ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 04, pp.49496-49498, April, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

AN IN VITRO STUDY ON MICROBIAL CONTENT ON THE DENTAL CAST

***,[1]Chandrapooja, J., [2]Dr. R. V. Geetha and [3]Dr. Subha**

[1]B.D.S 2nd year, Saveetha Dental College, 162, Poonamallee High Road, Chennai, Tamilnadu-600077
[2]Department of Microbiology, Saveetha Dental College, 162, Poonamallee High Road, Chennai, Tamilnadu-600077
[3]Department of Oral medicine, Saveetha Dental College, 162, Poonamallee High Road, Chennai, Tamilnadu-600077

ARTICLE INFO

Article History:
Received 19th January, 2017
Received in revised form
04th February, 2017
Accepted 22nd March, 2017
Published online 30th April, 2017

Key words:
Nasopharyngeal
Glutaraldehyde
Peptone

ABSTRACT

Background: A lot of oral and nasopharyngeal microorganism are present on the dental cast. The amount of microorganisms that are found in the oral fluids ranges from 4 millions to 5 billions per 1 milliliter, and that in dental plaque ranges from 10 and 1000 billions per 1 gram. These microorganisms survive on the dental cast even after removing then from the impression material and cause threat to the health of dental practitioner and thus the patients. Though the dental casts does not have suitable environment for the multiplication of the inhabiting microorganisms, individual protective measures like wearing gloves and protective goggles should be put into practise in order to avoid contamination of dental impressions and casts with microbes and their transmission.
Aim: The aim is to investigate the microbial content on the dental cast.
Materials and Methods: The sample size of 10 was chosen and the sample were collected aseptically by rotating sterile cotton swabs moistened with peptone water over the dental cast that are used in the dental clinics.
Conclusion: Various methods to prevent cross-contamination in dental clinics are used. Most significant methods of disinfecting impressions is using sodium hypochlorite which is a powerful disinfectant against bacteria and viruses and usage of glutaraldehyde.

Citation: Chandrapooja, J., Dr. R. V. Geetha and Dr. Subha, 2017. "An in vitro study on microbial content on the dental cast", *International Journal of Current Research*, 9, (04), 49496-49498.

INTRODUCTION

Oral and nasopharyngeal microorganisms are highly plentiful. Anaerobic and facultative aerobic bacteria are more prevalent. The variety, amount and types of microbes in the oral cavity is very vast (Richard *et al*., 2006). Contamination of dental casts can occur if the dental cast are improperly disinfected or carelessly not disinfected during fabrication of a prosthesis (Mitchell *et al*.,). Materials that come into contact with oral cavity fluids, like the materials used for dental impressions, casts and prostheses, are contaminated with microorganisms present in saliva, blood and oral fluids (Verran *et al*., 1996; Powell *et al*., 1990). Thus, it is important to implement procedures to disinfect the materials that are manipulated by the dental practitioner or those which are sent to a dental laboratory, to prevent cross- contamination, which may extend like a chain to dentists, the dental office staff, dental technician and patients (Egusa *et al*., 2008; Goel *et al*., 2014; Meghashri *et al*., 2014; Anaraki *et al*., 2013). Repeated infection control and disinfection protocols have been developed in prosthodontics with particular importance on the disinfection of impressions and casts used for the fabrication of prostheses (Bhat *et al*., 2012; Anaraki *et al*., 2013). Porous structure and dental casts with highly hydrophilic nature of enable deep penetration of microorganisms, therefore the surface disinfection techniques becomes ineffective (Breault *et al*., 1998). Cross-contamination through dental stone casts is possible due to the high risk of transfer of infectious agents from blood and saliva to the casts via impressions, occlusion rims, and trial dentures (Stern *et al*., 1991; Abdullhh, 2006). Therefore, an efficient infection control methods are necessary for dental offices and laboratories (Gopinath). The most commonly used disinfection technique is with the use of chemicals. An effective denture and dental cast hygiene and disinfection is necessary to control microbial biofilm to overcome associated oral diseases and to prevent cross contamination between them. (Shagana)

Corresponding author:* **Chandrapooja, J.
B.D.S 2nd year, Saveetha Dental College, 162, Poonamallee High Road, Chennai, Tamilnadu-600077

MATERIALS AND METHODS

The estimates sample size of 10 was chosen and the sample were collected aseptically by rotating sterile cotton swabs

moistened with peptone water over the dental cast that are used in the dental clinics. The swabs are then cultured in BHI agar medium and incubated at 37 degree Celsius for 24hrs. The growth on the plates were differentiated and identified by morphology and gram staining.

RESULTS

The swabs were taken from 10 different clinics and given to microbiology department for culturing. From the result it is seen that micrococcus and enterococcus are large in number.

Clinic number	No. of microbes present (colony factor unit)	Predominant organism present
Clinic 1	82	Enterococcus, micrococcus
Clinic 2	70	enterococcus
Clinic 3	13	baccilus
Clinic 4	47	Micrococcus, streptococcus species
Clinic 5	1	baccilus

Clinic number	No. of microbes present	Predominant organism present
Clinic 6	60	enterococcus
Clinic 7	55	enterococcus
Clinic 8	82	baccilus
Clinic 9	30	micrococcus
Clinic 10	16	baccilus

DISCUSSION

This study shows that the dental casts used in dental clinic are contaminated with various microorganisms. These microorganisms can act as a possible source for transmission of infection to clinicians and patients. The most commonly found microorganisms were micrococcus and enterococcus. Micrococcus rarely causes infections and other complications in the body, but patients with compromised immune systems, like HIV patients, are prone to skin infections caused by Micrococcus luteus. These skin infections leads to pruritic eruptions on the skin in certain areas and scattered papule lesions with or without central ulceration (Fox, 1976). Enterococci can cause a variety of infections. It mostly causes endocarditis and bacteremia, enterococci which clearly causes serious and often life-threatening diseases. Enterococcus causes urinary tract infections, bacterial endocarditis, diverticulitis, and meningitis. The most common type of enterococcal infection occurs in the urinary tract. Lower urinary tract infections (such as cystitis, prostatitis, and epididymitis) are frequently seen in older men. Enterococci are also mostly recovered from cultures of intra-abdominal, pelvic, and soft tissue infections. They are almost isolated as only one component of mixed microbial flora and rarely cause monomicrobial infection at these sites. In addition to this they cause some uncommon infections like meningitis, hematogenous osteomyelitis, septic arthritis, and pneumonia (Fox, 1976; Anderson *et al*., 2004).

Conclusion

To summarize, there are several suggestions and protocols to prevent cross-contamination in dental offices. Despite the well emphasized methods of disinfecting impressions using sodium hypochlorite which is a powerful disinfectant against bacteria and viruses and glutaraldehyde, some studies detect the presence of remaining microorganisms in the materials sent to dental laboratories. Regarding dental stone casts, the American Dental Association (ADA) recommends disinfection with sodium hypochlorite or iodophor by spray or immersion. Some authors have investigated the use of chlorhexidine and glutaraldehyde, added during the cast stone setting time, as another disinfection method. Recently, studies have demonstrated the efficacy of disinfection of dental stone casts using microwave technology.

REFERENCES

Abdullhh AM. 2006. Surface dental, compressive strength, and dimentional accuracy of gypsum casts after repeated immersion in hypochlorite. *J Prosthet Dent*., June; 95 (6): 462– 8. (PubMed)

American Dental Association. Infection control recommendations for the dental office and the dental laboratory: Council on Scientific affairs and ADA council on dental practice. *J Am Dent Assoc.*, 1996 May; 127(5):672-80.

Anaraki MR, Lotfipour F, Moslehifard E, Momtaheni A. and Sigari P. 2013. Effect of different energy levels of microwave on disinfection of dental stone casts. *J Dent Res Dent Clin Dent Prospects*, 7(3):140-6. doi: 10.5681/joddd. 2013.022.

Anaraki RM, Moslehifard E, Aminifar S, Ghanati H. 2013. Effect of microwave disinfection on compressive and tensile strengths of dental stones. *J Dent Res Dent Clin Dent Prospects*, Winter; 7 (1): 42– 6. (PMC free article) (PubMed)

Anderson D. J., Murdoch D. R., Sexton D. J., Reller L. B. 2004. Risk factors for infective endocarditis in patients with enterococcalbacteremia: a case-control study. Infection, 32(2):72–77. (PubMed)

Bhat V, Shenoy K. and Shetty S. 2012. Evaluation of efficacy of microwave oven irradiation in disinfection of patient derived dental cast. *Int J Infect Cont*., 8: 1– 4.

Breault LG, Paul JR, Hondrum SO, Christensen LC. 1998. Die stone disinfection: incorporation of sodium hypochlorite. *J Prosthodont*., March; 7 (1): 13– 6.(PubMed)

Egusa H, Watamoto T, Matsumoto T, Abe K, Kobayashi M Akashi Y, *et al*. 2008. Clinical evaluation of the efficacy of removing microorganisms to disinfect patient-derived dental impressions. *Int J Prosthodont*., Nov-Dec;21(6):531-8.

Fox, R. H. 1976. "Differentiation of Micrococcus luteus and Micrococcus varians on the Basis of Catalase Isoenzymes." Microbiology 93.2; 272-277. Health Canada: Material Safety Data Sheet: Micrococcus spp.

Goel K, Gupta R, Solanki J. and Nayak M. 2014. A comparative study between microwave irradiation and sodium hypochlorite chemical disinfection: a prosthodontic view. J ClinDiagn Res., Apr;8(4):ZC42-6. doi:10.7860/ JCDR/ 2014/8578.4274.

Gopinath, V. Oral hygiene practices and habits among dental professionals in Chennai, Department of Periodontics, Saveetha Dental College and Hospital, Poonamalee High Road, Velapanchavadi, Chennai - 600 077, India, *Indian Journal of Dental Research*.

Graham J. C. and Gould F. K. 2002. Role of aminoglycosides in the treatment of bacterial endocarditis. *Journal of Antimicrobial Chemotherapy*, 49(3):437–444. (PubMed)

Meghashri K, Kumar P, Prasad DK. and Hegde R. 2014. Evaluation and comparison of high-level microwave oven disinfection with chemical disinfection of dental gypsum casts. *J Int Oral Health*, Jun;6(3):56-60.

Owen CP. and Goolam R. 1993. Disinfection of impression materials to prevent viral cross contamination: a review and a protocol. *Int J Prosthodont*., Sep-Oct;6(5):480-94. (7,8)

Powell GL, Runnells RD, Saxon BA, Whisenant BK. 1990. The presence and identification of organisms transmitted to dental laboratories. *J Prosthet Dent*., Aug;64(2):235

Quantitative study of bacterial colonization of dental casts. Mitchell DL1, Hariri NM, Duncanson MG Jr, Jacobsen NL, McCallum RE. 1Department of Implantology, University of Oklahoma College of Dentistry, Oklahoma City, USA

Richard JL, Robert AB, Marilyn SL, Donald JL. 2006. Oral microbiology and immunology. ASM press; Washington, D.C.

Shagana, J.A. Evaluation of Bacterial Loads in Removable Dentures: A Review Saveetha Dental College, Chennai. *Journal of Pharmaceutical Science and Research*,

Stern MA, Johnson GH, Toolson LB. 1991. An evaluation of dental stones after repeated exposure to spray disinfectants. Part I: abrasion and compressive strength. *J Prosthet Dent*., May; 65 (5): 713– 8. (PubMed)

Verran J, Kossar S, McCord JF. 1996. Microbiological study of selected risk areas in dental technology labratories. *J Dent*., Jan- Mar; 24(1-2):77-80.

****