EDITORIAL

The Impact of Social Media on Knowledge Dissemination in Surgery

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WHAT IS SOCIAL MEDIA AND SOCIAL NETWORKS?

The development during the first decade of the 21st century of internet-based digital applications that allow communication between peers through the transmission of user-generated content (text, links to other content, images and photographs, live and recorded video), is transforming the way we share ideas e information and generate knowledge in our society. And we surgeons are not oblivious to this evolution, nor can we stay on the sidelines.[1]

The appearance of the first smartphone in 2007 and the myriad of applications for exchanging information directly from user to user, including Facebook, Youtube, Instagram, Linkedin or Twitter are creating global networks of connection between people[2] that make it possible an enormous flow of information through channels left behind by conventional mass communication media (written press, radio and television).

However, not all applications work the same. It is convenient to define and distinguish between "social media" and "social networks", not only due to the general implications, but also for their use, in order to exchange knowledge and favor the progress of surgery. Briefly, when we speak of "social media" we refer to applications that serve to disseminate and share information, but which are characterized by asymmetry and the absence of reciprocity in the connection between nodes (people). As example we have Twitter. However, when we talk about social networks, we also refer to applications to disseminate and share information, but which are constituted in communities with restricted access, characterized by symmetry and preponderance of reciprocity. Examples are Facebook and LinkedIn in their early years.

Surgeons, like other professionals, have been incorporating the use of these platforms with certain reluctance.[3] It has been difficult for us to convince ourselves that the same applications that celebrities use to show what they eat or the type of clothes they wear can be used to boost surgical care[4], teaching[5] and research[6-9]. But of all of them, the one that has the greatest impact on the dissemination of knowledge in an open way is Twitter. The other networks are often used as restricted access communities of practice.

Sociological bases of the use of social media

Every human group needs to process information in order to survive and advance. To process information in the most efficient way, groups are limited by the maximum number of individuals with whom it is possible to have a significant direct relationship. This number is 150, as described by Robin Dunbar. In addition to the number of individuals, the ability to exchange information between individuals is affected by distance and time.

Now, with the appearance of the Web 2.0 platforms, we have seen those limits of quantity, distance and time that limited the flow of information disappear. Thus, global communities geographically and temporally delocalized have begun to form, and function according to a framework[10] that is based on four large groups of actions:

1. Connection: to form the network
2. Contagion: to spread ideas
3. Adhesion: to keep the network together
4. Impact: to demonstrate the success of the network

This framework has been put in place to create a surgical ecosystem around the hashtag # SoMe4Surgery. In summary, a hashtag is a string of characters preceded by the symbol #, which when included in a tweet labels it and allows it to be quickly identified and searched. In this way, a link is created between messages shared from different accounts, without the need for them to be synchronous or limited to a geographical area. The result is that any message can be amplified, even viralized, within the network in which it is distributed. With this, you can reach and in-

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teract with more members of the network, which is very useful when you want to share explicit knowledge (codifiable and measurable), but above all tacit knowledge (implicit in the ideas we share).

As a consequence of the foregoing, the number of opinion leaders, organizations and even scientific journal who disseminate their content within the network and, particularly on Twitter, is increasing. In the field of general and colorectal surgery, the examples of surgeons such as Steve Wexner, Scott Steele, Antonino Spinelli, Gabriela Moslein, Amy Lightner, or Debby Keller are especially significant (Fig. 1). As for journals, in addition to Annals of Surgery, JAMA Surgery or BJS, there are the specialized Diseases of Colon and Rectum, Colorectal Disease, or Techniques in Coloproctology (Fig. 2).

How colorectal surgeons can use social media platforms (Examples)

Reputation and brand

Social networks attract the attention of academic surgeons, magazines, and surgical societies due to the visibility they generate and the global network that can be influenced.[11] Most surgical meetings now promote the live tweet with a conference hashtag; active participation in these meetings provides an important return on digital visibility at no cost.

Individual use has created opinion leaders, whose impact transcends that of their specialty. With a cut on September 27, 2020, tens of thousands of people, more than expected by the number of surgeons in practice, viewed information generated by accounts such as Neil Floch (@NeilFloch, 130,323 followers), Tom Varghese (@TomVarghesejr, 21,610 followers), Steve Wexner (@SWexner, 18,730 followers), Antonio de Lacy (@AntoniodeLacy, 11,741 followers) Richard R. Brady (@researchactive, 7,413 followers), Gianluca Pellino (@GianlucaPellino, 4,706 followers) or one of the co-authors (@juliomayol, 43,376 followers).

It is possible to measure and quantify the personal impact, that of the health hashtag and that of scientific articles, through analysis applications available partially or completely free of charge.

Twitter analytics, for example, is a basic tool that can be used by any user registered on the platform.[12] Quickly and intuitively presented, it provides information on the number of times a tweet is viewed (impressions) and the number of users who have interacted with the tweet (interactions). This can be filtered by time segments and by individual tweets. In addition, there is information on the number of visits to the profile, the mentions of the account by other users, and the profile of the users that make up the audience of said account. [13]

TABLE I: EXAMPLES OF INFLUENTIAL SURGEONS IN COLOPROCTOLOGY ON TWITTER

Name	User	Followers
Richard R. Brady	@researchactive	7.413
Antonio de Lacy	@AntoniodeLacy	11.741
Neil Floch	@NeilFloch	130.323
Debby Keller	@debby_keller	5192
Amy Lee Lightner	@AmyLightner	2307
Julio Mayol	@juliomayol	43.376
Gabriela Moeslein	@GabrielaMoslein	943
Gianluca Pellino	@GianlucaPellino	4.706
Antonino Spinelli	@AntoninoSpin	3.996
Scott R. Steele	@ScottRSteeleMD	6714
Tom Varghese	@TomVarghesejr	21.610
Steve Wexner	@SWexner	18.730

TABLE II: EXAMPLES OF TWITTER ACCOUNTS OF COLOPROCTOLOGY JOURNALS

Name	User	Followers
Annals of Surgery	@AnnalsofSurgery	40,2 mil
JAMA Surgery	@JAMASurgery	36,8 mil
British Journal of Surgery	@BJSurgery	29,5 mil
Diseases of the Colon & rectum	@DCRjournal	10,1 mil
Colorectal Disease	@ColorectalDis	10,7 mil
Techniques in Coloproctology	@TechColoproctol	4,9 mil

Communities of practice

#SoMe4Surgery "Social Media for Surgery" represents the online hashtag used to connect surgeons of various qualifications from any country to interact, disseminate knowledge, communicate and produce academic activity.[10] There are numerous advantages to using social networks to carry out research, since they are cost and time effective, and allow real-time "Tweet Chat" conversations.[4,15] To become competent physicians, young physicians need to properly interpret medical literature through critical thinking, apply evidence-based medications to patient care, and demonstrate a correct understanding of research methods.[16] In the US, the percentage of academic surgeons with an interest in research decreases in a linear fashion.[18] The low participation of surgeons in training in research has multiple factors, although one of the most important reasons is the lack of adequate guidance.

The most important example for the coloproctology community is #colorectalsurgery; the Hashtag was launched on April 24, 2016 and in just 180 days 15,708 tweets were registered; today there are millions of messages ex-
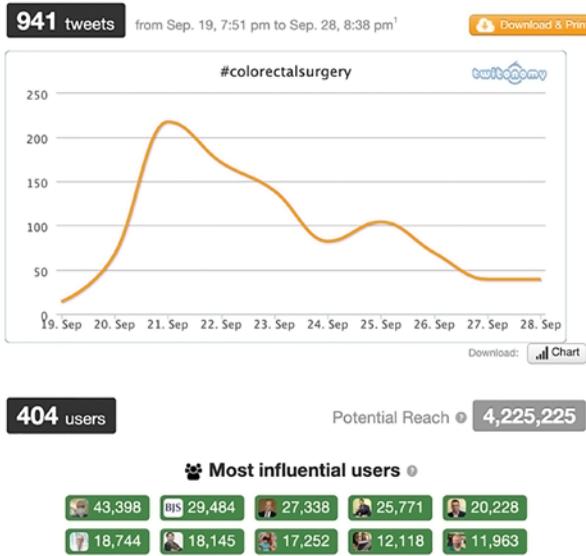
Figure 1: Analysis of #colorectalsurgery results on Twitter through Twitonomy between September 19 and 28, 2020.

changed and an example of the activity in 9 days is reflected in Figure 1.

Training

Basic knowledge of evidence-based medicine is essential for the training of a young surgeon. Regular reading of medical journals allows surgeons to keep up to date and also improve their writing skills. A single article read per week is equivalent to almost 52 articles per year.[18] Since Twitter allows content to be filtered and communication is immediate, it is an excellent vehicle for the rapid and specific acquisition of literature and news. Due to the inherent nature of this microblogging, content feeds are timely and often contextualized by top opinion leaders in the field.

Another training opportunity for younger surgeons are the Journal Clubs, where articles are often critically reviewed and explored by other researchers and experts in the field.

Among the Twitter accounts aimed at training in surgery are @Cirbosque (9,014 followers), @MISIRG1 (5,381 followers) and personal accounts such as Kenneth Mattox (@kmattox1 13,397 followers), or Paula Ferrada (@pferrada1 17,246 followers) and Hashtag like #Colorectalsurgery and ColorectalResearch are representative examples of the colorectal social community (Fig. 3).

Research

There is considerable evidence that the use of social media by researchers can have a positive impact on surgical re-

TABLE III: INFLUENTIAL TWITTER ACCOUNTS DEDICATED TO SURGERY TRAINING

Name	User	Followers
Cirbosque	@Cirbosque	9.014
Paula Ferrada	@pferrada1	17.246
Kenneth Mattox	@kmattox1	13.397
MISIRG	@MISIRG1	5.381

search. One of the well-documented contributions is the promotion of collaborator participation in multicenter audits and research projects. Khatri and colleagues reported their experience with the STARSurg collaborative model.[9] In this case, Twitter, Facebook, and YouTube were used alongside the traditional method to assess the impact of collaboration on education. Similarly, GlobalSurg Collaborative used the networks to recruit international researchers to study mortality after urgent abdominal surgery.[19]

It is a great opportunity for young people to take the introductory step into research, participate in the recruitment of patients according to their potential environment, participate in the protocol and in the writing of the manuscript, learn how to acquire approval from ethics committees, and connect with researchers from all over the world.

In times of COVID-19 the most surprising example of global participation has been the project launched by the GlobalSurg Collaborative under the name CovidSurg. The objective of the study has been to capture data worldwide in real time, thanks to the exchange of internatio-

nal experiences to improve the management of patients who undergo surgery throughout the COVID-19 pandemic, improving their clinical care. CovidSurg has been designed by an international collaborating group of surgeons and anesthetists who have now reached 69 countries.

What's next

Videoconferencing (COVID)

Mobility restrictions due to the COVID-19 pandemic have triggered a rapid alteration in the process of patient consultation, medical training and fellowships. The use of platforms such as Zoom®, Skype®, Webex® ... has exploded, especially in primary care. In many Spanish autonomous communities, consultation by teleconference is being experienced with great approval from patients. There are several limitations of this tool. Video consultations can only be done for review visits or for clinical guidance. It is difficult to replace the clinical examination of the patient to arrive at a pathological diagnosis. More "viral" has been the use of these platforms for medical training such as meetings, virtual congresses, monothematic conferences and online courses. An example is the large number of international conferences of great scientific weightimportance such as the ACS Congress 2020, the Virtually Vilnuis 2020 of the ESCP, or the Autumn Meeting 2020 of the AECP. Always on the subject of training, videoconferencing has played a fundamental role for residents. The reduction of ordinary hospital activity and the inability to participate in training courses has led to the development of virtual study platforms that have allowed residents to continue training in an appropriate way, being able to interact and learn from the best national and international professionals.

Very interesting has been an initiative of the Spanish Association of Surgeons (AEC) that has promoted a series of webinars with the name of "Virtual Classroom" dedicated to residents, which has seen the participation of national and international surgeons, delving into different topics in a weekly session throughout the COVID-19 pandemic.

TikTok®

In July 2019, the number of active social media users worldwide reached 3.534 million.[20] One of the most recent social networks is TikTok, a micro-video sharing platform that allows users to create short videos, lasting from several seconds to several minutes, and then share them with the TikTok® community. Founded in 2017, it is the fastest growing social media app in the world, topping the 'Most Downloaded' list in the US in 2018, and is now available in more than 150 countries. TikTok® is claimed to have over 500 million active users with over 1 billion downloads.[21] In contrast to other social media platforms, TikTok® is characterized by short micro-videos with easy-to-use editing features including music.[22,23] This binomial has been the key to its success, especially in the new generations. The application in the sanitary environment has also been rapidly applied; TikToK® on types of daily diets, knowledge of hypertension-type diseases, health care promotion, stories of health professionals, patients, medical knowledge, healthy lifestyle habits, are just a few small examples of the range of possibilities that this new social network opens. A Chinese study on the use of TikTok® by 31 Chinese provincial health systems has shown that 45.2% of these had an official TikTok® account with a total number of followers of 190,980, 962 videos uploaded and 1054 million likes.[24]

Artificial intelligence

One area that will attract a lot of attention in the near future is the use of social media data for surgical research. Unfortunately, most clinical decisions are not supported by strong evidence, and the current research infrastructure does not appear to be good enough to solve many clinical challenges.[9,25] Therefore, big data analysis or artificial intelligence systems has been proposed as a potential solution.[9,26] Real-time and predictive analytics capabilities could be used to analyze huge amounts of data captured from different sources (electronic health care records, patient-generated data, social media, genetic data, clinical images, etc.) and incorporate it into a raw database with minimal changes to the original format. This will present new opportunities and challenges that surgical researchers will need to learn to deal with.[9]

In summary, social networks and social media are a reality and colorectal surgeons must actively participate and seek new ways of use to adapt the practice, teaching and research in colorectal surgery to new social contexts. If surgeons leave a gap in the networks, others will fill it. So we must get involved for the good of all.

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