

Title: A bibliometric analysis of the 100 most-cited articles in rhinoplasty

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Abstract

Introduction. Citation analysis aims to quantify the importance and influence of a published paper within its field. We performed a bibliometric analysis to determine the most highly-cited papers within rhinoplasty and their impact on current practice.

Methods. The 100 most-cited articles relating to rhinoplasty, between and inclusive of January 1864-September 2015, were extracted from Web of Science™ in October 2015. Title, source journal, publication year, total citations, average citations/year, type of article, level of evidence, country of origin, main focus, use of outcome measures, incorporation into 'Selected Readings in Plastic Surgery' and funding status were recorded.

Results. The total number of citations per paper ranged from 61-276 (1.5 to 12.1 average citations per year). Surgical technique was the focus of 53% of papers, particularly those for reconstruction (75%). USA produced 72% of papers, compared to 8% from the UK. The top 100 papers were published within 20

journals; 'Plastic and Reconstructive Surgeons' contributed the most articles (n=57). None of the articles achieved level 1 or 2 of evidence (OECBM levels of evidence, 2011), with most achieving level 4 evidence (n=64). Case-series were the most popular methodology (n=37). Few papers used validated outcome measures (n=21). Twenty-nine percent were referenced in 'Selected Readings'. Eighty-nine percent were unfunded studies.

Conclusion. These top 100 papers are used in current teaching material and underpin surgical decision-making. Developing and utilising validated objective assessment tools will benefit surgeons, patients and the greater scientific community in objectively evaluating techniques with the most favourable results.

Introduction

The nose is considered one of the most prominent features of the face. “Rhinoplasty” refers to surgery of the nose performed to improve both form and function. Procedures on the nose are commonly undertaken by several specialities (Hospital Episode Statistics show a total of 89,188 ‘main procedures’ undertaken on the nose during 2014-15 in the UK)¹ with an increasing number of aesthetic surgical procedures being performed (4,878 people in the UK in 2013; an increase in 17% from the previous year).² Through a series of cases, the Edwin Smith Papyrus thesis was the first to describe and illustrate plastic surgery techniques on the nose.³ The dawn of the ‘modern’ era of rhinoplasty was cultivated by the efforts of Roe, Weir and Joseph,⁴ surgery on the nose subsequently embraced the efforts of several authors, institutions and countries. With textbooks devoted to the singular topic of rhinoplasty, the diverse array of published work can be attributable to the complexity of this particular surgery.

It is difficult to determine the true impact of a single article amidst a vast array of published literature. Citations are a tool used to credit the published work of peers and its relevance to the author’s article topic. The number of citations also influences the reputation of the author, their institution and a journal’s impact factor (IF). IF is a measure of the number of citations received over the last year divided by the number of published articles over the past two years).⁵ The IF is employed as a proxy for journal quality and is an issue of debate, however, journals with higher IF are seen as more prestigious within their respective scientific community.⁶ Other sub-specialities have previously reported most cited papers relevant to their area,^{7,8} and this distils the important characteristics that is required for research to be highly cited. Historically, people may have cited a large number of references to embellish their work, increase their credibility or to make a paper appear more important than it is.

Citation analysis aims to quantify the importance and influence of a published paper within its designated field. Whilst bibliometric analyses have been performed for the speciality of plastic surgery,⁹ to our knowledge, a structured objective analysis of the ‘classic’ papers in rhinoplasty which also involves the specialities of otorhinolaryngology and maxilla-facial surgery has not been undertaken. Our aim was to perform a bibliometric analysis of rhinoplasty, ascertain the top 100 cited papers and to examine the characteristics of each article therein.

Methods

The 100 most-cited articles relating to rhinoplasty, between and inclusive of January 1864–October 2015, were extracted from all available journals through an online database (Web of Science™, version 5.16.1, Thomson Reuters) of the Science Citation Index (SCI) of the Institute for Scientific Information on the November, 2015. All top 100 papers have come from the top 20 journals of the many hundreds of journals searched by the Web of Science (WOS). The database was searched individually by 3 investigators using the medical subject heading (MeSH) term “Rhinoplasty” as a ‘Topic’ and cross-checked to ensure repeatability of methods. A total of 15,485 articles were found. A list of 100 articles were created in descending order of “times cited”. Two articles which were not directly related to rhinoplasty were replaced with the 2 next most highly-cited articles. Articles whose main focus was not rhinoplasty (n=2: breast reconstruction and trans-sphenoidal hypophysectomy) were excluded (figure 1). Papers with the same number of total citations were ranked higher when they had a larger number of citations over a fewer number of years.

A single author (Y.S.), utilising the method of Kyler et al.⁷ recorded the following: title, source journal, publication year, total citations, average citations per year, type of study, level of evidence, country of origin, main subject, use of outcome measures, funding status and incorporation into ‘Selected Readings in Plastic Surgery’¹⁰ (a commonly employed, up-to-date, evidence-based guide to modern day plastic surgery practices) were recorded for each article into a computerised spreadsheet (Microsoft Excel 2013, Microsoft Corporation; Washington, USA). If the main subject of the article was a ‘technique’, then it was sub-categorised depending upon the focus of the technique and whether it was undertaken primarily for reconstructive or aesthetic purposes. The level of evidence was categorised according to the Oxford Centre for Evidence-Based Medicine (OCEBM; 2011).¹¹

Results

The hundred most cited articles were published between 1949 and 2008. Out of all the included journals, only 20 contained the 100 most cited articles (table 1). They have been listed in descending order according to the total number of times they have been cited (table 2). The total number of citations/paper ranged

from 273 by Burget & Menick¹² on a method to reconstruct the end of the nose to 61 by Guerrerosantos¹³ on the use of temporoparietal free fascia grafts. The mean citations/year ranged from 1.5 to 12.1.

The top 100 papers were published within 20 high IF journals; 'Plastic and Reconstructive Surgeons' contributed the majority of articles (n=57). Archives of Otolaryngology-Head & Neck Surgery was second (n=7). With the remaining journals contributing less than 5 papers each (Table 1). Of the 20 journals' surgical field of association; Plastic surgery journals were the highest contributors to the top 100 articles (n=74), followed by Otolaryngology/ENT (n=16), then by Psychology/Psychiatry (n=6) with the remaining specialities having only single contributions.

The countries with the highest number of publications were USA with 72% followed by 8% from the UK (table 3). The universities of Texas (n=17), California (n=5) and Pennsylvania (n=5) were placed first, second and third respectively (supplementary digital content 2). Single centre (n=76) work far outnumbered work undertaken at multiple centres (n=24).

The decade with the highest output of highly-cited papers was the 1990s, where almost half of the top 100 list originated from (n=46, figure 2). The decades of 1970s, 1980s and 2000s had similar lesser contributions (n=17, 16 and 17 respectively) and the 1960s had the lowest (n=4).

Rohrich was identified as the most prolific author with 8 papers (5 first author and 3 second author) featured in this list, followed by Gunter with 5 first author papers (supplementary digital content 3). Twenty-one authors contributed a total of 58 papers of the top 100 articles.

The most common focus of these 100 papers was surgical technique (53% of papers, figure 4), with a larger focus on reconstructive versus aesthetic procedures (3:1 ratio).

None of the articles achieved level 1 or 2 of evidence (OECBM levels of evidence, 2011). Most work only achieved level 4 evidence (n=64) (table 4) as a high proportion of the published literature were case-series (n=37) (figure 3). A small number of articles were for experimental studies (n=3), some for narrative literature reviews (n=21) with the majority being clinical studies (n=73), the remainder were expert opinions and assessment tool validations.

Outcome measures were employed in 72 papers, validated measures were used in 21 papers (14 objective physician-assessed measures and 25 patient-reported subjective surveys). Of the 72 papers, 47 used photographs as their primary outcome assessment tool. Twenty-nine percent of the papers in our top 100 list were included in the 2015 issue of 'Selected Readings in Plastic Surgery – Rhinoplasty'.¹⁰ Eighty-nine percent were unfunded studies (i.e. formalised sources of funding such as in the form of a grant).

Discussion

Our results demonstrate the characteristics of frequently cited papers within Rhinoplasty. There seems to be an increasing number of publications in rhinoplasty by different specialities which demonstrates the modern multi-disciplinary approach to management. Plastic, otolaryngology, maxillofacial surgeons and psychiatrists having their own journals where their respective doctors tend to publish. Analysis of the important papers amidst a growing body of literature can help guide the education and reading material of trainees in an attempt to keep abreast of 'classic' knowledge and developments in time-constrained environments this is shown by 29% of our top 100 papers being included in 'Selected Readings'. Strong links need to be maintained between surgeons and psychiatrists in particular, given the importance of such papers and journals contained in this list.

The most cited paper by Burget & Menick from 1985 discussed reconstruction of the nose based on topographic areas of its anatomy designated as subunits, central in perceived aesthetic outcomes and in planning surgery.¹² The second most cited paper by Sheen from 1984 detailed the use of a spreader graft in reconstruction of the roof of the middle nasal vault after Rhinoplasty; important for its use as an effective technique with good aesthetic and functional outcomes in one of the most commonly requested areas of primary or secondary rhinoplasty.¹⁴

Goin and Rees conducted a prospective study which demonstrated several important findings regarding patients' postoperative psychological reactions to Rhinoplasty, quantified by the Brief Symptom Inventory.¹⁵ This was pivotal in documentation on the influence between surgery and psychology with discrepancies between clinician and patient appraisal of aesthetic outcomes as well as expectations. The cosmetic procedure screening questionnaire (COPS) created by the team at the Department of Psychiatry

and Behavioural Sciences at University College London¹⁶ was valuable in identifying patients with body dysmorphic disorder (BDD) who may have a poor prognosis with cosmetic rhinoplasty. Recent work by this team has resulted in the production of a national cosmetic screening tool for BDD used in the UK.¹⁷ There may be a lag time between new concepts becoming available and their acceptance internationally with later citations two examples might include the trend from closed to open rhinoplasty¹⁸ and the utilisation of the COPS tool.¹⁶

Sarwer et al.¹⁹ undertook a review on the psychology of cosmetic surgery, their article highlights the necessity for a 'psychological work-up' prior to surgery and describes cosmetic surgery as a psychological intervention for self-esteem and other factors. Understanding body image concerns of cosmetic surgery patients has become incorporated into daily practice to limit the potential for unwanted psychological trauma from such procedures. Their review highlighted the need for further rigorous progress in psychological theory and research particularly into pre-operative assessment and post-operative response to the resulting change in appearance.¹⁹ The review by Honigman et al. further elaborated on this point and attempted to identify predictable factors for screening patients who would not be satisfied with the outcomes of cosmetic surgery. These factors included being young, male, having unrealistic expectations, previous unsatisfactory surgery, minimal deformity, motivation based on relationship influence and a history of depression, anxiety or personality disorder.²⁰

Other important papers in the list include Washio's Retroauricular-temporal flap²¹ and Tessier's total osteotomy of the middle face²² which have been picked out due to their technical wizardry alongside the forehead paramedian flap²³ which is an example of a workhorse technique, both of which are important in a plastic surgeon's skill set.

A problem encountered in all surgical specialities and not simply those relevant to Rhinoplasty, is the lack of randomised controlled trials (RCT) and generally, papers with OECBM levels 1 & 2. Unfortunately, despite a strong push for higher-quality studies in recent years, funding is still limited and not all surgical procedures can be investigated through RCTs. This is likely due to limited incidence in conditions, variation in presentation (especially true for Plastic surgery) and difficulty in standardising the patients, facilities, equipment and surgeons.²⁴

More than half the papers were techniques and follow the classic pattern of demonstration of a new technique with only the use of excellent illustrated examples. However, for the modern day plastic surgeon and patient, outcome assessment in a validated objective manner is needed and was not present in 79 of the 100 top papers. There is a lack of internationally validated outcome measures for aesthetic rhinoplasty.²⁵ Therefore, the challenge for future academic surgeons is not to copy these papers but to authenticate their techniques and methods with clear, objective outcome measures.

The common features of our top 100 papers include non-funded research that is of clinical relevance, study designs involving case-series or cohorts (e.g. level 3 or 4), being published in a high IF journal, is work from a single centre and focuses on reconstructive surgical techniques. Some of these findings are interestingly contrary to principals of EBM and to factors thought to result in a high-quality article. However, as demonstrated in the study designs within our list, measurement of scientific quality is not correlated with citations therefore once an article has crossed a threshold in terms of quality it is eligible to be highly-cited as long as it has significant clinical relevance.

The profile of topics demonstrates that there is a heavy focus on surgical techniques (n=53) but also in outcome measurement (n=18), psychiatry (n=11) and anatomy (n=7). The choice of subjects reflects the interests of the authors, journal and the scientific community. These high-impact articles have had an influence in Rhinoplasty as they inform surgeons' and clinicians' day-to-day practice as well as disseminating new concepts which are of direct clinical relevance and are thus integrated into clinical practice. One of the strengths in our methods is that we covered all journals in the SCI database, including those not traditionally considered as high-impact plastic surgery journals e.g. important psychiatry journals; this has been a shortfall of previous similar studies.^{7,9,26} Loonen et al. undertook a bibliometric analysis of the most-cited papers in Plastic surgery as a whole and their results demonstrate similar distributions to that of Rhinoplasty regarding the journals (PRS), countries and institutions (those affiliated to the USA), most common topic of article (reconstructive surgical techniques), low OCEBM levels employed (100% levels 4 and 5 in all of Plastic Surgery versus 24% level 3 and 76% levels 4 and 5 in Rhinoplasty), the speciality (and preference of single-centre studies (66% in all of Plastic surgery versus 75% in Rhinoplasty)).⁹

Whilst the papers themselves are different, the areas of interest and features of a high-cited paper in Plastic surgery is consistent and therefore reproducible.

Publications per decade as shown in figure 2 demonstrates that a vast number of the most-cited articles were published in the 1990s (n=46), but following this the 2000s also continued to produce highly-cited articles (n=17) and previous decades had fewer citations than the 1990s. The distribution of articles by decades showed that older articles were not heavily favoured because of effects of citation accumulation with time. This can possibly be explained by the concept of 'obliteration by inclusion' described by Garfield in 1987²⁷ (as the knowledge contained within an article becomes more accepted and incorporated into the scientific community, the less it is referenced and considered as acceptable common knowledge).

Whilst we have used the methodology previously described by Kyle et al⁷, one of the issues with citation analysis is that our list is naturally a dynamic one and to incorporate this facet, there are other methods besides the absolute number of citations for measuring the contribution of articles.²⁶ A reasonable alternative is the citations index (total citations over a period of years/number of years).⁹ It is generally considered that it can take 10 to 15 years for an article to reach its citation index peak,^{7,8} therefore this method was not employed as it would exclude several of the most-cited papers, especially those from recent years.

Having contributed so heavily to the growth of this area of surgery, the USA had the largest number of authors and institutions. This is not entirely surprising given the country's more accepted attitudes towards aesthetic rhinoplasty by their population, high gross domestic product, large scientific community, high demand, access to healthcare and promotion of a culture of academia within medicine and surgery.

However, there may be some attributable bias to this success; orientated bias may play a role in the form of auto-citing (authors try and increase the apparent recognition of their papers by citing themselves), local bias (authors in the USA cite other authors they know in the USA), in-house bias (authors cite colleagues and mentors). Further forms of negative orientated bias take the form of omission and incomplete biases, these refer to authors incorrectly not giving credit and citations to appropriate authors for the influence of their published work.²⁸ The journals themselves may promote bias towards promoting American work as they can exhibit powerful person bias (authors cite reviewers or editors of journals in an attempt to

increase the chances of acceptance of their manuscript), a national bias (reviewers for American journals can be biased towards accepting papers published from American authors)²⁹ and English language bias (journals are more likely to accept article written in English).²⁸ Despite these limitations, a vast number of journals were searched and the papers listed have made a significant contribution to this field of surgery and given the large number of citations should be entitled as being considered 'classics' in Rhinoplasty.

Conclusion

Citation analysis is not a measure of scientific quality and is afflicted by biases, however, it is an objective measure and we have used it to determine the most highly-cited papers in rhinoplasty. These top 100 papers have shaped current practice, are used in current teaching material and enforce surgical decision-making. We document the extensive use of cohorts and case-series as well as the evaluation of results primarily with photographs. Much has been achieved through the use of lower OECBM methods, however an evolving era of plastic surgery and an increasingly litigation-conscious climate, demands stringent methodology and systematically repeatable results. The current challenges for academic Rhinoplasty lies in the incorporation of validated objective outcome measures into the methodology and outcome analysis. These measures will not only benefit surgeons but also patients and the greater scientific community in developing techniques with the most favourable results.

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Figure Legends

1. Summary of methodology in creation of a database on the features of the hundred most-cited articles related to 'Rhinoplasty'.
2. The number of the hundred most-cited articles in Rhinoplasty by decade.
3. The types of articles employed in the hundred most-cited Rhinoplasty articles.
4. Focus of top 100 Rhinoplasty articles; surgical technique was sub-divided into those that focused on reconstructive operations and those techniques used for aesthetic purposes.

Table Titles

1. Top journals with their individual contribution to the 100 most-cited papers in Rhinoplasty.
2. The list of the 100 most-cited articles in Rhinoplasty.
3. Countries of origin for the 100 most-cited papers in Rhinoplasty.
4. Number articles with their respective OECBM level of evidence.

Supplementary Digital Content

1. References for Table 2; a list of the Top 100 articles in 'Rhinoplasty'.
2. Institutions most credited by the top 100 cited papers in Rhinoplasty.
3. Authors with more than one contribution to the 100 most-cited articles in Rhinoplasty.

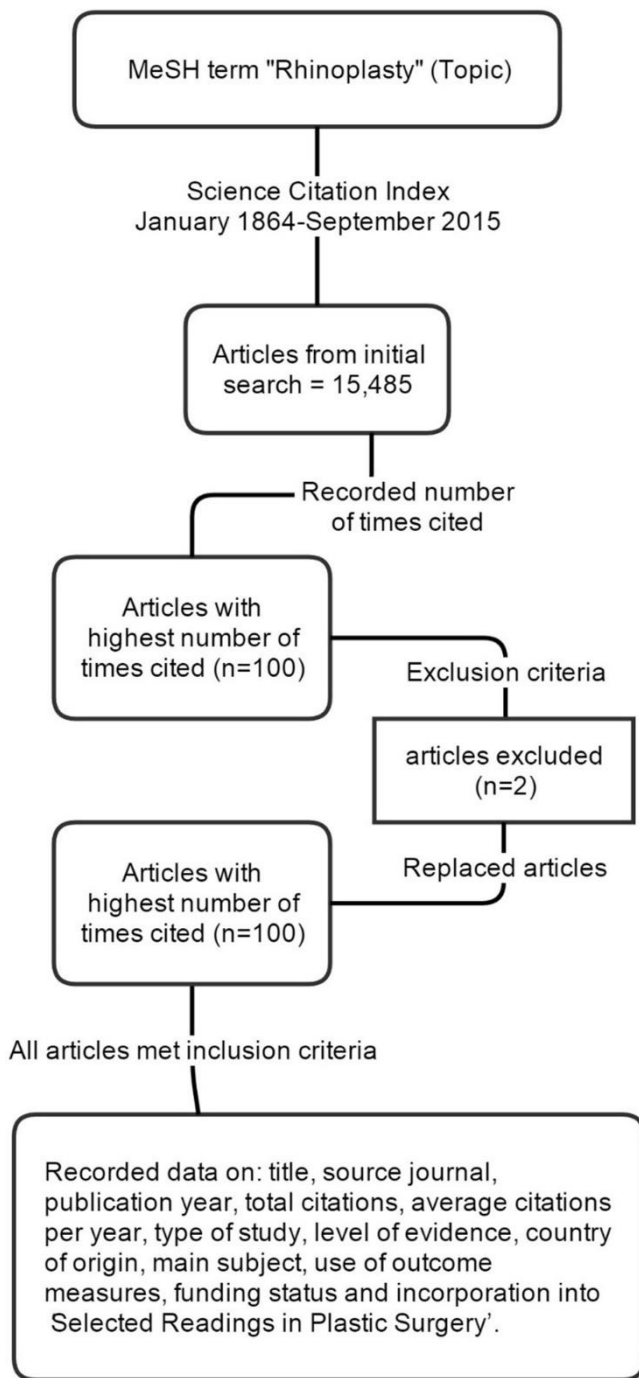


Figure 1

No. of articles in top 100 per decade

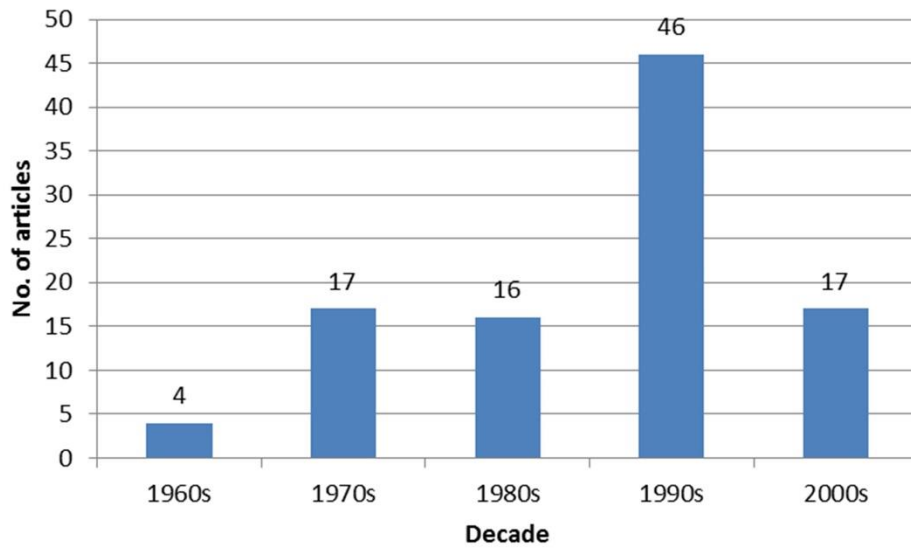


Figure 2

Types of articles in top 100

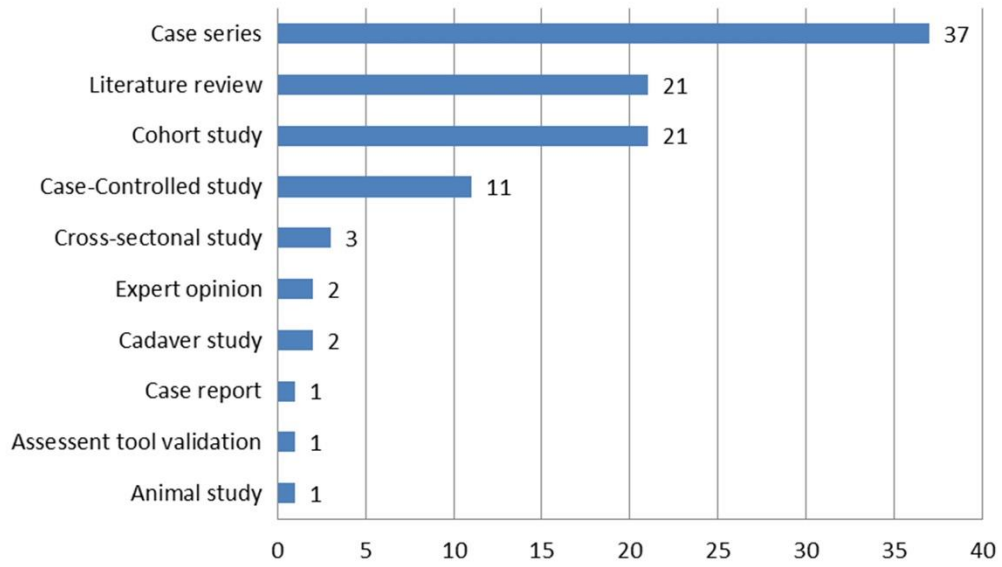


Figure 3

Topic of articles in top 100 Rhinoplasty papers

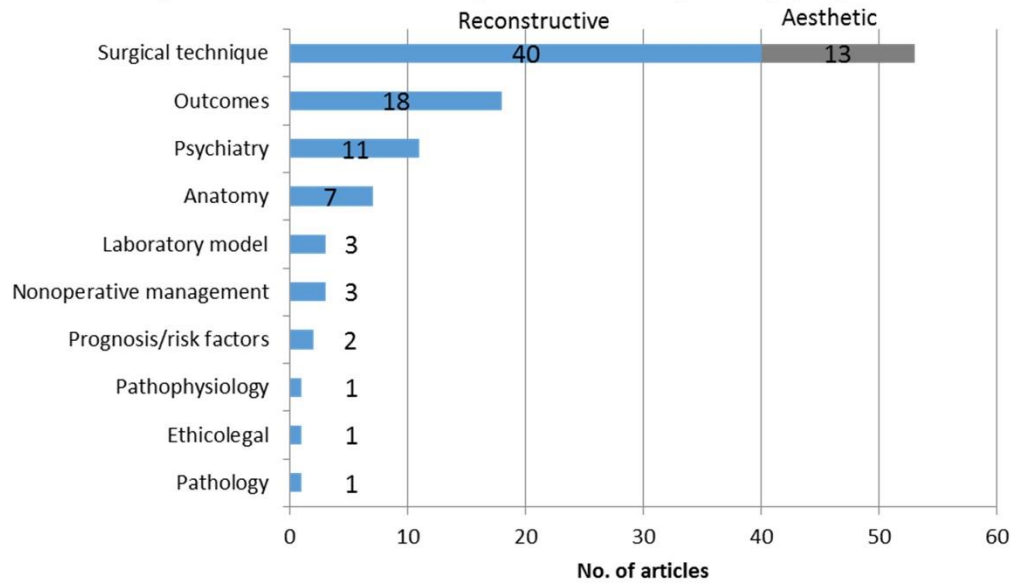


Figure 4

Table 1 – Top journals with their individual contribution to the 100 most-cited papers in Rhinoplasty

Rank	Journals	Counts	Journal's Main Speciality	Impact Factor^a
1	Plastic and Reconstructive Surgery	56	Plastic Surgery	2.99
2	Archives of Otolaryngology-Head & Neck Surgery	7	Otolaryngology/ENT	2.06
3	Laryngoscope	4	Otolaryngology/ENT	2.14
3	Clinics in Plastic Surgery	4	Plastic Surgery	0.91
3	British Journal of Plastic Surgery (updated to JPRAS)	4	Plastic Surgery	1.42
3	Archives of facial plastic surgery (updated to JAMA Facial Plastic Surgery)	4	Plastic Surgery	1.43
7	British Journal of Psychiatry	3	Psychology/Psychiatry	7.99
7	Aesthetic Plastic Surgery	3	Plastic Surgery	0.96
9	Cleft Palate-Craniofacial Journal	2	Plastic Surgery	1.20
9	Archives of Otolaryngology	2	Otolaryngology/ENT	2.33
9	Otolaryngologic Clinics of North America	2	Otolaryngology/ENT	1.49
12	Psychosomatics	1	Psychology/Psychiatry	1.86
12	Journal of Steroid Biochemistry and Molecular Biology	1	Basic Science	3.63
12	Journal of Psychiatric Research	1	Psychology/Psychiatry	3.96
12	Arthritis and Rheumatism	1	Rheumatology	7.76
12	Annals of Plastic Surgery	1	Plastic Surgery	1.49
12	Archives of Internal Medicine	1	Medicine	17.33
12	Annals of Otology Rhinology and Laryngology	1	Otolaryngology/ENT	1.09
12	Journal of Cranio-Maxillo-Facial Surgery	1	Oral & Maxillofacial surgery	2.93
12	Clinical Psychology Review	1	Psychology/Psychiatry	6.93

a) Official released impact factors found on journal websites as of October 2015.

b) Table 2 – The list of the 100 most-cited articles in Rhinoplasty

Rank	Author & Ref	No. of citations
1	Burget & Menick ¹	273
2	Sheen ²	272
3	Robinson et al. ³	242
4	McCoomb ⁴	148
5	Sarwer et al. ⁵	142
6	Bridger ⁶	134
7	Erol ⁷	133
8	Gunter & Friedman ⁸	127
9	Constantian & Clardy ⁹	126
10	Kridel et al. ¹⁰	124
11	Toriumi et al. ¹¹	118
12	Salyer ¹²	118
13	Tebbetts ¹³	116
14	Kumagai et al. ¹⁴	116
15	Menick, FJ ¹⁵	113
16	Ching et al. ¹⁶	112
17	Tajima & Maruyama ¹⁷	110
18	Toriumi ¹⁸	104
19	Sarwer et al. ¹⁹	103
20	Honigman et al. ²⁰	99
21	Klassen et al. ²¹	99
22	Daniel & Calvert ²²	98
23	Gunter & Rohrich ²³	98
24	Sheen ²⁴	98
25	Hay ²⁵	97
26	Rieger ²⁶	96
27	Wellisz ²⁷	95
28	Millard, D R Jr ²⁸	93
29	Burget & Menick ²⁹	91
30	Sheen ³⁰	89
31	Freeman et al. ³¹	88
32	Rankin et al. ³²	88
33	Byrd & Hobar ³³	88
34	Daniel ³⁴	88
35	Moss et al. ³⁵	88
36	Gunter et al. ³⁶	87
37	Crerand et al. ³⁷	86
38	Byrd et al. ³⁸	86
39	Farkas et al. ³⁹	86
40	Washio ⁴⁰	86
41	Byrd et al. ⁴¹	85
42	Khouri et al. ⁴²	84
43	Peck ⁴³	84
44	Millard ⁴⁴	84
45	Tessier ⁴⁵	81
46	Constantian ⁴⁶	80
47	Ortizmonasterio et al. ⁴⁷	79
48	Alsarraf et al. ⁴⁸	78
49	Mauil et al. ⁴⁹	78
50	Weikel & Habal ⁵⁰	78

Rank	Author & Ref	No. of citations
51	Koren et al. ⁵¹	77
52	Deva et al. ⁵²	77
53	Rees et al. ⁵³	75
54	Rohrich et al. ⁵⁴	74
55	Godin et al. ⁵⁵	74
56	Wells et al. ⁵⁶	74
57	Rohrich & Adams ⁵⁷	73
58	Gunter & Rohrich ⁵⁸	72
59	Guyuron et al. ⁵⁹	71
60	Pribaz et al. ⁶⁰	71
61	Jackson & Koch ⁶¹	71
62	Goin & Rees ⁶²	71
63	Gunter & Rohrich ⁶³	71
64	Hinderer ⁶⁴	71
65	Garciavelasco & Mondragon ⁶⁵	70
66	Janeke & Wright ⁶⁶	70
67	Grymer ⁶⁷	69
68	Owsley & Taylor ⁶⁸	69
69	Shumrick & Smith ⁶⁹	69
70	Alsarraf, R ⁷⁰	68
71	Kasperbauer & Kern ⁷¹	68
72	Courtiss & Goldwyn ⁷²	68
73	Herbert ⁷³	68
74	Millard ⁷⁴	68
75	Rohrich et al. ⁷⁵	68
76	Paniello ⁷⁶	67
77	Phillips ⁷⁷	67
78	Guyuron & Behmand ⁷⁸	66
79	Veale et al. ⁷⁹	66
80	Lovice et al. ⁸⁰	66
81	Rohrich & Hollier ⁸¹	66
82	Kimmelman ⁸²	66
83	McGregor & Soutar ⁸³	66
84	Hay & Heather ⁸⁴	66
85	Kridel et al. ⁸⁵	65
86	Wang et al. ⁸⁶	65
87	McComb ⁸⁷	65
88	Wright & Wright ⁸⁸	65
89	Rohrich et al. ⁸⁹	64
90	Park ⁹⁰	64
91	Jacobson & Kasworm ⁹¹	64
92	Connolly & Gipson ⁹²	64
93	McComb ⁹³	64
94	Wardinsky et al. ⁹⁴	63
95	Burget ⁹⁵	63
96	Daniel ⁹⁶	61
97	Mulliken & Martinez-Perez ⁹⁷	61
98	Sclafani et al. ⁹⁸	61
99	Hammer & Prein ⁹⁹	61
100	Guerrerosantos ¹⁰⁰	61

c) For references see Appendix 1.

d) Table 3 – Countries of origin for the 100 most-cited papers in Rhinoplasty

Rank	Countries	Count
1	USA	72
2	UK	8
3	Australia	6
4	Canada	3
5	Mexico	2
5	Japan	2
6	Spain	1
6	Switzerland	1
6	France	1
6	Denmark	1
6	Israel	1
6	Scotland	1
6	Turkey	1

e)

Table 4 – Number articles with their respective OECBM level of evidence

Level of evidence	No. of Articles
1	0
2	0
3	24
4	64
5	12

Supplemental Digital Content 1: References for Table 2; a list of the Top 100 articles in 'Rhinoplasty'.

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Supplementary Digital Content 2: Institutions most credited by the top 100 cited papers in

Rhinoplasty

Rank	Institution	No. of papers
1	University of Texas, Texas, USA	17
2	University of California, Los Angeles, USA	5
2	University of Pennsylvania, Philadelphia, USA	5
4	University of Washington, Washington, USA	4
5	University of Illinois, Illinois, USA	3
5	Columbia University, New York, USA	3
5	Butler Hospital, Rhode Island, USA	3
5	University of Florida, Florida, USA	3
5	New York University, New York, USA	3
5	Harvard University, Massachusetts, USA	3
5	Baylor College of Medicine, Texas, USA	3
12	Augustana Hospital, Illinois, USA	2
12	Dartmouth College, New Hampshire, USA	2
12	Hoag Memorial Hospital, California, USA	2
12	Boston University, Massachusetts, USA	2
12	Brown University, Rhode Island, USA	2
12	University of Oxford, England, UK	2
12	Glasgow Royal Infirmary, Scotland, UK	2
12	University of Melbourne, Australia.	2
12	University of Mexico, Mexico	2
12	Rabin Medical Centre, Israel	2

Supplementary Digital Content 3: Authors with more than one contribution to the 100 most-cited articles in Rhinoplasty

Name	Total no. of papers	First author	Second author	Third author or after
Rohrich, RJ	8	5	3	0
Gunter, JP	5	5	0	0
Sheen, JH	3	3	0	0
McComb, H	3	3	0	0
Byrd, HS	3	3	0	0
Burget, GC	3	3	0	0
Daniel, RK	3	3	0	0
Phillips, KA	3	1	2	0
Menick, FJ	3	1	2	0
Alsarraf, R	2	2	0	0
Hay, GG	2	2	0	0
Guyuron, B	2	2	0	0
Sarwer, DB	2	2	0	0
Rees, TD	2	1	1	0
Toriumi, DM	2	1	0	1
Mulliken, JB	2	1	0	1
Wright, WK	2	0	2	0
Wadden, TA	2	0	1	1
Pertschuk, MJ	2	0	1	1
Friedman, RM	2	0	1	1
Whitaker, LA	2	0	0	2