



The Value of Cognitive Rehabilitation for Adults With Acquired Brain Injury (ABI)



ABI is a serious public health problem in the United States.



Number of individuals who experience an ABI each year.^{1,2}



Direct and indirect costs associated with ABI.³



Cognitive rehabilitation decreases length of stay, increases independence, and improves overall function. Speech-language pathologists are a key part of the team that provides cognitive rehabilitation to adults with ABI.⁴⁻⁷



Adults receiving cognitive rehabilitation are...

- 17%-45% more likely to return to work.⁷⁻⁹
- 2 times more likely to be employed full time 12 months post injury.⁸
- 2 times more likely to live at home.⁸
- 45% less likely to reside in a skilled nursing facility.⁸



Compared with usual care, adults who receive early and continuous cognitive rehabilitation are discharged...

- 17 days sooner from acute care.⁸
- 29 days sooner from inpatient rehabilitation.⁸
- 35 days sooner from the hospital.⁸

Adults receiving cognitive rehabilitation improve in...

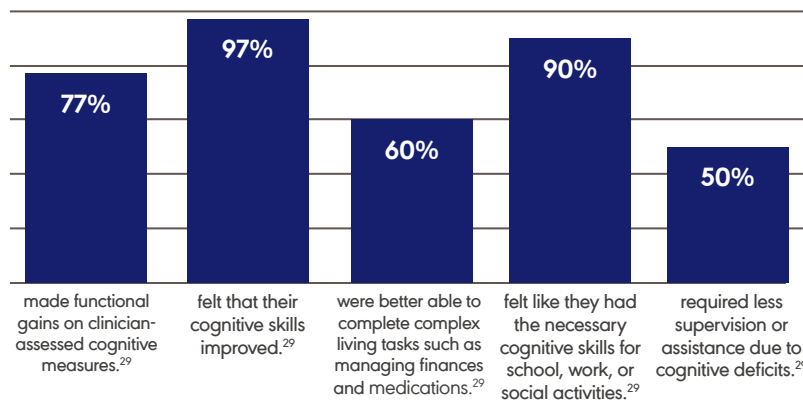
- Activities of daily living^{7,10}
- Attention^{7, 11-15}
- Executive function^{7,14-18}
- Global cognition^{7, 10, 13-15, 18-20}
- Memory^{7,14, 15, 18, 21-26}



- Quality of life⁷
- Self-awareness⁷
- Social cognition and pragmatic language^{7, 27, 28}
- Strategy use^{6, 27}
- Visuospatial skills¹⁷



After speech-language pathology treatment...



Increased Knowledge and Impact of Injury

Because of speech-language pathology services, 97% of adults receiving cognitive rehabilitation had a better understanding of their cognitive problems.²⁹

★★★ Consumer Satisfaction

Among those receiving cognitive rehabilitation, 86%-92% were satisfied with their cognitive rehabilitation services.^{30, 31}

References

- ¹ Centers for Disease Control and Prevention. (2015). *Report to Congress on traumatic brain injury in the United States: Epidemiology and rehabilitation*. National Center for Injury Prevention and Control. https://www.cdc.gov/traumaticbraininjury/pdf/TBI_Report_to_Congress_Epi_and_Rehab-a.pdf [PDF]
- ² Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Anderson, C. A. M., Arora, P., Avery, C. L., Baker-Smith, C. M., Beaton, A. Z., Boehme, A. K., Buxton, A. E., Commodore-Mensah, Y., Elkind, M. S. V., Evenson, K. R., Eze-Nliam, C., Fugar, S., Generoso, G., Heard, D. G., Hiremath, S., Ho, J. E., Kalani, R., . . . American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2023). Heart disease and stroke statistics—2023 update: A report from the American Heart Association. *Circulation*, *147*(8), e93–e621. <https://doi.org/10.1161/CIR.0000000000001123>
- ³ Lo, J., Chan, L., & Flynn, S. (2021). A systematic review of the incidence, prevalence, costs, and activity and work limitations of amputation, osteoarthritis, rheumatoid arthritis, back pain, multiple sclerosis, spinal cord injury, stroke, and traumatic brain injury in the United States: A 2019 update. *Archives of Physical Medicine and Rehabilitation*, *102*(1), 115–131. <https://doi.org/10.1016/j.apmr.2020.04.001>
- ⁴ Eapen, B. C., Bowles, A. O., Sall, J., Lang, A. E., Hoppes, C. W., Stout, K. C., Kretzmer, T., & Cifu, D. X. (2022). The management and rehabilitation of post-acute mild traumatic brain injury. *Brain injury*, *36*(5), 693–702. <https://doi.org/10.1080/02699052.2022.2033848>
- ⁵ Marshall, S., Lithopoulos, A., Curran, D., Fischer, L., Velikonja, D., & Bayley, M. (2023). *Living concussion guidelines: Guideline for concussion and prolonged symptoms for adults 18 years of age or older*. <https://concussionsontario.org>
- ⁶ Togher, L., Douglas, J., Turkstra, L. S., Welch-West, P., Janzen, S., Harnett, A., Kennedy, M., Kua, A., Patsakos, E., Ponsford, J., Teasell, R., Bayley, M. T., & Wiseman-Hakes, C. (2023). INCOG 2.0 guidelines for cognitive rehabilitation following traumatic brain injury, Part IV: Cognitive-communication and social cognition disorders. *The Journal of Head Trauma Rehabilitation*, *38*(1), 65–82. <https://doi.org/10.1097/HTR.0000000000000835>
- ⁷ Guideline Development Panel, Brown, J., Kaelin, D., Mattingly, E., Mello, C., Miller, E. S., Mitchell, G., Picon, L. M., Waldron-Perine, B., Wolf, T. J., Frymark, T., & Bowen, R. (2022). American Speech-Language-Hearing Association clinical practice guideline: Cognitive rehabilitation for the management of cognitive dysfunction associated with acquired brain injury. *American Journal of Speech-Language Pathology*, *31*(6), 2455–2526.
- ⁸ Anđelic, N., Bautz-Holter, E., Ronning, P., Olafsen, K., Sigurdardottir, S., Schanke, A. K., Sveen, U., Tornas, S., Sandhaug, M., & Roe, C. (2012). Does an early onset and continuous chain of rehabilitation improve the long-term functional outcome of patients with severe traumatic brain injury? *Journal of Neurotrauma*, *29*(1), 66–74. <https://doi.org/10.1089/neu.2011.1811>
- ⁹ Salazar, A. M., Warden, D. L., Schwab, K., Spector, J., Braverman, S., Walter, J., Cole, R., Rosner, M. M., Martin, E. M., Ecklund, J., & Ellenbogen, R. G. (2000). Cognitive rehabilitation for traumatic brain injury: A randomized trial. Defense and Veterans Head Injury Program (DVHIP) Study Group. *Journal of the American Medical Association*, *283*(23), 3075–3081. <https://doi.org/10.1001/jama.283.23.3075>
- ¹⁰ Nie, P., Liu, F., Lin, S., Guo, J., Chen, X., Chen, S., Yu, L., & Lin, R. (2022). The effects of computer-assisted cognitive rehabilitation on cognitive impairment after stroke: A systematic review and meta-analysis. *Journal of Clinical Nursing*, *31*(9–10), 1136–1148. <https://doi.org/10.1111/jocn.16030>
- ¹¹ Rohling, M. L., Faust, M. E., Beverly, B., & Demakis, G. (2009). Effectiveness of cognitive rehabilitation following acquired brain injury: A meta-analytic re-examination of Cicerone et al.'s (2000, 2005) systematic reviews. *Neuropsychology*, *23*(1), 20–39. <https://doi.org/10.1037/a0013659>
- ¹² Virk, S., Williams, T., Brunson, R., Suh, F., & Morrow, A. (2015). Cognitive remediation of attention deficits following acquired brain injury: A systematic review and meta-analysis. *Neurorehabilitation*, *36*(3), 367–377. <https://doi.org/10.3233/NRE-151225>
- ¹³ Merriman, N. A., Sexton, E., McCabe, G., Walsh, M. E., Rohde, D., Gorman, A., Jeffares, I., Donnelly, N. A., Pender, N., Williams, D. J., Horgan, F., Doyle, F., Wren, M. A., Bennett, K. E., & Hickey, A. (2019). Addressing cognitive impairment following stroke: Systematic review and meta-analysis of non-randomized controlled studies of psychological interventions. *BMJ Open*, *9*(2), e024429. <https://doi.org/10.1136/bmjopen-2018-024429>
- ¹⁴ Zhou, Y., Feng, H., Li, G., Xu, C., Wu, Y., & Li, H. (2022). Efficacy of computerized cognitive training on improving cognitive functions of stroke patients: A systematic review and meta-analysis of randomized controlled trials. *International Journal of Nursing Practice*, *28*(3), Article e12966. <https://doi.org/10.1111/ijn.12966>
- ¹⁵ Gibson, E., Koh, C. L., Eames, S., Bennett, S., Scott, A. M., & Hoffmann, T. C. (2022). Occupational therapy for cognitive impairment in stroke patients. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD006430.pub3>
- ¹⁶ Zhang, Q., Fu, Y., Lu, Y., Zhang, Y., Huang, Q., Yang, Y., Zhang, K., & Li, M. (2021). Impact of virtual reality-based therapies on cognition and mental health of stroke patients: Systematic review and meta-analysis. *Journal of Medical Internet Research*, *23*(11), Article e31007. <https://doi.org/10.2196/31007>
- ¹⁷ Kennedy, M. R., Coelho, C., Turkstra, L., Ylvisaker, M., Moore Sohlberg, M., Yorkston, K., Chiou, H. H., & Kan, P. F. (2008). Intervention for executive functions after traumatic brain injury: A systematic review, meta-analysis, and clinical recommendations. *Neuropsychological Rehabilitation*, *18*(3), 257–299. <https://doi.org/10.1080/09602010701748644>
- ¹⁸ Hallock, H., Collins, D., Lampit, A., Deol, K., Fleming, J., & Valenzuela, M. (2016). Cognitive training post-acute traumatic brain injury: A systematic review and meta-analysis. *Frontiers in Human Neuroscience*, *10*, Article 537. <https://doi.org/10.3389/fnhum.2016.00537>

References

- ¹⁹ Rogers, J. M., Foord, R., Stolwyk, R. J., Wong, D., & Wilson, P. H. (2018). General and domain-specific effectiveness of cognitive remediation after stroke: Systematic literature review and meta-analysis. *Neuropsychology Review*, 28(3), 285-309. <https://doi.org/10.1007/s11065-018-9378-4>
- ²⁰ Königs, M., Beurskens, E. A., Snoep, L., Scherder, E. J., & Oosterlaan, J. (2018). Effects of timing and intensity of neurorehabilitation on functional outcome after traumatic brain injury: A systematic review and meta-analysis. *Archives of Physical Medicine and Rehabilitation*, 99(6), 1149-1159.e1. <https://doi.org/10.1016/j.apmr.2018.01.013>
- ²¹ Elliott, M., & Parente, F. (2014). Efficacy of memory rehabilitation therapy: A meta-analysis of TBI and stroke cognitive rehabilitation literature. *Brain Injury*, 28(12), 1610-1616. <https://doi.org/10.3109/02699052.2014.934921>
- ²² Weicker, J., Villringer, A., & Thöne-Otto, A. (2016). Can impaired working memory functioning be improved by training? A meta-analysis with a special focus on brain injured patients. *Neuropsychology*, 30(2), 190-212. <https://doi.org/10.1037/neu0000227>
- ²³ das Nair, R., Cogger, H., Worthington, E., & Lincoln, N. B. (2016). Cognitive rehabilitation for memory deficits after stroke. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD002293.pub3>
- ²⁴ Fernández López, R., & Antolí, A. (2020). Computer-based cognitive interventions in acquired brain injury: A systematic review and meta-analysis of randomized controlled trials. *PLoS ONE*, 15(7), Article e0235510. <https://doi.org/10.1371/journal.pone.0235510>
- ²⁵ Lambez, B., & Vakil, E. (2021). The effectiveness of memory remediation strategies after traumatic brain injury: Systematic review and meta-analysis. *Annals of Physical and Rehabilitation Medicine*, 64(5), Article 101530. <https://doi.org/10.1016/j.rehab.2021.101530>
- ²⁶ Hudes, R., Baptist-Mohseni, N., Dimech, C., Rich, J. B., Troyer, A. K., & Vandermorris, S. (2022). Evaluating the effectiveness of compensatory memory interventions in adults with acquired brain injury: A systematic review and meta-analysis of memory and everyday outcomes. *Neuropsychology*, 36(4), 243-265. <https://doi.org/10.1037/neu0000799>
- ²⁷ Vogel, S., & Ciccia, A. (2023). The effects of cognitive rehabilitation on pragmatic language in traumatic brain injury: A meta-analysis. *Perspectives of the ASHA Special Interest Groups*, 8(1), 274-287. <https://doi.org/10.1044/2023.PERSP-22-00115>
- ²⁸ Roelofs, R. L., Wingbermühle, E., Egger, J. I. M., & Kessels, R. P. C. (2017). Social cognitive interventions in neuropsychiatric patients: A meta-analysis. *Brain Impairment*, 18(1), 138-173. <https://doi.org/10.1017/BrImp.2016.31>
- ²⁹ American Speech-Language-Hearing Association. (2023). *National Outcomes Measurement System (NOMS)*. <https://www.asha.org/NOMS>
- ³⁰ Becker, F., Kirmess, M., Tornås, S., & Løvstad, M. (2014). A description of cognitive rehabilitation at Sunnaas Rehabilitation Hospital: Balancing comprehensive holistic rehabilitation and retraining of specific functional domains. *Neurorehabilitation*, 34(1), 87-100. <https://doi.org/10.3233/NRE-131015>
- ³¹ Bergquist, T. F., Yutsis, M., & Sullan, M. J. (2015). Satisfaction with cognitive rehabilitation delivered via the Internet in persons with acquired brain injury. *International Journal of Telerehabilitation*, 6(2), 39-50. <https://doi.org/10.5195/ijt.2014.6142>