. Unlike other WDHFO's, the AXS is constructed of soft materials and is easily donned and doffed independently. The device is the product of a unique collaboration between engineers at Industrial Research Limited and clinicians at the Burwood Academy of Independent Living and has been clinically proven to be a valid assistive and hand therapy device¹.



How does it work?

The AXS Orthosis harness' the natural tenodesis movement and uses a nylon filament to pull the thumb into positive contact with the index finger during wrist extension.

Flexing the wrist produces the opposite effect, with the nylon filament gently pushing the thumb into a usable open position, ready for grasping. The AXS has three power setting modes and is capable of creating up to two kilogram's of pinch grip!

Who can benefit from the AXS?

Users; People who have partial or complete loss of digital function, but who retain wrist extension abilities (Modified Oxford Scale of 3 or more). Persons with C6/7 spinal cord injuries are most likely to benefit, but other patient groups with diminished hand function may find it extremely beneficial. Benefits are available through using the orthosis and ADL kit as hand therapy, and/or purchasing the orthosis for personal independent use.

Therapists; Occupational and Physical Therapists will find the orthosis, in combination with the AXS-ADL Kit, a highly useful tool to promote hand use for post-acute patients. The device can be used on dominant or non-dominant hands and should prevent learned non-use from occurring. Users of the device report high satisfaction rates as the AXS provides an instant, positive boost to hand functionality.

Hand Surgeons; The AXS accurately represents the likely outcome of tendon transfer and can be used to allow both surgeons and patients to assess the potential for invasive procedures.

How does the AXS-ADL System work?

Based on the clinical trial evidence, the AXS-ADL System replicates 6 useful daily scenarios with 13 sub tasks:

1. Remote control button
2. Feeding with a fork
3. Automated teller machine card
4. Zippers (horizontal & vertical)
5. Door lock & key
6. Electrical appliance plug

The system promotes a variety of hand, arm and postural positions and greatly encourages progression in hand technique development. Patients use the kit with and without the orthosis and get a real sense of their progress week by week. Therapists can compare patient progress with data from the clinical trial. The full kit includes training materials, assessment and sizing materials, patient data sheets, 6 x AXS Orthoses (S,M & L – Left & Right) and the ADL kit; all in one easy to use case.

Can patients use the AXS orthosis independently?

Yes, the AXS orthosis was developed in collaboration with people with SCI and is designed for independent use. Subject to funding criteria, the orthosis is available for purchase for individual clients through insurance and public funding schemes for equipment for people with disabilities. Consult with your therapist to find out more.



AXS System

Reference:

1. King, M J., Verkaaik, J K., Nicholls, A.; A Wrist Extension Operated Lateral Key-Pinch Grip Orthosis For People With Tetraplegia. July 2008.



The full kit includes training materials, assessment and sizing materials, patient data sheets, 6 x AXS Orthoses and the AXS-ADL kit; all in one easy to use case. The AXS-ADL System replicates six useful daily scenarios:

1. using a remote control button
2. picking up simulated food with a fork
3. inserting and removing an automated teller machine card
4. opening and closing two types of zippers (horizontal & vertical)
5. inserting, turning and removing a key
6. inserting and removing an electrical appliance plug

The system promotes a variety of hand, arm and postural positions and greatly encourages progression in hand technique development. Patients can use the kit with and without the orthosis and get a real sense of their progress week by week. Therapists can compare patient progress with data from the clinical trial.

Step 1. Measure & Fit

The sizes available are:

| LEFT | RIGHT |
|------|--------|
| | Small |
| | Medium |
| | Large |

The device works to add positive power to the tenodesis motion. Look at the position of the thumb in relation to the forefinger. You may need to work on splinting and positioning of the fingers to allow for positive contact between thumb-finger as the wrist extends. Spend time to fine tune the device to the hand using the adjustments available. The thumb position can be adjusted using the Velcro tension tab. Positioning the tab distally from the reference line opens the thumb for grasping larger objects, while positioning the tab proximally increases grip strength. Generally, you want to achieve the following with your measure and fit:

- Orthosis best fits dimensions of hand, wrist and thumb
- Straps are firm but not over tight
- Wrist is freely able to flex and extend freely
- The filament is centred on the midline of the wrist
- The thumb ring can be slipped on/off but is not loose on the thumb (bend thumb ring to suit)
- Natural tenodesis motion of the thumb throughout wrist extension is easy to observe

Use the video and and practical sessions to experiment with using the tenodesis motion. The orthosis can be used to teach proper technique of using wrist flexion/extension to effect thumb movement. Apply the glove and observe how the thumb ring PUSHES the thumb open during wrist flexion, and PULLS the thumb closed during wrist extension. Ideally the thumb should contact the forefinger in the neutral (wrist straight) position. Further wrist extension will then add power to the grip created.

The Velcro Tension Tab allows the thumb to be quickly repositioned for different grips:

- Distal tab position creates a wider thumb/forefinger gap
- Middle tab position results in thumb/forefinger contact at the neutral (straight) wrist position
- Proximal tab position closes thumb/forefinger gap and increases grip power

Step 3. Baseline

After a minimum of 30 minutes training time (not including fitting and tuning), use the AXS-ADL kit and score sheets to establish a baseline hand function score for the patient. In the clinical trial, average baseline scores without the orthosis were 2.3N (230 grams) and 5.4N (540 grams) with the orthosis.

! Safety Assessment: A visual assessment of skin marking should be carried out by a qualified health professional (OT or Nurse) to determine if the glove is safe to wear for extended periods. If any serious skin integrity problems are detected, usage of the orthosis should be suspended with that individual participant and the cause of the pressure area determined and eliminated if possible. It is normal for some minor skin marking to be evident after the wearing of the orthosis.

Step 4. Weekly Assessment

Patients should use the orthosis for a minimum of 30 minutes per day for a period of 6 weeks. The orthosis could be used for a range of ADL tasks, not just limited to the AXS-ADL kit. Patients should be assessed weekly on the AXS-ADL kit and their achievements recorded on the score sheets. A final assessment should be carried out at the end of Week 6.

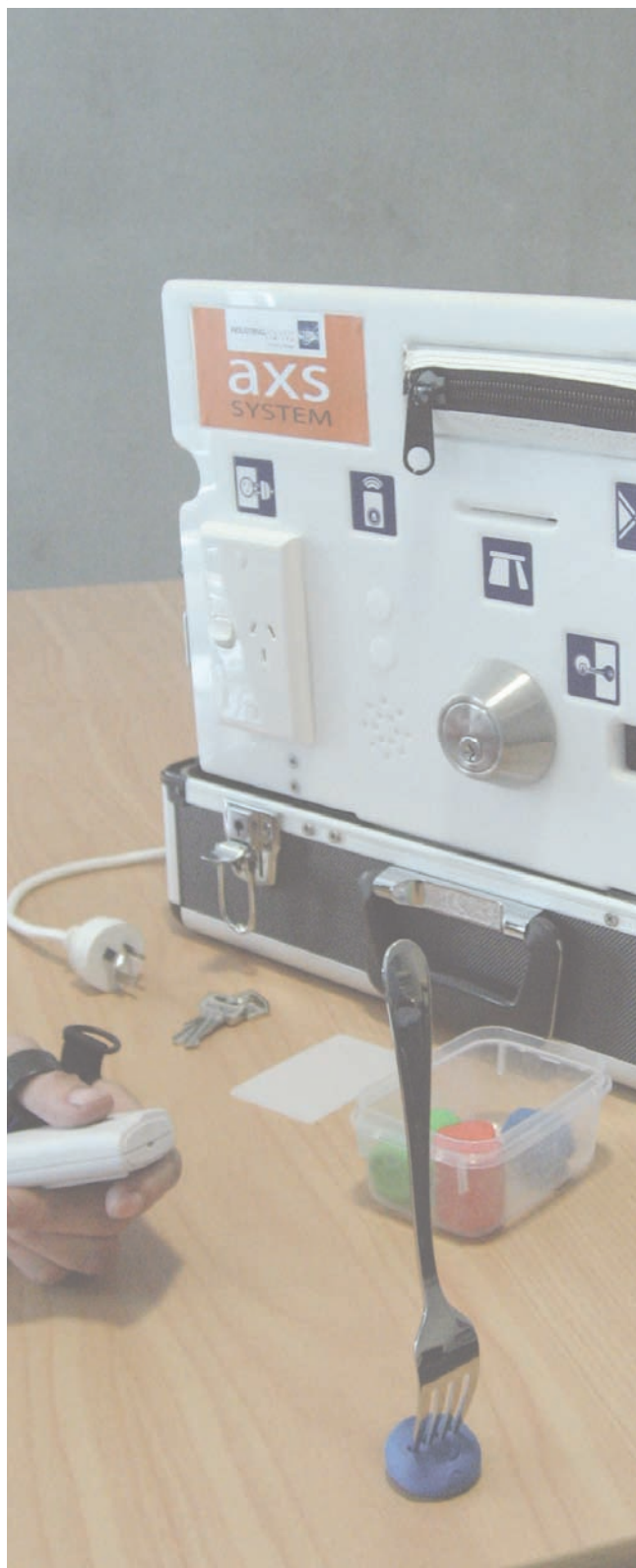
Reasonable Expectations; If a patient meets the usage criteria for the glove (Modified Oxford Scale >2 wrist extension ability), and adheres to the minimum usage requirements, they can reasonable expect to improve their average hand function scores as follows:

| | Baseline Score | Week 6 Score |
|----------------------------|----------------|--------------|
| Pinch Force (N) | | |
| Without Orthosis | 2.3 | 4.3 |
| With Orthosis | 5.4 | 13.1 |
| Hand Function Score | | |
| Without Orthosis | 3 | 6 |
| With Orthosis | 7 | 11 |

Step 5. Provision

If the AXS orthosis is likely to be useful in ADL tasks for the individual post discharge, then assessment and funding options should be explored to supply the individual with an AXS orthosis.

AXS Orthosis



Instructions for the AXS-ADL Kit

The AXS-ADL test kit is used to determine how the key-pinch orthosis improves a person's ability to carry out the ADLs and to promote usage of the affected hand. For testing we need to measure performance of one hand, with and without a key-pinch orthosis. Both hands may be used for positioning and support, but the grips must be achieved with the hand being tested. It is not meant as a physical or mental challenge so try to maximise the chance of success by placing the device and components in the best possible positions.



1. Pinch Grip Force

Use a digital Pinch Grip Force Meter (not supplied) to measure the strength in Newtons (N) of the opposing force between the thumb and the forefinger (key pinch). Set the meter to "hold" in order to record the maximum force attained and repeat 3 times each session.



2. Remote Control

The bell must be switched on using the switch on the side of the main unit. The remote control with the central button is to be placed on a table within easy reach. The task is to pick the remote up off the table, transfer it into the testing hand and depress the button, using key pinch, so that the bell rings.



3. Food & Fork

The ball of soft putty is placed on the table alongside the fork. The task is to pick up the fork and then insert the fork into the putty so that the putty can be lifted from the table.



4. ATM Card

The simulated credit card is to be placed on the table. The task is to pick up the card and insert it into the slot so that it is grabbed by the catch behind the slot. Release the card. Grip the leading edge of the card and remove it from the slot. Note that most ATM machines have less than 1cm of the card protruding from the machine when the return the card. Aim to grip the card by only the highlighted front edge.

To provide a positive experience it may be best to start with the activities that the person is most likely to succeed at. Do not let someone struggle with a task that is too hard. Once the person has stopped making progress the task should be marked as not achieved. If the task is substantially achieved so that a device can be operated, even though it is awkward, then the task is achieved. The 8 tasks are listed in an order that may be from easy to hard, depending on the individual's functional level. Tasks are assessed as completed or not completed and are recorded on the score sheet as a Yes or No.



5. Horizontal Zipper

The zipper is to be in the closed position at the start. The task is to grip the zipper and open the zip. Release the zipper, re-grip it and then close the zip



6. Vertical Zipper

The zipper is to be in the closed position at the start. The task is to grip the zipper and open the zip. Release the zipper, re-grip it and then close the zip



7. Door Lock

The key is to be placed on the table. The task is to pick up the key and insert it in the lock and turn the key so that the door bolt opens. Release the key, re-grip it and turn to close the bolt. Pull the keys from the lock and return to the table. Note that the bolt should be well lubricated from time to time.



8. Electric Plug

The plug is to be placed on the table. The task is to plug it into the socket and turn on the switch. Turn off the switch, grip the plug and remove from the socket. Note that you may need to stabilise the ADL for this task with your hand as the forces required to complete this task are higher.



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