Smartphone

- Neural and computational mechanisms of loss aversion in smartphone addiction
- Effects of subjective visual verticality and visual dependence on balance function in older adults using a smartphone-based virtual reality system
- Automated Implementation of the Edinburgh Visual Gait Score (EVGS)
- Smartphone language features may help identify adverse post-traumatic neuropsychiatric sequelae and their trajectories
- Simplified volume embolization ratio calculation method in endovascular coiling for unruptured cerebral aneurysms
- Safety and Efficacy of Different Therapeutic Interventions for Primary Progressive Aphasia: A Systematic Review
- In-hospital evaluation of an app-based seizure detection system in dogs: timely detection of generalized tonic-clonic seizures
- Developing digital health technologies for frontotemporal degeneration

---

Advances in video and fiber optics since the 1990s have led to the development of several commercially available high-definition neuroendoscopes. This technological improvement, however, has been surpassed by the smartphone revolution. With the increasing integration of smartphone technology into medical care, the introduction of these high-quality computerized communication devices with built-in digital cameras offers new possibilities in neuroendoscopy. The aim of a study of Mandel et al., was to investigate the usefulness of smartphone-endoscope integration in performing different types of minimally invasive neurosurgery.

They presented a new surgical tool that integrates a smartphone with an endoscope by use of a specially designed adapter, thus eliminating the need for the video system customarily used for endoscopy. They used this novel combined system to perform minimally invasive surgery on patients with various neuropathological disorders, including cavernomas, cerebral aneurysms, hydrocephalus, subdural hematomas, contusional hematomas, and spontaneous intracerebral hematomas.

The new endoscopic system featuring smartphone-endoscope integration was used by the authors in the minimally invasive surgical treatment of 42 patients. All procedures were successfully performed, and no complications related to the use of the new method were observed. The quality of the images obtained with the smartphone was high enough to provide adequate information to the neurosurgeons, as smartphone cameras can record images in high definition or 4K resolution. Moreover, because the smartphone screen moves along with the endoscope, surgical mobility was enhanced with the use of this method, facilitating more intuitive use. In fact, this increased mobility was identified as the greatest benefit of the use of the smartphone-endoscope system compared with the use of the neuroendoscope with the standard video set.

Minimally invasive approaches are the new frontier in neurosurgery, and technological innovation and integration are crucial to ongoing progress in the application of these techniques. The use of smartphones with endoscopes is a safe and efficient new method of performing endoscope-assisted neurosurgery that may increase surgeon mobility and reduce equipment costs [1].

Teleradiology services were observed to be widely used by on-call neurosurgeons in Germany. Nevertheless, a significant number of departments appear to use outdated techniques or techniques that leave patient data unprotected. On-call neurosurgeons in Germany report a willingness to adopt more modern approaches, utilizing readily available smartphones or tablet technology [2].

The application of telephone consultation for immediate management is needed as most neurosurgeons are technology orientated. This enables a specialist at a remote mobile site to receive the necessary information and reduce transmission time, from the second the patient is seen till the management is obtained.

Perusal et al. conducted a survey on smartphone ownership among doctors and gathered cases that needed neurosurgical input from 1(st) November 2012 till 30(th) April 2013 from all 24 district hospitals in Sabah, Malaysia.

The percentage of smartphone ownership among doctors surveyed and usage of it for remote and daily medicine at various departments at Queen Elizabeth Hospital, Kota Kinabalu, which shows at least 90% smartphone ownership and proves 100% ownership of cross-platform instant messaging applications and its usage for remote and daily medicine. It also proves to be a more popular mode of referral compared to “teleconsultation” (TC).

In Sabah, the TC service is used for remote medical consultation and only available at four hospitals. The sender needs direct access to a computer with the TC software, and it causes delay whereas doctors using smartphones will just need to discuss the case on the spot and obtain the appropriate management within minutes. Smartphone usage is also important in daily neurosurgery especially at the department level to promote efficient communication, organization, and interaction between all the staff. As for the department's administrative sector, it is useful to notify if anyone is on leave, attending courses or even meetings as the shortage can be avoided, and redistribution easily done. It also allows us to transfer simple intra-departmental data at any time, and any place whenever required.

With all the given fact, it is clear that a day without utilizing this service in our daily life will leave us handicapped and struggling with time and resources [3].

Overuse

Wang et al. [4] attempt to map the relationship between smartphone addiction symptoms and alterations in decision-making processes, using computational modeling (Drift Diffusion Model) and fMRI-based intersubject representational similarity analysis (IS-RSA). Their conclusion: higher smartphone addiction is linked to reduced loss aversion and modulated brain activity in decision-making networks.

 1. Conceptual Weakness: A Flawed Premise The study rests on a reductionist and poorly defined construct: “smartphone addiction,” operationalized via a self-report symptom scale (SAS) with limited validity. Labeling behavioral excesses as “addiction” without robust clinical diagnosis pathologizes everyday behavior and undermines the study’s credibility. Moreover, the notion that loss aversion—a complex trait shaped by personality, context, and cognition—can be mechanistically tied to screen time borders on intellectual laziness.

 2. Statistical Overengineering and Overfitting The use of the Drift Diffusion Model (DDM), while fashionable, verges on computational acrobatics in this context. Estimating latent parameters like

drift rate and decision thresholds from limited behavioral data and then feeding these into a mediation model creates a closed-loop of correlation chasing. The study commits the cardinal sin of pretending that modeling complexity equals insight, when in fact it amplifies noise and overfitting risk.

 3. Causal Inference Without Causality Despite being strictly correlational, the authors deploy mediation analyses to imply directional pathways: smartphone addiction → altered brain activity → decision-making changes. This is methodological overreach. Without experimental manipulation, longitudinal design, or randomization, these pathways remain statistical mirages, not evidence of causation.

 4. Neuroimaging: The Usual Suspects, Again Activation differences in regions like the occipital pole, precuneus, and middle frontal gyrus are reported with inflated significance. The selection of regions, coupled with broad network-based post hoc explanations (DMN, frontoparietal, sensorimotor, etc.), reads like a generic fMRI laundry list—lacking specificity, novelty, or mechanistic depth. The IS-RSA adds a layer of analytical opacity rather than clarity.

 5. IS-RSA: A Black Box Without Justification Intersubject Representational Similarity Analysis (IS-RSA) is used as a decorative statistical flourish. Its application here is poorly motivated, vaguely described, and raises questions of replicability and interpretability. It serves more to impress reviewers than to deepen understanding, falling into the trap of analytic gimmickry.

 6. Scientific Messaging: Overinterpretation and Inflated Claims The paper concludes with vague implications for interventions in addictive behavior, without proposing any actionable insights or evidence-based strategies. These speculative leaps turn a weak correlative study into overstated pseudo-clinical advocacy, risking misguidance rather than illumination.

 Final Verdict Wang et al.'s paper exemplifies a troubling trend in cognitive neuroscience: conceptual vagueness wrapped in computational complexity, with neuroimaging patterns used to reverse-engineer significance into weak behavioral associations. Despite the technical polish, the study is foundationally hollow, methodologically overbuilt, and interpretively reckless.

Its main value lies not in what it reveals about smartphone addiction or cognition, but in how it inadvertently showcases the dangers of misapplied tools, unjustified inferences, and the allure of complexity without clarity.

1)
Mandel M, Petito CE, Tutihashi R, Paiva W, Abramovicz Mandel S, Gomes Pinto FC, Ferreira de Andrade A, Teixeira MJ, Figueiredo EG. Smartphone-assisted minimally invasive neurosurgery. J Neurosurg. 2018 Mar 1:1-9. doi: 10.3171/2017.6.JNS1712. [Epub ahead of print] PubMed PMID: 29529913.
2)
Brenke C, Lassel EA, Terris D, Kurt A, Schmieder K, Schoenberg SO, Weisser G. On-call service of neurosurgeons in Germany: organization, use of communication services, and personal acceptance of modern technologies. J Neurol Surg A Cent Eur Neurosurg. 2014 May;75(3):217-23. doi: 10.1055/s-0033-1342936. Epub 2013 Aug 31. PubMed PMID: 23996686.
3)
Perumall VV, Sellamuthu P, Harun R, Zenian MS. Smartphones in remote medicine and daily neurosurgery: The Sabah update. Asian J Neurosurg. 2015 Jan-Mar;10(1):1-4. doi: 10.4103/1793-5482.151500. PubMed PMID: 25767567; PubMed Central PMCID: PMC4352620.
4)
Wang J, Liu C, Li X, Gao Y, Jin W, Wang P, Chen X, Wang Q. Neural and computational mechanisms of loss aversion in smartphone addiction. Cereb Cortex. 2025 Jun 4;35(6):bhaf150. doi: 10.1093/cercor/bhaf150. PMID: 40515411.