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An Analysis of the “Classic” Papers in Aesthetic Surgery

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Abstract

Introduction Over the past 50 years, there has been a significant increase in published articles in the medical literature. The aesthetic surgery literature is vast, consisting of a plethora of diverse articles written by a myriad of illustrious authors. Despite this considerable archive of published material, it remains nebulous as to which precise papers have had the greatest impact on our specialty. The aim of our study was to identify and analyse the characteristics of the top 50 papers in the field of aesthetic surgery in the published literature.

Methods The 50 most cited papers were identified in several surgical journals through the Web of Science. The articles were ranked in order of the number of citations received. These classic 50 papers were analysed for article type, their journal distribution, level of evidence as well as geographic and institutional origin.

Results Six journals contributed to the top 50 papers in aesthetic surgery with *Plastic and Reconstructive Surgery* contributing the most with 31 papers.

No Level Assigned This journal requires that authors assign a level of evidence to each submission to which Evidence-Based Medicine rankings are applicable. This excludes Review Articles, Book Reviews and manuscripts that concern Basic Science, Animal Studies, Cadaver

Studies and Experimental Studies. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors <http://www.springer.com/00266>.

Keywords Bibliometric · Citation analysis · Aesthetic · Top 50

Introduction

As the specialty of aesthetic surgery has advanced, the volume of published work has grown concurrently. The number of citations that a published article receives is a recognised yet inherently flawed method of gauging the importance of a piece of published work to a specific area [1]. A citation is an abbreviated alphanumeric expression that acknowledges the relevance given by the author to the work of others on a topic of discussion in which the citation appears. Its purpose is to acknowledge other authors for important and pertinent information that they have previously published. The citation of published work by other researchers is indicative of the scientific relevance of this paper and its relative impact may be measured by the actual number of citations it receives [2]. As a result, the citation number is increasingly being used to determine how subsidies, grants and awards are appointed [1–3]. Older articles are more likely to gain a higher citation number than more recent articles based on a longer duration in print. Loonen et al. reported how this bias could be overcome by creating a citation index for each paper when they analysed the characteristics of the top 50 papers in plastic surgery [2]. For each paper, the citation index was defined as the mean number of times it was cited per year up to 16 years after publication [4]. They found that the

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most significant change in annual increase of the fraction of citations occurred at 16 years post publication and consequently 16 years was accepted as the critical citable period.

The number of citations a scientific work receives is of paramount importance to the journal, as the more citations that an article from a particular journal receives, the greater the impact factor (IF) of the publication [5]. The IF was devised by Eugene Garfield to facilitate comparisons between journals within specific fields of scientific interest [4]. The IF is a measure used to reflect the average number of citations of recent articles published in the journal [5–7]. It is calculated on an annual basis, and it is used as a proxy for the relative importance of an academic journal within its field. The higher the IF, the more notable the journal is seemingly deemed. Despite the documented flaws with the system [2], it is still regarded as the best available method of judging the merits of specific journals [1]. For a specific year, the IF is the number of citations in that year to papers published in the journal over the two preceding years, divided by the number of citable papers published in that journal during the same two years [4, 8]. Citation analysis is a bibliometric process that describes the means of analysing the citation history of published papers [9].

Many medical and surgical specialties have performed bibliometric analyses on their own literature and the published papers provide an interesting record of many influential papers in each discipline [10, 11]. General surgery [3], orthopaedics [9, 12, 13], anaesthesiology [10], plastic surgery [2, 4] and otolaryngology [14] have all produced citation analyses of the most cited papers in their own specialty.

The aim of this study was to carry out a citation analysis on the most cited papers in aesthetic surgery and analyse each paper individually looking at surgical topic of interest, citation index, article type, year of publication, authorship, country of origin, institution and level of evidence.

Materials and Methods

Thirty international journals were included in our analysis and these were chosen based on an overall consensus reached by the senior authors. The journals included the 12 well-known specialised aesthetic and plastic surgery journals. Twelve high impact factor medical journals and six high-impact factor surgical journals were included as there was agreement by the authors that these would be the most likely journals to publish well-cited papers relating to aesthetic surgery.

The Web of Science, which is produced by the Institute of Scientific Information (ISI), provides Web access to the Science Citation Index [8], MEDLINE and other citation indexes, which collectively index more than 12,000

journals worldwide. Utilising this online database, we were able to identify the most cited papers in aesthetic surgery from 1945 to 2014 in all of these 30 publications.

All Web of Science™ (Thomson Reuters, NY, USA) indexed articles from the 12 plastic and aesthetic surgery journals were combined in our search and the resulting articles (55,871 papers in total) were ranked in order of times cited. Independently, three of the authors (CWJ, KMJ, JCK) identified the most cited articles relating to aesthetic surgery in these 12 specialist journals. A paper was selected for further study, only if all three authors agreed that it related to aesthetic surgery.

To locate the aesthetic surgery papers in the 12 medical and 6 general surgical journals, specific keywords were added separately into the Web of Science™ database and the 18 chosen journals were searched. All indexed papers from these journals (845,512) were combined and ranked in order of times cited. The keywords used were “aesthetic”, “cosmetic”, “-plasty”, “implant” and “breast”. As before, the authors analysed the filtered results looking for well-cited papers relating to aesthetic surgery. By combining the results from each search, we were able to identify the most frequently cited articles in aesthetic surgery from 1945 to 2014 in our chosen publications.

The 50 most referenced articles were then chosen for further analysis (Table 2).

Each paper was analysed independently by one of the authors (CWJ) looking at its topic of surgical interest, authorship, article-type, country of origin, institution, level of evidence and year of publication. The citation index was calculated by two of the authors (CWJ, KMJ) and there was 100 % concordance. As mentioned already, the difference in time since publication among the top 50 articles features a potential bias because older articles are likely to have obtained more citations merely because their citable period was longer [4]. To limit this bias, we calculated the citation index of each of the top 50 articles, defined as the mean number of times they were cited per year up until 16 years after publication. For articles that had been published within the last 16 years, the total citation numbers since publication were divided by the number of years since publication.

Results

Based on the total number of citations, the top 50 papers in aesthetic surgery are ranked in descending order in Table 2. The total citation numbers ranged from 108 to 351 with a mean of 161.1 ± 50.77 . Despite 30 journals being included in our initial search, only six contributed articles to the overall top 50 list. These consisted of four specialist plastic surgical journals (*Plastic and Reconstructive*

Table 1 The journals and the number of papers each journal contributed to the top 50 papers

Journal	Number of papers in the top 50
Plastic and reconstructive surgery	31
Aesthetic plastic surgery	6
New England journal of medicine	6
Clinics in plastic surgery	3
Annals of plastic surgery	3
Lancet	1

These journals were included in our citation search but did not contribute to the top 50: Journal of Plastic, Reconstructive and Aesthetic Surgery, Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery, British Journal of Plastic Surgery, Aesthetic Surgery Journal, Archives of Facial Plastic Surgery, Canadian Journal of Plastic Surgery, Facial Plastic Surgery, Journal of Plastic Surgery and Hand Surgery, Annals of Surgery, British Journal of Surgery, Journal of American College of Surgeons, Archives of Surgery, Surgery, American Journal of Surgery, Journal of the American Medical Association, British Medical Journal, PLOS Medicine, Annals of Internal Medicine, BioMed Central Medicine, Canadian Medical Association Journal, Mayo Clinic Proceedings, Journal of Internal Medicine, Annals of Medicine, American Journal of Medicine

Surgery (PRS), *Aesthetic Plastic Surgery*, *Clinics in Plastic Surgery* and *Annals of Plastic Surgery*) and two medical journals, (*the New England Journal of Medicine* and *Lancet*) (Table 1). Thirty-one papers from the top 50 were published in *Plastic and Reconstructive Surgery* whilst *Aesthetic Plastic Surgery* and the *New England Journal of Medicine* both contributed six papers each.

At the time of writing, the most cited paper on the list by Gabriel et al. [15] had been cited 351 times and it describes the perceived risk, at that time, of connective-tissue diseases after breast implantation. The 50th paper by Baldwin and Kaplan [16] received 108 citations and reported on a case of silicone-induced adjuvant disease following augmentation mammoplasty. The oldest paper in the top 50 was written by Peer [17] and published in *Plastic and Reconstructive Surgery* in 1950 where he described how the loss of weight and volume in fat grafts could be accounted for by the cell survival theory. The most recent paper by Yoshimura et al. was published in 2007 in *Aesthetic Plastic Surgery* and describes cell-assisted lipotransfer for breast augmentation [18]. The 1990's contributed the most of any decade to the top 50 with 22 papers (Table 3).

The mean citation index of the top 50 most cited papers was 9.95 ± 6.01 and the article with the highest citation index (23.8.) was by Gabriel et al. [15] (Table 2). This paper had the distinction of being the most cited paper and the article with the highest citation index. The papers with the 2nd, 3rd and 5th highest citation indices were all written by Dr. Coleman [19–21] which is not surprising as free-fat

transfer continues to grow in popularity and these three articles focused on the pioneering Coleman method for fat transfer to the face and breast. The mean citation index for all of the 12 papers relating to free-fat grafting was 12.28 ± 8.22 yet for Coleman's five papers it was 19.3 ± 3.65 , thereby highlighting the relative impact of his publications since he played a significant role in the resurgence of fat grafting. By examining the citation index per decade, we found that the mean was 15.65 ± 4.95 in the 2000's compared to 3.98 ± 1.34 in the 1970's which indicates more recent papers are cited more frequently than older ones. We also ranked the 50 papers in terms of citation index and found that the more recent papers tended to have a higher citation index than older ones (Table 4). The mean year of publication for the 25 papers with the highest citation index was 1995 ± 7.07 , whereas it was 1982 ± 10.03 for the 25 papers with the lowest citation index.

To facilitate the analysis of the characteristics of each paper, the 50 articles were placed into six different categories –breast, fat transfer, facial, trunk/liposuction, fillers and miscellaneous (Table 5). If an article dealt with two of the categories of interest, it would be added to both of these categories. Breast was the most common topic and accounted for 25 papers, 16 of which focused on augmentation. These included papers on the silicon controversy in the early 1990's and the perceived risks of implant-related connective tissue disorders and autoantibody production. Reduction mammoplasty was the subject of six papers, of which three described the vertical pattern mammoplasty and two documented the inferior pedicle technique. Twelve papers were based on free-fat transfer and Dr. Coleman was the first author on five of these [19–23] whilst the aesthetic use of fillers and their complications were detailed in three papers. The single paper in our miscellaneous category outlined the first study to investigate body dysmorphism in aesthetic surgery.

Forty-four of the top 50 papers were clinical, five were experimental and three were review articles. The majority of studies were Level 4 (24 %) or 5 (41 %) evidence and can be seen in Table 6.

Nine countries were responsible for producing all of the top 50 papers with the United States contributing the most with 39 papers (Table 7). In the top 50 list, The University of California system (Table 8) had seven papers followed closely by the New York School of Medicine with five articles. In relation to authorship in the top 50 papers, 11 individuals contributed to more than one paper overall (Table 9). Doctors Coleman [19–23], Hamra [24–26], Gabriel [15, 27], Ilouz [28, 29] and Courtiss [30, 31] were all first-named author on more than one paper each.

The second most cited article with 322 citations was Dr. Coleman's first paper in the top 10, in which lipo-filling to

Table 2 The 50 most cited papers in aesthetic surgery along with their citation index (CI)

Rank	Author	No. of citations	CI	PMID	Country	Institution	Topic
1	Gabriel [15]	351	23.8	8190133	USA	Mayo Clinic, MN	Breast
2	Coleman [21]	322	20.1	16936550	USA	NYU, NY	Fat
3	Illouz [28]	256	10.3	6622564	France	Bld Sachet, Paris, France	Liposuction/trunk
4	Sanchez-Guerrero [46]	256	17.8	7760867	USA	Harvard, MA	Breast
5	Coleman [22]	231	17.6	17312477	USA	NYU, NY	Fat/breast
6	Kessler [47]	224	14.3	1309171	USA	FDA, Rockville, MD	Breast
7	McKissock [32]	206	5.2	4551235	USA	UCLA, CA	Breast
8	Lejour [33]	199	21.1	8016222	Belgium	Institut Edith Cavell, Belgium	Breast
9	Gabriel [27]	196	12.2	9041097	USA	Mayo Clinic, MN	Breast
10	Coleman [19]	188	23.5	9142473	USA	NYU, NY	Fat
11	Coleman [23]	182	14	8526158	USA	NYU, NY	Fat
12	Klein [34]	181	17.1	8234507	USA	University of California, Irvine, CA	Liposuction/trunk
13	Hamra [24]	181	15.9	1615067	USA	University of Texas, Dallas, TX	Fat
14	Peer [17]	178	1.1	N/A	USA	New Jersey, NJ	Fat
15	Lemperle [48]	168	15.3	14648064	USA	University of California, San Diego, CA	Fillers
16	Hamra [25]	160	11.1	2359803	USA	University of Texas, Dallas, TX	Face
17	Robbins [35]	160	3.1	831241	Australia	Royal Melbourne Hospital, Australia	Breast
18	Yoshimura [18]	160	17.8	17763894	Japan	University of Tokyo, Japan	Breast/fat
19	Grazer [49]	158	2.3	847027	USA	Harvard, MA	Liposuction/trunk
20	Courtiss [30]	157	3.7	847026	USA	Harvard, MA	Breast
21	Nguyen [50]	154	5.8	2304989	USA	University of Michigan, Ann Arbor, MI	Fat
22	Janowsky [51]	154	11	10717013	USA	University of North Carolina, NC	Breast
23	Benelli [36]	153	9	2185619	France	Paris, France	Breast
24	Stuzin [52]	153	9.6	1741467	USA	University of Miami, FL	Face
25	Rudolph [37]	150	6.1	678332	USA	University of California, San Diego, CA	Breast
26	Coleman [20]	149	21.3	11248861	USA	NYU, NY	Fat
27	Furnas [53]	148	7.1	2909050	USA	University of California, Irvine, CA	Face
28	Berkel [54]	144	10.3	1588977	Canada	Alberta Cancer Board, Canada	Breast
29	Chajchir [55]	140	6.1	2587656	Argentina	Zubizarreta Hospita, BA, Argentina	Fat
30	Hall-Findlay [56]	138	9.2	10456528	Canada	Mineral Springs Hospital, Alberta, Canada	Breast
31	Isse [57]	137	13.4	8122572	USA	Pasadena, CA	Face
32	Handel [58]	135	10.3	7480271	USA	Van Nuys, CA	Breast
33	Hamra [26]	135	4.3	7624408	USA	University of Texas, Dallas, TX	Face
34	Ellenbogen [59]	134	4.3	3273033	USA	University of California, Irvine, CA	Fat/face
35	Sarwer [60]	133	8.3	9583501	USA	University of Pennsylvania, PA	Miscellaneous
36	Barker [61]	132	4.2	351637	USA	University of California, Los Angeles, CA	Breast
37	Press [62]	132	7.7	1360033	UK	Autoimmune Disease Centre, UK	Breast
38	Heggers [63]	130	6.3	6614755	USA	University of Chicago, IL	Breast
39	Grazer [64]	128	9.1	10627013	USA	Penn State University, PA	Liposuction/trunk
40	McGrath [38]	123	7.6	6385039	USA	George Washington University, DC	Breast
41	Illouz [29]	122	3.5	3725947	France	Bld Sachet, Paris, France	Fat
42	Teimourian [65]	119	6.1	2528776	USA	Suburban Hospital, MD	Liposuction/trunk
43	Courtiss [31]	119	3.8	441195	USA	Harvard, MA	Breast
44	Christensen [66]	119	13.2	15759096	Denmark	Rigshospitalet Fred, Denmark	Fillers
45	Knapp [39]	118	5.4	896997	USA	Stanford University, CA	Fillers
46	Domanskis [67]	116	4.1	792918	USA	University of California, San Francisco, CA	Breast
47	Katz [68]	115	7.7	10553215	USA	University of Pittsburgh, PA	Fat

Table 2 continued

Rank	Author	No. of citations	CI	PMID	Country	Institution	Topic
48	Ribeiro [69]	115	1.9	1118493	Brazil	University Fluminense, Rio de Janeiro, Brazil	Breast
49	de Camara [70]	113	8.3	8460185	USA	Carle Clinic Association, IL	Breast
50	Baldwin Jr [16]	110	5.1	6847084	USA	Stanford University, CA	Breast

delicately improve facial contour was discussed [21]. The third most cited paper by Illouz had 256 citations and it describes his case series of over 3000 patients who underwent body contouring by lipolysis [28]. The seventh and eighth most cited papers both focus on mammoplasty and were written by Drs. McKissock [32] and Lejour [33], respectively. The former describes a reduction mammoplasty with a vertical dermal flap whilst the vertical mammoplasty and liposuction of the breast is depicted by the latter.

In 12th place in the top 50, Klein [34] outlines the tumescent technique for local anaesthetic in large-volume liposuction. This paper is followed in thirteenth position by the 1990 paper by Hamra [24], where the deep-plane facelift is discussed. The 1977 paper by Robbins, [35] where the inferior pedicle mammoplasty is described, is in 17th position and Benelli's paper [36] focusing on the "round-block" technique for periareolar mammoplasty is in 23rd position. In 1978, Rudolph et al. [37] detailed the electron microscopic presence of both myofibroblasts and free silicon around breast implants and this is the 25th most cited paper. McGrath and Burkhardt reported on the safety profile and efficacy of breast implants for augmentation mammoplasty in their 1984 paper in *Plastic and Reconstructive Surgery* [38], whilst the early use of collagen in soft tissue augmentation described by Knapp et al. [39] was at 45.

Discussion

Aesthetic surgery has grown as a specialty over the last number of years and many of the important landmarks that reflect this evolution can be seen in our top 50 list of most cited papers. This list contains many first descriptions of exciting novel techniques and procedures, authored by many well-respected names in aesthetic surgery.

By reading through the top 50, it is difficult not to appreciate the relative importance of many of the papers present. However, several important articles in aesthetic surgery have not made it into the top 50 and this would certainly be a limitation of our study. What may partly account for their omission is the phenomenon of "obliteration by incorporation" [3]. This occurs over time, as many

"classic papers" fail to be cited as they have become such "common knowledge". The 1951 paper by Castanares [40], where a new blepharoplasty approach was described, is an example of a well-known "classic" paper with too few citations (105 citations) to be included in the top 50. A more recent example would be Tebbetts's seminal paper from 2002 [41] where he developed a novel system for dual plane breast augmentation based on refinement of the implant-soft tissue relationship. This prominent article is well known to plastic surgery trainees throughout the world and would generally be considered to have made a significant impact on the specialty, yet it did not receive enough citations (63 citations) for inclusion.

Several other limitations exist with this type of study. The phenomenon of 'incomplete citing' occurs when citations are made with the sole intention of persuading the reader rather than to acknowledge those who most influenced their work. Other biases encountered include self-citation, journal bias, in-house bias and omission bias by intentionally failing to cite competitors [6].

Some authors have stated that the most important papers may be found in the reference list of the most cited papers [2, 42]. However, it has also been proposed that older articles are likely to have attained more citations purely because their citable period is longer than more recent papers [2]. Our study demonstrated that the citation index of more recently published articles was higher than that of older articles and the likely explanation for this is two-fold. Firstly, the increased use of citation managers (i.e. End-Note, Thomson Reuters, NY, USA) permits the relatively effortless incorporation of an endless number of citations in today's papers that could not have been done previously. Secondly, more recent articles tend to be available online whereas older papers are usually less accessible electronically and retrieval often requires a good deal of effort. However, *Plastic and Reconstructive Surgery* publishes all its articles online thereby facilitating easy access to older papers.

The majority of studies in the top 50 were level 4 or level 5 evidence, thereby indicating that in aesthetic surgery research, no positive correlation exists between a high number of citations and a high level of evidence. This mirrors what Loonen et al. found when they analysed the characteristics of the top 50 papers in plastic surgery [4].

Table 3 The decades with the top 50 most cited papers

Decade	No. of papers
1990's	22
1970's	10
1980's	9
2000's	8
1950's	1

This may be explained by the fact that perhaps there are not many higher levels of evidence in aesthetic surgery papers or that the higher levels of evidence are just not cited frequently. Plastic surgery itself does not publish as many randomised controlled trials as in medicine and in fact, most published studies are either level 4 or 5 evidence [43]. Aesthetic surgery is very much in keeping with this trend. Limited disease incidence [4], the difficulty in standardising a surgical treatment and the varying expertise and experience of different surgeons often make surgery less suitable for clinical trials than medicine [44, 45]. As most systematic reviews, meta-analyses and randomised-control trials focus on the outcome of a certain intervention on a

specific condition, it is not surprising that there are few level 1 and 2 evidence papers in the aesthetic surgery literature. Anatomical cosmetic challenges and ageing tend to be the main focus of aesthetic surgery rather than pathologic diseases and consequently, papers with lower levels of evidence are relatively more valuable in aesthetic surgery than many other specialties. Therefore, it is likely that the level of evidence is not an accurate method of determining the importance of a published work in aesthetic surgery.

It has been previously demonstrated that longer articles and review articles tend to be cited more frequently than other types of published papers [1]. Interestingly, only three review articles were found in the top 50 list and not surprisingly, this may indicate that basic research papers incorporating novel techniques and innovations are of preferred interest to aesthetic surgery authors.

Many of the papers in the top 50 have been highly influential on aesthetic surgery as they are the first description of a novel technique or procedure and as a result, subsequent papers have cited them in their publications. A prime example is the 1983 paper by Illouz [28]

Table 4 The 50 papers ranked in order of citation index with their year of publication

Rank	Author	CI	Year	Rank	Author	CI	Year
1	Gabriel [15]	23.8	1994	26	Benelli [36]	9	1990
2	Coleman [19]	23.5	2006	27	de Camara [70]	8.3	1993
3	Coleman [20]	21.3	2007	28	Sarwer [60]	8.3	1998
4	Lejour [33]	21.1	1994	29	Press [62]	7.7	1992
5	Coleman [21] ¹	20.1	1997	30	Katz [68]	7.7	1999
6	Sanchez-Guerrero [46]	17.8	1995	31	McGrath [38]	7.6	1984
7	Yoshimura [18]	17.8	2008	32	Furnas [53]	7.1	1989
8	Coleman [22]	17.6	1995	33	Heggors [63]	6.3	1983
9	Klein [34]	17.1	1993	34	Chajchir [55]	6.1	1989
10	Hamra [24]	15.9	1992	35	Teimourian [65]	6.1	1989
11	Lemperle [48]	15.3	2003	36	Rudolph [37]	6.1	1978
12	Kessler [47]	14.3	1992	37	Nguyen [50]	5.8	1990
13	Coleman [23]	14	2001	38	Knapp [39]	5.4	1977
14	Isse [57]	13.4	1994	39	McKissock [32]	5.2	1972
15	Christensen [66]	13.2	2005	40	Baldwin Jr [16]	5.1	1983
16	Hamra [26]	12.4	1995	41	Ellenbogen [59]	4.3	1986
17	Gabriel [27]	12.2	1997	42	Barker [61]	4.2	1978
18	Hamra [25]	11.1	1990	43	Domanskis [67]	4.1	1976
19	Janowsky [51]	11	2000	44	Courtiss [30]	3.8	1979
20	Berkel [54]	10.3	1992	45	Courtiss [31]	3.7	1977
21	Handel [58]	10.3	1995	46	Illouz [29]	3.5	1986
22	Illouz [28]	10.3	1983	47	Robbins [35]	3.1	1977
23	Stuzin [52]	9.6	1992	48	Grazer [49]	2.3	1977
24	Hall-Findlay [56]	9.2	1999	49	Ribeiro [69]	1.9	1975
25	Grazer [64]	9.1	1977	50	Peer [17]	1.1	1950

Table 5 Number of papers in each aesthetic category chosen by the authors

Category	Number of papers
Breast	24
Silicone Implants	16
Mammaplasty	6
Fat Grafting	2
Fat	12
Free-Fat Grafting	11
Fat Engineering	1
Face	8
Free-Fat Grafting	2
Anatomical Studies	3
Rhytidectomy	3
Liposuction/Trunk	4
Liposuction	3
Abdominoplasty	1
Fillers	3
Miscellaneous	1

Table 6 The type and level of evidence of the clinical studies ($n = 41$) in the top 50

Clinical study type	Number of studies
Prognostic	2
Level 3	2
Therapeutic	39
Level 1	1
Level 2	1
Level 3	10
Level 4	10
Level 5	17

Table 7 The countries of origin of the top 50 papers in aesthetic surgery

Nation	Number of papers
USA	38
France	2
Canada	2
Argentina	1
Australia	1
Belgium	1
Brazil	1
Denmark	1
Germany	1
Italy	1
Japan	1

Table 8 The institutions that contributed the most papers to the 50 most cited papers in aesthetic surgery

Rank	Institution	Number of papers
1	University of California System, CA	6
2	New York School of Medicine, NY	5
3	Harvard University, Boston MA	2
4	University of Texas, Dallas, TX	3
5	Saint-Louis Hospital, Paris, France	2
6	Mayo Clinic, Rochester, MN	2

Table 9 The authors who contributed more than one article to the top 50 papers

Author	Number of citation classics	Position on author list
Coleman SR	4	First author-4
Goldwyn RM	3	Second author-1, last-2
Hamra ST	3	First author-3
Gabriel SE	2	First author-2
Illouz YG	2	First author-2
Kaplan EN	2	Second author-1, last-1
Kurland LT	2	Third author-1, fifth-1
Melton LJ 3rd	2	Last author-2
O'Fallon WM	2	Second author-1, third-1
Woods JE	2	Second author-1, fifth-1

which was the first paper to outline the concept of body contouring with liposuction. This paper detailed his five-year experience of performing liposuction on 3,000 patients and it certainly had a significant impact on the specialty considering that liposuction is now such a commonly performed procedure.

The most cited paper by Gabriel et al. [15] was published in the midst of the silicone controversy, following the moratorium by the Food and Drug Administration on silicone breast prostheses in 1992. This original article likely assuaged many fears regarding silicone use by publishing results that did not support the hypothesis that silicone implants were associated with a risk of developing a connective tissue disease. This paper has had a substantial impact on aesthetic surgery and has been heavily referenced accordingly.

Free-fat grafting is a relatively recent phenomenon in aesthetic surgery yet it is growing in popularity. Dr. Coleman was one of the pioneers of this procedure and it is therefore not surprising that all five of his papers are so well referenced and also have a high citation index [19–23]. Lejour's paper [33] on vertical mammoplasty is another article that could be considered a “game-changer”

in aesthetic surgery. This paper detailed her case series of 100 patients who underwent reduction mammoplasty using a technique that resulted in a shorter scar. This approach was heralded as a significant advancement in breast reduction surgery and is still widely used.

There is no doubt that most articles in our top 50 list have made a significant impact on our specialty despite several “classic” papers being omitted due to low citation numbers. Many papers from our list have described pioneering techniques or innovations that are still employed today. The citation index was developed to overcome the potential bias associated with older papers in bibliometric studies, yet this system is far from ideal. We found that its use favoured more recent papers, which is not surprising considering older papers have an overall tendency to be cited less frequently. Despite the fundamental weaknesses in using publication counts to assess the influence of published material, we feel it remains the best available method to determine which papers have been most influential on our specialty. Citation analysis is not a measurement of scientific quality yet nonetheless, the more citations a body of work obtains does reflect the impact that the article has made on the scientific community as a whole. The top 50 most cited papers in aesthetic surgery have been very influential on the specialty and will probably be the papers that are remembered the most.

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