Mapping Intraoperative Neuromonitoring Device (MIND) for Awake Craniotomy

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Introduction

Awake craniotomy improves overall survival in selected brain tumour patients by maximizing the extent of resection while preserving functional performance; both are independent factors impacting overall survival.

However, success of the procedure depends on accurate, reliable intraoperative feedback from the neurophysiology monitoring team, the clinical psychologist and the patient to the neurosurgeons.

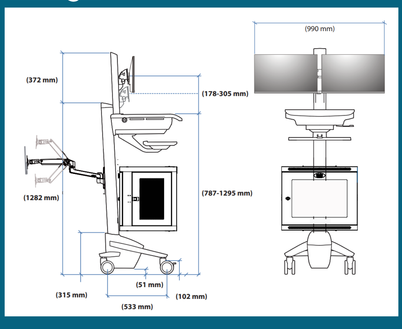
The **Mapping Intraoperative Neuromonitoring Device (MIND)** is an integrated intraoperative monitoring system developed to achieve this goal. It offers a comprehensive 360° view of the wide spectrum of information essential for intraoperative mapping for all members of the surgical team, offering a tailored integration and display of information critical to each party. We report our experience in utilizing this system for five patients that underwent awake craniotomy.

Features

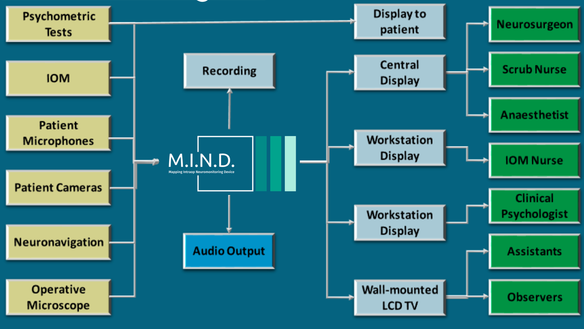
- Integrates multiple audio and video sources for simultaneous display and recording
- Includes customizable views from the operative microscope, the patient, neurophysiological responses, psychometric tests administered and image-guided neuronavigation data
- Independent displays for surgeon, clinical psychologist, patient and other members the surgical team
- Minimal real time-to-display delay ~240ms
- Easy setup with convenient UI
- Allows for archiving valuable mapping for subsequent training and clinical research

M.I.N.D.
Mapping Intraop Neuromonitoring Device

Design

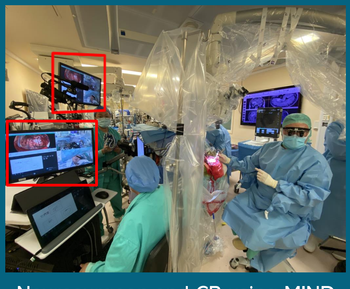


Schematic diagram

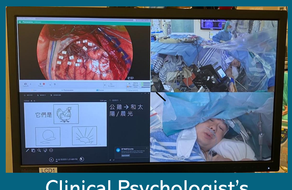


Application

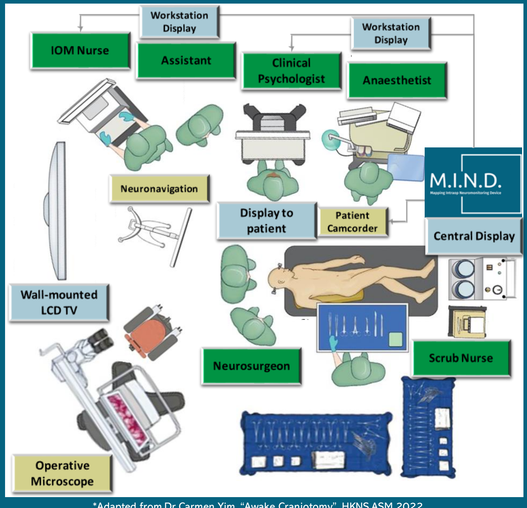
Neurosurgeon's display



Neurosurgeon and CP using MIND

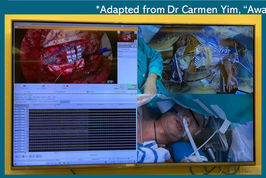


Clinical Psychologist's Display



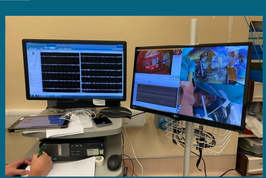
*Adapted from Dr Carmen Yim, "Awake Craniotomy", HKNS ASM 2022

MIND Console (front and back view)

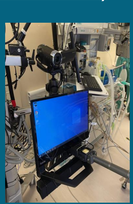


Wall-mounted LCD TV

Neuronavigation



IOM



Display and camcorder to patient

Conclusion

The Mapping Intraoperative Neuromonitoring Device (MIND) facilitates intraoperative mapping in awake craniotomy by providing instant relaying of centralized information to different members of the surgical team. The archived audio-video mapping data also provides us an opportunity for post-operative evaluation of cases with complex language or cognitive deficits.

References

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