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Evaluating patient education material regarding unicompartmental knee arthroplasty

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ABSTRACT

Background: Variability in quality and accuracy of information has been well documented in other orthopedic procedures. Given the growing role of the Internet in patient education, it is important to assess the quality of material provided. The purpose of this study was to evaluate online patient education materials regarding unicompartmental knee arthroplasty (UKA).

Method: The first 50 websites generated from a search of the term, *partial knee replacement*, using three search engines, Google, Yahoo!, and Bing, were analyzed for quality, content, and authorship. Categorical data between the three search engines were compared using the Freeman–Halton extension for the Fisher's exact test. Fisher's exact test was used to compare categorical data between the search terms *partial knee replacement* and *unicompartmental knee arthroplasty*.

Results: Most websites mentioned benefits of UKA (69%) but only a minority (39%) mentioned risks. A more technical search term, *unicompartmental knee arthroplasty*, yielded fewer websites authored by manufacturers/industry and miscellaneous sources ($p = 0.018$ and $p = 0.039$, respectively), more mentions of risks ($p = 0.0014$), and more references to peer-reviewed literature ($p = 0.0026$).

Conclusions: Overall, online information related to UKA is of questionable quality and may be geared more towards attracting patients than providing high-quality information.

1. Introduction

Unicompartmental knee arthroplasty (UKA) has become an increasingly popular alternative to traditional total knee arthroplasty (TKA) for patients with isolated unicompartmental osteoarthritis of the knee [1–3]. Although the first generation of UKA designs produced mixed results [4,5], in recent years improvements in both implant design and technique have greatly improved UKA outcomes; in fact, UKA outperforms TKA in many metrics such as smaller incisions [6,7], and lower blood loss [8,9]. Furthermore, post-operatively, UKA has been associated with faster recoveries [10], lower pain [11], and lower costs compared to TKA [12,13].

There are many resources available for patients seeking medical information ranging from physicians, friends and family to magazines and the Internet. Although it is most ideal for patients to receive information from physicians first, the Internet has become an increasingly used source for patients seeking medical information [14,15]. Unfortunately, previous studies have shown that the quality, accuracy, and readability of orthopedic information on the Internet are variable [16–18]. Specifically, previous studies on online information regarding minimally invasive total hip arthroplasty (THA) [19] and TKA [20] have revealed poor quality and accuracy of information. To date, however, there has been no study performed to assess the quality and accuracy of online patient educational materials regarding UKA.

The purpose of this study was to assess the quality, content, and authorship of information presented by websites related to UKA as well as to determine the effect of altering the search term on the quality of information presented regarding UKA.

2. Material and methods

The study design was based on a previously established protocol for evaluating patient education materials related to minimally invasive THA and TKA [19,20]. Websites related to UKA were searched for over a one-day period (Aug. 29, 2014) using the three most popular search engines (Google, Yahoo!, and Bing) [21]. A web search was performed using the search term, *partial knee replacement*, in each of the three aforementioned search engines; we chose this search term because we felt that this was the most commonly used layman's term for the UKA. The first fifty websites presented for each search engine were evaluated for authorship, content, and quality of information as described in

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Table 1
Authorship.

	Google	Yahoo!	Bing	Total	p-Value comparing 3 search engines	Google (alternative)	p-Value comparing alternative
Hospital/academic institution	24 (48%)	11 (22%)	15 (30%)	50 (33.3%)	0.021	24 (48%)	0.090
Private physician/clinic	7 (14%)	13 (26%)	9 (18%)	29 (19.3%)	0.35	12 (24%)	0.19
Manufacturer/industry	13 (26%)	10 (20%)	10 (20%)	33 (22%)	0.80	5 (10%)	0.018
News	3 (6%)	5 (10%)	6 (12%)	14 (9.3%)	0.21	0 (0%)	0.10
Miscellaneous	3 (6%)	11 (22%)	10 (20%)	24 (16%)	0.83	9 (18%)	0.039

the following paragraphs. A second search was performed using a more technical search term, *unicompartmental knee arthroplasty*. Of the three aforementioned search engines, Google is the most widely-used search engine [21]; therefore, Google was used to assess the technical search term. The alternative search was performed to compare the effect of a more technical search term on authorship, content, and quality of information presented from an online search [19,20]. The top 50 results of this search were compared to the top 50 from the Google search for the search term, *partial knee replacement*. The number of instances in which different search engines presented overlapping websites was recorded, as well.

2.1. Authorship

In order to assess authorship of the search results, the websites were categorized into one of five categories [19]. The categories were as follows: (1) hospital or academic institution, which identified author affiliations with an academic institution or hospital network; (2) private physician/clinic, which identified authors with affiliations with smaller professional networks but not to a larger medical institution; (3) manufacturer/industry, which identified companies that provided medical services or devices; (4) news source or local story without affiliation to a hospital, university, or private clinic; and (5) miscellaneous, which included authorship that did not fit into any of the previous categories including patient blogs, online encyclopedias, and patient forums.

2.2. Content & quality of information

2.2.1. Claims regarding benefits

The websites were reviewed for inclusion of any of the following when comparing UKA to TKA: (1) faster recovery or decreased hospital stay [22], (2) less post-operative pain [23], (3) smaller incision or less bone/tissue removed [24,25] and (4) less blood loss [26–28]. A count was made for description of each of these benefits for each website.

2.2.2. Mentions of risks

The websites were reviewed for inclusion of any risks associated with UKA including: (1) recurrent/unexplained pain [29], (2) higher revision rate [30,31], (3) more complicated revisions [32] and (4) blood clots [33].

2.2.3. Description of surgery

The websites were reviewed for description of the UKA procedure [19]. The explanations were categorized based on how thoroughly the procedure was described, and were classified in one of the following ways: (1) no description, (2) brief description without comparing UKA to TKA, and (3) full description of the technique with relevant diagrams/illustrations or explanation of the difference between UKA and TKA.

2.2.4. Patient eligibility criteria

The websites were reviewed for the inclusion of patient eligibility and exclusion criteria for the UKA procedure [19]. Potential exclusion criteria included age, comorbidities, inflammatory arthropathy, and osteoarthritis that involves more than one knee compartment [34,35]. Mention of at least one of the eligibility criteria was required for a website to be included in this category.

2.2.5. References

The websites were reviewed for the presence of references to peer-reviewed literature [19] to support claims mentioned in the website regarding UKA or any other medical procedure mentioned.

2.2.6. Ability to make appointments or request more information

The websites were reviewed for the ability of the user to request more information regarding a product or to schedule an appointment with a physician, health care worker, or author using information provided on the web page and not through any additional web services or internal search engines [19].

2.2.7. Advertisements

The websites were reviewed for the presence of advertisements on the webpage.

2.3. Statistical analysis

Categorical data from the three websites of Google, Yahoo!, and Bing were compared using the Freeman–Halton extension for the Fisher's exact test [36]. This test was used to determine if there was a statistically significant difference ($p < 0.05$) between the three search engines. Fisher's exact test was used to compare categorical data from the two searches using the search terms *partial knee replacement* and *unicompartmental knee arthroplasty*.

3. Theory

Successful patient education is a crucial step in healthcare that confers benefits such as empowering patients with better decision-making abilities [37], promoting patient engagement in clinical decisions [38], and lowering hospital readmission rates [39]. Given the growing role

Table 2
Description of benefits.

	Google	Yahoo!	Bing	Total	p-Value comparing 3 search engines	Google (alternative)	p-Value comparing alternate
Faster recovery/decreased hospital stay	28 (56%)	24 (48%)	29 (58%)	81	0.66	22	0.32
Lower post-op pain	21 (42%)	17 (34%)	17 (34%)	55	0.66	15	0.24
Smaller incision	21 (42%)	17 (34%)	19 (38%)	57	0.74	15	0.24
Lower blood loss	15 (30%)	17 (34%)	20 (40%)	52	0.60	13	0.79
None	14 (28%)	19 (38%)	13 (26%)	46 (31%)			
At least 1	36 (72%)	31 (62%)	37 (74%)	104 (69%)			