

Orthopedics This Week

Use AI to Streamline (Improve?) Patient Screening

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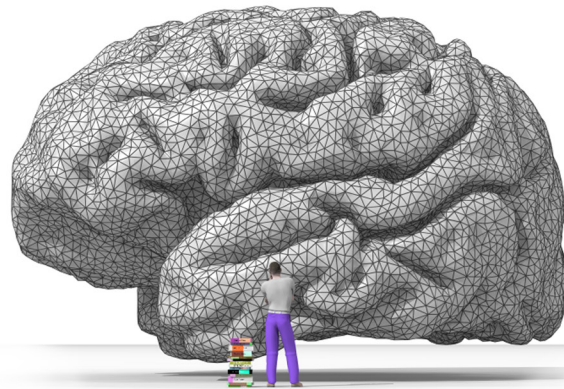
Artificial intelligence (AI) brings with it both promise and problems. In terms of sorting out and streamlining the logistics of healthcare, AI may well have the most potential for improving not only patient outcomes but also lowering the costs and human burden of providing healthcare services.

A team of doctors from Harvard Medical School have developed a machine learning (ML) algorithm which could, potentially, be used to screen patients for total joint arthroplasty—thereby improving both the efficiency and accuracy of selecting patients for large joint surgery.

The new algorithm was tested, retrospectively in a small (n=158) patient group and it showed a 92% rate of successfully predicting the need for surgical intervention.

The resulting paper, "[Development of a Machine Learning Algorithm to Identify Surgical Candidates for Hip and Knee Arthroplasty Without In-Person Evaluation](#)" was published in *Archives of Orthopaedic and Trauma Surgery* by Andrew K. Simpson, M.D. et al. February 2023.

According to the authors of the study, their goal was to use easily obtainable patient data—analyze it using an AI based algorithm, and without the benefit of an office visit—predict the



Source: Wikimedia Commons and Nicholas Rougier

likelihood that a patient would undergo surgery. Impressively, when tested, the algorithm achieved a 92% success rate in predicting the need for surgical intervention.

The researchers found that the following factors were most predictive for total joint arthroplasty:

- Degree of radiographic arthritis
- A trial of physical therapy
- History of intra-articular injections
- Smoking status
- Opioid use

Results

All patients in the study were evaluated using telemedicine. Of the 158 patients interviewed, 65% were indi-

cated for operative intervention prior to in-person evaluation. Among the patients who went on to see their surgeons in-person, 92% ultimately underwent surgical intervention. Eight patients decided not to participate in the follow-up after their surgical indication.

“The potential impact for leveraging data analytics to optimize the way patients interact with health systems is significant both in terms of reducing healthcare costs as well as improving clinical outcomes,” Dr. Simpson told OTW.

“Physicians are generally taught about how much nuance and thoughtful investigation is required to make clinical decisions for patients, but perhaps things are simpler than that...or perhaps leveraging processes beyond human decision capacity brings clarity in decision making.”

In Dr. Simpson's view, the current healthcare model is overly complex and confusing—particularly for the patient seeking the best possible guidance and care. And, perhaps, an AI algorithm much like the one Dr. Simpson and his colleagues have tested could reduce complexity and confusion.

Certainly, as some market forecasting services postulate, the number of total knee arthroplasty patients

are destined to rise significantly to as much as 935,000-1.26 million patients by 2030—just seven years from now, the conditions seem ripe for AI based screening and logistics efficiency tools.

Conclusion

While more validation testing needs to be performed and there are certainly other AI based algorithms on

the horizon, this early study reported out promising results and showed one area where artificial intelligence is likely to be an effective tool for improving both the logistics of healthcare and patient outcomes by improving the accuracy and precision of patient selection ♦