



Did COVID-19 impact osteoarthritis – clinical perspective?

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Purpose of review

To assess the impact of the coronavirus disease 2019 (COVID-19) pandemic on patients with osteoarthritis (OA).

Recent findings

The COVID-19 pandemic negatively affected patients with OA irrespective of them contracting the infection. Patients with OA had a disruption in access to the healthcare system, which resulted in delays in joint replacement surgeries from cancellations of elective surgical procedures. On the other hand, the pandemic accelerated the drive towards telemedicine and telerehabilitation, with many nonurgent services being delivered remotely whenever possible. Cross-sectional studies showed that the majority of patients with OA were willing to accept the increased risks of contracting the COVID-19 infection and proceed with elective joint replacement surgeries.

Summary

The American College of Rheumatology and the European League Against Rheumatism issued guidelines for managing immune-mediated rheumatic diseases during the pandemic. However, these guidelines did not include recommendations for patients with OA.

Healthcare providers, including physical therapists, should aim to schedule more frequent telemedicine follow-up appointments to maximize medical management while patients await elective joint procedures.

Keywords

arthroplasty, coronavirus disease 2019, osteoarthritis, physiotherapy, telemedicine

INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) emerged in late 2019, causing a global pandemic resulting in more than 2 million deaths [1]. In March 2020, many countries mandated lockdown to minimize in-person interactions and reduce the spread of the virus. The lockdown massively affected the healthcare system and influenced the methods of healthcare delivery. Social distancing and lockdown resulted in a significant decrease in physical activity level, loss of follow-up appointments with physicians and physical therapists (PTs), and delay or cancelation of surgical procedures [2^a,3^a,4].

Osteoarthritis (OA) is the most common age-related joint disease affecting more than 80% of people older than 55 years old [5] and more than 20% of the population [6^a]. It is one of the leading causes of pain and disability worldwide [7]. OA is present concomitantly with other chronic conditions such as cardiovascular disease, diabetes, and

obesity, which are risk factors for COVID-19 infection. These co-morbidities shared with advanced age are risk factors for high COVID-19 severity. The American College of Rheumatology [8] and the European League Against Rheumatism [9] issued guidelines for managing immune-mediated rheumatic diseases during the pandemic. However, these guidelines did not include recommendations for patients with OA.

In this review, we discuss how the COVID-19 pandemic affected patients with OA in terms of delays in elective joint replacement surgeries, the

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KEY POINTS

- The COVID-19 pandemic negatively affected patients' lifestyle habits, access to the healthcare system, and general well-being.
- Delays in elective arthroplasty resulted in worsening pain, increased patient dissatisfaction, and surgical backlog.
- Elective arthroplasty can be performed safely during the COVID-19 pandemic as long as there is strict adherence to infection prevention strategies.
- Patients may benefit from regular follow-up appointments with healthcare providers using telemedicine to deliver essential health services and optimize medical management.

development of telemedicine and telerehabilitation, and regular follow-up appointments and symptom management.

JOINT REPLACEMENT SURGERIES

In March 2020, the American College of Surgeons [10] and the US Centers for Disease Control and Prevention [11] recommended that nonemergency procedures be delayed in response to the rapidly spreading COVID-19 infection. A Norwegian study based on data from the BEREDT C19, the Norwegian emergency preparedness register, showed a marked decrease in elective hip surgeries down to one-third compared to before the lockdown [2[■]]. The data also showed a decline in the number of emergent hip surgeries due to fractures in men aged ≥ 35 and middle-aged women (35–69 years old) but not for older women aged ≥ 70 years old [2[■]]. The unexpected decline in the number of emergency surgeries in men and middle-aged women was thought to be due to lockdown, which reduced the risk for falls, as hospitals did not limit access to acute care [2[■]]. However, the unchanged incidence of emergency hip surgeries in older women was attributed to intrinsic causes such as osteoporosis [2[■]]. A survey conducted in the United Kingdom explored patients' willingness to proceed with elective hip and knee arthroplasty during the COVID-19 pandemic [12]. Patients from a single surgeon's waiting list were contacted; the survey showed that 70.6% of patients were willing to proceed with the procedure [12]. It was noted that patients were more willing to accept the increased risk of COVID-19 infection and proceed with elective hip arthroplasty (87.9%) compared with elective knee arthroplasty (57.1%, $P=0.007$) [12]. A Sweden study investigated the impact of COVID-19 on knee and hip surgeries

[13[■]]. The study showed a significant and rapid drop in elective procedures after the first wave of COVID-19, a 54% drop in the rate of joint replacements, and a 42% drop in the rate of arthroscopies [13[■]]. However, the rate of these elective procedures went back to the normal rate after the second wave of COVID-19 [13[■]]. Surgery for acute fractures was unaffected during the pandemic. The study showed that the first wave of the COVID-19 adequately prepared the healthcare system to minimize disruption in elective surgeries during the second phase of the pandemic. A Canadian study investigated the magnitude of the surgical backlog caused by the COVID-19 pandemic in Ontario, Canada [14]. Between March 15 and June 13, 2020, the estimated surgical backlog was 148,364 surgeries, with an average weekly increase of 11,413 surgeries [14]. The estimated backlog clearance time was 84 weeks [14]. The data suggest an urgent need to increase healthcare resources to accommodate incoming new cases without adding to the backlog [14]. A prospective qualitative study in Ireland assessed the attitudes, awareness, and behavioral changes in OA patients awaiting total joint arthroplasty during the COVID-19 pandemic [15]. Sixty-five patients completed a telephone questionnaire within one week in May 2020; 86% felt there was a minimum chance of contracting the COVID-19 infection, and this was noted mainly in participants younger than sixty-five years of age [15]. Patients with a preoperative modified Harris Hip Score below 50 were more interested in proceeding with surgery during the pandemic [15]. There were no significant differences in Short-Form-12 (SF-12) score, Charlson Comorbidity Index, and patients' desire to proceed or cancel the surgery [15]. In Austria, telephone interviews were conducted during and at the end of the lockdown [6[■]]. The study enrolled 63 patients with end-stage knee or hip OA who were scheduled for arthroplasty that was postponed because of the COVID-19 pandemic [6[■]]. There was a decrease in physical activity which resulted in a significant increase in both VAS and WOMAC pain scores [6[■]]. Almost 80% of participants wished they had their arthroplasty as soon as possible [6[■]]. Another study conducted in Italy showed that quarantine had a minimal impact or even a beneficial effect on clinical scores of OA patients awaiting arthroplasty [16]. The study recruited 34 patients with OA [16]. Despite the results, only seven patients were interested in postponing the surgery, whereas other patients stated they were willing to proceed with the surgery despite the persistence of the COVID-19 pandemic [6[■]]. One of the main limitations of this study was the small sample size. A retrospective study conducted in the National Capital Region in

India enrolled 147 patients who underwent arthroplasty during the COVID-19 pandemic (from March 2020 to April 2021) [17]. The patients were admitted to a 'ring-fenced ward' where everybody adhered to infection prevention strategies (the use of N-95 or surgical masks, personal protective equipment, hand hygiene, and social distancing). Physicians who cared for COVID-19 patients were not allowed to enter the 'ring-fenced ward' before completing a quarantine period [17]. The number of staff entered the operating theatre and the number of surgeries per day was markedly reduced [17]. Postoperatively, two patients manifested symptoms and tested positive for COVID-19 infection; however, neither required admission to the intensive care unit [17]. The study showed that arthroplasty procedures could be performed safely during the pandemic as long as everybody adheres to infection prevention strategies.

TELEMEDICINE AND TELEREHABILITATION

Telemedicine, a term often used interchangeably with telehealth, is defined as 'the use of medical information that is exchanged from one site to another through electronic communication to improve patient's health.' [18] Telemedicine can be delivered via telephone, video, or e-mail. Telerheumatology, telemedicine for the provision of rheumatology care, was first developed to facilitate and provide care to patients in rural and underserved areas [19]. The COVID-19 pandemic has accelerated the drive towards telemedicine and telerehabilitation, with many nonurgent services being delivered remotely whenever possible.

A qualitative study was nested within a clinical trial, the Physiotherapy Exercise and Physical Activity for Knee OA trial (the PEAK trial), which enrolled fifteen PTs who were provided with a novel e-learning program for physiotherapists to manage knee OA via telehealth. Although PTs were familiar with in-person 'hands-on' training, most of them valued the mock consultations and the self-paced nature of the program [20^a]. The program provided PTs with high confidence in practicing telerehabilitation [20^a]. The most significant challenge was helping patients to navigate the videoconference technology effectively [20^a]. Telerheumatology conferences (TCR) were conducted in Spain during the COVID-19 pandemic [21]. The majority of patients were diagnosed with OA, soft tissue rheumatic disease, and osteoporosis. The study showed that patient satisfaction was positively correlated with a higher level of education and good skills in managing information and communication technologies. TCR was explicitly helpful to patients who

resided in rural areas with difficult access to rheumatology specialists [21]. It was noted that the length of the TCR was less than 10 min compared to an average of 2 h for a regular in-person visit, including travel time if the patient was commuting from a rural area [21].

REGULAR FOLLOW-UP APPOINTMENTS AND SYMPTOM MANAGEMENT

Since elective and nonurgent joint replacement procedures were temporarily suspended during the COVID-19 pandemic, many patients had to rely on multimodal nonoperative symptomatic management. Primary care providers, including physicians and PTs, played a major role in optimizing the health and quality of life for thousands of people awaiting total joint replacement procedures. Although patients with OA had limited access to exercise facilities and parks, all patients were encouraged to stay active to avoid further limitations in range of motion and subsequent muscle atrophy. Patients were advised to participate in regular low-impact aerobic cardiovascular and muscle strengthening exercises, reduce weight, and adhere to a healthy diet. Many activities can be performed at home or near home (while maintaining social distancing), such as walking, yoga, home cycling, tai chi, pilates, and chair-based sessions.

The REUMAVID cross-sectional study enrolled 1800 patients with rheumatic and musculoskeletal diseases (RMD) from seven European countries to study the impact of the COVID-19 pandemic on their health [3^a]. Three hundred ten patients (17.3%) reported OA as a clinical diagnosis. Over 50% of participants had disruptions in access to healthcare services with a cancellation of their rheumatology appointments [3^a]. Almost half reported not receiving information about the impact of COVID-19 infection on their health and RMD [3^a]. Many participants reported poor lifestyle habits, with one-quarter of participants smoking more than before the lockdown, one-fifth reported increased alcohol consumption, and almost half were unable to continue exercising [3^a]. It was notable that over three-quarters of participants reported worsening pain [3^a]. Half of the participants reported poor well-being according to the WHO five well-being index (WHO-5), and about half were at risk for anxiety and depression, according to the Hospital Anxiety and Depression Scale (HADS) [3^a]. The study nicely elucidated the negative impact of the COVID-19 pandemic and subsequent lockdown on patients with RMD, including OA, from the patients' perspective.

CONCLUSION

Throughout the COVID-19 pandemic, patients with OA have experienced disruption in access to healthcare services, poor lifestyle habits (increased alcohol consumption and smoking and decreased physical activity), and adverse effects on their overall well-being and mental health. The most remarkable negative impact was the cancellation or delay in elective joint replacement surgeries.

Although a temporary delay in the surgical intervention will not result in disease progression, immobility due to pain and stiffness can result in muscle wasting, weight gain and decreased quality of life [22]. Although patients with severe OA experience intolerable pain, their symptoms should not be left unaddressed. A multimodal approach in the treatment of OA will significantly improve symptoms during the COVID-19 pandemic and will strengthen a culture of team-based primary care in the future. Healthcare providers should aim to schedule more frequent follow-up appointments via telemedicine, if possible, to address patient needs. Although increased weight and obesity are associated with worse outcomes in patients with OA, weight reduction was more challenging during the pandemic due to fewer opportunities for aerobic exercise. Adherence to a healthy diet with close attention to protein requirements should be emphasized during follow-up visits. Patients may benefit from an evidence-based patient education program that incorporates neuromuscular exercise under the supervision of certified PTs, such as the Good Life with OsteoArthritis: Denmark (GLA: D). The program effectively reduced pain, improved physical function and physical activity, reduced the number of patients taking painkillers, and reduced the number of patients on sick leave secondary to knee and hip OA [23]. We understand that none of these nonsurgical management strategies will completely substitute for joint replacement surgery. However, during the COVID-19 pandemic, healthcare providers should aim to optimize medical management, primarily patient education, cognitive behavioral therapy and physical exercise, whereas the health system works to safely and gradually reinstate elective joint replacement surgeries.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES AND RECOMMENDED READING

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest

1. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Dis* 2020; 20:533–534.

2. Magnusson K, Helgeland J, Grøslund M, Telle K. Impact of the COVID-19 pandemic on emergency and elective hip surgeries in Norway. *Acta Orthop* 2021; 92:376–380.

The study showed a decrease in elective hip surgeries down to one-third compared to before the COVID-19 pandemic. It also showed a decline in emergent hip surgeries in men aged ≥ 35 but not women aged ≥ 70 years old.

3. Garrido-Cumbrera M, Marzo-Ortega H, Christen L, *et al.* Assessment of impact of the COVID-19 pandemic from the perspective of patients with rheumatic and musculoskeletal diseases in Europe: results from the REU-MAVID study (phase 1). *RMD Open* 2021; 7:1–10.

The study nicely elucidated the impact of the COVID-19 pandemic and subsequent lockdown on patients with rheumatic and musculoskeletal diseases. It discussed the disruption in access to the healthcare system and worsening pain, depression, and anxiety in patients during the lockdown.

4. Mistry SK, Ali ARMM, Yadav UN, *et al.* Older adults with noncommunicable chronic conditions and their healthcare access amid COVID-19 pandemic in Bangladesh: Findings from a cross-sectional study. *PLoS One* 2021; 16:e0255534.

5. Cheng YJ, Hootman JM, Murphy LB, *et al.* Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation United States, 2007–2009. *MMWR* 2010; 59:1261–1265.

6. Endstrasser F, Braito M, Linser M, *et al.* The negative impact of the COVID-19 lockdown on pain and physical function in patients with end-stage hip or knee osteoarthritis. *Knee Surg Sports Traumatol Arthrosc* 2020; 28:2435–2443.

The study demonstrated a decrease in physical activity and worsening pain scores in patients with end-stage hip or knee OA during the lockdown. It also highlighted patients' desire to pursue arthroplasty as soon as possible.

7. Vos T, Flaxman A, Naghavi M. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380:2163–2196.

8. ACR. COVID-19 Clinical Guidance for Adult Patients with Rheumatic Diseases. <https://www.rheumatology.org/Portals/0/Files/ACR-COVID-19-Clinical-Guidance-Summary-Patients-with-Rheumatic-Diseases.pdf>. 2020. [Accessed April 11, 2020]

9. EULAR. EULAR Guidance for patients COVID-19 outbreak. https://www.eular.org/eular_guidance_for_patients_covid19_outbreak.cfm. 2020. [Accessed May 10, 2020]

10. American College of Surgeons. Guidelines for Triage of Non-Emergent Surgical Procedures. <https://www.facs.org/-/media/files/covid19/information-forsurgeons/triage>. 2020. [Accessed March 31, 2020]

11. Center for Disease Control. CDC Recommendation: Postpone Non-Urgent Dental Procedures, Surgeries, and Visits. <https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html>. 2020. [Accessed March 31, 2020]

12. Madanipour S, Al-Obaedi O, Ayub A, *et al.* Resuming elective hip and knee arthroplasty in the COVID-19 era: a unique insight into patient risk aversion and sentiment. *Ann R Coll Surg Engl* 2021; 103:104–109.

13. Dell'Isola A, Kiadaliri A, Turkiewicz A, *et al.* The impact of first and second wave of COVID-19 on knee and hip surgeries in Sweden. *J Exp Orthop* 2021; 8:4–10.

The study showed a significant and rapid drop in elective knee and hip procedures after the first wave of COVID-19. However, the rate of these elective procedures went back to the normal rate after the second wave of COVID-19. The study demonstrated that the first wave of the COVID-19 adequately prepared the healthcare system to minimize disruption in elective surgeries.

14. Wang J, Vahid S, Eberg M, *et al.* Clearing the surgical backlog caused by COVID-19 in Ontario: a time series modelling study. *CMAJ* 2020; 192:E1347–E1356.

15. Fahy S, Moore J, Kelly M, *et al.* Assessing the attitudes, awareness, and behavioral alterations of patients awaiting total hip arthroplasty during the COVID-19 crisis. *Geriatr Orthop Surg Rehabil* 2020; 11:1–6.

16. Larghi MM, Grassi M, Faugno L, *et al.* Clinical outcome before and after COVID-19 quarantine in patients affect of knee and hip osteoarthritis: experience of orthopedic department in one of the first European country involved in COVID-19 pandemic. *Acta Biomed* 2020; 91:1–7.

17. Meena OP, Kalra P, Shukla A, *et al.* Is performing joint arthroplasty surgery during the COVID-19 pandemic safe?: a retrospective, cohort analysis from a tertiary centre in NCR, Delhi, India. *J Clin Orthop Trauma* 2021; 21:101512.

18. Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *N Engl J Med* 2017; 977:1585–1592.
19. Davis P, Howard R, Brockway P. An evaluation of telehealth in the provision of rheumatologic consults to a remote area. *J Rheumatol* 2001; 28:1910–1913.
20. Jones SE, Campbell PK, Kimp AJ, *et al.* Evaluation of a novel e-learning program for physiotherapists to manage knee osteoarthritis via telehealth: ■ Qualitative study nested in the PEAK (Physiotherapy exercise and physical activity for knee osteoarthritis) randomized controlled trial. *J Med Internet Res* 2021; 23:1–13.

A qualitative study discussed the benefits and challenges of an e-learning program for physiotherapists in managing knee OA via telehealth during the lockdown.
21. Tornero-Molina J, Sanchez-Alonso F, Fernandez-Prada M, *et al.* Tele-rheumatology during the COVID-19 pandemic. *Reumatol Clin (Engl Ed)* 2021. doi: 10.1016/j.reuma.2020.10.002 [Epub ahead of print]
22. Cisternas AF, Ramachandran R, Yaksh TL, Nahama A. Unintended consequences of COVID-19 safety measures on patients with chronic knee pain forced to defer joint replacement surgery. *Pain Rep* 2020; 5:1–6.
23. Skou ST, Roos EM. Good Life with osteoArthritis in Denmark (GLA:D™): evidence-based education and supervised neuromuscular exercise delivered by certified physiotherapists nationwide. *BMC Musculoskelet Disord* 2017; 18:1–13.