

Myoelectric Hands

دستهای میوالکتریک

تهران - اسفند ۱۳۸۹

Below Elbow M.E Hands
(Trans Radial & Trans Carpal M.E Hands)

Control Systems

Components

Indications

Innovation

Human & Prosthesis Machine

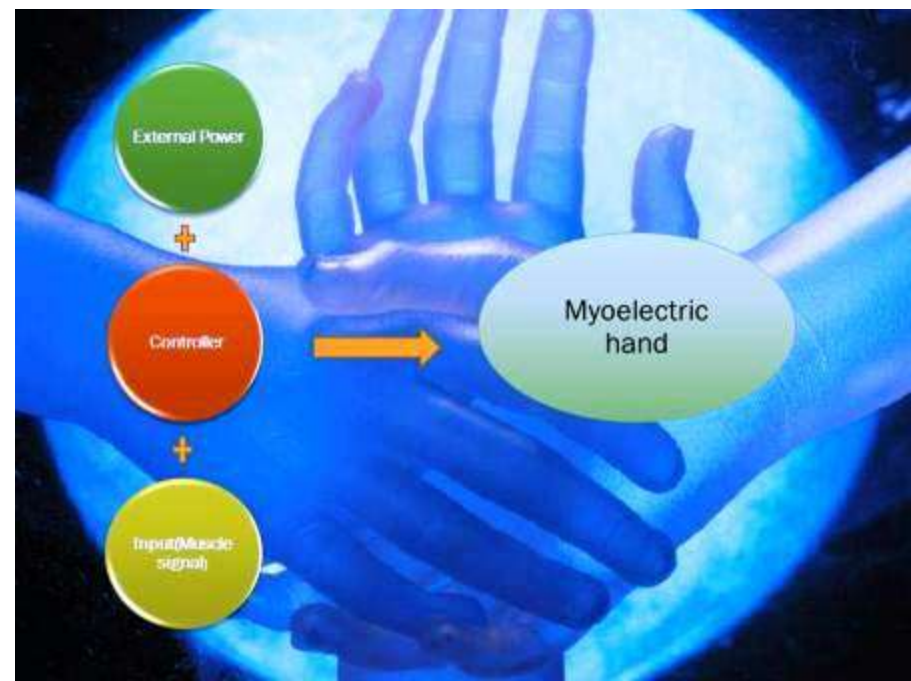
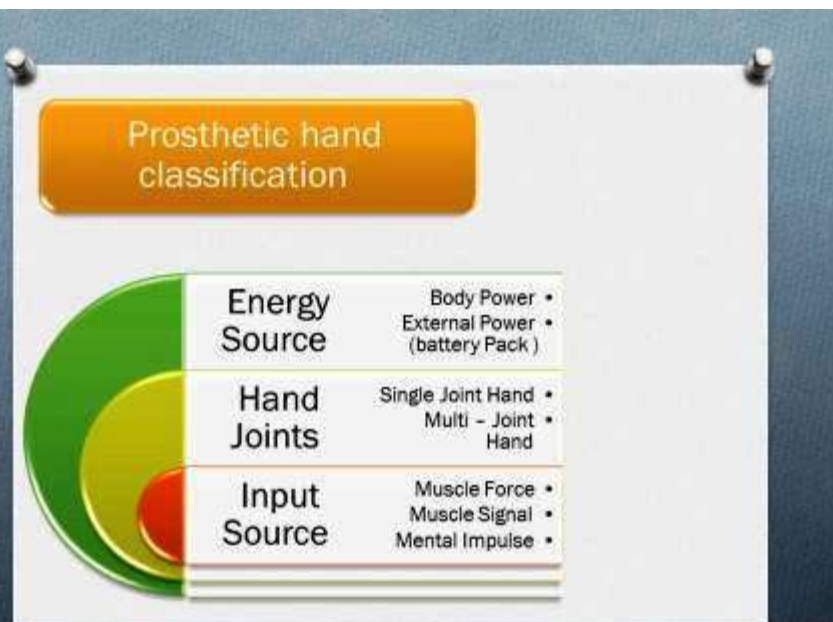
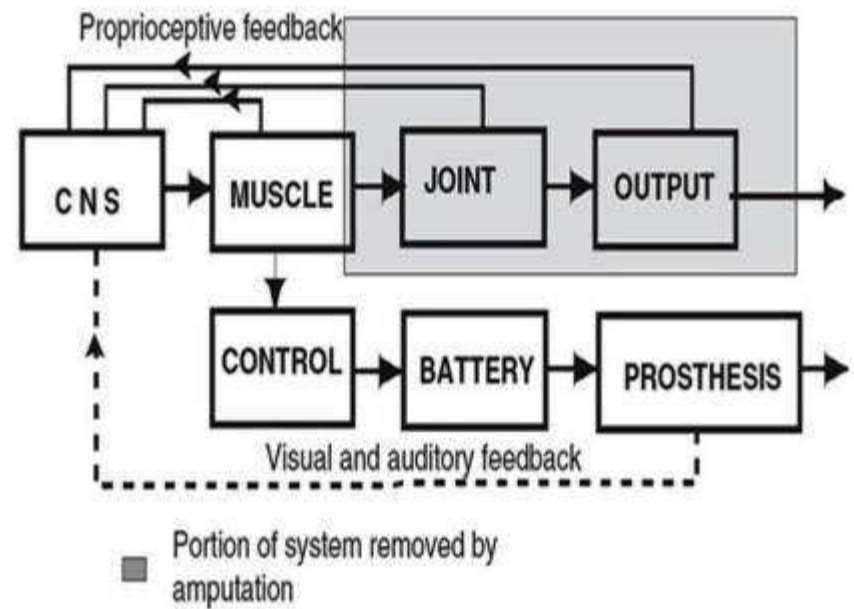
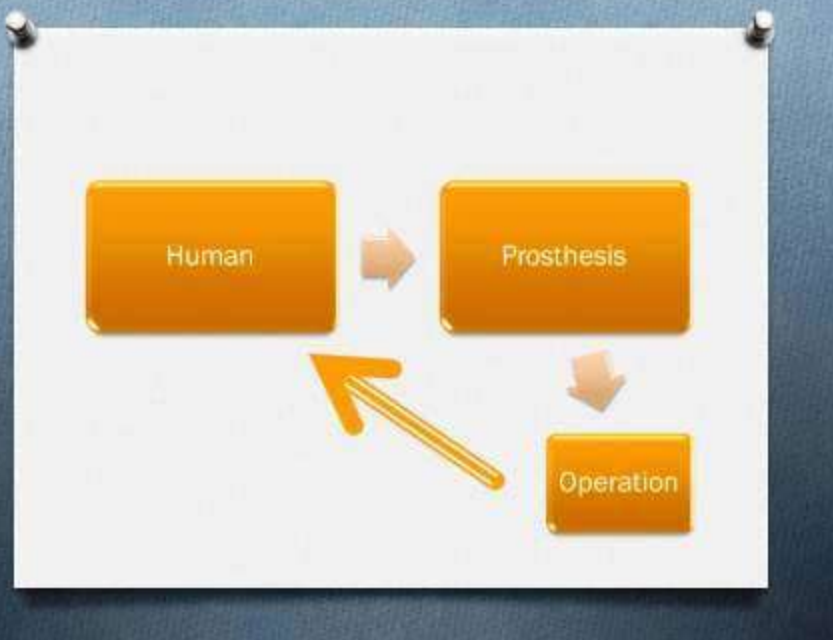
Operation

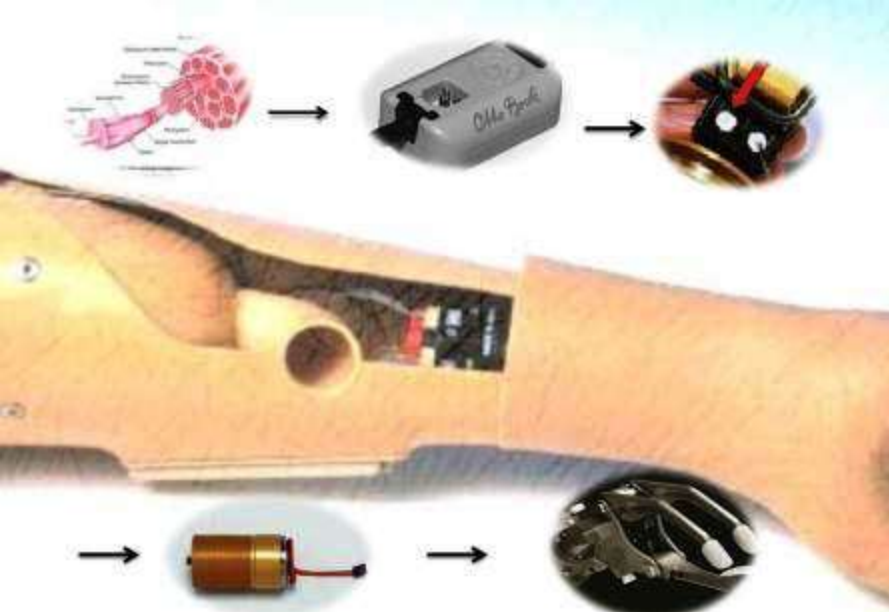
Prosthesis

13000 upper
extremity
amputation in a
year

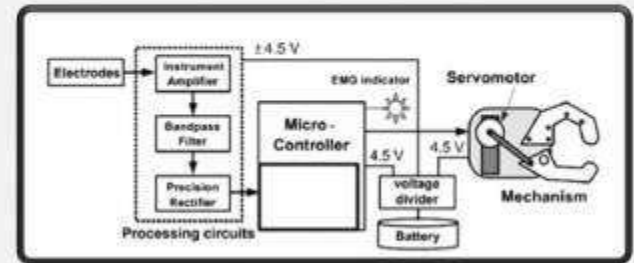
Control Systems

- Open Loop (Washing Machine)
- Closed Loop (Feed Back System)
- Desired Out put
- Various systems





How does it work?



Input (signal) Properties

Appearance or absence of signal

Duration Of signal

Intensity of Signal

Co-Contraction signal



Indications

- ◊ Trans radial or Trans carpal amputation
- ◊ Intact skin
- ◊ Muscle strength
- ◊ No damage in nerve

What do patients expect from prosthetic Hand?



A Good Prosthesis Control System Properties

- User friendly (Simple to learn to use)
- No sacrifice of human functional ability (energy efficient, light weight)
- Independence in multi functional control (Noiseless)
- Coordinated control of multiple function (high level amputation)
- Instantaneous response (fast reflex)
- Low mental Loading (cybernetic)

Myoelectric hands



Safety Information

- Don't use silicone spray to put on cosmetic glove
- Don't be near power line, transmitter, strong electro-magnetic source, dust, smoke
- Remove battery before any part disconnection
- Don't use for extreme sport
- Leave hand in open position if you don't want to use long time
- Drive safely! Drive when your hand switch is off & it is better to adapt your car with your condition
- Yearly inspection

Micro processor



Control Mechanisms

☐	Digital Twin	☐
☐	DMC (Dynamic Mode Control)	☐
☐	DMC Plus	☐
☐	Vario Control	☐
☐	Vario Dual	☐
☐	Sensor hand	☐
☐	EVO(Electronic voluntary opening)	☐
☐	Control motion	☐
☐	Van grip III	☐

Digital Twin (code 7in O.B Hands)

- Dual Site , 2 electrodes, opening and closing
Constant speed



Digital Twin (code 7in O.B Hands)

- One site (double channel) , one electrode, quick & strong signal (open), Slow & gentle signal (Close) , Constant speed



DMC (Dynamic Mode Control, Code 6)

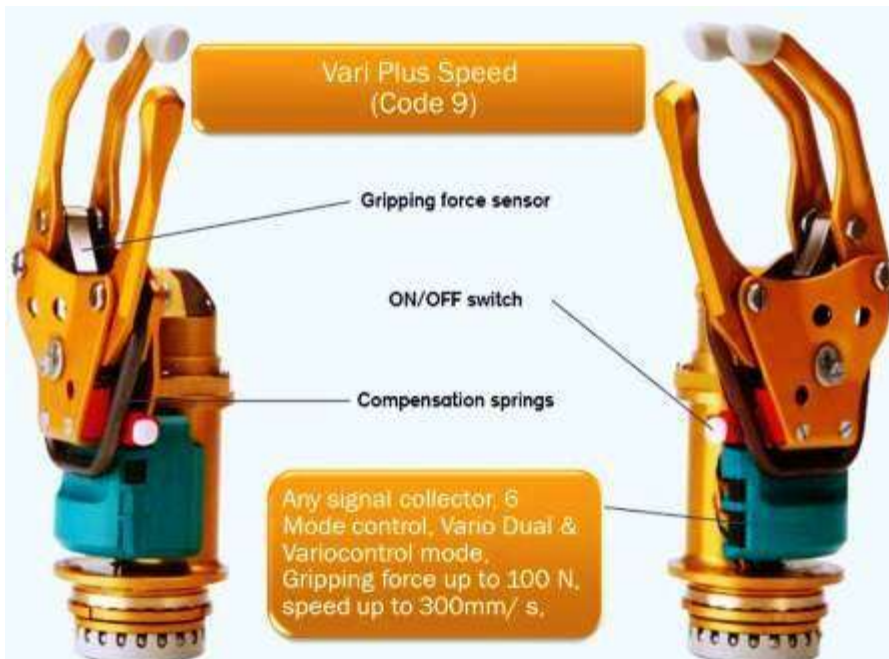
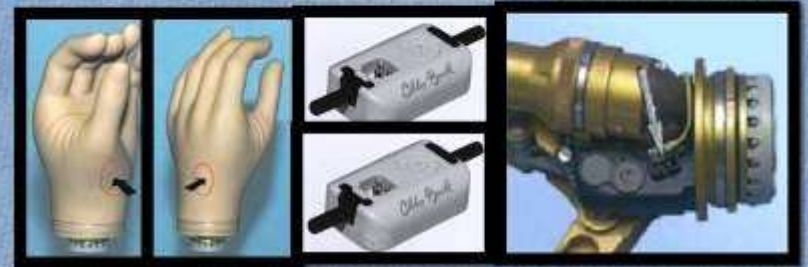
Control grip speed & grip force, proportional to strength of signal, 2 electrodes.



DMC Plus



Control grip speed & grip force, proportional to strength of signal, 2 electrodes, *will open with a signal strength slightly higher than first, for security*



Vario Control , Vario Dual

- o Opening speed(speed & strength of signal)
- o Closing speed (reduction of muscle tension)
- o Stopping: very slow muscle relaxation
- o 1 electrode
- o Vario dual: 2 electrode, opening and closing speed with 1 electrode, Grip force with another electrode.

Sensor Hand(Code 8)



Auto grasp, Flexi Grip



Comparison Chart

Terminal Device	Proportional Grip	Proportional Speed	Sensor	Weight with inner hand shell
MyoHand VariPlus Speed 8E38-9 8E39-9 8E41-9	0-130 N	15-300 mm/sec	No	460 g
SensorHand Speed 8E38-8 8E39-8 8E41-8	0-100 N	15-300 mm/sec	Yes	450 g
Greifer DMC VariPlus 8E33-9 8E34-9	0-160 N	8-200 mm/sec	No	540 g
Transcortical Hand 8E44-6 8E44-7	0-90 N	15-130 mm/sec	No	308 g

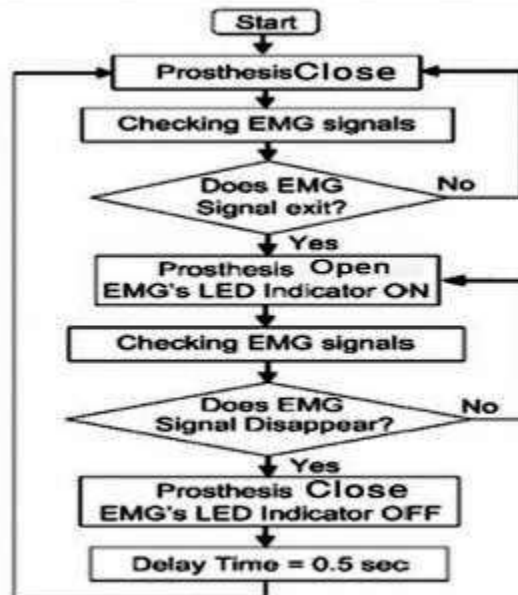
Signal sources				Electrode signal strength (according to MyoBoy® scale)		Speed		Grip force		Control mode	
										Name	No.
Two electrodes	One electrode	Linear transducer	Switch	OPENING	CLOSING	OPENING	CLOSING	Proportional to signal strength	Time proportional	Proportional to signal decline	
				HIGH	LOW	ON	Proportional to signal increase Proportional to signal strength	Digital (saturation above threshold) Proportional to signal decline Proportional to signal strength	Digital (saturation above threshold) Proportional to signal decline Proportional to signal strength		
										DMC plus®	1
										AutoControl LowInput	2
										VarioControl	3
										VarioDual	4
										Digital Control	5
										Double Channel Control	6

The terms ON, LOW and HIGH correspond to the respective scale values of MyoBoy® and MyoSoft®/PAULA.

MyoBock Program #	ADULT MYOELECTRIC COMPONENTS				PEDIATRIC			
	REDA, RED/RED or RED/BLK Modified MyoBock Speed Standard OMC Switches	RED/BLK or RED/BLK Standard OMC Switches	RED/BLK Modified to use with Fusion & Adult Terminal Straps	RED/BLK Standard Electronics	RED/BLK Modified to use with Fusion & Adult Terminal Straps	RED/BLK Standard Electronics	RED/BLK Modified to use with Fusion & Adult Terminal Straps	RED/BLK Standard Electronics
Program 1	OMC: POC 2 Electrodes Open ON → High Close ON → High	OMC: POC 2 Electrodes Open ON → High Close ON → High	Four Channel Control 2 Electrodes Superior ON → High or → 80 ms	Direct switch control (switch)	44475 100 TDA-1	Digital OMC 2 Electrodes Open ON Close ON	Digital OMC (S) 1 Electrode or 1 Switch Open → ON Close → ON	Digital OMC (S) 1 Electrode or 1 Switch Open → ON Close → ON
Program 2	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes or Switch combination Open ON → Low Close ON → High Time based gait force
Program 3	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON	AutoControl → Low Input 1 Electrode or 1 Linear Transducer Open ON → High Close High → ON Close High → ON
Program 4	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON	AutoControl → Low Input 2 Electrodes Open → High Close High → ON Close High → ON
Program 5	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force	Digital Control 2 Electrodes or switch combination Open ON → constant maximum speed Close ON → constant maximum speed Time based gait force
Program 6	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force	Double Channel Control 1 Electrode or 1 Linear Transducer Open ON → High or → 80 ms Close ON → High or → 80 ms Time based gait force
Program 7	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force
Program 8	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force	AutoControl → Low Input 2 Electrodes Open ON → High Close ON → High Time based gait force

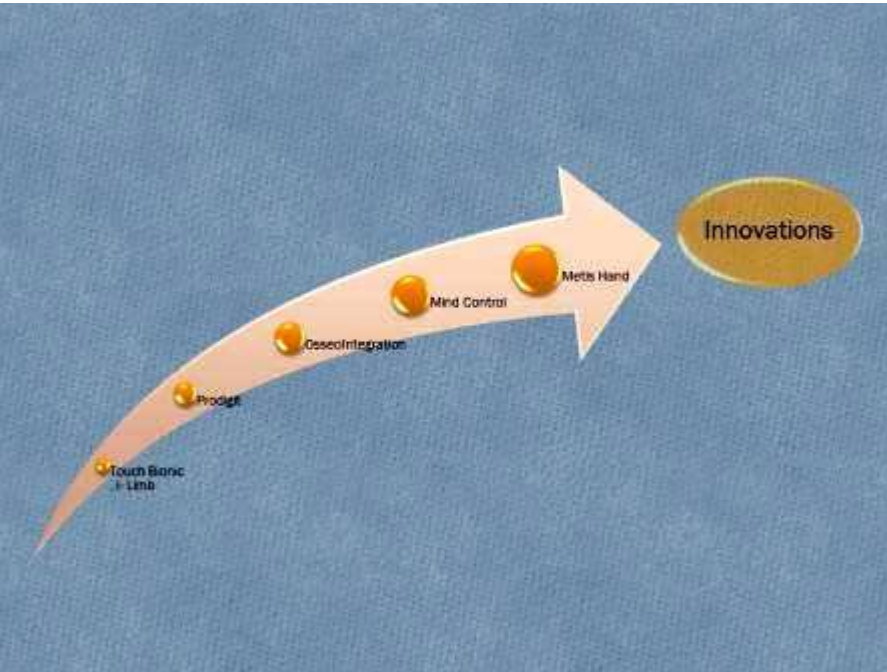
EVO (Electronic Voluntary Opening)

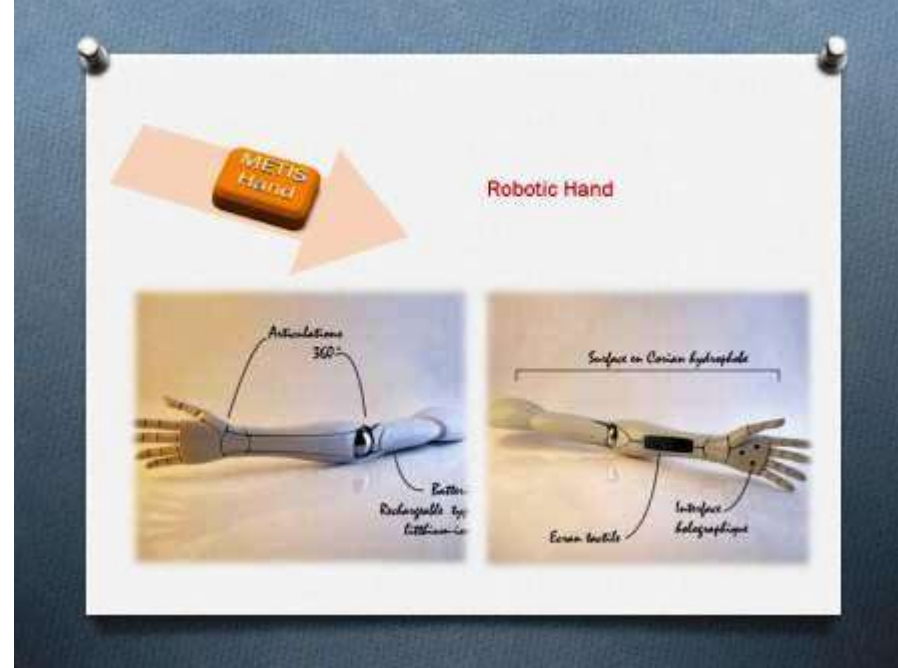
Electro hand 2000 (age:1.5 - 13)



Components

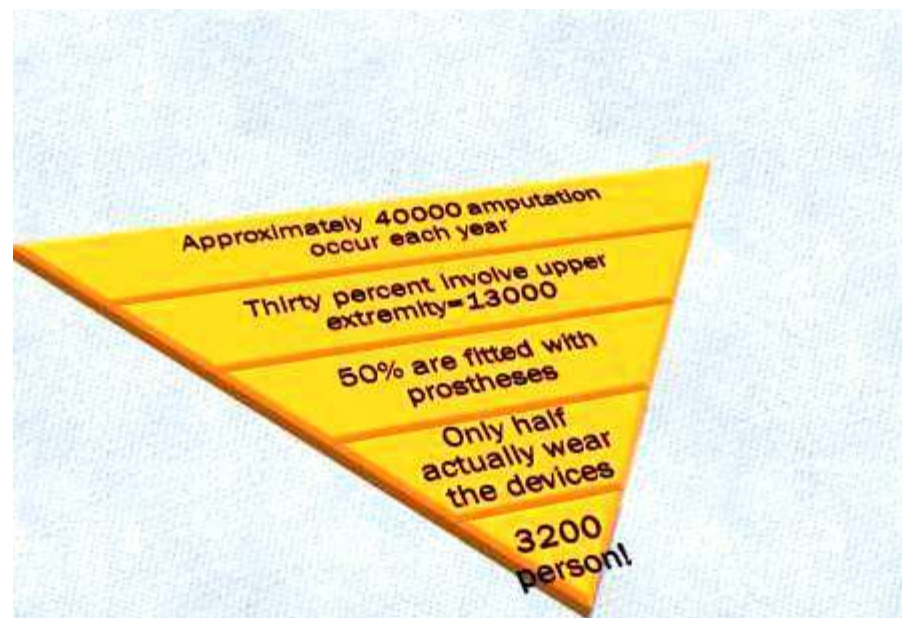






Indications

- 1- Motivation
- 2- Awareness of patient about advantages & disadvantages
- 3- IQ
- 4- Be able to pay
- 5- Muscle strength
- 6- Skin
- 7- No damage in Nerve





Thank you!

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