



INTELLIGENT WHEELCHAIR



Introduction

NUST in collaboration with SAKURA Japan has designed a wheelchair for physically disabled people. Different versions have been designed according to different needs and severity levels of disability.

Features

Mobile App Mode:

A patient/caretaker can control the wheelchair using mobile app according to his/her will. There are five different motions which includes forward, backward, left, right and stop. Moreover, an option for speed controlling of wheelchair is also present.

Eye Tracking Mode:

An eye tracking technique has been developed to control the wheelchair's direction. Seeing left, right, top and bottom are interpreted in move left, more right, move forward and move backward.

Brain Control Mode:

EEG emotive neuroheadset is used to take brain signals of a patient and then interpret them into different commands. For this mode, initial training is required for different commands to be used by the user.

Autonomous Path Planning Mode:

This mode is completely autonomous which navigates the wheelchair through cluttered environment. Start and goal positions are set by user and wheelchair moves towards goal position while avoiding obstacles in its path.

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Product Market

- Private & Government Hospitals
- Rehabilitation Centres
- Non-Government Organizations (NGO's)



MEDICAL DEVICES DEVELOPMENT CENTRE (MDDC)



Introduction

MDDC was established at NUST as a National Centre of Excellence on the special directives of Prime Minister's Office and Honorable Supreme Court of Pakistan.

This centre was developed with a mandate to produce good quality and cost-effective indigenous cardiac devices for the general public of Pakistan.

The products developed in MDDC are cost-effective and accessible to the low earning population in the country. Additionally, these products allow us to save significant amount of fee resulting in reduction of import bill on medical devices.



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Product Market

- Private & Government Cardiology Hospitals
- Pharmaceutical Companies



Product Line

1. VASOGLIDE

Percutaneous Transluminal Coronary Angioplasty Balloon Catheter for stent delivery and Coronary Balloon Angioplasty

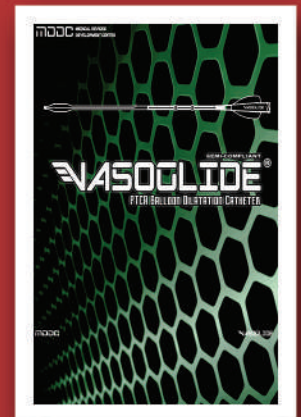
- Designed to treat even the most difficult cases efficiently and successfully
- An innovative concept that simplifies the endovascular navigation
- Robust distal tip material offers an easy passage even in highly calcified stenosis
- Highly flexible intermediate segment provides required flexibility, in order to guarantee a safe and effective push through complex stenosis
- Powerful dilatation up to 15 atmosphere rated burst pressure ensure its safety



2. REJUVENATE

Bare Metal Stent System with Cobalt Chromium Metal platform

- Superior cobalt chromium alloy with excellent proven corrosion resistance and high flexibility
- 90 µm strut thickness with optimum stent free surface area
- Outstanding proven biocompatibility response
- Optimum Crossing profile for easy deploy ability
- Excellent visibility for MRI
- Superior stent architecture for optimum flex-kink resistance

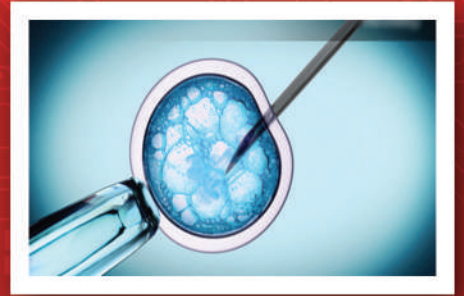


Upcoming Products:

- Drug Eluting Stent (Evololimus Coated Drug Eluting Stent)
- Angiographic Diagnostic Catheter
- Mitral Valve
- Wound Healing Device



MICRO CELL INJECTION SYSTEM CELLS OF CHANGE



Introduction

Micro cell injection system is widely used in the domain of cell biology as it allows to deliver a specific amount of substance into a cell using a micro injection pipette under the observation of microscope. This system increases the reliability of the process and makes the whole procedure easier to perform.

Virtual-Reality training simulator is also provided alongwith cell injection system to learn the skills required in cell injection procedures. It allows a user to inject drug, medicines, sperm or any kind of substance into the cell. The training simulator includes basic and advanced training modules with different evaluation metrics i.e. Injection Force, Desired trajectory, Time and Positioning Accuracy.

Features

- Dedicated VR training simulator
- VR exercises
- Cost effective
- Remotely accessible
- Semi-automated

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Product Market

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- Rehabilitation Centres



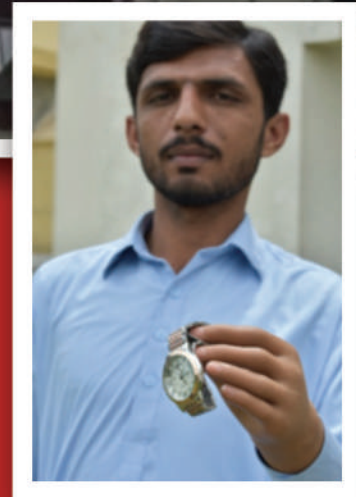
MYOELECTRIC PROSTHETIC UPPER LIMB

Introduction

The primary objective of this product is to transform the lives of amputees, by helping them regain their confidence and sense of independence while performing daily tasks. In order to facilitate such patients, a robust, reliable and cost-effective myoelectric prosthetic limb has been developed to greatly assist in rehabilitation.

Features

- Myoelectric prosthetic upper limb can assist the amputee in his / her daily tasks
- The mechanism contains 1 Degree of Freedom movement with pinch and grip capability
- The movement signals are acquired from the active muscles of the patient
- Amputees can grasp the objects easily and precisely
- Rechargeable Limb with ON/OFF Switch
- Non-invasive permanent Electrodes
- Light weight and affordable



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Product Market

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- Rehabilitation Centres



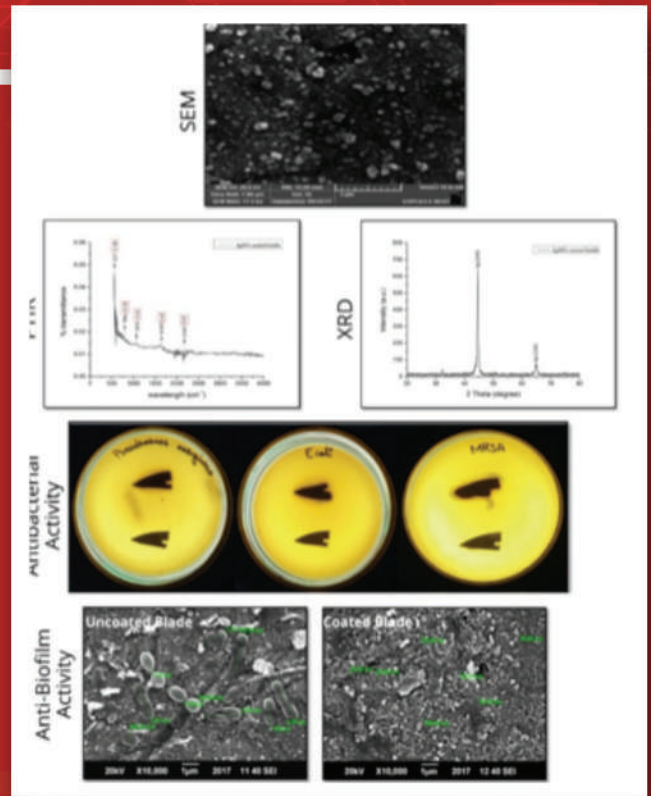
Nano-Surgical Blades

Introduction

Nano-surgical blades allow electrochemical deposition of silver nanoparticles on surgical blades to prevent nosocomial infections. This innovation allows prevention of cross infection caused due to non-treated surgical tools.

Features

- Blade treatment
- Electrochemical deposition of Silver nanoparticles
- Characterization of coated blade to test presence of silver nanoparticles layer using SEM, XRD, and FTIR
- Antibacterial and Antibiofilm activity tested



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Product Market

- Hospitals & Clinical Setups
- Diagnostic Centres
- Surgical Industry
- Cutlery Industry
- Blades Industry



SMART SIM™ LAPAROSCOPIC TRAINING SIMULATOR



Introduction

Smart SIM™ is a virtual-Reality laparoscopic surgical trainer for surgeons to learn the skills required in minimal invasive Surgery. It allows a surgeon to be trained, tested and specialized in diverse surgical scenarios and procedures developed as a part of this training simulator system. The training modules consists of all the exercises that are included in any state-of-the-art MIS simulator. These exercises include basic training exercises, such as camera and instrument navigation, grasping and clipping and the advance training exercises like laparoscopic cholecystectomy and appendectomy.

Features

Pre-Exercise Information

- Clearly defined exercise learning objectives
- Instructions with each exercise module for achieving goals
- Simulation videos recorded from expert surgeons are provided to facilitate the training
- Videos from real life surgeries are included to relate the skills learned from a given exercise to their real-life MIS scenarios

Run Time Assistance

- Step by step instructions and action-based warnings
- Runtime display of score

Post Exercise Review

- Evaluation metrics summarizing the performance of users
- Graphical representation of performance

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Product Market

- Teaching Hospitals
- Medical Colleges
- Medical Equipment Manufacturing Industries

TENDON SERVO DRIVEN EXOSKELETON HAND SYSTEM



Introduction

The designed exoskeleton hand uses a tendon servo driven mechanism which is being driven by five different servo motors. Three different modes have been used in this exoskeleton hand. In mode one, the glove's motion is completely replicated on the exoskeleton hand. This mode has been designed for those experts which are giving the training to a stroke patient. Moreover, a patient can also do that via wearing the glove on other hand. In second mode, glove is also used as an improvement measurement device for stroke patient which is equipped with different force sensors. In third mode, this exoskeleton hand is also controlled with myo armband using EMG based signals.

Features

- An exoskeleton that can assist a paralyzed person in daily activities
- The mechanism is able to realize a mechanical compliance of a human finger so that the total system including a human hand, could keep a stable grasp
- Exoskeleton hand can provide 5 DOF (Flexion/Extension) for the disabled hand with under-actuated finger joints, with locked adduction/abduction movements
- The system ability to gauge the flexion of the finger independent of each individual joint, making the control suitable for Hemiplegic patients

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Product Market

- Private & Government Hospitals
- Rehabilitation Centres



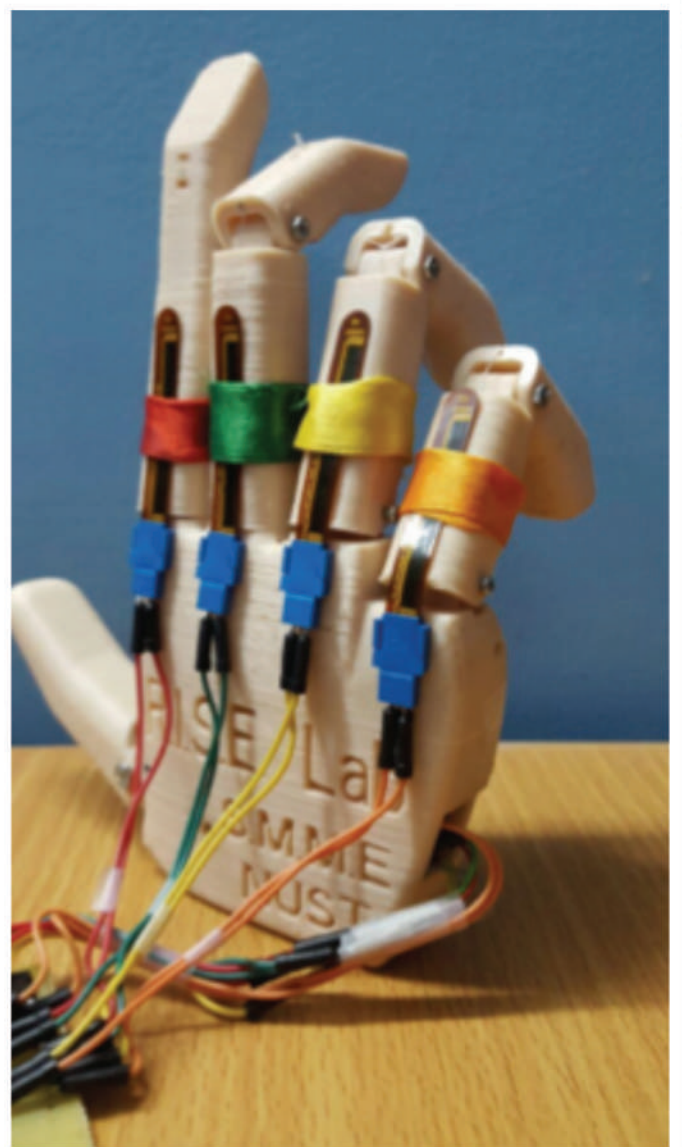
PROSTHETIC HAND

Introduction

The aim of developing this artificial hand is to provide new therapy solutions to increase the intensity and time devoted to hand rehabilitation and potentially providing long-term therapy and assistance in the home environment. The product will enable the person with paralyzed hand to perform day to day tasks easily and efficiently. The design incorporates a compliant solution to control the paralyzed hand in more natural and effective way.

Features

- An exoskeleton that can assist a paralyzed person in daily activities.
- The mechanism is able to realize a mechanical compliance of a human finger so that the total system including a human hand, could keep a stable grasp.
- Exoskeleton hand can provide 5 DOF (Flexion/Extension) for the disabled hand with under-actuated finger joints, with locked adduction/abduction movements.
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Product Market

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- Military Hospitals
- Rehabilitation centers



STIMULATION BASED VIBRATORS ON PLANTER SURFACE OF FOOT

Introduction

Rare movement often results in reduced activity of skeletal muscle pump which exaggerates multitude of peripheral circulatory disorders. Around 60% people across the world suffer direct or indirect blood flow related issues whereas, 50% of deaths in European Union are caused due to malfunctioning of circulatory system. Human extremities, such as legs and arms, are affected the most by poor circulation which results in consistent increase in therapy-based procedures for treatment of different anomalies.

Stimulation based vibrators are designed for patients with effected legs due to low circulation of blood. The vibrators will be placed in patient's shoe, resulting in increasing the blood flow in legs and feet.

Features

- Enhanced systolic velocity of peripheral blood flow
- Comfortable and user friendly to wear
- Reduce circulatory disorders in elderly adults, long standing and long sitting jobs and long-distance travels



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Product Market

- Pharmaceutical Companies
- Medical Devices Manufacturing Industries
- Footwear Industry



MYOBIONICS Prosthetic Gripper

Introduction

The primary aim at myobionics is to develop prosthesis that transform the lives of amputees by helping them regain their confidence and sense of independence while performing daily tasks. Controlled in a similar way to other myo-electric hands, (EMG sensor measure muscle flex), when the muscle contracts it sends a signal to the hand to perform the desired movements. i.e. to open and close.

Features

- Affordability
- Robust with dedicated software calibration
- Reliable & Robust
- Light
- Japanese Mabuchi Motor
- Rechargeable
- Built-in Battery Management
- Skin matching glove



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Product Market

- Hospitals
- Rehabilitation Centres
- People in Old Age



ORTHOTIC INSOLES



Introduction

The purpose of the orthotic insoles is to help support the feet and improves foot posture while also relieving the patient of any chronic foot or leg pain. Since a person's foot profile varies, custom insoles are developed while taking into consideration all the features of the foot profile like foot size, weight, foot arch and pronation angle to make the insoles that best suit your need. The insoles are made of highly flexible and durable Thermoplastic Polyurethane (TPU).



Features

- Relieves chronic pain caused by plantar fasciitis
- Correction of foot and leg pronation angles in flatfooted people
- Provides stability for high arch foot profiles
- Treatment for leg length discrepancy

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Product Market

- Hospitals
- Rehabilitation Centres
- People in Old Age



PROSTHETIC FOOT



Introduction

The object of this product is to allow the amputees to regain their bodily motor function and perform daily tasks with ease. This product is a passive prosthetic foot which works on the principal of storing potential energy and releasing it which means this foot does not require any actuators or joints, therefore it is light in weight and has no delay in response. This product can be adjust for your level of comfort by changing the deflection of the toe and heel.

Features

- The prosthetic foot can assist the wearing to walk and mildly run (K2-K3 activity level)
- Replicates the gait cycle without the use of joints
- Control deflection by filing off the protruded lairs
- Does not require any external power

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Product Market

- Hospitals
- Rehabilitation Centres
- Civilians