

Blue Cross Blue Shield of Massachusetts is an Independent Licensee of the Blue Cross and Blue Shield Association

Medical Policy Cognitive Rehabilitation

Table of Contents

- Policy: Commercial
- Policy: Medicare
- <u>Authorization Information</u>
- Coding Information
- Description
- Policy History
- Information Pertaining to All Policies
- References
- Endnotes

Policy Number: 660

BCBSA Reference Number: 8.03.10 (For Plan internal use only) NCD/LCD: N/A

Related Policies

Sensory Integration Therapy and Auditory Integration Therapy, #659

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO BlueSM and Medicare PPO BlueSM Members

Cognitive rehabilitation (as a distinct and definable component of the rehabilitation process) may be considered <u>MEDICALLY NECESSARY</u> in the rehabilitation of individuals with cognitive impairment due to traumatic brain injury.

Per state mandate Chapter 260 of the Acts of 2020 – Patients First Act, cognitive rehabilitation for cognitive impairment resulting from COVID-19 is covered in the outpatient setting.¹

Providers should document ALL of the following for coverage:

- Cognitive impairments resulted from COVID-19 that was either clinically diagnosed or diagnosed through PCR/Antigen testing, **AND**
- Patient symptoms impair daily functioning and are unlikely to resolve on their own over time, AND
- Patient symptoms are expected to improve with cognitive rehabilitation.

Inpatient cognitive rehabilitation for cognitive impairment resulting from COVID-19 is not covered unless the individual otherwise meets criteria for inpatient level of care.

Cognitive rehabilitation (as a distinct and definable component of the rehabilitation process) is considered **INVESTIGATIONAL** for all other applications, including, but not limited to, stroke, postencephalitic or post-encephalopathy individuals, autism spectrum disorder, seizure disorders, multiple sclerosis, the aging population, including individuals with Alzheimer disease, and individuals with cognitive deficits due to brain tumor or previous treatment for cancer.

Prior Authorization Information

Inpatient

For services described in this policy, precertification/preauthorization <u>IS REQUIRED</u> if the procedure is performed <u>inpatient</u>.

Outpatient

 For services described in this policy, see below for situations where prior authorization <u>might be</u> <u>required</u> if the procedure is performed <u>outpatient</u>.

	Outpatient
Commercial Managed Care (HMO and POS)	Prior authorization is not required .
Commercial PPO and Indemnity	Prior authorization is not required .
Medicare HMO Blue sM	Prior authorization is not required .
Medicare PPO Blue SM	Prior authorization is not required .

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

The following codes are included below for informational purposes only; this is not an all-inclusive list.

The above <u>medical necessity criteria MUST</u> be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT codes:	Code Description
97129	Therapeutic interventions that focus on cognitive function (eg, attention, memory, reasoning, executive function, problem solving, and/or pragmatic functioning) and compensatory strategies to manage the performance of an activity (eg, 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 (eg, attention, memory, reasoning, executive function, problem solving, and/or pragmatic functioning) and compensatory strategies to manage the performance of an activity (eg, 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)

CPT Codes

The following ICD Diagnosis Codes are considered medically necessary when submitted with the CPT code above if <u>medical necessity criteria</u> are met:

ICD-10 Diagnosis Coding

ICD-10-CM diagnosis	
codes:	Code Description
S01.90XA	Unspecified open wound of unspecified part of head, initial encounter

S01.90XD	Unspecified open wound of unspecified part of head, subsequent encounter
S01.90XS	Unspecified open wound of unspecified part of head, sequela
	Contusion and laceration of cerebrum, unspecified, without loss of consciousness,
S06.330A	initial encounter
	Contusion and laceration of cerebrum, unspecified, without loss of consciousness,
S06.330D	subsequent encounter
	Contusion and laceration of cerebrum, unspecified, without loss of consciousness,
S06.330S	sequela
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 30
S06.331A	minutes or less, initial encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 30
S06.331D	minutes or less, subsequent encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 30
S06.331S	minutes or less, sequela
000 000 0	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 31
S06.332A	minutes to 59 minutes, initial encounter
000 0000	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 31
506.332D	Minutes to 59 minutes, subsequent encounter
506 2225	minutes to 50 minutes, acquele
300.3323	Contusion and lacoration of corobrum unspecified with loss of consciousness of 1
S06 3334	bour to 5 hours 50 minutes, initial encounter
500.333A	Contusion and laceration of cerebrum unspecified with loss of consciousness of 1
S06 333D	hour to 5 hours 59 minutes, subsequent encounter
000.0000	Contusion and laceration of cerebrum unspecified with loss of consciousness of 1
S06.333S	hour to 5 hours 59 minutes, seguela
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 6
S06.334A	hours to 24 hours, initial encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 6
S06.334D	hours to 24 hours, subsequent encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of 6
S06.334S	hours to 24 hours, sequela
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness greater
S06.335A	than 24 hours with return to pre-existing conscious level, initial encounter
000 0055	Contusion and laceration of cerebrum, unspecified, with loss of consciousness greater
S06.335D	than 24 nours with return to pre-existing conscious level, subsequent encounter
000 0050	Contusion and laceration of cerebrum, unspecified, with loss of consciousness greater
500.3355	Contusion and locaration of parehrum unapposition with loss of consciousness graater
	than 24 hours without return to pro-existing conscious level with patient surviving initial
S06 3364	encounter
000.000A	Contusion and laceration of cerebrum unspecified with loss of consciousness greater
	than 24 hours without return to pre-existing conscious level with patient surviving
S06 336D	subsequent encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness greater
	than 24 hours without return to pre-existing conscious level with patient surviving.
S06.336S	sequela
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of any
	duration with death due to brain injury prior to regaining consciousness, initial
S06.337A	encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of any
	duration with death due to other cause prior to regaining consciousness, initial
S06.338A	encounter

S06 339A	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of
000.003A	Contusion and laceration of cerebrum unspecified with loss of consciousness of
S06.339D	unspecified duration, subsequent encounter
	Contusion and laceration of cerebrum, unspecified, with loss of consciousness of
S06.339S	unspecified duration, sequela
	Traumatic hemorrhage of cerebrum, unspecified, without loss of consciousness, initial
S06.360A	encounter
	Traumatic hemorrhage of cerebrum, unspecified, without loss of consciousness,
S06.360D	subsequent encounter
506 2605	I raumatic hemorrhage of cerebrum, unspecified, without loss of consciousness,
506.3605	Sequeia Traumatic homorrhage of corobrum, unspecified, with loss of consciousness of 20
S06 361 A	minutes or less initial encounter
500.30TA	Traumatic hemorrhage of cerebrum unspecified with loss of consciousness of 30
S06 361D	minutes or less, subsequent encounter
00010010	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 30
S06.361S	minutes or less, sequela
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 31
S06.362A	minutes to 59 minutes, initial encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 31
S06.362D	minutes to 59 minutes, subsequent encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 31
S06.362S	minutes to 59 minutes, sequela
000 000 0	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 1 hours
S06.363A	to 5 nours 59 minutes, initial encounter
S06 262D	to 5 hours 50 minutes, subsequent encounter
300.303D	Traumatic hemorrhage of cerebrum unspecified with loss of consciousness of 1 hours
S06 363S	to 5 hours 59 minutes, sequela
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 6 hours
S06.364A	to 24 hours, initial encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 6 hours
S06.364D	to 24 hours, subsequent encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 6 hours
S06.364S	to 24 hours, sequela
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of 6 hours
S06.365A	to 24 hours, sequela
506 265D	I raumatic nemorrhage of cerebrum, unspecified, with loss of consciousness greater
506.365D	Traumatic homorrhage of corebrum, unspecified, with loss of consciousness greater
S06 365S	than 24 hours with return to pre-existing conscious level sequela
000.0000	Traumatic hemorrhage of cerebrum unspecified with loss of consciousness greater
S06.366A	than 24 hours with return to pre-existing conscious level, sequela
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness greater
	than 24 hours without return to pre-existing conscious level with patient surviving,
S06.366D	subsequent encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness greater
	than 24 hours without return to pre-existing conscious level with patient surviving,
S06.366S	sequela
	I raumatic nemorrhage of cerebrum, unspecified, with loss of consciousness of any
S06 267A	encounter
300.307A	

	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of any
000 000 0	duration with death due to other cause prior to regaining consciousness, initial
S06.368A	encounter
S06.369A	I raumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of unspecified duration, initial encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of
S06.369D	unspecified duration, subsequent encounter
	Traumatic hemorrhage of cerebrum, unspecified, with loss of consciousness of
S06.369S	unspecified duration, sequela
S06.370A	Contusion, laceration, and hemorrhage of cerebellum without loss of consciousness, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum without loss of consciousness,
S06.370D	subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum without loss of consciousness,
S06.370S	sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 30
S06.371A	minutes or less, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 30
S06.371D	minutes or less, subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 30
S06.371S	minutes or less, sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 31
S06.372A	minutes to 59 minutes, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 31
S06.372D	minutes to 59 minutes, subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 31
S06.372S	minutes to 59 minutes, sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 1
S06.373A	hour to 5 hours 59 minutes, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 1
S06.373D	hour to 5 hours 59 minutes, subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 1
S06.373S	hour to 5 hours 59 minutes, sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 6
S06.374A	hours to 24 hours, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 6
S06.374D	hours to 24 hours, subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of 6
S06.374S	hours to 24 hours, sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness
S06.375A	greater than 24 hours with return to pre-existing conscious level, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness
S06.375D	greater than 24 hours with return to pre-existing conscious level, subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness
S06.375S	greater than 24 hours with return to pre-existing conscious level, sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness
	greater than 24 hours without return to pre-existing conscious level with patient
S06.376A	surviving, initial encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness
	greater than 24 hours without return to pre-existing conscious level with patient
S06.376D	surviving, subsequent encounter

	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness
S06 376S	surviving sequela
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of any
	duration with death due to brain injury prior to regaining consciousness, initial
S06.377A	encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of any
000 070 4	duration with death due to other cause prior to regaining consciousness, initial
506.378A	encounter
S06 379A	unspecified duration, initial encounter
000.07.07	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of
S06.379D	unspecified duration, subsequent encounter
	Contusion, laceration, and hemorrhage of cerebellum with loss of consciousness of
S06.379S	unspecified duration, sequela
	Contusion, laceration, and hemorrhage of brainstem without loss of consciousness,
S06.380A	initial encounter
000 0000	Contusion, laceration, and hemorrhage of brainstem without loss of consciousness,
S06.380D	Subsequent encounter
506 3805	contusion, laceration, and hemormage of brainstern without loss of consciousness,
000.0000	Contusion Jaceration and hemorrhade of brainstem with loss of consciousness of 30
S06.381A	minutes or less, initial encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 30
S06.381D	minutes or less, subsequent encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 30
S06.381S	minutes or less, sequela
COC 2024	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 31
506.382A	Contusion Jacoration, and homerrhage of brainstom with Jaco of consciousness of 21
S06 382D	minutes to 59 minutes, subsequent encounter
000.0020	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 31
S06.382S	minutes to 59 minutes, sequela
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 1
S06.383A	hour to 5 hours 59 minutes, initial encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 1
S06.383D	hour to 5 hours 59 minutes, subsequent encounter
506 2925	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 1
300.3635	Contusion Jaceration and hemorrhage of brainstem with loss of consciousness of 6
S06.384A	hours to 24 hours, initial encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 6
S06.384D	hours to 24 hours, subsequent encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of 6
S06.384S	hours to 24 hours, sequela
.	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness greater
SU6.385A	than 24 nours with return to pre-existing conscious level, initial encounter
SUE 395D	than 24 hours with return to pre-existing conscious level, subsequent encounter
300.3650	Contusion Jaceration and hemorrhade of brainstem with loss of consciousness greater
S06.385S	than 24 hours with return to pre-existing conscious level, sequela

	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness greater
S06.386A	encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness greater
	than 24 hours without return to pre-existing conscious level with patient surviving,
S06.386D	subsequent encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness greater
506 2865	than 24 hours without return to pre-existing conscious level with patient surviving,
300.3003	Contusion laceration and bemorrhage of brainstem with loss of consciousness of any
	duration with death due to brain injury prior to regaining consciousness initial
S06.387A	encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of any
	duration with death due to other cause prior to regaining consciousness, initial
S06.388A	encounter
	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of
S06.389A	unspecified duration, initial encounter
000 0005	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of
S06.389D	Unspecified duration, subsequent encounter
506 2005	Contusion, laceration, and hemorrhage of brainstem with loss of consciousness of
S06.3093	Other appointed duration, sequela
S06.090A	Other specified intracranial injury without loss of consciousness, initial encounter
S06.800S	Other specified intracranial injury without loss of consciousness, subsequent encounter
300.0903	Other specified intracranial injury with loss of consciousness, sequeia
S06 891A	initial encounter
	Other specified intracranial injury with loss of consciousness of 30 minutes or less.
S06.891D	subsequent encounter
	Other specified intracranial injury with loss of consciousness of 30 minutes or less,
S06.891S	sequela
	Other specified intracranial injury with loss of consciousness of 31 minutes to 59
S06.892A	minutes, initial encounter
000 0000	Other specified intracranial injury with loss of consciousness of 31 minutes to 59
506.892D	Minutes, subsequent encounter
506 8925	minutes sequela
000.0320	Other specified intracranial injury with loss of consciousness of 1 hour to 5 hours 59
S06.893A	minutes, initial encounter
	Other specified intracranial injury with loss of consciousness of 1 hour to 5 hours 59
S06.893D	minutes, subsequent encounter
	Other specified intracranial injury with loss of consciousness of 1 hour to 5 hours 59
S06.893S	minutes, sequela
	Other specified intracranial injury with loss of consciousness of 6 hours to 24 hours,
S06.894A	initial encounter
SOC 004D	Other specified intracranial injury with loss of consciousness of 6 hours to 24 hours,
506.894D	Subsequent encounter
S06 894S	sequela
000.0340	Other specified intracranial injury with loss of consciousness greater than 24 hours with
S06.895A	return to pre-existing conscious level, initial encounter
	Other specified intracranial injury with loss of consciousness greater than 24 hours with
S06.895D	return to pre-existing conscious level, subsequent encounter

S06.895S	Other specified intracranial injury with loss of consciousness greater than 24 hours with return to pre-existing conscious level, sequela
S06.896A	Other specified intracranial injury with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, initial encounter
000 0005	Other specified intracranial injury with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, subsequent
S06.896D	encounter Other appairied intragrapial injuny with loss of capacity appage grapter than 24 hours
S06.896S	without return to pre-existing conscious level with patient surviving, sequela
S06.899A	Other specified intracranial injury with loss of consciousness of unspecified duration, initial encounter
S06.899D	Other specified intracranial injury with loss of consciousness of unspecified duration, subsequent encounter
S06.899S	Other specified intracranial injury with loss of consciousness of unspecified duration, sequela
S06.1X0A	Traumatic cerebral edema without loss of consciousness, initial encounter
S06.1X0D	Traumatic cerebral edema without loss of consciousness, subsequent encounter
S06.1X0S	Traumatic cerebral edema without loss of consciousness, sequela
S06.1X1A	Traumatic cerebral edema with loss of consciousness of 30 minutes or less, initial encounter
S06.1X1D	Traumatic cerebral edema with loss of consciousness of 30 minutes or less, subsequent encounter
S06.1X1S	Traumatic cerebral edema with loss of consciousness of 30 minutes or less, sequela
	Traumatic cerebral edema with loss of consciousness of 31 minutes to 59 minutes,
S06.1X2A	initial encounter
S06.1X2D	Traumatic cerebral edema with loss of consciousness of 31 minutes to 59 minutes, subsequent encounter
S06.1X2S	Traumatic cerebral edema with loss of consciousness of 31 minutes to 59 minutes, sequela
S06.1X3A	Traumatic cerebral edema with loss of consciousness of 1 hour to 5 hours 59 minutes, initial encounter
S06.1X3D	Traumatic cerebral edema with loss of consciousness of 1 hour to 5 hours 59 minutes, subsequent encounter
S06.1X3S	Traumatic cerebral edema with loss of consciousness of 1 hour to 5 hours 59 minutes, sequela
S06.1X4A	Traumatic cerebral edema with loss of consciousness of 6 hours to 24 hours, initial encounter
S06 1X4D	Traumatic cerebral edema with loss of consciousness of 6 hours to 24 hours,
S06 1X4S	Traumatic cerebral edema with loss of consciousness of 6 hours to 24 hours, sequela
000.1740	Traumatic cerebral edema with loss of consciousness dreater than 24 hours with return
S06.1X5A	to pre-existing conscious level, initial encounter
S06.1X5D	Traumatic cerebral edema with loss of consciousness greater than 24 hours with return to pre-existing conscious level, subsequent encounter
	Traumatic cerebral edema with loss of consciousness greater than 24 hours with return
S06.1X5S	to pre-existing conscious level, sequela
	Traumatic cerebral edema with loss of consciousness greater than 24 hours without
S06.1X6A	return to pre-existing conscious level with patient surviving, initial encounter
S06.1X6D	Traumatic cerebral edema with loss of consciousness greater than 24 hours without return to pre-existing conscious level with patient surviving, subsequent encounter
	Traumatic cerebral edema with loss of consciousness greater than 24 hours without
S06.1X6S	return to pre-existing conscious level with patient surviving, sequela

S06 1X7A	Traumatic cerebral edema with loss of consciousness of any duration with death due to brain injury prior to regaining consciousness, initial encounter
S06 1X8A	Traumatic cerebral edema with loss of consciousness of any duration with death due to
500.1X0A	Traumatic cerebral edema with loss of consciousness of unspecified duration, initial
S06.1X9A	encounter
	Traumatic cerebral edema with loss of consciousness of unspecified duration,
S06.1X9D	subsequent encounter
S06.1X9S	Traumatic cerebral edema with loss of consciousness of unspecified duration, sequela
S06.4X0A	Epidural hemorrhage without loss of consciousness, initial encounter
S06.4X0D	Epidural hemorrhage without loss of consciousness, subsequent encounter
S06.4X0S	Epidural hemorrhage without loss of consciousness, sequela
S06.4X1A	Epidural hemorrhage with loss of consciousness of 30 minutes or less, initial encounter
	Epidural hemorrhage with loss of consciousness of 30 minutes or less, subsequent
S06.4X1D	encounter
S06.4X1S	Epidural hemorrhage with loss of consciousness of 30 minutes or less, sequela
	Epidural hemorrhage with loss of consciousness of 31 minutes to 59 minutes, initial
506.4XZA	Endounter
S06.4X2D	subsequent encounter
S06.4X2S	Epidural hemorrhage with loss of consciousness of 31 minutes to 59 minutes, sequela
	Epidural hemorrhage with loss of consciousness of 1 hour to 5 hours 59 minutes, initial
S06.4X3A	encounter
	Epidural hemorrhage with loss of consciousness of 1 hour to 5 hours 59 minutes,
S06.4X3D	subsequent encounter
506 4835	Epidural nemorrnage with loss of consciousness of 1 hour to 5 hours 59 minutes,
000.47.00	Epidural hemorrhade with loss of consciousness of 6 hours to 24 hours initial
S06.4X4A	encounter
	Epidural hemorrhage with loss of consciousness of 6 hours to 24 hours, subsequent
S06.4X4D	encounter
S06.4X4S	Epidural hemorrhage with loss of consciousness of 6 hours to 24 hours, sequela
	Epidural hemorrhage with loss of consciousness greater than 24 hours with return to
S06.4X5A	pre-existing conscious level, initial encounter
	Epidural hemorrhage with loss of consciousness greater than 24 hours with return to
S06.4X5D	pre-existing conscious level, subsequent encounter
SOG AVES	Epidural nemorrhage with loss of consciousness greater than 24 hours with return to
300.4733	Fidural hemorrhage with loss of consciousness greater than 24 hours without return to
S06 4X6A	pre-existing conscious level with patient surviving initial encounter
000.4707	Epidural hemorrhage with loss of consciousness greater than 24 hours without return to
S06.4X6D	pre-existing conscious level with patient surviving, subsequent encounter
	Epidural hemorrhage with loss of consciousness greater than 24 hours without return to
S06.4X6S	pre-existing conscious level with patient surviving, sequela
	Epidural hemorrhage with loss of consciousness of any duration with death due to brain
S06.4X7A	injury prior to regaining consciousness, initial encounter
	Epidural hemorrhage with loss of consciousness of any duration with death due to other
S06.4X8A	causes prior to regaining consciousness, initial encounter
	Epidural hemorrhage with loss of consciousness of unspecified duration, initial
S06.4X9A	encounter
	Epidural nemormage with loss of consciousness of unspecified duration, subsequent
300.4X9D	encounter

S06.4X9S	Epidural hemorrhage with loss of consciousness of unspecified duration, sequela
S06.5X0A	Traumatic subdural hemorrhage without loss of consciousness, initial encounter
S06.5X0D	Traumatic subdural hemorrhage without loss of consciousness, subsequent encounter
S06.5X0S	Traumatic subdural hemorrhage without loss of consciousness, sequela
	Traumatic subdural hemorrhage with loss of consciousness of 30 minutes or less, initial
S06.5X1A	encounter
	Traumatic subdural hemorrhage with loss of consciousness of 30 minutes or less,
S06.5X1D	subsequent encounter
	Traumatic subdural hemorrhage with loss of consciousness of 30 minutes or less,
S06.5X1S	sequela
	Traumatic subdural hemorrhage with loss of consciousness of 31 minutes to 59
S06.5X2A	minutes, initial encounter
	Traumatic subdural hemorrhage with loss of consciousness of 31 minutes to 59
S06.5X2D	minutes, subsequent encounter
	I raumatic subdural hemorrhage with loss of consciousness of 31 minutes to 59
506.5725	Traumatic subdural homorrhage with less of consciousness of 1 hour to 5 hours 50
S06 5Y24	minutes initial encounte
300.373A	Traumatic subdural bemorrhage with loss of consciousness of 1 hour to 5 hours 59
S06 5X3D	minutes subsequent encounter
000.0/(02	Traumatic subdural hemorrhage with loss of consciousness of 1 hour to 5 hours 59
S06.5X3S	minutes, sequela
	Traumatic subdural hemorrhage with loss of consciousness of 6 hours to 24 hours.
S06.5X4A	initial encounter
	Traumatic subdural hemorrhage with loss of consciousness of 6 hours to 24 hours,
S06.5X4D	subsequent encounter
	Traumatic subdural hemorrhage with loss of consciousness of 6 hours to 24 hours,
S06.5X4S	sequela
	Traumatic subdural hemorrhage with loss of consciousness greater than 24 hours with
S06.5X5A	return to pre-existing conscious level, initial encounter
	Traumatic subdural hemorrhage with loss of consciousness greater than 24 hours with
S06.5X5D	return to pre-existing conscious level, subsequent encounter
SOC EVES	I raumatic subdural hemorrhage with loss of consciousness greater than 24 hours with
500.5755	Treumetic subdural homerrhage with less of consciousness greater than 24 hours
S06 5X6A	without return to pre-existing conscious level with patient surviving, initial encounter
500.570A	Traumatic subdural bemorrhage with loss of consciousness greater than 24 hours
	without return to pre-existing conscious level with patient surviving, subsequent
S06.5X6D	encounter
	Traumatic subdural hemorrhage with loss of consciousness greater than 24 hours
S06.5X6S	without return to pre-existing conscious level with patient surviving, sequela
	Traumatic subdural hemorrhage with loss of consciousness of any duration with death
S06.5X7A	due to brain injury before regaining consciousness, initial encounter
	Traumatic subdural hemorrhage with loss of consciousness of any duration with death
S06.5X8A	due to other cause before regaining consciousness, initial encounter
	Traumatic subdural hemorrhage with loss of consciousness of unspecified duration,
S06.5X9A	Initial encounter
	I raumatic subdural hemorrhage with loss of consciousness of unspecified duration,
506.5X9D	subsequent encounter
S06 5X09	raumatic subdural nemormage with loss of consciousness of unspecified duration,
500.5A95	Traumatia autorophagid homorrhago without loss of consciousness, initial cross star
300.0AUA	Traumatic subaracimolu nemormage without loss of consciousness, initial encounter

	Traumatic subarachnoid hemorrhage without loss of consciousness, subsequent
S06.6X0D	encounter
S06.6X0S	Traumatic subarachnoid hemorrhage without loss of consciousness, sequela
	Traumatic subarachnoid hemorrhage with loss of consciousness of 30 minutes or less,
S06.6X1A	initial encounter
	Traumatic subarachnoid hemorrhage with loss of consciousness of 30 minutes or less,
S06.6X1D	subsequent encounter
000 01/40	Traumatic subarachnoid hemorrhage with loss of consciousness of 30 minutes or less,
S06.6X1S	sequela
506 6V24	I raumatic subarachnoid nemorrnage with loss of consciousness of 31 minutes to 59
300.072A	Traumatic subarasharid homorrhage with loss of consciousness of 21 minutes to 50
S06 6X2D	minutes, subsequent encounter
500.0A2D	Traumatic subarachnoid bemorrhage with loss of consciousness of 31 minutes to 59
S06 6X2S	minutes, sequela
000107120	Traumatic subarachnoid hemorrhage with loss of consciousness of 1 hour to 5 hours 59
S06.6X3A	minutes, initial encounter
	Traumatic subarachnoid hemorrhage with loss of consciousness of 1 hour to 5 hours 59
S06.6X3D	minutes, subsequent encounter
	Traumatic subarachnoid hemorrhage with loss of consciousness of 1 hour to 5 hours 59
S06.6X3S	minutes, sequela
	Traumatic subarachnoid hemorrhage with loss of consciousness of 6 hours to 24 hours,
S06.6X4A	initial encounter
	Traumatic subarachnoid hemorrhage with loss of consciousness of 6 hours to 24 hours,
S06.6X4D	subsequent encounter
SOC CVAS	I raumatic subarachnoid nemorrnage with loss of consciousness of 6 hours to 24 hours,
500.0745	Traumatic subarashapid hamarrhaga with lass of consciousness greater than 24 hours
S06 6X5A	with return to pre-existing conscious level initial encounter
000.0/00/1	Traumatic subarachnoid hemorrhage with loss of consciousness greater than 24 hours
S06.6X5D	with return to pre-existing conscious level, subsequent encounter
	Traumatic subarachnoid hemorrhage with loss of consciousness greater than 24 hours
S06.6X5S	with return to pre-existing conscious level, sequela
	Traumatic subarachnoid hemorrhage with loss of consciousness greater than 24 hours
S06.6X6A	without return to pre-existing conscious level with patient surviving, initial encounter
	Traumatic subarachnoid hemorrhage with loss of consciousness greater than 24 hours
	without return to pre-existing conscious level with patient surviving, subsequent
S06.6X6D	encounter
	I raumatic subarachnoid hemorrhage with loss of consciousness greater than 24 hours
506.6865	Without return to pre-existing conscious level with patient surviving, sequela
S06 6X0A	duration initial encounter
300.073A	Traumatic subarachooid hemorrhage with loss of consciousness of unspecified
S06 6X9D	duration subsequent encounter
000107102	Traumatic subarachnoid hemorrhage with loss of consciousness of unspecified
S06.6X9S	duration, sequela
S06.9X0A	Unspecified intracranial injury without loss of consciousness, initial encounter
S06.9X0D	Unspecified intracranial injury without loss of consciousness, subsequent encounter
S06.9X0S	Unspecified intracranial injury without loss of consciousness, sequela
	Unspecified intracranial injury with loss of consciousness of 30 minutes or less, initial
S06.9X1A	encounter

	Unspecified intracranial injury with loss of consciousness of 30 minutes or less
S06.9X1D	subsequent encounter
S06.9X1S	Unspecified intracranial injury with loss of consciousness of 30 minutes or less, seguela
	Unspecified intracranial injury with loss of consciousness of 31 minutes to 59 minutes.
S06.9X2A	initial encounter
	Unspecified intracranial injury with loss of consciousness of 31 minutes to 59 minutes,
S06.9X2D	subsequent encounter
	Unspecified intracranial injury with loss of consciousness of 31 minutes to 59 minutes,
S06.9X2S	sequela
	Unspecified intracranial injury with loss of consciousness of 1 hour to 5 hours 59
S06.9X3A	minutes, initial encounter
	Unspecified intracranial injury with loss of consciousness of 1 hour to 5 hours 59
S06.9X3D	minutes, subsequent encounter
	Unspecified intracranial injury with loss of consciousness of 1 hour to 5 hours 59
506.9835	minutes, sequeia
506 0V4A	Unspecified intracranial injury with loss of consciousness of 6 hours to 24 hours, initial
300.974A	Unspecified intracrapial injury with loss of consciousness of 6 hours to 24 hours
S06 9X4D	subsequent encounter
000.0/(40	Unspecified intracranial injury with loss of consciousness of 6 hours to 24 hours
S06.9X4S	sequela
	Unspecified intracranial injury with loss of consciousness greater than 24 hours with
S06.9X5A	return to pre-existing conscious level, initial encounter
	Unspecified intracranial injury with loss of consciousness greater than 24 hours with
S06.9X5D	return to pre-existing conscious level, subsequent encounter
	Unspecified intracranial injury with loss of consciousness greater than 24 hours with
S06.9X5S	return to pre-existing conscious level, sequela
	Unspecified intracranial injury with loss of consciousness greater than 24 hours without
S06.9X6A	return to pre-existing conscious level with patient surviving, initial encounter
	Unspecified intracranial injury with loss of consciousness greater than 24 hours without
S06.9X6D	return to pre-existing conscious level with patient surviving, subsequent encounter
	Unspecified intracranial injury with loss of consciousness greater than 24 hours without
506.9865	return to pre-existing conscious level with patient surviving, sequela
SOC OVOA	Unspecified intracranial injury with loss of consciousness of unspecified duration, initial
300.979A	Unspecified intracrapial injuny with loss of consciousness of unspecified duration
	subsequent encounter
000.37.30	Unspecified intracranial injury with loss of consciousness of unspecified duration
S06 9X9S	sequela
S09 8XXA	Other Specified Injuries of Head Initial Encounter
S09 8XXD	Other Specified Injuries of Head, Subsequent Encounter
S09 8XXS	Other Specified Injuries of Head, Sequela
S09 90XA	Unspecified injury of head, initial encounter
	Unspecified injury of head, subsequent encounter
S09.00XD	Unspecified injury of head, sequela
1100 0	Post COVID-19 condition unspecified
009.9	

Description

Cognitive rehabilitation is a structured set of therapeutic activities designed to retrain an individual's ability to think, use judgment, and make decisions. The focus is on improving deficits in memory, attention, perception, learning, planning, and judgment. The term cognitive rehabilitation is applied to various intervention strategies or techniques that attempt to help individuals reduce, manage, or cope with

cognitive deficits caused by brain injury. The desired outcomes are improved quality of life and function in home and community life. The term rehabilitation broadly encompasses reentry into familial, social, educational, and working environments, the reduction of dependence on assistive devices or services, and general enrichment of quality of life. Individuals recuperating from traumatic brain injury have traditionally been treated with some combination of physical therapy, occupational therapy, and psychological services as indicated. Cognitive rehabilitation is considered a separate service from other rehabilitative therapies, with its own specific procedures.

Summary

Description

Cognitive rehabilitation is a therapeutic approach designed to improve cognitive functioning after central nervous system insult. It includes an assembly of therapy methods that retrain or alleviate problems caused by deficits in attention, visual processing, language, memory, reasoning, problem-solving, and executive functions. Cognitive rehabilitation comprises tasks to reinforce or reestablish previously learned patterns of behavior or to establish new compensatory mechanisms for impaired neurologic systems. Cognitive rehabilitation may be performed by a physician, psychologist, or a physical, occupational, or speech therapist.

Summary of Evidence

For individuals who have cognitive deficits due to traumatic brain injury who receive cognitive rehabilitation delivered by a qualified professional, the evidence includes randomized controlled trials (RCTs), nonrandomized comparison studies, case series, and systematic reviews. Relevant outcomes are functional outcomes and quality of life. The cognitive rehabilitation trials have methodologic limitations and have reported mixed results, indicating there is no uniform or consistent evidence base supporting the efficacy of this technique. Systematic reviews have generally concluded that efficacy of cognitive rehabilitation is uncertain. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have cognitive deficits due to dementia who receive cognitive rehabilitation delivered by a qualified professional, the evidence includes RCTs, nonrandomized comparison studies, case series, and systematic reviews. Relevant outcomes are functional outcomes and quality of life. Systematic reviews of RCTs have generally shown no benefit of cognitive rehabilitation or effects of clinical importance. One large RCT evaluating a goal-oriented cognitive rehabilitation program reported a significantly less functional decline in 1 of 2 functional scales and lower rates of institutionalization in the cognitive rehabilitation group compared with usual care at 24 months. These results need replication. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have cognitive deficits due to stroke who receive cognitive rehabilitation delivered by a qualified professional, the evidence includes RCTs and systematic reviews. Relevant outcomes are functional outcomes and quality of life. Four systematic reviews evaluating 3 separate domains of cognitive function have shown no benefit of cognitive rehabilitation or effects of clinical importance. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have cognitive deficits due to multiple sclerosis who receive cognitive rehabilitation delivered by a qualified professional, the evidence includes RCTs and systematic reviews. Relevant outcomes are functional outcomes and quality of life. Systematic reviews of RCTs have shown no significant effects of cognitive rehabilitation on cognitive outcomes. Although numerous RCTs have investigated cognitive rehabilitation for multiple sclerosis, high-quality trials are lacking. The ability to draw conclusions based on the overall body of evidence is limited by the heterogeneity of patient samples, interventions, and outcome measures. Further, results of the available RCTs have been mixed, with positive studies mostly reporting short-term benefits. Evidence for clinically significant, durable

improvements in cognition is currently lacking. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have cognitive deficits due to epilepsy, autism spectrum disorder, postencephalopathy, or cancer who receive cognitive rehabilitation delivered by a qualified professional, the evidence includes RCTs, nonrandomized comparison studies, and case series. Relevant outcomes are functional outcomes and quality of life. The quantity of studies for these conditions is much less than that for the other cognitive rehabilitation indications. Systematic reviews generally have not supported the efficacy of cognitive rehabilitation for these conditions. Relevant RCTs have had methodologic limitations, most often very short lengths of follow-up, which do not permit strong conclusions about efficacy. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Additional Information

Clinical input obtained in 2010 provided the strongest support for the use of cognitive rehabilitation as part of the treatment of traumatic brain injuries. As part of clinical input obtained in 2015, the American Association of Physical Medicine & Rehabilitation reasserted its position of support. Cognitive rehabilitation may be considered medically necessary for traumatic brain injury based on this input.

Policy History

Date	Action
5/2022	Annual policy review. Policy statements unchanged.
10/2021	Clarified coding information.
5/2021	Annual policy review. Minor revision to summary of 2015 Clinical Input from American Association of Physical Medicine & Rehabilitation; intent unchanged. Policy statements unchanged.
1/2021	Policy updated to include coverage for cognitive rehabilitation for cognitive impairment resulting from COVID-19 in the outpatient setting in accordance with state mandate Chapter 260 of the Acts of 2020 – Patients First Act. Clarified coding information. Effective 1/1/2021.
5/2020	Annual policy review. Description, summary and references updated. Policy statements unchanged.
1/2020	Clarified coding information.
4/2019	Annual policy review. Description, summary and references updated. Policy statements unchanged.
5/2018	Annual policy review. New references added. Background and summary clarified. Prior Authorization Information reformatted.
1/2018	Clarified coding information.
10/2017	Clarified coding information.
4/2017	Annual policy review. New references added.
4/2016	Annual policy review. New references added.
12/2015	Annual policy review. New investigational indications described. Minor revision to medically necessary policy statement to clarify "cognitive impairment due to" traumatic brain injury. Effective 12/1/2105.
8/2014	New investigational indications described. Coding information clarified. Effective 8/1/2014.
9/2013	Annual policy review. New medically necessary indications described. Effective 9/1/2013.
5/2013	New references from Annual policy review.
11/2011- 4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information: <u>Medical Policy Terms of Use</u> <u>Managed Care Guidelines</u> <u>Indemnity/PPO Guidelines</u> <u>Clinical Exception Process</u> <u>Medical Technology Assessment Guidelines</u>

References

- 1. Hardy KK, Willard VW, Allen TM, et al. Working memory training in survivors of pediatric cancer: a randomized pilot study. Psychooncology. Aug 2013; 22(8): 1856-65. PMID 23203754
- Kesler S, Hadi Hosseini SM, Heckler C, et al. Cognitive training for improving executive function in chemotherapy-treated breast cancer survivors. Clin Breast Cancer. Aug 2013; 13(4): 299-306. PMID 23647804
- 3. Bonavita S, Sacco R, Della Corte M, et al. Computer-aided cognitive rehabilitation improves cognitive performances and induces brain functional connectivity changes in relapsing remitting multiple sclerosis patients: an exploratory study. J Neurol. Jan 2015; 262(1): 91-100. PMID 25308631
- De Giglio L, De Luca F, Prosperini L, et al. A low-cost cognitive rehabilitation with a commercial video game improves sustained attention and executive functions in multiple sclerosis: a pilot study. Neurorehabil Neural Repair. Jun 2015; 29(5): 453-61. PMID 25398725
- 5. Gich J, Freixanet J, Garcia R, et al. A randomized, controlled, single-blind, 6-month pilot study to evaluate the efficacy of MS-Line!: a cognitive rehabilitation programme for patients with multiple sclerosis. Mult Scler. Sep 2015; 21(10): 1332-43. PMID 25716880
- 6. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Cognitive rehabilitation. TEC Assessments. 1997;Volume 12:Tab 6.
- Langenbahn DM, Ashman T, Cantor J, et al. An evidence-based review of cognitive rehabilitation in medical conditions affecting cognitive function. Arch Phys Med Rehabil. Feb 2013; 94(2): 271-86. PMID 23022261
- Chung CS, Pollock A, Campbell T, et al. Cognitive rehabilitation for executive dysfunction in adults with stroke or other adult non-progressive acquired brain damage. Cochrane Database Syst Rev. Apr 30 2013; (4): CD008391. PMID 23633354
- 9. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Cognitive rehabilitation for traumatic brain injury in adults. TEC Assessments. 2008;Volume 23:Tab 3.
- 10. Chiaravalloti ND, Sandry J, Moore NB, et al. An RCT to Treat Learning Impairment in Traumatic Brain Injury: The TBI-MEM Trial. Neurorehabil Neural Repair. Jul 2016; 30(6): 539-50. PMID 26359341
- das Nair R, Bradshaw LE, Carpenter H, et al. A group memory rehabilitation programme for people with traumatic brain injuries: the ReMemBrIn RCT. Health Technol Assess. Apr 2019; 23(16): 1-194. PMID 31032782
- 12. Bahar-Fuchs A, Martyr A, Goh AM, et al. Cognitive training for people with mild to moderate dementia. Cochrane Database Syst Rev. Mar 25 2019; 3: CD013069. PMID 30909318
- 13. Huntley JD, Gould RL, Liu K, et al. Do cognitive interventions improve general cognition in dementia? A meta-analysis and meta-regression. BMJ Open. Apr 02 2015; 5(4): e005247. PMID 25838501
- Bahar-Fuchs A, Clare L, Woods B. Cognitive training and cognitive rehabilitation for mild to moderate Alzheimer's disease and vascular dementia. Cochrane Database Syst Rev. Jun 05 2013; (6): CD003260. PMID 23740535
- Clare L, Linden DE, Woods RT, et al. Goal-oriented cognitive rehabilitation for people with early-stage Alzheimer disease: a single-blind randomized controlled trial of clinical efficacy. Am J Geriatr Psychiatry. Oct 2010; 18(10): 928-39. PMID 20808145
- Martin M, Clare L, Altgassen AM, et al. Cognition-based interventions for healthy older people and people with mild cognitive impairment. Cochrane Database Syst Rev. Jan 19 2011; (1): CD006220. PMID 21249675
- Clare L, Kudlicka A, Oyebode JR, et al. Individual goal-oriented cognitive rehabilitation to improve everyday functioning for people with early-stage dementia: A multicentre randomised controlled trial (the GREAT trial). Int J Geriatr Psychiatry. May 2019; 34(5): 709-721. PMID 30724405

- 18. Amieva H, Robert PH, Grandoulier AS, et al. Group and individual cognitive therapies in Alzheimer's disease: the ETNA3 randomized trial. Int Psychogeriatr. May 2016; 28(5): 707-17. PMID 26572551
- 19. Regan B, Wells Y, Farrow M, et al. MAXCOG-Maximizing Cognition: A Randomized Controlled Trial of the Efficacy of Goal-Oriented Cognitive Rehabilitation for People with Mild Cognitive Impairment and Early Alzheimer Disease. Am J Geriatr Psychiatry. Mar 2017; 25(3): 258-269. PMID 28034509
- Thivierge S, Jean L, Simard M. A randomized cross-over controlled study on cognitive rehabilitation of instrumental activities of daily living in Alzheimer disease. Am J Geriatr Psychiatry. Nov 2014; 22(11): 1188-99. PMID 23871120
- Brunelle-Hamann L, Thivierge S, Simard M. Impact of a cognitive rehabilitation intervention on neuropsychiatric symptoms in mild to moderate Alzheimer's disease. Neuropsychol Rehabil. 2015; 25(5): 677-707. PMID 25312605
- 22. Kurz A, Thone-Otto A, Cramer B, et al. CORDIAL: cognitive rehabilitation and cognitive-behavioral treatment for early dementia in Alzheimer disease: a multicenter, randomized, controlled trial. Alzheimer Dis Assoc Disord. Jul-Sep 2012; 26(3): 246-53. PMID 21986341
- Chapman SB, Weiner MF, Rackley A, et al. Effects of cognitive-communication stimulation for Alzheimer's disease patients treated with donepezil. J Speech Lang Hear Res. Oct 2004; 47(5): 1149-63. PMID 15603468
- Spector A, Thorgrimsen L, Woods B, et al. Efficacy of an evidence-based cognitive stimulation therapy programme for people with dementia: randomised controlled trial. Br J Psychiatry. Sep 2003; 183: 248-54. PMID 12948999
- 25. Bowen A, Hazelton C, Pollock A, et al. Cognitive rehabilitation for spatial neglect following stroke. Cochrane Database Syst Rev. Jul 01 2013; (7): CD003586. PMID 23813503
- 26. Loetscher T, Lincoln NB. Cognitive rehabilitation for attention deficits following stroke. Cochrane Database Syst Rev. May 31 2013; (5): CD002842. PMID 23728639
- 27. Nair RD, Lincoln NB. Cognitive rehabilitation for memory deficits following stroke. Cochrane Database Syst Rev. Jul 18 2007; (3): CD002293. PMID 17636703
- 28. das Nair R, Cogger H, Worthington E, et al. Cognitive rehabilitation for memory deficits after stroke. Cochrane Database Syst Rev. Sep 01 2016; 9: CD002293. PMID 27581994
- 29. Gillespie DC, Bowen A, Chung CS, et al. Rehabilitation for post-stroke cognitive impairment: an overview of recommendations arising from systematic reviews of current evidence. Clin Rehabil. Feb 2015; 29(2): 120-8. PMID 24942480
- 30. Diamond PT. Rehabilitative management of post-stroke visuospatial inattention. Disabil Rehabil. Jul 10 2001; 23(10): 407-12. PMID 11400902
- 31. Zucchella C, Capone A, Codella V, et al. Assessing and restoring cognitive functions early after stroke. Funct Neurol. Oct-Dec 2014; 29(4): 255-62. PMID 25764255
- 32. das Nair R, Ferguson H, Stark DL, et al. Memory Rehabilitation for people with multiple sclerosis. Cochrane Database Syst Rev. Mar 14 2012; (3): CD008754. PMID 22419337
- 33. Rosti-Otajarvi EM, Hamalainen PI. Neuropsychological rehabilitation for multiple sclerosis. Cochrane Database Syst Rev. Feb 11 2014; (2): CD009131. PMID 24515630
- 34. das Nair R, Martin KJ, Lincoln NB. Memory rehabilitation for people with multiple sclerosis. Cochrane Database Syst Rev. Mar 23 2016; 3: CD008754. PMID 27004596
- Lincoln NB, Bradshaw LE, Constantinescu CS, et al. Cognitive rehabilitation for attention and memory in people with multiple sclerosis: a randomized controlled trial (CRAMMS). Clin Rehabil. Feb 2020; 34(2): 229-241. PMID 31769299
- Lincoln NB, Bradshaw LE, Constantinescu CS, et al. Group cognitive rehabilitation to reduce the psychological impact of multiple sclerosis on quality of life: the CRAMMS RCT. Health Technol Assess. Jan 2020; 24(4): 1-182. PMID 31934845
- Brissart H, Omorou AY, Forthoffer N, et al. Memory improvement in multiple sclerosis after an extensive cognitive rehabilitation program in groups with a multicenter double-blind randomized trial. Clin Rehabil. Jun 2020; 34(6): 754-763. PMID 32475261
- Chiaravalloti ND, DeLuca J, Moore NB, et al. Treating learning impairments improves memory performance in multiple sclerosis: a randomized clinical trial. Mult Scler. Feb 2005; 11(1): 58-68. PMID 15732268

- 39. Chiaravalloti ND, Moore NB, Nikelshpur OM, et al. An RCT to treat learning impairment in multiple sclerosis: The MEMREHAB trial. Neurology. Dec 10 2013; 81(24): 2066-72. PMID 24212393
- Rosti-Otajarvi E, Mantynen A, Koivisto K, et al. Neuropsychological rehabilitation has beneficial effects on perceived cognitive deficits in multiple sclerosis during nine-month follow-up. J Neurol Sci. Nov 15 2013; 334(1-2): 154-60. PMID 24011606
- 41. Mantynen A, Rosti-Otajarvi E, Koivisto K, et al. Neuropsychological rehabilitation does not improve cognitive performance but reduces perceived cognitive deficits in patients with multiple sclerosis: a randomised, controlled, multi-centre trial. Mult Scler. Jan 2014; 20(1): 99-107. PMID 23804555
- 42. Hanssen KT, Beiske AG, Landro NI, et al. Cognitive rehabilitation in multiple sclerosis: a randomized controlled trial. Acta Neurol Scand. Jan 2016; 133(1): 30-40. PMID 25952561
- 43. Shahpouri MM, Barekatain M, Tavakoli M, et al. Evaluation of cognitive rehabilitation on the cognitive performance in multiple sclerosis: A randomized controlled trial. J Res Med Sci. 2019; 24: 110. PMID 31949461
- Chiaravalloti ND, Moore NB, Weber E, et al. The application of Strategy-based Training to Enhance Memory (STEM) in multiple sclerosis: A pilot RCT. Neuropsychol Rehabil. Mar 2021; 31(2): 231-254. PMID 31752604
- 45. Farina E, Raglio A, Giovagnoli AR. Cognitive rehabilitation in epilepsy: An evidence-based review. Epilepsy Res. Jan 2015; 109: 210-8. PMID 25524861
- Engelberts NH, Klein M, Ader HJ, et al. The effectiveness of cognitive rehabilitation for attention deficits in focal seizures: a randomized controlled study. Epilepsia. Jun 2002; 43(6): 587-95. PMID 12060017
- 47. Helmstaedter C, Loer B, Wohlfahrt R, et al. The effects of cognitive rehabilitation on memory outcome after temporal lobe epilepsy surgery. Epilepsy Behav. Apr 2008; 12(3): 402-9. PMID 18155965
- 48. Reichow B, Servili C, Yasamy MT, et al. Non-specialist psychosocial interventions for children and adolescents with intellectual disability or lower-functioning autism spectrum disorders: a systematic review. PLoS Med. Dec 2013; 10(12): e1001572; discussion e1001572. PMID 24358029
- 49. Wang M, Reid D. Using the virtual reality-cognitive rehabilitation approach to improve contextual processing in children with autism. ScientificWorldJournal. 2013; 2013: 716890. PMID 24324379
- Eack SM, Greenwald DP, Hogarty SS, et al. Cognitive enhancement therapy for adults with autism spectrum disorder: results of an 18-month feasibility study. J Autism Dev Disord. Dec 2013; 43(12): 2866-77. PMID 23619953
- Akel BS, Sahin S, Huri M, et al. Cognitive rehabilitation is advantageous in terms of fatigue and independence in pediatric cancer treatment: a randomized-controlled study. Int J Rehabil Res. Jun 2019; 42(2): 145-151. PMID 30741725
- 52. Zucchella C, Capone A, Codella V, et al. Cognitive rehabilitation for early post-surgery inpatients affected by primary brain tumor: a randomized, controlled trial. J Neurooncol. Aug 2013; 114(1): 93-100. PMID 23677749
- Fernandes HA, Richard NM, Edelstein K. Cognitive rehabilitation for cancer-related cognitive dysfunction: a systematic review. Support Care Cancer. Sep 2019; 27(9): 3253-3279. PMID 31147780
- Zeng Y, Cheng AS, Chan CC. Meta-Analysis of the Effects of Neuropsychological Interventions on Cognitive Function in Non-Central Nervous System Cancer Survivors. Integr Cancer Ther. Dec 2016; 15(4): 424-434. PMID 27151596
- Poppelreuter M, Weis J, Mumm A, et al. Rehabilitation of therapy-related cognitive deficits in patients after hematopoietic stem cell transplantation. Bone Marrow Transplant. Jan 2008; 41(1): 79-90. PMID 17934527
- Butler RW, Copeland DR, Fairclough DL, et al. A multicenter, randomized clinical trial of a cognitive remediation program for childhood survivors of a pediatric malignancy. J Consult Clin Psychol. Jun 2008; 76(3): 367-78. PMID 18540731
- Richard NM, Bernstein LJ, Mason WP, et al. Cognitive rehabilitation for executive dysfunction in brain tumor patients: a pilot randomized controlled trial. J Neurooncol. May 2019; 142(3): 565-575. PMID 30847839
- 58. National Institute for Health and Care Excellence (NICE). Stroke rehabilitation in adults [CG162]. 2013; https://www.nice.org.uk/guidance/CG162. Accessed January 24, 2021.

- 59. National Institute for Health and Care Excellence (NICE). Dementia: assessment, management and support for people living with dementia and their carers [NG97]. 2018; https://www.nice.org.uk/guidance/ng97/chapter/Recommendations#interventions-to-promote-cognition-independence-and-wellbeing. Accessed January 24, 2021.
- 60. Institute of Medicine. Cognitive rehabilitation therapy for traumatic brain injury: evaluating the evidence. Washington, DC: National Academies Press; 2011.
- 61. Department of Veteran Affairs Department of Defense. VA/DoD clinical practice guideline for management of concussion/mild traumatic brain injury. Washington (DC): Department of Veteran Affairs, Department of Defense; 2009.
- 62. Management of Concussion-mild Traumatic Brain Injury Working Group. VA/DoD clinical practice guideline for the management of concussion-mild traumatic brain injury, Version 2.0. Washington, DC: Department of Veterans Affairs, Department of Defense; 2016.
- 63. Department of Veterans Affairs/Department of Defense Management of Stroke Rehabilitation Work Group. VA/DoD Clinical Practice Guideline for the Management of Stroke Rehabilitation. Version 4.0, 2019.

https://www.healthquality.va.gov/guidelines/Rehab/stroke/VADoDStrokeRehabCPGFinal8292019.pdf. Accessed January 24, 2021.

COVID-19 Cognitive Rehabilitation

- Henry L Lew, Mooyeon Oh-Park, David X Cifu et al. The War on COVID-19 Pandemic: Role of Rehabilitation Professionals and Hospitals. Am J Phys Med Rehabil. 2020 Jul;99(7):571-572. <u>https://pubmed.ncbi.nlm.nih.gov/32371624/</u>
- Benjamin C Mcloughlin, Amy Miles, Thomas E Webb et al. Functional and cognitive outcomes after COVID-19 delirium. Eur Geriatr Med. 2020 Oct;11(5):857-862. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7358317/
- Silvia Alonso-Lana, Marta Marquié, Agustín Ruiz et al. Cognitive and Neuropsychiatric Manifestations of COVID-19 and Effects on Elderly Individuals with Dementia. Review Front Aging Neurosci. 2020 Oct 26;12:588872. <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7649130/</u>
- Francesco Iodice, Valeria Cassano, and Paolo M. Rossini et al. Direct and indirect neurological, cognitive, and behavioral effects of COVID-19 on the healthy elderly, mild-cognitive-impairment, and Alzheimer's disease populations. Neurol Sci. 2021 Jan 7: 1–11. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7787936/
- Vicky Yamamoto, Joe F. Bolanos, John Fiallos et al. COVID-19: Review of a 21st Century Pandemic from Etiology to Neuro-psychiatric Implications. Review J Alzheimers Dis 2020;77(2):459-504. <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7592693/</u>

COVID-19 Neurological Issues

 Lin JE, Asfour A, Sewell TB et al. Neurological issues in children with COVID-19. Neurosci Lett. 2020 Dec 19;743:135567.

https://www.sciencedirect.com/science/article/pii/S0304394020308375?via%3Dihub

- 7. Nath A, Smith B. Neurological issues during COVID-19: An overview. Neurosci Lett. 2021 Jan 18;742:135533. <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7686787/</u>
- 8. Golomb MR. Neurological issues in COVID-19, summarized in verse. J Stroke Cerebrovasc Dis. 2020 Aug;29(8):104939. <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7686787/</u>
- Kumar M, Thakur AK. Neurological manifestations and comorbidity associated with COVID-19: an overview. Neurol Sci. 2020 Dec;41(12):3409-3418. Oct 14. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7556575/
- 10. Ellul MA, Benjamin L, Singh B et al. Neurological associations of COVID-19. Lancet Neurol. 2020 Sep;19(9):767-783. <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7332267/</u>
- 11. Montalvan V, Lee J, Bueso T et al. Neurological manifestations of COVID-19 and other coronavirus infections: A systematic review. Clin Neurol Neurosurg. 2020 Jul;194:105921. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7227498/
- Aghagoli G, Gallo Marin B, Katchur NJ et al. Neurological Involvement in COVID-19 and Potential Mechanisms: A Review. Neurocrit Care. 2020 Jul 13:1-10. <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7358290/</u>

Endnotes

¹ Massachusetts State Mandate Chapter 260 of the Acts of 2020