neofect

Neofect Smart Pegboard

Neofect Smart Rehabilitation Solution

CES INNOVATION AWARDS 2018 HONOREE

CES INNOVATION AWARDS 2020 HONOREE

The Smart Pegboard is a gamified rehab tool for dexterity training and fine motor skill development.

The pegboard is a multi-sensory experience, engaging different body systems:

Visual: Light-up board promotes visual tracking, varied size and shapes challenge perceptual skills
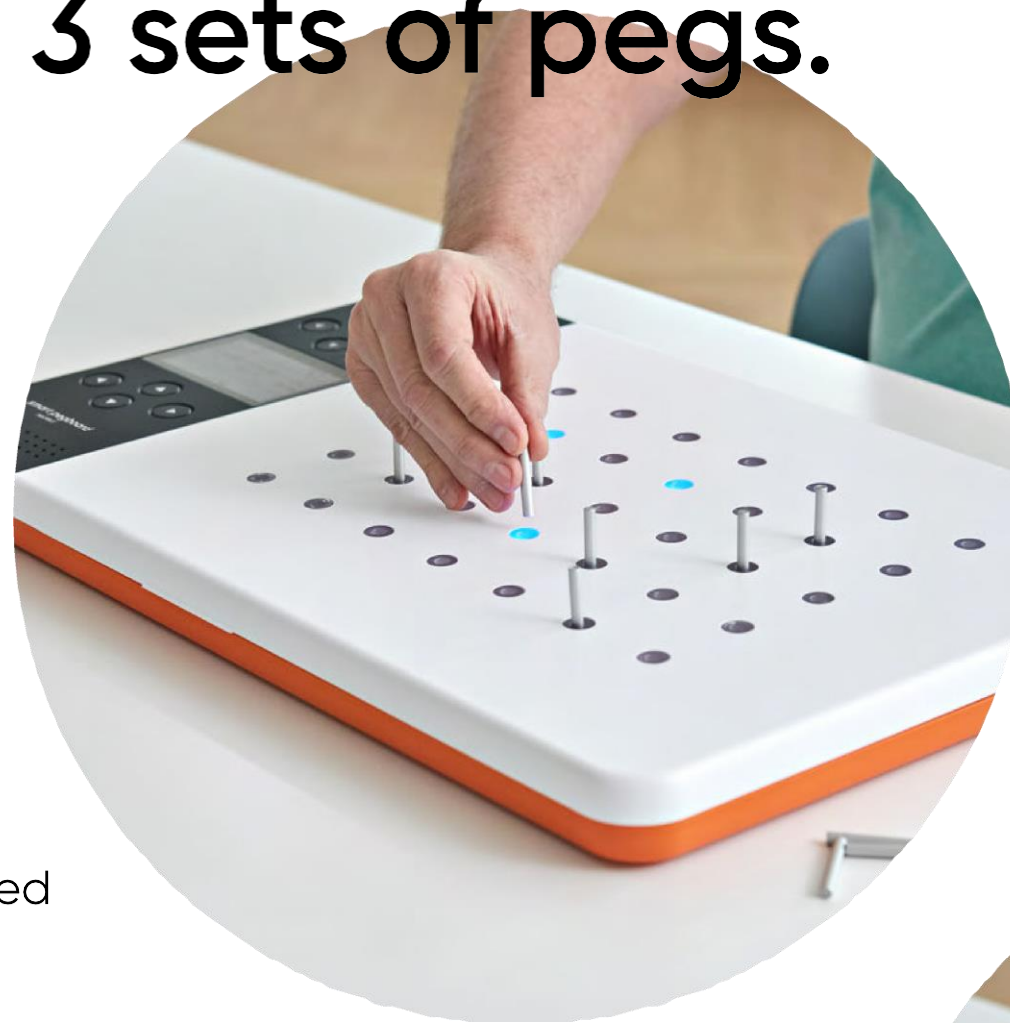
Auditory: Verbal directions and positive feedback gauge comprehension, increase engagement

Tactile: Varied peg size and shape provide tactile input during grasp and pinch, challenge stereognosis

Cognitive: 15 training games incorporate attention, memory, and problem-solving skills

Includes 1 base unit, 3 boards and 3 sets of pegs.

The 15 training games can be played using multiple peg shapes.

Graded peg shapes challenge increasingly complex fine motor skills (standard → mixed shape → pinch)

Digital display provides **in-game performance tracking*** and **streamlined outcomes reporting:** total time, total correct, total incorrect, success rate, average time per peg (reaction time)

*Patient profiles are not available. Once game is replayed, previous data is erased. Make sure to record data after each game to track progress.

Typical Candidate:

Diagnosis resulting in decreased fine motor skills of one or both hands.

Adults: CVA, TBI, SCI, neurodegenerative

Peds: +CP, developmental delay

Prerequisites:

Fair or better functional reaching (hand to table), grasp sufficient to hold and transport 1" diameter peg

Skills targeted:

Fine Motor: Grasp/release, pincer grasp, tripod grasp, arch development, thumb webspace opening, thumb opposition, bilateral coordination, in-hand manipulation

Visual motor: Hand-eye coordination, visual scanning, visual perception, visual attention, depth perception, color/shape discrimination

Cognitive: Attention (sustained, divided), short-term memory, problem-solving

The Smart Pegboard can help to streamline clinician responsibilities and enhance patient engagement.

Less than 2 minutes set up time

Get patients started with an effective, engaging exercise routine right away

Versatile

Flexible for use as a therapy treatment activity or home exercise program

Maximize visits

Exercise and warm-up before treatment to leave more time on functional goals with the clinician

Increase compliance and motivation

Keep patients invested in their home exercise programs with 15 engaging games

Data-driven

Hardware tracks progress and performance per game for streamlined outcome measurement and reporting

Multi-sensory

Auditory directions and lighted cues challenge cognition and vision in addition to pegboard dexterity training

Available Activities: Standard board

Title	Description	Vision	Cognition	Fine Motor
Freestyle	Place the pegs anywhere you want			●
Visual Training 1	Starting line is starting column for training (1 closer to midline to 7, farther from midline). Gives visual and auditory prompt.	●		●
Visual Training 2	Prompts to place peg at middle or end of row. Assesses orientation to midline/spatial orientation. Gives visual and auditory prompt.	●		●
Shape Completion	User completes a shape with a certain number of pegs	●	●	●
Randomizer	Random arrangement of lights prompt patient	●		●
Smash a Mole	React to a "mole" in a set amount of time, coordination and reaction time are challenged.	●	●	●
Memory Placement	Memorize the lit locations and place the pegs. Greater number of pegs based on level.		●	●
Simon Says	Pegs are placed in corresponding order. Lights turn off after illuminating to challenge user memory.		●	●
Snake Trap	Trap a moving snake by placing a peg on "body". Challenges reaction time and speed of movement.	●	●	●

Available Activities: Mixed shpae board

Title	Description	Vision	Cognition	Fine Motor
Freestyle	Place the pegs anywhere you want			●
Shape Recognition	Use square, round, triangle. Auditory prompt for shape to be used..	●	●	●
Blackout	Follow blinking lights in sequence to fill the board and match shape.	●	●	●
Randomizer	Random arrangement of lights prompt patient	●		●
Smash a Mole	React to a "mole" in a set amount of time, coordination and reaction time are challenged.	●	●	●
Memory Placement	Memorize the lit locations and place the pegs. Greater number of pegs based on level.		●	●
Simon Says 1 and 2	1: Pegs are placed in corresponding order. Lights turn off after illuminating to challenge user memory. 2: Pegs are placed in reverse order. Lights turn off after illuminating to challenge user memory.		●	●
Pathfinder	Create path between illuminated targets. Straight lines must be used, objective is to use fewest number of pegs.	●	●	●
Find Home	Place pegs to help guide blinking light to its destination. Planning and spatial skills utilized.	●	●	●

Available Activities: Pinch Board

Title	Description	Vision	Cognition	Fine Motor
Freestyle	Place the pegs anywhere you want			●
Shape Completion	User completes a shape with a certain number of pegs	●	●	●
Randomizer	Random arrangement of lights prompt patient	●		●
Smash a Mole	React to a "mole" in a set amount of time, coordination and reaction time are challenged.	●	●	●
Memory Placement	Memorize the lit locations and place the pegs. Greater number of pegs based on level.		●	●
Simon Says 1	Pegs are placed in corresponding order. Lights turn off after illuminating to challenge user memory.		●	●
Simon Says 2	Pegs are placed in reverse order. Lights turn off after illuminating to challenge user memory.		●	●
Snake Trap	Trap a moving snake by placing a peg on "body". Challenges reaction time and speed of movement.	●	●	●
Find Home	Place pegs to help guide blinking light to its destination. Planning and spatial skills utilized.	●	●	●

Spec sheet

Size	(W) 21.9 x (D) 13.8 x (H) 1.4 inches
Weight	6.6 lbs (A base unit and a board)
Number of LED	63 ea
Number of Sensors	Recognizing Peg Sensor: 63ea / Recognizing Board Sensor: 8ea
Display	TFT LCD 4.3 inches
Languages	Korean, English, Spanish, German, Polish, Chinese, Japanese, Cantones, French, Italian, Czech, Finnish, Taiwanese, Dannish, Estonian, Swedish, Latvian, Lithuanian, Macedonian, Thai
Power supply	Micro USB 5pin
Standard Pegs	Red 21 ea, Blue 21 ea, Yellow 21 ea (Diameter 0.9 inches / Height 4.7 inches)
Mixed Shape Pegs	Red - Round 2 ea, Triangle 1 ea, Rectangle 2 ea / Blue - Round 2 ea, Triangle 2 ea, Rectangle 1 ea/ Yellow - Round 1 ea, Triangle 2 ea, Rectangle 2 ea / Green - Round 2 ea, Triangle 1 ea, Rectangle 2 ea
Pinch Pegs	35 ea (Diameter 0.2 inches / Height 1.6 inches)

Multiple research studies have been conducted with the Smart Pegboard

[Pegboard training + traditional OT produces statistically significant improvements in cognitive outcomes in domains of attention, memory, and visuospatial skills for adults post-stroke compared to traditional OT alone](#)

Kim, Park, and Lee 2020

Objective: The purpose of this study is to investigate the effects of audiovisual biofeedback training using RAPAEL Smart Pegboard on the cognitive function of stroke patients.

Methods: A total of 20 participants were divided into an intervention group and a control group, with 10 patients per group K-MoCA and NCSE were used for pre and post intervention evaluation. The intervention method of the intervention group provided traditional occupational therapy and audiovisual biofeedback training, and the control group provided traditional occupational therapy and participated in self-activity programs.

Results: K-MoCA revealed a significant difference in visuo-spatial and executive functions, attention, memory, and overall score in the internvention group compared to the control group ($p<.05$). In addition, the results of NCSE showed that there was a significant difference in attention, memory, and overall score in the intervention group compared to the control group ($p<.05$).

Conclusion: We confirmed that the audiovisual biofeedback training had a positive effect on the cognitive function of stroke patients. Therefore, it could be useful tool for the rehabilitation of stroke patients in future occupational therapy clinical environments.

[Pegboard + traditional OT produces significantly significant improvements in hand function and visual motor integration for children with developmental disabilities compared to traditional OT alone](#)

Kim et al. 2019

Purpose: This study examined the hand function and visual motor integration capabilities in 30 children with developmental disabilities. The children were divided into an experimental group (n=20) that received digital sensory perception training and a control group (n=10) that did not receive this training.

Methods: Training was conducted a total of 12 times for six weeks, for 50 minutes a day, twice a week, for the experimental group. The Jebsen-Taylor Hand Function Test was used to determine the hand function before and after the intervention, and the Beery VMI-6 was performed to identify the visual motor integration capability.

Results: After the intervention, the ability to perform hand functions and visual motor interaction increased significantly in the experimental group but not in the control group. Digital sensory training therefore had a positive effect on the hand function and visual motor integration in children with developmental disabilities.

Conclusion: A digital sensory perception training program is an arbitration method that can positively improve the hand function and visual motor integration ability in children with developmental disabilities.