Cognitive Rehabilitation and Coma Stimulation

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➲ Instructions for Use

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Application

UnitedHealthcare Commercial

This Medical Policy applies to UnitedHealthcare Commercial benefit plans.

UnitedHealthcare Individual Exchange

This Medical Policy applies to Individual Exchange benefit plans.

Coverage Rationale

Note: This policy applies to outpatient Cognitive Rehabilitation services only. Refer to the member specific benefit document for inpatient services.

Cognitive Rehabilitation (CR) is proven and medically necessary under certain circumstances. For medical necessity clinical coverage criteria, refer to the InterQual® LOC: Outpatient Rehabilitation & Chiropractic.

Click here to view the InterQual® criteria.

Coma Stimulation (also known as Coma arousal, Coma responsiveness, multisensory stimulation, and Coma care therapy/programs) is unproven and not medically necessary due to insufficient evidence of efficacy for any Disorder of Consciousness (DOC).

Definitions

Cognitive Rehabilitation (CR): Is a multidisciplinary treatment program designed to improve cognitive function and retrain an individual's ability to think, use judgment, and make decisions. The focus of these therapeutic activities is to improve deficits in memory, attention, perception, visual processing, language, reasoning, learning, planning, judgment, and problem-solving. CR comprises tasks to reinforce or reestablish previously learned patterns of behavior or to establish new compensatory mechanisms for impaired neurologic systems. The goal of CR is to maximize functional independence with minimal interference from cognitive limitations (Hayes, 2017; updated 2021).

Coma Stimulation: The use of multimodal sensory stimulation in an attempt to speed up the process of recovery from coma or improve arousal level (APA).

Disorder of Consciousness (DOC): A state of prolonged altered consciousness, which can be categorized into coma, vegetative state, or minimally conscious state based on neurobehavioral function (Eapen et al., 2017).

Applicable Codes

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Guidelines may apply.

CPT Code	Description
97129	Therapeutic interventions that focus on cognitive function (e.g., attention, memory, reasoning, executive function, problem solving, and/or pragmatic functioning) and compensatory strategies to manage the performance of an activity (e.g., managing time or schedules, initiating, organizing, and sequencing tasks), direct (one-on-one) patient contact; initial 15 minutes
97130	Therapeutic interventions that focus on cognitive function (e.g., attention, memory, reasoning, executive function, problem solving, and/or pragmatic functioning) and compensatory strategies to manage the performance of an activity (e.g., managing time or schedules, initiating, organizing, and sequencing tasks), direct (one-on-one) patient contact; each additional 15 minutes (List separately in addition to code for primary procedure)

HCPCS Code	Description
S9056	Coma stimulation per diem

Description of Services

Cognitive impairment can include deficits across multiple areas of cognitive function such as memory, attention, executive function, language, and visuoperceptual ability (Brain Injury Association).

Cognitive Rehabilitation aims to improve the ability to process information and perform mental tasks. It includes two types: restorative and compensatory. Restorative rehabilitation strengthens or restores skills through cognitive tests of increasing difficulty. The compensatory approach teaches ways to bypass or compensate for impaired functions (Barman et al.).

Virtual reality (VR) training for Cognitive Rehabilitation is a small but growing field and is gaining interest as another treatment modality for improving cognitive function. It has the potential to overcome the barriers of other therapies due to its immersive, highly engaging, and gamified format (Jahn 2021). Currently, there are no established device protocols or definitive patient selection criteria.

Coma Stimulation is proposed to promote the awakening of brain-injured patients from consciousness disorders. This may involve stimulation of any or all the senses with various stimuli. There are no established protocols, or definitive patient selection criteria for this type of stimulation.

Clinical Evidence

Other Disorders

CR has also been investigated for disorders such as cerebral palsy, Down syndrome, Alzheimer's disease (AD), schizophrenia, attention deficit hyperactivity disorder (ADHD), multiple sclerosis, autism spectrum disorders (ASD), and Parkinson's disease. The medical literature is limited, and available studies include small study samples, lack of comparison groups, and long term follow up. In the wake of the pandemic, cognitive dysfunction is one of the most common conditions persisting following Covid-19 infection. Concerns regarding the long-term effects on cognitive function have emerged, and further research is needed regarding Covid-19 specific cognitive impairment interventions (Möller et al. 2023).

Braga et al. (2024) conducted a prospective, longitudinal, observational study on the cognitive profiles of 208 individuals with “long COVID” that were referred to a network of rehabilitative hospitals in Brazil. These hospitals had developed a multidisciplinary program for patients diagnosed with long-COVID. Individuals with subjective complaints of cognitive dysfunction were directed to the neuropsychology team and participate in a four- week long program with weekly two-hour group meetings of twelve individuals, that focused on compensatory strategies and emotional support. Individuals were evaluated subjectively and objectively using standardized assessment tools. The results showed that 70% of individuals reported improvement in cognitive complaints that included better language, attention, memory, reasoning, and planning. In most of these patients, improvement was maintained through 6 months. Objectively, there were statistically significant gains in the Barrow Neurological Institute Screen for Higher Cerebral Functions scores, as well as phonetic verbal fluency. Quality of life scores showed improvement across all domains. The authors concluded that the results show neuropsychological improvement up to 25 months after acute COVID-19 infection, but do not fall within the normative parameters established by neuropsychological tests. This study is limited by no data available on cognitive function prior to COVID-19 infection, and the observational nature. Furthermore, this was limited to a specific population and results may not be extrapolated to the overall population. Ongoing research is needed to identify cognitive rehabilitation for this cohort of patients.

Zoupa et al. (2022) conducted a review of observational trials, RCTs, and pilot and feasibility studies to determine the impact of cognitive rehabilitation programs in individuals diagnosed with schizophrenia. The results showed cognitive rehabilitation was able to enhance the majority of cognitive functions, including attention/concentration and vigilance, learning, working memory, verbal and visual episodic memory, executive functions, logical thinking and reasoning, mental flexibility, processing speed, metacognition, language, and perception. These neurocognitive domains are reported to be beneficial to psychosocial functioning for patients with schizophrenia alleviating overall disorganized thinking symptoms. The majority of these studies involved computerized therapy and this is considered beneficial for neuroplasticity as it provides multisensory stimulation, automatic adjustment of the difficulty level, and personalization activities. The authors concluded that this review suggests that cognitive rehabilitation provides benefits in individuals living with schizophrenia cognitive functioning and may lead to improvements in global functioning. This review is limited by studies with a small number of participants, and lack of follow-up. Larger randomized control trials are needed to validate these findings.

In a 2022 systematic review and meta-analysis, Pigott et al. evaluated the clinical effectiveness of self- management interventions for adults with idiopathic Parkinson’s disease and the effects on quality of life (QOL), wellbeing and function. The interventions included group-based self-management education and training programs, either alone, combined with multi-disciplinary rehabilitation, or combined with Cognitive Behavior Therapy (CBT), and a self-guided community-based exercise program. Thirty-six studies from ten countries (the majority were from North America and the United Kingdom) totaling 2884 participants were included. The results showed that only four studies reported statistically significant improvements in QoL, wellbeing or functional outcomes for the intervention compared to controls. These interventions were group-based self-management education and training programs, either alone, combined with multi-disciplinary rehabilitation, or combined with CBT, and a self-guided community-based exercise program. The authors concluded that the quality of this evidence was very low, and the effect of the intervention is uncertain. More high-quality research is needed.

In 2021, Jahn et al. conducted a systematic review of randomized controlled trials to assess the pro-cognitive impact of fully immersive virtual reality (VR) as an intervention in transdiagnostic cognitive rehabilitation. Nine studies were selected for review that met the criteria of individuals with a psychiatric disorder or central nervous system disease or trauma using fully immersive VR intervention with cognitive rehabilitation as the main outcome or key aim. Of the nine selected, one addressed attention deficit hyperactivity disorder (ADHD), three were schizophrenia, four addressed mild cognitive impairment (MCI), and one looked at stroke. Group sizes were small (six-34 participants), and the length and intensity of the VR intervention varied greatly. The Cochrane risk of bias assessments indicated either ‘some concerns’ or ‘high risk of biases in all studies, due to a lack of blinding of assessors, individuals and/or trainers, inadequate statistical analyses, and insufficient reporting of the methodology. The results showed visual working memory and executive functions improved significantly after VR training. While the nine studies had different targets and primary cognitive outcome measures, the results showed an overall significant improvement in visual working memory, including visuospatial memory and executive functions which are important for optimization of other cognitive skills. Of note, four studies found that the significant improvements involved activities of daily living (ADL) such as cooking and shopping. The authors concluded that the scarcity of evidence prevents coming to firm conclusions, but this preliminary review of the evidence suggests VR may be useful in improving cognitive function across a range of diagnoses. Future research should focus on larger high-quality studies that focus on standardization of VR training scenarios, control groups and outcome measures.

In 2019, Gómez-Soria et al. conducted a systemic review to evaluate the efficacy of cognitive intervention programs for older adults with amnesic mild cognitive impairment (aMCI) which is a prodromal stage of Alzheimer’s disease. Randomized controlled trials and clinical trials published until March 2020 were searched with a total of seven studies

meeting criteria for inclusion in the review. The authors found cognitive intervention programs led to improvements in global cognitive function and some improvements in memory, language, attention, executive function, and visuospatial abilities. Limitations include a small sample size of 18-22 participants, heterogeneity of cognitive interventions and assessment tools, lack of training of some health-care professionals and differences in follow-up analysis. Further well-designed studies of cognitive intervention are recommended to provide more definitive evidence.

Iwata et al. (2017) conducted a multicenter RCT examining whether cognitive remediation is effective in improving both cognitive and social functions in individuals living with schizophrenia in outpatient settings, that provide learning-based psychiatric rehabilitation. Participants were randomly assigned either a cognitive remediation program (n = 29) or treatment as usual (n = 31). The cognitive remediation intervention included cognitive training using computer software (CogPack) administered twice a week, while the control group met weekly over 12 weeks and was based on the Thinking Skills for Work program. Most participants were attending day treatment services where social skills training, psychoeducation for knowledge about schizophrenia, group activities and other psychosocial treatment were offered Cognitive and social functioning were assessed using the Brief Assessment of Cognition in Schizophrenia (BACS) and Life Assessment Scale for Mentally Ill (LASMI) at pre- and postintervention. Processing speed, executive function, and the composite score of the BACS, as well as significant improvement in interpersonal relationships and work skills on the LASMI, showed greater improvement for the cognitive remediation group than the control group. The researchers concluded that cognitive remediation in addition to psychiatric rehabilitation contributed to greater improvement in both cognitive and social functioning than psychiatric rehabilitation alone. Cognitive remediation may enhance the efficacy of psychiatric rehabilitation, improving social functioning. Limitations to this study include but were not limited to small study size and absence of long term follow up.

Díez-Cirarda and colleagues (2017). assessed structural and functional cerebral changes in 44 individuals living with Parkinson's disease, after attending a three-month integrative CR program (REHACOP) as part of a RCT. Individuals were randomly divided into REHACOP group (CR) and a control group (occupational therapy). T1-weighted, diffusion weighted and functional magnetic resonance images (fMRI) during resting-state and during a memory paradigm were obtained both pre- and post-treatment. Cerebral changes were assessed with repeated measures ANOVA 2 × 2 for group x time interaction. Results demonstrated that the REHACOP group showed significantly increased brain connectivity and activation in both the resting state and recognition fMRIs compared to the control group. The study group showed increased brain activation in the learning fMRI when comparing the post- to the pre-treatment, as well as showing significant and positive correlations between the brain connectivity and activation and the cognitive performance at post-treatment. Researchers concluded that an integrative CR program can produce significant functional cerebral changes in PD patients. Acknowledging the small sample size, future studies with larger samples are needed to replicate these findings.

A Cochrane review evaluated the efficacy of cognitive training and CR for mild to moderate Alzheimer's disease (AD) and vascular dementia. The evidence reviewed included eleven trials of cognitive training, and a single trial of CR. The authors found no evidence for the efficacy of cognitive training to improve cognitive functioning, mood, or activities of daily living (ADL) in individuals with mild to moderate AD or vascular dementia. The single trial of CR provided preliminary indications of the potential benefits of individual CR to improve ADLs in individuals with mild AD. The authors recommend that more high-quality trials of both cognitive training and CR are needed in order to establish the efficacy of cognitive training and CR for individuals with early-stage dementia (Bahar-Fuchs, 2013).

Kurz, et al. (2011) conducted a multicenter RCT on 201 patients with mild dementia in AD. The intervention comprised 12 individual weekly sessions of CR and combined 4 established strategies adopted from neurorehabilitation and psychotherapy. ADLs were chosen as the primary outcome. The results showed no effect of the intervention on everyday functioning. There were improvements favoring the intervention on QOL and treatment satisfaction and a significant antidepressant effect in female participants. The findings of this study may be helpful for designing further studies that are needed to determine the potential of CR in older adults with dementia.

Coma Stimulation

Controlled trials comparing care with and without coma stimulation programs are limited in current literature that effectively demonstrates a consistent, reproducible, and positive impact on health outcomes.

Kumar et al. (2024) conducted a systematic review and meta-analysis on the effectiveness of various coma arousal therapies on individuals with disorders of consciousness (DOC). Studies with interventions that included repetitive transcranial stimulation (rTMS), transcranial direct stimulation (tDCS), tilting, sensory stimulation, and vagus nerve stimulation (VNS) were identified and outcomes evaluated using the Coma Recovery Scale-Revised (CRS-R) with the Glasgow Coma Scale (GCS) used as a secondary outcome measure. The group receiving interventions comprised 31 studies and 574 individuals, and the 19 studies with control groups totaled 417 individuals. All studies measured the

behavioral response to the intervention by CRS-R, and six measured consciousness level by GCS. The results showed that all interventions except tilting showed improvement from pretest to posttest, with sensory stimulation showing the largest effect in both groups. A secondary analysis on the duration of the injury was also completed and those results showed the overall effect of tDCS, rTMS, sensory stimulation, and VNS in injuries over 3 months showed improvement.

In a systematic literature review, Li et al. (2020) focused on sensory stimulation to improve coma arousal in comatose individuals following a TBI. In total, ten studies were eligible for the analysis. The review included post TBI individuals with severe disorders of consciousness who received sensory stimulation with specific intervention protocols, assessment tools, and behavioral/neural responses assessed by standard scales and instruments. Limitations included heterogeneity of outcome evaluation measures, varying interventions, short intervention period, absence of long-term follow-up and small sample size. The authors concluded that the sensory stimulation program improved coma arousal and is likely to aid recovery. Overall, sensory stimulation with structured, meaningful, multimodal, familiar, and emotional stimuli is recommended. However, the authors noted that additional high-quality clinical trials with larger sample sizes are needed to establish standard sensory stimulation protocols to improve outcomes after TBI.

In 2016, Padilla and colleagues conducted a systematic review to assess the effectiveness of sensory stimulation to improve arousal and alertness of individuals in a coma or persistent vegetative state following a traumatic brain injury. A total of nine studies published from 2008 through 2013 were included for analysis. The authors concluded that there is strong evidence for the effectiveness of multimodal sensory stimulation in improving the clinical outcomes after a traumatic brain injury-induced coma or persistent vegetative state. In addition, “Moderate evidence was also provided for auditory stimulation, limited evidence was provided for complex stimuli, and insufficient evidence was provided for median nerve stimulation.” This systematic review grouped widely heterogeneous studies in terms of design, outcomes, and populations. Furthermore, the clinical significance of the studies chosen for inclusion is not clear. Given the lack of rigorous, clinically meaningful studies for inclusion and the qualitative methodological approach that was used in analysis, more research is needed to confirm the conclusions the authors have made from this review. (Megha 2013, which was previously cited in this policy, was included in this systematic review)

Clinical Practice Guidelines

American Academy of Neurology (AAN)

In a 2018 practice guideline (reaffirmed in September 2021) regarding disorders of consciousness, the AAN does not address the use of stimulation as a treatment modality for patients with a prolonged disorder of consciousness. They recommend families be counseled regarding the limitations of existing evidence associated with interventions that lack support, and there are no established therapies for children with a prolonged disorder of consciousness (Giacino 2018).

U.S. Food and Drug Administration (FDA)

This section is to be used for informational purposes only. FDA approval alone is not a basis for coverage.

Cognitive Rehabilitation is therapy and is not subject to FDA regulation.

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Policy History/Revision Information

Date	Summary of Changes

10/01/2025	**Title Change**
	• Previously titled *Cognitive Rehabilitation*
	Coverage Rationale
	• Replaced language indicating “Coma Stimulation (also known as coma arousal, coma responsiveness, multisensory stimulation, and coma care therapy/programs) is unproven and not medically necessary for any *indication, including individuals who are comatose, in a vegetative or minimally conscious state*” with “Coma Stimulation (also known as coma arousal, coma responsiveness, multisensory stimulation, and coma care therapy/programs) is unproven and not medically necessary for any *Disorder of Consciousness (DOC)*”
	Definition
	• Added definition of “Disorder of Consciousness (DOC)”
	• Removed definition of:
	  ○ Coma/Persistent Vegetative State
	  ○ Minimally Conscious State

Date	Summary of Changes
	Supporting Information • Updated *Description of Services*, *Clinical Evidence*, and *References* sections to reflect the most current information • Archived previous policy version 2025T0144FF

Instructions for Use

This Medical Policy provides assistance in interpreting UnitedHealthcare standard benefit plans. When deciding coverage, the member specific benefit plan document must be referenced as the terms of the member specific benefit plan may differ from the standard plan. In the event of a conflict, the member specific benefit plan document governs. Before using this policy, please check the member specific benefit plan document and any applicable federal or state mandates. UnitedHealthcare reserves the right to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

This Medical Policy may also be applied to Medicare Advantage plans in certain instances. In the absence of a Medicare National Coverage Determination (NCD), Local Coverage Determination (LCD), or other Medicare coverage guidance, CMS allows a Medicare Advantage Organization (MAO) to create its own coverage determinations, using objective evidence-based rationale relying on authoritative evidence (Medicare IOM Pub. No. 100-16, Ch. 4, §90.5).

UnitedHealthcare may also use tools developed by third parties, such as the InterQual® criteria, to assist us in administering health benefits. UnitedHealthcare Medical Policies are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.