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ORIGINAL ARTICLE

Assessment of knowledge level on dental impression disinfection in undergraduate students

Evaluación del nivel de conocimiento sobre desinfección de impresiones dentales en estudiantes de pregrado

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ABSTRACT

Introduction: in the dental office, the disinfection of dental impressions plays a fundamental role, since it is understood that the personnel working in this place need to have adequate knowledge about this process.
Objective: identify the knowledge about the disinfection process of dental impressions, presented by students of the Dentistry program.
Methods: observational, descriptive, cross-sectional study, carried out at the Corona Gómez PhD dental specialty clinic, between November 2023 and March 2024. In a non-probabilistic manner, for convenience, a sample of 416 students who met the selection criteria was selected. The application of a questionnaire allowed obtaining information, using descriptive statistics methods for its analysis. Medical ethics were respected.
Results: only 27,6 % of respondents understand the concept of disinfection, while 33,4 % know the means for sterilization. Less than a third of respondents know the actions to be taken for disinfection, the duration of the process, and its optimal form of execution.
Conclusion: the existence of gaps in knowledge about the disinfection processes of dental impressions was identified, which leads us to consider the high risk of cross-contamination in all those involved in a dental treatment; taking into account that as undergraduate students, emphasis should be placed on solving these gaps with training on the subject.

Keywords: DISINFECTION; DENTAL IMPRESSION MATERIALS; DENTAL DISINFECTANTS.

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RESUMEN

Introducción: en el consultorio odontológico, la desinfección de impresiones dentales tiene un papel fundamental, por cuanto se comprende la necesidad de que el personal que labora en dicho lugar tenga un conocimiento adecuado acerca de este proceso.
Objetivo: identificar el conocimiento sobre el proceso de desinfección de las impresiones dentales, presentado por los estudiantes de la carrera de Odontología.
Métodos: estudio observacional, descriptivo, transversal, desarrollado en la clínica de especialidades odontológicas Corona Gómez PhD, entre noviembre de 2023 y marzo de 2024. De forma no probabilística, por conveniencia, fue seleccionada una muestra de 416 estudiantes quienes cumplieron los criterios de selección. La aplicación de un cuestionario permitió la obtención de información, empleándose métodos de estadística descriptiva para su análisis. Se respetó la ética médica.
Resultados: apenas el 27,6 % de los participantes entiende el concepto de desinfección; conociendo los medios para la esterilización el 33,4 %. Menos de la tercera parte de los encuestados conoce las acciones a realizar para la desinfección, la duración del proceso, y su forma óptima de ejecución.
Conclusión: se identificó la existencia de falencias en el conocimiento sobre los procesos de desinfección de impresiones dentales, lo que nos lleva a considerar el alto riesgo de contaminación cruzada en todos los involucrados en un tratamiento odontológico; tomando en cuenta que al ser estudiantes de pregrado se debe hacer énfasis en solventar estas falencias con capacitaciones sobre el tema.

Palabras clave: DESINFECCIÓN; MATERIALES DE IMPRESIÓN DENTAL; DESINFECTANTES DENTALES.

INTRODUCTION

The material chosen for a dental impression must be given its respective importance since it can greatly affect the accuracy and precision of the impression and, therefore, the final result. There are hard materials (gypsum and zinc oxide-eugenol) and flexible ones (agar, alginates, polyesters, condensed silicones (silicone C), added silicones (silicone A) and polysulfides).[1] Nowadays, sodium alginate is used as a base material for taking impressions since it is flexible and allows for high quality work. Dentists generally prefer silicones due to their high flexibility and recovery capacity during extraction from the mouth, as well as their ability to be infused for up to one week with minor changes in dimensional stability (0,3 %).[2]

In the dental practice, disinfection is intended to protect people working with impressions or models from diseases caused by exposure to microorganisms such as viruses; Hepatitis B, Hepatitis C, Herpes and HIV and Mycobacterium tuberculosis. The British Dental Association recommends sterilization and decontamination of dental impressions before sending them to the dental laboratory in Health Technical Memorandum 01-05 and notes that there is a duty to ensure that dental impressions are sterilized and labeled before sending them to the dental laboratory.[3]

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There are around 700 species of bacteria in the oral cavity, some of which are opportunistic pathogens such as those that cause gingivitis or periodontitis, which is why cross-contamination is a risk that dentists can cause due to the frequent oral impressions they take.Dental impressions are exposed to blood, saliva, or both; therefore, dental offices and commercial laboratories must follow agreed protocols to avoid the risk of cross-contamination. For maximum effectiveness, they should be disinfected immediately after removal from the mouth. In recent years, several reports have investigated the effects of sterilization procedures on the surface properties and dimensional stability of dental impression materials.[4,5]

Making an accurate impression is a crucial step in the fabrication of any prosthesis. Inaccuracies in this step could lead to compound errors in subsequent steps of prosthesis fabrication. Conventional impressions made of elastomeric materials are commonly used in general dental practice. There are several reasons for inaccurate impressions, such as the level of knowledge and skill of the practitioner, as well as factors unrelated to the practitioner, including distortion of the impression material, disinfection procedures, technical errors, and transportation to the dental laboratory under different climatic conditions.[6,7,8] Taking this into account, the present investigation was carried out, which aimed to:To identify the knowledge about the disinfection process of dental impressions, presented by the students of the dentistry program at the Corona Gómez PhD dental specialty clinic, Universidad Regional Autónoma de los Andes, Ambato headquarters, during the academic period November 2023 - March 2024.

METHODS

An observational, descriptive, cross-sectional study was carried out at the Corona Gómez PhD dental specialty clinic, belonging to the Universidad Regional Autónoma de los Andes, Ambato headquarters, during the academic period November 2023-March 2024. For this purpose, from a universe consisting of the 450 students belonging to said institution, in a non-probabilistic way, a sample of 416 was selected by convenience, who met the selection criteria [inclusion (student of the Dentistry career, belonging to the aforementioned institution, who in the indicated period of time is completing an internship at the Corona Gómez PhD dental specialty clinic, who agrees to voluntarily participate in the study) and exclusion (student who is in preclinical internship or who is pursuing postgraduate studies)].

For the collection of information, the application of the questionnaire was used Gordillo,[9] which consists of 15 questions about the procedure performed with dental impressions. This instrument evaluates the level of knowledge about disinfection of dental impressions presented by the students.

Descriptive statistics were used to analyse the data obtained, with absolute frequencies and percentages being analysed. Authorisation was requested from the relevant authorities prior to the study being carried out, in compliance with medical ethics.

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RESULTS

In the sample analyzed, a predominance of female students was found (65,1 %). 27,6 % of them understand the concept of disinfection; 33,4 % know the means to use for sterilization; 25,5 % know that the disinfectant agent to use is sodium hypochlorite and it must be sprayed to disinfect a dental impression with alginate. Similarly, less than a third of the respondents know the actions to take for disinfection, while 21,6 % know the time required for it; as well as 35.6% know the optimal way to transport an impression or diagnostic model. Table 1 shows the remaining responses to the questionnaire.

Table 1. Distribution of students according to questionnaire response.

Ask	Answer			
	Correct		Incorrect	
	No.	%	No.	%
What do you mean by disinfection?	115	27,6	301	72,4
What means can you use for sterilization?	139	33,4	277	66,6
What is the disinfectant agent and how should it be used to disinfect an alginate dental impression?	106	25,5	310	74,5
What action and time can leave an alginate impression, which I have already disinfected?	131	31,5	285	6,5
What action and disinfectant agent do you use on a silicone dental impression?	86	20,7	330	79,3
How long does it take to disinfect a silicone dental impression?	90	21,6	326	78,4
What does the degree of disinfection of dental materials depend on?	99	23,8	317	76,2
What is the optimal way to transport a diagnostic impression or model to the laboratory?	148	35,8	268	64,2
Indicate which of the following statements is a purpose for disinfecting dental impressions?	170	40,9	246	59,1
If cross-contamination occurs in the printing material, who is affected?	227	54,6	189	45,4
What types of pathogens can be transmitted by poor disinfection of dental impressions?	316	76	100	24
What is the procedure for obtaining adequate manual cleaning of the material?	41	9,9	375	90,1
What is the classification of dental material disinfectants?	174	41,8	242	58,2

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DISCUSSION

In the surveys carried out on dental students who do their internships at CEO Corona Gomez Phd, on disinfection of dental impressions, it is found that more than 50% of the participants do not have a general knowledge of the type of disinfection substances, the time and method of use of these, as well as definitions that encompass the disinfection process. Being the few bases of knowledge for the correct application of the disinfection protocol as reflected in the survey responses that range from definitions and basic concepts and protocols of this. This phenomenon draws attention in a remarkable way if one takes into account that the prevention of cross infection has a significant effect on infection control.[10]

This is how in the study of Qiuet al.,[11] present the disinfection materials for dental impressions, being 10 minutes with 0.5-1% sodium hypochlorite or 2 % glutaraldehyde, showing effectiveness in the action against oral flora and common bacteria. Unlike our study, which presents 22,5 % in agreement with the use of sodium hypochlorite and 20,7 % of glutaraldehyde based on the results of the surveys regarding these disinfectants. Qiu also mentions that chemical disinfection in alginate and polyether within 30 minutes does not alter the dimensional stability, details and humidity; being contradictory to the scientific information base that postulates that the overexplosion of disinfectants alters the impression material, especially alginate, which should only be sprayed and not immersed in the disinfectant agent.

Pathogenic microorganisms are part of this process, so in the study by Chidambaranathan et al., the control groups were subjected to microbiological evaluation at three different time intervals, T0--24h, T1--1 month and T2--3 months of storage, comparing the colony-forming units of bacteria and fungi. This coincides with the 76 % of students who consider that dental impressions consist mainly of these microorganisms.[12]

On the other hand, regarding contamination that can occur by microorganisms according to in vitro studies, analyzed in Hardan's article on the disinfection of impressions with alginate using chlorhexidine, alcohol, glutaraldehyde and sodium hypochlorite, the CFU/mL count on the surface decreased, thus concluding that these substances could be used to reduce cross contamination in the dental office. This result agrees with the information provided by the surveyed students, who in 40,9 % know that a risk of poor disinfection technique is cross contamination.[13]

As for those people who are affected by the lack of knowledge of carrying out a correct disinfection protocol, we have as an answer 54,6 % of the participants who know that not only the dentist is exposed to contamination but all the people involved in this process; This is how in the study by Sinha et al. who surveyed dental mechanics, they found that only 32,8 % of the technicians practiced the disinfection procedure, concluding that dental technicians lack the knowledge and motivation to implement infection control measures in dental laboratories.[14]

Similarly, in the study by Batista on Prosthodontic Practice during the COVID-19 Pandemic: Prevention and Implications, it shows us that both dentists and patients and laboratory personnel are susceptible to contamination due to lack of disinfection protocols for dental impressions.[15]

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CONCLUSION

The study highlighted the existence of gaps in knowledge about the disinfection processes of dental impressions, which leads us to consider the high risk of cross-contamination in all those involved in a dental treatment; taking into account that as undergraduate students, emphasis should be placed on solving these gaps with training on the subject.

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