



Fig. 1. Relative search volume by month. Data are displayed as percentage above/below annual procedure mean (green, aging face surgery; gold, injectables; blue, rhinoplasty).

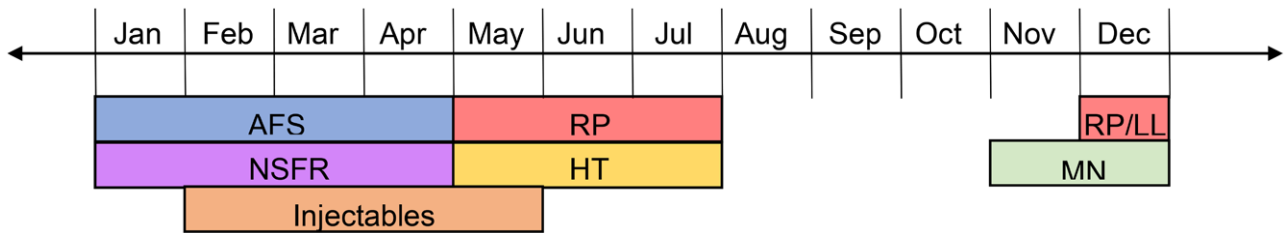


Fig. 2. Advertising timetable. AFS, aging face surgery (rhytidectomy, brow lift, blepharoplasty, neck lift); NSFR, nonsurgical facial rejuvenation (chemical peel, laser resurfacing, microdermabrasion); RP, rhinoplasty; LL, lip lift; HT, hair transplantation; MN, microneedling. “Injectables” refers to neuromodulators and facial filler.

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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Migraine Surgery: Two Decades of Innovation

Migraine surgery is one of the latest triumphs in the field of plastic surgery. Since the days of Joseph Murray, plastic surgeons have been at the forefront of innovation, fueled by their continuous desire to improve patients’ quality of life. While once

a condemned field by neurologists—even called a complete placebo by some¹—migraine surgery has persevered and flourished due to the vast amount of scientific data proving its efficacy. While its literature continues to expand at an astounding rate, remaining abreast of all newly published articles can prove difficult—a phenomenon extensively studied in medicine.² Therefore, an up-to-date bibliometric analysis of the migraine surgery research milieu is warranted. By cataloguing the origins and development of this prospering field, we aspire to provide concrete recommendations that could assist plastic surgeons in their future migraine surgery research pursuits.

A comprehensive search was conducted on PubMed, from the inception of the database to October of 2020, yielding a total of 1642 studies. Of that initial search, 116 studies pertained to and/or discussed migraine surgery, and therefore were included in this analysis. The field of migraine surgery was born in 2000 with Guyuron et al.’s seminal article, which demonstrated that corrugator supercillii excision led to the elimination or significant improvement of migraines. The following two decades witnessed a proliferative increase in our understanding of the underlying mechanisms of successful migraine surgeries, as evidenced by an exponential growth of its scientific literature. Our analysis shows an average year-to-year increase of 32 percent in

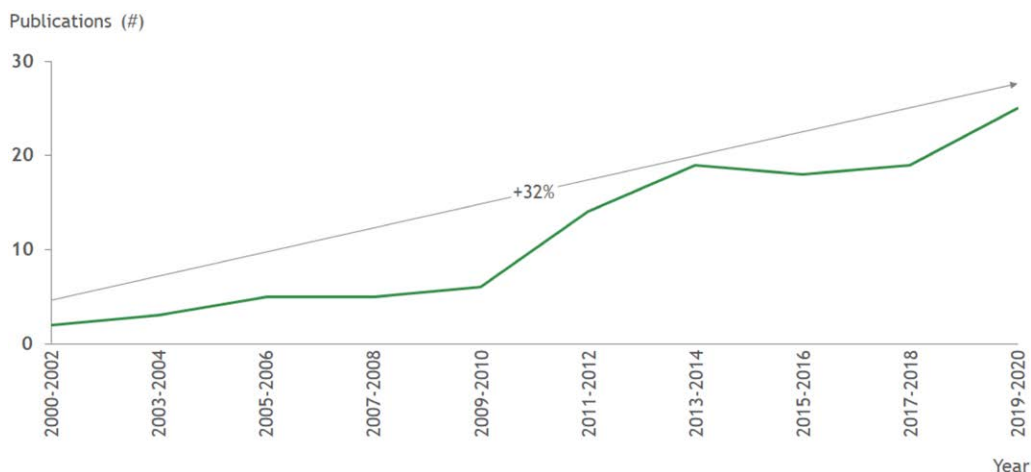


Fig. 1. Number of migraine surgery publications over the last 20 years.

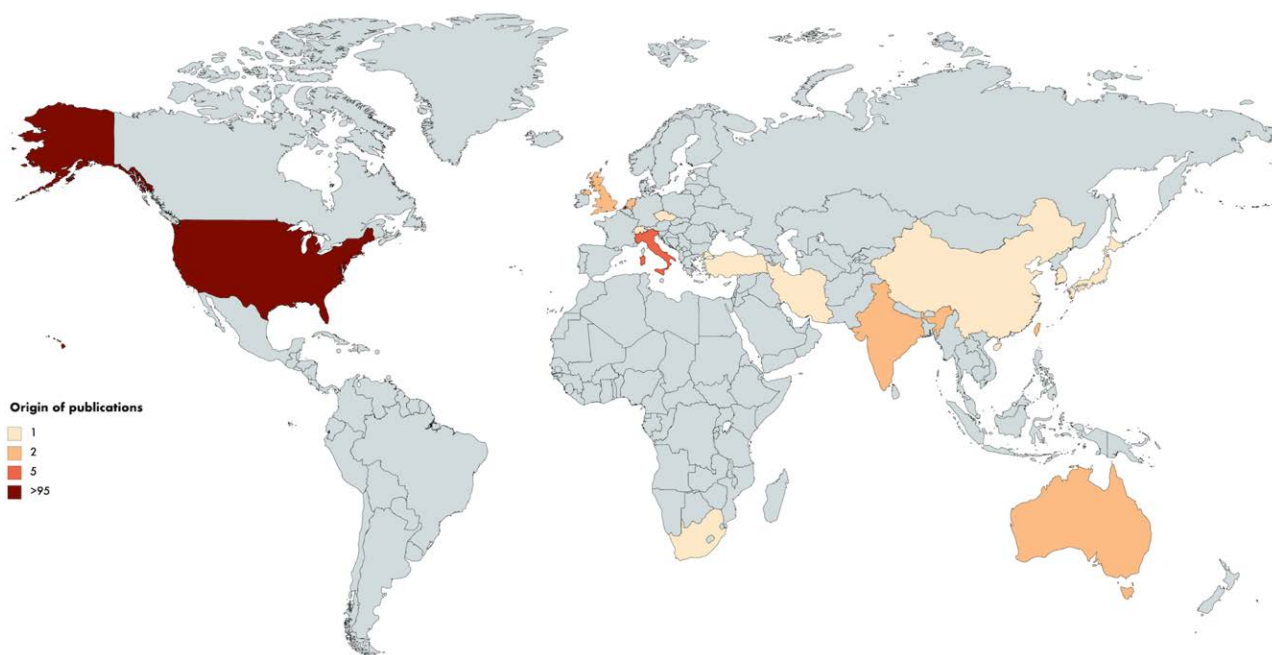


Fig. 2. Country of migraine surgery publication.

the number of publications since 2000, with more than 21 percent of all the studies published only in the last 2 years (Fig. 1). Furthermore, while a total of 15 countries contributed to the scientific literature of migraine surgery, our analysis demonstrates clear migraine surgery “hot spots,” with the United States publishing 78.4 percent of the available scientific literature, followed by Italy with only 4.3 percent of the total number of publications (Fig. 2). With regard to journals, a total of 23 journals published migraine surgery articles, with 56.9 percent published in *Plastic and Reconstructive Surgery*, followed by 9.5 percent published in *Plastic and Reconstructive Surgery Global Open* (Table 1).

A closer look at the studies demonstrates that the majority of the published research (56.0 percent) consisted of case series, while only five studies (4.3

percent) were randomized controlled studies. This disproportion in employed methodologies is a common phenomenon in novel scientific domains, where the majority of initial research on a topic usually consists of lower-grade evidence, such as case series and expert opinions.³ Interestingly, over a quarter of all migraine surgery studies (25.8 percent) were anatomy/cadaver-based, which highlights the importance of understanding anatomical approaches to the surgical management of migraines. Furthermore, migraine surgery is considered an interdisciplinary domain that involves physicians from various backgrounds, best exemplified by how authors from seven different disciplines published on migraine surgery. Plastic surgeons were the pioneers of this promising field, and our analysis shows that they are still at its forefront,

Table 1. Characteristics of Migraine Surgery Related Publications

Journal	No. of Each Publication Type					Content of Publication			
	No. of Publications	Case Series*	Comparative Studies†	Letter to the Editor/Discussion‡	Review§	RCT	Clinical Findings	Anatomy	Other
<i>Plastic and Reconstructive Surgery</i>	66	38	13	6	5	4	36	21	9
<i>Plastic and Reconstructive Surgery Global Open</i>	11	7	0	2	2	0	7	1	3
<i>Journal of Plastic Reconstructive and Aesthetic Surgery</i>	7	2	3	0	1	1	5	2	0
<i>Annals of Plastic Surgery</i>	5	3	0	0	2	0	4	1	0
<i>Headache</i>	5	1	0	3	1	0	1	0	4
<i>Journal of Craniofacial Surgery</i>	3	3	0	0	0	0	3	0	0
Other	19	11	1	4	3	0	9	5	5
Total	116	65	17	15	14	5	65	30	21

RCT, randomized controlled trial.

*Case series include retrospective and prospective noncomparative studies.

†Comparative studies include cohort, case-control, and cross-sectional studies.

‡Letter to the editor/Discussion includes viewpoints, editorials, and comments.

§Review includes systematic reviews, narrative reviews, and meta-analyses.

||"Other" includes guideline papers, historical perspectives, discussions, and surgical approaches with no outcomes reported.

with 85.3 percent of all the available literature published by them. As the field continues to grow, we expect more specialists to integrate migraine surgery into their practice, much as how a recent article published in 2020 recommends its adoption by oral maxillofacial surgeons.⁴

Migraine surgery is a promising field that allows the treatment of severe refractory migraines. On the basis of this bibliometric analysis, we have several recommendations to help nurture this domain. The first is to continue improving our understanding of anatomy, since it is key to the success of this surgery. Second, future studies should include randomized controlled trials comparing surgical and medical treatment of migraines in different patient populations. Finally, we hope that plastic surgeons, as the founders and developers of this field, will endeavor to propagate it among their colleagues. As this field is mainly concentrated in the United States, we have a responsibility to continue presenting this evidence-based surgical domain to the global society of plastic surgeons, so that they may adopt migraine surgery in their respective countries.

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Upper Extremity Reconstruction in Persons with Tetraplegia: Low Utilization and Postoperative Complications

Restoring upper extremity function is an important rehabilitative goal for persons with cervical spinal cord injury.¹ Surgical upper extremity reconstruction has historically included tendon transfer and arthrodesis procedures, but motor nerve transfers have become a viable strategy for upper extremity reconstruction in persons with spinal cord injury.^{2,3} Although restoration of upper extremity function is important, intraoperative and postoperative complications can result in life-threatening conditions and death. Knowledge of the operative risks and complications associated with upper extremity reconstruction is essential in this vulnerable population.