Quality of Information on the Internet About Carpal Tunnel Syndrome: An Update

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abstract

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The use of the Internet for health-related information has increased significantly. In 2000, the current authors examined the source and content of orthopedic information on the Internet. At that time, Internet information regarding carpal tunnel syndrome was found to be of limited quality and poor informational value. The purposes of the current study were to reevaluate the type and quality of information on the Internet regarding carpal tunnel syndrome and to determine whether the quality of information available has improved compared with 1 decade ago.

The phrase *carpal tunnel syndrome* was entered into the 5 most commonly used Internet search engines. The top 50 nonsponsored and the top 5 sponsored universal resource locators identified by each search engine were collected. Each unique Web site was evaluated for authorship and content, and an informational score ranging from 0 to 100 points was assigned. Approximately one-third of nonsponsored Web sites were commercial sites or selling commercial products. Seventy-six percent of sponsored sites were selling a product for the treatment of carpal tunnel syndrome. Thirty-eight percent of nonsponsored sites provided unconventional information, and 48% of sponsored sites provided misleading information. Just more than half of nonsponsored sites were authored by a physician or academic institution. The informational mean score was 53.8 points for nonsponsored sites and 14.5 points for sponsored sites.

The informational quality on the Internet on carpal tunnel syndrome has improved over the past decade. Despite this progress, significant room exists for improvement in the quality and completeness of the information available.

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In 2000, the current authors reported a study examining the source and content of orthopedic information on the Internet.[1] At that time, information posted regarding carpal tunnel syndrome was found to be limited in quality and poor in informational value. In the intervening decade, the number of Internet users in the United States has nearly doubled from 43.1% to 79.3% of the population.[2] In addition, it is estimated that more than half of the users access the Internet as a source of health information on various medical conditions at least once per month.[3-8] The purposes of the current study were to re-evaluate the type and quality of information on the Internet regarding carpal tunnel syndrome and to assess whether the quality of information has improved over the past decade.

Table 1

Distribution of Web Sites by Author Type

	No. (%)		
Author Type	**Current Study (Search) (n=65)**	**Current Study (Sponsored) (n=25)**	**Beredjikian et al[1] (n=175)**
Academic	18 (28)	3 (12)	22 (13)
Commercial product	9 (14)	19 (76)	57 (33)
Lay	4 (6)	1 (4)	2 (1)
Nonphysician care provider	1 (2)	0	16 (9)
Physician	15 (23)	1 (4)	17 (10)
Commercial site	12 (18)	0	52 (30)
Unidentified	6 (9)	0	9 (5)

MATERIALS AND METHODS

The authors replicated the methods used in the previous study.[1] The phrase *carpal tunnel syndrome* was entered into the 5 most commonly used Internet search engines: Google, Yahoo, Bing, Ask, and AOL.[9] The top 50 Web sites or universal resource locators identified by each search engine were collected (250 total). Duplicate entries, pages that provided only audio or video, those that had no content, and those whose content was not about carpal tunnel syndrome (eg, a page that discussed only cubital tunnel) were discarded.

Each Web site was evaluated according to the medical Web site evaluation guidelines as reported by Soot et al,[10] which was also used in the previous study.[1] Two fellowship-trained hand surgeons (K.L., P.B.) reviewed all sites, characterized them, and gave them an informational score.

In contrast to the search engine output formats that were generated during the previous study,[1] all of the search engines in the current study displayed links to sponsored sites or had ads alongside the Web search results. The first 25 of these sites for each search engine were tabulated and classified as described above, separately from the standard Web search results.

The current data were compared with those from the previous study[1] to assess any changes in the authorship and informational value of the Web sites. Statistical analysis was performed using the 2-tailed Student's *t* test for numeric data and chi-square analysis for nonparametric data.

RESULTS

After omitting pages that were duplicates, had no written content, and those whose content was not on carpal tunnel syndrome, 65 unique sites remained for further consideration. The authorship of these Web sites is shown in Table 1. The 2 evaluators agreed on the categorization of the authorship in 64 (99%) of the 65 standard sites. Similarly, 25 unique Web sites were identified in the sponsored/ads group. The 2 evaluators agreed on the categorization of the authorship in all (100%) of these sites.

The content of the Web sites is shown in Table 2. Six (9%) of the current 65 Web sites had misleading information, whereas the previous study[1] reported that 25 (14%) of the 175 sites were categorized as misleading. The content of the sponsored/ads sites was misleading in 12 (48%) of 25 sites.

The informational value scores were calculated for all Web sites by both evaluators, and the 2 scores were averaged for each site. The informational mean score was 53.8±24.4 of a maximum of 100 points in the current study and 28.4±28.3 points in the previous study ($P<.001$). The informational mean score for the sponsored/ads Web sites was 14.5.

The interobserver reliability of the informational scores was assessed. Mean differences in scores between the 2 evaluators was 0.9 points. In 1 case, the difference in score per Web site was greater than 6 points, and in 6 other cases the differences were between 3 to 6 points. In 82 of 89 Web sites, the difference in score between observers was less than 3 points, which represented high interobserver reliability. Of note, the informational score for the Wikipedia page on carpal tunnel syndrome[11] received an informational score of 83, and the carpal tunnel syndrome fact sheet published by the National Institutes of Health[12] had a score of 93.

DISCUSSION

Use of the Internet for health-related information has significantly increased over the past few years. Between 2000 and 2006, the proportion of patients using the Internet increased from 16% to 55%.[8] Therefore, the authors asked whether

a concomitant increase occurred in the quality of medical information. Compared with the authors' previous study,[1] a modest increase was found in the informational value of average Web sites; they found slightly more unconventional material but slightly less outright misleading information, and a greater share of sites were authored by physicians or other providers compared with commercial entities.

A few other observations can be noted. First, the 5 search engines only returned a total of 65 unique Web sites in the current study. However, 12 years prior, 5 search engines produced 175 unique results, not one of which was identified by all 5 search engines.[1] The current smaller set of unique sites represents the homogenization of search. It is more likely that individuals searching the Internet will find the same thing. Whether this is a boon or a hindrance depends on what is found. Similarly, a single search engine, Google, now has a market share of more than 80% of search engines.[9] This is potentially helpful because the amount of information is condensed. However, this may not be positive because the bulk of the search engine traffic is now largely distilled through 1 filter.

All of the search engines evaluated in the current study had sponsored/ads sites and conventional search results. These were not found during the previous study[1] and are generally placed at the top of the results page or in colored banners along the sides. This prominent location makes them apt to be seen; the fact that these results are commercial in nature may not be apparent to casual observers. In the current evaluation, 12 of 25 sponsored sites provided misleading information. Although a generalized trend existed to fewer misleading sites in the nonsponsored search results, a high concentration of misleading information existed among the sponsored sites. This improvement is a step in the right direction but only to the extent that people do not follow the sponsored sites or have a clear understanding that these sites represent a commercial interest.

Table 2

Web Site Content

Content Type	No. (%) Current Study (Search) (n=65)	Current Study (Sponsored) (n=25)	Beredjikian et al[1] (Search Only) (n=175)
Conventional	31 (48)	4 (16)	80 (46)
Misleading	6 (9)	12 (48)	25 (14)
Noninformational	3 (5)	7 (28)	54 (31)
Unconventional	25 (38)	2 (8)	16 (9)

Beyond the advent of sponsored sites, another recent change in the Internet is the growth and development of Wikipedia, a free, anonymously written, crowd-sourced encyclopedia. The accuracy of Wikipedia has been tested and found comparable with, if not better than, conventional encyclopedias. The success of Wikipedia prompted Encyclopedia Britannica to cease publication.[13] Even within medical domains, Wikipedia has performed well.[14,15] Wikipedia offered reasonably complete and accurate information on osteosarcoma.[16] In the current study, the informational value of the Wikipedia page on carpal tunnel syndrome[11] was 83, which was greater than the average score by a considerable margin; however, it may be deemed far less than complete.

The current findings were consistent with similar recent investigations. Starman et al[3] assessed the quality of Internet information for 10 common orthopedic sports medicine diagnoses using 2 search engines (Google and Yahoo). The most common type of Web site, accounting for nearly half of the sites that were retrieved, was a commercial site. Less than half (30 of 74) of these sites were rated as high quality. Thirty-two sites they reviewed (approximately 20% of the sites retrieved) were academic. Twenty-five percent of these were rated as high quality. Nonprofit organizations had the highest proportion (4 of 7) of high-quality sites.[3] Sambandam et al[17] reviewed the quality of patient information regarding knee arthroscopy and concluded that most sites were outdated, inadequate, or not accountable for the accuracy of their information. Similar concerns about the quality of information have also been noted in other disciplines. Yeung and Mortensen[18] examined 60 Web sites regarding the quality of their information on diverticular disease. They reported that less than 20% of the sites had been updated in the past 2 years and that 36.7% were identified as being good or excellent.[18] For patients undergoing thyroidectomy, the quality of information varies.[19] Soot et al[10] reported that the quality of information regarding vascular surgery conditions was poor, misleading, or difficult to obtain. Patients are aware of the difficulties in accessing quality medical information online. Garneau et al[20] reported 101 patients who had obtained information from the Internet regarding their diagnosis of rheumatoid arthritis. Forty percent of these patients found the Internet to be a useful source of information, and 87% found their rheumatologist to be a useful source. Sethuram and Weerakkody[6] reported that although 60% of the patients studied had accessed information on the Internet, only 4% were aware of the recommended Web sites for information. Patients reported that the information they obtained was unclear or confusing.

In the current study, a modest improvement occurred in the quality and reliabil-

ity of the information for a search of carpal tunnel syndrome in the years since the first report.[1] Nonetheless, the quality and reliability of information on the Internet have not improved as much as needed. Because of its prevalence, one would expect that carpal tunnel syndrome would be a condition with perhaps the best quality of information; the deficits the authors found augur an even worse state regarding orthopedic surgery information for other conditions.

The Internet has no overseer and no censor; therefore, it is not reasonable to expect that misleading information can be removed. The fundamental change brought about by Internet-based publication is that all readers are now potential writers. If orthopedic surgeons and other experts wrote feedback on the sites they read, the overall quality of information might increase. Until then, the warning applies: *caveat lector*—let the reader beware.

REFERENCES

1. Beredjiklian PK, Bozentka DJ, Steinberg DR, Bernstein J. Evaluating the source and content of orthopaedic information on the Internet. The case of carpal tunnel syndrome. *J Bone Joint Surg Am*. 2000; 82:1540-1543.
2. World Bank. Internet users as percentage of population. Google Public Data Web site. http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&ctype=l&strail=false&bcs=d&nselm=h&met_y=it_net_user_p2&scale_y=lin&ind_y=false&rdim=region&idim=country:USA&idim=region:ECA&ifdim=region&tdim=true&tstart=-304718400000&tend=1304654400000&hl=en&dl=en&ind=false&q=internet+users+in+usa. Accessed May 19, 2012.
3. Starman JS, Gettys FK, Capo JA, Fleischli JE, Norton HJ, Karunakar MA. Quality and content of Internet-based information for ten common orthopaedic sports medicine diagnoses. *J Bone Joint Surg Am*. 2010; 92:1612-1618.
4. Fortinsky KJ, Fournier MR, Benchimol EI. Internet and electronic resources for inflammatory bowel disease: a primer for providers and patients. *Inflamm Bowel Dis*. 2012; 18:1156-1163.
5. Castleton K, Fong T, Wang-Gillam A, et al. A survey of Internet utilization among patients with cancer. *Support Care Cancer*. 2011; 19:1183-1190.
6. Sethuram R, Weerakkody AN. Health information on the internet. *J Obstet Gynaecol*. 2010; 30:119-121.
7. Pramuka M, Hendrickson R, Van Cott AC. Survey results of Internet and computer usage in veterans with epilepsy. *Epilepsy Behav*. 2010; 17:366-368.
8. Trotter MI, Morgan DW. Patients' use of the Internet for health related matters: a study of Internet usage in 2000 and 2006. *Health Informatics J*. 2008; 14:175-181.
9. Soames C. Most popular search engines—UK, US and worldwide. Smart Insights Web site. http://www.smartinsights.com/search-engine-optimisation-seo/multilingual-seo/search-engine-popularity-statistics/. Published March 15, 2012. Accessed May 19, 2012.
10. Soot LC, Moneta GL, Edwards JM. Vascular surgery and the Internet: a poor source of patient-oriented information. *J Vasc Surg*. 1999; 30:84-91.
11. Wikipedia. Carpal tunnel syndrome. http://en.wikipedia.org/wiki/Carpal_tunnel_syndrome. Updated July 9, 2013. Accessed May 19, 2012.
12. National Institute of Neurological Disorders and Stroke. Carpal tunnel syndrome fact sheet http://www.ninds.nih.gov/disorders/carpal_tunnel/detail_carpal_tunnel.htm. Published July 2012. Updated June 18, 2013. Accessed May 19, 2012.
13. Bosman J. After 244 years, Encyclopaedia Britannica stops the presses. The New York Times Web site. http://mediadecoder.blogs.nytimes.com/2012/03/13/after-244-years-encyclopaedia-britannica-stops-the-presses. Published March 13, 2012. Accessed May 19, 2012.
14. Laurent MR, Vickers TJ. Seeking health information online: does Wikipedia matter? *J Am Med Inform Assoc*. 2009; 16:471-479.
15. Clauson KA, Polen HH, Boulos MN, Dzenowagis JH. Scope, completeness, and accuracy of drug information in Wikipedia. *Ann Pharmacother*. 2008; 42:1814-1821.
16. Leithner A, Maurer-Ertl W, Glehr M, Friesenbichler J, Leithner K, Windhager R. Wikipedia and osteosarcoma: a trustworthy patients' information? *J Am Med Inform Assoc*. 2010; 17:373-374.
17. Sambandam SN, Ramasamy V, Priyanka P, Ilango B. Quality analysis of patient information about knee arthroscopy on the World Wide Web. *Arthroscopy*. 2007; 23:509.e2-513.e2.
18. Yeung TM, Mortensen NJ. Assessment of the quality of patient-orientated internet information on surgery for diverticular disease. *Dis Colon Rectum*. 2012; 55:85-89.
19. Muthukumarasamy S, Osmani Z, Sharpe A, England RJ. Quality of information available on the World Wide Web for patients undergoing thyroidectomy: review. *J Laryngol Otol*. 2012; 126:116-119.
20. Garneau K, Iversen M, Jan S, Parmar K, Tsao P, Solomon DH. Rheumatoid arthritis decision making: many information sources but not all rated as useful. *J Clin Rheumatol*. 2011; 17:231-235.