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The importance of perceived helplessness and emotional health in understanding the relationship among pain, function, and satisfaction following revision knee replacement surgery

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SUMMARY

Objective: Little is known about the relationships among pain, function, psychological variables like perceived helplessness and emotional health, and patient satisfaction in people with revision knee replacement surgery. We hypothesized that pain and function would have a direct association with satisfaction as well as an indirect association through patient perceptions of helplessness and emotional health.

Design: This longitudinal study included 145 participants undergoing revision knee replacement surgery. Demographic data and expectation of benefit from surgery were recorded prior to surgery. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the Arthritis Helplessness Scale (AHS) and the Mental Component Scale (MCS) of the SF-36 (emotional health) were collected prior to and 2 years post-surgery. Satisfaction was recorded 2 years post-surgery. Regression analyses were conducted to test for mediation effects of helplessness and MCS.

Results: Participants were on average 69 years old and 54% were women. Participants were satisfied with the results of the surgery (mean ± standard deviation (SD) = 70.42 ± 31.46). Less pain and functional disability were associated with increased patient satisfaction and, the effect of pain or function was also mediated through helplessness whereby more pain and disability were associated with perceptions of helplessness and helplessness was associated with lower satisfaction. MCS did not mediate the relationship of pain and function with satisfaction.

Conclusion: Helplessness plays an important role in understanding patient satisfaction. Interventions aimed at improving patient outcome should target not only pain and function but also should address strategies to support people in managing following knee revision surgery to maximize satisfaction with outcome.

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Introduction

Patient-reported outcomes are well accepted as measures of benefit and it has been argued that the ultimate goal of orthopedic surgery is patient satisfaction[1–5]. Clinicians, clinical programs, administrators, and policy makers use satisfaction as a measure of success of treatment and care, and to make decisions about care delivery and reimbursement[6,7]. The Ministry of Health and Long-term Care in Ontario, Canada is implementing a health-based funding model where reimbursement will be linked to quality indicators. Additionally, while not yet implemented, funders such as the National Health System in the United Kingdom have indicated their intention to link reimbursement to patient outcomes[8].

While there has been significant focus on primary hip and knee replacement outcomes in the literature, our understanding of the outcomes of revision total knee replacement (TKR) is more limited, particularly in understanding factors that are associated with outcome. This is concerning for a number of reasons: data indicate that while 80–90% of people with primary knee replacement are satisfied with the results of surgery, fewer people with revision TKR are satisfied (69–88%), despite similar improvements in pain and function; increasing volumes of primary joint replacements are being performed in the developed world; and, there is limited longevity of primary joint replacement with ultimate need for revision surgery[1,3,4,9–13]. In 2007, 550,161 TKRs were performed in the United States (US) representing 100% increase over 1997[14]. In 2008–2009, 47,429 knee replacements were performed across Canada (excluding Quebec), representing a 139% 10-year increase in TKR[15]. Approximately 6.2% of all knee replacements were revisions in 2009/10 in Canada[16]. Given this increase in primary TKR, the number of revision TKRs is expected to rise. This increased volume as well as the increased technical demand and longer operating time for revision surgery will impact the resources of the health system[17]. Consequently, it is critical that we understand patient outcome after revision TKR.

Pre-operative pain and function, obesity and the number of comorbidities, are reported predictors of pain and function outcomes following revision TKR[18–21]. However, there has been little evaluation of psychological variables in revision TKR, other than reporting pre- and post-surgery scores of measures such as the Mental Component Score (MCS) of the Shortform (SF)-36[12,22]. Additionally, Singh *et al.* reported no significant relationship between pain or function and the personality trait of optimism/pessimism[23]. In people with primary TKR, depression, anxiety, and helplessness in managing one's arthritis were associated with increased pain and reduced function, and decreased satisfaction. Depressive symptoms and anxiety were associated with pain and function 5 years after Total Knee Arthroplasty (TKA)[24]. Scott *et al.* found the Mental and Physical Component Scores of the SF-12 and pain to be independent predictors of satisfaction[25]. Having positive expectations of a good outcome, decreased pain and improved function are consistently related to satisfaction[1,2]. There is also evidence that feelings of helplessness affect pain and function. Helplessness refers to a belief that nothing can be done to resolve a problem, characterized by emotional, motivational, and cognitive deficits[26]. It is a belief that one's outcomes are independent of one's actions[27]. In a study looking at brain imaging of patients with osteoarthritis (OA), helplessness was found to play an important role in the perception of pain. A painful stimuli elicited considerable cognitive and emotional activity in the brain compared to control subjects[28]. Additionally, the literature shows that helplessness impacts pain in people with arthritis and greater helplessness predicted lower WOMAC change scores at 1 year after primary joint replacement surgery[29–32].

Given this literature and that people experienced failure of their primary joint replacement, we were interested in evaluating if psychological variables like perceived helplessness and emotional health would explain the relationships between pain or function and satisfaction in people with revision TKR. We hypothesized that the relationship of pain and function with satisfaction occurred through a mediated model whereby pain and function affect helplessness and emotional health, which in turn affect satisfaction (Fig. 1). If mediation occurs, the following relationships would exist: (1) pain and function would be associated with satisfaction whereby less pain and higher function are associated with more satisfaction; (2) pain and function would be associated with helplessness and emotional health such that less pain and higher function are associated with less helplessness and improved emotional health; and, (3) statistically controlling for helplessness and emotional health should reduce the magnitude of the relationship between pain and function with satisfaction. That is, pain and function either become non-significant (i.e., a fully mediated model) or their effect is reduced (i.e., a partially mediated model). If a meditated relationship is present, interventions that address perceived helplessness and or emotional health may improve patients' perception of their outcome.

Methods

This research was part of a longitudinal study evaluating patient-reported outcomes of people with revision TKR[33]. The longitudinal study recruited patients from five academic Canadian centers (Halifax, London, Toronto, Vancouver, and Winnipeg) between 2002 and 2005 and followed them over 2 years. The cohort included people who underwent revision knee replacement for aseptic failure of a primary knee replacement initially for OA. Exclusion criteria included revision for infection, periprosthetic fracture, patellar revision only, or polyethylene liner exchanged only. Fluency in English was required for questionnaire completion. Participants, identified through the participating surgeon's rosters, who consented to participate completed questionnaires within 2 weeks prior to surgery at the pre-surgery admission clinic and by mail at 2 years post-surgery. The study was approved by the research ethics board at each of the participating institutions and all participants provided informed, written consent.

Data collection

All data were collected via questionnaire.

Outcome

Satisfaction at 2 years following surgery: Patients reported their satisfaction using a reliable and valid four-item scale that evaluates patient satisfaction with relief of pain, improvement in activities of daily living, improvement in recreational activities, and overall

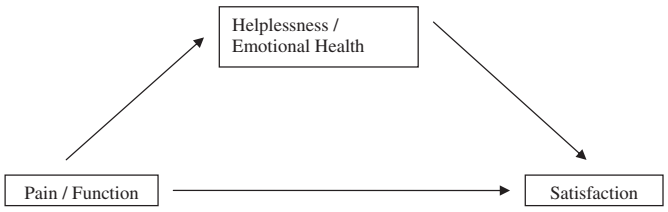

Fig. 1. Mediation model. It shows the hypothesized relationship of pain (or function) directly associated with satisfaction and the indirect relationship through helplessness (i.e., partially mediated through helplessness).