The LapPointer: Introduction of a novel intraoperative laparoscopic pointer.

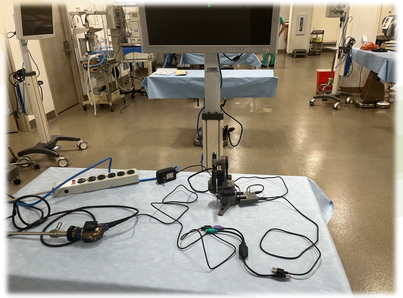
Gamme, Gary[1] MD, Cubas, Robert[1] MD, Jimenez, Carolina[1] MD, Bowles, Robert[1] MD, Martinez, Jose[1] MD

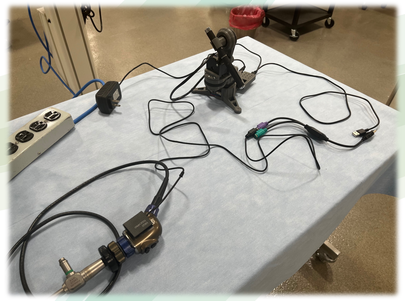
1. Division of Laparoendoscopic Surgery University of Miami

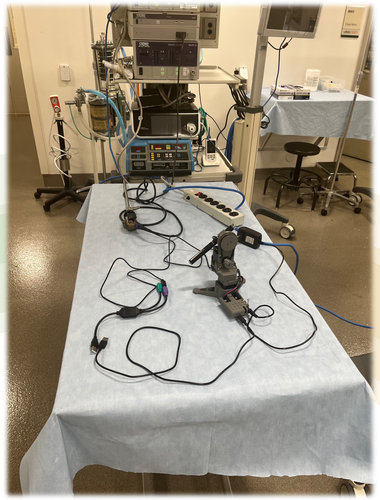
Introduction - Intraoperative communication between surgeon instructors and trainees is currently limited mainly to verbal instructions. The great variability in laparoscopic operative set up, camera position and orientation, as well as locations of screens contribute to great difficulty in coordinating directions to anatomic locations on the screen as they relate to laparoscopic movements. A potential solution to the laparoscopic mentor mentee communication problem is the use of the LapPointer laser pointer device

The Device -. This remote pointing device can optimize ergonomics to allow an instructor to hold a laparoscope with a mouse track pad attached onto its camera head to allow control of a rotating laser pointer. This allows the track pad along with the camera head to be kept out of the sterile field with the use of a camera drape. Its connecting wire would run along the camera head wire and into a small console with a laser pointer attached to a servo to allow pointer rotation.

The servo is controlled by a Raspberry Pi, single board computer, which has programming to allow basic functionality and interaction between the laser pointer-servo combo and the mouse pad. Track pad movements would move the laser pointer around on the screen. With one hand on the laparoscope and camera head an operator can control the mousepad attached to the top or side of the camera with a thumb on the same hand. This allows the instructor one hand on the camera and trackpad and another free hand to participate in the case.







Testing Methodology - Validation testing for this model will be performed on a simulated laparoscopic cholecystectomy setting in a porcine lab. Our primary goal will be to determine whether a porcine laparoscopic cholecystectomy set up with a laser pointer will lead to shorter times for trainees to grab or point to a target location on the screen versus a traditional set up with only verbal instructions. Based on previous similar studies we expect the mean time in the verbal group to be 10-12 seconds (SD 2-3s) and the mean time in the pointer group to be 5 seconds (SD 0.35-0.65s). Power calculations performed using STATA with assumed alpha of 0.05 and a power (beta) of 0.80 to identify a 20% improvement in time to task completion between verbal instruction and pointer groups demonstrates a required sample size of 26 with 13 trainee subjects in each group. Once the validation testing is complete the next steps are to develop an improved more ergonomic prototype with expanded capabilities able to handle a dual screen laparoscopy setup.

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