Impact of COVID-19 on orthopaedic care: a call for nonoperative management

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Abstract

Background: Surgical specialties face unique challenges caused by SARS-COV-2 (COVID-19). These disruptions will call on clinicians to have greater consideration for non-operative treatment options to help manage patient symptoms and provide therapeutic care in lieu of the traditional surgical management course of action. This study aimed to summarize the current guidance on elective surgery during the COVID-19 pandemic, assess how this guidance may impact orthopaedic care, and review any recommendations for non-operative management in light of elective surgery disruptions.

Methods: A systematic search was conducted, and included guidance were categorized as either "Selective Postponement" or "Complete Postponement" of elective surgery. Selective postponement was considered as guidance that suggested elective cases should be evaluated on a case-by-case basis, whereas complete postponement suggested that all elective procedures be postponed until after the pandemic, with no case-by-case consideration. In addition, any statements regarding conservative/non-operative management were summarized when provided by included reports.

Results: A total of 11 reports from nine different health organizations were included in this review. There were seven (63.6%) guidance reports that suggested a complete postponement of non-elective surgical procedures, whereas four (36.4%) reports suggested the use of selective postponement of these procedures. The guidance trends shifted from selective to complete elective surgery postponement occurred throughout the month of March. The general guidance provided by these reports was to have an increased consideration for non-operative treatment options whenever possible and safe. As elective surgery begins to re-open, non-operative management will play a key role in managing the surgical backlog caused by the elective surgery shutdown.

Conclusion: Global guidance from major medical associations are in agreement that elective surgical procedures require postponement in order to minimize the risk of COVID-19 spread, as well as increase available hospital resources for managing the influx of COVID-19 patients. It is imperative that clinicians and patients consider non-operative, conservative treatment options in order to manage conditions and symptoms until surgical management options become available again, and to manage the increased surgical waitlists caused by the elective surgery shutdowns.

Keywords: COVID-19, nonoperative treatment, pandemic, surgery

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Background

The COVID-19 pandemic has had a major impact on healthcare systems globally. The COVID-19 spread has resulted up to now in over nearly 3 million cases and over 200,000 deaths, which has tested the capacity and resources of global healthcare systems, as this influx of cases occurred in a rapid and unexpected timeframe.[1] To combat this, many forms of guidance have been provided to assist in risk mitigation of viral spread, potential

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therapy options to treat COVID-19 patients, and reorganization strategies for hospital departments to help manage the increased patient load.[2,3] Surgical specialties face unique challenges caused by COVID-19.[4] For many urgent surgical procedures, additional steps are required to protect both patients and healthcare workers from the virus.[5–7]

Non-urgent and elective surgical procedures have seen a disruption due to the COVID-19 pandemic as well.[8,9] Personal experiences of surgical departments have summarized how they have managed elective surgery procedures during the COVID-19 pandemic, and guidance in the published literature has highlighted the importance of minimizing resource utilization for elective surgeries in order to provide greater support for COVID-19 patient management.[8,10–13] Due to increases in resource needs within urgent and critical care patients, the certainty around scheduled elective procedures may be limited for both surgeons and patients.[9]

Disruptions to non-essential surgery may have left patients waiting for a rescheduled procedure, with no clarity on when elective surgical practices will return to normal.[14] Within orthopaedics, previous research has demonstrated that postponing major elective surgery, such as total joint arthroplasty or surgical non-union management, causes a considerable decrease in a patients' quality of life.[15–18] A significant deterioration of patient quality of life may occur over the course of their pre-operative waiting period.[16,17] Globally, a vast number of patients are at risk of suffering major quality of life deterioration as a result of their elective surgery being postponed or cancelled.

These disruptions will call on clinicians to have greater consideration for conservative non-surgical treatment options to help manage patient symptoms and provide therapeutic care in lieu of the original surgical management course of action. This study aimed to summarize the current guidance on elective surgery during the COVID-19 pandemic, assess how this guidance may impact orthopaedic care, and review any recommendations for non-operative management in light of elective surgery disruptions.

Methods

Systematic search

This review followed PRISMA guidance on systematic review reporting.[19] A systematic search was conducted in order to identify current elective surgery guidance globally as a result of the COVID-19 pandemic within MEDLINE, EMBASE, Global Health and Emcare from the databases from inception until 6 April 2020 (Appendix A).[20] The search was repeated on 19 April 2020, but no additional articles were eligible. A hand search using Google and reference lists of relevant publications was conducted to identify any additional publications or grey literature that may be relevant for inclusion. In addition, all articles with a surgical focus were screened from a recently conducted scoping review on COVID-19 literature.[21] Reports were included if they provided health association recommendations or position statements regarding non-urgent/elective surgery in the COVID-19 pandemic. Reports were excluded if they were personal opinion, secondary guidance in reference to a primary guidance document, or reviews of guidance given by health associations. One of the included reports also provided a comprehensive overview of guidance for the eventual phased re-introduction of elective surgery, which is summarized in this review as well.[20]

Data extraction and analysis

Pertinent data regarding the date of publication, country, elective surgery recommendations, and information about conservative management guidance were extracted from each of the included reports. Recommendations were summarized and plotted over time to identify the cumulative number of reports providing elective surgery guidance. These reports were categorized as either "Selective Postponement" or "Complete Postponement" of elective surgery. Selective postponement was considered for guidance that suggested elective cases should be evaluated and possibly postponed if needed. Complete postponement was considered when guidance suggested that all elective procedures be postponed until after the pandemic. In addition, any statements regarding conservative/non-operative management were summarized when provided by included reports.

Results

Report selection

A total of 240 reports were identified for potential inclusion. The systematic literature search identified 30 articles, whereas an additional 169 articles were identified through additional searches of

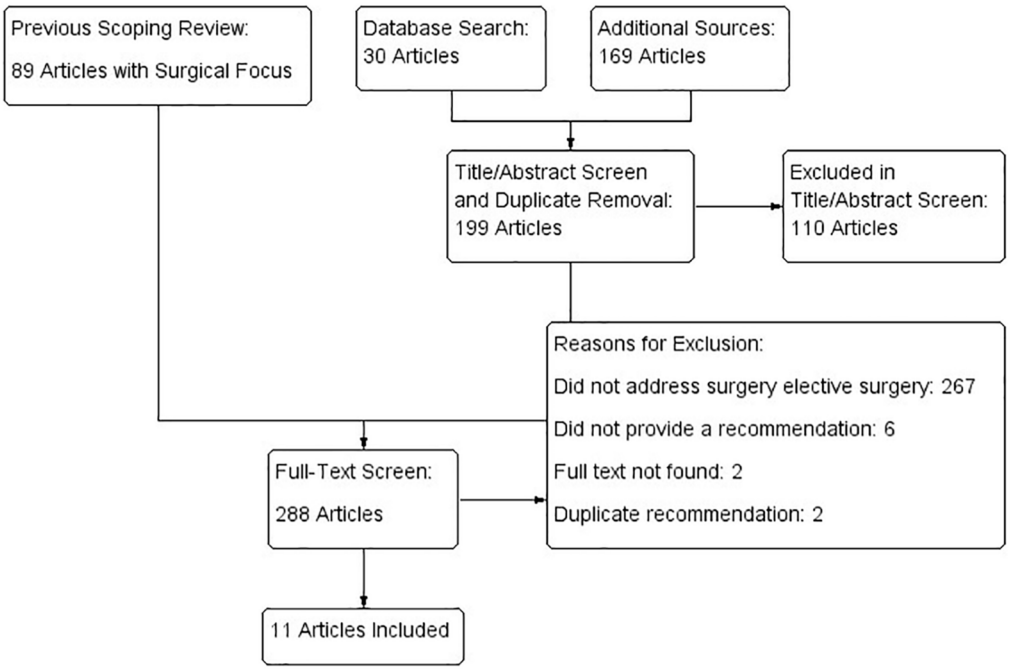

Figure 1. Article screening process.

association websites and reference lists. The previously conducted scoping review identified 90 articles with a surgical focus. After article screening, a total of 11 reports from nine different medical associations were included in this review.[14,22–31] A summary of the screening process is included in Figure 1.

Summary of included reports

The included reports were published between 29 February 2020 and 26 March 2020. Their guidance was provided from organizations in the United States (US; four reports), United Kingdom (UK; four reports), China (one report), and Australia (one report). One report [World Health Organization (WHO)] was considered an international guidance document (Table 1). Two reports were published in peer-reviewed journals, whereas nine were reported directly on association websites.

Elective surgery guidance

There were seven (63.6%) guidance reports that suggested a complete postponement of non-elective surgical procedures, whereas four (36.4%) reports suggested the use of selective postponement of these procedures. Throughout the month of March, elective surgery guidance became increasingly strong in its suggestions for completely postponing all elective surgery. Figure 2 provides an overview of the cumulative number of guidance documents within these categories over time. The guidance for postponement of elective surgeries typically suggested that procedures should be rescheduled to a time after the COVID-19 pandemic is over; however, it is unclear as to when this will be. Guidance from the British National Health Service (NHS) has suggested elective surgery will postponed until at least mid-July, as guidance suggested a 3 month postponement starting 15 April.[27,31]

The trend of stronger recommendations against elective surgery throughout the month of March is highlighted by two guidance reports provided by the American College of Surgeons on 13 and 24 March 2020. Guidance on 13 March 2020 suggested to "reschedule elective surgeries as necessary" in order to facilitate care for the increased hospital load of COVID-19 patients. Less than 2 weeks later, guidance from the same organization strengthened their guidance to provide a three-phase plan, which ends in "phase III: to eliminate all elective practice". This trend was seen across guidance groups, indicating that the widespread elimination of elective surgical procedures is apparent. Table 1 provides a brief summary of each report's guidance on elective surgery in light of the COVID-19 pandemic.

Table 1. Elective surgery guidance from health organizations.

Organization	Country	Date published	Details regarding elective surgery	Details regarding nonoperative management
CDC[25]	US	29 February 2020	Reschedule elective surgeries as necessary. Shift elective urgent inpatient diagnostic and surgical procedures to outpatient settings, when feasible.	None
Tao *et al.*[14] (Overview of National Health Commission of the People's Republic of China)	China	1 March 2020	For patients undergoing elective surgery, it is recommended not to perform surgical treatment for the time being, and they can be elective after the epidemic is under control.	None
Royal Australasian College of Surgeons[28]	Australia	1 March 2020	Series of statements from sub-specialty associations: Non-urgent and elective surgeries to be suspended immediately.	Non operative treatment treatments will confer advantage over operative treatments if similar outcomes, or even slightly downgraded outcomes are expected.
American College of Surgeons[22]	US	13 March 2020 24 March 2020	Reschedule elective surgeries as necessary. Shift elective urgent inpatient diagnostic and surgical procedures to outpatient settings, when feasible. List by subspecialty declaring which surgeries should be schedule or reschedule depending the phase of COVID-19 pandemic. Phase II (curtail elective practice), phase III (eliminate elective practice). Full list by subspecialty in document.	None Consider nonoperative management whenever it is clinically appropriate for the patient.
Centers for Medicare and Medicaid Services[26]	US	15 March 2020	CMS urges healthcare facilities and clinicians to consider using a tiered approach to curtailing non-emergent, elective medical services and treatment.	None
NHS[31]	UK	16 March 2020	The elective component of trauma and orthopaedic work may be curtailed. Elective resources should be repurposed to support influx of COVID cases.	A number of injuries can be managed either operatively or non-operatively. Clinical decisions during a serious incident must take into account the available facility for the current patient and also the impact this may have on the whole community.
		18 March 2020	NHS hospitals in England have been told to suspend all non-urgent elective surgery for at least 3 months from 15 April 2020	None
British Orthopaedic Association[24]	UK	24 March 2020	Patients should have consultant-delivered, definitive decision-making at first attendance and, in particular, should not be scheduled for surgery without senior input.	Aim for non-operative management for the majority of injuries where this is possible and safe.

(Continued)

Table 1. (Continued)

Organization	Country	Date published	Details regarding elective surgery	Details regarding nonoperative management
WHO[30]	International	25 March 2020	Many routine and elective services may be postponed or suspended. Establishing effective patient flow (including screening, triage, and targeted referral of COVID-19 and non-COVID-19 cases) is essential at all levels.	None
Royal College of Surgeons[29]	UK	26 March 2020	Acute/emergency patients are priority. Only emergency endoscopic procedures should be performed.	Where non-operative management is possible and reasonable (such as for early appendicitis and acute cholecystitis) this should be implemented.

CDC, Centers for Disease Control and Prevention; NHS, National Health Service; UK, United Kingdom; US, United States; WHO, World Health Organization.

Non-operative management guidance

There were five reports (45.5%) that specifically provided suggestions on the non-operative management of patients who have had their surgery postponed. The general guidance provided by these reports was to consider non-operative treatment options whenever it is possible and safe, in order to limit or delay the need for surgery. When discussing potential outcomes of non-operative treatment, guidance stated "Non-operative treatments will confer advantage over operative treatments if similar outcomes, or even slightly downgraded outcomes are expected". A summary of the guidance provided by each report is provided in Table 1.

Summary of phased re-introduction of elective surgery

Recently, guidance provided an overview of strategies to eventually phase elective surgery back into clinical practice.[20] This guidance suggests that phased introduction of elective surgery will continue to postpone non-urgent elective surgery, with semi-urgent and more urgent elective surgery cases being slowly scheduled when feasible. This feasibility would depend on patient characteristics, potential benefits and harms of surgery, pandemic severity, and hospital resources – including available personal protective equipment (PPE).[20] Testing policies are also required to ensure health professional safety, which may be difficult in areas that have limited COVID-19 testing resources. In addition, a prioritization of access to outpatient rehabilitation services will be beneficial in limiting the impact on hospital resource demand for elective surgery phased re-introduction. This includes the use of tele-health

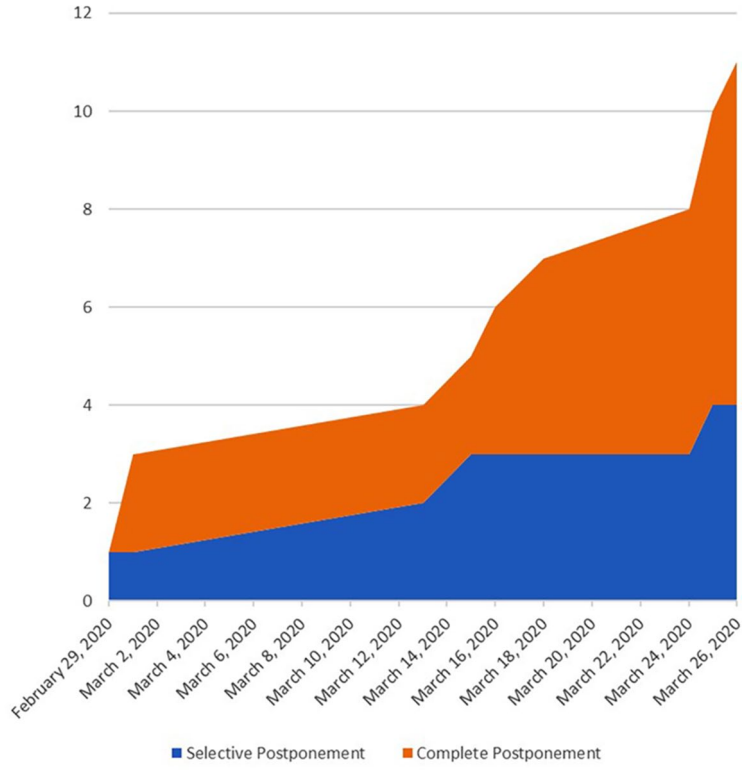

Figure 2. Guidance documents for elective surgery postponement. Data presented as cumulative number of reports.

and tele-rehabilitation efforts for post-operative follow-ups, which will minimize hospital resources required after surgery.[20]

Discussion

Summary of current guidance

Based on the guidance documents included in this review, it is apparent that elective surgical practices are being postponed globally. Transitions from selective rescheduling to complete rescheduling of all elective patients has been occurring throughout the month of March. Major guidance groups such as the Centers for Disease Control and Prevention (CDC), NHS, and WHO, have provided guidance on elective surgery, which has been disseminated by smaller organizations and local governments.[9] A recently published review of US State guidance on elective surgery provided a similar summary of local government guidance as we have seen within the health association recommendations. This review highlighted that 30 states have called for the complete postponement of elective surgery, and 16 states have suggested selective postponement of elective surgery.[9] These recommendations come as a follow up to the reports we have summarized in this review, as health organizations have helped guide local governments in their decision to postpone elective surgery.

Available guidance has agreed that elective surgery must be postponed to help make healthcare needs for the influx of COVID-19 patients more readily accessible and available. What is not apparent is how long this postponement of elective surgery will be required for, as the uncertainty of the COVID-19 patient projections remains. With elective surgery postponed, patients are finding themselves within a treatment gap. They are still living with their condition, but cannot be surgically treated. This period of time has been shown to be a vital time for maintaining patient health and quality of life, as increased surgical wait times can have serious negative health implications.[16,17] It is imperative that these patients receive some form of treatment for the time being, until after the pandemic and their surgery can be rescheduled. Currently, it is unclear when this may be, which means it is unknown for how long these patients will be without treatment if they are not offered some sort of conservative intervention. The Royal Australasian College of Medicine suggested that "Non operative treatments will confer advantage over operative treatments if similar outcomes, or even slightly downgraded outcomes are expected", as even slightly worse outcomes than what would be expected with surgery may still be a better option than providing no treatment at all.[28] Decisions for symptom management or conservative therapies that may resolve the condition should be considered during these times due to the removal of surgical intervention as an option. The use of non-operative treatment options is going to play a vital role in the coming years, as the backlog of surgical patients created by the postponement of elective surgery will have a drastic impact on surgical waitlists. In order to judiciously manage and curtail excessive waitlist times for the foreseeable future, clinicians will need to have increased consideration towards non-operative care whenever appropriate. Clinicians should also give greater consideration to options that allow patients to remain at home in order to reduce the burden on healthcare systems. This includes telehealth and virtual follow ups, virtual fracture clinics, as well as treatment options like physical therapy and exercises, that can be administered virtually.

Implications for orthopaedic practice

There are a number of common orthopaedic conditions that would typically be managed operatively, but would not be deemed as urgent procedures within the COVID-19 crisis. Following the COVID-19 pandemic, there will be an increased role of non-operative management to help minimize the impact that the elective surgery shutdowns have had on surgical waitlists. Four major orthopaedic areas affected by this include trauma, sports medicine, spine and joint arthroplasty. Other than acute trauma cases, many procedures for non-urgent fractures or non-unions will be postponed during this pandemic. Within fracture care, this will call on an increased use of non-operative modalities, as well as non-union risk mitigation efforts. Options for non-operative fracture/non-union care may include such modalities as splinting/bracing/casting, bone stimulation using low intensity pulsed ultrasound (LIPUS), physical therapy, or osteoporosis medications (teriparatide). Whereas use of osteoporosis medications have limited evidence for fracture healing specifically,[32] LIPUS treatment has demonstrated positive healing properties, particularly within non-unions.[33–36] Additional considerations for mitigating the risk of non-union would be to limit the use of non-steroidal anti-inflammatory drugs (NSAIDs), opioids, alcohol, and smoking.[37]

Sports medicine specialists dealing with soft tissue injury may need to consider the use of physical therapy, bracing, NSAIDs, or local injectables to help manage patient symptoms.[38,39] Within arthroplasty practices, physiotherapy, NSAIDs, and injectables may all be potential options for managing patient symptoms in the scenario that their surgical procedure has been postponed.[40,41] Evidence has demonstrated patient improvements in pain for 3–6 months after injection with high molecular weight hyaluronic acid for their knee osteoarthritis.[42,43] Other options, such as corticosteroid injections may also provide pain relief, but demonstrate a more short-term benefit.[44] WHO guidance against the use of corticosteroids in COVID-19 patients has led to some professional groups suggesting that corticosteroids should not be used for pain management during this pandemic.[45,46] Clinicians should be cautious in deciding to use corticosteroids due to this guidance. In addition, recent evidence has demonstrated patients who underwent physical therapy had less pain and functional disability than patients who received corticosteroid injection after 1 year.[41] Due to social distancing efforts to combat COVID-19, physical therapy interventions may need to be provided through video or tele-health options opposed to in-person sessions. Recent guidelines that specifically address the non-operative management of osteoarthritis have been published by professional groups such as OARSI, which should also be given increased consideration when managing these patients.[47] Programs such as the GLA: D program in Canada or the Escape Pain program in the UK have been introduced to help provide remote physical therapy and exercise programs to individuals suffering from arthritis. This allows for patients to remain socially isolated, while still gaining the benefits of physical therapy. The use of virtual and telehealth interventions to help manage patient symptoms will not only provide therapeutic relief to patients, but also reduce the burden on healthcare centers during the COVID-19 pandemic.

Spine surgeons also face unique challenges due to the postponement of non-urgent surgery. For conditions such as lumbar disc herniation, there is some evidence that non-operative options could provide some symptom relief. Whereas surgical intervention may provide superior outcomes, the absence of surgery as a treatment option may lead to an increased consideration for non-operative care.[48] Given the progress that has been made on limiting exposure to opioids and decreasing opioid utilization, decisions surrounding treatment pathways should maintain strict protocols around pain management options. Table 2 provides a summary of non-operative management options that one may consider for patients who have had their operative treatment postponed.

Table 2. Potential orthopaedic non-operative management options.

Indication	Non-operative treatment options
Fractures/non-unions	Bracing/splinting/casting Physical therapy Bone stimulation (LIPUS) Osteoporosis Medications
Osteoarthritis	Bracing Physical therapy Weight Loss NSAIDs **Injectables:** Hyaluronic acid injection Corticosteroid injection Platelet-rich plasma
Soft tissue injury	Bracing/splinting/casting Physical therapy NSAIDs **Injectables:** Corticosteroid injection* Platelet-rich plasma Local anaesthetics
Spine	Physical therapy Pain medication Bed rest

LIPUS, low intensity pulsed ultrasound; NSAIDS, non-steroidal anti-inflammatory drugs.
*May be contraindicated for COVID-19 patients.

Strengths and limitations

This review is strengthened by its systematic approach to identifying relevant literature. Despite this approach, it remains a challenge to identify all relevant documents, as many organizations are opting to publish guidance directly on their websites, opposed to through traditional peer-reviewed journals. While this allows for a more rapid dissemination of information, it poses as a challenge when synthesizing all available reports. Forgoing the peer-review process also risks that information is not being thoroughly vetted before being publicly released. In addition, there are changing recommendations within individual organizations and societies that are occurring in real-time. There is a current struggle between having new information rapidly available

and having information thoroughly reviewed for accuracy. Despite the possibility that some non-peer reviewed guidance from medical association websites or internal correspondence was not captured in this review, the available documents provide a representative sample of the current global recommendation trends regarding the postponement of elective surgery.

Conclusion

Global guidance from major medical associations are in agreement that elective surgical procedures require postponement in order to minimize the risk of COVID-19 spread, as well as increase available hospital resources for managing the influx of COVID-19 patients. For patients that have their elective surgery postponed, there is no clarity as to how long it will be before their elective surgeries will be rescheduled. It is imperative that clinicians and patients consider non-operative, conservative treatment options in order to manage conditions and symptoms until surgical management options become available again, and to manage the increased surgical waitlists caused by the elective surgery shutdowns.

Conflict of interest statement

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Supplemental material

Supplemental material for this article is available online.

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