

## Orthopaedics Procedures in Patients with Coronavirus Disease

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**Abstract**

**Introduction:** Orthopaedics' surgeons may not be in the front line in the fight against the viral pandemic, but the way they practice has been affected substantially. The emergence of the COVID-19 pandemic has severely squeezed medical performs throughout the world, especially those of infectious syndrome specialists, emergency room personnel, anaesthetists, intensivists, virologists, epidemiologists and hygienists. At the same time, researchers have also been affected.

**Objective:** This work pretends to show the procedures done by orthopaedics physicians in patients with coronavirus disease and to describe the reality fight by these healthy professionals.

**Methods:** Articles searched in PubMed with key-words Orthopaedics and Coronavirus were founded accepting the following criteria: free full text, clinical trial, meta-analysis, review, in the last year, English language, and still in MEDLINE data.

**Results:** The research was done on July 14<sup>th</sup> 2020 and it was founded 15 articles that comprises in the criteria cited above, but only 9 attend the goal of this article.

**Conclusion:** The scientific reasons for the correctly use of surgeon's procedures and the eligibility of those procedures that it was used in some cases were presented in this work. We hope that this work will be a guide for the orthopaedic professionals.

**Keywords:** *Orthopaedics; Surgery; Coronavirus; COVID-19; PubMed*

**Introduction**

In the end of 2019, Wuhan, China, observed a mysterious cluster eruption of pneumonia which on 31<sup>st</sup> of December 2019, was identified as a novel strain of coronavirus and termed by World Health Organization (WHO) as 2019-nCoV. The disease has continued its inflexible march across the globe and was declared as a Public Health Emergency of International concern on the January 2020. This pandemic on March 2020 was declared global disease and received the name COVID-19 by WHO. Although orthopaedic surgeons are not considered the frontline in combating the pan-

dem of COVID-19, but certain measures can be adopted in their WHO announced the name of the disease as COVID-19 (Corona Virus Disease) on February 2020? The epidemic was declared as a Public Health Emergency of International Concern on January 2020 and later as a pandemic by WHO on March 2020. The outbreak spreads rapidly from China to numerous countries across the world. The epicentre of the pandemic continually moved from Wuhan to Italy and then Spain in Europe and at present to New York State in the USA. Since the opening of this outbreak, health care workers (HCW) occupied as frontline soldiers have been recognized as a uniquely high-risk group. Orthopaedics' surgeons may

not be in the front line in the round against the viral pandemic, but the way they preparation has been affected considerably. Some sub-specialties of Orthopaedics surgery like Arthroplasty are affected with patients who are younger and healthy and require actions which are often slightly invasive with a day care or short stay interference [1].

The COVID-19 pandemic has strictly squeezed medical performs throughout the world, especially those of infectious syndrome specialists, emergency room workers, anaesthetists, intensivists, virologists, epidemiologists and hygienists. All at once, researchers have also been affected. The common of non-essential clinical staff has been sent home to work remotely, thereby providing chances for increased efforts fixated on scientific research [2].

Although certain measures could be adopted in orthopaedic surgeons practice during this period that help to control and lessen the spread of the disease, this professional are not considered the frontline in combating the pandemic of COVID-19 [3].

It important that orthopaedic departments place on personnel safety and reducing the range of the virus preserving vital functions. Some thinks are important as well as physical distancing and emerging technologies [4].

### Objective of the Study

The main objective of this work is to show the common procedures adopted by orthopaedics physicians with their patients with COVID-19 and to describe the reality fight by these healthy professionals.

### Methods

Articles searched in PubMed ([www.pubmed.com](http://www.pubmed.com)) with keywords Orthopaedics and Coronavirus. The research was done using the following criteria: articles obtained in free full text; with clinical trial; done as meta-analysis; as a review work; done in the last year; in English language; and still in MEDLINE data.

### Results

The research was done on July 14<sup>th</sup> 2020 and it was founded 15 articles that comprises in the criteria cited above.

Two of then versed about random research, but they explained the protocols that must be used to protect the professionals during

the execution of their work. One was about economic impacts of the disease, one was about educational findings and other two were about guidelines and protocols that must be used in orthopaedic against the coronavirus.

Nine articles were revision papers about orthopaedic procedures and coronavirus, and were used in this work to clarify the speciality comprehension about this disease.

The results are showed in table 1 where it was founded the principal's topics about the orthopaedics procedures and the COVID-19.

### Discussion

Caro., *et al.* [5] done a search performed in relevant articles with strategies and advice on managing the orthopaedic patient flow during outpatient clinics as well as surgical procedures including the necessary safety measures providing a high-quality patient experience. But Ambrosio., *et al.* [14], although this pandemic has precipitated an unequalled global health crisis, the prompt response in most countries, the different chronology of local outbreaks and the disparity among containment measures adopted pose a great hurdle to provide universal indications applicable for all facilities, described pandemic dynamics are continuously evolving thus needing careful monitoring and formulation of flexible dispositions that may be more or less permissive depending on COVID-19 prevalence, workforce availability and supplies.

The research done by Farrel., *et al.* [6] cited that COVID-19-necessitated practice changes provide the potential for positives lessons that can result in meaningful long-term improvements in care. Managing without such imaging like videoconferencing and teleconferencing, might highlight which conditions truly require the routine follow-up radiograph and which do not, ultimately reducing unnecessary exposure to radiation and clinic visits. Emara., *et al.* [15] showed that although orthopaedic surgeons are not considered the frontline in combating this pandemic, but certain measures can be adopted in their practice during this period that help to control and lessen in their practice during this period that help to control and lessen the spread of the disease.

Thus, Liang., *et al.* [7] recorded that "in the surgical and perioperative management of COVID-19-patients, the main principles of clinical urgency, patient and health-care worker protection, and conservation of health care resources need to be similar applied

Article	Objective	Methods	Results	Conclusion
De Caro., <i>et al.</i> 2020 [5]	To review the available strategies in the international literature to efficiently and safely return to both normal orthopaedic surgical activities and to normal outpatient clinical activities in the aftermath of a large epidemic or pandemic.	A literature search was performed for relevant research articles.	There was not any specific literature concerning the organization of an outpatient clinic and surgical activities and the particular challenges in dealing with a high-volume practice, in the after wave of a pandemic.	As the COVID-19 crisis has abruptly halted most of the orthopaedic activities both in the outpatient clinic and the operating room, a progressive start-up scenario needs to be planned.
Farrel., <i>et al.</i> 2020 [6]	These guidelines, based on expert opinion and best available evidence, provide a framework for the management of pediatric orthopaedic patients during the COVID-19 pandemic.	General principles include limiting procedures to urgent cases such as traumatic injuries and deferring outpatient visits during the acute phase of the pandemic.	Nonsurgical methods should be considered where possible.	For patients with developmental or chronic orthopaedic conditions, it may be possible to delay treatment for 2 to 4 months without substantial detrimental long-term impact.
Liang., <i>et al.</i> 2020 [7]	To share important surgical considerations and protocols when operating on orthopaedic patients who have suspected or confirmed COVID-19 infections.	To described 3 main principles for any operation during this pandemic, namely (1) clinical urgency, (2) patient and health-care worker protection, and (3) conservation of health-care resources.	Effective surgical management of patients with COVID-19 mandates a collaborative effort across services and disciplines from porter and security staff to our nursing and anesthesiology colleagues. Precautions that are taken before and after anesthetic induction are crucial in the prevention of COVID-19 transmission to the surgical team. Any lapse potentially can result in the entire surgical team being compromised, with profound repercussions.	We need to be cognizant of specific nuances with regard to orthopaedics when surgically managing patients with COVID-19. Among these include the consideration of uncemented and unreamed implants to avoid respiratory compromise, and the employment of surgical strategies with which one is most familiar and in which one is most confident to shorten operative times.

<p>Mao., et al. 2020 [8]</p>	<p>To investigate the global status and trends of coronavirus research.</p>	<p>Publications related to the studies of coronavirus research from January 1, 2003 to February 6, 2020 were retrieved from the Science Citation Index-Expanded (SCI-E) of the Web of Science database. A total of 9294 publications were included. The data source was studied and indexed by bibliometric methodology. For visualized study, bibliographic coupling analysis, co-authorship analysis, co-citation analysis, co-occurrence analysis and the analysis of publication trends in coronavirus research were conducted by VOS (visualization of similarities) viewer and GraphPadPrism 6 software.</p>	<p>The number of publications about coronavirus research increased sharply in 2004 for SARS outbreak and increased again in 2012 for MERS outbreak. The USA made the highest contributions to the global research with the most total number of publications, total citation frequency, and the highest H-index, while Netherlands had the highest average citation per item. Journal of Virology had the largest publication numbers. The University of Hong Kong is the most contributive institution with the most publications. The main research orientation and funding agency were virology and United States Department of Health Human Services. Keywords of all related studies could be divided into 4 clusters: "Pathological research," "Epidemiology research," "Clinical research," and "Mechanism research".</p>	<p>The outbreak of the epidemic could promote coronavirus research, meanwhile, coronavirus research contributes to overcoming the epidemic. Attention should be drawn to the latest popular research, including "Spike protein," "Receptor binding domain," and "Vaccine". Therefore, more and more efforts will be put into mechanism research and vaccine research and development, which can be helpful to deal with the epidemic.</p>
<p>Massey, et al. 2020 [9]</p>	<p>We review the literature on several areas that have been affected including surgical selection, inpatient care, and physician well-being.</p>	<p>Review literature articles that presents surgical selection, inpatient care and physician well-being.</p>	<p>These areas affecting inpatient paradigms include surgical priority, physical or social distancing, file sharing for online clinical communications, and physician wellness. During this crisis, it is important that orthopaedic departments place an emphasis on personnel safety and slowing the spread of the virus so that the department can still maintain vital functions.</p>	<p>Orthopaedic surgeons should follow the Centers for Disease Control and Prevention guidelines, wear PPE when appropriate, have teams created using physical distancing, understand the department's policy on elective surgery, and engage in routines which enhance physician wellness.</p>

<p>Sarac., <i>et al.</i> 2020 [10]</p>	<p>To discuss the impact of these guidelines on orthopaedic surgery, and to provide the general framework used to determine which procedures have been postponed at our institution.</p>	<p>An internet search was used to identify published state guidelines regarding the cancellation of elective procedures, with a publication cutoff of March 24, 2020, 5:00 P.M. Eastern Daylight Time. Data collected included the number of states providing guidance to cancel elective procedures and which states provided specific guidance in determining which procedures should continue being performed as well as to orthopaedic-specific guidance.</p>	<p>Thirty states published guidance regarding the discontinuation of elective procedures, and 16 states provided a definition of “elective” procedures or specific guidance for determining which procedures should continue to be performed. Only 5 states provided guidelines specifically mentioning orthopaedic surgery; of those, 4 states explicitly allowed for trauma-related procedures and 4 states provided guidance against performing arthroplasty. Ten states provided guidelines allowing for the continuation of oncological procedures.</p>	<p>Few states have published guidelines specific to orthopaedic surgery during the COVID-19 outbreak, leaving hospital systems and surgeons with the responsibility of balancing the benefits of surgery with the risks to public health.</p>
<p>Vaccaro., <i>et al.</i> 2020 [11]</p>	<p>In this editorial, we address practice finances, staffing, telehealth, operational plans after the crisis, and ethical considerations.</p>	<p>To present different aspects in practice finances, staffing and other ethical considerations.</p>	<p>To show the practice management in different phases of the pandemic.</p>	<p>It is crucial that the groups have a plan in place to survive this period for the foreseeable future and also be positioned to return from this crisis in a manner that best benefits patients and their staff.</p>
<p>Wright., <i>et al.</i> 2020 [12]</p>	<p>To present the American Board of Orthopaedic Surgery procedures to the COVID-19 pandemic.</p>	<p>steps to adapt our Board Certification and Continuous Certification processes.</p>	<p>These changes were made to provide flexibility for as many Candidates and Diplomates as possible to participate while maintaining our high standards.</p>	<p>The American Board of Orthopaedic Surgery is first and foremost committed to the safety and well-being of our patients, physicians, and families while striving to remain responsive to the changing circumstances affecting our Candidates and Diplomates.</p>
<p>Yung., <i>et al.</i> 2020 [13]</p>	<p>to provide the basic information necessary for us, orthopaedic surgeons to prepare ourselves to face this pandemic together.</p>	<p>We cover the background of COVID-19, presentation, investigations, transmission, infection control and touch upon emerging treatments.</p>	<p>Development the themes about presentation, investigations, transmission, infection control and emerging treatments.</p>	<p>It is of paramount importance that we should stay vigilant for our patients, our families and ourselves. Adequate infection control measures are necessary during day-to-day clinical work.</p>

**Table 1:** Principals findings about orthopaedics procedures and COVID-19 pandemic.

in the preoperative, intraoperative, and postoperative settings to minimize inadvertent occupational exposure." The selections made by surgeons fulfilled the needs of the entire health system [16]. Depending of the local community needs and the moment of COVID-19 outbreak in a specific area, the surgical priorities may change.

Mao, *et al.* [8] presented the news status and trends known about coronavirus research. The crystal structure, spike protein, respiratory syndrome coronavirus, receptor binding domain, and vaccine are one of the directions researched contribute to recognizing and defeat COVID-19. The vaccine research for COVID-19 centred on spike protein or other structures from the virus could help to be promptly understand how to do against this pathogenic infection. Mullard [17] wrote that "about ten vaccines against severe acute respiratory syndrome coronavirus 2 are in clinical trials, and although many infectious disease experts argue that even 18 months for a first vaccine is an incredibly aggressive schedule, a few optimists believe that hundreds of millions of doses of vaccine might be ready for roll-out by the end of 2020".

New technologies as well as inpatient telemedicine and online file sharing applications can prepare orthopaedic programs to still function while it is suitable to protect medical staff and patients from COVID-19 spread [9]. News approaches were described to solve the problem and to point news strategies in some revision guidelines in all the world [18-20].

Sarac, *et al.* [10] showed to us in his work a guide to continue orthopaedic procedures that has come from a variety of organizations and frequently has been vague, putting the onus of decision-making on individual hospital systems. While patients wait for surgery, surgeons should provide them information regarding alternative methods of managing their pain. Neradi, *et al.* [18] showed that "to prevent cross-contamination among fellow residents and faculty, it was imperative to have a dedicated orthopaedic team to manage these suspected or diagnosed COVID-19 patients".

The fight against this pandemic presented the orthopaedic community with challenges never faced by this profession outside of wartime. It is primordial that the groups have a plan in local to survive this period for the foreseeable future and also be po-

sitioned to return from this crisis in a manner that best benefits patients and their staff [11]. The recognition of the importance of these questions made with the American Board of Orthopaedic Surgery (ABOS) staff remain committed to helping while also maintaining safe standards of working from home and social distancing [12].

Yung, *et al.* [13] showed in their work a key points that had been presented by this pandemic: This is a rapidly evolving pandemic; Transmission is mainly by respiratory droplet and contact, but there is potential for airborne transmission particularly in aerosol-generating procedures; Orthopaedic operations such as those requiring intubation for general anaesthesia, high-speed cutters and other aerosol-generating procedures should be reduced in the short term given the global scarcity of personal protective equipment (PPE); Cough and fever are the commonest symptoms, but a significant proportion are asymptomatic, and a minority present with diarrhoea; Patients pending elective operations who develop fever, upper respiratory tract symptoms or diarrhoea should be tested for COVID-19 before undergoing surgery; Prevention of nosocomial transmission requires the prudent use of PPE combined with hand hygiene and environmental measures such as Airborne Infection Isolation Rooms (AIIRs); Prevention of community transmission requires systematic screening and early detection, hand hygiene, appropriate use of masks, social distancing, avoiding mass gatherings and government policies to enact travel restrictions.

## Conclusion

This work means to provoke the conscious of the orthopaedic professionals for the correctly procedures to use in this pandemic and to use with take care of their patients. The scientific reasons for the correctly use of surgeon's procedures and the eligibly of those procedures that it was used in some cases were presented in this work. We hope that this work will be a guide for the orthopaedic professionals.

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## Conflict of Interest

The author declares that there isn't any conflict of interest in this work.

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