**Commentary on:**
*Social Media Metrics and Bibliometric Profiles of Neurosurgical Departments and Journals: Is There a Relationship?*
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# Maximizing the Potential of Social Media and Social Networks in Neurosurgery

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The Internet has become more accessible than ever over the past few decades. A combination of faster connection speeds at lower costs, the evolution of handheld technological devices like smartphones, and a revolution in the ways that content is created have led to the surge of what is known as social media. Previously, Web content was created primarily by organizations or individuals as 1-way communication tools, much like the traditional media of newsprints or television segments. Content generation and sharing by the end user are now highly encouraged.

In neurosurgery, the use of social media is certainly catching on. Societies like the American Association of Neurological Surgeons and the Congress of Neurological Surgeons have adopted social media accounts, which have been used to disseminate live tweets at their respective annual meetings, highlight upcoming events and developments in the neurosurgical world, and serve as a forum for online discussion of topical issues. In this perspective article, we explore the findings of a recent study on social media in neurosurgery. Then, we consider the role of social media in clinical practice, how social media can benefit patients, and how research can be enhanced through the use of social media.

A quick search on PubMed produced several articles on this topic, including the article in a recent issue of **WORLD NEUROSURGERY** by Alotaibi and colleagues from the University of Toronto. These investigators built on their previous work on the same topic (also published in **WORLD NEUROSURGERY**) by investigating the relationship between social media metrics and academic indices of neurosurgical programs in North America and neurosurgical journals. As of the end of November 2015, almost 1 in 5 North American neurosurgical programs had at least 1 social media account. About 30% of neurosurgical/spine journals also had social media accounts. The major findings of the study were that academic departments with social media accounts as a whole appeared to score higher on academic metrics compared with departments without social media accounts. However, none of the individual social media metrics evaluated (number of Facebook likes, Twitter followers, Twitter likes, tweets, or Klout score) correlated with academic metrics included (ih[5]-Index, Summed h-Index, total publications, or total citations). This implies that the investigators have not identified any strong causal links between social media and academic productivity. As the investigators have acknowledged, the social media presence observed may be a result of the availability of resources by more academically established neurosurgical institutions.

One way that a social media presence might be beneficial is through its powerful role in the conduct of research. Subject recruitment could be facilitated through social media platforms, which can reach millions of individuals. The public can also be educated on the research process, which helps allay any fears and misconceptions about being used as a guinea pig. Research study teams can disseminate updates to collaborators and subjects alike. Patient confidentiality and privacy issues aside, social media has the potential to facilitate the follow-up of research subjects around the globe over a span of time. Large-scale epidemiologic studies may become more feasible as a result. Social media has also been proposed as a tool for postmarketing safety surveillance for drugs and devices.[1]

**Key words**
- Bibliometric
- Centrality
- Connectivity
- Neurosurgery
- Social Media
- Social Networks

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Academic neurosurgical departments will have to decide what level of resources to invest in maintaining a social media presence. To make this informed decision, prospective studies building on the work of Aloitaibi and colleagues are required. Part of the problem is identifying the social media metrics that should be quantified (eg, number of tweets, number of page likes). These require more sophisticated social network analyses. The article by Alotaibi and colleagues discusses this issue, but there is no consensus. Exposure to the research work of a particular group can be enhanced through publicity on social media, which could lead to the fostering of collaborations and citation of published work. Academic departments will need to develop clear-cut strategies for their social media accounts in terms of marketing, patient follow-up, quality improvement, research, and development.

Social media have also been used for publicity purposes. These include the marketing of services offered and the expertise available. The target audience includes patients and potential patients, and increasingly the value of marketing to other health care professionals is beginning to be understood, as shown by the surging popularity of platforms such as LinkedIn and Doximity. Through these platforms, health care professionals are able to evaluate the area of expertise of a particular physician and the number and types of connection with other health care professionals, which could be a surrogate marker of expertise. However, little is known about the rational strategy behind the use of networking tools for physician-to-physician referrals.

Social media has the capability to enable institutions and departments to analyze posts made by patients as part of a follow-up analysis. For example, alerts could be sent to physicians on patients who are unhappy with outcomes or struggling with postsurgical effects. Patients have also benefited from participation in support groups through social media.[2,3] For example, the Syringomyelia Surgery Survivor Support Group on Facebook had 355 members sharing their experiences and answering questions that have been posted to the group. Although some patients may prefer to keep their identities private, many have been providing personal perspectives in the virtual environment of the Internet. For rare diseases, this medium can bring a sizeable cohort together from around the globe. The impact of these social media support groups on patient outcomes and satisfaction should be evaluated. With data mining, it would be possible to identify patterns in patients' social media interactions. For example, a connection to a chiropractor might prompt an invitation to return for follow-up for possible fusion failure.

Another role that social media plays is as a fund-raising tool. Crowdfunding has been used to raise funds for treatment that patients would otherwise not be able to afford (eg, https://www.youcaring.com/). Researchers have resorted to crowdfunding when faced with difficulty obtaining taxpayer funds for trials.[4] In the future, it may be possible to identify patients who are likely to make donations through social media connectivity. Although this is a potential benefit of a rational and sophisticated social media/social networking strategy, it raises some important privacy and ethical questions that affect development efforts of academic departments and institutions.

Access to social media implies access to social networks. Social media can be used for identifying patients using networking tools. The concepts of connectivity (degree, closeness, and betweenness centrality among others) are quantifiable attributes of social networks that have been leveraged to reveal hidden patterns for applications such as antiterrorism[5] and public health.[6] In health care, this will enable neurosurgeons to learn new and unexpected things about patient mix, donors, and research subjects. Data mining of social media connectivity has the potential to facilitate quality improvement initiatives through the analysis of feedback received through free text (with keyword mining) and patterns of activity (eg, Facebook likes, Twitter retweets). In the future, it may even be possible to predict patient risk factors for surgical complications based on their social media network connectivity.

Alotaibi and colleagues should be commended for their study. Their findings provide data that departments can use to guide social media adoption and maintenance. Certain elements need to be further clarified, including the metrics that would be relevant to neurosurgeons. The power of social media has opened a whole new realm in the practice of neurosurgery. It is time that we embrace this and use it to our advantage for the care of our patients.

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