

Title:

Use of laparoscopic videos amongst surgical trainees in the United Kingdom.

Celentano V, Smart N, Cahill RA, McGrath JS, Gupta S, Griffith JP, Acheson AG, Cecil TD,
Coleman MG.

ABSTRACT

Background: Surgical trainers consider laparoscopic videos as a useful teaching aid to maximize trainees' learning and skill development given the backdrop of time constraints and productivity demands. Aim of this study is to assess the current use of laparoscopic videos amongst surgical trainees in the United Kingdom.

Methods: A steering committee of 15 experienced laparoscopic trainers from 8 countries developed a survey on the use of laparoscopic videos by surgical trainees. The survey items were finalized by discussion through e-mails, teleconferences, and face-to-face meetings and a finalised questionnaire was distributed amongst surgical trainees in the United Kingdom.

Results: 92 trainees were invited and 75 returned the questionnaire (81.5%). 86.7% of the trainees routinely watched online surgical videos and the more frequently used websites were Youtube.com and Websurg.com. Trainees require laparoscopic videos to have supplementary educational content such as English commentary (90.7%) and use of snapshots (93.3%) and diagrams (86.7%). Position of the patient and trocars, indication for surgery, preoperative data and postoperative outcomes are required characteristics of laparoscopic videos. 29 trainees (38.7%) do not record the laparoscopic procedures they perform, despite the majority of them recognising the usefulness of routine video-recording for training purposes (78.7%).

Conclusions: Surgical trainees consider videos a useful adjunct in laparoscopic surgery training, with preference for open access sources. Trainees value highly informative videos with supplementary educational content.

Keywords: Laparoscopic surgery, surgical videos, distance learning, surgical training.

Introduction

Trainee surgeons are required to gather more technical skills in a shorter time period [1] and a deficiency of successful performance of enough critical laparoscopic cases by trainees has been demonstrated [2,3]. The proportion of operations undertaken by surgical trainees has reduced in the past decade [4] as they spend less time in theatre and more time covering night shifts and care of acute admissions [5,6]. The duration of surgical training varies significantly around the world, and trainee working patterns differ, ranging from 48 hours per week in Europe [7] to 80 in the USA [8]. The lack of worldwide standardization of expected operative experience in general surgical training with different requirements of surgical curricula is likely to influence the opportunities for gaining experience with the potential for wide variation in the operative exposure of newly qualified surgeons around the world [9].

Consequently, it has become widely accepted that surgeons must develop new innovative methods of surgical training [10, 11] outside of the surgical theatre [12] to abbreviate the learning curve and potentially further enhance patient safety.

Audio-visual presentations are recognized in the medical field as important educational materials; thus, they are used to communicate information effectively to clinicians, patients and students [13-14]. Fortunately, laparoscopic surgery lends itself to the production of audio-visual educational materials, with current laparoscopic systems equipped with video-recording devices, making it easy to capture high-quality images in a digital format. Recent studies suggest that these sources hold promise as educational tools for scientific disciplines [15], but the trustworthiness of a large proportion of publicly available files remains questionable as not all videos are authoritative and may not show techniques based on solid evidence. Furthermore they may contain incorrect or misleading promotional information [16-17]. Instructive laparoscopy videos with appropriate exposition could therefore be ideal for initial training in laparoscopic surgery [18] and can be produced even with minimal prior

video editing experience [19]. Surgical trainers consider laparoscopic videos as a useful teaching aid [20] to maximize trainees' learning and skill development given the backdrop of time constraints and productivity demands [21]. The aim of this study is to assess the current use of laparoscopic videos amongst surgical trainees in the United Kingdom.

Methods

A steering committee consisting of 15 experienced laparoscopic trainers from eight countries developed a survey on the use of laparoscopic videos by surgical trainees. The survey items were finalized by discussion through e-mails, teleconferences, and face-to-face meetings. Based on the results of the discussion; the steering committee prepared an anonymised questionnaire which was distributed amongst surgical trainees in the UK willing to take part to the study and sampled from the trainers' units using an electronic survey tool (Enalyzer, Denmark, www.enalyzer.com), over a period of 6 months from July 2016 to January 2017. A second round of questionnaires was sent to junior trainees who had not previously participated between December 2017 and June 2018.

After completion of a two-year postgraduate Foundation programme, the UK surgical training pathway is structured with a two-year 'Core Surgical Training' programme, followed by six-year 'Specialist Training' programme [22]. The Joint Committee on Surgical Training (JCST) is responsible for curriculum development and quality assurance of all the surgical training programmes, and the end of training is marked by the award of a 'certificate of completion of training' (CCT), which requires completion of the intercollegiate fellowship examinations, completion of surgical training competency based assessments, demonstration of management and leadership skills and logbook evidence as outlined by the JCST [23].

Trainees were invited via email, and were considered eligible for inclusion in the survey if they had completed a core surgical training programme and if they were currently enrolled, or planning to be, into a specialist surgical training programme in the United Kingdom with interest in pursuing a career in colorectal surgery, oesophagogastric surgery, hepatobiliary or general surgery.

Categorical variables are presented as frequency or percentage and were compared with the use of the chi-square test or Fisher's exact test, as appropriate. Continuous variables are presented as means (\pm standard deviation) and were compared with the use of Student's t test. The Mann-Whitney U test was used for continuous, not normally distributed, outcomes.

Results

A total of 92 UK trainees (70 in the first round and 22 in the second round) were invited and 75 returned the questionnaire (81.5%). 41 were males (54.7%) and 34 females (45.3%). The number of years trainees had spent in speciality training, after completion of foundation year and core surgical training, was 1 in 18 cases (24%), 2 in 17 (22.7%), 3 in 11 (14.7%), 4 in 7 (9.3%), 5 in 8 (10.7%) and 6 in 7 (9.3%). Seven trainees (9.3%) who had completed core surgical training but not obtained yet a higher surgical training placement were also included.

64 trainees (86.7%) routinely watched online laparoscopic surgical videos, and the most frequently accessed websites (Figure 1) were YouTube (<http://www.youtube.com>) and Websurg (<http://www.websurg.com>). Trainees preferred laparoscopic videos to have supplementary educational content such as English commentary (90.7%) and the use of snapshots (93.3%) and diagrams (86.7%) to demonstrate the anatomy. Surgical trainees are interested in videos showing not only surgical details such as the position of the patient and

trocars (100%), but also the indication for surgery (96%), pre-operative data (body mass index 92%, previous surgical history 98.7%) and post-operative outcomes (length of hospital stay 80%, 30-day morbidity 94.6%), as summarized in Table 1. The characteristics of the videos found online by the surgical trainees are detailed in Table 2. 14 trainees (21.9%) do not know if the videos they watch online have undergone peer review prior to publication and 5 trainees (7.8%) do not even know if the videos have undergone prior editing, suggesting that some of the trainees might be superficial users of online laparoscopic surgery videos, that could explain some of the disparities between the videos trainees claim to prefer and the ones they actually watch.

33 trainees (41.3%) had dedicated briefing and debriefing sessions with their trainer(s) in elective theatre lists and only in 9 cases trainers used scoring system to critically evaluate the procedure performed by the trainees. Only 46 trainees out of 75 (61.3%) video-record the laparoscopic procedures they perform, despite 59 trainees (78.7%) recognising that it could be useful reviewing the videos of the laparoscopic procedures performed and 64 trainees (85.3%) stating that they would like attending dedicated video review sessions with peers and trainers. 22 of the 46 trainees who video-record the laparoscopic procedures they perform review the video on their own (47.8%), while 6 with peers (12.5%) and 18 with the trainer (39.1%).

Discussion:

Our study demonstrates that surgical trainees in the UK use online laparoscopic videos as an educational tool. Trainees value highly informative videos detailing patients' characteristics and surgical outcomes, and integrated with supplementary educational content such as snapshots and diagrams to facilitate the recognition of anatomy and division of the procedure

into modular steps. Written commentary is particularly beneficial for people watching videos in their non-native language [24], which could also be relevant for distance mentoring and proctoring of surgeons introducing a new technique in a different country.

We also acknowledge that trainees use open access sources such as YouTube.com more frequently than peer reviewed sources, despite recognising that the latter offer videos with more educational content. YouTube is an ideal platform for educational presentations providing easy sharing of videos, which are streamed in different resolution qualities, allowing for easy viewing on a multitude of devices including the personal computer, handheld media players and smart phones [25]. However, the widespread use of YouTube might reflect the concerning trend observed in the last few years [26], with more videos being shared without undergoing a formal peer-review process, with limited educational content and lack of information on patients' data, indication for surgery and surgical outcomes such morbidity and histopathological assessment. On the basis of these premises, an international, multispecialty, joint trainers-trainees committee recently developed consensus statement on how to report a laparoscopic surgery video for educational purposes (LAP-VEGaS: LAParoscopic surgery Video Educational GuidelineS) with the aim to reduce the gap between trainees' expectations and online resources' quality [27], as adherence to the guidelines could help improve the educational value of video materials when used for the purposes of training, as well as providing a template for critical appraisal and review of videos submitted for publication.

Technical competency is dependent on supervised training volume [28], which is consistent with the theory of deliberate practice, indicating that expertise is not related exclusively to the volume of experience but to time spent practising with constructive feedback [29]. Therefore, technical competence should be based on objective assessment of the quality of performance rather than the number of procedures performed and video-based learning should not only be

limited to watching a procedure performed by another surgeon, but also include appraising the trainees' own performance, by reviewing the video with peers and trainers. Given that feedback has been demonstrated to improve performance [30], this should be a fundamental part of training in advanced laparoscopic surgery, despite it being a shift from the more traditional method of surgical teaching [31]. Surprisingly, 29 of the 75 trainees who answered our survey declared they do not routinely record the laparoscopic procedure they perform with only 18 trainees reviewing the video with the trainer in a feedback session and objective scoring systems only being used in nine cases, which is a concerning finding of lack of reflective practice based on objective performance. Consistent review of surgical videos could facilitate understanding of common errors in order to create awareness of potential injury mechanisms by acknowledging error-event patterns [32] and by engaging with online content through informal interactions [33] including peer discussion facilitated via social media, which can provide an important component of surgeons' ongoing development by shared experiential learning and knowledge [34].

Social media is becoming an increasingly popular component of modern-day surgical practice [33] and Twitter (<http://www.twitter.com>) has been found to be the most popular app on surgeons' mobile phones [35] with peer-reviewed journals disseminating new research online [36-37] and surgical societies live tweeting to increase engagement at events and conferences [38]. Our study focused on the use of online websites by trainees, potentially excluding the content which can be found on other social media platforms, with examples including LinkedIn (<http://www.linkedin.com>), a business and employment social network, and growing Facebook (<http://www.facebook.com>) closed groups [34] such as the International Hernia Collaboration [39] and Robotic Surgery Collaboration [40] where high quality video content is shared and live peer reviewed amongst more than 5000 group members.

Higher surgical training in General surgery, with access to specialty training, is a national recruitment system in the United Kingdom, which can be accessed by surgical trainees who have completed the foundation year programme (duration of 2 years), and the core surgery training programme (duration of 2 years). In order to direct our survey to a homogeneous sample of trainees committed to general surgery training, we decided to exclude trainees who had not completed yet core surgical training, as some of them might decide to opt for different specialties such as orthopaedics or plastic surgery, which do not involve laparoscopic surgery. Addressing our survey to a group of more senior trainees, committed to a career in general surgery, minimised the risk of enrolling trainees not using online videos simply because not interested in laparoscopic surgery, but resulted nevertheless in recruiting only 92 trainees, which might not be representative of the whole population of trainees in the United Kingdom, particularly in view of their different levels of experience which may have underpowered subgroup analysis. More importantly, trainees with different levels of experience might be watching videos from different sources being the web content not all similar, with websites preferentially directed towards more senior trainees or independently practising surgeons, who may be less attracted by videos lengthily detailing basic surgical techniques or with a lot of background information. The preliminary findings of our study could guide the development of a more detailed survey with the use of Likert scales to better define the characteristics of laparoscopic video usage amongst surgical trainees, and promotion of the survey by trainees associations could ensure appropriate geographical representation and likely a larger sample size of UK surgical trainees. Another limitation of our study is that teaching surgical techniques also requires non-technical skills, as communication and teamwork have been shown to influence surgical performance [41-42], while video based learning in surgery mainly addresses technical aspects of the procedure. A more qualitative survey, promoted by surgical societies or trainee associations is desirable,

addressing the reasons for lack of engagement with distance learning by some trainees, which could be explained by service provision pressures and time constraints, in case this finding is confirmed.

Conclusion:

Surgical trainees consider videos a useful adjunct in laparoscopic surgery training, with preference for open access sources. Trainees value highly informative videos with supplementary educational content. A limited proportion of trainees routinely records and reviews with peers and trainers the surgical procedure they perform.

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Tables:

Table 1. Essential information required by surgical trainees in educational laparoscopic videos.

Table 2. Characteristics of laparoscopic video usage amongst surgical trainees in the UK.

Figures:

Figure 1. Number of users of online resources for laparoscopic surgical videos.

Table 1. Essential information required by surgical trainees in educational laparoscopic videos.

	YES, n(%)	NO, n(%)	Don't know, n(%)	No answer, n(%)
<u>Patient characteristics</u>				
Indication for surgery	72 (96 %)	0	1 (1.3%)	2 (2.7%)
Age of the patient	75(100%)	0	0	0
Sex of the patient	75 (100%)	0	0	0
ASA score	59 (78.7%)	8 (10.6%)	6 (8%)	2 (2.7%)
Comorbidities	57 (76%)	5 (6.7%)	8 (10.6%)	5 (6.7%)
Body Mass Index	69 (92%)	5 (6.7%)	1 (1.3%)	0
Previous surgery	74 (98.7%)	0	0	1 (1.3%)
Preoperative imaging	71 (94.6%)	2 (2.7%)	0	2 (2.7%)
Preoperative work up	60 (80%)	6 (8%)	3 (4%)	6 (8%)
<u>Surgical outcomes</u>				
Operating time	63 (84%)	8 (10.6%)	4 (5.3%)	0
Length of hospital stay	60 (80%)	13 (17.3%)	1 (1.3%)	1 (1.3%)
Blood loss	69 (92%)	4 (5.3%)	1 (1.3%)	1 (1.3%)
30-day morbidity	71 (94.6%)	2 (2.7%)	2 (2.7%)	0
Histology	68 (90.7%)	4 (5.3%)	2 (2.7%)	1 (1.3%)
Follow-up duration and outcomes	51 (68%)	16 (21.3%)	5 (6.7%)	2 (2.7%)
<u>Educational content</u>				
The procedure should be presented in a step by step fashion	73 (97.3%)	0	1 (1.3%)	1 (1.3%)

Position of the ports	75 (100%)	0	0	0
Position of the patient	75(100%)	0	0	0
Position of extraction site	71 (94.7%)	4 (5.3%)	0	0
Open part of the procedure demonstrated	47 (62.7%)	13 (17.3%)	11 (14.7%)	4 (5.3%)
Audio/written English commentary	68 (90.7%)	3 (4%)	4 (5.3%)	0
Use of snapshots	70 (93.3%)	1 (1.3%)	2 (2.7%)	2 (2.7%)
Use of diagrams	65 (86.7%)	8 (10.7%)	1 (1.3%)	1 (1.3%)

ASA: American Society of Anaesthesiologists

Table 2. Characteristics of laparoscopic video usage amongst surgical trainees in the UK.

	Yes, n(%)	No, n(%)	I don't know, n(%)
Do you find that all the videos you watch are educational?	46 (71.9%)	18 (28.1%)	0
Do you find differences in the educational value among videos?	60 (93.7%)	4 (6.3%)	0
Do the videos you watch undergo peer review prior to publication?	36 (56.2%) <i>Always: 1 (1.6%)</i> <i>Sometimes: 26 (40.6%)</i> <i>Rarely: 9 (14%)</i>	14 (21.9%)	14 (21.9%)
Did you notice a difference in the educational value between peer reviewed and non-peer reviewed videos?	60 (93.7%)	4 (6.3%)	0
Do you think that peer reviewed videos are more educational?	52 (81.3%)	7 (10.9%)	5 (7.8%)
Do you think that peer reviewed videos present a safer procedure?	54 (84.4%)	4 (6.3%)	6 (9.3%)
Have the videos you watch been edited?	59 (92.2%) <i>Always: 27 (42.1%)</i> <i>Sometimes: 32 (50%)</i> <i>Rarely: 0</i>	0	5 (7.8%)
Do you think watching unedited videos could be more educational?	38 (59.4%)	24 (37.5%)	2 (3.1%)

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Figure 1. . Number of users of online resources for laparoscopic surgical videos.

The numbers above each bar indicate the percentage of respondents that use each of the online resources. Every trainee had the opportunity to indicate up to 3 resources.

Ann Surg Annals of Surgery journal

Colorectal Dis Colorectal Disease video channel

