

Callosal disconnection syndrome

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[Callosal disconnection syndrome](#), or split-brain, is an example of a disconnection syndrome from damage to the [corpus callosum](#) between the two hemispheres of the brain. Disconnection syndrome can also lead to [aphasia](#), left-sided [apraxia](#), and [tactile aphasia](#), among other symptoms.

Division of the anterior two thirds of the [corpus callosum](#) minimizes the risk of [callosal disconnection syndrome](#).

Disturbed intermanual transfer of tactile learning in callosal agenesis has been interpreted as a sign of disconnection syndrome. Imamura et al. observed this sign in one of four acallosal patients with a conventional form-board task, and tried to elucidate the nature of the deficit. The form-board performance of the patient with disturbed transfer of learning totally depended on motor skill, while the other acallosals and normal controls executed the task based on spatial and somesthetic information. All acallosals and normals, however, failed to show transfer of learning with another tactile task which needed motor skill but not spatial-somesthetic information. These findings suggest that the task-performing strategies in form-board learning change the state of interhemispheric transfer. Unimanual learning effect is transferred if spatial-somesthetic information is acquired in the process of learning, but is not transferred if motor skill is the exclusive content of learning. We conclude that disturbed "transfer" of learning in some acallosals is not a true disconnection sign. It should be attributed to a lack of appropriate strategy, as a result of ineffective problem solving in tactile tasks ¹⁾.

[Disconnection syndromes](#) following [corpus callosotomy](#) represent complex and variably expressed groupings of signs and symptoms affecting motor control, spatial orientation, vision, hearing, and language. Little is known, however, about the functional topography of callosal fiber pathways. In addition, most published case reports and case series of corpus callosotomy seldom report neurological deficits ²⁾.

A report show the findings of [18F positron emission tomography](#) (FDG-PET) and diffusion tensor [tractography](#) (DTT) in a right-handed patient presenting with callosal [disconnection syndrome](#), including [alien hand syndrome](#), after an [anterior communicating artery aneurysmal](#) rupture. The 49-year-old patient had right [hemiparesis](#) and unintended movement of the right hand during action of the left hand. A brain [magnetic resonance imaging](#) revealed lesions in the upper part of the genu and body in the [corpus callosum](#) as well as hemorrhage in the [interhemispheric fissure](#). They observed

extensive disruption of corpus callosum fibers in the upper genu and trunk by DTT for the evaluation of inter-hemispheric connection. FDG-PET revealed severe hypometabolism in the left [cerebral hemisphere](#), including [basal ganglia](#) and [thalamus](#), and hypermetabolism in the right cerebral hemisphere. Based on findings of FDG-PET and DTT, the callosal disconnection syndrome presented in the patient could be the result of loss of transcallosal inhibition in the contralateral hemisphere ³⁾.

¹⁾

Imamura T, Yamadori A, Shiga Y, Sahara M, Abiko H. Is disturbed transfer of learning in callosal agenesis due to a disconnection syndrome? Behav Neurol. 1994;7(2):43-8. doi: 10.3233/BEN-1994-7201. PubMed PMID: 24487287.

²⁾

Jea A, Vachhrajani S, Widjaja E, Nilsson D, Raybaud C, Shroff M, Rutka JT. Corpus callosotomy in children and the disconnection syndromes: a review. Childs Nerv Syst. 2008 Jun;24(6):685-92. doi: 10.1007/s00381-008-0626-4. Epub 2008 Mar 29. Review. PubMed PMID: 18373102.

³⁾

Kim IH, Lee S, Lee C, Lee DG. Intracranial Hemorrhage in the Corpus Callosum Presenting as Callosal Disconnection Syndrome: FDG-PET and Tractography: A Case Report. Ann Rehabil Med. 2014 Dec;38(6):871-875. Epub 2014 Dec 24. PubMed PMID: 25566491.

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