Original Research Article

Readability and quality assessment of online information on Lisfranc complex injuries

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ABSTRACT

Introduction: In this age of digital and social media, online health information is easily accessible. Patients are more likely to be fully aware and averse of their underlying health condition. This makes it paramount to have quality and easily comprehensible information available to general public. The goal of this study is to evaluate the readability and quality of information available on the Internet relating to Lisfranc complex injuries.

Materials and Methods: To identify potential web sites, five most common internet search engines, Google, Bing, Yahoo, Yandex and Duck Duck go were used and a search for "Lisfranc complex injuries" and "Lisfranc fractures" was performed on each. 98 web sites were reviewed. Quality of information was assessed by DISCERN tool, Journal of American Medical Association benchmark criteria, JAMA and Health on the Net code (HON) while readability was analysed with Flesch Reading Ease score (FRES), Flesch Kincaid Grade level (FKG) and Gunning Fog Index (GFI) scores.

Results: After removing duplicates, 98 web sites were identified and analysed. Only 17% of the websites were Health on the Net Code Certified. HON-code certified websites demonstrated higher quality information than those without the code. They also achieved significantly greater JAMA scores. 97% of the websites were above the recommended 6th grade readability level. Flesch readability ease score of more than 80 websites (81%) was below 60 which makes them fairly difficult to read by public.

Conclusion: Like other orthopaedic problems, online information on Lisfranc injuries is of dubious quality. Most of the available information is either set at an academic level standard that is too difficult to comprehend by an average layman person or its too deficient. As a result, the need of hour is to have simple, reliable and quality assured online information available to the patient.

1. Introduction

With the rapid advance of modern media technology, access to the internet has been dramatically growing.[1] The increasing utilization of the internet has provided a better opportunity for people to search for health information online, which was not easily available to them in the past, regardless of its credibility, accuracy, and reliability.[2] As of March 2021, worldwide numbers of internet users have crossed 5 billion.[3] Central statistics office report (2021) shows 93% of all household have internet access in Ireland and 89% among them use the internet daily.[4] Among all households in 2018, 85% has internet broadband subscription in US as per Census bureau statistics.[5]

Numerous studies have shown that information present on internet can be ambiguous and inaccurate.[6–8] The aim of our study was to evaluate the quality and readability of internet based information on Lisfranc complex injuries.

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2. Materials and Methods

We used top 5 search engines according to the percentage of market share and searched for the terms "Lisfranc complex injuries" and "Lisfranc fractures" in each. This web search was done on the 29th January 2022.[9] 98 websites were identified after removing the duplicates (Figure 1). Websites were scored for quality and readability by two independent authors.

Readability scoring (Flesch reading ease score, Flesch Kincaid grading level and Gunning Fog Index) was done by using websites www.readable.com and www.webfx.com respectively.[10,11] These scores are a way to measure whether written information is likely to be understood by the intended reader.[10]

Quality assessment was performed using validated quality tools including the DISCERN score, the Journal of the American Medical Association (JAMA) benchmark criteria, and the Health on the net Code (HON-code) certification. The DISCERN instrument developed by the University of Oxford is a 0-80 points score based on publication reliability, quality of information and the overall rating of the publication.[12] The Journal of the American Medical Association (JAMA) benchmark criteria assess the four core standards including website authorship, attribution, disclosures and currency.[13] Each website was checked for HON-code certification.[14]

3. Results

3.1. Website quality analysis

On review, we discovered only 17 sites (17%) were HON-Code Certified. The mean DISCERN score was 39.15 (range 22-67). HON-code certified sites had a higher mean DISCERN score of 40.41 (29-61), in contrast to the non HON-code certified sites, mean of 38.88 (range 22-67). The overall mean JAMA score was 2.36 (1-4), again HON-code certified websites having a higher JAMA mean of 3.05 (2-4).

3.2. Website readability analysis

The mean Flesch readability ease score noted was 48.83 (9.3-76.2) and mean Flesch-Kincaid grade level noted was 9.41 (5.2-18.5) (Table 2). FKG of 97% sites and Gunning Fog index of 97 out of 98 (99%) websites was found to be more than the recommended 6th grade level (mean 9.41). There were no major FKG and GFI score difference seen in HON-code certified websites vs non certified web sites while FRES score were slightly higher for HON-code certified sites i.e. 52.79 as compared to non HON-code sites i.e. 48.0 (Table 1).

4. Discussion

The Lisfranc injury was named after French gynaecologist and field surgeon Jaques Lisfranc de Saint-Martin who described an amputation through the tarsometatarsal (TMT) joint in 1815.[15] Lisfranc injuries range from pure ligamentous sprains to frank fracture dislocations of the tarsometatarsal and inter-cuneiform joint complex.[16] Lisfranc injuries have an estimated incidence of 1/55 000 people.[17] However, the total number of Lisfranc injuries could be under reported, because almost 20% of these injuries are initially missed.[18]

Lisfranc injuries generally result from either direct or indirect mechanisms.[19] Most common causes include falls from heights, motorcycle or motor vehicle accidents, and lower-energy injuries, such as with competitive sports or a slip and ground-level falls.[19] The pathoanatomy is individually specific and highly variable and may consist of a pure ligamentous injury, a pure bony injury (fracture), or a combination.[20]

The quality of online information relating to Lisfranc injuries and its accessibility may impact on a patient's understanding and subsequent clinical outcome. Web users read information on a screen differently to how they might read it in a printed format.[21] In research on how people read websites it was found that 79 percent of the test users always scanned any new page they came across; only 16 percent read word-by-word. The average reading age in the UK is nine years old and recommended Flesch-Kincaid reading ease score is of 60 and over.[21] 85% of the public can read your content if it has a readability grade of 8 or lower.[10] As per the American Medical Association (AMA), the readability of patient education materials should not be higher than sixth-grade reading level.[22]

The role of the Internet as a source of health information has increased.[23] Patients are much more likely to search web and are better informed about health conditions than ever before.[24] Studies report that searching on the internet for health information may potentially influence an individual's decision making to change her health-seeking behaviours.[8] Google, Yahoo!, Bing, Yandex and DuckduckGo are by and large effective search engines for helping lay users get health and medical information.[9] Healthline.com is the top most visited website for health related topics worldwide whereas HSE. i.e and NHS.uk are the top most ranked health websites in Ireland and UK subsequently.[25] The number of people using the Internet for health information is large and growing; more than 70,000 websites (2017) provide health information.[26] Studies have shown that the information available on the Internet is highly variable and provides poor to moderate quality information on health topics.[6,22,27]

The overall mean readability scores indicated that the Web sites as a group were difficult to read. The mean FRE score was 48.83 (9.3-76.2), FKGL was 9.41(5.2-18.5) and the GFI was 11.12 (5.6-16.7). The complete readability scores are presented in Tables 1 and 2. 80% of the websites (79/98) FRES score was at or less the recommended
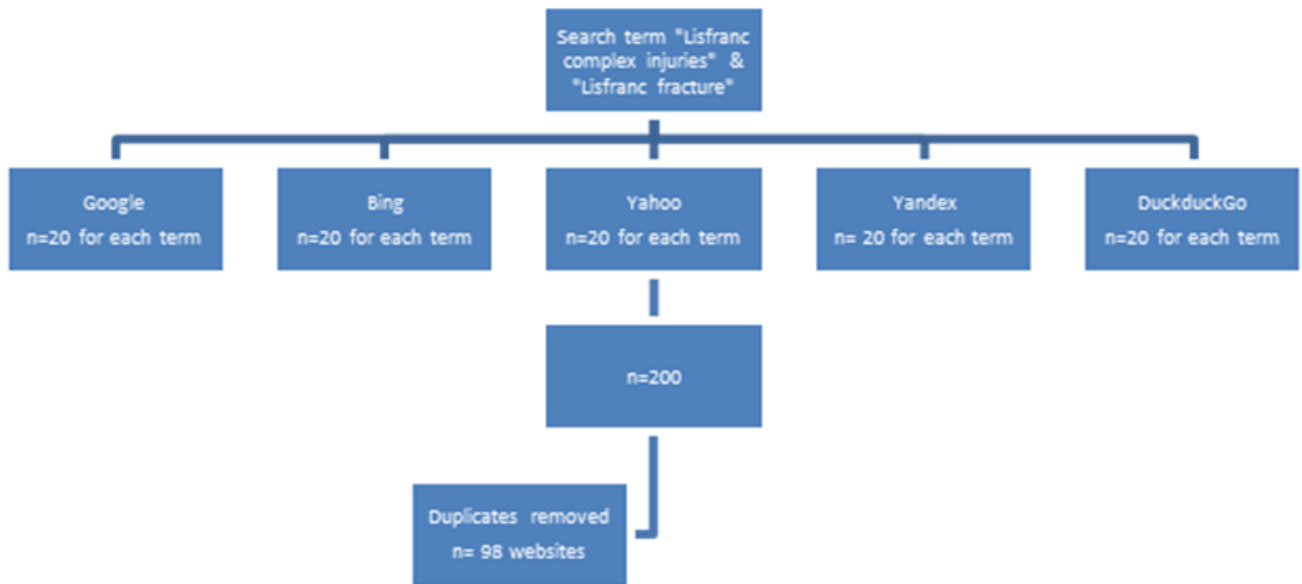
Fig. 1: Websites inclusion flow chart

Table 1: Overall mean readability and quality scores

No. of Sites	HON Code	DISCERN	JAMA	FRES	FKGL	GFI
N=98	N=17	39.15(r=22-67)	2.36(r=1-4)	48.83(r=9.3-76.2)	9.41(r=5.2-18.5)	11.12(r=5.6-15.7)

HON: Health on the Net Foundation, FRES: Flesch Reading Ease Score, FKGL: Flesch-Kincaid Grade Level, GFI: Gunning Fog Index, n: Number, r: Range, DISCERN: DISCERN Instrument, JAMA: The Journal of the American Medical Association Benchmark Criteria

Table 2: Readability and quality scores comparison between HON-code vs non HON-code certified websites

HON-code	No of sites	DISCERN	JAMA	FRES	FKGL	GFI
Certified	N=17	40.41(r=29-61)	3.05(r=2-4)	52.79(r=32.3-70.8)	8.69(r=5.9-11.2)	10.33(r=8-13.9)
Non- Certified	N=81	38.88(r=22.67)	2.22(r=14)	48.00(r=9.3-76.2)	9.56(r=5.2-18.5)	11.28(r=5.6-16.7)

HON: Health on the Net Foundation, FRES: Flesch Reading Ease Score, FKGL:Flesch-Kincaid Grade Level, GFI: Gunning Fog Index, n: Number, r: Range, DISCERN: DISCERN Instrument, JAMA: The Journal of the American MedicalAssociation Benchmark Criteria

score of 60 (Graph 1).

97% websites had a higher readability level than the recommended 6th grade level (Graph 1). However, the presence of HON-code certification did not predict a significant difference in any of the readability assessments used but a slight higher score in FRES and one grade lower in FKGL and GFI readable level (Table 2).

We noted that HON-code Certified websites have a significant higher JAMA(3.05) and better DISCERN score (40.41) as compared to non HON-code sites (DISCERN: 38.88, JAMA: 2.22) but achieved better readability scores (Table 2)
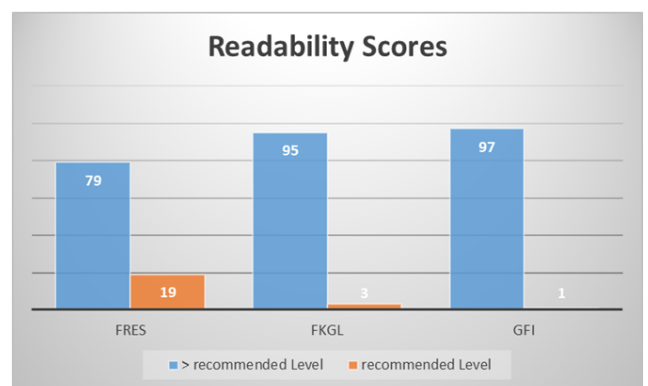
Graph 1: Recommended readability scores comparison of no of websites

5. Conclusion

In conclusion, health related information on internet is written above the recommended readability level. Patients are now better informed and equipped with the necessary information before they seek consultation. Hence forth, it is vital to have accurate and reliable online information available so patients and health care professionals can make informed shared care decisions. As HON-code certified websites consistently achieve higher standardized quality scores hence patients should be encouraged to seek information from those certified websites.

6. Research Ethics Committee

Approval from the hospital research committee was not needed/not applicable.

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8. Data Access Statement

All relevant data are within the paper and its supporting information files.

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