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EDITORIAL

New surgical techniques and social media in orthopaedics. Is a scientific peer-reviewed journal assimilated to a social media platform?

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New techniques and modifications of old procedures appear and disappear in the history of Orthopaedics and Medicine. A brief summary of the articles published in history sections and topical collections are useful to understand the linkages between past and present [1–5]. A brief review of a Journal published 20 or 30 years ago describes the trends and facts valid for that time.

Are there influential papers from the 80s and 90s still state-of-the-art today? How did they get validated and are they really meaningful and used? How many procedures are really effective in improving patient's status of health or function? And if the procedures are effective, are some more effective than others and is the result related to the patient selection or to the surgeon's skills?

Outcome studies analyze this with scales of evaluation that are more or less debatable; back in the early 90 s, adherents of quantitative and qualitative methods were arguing that their methodology was the only one correct. However, patients' related outcomes are driven by the surgeon's analysis or suggested during clinics. For years thereafter, economists and evaluators have been engaged in a passionate argument on randomized controlled trials (RCTs) vs. observational studies. In any case, evaluation should incorporate qualitative methods, be ethical, accurate and technically adequate, affordable/appropriate in terms of budget, and should be carried out by skilled persons in a timely fashion.

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As students, we learn and make progress by using the algorithm "pathology-treatment." Ideally, we find or discover the diagnosis based on clinical and investigation tool. Then we administrate the treatment, for pathology A—treatment B, that would be wonderful in an ideal world. Then details arrive and our understanding grows. With experience, we learn that we "manage patients and resources" and the management could be surgical or medical, as well as techniques and indications depending on variables.

Conditions and diseases that were treated conservatively 50 years ago became subject to surgery and some surgical techniques disappeared or were replaced. The best treatment in different conditions became subject to debate.

As advances in medicine occur, surgical procedures in that area might decline—for example the advent of medical treatment for peptic ulcer disease made most gastric/duodenal surgery redundant; similarly, new treatments for rheumatoid arthritis have made surgery for the joint destruction seen in this disease uncommon.

Many conditions that were considered "pathology" in the 60 s and 70 s of the twentieth century became "variations" or "modifications" of certain "normality" that is also patient depending. The cases of "dysplasia" multiplied since the methodical use of the scanner and 3D reconstructions. Normality was redefined. Magnetic resonance imaging (MRI), computed tomography (CT) scan, and ultrasound changed our ways of performing diagnostics based on objective viewing of the normal and modified anatomy.

For the last decades, surgery has undergone a dramatic change with the introduction, acceptance, and rapid development of "minimally invasive," "endoscopic," "imaging guided," "computer and robotic assisted" techniques. It is not an exaggeration to say that today these techniques and treatments have been applied to almost every field of traditional surgery. Realizing this fact, is there a "metamorphosis" of surgeons to endoscopic and minimally invasive

specialists, and has traditional surgery disappeared? Minimally invasive is an option or has become an obligation?

The advance of the randomized control trial as the arbiter of therapeutic efficacy happens between in the twentieth century. Those important differences include additional antimicrobials, the practice of medicine itself, diagnostics, treatment, the advent of professionalism and bioethics, and understanding the risk factors and burden of disease "[6].

The American College of Surgeons was also active in setting standards for quality care. In 1917, it developed the Minimum Standard for Hospitals and started on-site inspections the next year. This program was the precursor of hospital accreditation [7].

Quality outcome studies and research help in understanding outcomes after a procedure or compare different procedures and treatments. The availability of some life-saving techniques such as vascular stents for coronary heart disease resulted in an inflation of procedures with an inevitable corollary of 2% complications related to the stent implantation, some of those being lethal.

New techniques and new tools are seen and published every year. Usually, they are created by surgeons or medical engineers and introduced in practice after trials and research. They are validated by clinical studies with at least two years of follow-up, five years for some implants. Some specialties like cosmetic surgery contribute more to visibility of clinical results on the Internet [8].

The social media influence and influencers in medicine

When new implants or procedures are released for clinical use, it became usual to agreement this novelty with social media input, tweets, likes, reactions, and testimonials from surgeons and from patients. It became a trend to publish results of surgery in social media, without a peer-review or trusted evaluation. The way orthopaedic surgery information is being transmitted is rapidly changing as online platforms now play a greater role for both trainees and surgeons. Social media, in particular Twitter and Instagram, are often used as avenues to remotely learn, teach, and engage with the national and international orthopaedic surgery community. The rapid dissemination of information that is possible with these platforms has made them powerful tools for education, networking, research sharing, and marketing. The popularity of social media in the orthopaedic surgery community was sharply accelerated by the COVID-19 pandemic and the ensuing social distancing guidelines that limited in-person educational meetings. In 2020, 85% of all current orthopaedic surgery residency program Instagram accounts were created and the number of active orthopaedic podcasts more than doubled. Regardless of future COVID-19 pandemic consequences, the role of social media as a central player in orthopaedic information sharing is now well established.

In recent published surveys [9–13], the orthopaedic surgery residents and applicants confirmed the wide use of social media in information and learning. The main use was for making choices in residency program and was performed mainly by listening to podcasts. Most survey respondents used social media daily, have listened to orthopaedic podcasts, found case presentations with corresponding imaging the most useful format for educational posts, and preferred to see residency programs post about resident life outside of the hospital. A residency program's social media presence did not significantly influence applicants' decision to apply to a specific program; however, there was a trend toward increasing influence with more recent applicants.

The use of Youtube and other video platforms was increasing recently and considered useful by residents in learning new procedure or anatomy. The invention of smartphones and the easy accessibility of the internet over the past few decades have increased the availability of resources that one can access for study. The sheer number of sites and resources makes it difficult to choose and decreases the probability for the residents and budding surgeons to identify the ones with quality and usefulness. However, there is limited information about the impact of social media on the choices of activity and surgical indication as the presentation is unidirectional "this is what we do, have a look" and adaptative techniques or subtle details are not included for different reasons. It is not clear if smartphone apps, YouTube channels, Tik-Tok, and podcasts provide better resource management and are valuable for students in the field of orthopaedics.

A social media influencer is a person who carries significant impact within a given circle or topic. Social media influence is a complex interplay between engagement (likes and comments), content impact, and interconnectedness with other influencers. In many ways, social media influence is akin to the academic Hirsch index (h-index), which calculates a researchers productivity and citation impact. Given that nearly 80% of patients read medical information online, influencers serve in a unique position to sway patient expectations in a positive or negative manner (marketing). Patients may develop beliefs, questions, or concerns based on the influencers to which they are exposed [14].

According to a research measuring data from 2018, "the top orthopaedic social media influencers on Twitter were predominantly board-certified, sports-medicine subspecialists working in private practice in the USA. Social media influence was highly concordant with academic productivity as measured by the academic h-index. Though the majority

of influencers are orthopaedic surgeons, 22% of top influencers on Twitter are not, which is important to identify given the potential for these individuals to influence patients' perceptions and expectations."

Colleagues from different regions and countries advocate for opening and intensively using "Instagram, Twitter, Facebook, Baidu, and Linkedin" [15]. McLawhorn and co-workers outline that the use of social media is low-cost, brings visibility, and improves the ability to deliver patient centered care. This represents a latent source of new patients. From the patient's side, this is seen as a source of knowledge and information and improves the care and management for different conditions [16].

How are new procedures and activity seen on social media and is there any correlation between the effectiveness of a procedure and the volume of information released on the Internet? In our experience, the release of a scientific article on a procedure discussing results and outcomes is accompanied by social media echos (tweets, likes, etc.). We do not know exactly if this increased volume of communication is beneficial for the patients or it is just stirring interest. Otherwise said, we know that there is action but we cannot appreciate objectively if this is a step forward on a solid path or in a moving sand.

The uncontrolled use of social media as a promotional tool is increasingly a problem for patient education and treatment choice. While social media may be useful in promulgating useful medical information, it has a definite role in misinformation promoting stem cell therapy and other unproven technologies. This misinformation may be linked to practitioners via social media, driven by patient testimonials, etc. [16, 17]. This "wild west" part of social media may pose a threat to the credibility of physicians in general and specifically those who promote care on these platforms.

Rather than targeting selectively patients on new procedures performed by some surgeons, the orthopaedic community should rather stimulate some national authorities to improve public health strategies and bring specific topics into public views via media. Combatting the obesity epidemic, supporting pre-operative smoking cessation before elective surgery, or describing the beneficial side-effect on bone healing of smoking cessation after fracture could be some ethical goals of social media.

Social media could also be used to bring information to patients and surgeons on rare diseases. Osteochondrodysplasias, osteogenesis imperfecta, some bone tumours, sickle cell disease osteonecrosis, mucopolysaccharidosis are rare diseases poorly known by patients and orthopaedic surgeons. Despite (by definition) the rarity of each "rare disease" person, the total number that exists is surprising for the surgeons and the public. Rare diseases in musculoskeletal pathology affect 4–6% of the worldwide population (8 billion of people), i.e., an estimated 400 million people in the world [18–20]. As consequence, this means that 5% of the total world population are "rare disease patients." This figure is more than to the population of the USA, or of Europe. Providing world support and cooperation, ensuring common policy guidelines are shared throughout the world in centres of expertise, research, information, and screening, is a key point for these rare diseases. Coordinating the care of rare disease individuals requires a supranational approach, which can be emphasized by social media.

Social media are formidable tools, able to create and orientate opinions and interest, enhance visibility, point out facts, and results. We hope that the use of these tools could be somehow controlled with ethical principles, based on truth and patients' quality of life improvement.

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