BITS®

Bioness | Integrated | Therapy | System

Progress You Can Touch

Bioness®

Overview

BITS is a multi-disciplinary therapy solution designed to motivate patients and improve clinician efficiency. BITS' interactive touchscreen and diverse program options challenge patients to improve performance through the use of visual motor activities, visual and auditory processing, cognitive skills and endurance training. Standardized assessments and progress reports make documenting outcomes quick and easy.

BITS empowers patients and clinicians with the tools needed to improve performance.

Assess || Treat || Track

System Description

BITS integrates software and hardware with an interactive touchscreen display (48" or 55"), portable stand, and a computer with the BITS software application, including five therapy categories, 24 unique programs and four standardized assessments.

Baseline Comparisons, Graphs & Progress Reports

Several BITS therapy programs allow a Baseline Session to be designated so that a user's performance in future sessions can be compared against it. Detailed results are provided with red and green indicators of progress and decline. Individual session results can also be graphed to show performance trends over time. Use this information to create a Progress Report, customized with your facility logo and contact information so that it can be provided to physicians, payers, clients and caregivers. BITS Reports keep patients engaged and motivated to improve.
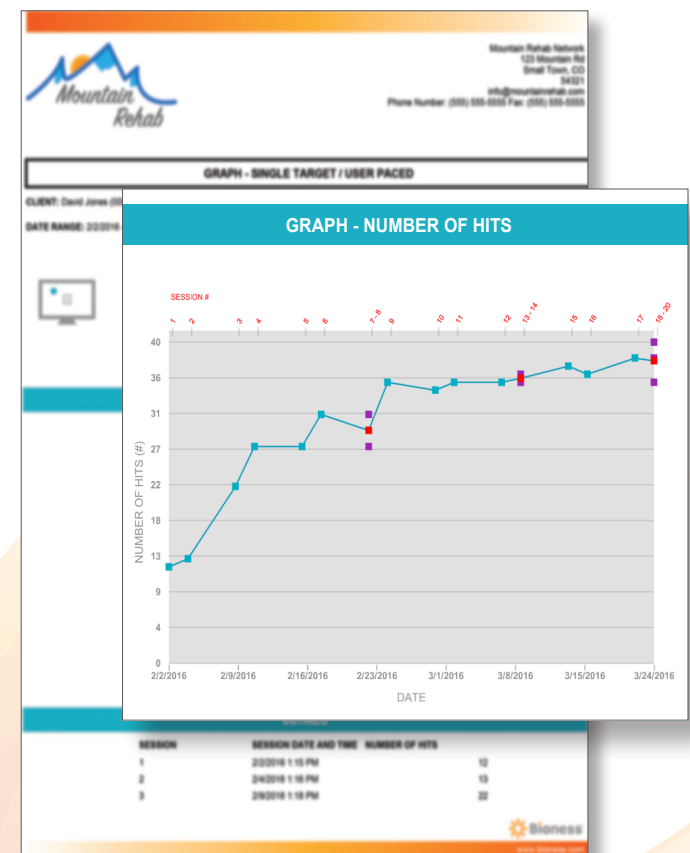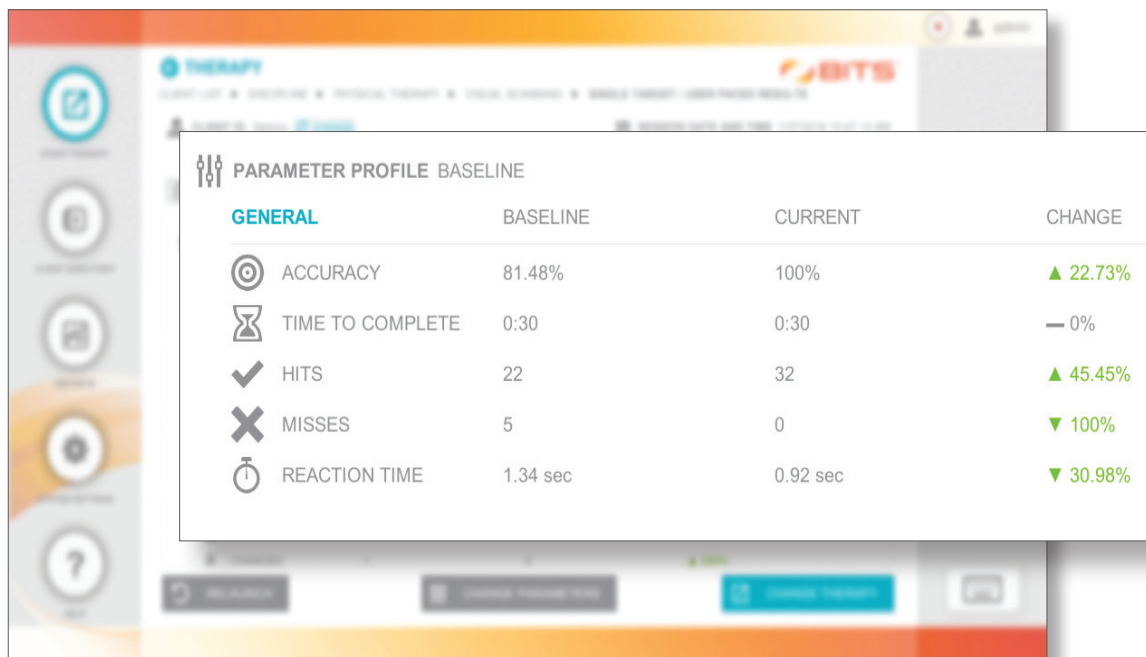
BITS 2.0 Therapy Programs

Therapy Category	# of Programs	Programs	Module Options	Clinical Focus
VISUAL SCANNING	6	Single Target	(1) User Paced (2) Time Paced (3) Reaction Time	Visuomotor coordination, scanning, reaction time, peripheral awareness
		Complex Array	(1) Sequence (2) Verbal (3) Competition	
VISUAL PURSUIT	5	Smooth Pursuit	(1) Smooth Pursuit	Visual tracking, motor skill planning, cognitive skills
		Rotator	(1) Single Color (2) Multi Color (3) Sequence (4) Gap Sequence	
COGNITIVE	2	Memory	(1) Memory	Working memory, visual/auditory processing, impulsivity, timing
		Rhythm	(1) Rhythm	
VISUAL MOTOR	5	Geoboards	(1) Geoboards	Visual spatial perception, motor coordination, attention
		Draw	(1) Symmetry (2) Trace (3) Replicate (4) Between the Lines	
CHARTS	6	Letter Charts	(1) Static (2) Motion (3) Multiple (4) Puzzle	Visual search, attention, visual/auditory processing
		Peripheral Letter Charts	(1) Sequence (2) Match	
ASSESSMENTS	4	Trail Making	(1) Part A & Part B	Visuomotor coordination, scanning, cognition, reaction time
		Bell Cancellation	(1) Bell Cancellation	
		Maze Test	(1) Maze Test	
		Visual Scanning & Motor Reaction	(1) Levels 1, 2, 3 & 4	

Examples of Therapy Uses

1| Balance training during pre-gait stepping, reaching towards targets while on multiple surfaces
2| Combine BITS with upper extremity activities
3| Use lower quadrant loading to make elderly patients more aware of steps/curbs/flooring
4| Use upper quadrant loading with overhead sport athletes
5| Increase speed and reaction performances within sports applications
6| Cognitive training and memory/processing post TBI/ABI
7| Motor reaction and planning repetitive task practice
8| Endurance training in the physical and cognitive capacities
9| Hand-object-eye coordination activities – hitting targets with thrown ball or extended dowel
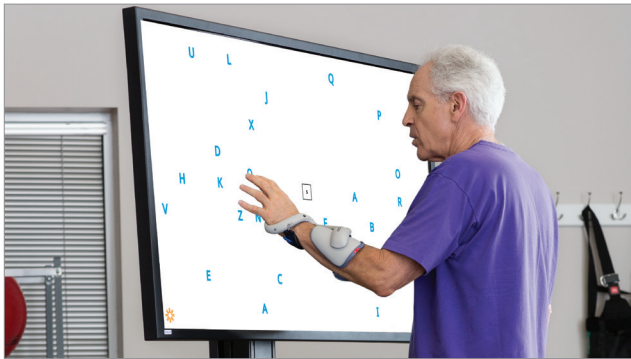
|| Trail Making

PROGRAM DESCRIPTION

This program assesses visual attention and task switching. It consists of two parts: Part A requires the user to connect a set of 25 numbers in the correct sequence as fast as possible while still maintaining accuracy. Part B increases the level of complexity with an alphanumeric sequence of 25 stimuli (1, A, 2, B).
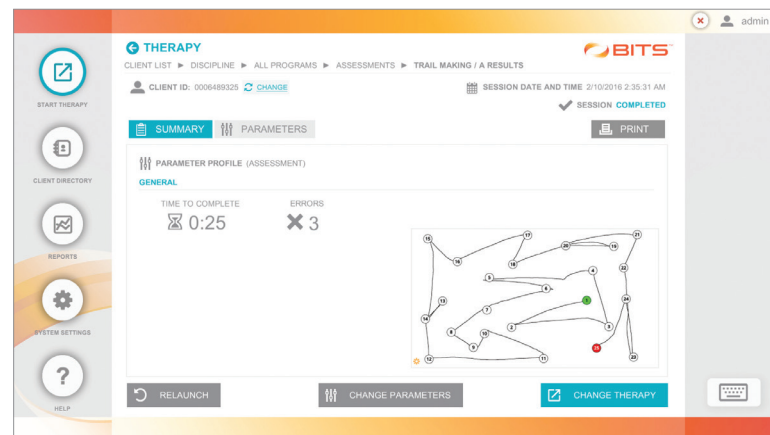
The Trail Making Assessment can be used to provide information about visual search speed, scanning, speed of processing, mental flexibility, as well as executive functioning.[1] The assessment can be administered full screen, or in a size comparable to the A4 paper assessment.
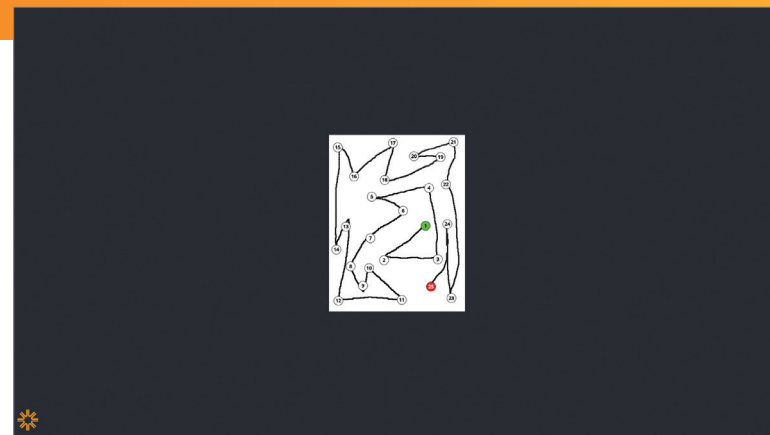
A4 Paper Size Assessment
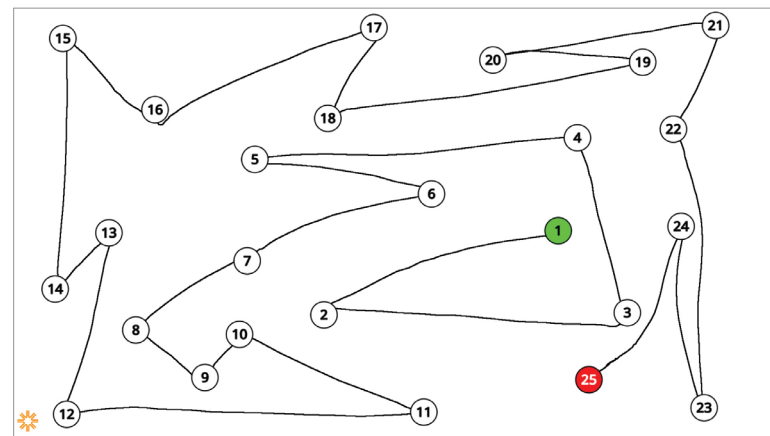
Full Screen Assessment

Results Screen

Bell Cancellation

PROGRAM DESCRIPTION

This cancellation task allows for a quantitative and qualitative assessment of visual neglect in the near extrapersonal space. The user is asked to identify and touch all 35 bell images embedded within 280 distractors (houses, horses, etc.). This standardized test has shown that an omission of 6 or more bells on the right or left half of the page may indicate unilateral spatial neglect.[2] The selection order also provides insight into the user's visual scanning patterns and attention.
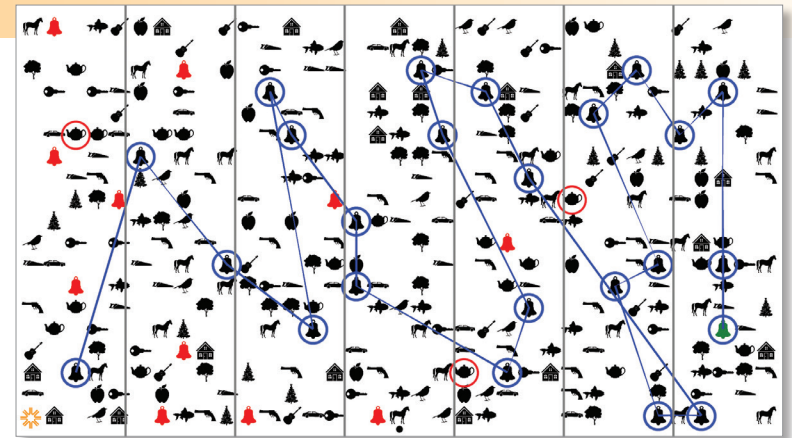
Full Screen Assessment Screen
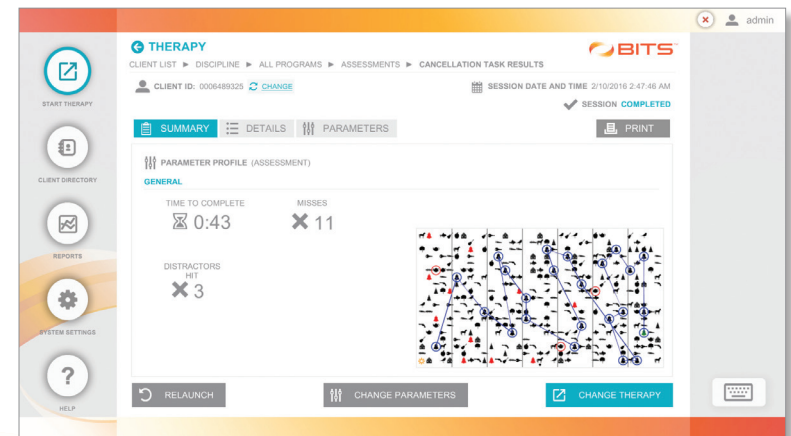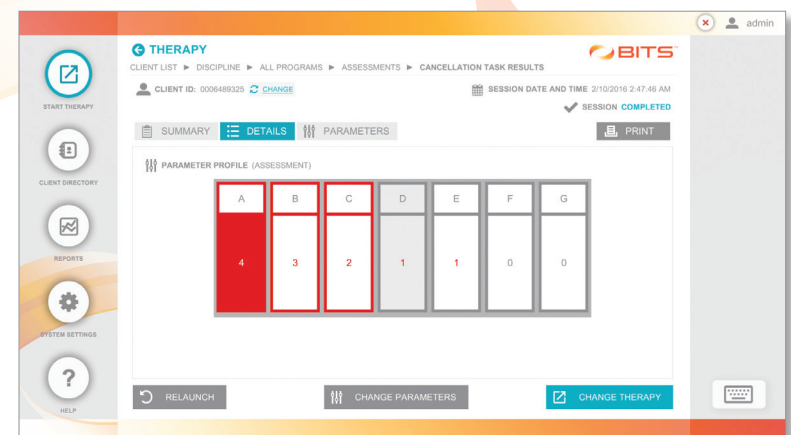
Results Screen

Detailed Results Screen

Maze Test

PROGRAM DESCRIPTION

This program assesses attention, visuoconstructional ability and executive functions of planning and foresight.[3] Performance is scored according to time to complete the test and total number of errors. Errors are determined by counting the number of times the user entered a dead-end alley or failed to stay within the lines.
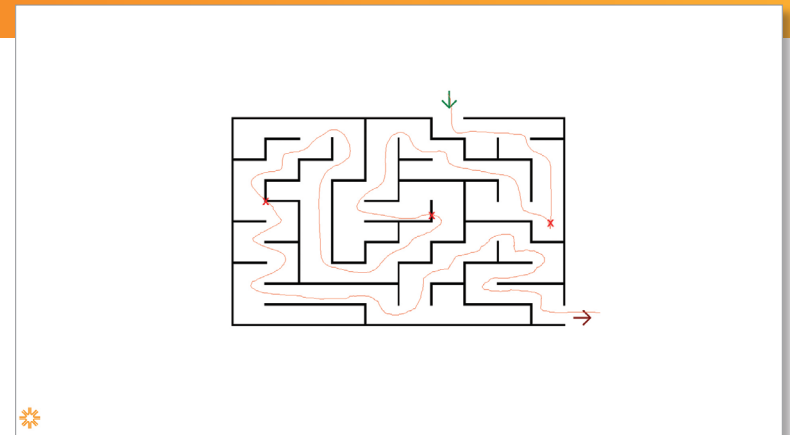

Full Screen Assessment Screen
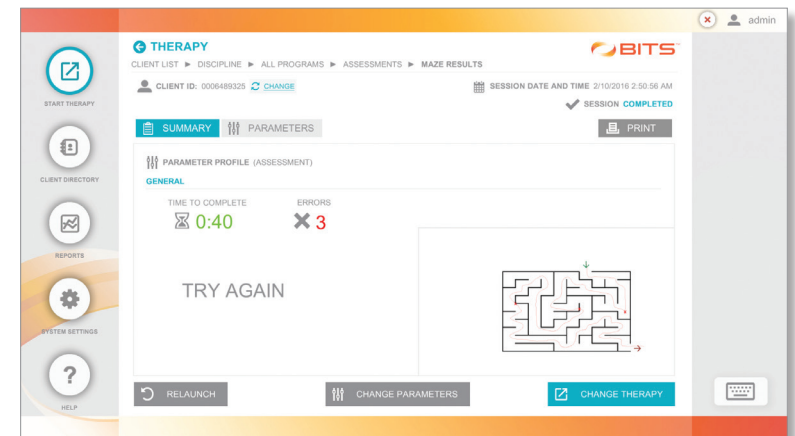
Results Screen

# Visual Scanning & Motor Reaction Assessment

PROGRAM DESCRIPTION

This four part trial assesses eye hand coordination, peripheral awareness, hand speed, reaction time and endurance. Targets appear on the screen one at a time. Users are instructed to visually scan the screen and touch each stimulus as it appears. The objective is to correctly touch as many stimuli as possible, as fast as possible.

Parameter Screen
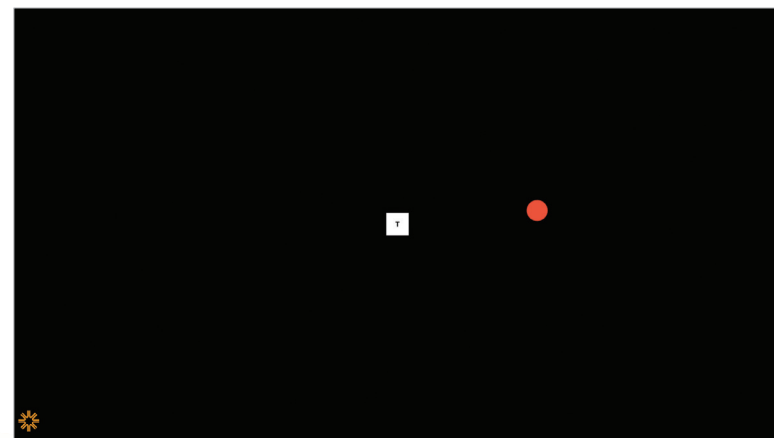
Therapy Screen (Level 2)
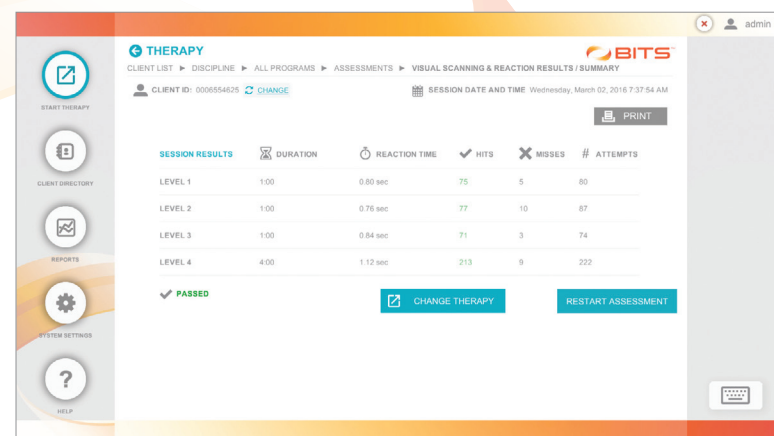
Results Screen

Single Target

PROGRAM DESCRIPTION

This program group is designed to challenge eye hand coordination, peripheral awareness, hand speed, and reaction time. Targets appear on the screen one at a time. Users are instructed to visually scan the screen and touch each stimulus as it appears as fast as possible.

USER PACED – Target stays present until the patient touches it.

**TIME PACED –** Target will stay present for a fixed/set amount of time before next target appears.

REACTION TIME – Patient starts with hand in center then moves to target when it appears. Program records reaction latency (how long to lift hand) and response time (how long it takes to hit target).
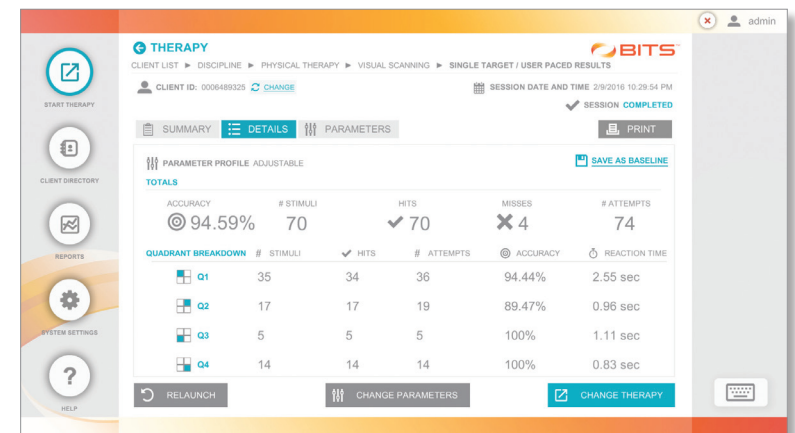
HIGHLIGHTED PARAMETERS:

|| Quantity of Stimuli
|| Session Duration
|| Stimuli Type and Size

|| Quadrant Loading (%)
|| Central Fixation (Adjustable)
|| Color & Contrast
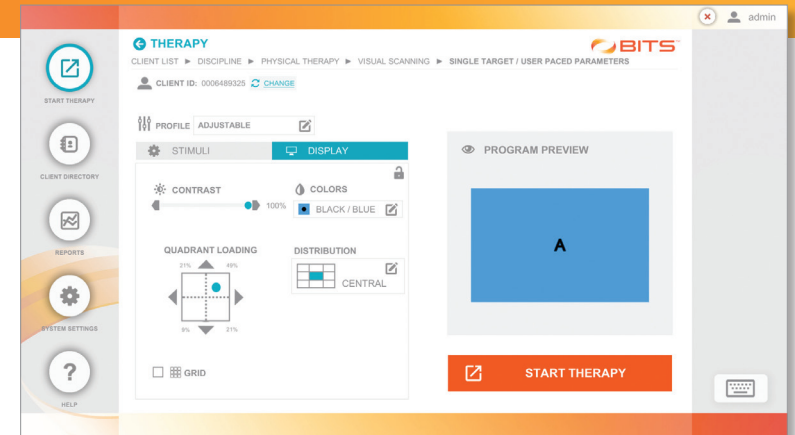
Parameter Screen
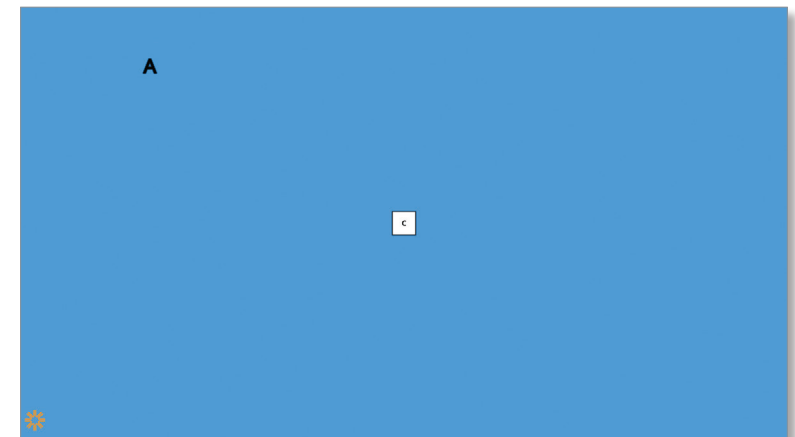
Therapy Screen

Results Screen

Complex Array

PROGRAM DESCRIPTION

This program group is designed to challenge a user's ability to visually scan and process a complex environment with multiple stimuli. The target stimuli must be touched in the correct sequence which demands cognitive effort, eye hand coordination and attention.

SEQUENCE – Alphanumeric targets must be hit in a specified sequence.

**VERBAL –** Patient will locate and hit the target that is spoken to them by the BITS system.

COMPETITION – Allows for competition between 2 people. Program splits the screen in half with the computer telling the participants which alphanumeric target to hit, and scores a winner upon completion.
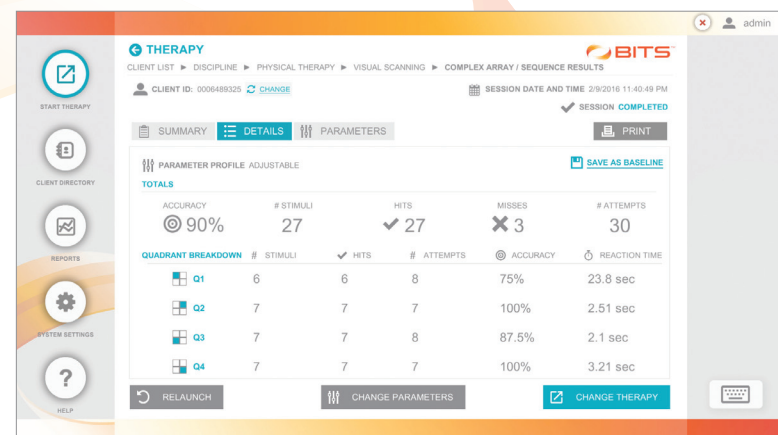
ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

|| Stimuli Type: Letters Upper, Lower or Combination; Numbers; Letters and Numbers
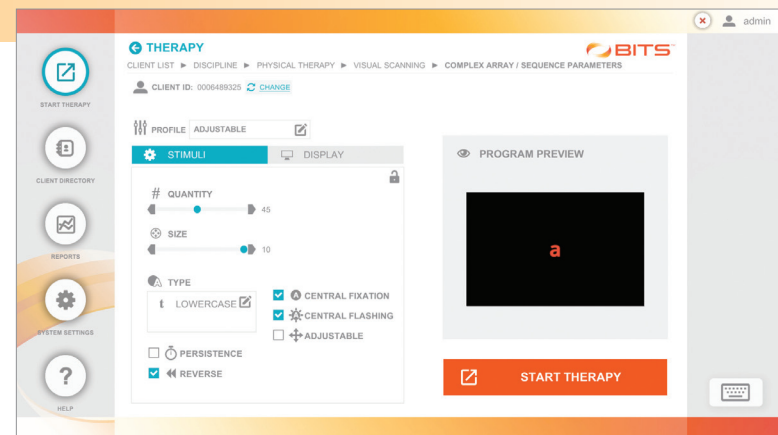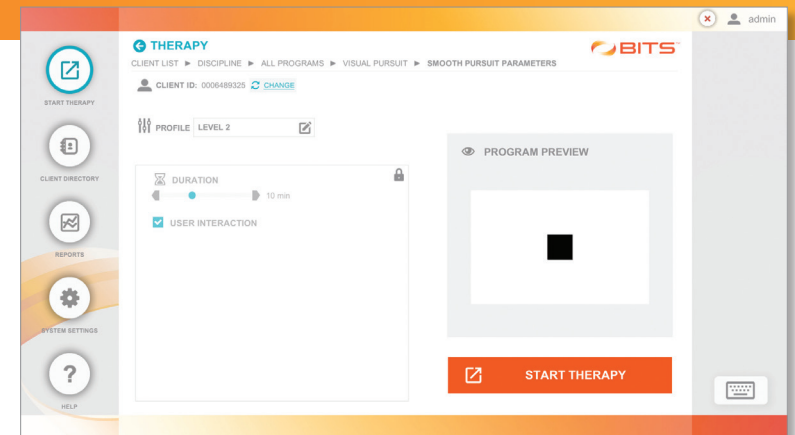

Parameter Screen
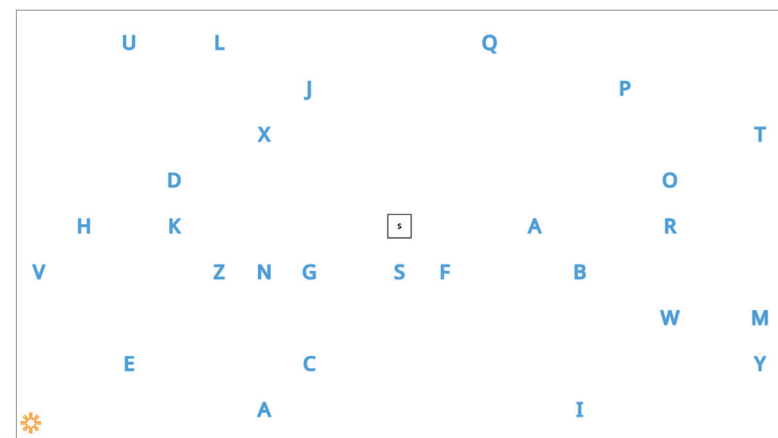
Therapy Screen

Results Screen

Smooth Pursuit

PROGRAM DESCRIPTION

This program guides users to follow moving stimuli with their eyes toward the neglected hemispace. Smooth pursuit eye movement training (SPT) uses optokinetic stimulation and may reduce visual, auditory, and haptic neglect.
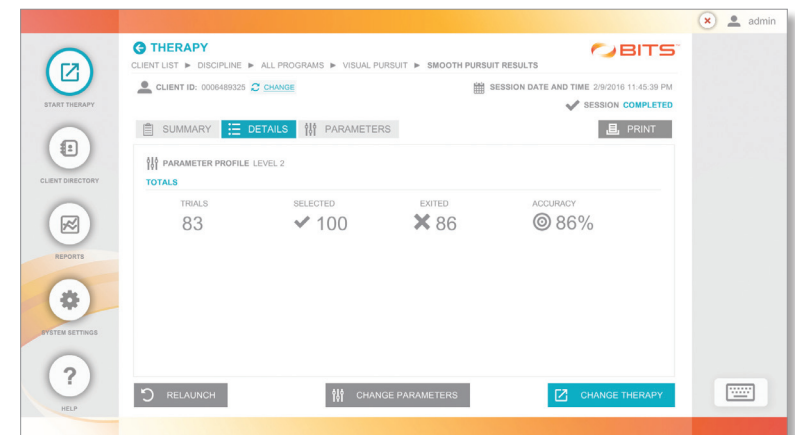
ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

|| User Interaction: Requires physical engagement and provides a measure of success in terms of following a stimulus from right to left

Parameter Screen
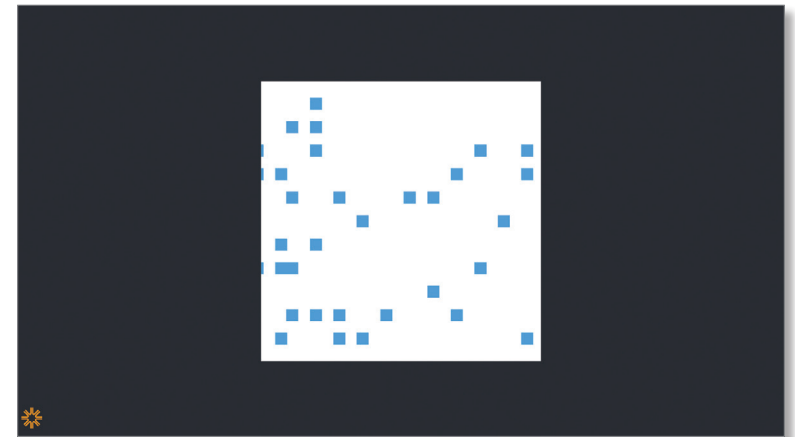
Therapy Screen

Results Screen

Rotator

PROGRAM DESCRIPTION

Multiple stimuli appear on a rotating wheel. Users are instructed to visually track the stimuli and accurately touch and eliminate them one by one. This program challenges the user's ability to visually track moving objects, plan and coordinate motor movements.

**SINGLE COLOR –** All targets on the rotator are the same color.

MULTI-COLOR – Multi-colored targets must be eliminated in a specified order.

**SEQUENCE -** Alphanumeric targets must be eliminated in a specified sequence, normal (1-10) or reverse (Z-A).

GAP SEQUENCE – Alphanumeric targets must be eliminated in order with the added complexity of gaps within the sequence (2, 5, 8, 10, 15).

ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

|| Stimuli Type: Letters Upper, Lower or Combination of Upper and Lower, Numbers and Numbers/Letters

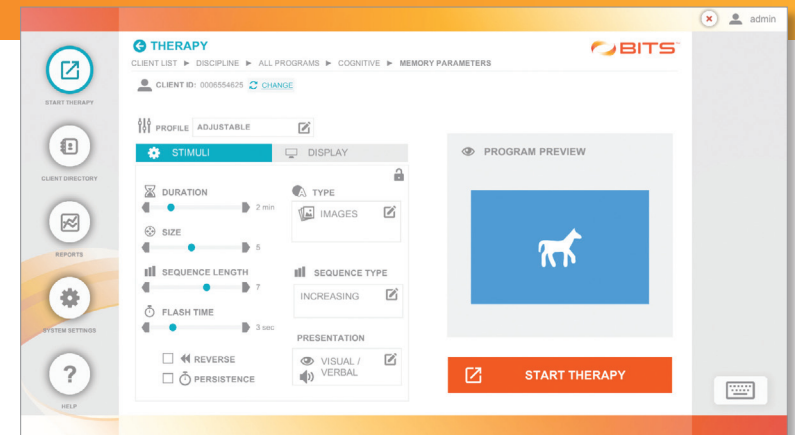Parameter Screen
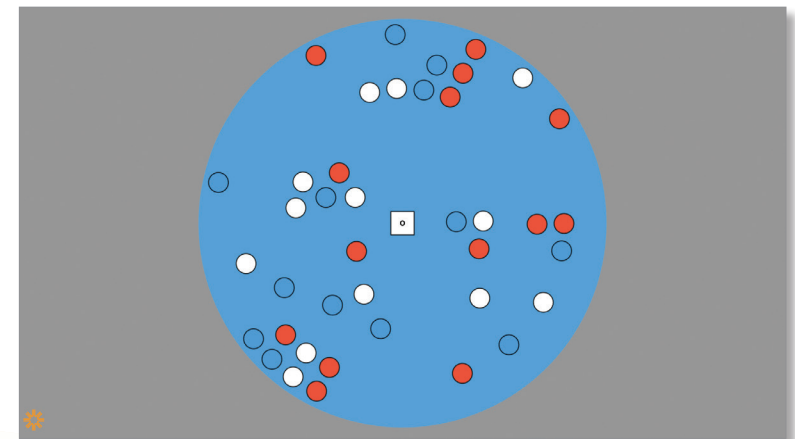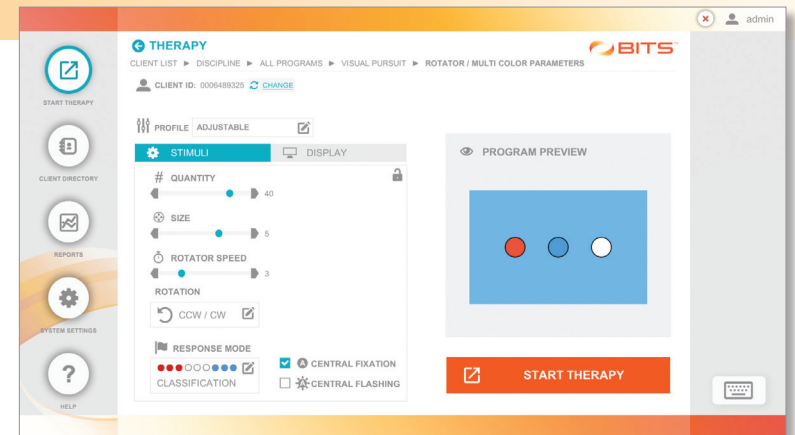
Therapy Screen

Results Screen
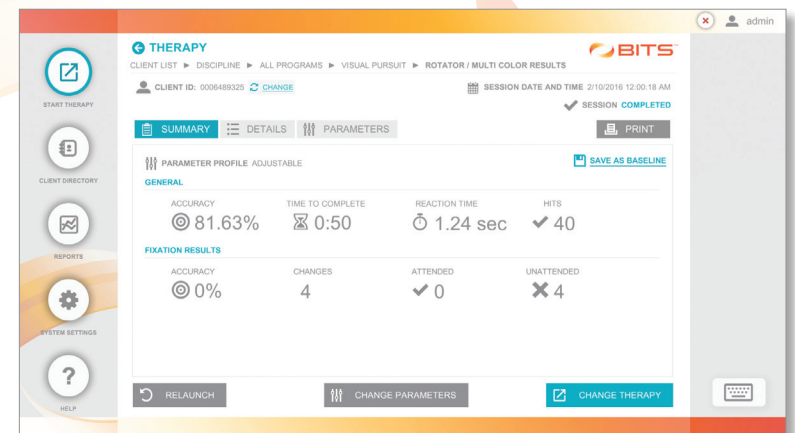
Memory

PROGRAM DESCRIPTION

This program is designed to improve speed of recognition, visual memory, auditory memory, while providing cognitive training. Target stimuli are presented verbally and/or visually on the display screen. The user must remember the presented sequence, locate the correct images, letters, numbers, or words, and touch them according to the correct sequence.

Parameter Screen

Therapy Screen

ADDITIONAL/UNIQUE PARAMETERS INCLUDE:
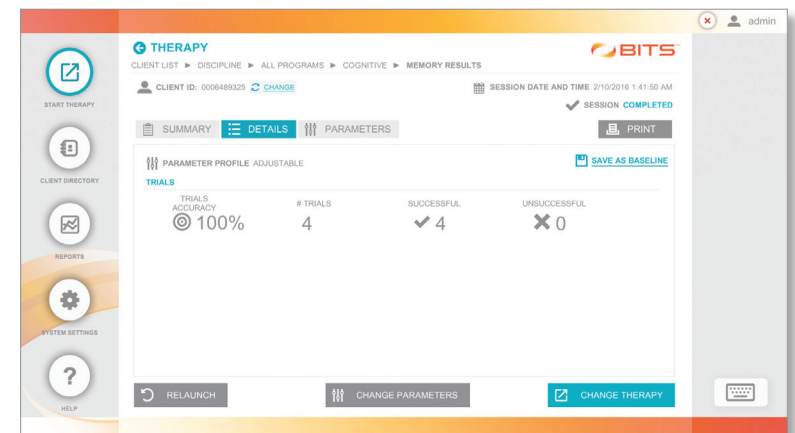
|| Stimuli Type: Letters, Numbers, Words/Custom words, Images/Custom images

|| Sequence Type: Increasing, Increasing Random, Fixed Quantity

|| Flash Time: Length of time the stimuli sequence persists before disappearing
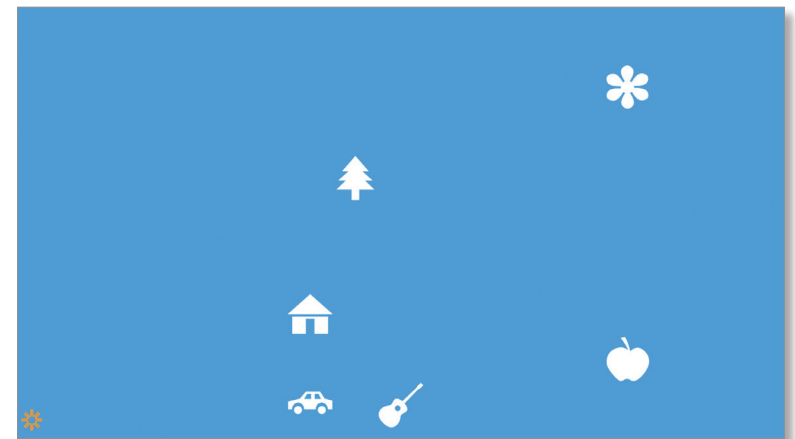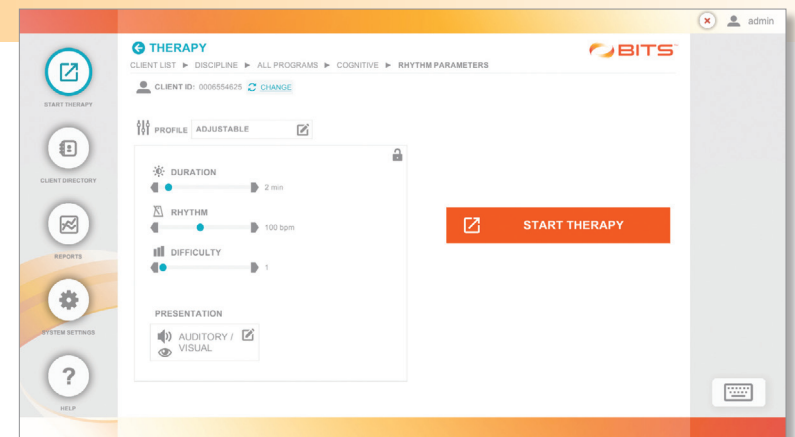

Results Screen

# Rhythm

PROGRAM DESCRIPTION

This program is designed to improve timing, speed, accuracy, and visual/auditory motor planning. The user must touch either of the two targets on screen at the selected rhythm in beats per minute.

Parameter Screen

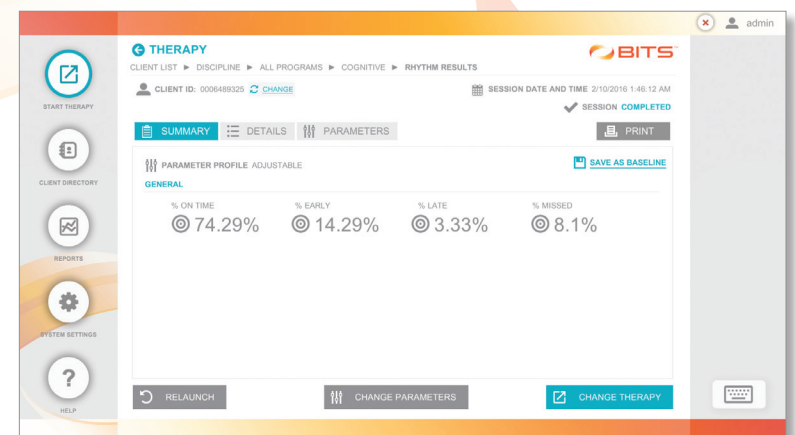
Therapy Screen

ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

‖ Beats Per Minute (BPM): Rhythm can be set from 20-200BPM
‖ Presentation Mode: Hear and/or see the beat
‖ Level: Set the precision requirement for being "on rhythm"
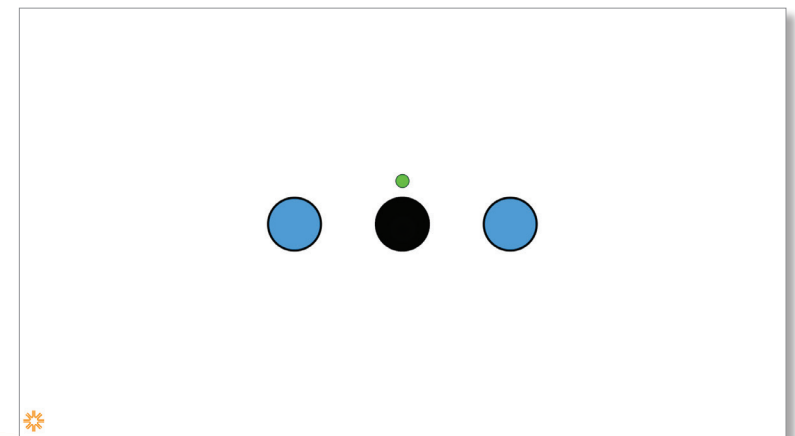
Results Screen

Geoboards
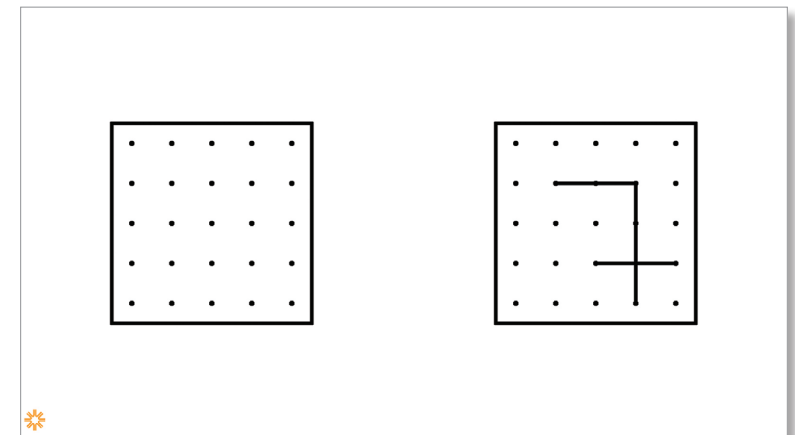
PROGRAM DESCRIPTION

This program is designed to challenge a user's visual spatial processing skills, memory, and motor coordination. Two geoboards appear on the display screen. One board will display a pattern on it. The user is instructed to recreate this pattern by drawing on the blank board.

Parameter Screen

Therapy Screen
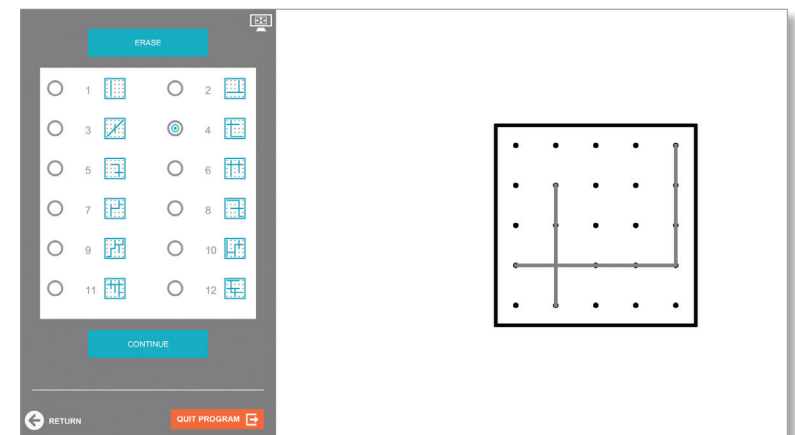
ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

|| Memory: Increase challenge by setting a flash time between 1-10 seconds before the pattern disappears

|| Draw Requirement: Duplicate, Horizontal Flip, Vertical Flip, Rotated 90° Left, and Rotated 90° Right
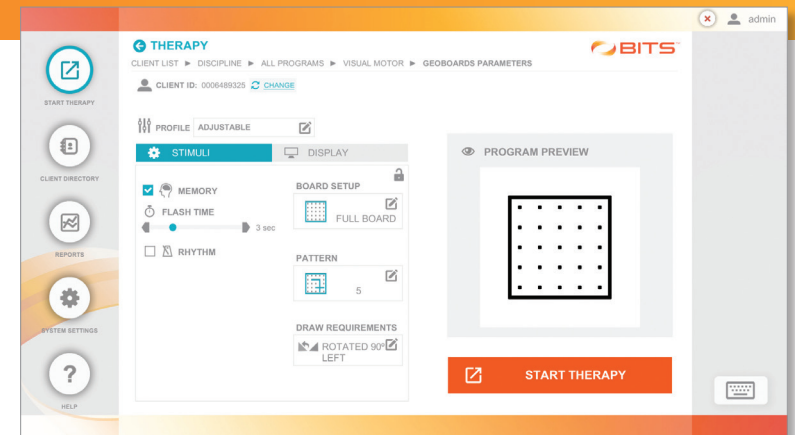
Therapy Screen

Drawing Programs

PROGRAM DESCRIPTION

This program group consists of four therapy programs: Symmetry, Trace, Replicate, and Between the Lines. Each program requires clients to interact with the program by drawing various shapes with their finger or a stylus. These programs are designed to improve visuomotor integration, visual form perception, and peripheral awareness.

SYMMETRY – Open drawing canvas with the ability to assess bilateral symmetry and document activities like the Clock Drawing Test.

TRACE – Trace a given shape with a set buffer that provides visual and audio feedback if patient traces "off pattern".

REPLICATE - Replicate the shape by drawing it on opposite side of screen.
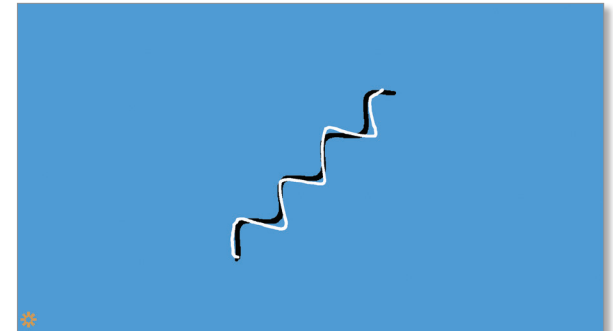
BETWEEN THE LINES – Draw within the borders of a set of default shapes with audio and visual feedback.
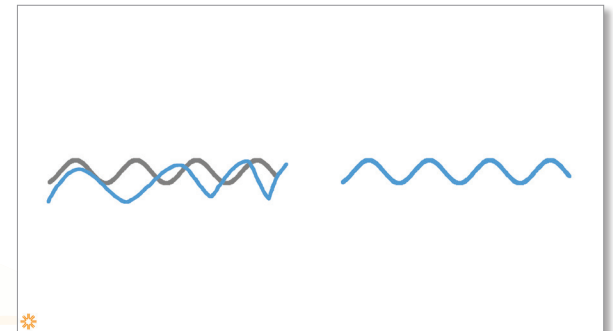
ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

|| Type: Shapes, Lines, Letters and Numbers
|| Pen Width and Line Width
|| Buffer: Control the buffer area around the pattern being traced to determine level of precision required to avoid an error
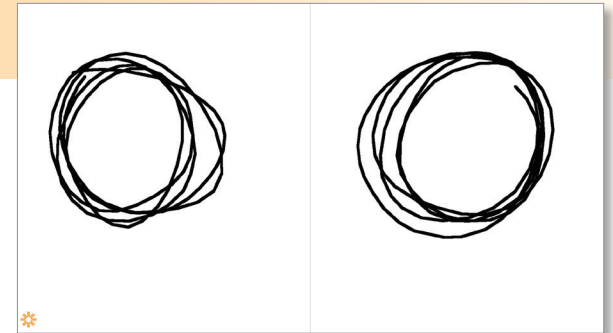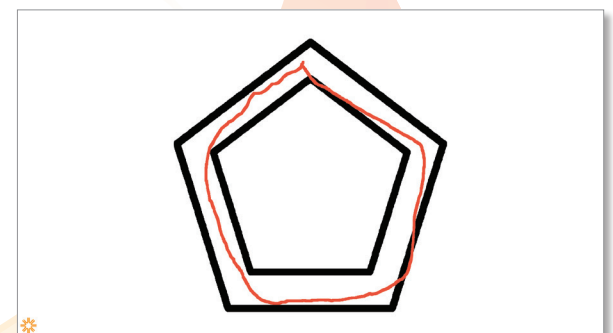

Symmetry Screen

Trace Screen

Replicate Screen

Between the Lines Screen
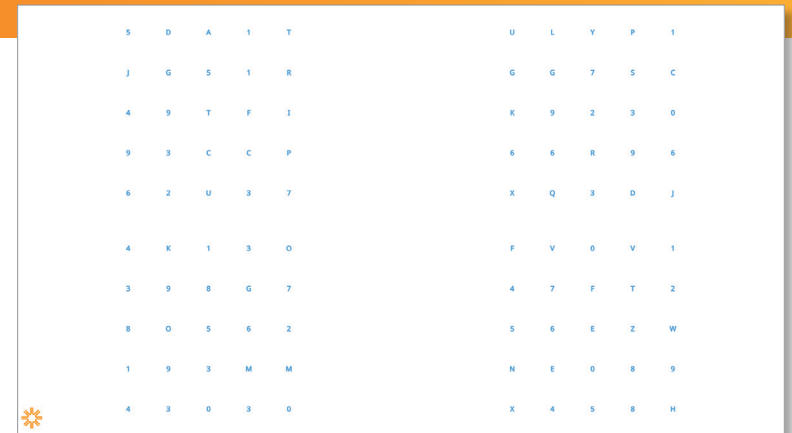
Charts

PROGRAM DESCRIPTION

This program group is designed to improve visual search skills, accuracy, speed of response, and visual and auditory processing. The Charts Therapy Category is divided into two Program Groups: (1) Letter Charts and (2) Peripheral Letter Charts.
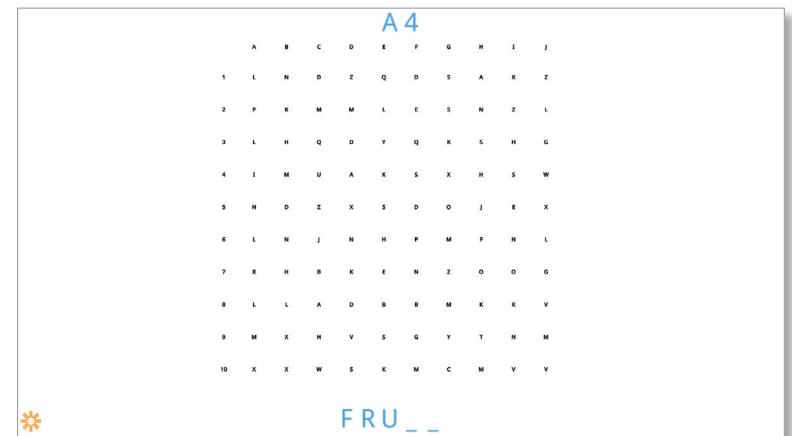
LETTER CHARTS –

1| Static – original Hart Chart to read
2| Motion – sets the chart in motion
3| Multiple – display multiple charts on the screen
4| Puzzle – gives the patient a row and column coordinate to find letters to make up a word
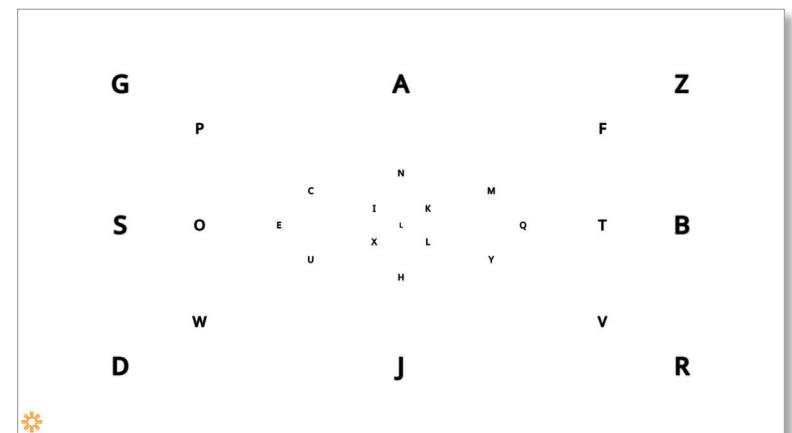
PERIPHERAL LETTER CHART –

1| Sequence – expanded chart with larger peripheral letters to hit in alphabetical sequence
2| Match – expanded chart where the patient hits the letter that matches the center letter

Letter Charts Screen

Puzzle Screen

Peripheral Letter Charts Screen

ADDITIONAL/UNIQUE PARAMETERS INCLUDE:

|| Chart Type: Choose 10x10 (100 letters), or 5x5 (25 letter) options
|| Stimuli Circles: Places circles around targets
|| Place Guide: Adds row and column headers to the charts
|| Stimuli: Shapes, arrows, numbers, letters and bdpq when letters are difficult/unknown
|| Center Active: The center E in the Peripheral Letter Chart Sequence will change direction
|| Active Chart: Enables the targets on the chart to be hit
|| Center Active Delay: The length of time the patient has to hit the letter that matches the center position

1. Tombaugh, T.N. (2004). Trail Making Test A and B: normative data stratified by age and education. *Archives of Clinical Neuropsychology*, 19, 203-214.
2. Gauthier L, Dehaut F, Joanette Y. The Bells Test—A Quantitative and Qualitative Test for Visual Neglect. *International Journal of Clinical Neuropsychology*. 1989; 11: 49-54.
3. Snellgrove C.A. (2005). Cognitive Screening for the Safe Driving Competence of Older People with Mild Cognitive Impairment or Early Dementia. Civic Square, Australian Capital Territory: Australian Transport Safety Bureau.

Individual results vary. Patients are advised to consult with a qualified physician to determine if this product is right for them.

For Indications for Use, Risks, Contraindications, Warnings, Adverse Reactions, Precautions, and other safety information please refer to www.bionesstherapy.com/safety

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