TOOTHBRUSH CONTAMINATION A REVIEW OF INDIAN LITERATURE

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ABSTRACT
Tooth brushing is one of the oldest methods of mechanical plaque control. This paper review the scientific literature of Indian studies conducted to evaluate toothbrush contamination and interventions used to reduce contamination of toothbrushes over the last decade.

Key words: Bacteria; Contamination; Oral Hygiene; Oral Health; Toothbrush

Introduction
Tooth brushing is the most effective and commonly used method of plaque control. Along with the brushing methods, disinfection of toothbrush is also equally important for maintenance of health of oral tissues. As early as 1920, Cobb reported that toothbrushes could be the source of repeated oral infection. Despite toothbrushes role being imperative to personal oral hygiene and plaque reduction, they, on regular usage become contaminated with microorganisms, which colonize in the oral cavity. The bacteria, fungi and viruses can grow and multiply on toothbrush bristles and handles.

Fluid and food debris can be drawn into the spaces between the tufts by capillary action causing bacterial growth. Toothbrushes kept in a moist environment like that of a bathroom, uncovered spot in the bathroom, are where or fecal bacteria and germs are present in the environment and contaminating the toothbrush placed in those areas. Thus, proper storage or regular disinfectant of toothbrushes is important aspect in toothbrush care.

A systematic review of the English scientific literature of Indian studies conducted on human subjects was obtained for over the last decade (2000-2013). The review included studies that evaluated toothbrush contamination in healthy samples and interventions for reducing contamination of toothbrushes, i.e., experimental and non-experimental designs were included in the review. This paper review the scientific literature of Indian studies conducted to evaluate toothbrush contamination and interventions used to reduce contamination of toothbrushes over the last decade.

The databases search includes Pub Med (clinical inquiries and MESH), and Google Scholar. Key search terms used in the review were toothbrush, tooth brushing, colonization, bacterial and microbial contamination, oral hygiene, oral health and India. After the first search, a second search was given for the articles cited in the main article for the same period and criteria. The duplicated data were excluded. Studies were identified after the first and second search for toothbrush contamination of healthy individuals in the Indian settings. Most of the studies focused on children and young adults and few were in vitro studies.

The literature has shown that tooth brushes can be a reservoir for the direct transmission of microorganisms, as well as a source for inoculation or reintroduction of microorganisms from infected to non-infected tissues. Colonies of Streptococcus mitis, S. mutans, S. sanguis, S. milleri and Candida were recovered from the samples of used toothbrushes. A highly significant decrease in their numbers was found after the single-use of toothbrush. Streptococcus mutants, Staphylococcus aureus, Pseudomonas, Lactobacillus, Klebsiella, Candida species were isolated in one month and three months used toothbrushes kept in the bathrooms without attached toilet. Escherichia coli were found in three months used toothbrushes kept in the bathrooms with attached toilet. The isolated microorganisms from the toothbrush were Staphylococcus pyogenes, Klebsiella spp., E. coli, Proteus spp. And beta-hemolytic Streptococcus faecalis.

All studies identified Streptococcus mutants and a few identified, other microorganisms like Streptococcus mitis, S. mutans, S. sanguis, S. milleri, Candida, Staphylococcus aureus, Pseudomonas, Lactobacillus, Klebsiella, and candida as contaminating bacteria on toothbrushes. In vivo studies evaluated efficacy of different disinfectants and methods for decontamination and reduction of S. mutans growth on toothbrushes. These studies compared different groups with a control group for different disinfectants.

Studies evaluating efficacy of different disinfectant methods for thwarting growth of microorganisms report efficacy of microwave, spraying Chlorhexidine over (control) sterile tap water, for the disinfection of contaminated toothbrushes and pacifiers by Streptococcus mutants. Sanitization procedure by microwave irradiation and UV radiation was significantly effective in reduction in microbial contamination of toothbrushes as compared to control group. This study suggests that microwave irradiation is an effective disinfectant agent for bacteria and fungi on toothbrushes.

The review of studies on efficacy of disinfectant to control toothbrush contamination suggests use of 0.12% chlorhexidine gluconate, sodium hypochlorite and 3% hydrogen peroxide. Studies, which evaluate efficacy of disinfectants, suggest that Hexidine, 3.0% hydrogen peroxide and Listerine showed 100% efficacy, whereas Dettol showed 40% effectiveness in decontaminating the toothbrushes. Water as a control showed the least effectiveness in cleaning the toothbrushes of healthy male children. The toothbrushes rinsed with tap water and left for drying were more contaminated and more types of organisms than those rinsed with disinfectant Hexidine mouthwash, Hydrogen Peroxide, Dettolin. 3% hydrogen peroxide was most effective followed by CHX 0.2% and followed by es-
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In conclusion, as a contaminated toothbrush can reintroduce microorganisms into the oral cavity, it may be a sound practice to change the toothbrush as frequently as possible.

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**References**


**How cite this article**


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**Source of Support:** Nil

**Conflict of Interest:** None Declared