

Stapedotomy Websites: Do Patients Have Access To Good Quality, Readable Information?

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ABSTRACT

Introduction: Otosclerosis is a condition in which there is abnormal growth and remodelling of bone in the middle ear, with both genetic and environmental risk factors. This primarily affects the stapes footplate and otic capsule leading to progressive conductive or mixed hearing loss affecting multiple hearing frequencies. The gold standard of treatment for this condition is considered by many to be a stapedotomy. This is a surgical procedure which creates a fenestration in the stapes footplate (using a microdrill or a laser) and removes part of the stapes bone. Current guidelines recommend a hearing loss of greater than 20dB. Analysing online materials, that patients have access to, is of the utmost importance not only in checking that the most up-to-date information is being used but to also verify that the online materials are being set at an appropriate reading standard. This particular study aims to investigate the quality and readability of stapedotomy patient information websites.

Method: Searches were performed using Google on the term “stapedotomy “. Inclusion and exclusion criteria were applied and the first 16 websites that met the criteria were noted and further analysed for quality and readability using the DISCERN website quality measurement tool and Flesch Reading Ease (FRE) Score and Simple Measures of Gobbledygook (SMOG) readability assessment methods.

Results: 11 of the 16 websites (69%) were rated as being of poor quality (DISCERN scores less than 39) and 5 (31%) were rated as being of average or fair quality (DISCERN scores between 39-50). None of the websites were rated as being of good quality. Based on the FRE Score, 31% of websites (5/16) were seen as “average to read” while the remaining 69% of websites (11/16) were graded as “difficult to read”. No websites were rated as “easy to read.” Despite most of them (94%) having a reading age below the average reading age of 9 years old based on the SMOG index.

Discussion: Majority of the stapedotomy websites failed to mention alternative treatment options, the importance of shared decision making, discussing areas of uncertainty and emphasising the aims of the website. The authors of such websites may argue that these areas are not essential since key medical information is covered in clinical consultations. The DISCERN website is a UK based tool; however, the websites sampled here were from 5 different countries. Information that is displayed on these websites and deemed to be important will vary between each country and this has to be taken into consideration. However DISCERN has been used in other countries and has still be found to be reliable and effective so the findings here still have some credibility in spite of the diversity of countries represented among the websites.

Conclusion: It is essential for patient understanding that authors continue to constantly improve the quality of patient information websites through the use of multiple readability indexes and tools such as the DISCERN framework. Further research is required to improve overall website designs.

Keywords: Otosclerosis, Stapedotomy, Flesch Reading Ease, Multiple Hearing Frequencies, DISCERN.

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INTRODUCTION

Otosclerosis is a condition in which there is abnormal growth and remodelling of bone in the middle ear, with both genetic and environmental risk factors. This primarily affects the stapes footplate and otic capsule leading to progressive conductive or mixed hearing loss affecting multiple hearing frequencies. Once a history and examination have been carried out, audiograms are performed according to guidelines¹. The audiogram may show a Carhart's notch although this is not essential for diagnosis^{2, 3}. Initial treatment options may include active monitoring or the use of hearing aids, however, since the hearing loss is progressive, the gold standard of treatment for this condition is considered by many to be stapes surgery^{4, 5}. Knowing when to recommend surgery for otosclerosis is of critical importance. Current guidelines recommend a hearing loss of greater than 20dB. However, there is variation among authors with some suggesting that patients with hearing loss of 15dB is enough for an operation while others suggest hearing loss of at least 30dB is required to justify the risk-benefit ratio to proceed with stapes surgery and provide overall benefit^{1, 6, 7}.

A stapedotomy is a surgical procedure which creates a fenestration in the stapes footplate (using a microdrill or a laser) and removes part of the stapes bone. This is believed by many surgeons to be a less invasive and technically easier operation of shorter duration, in comparison to a stapedectomy, where the stapes bone and footplate are removed completely^{8, 9}. Even though microscopes have been used in the past, there is an increasing trend to perform stapes surgery using an endoscope, yielding similar audiological outcomes^{4, 10}.

The exact number of stapes surgeries performed in the UK each year remains unknown due to the current lack of a database. However, recent surveys and studies conducted by otologists throughout multiple countries have shown that stapedotomy is now the preferred technique^{5, 8, 9}. These surveys and studies have compared the short and long term results of both techniques; the most recent results indicate that, when compared to stapedectomy, stapedotomy offers equivalent sustainable outcomes with better high frequency hearing improvements, shorter operating times leading to the potential for multiple day case surgeries, and complications of lower severity and shorter duration¹¹⁻¹⁴. The specific complications that are most often reported with stapedotomy can include vertigo, tinnitus, sensorineural hearing loss, dysgeusia and tympanic membrane perforation^{4, 13}. There is always a risk of needing to perform revision surgery around the stapes prosthesis if the conductive hearing loss returns post-operatively after a period of time¹⁵.

Patients and Non-Ear Nose and Throat (ENT) healthcare workers may not be well informed about ENT procedures and post-operative complications from these procedures. This can lead to problems within the first few days or weeks after surgery^{16, 17}. Limited access to doctors and

a lack of information from hospitals or GP surgeries can cause patients to search their medical condition or surgery on the internet^{18, 19}. Therefore, improving the quality of internet-based materials, specifically in this case related to stapedotomy, is essential in helping to address patients' needs for information in the post-operative period as well as reducing the burden on healthcare professionals who might otherwise have to arrange extra clinic or telephone appointments to answer simple queries.

According to research conducted by the National Institute for Health and Care Research (NICE), up to 40% of adults struggle to understand health education websites while 60% may find it difficult to comprehend health information material that involves statistics and numbers; this has serious consequences for the comprehension of healthcare websites²⁰. The average reading age of adults in the UK has been estimated at 9 years old; however, National Literacy Trust data estimates that up to 9 million adults in the UK are functionally illiterate^{20, 21}. This raises the possibility that information leaflets written at a level considered to be too difficult for the average adult, could have an impact on their compliance with post-operative advice or understanding how to care for children who have had certain operations, which could lead to serious health consequences²²⁻²⁴. Therefore, analyzing such online materials, that patients have access to, is of the utmost importance not only in checking that the most up-to-date information is being used but to also verify that the online materials are being set at an appropriate reading standard. This particular study aims to investigate the quality and readability of stapedotomy patient information websites.

METHODS

Search Strategy

"Stapedotomy" was used as a search term on search engines. Google is currently the most popular UK search engine^{25, 26} with Google Chrome and Safari being the most frequently used UK browsers on PC and Apple Mac computers respectively²⁷. Desktop versions of both browsers have been compared previously and found to generate similar search results^{28, 29}. Searches were performed using inclusion and exclusion criteria, and the first 16 websites that met the criteria were noted and further analysed for quality and readability. Any duplicate results were ignored. Location settings were disabled to minimise the effect of the researcher's geographical location.

Inclusion and Exclusion criteria

Inclusion criteria were websites that had patient operative educational material about stapedotomy. Exclusion criteria were websites that required log-in or access through a pay wall, non-English language websites, websites that did not include patient operative educational material, healthcare blogs, professional database websites (e.g. Pubmed) and websites that contained terminology outlined for doctors and surgeons.

Quality assessment of websites using the DISCERN instrument

The quality of the surgical patient information websites was assessed using the DISCERN website quality assessment tool^{30, 31}. The 16 questions within the framework are divided into 3 topics; reliability (questions 1-8), treatment (questions 9- 15) and website quality (question 16). Answers are graded from 1-5 to indicate a strong “no” (1 out of 5) or a strong yes (5 out of 5). A score of 1 for question 16 indicates a low-quality website while a score of 5 indicates a website of exceptional quality. A website can be given a maximum score of 80 for all questions³².

Table 1 illustrates the questions used in the DISCERN instrument³⁰.

Table 2 describes the interpretation of the total scores, based on the DISCERN framework³².

Readability assessment using Flesch Reading Ease Score and Simple Measures of Gobbledygook Index

Text with better readability is easier to understand and can be appreciated by people with a range of academic abilities. Content, text organisation, structure, style of presentation and language used can all influence the readability level³³.

The most widely used readability tool in the UK is the Flesch Reading Ease (FRE) Score; other tools exist and each has its own strengths and limitations^{33, 34-37}. The ability to calculate and generate the FRE Score from a piece of text is built into Microsoft Word and can be calculated relatively easily by copying and pasting the text from the website into word and running an analysis. There are also websites that allow calculation of the FRE simply by entering the web address into the web. The <https://www.webfx.com/tools/read-able> website was used here for that person⁴⁰.

Table 3 shows how the FRE Scores can be ranked^{36, 37}.

The second readability tool used in this study was the Simple Measure of Gobbledygook (SMOG) Index. The

Table 1: Questions used in the DISCERN instrument for assessing the quality of healthcare websites³⁰.

Section 1	Reliability
	1. Explicit aims
	2. Aims achieved
	3. Relevance to patients
	4. Sources of information
	5. Currency (date) of information
	6. Bias and balance
Section 2	Treatment choices
	7. Additional sources of information
	8. Reference to areas of uncertainty
	9. How treatment works
	10. Benefits of treatment
	11. Risks of treatment
	12. No treatment options
	13. Quality of life
	14. Other treatment options
	15. Shared decision making
Section 3	Summary
	16. Overall quality of website

Table 2: Interpretation of DISCERN scores³².

DISCERN Score Range	Quality Rating
< 27	Very poor quality
27 – < 39	Poor quality
39 – < 51	Fair quality
51 – < 62	Good quality
> 62	Excellent quality

Table 3: Interpretation of FRE Scores^{36, 37}.

Flesch Reading Ease Score Range	Interpretation
0 – < 30	Very difficult
30 – < 50	Difficult
50 – < 60	Fairly difficult
60 – < 70	Standard
70 – < 80	Fairly easy
80 – < 90	Easy
90 – 100	Very easy

Table 4: Results of the readability assessments.

	FRE Score	SMOG Index
Range	25.2 – 78.1	3.5 – 11.4
Mean +/- standard deviation	54.3 +/- 12.81	6.5 +/- 1.76

SMOG Index can generate more consistent scores than other tools and is easy to use^{35, 38, 39}. The SMOG formula generates a number equivalent to the “average age required to read and understand the material”. A figure of 5 for one website and 12 for another website would indicate that the second website is more difficult to read since a reader would need 12 years of education to understand that website material easily. The SMOG readability calculator was accessed by the use of the website and designed to reduce error in the calculation process which can be caused by a lack of understanding of the formula or fatigue leading to mistakes in the process (<https://www.webfx.com/tools/read-able>)⁴⁰.

RESULTS

Overall website features

Out of the 41 websites that came from initial search results, only 16 (39%) met the “patient educational material” inclusion criteria and so these were selected. 23 (56%) were journal articles and 2 (5%) were Youtube videos. 4 (25%) of the websites were from the UK, 9 (56%) of the websites were from the US and the remaining 3 websites (18%) were from the Netherlands, Australia and Qatar; 1 from each country (6% each).

Quality

The DISCERN scores across the 16 websites ranged from 32-42. The mean DISCERN score was 37.4 with a standard deviation of +/- 3.07 and a median score of 38. Of the 16 websites, 11 (69%) were rated as being of poor quality (DISCERN scores less than 39) and 5 (31%) were rated as being of average or fair quality (DISCERN scores between 39-50). None of the websites were rated as being of good quality.

Readability

The results for the two readability scores are outlined in Table 4 below.

According to the FRE Score, 31% of websites (5/16) were seen as “average” while the remaining 69% of websites (11/16) were graded as “difficult” (very difficult, difficult or fairly difficult to read). No websites were rated as “easy to read.”

According to the SMOG Index, 94% of websites (15/16) had readability ratings below the average reading age of 9 years old while 6% of websites (1/16) had a reading age of 11.4 years.

The Pearson rank correlation coefficient gave a score of $r = -0.52$ showing a negative correlation between Flesch

and SMOG index readability scores

DISCUSSION

Online healthcare material has the potential to create a positive impact on the decision-making process of patients and their relatives^{41,42}. Unfortunately, the lack of regulation of these online material means that misleading information is allowed to exist and as such, has the potential to cause significant harm^{43,44}.

NICE have conducted several studies and concluded that up to 6 in 10 adults may struggle to understand healthcare information and that 7.1 million people read at or below the average reading age of 9 years^{20,21}. None of the websites in this study were considered to be “easy to read” according to the Flesch Reading Ease Score with 69% considered to be “difficult to read.” Majority of the websites found were assessed as being of poor quality according to the DISCERN tool. This is concerning since patients may find ENT procedures confusing, particularly when similar sounding jargon like stapedotomy, stapes surgery and stapedectomy can have different meanings⁴⁵.

Majority of the stapedotomy websites failed to mention alternative treatment options, the importance of shared decision making, discussing areas of uncertainty and emphasising the aims of the website. The authors of such websites may argue that these areas are not essential since key medical information is covered in clinical consultations. The DISCERN website is a UK based tool; however, the websites sampled here were from 5 different countries. Information that is displayed on these websites and deemed to be important will vary between each country and this has to be taken into consideration. However DISCERN has been used in other countries and has still be found to be reliable and effective so the findings here still have some credibility in spite of the diversity of countries represented among the websites⁴⁶⁻⁴⁸.

Ultimately, the creation of accurate and readable patient information websites should follow appropriate guidelines (e.g. NICE), be assessed via the DISCERN framework prior to website creation and outline appropriate financial and IT resources⁴⁹. This will allow key material to be used when planning and designing a website in order to improve its overall quality.

LIMITATIONS

There were a number of limitations identified with this particular study. Firstly, it would have been more prudent to include more readability assessments and an assessment of the correlation scores between each of those included.as this would have helped to increase the reliability of our findings. Only 16 websites were considered here. Increasing the number of websites

from 16 to 100 would have been helpful. This may provide more insights and strengthen the robustness of the current findings.

A high FRE Score and a low SMOG Index indicate easier reading material which explains negative Pearson rank correlation coefficient observed here. The SMOG index rated the majority of websites in this study as being below the average reading age. It would have been helpful to use more than one online calculator to check for consistency across different websites.

Regarding readability scores, it would have been helpful to calculate the correlation between the DISCERN website quality score with the various readability scores and then report the highest and lowest correlation figures; a larger sample of websites and a wider range of readability methods would ideally be required for this. If the findings from such calculations suggested that some readability methods were better correlated to the DISCERN quality scores than others, then using a larger sample of websites and testing multiple readability tools would add greater support to any recommendations made.

There were several other sources of information that were not considered in this study such as online videos, patient information leaflets given in clinics, websites in other languages (patient dependent), word of mouth and the impact of prior experience of similar surgery.

Scientific journal articles were excluded, however, it is worth considering that some patients do specifically search for this high-level information and are able to understand it, and so the impact of such material was missed in this study.

We restricted the search term to “stapedotomy.” It may have been more prudent to include broader terms such as “stapedectomy”, “stapes surgery”, “ear surgery”, “ear operation” and other terms that patients may have used.

CONCLUSION

It is essential for patient understanding that authors continue to constantly improve the quality of patient information websites through the use of multiple readability indexes and tools such as the DISCERN framework. Further research is required to improve overall website designs and to direct patients to those websites of the best quality, whilst also being aware that an information website will never replace the process of informed consent nor the need for a strong doctor-patient relationship.

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