



What are the Functional Differences Between the Various Myoelectric Hands and Hooks?

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Disclosure Statement

We have the following relevant relationships in the products or services described, reviewed, evaluated or compared in this presentation.

Hanger Clinic:

The speakers are paid employees of Hanger Clinic and receive a salary.



Learning Objectives

- Attendees will learn about the types of myoelectric terminal device options available for upper limb prosthetic users.
- Attendees will understand the functional differences between each option.
- Attendees will be more informed when deciding on the right terminal device.

THE POWER OF YOU!



Electronic Terminal Device (ETD) Motion Control

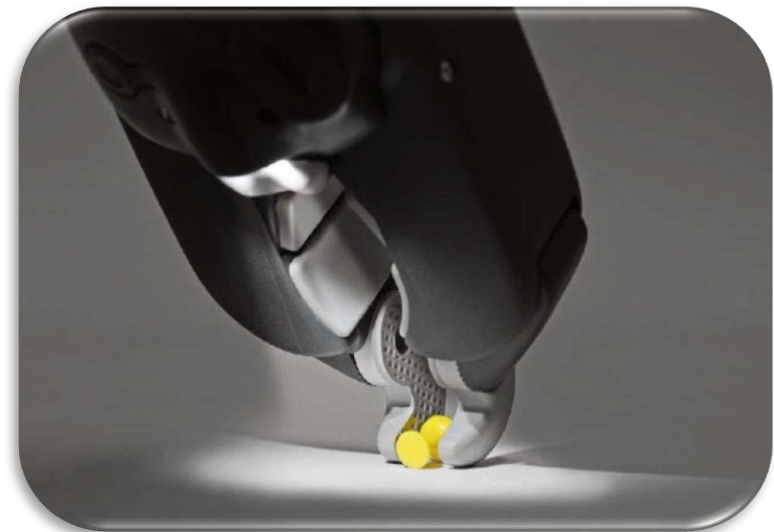
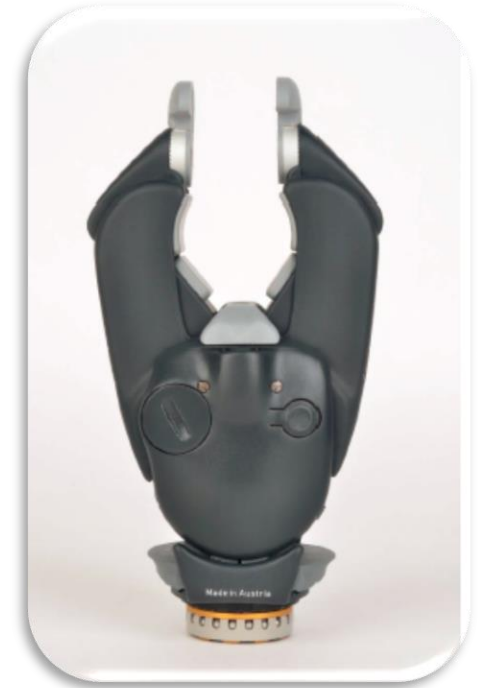
- Powerful pinch force – 25 lbs.
- Slender tips for fine motor tasks
- Good visibility
- Wide opening
- Water resistant up to wrist
- FLAG (Force Limiting Auto Grasp)
– important to know if ETD has FLAG for training purposes
- ETD2 – shorter fingers





GREIFER OTTOBOCK

- Powerful grip force – 28 lbs.
- Large opening width
- Very robust – great for manual labor
- Modern color – dark grey tones stay cleaner
- Built in LED flashlight for greater functionality with delicate tasks
- Clutch release lever
- Built in wrist deviation
- Different gripping tip options





i-Limb[®] Quantum Touch Bionics by Össur

- 4 methods of control – gesture using imo™ technology, use of the app, muscle triggers and proximity using grip chips
- 36 different grips available, both preprogrammed and customized.
- Adjustable speed boost for digits up to 30%
- Electronically rotating thumb automatically switches between lateral and oppositional grip patterns.
- Five independently articulating digits with individual stall out ability.
- Biosim™ and My i-Limb™ Apps.
- Available in 4 sizes
- Requires a glove cover for warranty





bebionic Ottobock

- Individually powered fingers
- 2 position thumb rotation
- Thumb position determines grip pattern
- 14 selectable grip patterns – 8 programmed
- Computer programmable via Bluetooth
- Spring loaded flexion in fingers - flex naturally when they brush against people or unintentionally bump into objects, folding away to protect the mechanics of the hand.
- Padded finger tips for maximum gripping surface
- 2 colors choices - black or white
- Glove options
- 2 sizes

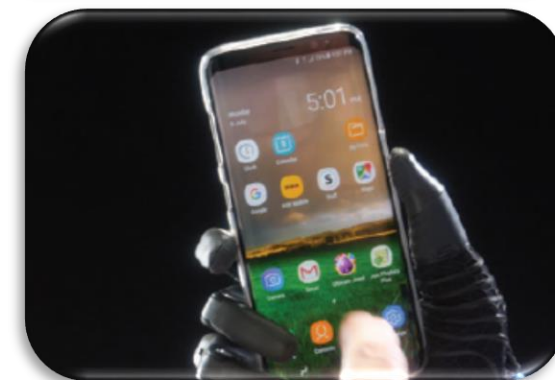




Taska Hand

Taska Prosthetics – Distributed by Motion Control

- 23 grip patterns –accessible with buttons on hand, patient app or EMG triggers, active and passive grips
- High speed electronic thumb rotation
- Built in flexion wrist, lockable in 3 positions
- Fingers have lateral compliance allowing them to move from side to side for secure grip when placing items in between the fingers
- Breakaway fingers if overloaded
- Water-resistant, submersible, robust
- IOS and Android apps
- 3 colors – black, sand and white with some customizable dorsal covers, 2 sizes
- No glove cover required





Michelangelo OttoBock

- Fast and powerful
- Powered thumb rotation
 - 2 positions – lateral and opposition
 - Return to neutral option
- Natural appearance
- Relaxed hand posture
- Flexible oval wrist - 7 lock options
- 7 grasp patterns
- Computer programmable via Bluetooth
- Glove options
- One size





The Nexus Hand by COVVI

- Powered thumb rotation – 2 operational modes
- Integrated flex wrist - 3 lock options or can be left in a free-flex state
- Informative data screen on hand
- Index finger is compatible with touchscreens
- 10 grasp patterns
- Simple app connectivity for programming
- Unique glove strategy
- Four colors
- 3 sizes
- IP44 rated splash resistance

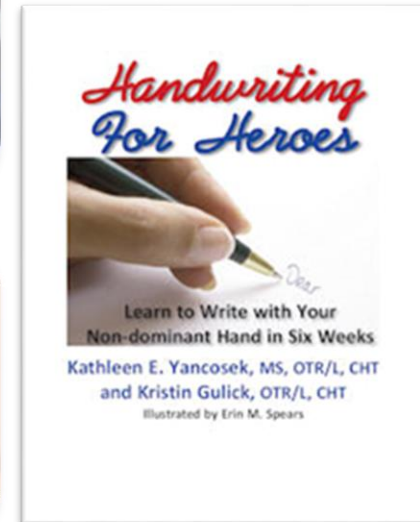
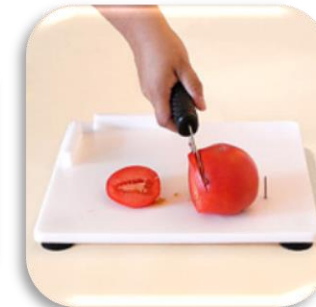




Pre-Prosthetic Therapy

Goal: to increase independence with ADLs after amputation and to prepare the patient/residual limb for acceptance of a prosthesis.

- Patient education
- ROM, strengthening, body symmetry/image
- Phantom sensation, pain, mirror therapy
- Edema control and limb shaping
- Desensitization and scar management
- Change in hand dominance
- Psychological support
- Myosite testing and training
- Current ADL function and adaptive equipment



Prosthetic Training

Goal: To increase independence with ADLs, improve quality of life and return to participation in desired occupations

- Controls Training
 - Training without Objects
 - Basic control of prosthetic function
 - Sitting, standing, walking
- Repetitive Drills
 - Training with objects – grasping
 - Repetition and variations of sequences and objects
 - Grip force
- ADL – Bi-manual training
 - Everyday activities goal directed by the patient





Questions and Answers

References

1. Cutti, et al. *The Psychosocial and Biomechanical Assessment of Amputees Fitted with Commercial Multi-grip Prosthetic Hands*. Grasping the Future: Advances in Powered Upper Limb Prosthetics, 2012, Pp.59-77(19).
2. Tomlinson, T. Penn State University Grad School Dissertation. 2012. *The Dynamic Dominance Hypothesis as a General Theory of Human Motor Control*.
3. Dechev et al. Paper, *Multi-fingered, passive adaptive grasp prosthetic hand: Better function and cosmesis*, in the Proceedings of the 17th Canadian Congress of Applied Mechanics, Ontario, Canada, 30 May–3 June 1999.
4. Ritchie, et al. *Perceptions of cosmesis and function in adults with upper limb prostheses: a systematic literature review*. *Prosthetics and Orthotics International* 35(4), 2011, 332–341.
5. Physiologic Function and Prosthetic Emulation of the Human Hand. Gerald Stark, PhD, MSEM, CPO/L, FAAOP (D), Ottobock Healthcare.
6. Smurr, Lisa M; Gulick, K; Yancosek, K; Ganz, O, (2008). Managing the Upper Extremity Amputee: A Protocol for Success. *J of Hand Therapy*, 21(2), 160-176.
7. Wise, M, (2007). Rehabilitation for persons with upper extremity amputation. In M.M. Lusardi & C.C. Nielsen (Eds.), *Orthotics and Prosthetics in Rehabilitation* (pp. 859-874). St. Louis, Mo.: Saunders/Elsevier.
8. Motion Control.
9. Ottobock.
10. Touch Bionics by Ossur.
11. Covvi.
12. Taska Prosthetics.



Thank You!