Ethical and legal aspects involving the manipulation of extracted human teeth: the dental surgeons' viewpoint

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ABSTRACT

It was intended to investigate the knowledge of dental surgeons about the ethical and legal aspects involved in the handling and disposal of extracted human teeth. A semi-structured questionnaire was used, sent electronically to dental surgeons. The objective questions were analyzed by descriptive statistics and the subjective ones by Collective Subject Discourse. Of the 208 dental surgeons who answered the questionnaire, 78.4% recognized the dental element as an organ, 98.6% stated that they used human teeth for laboratory training and research during graduation and post-graduation, 42.4% obtained these teeth in health units, 28.3% in dental offices, 22% in teaching institution and 2.4% through purchase. Donation by health units and dental offices was signaled as the ideal way to acquire the teeth (72.11%). Although 75.5% claimed to know the specific regulation, this was not reflected in the other questions evaluated. As for the biological risk in handling teeth, 88.9% considered it existed and the qualitative analysis of the answers generated the categories "contamination" and "cross infection". As for the purpose of the Tooth Bank, 59.6% said they knew it, and categories such as "teaching and research" and "illegal trade" emerged. Despite this knowledge, only 43.3% indicated that they were totally willing to join a tooth bank for donation. It is concluded that there is little knowledge about the ethical-legal aspects involved in the handling and disposal of extracted human teeth and that this unawareness is reflected in the low intention of joining the activities of a future Tooth Bank installed in the researched municipality.

Descriptors: Tooth. Dental Ethics. Legislation.

1 INTRODUCTION

The dental surgeon's activities, when well executed, are the result of an education based on efficient clinical practices whose learning requires, before direct interventions with patients, motor training that equips the students to perform the procedures on the individuals to whom they will provide care.

The use of extracted human teeth for the study of anatomy and pre-clinical training of the most varied specialties of dentistry is very old and necessary for the training of professionals[1-4]. Nonetheless, in many Dental teaching institutions in Brazil, this practice is held by ignoring ethical, legal and biosafety principles regarding the manipulation of these teeth, which has sometimes encouraged the illegal commercialization of these dental elements[1,3,5,6].

The way undergraduate and graduate students, as well as some professors, acquire these dental elements has been the object of some research pointing to the need for a regulation and systematization of this practice within the precepts of legality[1,3,6-8].

The formulation of the Transplant Law nº 9.434, dated 02/04/1997[9], recognized the dental element as an organ, requiring the donor's authorization, preferably in writing, for the handling and use of this tooth. Chapter V, in its article 14, provides for a penalty of 2 to 6 years in prison, in addition to a fine, for anyone who removes tissues, organs or body parts from a person or corpse, as well as, according to article 15, anyone who buys or sells them is subject to a penalty of 3 to 8 years in prison and a fine[9]. The Brazilian Penal Code, in Article 210 of Chapter II, considers it a crime to "*violate or desecrate a grave or funerary urn*", punishing with one to three years of imprisonment and a fine[10]. In turn, the Code of Ethics of the dentistry class reaffirms that it is an ethical infraction not to comply with the Brazilian legislation that regulates the use of dead bodies for study purposes or surgical techniques and transplants of human organs[11].

Additionally, the illegal use of human teeth, when used for research purposes, also violates the rules regarding the collection, deposit, storage, use and disposal of human biological material, regulated by the National Health Council, through Resolution nº 441, dated May 12, 2011[12]. Freitas et al. (2012)[3] report that the vast majority of national publications that use extracted teeth do not mention the source from which these teeth were obtained or the submission of the research to an Ethics Committee, and reaffirm that methodological quality and ethics should guide research to achieve excellence. Accordingly, it is evident that, for the use of human teeth, whether for teaching or research purposes, it is necessary that they come from official bodies authorized for this purpose or by direct authorization from the donor.

Another important aspect, concerns the destination given to the dental element after its removal. The resolutions of the National Environment Council (CONAMA) nº 358, dated 2005, and of the National Health Surveillance Agency (ANVISA) No. 222 of 2018 regulate the management of Health Service Waste (HSW)[13,14]. Dental waste, classified as group A4 (organs or tissues from surgical procedures or anatomopathological studies or diagnostic confirmation) must be packaged in milky white bag with "infectious waste" symbol and forwarded to the environmentally appropriate final disposal. They should be packaged in appropriate containers and disposed of at a site duly licensed for final waste disposal. Despite the existence of specific legislation, it is still known that some dental care facilities perform exodontias and do not have an appropriate destination for these dental elements, making clear the need for dental surgeons to be aware of

their ethical obligations and legal aspects involving the disposal given to the extracted human dental organ[15].

This disposal in inadequate environments, as well as the fact that some professionals keep teeth in private collections, brings to light another problem, which is the risk of contamination. This risk is also present when these teeth are used for teaching or research activities without proper decontamination[5,16,17].

As a way to legalize the treatment given to the extracted human dental organ, as of the year 2000, the Human Tooth Banks (HTB) were implanted in some higher education institutions in Brazil, with the objective of minimizing the illegal commerce of dental structures, as well as to develop a perception of the dental students and professionals about biosafety, legal issues and discussions on Bioethics. The HTB are responsible for the reception, preparation, disinfection, manipulation, selection, preservation, cataloging, storage, assignment, loan and administration of donated teeth[18]. It is important to emphasize that the HTB is responsible for eliminating cross-infection in the indiscriminate handling of extracted teeth[5].

For the creation of the HTB, there is still no specific legislation in Brazil, and the destination of stored teeth is defined only for teaching and extension activities[18], while for research purposes, Resolution nº 441, dated May 12, 201[12], regulates the institution of Biobanks, which are organized collections of human biological material and associated information, collected and stored specifically for research purposes.

Similar to research with the academic community, some investigations have been conducted in order to understand the knowledge that dental surgeons have about the correct handling and disposal of human teeth after extraction[7,17,19]. These studies show that, although these professionals recognize the dental element as an organ, there is still a lack of knowledge about the proper handling of these teeth and the legal implications of this practice. It is also observed that there is unawareness on the part of dental surgeons about the existence of HTB and its importance to the academic community.

Therefore, considering the fundamental role of the dental surgeon as the professional responsible for the final destination given to extracted teeth in dental services, as well as in the referral or donation of these teeth for teaching and research activities, this study aimed to investigate the level of knowledge that dental surgeons in the city of Natal/RN have about the ethical and legal aspects involving the handling and disposal of extracted human teeth.

2 METHOD

This is a descriptive cross-sectional study that used a semi-structured questionnaire (Figure 1) containing objective and subjective questions, applied to dental surgeons registered with the Regional Council of Dentistry of Rio Grande do Norte (CRO/RN) and working in the city of Natal, in the period from August 2018 to September 2019, and who agreed to participate in the study. The estimated number of professionals was 2,339 at the time of data collection, according to the CRO/RN.

The questionnaire, structured in Google Forms® platform, approached aspects related to the forms of obtaining, handling and disposal of extracted dental elements during the dental surgeons' academic training, as well as in their clinical activities, besides the knowledge that these professionals had about the importance and functioning of an HTB.

The recruitment of participants happened through electronic mail (e-mail), containing the summary of the research project and the link to the virtual Free and Informed Consent Form (FICF)

and questionnaire. In order to obtain a satisfactory response rate, the e-mails were sent and forwarded twice through the CRO/RN's direct mail. This study was carried out after the approval of the institutional Research Ethics Committee under nº 2.962.146 (CAAE: 76781517.5537).

1. For you, the tooth under the law is recognized as:
( ) Appendix ( ) Tissue ( ) Organ ( ) There is no law that deals with this ( ) I don't know

2. For you, what would be the degree of importance of these structures of the human body?

	Very Little Important	Little Important	Neutral	Important	Very Important
Nail	( )	( )	( )	( )	( )
Finger	( )	( )	( )	( )	( )
Heart	( )	( )	( )	( )	( )
Skin	( )	( )	( )	( )	( )
Tooth	( )	( )	( )	( )	( )

3. Did you need dental elements for academic activities during the period of your graduation and/or specialization? ( ) Yes ( ) No

4. If the previous answer was yes, how did you get these dental elements?
( ) Purchase
( ) Health Units
( ) Dental Offices
( ) Extracted at the educational institution
( ) Other:_____

5. Are you aware if there is a regulation on the acquisition of extracted human teeth?
( ) Yes ( ) No

6. In your opinion, what is the ideal way to acquire human dental elements in teaching/research activities?
( ) Elements saved from the teaching activities themselves
( ) Donation from Health Units/Dental Offices
( ) Purchase of third-party elements
( ) Other:_____

7. Do you consider that there is a biological risk involved in handling extracted dental elements?
( ) No ( ) Yes. Which ones?_____

8. What is the destination of the extracted dental elements in your work institution?
( ) Ordinary garbage ( ) Hospital garbage ( ) Don't know ( ) Storage for donation ( ) Other_____

9. Do you know the purpose of a Human Tooth Bank?
( ) No ( ) Yes. Which one? _____

10. Would you be willing to be linked to any institution, in order to give a more correct and conscious destination to the dental elements extracted in your office?
( ) Yes, I fully agree
( ) Yes, as long as it didn't change my clinical routine
( ) Yes, as long as it does not entail any financial cost
( ) I'm not interested

Figure 1. Questionnaire applied to dentists.

The data referring to the objective questions were processed in an electronic spreadsheet and evaluated through descriptive statistics (absolute numbers and percentages).

The data related to the subjective questions were categorized and evaluated descriptively in the light of the conceptual framework Collective Subject Discourse. After a floating reading of the textual material generated, four categories emerged ("contamination", "cross infection", "teaching and research" and "illegal trade", described and interpreted according to the flow of the Analysis Plan (Figure 2).

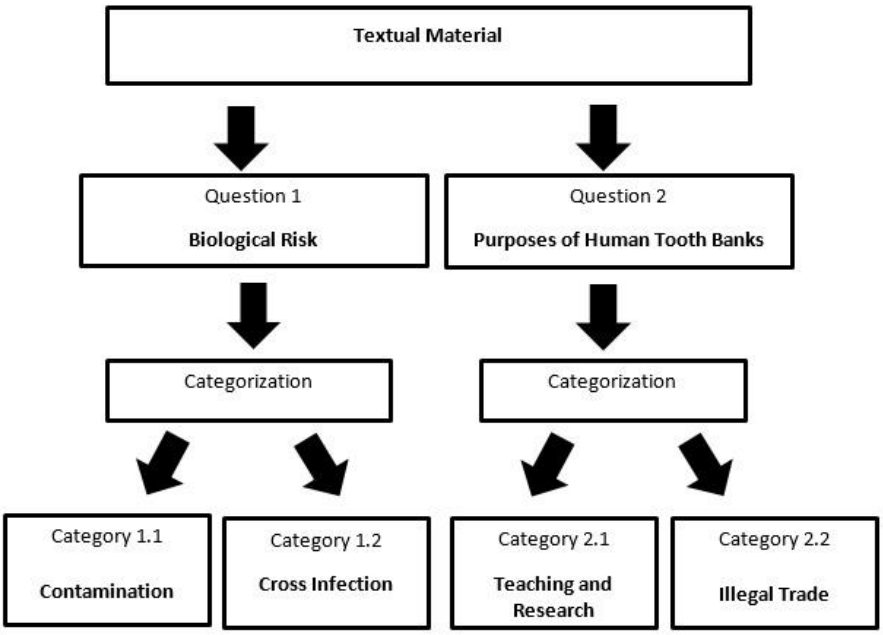

Figure 2. Analysis plan for the categories emerging from the textual material generated from the open-ended questions.

3 RESULTS AND DISCUSSION

A total of 208 returns (8.9%) were obtained from the emails sent to dentists who agreed to participate in the research. Thus, when asked about how the dental element is recognized under the legislation, 78.4% considered the tooth as an organ, classifying it in relation to the degree of importance with other structures of the human body as very important (68.75 %), along with the heart (87.98%), skin (82.21%) and fingers (64.9%), with the scale represented by scores such as very little important, little important, neutral, important and very important.

Almost all professionals (98.6%) used human teeth during undergraduate or graduate courses. Of these, 42.4% obtained their teeth in health facilities, 28.3% in dental offices, 22% in

the educational institution itself, 2.4% by purchase and 5% by other means. Of those who acquired it in other ways, 70% was through donation and the others through other unregulated ways.

Of the respondents, 75.5% said they were aware of the existence of regulations on the acquisition of extracted human teeth. However, in response to the ideal way to acquire human dental elements in teaching/research activities, 72.11% considered donation by health units/dental offices the most appropriate way, 23.55% mentioned teeth stored in the institution of teaching, 0.5% through purchase and 3.8% in other ways, such as the HTB for example.

As for the existence of biological risk during the manipulation of extracted teeth, 88.9% of professionals believe that this risk exists and, when asked what it would be, two categories emerged: "contamination" and "cross-infection" (chart 1).

Regarding knowledge about the destination given to teeth extracted in their workplace, 71.6% of professionals said it was hospital waste, 11% believed that teeth are stored for donation, 8.2% said it was common waste, 5 .3% said they did not know and 3.8% indicated other options. Of these other options, the patient's own storage of the tooth, personal storage by the dentist for clinical practices was reported, and others reported not performing the extraction procedure.

As for the purposes of a HTB, 59.6% said they knew about them and, among the answers mentioned, there were two categories described as "teaching and research" and "illegal trade" (chart 2).

The last objective question was intended to know the interest that the dentist would have to be linked to some institution, in order to give an adequate destination to the extracted dental elements. The answers were: 43.3% indicated being totally willing, 31.7% would accept as long as their routine was not changed, 38% would accept with the condition that no financial cost was incurred, and 12% showed no interest in joining.

The results of the present study revealed that the majority (78.4%) of dentists claim to have an understanding that the human tooth, even after being extracted, represents an organ under the laws in force in Brazil, results that are in line with the studies by Pinto et al., (2009)[7], Slongo, Dallanora and Dallanora (2016)[17] and Silva et al., (2018)[19].

Although the results point to a knowledge on the part of dentists regarding the legal value of the dental element, this understanding still does not seem to be consolidated, since in the subsequent questions the results were sometimes contradictory.

The majority (98.6%) of the participants claimed to have used dental elements at some point in their academic life and declared to have obtained these teeth in dental offices and health units or even in the educational institution of their training. It is likely that the ways in which these teeth were obtained were not in line with the legal precepts, considering that it was not common practice to donate through the FICF, the observance of ethical principles in teaching and research, especially if we consider the inexistence until then, from a HTB in the city of Natal/RN. In addition, there was a small percentage who claimed to have acquired their teeth through purchase, as reported by other studies on the existence of illegal commercialization of human teeth[1,7], contrary to what is recommended in the Transplant Law[9].

A contradictory aspect refers to the fact that 75.5% of respondents claim to know some regulation

Chart 1. Categorization of respondents' statements, central ideas and collective subject discourse referring to the question "What are the biological risks involved in the handling of extracted human teeth"

CATEGORY	CENTRAL IDEAS	COLLECTIVE SUBJECT DISCOURSE
Contamination Contamination through blood and tissue debris when the tooth is not properly sanitized... HIV virus, hepatitis B virus, syphilis bacteria, among other microorganisms... Risk of contamination with blood pathogens... Contamination with residual fluids (blood, saliva) on teeth... Contamination through microorganisms and viruses if handled without proper care... Risk of contamination with possible viral and/or bacterial diseases... Direct and cross contamination in different ways ... Contamination through necrotic content, risk of infections... Contamination due to needlestick accidents....	**Contamination by microorganisms**	There are countless possibilities for the risk of direct, indirect and cross contamination, through bacteria, viruses and other microorganisms, if the tooth is not properly sanitized and remains of blood and saliva.
Cross Infection "Contact with blood, presence of bacteria and contact with the hepatitis B virus... Transmission of viruses, bacteria, spores and resistant dirt, especially when the tooth has not been properly disinfected... Cross-infection, if the teeth are still contaminated... Several infectious diseases can be acquired through the manipulation of extracted human teeth such as tuberculosis, hepatitis, herpes and so on. ... Cross-infections in the total management process... Bacterial infections and/or viral processes depending on the time elapsed between extraction and tooth manipulation. For example, the hepatitis B virus can survive in dried blood for at least 7 days... Depending on the form of handling and non-use of PPE, it can get eye infection by splashes...Transmission of infectious diseases that depend on as these were disinfected and conditioned, there may be the transmission of some diseases such as hepatitis and the acquired immunodeficiency syndrome (AIDS)... Transmission of diseases, through fungi, bacteria, viruses, which may perhaps be present in the tooth structure. .."	**Transmission of infectious and contagious diseases**	There is an imminent risk of transmission of several infectious-contagious diseases that can be acquired through the manipulation of extracted human teeth, especially in recent surgical procedures when these were not properly disinfected and sterilized, especially if PPE was not used.

concerning the acquisition of extracted human teeth. This data reveals a contradiction when 72.11% of professionals reveal that the ideal way to obtain teeth for teaching and research purposes would be donation by health units/clinics or even collections kept in institutions (23.55%). Only 2.4% of respondents cited the HTB as the ideal means for acquiring dental elements. It is important to highlight that the alternative "tooth bank" was not deliberately placed so as not to induce the correct answer, and so that it was possible to check the level of knowledge of professionals about this theme.

When asked about aspects related to biosafety, 88.9% of dental surgeons considered the existence of biological risk in the handling of extracted human teeth, a result that is in line with those obtained by Silva et al., (2018)[19], where 100% of professionals said they knew that, in the pulp and periodontal tissues, there may be transmissible blood pathogens. From the answers to the question about potential biological risks, the categories "contamination" and "cross infection" emerged as evidenced in the following

Chart 2. Categorization of the respondents' speeches, central ideas and collective subject discourse regarding the question "Do you know the purpose of a Human Tooth Bank-HTB?"

CATEGORY	CENTRAL IDEAS	COLLECTIVE SUBJECT DISCOURSE
Teaching and research "Properly storing and handling extracted teeth to be used for teaching and research...Provides a better way of controlling and storing teeth for use in research projects and in the use of preclinical laboratory training... Receive, sterilize and store dental elements from clinics and provide them for research and use by students for practical classes, research, teaching and extension... Source of stem cells and for research in the areas of dental materials. Possessing a collection of human teeth that can be useful in conducting research in various areas such as: genetics, stem cells, dental anatomy, endodontics, cariology.... Academic use, if stored under ideal conditions (conservation medium) can also be used to study stem cells, nerve cell reproduction and search for cure of many degenerative diseases...Offering a restorative option to patients who have lost part of tooth elements through dental caries or fracture, and the use of tooth fragments..."	**Providing teeth for teaching and research** **Delivering tooth fragments for restorative bonding**	Some purposes of a BDH are clearly perceived, such as: receiving, sterilizing, storing and supplying human teeth for teaching and research activities by undergraduate and graduate students, as well as enabling research with stem cells. Another possibility is to offer a restorative option to patients who have lost part of their dental elements, through the use of tooth fragments using the bonding technique.
Illegal trade "Legalizing the use of human teeth in teaching units regarding ethical and biosafety aspects... raise awareness of the practice of donating dental organs, make material for research feasible, as well as curb the illegal practice of trade in teeth... Supply of teeth, with control and insurance... Store donated teeth, following a safety protocol."	**Eliminating the illegal trade in extracted human teeth**	Some interesting concerns were expressed, such as: providing teeth to educational institutions in a legal manner, considering ethical and biosafety aspects. Another important point, since the tooth is a human organ, is the awareness of the practice of donating it, thus eliminating the illegal trade.

speech reports:

> *"Like all material of biological origin, prior to the disinfection processes, there are inherent risks of contamination for those in contact".*
>
> *"In this case, if the tooth is well sanitized and remains of blood with contamination from a patient with some contagious pathology".*
>
> *"Transmission of diseases, through fungi, bacteria and viruses, which may be present in the tooth structure".*
>
> *"Depending on the way of handling and not using PPE, you can get eye infection from splashes".*
>
> *"Bacterial infections and/or viral processes depending on the time elapsed between extraction and tooth manipulation. For example, the hepatitis B virus can survive in dried blood for at least 7 days".*

In this context, Dominici et al., (2001)[20] report that extracted teeth are potential sources of contamination, as some pathogens can survive for a long time, even on dry substrates. Thus, it is essential that these teeth go through a process of disinfection/sterilization to prevent the risk of cross-infection, making clear the need to institutionalize these actions through a HTB.

Another important aspect concerns the fate that is given to the thousands of human teeth still extracted in Brazil. Asked about the disposal given to dental elements in their workplaces after extraction, 71.6% said it was hospital waste, 8.2% common waste, 11% said they store their teeth for donation and 5.3% said no know. These data are corroborated by the findings by Silva et al. (2018)[19], where the majority of dentists surveyed reported discarding teeth in the trash or handing them over to patients. Thus, the inadequate conduct of these professionals is evident, regarding the ethical and legal aspects related to the disposal of the human dental organ, a fact that reinforces the need for greater dissemination and awareness on the part of professional bodies regarding these aspects, reinforcing the need creation of a HTB to prevent these infractions.

As for the knowledge about the purposes of a tooth bank, only 59.6% declared to know them and, among the answers mentioned, two categories were obtained named "teaching and research" and "illegal trade". The following reports illustrate these results:

> *"Properly storing and handling extracted teeth, in order to be used for teaching and research".*
>
> *"Having a collection of human teeth that can be useful in conducting research in various areas such as genetics, stem cells, dental anatomy, endodontics and cariology".*
>
> *"Providing a better form of control and storage of teeth to be used in research projects and in the use of laboratory and pre-clinical training".*
>
> *"Delivering material in an ethically adequate and legalized way, since it is a human organ".*
>
> *"Receiving, sterilizing and storing dental elements from clinics and providing them for research and student use for practical classes".*
>
> *"Contributing to dental academic and professional training, whether in teaching and research, contributing to the construction of oral health for all".*
>
> *"Subsidizing research in different areas of dentistry and health sciences, such as dental materials, dentistry, endodontics, human genetics, pathophysiology. Allowing undergraduate students easier access to teeth, for the development of their academic activities and development of skills and competences in Dentistry. Offering a restorative option to patients who have lost part of their tooth elements through dental caries or fractures, through the use of tooth fragments".*
>
> *"Its purpose is to provide students with access to human teeth for their practical activities, without the risk of contamination and with greater control."*

Despite more than half of the respondents claiming to know the purposes of a tooth bank, only 43% were fully willing to link to these organs through donations, as a way of giving a more correct destination to the extracted teeth. This percentage was lower than that observed in the investigations by Pinto et al., (2009)[7], Silva et al., (2018)[19] and Slongo, Dallanora and Dallanora (2016)[17], where professionals said they would donate teeth to a HTB.

It is likely that the lowest percentage observed for this question in the present study is due to the fact that it does not have a dichotomous character as in other studies. The alternatives proposed in this question sought to measure the degree of attachment to which these professionals were willing to commit. This was clear as 31.7% said they would agree to be linked as long as their routine was not changed and 38% would accept with the condition that no financial cost was incurred. However, 12% showed total disinterest in

joining a HTB, which is a significant percentage, when we realize the real importance of this attitude for adhering to the ethical and legal precepts involved in this theme.

Thus, from the results obtained in this study, it is suggested the need for institutionalization of actions that promote the capture, decontamination and disposal of human teeth extracted for teaching or research purposes, within the precepts of legality. For this, the implementation of a HTB in educational institutions becomes fundamental.

In this context, it is understood that the low rate of return obtained in this study may represent a limitation, despite the fact that 3 submissions of the questionnaire were carried out in a period of 1 year, indicating a low intention and lack of interest in the subject by some professionals, probably due to their lack of knowledge to collaborate with research of this nature.

5 CONCLUSIONS

It is concluded that there is little knowledge of dental surgeons regarding the ethical and legal aspects involved in the handling and disposal of extracted human teeth. This lack of awareness is reflected when respondents did not demonstrate that they value these procedures and in the low intention to be linked to the activities of a tooth bank. It is suggested that these themes be approached in a transversal way in professional training courses, as well as the implementation of a HTB as a way to contribute to changing the attitude of dentists in their professional practice with regard to valuing the dental element as an organ.

RESUMO

Aspectos ético-legais que envolvem a manipulação de dentes humanos extraídos: o olhar de cirurgiões-dentistas

Investigou-se o conhecimento de cirurgiões-dentistas acerca dos aspectos ético-legais envolvidos na manipulação e descarte de elementos dentários humanos extraídos. Utilizou-se um questionário semiestruturado, enviado eletronicamente para cirurgiões-dentistas. As perguntas objetivas foram analisadas pela estatística descritiva e as subjetivas pelo Discurso do Sujeito Coletivo. Dos 208 cirurgiões-dentistas respondentes, 78,4% reconheceram o elemento dentário como órgão, 98,6% afirmaram ter utilizado dentes humanos para treinamento laboratorial e pesquisa na graduação e pós-graduação, 42,4% obtiveram esses dentes em unidades de saúde, 28,3% em consultórios odontológicos, 22% na instituição de ensino e 2,4% através de compra. Sinalizou-se a doação por unidades de saúde e consultórios odontológicos como forma ideal para aquisição dos dentes (72,11%). Apesar de 75,5% afirmarem conhecer a regulamentação específica, isso não se refletiu nas demais questões avaliadas. Quanto ao risco biológico na manipulação dos dentes, 88,9% consideraram existir e a análise qualitativa das respostas gerou as categorias "contaminação" e "infecção cruzada". Já sobre a finalidade do Banco de Dentes, 59,6% declararam conhecê-las, emergindo categorias como "ensino e pesquisa" e "comércio ilegal". A despeito desse conhecimento, apenas 43,3% indicaram estar totalmente dispostos a se vincular a um Banco de Dentes para doação. Conclui-se que existe pouco conhecimento quanto aos aspectos ético-legais envolvidos na manipulação e descarte de dentes humanos extraídos e que essa insciência se reflete na baixa intenção em se vincular às atividades de um futuro Banco de Dentes instalado no município pesquisado.

Descritores: Dente. Ética Odontológica. Legislação.

REFERENCES

1. Zucco D, Kobe R, Fabre C, Madeira L, Baratto Filho F. Avaliação do nível de conhecimento dos acadêmicos do curso de odontologia da UNIVILLE sobre a utilização de dentes extraídos na graduação e banco de dentes. RSBO 2006; 3(1):54-8.
2. Freitas ABDA, Castro CDL, Sett GSJ,

Barros LM, Moreira NA, Magalhães CS. Uso de dentes extraídos nas pesquisas odontológicas publicadas em periódicos brasileiros de acesso online gratuito: um estudo sob o prisma da bioética. Arq Odontol. 2010; 46(3):136-43.

3. Freitas ABDA, Pinto SL, Tavares EP, Barros LM, Castro CDL, Magalhães CS. Uso de Dentes Humanos Extraídos e os Bancos de Dentes. Pesq Bras Odontopediatria Clín Integr**.** 2012; 12(1):59-64.
4. Louzada LN, Jorge RC, Silva KS, Pacífico RSL, Dantas FFP, Novaes SEA, et al. Banco de Dentes Humanos: ética a serviço do ensino e da pesquisa - a experiência da Faculdade de Odontologia da UERJ. Interagir Pensando Ext. 2015; (20):67-79.
5. Nassif ACS, Tieri F, Ana PA, Botta SB, Imparato JCP. Estrutura de um Banco de Dentes Humanos. Pesqui Odontol Bras. 2003; 17(Supl 1):70-4.
6. Medeiros MCS, Costa ICC, Silva EM, Silva LCA, Santos DA, Paiva DFF. Conhecimento de docentes e discentes de um curso de Odontologia sobre os aspectos legais que envolvem a utilização de dentes humanos extraídos. Rev ABENO. 2020; 20(1): 13-25, 2020.
7. Pinto SL, Silva SP, Barros LM, Tavares EP, Silva JBOR, Freitas ABDA. Conhecimento popular, acadêmico e profissional sobre o banco de dentes humanos. Pesqui Bras Odontopediatria Clín Integr. 2009; 9(1):101-6.
8. Leite DP, Galdino CAN, Bezerra IPB, Oliveira RR, Gurgel JMTM, Duarte RM, et al. Avaliação do nível de conhecimento de docentes, discentes e leigos sobre utilização de dentes extraídos e Banco de Dentes Humanos. Rev Bras Ciênc Saúde. 2017; 21(2):145-50.
9. Brasil. Lei 9.434 de 4 de fevereiro de 1997. Dispõe sobre a remoção de órgãos, tecidos e partes do corpo humano para fins de transplante e tratamento e dá outras providências. 1997. [Cited: Sept 9, 2020]. Available from: http://www.planalto.gov.br/ccivil_03/LEIS/L9434.htm.
10. Brasil. Código Penal Brasileiro. Decreto-Lei n 2848, de 7 de dezembro de 1940. 1940. [Cited: Sept 9, 2020]. Available from: https://www2.camara.leg.br/legin/fed/declei/1940-1949/decreto-lei-2848-7-dezembro-1940-412868-publicacaooriginal-1-pe.html.
11. Conselho Federal de Odontologia. Código de ética odontológica: aprovado pela Resolução CFO n^0 118/2012. Rio de Janeiro: CFO; 2012. [Cited: Sept 9, 2020]. Available from: https://website.cfo.org.br/wp-content/uploads/2018/03/codigo_etica.pdf.
12. Brasil. Ministério da Saúde. Conselho Nacional de Saúde. Resolução nº 441, de 12 de maio de 2011. Aprovar as seguintes diretrizes para análise ética de projetos de pesquisas que envolvam armazenamento de material biológico humano ou uso de material armazenado em pesquisas anteriores. 2011. [Cited: Sept 9, 2020]. Available from: https://conselho.saude.gov.br/resolucoes/2011/Reso441.pdf.
13. Conselho Nacional de Meio Ambiente. Resolução n. 358, de 29 de abril de 2005. Dispõe sobre o tratamento e a disposição final dos resíduos dos serviços de saúde e dá outras providências. Diário Oficial da União 2005; 04 maio.
14. Agência Nacional de Vigilância Sanitária (Brasil). Resolução RDC n. 222, de 28 de março de 2018. Dispõe sobre a Regulamentação das Boas Práticas de Gerenciamento dos Resíduos de Serviços de Saúde e dá outras providências. Diário Oficial da União. 2018; 29 março.
15. Gomes GM, Gomes GM, Pupo YM, Gomes

OMM, Schmidt LM, Kozlowski Júnior VA. Utilização de dentes humanos: aspectos éticos e legais. RGO 2013; 61(Suppl.):477-83.

16. Costa SM, Mameluque S, Brandão EL, Melo AEMA, Pires CPAB, Rezende EJC, et al. Dentes humanos no ensino odontológico: procedência, utilização, descontaminação e armazenamento pelos acadêmicos da Unimontes. Rev ABENO. 2007; 7(1):6-12.
17. Slongo IL, Dallanora LF, Dallanora FJ. Avaliar o conhecimento dos cirurgiões-dentistas atuantes na região meio-oeste catarinense acerca da existência do banco de dentes humanos da Unoesc. Ação Odonto. 2016; (1):87-98.
18. Pereira DQ. Banco de dentes humanos no Brasil: revisão de literatura**.** Rev ABENO. 2012; 12(2):178-84.
19. Silva DP, Vasconcelos US, Silva Neto AP, Martins GAS, Sipaúba GMO, Mour WL, et al. Conhecimento dos cirurgiões-dentistas sobre Banco de Dentes Humanos**.** Rev ABENO. 2018; 18(2):20-6.
20. Dominici JT, Eleazer PD, Clark SJ, Staat RH, Scheetz JP. Disinfection/sterilization of extracted teeth for dental student use. J Dent Educ. 2001; 65(11):1278-80.

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