RAPAEL™
SMART GLOVE

Active Finger & Hand Rehabilitation Solution

NEOFECT
RAPAEL SMART REHABOLUTION

RAPAEL SMART REHABILITATION CONCEPT

RAPAEL Smart Rehabilitation Solution is designed to induce neuroplasticity for hand function of patients with neurological brain injuries.

In order to enhance rehabilitation of patients whose extremities are affected by lesions in the central nervous system (e.g., stroke), they should practice goal-oriented and task-specific motor skills repetitively. However, the repetitive rehabilitation process easily decreases patients’ motivation and makes it hard to maintain an optimal challenging level of difficulty to induce neuroplasticity.

Hence, therapists no longer have to manually adjust the task’s level of difficulty in order to motivate patients. Moreover, objective evaluation of exercises and user-friendly reports on the patient’s progress allow effective and efficient rehabilitation process management.

LEARNING SCHEDULE ALGORITHM FOR EFFECTIVE MOTOR LEARNING & CONSTANT CHALLENGE

Our Learning Schedule Algorithm is designed to enhance learning multiple functional tasks by proposing an optimal task at a proper challenging level for the patient. Based on the patient’s data, such as the training progress, prescription, personal interest, and motor function scores, it computationally selects which game to play at an appropriate level of difficulty. Our RAPAEL solution, a novel User Interface/User Experience (UI/UX) for task difficulty modulation process, helps patients monitor their exercise progress in real-time.

RAPAEL SMART GLOVE

Our bending sensor is a variable resistor that changes as it is bent. The sensor is connected to a computer system which can accurately compute the amount of individual finger movements. Such movements can yield over 5,900 data points per minute.

- 3 acceleration channels
- 3 angular rate channels
- 3 magnetic field channels

- ST’s 130 nm ultra-low-leakage process technology
- Shared technology, architecture and peripherals
- ARM Cortex-M3 core @32 MHz
- 32 to 384 Kbyte Flash, dual bank, RWW

ULTRA-LOW-POWER ENERGLITE™ 32-BIT MICROCONTROLLERS

BENDING SENSOR TECHNOLOGY

LEAD FEATURES

LIGHTWEIGHT
132g or 4.7oz

ERGONOMIC
Design for various joint movements
Easy wearing even for stiff hand

ELASTOMER MATERIAL
Easy cleaning
Form preservation

WIRELESS
Bluetooth connection

SENSOR TECHNOLOGY
Bending sensor and 9-axis IMU sensor

9-AXIS MOVEMENT & POSITION SENSOR

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A patient can easily interpret their own performance immediately after completing each exercise through a user-friendly interface and numeric scores for further motivation. Results are quantitative which allows progress to be monitored over time.

RAPAEL Smart Platform provides various functional movements such as ADL-related tasks with entertainment, considering both clinical effectiveness and fun factor. The learning schedule algorithm automatically adjusts optimal levels of difficulty for each game to balance challenge and motivation.

RAPAEL Smart Glove allows various biomechanical evaluations such as passive and active range of motion and motion analysis of the fingers and hand. The difficulty level for the initial exercise is based on the measured ROMs taken from the evaluation.

Performance result shows patient’s current state, exercise progress and improvement by analyzing AROM value measured while exercising.
**EXPANSION OF LINE-UP**

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<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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</thead>
<tbody>
<tr>
<td><strong>Active Device</strong></td>
<td>Smart Body</td>
<td>Smart Body</td>
<td>Smart Body</td>
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<tr>
<td><strong>Assistive Device</strong></td>
<td>Smart Arm</td>
<td>Smart Arm</td>
<td>Smart Arm</td>
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<tr>
<td><strong>Active Device</strong></td>
<td>Smart Glove</td>
<td>Smart Pinch</td>
<td>Smart Pinch</td>
</tr>
<tr>
<td><strong>Assistive Device</strong></td>
<td>Finger Master</td>
<td>Finger Master</td>
<td>Finger Master</td>
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**COMPONENT**

- **Smart Glove**: 2 pairs (Left/Right)
- **Tablet PC**: 1 ea
- **Extra Silicone Pad**: 2 pairs (Left/Right)
- **Extra Body Band**: 2 pairs (Left/Right)
- **Charger**: 1 ea
- **Battery**: 5 ea
- **Quick Guide**: 1 ea
- **Instruction for Use**: 1 ea
- **Hard Case**: 1 ea

**KEY VALUES**

- Motivation, feeling of achievement
- Data-based planning & tracking
- Reduced resource requirement (space, labor, others)
ABOUT NEOFECT

NEOFECT was founded to create hope for a better life and better world. NEOFECT believes that any patient deserves to enjoy a happy life with hope for a full recovery. NEOFECT has a vision to help more patients take advantage of advanced digital and robotic technologies through developing and commercializing light, portable, and affordable rehabilitation solutions. Please look forward to more products to launch and join us in our journey to make a meaningful impact in our patients’ hope through disruptive innovation in rehabilitation medicine.

PRODUCT DEVELOPMENT & CLINICAL PARTNERS

- National Rehabilitation Center
- Seoul National University
- KAIST, Korea Advanced Institute of Science and Technology
- UNIST, Ulsan National Institute of Science and Technology
- Samsung Medical Center
- Yonsei University Hospital
- Seoul National University Hospital
- Bundang Jesaeng General Hospital

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NEOFECT
[ne-o-fekt]
to produce a new effect, change, or impression on the mind

WITH NEW CHANGE COMES NEW HOPE