

The Value of Case Reports in Plastic Surgery: An Analysis of 68,444 Articles across Six Major Plastic Surgery Journals

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Background: Case reports provide a salient contribution to the field of plastic surgery through the timely dissemination of knowledge on previously underreported topics. Once a time-honored hallmark of the surgical literature, the perceived value of case reports has decreased with the ongoing prioritization of higher levels of evidence. In this study, we aimed to assess long-term trends in case report publication rates and discuss the continued merits of case reports in the modern-day landscape.

Methods: A PubMed search was used to identify articles published in six prominent plastic surgery journals since 1980. Articles were separated as case reports versus all other publication types. The total number of articles published by group was tracked, and citation rates were compared across groups. Additionally, the most cited articles from each journal were identified for both groups.

Results: A total of 68,444 articles were included for analysis. In 1980, there were 181 case reports published compared with 413 other articles across all six journals. In 2022, there were 188 case reports published compared with 3343 other articles. When comparing citations per year of case reports versus other article types across all journals since 1980, case reports were found to be cited significantly less frequently ($P < 0.001$).

Conclusions: Case reports have been published and cited less frequently than other types of literature over the last 42 years. However, despite these trends, they have demonstrated significant historical contributions and provide continued value as an impactful forum for highlighting novel clinical entities. (*Plast Reconstr Surg Glob Open* 2023; 11:e5069; doi: [10.1097/GOX.0000000000005069](https://doi.org/10.1097/GOX.0000000000005069); Published online 14 June 2023.)

INTRODUCTION

Case reports in medical education represent the inception of research and innovation in medicine. From the beginning of medicine, case reports have been a key aspect of medical education, dating back to 1600 BC, and possibly earlier.¹ Case reports provide fast, easily transmittable information regarding new disease processes, medical treatments, and surgical techniques. For example, most notably in recent history, the first case report of the 2019 novel coronavirus in the United States

was of utmost importance to readers across the country and world.² Without the forum for this timely and widespread dissemination of information, identification and treatment may have been delayed for future cases around the country.

In plastic surgery, case reports have been paramount in providing detailed information on how we are able to treat and correct a variety of diseases and deformities, respectively. Perhaps the earliest reports in plastic surgery come from India in the form of nasal reconstruction following an amputated nose.³ The manner in which case reports have been presented over time, however, has changed. The advent and implementation of levels of evidence in research and academic writing, first created in 1979 and most recently refined by the American Society of Plastic Surgery in 2011,⁴ altered the medical community's perception of various types of research, including case reports.⁵ Although different levels of evidence exist for therapeutic, diagnostic, and prognostic studies, case

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reports are generally considered the lowest (level V), and randomized controlled trials and systematic reviews the highest (level I). This pyramid has emphasized and rewarded research with more robust statistical analyses and, in some cases, discouraged case reports, even though these are still an invaluable contribution to medical literature and can have material impact.

In this article, we sought to describe the historical and current landscape of case reports in plastic surgery by assessing long-term publication trends and comparing with other article types.

METHODS

To analyze trends in the plastic surgery literature, all articles indexed in PubMed from six major plastic surgery journals were queried: *Aesthetic Plastic Surgery (Aesthetic PS)*; *Aesthetic Surgery Journal (Aesthetic Surg J)*; *Annals of Plastic Surgery (Annals of PS)*; *Journal of Plastic and Reconstructive Aesthetic Surgery (JPRAS)*; *Plastic and Reconstructive Surgery (PRS)*; *Plastic and Reconstructive Surgery – Global Open (PRS–GO)*. Because *JPRAS* was previously titled the *British Journal of Plastic Surgery (BJPS)*, the search results of both journal titles were combined. Journals were selected by first identifying the eight highest cited plastic surgery journals according to the Google Scholar h5-index, which is a measure of journal impact defined as the number of articles published in the preceding five years with at least 10 citations each.⁶ The *Journal of Cosmetic Dermatology* and *Dermatologic Surgery* were then excluded as they were dermatology focused, rather than plastic surgery. Journals were categorized according to their corresponding publication format: subscription based, open access, or a hybrid of the two. The filter “case reports” was used to separate published case reports from all other articles. Two lists of PMIDs, one containing case reports and one containing all other articles, were then uploaded into the publicly available iCite tool developed by the National Institutes of Health to identify the number of citations for each article.⁷ Because 1980 is the earliest timepoint that iCite collects citation data, only articles published in 1980 or later were included. Consequently, journals were tracked from 1980 or date of inception, whichever was later. Because older articles have more time to be referenced and accumulate citations than more recent articles, a citation rate was determined for each article by dividing the total number of citations by the number of years since publication. Additionally, to determine the proportion of case reports published each year, the total number of case reports was

Takeaways

Question: What are the long-term trends in case report publication and citation rates compared with other article types?

Findings: From 1980 to 2022, case reports have had lower publication and citation rates than other forms of literature, which may be due to the growing emphasis on research with higher levels of evidence over this period.

Meaning: Despite their decreased prominence in the literature, case reports still offer significant merit in modern-day plastic surgery by offering a forum for the timely dissemination of knowledge on underreported clinical entities.

divided by the number of case reports added to the number of all other article types published.

The Kolmogorov-Smirnov test was used to determine the normality of continuous variables. Publication and citation rates were then presented as medians and interquartile ranges. Because none of the citation rates were found to be normally distributed, the Mann-Whitney *U* test was used to discern any differences in the citation rates of case reports versus all other article types. Testing was carried out among journals and as an entire group. Statistical analysis was performed in IBM SPSS Statistics for Macintosh (IBM Corp., version 27.0, Armonk, N.Y.), and a *P* value less than 0.05 was considered statistically significant. Additionally, the top cited articles from each journal were identified for both groups.

RESULTS

A total of 68,444 articles were included for analysis. There were 12,449 case reports and 55,995 other publication types. *PRS* was found to have published the most articles since 1980, followed by *Annals of PS* and *JPRAS*, respectively. A summary of the number of articles included from each journal from date of inception or 1980, whichever was later, can be found in [Table 1](#).

The case report publication rate, defined as the percent of all articles published that were case reports each year, was tracked by journal to assess for long term-trends. The highest rate for an individual journal was in 1980, when 48.8% of all articles published in *BJPS* (now *JPRAS*) were case reports. When taking the median rate across the six journals for a given year, the highest median rate of case report publication was 37.6%

Table 1. Number of Articles Published per Journal by Article Type Since First Collection Date Available

Journal	Publication Type	First Year of Collection	Case Reports	Other Articles	Total
<i>Aesthetic PS</i>	Hybrid	1980	710	5212	5922
<i>Aesthetic Surg J</i>	Hybrid	1997	134	4418	4552
<i>Annals of PS</i>	Hybrid	1980	3097	8999	12,096
<i>JPRAS/BJPS</i>	Hybrid	1980	3172	8736	11,908
<i>PRS</i>	Hybrid	1980	4438	25,000	29,438
<i>PRS–GO</i>	Open access	2013	898	3630	4528
Total	—	—	12,449	55,995	68,444

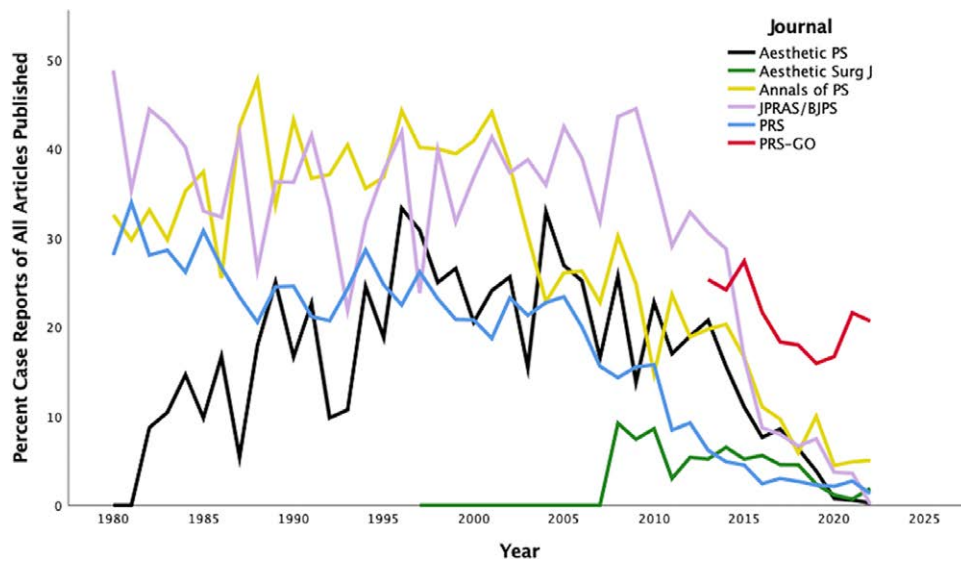


Fig. 1. The percentage of total journal articles published that were case reports per journal and year.

(30.6–42.5, interquartile range) of all articles in 1996, and the lowest rate was 1.6% (0.5–4.3) of all articles in 2022. For the year of 2022, *PRS-Global Open*, which is the only exclusively open access journal included, was the only journal to publish case reports at a rate greater than 5%, with four journals publishing case reports at a rate less than 2% of all articles (*PRS*, *JPRAS*, *Aesthetic PS*, and *Aesthetic Surg J*). These results are illustrated in [Figure 1](#).

The total number of articles published in each group was determined for each year. In 1980, there were 181 case reports published compared with 413 other articles across all journals. In 2022, there were 188 case reports published compared with 3343 other articles. When comparing publication counts between 1980 and 2022, the number of

case reports increased by 3.9%, and the number of other article types increased by 709.4%. These results are shown in [Figure 2](#).

To evaluate the impact of case reports compared with other literature, the number of article citations per year was compared across groups for each journal ([Table 2](#)). Articles other than case reports were found to be cited significantly more in three journals, including *PRS-GO*, *JPRAS*, and *Annals of PS* ($P < 0.001$). For *PRS*, *Aesthetic PS*, and *Aesthetic Surg J*, no significant difference in citation rates was found ($P \geq 0.05$). When combining the results of each journal, the overall citation rate was significantly higher for other article types ($P < 0.001$).

The most cited articles from each respective journal were identified for both groups. The overall most cited

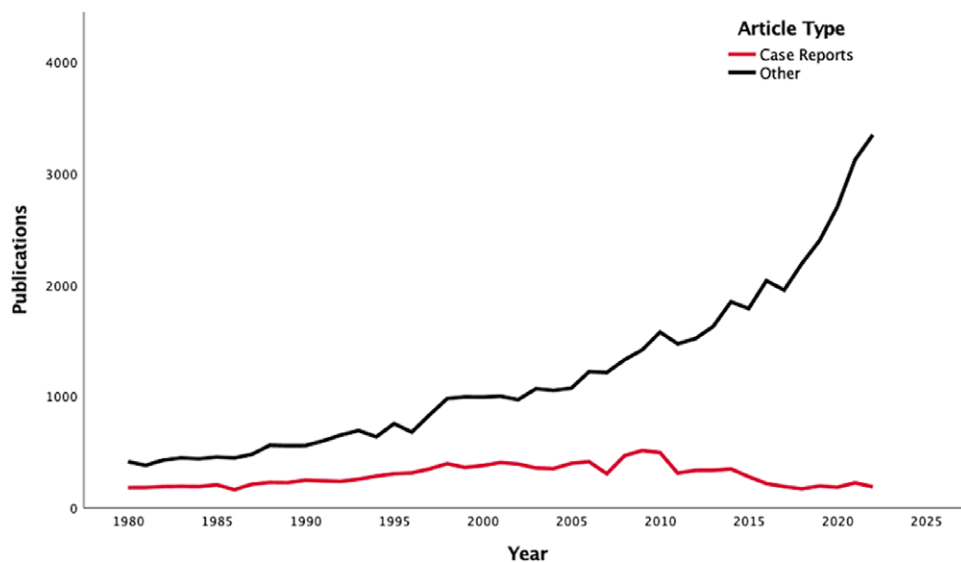


Fig. 2. The number of articles published across all journals each year according to article type.

Table 2. Citation Rate per Publication Type for Each Journal with Corresponding h5-Index Values

Journal	h5-Index	Case Reports Median (IQR)	Other Articles Median (IQR)	P
<i>Aesthetic PS</i>	36	0.67 (0.28–1.33)	0.50 (0.00–1.70)	0.054
<i>Aesthetic Surg J</i>	45	0.44 (0.18–0.89)	0.50 (0.06–1.28)	0.705
<i>Annals of PS</i>	32	0.38 (0.15–0.75)	0.54 (0.12–1.33)	<0.001*
<i>JPRAS/BJPS</i>	39	0.36 (0.14–0.76)	0.50 (0.08–1.40)	<0.001*
<i>PRS</i>	61	0.45 (0.15–1.08)	0.50 (0.05–1.86)	0.050
<i>PRS-GO</i>	40	0.20 (0.00–0.56)	0.56 (0.00–1.40)	<0.001*
Total	—	0.38 (0.14–0.85)	0.50 (0.06–1.56)	<0.001*

*Statistical significance of $P < 0.05$.

case report (McCarthy et al, 1282 citations)⁸ and other article type (Mulliken and Glowacki, 2112 citations)⁹ were both published in *PRS*. In all six journals, the highest cited case reports had fewer citations than corresponding other article types; however, in *JPRAS/BJPS*, the case report had a higher number of citations per year. These results, along with the titles of corresponding articles, are summarized in Table 3.

DISCUSSION

Case reports offer an invaluable contribution by providing a forum for the presentation and discussion of newly encountered clinical entities; however, over the last several decades, their role has been increasingly deemphasized based on the proportion of case reports published relative to other study designs. In this study, we sought to evaluate these trends within the context of plastic surgery by assessing long-term changes in publication and citation rates compared with other literature.

The key results were the relative changes in publication rates between groups over the last 42 years (3.9% increase for case reports versus 709.4% increase for other article types from 1980 to 2022) and the finding that 5% or less of articles published in 2022 were case reports in five of the six major plastic surgery journals. These numbers corroborate trends in the otorhinolaryngology, pediatric, and

greater medical literature.^{20,21} Notably, *PRS-Global Open* has a journal section editor dedicated entirely to case report publications, which may explain why it is the only journal to publish case reports at a rate more than 5% of all articles published. Additionally, although the overall rate of citations per year was lower for case reports than other article types, for three journals individually, there were no significant differences between citation rates. Importantly, citation rates alone do not capture the extent of case report utility, which are often referenced by surgeons in practice to guide management without publishing manuscripts to produce trackable citations.²²

One likely cause of these observations has been the evolution and focus of evidence-based medicine, which has led to the prioritization of research with higher levels of evidence, such as RCTs.²³ Although the intention has been to improve patient outcomes and financial resource allocation,²⁴ one consequence has been a reduced perception of case reports, which may be deemed to lack sufficient scientific and statistical merit to guide medical decision-making. Assessing the value of case reports purely within reference to the levels of evidence fails to appreciate the extent and diversity of their impact, however. They are utilized when novel disease states, anatomical variations, complications, surgical techniques, and other clinical rarities are approached for which no previous literature exists.²⁰ They fill this gap and contribute new perspective

Table 3. Most Cited Articles in Each Journal

Journal	Article Type	Title	Citations	Citation Rate
<i>Aesthetic Surg J</i>	Case report	Rhinoplasty: surface aesthetics and surgical techniques. ¹⁰	50	5.0
	Other article	Fat injection to the breast: technique, results, and indications based on 880 procedures over 10 years. ¹¹	329	23.5
<i>Aesthetic PS</i>	Case report	Long-term survival of fat transplants: controlled demonstrations. ¹²	529	18.9
	Other article	Cell-assisted lipotransfer for cosmetic breast augmentation: supportive use of adipose-derived stem/stromal cells. ¹³	597	39.8
<i>Annals of PS</i>	Case report	Deep inferior epigastric perforator flap for breast reconstruction. ¹⁴	768	37.9
	Other article	Vacuum-assisted closure: a new method for wound control and treatment: animal studies and basic foundation. ¹⁵	1481	57.0
<i>JPRAS/BJPS</i>	Case report	Inferior epigastric artery skin flaps without rectus abdominis muscle. ¹⁶	751	52.9
	Other article	The vascular territories (angiosomes) of the body: experimental study and clinical applications. ¹⁷	1090	30.3
<i>PRS-GO</i>	Case report	Subcutaneous tissue expander placement with synthetic titanium-coated mesh in breast reconstruction: long-term results. ¹⁸	42	3.3
	Other article	Subcutaneous direct-to-implant breast reconstruction: surgical, functional, and aesthetic results after long-term follow-up. ¹⁹	123	17.6
<i>PRS</i>	Case report	Lengthening the human mandible by gradual distraction. ⁸	1282	41.4
	Other article	Hemangiomas and vascular malformations in infants and children: a classification based on endothelial characteristics. ⁹	2112	51.5

for the next surgeon to build upon. Often their role as the first step in understanding an unreported entity is a necessary bridge to research with higher levels of evidence that may come after.²⁵

Specifically, within the field of plastic surgery, case reports provide a forum to present new procedural methods that, in several instances, have gone on to revolutionize the standard of care. Two exemplars of this phenomenon are the case reports from Koshima and Soeda¹⁶ along with Allen and Treece¹⁴ that led to the development of the DIEP flap for autologous breast reconstruction, which is now considered the gold standard method for autologous breast reconstruction.²⁶ Additionally, in his report of autologous fat grafting on two patients, Dr. Sydney Coleman described a technique for fat grafting that is still being used today (with subsequent modifications) in the setting of facial aesthetic rejuvenation, scar-related conditions, and breast reconstruction, amongst other applications.^{12,27-29} In the most cited case report of all journals included in the current study, McCarthy et al was the first to report the use of distraction osteogenesis (DO) to lengthen the mandible, which has led to the widespread integration of DO throughout craniofacial reconstructive surgery.^{8,30} Although these mentioned articles represent outliers, it becomes clear that case reports have served an integral role in the progression to modern-day plastic surgery.

Case reports also have diverse utility beyond the introduction of new procedural techniques. Often in the surgical setting, higher levels of evidence such as RCTs are not feasible due to both the rarity of certain conditions and the ethical ramifications of sham surgery. In these contexts, such as reconstruction of congenital hand deformities in Apert syndrome, case reports provide a backdrop of knowledge for surgeons to reference when limited other resources exist.³¹ In addition, they provide an established medium for reporting serious, rare complications or adverse events. For example, in 1997, Keech and Creech authored the first report of breast implant associated anaplastic lymphoma, which has since garnered significant attention and led to 1130 total reports according to the most recent FDA release from April 1, 2022.^{32,33} Moreover, although case reports are traditionally excluded from meta-analyses, one study demonstrated comparable results between a meta-analysis of case reports versus another of clinical studies on the same topic. Thus, pooled case reports may offer an avenue for improved earlier conclusions before the availability of higher level studies.³⁴ Although the primary intent of case reports should always remain on the dissemination of valuable knowledge, there has even been a reported benefit in the education of early medical trainees who can gain experience in scientific writing and case-based clinical learning.^{20,35}

Another aspect is the fact that not all clinical settings provide the proper resources to perform research of higher evidence level, such as long term RCTs or larger patient cohorts. Nevertheless, experiences in these settings could be of high value to other surgeons experiencing similar challenges, especially in lesser developed, often nonacademic, settings. Hence, the ability to publish

a case report increases awareness of problems that would otherwise remain unpublished due to their inherent low-volume nature. Ultimately, considering the variety of benefits offered by case reports historically and presently, the current results that case reports are being published at relatively decreasing rates compared with other article types warrants consideration from the plastic surgery community. While research with higher levels of evidence certainly has a valued place within the literature, so, too, do case reports. Their continued publication is necessary, as their contribution is particularly important in a field with rapid procedural innovation. Important to mention, as well, is the need for high-quality articles to effectively communicate this new knowledge. In 2013, the CARE (CAsE REport) guidelines were published to guide case report preparation and improve their overall completeness and transparency.³⁶ Although these should always be referenced when writing a case report, one author emphasizes that above all, “the most important rule for writing a good case report is to be very clear about the single message that you want to bring.”³⁷

On a technical note, although case reports and case series represent similar study formats, they remain distinct entities. There is no universally accepted point of delineation, but it has been proposed that four patients should be the upper limit to classify a true case report, and any larger sample should be categorized as a case series.³⁸

The presently enumerated benefits of case reports justify their space in the literature, but their shortcomings should not be ignored. They are often poorly generalizable, are subject to overinterpretation, emphasize rare events, and do not address causal inference.³⁹ All these reasons are collectively responsible for their classification as low level evidence, and publication bias towards higher evidence levels is in line with the findings that evidence-based medicine does lead to better patient outcomes and resource allocation.²⁴ Moreover, it may be that as the breadth and accessibility of clinical knowledge grows, the world of truly rare events shrinks, and case reports of quality may be more difficult to produce. Nonetheless, their value, both historically and presently, is undeniable, and an appropriate understanding of their strengths and weaknesses allows for a better appreciation of their contribution.

LIMITATIONS

This current study is not without its limitations. The search strategy relied on accurate PubMed indexing of case reports. Additionally, due to limited indexing of other study types, we were unable to establish a comparator group of primary clinical investigations rather than all other article types. Moreover, we were unable to capture the number of reads per article, which may have been more appropriate to measure the influence of case reports. We also included only six of the most prominent plastic surgery journals, although other journals exist. Over time, *PRS* has changed inclusion criteria for publication and no longer accepts case reports, which additionally affects recent publication rates. Also, because iCite collects citation data only back to 1980, articles were only included

if published then or later. Ultimately, however, our current methods allowed for the inclusion of 68,444 articles, which provided a significant sample size to address publication trends.

CONCLUSIONS

In this study, we assessed the long-term trends in case report publication rates within the field of plastic surgery. We demonstrated that over time, the relative rate of case report publication compared with other article types has decreased significantly, which is primarily attributed to the growing emphasis of research with higher levels of evidence. Despite this trend, we believe case reports may still offer significant merit in the present due to the variety of benefits they have demonstrated historically. We encourage members of the field to continue publishing high-quality case reports that aim to spread knowledge on novel and exceptional clinical rarities.

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DISCLOSURES

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