

01. SENSORY AND MOTOR DEVELOPMENT

For children, IMSAND promotes the development of fine and gross motor skills – digging and shaping sand. For adults, IMSAND helps maintain or restore hand movement coordination and strength. Arranging blocks with letters and symbols encourages the pincer grasp, develops hand-eye and bilateral coordination, and improves spatial body awareness. Various visual, auditory, and tactile sensations enhance brain activity.

Specific rehabilitation objectives:

- Fine motor skills development. For children: development of finger dexterity, hand-eye coordination, pincer grasp. For adults: development of finger dexterity, hand-eye coordination, control and strength of hand movements (e.g., digging, moving sand), improvement/restoration of shoulder, elbow, and wrist joint movements.
- Gross motor skills development. (Coordination of movements, control and strength of arm movements (e.g., digging, moving sand), improvement of shoulder, elbow, and wrist joint mobility.)
- Sensory integration: tactile stimulation (enhancement of tactile sensations – especially important for children with sensory integration disorders or autism spectrum disorders); visual and tactile interaction – visual changes responding to physical actions strengthen sensory integration (“what I see” ↔ “what I feel”).

02. COGNITIVE FUNCTIONS AND LEARNING

During IMSAND games, logical thinking, spatial perception, and understanding of cause-and-effect relationships are developed. For adults, using IMSAND helps maintain or restore memory, attention, planning abilities, and spatial perception.

Specific rehabilitation objectives:

- Cognitive skill development. Spatial perception and orientation: recognition of shapes, reliefs, water flow, etc. Learning about map topography (elevations, depressions, bodies of water). Problem-solving skills: the child must achieve a goal (e.g., create a channel through which “water” will flow), solving simple logic tasks. For adults, additionally serves as cognitive rehabilitation (maintenance of memory, attention, and planning).
- Attention concentration and maintenance. Long-term activities promote attention retention. The activity is engaging but does not require excessive cognitive load. Suitable for adults with dementia or after stroke.
- Language and communication skills: development of description and storytelling – encouraged to name shapes, colors, and explain actions.

03. EMOTIONAL AND SOCIAL BENEFITS

When playing with IMSAND, children enjoy the play – the sandbox creates a safe, creative, and relaxing environment. It is an excellent tool for intergenerational interaction (children – grandparents) or group activities in rehabilitation institutions.

Specific rehabilitation objectives:

- Emotional stability (relaxation, stress reduction, emotion regulation). A safe, relaxing environment helps open up to therapist-led conversations or tasks. Activities with sand have a therapeutic effect – they calm, reduce stress, and are especially beneficial for children with emotional regulation difficulties and adults showing signs of depression.
- Language and communication skill development (naming, storytelling, group communication). In group activities, social skills are developed.

04. MOTIVATION AND ENGAGEMENT

IMSAND’s interactive elements (e.g., mountains and rivers appearing when changing the sand surface) encourage curiosity and motivation to participate. For children, it is play, and for adults – an interesting innovation that evokes positive emotions.

Specific rehabilitation objectives:

- Encouragement of participation in rehabilitation activities.
- Strengthening of intrinsic motivation (positive emotional background).

05. INDIVIDUAL ADAPTABILITY

IMSAND can be used by people of different ages and with varying physical or mental abilities. Activities can be adapted according to individual rehabilitation goals: to develop hand movements, learn geography, recognize colors, etc.

Rehabilitation directions:

- Targeted sensory integration for children with disorders.
- Individualized development of motor, speech, or cognitive skills as needed.
- For adults, suitable after neurological disorders (stroke, dementia, traumatic brain injuries) – as part of occupational or cognitive rehabilitation. Improves visual and movement coordination, orientation, logical thinking, and initiative skills. Used as part of an occupational or cognitive rehabilitation plan.
- Individual adaptation according to the person’s functional disorders.

REHABILITATION PLAN EXAMPLE

THERAPY GOAL

Improvement of sensory, motor, and cognitive functions using the augmented reality sandbox.

GENERAL THERAPEUTIC GOAL

To improve (or maintain) the patient's motor, cognitive, sensory, and social abilities through structured, motivating, and safe activities with the AR sandbox.

SPECIFIC THERAPEUTIC GOALS

DEVELOP FINE MOTOR SKILLS

Task / Activity

Form small objects (e.g., a hill, a lake) using fingers or tools

Evaluation Criteria

Within 4 weeks, hand movement accuracy improves (visually assessed by the therapist)

01.

STRENGTHEN SPATIAL PERCEPTION

Task / Activity

Recreate a landscape model based on an example or verbal description

Evaluation Criteria

Recreates 3 out of 4 elements without assistance

02.

IMPROVE ATTENTION CONCENTRATION

Task / Activity

Perform a task independently for 10–15 minutes (e.g., constructing a water flow channel)

Evaluation Criteria

Client maintains focus without interruption for more than 10 minutes

03.

ENCOURAGE VERBAL COMMUNICATION

Task / Activity

Describe what they are doing (“what is this?”, “why did you do that?”)

Evaluation Criteria

Client responds spontaneously or with prompting to 3 or more questions

04.

REDUCE ANXIETY / PROMOTE EMOTIONAL STABILITY

Task / Activity

Free play with AR sand in a calming environment

Evaluation Criteria

Client remains calm, shows noticeable interest and engagement (verbal / nonverbal)

05.

Session frequency and duration:

Duration: 6 weeks

Frequency: 2 times per week

Session length: 30–45 minutes

Responsible specialist

Occupational therapist

Other participating specialists: speech therapist, psychologist, physiotherapist

Evaluation after the program

Progress is recorded for each goal (e.g., “goal achieved / partially achieved / not achieved”). Recommendations are provided for continued therapy or adaptation.

NOTES

- The plan is applicable to both children and older adults, with tasks adjusted according to their needs.
- The AR sandbox functions as a multifunctional rehabilitation tool that simultaneously develops several skills in a playful environment.