



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Osteoarthritis and Cartilage

Editorial

Waiting for orthopedic surgery — are we underestimating the impacts on people with advanced osteoarthritis?



The systematic review and meta-analysis by Patten *et al.*¹ is well timed given the profound and ongoing impacts of the COVID-19 pandemic on the provision of joint replacement surgery worldwide. While the full picture is not yet clear, the capacity of health systems to provide joint replacement surgery in a timely manner to those who need it remains considerably strained. Several national arthroplasty registries have reported on the volume of procedures missed in 2020, commonly due to restrictions on elective (non-urgent) surgery. For example, compared with 2019 numbers, 106,922 fewer procedures were performed in the UK in 2020², 7,086 fewer procedures were performed in Australia in 2020³, and there was a 23% reduction in primary hip replacements and a 30% reduction in primary knee replacements in Sweden in 2020⁴. Importantly, these statistics do not reflect anticipated annual growth in joint replacement numbers, and missed procedures from 2021 to 2022 have yet to be quantified.

Modeling conducted by the National Joint Registry in the UK has estimated it will take 10 years to catch up on the joint replacement deficit from 2020 alone, if a 5% increase in surgery provision can be achieved². Whether this is feasible remains to be seen, given the multiple pressures on acute hospitals. What does this mean for patients with advanced osteoarthritis? Unfortunately, the wait for joint replacement surgery has grown considerably in many settings. Patten *et al.* refer to median waiting times for total hip replacement (THR) and total knee replacement (TKR) in Australia of 110 and 193 days, respectively, in 2016/17¹. These have since lengthened to 179 and 308 days, respectively, in 2020/21⁵. Concerningly, data from the Australian Institute of Health and Welfare also reveal that 21% and 32% of patients waiting for THR or TKR, respectively, are now waiting more than 12 months for their surgery⁵.

Based on 33 included studies, Patten *et al.* conclude that waiting for up to 1 year had a minimal impact on pain¹. They also found that waiting time duration was not associated with changes in pain, although it is important to note that only one-quarter of included studies had a follow-up time exceeding 6 months. When predictors of pain were examined, average BMI was the only variable associated with worsening of pain on univariate analysis (albeit to a minor degree). However, the observed association disappeared after adjustment for other factors (including age and sex) and so should not be given undue emphasis. Moreover, average BMI (when reported) for the included studies fell within a narrow range (26.6–34.5 kg/m²) that reflected the patients who typically present for joint replacement surgery. Most of the included studies had a relatively small sample size (only eight of 33 studies had more than 100 participants and five studies had fewer than 20 participants).

Other issues impacting the methodological quality of the included studies were also acknowledged by Patten *et al.*¹ It is noteworthy that the included studies comprised patients waiting for joint replacement surgery as well as those referred for initial surgical consultation, and that some studies included patients waiting for unicompartmental (partial) knee replacement. This suggests that patients with varying disease severity were likely included in the review. While effect sizes for changes in pain were reported, a comparison of baseline pain scores for the included studies would have assisted in further characterizing the study samples. Understanding the use of analgesia over the waiting period would also have been valuable with respect to pain scores.

One of the challenges for this meta-analysis was the breadth of patient-reported outcome measures (PROMs) used to assess pain in the included studies. Eleven different instruments were used and these varied in both the constructs covered (for example, pain frequency, average pain, least pain, worst pain, night pain, and pain with specified functional activities) and the recall period (for example, past 4 weeks for the SF-36 and last week for the HOOS and KOOS). Notwithstanding efforts to group the PROMs instruments by category, this heterogeneity in pain assessment tools may have impacted the findings.

The observed stability in pain scores aligns with earlier reviews that have focused on patients with less severe OA⁶ and those waiting less than 6 months for joint replacement⁷. While this finding appears reassuring for patients and treating clinicians, it is prudent to unpack this in more detail. First, we should recognize that 'waiting for surgery' can include multiple waiting periods; initially, the time waiting for the first consultation with an orthopedic surgeon (which could be weeks or months, depending on the setting) and then the time waiting for the surgery itself (commonly considered as the 'surgical waiting list'). The entire waiting period, as experienced by patients, is often not captured in research because studies usually focus on the surgical waiting list aspect. Second, the systematic review by Patten *et al.* sought to understand the impacts of waiting on changes in pain. While this is entirely reasonable (given that pain is a key driver for seeking orthopedic care), we should not forget the other recognized impacts of advanced osteoarthritis. These include impaired function, quality of life and psychological health, and reduced capacity to undertake paid and unpaid work. Taking a broader 'participation' approach⁸ will allow us to understand the full impacts of waiting for orthopedic surgery. Patten *et al.* appropriately state that future research is needed to understand whether patients who wait beyond 1 year for surgery have increasing levels of pain. This is critical, given 2 years of restricted joint replacement access (to varying degrees, depending on the jurisdiction) and international projections for growing

surgical demand^{9,10}. Clearly, further work is needed to understand the potential impacts of protracted waiting times for surgery.

The systematic review by Patten *et al.* focused on patients who did not receive any ‘active treatment’ while waiting. Despite studies showing that interventions such as exercise therapy are safe for people with severe OA¹¹, patients may receive little or no intervention during the waiting period. Patten *et al.* refer to the waiting period as an opportunity to provide non-surgical, evidence-based interventions (these may include education, exercise therapy, and weight management support) to address modifiable risk factors and improve quality of life. This goal is both admirable and achievable, if we can address the structural barriers that prevent people with OA from accessing non-surgical care. In some settings, adequate reimbursement models for non-surgical programs do not exist and patients may face substantial costs. Remote delivery options are needed for people living in non-metropolitan areas, and to optimize access to care for patients with restricted mobility.

Another key opportunity that this review highlights is the inconsistency in how patients waiting for surgery are assessed and monitored over time. Achieving consensus on a standard set of PROMs instruments and standardized assessment points (including consistently defining the start of the waiting period and the use of 3- or 6-monthly assessments thereafter, as practical) would enable datasets to be more easily pooled for analysis. While the ‘minimum clinically important difference’ has its methodological limitations¹², using such thresholds could allow us to report the proportion of patients who experience meaningful deterioration in pain and other pertinent constructs while waiting for surgery.

The question remains — are we underestimating the impacts of waiting times on people with advanced OA? While the contemporary evidence indicates that, on average, pain remains stable for patients waiting up to 1 year, we cannot confidently generalize these conclusions to patients who are experiencing protracted surgical waiting times in the current healthcare landscape. Robust methods for defining the entire waiting period in cohort studies and the analysis of data on function, quality of life, and participation outcomes will help guide future evidence synthesis. At a health system level, a greater focus on what can be done to support patients while they are waiting for surgery (including the provision of evidence-based, non-surgical care plus efficient monitoring systems to identify patient deterioration) will be necessary while we are navigating joint replacement supply and demand issues in the years ahead.

Author contributions

Professor Ackerman conceived and wrote the content of the manuscript, approved the final version, and is responsible for the integrity of the work as a whole.

Conflict of interest

There are no conflicts of interest to declare.

Funding

Professor Ackerman is supported by a Monash University Faculty of Medicine, Nursing and Health Sciences Senior Postdoctoral Fellowship.

References

1. Patten RK, Tacey A, Bourke M, Smith C, Pascoe M, Vogrin S, *et al.* The impact of waiting time for orthopaedic consultation on pain levels in individuals with osteoarthritis: a systematic review and meta-analysis. *Osteoarthritis Cartilage* 2022, <https://doi.org/10.1016/j.joca.2022.07.007>.
2. Sayers A, Deere K, Lenguerrand E, Kunutsor SK, Rees JL, Judge A, *et al.* The COVID-19 Induced Joint Replacement Deficit in England, Wales and Northern Ireland. National Joint Registry, 2021. Available from: <https://reports.njrcentre.org.uk/Portals/0/PDFdownloads/NJR%2018th%20AR%20Effects%20of%20COVID-19%20pandemic%20on%20joint%20replacement%20surgery.pdf>.
3. Australian Orthopaedic Association National Joint Replacement Registry. Annual Report — Hip, Knee and Shoulder Arthroplasty. Adelaide: Australian Orthopaedic Association; 2021.
4. Swedish Arthroplasty Register. Annual Report 2021. Gothenburg: Registercentrum Västra Götaland; 2021.
5. Australian Institute of Health and Welfare. Elective surgery waiting times 2020–21. Available from: <https://www.aihw.gov.au/reports-data/myhospitals/sectors/elective-surgery>; accessed August 18, 2022.
6. Previtali D, Andriolo L, Di Laura Frattura G, Boffa A, Candrian C, Zaffagnini S, *et al.* Pain trajectories in knee osteoarthritis — a systematic review and best evidence synthesis on pain predictors. *J Clin Med* 2020;9.
7. Hoogbeem TJ, van den Ende CHM, van der Sluis G, Elings J, Dronkers JJ, Aiken AB, *et al.* The impact of waiting for total joint replacement on pain and functional status: a systematic review. *Osteoarthritis Cartilage* 2009;17:1420–7.
8. World Health Organization. How to Use the ICF: A Practical Manual for Using the International Classification of Functioning, Disability and Health (ICF). Exposure Draft for Comment. Geneva: World Health Organization; 2013.
9. Ackerman IN, Bohensky MA, Zomer E, Tacey M, Gorelik A, Brand CA, *et al.* The projected burden of primary total knee and hip replacement for osteoarthritis in Australia to the year 2030. *BMC Musculoskeletal Disorders* 2019;20:90.
10. Rupp M, Lau E, Kurtz SM, Alt V. Projections of primary TKA and THA in Germany from 2016 through 2040. *Clin Orthopaedics and Related Research* 2020;478:1622–33.
11. Quicke JG, Foster NE, Thomas MJ, Holden MA. Is long-term physical activity safe for older adults with knee pain? A systematic review. *Osteoarthritis Cartilage* 2015;23:1445–56.
12. Wang Y, Devji T, Qasim A, Hao Q, Wong V, Bhatt M, *et al.* A systematic survey identified methodological issues in studies estimating anchor-based minimal important differences in patient-reported outcomes. *J Clin Epidemiol* 2022;142:144–51.

I.N. Ackerman

School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

E-mail address: ilana.ackerman@monash.edu.