IJSPT

ORIGINAL RESEARCH

KINESIOLOGY TAPING AND THE WORLD WIDE WEB: A QUALITY AND CONTENT ANALYSIS OF INTERNET-BASED INFORMATION

Bryan G. Beutel, MD[1]
Dennis A. Cardone, DO[1]

ABSTRACT

Background: Due to limited regulation of websites, the quality and content of online health-related information has been questioned as prior studies have shown that websites often misrepresent orthopaedic conditions and treatments. Kinesiology tape has gained popularity among athletes and the general public despite limited evidence supporting its efficacy. The primary objective of this study was to assess the quality and content of Internet-based information on Kinesiology taping.

Methods: An Internet search using the terms "Kinesiology tape" and "Kinesiologylogy tape" was performed using the Google search engine. Websites returned within the first two pages of results, as well as hyperlinks embedded within these sites, were included in the study. These sites were subsequently classified by type. The quality of the website was determined by the Health On the Net (HON) score, an objective metric based upon recommendations from the United Nations for the ethical representation of health information. A content analysis was performed by noting specific misleading versus balanced features in each website.

Results: A total of 31 unique websites were identified. The majority of the websites (71%) were commercial. Out of a total possible 16 points, the mean HON score among the websites was 8.9 points (SD 2.2 points). The number of misleading features was significantly higher than the balanced features ($p < 0.001$). Fifty-eight percent of sites used anecdotal testimonials to promote the product. Only small percentages of websites discussed complications, alternatives, or provided accurate medical outcomes. Overall, commercial sites had a greater number of misleading features compared to non-commercial sites ($p = 0.01$).

Conclusions: Websites discussing Kinesiology tape are predominantly of poor quality and present misleading, imbalanced information. It is of ever-increasing importance that healthcare providers work to ensure that reliable, balanced, and accurate information be available to Internet users.

Key Words: Internet information, kinesiology tape, quality

Level of Evidence: IV

CORRESPONDING AUTHOR
Bryan G. Beutel, MD
NYU Hospital for Joint Diseases
Department of Orthopaedic Surgery
New York, NY, 10010
Telephone Number: (212) 598-6000
Fax Number: (212) 598-7654
E-mail: bryanbeutel@gmail.com

[1] NYU Hospital for Joint Diseases Department of Orthopaedic Surgery New York, NY

INTRODUCTION

The advent of the Internet has profoundly altered the landscape of information exchange. As the Internet has expanded over the past few decades, so has its user population. Currently, nearly 2.5 billion people worldwide have Internet access, a dramatic increase of 566.4% since the year 2000.[1] Large portions of the population within the United States (78.1%) and Canada (83%) have Internet access. Concomitant with this expansion has been an increasing influence on various facets of its users' daily lives. From trends in popular culture to political issues, the Internet affords people rapid, convenient access to a vast array of information, much of which was previously restricted to libraries and similar institutions. This is particularly evident in the medical realm. Given the preponderance of accessible medical commentary on the Internet, over half of users search the Internet for health-related information at least once each month.[2] In doing so, many patients make decisions about their healthcare, including medical and surgical treatments to pursue or even whether or not to seek out a physician, based upon online resources.

While the Internet serves as a powerful instrument for the dissemination of ideas, the quality of available information and resources is highly variable. Prior studies in the medical literature have demonstrated that websites frequently misrepresent orthopaedic conditions and treatments.[3,4] Starman et al evaluated websites reviewing ten common sports medicine conditions and concluded that the quality and content of online orthopaedic health information is variable and generally poor.[3] Similarly, Sambandam et al investigated the depiction of knee arthroscopy on the Internet and showed that websites are largely inadequate, outdated, and not accountable.[4] These trends may stem from a dearth of many formal, enforced guidelines for regulating online content, coupled with the open forum nature of the Internet.[5] In essence, accessibility may not necessarily equate to, or correlate with, quality. Consequently, patients may be making medical decisions based upon inaccurate media information.

One orthopaedic treatment modality, which has recently gained attention in the media is Kinesiology taping. Originally designed in the 1970s, Kinesiology tape (KMS LLC, Albuquerque, NM) was not commonly used until the 2008 Olympics, during which time it was donated to numerous countries for use on their athletes. The brightly-colored tape was highly visible to onlookers, and as these high-profile athletes were seen adorning the product, media curiosity mounted. Consequently, over the past several years, Kinesiology tape has garnered increasing popularity among other athletes and the public in general. The product, a form of kinesiology tape, is reported to elevate the skin, thereby allowing improved blood flow and drainage of lymphatic fluid.[6] This process is stated to facilitate pain relief and support injured muscles and joints for a more rapid recovery.[7-10] Despite its popularity, there is limited evidence in the medical literature to support the efficacy of Kinesiology taping. Various studies have indicated that Kinesiology taping may improve cervical spine range of motion, quadriceps strength, and symptomatic shoulder impingement.[11-14] Additionally, Kinesiology taping may reduce pain and disability in patients with chronic, non-specific low back pain, but the effects may be too minimal to be clinically significant.[15] More robust analyses have shown no benefit to the use of Kinesiology taping. A systematic review of the existing literature by Mostafavifar et al. reported that there are few quality studies investigating this taping method, and, overall, there is insufficient evidence to support its use for treating musculoskeletal injuries.[7] Other meta-analyses reached similar conclusions, stating that there is no clear evidence for the effectiveness of Kinesiology taping for a variety of movement disorders or even as an alternative over other treatment modalities.[16,17]

Nonetheless, despite limited evidence supporting its use, Kinesiology tape has been widely publicized and marketed through the Internet, with many taping courses heavily promoted to healthcare professionals. It remains unknown, however, what type and quality of information is available to patients online. Therefore, the primary objective of this study was to characterize the Internet-based portrayal of Kinesiology taping through the analysis of related websites. The authors hypothesized that the content and quality of online information would be incomplete, imbalanced, and largely poor.

METHODS

In July 2013, the Google Chrome browser (version 27.0) was utilized to perform an Internet search for

the terms "Kinesiology tape" and "kinesiology tape." In order to mimic real-world use, the search engine Google was chosen to execute the search, as data suggests that nearly 70% of Internet searches in the United States are powered by Google.[18] Websites were included for analysis if they were contained within the first two pages of results returned by the search engine and discussed Kinesiology taping. Because prior studies have demonstrated that users rarely look beyond the first two pages of search results when browsing for health-related information, this criterion further simulated actual patient use, and has been employed in other Internet search studies.[4,19,20] Hyperlinks embedded within the resulting websites were also included for a more comprehensive investigation.

After identifying the websites, each was classified according to the type of site. These categories included commercial (e.g. received industry funding or sold Kinesiology tape or related products), news-oriented (e.g. nonmedical sites with articles or stories), personal (e.g. public blogs or non-physician sites by therapists), physician (e.g. professional sites for physicians not affiliated with an academic institution), nonprofit (e.g. organizational sites receiving government funding or donations only), or academic (e.g. affiliated with a medical society, university, or journal). These classifications have been used in previous research.[3]

Websites were subsequently assessed for quality according to their compliance with the Health On the Net (HON) Foundation guidelines.[21] Founded as a nonprofit organization accredited by the Economic and Social Council of the United Nations, HON has established criteria for ethical standards for maintaining transparency and purpose of website material (the HONcode) in order to protect Internet users from misleading health information. Using this code, Starman et al. devised an assessment (the HON score, scored from 0 to 16) to determine the compliance of a website to the HONcode's core principles, with scores greater than or equal to 12 considered to be adequate (see Appendix).[3] This objective quality measure includes factors such as the transparency of the website provider, provision of information regarding sources, accountability, and accessibility, among others. The HON scoring method was applied to all websites in this study.

Furthermore, a content analysis was performed. Using a modified approach based upon methods employed in prior studies, each website was assessed for misleading and balanced features.[20] Misleading features included inappropriate statements regarding Kinesiology taping compared to those found in the scientific literature, medical imbalance (e.g. discussing only one perspective on this treatment), use of individual stories or testimonials, unsubstantiated promises, and the misuse of medical literature (e.g. exaggerating only positive results while inappropriately omitting negative ones). Balanced features were a discussion of alternative treatments, explanation of complications, use of accurate outcomes cited in the medical literature, and a discussion of appropriate candidates for Kinesiology taping treatment. The presence or absence of each feature was recorded for every website.

Additionally, the date when the website was last updated or modified, as well as whether or not the site displayed the HONcode banner indicating that it met criteria set forth by HON, was documented. Of note, sites are permitted to display the banner if they submit an application to the HON Foundation stating that they meet all of the core principles set forth by the organization, after which their site is extensively reviewed and subjected to periodic unannounced audits ensuring compliance with these ethical standards. The same single investigator reviewed all websites. Statistical analysis was performed using SPSS (version 19.0.1, IBM, Chicago, IL). Data were initially analyzed with the Kolmogorov-Smirnoff test to assess for normality of distribution. The t-test was used for the comparison of continuous variables when the data were normally distributed. The Mann-Whitney U test was used in lieu of the t-test when the data were not normally distributed. Significant differences were determined for comparisons, with two-tailed p-values and a $p < 0.05$ indicating significance.

RESULTS

The Internet search produced 44 websites meeting the inclusion criteria. After accounting for 13 duplicate sites, 31 were ultimately available for analysis. Of these, 11 (35%) provided the date when the site was most recently updated or modified. The mean time interval between the last update and the date of the Internet search was 1.5 years (standard devia-

tion (SD) 0.97 years, range 0.06 – 3.26 years). Additionally, only 1 website (3%) featured the HONcode banner. With regard to their classification, the websites were distributed among a variety of categories. As noted in Table 1, the majority were commercial in nature, with 22 sites (71%) in this category. The remaining 9 websites were of variable type; the least common were physician and nonprofit sites.

Website quality analysis revealed predominantly low HON scores (Table 2). Out of a total possible of 16 points, the mean HON score among the websites was 8.9 points (SD 2.2 points) with actual scores ranging from 6 – 14 points. Review of the specific score criteria demonstrated areas in which the websites excelled and others where they were deficient. This was manifested as high marks in criteria such as provider transparency (mean of 1.8 points out of a possible 2 points, SD 0.4 points), transparency of the site's purpose and objective (each site achieved the maximum score of 1 point in this category), a clearly defined target audience (mean of 1.0 point out of a possible 1 point, SD 0.2 points), and accessibility of content (mean of 1.0 point out of a possible 1 point, SD 0.2 points). Conversely, low point values were evidenced in source information (mean of 0.5 points out of a possible 3 points, SD 1.0), with only 8 sites (26%) providing a statement of at least some of their sources. Sites were also largely deficient in clear and regular updating of their content (mean of 0.3 points out of a possible 1 point, SD 0.5 points) and providing an editorial policy on how content was selected for publication (mean of 0.2 points out of a possible 1 point, SD 0.4 points).

Table 1. *Distribution of website categories*

Category	No. (%)
Commercial	22 (71)
News-oriented	4 (13)
Personal	3 (10)
Physician	1 (3)
Nonprofit	1 (3)
Academic	0 (0)

Table 2. *Health on the Net (HON) score analysis*

Criteria	Mean	SD*	Normal Range†
Provider transparency	1.8	0.4	0 - 2
Purpose/objective transparency	1.0	0.0	0 - 1
Target audience stated	1.0	0.2	0 - 1
Funding sources stated	0.5	0.5	0 - 1
Source information	0.5	1.0	0 - 3
Author details	0.8	0.9	0 - 2
Privacy	0.8	0.4	0 - 1
Updating policy	0.3	0.5	0 - 1
Accountability	1.0	0.2	0 - 2
Editorial policy	0.2	0.4	0 - 1
Accessibility	1.0	0.2	0 - 1
HON Score	8.9	2.2	0 - 16

*Refers to "standard deviation"

†Range of points allotted for each criterion in HON scoring system

The content analysis assessed websites for misleading and balanced features. In terms of misleading content (Table 3), the majority of sites (71%) made inappropriate statements regarding the evidence or efficacy of Kinesiology tape, while the same percentage displayed medical imbalance by only presenting information in favor of Kinesiology taping. Testimonials and individual patient experiences were often used to promote the perceived effectiveness of the product. Unsubstantiated promises included "guarantees" for treatment and "pain free" outcomes. Also, the medical literature was misused in several sites by inappropriately highlighting only positive results without any mention of negative data. Conversely, the frequency of balanced features found within each site was generally lower (Table 4). Discussions about alternatives to Kinesiology tape for the treatment of muscle strains and arthralgias, such as anti-inflammatory medications and physical therapy, were found in a minority of websites. A review of the potential complications of Kinesiology taping, including the development of rashes, blisters, pru-

Table 3. *Analysis of misleading features of websites*

Misleading Feature	Number (%)
Inappropriate statements	22 (71)
Medical imbalance	22 (71)
Individual stories	18 (58)
Unsubstantiated promises	9 (29)
Misuse of literature	5 (16)

Table 4. *Analysis of balanced features of websites*	
Balanced Feature	**Number (%)**
Alternatives	4 (13)
Complications	4 (13)
Accurate literature outcomes	5 (16)
Candidate discussion	21 (68)

ritus, and edema, was only observed within a few sites.[22] The majority of sites, however, did define the candidates for Kinesiology taping. Overall, the number of misleading features was significantly higher than the balanced features ($p < 0.001$).

A comparison of the quality and content analyses by the type of website is shown in Table 5 and Figure 1. The mean HON score for commercial websites was 8.5 points (SD 2.3 points), while the non-commercial sites (including news-oriented, personal, physician, and nonprofit) had a collective mean of 10.1 points (SD 1.7 points). The difference in mean HON scores approached, but did not attain, statistical significance ($p = 0.06$). Furthermore, commercial websites had a mean of 2.9 misleading features (out of a possible 5, SD 1.3), while non-commercial sites maintained a mean of 1.4 features (SD 1.5). No misleading features were identified in the physician or nonprofit websites. The difference in misleading features between the commercial and non-commercial sites was significant ($p = 0.01$). Additionally, no significant difference was observed between the number of balanced features ($p = 0.94$), with a mean of 1.1 balanced features (SD 0.7) and 1.1 features (SD 0.6) in the commercial and non-commercial sites, respectively.

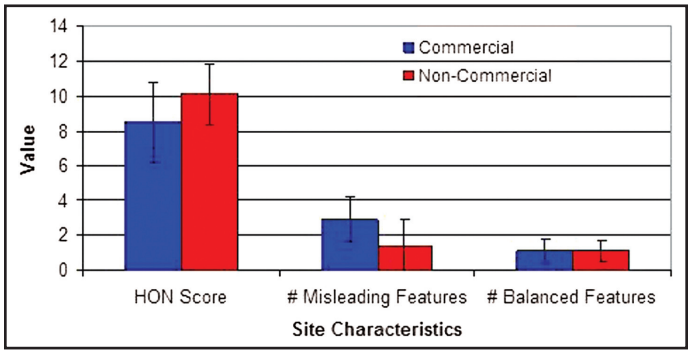

Figure 1. *Comparison of commercial and non-commercial site characteristics. Mean values with standard deviation bars are provided.*

DISCUSSION

The rapidly-expanding access to, and content of the Internet has established it as a prominent resource for gathering health-related information. Concomitant with this expansion has been a growing concern regarding the quality of the information presented to Internet users, as there is little regulation to monitor and enforce standards for website quality and the content contained therein. Prior studies have validated this concern with respect to health information, demonstrating a trend towards poor quality among websites.[23,24]

No prior analysis has been performed on Internet-based information regarding Kinesiology taping. The rapid rise in popularity of Kinesiology tape has occurred despite several studies, which have concluded that there is little evidence supporting its efficacy.[7,16,17] The results of the current study demonstrate that websites discussing Kinesiology taping are predominantly of poor quality. This is strongly indicated by the low mean HON score of 8.9 points, correlating to a 56% on a 100% scale, among all reviewed websites, and is

Table 5. *Health on the Net (HON) and content analysis by category of website*			
Category	**HON Score**	**Misleading Features***	**Balanced Features***
Commercial	8.5 (2.3)	2.9 (1.3)	1.1 (0.7)
News-oriented	10.3 (1.7)	2.3 (1.5)	1.3 (0.5)
Personal	8.7 (0.6)	1.3 (1.5)	0.7 (0.6)
Physician	12 (-)	0 (-)	2 (-)
Nonprofit	12 (-)	0 (-)	1 (-)

Note: Values are expressed as mean (with standard deviation)

*Refers to the number of types of each feature represented in the website

"-" denotes an undefined standard deviation as there is only 1 data point

further revealed by the fact that only 1 out of 31 websites (3%) displayed the HONcode banner signifying compliance with HON quality guidelines. These findings are even more concerning than those of Starman et al, who demonstrated that sites discussing common orthopaedic sports medicine diagnoses had a mean HON score of 9.3 points, with 24% of these websites displaying the HONcode banner.[3] Moreover, while the sites in the present study were transparent with respect to purpose, objective, and provider, the majority provided no information regarding the sources (from the medical literature or elsewhere) used to reportedly substantiate their claims. Furthermore, most websites failed to provide a policy about how content is updated. As only 35% of sites displayed the date of the most recent content update, with some of those modifications occurring as long as 3 years ago, websites largely provided neither evidence that their content was up-to-date nor any intention to rectify this. Sambandam et al found similar poor rates (24%) of content updating in their review of knee arthroscopy websites.[4] The lack of valid sources and regular updating of content raises concerns regarding the quality and legitimacy of the online information.

Additionally, the current study shows that websites frequently misrepresent Kinesiology taping in favor of its advocates. This skewed portrayal is reflected in the statistically higher number of misleading features within each website compared to the balanced features ($p < 0.001$). Notably, medical imbalance and inappropriate statements regarding Kinesiology taping were common, each documented in 71% of the websites. Moreover, sites frequently employed testimonials as a tool to promote Kinesiology tape. These anecdotes, particularly when linked to athletes, celebrities, or those perceived by the public to have an expert opinion, can greatly influence peoples' perceptions, as noted by Renaud et al.'s work on mechanisms through which the media affects health behaviors.[25] Many websites utilized these individual testimonials to justify unsubstantiated, global promises and guarantees of the purported effectiveness of Kinesiology taping. Furthermore, few sites offered information regarding complications of, and alternatives to, this product, and nearly just as few stated accurate outcomes based upon published research. Considering these factors, much of the Internet-based information regarding Kinesiology tape can be characterized as inaccurate and biased. As individuals are increasingly relying on the Internet for health-related advice, this inaccurate information could potentially delay appropriate treatment for these patients or preclude them from seeking professional medical attention. In certain circumstances, this could lead to serious consequences.

Similar to the results seen in previous research, the distribution of website types in our study demonstrates that commercial sites represent the single most common type of website (71%).[3] Many of these websites sold Kinesiology tape and related materials, the act of which can appear as a tacit endorsement of the product. Additionally, commercial sites had generally lower HON scores for quality and statistically higher numbers of misleading features compared to non-commercial sites. This, coupled with the abundance of commercial sites, further amplifies the misrepresentation of Kinesiology tape. The prospect of financial gain from positive reviews (justified or not) of Kinesiology tape may unduly influence the presentation of information on these sites. Also, the presence of only 1 physician site and the absence of any academic websites suggests that Internet users may have poor access to peer-reviewed literature and actual expert opinions utilized by the medical community to develop appropriate treatment algorithms.

This study is not without its limitations. Specifically, although the methods utilized were designed to replicate real-world Internet use based upon studies of general Internet search practices, it is possible that certain users may perform searches on different web browsers or delve more deeply into the returned results. Therefore, they may encounter different websites not assessed by this review, which may be of differing quality and content. This was mitigated in the current study, however, by the use of the popular Google search engine, which, as previously noted, is utilized in the vast majority of Internet searches, is the search tool of choice in prior studies, and is representative of actual patient use. Also, while the quality and content analyses were structured to be objective, an element of subjectivity may be present. Having all assessments performed by a single reviewer minimized variability; however, the

use of one reviewer rather than two or more independent reviewers is also a limitation of the study since one reviewer's interpretation may slightly bias the results. Furthermore, as the Internet evolves and search results change over time with the advent of new websites, it is possible that the results of this study may not necessarily reflect future searches.

Knowledge of the quality and accuracy of the Internet-based information available to patients will help clinicians appropriately educate patients on the benefits, shortcomings, and use of Kinesiology taping. It may also assist clinicians in critically evaluating information brought in by patients. Consequently, healthcare providers should inform their patients about the apparent bias inherent to many websites dedicated to Kinesiology taping, of which most patients may be unaware. In order to avoid misinformation, clinicians should also counsel patients on how to find accurate, objective, and balanced information. Based upon the findings in the current study, this would entail directing patients to non-commercial websites (e.g. university or other academic sites, hospital or physician websites) which discuss/cite relevant medical literature to support claims and provide alternatives to Kinesiology tape. Commercial websites selling the product and using testimonials should be avoided as they are more likely to provide inaccurate and imbalanced information. Given this, it is increasingly important that healthcare providers work to ensure that reliable, balanced, and accurate information is available to Internet users. This information should be provided in terminology understandable to the general public, so that patients will be more inclined and comfortable seeking information and advice from these more balanced, trusted online resources.[26,27] Additionally, advocating for establishing more enforceable guidelines to ensure appropriate quality and content of Internet-based health information should be a primary focus. Healthcare organizations and specialty associations can raise awareness of this by disseminating consensus statements on the importance of quality online health information, and collaborating with organizations such as the Health On the Net Foundation to promote such standards.

CONCLUSION

The results of the current study reveal that websites discussing Kinesiology tape are predominantly of poor quality and present misleading and imbalanced information about the product. The majority of these sites are commercial in nature, which display a greater number of misleading features and tend to be of poorer quality compared to their non-commercial cohort. This distinction is noteworthy when educating patients on where to find accurate websites.

REFERENCES

1. Internet World Stats: Usage and Population Statistics. February 17, 2013; http://www.internetworldstats.com/stats.htm. Accessed July 15, 2013.
2. Beredjiklian PK, Bozentka DJ, Steinberg DR, et al. Evaluating the source and content of orthopaedic information on the Internet. The case of carpal tunnel syndrome. *J Bone Joint Surg Am*. 2000;82-A:1540-1543.
3. Starman JS, Gettys FK, Capo JA, et al. Quality and content of Internet-based information for ten common orthopaedic sports medicine diagnoses. *J Bone Joint Surg Am*. 2010;92:1612-1618.
4. Sambandam SN, Ramasamy V, Priyanka P, et al. Quality analysis of patient information about knee arthroscopy on the World Wide Web. *Arthroscopy*. 2007;23:509-513 e502.
5. Winker MA, Flanagin A, Chi-Lum B, et al. Guidelines for medical and health information sites on the internet: principles governing AMA web sites. American Medical Association. *JAMA*. 2000;283:1600-1606.
6. Williams S, Whatman C, Hume PA, et al. Kinesio taping in treatment and prevention of sports injuries: a meta-analysis of the evidence for its effectiveness. *Sports Med*. 2012;42:153-164.
7. Mostafavifar M, Wertz J, Borchers J. A systematic review of the effectiveness of kinesio taping for musculoskeletal injury. *Phys Sportsmed*. 2012;40:33-40.
8. Bicici S, Karatas N, Baltaci G. Effect of athletic taping and kinesiotaping(R) on measurements of functional performance in basketball players with chronic inversion ankle sprains. *Int J Sports Phys Ther*. 2012;7:154-166.
9. Krajczy M, Bogacz K, Luniewski J, et al. The influence of Kinesio Taping on the effects of physiotherapy in patients after laparoscopic cholecystectomy. *ScientificWorldJournal*. 2012;2012:948282.
10. Karatas N, Bicici S, Baltaci G, et al. The effect of Kinesiotape application on functional performance in surgeons who have musculo-skeletal pain after performing surgery. *Turk Neurosurg*. 2012;22:83-89.

11. Kaya E, Zinnuroglu M, Tugcu I. Kinesio taping compared to physical therapy modalities for the treatment of shoulder impingement syndrome. *Clin Rheumatol*. 2011;30:201-207.
12. Thelen MD, Dauber JA, Stoneman PD. The clinical efficacy of kinesio tape for shoulder pain: a randomized, double-blinded, clinical trial. *J Orthop Sports Phys Ther*. 2008;38:389-395.
13. Gonzalez-Iglesias J, Fernandez-de-Las-Penas C, Cleland JA, et al. Short-term effects of cervical kinesio taping on pain and cervical range of motion in patients with acute whiplash injury: a randomized clinical trial. *J Orthop Sports Phys Ther*. 2009;39:515-521.
14. Wong OM, Cheung RT, Li RC. Isokinetic knee function in healthy subjects with and without Kinesio taping. *Phys Ther Sport*. 2012;13:255-258.
15. Castro-Sanchez AM, Lara-Palomo IC, Mataran-Penarrocha GA, et al. Kinesio Taping reduces disability and pain slightly in chronic non-specific low back pain: a randomised trial. *J Physiother*. 2012;58:89-95.
16. Kalron A, Bar-Sela S. A systematic review of the effectiveness of Kinesio taping - Fact or fashion? *Eur J Phys Rehabil Med*. 2013;49:699-709.
17. Morris D, Jones D, Ryan H, et al. The clinical effects of Kinesio Tex taping: A systematic review. *Physiother Theory Pract*. 2013;29:259-270.
18. comScore Releases May 2013 U.S. Search Engine Rankings. June 12, 2013; http://www.comscore.com/Insights/Press_Releases/2013/6/comScore_Releases_May_2013_U.S._Search_Engine_Rankings. Accessed July 17, 2013.
19. Eysenbach G, Kohler C. How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *BMJ*. 2002;324:573-577.
20. Deren ME, DiGiovanni CW, Feller E. Web-based portrayal of platelet-rich plasma injections for orthopedic therapy. *Clin J Sport Med*. 2011;21:428-432.
21. Health On the Net Foundation. June 13, 2013; http://www.hon.ch/HONcode/Pro/Visitor/visitor.html. Accessed July 10, 2013.
22. Chou YH, Li SH, Liao SF, et al. Case report: Manual lymphatic drainage and Kinesio taping in the secondary malignant breast cancer-related lymphedema in an arm with arteriovenous (A-V) fistula for hemodialysis. *Am J Hosp Palliat Care*. 2013;30:503-506.
23. Greene DL, Appel AJ, Reinert SE, et al. Lumbar disc herniation: evaluation of information on the internet. *Spine (Phila Pa 1976)*. 2005;30:826-829.
24. Moshirfar A, Campbell JT, Khasraghi FA, et al. Evaluating the quality of Internet-derived information on plantar fasciitis. *Clin Orthop Relat Res*. 2004;421:60-63.
25. Renaud L, Bouchard C, Caron-Bouchard M, et al. A model of mechanisms underlying the influence of media on health behaviour norms. *Can J Public Health*. 2006;97:149-152.
26. Hansberry DR, Agarwal N, Shah R, et al. Analysis of the readability of patient education materials from surgical subspecialties. *Laryngoscope*. 2014;124:405-412.
27. Fabricant PD, Dy CJ, Patel RM, et al. Internet search term affects the quality and accuracy of online information about developmental hip dysplasia. *J Pediatr Orthop*. 2013;33:361-365.

Appendix. *Health on the Net (HON) sample scoring sheet*	
HON Categories	**Criteria (Points Allotted)**
Provider transparency	• Name of person/organization responsible for site provided (1) • Physical/electronic address provided (1)
Purpose/objective transparency	• Purpose and objective of site is clear (1)
Target audience	• Specific audience is clearly defined (1)
Funding sources	• Sources of funding for site are clear and transparent (1)
Source information	• Sources of information are provided (none = 0, some = 1, all = 2) • Date of source publication provided (1)
Author details	• Author names and credentials provided (none = 0, some = 1, all = 2)
Privacy	• Data protection policy clearly stated (1)
Updating policy	• Policy for, and date of, information updates provided (1)
Accountability	• Option for user feedback is provided (1) • Quality compliance officer is named on site (1)
Editorial policy	• Policy describing how site content is selected (1)
Accessibility	• Information on site is searchable and readable (1)
Total HON Score	0 - 16