

Active Finger & Hand  
Rehabilitation Solution

# RAPAE

SMART GLOVE



NEOFECT

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# RAPAE SMART REHAB SOLUTION



## RAPAE SMART GLOVE



### REAL-TIME BIOFEEDBACK DEVICE

Lightweight, Ergonomic design  
Elastomer material  
Wireless connection

## RAPAE SMART REHAB PLATFORM



### GAME-LIKE EXERCISES

Learning Schedule Algorithm  
Intensive, repetitive, task-oriented training  
ADL-related tasks



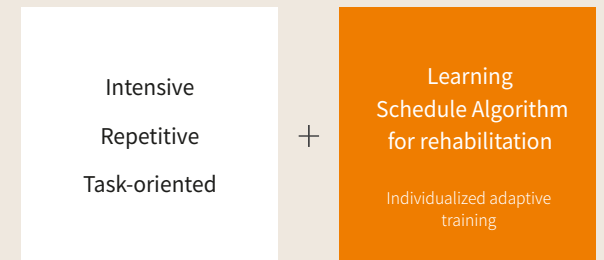
### DATA VISUALIZATION

Biomechanical evaluation(eg. PROM, AROM)  
Monitoring training progress

## RAPAE SMART REHABILITATION CONCEPT

**RAPAE Smart Rehabilitation Solution is designed to induce neuroplasticity for hand function of patient with brain damage.**

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

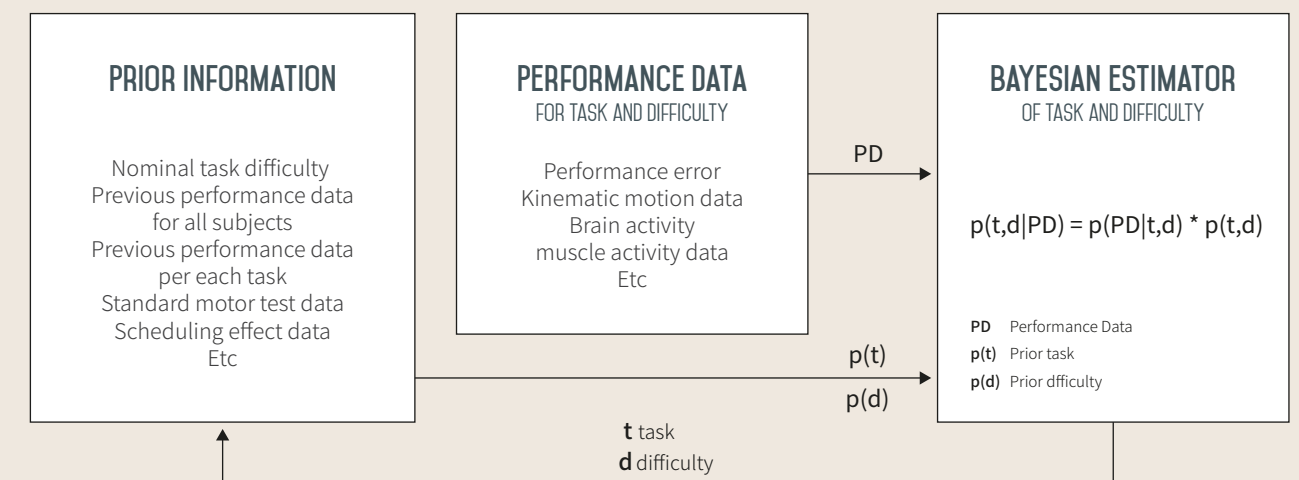


neuroplasticity. RAPAE Smart rehabilitation solution applies the 'Learning Schedule Algorithm' to game-like exercises so that patients can remain motivated and can find the exercises gradually challenging. Hence, therapists no longer have to manually adjust the task's level of difficulty in order to motivate patients. Moreover, objective evaluation of exercises and user-friendly reports on progress allow effective and efficient rehabilitation process management.

## LEARNING SCHEDULE ALGORITHM FOR EFFECTIVE MOTOR LEARNING & CONSTANT CHALLENGE

Learning Schedule Algorithm is designed to enhance learning multiple functional tasks by proposing an optimal task in proper challenging difficulty. Based on patient's data such as training progress, prescription, personal interest, motor function scores,

and etc, it computationally selects which game to play in which level of difficulty. In RAPAE solution, a novel UI/UX for task difficulty modulation process makes patients to understand how exercise progresses in real-time.



# RAPAEL SMART GLOVE

## KEY FEATURES

### LIGHTWEIGHT

132g

1

### ERGONOMIC

Design for various joint moving  
Easy wearing even for stiff hand

2

### ELASTOMER MATERIAL

Easy cleansing  
Form preservation

3

### WIRELESS

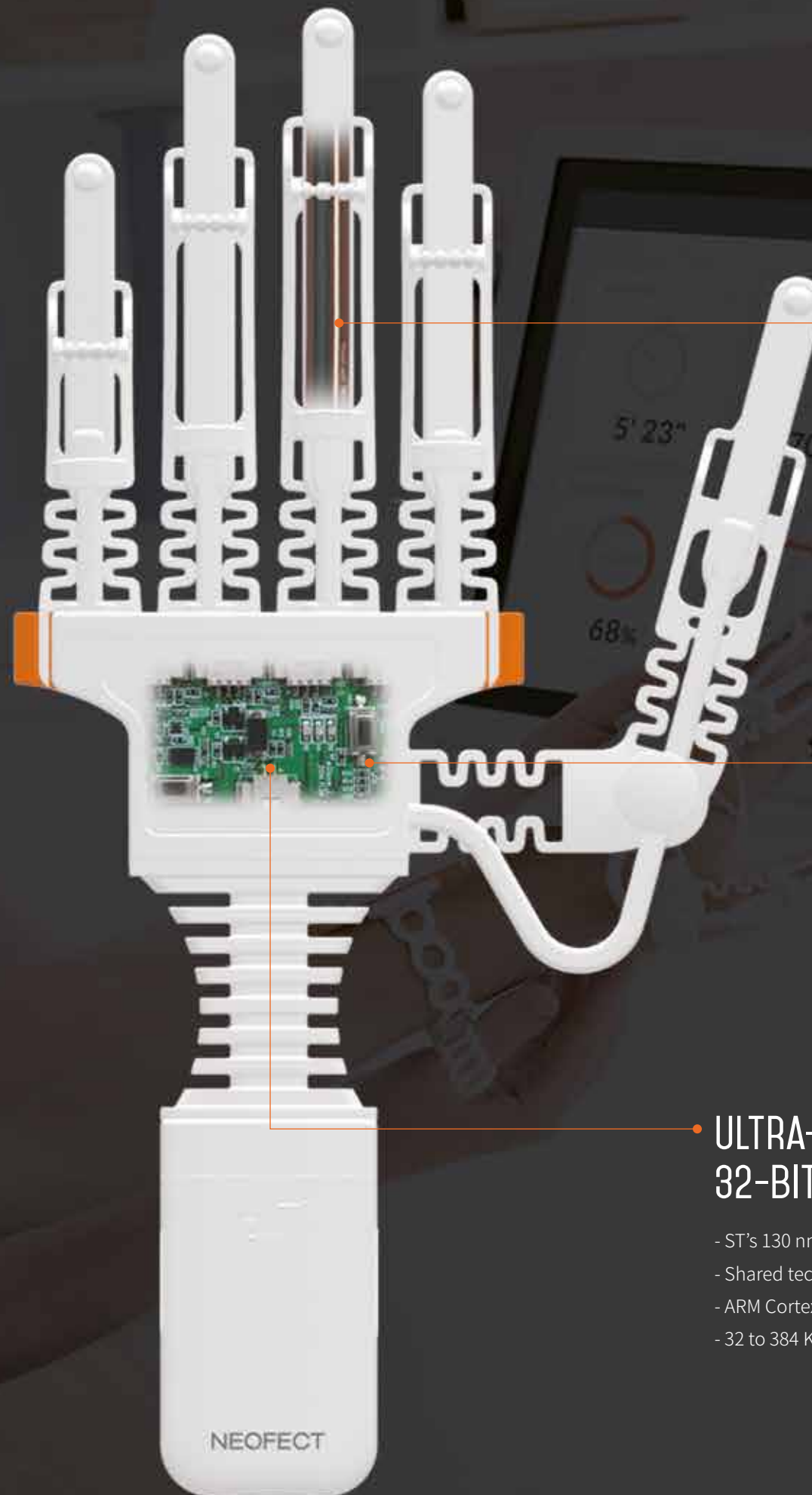
Bluetooth connection

4

### SENSOR TECHNOLOGY

Bending sensor and 9-axis IMU sensor

5



### BENDING SENSOR TECHNOLOGY

Bending Sensor is a variable resistor that changes as it is bent. The sensor is connected to computer system which can accurately compute the amount of individual finger movements. A movement of only one inch can yield over 200,000 data points.

### 9-AXIS MOVEMENT & POSITION SENSOR

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

### ULTRA-LOW-POWER ENERGYLITE™ 32-BIT MICROCONTROLLERS

- 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

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# RAPAE SMART REHAB PLATFORM



**FOREARM SUPINATION / PRONATION**



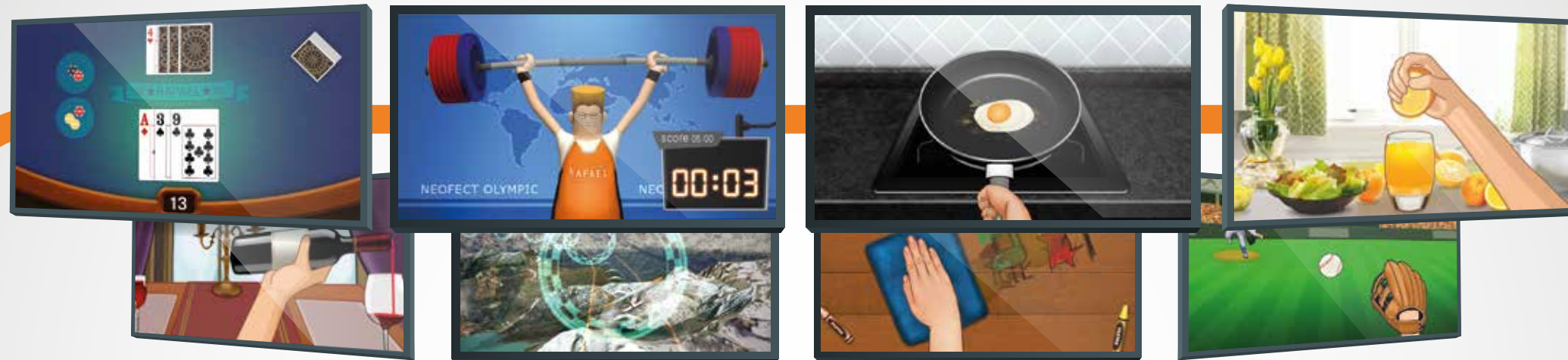
**WRIST FLEXION / EXTENSION**



**WRIST RADIAL / ULNAR DEVIATION**



**FINGER FLEXION / EXTENSION**



## EVALUATION

RAPAE Smart Glove allows a range of bio-mechanical evaluation such as passive and active range of motion and motion analysis of the fingers and hand. Such measured ROMs are applied as the difficulty level of the initial exercise.



## GAME-LIKE EXERCISES

RAPAE Smart Platform provides various kinds of motion tasks such as ADL-related task with entertainment, considering both clinical effectiveness and fun factors. Learning schedule algorithm automatically adjusts optimal level of difficulty game by game so as to balance challenge and motivation.



## GAME RESULT

A patient can easily interpret his or her own performance right after completing each session of exercise through user-friendly interface and numeric scores for further motivation.



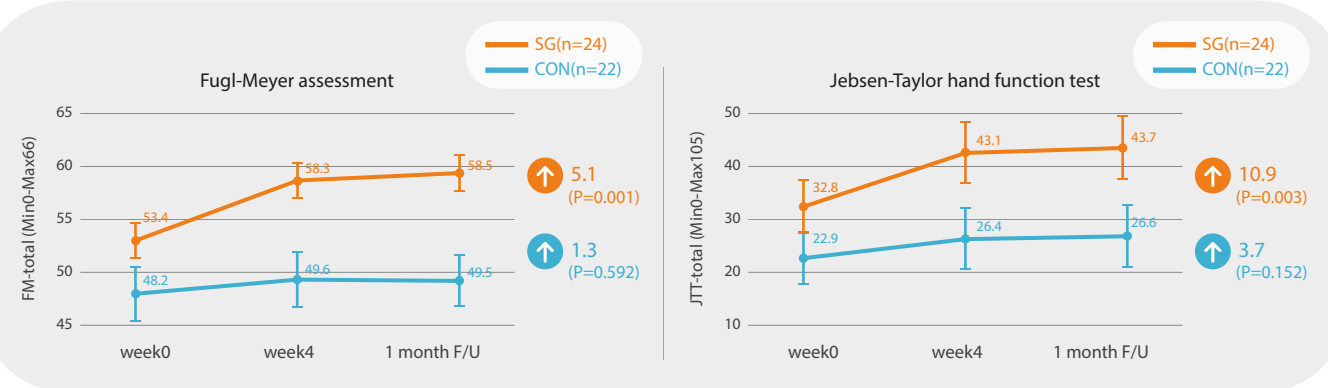
## PERFORMANCE RESULT & REPORT FOR PRINTING

Performance result shows patient's current state, exercise progress and improvement by analyzing AROM value measured while exercising.

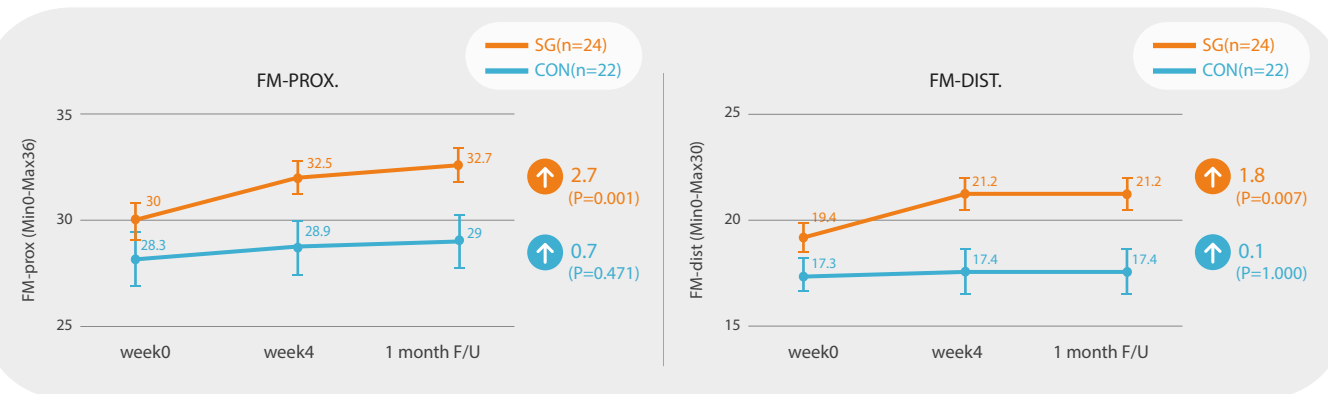
# CLINICAL DATA

- RAPAEL Smart Glove(SG) showed statistically significant improvements in FM & JTT scores which maintained over one-month period.

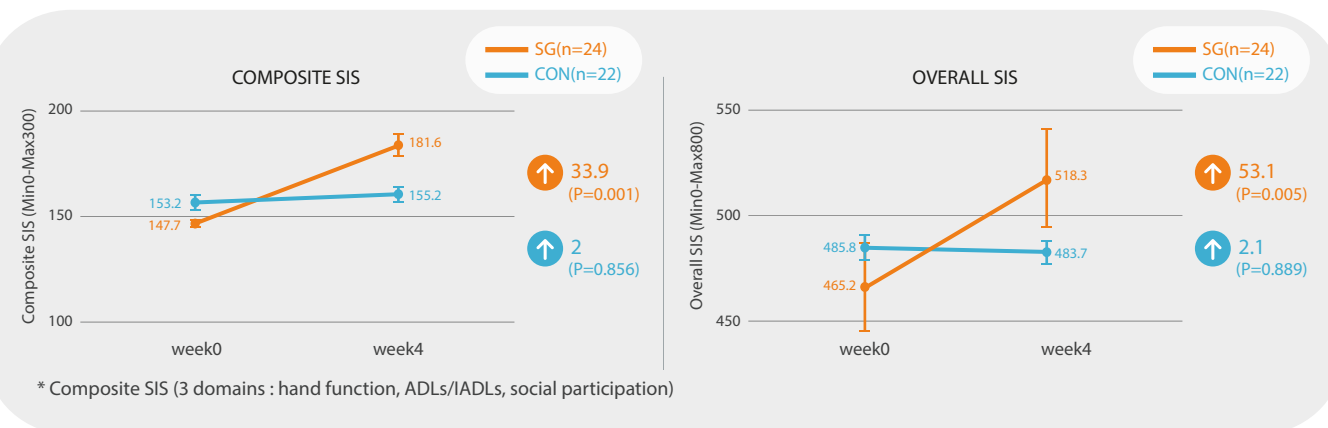
Smart Glove (n=24)  
Conventional (n=22)



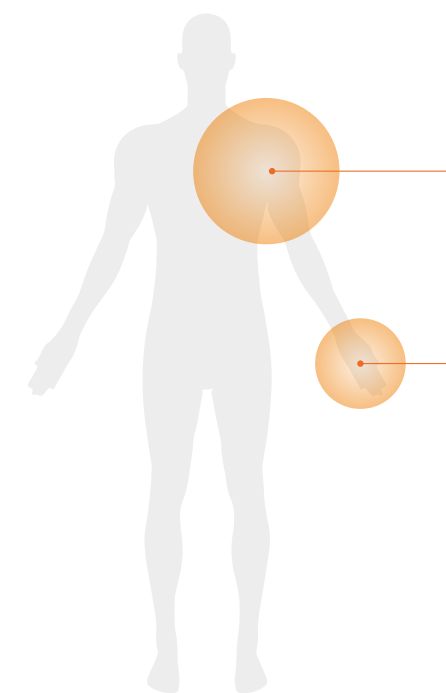
- RAPAEL Smart Glove(SG) showed statistically significant improvements in both proximal and distal upper limb functions due to high activity of the distal extremity



- RAPAEL Smart Glove(SG) showed statistically significant improvements in Composite & Overall SIS scores, which means noticeable enhancement on health-related quality of life(HRQoL).



# EXPANSION OF LINE-UP



	2015	2016	2017
Active Device	Smart Board	Smart Body	
Assistive Device			Smart Arm
Active Device	Smart Kids	Smart Ball	
Assistive Device			Finger Master
Platform		RAPAEL 2.0	

# KEY VALUES

Motivation, feeling of achievement

Data-based planning & tracking

Reduced resource requirement (space, labor, others)

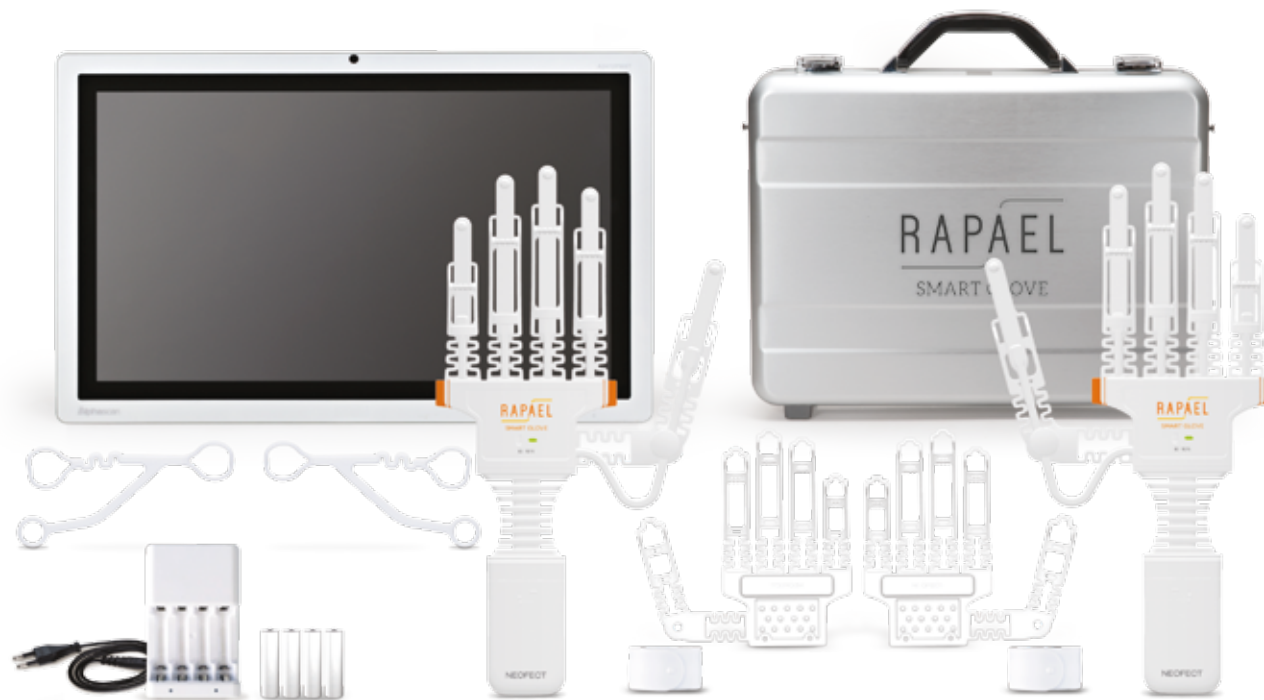
# COMPONENT

- Smart Glove: 1pair(Left/Right)
- Tablet PC: 1ea
- Extra silicone pad: 1pair(Left/Right)
- Extra body band: 1pair(Left/Right)
- Charger: 1ea
- Battery: 6ea (AAA)
- Quick guide: 1ea
- Instruction for use: 1ea
- Hard case: 1ea

# ABOUT NEOFECT

NEOFECT was founded to create hope for better life and better world. NEOFECT believes that any patient is deserved to enjoy happy life with hope for full recovery. NEOFECT has vision to help more patients take advantage of advanced digital and robot tech-

nologies 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 meaningful impact through disruptive innovation for patient's hope.



## 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



We inspire hope

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