

The potentials for hands-free interaction in micro-neurosurgery

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From the first moment in diagnosis process to the last step of treatment, medical technologies empower practitioners to conduct a successful process. Practitioners, as the main role in this process are the end users of these technologies. In decades, medical procedures benefit from advances in healthcare technologies; yet, beyond the technical aspects, the technologies take advantages from innovations in human-computer interaction research. Either an individual uses a medical device, or there is a combination of several devices and a complex teamwork, the smooth interaction of practitioners with these devices affects the quality of outcome. As new medical technologies are introduced into the operating rooms, these bring along issues concerning ergonomics and human-factors that affect team collaboration. The mechanisms of team collaboration need to be first understood. Same concept has been applied in micro-neurosurgery. Advances in the surgical microscopes bring more precision to the treatment and empower the surgeon to conduct a successful procedure. However, recent researches indeed reported that the use of the microscope imposes several constraints, both on the surgeon's performance and on the collaborative processes during the intraoperative care. Because the interaction with the surgical microscope is hand-based through the control handgrips it has been observed previously that a source of interruption comes from the needs to adjust the device. On the other hand, the surgical procedure is not confined to the surgeon's work. The complex teamwork of the OR team member and in particular, the scrub is an essential factor to achieve an error-free operation. It is important to know how the presence of the microscope and constant engagement of the surgeon with it, affects on the work of the nurse and other team members. We construct knowledge for improvement of the user interaction with the surgical microscope in neurosurgical operating rooms and we explored the potentials for replacing the current hands-based interaction with gaze interaction.

Recent Publications

1. H Ari, R Bednarik, S Makela and S Eivazi (2016) Mechanisms for maintaining situation awareness in the micro-neurosurgical operating room. *Comput. Stud.* 95: 1-14.

2. S Eivazi, H Ari, R Bednarik, V Leinonen, M Tukiainen and J E Jaaskelainen (2015) Analysis of disruptive events and precarious situations caused by interaction with neurosurgical microscope. *Acta Neurochir. (Wien)* 157: 7.

References

1. G Fitzpatrick and G Ellingsen (2013) A review of 25 years of CSCW research in healthcare: Contributions, challenges and future agendas. 22: 4-6.

2. K O'Hara, R Harper, H Mentis, A Sellen and A Taylor (2013) On the Naturalness of Touching the Interaction Back into NUI. *ACM Trans. Comput. Interact.* 20(1): 1-25.

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