

Technical Notes & Surgical Techniques

The current usage of Instagram in neurosurgery

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ARTICLE INFO

Keywords:

Instagram
Neurosurgery
Social media

ABSTRACT

Aim: Social media usage in healthcare is increasing exponentially. Instagram is a worldwide popular social media smartphone application (SPA) with personal and institutional accounts intended for patient education and publicity. Our aim is to evaluate the prevalence of neurosurgery on Instagram.

Material and methods: The terms “#neurosurgery” and “#neurosurgeon” were searched on Instagram. The number of accounts, followers, posts as well as the content of these posts was evaluated.

Results: One hundred twenty-three Instagram accounts were found in the search page and 113 of these accounts were public and therefore accessible for analysis. 36.1% of 113 accounts' posts were related to neurosurgery. The most common type of post was a case sample (83.5%), whereby most of these posts were photo images (72.01%).

Conclusion: The rise of social media has allowed a new platform for communication between patients and neurosurgeons. Instagram can provide information to patients as well as educational support to those in neurosurgical training.

1. Introduction

Instagram (Instagram, Inc.) is a free, online photo and video sharing application that is available for use on mobile phones and tablets. Founded in 2010, Instagram was based on the premise of making memories with photos. The archive includes more than 300 billion photos with nearly 70 million photos uploaded daily [1]. The total population of Instagram accounts was more than 700 million in 2017 [2]. In the search and explore page of Instagram, users can quickly find accounts of neurosurgeons.

The main page of Instagram includes the small stories of users that an individual is following. An account owner's profile page contains photos, posts, followers, and the users that he or she is following. Account owners can also create a TV channel. All stories and posts cannot be longer than 1 min, however, the TV channel component lets users upload videos longer than 1 min.

Instagram differs from similar social media platforms like Facebook (Facebook, Inc.), Twitter (Twitter, Inc.), WordPress, Flickr, YouTube (YouTube, LLC), and LinkedIn (LinkedIn Corporation) in that Instagram's perspective is ‘first photo, second text’. In other words, pictures speak louder than words. Neurosurgical accounts can take advantage of the visual power of Instagram. Users can share photos and videos with a caption and hashtags to increase the image's visibility. All

shared data can be accessed by all Instagram users if the account is made public. Furthermore, Instagram provides a way to generate direct messages to a specific user. Given an increased presence of neurosurgical accounts created both by individuals and organizations on Instagram, this study strives to investigate the impact of these user.

2. Material and methods

The initial search was done in the Instagram search page in September 2018 with the terms: “#neurosurgery” and “#neurosurgeon”. The shared posts were first evaluated as neurosurgical and non-neurosurgical. The criteria included 1) Did the account owner declare him/herself as a neurosurgeon? 2) Does the account belong to a neurosurgical journal/department? 3) Were the posts related to neurosurgery? The accounts and posts that did not belong to neurosurgeons were all excluded. One-hundred twenty-three accounts were found that were associated with neurosurgery. Follow-up requests were sent to all neurosurgical accounts and 113 users accepted the requests. Neurosurgical posts were classified as case sample (Fig. 1), anatomy (Fig. 2), education (slide or illustration) (Fig. 2), promotion, published paper, autopsy, and animal experiment. The category of case sample included questionnaires, surgical videos, and perioperative images. The category of anatomy included cadaveric photos, named intraoperative

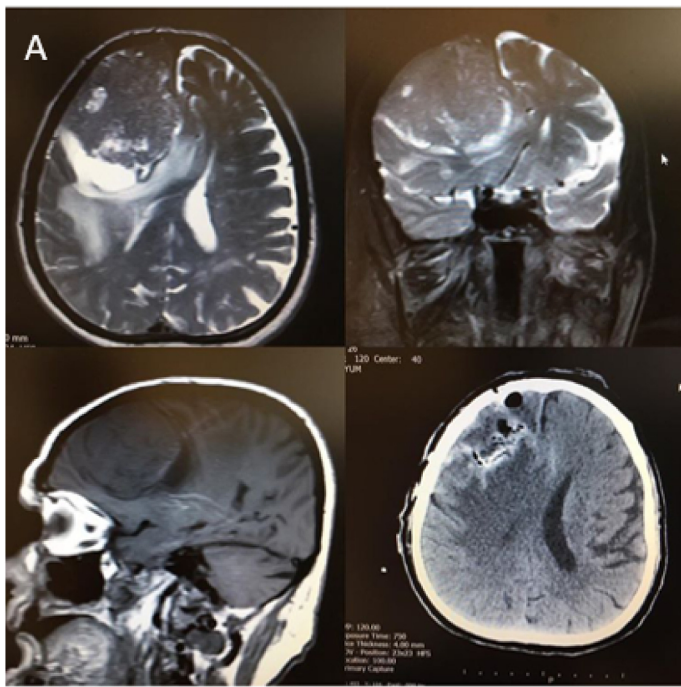
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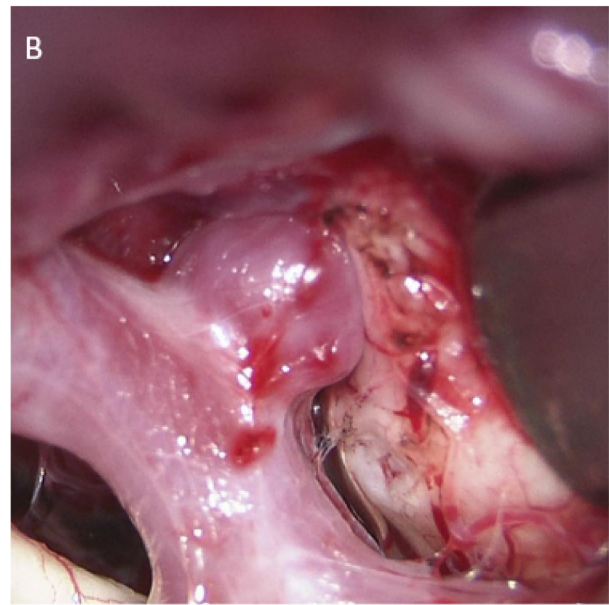
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Received 5 July 2019; Received in revised form 23 July 2019; Accepted 3 August 2019

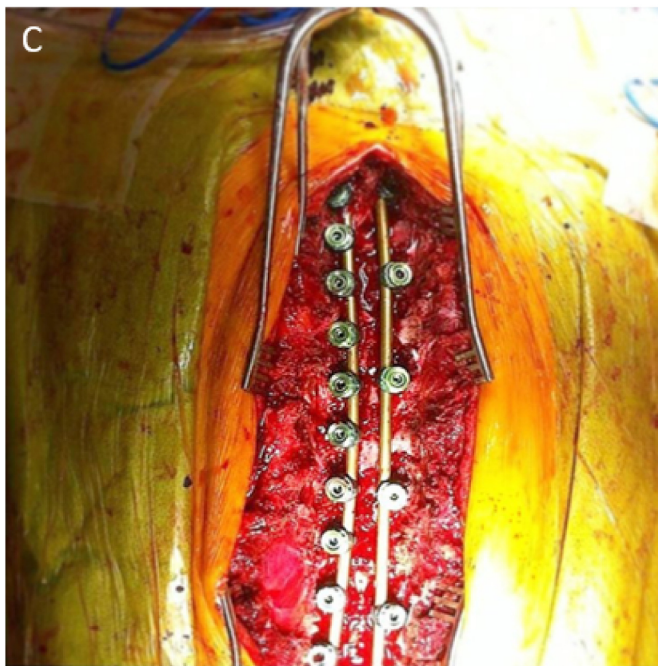
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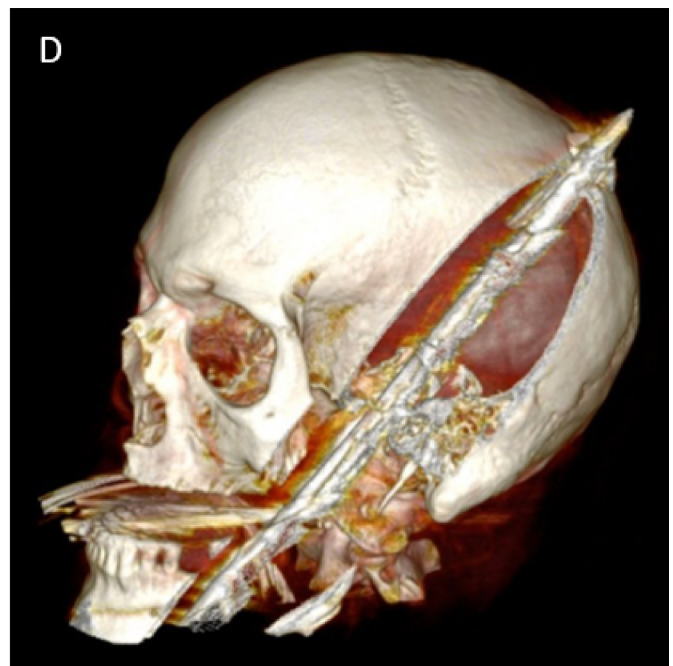
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 postoperative CT, no motor deficit #neurosurgery
 #brainsurgery #meningioma #microneurosurgery



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 microneurosurgery? 🧠🔪 Quiz: What is this? What TYPE
 of „this“ is this (as in, describe the shape). And for the
 geniuses among you: Where in the brain are we located?

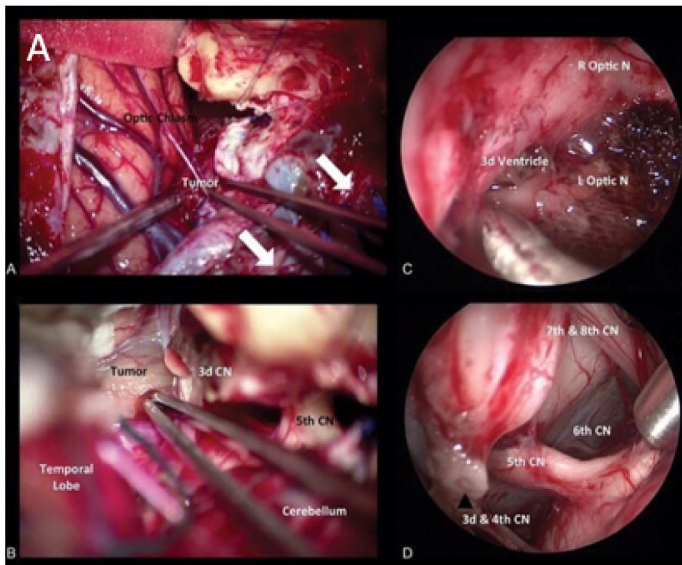


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 Correction 🧠🔪 Although most surgeons use an open
 approach for deformity spine surgery, in some cases newer
 Minimally Invasive (MI) techniques can be used. These have

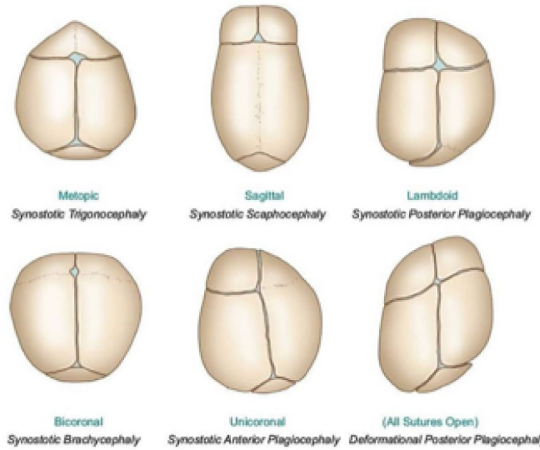
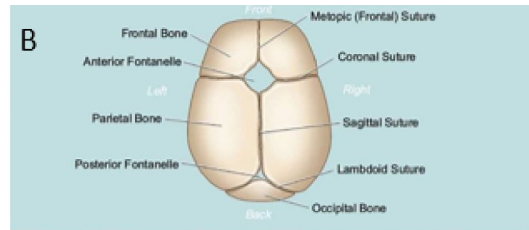


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 I showed just before 🧠🔪 Attempted suicide using a
 speargun. What would you do?

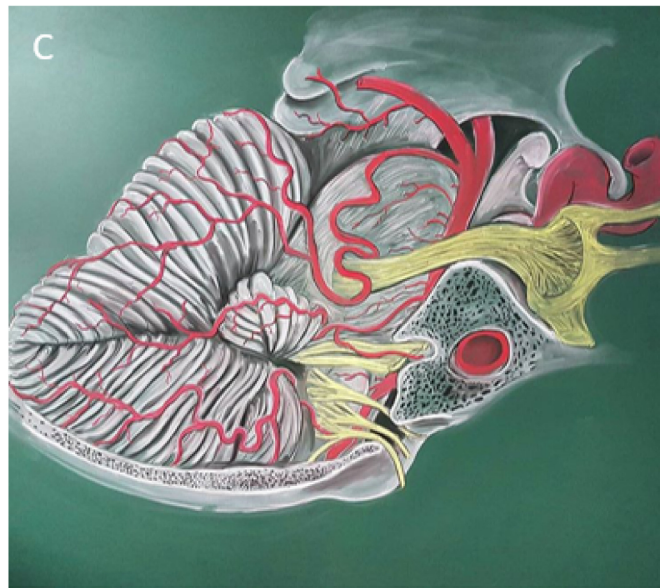
Fig. 1. Case examples. (A) Pre/postoperative images of a meningioma. (B) A questionnaire for intracerebral arteries. (C) An intraoperative image of scoliosis surgery. (D) A penetrating trauma brain injury with a speargun.



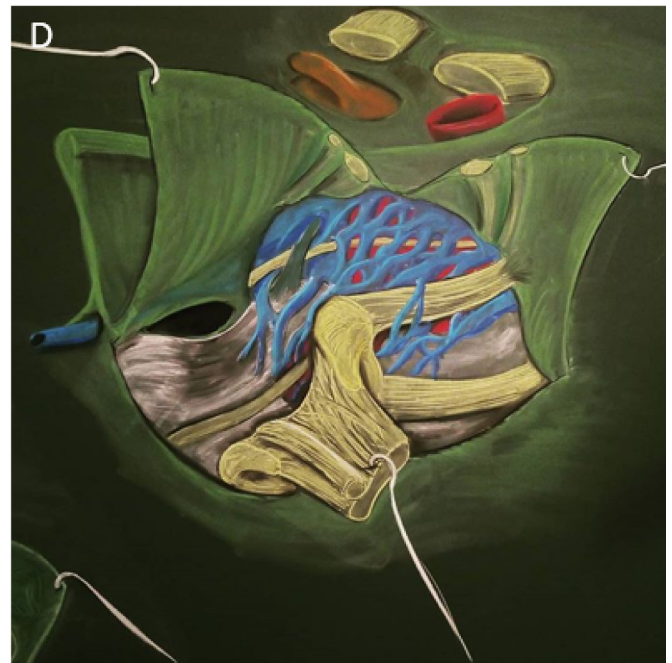
The Posterior Transpetrosal Approach in a case of large Retrochiasmatic Craniopharyngioma by Labidi M. et al.
 🧠🔪🩺 What structures do you recognize?



Types of Craniosynostosis



#anatomy #drawing #neuroanatomy #neurosurgery
 #brainstem #posteriorfossa #cerebellum #anatomie
 #blackboard #chalk #cranialnerves #sketch



#anatomy #drawing #anatomie #cavernous #gasser
 #skullbase

Fig. 2. Anatomy and education examples. (A) An intraoperative named photo. (B) A mini brief for craniosynostosis. (C and D) Illustrations of the vasculature of the posterior fossa and cavernous sinus.

photos, pictures from anatomy books, and plastic anatomy models. “Education” included slides (texts and pictures) and illustrations (drawings). “Promotion” included book launches and congress posters. The photos that were taken from articles with a screenshot of the article’s title were classified as “published paper”.

3. Results

The total number of followers was 600,704 and the mean was $5315.97 \pm 29,139.06$ (range from 5 to 289,000). Twenty-three accounts were inactive (account had never been posted from). The

Table 1
Detailed evaluation of accounts and posts.

Number of accounts	113
Number of followers	
Total	600,704
Mean	5315.97 ± 29,139.06
Range	(5–289,000)
Number of 113 accounts' posts	
Total	16,656
Mean	147.4 ± 523.22
Range	(0–5332)
Posts related to neurosurgery	
Total	6021 (36.14%)
Mean	53.29 ± 185.69
Range	0–1848
Classification of posts shared	
Case sample	5028 (83.5%)
Anatomy	234 (3.88%)
Education	
- Slide	72 (1.19%)
- Illustration	283 (4.7%)
Promotion	197 (3.27%)
Published paper	203 (3.37%)
Autopsy	3 (0.049%)
Animal experiment	1 (0.016%)
Type of posts	
Photo	4336 (72.01%)
Video	1685 (27.99%)

frequency of posts from these 113 accounts was 16,656 (mean 147.4 per account ± 523.22, range 0–5332 per account). The most-followed account had 289 K followers with the highest number of posts (5332) as well. The number of shared posts associated with neurosurgery was 6021 (36.14%) with a mean of 53.29 ± 185.69 (range from 0 to 1848). Observed occurrences of the classified themes included 5028 (83.5%) case samples, 234 (3.88%) anatomy, 72 (1.19%) slides, 283 (4.7%) illustrations, 197 (3.27%) promotions, 203 (3.37%) published papers, 3 (0.049%) autopsy and 1 (0.016%) animal experiment. Videos accounted for 28%, while photos accounted for 72% of all posts (Table 1).

4. Discussion

A recent study cited the social media usage rate at 74% among adults [3]. The evolution of social media has affected academic life and provided online visibility to its users [3,4]. Developing technologies in the 21st century produced virtual libraries such as PubMed, making scientific literature more accessible [5]. Social media has made PubMed even more accessible. For example, the Instagram account of the Journal of Neurosurgery (with more than 27,000 followers) routinely shares excerpts from recently published manuscripts.

When searching PubMed, users can find more than 22,000 results with the keyword “social media”. Alotaibi et al. [6] evaluated Twitter and Facebook accounts of Neurosurgery departments and journals to assess the relationship between social media metrics and scientific productivity. The study specified that the use of social media can improve academic collegiality and publication dissemination. The academic articles about social media mostly included Facebook, Twitter [3,5–8], and YouTube [3,5,7,9], however, this study is the first social media research about neurosurgery that emphasizes only Instagram.

Instagram users most frequently fall between the ages of 18–29, and medical students and residents often lie within this age group [10]. Shafer et al. [11] relied on this information and evaluated an Instagram account (Ctibus) for radiology education. The study evaluated 6000 users of the tool, with the authors concluding that Instagram is an important educational instrument for youth.

From the surgeon's point of view, social networks can facilitate easier consultation and collaboration, increase awareness of campaigns, and share new study findings and guidelines [12]. The digital identities of neurosurgeons has been examined in scientific articles [13].

However, the digital footprint was found mostly in websites by Kim et al. [13], with a relative dearth of social media accounts. The rate of neurosurgeons encountered on the web was ten times higher than in social media [13]. Interestingly, Haerberle et al. [14] evaluated scoliosis surgeons on social media and they declared that scoliosis surgeons preferred LinkedIn more than Instagram and Twitter because of the more academic environment. While surgeons gravitate towards technology and internet usage, most have not completely adopted a consistent use of social media. Of note, Ban et al. [15] declared that social media accounts will be a necessity for the academic department for marketing, patient follow-up, quality improvement, and development.

Instagram accounts of high impact journals (e.g. Journal of Neurosurgery), institutions (e.g. Yale Neurosurgery); and personal accounts serve as education platforms. These accounts walk users through neurosurgical cases, “quizzing” users with questions such as “what is your diagnosis?” and “which approach would you prefer for this lesion?” The other types of posts are often unique cases, educational illustrations, and short summaries of diseases. Illustrations facilitate learning of complex anatomical structures with images/videos providing quick recall. Websites and online stores include original papers and e-books. Though social media does not always provide reliable references, for users that already spend a proportion of their day dedicated to sifting through Instagram posts, these neurosurgical accounts are easy ways to augment medical knowledge in a limited timeframe.

There is also a growing interest in social media networks for the passage of educational information to families, with several studies evaluating the utility of social media as a communication tool [5,16,17]. Elkarm et al. [7] evaluated the role of social media for social support, Meng et al. [8] declared that social media will be an important tool in the management of epilepsy in the near future, spreading awareness of the disease. The studies that evaluate specific diseases [17,18] act as a bridge between patients and medicine [16]. This information flow may provide additional psychological support for patients [16].

The patients' experiences with spine surgeons were assessed in Florida through three websites. The number of comments/ratings, patient wait time and the presence of physician website/social media account were evaluated and the study has emphasized the importance of these factors for the future of patient-centered healthcare [19]. Such studies can help government and healthcare providers to determine health policies.

Philips et al. [20] performed an online survey about social media use for professional purposes in the neurosurgical community. The survey declared that lack of time, lack of perceived value, and privacy concerns are obstacles to the use of social media. When posting via a social media account, there should be no patient name on the post and written consent must be obtained from the patient for privacy and legal issues.

4.1. Limitations

The search was made in the English language, which limits evaluation of the accounts of neurosurgeons with other native languages. Also, social media has a dynamic structure, so the numbers of followers and posts can change instantaneously. Finally, the accounts may be easily manipulated by third party-applications or account owners.

4.2. Conclusions

The rise of social media has allowed a new platform for communication between patients and neurosurgeons. Instagram can provide information to patients as well as educational support to those in their neurosurgical training.

Funding statement

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Contributorship statement

FY and NA were involved in the design and conception of this manuscript. FY performed the literature search and compiled the primary manuscript. NA and RJ critically revised the manuscript. All authors have approved the manuscript as it is written.

Data sharing

All data pertaining to this research article are included within the manuscript as written.

Details of previous presentation

No presentation.

Declaration of competing interest

None.

Acknowledgements

Figure 1A was provided by the Instagram channel @fyneurosurgery. Figures 1B, 1C, 1D, and 2A were provided by Instagram channel @neurologicalsurgeon. Figure 2B was provided by Instagram channel @pediatricneurosurgery_unpad. Figures 2C and 2D were provided by Instagram channel @de_humanis_corporis_fabrica.

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