

Dissection of White Fibers from the Lateral Surface of the Brain through the Klingler Method: Step by Step

**Kléber González Echeverría*,
Oliver-Soto Granados,
Bruno Lourenço-Costa,
Yair Ugalde-Hernández, and
Feres Chaddad-Neto**

Received: October 13, 2017, **Accepted:** October 24, 2017, **Published:** October 26, 2017

Laboratory of Neuro-surgical Techniques,
Federal University of São Paulo, Brazil

Clinical Images

Materials and methods

The method we present is a modification to the Klingler method with which we have obtained adequate results in the generation of anatomical demonstrative pieces for the teaching and learning of the internal structures of the encephalon. The modified Klingler method consists of: (1) Extraction, (2) Washing, (3) Fixation, (4) Conservation, (5) Removal of arachnoids, (6) Freezing, (7) Dissection. Before dissection, the arachnoid and cerebral arterial system are removed from the external configuration of the brain taking care not to injure the cerebral cortex, cerebellar or cranial nerves at their apparent origin. The brain is placed for a period of 8 days in freezing at -13 to -15 ° C. The freezing of the solution located between the fascicles, the cortex and the nuclei forms micro crystals that when thawed they perform a hydrodissection. After freezing, the brain is removed and placed in a tray to thaw at room temperature for 20 minutes. The color of the cortex becomes dark brown, the cortex is fragmented and easily removable from the white matter (**Figures 1-12**). These characteristics are ideal for initiating the dissection of the internal structures of the brain [1]. The study was performed in 4 cerebral hemispheres, from April to September 2017. Nine steps were used, each of which was detailed during the study. The dissection was performed under the supervision of Dr. Feres Chaddad Neto, Vascular Neurosurgeon and Head of the Microsurgical Neuro Techniques Laboratory of the Federal University of São Paulo - Brazil. After the dissection was placed the anatomical piece worked in glycerin for one hour to acquire a darker color of the gray matter and can be more easily related to the white matter, then after the required time the anatomical piece is placed in a

*Corresponding author:

Kléber González - Echeverría

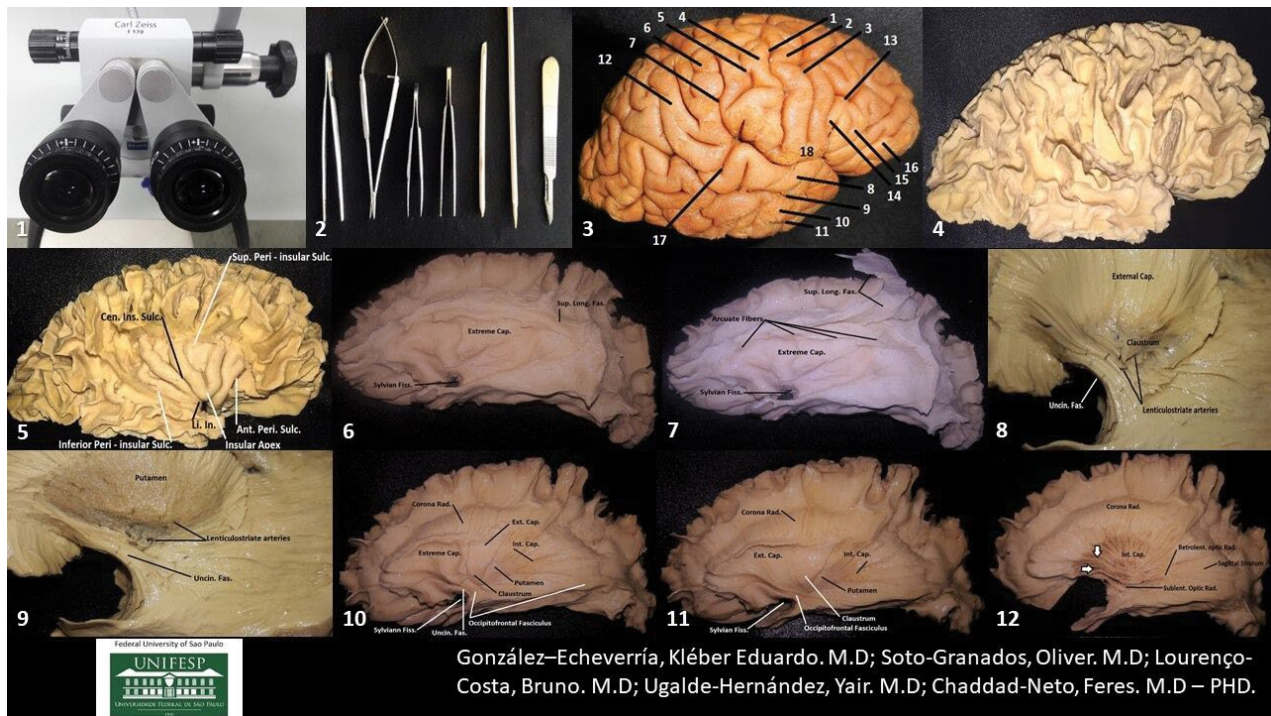
✉ klerdolez@gmail.com

Tel: +5511971785210

Citation: Echeverría KG, Granados OS, Costa BL, Hernández YU, Neto FC (2017) Dissection of White Fibers from the Lateral Surface of the Brain through the Klingler Method: Step by Step Neurosci and Brain Imaging Vol. 1 No. 1:4.

clean field for 10 minutes so that the glycerin is drained from the part and proceed to the respective photographic shot [2]. The material used for the dissections were [3]:

1. Carl Zeiss OPMI peak f 170 microscope.
2. Dissection tray + non-sterile field.
3. Micro scissors.
4. Dissecting tweezers with and without teeth.
5. Scalpel sheet number 11.
6. Wooden stick adapted for dissection.
7. Glycerin.
8. Camera: Brand Nikon 12x COOLPIX S6800 digital.



González-Echeverría, Kléber Eduardo. M.D; Soto-Granados, Oliver. M.D; Lourenço-Costa, Bruno. M.D; Ugalde-Hernández, Yair. M.D; Chaddad-Neto, Feres. M.D – PHD.

Figure 1

Microscope Carl Zeiss OPMI pico f 170. **Figure 2:** Instrumental used during the dissection of white fibers of the lateral surface of the brain. **Figure 3:** 1. Central sulcus. 2. Pre central gyrus. 3. Pre central sulcus. 4. Post central gyrus. 5. Post central sulcus. 6. Supra marginal gyrus. 7. Ascending branch of the lateral fissure or Silvio. 8. Superior temporal gyrus. 9. Superior temporal sulcus. 10. Middle temporal gyrus. 11. Inferior temporal sulcus. 12. Angular gyrus. 13. Inferior frontal sulcus. 14. Pars opercularis. 15. Pars triangularis. 16. Pars orbitalis. 17. Downward branch of the lateral fissure or Silvio. 18. Subcentral gyrus. **Figure 4:** The lateral surface of the brain is dissected, leaving the insula intact and exposing the Meynert U-fibers. **Figure 5:** **Sup. Peri - insular Sulc.:** Superior peri insular sulcus. **Cen. Ins. Sulc.:** Central insular sulcus. **Ant. Peri. Sulc.:** Anterior peri - insular sulcus. **Insular apex:** Insular apex. **Li. In.:** Limen insular. **Inferior Peri - insular Sulc.:** Inferior peri - insular sulcus. **Figure 6:** In this anatomical piece the frontal, parietal, occipital and temporal U fibers were removed. The gray matter was dissected from the short and long gyrus of the insula. **Sup. Long. Fas.:** Superior longitudinal fasciculus. **Extreme Cap.:** Extreme capsule. **Sylvian fiss.:** Sylvian fissure. **Figure 7:** **Sup. Long. Fas.:** Superior longitudinal fasciculus. **Arcuate Fibers. Extreme Cap.:** Extreme capsule. **Sylvian Fiss.:** Sylvian fissure. **Figure 8:** **External Cap.:** External capsule. **Clastrum. Lenticulostriate arteries. Uncin. Fas.:** Uncinate fasciculus. **Figure 9:** **Lenticulostriate arteries. Uncin. Fas.:** Uncinate fasciculus. **Putamen. Figure 10:** **Corona Rad.:** Corona radiata. **Ext. Cap.:** External capsule. **Int. Cap.:** Internal capsule. **Putamen. Claustrum. Occipitofrontal Fasciculus. Uncin. Fas.:** Uncinate fasciculus. **Sylvian Fiss.:** Sylvian fissure. **Figure 11:** **Corona Rad.:** Corona radiata. **Ext. Cap.:** External capsule. **Int. Cap.:** Internal capsule. **Putamen. Claustrum. Occipitofrontal Fasciculus. Sylvian Fiss.:** Sylvian fissure. **Figure 12:** The white arrows indicate the ratio of the anterior arm of the internal capsule to the head of the caudate nucleus towards the medial region. **Corona Rad.:** Corona radiata. **Int. Cap.:** Internal capsule. **Retrolent. Optic Rad.:** Retrolenticular optic radiations. **Sagittal Stratum. Sublent. Optic Rad.:** Sublenticular optic radiations. (2 – 3).

References

- 1 Cobos M, Butrón L, Echeverría G, Gasca B, Alejandr  M (2017) Manual of vascular and nervous microsurgery, macroscopic dissection of the brain and cerebral white matter through the Klingler method, 1 edn 16:108 - 113.
- 2 Rhoton. Anatomy and surgical approaches. Chapter 1 – Brain: 65-77.
- 3 Uğur T, Yaşargil M, Gazi, Allan FH, Ossama AM (2000) Fiber dissection technique: Lateral aspect of the brain [Surgical anatomy and technique]. Neurosurg 47: 417-427.