

## Social Media for Academic Neurosurgical Programs: The University of Toronto Experience

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■ **BACKGROUND:** There is a paucity of available strategies to increase visibility and engagement in social media (SM) within the neurosurgical community. The objective of this study was to investigate the possible factors for engagement and reach among SM users in neurosurgery.

■ **METHODS:** Data from Facebook and Twitter accounts of our institution were collected. We extracted data on demographics and attributes of our current users, including sex, country, age group, device used, and language. Attributes of SM posts were also collected, including time of post, type and content of post, impressions, and engagements. Nonparametric analyses were conducted to evaluate differences in metrics.

■ **RESULTS:** Metrics were obtained on 192 Facebook and Twitter posts, published online between October 1, 2013, and March 13, 2016. On both platforms, there was a greater representation of male users relative to female users. Facebook users were predominantly in the 18–34 years age range (83%), with most users being from outside of North America. Conversely, users from Canada and the United States comprised the highest proportion of Twitter users. On both platforms, posts containing photos or videos scored significantly higher in engagements and impressions ( $P < 0.05$ ). Posts on weekdays and during work hours achieved higher visibility and engagements. Moreover, Facebook posts demonstrated higher SM metrics if they mentioned faculty with more than 16 years' experience ( $P < 0.05$ ).

■ **CONCLUSIONS:** The current study demonstrates that our SM users predominantly comprise a younger demographic and that content optimization with media materials may lead to higher visibility and engagement. The impact of high SM reach on academic neurosurgical programs remains to be determined.

### INTRODUCTION

Over the last decade, online social media (SM) websites have become extraordinarily popular, both for private use and as a public platform for marketing. Currently, 2 SM platforms, Twitter and Facebook, have >300 million active users and 1 billion members worldwide, respectively. Because of the widespread reach of SM, numerous academic neurosurgical programs have begun expanding their SM presence in an attempt to increase the degree of engagement with their students, residents, faculty, and patients. Despite the vast potential for SM to facilitate engagement and outreach, many academic neurosurgical programs have yet to invest and participate in outreach via SM platforms.<sup>1</sup>

The Division of Neurosurgery at the University of Toronto is currently one of the largest (32 clinical faculty, 9 research faculty, 32 residents, and 26 fellows) and most productive programs in academic neurosurgery worldwide.<sup>2</sup> Moreover, the SM pages for the division on Facebook and Twitter are among the most highly followed online neurosurgical program accounts in North America.<sup>3</sup> However, since the initial launch of this online initiative, the impact of the division's SM presence has not been formally evaluated.

### Key words

- Academic
- Neurosurgery
- Programs
- Residency
- Social media

### Abbreviations and Acronyms

**IQR:** Interquartile range

**JNIS:** *Journal of NeuroInterventional Surgery*

**SM:** Social media

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Accordingly, this study systematically explores our division's preliminary experience with SM and investigates the possible factors that contribute to high reach and engagement among users in the online neurosurgical community. This study also afforded the opportunity to assess the relationship between SM metrics and academic indices of neurosurgical faculty.

## METHODS

Historically, the Division of Neurosurgery at the University of Toronto has announced updates on events and academic achievements through a monthly e-mail from the chairman's office. This monthly e-mail includes all publications, awards, and grants achieved by the division. In April 2013, the division decided to implement SM use and create a SM coordination team to expand the online presence of the academic program and its activities using Facebook (<https://www.facebook.com/UOfTNeurosurgery>) and Twitter (<https://twitter.com/UofTNeuroSurge>). It began publishing text and media posts regarding updates for events and academic achievements. All posts were taken from items in the monthly e-mail by the chairman's office. Most were posted simultaneously on both Facebook and Twitter accounts.

### Facebook Insights and Twitter Analytics

The Facebook Insights and Twitter Analytics webpages for the division profiles were visited by the administrator of the accounts. These pages provide detailed information on user demographics and SM metrics. Metrics were retrieved for all posts from October 1, 2013, to March 13, 2016.

**Users.** Detailed information was collected on our current users and followers, including sex, country, age group, device used, and language. All publicly accessible Twitter accounts that were following our account were also visited, and the biographies of these followers were categorized into neurosurgeon, neurosurgical or surgical resident, undergraduate or medical student, health care worker, corporate or surgical tech company, foundation or patient support account, academic department or hospital, journal or blog, professional association or society, or private practice center. The Facebook Insights page does not provide a list of users.

**Posts.** Each of our Facebook and Twitter posts were analyzed. For each post, detailed attributes were collected, including time of post, type of post (text only, photo, video, and link), impressions (number of times a post from the account is viewed by users, whether the post is clicked on or not), and engagements (refers to the activity a post generates with other users, and this include re-Tweets, shares, likes, and clicks on photos or links).

### Faculty Profiles

Faculty profiles were assessed in order to determine the relationship between faculty academic metrics and SM metrics. For every post that included mention of a faculty member from the division, we collected the faculty member's most recent indices of academic productivity as of April 2016, including total publications, h-index (from the Scopus database), academic rank (assistant, associate, or full professor), and total years of clinical experience since receiving their Fellow of the Royal College of Surgeons of Canada certification in neurosurgery.

## Statistical Analysis

Summary statistics, including mean, median, SD, and interquartile range (IQR) for SM metrics were calculated. The statistical approach used acknowledged that our data did not conform to the normal distributions needed to conduct parametric analyses, as previously described in studies involving SM metrics.<sup>4-6</sup> For this reason, we performed nonparametric tests to evaluate potential differences in the number of impressions and engagements based on timing of posts, type of post, faculty characteristics, and their academic productivity metrics (using a Mann-Whitney U test for 2 groups or Kruskal-Wallis test for multiple groups).

To allow for a meaningful comparison, faculty members were divided into 2 groups based on the median values of their clinical and academic metrics. P values are based on 2-sided tests, and values less than 0.05 were considered significant. All statistical analyses were performed with SPSS version 21 (IBM SPSS Statistics, Chicago, Illinois, USA).

## Ethics and Funding

This study did not require institutional review board approval, and there are no privacy implications. We did not receive funding from foundations or other organizations to support our accounts with a promotional online campaign.

## RESULTS

### User Characteristics

The number of current users for our SM accounts and their demographics are summarized in **Table 1**. An example of used post metrics from Facebook and Twitter is shown in **Figure 1**. There was a greater representation of men relative to women among users on both Facebook and Twitter platforms. Most Facebook users (83%) were 18 to 34 years old. Age groups were not available on Twitter Analytics. With regard to geographic distribution, most Facebook users were from countries outside North America, including Egypt (35.4%), India (17.1%), and the Philippines (10.1%). Conversely, users from Canada and the United States comprised the highest proportion of Twitter users (28% and 22%, respectively). Most users accessed our SM accounts through a desktop or laptop compared with mobile devices.

Among our 1647 followers on Twitter, 438 users (26.6%) did not have a biography mentioned in their profiles. Of those with biographies, 145 (8.8%) were written in non-English language, and 178 (10.8%) did not have enough info to be categorized. Most users with informative and categorizable biographies were undergraduate and medical students (10%) and trained neurosurgeons (9.4%). **Figure 2** shows a word cloud, constructed from the publicly accessible English biographies of all our users, that demonstrates the most common words used by them.

### Impressions, Engagements, and Attributes

Detailed metrics were obtained on 192 posts on Facebook and Twitter published between October 1, 2013, and March 13, 2016 (**Table 2**). The total number of impressions and engagements on Facebook was 226,234 (mean  $\pm$  SD, 2432.62  $\pm$  3234.7; range, 208–20,219; median, 1391; IQR, 692–2793) and 11,176 (mean  $\pm$  SD, 120.17  $\pm$  194.7; range, 5–1185; median, 60; IQR, 30–118),

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