ChatGPT as a Source of Patient Information for Lumbar Spinal Fusion and Laminectomy: A Comparative Analysis Against Google Web Search

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INTRODUCTION: ChatGPT, an artificial intelligence chatbot with seemingly unlimited functionality, may present an alternative to a Google web search for patients seeking information about medical questions. With widespread misinformation and suboptimal quality of online health information, it is imperative to assess ChatGPT as a resource for this purpose. The objective of this study was to assess the utility of ChatGPT in providing patient information for lumbar spinal fusion and lumbar laminectomy in comparison with the Google search engine, with respect to: (1) the top ten most frequently asked questions (FAQs) associated with these procedures by question type/topic; (2) answers provided for shared FAQs; and (3) replicated responses in ChatGPT from FAQs with a numerical response on Google web search.

METHODS: The search terms "lumbar spinal fusion" and "lumbar laminectomy" were individually inputted into a Google web search and the first 10 FAQs were extracted. ChatGPT was then utilized to extract its own list of 10 FAQs using the statement: "Perform a google search with the search term 'lumbar spinal fusion' and record the 10 most FAQs related to the search term", repeated with 'lumbar laminectomy' as the second search term. Shared questions in the two lists were then inputted into ChatGPT for a response, and the responses between the two platforms were compared in terms of length and readability, using the Flesch Reading Ease score and Flesch-Kincaid Grade Level. The first 10 FAQs for each procedure with a numerical response in a Google search were replicated in ChatGPT and its responses were recorded.

RESULTS SECTION: 2 of 10 (20%) questions for both lumbar spinal fusion and lumbar laminectomy were asked similarly between ChatGPT and Google web search. Compared to the Google web search, ChatGPT's responses to these questions were a mean length of 340.0 words (vs. 159.3), an average Flesch Reading Ease score of 34.0 (vs. 58.2), and an average Flesch-Kincaid grade level of 11.6 (vs. 8.8). Subjectively, we evaluated these responses to be accurate and adequately non-specific. Each response concluded with a recommendation for the user to discuss further with a healthcare provider. Regarding numerical responses, over half of the questions from the Google web search produced a varying or non-numerical response in ChatGPT.

DISCUSSION: FAQs and responses regarding lumbar spinal fusion and lumbar laminectomy were highly variable between ChatGPT and a Google web search. While ChatGPT may be able to produce relatively accurate responses in select questions, its role remains as a supplement or starting point to a consultation with a physician, not as a replacement. Its utility as a resource for patient information must be taken with caution until the functionality of its response production can be verified and validated.

SIGNIFICANCE/CLINICAL RELEVANCE: Having amassed meteoric popularity for its accessibility and seemingly unlimited functionality, ChatGPT may serve as an alternative platform to a Google web search in providing patients with pertinent questions and answers related to lumbar spinal fusion and lumbar laminectomy that advance their health literacy. Although variable and lengthier compared to Google's responses, the current study found that ChatGPT's responses are adequately non-specific and subjectively accurate.

IMAGES AND TABLES:

Table 2. Comparison of Google Web Search and ChatGPT's Top 10 Most Frequently Asked Questions for Lumbar Spinal Fusion

Google Web Search	ChatGPT
1. Is lumbar spinal fusion a major surgery? (value/evaluation of surgery)	1. What is lumbar spinal fusion? (fact/technical details)
2. How long is recovery for lumbar spinal fusion? (fact/timeline of recovery)	2. Why is lumbar spinal fusion performed? (policy/indications or management)
3. Is lumbar spinal fusion worth it? (value/evaluation of surgery)	3. What are the risks and complications associated with lumbar spinal fusion? (policy/risks or complications)
4. Can you live a normal life after lumbar fusion? (value/evaluation of surgery)	4. What is the recovery time for lumbar spinal fusion surgery? (fact/timeline of recovery)
5. What are the permanent restrictions after spinal fusion? (fact/restrictions)	5. How long does it take to return to normal activities after lumbar spinal fusion? (fact/timeline of recovery)
6. What are the disadvantages of lumbar fusion? (policy/risks or complications)	6. What is the success rate of lumbar spinal fusion? (fact/technical details)
7. Who is not a good candidate for spinal fusion? (policy/indications or management)	7. Are there alternative treatments to lumbar spinal fusion? (policy/indications or management)
8. Will I be pain free after lumbar fusion? (value/pain)	8. What is the difference between minimally invasive and traditional lumbar spinal fusion? (policy/indications or management)
9. What are the odds of being paralyzed after spinal fusion? (policy/risks or complications)	9. How long does the fusion take to fully heal after lumbar spinal fusion surgery? (fact/timeline of recovery)
10. Can you ever bend again after spinal fusion? (fact/restrictions)	10. What are the factors that can affect the outcome of lumbar spinal fusion surgery? (policy/risks or complications)

Table 4. Comparison of Google Web Search and ChatGPT's Top 10 Most Frequently Asked Questions for Lumbar Laminectomy

Google Web Search	ChatGPT
1. Is a lumbar laminectomy a major surgery? (value/evaluation of surgery)	1. What is a lumbar laminectomy? (fact/technical details)
2. Can you walk normally after laminectomy? (fact/specific activities)	2. Why is a lumbar laminectomy performed? (policy/indications or management)
3. How serious is a lumbar laminectomy? (value/evaluation of surgery)	3. How long does it take to recover from a lumbar laminectomy surgery? (fact/timeline of recovery)
4. What is done in a lumbar laminectomy? (fact/technical details)	4. What are the risks and complications associated with lumbar laminectomy? (policy/risks or complications)
5. Are there permanent restrictions after a laminectomy? (fact/restrictions)	5. What is the success rate of lumbar laminectomy? (fact/technical details)
6. How bad is pain after lumbar laminectomy? (value/pain)	6. How is a lumbar laminectomy different from a lumbar fusion? (fact/technical details)
7. What are the red flags after a laminectomy? (policy/risks or complications)	7. Will I need physical therapy after a lumbar laminectomy? (policy/indications or management)
8. How long does it take to fully recover from lumbar laminectomy? (fact/timeline of recovery)	8. Can a lumbar laminectomy be performed using minimally invasive techniques? (fact/technical details)
9. Do you need rehab after laminectomy? (policy/indications or management)	9. What are the alternative treatments to lumbar laminectomy? (policy/indications or management)
10. What are the long term problems after a laminectomy? (policy/risks or complications)	10. How long does the effect of a lumbar laminectomy last? (value/longevity)