

Microsuturing

The Tobii eye-tracker was used to record surgeons' eye movements while they performed a microsuturing task. A total of 19 expert and 18 novice trials were recorded under the microscope. Surgical videos were annotated to label subtasks and critical actions. Total [suturing](#) time and subtask times were also compared between novice and expert surgeons. At 3 critical and discrete surgical actions (needle piercing into tissue, exiting, and thread cutting) we examined eye fixation that was directly coupled to each of these actions.

Results: Compared with novices, expert surgeons completed the suture with shorter total time (258.52 ± 102.14 seconds vs. 330.02 ± 96.52 seconds, $P = 0.038$), penetration time (17.15 ± 3.50 seconds vs. 26.26 ± 18.58 seconds, $P = 0.043$), and knot-tying time (194.63 ± 94.55 seconds vs. 262.52 ± 79.05 seconds, $P = 0.025$). On average, experts displayed longer fixation (1.62 seconds) and preaction fixation time (1.3 seconds) than novices (fixation time = 1.24 seconds, $P = 0.048$; preaction fixation = 0.82 seconds, $P = 0.005$). Experts maintained their visual engagement constantly over the 3 levels of subtasks while novices required a longer fixation time for the challenging piercing action than for the exiting and cutting action.

Conclusions: The action-related fixation can be used to evaluate microsurgeons' level of expertise and in surgical education for gaze training.

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