ChatGPT Responses to Common Questions about Anterior Cruciate Ligament Injuries are Far Too Complex for Patient Education Purposes

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INTRODUCTION: Patients who sustain an anterior cruciate ligament (ACL) injury often must wait for an outpatient clinic appointment to speak with a medical provider, as well as magnetic resonance imaging (MRI) confirmation of injury prior to discussing management of their injury. Consequently, patients often utilize Internet resources for information regarding common ACL questions, prior to any discussion with a medical professional. ChatGPT is a large language model artificial intelligence (AI) that is quickly gaining traction in aiding with education in a wide range of topics. One potential application is helping to answer patient medical questions, particularly information regarding common injuries/illnesses. As more and more people - especially younger populations - are switching from conventional search engines to ChatGPT, this may direct injured populations away from searches that would typically lead them to hospital websites. Within orthopaedics, utilizing AI responses for these answers will likely continue to grow, and the purpose of this study was to compare the content and readability of AI generated responses of commonly asked questions related to ACL injury and treatment with information found on the AAOS and hospital websites. We hypothesized that there would be little difference between the AI generated responses and conventional orthopaedic patient information resources.

METHODS: Six questions regarding ACL injuries were identified as commonly answered questions on the websites of hospitals in the top-20 list of US New & World Report Best Hospitals for Orthopaedics. These questions were: 1. What is the ACL/What is an ACL tear? 2. What are the symptoms of an ACL tear? 3. How is an ACL injury diagnosed? 4. What are the surgical treatments for an ACL tear? 5. What are the nonsurgical treatments for an ACL tear? 6. What is the recovery time for an ACL tear? Three of these top-20 hospitals were randomly selected (one east coast, one midwest, and one west coast), and their responses to these questions on their websites were recorded. These questions were then asked to ChatGPT on two separate days, and responses were recorded. Responses between the three hospital websites, the American Academy of Orthopaedic Surgeons (AAOS) website, and ChatGPT were evaluated for content. Readability of all responses was assessed using the Readability software. The Flesch-Kincaid Grade Level (FKGL) and Gunning Fog Index (GFI) both generate the reading grade level of a text with larger values being indicative of increased difficulty/complexity. The National Institutes of Health has recommended that patient education materials be written at no more than an eighth-grade level. The Flesch Reading Ease (FRE) metric was used to assess the complexity of the text and is based on sentence length and the number of syllables per word. Scores range from zero (unreadable) to 100 (very easy), and FRE values > 60 are considered acceptable for patient education. Two-tailed independent t-tests were then used to compare readability of the hospital and AI-generated responses.

RESULTS: When subjectively evaluating the content of the responses, AI responses contained accurate information and similar content to hospital websites and the American Academy of Orthopaedic Surgeons (AAOS). However, the AI responses were significantly more difficult to read than the hospital responses (FKGL: AI=13.1±1.3 vs. Hospital=6.5±1.5; GF: AI=16.6±1.6 vs. Hospital=9.7±2.0; FRI: AI=34.1±9.2 vs. Hospital=63.5±10.7; $p<0.00001$ for all 3 scores). AI responses were found to be at an undergraduate or graduate reading level, while hospital websites were generally found to be within the recommended guidelines for patient education materials.

DISCUSSION AND CONCLUSION: Ultimately, while AI will likely be more heavily utilized in providing patient education on common injuries moving forward, these results suggest that the complexity of current AI responses may limit their role in providing accessible patient education to all regarding ACL injury, diagnosis, treatment, and recovery. The role of healthcare professionals creating content and information for hospital websites continues to be valuable in providing accessible patient education to a wide range of patients.