Evaluation of information available on the internet regarding reverse total shoulder arthroplasty

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Abstract

Background: Prior studies have analyzed the quality of information available on the Internet regarding common orthopaedic surgical procedures. The purpose of the present study was to evaluate the quality of information available for reverse total shoulder arthroplasty (rTSA).

Methods: Websites were identified using the search term ‘reverse total shoulder arthroplasty’ and the first 50 websites from three separate search engines (Google, Yahoo, and Bing) were selected for evaluation of authorship and quality of information using the DISCERN instrument (www.discern.org.uk). After disregarding duplicated or overlapping websites within and among search engines, 90 of the total 150 websites were evaluated. A one-way analysis of variance test was used to compare differences in DISCERN scores between three categories of authorship (academic, private, other).

Results: The majority of the websites evaluated were authored by academic (43%) and private institutions (36%). These were the most credible sources, providing overall better quality and reliability than other sources. DISCERN reliable ($p = 0.017$) and overall scores ($p = 0.020$) were significantly higher for academic institutions compared to other websites.

Conclusions: The information available on the Internet pertaining to reverse total shoulder arthroplasty is highly variable and provides moderate quality information about treatment choices with some limitations based on the DISCERN instrument.

Keywords

consumer health information, evaluation studies, information dissemination, Internet, reverse total shoulder arthroplasty, search engine

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Introduction

The Internet is becoming an increasingly popular source for patients to obtain medical information.¹ There have been studies examining the strengths and weaknesses of information available on the Internet regarding several common orthopaedic surgical procedures including anterior cruciate ligament reconstruction,² anatomic total shoulder arthroplasty,³ and rotator cuff repair.⁴ There is an increasing incidence of shoulder arthroplasty in the United States, which is at least partially a result of the now expanded use of reverse total shoulder arthroplasty (rTSA).⁵

The term ‘reverse total shoulder’ is often confusing to patients, leading patients to seek more information on the procedure. The purpose of the present study is to

determine the reliability of the information obtained on the Internet regarding rTSA by examining the authorship and content of available websites. We hypothesized that the information available on the Internet regarding reverse total shoulder arthroplasty would be limited in quality. We also hypothesized that websites authored by academic institutions would provide the highest-quality information.

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Materials and methods

Websites were identified using the search term ‘reverse total shoulder arthroplasty’ and entered into three separate search engines (Google, Yahoo, and Bing) on 25 July 2016. The first 50 websites from each search engine were selected for evaluation of authorship and quality of information using the DISCERN instrument (www.discern.org.uk).^{6,7} All duplicate or overlapping websites within and among search engines were discarded. The data collection methods are similar to those reported previously.²⁻⁴

The DISCERN instrument is designed to help users of consumer health information determine the quality of a publication written about treatment questions. The DISCERN questionnaire consists of 16 questions divided into three subdivision scores: the reliable score, the treatment options score and the overall quality score (question 16) (Table 1). The DISCERN scores were independently applied by two reviewers, whose results were compared to determine the quality of a publication written about treatment questions. When discrepancies were present, the two reviewers discussed the results and came to agreement.⁷

The authorship of each website was categorized into one of three categories: (1) *academic*: included any physician or research group affiliated with a university or academic organization; (2) *private*: indicated that there were no affiliations between the physician group and any academic organization or university; (3) *other*: included five subcategories—(3a) *industry*: included advertisement of a product or service for a profit by any manufacturing or marketing company; (3b) *news*: sources included any bulletin or media reports without affiliation to any academic institution or medical practice; (3c) *public education*: sites indicated third-party information was provided by an individual or organization with a noncommercial website; (3d) *blogs*: included websites describing any individual’s personal experiences in journal form;² and (3e) *video*: included any websites containing a video to explain the procedure. Any academic websites containing a video were categorized as academic.

The websites were then evaluated for the ability to contact the author and initiate injury discussion. The ability to contact the author was analyzed for each website and considered positive if an e-mail, a telephone number, or the capacity to schedule an appointment was available. Discussion of the disorder was considered positive if there was a detailed explanation of the indications and reasons for performing a rTSA. These indications included (but are not limited to) a completely torn rotator cuff, cuff tear arthropathy, a previous shoulder replacement that was unsuccessful, severe shoulder pain when lifting the affected arm, and shoulder pain not relieved by other treatments,

Table 1. DISCERN instrument.

Items of the reliable score
1 Are the aims clear?
2 Does it achieve its aims?
3 Is it relevant?
4 Is it clear what sources of information were used to compile the publication (other than the author or producer)?
5 Is it clear when the information used or reported in the publication was produced?
6 Is it balanced and unbiased?
7 Does it provide details or additional sources of support and information?
8 Does it refer to areas of uncertainty?
Items of the treatment score
9 Does it describe how each treatment works?
10 Does it describe the benefit of each treatment?
11 Does it describe the risks of each treatment?
12 Does it describe what would happen if no treatment was used?
13 Does it describe how the treatment choices affect overall quality of life?
14 Is it clear that there may be more than 1 possible treatment choice?
15 Does it provide support for shared decision-making?
Overall impression of website
16 Based on the answers to all of the above questions, rate the overall quality of the publication as a source of information about treatment choices.

The questionnaire includes the 16 questions of the DISCERN instrument extracted from www.discern.org.uk.

such as rest, medications, physical therapy and cortisone injections. Treatment options were considered positive if nonsurgical treatment options such as physical therapy were mentioned. Patient’s eligibility for rTSA was evaluated for each website and considered positive if the website discussed factors that determined a patient’s eligibility for rTSA. These factors included both chronological and physiological age, as well as patient activity level.

The surgical technique was considered positive if there was a written detailed paragraph or diagram

describing the procedure. Complications were considered positive if one of the following risks was listed: infection, instability of the joint prosthesis, fracture of either the humerus or glenoid, nerve injury, prosthetic loosening and anesthesia-related complications. Rehabilitation was considered positive if the postoperative care was at least briefly mentioned. To be considered positive for peer-reviewed references, each website had to reference a peer-reviewed source of information regarding rTSA.

Statistical analysis

Average DISCERN scores and standard deviations were calculated for each category (academic, private, other). One-way analysis of variance was used to compare DISCERN scores between the three categories. A Tukey post-hoc analysis was used in cases where

$p < 0.05$ (http://astatsa.com/OneWay_Anova_with_TukeyHSD).

Results

After eliminating duplicate websites from the three search engines, 90 websites were evaluated. Regarding authorship, 43% of the websites were associated with an academic institution, 36% of the websites were authored by private physicians or groups not associated with an academic institution and 8% of the websites were designed to provide third-party information to the public (Figure 1).

Sixty-two websites (69%) provided information to contact the author either by e-mail, phone or the ability to directly schedule an appointment. Seventy-five websites (83%) explained indications or reasons for a rTSA procedure. Only fifteen websites

Figure 1. Distribution of websites by category. Pie chart depicts the website authorship for the search term ‘reverse total shoulder arthroplasty’.

Table 2. Ability to contact author and initiate injury discussion.

Website	Ability to contact	Discussion of disorder	Treatment options	Eligibility
Google	37	42	10	10
Yahoo	27	39	8	17
Bing	20	20	4	8
Total (n = 90)	62 (69%)	75 (83%)	15 (16%)	26 (29%)

Duplicates are included, which is why the columns add up to more than 90 websites.

Table 3. Explanation of surgery, rehabilitation and references.

Website	Surgical Technique	Complications	Rehabilitation	Peer-Reviewed References
Google	29	28	26	28
Yahoo	28	17	24	22
Bing	9	9	13	9
Total (n = 90)	51 (57%)	39 (43%)	42 (47%)	43 (48%)

Duplicates are included, which is why the columns add up to more than 90 websites.

(16%) discussed options for nonsurgical treatment. Twenty-six websites (29%) explained eligibility criteria for the procedure (Table 2).

Fifty-one websites (57%) provided a detailed paragraph or diagram explaining the surgical procedure. Thirty-nine websites (43%) explained some possible complications of rTSA. Forty-two websites (47%) described postoperative rehabilitation. Forty-three websites (48%) cited peer-reviewed sources for information regarding rTSA (Table 3).

There was a significant difference between the three authorship categories for DISCERN reliable mean scores ($p = 0.021$), with academic websites having a significantly higher score (3.9) than the other websites (2.8) ($p = 0.017$). There was also a significant difference between the three authorship categories for DISCERN overall mean scores ($p = 0.024$), with academic websites having a significantly higher score (3.9) than other websites (2.8) ($p = 0.020$) (Table 4).

Discussion

The Internet has become a primary source for obtaining health information by both patients and health professionals.^{8,9} However, the quality and validity of the content are not strictly regulated.¹⁰ Therefore, patients should be cautious and use only well-known websites.⁹ The term 'reverse total shoulder' is often confusing for patients. Therefore, we sought to determine the quality of Internet information available on this procedure.

Table 4. DISCERN scores by category.

Website category	DISCERN reliable mean	DISCERN treatment mean	DISCERN overall mean
Academic	3.9	3.9	3.9
Private	3.7	3.8	3.7
Other	2.8	3.0	2.8
p-value	0.021*	0.054	0.024**

'Other' includes industry, news source, public education, blog and video websites. DISCERN reliable and overall scores were significantly higher for academic websites than other websites *Tukey post-hoc analysis ($p = 0.017$). **Tukey post-hoc analysis ($p = 0.020$).

Based on the results of the present study, there was a high proportion of credible Internet sources with 43% of the websites affiliated with an academic institution and 36% of the websites authored by a private physician or group with no academic affiliations. Websites with an academic affiliation may be more reliable because of private institutional motive to receive more business.² Indeed, DISCERN reliable and overall scores were significantly higher for websites affiliated with an academic institution compared to other websites. This indicates that academic websites were the most reliable and provided the best quality of health-related information on the Internet. The DISCERN

overall score rated the publications as moderate, indicating the websites as being a useful source of information, although they would benefit from additional information. Given the DISCERN scores across studies, information on rTSA was comparable with studies using the DISCERN instrument to evaluate other conditions such as rotator cuff repair,⁴ chronic pain,⁷ general anesthesia,⁹ bunions¹¹ and anterior cruciate ligament reconstruction.¹²

A credible source ideally would include a point of contact for patients to address questions or make an appointment to initiate discussion of their injury. Only 69% of the websites found provided information to contact the author, whereas 83% of the websites provided an explanation of the indications and reasons for undergoing a rTSA procedure. It was concerning to find limited discussion of nonsurgical treatments, eligibility, as well as postoperative care and risks of the surgery itself. For patients to make an educated decision regarding their healthcare, it would be beneficial for the authors of the websites evaluated to provide advantages and disadvantages of the procedure and to provide evidence for these.

The present study has several limitations. Because Internet resources are frequently updated, the results of our study could vary from the initial search to the present time. The number of websites that a user visits during a search decreases significantly after the first page of results provided by the search engine. Previous studies have demonstrated a decrease in views after the first 20 websites from 97% to 58%, although it is unknown whether patients visit the websites further down the list of 150.⁴ Additionally, patients may use other resources recommended by a physician, family/friend or media forms to gather health-related information instead of using the Internet.¹³ Furthermore, the DISCERN scoring system does not evaluate the accuracy of information and is only validated to address the quality of information available online.⁶ Lastly, the results of our initial search using only one term could vary with alternative terminology such as ‘replacement’ rather than ‘arthroplasty’.

The information available on the Internet on reverse total shoulder arthroplasty is highly variable and provides mostly fair quality information about treatment choices, with some limitations based on the DISCERN instrument. Although the majority of sources provided a discussion of the disorder explaining indications for performing a rTSA, many less credible sources disregarded a description of equally important issues such as nonsurgical treatment options, patient eligibility, postoperative care and potential surgical complications. Surgeons who often perform rTSA procedures may consider providing handouts containing nonbiased, evidence-based material for potential rTSA candidates.

Healthcare professionals should be aware of the quality and substantial use of the Internet for health information when counselling patients regarding surgery.

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Ethical Review and Patient Consent

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