

Breast surgeons updating on the thresholds of COVID-19 era: results of a multicenter collaborative study evaluating the role of online videos and multimedia sources on breast surgeons education and training

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Abstract. – OBJECTIVE: Current trends show a rise of attention given to breast cancer patients' quality of life and the surgical reconstruc-

tive result. Along with this trend, surgical training quality and efficacy are gaining importance and innovative training methods such as online

videos shared on social media portals, are becoming main updating tools. In hazardous times like COVID-19 pandemic nowadays, online communication becomes of vital importance and adaptation and innovation are fundamental to keep research and education alive. The authors aimed to investigate the role of video and multi-media sources on the daily activity and surgical training of a representative group of surgeons specifically dedicated to oncologic, oncoplastic and reconstructive breast surgeries.

MATERIALS AND METHODS: A survey was produced and administered to 20 major Italian Breast Centers. Collected data were analyzed with Fisher's Exact Test.

RESULTS: From October 2019 to March 2020, a total of 320 surveys were collected. Among the responders, there were 188 trainees (intern medical doctors and residents) and 110 faculty, 72% of them belonged to a plastic surgery environment, while 28% to general surgery environment. Almost all respondents have ever watched videos concerning breast surgery.

CONCLUSIONS: The results of the study show how breast surgeons rely on videos and web platforms, mostly YouTube, when searching for training info about surgical procedures. Social media offer great opportunities for sharing knowledge and diffusion of new ideas but greater attention to their reliability is mandatory.

Key Words:

Online videos, Social media, Surgical training, Breast surgery.

Introduction

Breast cancer is the most common malignancy in women worldwide nowadays¹. Despite the mortality rates associated with breast cancer are gradually reducing, incidence is actually increasing^{2,3} along with the attention given to patients' expectations, quality of life and the final reconstructive result⁴⁻¹⁰.

More widely, according to recent literature, we are witnessing a shift in healthcare culture, with increased attention to patient expectation and professionals' liability^{11,12}.

Along with this trend, there are rising concerns about surgical residency training quality and efficacy. During residency and for the rest of their professional life, surgeons must achieve new competences, avoiding patient's safety impairment¹³. The original Halstedian model of "see one, do one, teach one"¹⁴ is changing into a modern proficiency-based training¹⁵.

In this regard, online videos shared on social media portals are gaining importance. Nowadays, there are more than 3 billion users worldwide and healthcare-related information represents an important topic in the world wide web¹⁶. Social media portals are an easy and effective way to share information in medical field and plastic surgeons appear to be particularly fond of their use¹⁷.

Moreover, online communication becomes of vital importance when all humanity faces extreme conditions as in nowadays COVID-19 pandemic. In times of uncertainty, research and education face great difficulties, that can be overcome only if adaptation and innovation are introduced.

Given their recent spread in healthcare field and considering their potential to improve surgical training, social media portals may be a powerful educational tool for residents and specialists, especially at the present time¹⁸.

In this regard, the authors focused the attention on breast surgeons and Breast Units, inquiring on how surgeons and medical doctors dedicated to this field, update their skills or might be influenced by multimedia sources in their daily clinical practice. In particular, online video usage was investigated, highlighting characteristics and sources. As far as we know this first multi-centric study focusing on Breast oncologic, oncoplastic and reconstructive surgery and investigating the opinion of 320 breast dedicated surgeons from 20 Breast centers all over Italy. Data on the impact and role of video and multi-media sources on clinical activity, surgical training, acquisition and consolidation of surgical skills are reported.

Materials and Methods

The multi-centric research project involved 20 major Italian breast dedicated services.

A fast and "easy to answer" survey consisting of 16 questions was produced in order to investigate the role of video and multimedia sources on the daily clinical activity and surgical training of a representative group of surgeons specifically dedicated to oncologic, oncoplastic and reconstructive breast surgeries (Figure 1).

The survey was distributed either to plastic and general surgery faculty, residents and intern medical doctors dedicated to breast surgery and belonging to certified Breast Units, University, Public and private breast dedicated services, all over the Italian territory. All contributors were anonymous and voluntarily decided to partici-

**Sources and Use of Educational Videos for Surgeons in Breast Units:
Survey Content Questions for Intern Medical doctors, Residents, and Faculty.**

1. What is your Specialization? (You may choose more than one answer)

- *Plastic Surgeon*
- *General Surgeon*
- *Gynecologist Surgeon*
- *Other*

2. Which position do you cover in a Breast Unit?

- *Intern Medical Doctors*
- *Junior resident (1-3 year)*
- *Senior resident (4-5 year)*
- *Faculty*
- *Senior Faculty (more than 10 years)*

3. Which source do you preferably use for preparing Breast surgery?

- *Books and specific Texts*
- *Scientific Articles*
- *Videos*
- *Consult with colleagues*
- *Other:*

4. Do you ever watch videos to prepare for Breast surgery?

- *yes.*
- *No*

5. How often do you watch videos before performing Breast surgery?

- *More than once per week*
- *Once per week*
- *Once per month*
- *Less*
- *Never*

6. Before performing Breast surgery, how much of preparation time do you spend watching video?

- *0-25%*
- *25-50%*
- *50-75%*
- *75-100%*

7. In which language do you usually watch videos?

- *English*
- *Italian*
- *Other*

8. What's your favorite videos' source?

- *YouTube*
- *Social medias (Instagram/Facebook/...)*
- *Purchased videos*
- *Society webpages*
- *Scientific portals*
- *Commercially available videos*
- *Other:*

9. Which kind of Breast surgery have you reviewed by watching videos (you may choose more than one answer)?

- *Breast conservative surgery*
- *Mastectomy (Traditional / Conservative / Skin reducing).*
- *Oncoplastic Procedures.*
- *Heterologous Breast Reconstruction Procedures*
- *Autologous Breast Reconstruction Procedures*
- *Microsurgical procedures (Flap / lymphnode transfer).*
- *Lipofilling*
- *Sentinel node biopsy procedures*
- *Axillary Dissection*
- *Other*

10. Were the videos interactive? Was it possible to share comments and questions with their authors and other viewers?

- *Yes*
- *No*
- *Not useful*

11. In your opinion, how useful are videos for preparing surgical procedures (1: useless – 5:very useful)?

- *1*
- *2*
- *3*
- *4*
- *5.*

12. Which aspect of the procedure would you look for while reviewing a video before performing a surgical case?

- *Preoperative Surgical planning and Decision Making.*
- *Step by Step technical demonstration*
- *Anatomical aspects (3-D perspective of the dissection)*
- *Tips and Tricks by eminent or senior authors experience.*
- *How to deal with complications*
- *Perception of "how far can i push myself" in relation to a specific step of the procedure*

13. Have you ever made a video while performing surgery?

- *Yes*
- *No.*

14. If yes, which was the main purpose (you may choose more than one answer)?

- *Teaching my students/residents*
- *Communication for congress*
- *Research and publishing*
- *Commercial*
- *Uploading on web to share experience*
- *Explaining the procedure to patients*
- *Other:*

15. Give any suggestion to improve an educational video making for surgical procedures?

16. Does your Breast Unit belong to a University Institute?

- *Yes*
- *No*

Figure 1. The survey sent to the breast surgeons from selected Breast Centers all over Italy. There are 15 closed-ended questions investigating on the impact of video and multimedia sources on the daily clinical activity and surgical training of breast surgeons and one open-ended question that collects suggestions regarding further development, video making process improvements, availability and other hints from a “surgeon centered” perspective.

pate. The authors aimed to picture the modern evolution of technical skills update system in Italian breast surgery field. The survey focused on the evolution of breast surgeon's relationship with technology and more specifically, multi-media innovative training methods such as online videos shared on social media portals. Role, diffusion and efficacy of these training tools were analyzed stratifying the surgeons by age, specialization and role in Breast Units. The structure and contents of the survey, underwent a previous consensus agreement. The first two and the last closed-ended questions (#1;2;15) were demographics. The rest of 12 closed-ended questions inquired the modalities of video consuming: the source, frequency of viewing, language, type and utility. Finally, the only one open-ended question (#16) aimed to involve actively the surgeon in order to collect suggestions regarding eventual further development, video making process improvements, availability or similar hints from a "surgeon centered" perspective. Fisher's Exact Test was applied to analyze the results collected.

Results

From October 2019 to March 2020, a total of 307 surveys were collected, reaching 96% of overall response rate, as shown in Table I. Table II summarizes the main results emerging from surveys' analysis.

There were 188 trainees (54 intern medical doctors, 134 residents) and 110 faculty (61 junior faculty and 49 senior faculty, defined by a working experience exceeding 10 years threshold).

Table I. Breast surgeons' participants of the study sorted by position covered in Breast Centers.

Population		
Survey		307
Trainee	Intern	188
	1,2,3 4,5	54
		70
		64
Faculty		110
	Junior	61
	Senior	49

Trainee group was composed by intern medical doctors and residents divided into two subgroups (first 3 years and last 2 years). Faculty group was composed by junior members (0-10 years of working experience) and senior members (more than 10 years of working experience).

Eighty-five percent of the participants belonged to a University Institute, the rest of them were from public and private breast dedicated services, all over the Italian territory. All survey respondents were identified as breast training surgeons, specifically breast dedicated experienced surgeons or surgeons performing a main clinical and surgical activity in a breast center. Among them, 72% were identified as belonging to a plastic surgery environment, and 28% to a general surgery environment. The 98% of trainees, and the 96% of the faculty have ever watched videos for preparing breast surgery. For 59% of trainees and 30% of faculty (11% of senior faculty), videos represented a preferably source with statistically significant difference ($p < 0.001$).

Concerning the scientific literature, it was observed that only 22% of trainees used videos by scientific articles as a source to prepare breast surgery, while peer-review articles had been widely used by faculty (47%), showing a statistically significant difference among the two groups ($p < 0.001$). Furthermore, the habit of individual consultation with expert colleagues seems to increase along with the experience of the surgeon.

The majority of trainees (41%) and faculty (44%) spent watching videos 25-50% of preparation time before performing breast surgery and English was the main language. Twenty-three percent of trainees and only the 8% of faculty used videos more than once per week and almost a quarter of the faculty used video less than once per month.

YouTube was the favorite video source preferably chosen by a 91% of trainees and 66% of faculty with a significant difference within the two groups ($p < 0.0001$). The second most used source was social media for the trainees (15%) with a significant difference too ($p = 0.0006$) and scientific portals for the faculty (Figure 2).

Furthermore, it was investigated the type of breast surgery mostly reviewed by watching videos. The majority of trainees answered with "Mastectomy" (50%) and the second was "Heterologous reconstruction" (29%), while faculty answered with "Breast conservative surgery" (71%) and the second was "Mastectomy" (29%). The main aspect looked for was the "step by step procedures" videos (65% of the trainees and 53% of faculty); only 6% of trainees observed videos about "how to deal with complications" and only 5% of faculty about "anatomical aspects".

Most of trainees and faculty found useful or very useful watching videos, but almost only

The social media influence on breast surgeons' training

Table II. Summary of 307 collected surveys' results, divided into two main groups: Trainee (intern medical doctors and residents) and Faculty (junior and senior faculty members).

Survey answer		Trainee %	(N)	Faculty %	(N)
Ever watched Video		98	188	96	110
Source to prepare Breast surgery	Video	59	111	30	33
	Books	26	50	34	39
	Articles	22	42	47	54
	Consult	0	0	26	30
Frequency of watching video	More than once per week	23	43	8	9
	Once per week	26	50	24	26
	Once per month	32	61	44	49
	Less	18	34	24	26
Time spent watching videos	0-25%	35	66	42	46
	25-50%	41	77	44	49
	50-75%	18	34	8	9
	> 75%	6	11	5	6
Type of breast surgery watched	Oncoplastic and Breast conservative surgery	21	39	71	78
	Mastectomy	50	94	29	32
	Heterologous reconstruction	29	55	21	23
	Autologous reconstruction	24	45	18	20
	Microsurgical procedures	35	66	24	26
Main aspects of the Video	Preoperative planning	15	28	32	35
	Step By step	65	122	53	58
	Anatomical aspects	21	39	5	6
	Tips and tricks	12	23	37	41
	How to deal with complications	6	11	16	18

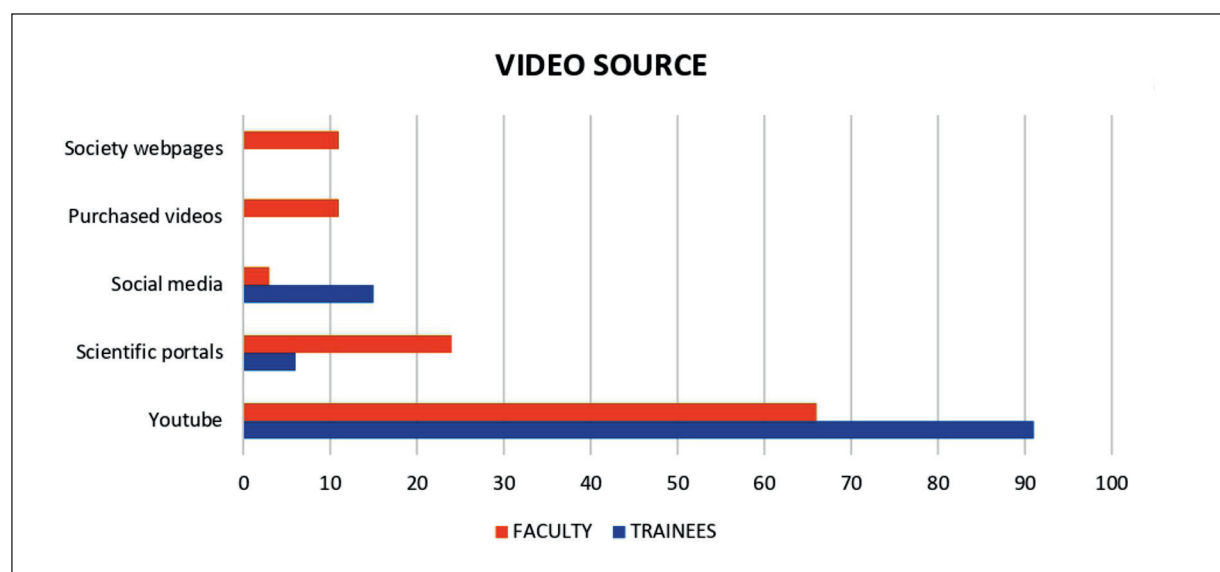


Figure 2. The graphic shows the main online sources of tutorial videos for trainees (*in blue*) and faculty (*in orange*). YouTube represents the favorite video source for both categories (91% of trainees and 66% of faculty).

faculty had ever made videos themselves (2% trainees, 47% faculty). Only 33 (11.7%) adjunctive comments or suggestions as requested by question #16 were registered. Responders mostly pointed out the lack of explicatory narration, pictures and graphics (12; 4%), the advisable necessity of frontal cameras offering the best surgeon perspective of surgical procedure (11; 3.7%), the lack of late postoperative documentation on surgical outcomes (6; 2%) as well as more in general the request for easier access to material from scientific portals (4; 1.3%).

Discussion

As a consequence of the increasing incidence and the high rates of survival in breast cancer, patients' quality of life gained greater significance^{19,20}. For breast surgeons, this trend led to the important shift introduced by Umberto Veronesi: "from maximum tolerable treatment to minimum effective treatment"²¹.

As the quality of breast reconstructive result raises in importance for both surgeons and patients, modern breast surgeons should consider inter-specialty collaboration as one of their practice pillar, for innovation and improving does not come from isolated work, rather from cooperation and sharing of ideas and knowledge²². Kovacs et al²³ pointed out how modern breast surgery has become complex from both a surgical and oncological points of view. Surgeons that work in Breast Units have to upgrade their skills constantly, as they appear to present limited training from their residency²³. New ways to improve themselves can be found on the Web.

Social media are online applications that allow people to share their own information, in many formats including video. They are powerful channels for information to spread and more than half of European Union population have used them²⁴. For surgeons, YouTube, Twitter, Instagram, different Webinar platforms or Facebook may represent educational tools, as they can connect with colleagues from all over the world and confront them^{25,26}.

However, despite the potential advantages, the quality of information provided on social media portals may be not always guaranteed^{27,28}. Plastic surgeons' utilization of social media for educational purposes has been described previously²⁹.

As far as we know, this is the first multi-centric study focusing on breast oncologic, oncoplastic

and reconstructive surgery, that investigates the impact of multimedia sources on breast surgeons' clinical activities and skills update. Over 300 surveys from 20 certified Italian University and Public Breast Units and private breast dedicated services were collected in order to picture the national trend of how multimedia tools and social media in particular, can affect breast surgeons' information, communication and training. Responders were divided into two main categories, faculty and trainees showing some interesting data and differences in bringing up-to-date approaches. Almost all of them reported to have ever watched a video for updating but for trainees, it represented the favorite source and "step by step procedures" was the most popular theme.

Instead, trainees did not appear to be interested in "how to deal with complications", as only 6% of them reported to have searched for that. This trend may be explained by the paucity of online materials focusing on surgical complications or complex cases failures, probably due to some residual generalized resistance by surgeons to publishing videos on complications or personal failures. On the other hand, perhaps, young surgeons or trainees might not feel directly or personally involved in dealing with such complex cases, as a consequence of their relatively early stage of training or lack of first-person involvement by their senior colleagues. Study data show that trainees apparently focus on "mastectomy" and "step by step procedures" when searching for online tutorial videos, while faculty search for "oncoplastic and breast reconstructive surgery" topic, mostly. The introduction of fundamental oncoplastic and reconstructive surgical principles as well as recent innovations and devices such as acellular dermal matrix (ADM) or titanium-coated polypropylene mesh (TCPM), are giving new perspective to breast surgery and open new horizons in implant-based breast reconstruction³⁰⁻³⁵.

It seems reasonable for experienced surgeons to seek for updating in order to follow these raising new technologies, while trainees may initially focus on standard procedures. Mostly senior faculty report to have ever produced videos of their practice. It might be related to the increasing demand for innovative teaching skills or tutorial duties in the daily practice or even to the scientific societies trend, encouraging the production of self-made videos presentations to develop more appealing multimedia format for educational events and conferences. On the contrary, young surgeons appear to be less motivated

in this aspect and apparently use videos to promote themselves for private practice using social media like preferred channels for advertising and commercial communication^{36,37}.

Surprisingly, only 22% of trainees resort to scientific articles, while YouTube was the favorite updating video source for 91% of them. Revising the literature, a particular predilection for YouTube as learning videos' source was already evidenced by other authors in previous reports, concerning other surgical fields than breast surgery³⁸⁻⁴².

Our results demonstrate that nowadays YouTube is the favorite source of tutorial videos for breast surgeons. We might explain this data as a consequence YouTube popularity and its capillary diffusion in our society. Moreover, it is easy to use, all web users are accustomed to search this platform for all kinds of multimedia files, and last but not likely not least, it is free of charge.

Since its introduction in 2005, YouTube showed a constant increase in users' number and videos offered⁴³. Surgical videos have been posted all along, but there is no warranty on their reliability and technical accuracy. The most viewed and "liked" videos are the first links suggested in every research on this social media portal, but there is no correlation between number of "likes" and quality⁴⁴. Similarly, Maldonado et al⁴⁵ showed the plastic surgery-related "tweets" trend on Twitter in Europe. Of the 800 tweets analyzed, they found that 17.6% were published by plastic surgeons and only 3% came from universities or academic hospitals. Moreover, the majority of tweets posted by plastic surgeons were about aesthetic surgery, with no reference to scientific articles. In a scenario of world-wide crisis due to COVID-19 pandemic, with quick disease spreading and personal interactions progressively or totally restricted, social media and their real-time video information become even more crucial, as educational health related news and the need for indications are expected to move faster than the virus. In these days, health workers, politicians and military are constantly looking for reliable channels of communication or social media portals to facilitate a better understanding of precautional recommendations and delivery of data about virus dynamics and epidemiology⁴⁶.

Breast surgeons are in the forefront of the battle against breast cancer and COVID-19, as they must ensure the continuity of oncological surgical activity while all humanity is producing an extraordinary effort to face the pandemic event.

Research and sharing knowledge must not stop and health professionals are forced to adapt and find new ways to connect, update and improve.

Breast surgeons searching online educational materials should always look for high caliber and peer reviewed sources, even if they are not easy to access as the ones offered by social medias. Safe information spread is already promoted in U.S. by the American Society of Plastic Surgeons, with social media initiative⁴⁷. As the online search for health care-related information is increasing, similar initiatives should be promoted in Europe too especially in a field in continuous evolution and socially impacting, such as breast cancer and related surgical approaches. Nowadays, world-wide population is experiencing in real-time the effects of spreading misinformation regarding COVID-19, with the risk that confusion and fear may travel faster than the virus itself⁴⁸. As a fact, the World Health Organization (WHO), along with the main social media portals as Facebook, Twitter, YouTube and Pinterest are fighting a parallel 'infodemic' crisis, against the harmful misinformation diffusion around Coronavirus⁴⁹.

As far as we know, there are no other reports in literature showing a nationwide picture of online videos and social media impact on surgical training and skills updating in a constantly evolving field, such as breast oncologic and reconstructive surgery. Videos represent a useful and easily accessible information source, either for patients or health care professionals^{50,51}.

Following this actual course, further studies are needed to lead the "breast surgeons" community to make an effort to develop a regulatory system in order to produce standardized, clear and safe educational video, either directed to surgeons or patients.

Conclusions

Hard and unpredictable times, such as nowadays demand for flexibility. The evolution of human habits is mandatory, along with technology development. It has been said that modern pandemics "should be expected to happen more frequently moving forward"⁵² and scientific community must show preparedness to confront with enemies like the COVID-19. In this regard, the current study shows how breast surgeons diffusely rely on videos and web platforms, from YouTube in particular, when searching for education-

al and training info about surgical procedures. Nowadays social media are raising as an important but still unexplored tool for surgeons, residents and medical students. They offer great opportunities of connection, sharing of knowledge and diffusion of new ideas but greater attention to their reliability is mandatory. This manuscript opens the way to an indispensable next step for our community: the development of a consensus statement that focuses on setting virtuous basic rules to certify the “good standing” process of online educational surgical video making and uploading. This process definitely may help breast surgeons to access trustworthy information to broaden and improve their surgical skills.

Conflict of Interest

The Authors declare that they have no conflict of interests.

Declaration of Funding Interests

The authors have nothing to declare.

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