

# CHOOSING A MYOELECTRIC HAND AND HARDWARE THAT SUITS THE UNILATERAL AMPUTEE'S FUNCTIONAL REQUIREMENTS.

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## AIM OF THE STUDY:

Enabling the amputee to choose his own multi-functional hand has been a project for the last 4 years.

## TECHNIQUES USED:

In NSW, the insurers need justification of the functional benefits of the multifunctional hand prior to its approval. It is difficult to be specific about the most appropriate hand without the use of a trial prosthesis. Since 2013 15 unilateral amputees have had trials of one or more hands prior to prescription.

The questions that are asked by all funding bodies for a prosthetic request are:

- State the participant centred goal/s that relates to this/these items of prosthesis.
- Describe why the participant needs this prosthesis. How often is this prosthesis likely to be used?
- Describe why the features/specifications of the proposed prosthesis are reasonable and necessary. Why have these components been chosen?
- Can the participant don and doff the prosthesis independently? If not what assistance is required?
- Other information relevant to the prescription.
- What other prosthetic options / components were considered or trialed? Why are they not appropriate?

## RESULTS:

Each trial costs about \$5,000 if an interim socket has to be fabricated but \$1,000 if they already have a suitable socket. Every insurer has approved the interim socket and trial of the hand. They can see their way to approve \$5,000 without high levels of justification but the cost of \$100,000 requires oversight by the NSW governing body and is much more stringent).

As a result the patients are able to determine their preference based on a variety of factors including cosmesis and function. Appropriate functional justifications dealing

with specific tasks are able to be submitted for funding to easily answer the questions.

The method of prosthetic control was identified accurately, the postures that were identified, the outcome from other trials if another hand has been used. The amputee also takes responsibility for their own decisions. Manufacturers know that they have to be able to loan hand to make future sales.

- MG (2015) - A partial hand amputee with intact thumb had been prescribed and fabricated a Ilimb digits prosthesis as recommended by her Solicitor. She used it well and found it useful in food preparation for 1-2 hours per day.
- JM (2014) – A farmer who suffered severe burns resulting in loss of all 5 fingers. He did not have the range of movement for any body powered prosthesis. He did not find the Limb digits strong enough for farming work and rejected them choosing to have body powered prosthesis fabricated. By that time he had developed the range of movement to find it useful.
- HL (2017) A recent referral who suffered amputation of the thumb and index of his dominant hand in late 2016. His poor English language and poor education makes his need for hand function more important. He lives alone and needs to be independent in food preparation.
- DMcS – 2011 was provided with the first Ilimb hand. He preferred the gripper with its functionality rather than cosmesis. He was a builder by trade and worked in the Coal Mines.
- MB – 2001 who was provided with rigid grip hand. He had an intellectual disability and lived 600 km from the fitting centre. He returned in 2015 for a replacement prosthesis but chose to continue with a rigid grip hand for simplicity and ease of use.
- RMcC - 2013 He was provided with an Ilimb in 2013 which was the only multifunctional hand available. He had a body powered prosthesis which he used at work and still uses at work.
- DS (2013 and 2014) trialed the Ilimb and Michaelangelo. He did not find the 4 grips of the Ilimb easy and chose the Michelangelo for its

strength and speed. He has had a lot of difficulty with the socket and wears it occasionally.

- BW (2014)– Trialled the Ilimb and Michelangelo. However the Ilimb was a 2 week trial and the Michelangelo was only 30 minutes with a general socket. He chose the Ilimb hand but for the past 12 months it is hardly used and has spent months in repair. He states the grip is not sufficient.
- PT (2016) – He trialled both the Ilimb and Bebionic. He did not want to trial a Michelangelo. He preferred the Bebionic without a glove. He chose to utilise a roll on silicon liner which had used in cosmetic prostheses prior to this one.
- AS (2015) – He was prescribed a rigid grip hand. He wanted a trial of Bebionic and Ilimb but only had a single site control and did not have good activation of that site. We were only able to justify a rigid grip hand. He has found it difficult to make use of and progressed to a silicon liner to increase the comfort.
- RH (2016) - Over 15 years, he had used Sensor Speed Hand. He a very early Ilimb but did not like it and did not find it useful. He had a trial of Michelangelo but did not like the noise. He refused a trial of Bebionic because it did not have an electrically operated thumb for prepositioning. He chose the new Ilimb.
- RG (2013 and 2015) – He had an existing ergo elbow and internal battery. He trialled the Ilimb and while in the first week he was excited, by the end of the fortnight he stated it was too difficult to know which posture he was trying achieve. A trial of the Bebionic was successful and to date he has achieve 4 possible postures with 2 in opposition and 2 in non opposition. He wears his Bebionic hand on a daily basis.
- ML (2014) – He had undergone osseointegration before a prosthesis was trialled. He trialled both the Ilimb and Bebionic but preferred the Bebionic. The prosthetist supplied the Ilimb. He wears and uses the prosthesis intermittently. He has difficulty with skin conduction and has now undergone TMR as the first case with a surgeon in Sydney.
- TF (2016) – He has been provided with several sockets and trialled several hands. Initially he wanted the Ilimb but later on our recommendation trialled the Bebionic and eventually chose a flexion wrist. He did not want any trials but it took 2 socket designs and 3 hand trials before he had a prosthesis that was actually useful in the workshop and garden. He has an electric lock ergo elbow

but uses it purely passively with his other prosthesis. A silicone liner has provided the appropriate suspension. As a short trans-humeral he would have required very proximal trim lines in his standard socket and he did not want that. .

- JC (2014) – He chose an Ilimb hand while in acute care. He wanted an electric elbow and osseointegration. Neither of these options were prescribed and he did not like the ergo elbow. He eventually chose an Ener elbow and uses it with his Ilimb hand. He has worked very hard to make it useful and wears it daily using 2-3 postures. He now wants to upgrade to an electric elbow and is consider TMR.

## CONCLUSIONS

There have been 3 partial hand, 8 trans-radial and 4 transhumeral amputees.

Patients dislike harnessing and prefer silicone liners for suspension. This enable with electrode holes cut in the liners.

One partial hand did not want the Idigits due to lack of durability.

One trans-radial patient was refused multifunctional hand but approved for a rigid grip hand (due to cost)

One partial hand is awaiting approval of the trial.

12 mutlifunctional hands have been approved.

Two out of 3 transhumeral subjects have chosen to have roll on silicon liners.

. Specific tasks are identified. Not all results have been successful.