



Systematic Review of Quality of Patient Information on Liposuction in the Internet

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Background: A large number of patients who are interested in esthetic surgery actively search the Internet, which represents nowadays the first source of information. However, the quality of information available in the Internet on liposuction is currently unknown. The aim of this study was to assess the quality of patient information on liposuction available in the Internet.

Methods: The quantitative and qualitative assessment of Web sites was based on a modified Ensuring Quality Information for Patients tool (36 items). Five hundred Web sites were identified by the most popular web search engines.

Results: Two hundred forty-five Web sites were assessed after duplicates and irrelevant sources were excluded. Only 72 (29%) Web sites addressed >16 items, and scores tended to be higher for professional societies, portals, patient groups, health departments, and academic centers than for Web sites developed by physicians, respectively. The Ensuring Quality Information for Patients score achieved by Web sites ranged between 8 and 29 of total 36 points, with a median value of 16 points (interquartile range, 14–18). The top 10 Web sites with the highest scores were identified.

Conclusions: The quality of patient information on liposuction available in the Internet is poor, and existing Web sites show substantial shortcomings. There is an urgent need for improvement in offering superior quality information on liposuction for patients intending to undergo this procedure. (*Plast Reconstr Surg Glob Open* 2016;4:e759; doi: 10.1097/GOX.0000000000000798; Published online 28 June 2016.)

Liposuction is an esthetic procedure that removes fat from many different sites of the body, of which the most common are abdomen, thighs, buttocks, backs of the arms, and neck.¹ The majority of patients considering liposuction may actively search for information in the Internet before consultation by a health professional.^{2,3} The Internet provides direct and fast access to patient information, and there was an enormous growth of this medium in the last decades including the field of esthetic surgery.⁴ However, everyone can create his or her own Web site with uncontrolled and not peer-reviewed information, including physicians, in-

stitutions, patient representatives, and the industry. The concern about the quality of patient information in the Internet is increasing.^{5–9} Liposuction is the world's most frequently performed esthetic surgery procedure. In 2011, plastic surgeons performed >1.2 million liposuctions worldwide which made 19% of all plastic surgery procedures.¹⁰ Economic analyses predict a further increase of esthetic procedures being performed in the near future.¹¹ The need for reliable and comprehensive information on this topic will grow too. Several instruments to evaluate patient information were proposed.^{3,12} The modified Ensuring Quality Information for Patients (EQIP) is a reliable, easy to use, validated, and reproducible tool to analyze the quality of patient information in the Internet.^{12,13} To the best of our knowledge, assessment of available information on liposuction with a validated tool was never reported. The aim of this study was therefore to assess systematically whether the Internet provides adequate quality of information for patients interested in liposuction.

MATERIALS AND METHODS

Eligibility Criteria, Information Sources, and Study Selection

Data were collected in November and December 2013 by 1 investigator using the 5 most popular search engines: Google,

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Table 1. Overall Results of the Included Web Sites According to the Modified Ensuring Quality Information for Patients Instrument

Item	Criteria	Yes (%)	No (%)	Does Not Apply (%)
Content data				
1	Initial definition of which subjects will be covered	244 (99.6)	1 (0.4)	0 (0)
2	Coverage of the previously defined subjects (NA if the answer is “no” for Item 1)	244 (99.6)	1 (0.4)	0 (0)
3	Description of the medical problem	222 (90.6)	23 (9.4)	0 (0)
4	Definition of the purpose of the surgical intervention	206 (84.1)	39 (15.9)	0 (0)
5	Description of treatment alternatives	93 (38.0)	152 (62.0)	0 (0)
6	Description of the sequence of the surgical procedure	65 (26.5)	180 (73.5)	0 (0)
7	Description of the qualitative benefits to the recipient	58 (23.7)	187 (76.3)	0 (0)
8	Description of the quantitative benefits to the recipient	57 (23.3)	188 (76.7)	0 (0)
9	Description of the qualitative risks and side effects	69 (28.2)	176 (71.8)	0 (0)
10	Description of the quantitative risks and side effects	68 (27.8)	177 (72.2)	0 (0)
11	Addressing quality-of-life issues	54 (22.0)	191 (78.0)	0 (0)
12	Description of how complications are handled	16 (6.5)	229 (93.5)	0 (0)
13	Description of the precautions that the patient may take	80 (32.7)	165 (67.3)	0 (0)
14	Mention of alert signs that the patient may detect	43 (17.6)	202 (82.4)	0 (0)
15	Addressing medical intervention costs and insurance issues	169 (69.0)	76 (31.0)	0 (0)
16	Specific contact details for hospital services	13 (5.3)	0 (0)	232 (94.7)
17	Specific details of other sources of reliable information/support	11 (4.5)	234 (95.5)	0 (0)
18	Coverage of all relevant issues for the topic (summary item for all content criteria)	0 (0)	244 (99.6)	0 (0)
Identification data				
19	Date of issue or revision	207 (84.5)	38 (15.5)	0 (0)
20	Logo of the issuing body	164 (66.9)	81 (33.1)	0 (0)
21	Names of the persons or entities that produced the document	215 (87.8)	30 (12.2)	0 (0)
22	Names of the persons or entities that financed the document	10 (4.1)	235 (95.9)	0 (0)
23	Short bibliography of the evidence-based data used in the document	13 (5.3)	232 (94.7)	0 (0)
24	Statement about whether and how patients were involved/consulted in the document's production	24 (9.4)	221 (90.2)	0 (0)
Structure data				
25	Use of everyday language and explanation of complex words or jargon	244 (99.6)	1 (0.4)	0 (0)
26	Use of generic names for all medications or products (NA if no medications described)	71 (29.0)	30 (12.2)	144 (58.8)
27	Use of short sentences (<15 words on average)	243 (99.2)	2 (0.8)	0 (0)
28	Personal address to the reader	244 (99.6)	1 (0.4)	0 (0)
29	Respectful tone	245 (100.0)	0 (0)	0 (0)
30	Clear information (no ambiguities or contradictions)	238 (97.1)	7 (2.9)	0 (0)
31	Balanced information on risks and benefits	18 (7.3)	227 (92.7)	0 (0)
32	Presentation of information in a logical order	92 (37.6)	153 (62.4)	0 (0)
33	Satisfactory design and layout (excluding figures or graphs)	202 (82.4)	42 (17.1)	0 (0)
34	Clear and relevant figures or graphs (NA if absent)	12 (4.9)	2 (0.8)	231 (94.3)
35	Inclusion of a named space for the reader's note or questions	1 (0.4)	243 (99.2)	0 (0)
36	Inclusion of a printed consent form contrary to recommendations (NA if not from hospitals)	0 (0)	14 (5.7)	231 (94.3)

Bing, Yahoo, Ask.com, and AOL.¹⁴ The keyword “liposuction” was used and the first 100 Web sites for each search engine were identified. This was based on the assumption that most people limit their search to a number below 100 (ie, the first 10 search results pages), as previously described.¹⁵ From the initial number of 500 Web sites in English, the following were eliminated: duplicates, irrelevant Web sites, such as those covering the keyword in different context than providing information on liposuction, and Web pages including scientific articles such as those from scientific journals which are primarily intended for professionals due to specialized vocabulary and have restricted access to subscribers.¹⁵

The source of the eligible 245 Web sites was categorized into 10 groups: (a) academic/educational institutions, (b) encyclopedias, (c) health departments, (d) hospitals, (e) the industry, (f) news services (ie, the press), (g) patient groups, (h) practitioners, (i) professional societies, and (j) Web portals.

Medical Information Assessment Tool

Eligible Web sites were assessed using the modified EQIP instrument,^{12,13} which provides a checklist composed

of 36 items that evaluate the content, identification, and structure data of online available patient information (Table 1). This instrument was successfully used by other authors,¹⁶ and we decided to adapt its modified version¹⁵ using the binary scale of yes versus no or NA (not applicable) for items not applicable to liposuction. The modification consisted in not using the answer partially yes, which is of subjective nature and of low reliability, as previously described.^{13,17}

Morbidity and Mortality Risks

Items 9 and 10 of the modified EQIP instrument assess information on complications, morbidity, and mortality risk (Table 1). Liposuction can be associated with a variety of complications, which may be local, such as edema, ecchymosis, hematoma, and infection or systemic such as significant blood loss, visceral perforation, thromboembolism, or even death (Item 9, Table 1).¹⁸ Item 10 evaluates the description of quantitative risks represented as a proportion or a ratio, such as infection rates after liposuction. Various authors report incidence of <1%,^{19–21} but lethal complications were also reported.²²

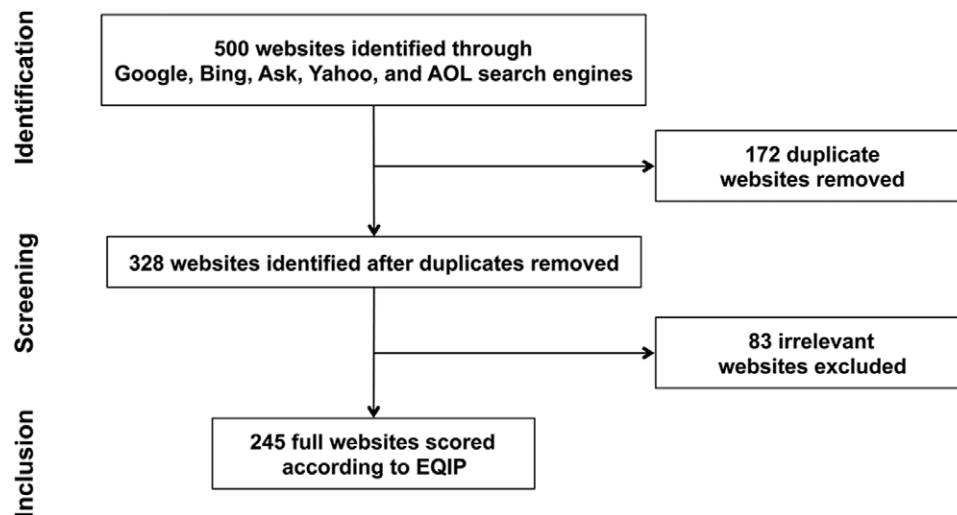


Fig. 1. Flow chart showing how relevant Web site were identified, screened, and included to our study.

Quality of Life

In esthetic surgery procedures, such as liposuction, the primary determinants of success are patient satisfaction and quality of life.²³ This issue (Item 11) should provide information on what patients' expectations towards surgery can be, and if they can always be achieved, given that this information being available in the literature.²⁴

Statistical Analysis

SPSS version 21 for Mac (IBM Corp., Armonk, N.Y.) was used to perform statistical analysis. Data derived from categorical variables were compared with the χ^2 or Fischer's tests; the one-way analysis of variance or Student *t* tests were used to compare continuous variables where appropriate. The *P* values <0.05 were considered statistically significant, and all of them were 2-sided. The Web sites were scored from 0 to 36, and equal weight of importance was given to every item. All Web sites were assessed by 1 investigator to maintain consistency in the review. The EQIP score was dichotomized by using the 75th quartile as a cutoff point to discriminate high-score Web sites from low-score ones, as previously described.¹⁵

RESULTS

Web Sites Providing Medical Information on Liposuction for Patients

Five hundred Web sites developed in English containing the keyword "liposuction" were identified with Google, Bing, Ask.com, Yahoo, and AOL Internet search engines. After elimination of duplicates, irrelevant Web sites, and those intended for scientists with access restricted only to professionals, 245 eligible Web sites underwent qualitative and quantitative assessment (Fig. 1). From these eligible Web sites, 163 (66.5%) were developed by medical practitioners, followed by 50 (20.4%) by portal developers, 9 (3.7%) by hospitals, 8 (3.3%) by academic centers, 4 (1.6%) by encyclopedias, 4 by news services, and 4 by pro-

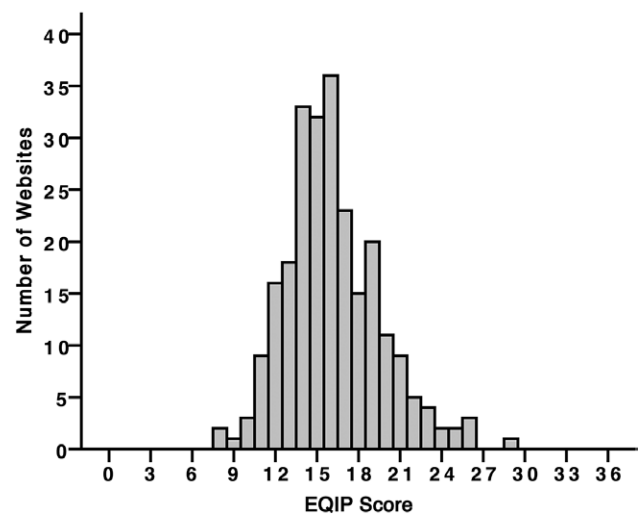


Fig. 2. Histogram presenting the number of Web sites (vertical axis) and their scores according to the modified EQIP instrument (horizontal axis).

fessional societies and 1 (0.4%) by a health department, 1 by the industry, and 1 by a patient group.

A total of 216 Web sites originated from the United States (88.2%), followed by 9 (3.7%) from Australia, and 9 from the United Kingdom, and 11 (4.4%) from other countries such as Canada, Dominican Republic, India, Mexico, New Zealand, Singapore, South Africa, and the United Arab Emirates.

EQIP Score Achieved by All Web Sites

The median score of 16 points [interquartile range (IQR), 14–18] was achieved according to the EQIP scoring system. Web sites obtaining a score of more than 18, which corresponds to the 75th percentile, were defined as high-score Web sites¹⁵ and those obtaining a score of ≤ 18 were defined as low-score Web sites. A high score was obtained by 72 Web sites (29%), and low score by the remaining 173 (71%; Fig. 2; Table 1).

Table 2. The Top-rated Web Sites (>95th Percentile According to the Modified EQIP Instrument)

Ranking	Website	Country of Origin	Source of Information	Score
1	http://cosmeticsurgery.ucla.edu/body.cfm?id=35	United States	Academic center	29
2	http://westcountyplasticsurgeons.wustl.edu/Procedures/Body-Procedures/Tumescent-Liposuction	United States	Academic center	26
2	http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/liposuction	Australia	Health department	26
2	http://www.cosmosclinic.com.au/tummy/liposuction	Australia	Practitioner	26
5	http://www.answers.com/topic/liposuction	United States	Portal	25
5	http://www.deramonpsi.com/liposuction-harrisburg.html	United States	Practitioner	25
7	http://www.buzzle.com/articles/liposuction	United States	Portal	24
7	http://www.plasticsurgery.org/cosmetic-procedures/liposuction.html	United States	Professional society	24
9	http://www.austinplasticsurgerycenter.com/liposuction.php	United States	Practitioner	23
9	http://www.emedicinehealth.com/liposuction/article_em.htm	United States	Portal	23
9	http://www.surgery.com/procedure/liposuction	United States	Portal	23
9	http://www.thevictoriancosmeticinstitute.com.au/liposuction	Australia	Practitioner	23

The 12 top-rated Web sites¹⁵ obtained a score of more than the 95th percentile (EQIP \geq 23; Table 2). Most of the top-rated Web sites originated from the United States followed by Australia. The highest-scored Web site received 29 of total 36 points.²⁵

EQIP Score Achieved by First 30 Web Site Search Results

Under the assumption that most users limit their search for a keyword to the first 3 pages (ie, 30 Web site results, 10 per page), a subgroup analysis was performed to compare the overall quality of patient information of the first 30 search results for the keyword “liposuction” with the median EQIP score calculated according to the EQIP scoring system. There was a statistically significant difference of only 1 EQIP point favoring the first 30 Web site results (median, 16; IQR, 14–19 vs median 15; IQR, 14–17; $P = 0.003$).

Overall Quality of Medical Information Assessed with the Modified EQIP Tool

The lowest score achieved was 8 by 2 Web sites,^{26,27} the maximum score of 29 was achieved by a Web site developed by an academic center, the University of California, Los Angeles.²⁵ None of the assessed Web sites provided information on all 36 items of the modified EQIP tool. There were 72 Web sites that covered >18 items and classified as high-score Web sites. Regarding the source of information, professional societies, portals, patient groups, health departments, and academic center Web sites scored higher as assessed by the modified EQIP instrument when compared with those developed by private practicing surgeons alone (Fig. 3). Furthermore, 77% (126/163) of the Web sites developed by private practicing surgeons were scored low ($P = 0.035$) when compared with other sources. In an attempt to identify the reason why these Web sites scored low, we performed a subgroup analysis assessing the reporting of complications and mortality. A surprising 76% (136/177) of the Web sites developed by private practicing surgeons did not mention any risks associated with liposuction when compared to Web sites developed from other sources ($P < 0.001$).

Year First Published

The oldest Web site origins from 1994 but most of them (62%) were first published or fully updated in 2013.

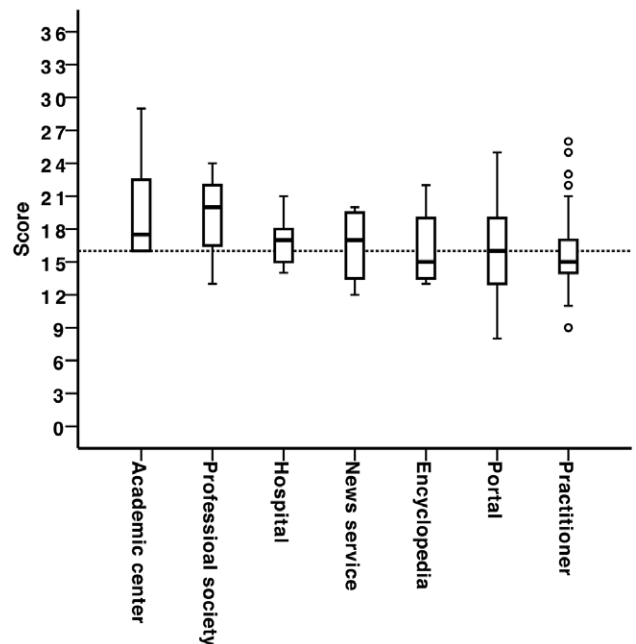


Fig. 3. Box plot presenting Web site scoring based on the modified EQIP tool depending on source of information. The horizontal thick line within the box plot represents the median. The upper line of the box plot represents the 75th percentile while the lower the 25th percentile. The upper whisker line represents the maximum value, while the lower the minimum value. Outliers are shown as circles. The median EQIP score was 16 points (dotted line). Health departments, industry, and patient groups were excluded as each of them provided only 1 Web site.

Figure 4 illustrates how the quality of the Web sites based on the EQIP score did not significantly change with time.

Length of Professional Experience in Private Practicing Surgeons

Figure 5 demonstrates the relation between the professional experience of Web site developers and the EQIP score achieved by their Web sites. In this subgroup analysis, we focused on Web sites from American single surgeon private practices, as most of the screened Web sites originated from the United States. The verification of time since board certification issuance and Web site develop-

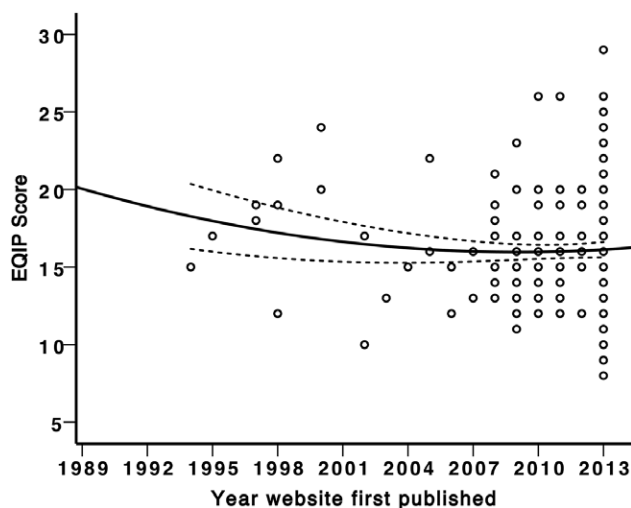


Fig. 4. Scatter plot with the year of Web site publication on the horizontal axis and their scores awarded by the modified EQIP instrument on the vertical axis. The solid line represents the mean EQIP score of the Web sites, and the dotted lines represent the 95% confidence intervals.

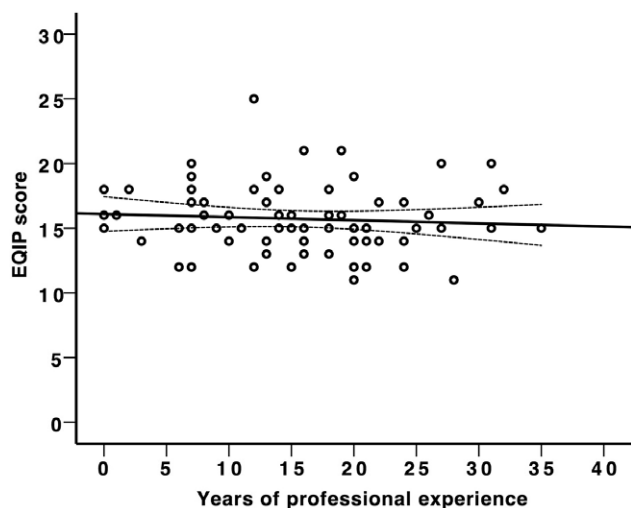


Fig. 5. Scatter plot with the years of private practicing surgeon's professional experience on the horizontal axis and scores that their Web sites were granted by the modified EQIP instrument on the vertical axis. The solid line represents the mean EQIP score of the Web sites.

ment using the official register of the American Society of Plastic Surgeons²⁸ was possible in 72 cases.

DISCUSSION

This is the first study to assess the quality of patient information on liposuction using the validated modified EQIP instrument. The most important findings of the study were, first that the overall quality of information on liposuction for patients was poor. Second, private practicing surgeons, representing over two thirds of the assessed Web sites, developed the lowest quality Web sites. Third, according to the type of data covered, content data items were addressed insufficiently whereas the identification

and structure data were well presented. Fourth, only few Web sites reported the estimated morbidity and mortality rates.

We used the validated modified EQIP instrument to systematically assess the eligible Web sites.²⁹ This tool guarantees reproducibility of the results as already shown by other authors.^{12,13,30} The initial EQIP tool was developed with a 20-item scoring system¹³ and later validated and expanded into a 36-item assessment tool addressing the content, structure, and identification data of patient information documents. It was developed by rating the quality of 73 documents describing medical care procedures, used at the University Hospital of Geneva, Switzerland. The assessment rules were defined on 25 documents, and the remaining 48 documents were independently rated by 2 assessors. The inter-rater reliability was very good (κ statistic = 0.84) and the intraclass correlation coefficient was as high as 0.95. The authors recommended that all efforts should focus on respecting guidelines and including patients when producing patient information material.¹²

According to our results, the overall quality of information on liposuction for patients is very poor. Although the slightly better quality of patient information in the Internet after reducing the screened Web site number to 30 hits, as opposed to the first 100, was shown to be statistically significant, as assessed by the median EQIP score, nevertheless this difference was relatively small.

Many plastic surgeons that practice in the private settings advertise their service using the Internet. This may explain the fact that two thirds of the assessed Web sites were developed by physicians compared with one-third by other providers. In a study on advertisement in esthetic surgery, plastic surgeons had the highest average overall ethical code scores compared with other specialties,² therefore the low quality of the Web sites found in this study is disappointing. Even the top 10 Web sites show substantial shortcomings as assessed by the modified EQIP instrument. Better quality of patient information is needed especially in terms of the surgical procedure, qualitative and quantitative benefits, and risks for the patient, how complications are handled, and what precautions patients can take. Different surgical techniques and alternatives to surgery should also be better covered. An appropriate patient selection is another important issue that should be addressed while considering an intervention in previously obese patients after massive weight loss.¹⁸ Furthermore, it was insufficiently mentioned that the results of liposuction are not permanent if no further lifestyle changes are taken.¹⁹

Photographs of previously operated on patients followed by board certification, training, hospital affiliations, and costs of surgery are most frequently searched information on a plastic surgeon's Web site.² Item 34 of the modified EQIP tool assessed whether images of the body are used, but it would have been interesting to show how poor the overall quality of photographs can be. Very few Web sites used fair photographs, meaning same size and same projection. As a matter of fact, unprofessional Web sites may discourage patients from making an appointment.

In case video tools were used, the Web sites were all well prepared and provided adequate information. Furthermore, in many Web sites, a liposuction video developed from the American Society of Plastic Surgeons was repeatedly available.³¹ Clearly, the currently best liposuction Web site which could be recommended to physicians to suggest to their patients was provided by University of California, Los Angeles.²⁵ This Web site used the Emmi tool (Emmi Solutions, LLC, Chicago, Ill), an interactive introduction video which takes approximately 15 minutes, and presents the different considerations in liposuction as risks, benefits, and alternatives fairly.

The fact that most of the Web sites were developed recently in contrary to the oldest one, created almost 20 years ago, does not necessarily mean they are better, as assessed by the modified EQIP criteria. Although there is a great amount of research on the topic 'patient information', it seems to be staying at experimental level.³²

The overall complication rate after liposuction was reported as high as 1 in every 10 patients in an analysis of 2398 cases,³³ and the mortality rate is estimated to be 1 in every 5000 procedures.³⁴ However, in our study less than a third of the Web sites mentioned potential postoperative complications or even death after liposuction. A surprising 76% of the Web sites developed by private practicing surgeons did not mention any risks associated with liposuction when compared with Web sites from other sources. In contrary, over half of the Web sites providing donor information for living donor liver transplantation reported risk of complications and death after donation.¹⁵ This may reflect the fact that liposuction is a customer-oriented procedure, and despite ethical concerns, Web site developers may be discouraged from reporting these risks to attract more patients/customers.³⁵ This commercial aspect may also explain why Web sites developed by academic centers and other non-profit organizations scored better than those developed by private practicing surgeons (Fig. 4).

This study has some limitations. Web sites developed in any other language rather than English were excluded from the study due to our linguistic limitations, and thus, the quality of the Web sites published in other languages remains unknown. However, English is spoken as first or second language in most of the developed countries.³⁶ The modified EQIP instrument was developed to assess any type of patient information and does not refer specifically to liposuction—this may be a limitation of the assessment tool itself. Some elements of the international recommendations for developers of new decision aids in health care, established by the International Patient Decision Aids Standards (IPDAS) collaboration, were not addressed in this study as the modified EQIP tool does not include all the items of the IPDAS checklist.^{12,15,37} However, it was shown that the modified EQIP instrument has higher inter-rater reliability; it is highly reproducible and simpler than the IPDAS checklist. Another potential shortcoming could be the fact that only a single investigator performed the assessment of the Web sites in our study. Due to work and time constraint, we did not consider having the Web sites assessed by an additional independent investigator as

the modified EQIP tool was shown to be highly reproducible and objective.

In this study, we focused on the evaluation of the existing patient information on liposuction with a validated and reproducible tool, and to our best knowledge, this was done for the first time. We did not consider any other form of assessment, for instance to create our own assessment instrument, as shown by Jejurikar et al⁹ or to review the patient information by an experienced health professional, as shown by Gordon et al,⁸ as this would lack validation.

Based on the findings of this study, we recommend that Web site developers use of modified EQIP instrument to ensure good quality of their Web sites. An inclusion of a tag "Quality of information published on this Web site was checked with modified EQIP tool" at its bottom would be a characteristic distinguishing it from other Web sites published without any peer-review process. Alternatively, a review and certification from a national board of plastic and reconstructive surgeons may be useful to be included. One's contribution to improve the overall quality of information presented in the Internet would be to meet all of the modified EQIP criteria: the positive ones which can attract patients and the possibly negative ones, like morbidity and mortality risks (but in a careful way, eg, in a form of percentage or ratio and well interpreted) to promote patient transparency.

CONCLUSIONS

According to the best of our knowledge, this is the first study to assess the quality of patient information on liposuction in the Internet using the modified EQIP instrument. Our results show that the overall quality of the Web sites based on the validated modified EQIP instrument seems to be relatively poor. Only a few of the Web sites scored high but nevertheless they still did not fulfill all the requirements. There is an urgent need of developing a Web site on this topic satisfying all EQIP items by a multidisciplinary working group supported by an international society with the use of the Delphi or Danish model of consensus.

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