

Forensic Teleneuropathology: Application of Telepathology for Neuropathologic Consultation in the Forensic Setting

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Background: Access to neuropathologists (NPs) in the forensic pathology (FP) setting varies widely and can impact diagnostic adequacy as well as turn-around time. However, telepathology, as used for intraoperative diagnosis in centers without NP faculty, can be adapted for remote viewing of brain gross examinations ("brain cuttings"), using free software and equipment common to many FP offices, allowing real-time evaluation by an off-site NP.

Technology: A motorized photography copy stand with adjustable lights was fitted with a digital Canon EOS-80D camera with a fixed focal length lens. The camera was setup with an AC adapter for continuous usage and attached via USB to a networked computer running Windows 10. The free Canon web utility (EOS 3.13.10) was run in the remote shooting mode providing a real-time display of the camera feed with options for 1x, 5x, and 10x digital zoom, manual and automatic focusing, adjustable exposure, and remote still image capture. The "virtual brain cuttings" were broadcast via the share screen function using Microsoft Teams.

Methods: The FP/NP fellows placed case specimens on the stand (Figure 1) and livestreamed images to the NP's remote computer via Microsoft Teams. After discussion of case history and differential diagnosis, specimen(s) were dissected according to standard protocols, with slabs again livestreamed to the NP. When desired, off-site FPs could also remotely participate in the consultation.

Results: Between 9/1/20 and 1/31/21, 165 cases were evaluated via teleneuropathology. We found the image resolution to be of high quality (Figure 2), allowing the NP to easily detect and point out subtle findings and make critical decisions on a case-by-case basis, including selection of histologic samples. When the FP participated, real-time discussions of specific diagnostic concerns enhanced the overall consultation.

Conclusions: The application of telepathology for NP consultation can be adapted to FP offices, using technological infrastructure that may already be available, providing a high-quality mechanism for integrating consistent access to an offsite NP.

Figure 1. Forensic Teleneuropathology Setup for Remote Viewing of Brain Gross Examination



Figure 2. Sample Image from Gross Examination Utilizing 10x Magnification.



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