HUMAN TEETH BANK IN BRAZILIAN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

In 1996, the first Human Teeth Bank (HTB) was established in Brazil. The HTB should be linked to Higher Education Institutions (HEI) and/or Research Centers, related to Dentistry. Its main objective supply the academic and scientific-didactic needs, thereby eliminating the illegal trade of teeth. After donated, the teeth are will be sterilized, cleaned and divided according your characteristics to loan to the subjects of the academy under previously conditions stablished. Considering the existence of legislation regulating the activities related to the use of human organs and tissues, there is the importance of the implementation of the HTB in the HEI of Dentistry. Thus, the aims of this study is to compile basic information that can guide HEI for the implementation of a HTB.

KEYWORDS: Human Teeth Bank, legislation, odontology.

1. INTRODUCTION

The Human Teeth Bank (HTB) is a nonprofit foundation, for the storage of extracted teeth, linked to an Higher Education Institutions (HEI) and/or Research Centers, related to dentistry; has as its main objective supply the academic and scientific-didactic needs, thereby eliminating the illegal trade of teeth[1].

The HTB should follow the institutional norms, with the prediction that at least one professor and at least one student to be responsible for its operation, enabling to obtain the teeth, the register of donors, storage, sterilization and the loan of donated teeth. Furthermore, HTB also aims to reduce the risk of cross-infection, preventing contamination of students, professors, clinical and environmental environments[1].

The first HTB established in Brazil, was of the School of Dentistry, University of São Paulo, in 1996[2,3], no consensus regarding the importance of the implementation of the BDHs educational institutions/ research center.

However, Pinto *et al*. (2009)[4] conducted a survey on the level of knowledge about the HTB with undergraduate students in a course in Dentistry; the study showed that 51% of respondents students received teeth Dentists and about 98% of these graduates were not aware of a HTB, a worrisome fact, considering the risk of infection and the disrespect for law.

A study conducted by Freitas *et al.* (2012)[5] shows that most academic discipline that uses human teeth is Endodontics, followed by Prosthodontics and Operative Dentistry. In the HEI with postgraduate academic discipline that asks more teeth is Endodontics followed by Dentistry and Prosthodontics. Already in scientific research 86% of HEI claimed to know the origin of teeth used. However, scientific research published in the form of a scientific paper show that there was no citation of sources of extracted teeth used. According to Costa *et al.* (2012)[6], the teeth were requested by more teachers than for students. Most teeth were most commonly used in pre-clinical practices, such as caries removal, cavity preparation, restoration and instrumentation channel.

Thus, given the heterogeneous scenario on the knowledge of the dental community about who is a HTB, this study aims to compile basic information that can guide HEI for the implementation of a HTB.

2. MATERIAL AND METHODS

For the development of this integrative review we chose the proposal of Ganong (1987)[7], according to the following steps: 1) identification of the research question, followed by a search of the descriptors or keywords; 2) determining the criteria for inclusion or exclusion of research in online databases; 3) categorization of studies, summarizing and organizing relevant information; 4) assessment of studies for critical analysis of the extracted data; 5) discussion and interpretation of the examina-

tion results, contextualizing theoretical knowledge and evaluating their applicability as; 6) presentation of the integrative review and synthesis of knowledge of each article reviewed briefly and systematic way.

In the present study the guiding question of the integrative review was: to review the literature for to compile basic information that can guide Higher Education Institutions and/ or Research Center for the implementation of a BHT.

Bases (Latin American and Caribbean Literature on Health Sciences) LILACS, SciELO (Scientific Electronic Library on Line) and PubMed (- NCBI US National Library of Medicine National Center for Biotechnology Information) were consulted. Studies that have addressed the thematic, published from 1981 to 2013, regardless of the languages of publication were included. The following controlled for the search and also used as keywords descriptors were used: Human Teeth Bank, legislation, odontology.

3. LITERATURE REVIEW

Historic

The first reported structure of a Bank of teeth emerged around 1981, when Grabrielli *et al.* (1981)[8] developed a method of collage, for anterior teeth. To put his methodology in practice, however, it was necessary to perform the selection of a tooth that could restore the condition of crown fracture, with the consequent replacement of lost tooth fragment. Thus, the selection of the tooth to be used was made by a Bank of teeth, taking back an excellent cosmetic result. However, the pioneer in the use of extracted teeth was Hayward, who gone in 1968, had practiced this technique; however, there are reports in the literature around 1600 b.C. already practiced this act. There are reports together by gold wire molars, carved ivory teeth, and even the use of teeth of sheep.

Legal support

The tooth has to be analyzed as an organ like any other organ in the body, because it is formed by different tissues and contains genetic material where they can get the DNA of the individual through his pulp.

However, only in 1997, the team of HTB of University of São Paulo got the teeth started to be considered as organs of the human body, and thus subject to what is available in Law number 9,434, (February, 4, 1997) deals with the removal of organs, tissues and body parts for transplantation and treatment. In its Chapter II of Article 6th is forbidden to post-mortem removal of organs, tissues or body parts of unidentified persons, predicting worth 2-6 years imprisonment and a fine: 100-360 fine days. Penalty of 3-8 years imprisonment and fine of 200 to 360 fine-days for people who buy or sell organs, tissues or parts the human body. In addition, worth 1-3 years imprisonment for those who violate graves[1,9].

Now, knowing that the tooth is an organ and undergoes Transplant Brazilian (Law number 9,434), in the Chapter IV - Supplementary Provisions, Article 10, proclaims: "*the transplant or graft will only express consent of the recipient, written in list only waiting, after advising on exceptionalism and the risks of the procedure*"[9]. Thus, HTB has among others, the purpose of regulating the use of teeth by academics, scientists and professors of Dentistry.

According to the Resolution of the National Health Council (NHC) number 196 (October, 10, 1996), in his section IV proclaims: "*The respect due to the dignity of free and informed consent of the subjects, individuals or groups by themselves and/ or their legal representatives expressed their agreement to participate in research*"[9]. I.e., any material used in human research must be donated and have provenance. By performing some research with human material, without knowing the origin, and without the formal consent of the donor or spouse, who is declared by completing and signing the consent form, its use is prohibited, and disapproved by the Committee Ethics in Human Research.

In this direction, there is also the legal provision of punishment for professors who may require their students to use teeth without origin; in these cases, the professor can be framed in the current legislation, the offense of incitement to crime. It is noteworthy that professors and students cannot claim innocence implied by lack of legal provisions, which provides for the use of human teeth. This is because the act committed is a crime, with frameworks Criminal and/ or Civil, and "*nobody is excused from complying with the law, claiming not to know*"[4]. According to Article 39th of Dental Ethics Code, which was released in 2006, non-compliance with legislation governing organ transplants and use the corpse to study and/ or exercise of surgical techniques is considered ethical violation, with penalties ranging from confidential warning to revocation of professional practice[10].

Conditioning of the teeth

After donated, the teeth are collected, they will be sterilized, cleaned and divided into sound teeth with amalgam in restoration, restoration in resin, supernumerary, anomalous, prosthesis, with crown and damaged root with root intact and damaged crown, with damaged and intact root crown and root fragments. Are further subdivided into incisors, canines, premolars and molars. The teeth are stored in glass jars with threadable cap, immersed in distilled water (4 °C) changed weekly[1].

The cooling of the tooth is done to preserve their physical and optical structures. Only teeth with amalgam restoration in will not be autoclaved, not to emit mercury

fumes into the environment; these teeth will be sterilized by immersion in 2% glutaraldehyde solution for 10 hours. The other teeth when requested will be sterilized in an autoclave at 121 °C, for 15 min, before your section students[1].

However, for research purposes, the teeth are preferably sterilized by autoclaving, as described. However, when no proper sterilization, interference by the methods of disinfection or sterilization can produce on the physico-chemical properties of the tooth, committing some results of the research, the investigator must sign an acknowledgment of science of the risk and use of protective equipment individual[1,10,11].

It is known that the tooth may contain pathogens with potential to survive for long time in extracted teeth and that these microorganisms are harmful to human health, disinfection of the dental organ by HTB helps control infections among users, and the community.

Maintenance of the teeth´s stock of the HTB

To achieve the teeth, demands will be made for dentists, health and even dental clinical faculty. This should happen legally, through the term of free and informed consent.

The team of HTB should invest in advertising in order to raise teeth donated by layman, a dentist and academic population. Using means such as lectures, brochures, posters, social networking, etc. Such disclosure must have as its motto as the appreciation of the tooth organ and the importance of dental element in the academic and scientific use. Thus, it becomes easier to popularize the HTB between academic and lay population, making them aware of their existence as well as of the benefits of their services.

A Socioeconomic data of donors to HTB conducted by Poleto *et al.* (2010)[12], there are several causes of tooth loss: orthodontic reasons, supernumerary teeth, included convicts, convicted of carious teeth due to periodontal pockets too deep, beyond the 3rd molars. Most donors, 58% were aged 30-49 years, 38% were men and 62% women, with varied professions. 58% of these people not previously sought dental treatment for the tooth in question.

In this case, for the donation of the former betrayed tooth occurs, the professional who did the procedure should explain to the patient that your tooth will be used for scientific research and scholarship, and its identity is preserved. After the agreement of the patient, he will sign the Instrument of Consent. During the two years of study conducted by Albuquerque Rolim *et al*. (2011)[13], between the years 2005-2007, had a total of 133 donors with most students, having donated their number of teeth ranging from 1 to 50 teeth per donor.

In the latter case, nowadays there are artificial dental arches that mimic well dentin and enamel, dental anatomy and occlusion, but the use of human dental element is of great importance to academic learning.

Operationalization of the HTB

For the loan of teeth to the students, it is recommended the preparation of a "Term of Loan" where the applicant shall sign it as well as engage with the return of the assigned teeth. In case of requests for scientific research, the researcher responsible for the project must submit your request along with the protocol for approval of the terms of use of the teeth by the Committee Ethics in Human Research that reviewed the research project previously.

We suggest that the professor or student request to HTB the amount needed for their activities with four days prior, because in some cases the tooth will still be prepared for use. Teeth returned will be assessed, and if favorable for use will be prepared for reuse and unfavorable should be incinerated[1,10]. Each record both the donation as the loan completed, will be separated by type of tooth filing and registering them[1,4,9,11].

4. CONCLUSION

The HTB still not part of many HEI, due to lack of sensitivity of academics, the lack of information of agencies that should regulate them or by lack of knowledge of the population which together result in the shortage of donations teeth.

Human teeth may be of high biological risk, especially if stored and handled incorrectly; the proper disposal of extracted teeth, this aspect is advantageous because at the same time protects the community of pathogens contributes to the training of new professionals already bring with it the notion of the importance of maintaining a HTB in a given locality.

Finally, considering the existence of legislation regulating the activities related to the use of human organs and tissues, there is the importance of the implementation of the HTB in the HEI of Dentistry. It is by treading an ethical and legal way for the use of extracted teeth for scientific research, studies and academic papers.

REFERENCES

[1] Nassif A.C.S. et al. Estruturação de um Banco de Dentes Humanos Pesqu. Odontol Bras. 2003; 17: 220-1.

[2] Vinholes, Fernandes, Ritzel. Banco de dentes humanos no curso de Odontologia da ULBRA – Campus Torres. Conversas Interdisciplinares". 2011; 1:11.

[3] Rezende LR. Banco de dentes humanos: contribuição para o ensino e pesquisa odontológica.
Disponível em:

www.bioeticapr.org.br/upload/biblioteca/banco_de_dentes_humanos.doc. Acessado em: 12 de junho de 2014.

[4] Pinto S.L. et al. Conhecimento popular, acadêmico e profissional sobre o banco de dentes humanos. Pesq. Bras. Odontoped. Clin. Integr. 2009; 9(1):101-6.

[5] Freitas ABDA, *et al*. Uso de dentes humanos extraídos e os bancos de dentes nas instituições brasileiras de ensino de odontologia. Pesq Bras Odontoped Clin Integr. 2012; 12(1): 59-64.

[6] Costa S.M. et al. Assesment of a state university tooth bank two years after its foundation. Rev. GaúchaOdontol. 2012; 60(2):227-32.

[7] Ganong LH. Integrative reviews of nursing research. Res Nurs Health, 1987; 10(1):1-11.

[8] Grabrielli *et al.* Apresentação e avaliação clínica e uma técnica de restauração de dentes anteriores, com fragmentos adaptados de dentes extraídos. RGO. 1981; 29(2):83-7.

[9] Gomes G. M. et al. Utilização de dentes humanos: aspectos éticos e legais. RevGaucha Odontol. 2013; 61:477-83.

[10] Miranda G.E. et al. Banco de dentes humanos: uma analise bioética. Rev. Bioét. (impr). 2012; 20(2):255-66.

[11] Farias, FF. Projeto Banco de Dentes humanos. 2001. Disponível em: http://bancodedenteshumanos.blogspot.com.br/2011/06/projeto-banco-de-dentes-humanos-por.html.

[12] Poletto MM, *et al*. Banco de dentes humanos: perfil sócio-cultural de um grupo de doadores. Rev Gaúcha Odontol. 2010; 58(1):91-4.

[13] Albuquerque R, *et al*. Implantação de um banco de dentes humanos: importância para as disciplinas pré-clínicas do departamento de Odontologia Restauradora. I Semana de Ciência, Tecnologia, Esporte, Arte e Cultura. Resumo 0081. 2011; Disponível em: http://www.prac.ufpb.br/anais/XIIENEX_XIIIENID/ENID/MONITORIA/resumos_04.html. Acessado em: 14 de fevereiro de 2014.