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Clinical perspectives on neuropsychological rehabilitation: challenges, expectations, and family involvement

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1 Introduction

Neuropsychological rehabilitation (NR) is a comprehensive clinical approach aimed at restoring and compensating for cognitive, emotional, behavioral, and psychosocial impairments resulting from acquired brain injury (ABI) or neurological conditions (Cicerone et al., 2019; Wilson, 2014). Unlike purely cognitive rehabilitation, which focuses on specific domains such as memory or attention, NR encompasses a broader, interdisciplinary strategy designed to facilitate real-life functional recovery and reintegration into social roles (Prigatano et al., 1984).

The origins of NR can be traced back to early interventions with soldiers during World War I, where clinicians first recognized the complex consequences of brain injuries beyond physical deficits (Goldstein, 1942; Luria, 1980; Wilson, 2008). Over time, NR has evolved to incorporate advances in neuroscience, psychology, and clinical care, grounded in principles such as neuroplasticity (Cramer et al., 2011). Today, NR is used to support patients with a variety of neurological conditions, including traumatic brain injury, stroke, tumors, epilepsy, infections, and neurodevelopmental disorders (Polanowska, 2020; Kotelnikova et al., 2024).

In this opinion article, we aim to share reflections grounded in our clinical experience on key factors that influence the effectiveness of neuropsychological rehabilitation. We discuss the need for individualized treatment protocols, the emotional and practical involvement of families, the role of patient awareness and expectations, and the challenges associated with treatment dropout. Our goal is to provide clinical insights that can inform more effective rehabilitation strategies and improve long-term outcomes for individuals with ABI.

2 Factors influencing cognitive rehabilitation for brain-damaged patients

2.1 Why not follow the same neuropsychological rehabilitation process with all patients?

NR cannot be standardized across all patients with ABI because each individual presents with unique neurological, psychological, and social profiles. Several essential factors underscore the need for individualized treatment planning:

(a) Diversity of injuries and clinical presentations: ABI can result from diverse etiologies such as traumatic brain injury, stroke, or encephalitis. These vary in lesion location, size, and severity, which directly influence the patient's cognitive and behavioral profiles (Wilson, 2008). For instance, a left hemisphere stroke may result in aphasia, while a frontal lobe injury could cause executive dysfunction and emotional dysregulation.

(b) Neuroplasticity: One of the key principles guiding NR is neuroplasticity—the brain's capacity to reorganize and establish new connections following injury. This plasticity is most active during early development, yet persists to a lesser extent across the lifespan (Cramer et al., 2011). Younger patients tend to exhibit better recovery potential due to higher plasticity levels, making restorative techniques more effective. In contrast, older individuals may benefit more from compensatory strategies that promote functional adaptation rather than restoration.

(c) Psychological and emotional differences: Emotional responses to injury, including grief, denial, depression, or anxiety, vary significantly between individuals. Some patients may experience heightened emotional distress, while others display resilience. These psychological factors influence treatment engagement and outcomes (Kreutzer et al., 2009).

(d) Personal goals and sociocultural context: A patient's rehabilitation should align with their real-life objectives, such as returning to work, driving, or maintaining interpersonal relationships. Cultural background, family dynamics, and access to resources also affect how goals are set and pursued (Oshomoji et al., 2025; Prigatano, 2024).

(e) Interdisciplinary collaboration: Effective NR is typically delivered through a multidisciplinary team, including neuropsychologists, occupational therapists, speech-language pathologists, social workers, and neurologists. Coordination among professionals is necessary to address all functional domains and adapt to evolving needs over time (Ben-Yishay and Diller, 2011; Cicerone et al., 2019).

(f) Level of self-awareness: Perhaps one of the most critical, yet often underestimated, elements of individualized NR is the patient's level of self-awareness. Many ABI patients present anosognosia, a neurological deficit in which the individual lacks insight into their impairments (Zakrzewski and Rosen, 2014; Vuilleumier, 2004). This condition can significantly hinder engagement and adherence to treatment. Patients with intact self-awareness are generally more likely to participate actively and benefit from goal-directed interventions (Krivošíková and Angerová, 2021).

2.2 Family reactions and adaptation following an acquired brain injury diagnosis

In the acute and subacute phases of NR, it is common to observe intense emotional reactions from families upon receiving an ABI diagnosis. This emotional impact is often shaped by the sudden and disruptive nature of the injury, leading to grief, denial, shock, and even resistance to accepting the diagnosis, especially when it involves long-term or permanent cognitive and behavioral consequences (Allen et al., 2022).

Families frequently hold onto the hope of full recovery, which can generate unrealistic expectations and an unwillingness to acknowledge the severity or chronicity of the patient's deficits. In some cases, this may lead to the pursuit of unproven interventions or “miracle cures,” fueled more by emotional desperation than scientific evidence. Such pathways can divert families away from structured, evidence-based care, potentially delaying therapeutic engagement at a critical period in the patient's recovery (Al-Adawi et al., 2012).

On the other hand, families who succeed in accepting the diagnosis often display greater emotional resilience and adaptability. These families are more likely to actively participate in the therapeutic process and form a constructive alliance with the clinical team. Their ability to reorganize family roles, accept new caregiving responsibilities, and integrate psychoeducational guidance is associated with improved rehabilitation outcomes (Backhaus et al., 2021).

However, adaptation is not linear. Many families experience crises when faced with the reality of persistent impairments. Emotional overload, uncertainty about the future, and pre-existing family conflicts can amplify stress. These situations often require structured psychological support, especially in the form of family counseling, support groups, and educational interventions tailored to their needs and level of understanding (Braine, 2011).

The role of psychoeducation is central in this phase. Well-structured psychoeducational programs have been shown to help families understand the nature of ABI, interpret patient behaviors accurately, and develop realistic expectations about recovery. These programs also empower families to become active participants in the rehabilitation journey, enhancing their emotional preparedness and reducing the risk of burnout (De Luca et al., 2022).

2.3 The role of the patient and the challenges of neuropsychological rehabilitation

The degree to which a patient with ABI can engage in NR is strongly influenced by a combination of neurological, psychological, and contextual variables. These include the type, severity, and location of the brain injury, as well as the patient's baseline personality traits, emotional resilience, self-awareness, and support systems (Gutbrod et al., 2017).

Neurological severity, often assessed using tools such as the Glasgow Coma Scale, post-traumatic amnesia duration, or neuroimaging, can predict a patient's initial level of awareness,

attention, and capacity for active participation in therapeutic tasks. Patients with severe injuries may initially require a passive role, relying heavily on structured, externally guided interventions. In contrast, patients with mild to moderate injuries may assume a more collaborative and autonomous role, actively engaging in goal setting and self-monitoring during rehabilitation (Kwak et al., 2020).

Furthermore, the psychosocial impact of the injury must not be underestimated. ABI often results in significant changes to the patient's roles and identity, including loss of employment, dependency in daily activities, and strained interpersonal relationships. These disruptions can contribute to depression, demotivation, and withdrawal, which are known to interfere with rehabilitation outcomes. Psychotherapeutic support, motivational interviewing, and cognitive-behavioral strategies are essential to address these issues and foster emotional readiness (Carnes and Quinn, 2005).

The context of rehabilitation, including access to services, socio-economic conditions, and family support, also plays a vital role. Patients from underserved backgrounds may face logistical and financial barriers that reduce continuity of care. Likewise, cultural factors may influence the patient's understanding of their condition and expectations for recovery. A culturally responsive and context-sensitive approach to NR is essential to overcome these systemic challenges (Oshomoji et al., 2025).

2.4 Expectations and misconceptions in neuropsychological rehabilitation

In patients and families confronting the aftermath of ABI, expectations regarding the rehabilitation process often oscillate between overconfidence and despair. While some maintain an optimistic view of complete recovery, others perceive minimal improvement as evidence of therapeutic failure. These unrealistic or binary expectations can significantly impair motivation, adherence, and emotional resilience (Stejskal, 2012).

Research shows that families frequently hope for a full return to premorbid functioning, particularly in cases of mild to moderate injuries where physical recovery progresses faster than cognitive or emotional recovery. This mismatch between visible recovery and invisible deficits, such as executive dysfunction or memory problems, often leads to frustration and disappointment when patients do not meet initial timelines or expected milestones (Blanton et al., 2018).

Cultural beliefs, misinformation, and lack of education may also shape expectations. Some families resort to non-evidence-based treatments or delay formal rehabilitation, expecting spontaneous recovery or "miraculous" improvements through prayer, rituals, or unverified therapies. Although culturally rooted hope can be emotionally supportive, excessive reliance on magical thinking may result in neglecting time-sensitive and critical early neurorehabilitation strategies that are crucial for brain plasticity.

These dynamics underscore the need for structured psychoeducation, a central intervention that helps align expectations with the scientific reality of neuropsychological recovery. Well-designed psychoeducational programs facilitate

understanding of the brain's healing trajectory, the complexity of functional outcomes, and the importance of consistency and engagement over time (Ekhtiari et al., 2017).

Psychoeducation should not only focus on patients, but also involve their family and caregivers as active stakeholders. Clinicians must adopt a communicative style that is transparent, empathetic, and tailored to the individual's educational level and emotional state. Through this approach, unrealistic expectations can be replaced by informed hope, where patients and families recognize the challenges ahead while remaining engaged in the rehabilitation journey.

2.5 The essential role of family participation in neuropsychological rehabilitation

Family participation is a cornerstone of successful NR, particularly for individuals recovering from ABI. The family's involvement extends beyond emotional support, significantly influencing adherence to treatment, functional recovery, and long-term psychosocial outcomes.

Families serve as co-therapists, reinforcing therapeutic techniques at home, facilitating daily routines, and helping patients apply learned strategies to real-world contexts. Their participation ensures that rehabilitation extends beyond the clinical environment, promoting consistency, motivation, and generalization of skills (Kreutzer et al., 2009).

However, this involvement is often accompanied by psychological strain, particularly when families must suddenly assume caregiving roles without prior preparation. Common challenges include emotional overload, financial stress, social isolation, and role conflicts, especially when the injured person has been a primary income earner or caregiver themselves (Verhaeghe et al., 2005).

The quality of family functioning, including communication patterns, cohesion, and conflict resolution skills, also affects the rehabilitation process. Families with pre-existing conflict may experience increased tension and reduced caregiving efficacy, while well-functioning families can buffer the patient from psychological distress and environmental instability (Pitschel-Walz et al., 2011).

As such, the integration of family-centered interventions into NR is vital. These include:

- Psychoeducation, to enhance understanding of the injury, prognosis, and treatment process.
- Skills training, including communication, problem-solving, and stress management techniques.
- Psychological support, such as counseling or support groups, to reduce caregiver burden and prevent burnout.

Furthermore, family participation is often dynamic, beginning with high motivation and involvement, but later declining due to cumulative fatigue, disillusionment, or logistical barriers. Clinicians must monitor family engagement longitudinally and provide booster sessions, flexible communication,

and tailored support plans to maintain commitment over time.

2.6 Patient attrition in neuropsychological rehabilitation: barriers and solutions

One of the most significant challenges in NR is patient attrition (the premature discontinuation of treatment despite ongoing clinical need). Attrition is often driven by a complex interaction of cognitive, emotional, socioeconomic, and systemic factors, and its consequences are serious: reduced functional recovery, increased caregiver burden, and higher long-term healthcare costs (Singh and Kaloiya, 2020).

From a cognitive standpoint, conditions like anosognosia or executive dysfunction can impair the patient's ability to recognize their deficits, organize their schedule, or follow through with therapeutic activities (Prigatano et al., 2023). These patients may believe that they are fully recovered or that rehabilitation is unnecessary, which contributes to poor engagement and eventual dropout (Steward and Kretzmer, 2021).

Emotionally, patients with ABI frequently face depression, frustration, shame, or loss of identity, factors that diminish motivation, hope, and treatment adherence. When expectations for recovery are overly optimistic and not met quickly, disappointment can lead to withdrawal from therapy (Coetzer, 2009).

Systemic and environmental issues compound these personal struggles. Logistical barriers, such as transportation difficulties, work or family obligations, or the lack of flexible scheduling, are common causes of missed sessions. In low- and middle-income contexts, financial limitations and poor access to follow-up care frequently result in early dropout, especially among underserved populations (Legg et al., 2022).

Addressing attrition requires a multi-level strategy. Early psychoeducation is crucial for aligning patient and family expectations, enhancing insight, and clarifying the non-linear and prolonged nature of recovery. Motivational interviewing, metacognitive interventions, and emotion-focused therapies can help patients reconnect with their sense of agency and purpose. Moreover, integrating caregiver support into treatment reduces the burden and fosters sustained participation (Bivona et al., 2022).

On a structural level, telehealth and home-based NR programs have shown promising results in reducing dropout, especially for patients with transportation or mobility issues. Rehabilitation programs must also adopt flexible, culturally sensitive, and person-centered models that accommodate the specific needs and values of each patient (Appleman et al., 2021).

3 Discussion

NR is a multifaceted process that involves more than restoring cognitive functions; it demands a deep understanding of the patient's neurological condition, psychological state, social context, and family dynamics. In this opinion article, we have discussed six critical dimensions that regularly emerge in clinical settings when treating patients with ABI: the need

for individualized rehabilitation, family reactions to diagnosis, patient participation and insight, the role of expectations, the impact of family engagement, and the phenomenon of treatment attrition.

First, we emphasized the need to reject one-size-fits-all approaches. Given the diversity of ABI presentations and recovery potential, tailoring rehabilitation plans to individual profiles is fundamental. Neuroplasticity provides a scientific foundation for optimism, but its application must be realistically calibrated based on age, severity, and co-occurring factors.

Second, the emotional and behavioral responses of families to diagnosis profoundly shape the therapeutic environment. When families move beyond denial and engage with structured psychoeducation and support, they become not just caregivers but therapeutic allies. Conversely, unresolved grief or unrealistic expectations can become obstacles to rehabilitation progress.

Third, the role of the patient is heavily influenced by the severity of the injury, cognitive awareness, and emotional adjustment. Impaired self-awareness is one of the most challenging barriers to overcome, yet targeted strategies, such as metacognitive training and insight-oriented therapy, can improve engagement and long-term adherence.

Fourth, unrealistic expectations often hinder participation, especially when cultural or emotional narratives clash with the scientific realities of slow, non-linear recovery. Early and clear psychoeducation can prevent disillusionment and instead cultivate a mindset of "informed hope," which is essential to sustaining therapeutic effort.

Fifth, active family participation enhances adherence, facilitates the transfer of learned strategies to daily life, and mitigates the emotional impact of disability. However, such involvement must be supported by institutional interventions that address emotional fatigue, role strain, and systemic barriers to continued caregiving.

Sixth, patient attrition remains a persistent issue in NR. It is rarely due to "lack of will," but more often reflects cognitive, emotional, and structural barriers. Understanding these elements enables clinicians to proactively implement strategies such as telehealth, caregiver reinforcement, flexible scheduling, and motivational techniques to sustain engagement.

As we have seen through clinical observation and supported by scientific evidence, the success of NR depends not only on the therapeutic content, but also on the patient's ecosystem, their emotional resources, insight, family support, and the cultural and institutional context in which rehabilitation occurs.

Although this article presents reflections based on daily clinical practice, it also aims to encourage a broader dialogue about neglected or underestimated variables in rehabilitation planning. In future works, we intend to explore topics such as cultural interpretations of cognitive disorders, spiritual coping strategies, and neuroeducational counseling as tools for family empowerment and therapeutic alliance-building.

In conclusion, NR is both a scientific endeavor and a profoundly human one. It demands technical skill, cultural sensitivity, and relational commitment. We hope this contribution supports clinicians and researchers in designing interventions that are not only effective but compassionate and realistic.

Author contributions

CR-G: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. JG: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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