Exactech Shares Industry's First Shoulder Replacement Surgery "Smart Score" Metric Based on Machine Learning

Surgeons and researchers worldwide can quantify shoulder patient outcomes through a new, more efficient measure

GAINESVILLE, Fla. (April 27, 2021) – Exactech, a developer and producer of innovative implants, instrumentation and smart technologies for joint replacement surgery, announced today the first orthopaedic clinical outcomes measure based on machine learning. The Shoulder Arthroplasty Smart (SAS, or "Smart") Score quantifies clinical outcomes for shoulder arthroplasty patients so surgeons can determine how well patients are doing before and after surgery. The score is available to any surgeon or researcher through the website www.smartshoulderscore.com.

Unlike existing scores available in the industry, the Smart Score offers surgeons a more efficient means of measuring patient outcomes by requiring only half the inputs of other scores. With just six patient-specific inputs, determined through machine learning research to be the most significant assessments of post-operative outcomes, the Smart Score (ranging from 0-100) is determined for each patient. The score is based on three objective active range of motion measures and three subjective measures of the patient's pain and function. The Smart Score will be used as part of Exactech's new Predict+™ clinical decision support tool that uses machine learning to provide predictions of individual patient outcomes after shoulder replacement surgery.

A paper recently published in *JSES Seminars in Arthroplasty* concluded that machine learning can help create more efficient and effective clinical outcome measures. Another paper published this week in the *Journal of Shoulder and Elbow Surgery* compared the new Smart Score to five other assessment tools currently available and found that it was more efficient, with fewer inputs, and showed equivalent or better validity, responsiveness and clinical interpretability.

"Historically, there has not been a single gold standard tool to quantify outcomes before and after shoulder replacement surgery," said orthopaedic surgeon Joseph Zuckerman, MD, of NYU Langone Orthopedic

Hospital, and an Equinoxe® shoulder replacement system design team surgeon. "Because of that, shoulder surgeons have used many different generic shoulder outcome scores to quantify pain relief or functional improvement after shoulder arthroplasty. Our clinical research detailed in this publication proposed a new shoulder arthroplasty-specific clinical outcome score, the Shoulder Arthroplasty Smart Score, that more accurately and efficiently quantifies outcomes, without the bias, ceiling effects or response range issues of the other scores."

Exactech Vice President of Extremities Chris Roche added, "Three of the most common tools to quantify clinical outcomes in the shoulder are the ASES, Constant and UCLA scores. These tools were developed 30 years ago and have changed little since that time despite significant advances in treatment and data science. New machine learning-based analyses provide an opportunity to evaluate the predictive validity of these historical tools. In fact, our research identified the preoperative input questions that are predictive of clinical outcomes, and those that aren't predictive. We also found that the majority of the inputs composing these three historical clinical tools were of low predictive validity, suggesting the need for an altogether new tool like the Smart Score, with preoperative inputs that are more correlated to post-operative outcomes after shoulder surgery."

About Exactech

Exactech is a global medical device company that develops and markets orthopaedic implant devices, related surgical instruments and the Active Intelligence® platform of smart technologies to hospitals and physicians. Headquartered in Gainesville, Fla., Exactech markets its products in the United States, in addition to more than 30 markets in Europe, Latin America, Asia and the Pacific. Visit www.exac.com for more information and connect with us on LinkedIn, YouTube and Instagram.

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