

Computer based  
cognitive rehab solution

# RAPAEL

Cognition



NEOFECT

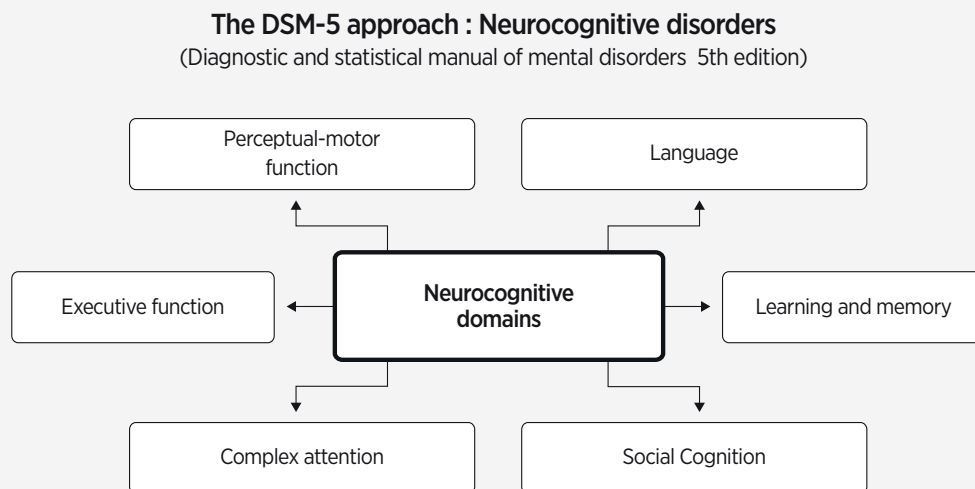
# BASIC APPROACH TO COGNITIVE REHAB

RAPEAL Cognition is a computer based therapy program which promotes retraining and reorganization of the brain after injury or illness.

## Importance of Cognitive Rehabilitation

Cognitive function refers to the intellectual activities that encompass memory, reasoning, attention and language. Damage to cognitive function can cause difficulties in ones' daily life. Promoting brain neuroplasticity is a key element to the rehabilitation process after a brain injury. Neuroplasticity is a concept that states that the brain will essentially rewire itself to compensate for the area of injury or damage. Cognitive rehabilitation focuses on the importance of retraining the brain.

The DSM-5 defines cognitive function with 6 major domains.[3] The first domain is the cognitive domain, which includes the fundamental areas of concentration, memory, planning, organization, problem solving, and abstraction. Integration of sensation, language, and visual-perception is the foundation of this domain[4].



## Basic Approach to Cognitive Rehabilitation

It is shown that in order to be successful with cognitive training it is best to progress using a bottom up approach; progressing from simple to more complicated activities. RAPEAL Cognition designs its cognitive rehabilitation around the Hierarchical Approach, which focuses on attention, perception, discrimination, organization and memory.

### Hierarchical Processing Model of Cognition<sup>[5]</sup>

- Arousal / alerting
- Perception, selective attention
- Discrimination
- Organization
- Memory, recall
- High-level thought processing

Ref. [1] Najenson T, Rahmani L, Elazar B, et al. An Elementary Cognitive Assessment and Treatment of the Craniocerebrally Injured Patient. New York, Plenum. 1984.

[2] Glisky EL, Schacter DL, Tulving E. Learning and retention of computer-related Vocabulary in memory-impaired patients: method of vanishing cues. J Clin Exp Neuropsychol. 1986;8:292-312

[3] Sachdev, P. S. et al. (2014) Classifying neurocognitive disorders: the DSM-5 approach Nat. Rev. Neurol. doi:10.1038/nrneurol.2014.181

[4] Wheately CJ. Evaluation and treatment of cognitive dysfunction. In: Occupational Therapy Practice Skills of Physical Dysfunction. 4th ed. St. Louis, Mosby. 1995;241-252.

[5] Adamovich BB, Henderson JA, Auerbach S. Cognitive Rehabilitation of Closed Head Injured Patients: A Dynamic Approach. London: Taylor & Francis; 1985.

# WHY RAPAEI COGNITION?

RAPAEI Cognition is a collaborative project that combines the strengths of computer-assisted cognitive rehabilitation with the unique RAPAEI interface and algorithm.

## Strength of CACR<sup>[1]</sup>

The Computer Assisted Cognitive Rehab (CACR) program shows notable improvements with memory, problem solving and attention training for people who have suffered from a brain injury [2].



### Coherent Repetitive Learning

Standardized repetitive learning can be graded by therapists and patients.



### Computer Algorithm of Difficulty Level

Computer algorithm automatically customizes the difficulty level to each individual patient.



### Instant Feedback

Provides immediate feedback on performance.



### Patient Specific Programs

Determines the activities based on analysis of each patients' performance.



## NEW RAPAEI Cognition

RAPAEI collaboratively developed a new design that incorporates touch screen access which can be used across many disciplines.



### Collaborative Expert R&D

Developed by experts from different disciplines including clinicians, therapists and engineers.



### Customized Training Design

Therapists have the ability to improve the interest and concentration of each patient by changing the contents and graphics according to patient's needs.



### Instinctive User Experience

UX reinforced for therapists and patients to have a good understanding of progresses and results of the training.



### ALL Touch Screen

Touch screen adapted for the convenience sake of the patients' uses.

Ref. [1] Computer-assisted Cognitive

[2] Zoltan B. Vision, Perception and Cognition. 3rd ed. New Jersey, Slack. 1996.

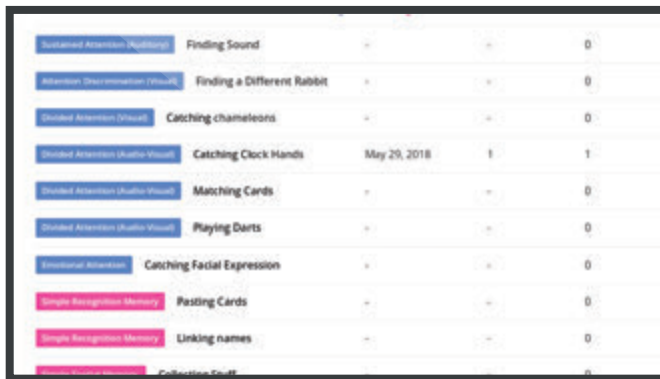
# RAPAEL COGNITION PLATFORM & CONTENTS DESIGN

RAPAEL platform enables therapists of easy and systematic training, while patients are able to experience it with much interest and co

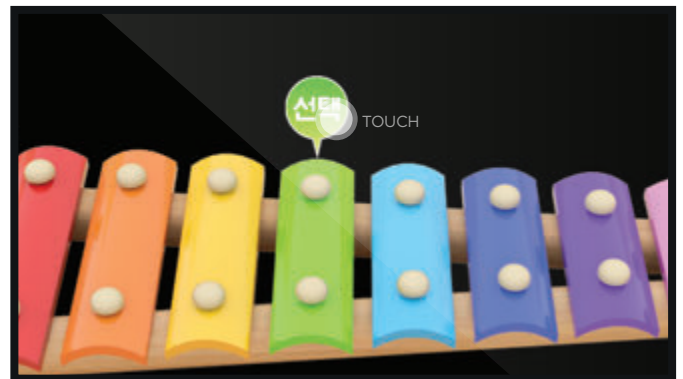
## Rehab information Processing & Key Features

Instinctive Selection

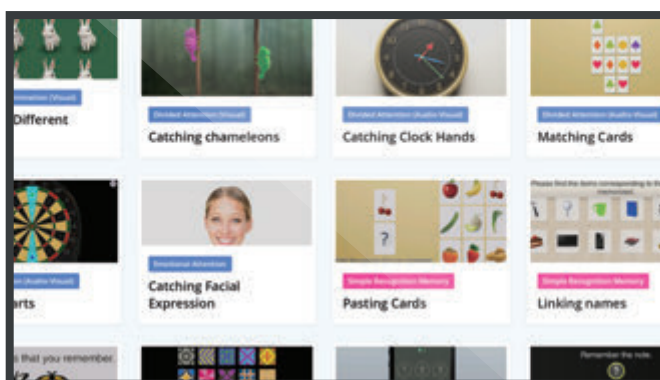
Convenient Use



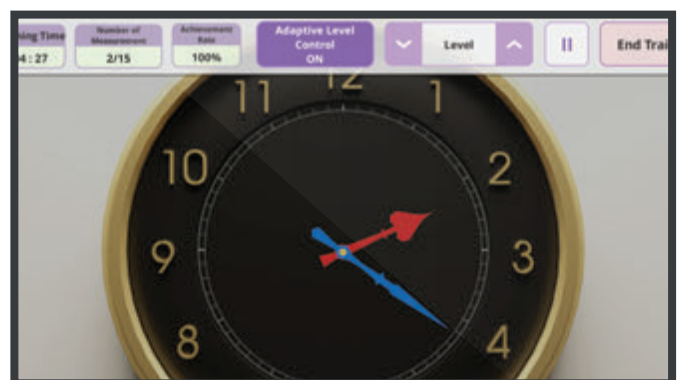
Training Selection per Specific Purposes



Touch Input



Instinctive Images Screen



Training Managing Widget

GN

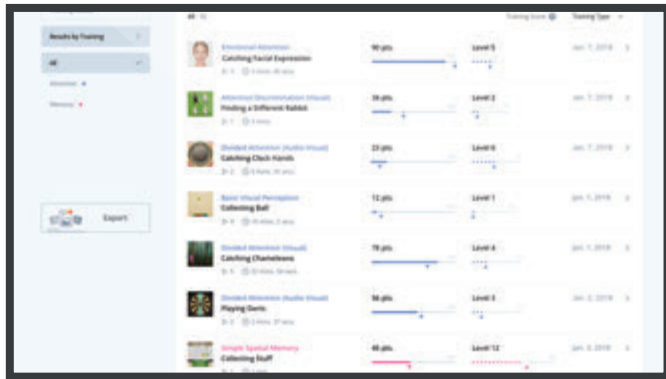
nd concentration

## Training Immersion

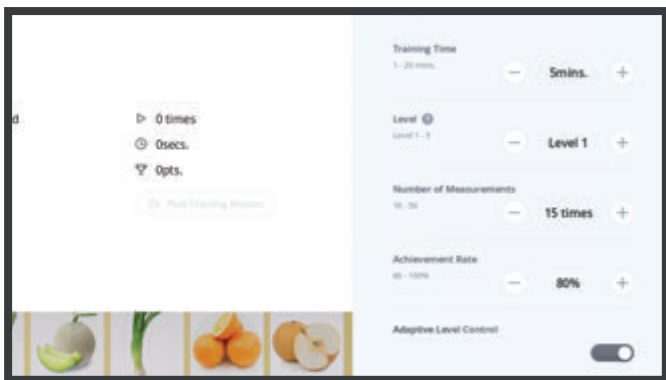
## Overall results and Report



Reinforced Design Meeting the Purpose



Comprehensive Result per Training Purposes



Contents Difficulty Segmentation



Core Result per Each Training

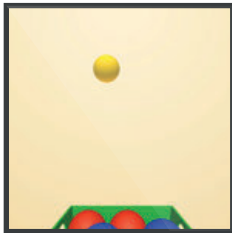
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# RAPAEL COGNITION CONTENTS INSTRUCTION

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## Attention Training

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### Collecting Balls Basic Visual Perception

Visual attention  
strategy training



### Catching Chameleons Complex Attention Discrimination

Reaction training to  
complex visual stimuli



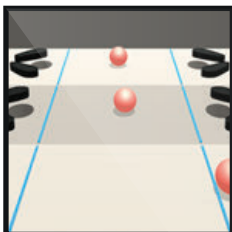
### Hearing Sounds Basic Auditory Perception

Attention discrimination  
training on auditory directions



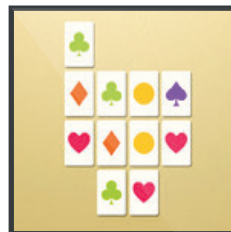
### Grabbing Hands of Clock Complex Attention Discrimination

Visual / Auditory complex  
attention training



### Holding Balls Maintaining Attention

Attention / Distance  
perception training



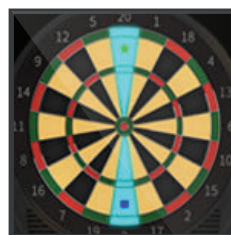
### Matching Cards Complex Attention Discrimination

Visual / Auditory complex  
attention training



### Catching Sounds Maintaining Attention

Attention discrimination  
training on auditory directions



### Playing Darts Complex Attention Discrimination

Visual / Auditory complex  
attention training



### Determining a Different Rabbit Attention Discrimination

Visual attention  
discrimination training

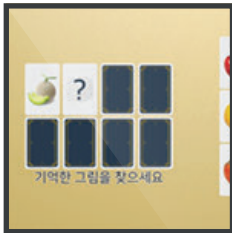


### Finding a Face Emotional Attention

Sympathy training



## Memory Training



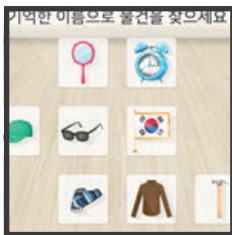
### Pasting Cards Recognition Memory

Space memory  
ability training



### Playing a Musical Instrument Sequential Recalling

Sequential recalling  
training by auditory stimuli



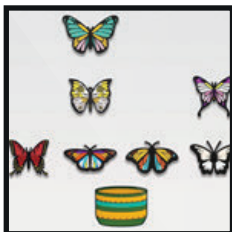
### Linking Names Recognition Memory

Attention holding  
ability training



### Connecting Sounds Sequential Recalling

Establishing memory  
strategy by auditory stimuli



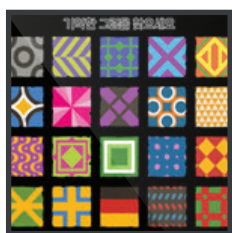
### Collecting Stuffs Space Memory

Remembering features  
/ Location of visual stimuli



### Connecting Numbers Associate Memory

Verbal-Non verbal  
complex memory training



### Selecting Tiles Space Memory

Remembering features  
/ Location of visual stimuli



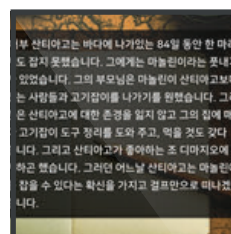
### Group Memory Verbal Categorizing Memory

Memory training by  
categorization



### Making a Call Sequential Recalling

Establishing memory strategy  
by sequential memorizing



### Story Memory Language Integration

Memory improvement  
by video training

# RAPAEL COGNITION EVOLUTION PLAN

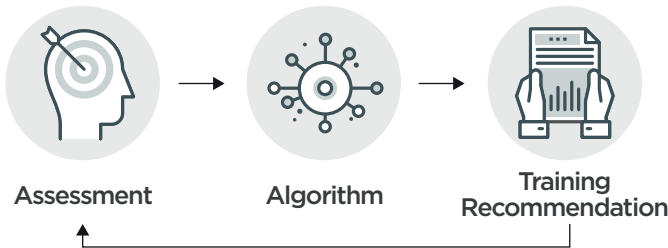
## Training Program Development

By developing specific cognitive rehabilitation training programs, Cognition maximizes brain function and decreases further brain deterioration.

| Additional Training     | Details   |
|-------------------------|---|
| Visuospatial Perception | Accurately perceives and represents an object, and transforms spatial information.                      |
| Execution Function      | Obtains needed information and coordinates behaviors.   |
| Emotion                 | Controls psychological-physiological status related to various emotions, thoughts, and behaviors.       |
| IADL                    | Requires more advanced problem solving ability than common factors does, which demands basic functions. |

## Development of Initial Assessment System

Cognition develops a customized algorithm for each patient and recommends a suitable program through an optimized assessment process.



## Training Program by Diagnosis

Cognition is designed to work with many diagnoses and offers several approaches in order to allow for use in a variety of clinics and local communities.

|   |   |
|---|---|
| <b>Aging / Dementia</b> <ul style="list-style-type: none"><li>· Memory Training</li><li>· Frontal Lobe Function Enhancement</li><li>· Execution Function Training</li></ul>                 | <b>Stroke</b> <ul style="list-style-type: none"><li>· Attention Training</li><li>· Unilateral Neglecting Visual perceptive Training</li><li>· IADL Training</li></ul> |
| <b>Traumatic Brain Injury</b> <ul style="list-style-type: none"><li>· Cognitive Behavior Control Training</li><li>· Emotion Control Training</li><li>· Attention, Memory Training</li></ul> | <b>Depression / Emotional Disturbance</b> <ul style="list-style-type: none"><li>· Emotion Control Training</li><li>· IADL Training</li></ul>                          |



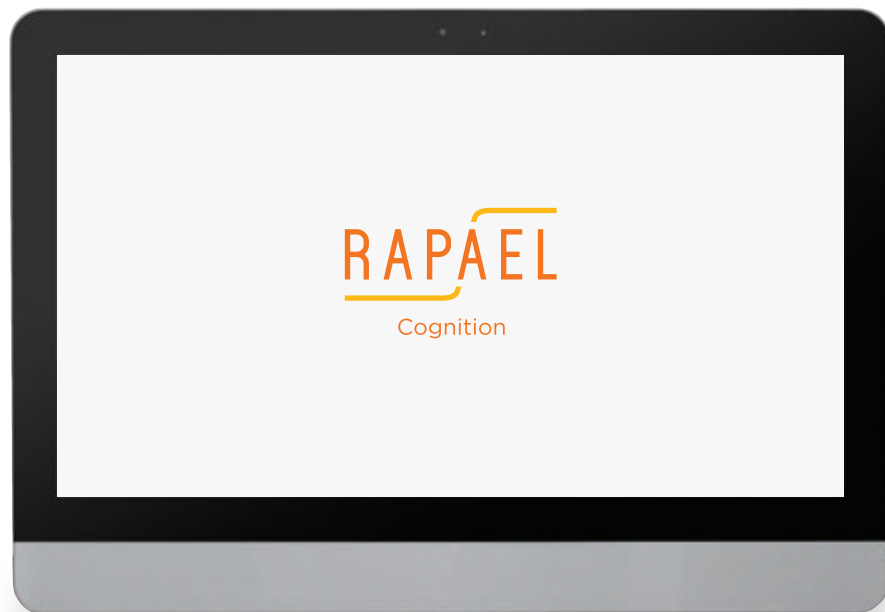
# NEOFECT EXPANSION OF LINE-UP

| Product Family   | Device Type | 2014        | 2015      | 2016       | 2017                              | 2018                                      | 2019                         |
|------------------|-------------|-------------|-----------|------------|-----------------------------------|---|------------------------------|
| Cognitive        |             |             |           |            | Cognition<br>(+ Attention Memory) | Cognition<br>(+ Visuospatial Neglect etc) | Cognition<br>(+ Emotion etc) |
| Shoulder / Elbow | Active      |             |           |            | Smart Board                       | Smart Shoulder / Smart Arm                | Upper Assist                 |
| Hand             | Active      | Smart Glove |           | Smart Kids | Smart Pegboard                    |   |                              |
|                  | Assistive   |             |           |            |                                   | NeoMano Glove                             |                              |
| Platform         |             | RAPAE 1.0   | RAPAE 1.2 |            | RAPAE 2.0<br>(+ Multi-Device)     | Platform                                  | Platform                     |

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# COMPONENT

- RAPAEL Cognition Software
- Android PC box: 1 pc
- Touchscreen monitor: 1 pc
- Manual: 1 pc

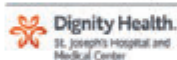


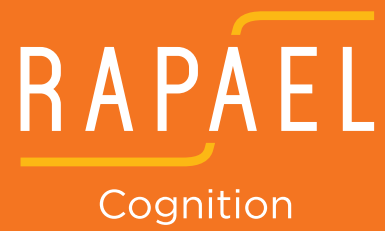
# ABOUT NEOFECT

NEOFECT was founded to create hope for better lives and a better world. NEOFECT believes that every patient deserves to enjoy a happy life with hope for full recovery. NEOFECT has a vision to help more patients take advantage of advanced digital and robot technologies through developing and commercializing light, portable, and affordable rehabilitation solutions. We look forward to launching new products and hope you join us on our journey as we create a meaningful impact through new innovations creating hope for our patient's.



## Clinical partners





*We inspire hope*

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