

Impact of COVID-19 in residency in Oral and Maxillofacial Surgery of the Federal District Public Health System

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ABSTRACT

With the social isolation resulting from the coronavirus pandemic, the residency in Oral and Maxillofacial Surgery of the Federal District Public Health System adapted to maintain the attendance and course schedule. Theoretical classes migrated to online and there was an abrupt change in practical activities, such as the reduction in elective care and new biosafety protocols. The objective of this research was to understand the impact of the pandemic on the residency, including the analysis of perception and the level of satisfaction of the participants regarding online classes and practical activities, analysis of the number and type of surgeries performed in 2020 and residents' attitudes aimed for professional career, through Likert type questionnaires. Only half of the tutors and less than half of the residents were motivated to use the virtual teaching environment. In addition, the number of surgeries was reduced by more than 40%. In addition, half of the residents responded that they do not feel capable to resolve unexpected events related to their training and that they are not confident in making decisions regarding their professional career. COVID-19 will continue to have a greater impact on surgical practice, so hospitals should develop a detailed contingency plan, including for pandemics and schools should permanently incorporate options of complementary remote activities in their curriculum.

Descriptors: Education; Dentistry; Surgery, Oral; Coronavirus Infections; Internship and Residency.

1 INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic was officially acknowledged by World Health Organization in March 11, 2020¹. Since then, it was determined the total closure of non-essential activities and social isolation by the government of the Federal District, Brazil, and surroundings².

It is a consensus that the dental category is unmatched exposed to coronavirus due to its performance in contact with potentially contaminated secretions. Therefore, most dental offices closed during the beginning of the pandemic. Specially, Oral and Maxillofacial Surgeons were exposed, since many of them provide service in the emergency room of hospitals³.

The Public Health System provides nowadays the only Oral and Maxillofacial Residency program in Federal District, a county of Brazil which counts with more than three million inhabitants. This residency was founded in 2005 and rotates in different public hospitals with tertiary level of care, including outpatient and emergency cares, with emphasis in facial traumatology. At that time, the program was composed of nine residents and five specialist preceptors.

The pandemic and quarantine determined impacts in the residency activities both in the educational aspect and in the clinical care⁴. Face-to-face classes were replaced by online courses and the number of elective surgeries decreased. In addition, patients screening, team dressing and surgical rooms were also adapted, so that the health of professionals and patients could be preserved⁵.

Therefore, this study aims to understand the impact of COVID-19 pandemic in teaching residency in Oral and Maxillofacial Surgery, including staffs' and residents' perceptions and level of satisfaction with theoretical online

classes and practical activities, and analysis of the number and type of surgical procedures carried out in 2020 compared to the same period last year and residents' attitudes towards their career.

2 METHODS

This study was approved by the Ethics Committee of the Base Hospital Institute of the Federal District under the number CAAE 38482620.6.0000.8153.

In order to verify if the changes in the methodologic teaching during quarantine were positives and if they should be turned permanents, an observational prospective cross-sectional study was designed. After the assignment of the consent term, validated Likert questionnaires adapted from Holanda⁶ were answered via Google Forms, from November to December 2020, by three preceptors and nine residents covering the following aspects: a) assessment of online classes, regarding interaction and stimuli; b) attitudes, that is, interest and motivation to teach/ learn; c) dedication, discipline and time management to online education. Furthermore, a self-efficacy validated Likert survey based on Bandura's work⁷ and proposed by Polydoro⁸ was provided to the students in order to evaluate their attitudes towards organization and execution actions required to achieve a goal.

A concept was applied to each of the criteria mentioned as follows: 1- Very suitable; 2- Suitable; 3- Indifferent; 4- Poorly suitable; 5- Unsuitable. To assess the average and the standard deviation of the concepts, the following values were assigned: 1 to concept 1; 0,75 to concept 2; 0,50 to concept 3; 0,25 to concept 4; and 0 to concept 5.

Moreover, information describing the number and type of surgical procedures was retrieved from March to July 2019 and compared

with the same period of 2020.

3 RESULTS

In March 2020, institutional policies from the regulatory education board was sent to all residency programs with the following recommendations: theoretical classes must shift to the online method, all scientific events should be suspended, knowledge and constant updates about coronavirus disease should be available in online classes, staff over 60 years or staff and students with any risk factor should be taken away from their activities. Since then, four out of five preceptors started online theoretical classes to nine Oral and Maxillofacial residents. The residents' group consisted of six men and three women, with an average age of 22 years old, and average graduation completion time of two years. The staff was composed of three men, with an average age of 44 years old. Additional recommendations consisted of emphasis on the new protocols for dressing and de-dressing, as well as the risk classification of emergency room patients.

Since April 2020, the biggest hospitals of the Federal District were totally dedicated to COVID-19 patients. Although residents kept on rotating, elective surgeries were suspended and the main care was focused to inpatients and emergency patients. Also, a high number of contaminated people came from the penitentiaries, where the coronavirus disease rapidly disseminated.

Although all the protocols were strictly followed, three of four preceptors and seven of nine residents were soon contaminated. The first COVID-19 outbreak in Brasília was in May 20, 2020, with 5,161 new cases only that day⁹. Due to it and the dissatisfaction with the online method, mainly by residents, in a month and half online classes were shifted to face-to-face classes again. Courses were taken only by three

preceptors because one of them was hospitalized for a long time due to coronavirus disease. Unfortunately, shortly after his recovery, he committed self-extermination.

Three leading online platforms were used: Zoom™, Google Meet™ and Microsoft Teams™. Most preceptors and residents agreed that the access to online platforms was easy, and that the virtual environment proposes learning situations. Residents and preceptors also agreed that complementary activities on the content, such as online texts and webinars would be useful. Moreover, most residents seemed to access classes with the proposed regularity and were satisfied, as well as staff, with the use of e-mail, chat, forum or phone call to answer questions about the content. Besides, only half of the preceptors and less than half of the residents were motivated to use the virtual learning environment, although most of the preceptors judged their ability to teach using online platforms suitable. Almost all preceptors asserted that they have very convenient time organization for online course activities while less than half of the residents could not organize their time properly.

The practical activities maintained the same schedule as last year, however, less complex procedures were done in the same period of 2020, which hindered professional training. It was observed that no orthognatic surgery was done during March to August, 2020, and there was a significantly increase in the amount of abscess drainage while the amount of mandible fractures surgery decreased. The total surgical procedures had a decrease of more than 40%. According to the questionnaires, half of the residents are satisfied with the workload of practical activities, although most of them judged that the practical activities carried out during the pandemic were insufficient for their professional training. In comparison, all preceptors think that

the workload for practical activities is suitable and only half of them agree that the practical activities during the pandemic were harmed.

Tables 1 and 2 show detailed residents and

staff perceptions of online classes and satisfaction with practical activities, respectively. Table 3 shows a comparison of the procedures done in 2019 and in the same period of 2020.

Table 1. Residents' perceptions of online classes and satisfaction with practical activities

Interaction and Stimulus	Average	SD*
a. Does the virtual environment facilitate interaction and interest in the subject?	0,305	0,166
b. Does the virtual environment propose learning situations?	0,472	0,291
c. Are online activities relevant and meet the proposed objectives?	0,444	0,300
d. Was access to online platforms easy?	0,527	0,458
e. Does the online tool instigate change in behavior and attitude?	0,444	0,370
Interest and motivation		
f. Are you motivated to use the virtual learning environment?	0,361	0,253
g. Was carrying out complementary activities on the content (video, lectures by other teachers, scientific articles, webinars) useful?	0,472	0,317
h. How do you judge your ability to study using the virtual learning environment?	0,444	0,300
Dedication, discipline and time management		
i. How do you judge your time organization for online course activities?	0,416	0,279
j. How do you judge your self- discipline for online teaching?	0,388	0,220
k. Do you access classes with the proposed regularity?	0,666	0,176
Communication tools		
l. Does the environment trigger the exchange of information with colleagues and teachers?	0,305	0,300
m. Are the links provided relevant to the content for learning?	0,416	0,414
n. How do you judge using e-mail, chat, forum or phone call to answer questions about the content?	0,472	0,363
Satisfaction with the practical activities of the residency		
o. How do you judge the workload for practical activities in oral and maxillofacial surgery?	0,500	0,484
p. How do you judge the practical activities carried out during the pandemic for your professional training?	0,361	0,397

Statistics based on nine residents' responses. *SD = Standard Deviation

Table 2. Preceptors' perceptions of online classes and satisfaction with practical activities

Interaction and Stimulus	Average	SD*
a. Does the virtual environment facilitate interaction and interest in the subject?	0,416	0,381
b. Does the virtual environment propose learning situations?	0,583	0,520
c. Are online activities relevant and meet the proposed objectives?	0,666	0,577
d. Was access to online platforms easy?	0,833	0,144
e. Does the online tool instigate change in behavior and attitude?	0,416	0,381
Interest and motivation		
f. Are you motivated to use the virtual learning environment?	0,500	0,433
g. Was carrying out complementary activities on the content (video, lectures by other teachers, scientific articles, webinars) useful?	0,583	0,520
h. How do you judge your ability to teach using the virtual learning environment?	0,666	0,577
Dedication, discipline and time management		
i. How do you judge your time organization for online course activities?	0,916	0,144
Communication tools		
j. Does the environment trigger the exchange of information with the students?	0,583	0,520
k. How do you judge the use of e-mail, chat, forum or phone call to answer questions about the content?	0,500	0,5
Satisfaction with the practical activities of the residency		
l. How do you judge the workload for practical activities in oral and maxillofacial surgery?	1,00	0
m. How do you judge the practical activities carried out during the pandemic for the professional training of residents?	0,500	0,433

Statistics based on three preceptors' responses. *SD = Standard Deviation

Table 3. Comparison of procedures in the years 2019 and 2020

March – August, 2019		March – August, 2020	
<i>Elective surgeries:</i>		<i>Elective surgeries:</i>	
Orthognatic	31%	Mandibular fracture	36.6%
ZMC* and orbital fracture	16.67%	Lesion exeresis	12.2%
Mandibular reconstruction	13.1%	ZMC* and orbital fracture	12.2%
Lesion exeresis	12%	Removal of synthesis materials	7.3%
Mandibular fracture	10.7%	Frontal bone fracture	7.3%
Le Fort I	3.6%	Mandibular reconstruction	4.9%
Condylectomy	3.6%	Panfacial fractures	4.9%
Discopexy	2.4%	Le Fort I	4.9%
ATM prothesis	1.155%	Le Fort III	2.425%
Le Fort III	1.155%	Condylectomy	2.425%
Foreign body removal	1.155%	Maxillary expansion	2.425%
Eminectomy	1.155%		
Non-specified	1.155%		
Total	84	Total	41
<i>Emergency surgeries</i>		<i>Emergency surgeries</i>	
Mandibular fracture	80.3%	Mandibular fracture	57.45%
Abscess drainage	6.06%	Abscess drainage	31.9%
ZMC* fracture	4.54%	ZMC* fracture	6.4%
Face and mouth suture	3.03%	Removal of synthesis materials	2.125%
Panfacial fractures	3.03%	Panfacial fractures	2.125%
Maxillary fracture	1.52%		
Palate debridement	1.52%		
Total	66	Total	47

*ZMC: zygomatic-maxillary complex

The self-efficacy survey showed that residents are not sure to make decisions related to their academic training and still doubt which area to pursue. Also, most of them had difficulties using cognitive strategies to facilitate learning, while half of them could not understand the course content. Half of the participants answered that they could not solve unexpected

events related to their training in pandemic time. Less than half of the students seek help from preceptors to develop course activities while most of them can establish friendships with classmates and ask for help from colleagues. Almost all of the students showed motivation and effort to academic activities although less than half seek information about the institution's

resources or programs. Table 4 shows detailed results from the self-efficacy survey.

Table 4. Students' self-efficacy survey

ACADEMIC SELF-EFFICACY how much I am capable of...	Average	SD*
1. Learn the content that is necessary for my training?	0,527	0,422
2. Use cognitive strategies (making summaries, spreadsheets, diagrams) to facilitate my learning?	0,472	0,384
3. Demonstrate, during the assessment, what I learned during my course?	0,527	0,317
4. Understand my course requirements?	0,583	0,414
5. Apply the knowledge learned in the course in practical situations?	0,611	0,416
6. Establish conditions for the development of the work requested by the course?	0,555	0,390
7. Understand the content covered in the course?	0,500	0,375
8. Cumprir o desempenho exigido para aprovação no curso? meet the performance required to pass the course?	0,555	0,370
9. Prepare for the assessments?	0,527	0,291
SELF-EFFICACY IN REGULATING TRAINING		
10. Plan actions to achieve my professional goals?	0,583	0,353
11. Reflect on the achievement of my training goals?	0,583	0,306
12. Select, among the resources offered by the institution, the most appropriate for my training?	0,500	0,330
13. Make decisions related to my training?	0,472	0,422
14. Define, with certainty, what I intend to follow among the various possibilities of professional activity that exist in my area of training?	0,388	0,397
15. Establish my professional goals?	0,416	0,395
16. Solve unexpected problems related to my training?	0,500	0,330
SELF-EFFICACY IN PROACTIVE ACTIONS		
17. Keep me updated on new professional trends in my training area?	0,555	0,325
18. Seek help from teachers for the development of course activities?	0,444	0,390
19. Contribute ideas to improve my course?	0,555	0,273
20. Update the knowledge acquired in the course?	0,527	0,363
21. Seize opportunities to participate in extracurricular activities?	0,500	0,375
22. Seek information about the resources or programs offered by my institution?	0,444	0,273
23. Claim extracurricular activities relevant to my training?	0,555	0,325
24. Express my opinion when another classmate disagrees with me?	0,555	0,300
25. Ask for help, when necessary, from colleagues in the course activities?	0,611	0,377
26. Work in a group?	0,527	0,341
27. Cooperate with colleagues in course activities?	0,611	0,356
28. Establish good relationship with my teachers?	0,666	0,395
29. Ask when I am in doubt?	0,611	0,333
30. Establish friendships with classmates?	0,666	0,353
31. Strive for academic activities?	0,694	0,370
32. Motivate me to do the activities related to the course?	0,694	0,300
33. Finish course work on time?	0,500	0,375
34. Plan to carry out the activities requested by the course?	0,611	0,333

Statistics based on nine residents' responses. *SD = Standard Deviation

4 DISCUSSION

COVID-19 is disrupting routines in hospitals and health schools. As such, it is essential to record and study the full extent of the

changes in education being made in response to this international emergency to clarify how to recover from this pandemic¹⁰.

In the theoretical context, presential

conferences, congresses and meetings have been cancelled or postponed, further reducing the opportunities for trainees' continuous education. On the other hand, virtual platforms allowed the implementation of online lectures and teaching sessions¹¹⁻¹⁴. The curricular reforms undertaken by many academic institutions worldwide in the past decade, mainly promoting flipped-classrooms and active learning, have facilitated an easy transition of face-to-face learning to the online method^{12,13,15-18}. However, although the described residency has turned to flipped-classroom for a long time, Oral and Maxillofacial residents did not adapt to the synchronous online classes during the pandemic. Even though flipped-classrooms for Maxillofacial Surgery training have been discussed previously, further research is required regarding virtual learning^{19,20}. Other asynchronous modalities of online education described in the literature, such as reports and case discussions, online journal articles, webinars for interdisciplinary learning and videos, were well accepted by the interviewed residents. Technology can be very useful²¹ but, for many preceptors and residents, it still involves a learning curve. The Remote Emergency Teaching²² imposed by the pandemic made impossible to evaluate and choose between synchronous and asynchronous online teaching and learning, to relay to students distance education protocols, yet still keeping the original plan of content delivery. The success of e-learning depends on the attitudes and interactive teaching styles of the staff, as well as on the experience and attitudes of students concerning technology^{23,24}. In this study, the theoretical content of the 2020 year was all completed, with online and face-to-face classes.

The COVID-19 pandemic will continue to have a major impact on surgical practice. The first activity suspended under the state of emergency in teaching hospitals was dental

residents' elective procedures. To postpone direct patient care is the biggest challenge, since it is the key component of the dental curriculum²⁵. No virtual sessions can duplicate the close experience with patients and surgery can only be perfected by practicing^{14,23,26}. Furthermore, it is unclear whether and when the service will be ready to resume elective surgical cases²⁷. There is a possibility that surgical education may hinder and inevitably reduce students' interest in pursuing a surgical career²⁶. Indeed, there has been declining interest in surgery among United Kingdom medical students²⁸, and this pandemic may serve to hasten this trend. The elective cases for benign disease that are mostly affected are the ones that residents usually performed with minimal supervision, in contrast to the more complex urgent or life-threatening operations that staff mostly perform.²⁹ The residents were most concerned with losing experience in anesthesia, orthognathic surgery, and reconstructive and cosmetic surgery³⁰, which is in agreement with the findings of this study. Implementing technology into health education may allow students to develop collaborative skills and improve adaptability. Use of remote-technologies and augmented reality, whereby residents can witness live proctoring by surgeons and interact remotely, can help surgical training with an immersive experience^{10,14,26,31}.

Still in learning the period, residents must correlate their academic training with their valuable contribution to the current health crisis. Students who can better adapt to this adverse event usually show more creativity and innovation to alter pre-conceived notions of how patient care should be practice. In fact, residents can show new methods for developing their skills, teamwork and dedication to research. Regardless of each student's situation's nuances, all of them will face difficulties due to the widespread effects of the COVID-19

pandemic¹⁰. At the time of submission, 9,339,420 cases of COVID-19 in Brazil with 227,563 deaths and 104,499,482 cases around the world with 2,271,232 deaths had been reported³².

5 CONCLUSION

According to the protocols imposed on the residency program as a result of the pandemic, it is certain that residents have lost many activities, such as congresses, meetings and theoretical classes. Also, many residents and preceptors had to leave their daily routine for at least fourteen days to recover from SARS-CoV-2 infection.

Although preceptors and residents agreed that using online platforms was easy, both were not motivated enough to use the virtual learning environment. Most of the residents were dissatisfied with the online method, and preceptors soon returned to face-to-face courses. Therefore, webinars and other online contents were used only as complementary activities. In 2020, the total number of surgical procedures decreased by more than 40% and less complex procedures were performed, which hindered professional training. Thus, the majority of residents considered that the practical activities carried out during the pandemic were insufficient for their professional training while all preceptors thought that the workload for practical activities is suitable and only half of them agreed that the practical activities during the pandemic were harmed. In addition, the self-efficacy survey showed that residents are not sure to make decisions related to their academic training and most of them had difficulties using cognitive strategies to facilitate learning.

Moving forward, it will be important to systematically study the effects of the changes on both residents and program training, including residents' career progression, their mental health

and biosafety of the team.

RESUMO

Impacto da COVID-19 na residência em Cirurgia Buco-Maxilo-Facial da Secretaria de Saúde do Distrito Federal

Com o isolamento social decorrente da pandemia de coronavírus, a residência em Cirurgia Buco-Maxilo-Facial da Secretaria de Saúde do Distrito Federal se adaptou para manter o atendimento e o cronograma do curso. Aulas teóricas migraram para *online* e houve abrupta mudança das atividades práticas, como a diminuição do atendimento eletivo e novos protocolos de biossegurança. O objetivo dessa pesquisa foi entender o impacto da pandemia no ensino na residência, incluindo a análise de percepção e do nível de satisfação dos participantes quanto às aulas *online* e atividades práticas, análise do número e tipo de cirurgias realizadas em 2020 e atitudes dos residentes voltadas para carreira profissional, por meio de questionários do tipo Likert. Apenas metade dos preceptores e menos da metade dos residentes estavam motivados a usar o ambiente virtual de ensino. O número de cirurgias foi reduzido em mais de 40%. Além disso, metade dos residentes respondeu que não se sente capaz de resolver eventos inesperados relacionados à sua formação e que não está segura em tomar decisões relativas à sua carreira profissional. A COVID-19 continuará a ter maior impacto na prática cirúrgica, por isso, hospitais devem desenvolver um plano de contingência detalhado, inclusive para o caso de futuras pandemias e escolas devem incorporar opções de atividades remotas complementares permanentemente em seu currículo.

Descritores: Educação; Odontologia; Cirurgia Bucal; Infecções por Coronavírus; Internato e Residência.

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