Value of the Crowd-Sourced Assessment of Technical Skills (C-SATS) platform in surgical procedures: A systematic review of evidence and critical evaluation of future directions

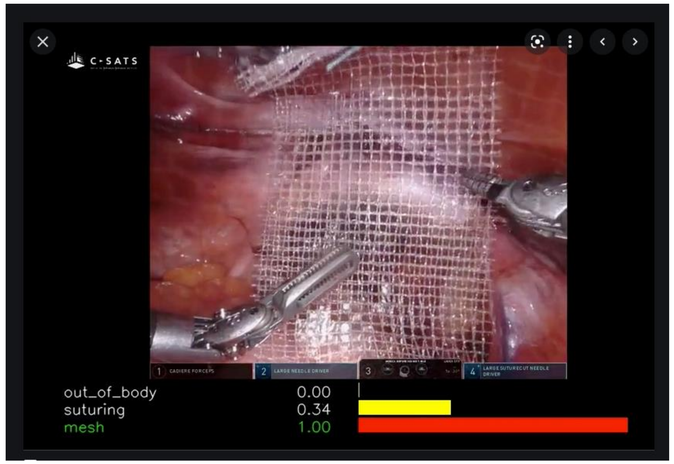
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Alvand J Sehat[1-4], Giovanni A Tommaselli[2], Philippe Grange[3], Crystal D Ricketts[1], Jeffrey W Clymer[1], Robin P Blackstone[1]
J&J, MD sector, Global Medical Affairs: (1) Cincinnati, OH –(2)-Napoli – IT (3)- Norderstedt – DE, Rutgers NJMS (4)

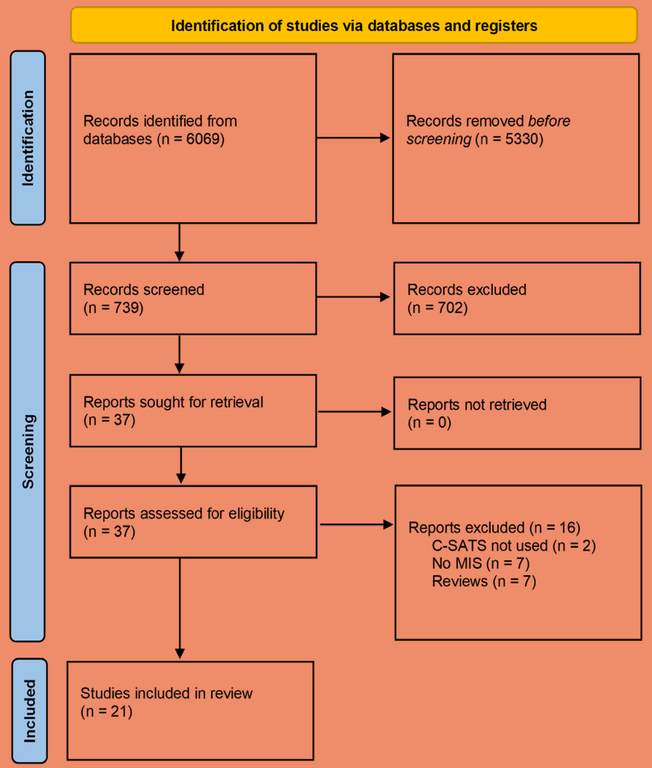
Background

- **Crowd-Sourced Assessment of Technical Skills (C-SATS):**
  - surgical video data analytic platform
  - knowledge of expert surgeons and lay groups to assess the technique and technical skills of surgeons
  - Driven by AI and Machine Learning
- **Aim**:
  - Summarize published literature on the performance of C-SATS as compared to expert evaluations and assess its use as a training and validation tool in minimally invasive surgery (MIS).





Methods



Results

- Twelve studies compared crowd-sourcing evaluations against expert assessment which indicated overall excellent or good correlation between Global Operative Assessment of Laparoscopic Skills (**GOALS**), Global Evaluative Assessment of Robotic Skills (**GEARS**), and Robotic Objective Structured Assessment of Technical Skills (**R-OSATS**) scores.
- All scores had a Pearson's or Spearman's correlation coefficients ranging from 0.69 to 0.95 and Cronbach's alpha from 0.63 to 0.93 across different specialties and surgical approaches, indicating good inter-rater reliability between expert surgeons and crowd workers
- When using C-SATS to assess performance and validation, assessments positively correlated with traditional methods of time and error-based scoring and global rating scale.

Conclusions

- The C-SATS platform has been shown to efficiently provide crowd-sourced assessments that correlate favorably with expert assessments across a range of surgical specialties.
- Use of crowdsourcing has uniformly yielded accurate assessments of surgeons' technical skills in a markedly shorter time than expert reviews.
- C-SATS may be additional tool to complement the traditional models of evaluating surgical proficiency.