



Asepsis Measures Undertaken by Mumbai Based Orthodontists: A Survey Report

¹Floyd S Fernandes, ²Amol C Mhatre, ³Divij D Joshi, ⁴Prateek Daga, ⁵Neeraj E Kolge, ⁶Swapnagandha R Kate

ABSTRACT

Introduction: This study aimed to assess and evaluate Mumbai based orthodontists based on recommended (Centre of Disease Control) infection control procedures followed by them in their practice.

Materials and methods: A cross-sectional study was conducted through an online questionnaire of 24 questions which was sent by personal e-mail and communication through the phone to active orthodontic professionals in Mumbai (n = approximately 300) from January to February, 2018. The questionnaire was accessible for 2 months. The data generated were collected and analyzed.

Results: The results showed that 50.9% of respondents sterilized their instruments at the end of each day and 66.7% used a steam sterilizer. Twenty point three percent sterilized their instruments between patients and 56.4% used heat/self-sealed pouches to package instruments. Twenty-four point four percent stored them in a sterilized environment and 25.6% ran equipment maintenance every month. Eighty-two point two percent sterilized tried-in preformed molar bands before putting them back in storage and only 36.2% used steam sterilization for the same. Twenty-seven point five percent placed the bands in an ultrasonic cleaner before sterilization. Sixty six point five percent used pre-determined lengths of elastomeric chain. Ninety-two point two percent used pre-determined lengths of ligature wire. Twenty-nine point seven percent disinfected alginate impressions. Fifty-three point two percent used a plastic barrier on the dental chair's light handle while only 24.3% used a barrier around the anesthetic spray canister. Seventy five point nine percent followed standard hand scrub protocol between patients. Thirty-one point four percent had their offices fumigated on a regular basis. Fourteen point nine percent had sterilization efficacy tests done. Eighty-five point six percent had themselves and their staff vaccinated against Hepatitis B while 72.8% had received the booster dose. Sixty-seven point six percent have been vaccinated against Hepatitis A. Fifty-three point four percent underwent regular health check-ups.

Conclusion: The survey displayed a varying percentage of Orthodontic practitioners who follow recommended centres of disease control and prevention (CDC) infection control and aseptic core orthodontic clinical procedures in Mumbai. There is a need to increase knowledge and awareness regarding general aseptic dental procedures and maintenance of equipment. This demands a more proactive attitude towards knowledge acquisition and implementation of aseptic procedures by the orthodontists of Mumbai in a dental office.

Keywords: Clinical aseptic procedures, Infection control, Orthodontic office.

How to cite this article: Fernandes FS, Mhatre AC, Joshi DD, Daga P, Kolge NE, Kate SR. Asepsis Measures Undertaken by Mumbai Based Orthodontists: A Survey Report. *J Contemp Dent* 2018;8(2):77-82.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Most of the instruments used in an orthodontic office can be classified as semi-critical instruments according to Spaulding's classification. The incidence of transmissible diseases is high even in such a setting making the dental staff and patients prone to cross infections.¹ Cross infections result in high levels of morbidity and mortality around the world.² It is difficult to detect patients who are infected with bloodborne pathogens like the Hepatitis B virus through a clinical examination in a dental office.³ Hence, universal precautions have been recommended to minimize the incidence of cross infection.⁴ The aseptic procedures employed in an orthodontic office must meet the specifications of the CDC.⁵ This will ensure a high level of quality in both treatment delivery and aseptic management thereby reducing the chances of iatrogenic damage to the overall health of doctors and patients alike. Few studies have gathered information on the knowledge of orthodontists about clinical aseptic procedures.^{3,6,7} We surveyed orthodontists in Mumbai in 2018. The objective was to assess and evaluate Mumbai based orthodontists based on recommended CDC infection control procedures followed by them in their practice. Thus, we will be able to assess the need of creating awareness amongst orthodontists with respect to infection control in the dental office thereby ensuring the safety of the patients, doctors and auxiliary staff in day-to-day practice.

^{1,5,6}Postgraduate Student, ^{2,4}Associate Professor, ³Assistant Professor

¹Department of Orthodontics, MGM Dental College and Hospital, Pune, Maharashtra, India

²⁻⁶Department of Orthodontics, MGM Dental College and Hospital, Navi Mumbai, Maharashtra, India

Corresponding Author: Floyd S Fernandes, Department of Orthodontics, M.G.M. Dental College and Hospital, Navi Mumbai, Maharashtra, India, e-mail: envergadurafloyd@gmail.com

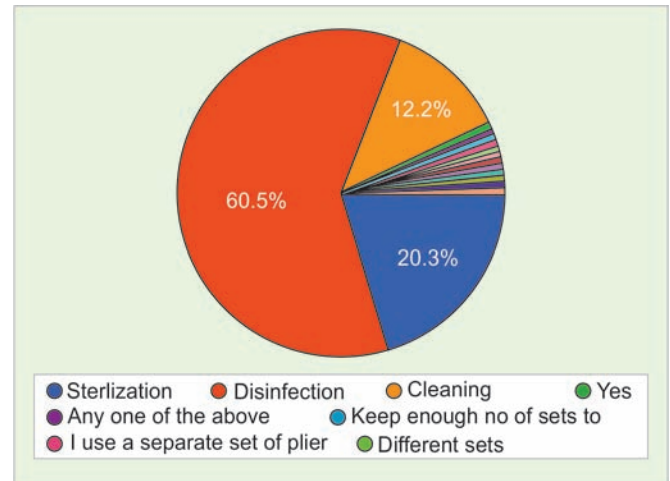
MATERIALS AND METHODS

The study population (n = 300) included orthodontists actively practicing in Mumbai. The survey included 24 multiple choice questions relating to infection control in routine orthodontic practice. The survey was distributed through personal e-mails and communication through the phone. Follow up included one reminder e-mail and one telephonic message to *non-respondents*. The questionnaire was accessible for 2 months. The data generated was collected and analyzed.

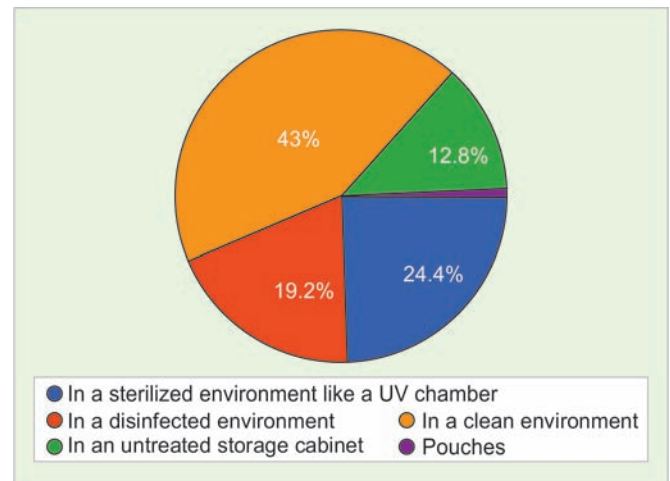
RESULTS

One hundred and seventy-five percent responses were recorded. Fifty-nine percent of respondents sterilized their instruments at the end of each day (Graph 1). Sixty six point seven percent used a steam sterilizer while 18.5% used a dry heat sterilizer. Sixty point five percent disinfected while 12.2% cleaned and 20.3% sterilized their instruments in between patients (Graph 2). Fifty-six-point-four percent used heat/self-sealed pouches to package instruments. Forty three percent stored instruments in a clean environment while 24.4% stored them in a sterilized environment (Graph 3). Twenty five point six percent ran equipment maintenance every month. Eighty-two-point-two percent sterilized tried-in preformed molar bands before putting them back in storage (Graph 4). Twenty-two-point-four percent used chemical sterilization while 36.2% used steam sterilization for the same (Graph 5). Twenty seven point five percent placed the bands in an ultrasonic cleaner before sterilization. Sixty-six point five percent used pre-determined lengths of E-chain. Ninety two point two percent used pre-determined lengths of ligature wire before engaging them in the patients' mouth. Twenty-nine-point-seven percent disinfected alginate impressions (Graph 6). Fifty three point two percent used a plastic

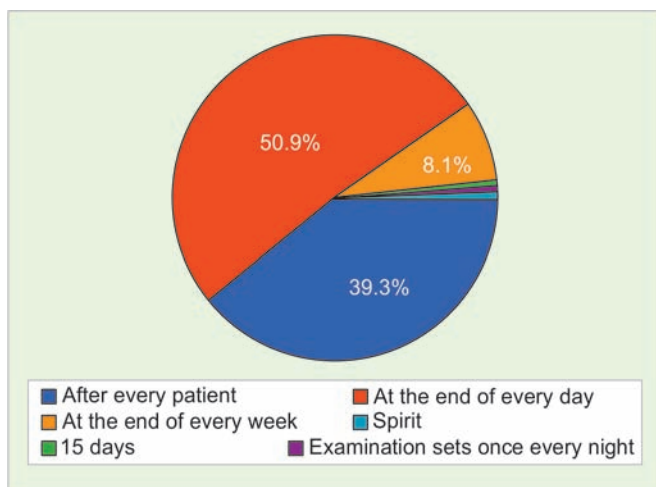
barrier on the dental chair's light handle (Graph 7) while 24.3% used a barrier around the anesthetic spray canister. Seventy-five-point-nine percent followed standard hand scrub protocol between patients. Thirty-one-point-four



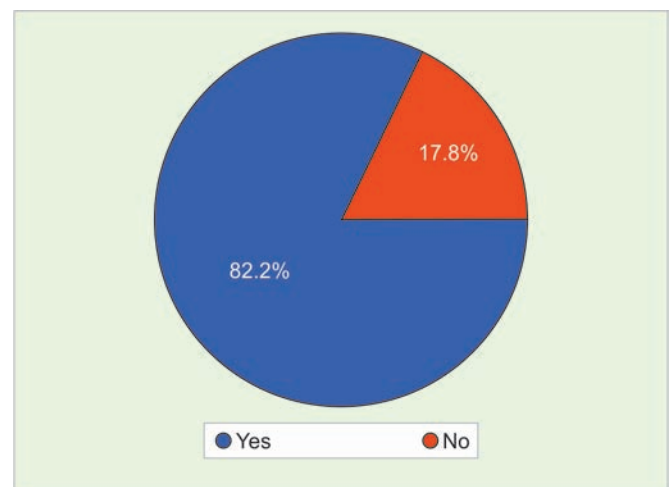
Graph 2: Percentage of responses when asked how asepsis was maintained between patients



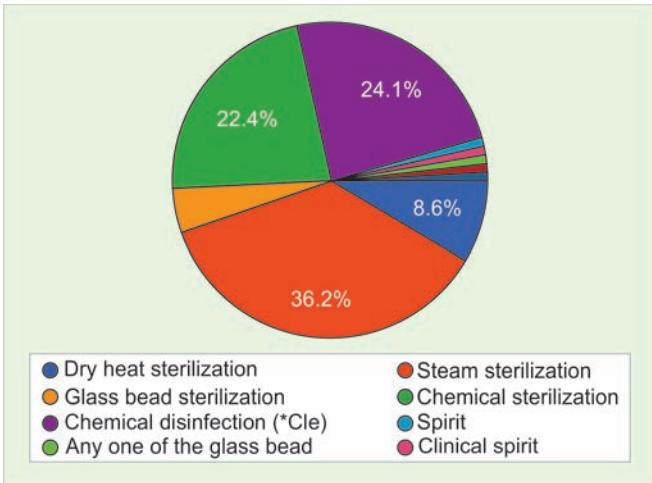
Graph 3: Percentage of responses when asked how sterilized instruments were stored



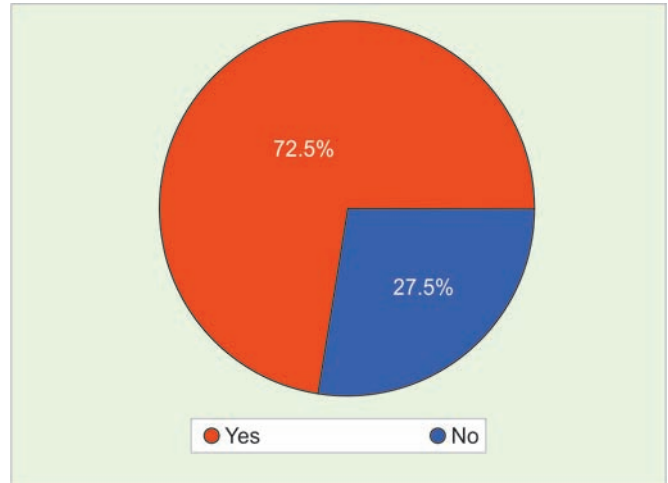
Graph 1: Percentage of responses when asked often instruments were sterilized



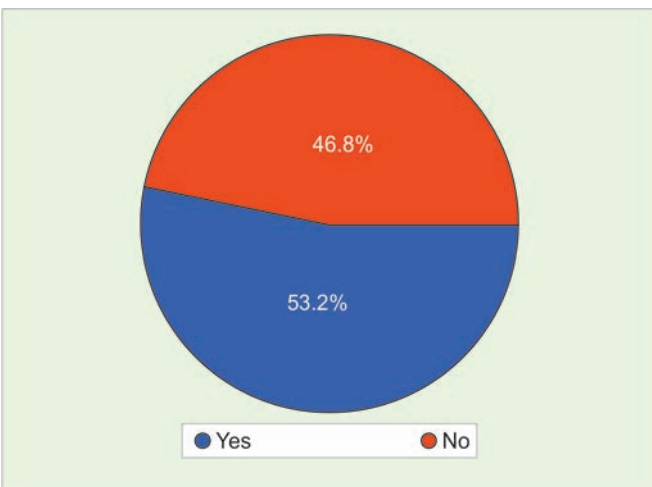
Graph 4: Percentage of responses when asked if tried-in molar bands were sterilized before storing



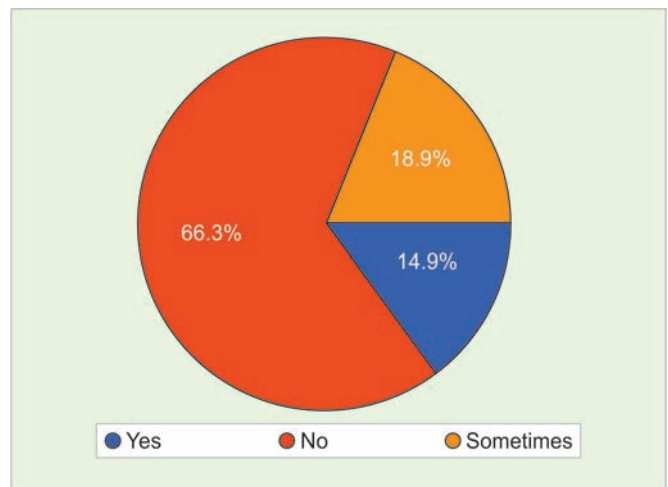
Graph 5: Percentage of responses when asked how tried-in molar bands were sterilized



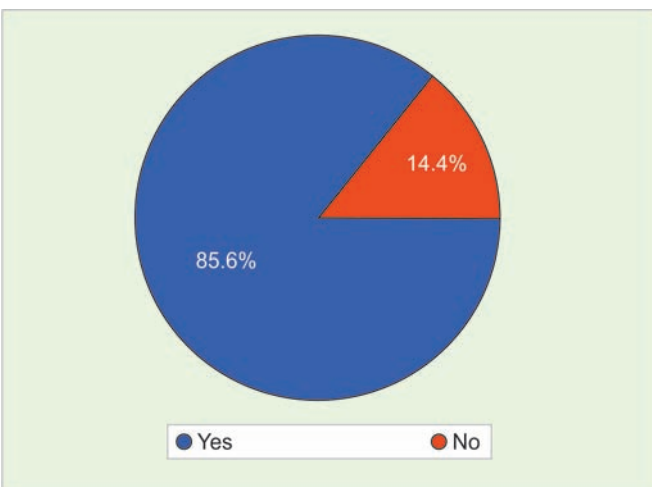
Graph 6: Percentage of responses when asked if alginate impressions were disinfected



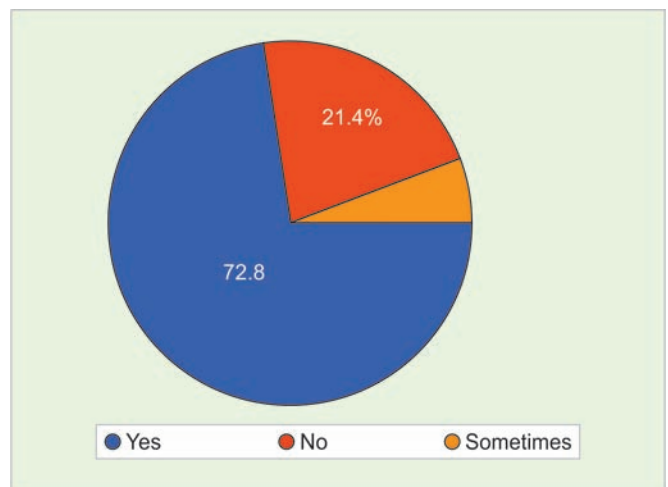
Graph 7: Percentage of responses when asked if a barrier was used on the dental chair's light handle



Graph 8: Percentage of responses when asked if sterilization efficiency tests were carried out



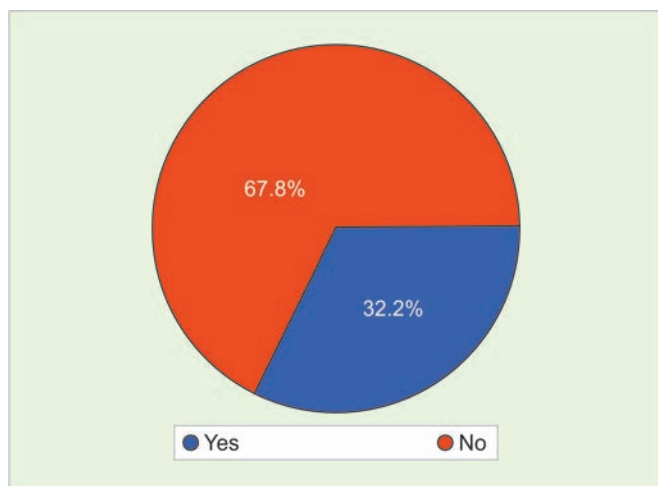
Graph 9: Percentage of responses when asked whether vaccinated against hepatitis B



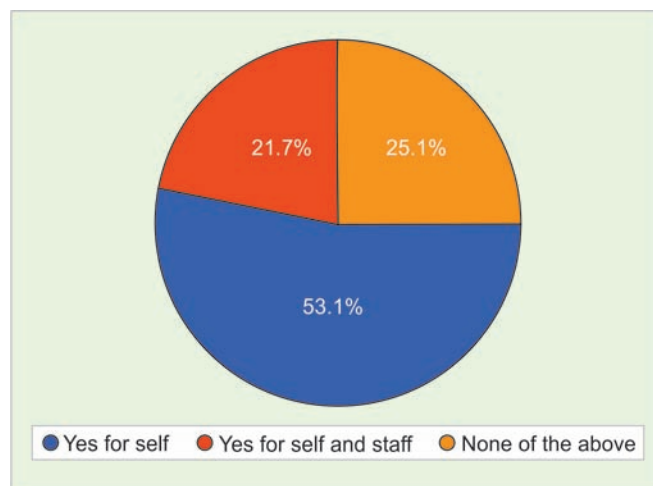
Graph 10: Percentage of responses when asked whether booster dose of hepatitis B vaccine was administered

percent had their offices fumigated on a regular basis. Fourteen-point-nine percent had sterilization efficacy tests done (Graph 8). Eighty-five-point-six percent had themselves and their staff vaccinated against Hepatitis B

(Graph 9) while 72.8% had received the booster dose (Graph 10). Sixty-seven-point-six percent have been vaccinated against Hepatitis A (Graph 11). Fifty-three-point-four percent underwent regular health check-ups (Graph 12).



Graph 11: Percentage of responses when asked whether hepatitis A vaccine was administered



Graph 12: Percentage of responses when asked whether they and their staff undergo regular health check-ups

DISCUSSION

It is evident from the results that convenient alternatives are being used to reduce instrument sterilization turn-over time. The American Dental Association recommends that semi-critical instruments be sterilized between patients.⁸ Ninety-five-point-four percent practitioners that sterilize their instruments out of which 66.7% employ steam sterilization while 18.5% use dry heat sterilization. There is no significant difference in the appearance, corrosion, or efficiency of orthodontic pliers when comparing cold disinfection with autoclaving.⁹ Disinfection is acceptable for instruments that are sensitive to heat and moisture.⁴ Ethically every patient must be treated using a sterilized set of instruments. Some practitioners use separate sets for each patient. Thirty-nine point three percent of the surveyed Orthodontists sterilized their instruments after each patient while 50.9% sterilized their instruments at the end of each working day. Eight point one percent sterilized their instrument sets at the end of each week. Though sterilization is the optimum means of infection control,⁹ only 20.3% of the respondents did so; 12.2% cleaned while 60.5% disinfected their instruments in between patients. Packaging instruments allow the penetration of active sterilizing agents and maintain the sterilized state after removal from the chamber.^{10,11} Forty three percent of the respondents store their instruments in a clean environment, 24.4% in a sterile chamber (example UV chamber), 19.2% in a disinfected unit and 12.8% in an untreated storage system. Though storage of unwrapped semi-critical instruments is discouraged as it exposes them to contaminants,¹² clean dental instruments can be stored in isolated storage units.¹³

Sterilization units must be maintained on a weekly basis.¹⁴ This will ensure a quality control of aseptic orthodontic practice. Twenty-five-point-six percent claimed a monthly maintenance regime; 22% did it

every 3 months.¹⁴ Nine percent at 6-month intervals, and 30.4% ran maintenance only when equipment became faulty.

Seventy-two-point-one percent respondent use pre-formed molar bands. Molar bands that have been tried in the patient's mouth but deselected for use must be cleaned and sterilized before they are put back into storage.¹⁵ Thirty-six-point-two percent respondents followed the recommended protocol; 22.4% used chemical sterilization, 8.6% used clinical spirit, while 24.1% used chemical disinfection. Only 27.5% used an ultrasonic cleaner before sterilizing the tried-in bands.

Elastomeric chains (E-chains), elastomeric ligatures cannot be sterilized or disinfected as their physical properties do not permit it.¹⁶ The use of individual patient packets or taking a little excess than what is required from the spool can reduce chances of spool contamination and cross-infection between patients.¹⁷ Sixty-six-point-five percent of respondents used pre-cut lengths of E-chain, 92.2% used pre-cut stainless steel (SS) ligature wire.

Maintaining records is often as arduous as it is "important. Alginate impressions must be placed in disinfectant like 1% Sodium hypochlorite or 2% glutaraldehyde for a maximum of 10 minutes.¹⁸ Guidelines for alginate impression disinfection must be followed to reduce cross-infection in the laboratory.¹⁸ Twenty-nine point seven percent of respondents followed this protocol.

Light handle and anesthetic spray canister are difficult to sterilize. Hence it is recommended that a protective plastic barrier be placed around them while using them. One thousand two-hundred-fifty-three-point-two percent of respondents used a barrier around light handles and 24.3% used a protective barrier around the anesthetic spray canister. One response stated that the dental assistant held the canister. Four handed dentistry is a validated solution to most of the problems faced when

it comes to transferring items and touching housekeeping surfaces. Strict protocol of hand scrubbing must be followed especially when contaminated surfaces have been touched with bare hands.¹⁹ Seventy-five point nine percent of respondents claimed to follow surgical hand scrub protocol in between patients.

Air and surface disinfection of any health care facility must be carried out regularly.^{20,21} Thirty-one point four percent claimed to fumigate their offices on a regular basis. It is also recommended that the efficacy of the sterilization process be checked weekly.²² This will reduce the probability of faulty reading from equipment that may malfunction or function with reduced efficiency over long periods of time. Fourteen-point-nine percent respondents claimed to run sterilization efficacy tests. Following the CDC recommendations for hepatitis B vaccination, serologic testing, follow-up, and booster dosing reduces the probability of contracting the disease.^{23,24} Eighty-five point six percent of the respondents claimed to have received vaccination against Hepatitis B while 72.8% have received the booster dose. Thirty-two-point-four-percent have been vaccinated against hepatitis A. Regular health check-ups are essential to maintain an infection-free workspace.²¹ Three-point-four percent of respondents claimed to have undergone regular health check-ups themselves and ensured the same for their auxiliary staff as well.

This study evaluates on a small portion of infection control procedures and can be expanded to involve more updates recommended by the CDC.

CONCLUSION

The survey displayed a varying percentage of orthodontic practitioners who follow recommended CDC infection control and aseptic core orthodontic clinical procedures in Mumbai. There is a need to increase knowledge and awareness regarding general aseptic dental procedures and maintenance of equipment. This demands a more proactive attitude towards knowledge acquisition and implementation of aseptic procedures by the orthodontists of Mumbai in the dental office.

CLINICAL SIGNIFICANCE

This article will bring to light the areas of infection control protocol that Orthodontic practitioners can focus on and improve in order to provide wholesome and aseptic treatment to all patients.

REFERENCES

1. Punathal S, Bhat SS, Bhat V. Chairside sterilization of endodontic hand files. *Int J Adv Res Biol Sci*. 2014;1(5):162-165.
2. Jha AK, Prasopa-Plaizier N, Larizgoitia I, Bates DW; Research Priority Setting Working Group of the WHO World Alliance for Patient Safety. Patientsafety research: an overview of the global evidence. *Qual Saf Health Care*. 2010 Feb;19(1):42-47.
3. McCarthy GM, Mamandras AH, MacDonald JK. Infection control in the orthodontic office in Canada. *Am J Orthod Dentofacial Orthop*. 1997 Sep; 112(3):275-281.
4. Centers for Disease Control. Recommended infection control practices for dentistry, 1993 May. *MMWR* 41 (RR-8): 1-12.
5. Greene VW. Microbiological contamination control in hospitals. 1 *Perspectives hospitals*. 1969 Oct;43(20):78-88.
6. Buckthal J, Mayhew M, Kusy R, Crawford J. Survey of sterilization and disinfection procedures. *J Clin Orthod*. 1986 Nov;20(11):759-765.
7. Cash R. Trends in sterilization and disinfection procedures in orthodontic offices. *Am J Orthod Dentofac Orthop*. 1990 Oct;98:292-299.
8. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM. Guidelines for infection control in dental health-care settings-2003. *MMWR* 2003 Dec;52 (no. RR-17):1-67.
9. Jones ML. An initial assessment of the effect on orthodontic pliers of various sterilization/disinfection regimes. *Br J Orthod*. 1989;16:251-258.
10. Association for the Advancement of Medical Instrumentation, American National Standards Institute. Steam sterilization and sterility assurance in health care facilities. ANSI/AAMI ST46-2002. Arlington, VA: Association for the Advancement of Medical Instrumentation, 2002.
11. Association for the Advancement of Medical Instrumentation, American National Standards Institute. Steam sterilization and sterility assurance using table-top sterilizers in office-based, ambulatory-care medical, surgical, and dental facilities. ANSI/AAMI ST40-1998. Arlington, VA: Association for the Advancement of Medical Instrumentation, 1998.
12. Miller CH, Palenik CJ. Sterilization, disinfection, and asepsis in dentistry [Chapter 53]. In: Block SS, ed. 5th ed. *Disinfection, sterilization, and preservation*. Philadelphia, PA: Lippincott Williams & Wilkins, 2001:1049-1068.
13. Cardo DM, Sehulster LM. Central sterile supply [Chapter 65]. In: Mayhall CG, ed. *Hospital Epidemiology and Infection Control*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins, 1999:1023-1030.
14. Garner JS, Favero MS. CDC guideline for handwashing and hospital environmental control, 985. *Infect Control*. 1986 Jan; 7:231-243.
15. Benson PE, Douglas CWI. Decontamination of molar bands following size determination and cleaning. *Journal of Orthodontics*. 2007 Mar;34(1):18-24.
16. Jeffries CL, von Fraunhofer JA. The effects of 2% alkaline glutaraldehyde solution on the elastic properties of elastomeric chain. *Angle Orthod*. 1991 Spring;61(1):25-30.
17. Korath AV, Janardhanam P. Practical Guidelines for Implementing Instrument Sterilization in the Orthodontic Office. *JIOS*. 2010 Jan;44(1):73-80.
18. Blair FM, Wassell RW. A survey of the methods of disinfection of dental impressions used in dental hospitals in the United Kingdom. *Br Dent J*. 1996 May 25;180(10):369-375.

19. CDC. Guideline for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR*. 2002 Oct;51(No. RR-16).
20. Centers for Disease Control. Guidelines for Environmental Infection Control in Health-Care Facilities, 2003. *MMWR* 2003 Jun;52 (No. RR-10):1-44.
21. Jawdekar AM. Infection control policy for Dental Practice. An Evidence-based approach. *J Contemp Dent*. 2013 Aug; 3(2):82-86.
22. Greene WW. Control of sterilization process [Chapter 22]. In: Russell AD, Hugo WB, Ayliffe GA, eds. Principles and practice of disinfection, preservation, and sterilization. Oxford, England: Blackwell Scientific Publications, 1992:605-624.
23. CDC. Perspectives in disease prevention and health promotion update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other bloodborne pathogens in health-care settings. *MMWR*. 1988 Jun;38:377--382, 387-388.
24. CDC. Updated U.S. Public Health Service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for post exposure prophylaxis. *MMWR*. 2001 Jun;50(No. RR-11).