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Orthopedic Frailty Risk Stratification (OFRS): A Systematic Review of the Frailty Indices Predicting Adverse Outcomes in Orthopedics

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - Dr. BCT is a consultant for/lecturer bureau for ZimmerBiomet; consultant for Stryker; consultant for Atricure; royalties from Innomed; editorial board for Orthobullets.com. NG, FD, HRC, CS, AB, MFR, Dr. TM, Dr. MT, Dr. TKW, Dr. JW, and Dr. CB report no financial or non-financial competing interests.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 November 2024 and was last updated on 25 November 2024.

INTRODUCTION

Review question / Objective The objective of this study was to understand the current literature regarding preoperative Orthopedic Frailty Risk Stratification (OFRS) and describe the disparate frailty indices and their capabilities for discrimination in predicting adverse postoperative outcomes.

Rationale The use of frailty as a measure of preoperative risk stratification and outcome prediction is becoming increasingly relevant in orthopedic surgery, especially with an aging population. However, there remains no gold standard tool for assessing frailty, resulting in a large heterogeneous body of orthopedic literature. The diversity in frailty assessment tools complicates their application to clinical and research settings, leading to inconsistencies in identifying frail patients with the highest risk of adverse surgical outcomes.

Condition being studied The application of frailty to any orthopedic surgery pathology or procedure. Examples include those within orthopedic subspecialties such as arthroplasty, trauma, oncology, and sports.

METHODS

Search strategy Search strategy: "((("orthopedic" OR "orthopaedic") AND (surgery)) AND (frailty OR frail))"
Database: Pubmed.

Participant or population The population included in this review includes patients undergoing orthopedic surgery who have been stratified/

assessed using a frailty measure to assess relevant clinical and postoperative outcomes.

Intervention Not applicable.

Comparator Not applicable.

Study designs to be included Primary full-text peer-reviewed articles including retrospective studies, prospective studies, cohort studies, observational studies, and case control studies.

Eligibility criteria Inclusion criteria: 1) Related to frailty in orthopedic surgery, 2) Used a frailty index to measure patient frailty, 3) Analyzed frailty's effect on orthopedic postoperative or clinical outcomes, and 4) Published in English language or had an English translation.
Exclusion criteria: 1) Not primary full-text peer-reviewed articles (letter, review, or conference abstract), 2) Using sarcopenia or single disease as the only frailty measure, 3) Orthopedic pathology not separable from non-orthopedic pathology, 4) Investigating frailty in rheumatoid arthritis, and 5) Examining frailty in spine pathologies or procedures.

Information sources PubMed.

Main outcome(s) Study characteristics including study design, data source, and category of procedure/pathology. The type of frailty measure(s) utilized and frailty tiers (as applicable). Demographic variables including cohort size and mean/median age cutoff for inclusion. Outcomes associated with frailty including predictive value in comparison to other risk factors.

Quality assessment / Risk of bias analysis Risk of bias analysis will be conducted using the modified Newcastle Ottowa Scale.

Strategy of data synthesis Data will be synthesized qualitatively to provide an overview of the current state of frailty in the orthopedic surgery literature. Quantitative data synthesis will likely not be possible due to the heterogenous nature of the included studies.

Subgroup analysis No official subgroup analysis will be performed due to the qualitative nature of data synthesis. Studies will be presented stratified by orthopedic subspecialty.

Sensitivity analysis A sensitivity analysis was not performed as the synthesis of studies will by qualitative in nature.

Language restriction Including only articles published in English or non-English studies with a published English translation.

Country(ies) involved United States.

Keywords orthopedic frailty risk stratification (OFRS), orthopedic surgery, modified frailty index (mFI), comorbidity index, frailty index, and preoperative risk stratification.

Contributions of each author
Author 1 - Nithin Gupta - manuscript conception and design, acquisition or analysis of data, interpretation of data, and drafting of the article.
Author 2 - Forrest Dunivin - acquisition or analysis of data.
Author 3 - Hikmait Chmait - acquisition or analysis of data and drafting of the article.
Author 4 - Chase Smitterberg - acquisition or analysis of data and drafting of the article.
Author 5 - Azhaan Buttar - acquisition or analysis of data.
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Author 7 - Tayor Manes - interpretation of data and drafting of the article.
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Author 9 - Tyler Williamson - interpretation of data and drafting of the article.
Author 10 - Benjamin Taylor - interpretation of data and critical revision of the article.
Author 11 - Jack Weick - interpretation of data and critical revision of the article.
Author 12 - Christian Bowers - manuscript conception and design, interpretation of data, drafting of the article, and critical revision of the article.