



and Other Interventional Techniques

Motion tracking systems for assessment of surgical skill

We read with interest the recent paper by Van Sickle et al. [4] regarding construct validity of the video-based motion tracking system on the ProMIS laparoscopic simulator. Indeed, our department has also reported the validity of this device for objective assessment of psychomotor skill [3]. As stated, the ultimate goal is to objectively assess surgical skill in a realistic environment (i.e., the operating room).

In this vein, we have been working with electromagnetic motion systems, both with the use of standard bench models in the skills laboratory and in the operating room [1, 2]. As stated, a fundamental drawback to the use of electromagnetic systems is their susceptibility to noise within a metallic environment. This is an unavoidable product of using such a system. However, the Imperial College Surgical Assessment Device (ICSAD) incorporates application-specific software, which with adequate pre- and postprocessing and validated filters can minimize the effect of anomalous readings. We thus refer Van Sickle et al. to numerous studies published in the literature that have proven the use of the ICSAD electromagnetic device for motion tracking in both controlled and operating room environments.

We have also attempted to assess video-based tracking for the operating room with the use of pre-marked gloves, in a similar manner to the system used by the ProMIS simulator. However, the cameras suffered from line-of-sight disturbances that could only be rectified by the use of multiple cameras at strategically placed sites. Motion analysis involves the placement of thimble-sized sensors on the dorsum of the surgeons' hands, making it a feasible and portable device for skills

assessment. The device has been shown to be consistent, reliable, and eminently practicable for motion tracking analysis in the operating room [2]. The use of vision tracking for motion analysis in the operating room necessitates further work, although it has been shown to be ideal for tracking instruments in a closed box trainer.

References

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