

Apraxia

What is Apraxia ?

- Apraxia can be characterized as a neurocognitive impairment in motor planning, resulting in the incapacity to execute purposeful actions without concurrent symptoms of weakness, sensory loss, coordination deficits, cognitive comprehension deficits, or inattentiveness to commands
- Apraxia is a disorder of skilled purposeful movement (A cognitive motor planning disorder) that cannot be attributed to comprehension deficits or sensorimotor dysfunction (Heilman & Gonzalez Rothi, 2003).
- Apraxia may affect a person's ability to conceptualize the selection of a goal, initiate and execute a movement, and anticipate its results (Hansen, Steultjens, & Satink, 2009).
- Certain scholars have seen that apraxia can be conceptualized as a disruption within the frontotemporal network localized predominantly in the left hemisphere.

- The praxis system operates to store motor information for future use so motor planning is not required every time an activity is initiated (Maher & Ochipa, 1997).
- Functionally, the praxis system facilitates skilled interaction with the environment (Maher& Ochipa, 1997).
- Apraxia, commonly associated with left hemisphere stroke, Alzheimer's disease, or corticobasal degeneration, has a marked impact on functional performance of activities (Buxbaum et al., 2008).
- In total 51.3% of the patients with a left hemisphere stroke were found to have apraxia, as opposed to 6.0% of the patients with a right hemisphere stroke.

Types Of Apraxia

- 1. Ideational apraxia:** A manifestation involving the inability to properly sequence a series of actions aimed at achieving a specific goal. (Impaired organization and utilization of knowledge and concepts necessary for action execution.)

refers to problems related to “knowing what to do”, leading to difficulties of task sequencing and object use.



2. Ideomotor apraxia: A deficit characterized by an impaired understanding of how to correctly position and move the forelimb in space while performing both transitive and intransitive movements. **A person with ideomotor apraxia knows what to do, but not “how to do it”, so still has problems with carrying out the task**



3. **Conceptual apraxia:** A condition marked by the loss of mechanical and tool-related knowledge.
4. **Dissociation apraxia:** A modality-specific impairment resulting in the inability to execute previously learned skilled actions.
 - **Unfortunately, the term ideational apraxia has been used to label many different disorders, including dissociation apraxia and conceptual apraxia.**
5. **Limb-kinetic apraxia:** A loss of dexterity and precision in hand-finger movements.

Different forms of apraxia can also affect speech, touch, writing/drawing skills, eye movements, and body movements.

Types Of Errors

The manifestation of apraxia can give rise to several types of errors:

- 1. Temporal errors:** Difficulties in appropriately concluding or completing movements, such as continuously stirring coffee without consuming it.
- 2. Spatial errors:** Displacement or misalignment of objects, such as placing dishes onto the dishwasher instead of inside it, or misjudging one's own positioning in relation to objects, such as standing too far from the sink while washing dishes.

Types Of Errors (continued)

- **3. Sequential errors:** Errors in executing actions in the correct order, such as attempting to pour milk without first removing the lid.
- **4. Addition errors:** Inclusion of unnecessary elements, such as adding sugar or milk when not required.
- **5. Repetition errors:** Repetition of movements or actions beyond what is necessary, such as excessively washing a particular body part.
- **6. Execution errors:** Exhibiting clumsiness or imprecision during task performance, for instance, spilling milk while stirring it.

7. Preservation errors: Persistently engaging in a previous action, such as stirring the milk and subsequently stirring the sugar.

8. Object substitution errors: Substituting one object for another, such as using a toothbrush to comb hair or utilizing a body part as a makeshift tool for combing hair.

9. Quantity errors: Erroneously adding an excessive or insufficient amount of an ingredient

[Note: The list provided includes examples of various error types observed in apraxic individuals].

Interventions:

Individuals affected by apraxia often encounter challenges when engaging in activities, posing a significant challenge for occupational therapists tasked with addressing these conditions. Providing effective interventions that facilitate the successful execution of necessary activities represents a considerable undertaking. Conducting a thorough review of the existing literature equips clinicians with valuable insights into proposed mechanisms underlying apraxia.

There are two primary approaches employed in addressing apraxia:

- 1. Compensatory Approach:** The compensatory approach centers on leveraging the patient's existing strengths to compensate for weaknesses in other areas. This approach entails providing support to patients and their families, assisting them in identifying alternative strategies to overcome deficits and weaknesses. Adjusting the activity, environment, or the patient's behavior, as well as engaging in practice, are some techniques utilized within this approach

2. Restorative Approach: The restorative approach emphasizes the neuroplasticity and inherent recuperative capacity of the brain. Therapists employing this approach deliver controlled sensory stimulation, such as visual, auditory, vestibular, tactile, proprioceptive, and kinesthetic stimuli, to facilitate the recovery of the central nervous system and the processing of sensory information .

Intervention Tips for Clinicians

1. "Tap into" an individual's routines and habits."
2. "Collaborate with the client and significant others/ caregivers in order to choose the tasks that will be focused on and that will become the goals of therapy (i.e., a client-centered approach)."
3. Whenever possible, "practice activities in the appropriate environments and at the appropriate time of day"
4. "Encourage practice of learned skills outside of therapy and throughout the day".
5. "For those with ideomotor apraxia, experiment with decreasing the degrees of freedom (i.e., number of joints) used to perform the task. For example, encourage a woman who is attempting to apply makeup to keep her elbow on the table. Grade required functional movements from simple to complex such as grading from smoothing out a bedspread, to removing a pillow from a pillowcase, to placing a

Intervention Tips for Clinicians

- 6."Grade the number of tools and distracters used in a task. For example, finger feeding (no tools), followed by eating applesauce with only a spoon available, followed by eating applesauce with the choice of one to three utensils, followed by eating a meal requiring the choice of various tools for different aspects of the task (spoon to stir coffee, knife to cut and spread butter, etc.), followed by a meal with the necessary and usual utensils in addition to distracter tools such as comb, toothbrush, etc."
- 7."Use clear and short directions."
- 8."Encourage verbalization of what is to be done."
- 9."Demonstrate the task while sitting parallel to the person with apraxia to help develop a visual model of the task at hand."

Interventions:

1. Strategy Training
2. Errorless Training/Learning
3. Exploration Training
4. Direct Training
5. Cueing
6. Chaining
7. Gesture training
8. Sensory stimulation
9. Proprioceptive protocol
10. Assistive technology : a- The COACH system b-Virtual reality (VR)

Case 1

A 69-year-old woman had been an excellent cook her entire life. In the past few months, her husband noticed that she appeared to have some problems controlling her temper and was not keeping the house as clean as she used to keep it, but thought these changes were just part of aging. One morning, wanting to make a cheese omelet for her husband, she took out the liquid eggs, slices of American cheese, and butter. After putting the frying pan on the gas range, she turned on the range and waited until the pan got hot. She then dropped the cheese onto the hot pan and after a few minutes poured the eggs on top of the cheese. The cheese melted and after the eggs hardened, she tried to slide the cheese omelet onto the plate but found it was stuck to the frying pan. By the time she got the eggs and cheese out of the pan she had made scrambled cheese eggs. This action alarmed her husband, who made an appointment for her to be seen in a memory disorder clinic. **Comment. The patient's inability**

Case 1

A 55-year-old dentist returned to work after a 3-month world cruise. His first patient had a cavity that was not deep. His assistant inserted a drill bit into the drill and handed him the drill so that he could clean out the decay. He asked the patient to open her mouth and pressed on the pedal that made the drill rotate when he realized that he was not sure how to correctly move the drill in the patient's mouth. He told the patient he could not work on her teeth and apologized. When examined in the clinic and asked to pantomime transitive movements, he made postural and movement errors, could not imitate transitive movements, and even had trouble using actual tools. His deficit was much worse in his right than left hand. In subsequent visits, he developed some plastic rigidity in that arm and myoclonus. Comment. This man's spatial errors were typical of IMA. **The presence of unilateral IMA, asymmetric rigidity, and myoclonus suggest that this man had corticobasal degeneration.**

