# Fiber dissection technique

The fiber dissection technique involves peeling away the white matter tracts of the brain to display its three dimensional anatomic organization. Early anatomists demonstrated many tracts and fascicle of the brain using this technique. The complexities of the preparation of the brain and the execution of fiber dissection have led to the neglect of this method, particularly since the development of the microtome and histological techniques. Nevertheless, the fiber dissection technique is a very relevant and reliable method for neurosurgeons to study the details of brain anatomic features.

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The fiber-dissection and diffusion-tensor magnetic resonance imaging techniques are reciprocally enriched not only in their application to the study of the complex intrinsic architecture of the brain, but also in their practical use for diagnosis and surgical planning [1)]

**2015**

Twenty-five formalin-fixed human brains and 4 whole cadaveric heads were examined by fiber dissection technique and ×6 to ×40 magnification. The fiber tracts and central core structures, including the insula and basal ganglia, were examined and their relationships captured in 3-D photography. The depth between the surface of the cortical gyri and selected fiber tracts was measured.

The topographic relationships of the important association, projection, and commissural fasciculi within the cerebrum and superficial cortical landmarks were identified. Important landmarks with consistent relationships to the fiber tracts were the cortical gyri and sulci, limiting sulci of the insula, nuclear masses in the central core, and lateral ventricles. The fiber tracts were also organized in a consistent pattern in relation to each other. The anatomic findings are briefly compared with functional data from clinicoradiological analysis and intraoperative stimulation of fiber tracts.

An understanding of the 3-D anatomic organization of the fiber tracts of the brain is essential in planning safe and accurate cerebral surgery [2)].

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The fiber dissection technique supports the presence of the subthalamic region as an integrative network in humans and offers the potential to aid in understanding the impacts of DBS surgery of the STN in patients with Parkinson disease. Further research is needed to define the exact role of the STN in the integrative process [3)].

**2014**

Fiber dissection technique in combination with the 3-D photography is a useful addition to the goal of making entry into the brainstem more accurate and safe [4)].

**2005**

The cerebral hemispheres of 10 cadaveric brains were dissected in a mediolateral direction by using the fiber dissection technique, corresponding to the surgical approach.

This study illuminates the delicacy of the intertwined and stratified fiber laminae of the white matter, and establishes that these structures can be preserved at surgical exploration in patients [5)]

**2000**

Twenty previously frozen, formalin-fixed human brains were dissected from the lateral surface to the medial surface, using the operating microscope. Each stage of the process is described. The primary dissection tools were handmade, thin, wooden spatulas with tips of various sizes.

The complex structures of the brain can be more clearly defined and understood when the fiber dissection technique is used. This knowledge can be incorporated into the preoperative planning process and applied to surgical strategies. Fiber dissection is time-consuming and complex, but it greatly adds to our knowledge of brain anatomic features and thus helps improve the quality of microneurosurgery. Because other anatomic techniques fail to provide a true understanding of the complex internal structures of the brain, the reestablishment of fiber dissection of white matter as a standard study method is recommended [6)].

# References

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