

C

Commissurotomy



Christina Kwasnica
Barrow Neurological Institute, Phoenix, AZ, USA

Synonyms

[Split brain](#)

Definition

The term referring to the medical procedure in which interconnecting fibers between the cerebral hemispheres are lesioned. The anatomic location includes either or both anterior and posterior fibers. When posterior fibers are resected, connections to the hippocampus may also be affected.

Current Knowledge

The neurosurgical technique is based on the premise that when stimuli enters the brain it is rapidly communicated via the corpus callosum to the other hemisphere. In refractory epilepsy, severing the corpus callosum may prevent the spread of electrical activity between hemispheres and generalization of the seizure activity. This procedure prevents the communication of the two hemispheres thus resulting in a clinical scenario of a “split brain.” Clinical disconnection syndromes in these patients have been studied across a large

number of neurocognitive tasks. These surgical lesions have allowed for the study of sensory perceptual processes and lateralization. Deficits have been seen in the area of perception, attention, memory, language, and reasoning. In studies of these patients, it has become clear that the left hemisphere has limitations in perceptual functions while the right hemisphere has more striking limitations in cognitive functions. The split brain studies have also led to theories of consciousness and a neurocognitive framework for the human experience. Recent literature has sought to differentiate between the surgical technique of severing only in corpus callosum, or a callostomy, versus procedures which disconnect the anterior or posterior commisures, otherwise known as a true commissurotomy, thus helping us better understand cognitive processing.

Further Readings

- Agrawal, D., Mohanty, B. B., Kumar, S., & Chinara, P. K. (2014). Split brain syndrome: One brain but two conscious minds? *Journal of Health Research and Reviews, 1*, 27–33.
- Gazzaniga, M. S. (2000). Cerebral specialization and interhemispheric communication: Does the corpus callosum enable the human condition? *Brain, 123*, 1293–1213.
- van der Knaap, L. J., & van der Ham, I. J. (2011). How does the corpus callosum mediate interhemispheric transfer? A review. *Behavioural Brain Research, 223*, 211–221.
- Winter, T. J., & Franz, E. A. (2014). Implication of the anterior commissure in the allocation of attention to action. *Frontiers in Psychology, 5*, 432–435.