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# "TO COMPARE EFFICACY OF VARIOUS MEANS OF STERILIZATION OF EXTRACTED TEETH AND DETERMINE THEIR EFFECT ON PHYSICAL PROPERTIES OF THE TOOTH": AN IN VITRO STUDY.

By

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Dissertation submitted to the
Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore

In partial fulfillment
of the requirements for the degree of

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**MASTER OF DENTAL SURGERY (M.D.S)**

in

**PEDIATRIC AND PREVENTIVE DENTISTRY**

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***May 2018***

# ABSTRACT

*Background:*

Anterior teeth form the most important part of esthetics. However, in primary dentition early childhood caries affects preschoolers resulting in severely mutilated anterior teeth. In permanent and mixed dentition, anterior teeth may also be affected as a result of traumatic injuries to teeth resulting in fractures. Premature loss of anterior teeth may affect esthetics, speech and may lead to abnormal tongue habits resulting in subsequent malocclusion. Over the past decades, dentistry has achieved great scientific and technological advances regarding restorative and adhesive materials. Nevertheless, to date, no restorative material has been more effective than the properties of natural dental structures themselves. Several authors have proposed use of natural teeth fragments as efficient method for restoring fractured anterior teeth. When the patient presents the fragment in good condition, this procedure presents optimal results in the restoration of fractured teeth (autogenous bonding). However, when the patient does not present the fragment, or its use is not recommended, donated extracted teeth (homogeneous bonding) can be used. Fragment reattachment using natural teeth is a technique known as "Biological Restoration" and provides excellent results regarding surface smoothness, esthetics, and the maintenance of the incisal guide in dental structures that cause physiological wear.

Extracted teeth may harbor potential pathogens as the bacteria may remain viable within root canals for extended periods of time, thus removal of all potential organisms capable of transmitting disease becomes very important. Several chemicals and techniques have been tried for sterilization of extracted teeth. However, there is

no specific recommendation at present. Most of the literature available currently focuses on sterilization of teeth for educational and research purposes with no mention about its sterilization for its use as a homogenic restoration. Since there is extensive loss of tooth structure, an ideal post should have adequate compressive strength and fatigue resistance to withstand the occlusal forces. Thereby it is necessary to determine the sterilization technique which is most efficacious with minimal changes in the mechanical properties of dentin.

*Materials and Methods:*

80 single rooted healthy premolars tooth extracted for orthodontic purpose were collected and stored in normal saline. Four groups were determined based on the technique of sterilization used, comprising of control, steam sterilization, ETO sterilization and sterilization using 10% formalin. Post sterilization the teeth were cultured to determine the growth of bacterial colonies. Following which the sterilized teeth were, individually, subjected to testing for measurement of physical properties namely compressive strength and flexural strength using Universal Testing Machine.

*Results:*

The obtained data was tabulated and evaluated. Results indicated that steam sterilisation, EtO sterilisation and 10% formalin were effective in sterilisation of extracted teeth. The greatest mean compressive strength and flexural strength was exhibited by control group. The lowest mean compressive strength and flexural strength was exhibited by 10% formalin group. Study samples subjected to steam sterilisation had compressive strength ($p<0.05$) and flexural strength closest to the control group ($p>0.05$).

*Conclusion:*

From the results obtained, it can be concluded that steam sterilisation lead to efficient sterilisation with minimal alteration of physical properties. Thus, for sterilisation of teeth to be used for biological posts steam sterilisation seems to be most promising.

*Keywords: sterilisation, extracted teeth, biological posts, physical properties.*