

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

Fudhla Sadoon Al- Zubaydi¹, Noor Nourie Abbass Abdulla², Rehab Adil Al-Rawi³

¹University Health Center - University of Baghdad/Iraq

^{2,3}College of Dentistry / Al-Iraqia University/Iraq

Email: fudhla@yahoo.com

ABSTRACT

It goes without saying that infection control is as important as diagnosis and constitutes half the treatment, irrespective of how experienced, advanced, or high-ranking the general practitioners or orthodontist is. This study is based on both scientific research and field surveying conducted amongst 210 Iraqi dentists (divided into orthodontists and general practitioners), which revealed positive and negative attitudes between general dentists and orthodontists when it comes to adherence to infection control guidelines.

Keywords: Infection Control, General Practitioners, Orthodontists.

Correspondence:

Fudhla Sadoon Al- Zubaydi

University Health Center - University of Baghdad/Iraq

Email: fudhla@yahoo.com

INTRODUCTION

Success in a dental clinic is the product of teamwork based on various factors, including clinic design, insistence on infection control protocols that provide patients with a sense of safety and trust, with the skills and expertise of both dentists and the staff. (1-2)

Dentistry has developed from traditional treatment to modern techniques that have almost diminished disease progression and treatment mistakes and improved patient understanding and compliance. (3)

Employees must know CDC & ADA guidelines and OSHA regulations as well as the rules of the Environmental Protection Agency concerning workplace exposure to chemicals, heat and radiation, and the discharge and final treatment of waste materials. Dental staff must be immunized (pre and post-exposure prophylaxis). Post-exposure prophylaxis should be obligatory in case of exposure to a potential carrier. (4)

Personal protective equipment (PPE) should be worn by the dental team. (5) Antiseptic mouthwash is a standard measure for the patient before dental treatment to minimize cross-contamination. (6)

Standard medical precautions should not be applied at face value, because incoming patients may look healthy both clinically and through medical history while they may be disease carriers. (7-8)

Dental treatment injuries are more likely to occur than in other health care practices, due to the patient's movement and the use of sharp instruments in a usually tight operation space. (9) Furthermore, cross-infection can happen through the transmission of air droplets, aerosols, blood, saliva, and direct or indirect contact with instruments contaminated with secretions. (10-11)

Orthodontists face additional injuries by archwires, bands, and others sharp cutting instruments, (12-13) in addition to cross infections of any kind (14) which gives them the second-highest number of hepatitis infections among dentists. (15)

Aim:

This study aims to investigate the differences in demeanor and knowledge between orthodontists and general dentists according to infection control guidelines in Iraq.

MATERIAL AND METHODS

The current study had conducted with 210 Iraqi dentists divided into 159 orthodontists and 51 general practitioners (GPs) who had joined clinical training courses in orthodontic practice, the participant worked either in a private clinic, hospital, or university clinic. The questioner was performed to get information regarding the methods of dealing with preventing cross-infection during orthodontic practice with different variables includes: (13)

1. Instruments Cleaning and Sterilization Devices.
2. Presoaking and Packing Of the Instrument.
3. Sterilization of Handpieces and Instruments.
4. Molar Bands Sterilization.
5. Disposing Material.
6. Recycled Material.
7. Using Of Chlorhexidine Mouthwash.
8. Gloves Used During Cleaning Of Instruments.
9. Hepatitis B Vaccination.

All data were analyzed by statistical software SPSS version 23 which was used to test two proportion and chi-square for the goodness of fit to test more than two proportion, N.S non-significant ($P > 0.05$), S significant at ($P < 0.01$), and highly-significant ($P < 0.001$).

RESULT

Different tables describe our findings and summarize the outcomes of attitude and knowledge concerning infection control.

Table 1 shows a non-significant association with a slight increase for manual cleaning than mechanical cleaning also a non-significant association between participants for sterilizing devices, both groups show an increase in employing autoclave sterilization more than in other types.

Table 2 shows a non-significant association for a presoaked instrument in disinfectant despite a slight rise for GPs (88.2%), and highly significant association with packing tools, (66.7%) for GPs who use cassettes than (34.8%) for specialists, but with reverse proportion for wrapping as it grew up (45.8%) for specialists than (17.6%) for GPs.

Table 3 shows a significant association between two groups for sterilization of handpieces in an autoclave with (48.7%) for specialists and nearly half (27.5%) for GPs and the

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

opposite for wiping (51.3%) for specialists and rise percent (72.5%) for GPs, while non-significant association regarding sterilization of instruments.

In terms of sterilization of molar bands after purchase as explained in table 4, it reflect the non-significant association amongst (66.7%) of GPs compare to (45.3%) of specialists that responded positively.

A significant number of participants did not use recycled material in orthodontic practice as shown in table 5. As regards disposing of the bands and brackets in table 6, this shows significant associations between participants with a high percentage (68.6% and 39.2%) amongst GPs and specialists respectively who dispose of particles into wastebaskets.

There is a non-significant association between participants who use examination gloves during cleaning rather than kitchen type gloves as indicated in table 7. Similarly, the proportion seen in table 8 reveals a non-significant association between the subjects given the hepatitis B vaccine; both of them show (88.2% and 79.4%) of receiving the vaccine.

As to mouth wash, (64%) of GPs responded negatively while (47.1%) of specialists responded positively as it shown in table 9.

DISCUSSION

Infection transfer from patients to dentists and dental staff remains an occupational hazard, although dentistry has witnessed remarkable advances in this field. ⁽¹¹⁾

In this regard, a random survey was conducted to study the differences, if any, between Iraqi general practitioners (GPs) and orthodontists regarding their views and behavior concerning infection control rules.

Presoaking of the instrument:

All contaminated instruments should be put in a presoak solution immediately after the procedure which is in line with our finding that 88.2% of GPs and 85.5% of orthodontists use this method before sterilization. This helps dilute blood and prevent debris from drying up on the instrument which makes cleaning and sterilization rather difficult. ⁽¹²⁻¹⁶⁾ The presoak solution used must be replaced everyday. ⁽¹²⁻¹⁷⁾

Mechanically (Ultrasonic cleaner):

Ultrasonic units are an advance, time-saving and harmless procedure for the pre-cleaning of instruments via debridement and breakdown of contaminants and particles using a solution with anti-rust composition and enzyme-based in a special container. ⁽¹²⁻¹⁶⁻¹⁷⁾ Any trace of residual moisture must be eliminated, the presence of moisture in between the joint and tip of pliers increases corrosion which is why only 42% of orthodontists use ultrasonic while 57% prefer manual cleaning. Unlike GPs, orthodontists do not deal with traumatic operations. ⁽¹³⁾

Autoclave:

Although microorganisms are killed by dry heat, it is not efficient to be a heat conductor like moist heat. ⁽¹²⁾ Hence, 92.2% of GPs and 88.7% of orthodontists using autoclave sterilization in their clinics. ⁽¹⁸⁾ This is observed for pliers and instruments sterilization 83.6%-80% for orthodontists and GPs respectively. ⁽¹⁹⁾ Meanwhile, 66.7% of GPs do not sterile purchase bands, ignoring contamination risks related to materials received from various sources, handlers, etc. ⁽¹⁴⁾ This fact must not be overlooked.

Instrument Packing:

Instrument processing is obligatory for preparing contaminated ones to be reused while keeping their damage to a minimum ⁽¹⁷⁻²⁰⁾. Sterile packs (pouch/cassettes) should be stored in a dry, enclosed, low dust area away from heat sources. First-in-first-out systems of stock rotation should be followed. ⁽²¹⁾ A one-month maximum storage time might be considered and should be open at chairside. ⁽²²⁾

Instruments rub against each other in the ultrasonic cleaner and when stored in pouches. This causes loss of sharpness and further damages. Assistants must go through all instruments after ultrasonic cleaning, then do manual cleaning and sorting them out by hand increasing the risk of injury. This is time-consuming, the instrument may get in the wrong setup, and pouches may get torn during bad storage. ⁽²³⁾

Cassettes bring many benefits over pouches in sterilization. They come in different sizes and capacities and keep instruments properly placed thus increasing efficiency and instrument-life while enhancing safety and reducing hand scrubbing and time-wastage. ⁽²⁴⁾ This agrees with the significant findings of this study, i.e. 66.7% of GPs use cassettes, while 45.8% of orthodontists use pouches for autoclaving their instruments.

Handpiece:

Living blood cells, bacterial and viral molecules can survive inside the handpiece even after inclusive cleansing. ⁽²⁵⁾ Unfortunately, 72.5% of GPs prefer sterilizing their handpieces by wiping them with disinfection, while only 27.5% of them use autoclave sterilization, the fear of damaging handpiece by autoclave can explain this significant finding. ⁽⁷⁾ Among orthodontists, 51.3% wipes the outer surface while 48.7% use an autoclave. This slight difference reflects a positive attitude but poor compliance with infection control. ⁽¹⁰⁾

Recycle:

93.7% of orthodontists and 82.4% of GPs see little reason for recycling because orthodontic materials are not costly besides the fact that recycling affects the physical and mechanical properties with additional risks of contamination. ⁽²⁶⁾

Sharp bin:

Dental waste poses health risks ⁽²⁷⁾. This makes sharp bins especially important in clinics. Our study shows only 13.7% of GPs and 36.7% of orthodontists use a sharp bin in their clinics. The majority use ordinary wastebaskets 68.6% and 39.2% respectively. This behavior should change. All sharp articles must be gathered in closed, leak-proof, puncture resistance containers label with biohazard symbol as well as, color-coded for easy identification. ⁽⁷⁻²²⁾

Gloves:

Kitchen gloves are thick and safe against infection. ⁽¹⁶⁾ Examination gloves are thin and easily punctured ⁽²⁸⁾ leading to bacterial infiltration. ⁽²³⁾ The WHO finds examination gloves effective for hand hygiene and should be worn in a specific situation. This is a matter of personal choice for safety, depending on training, workload, etc. ⁽²⁹⁾ In Iraq, examination gloves are used by up to 98% of GPs and 96.8% of orthodontists for cleaning purposes, which is an unfortunate fact.

HVB vaccination:

HVB vaccination varies among dental professionals ranging, from 33%-97% worldwide. ⁽⁸⁻¹⁰⁾ In Iraq, HVB vaccination is compulsory resulting in 88.2% of GPs and

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

79.4 % of orthodontists being vaccinated to prevent disease transmission. ⁽¹³⁾
Mouth wash:

47.1% of orthodontists use chlorhexidine mouthwash before treatment. 64% of GPs do not do this. This discrepancy must be addressed to reduce microbes in patients' mouths preoperatively. ⁽⁶⁾

Table 1: Instruments Cleaning and Sterilization Devices

		Manually	Mechanically (Ultrasonic cleaner)	Total	p-value	Autoclave	Dry heat (oven)	None	Total	P-value
GP	Count	26	25	51	0.389	47	3	1	51	0.116
	% within Gp	51.0%	49.0%	100.0%		92.2%	5.9%	2.0%	100.0%	
Specialist	Count	92	67	159		141	18	0	159	
	% within Specialist	57.9%	42.1%	100.0%		88.7%	11.3%	0.0%	100.0%	

Table 2: Presoaking and Packing of the Instrument

		How do you sterilize dental handpieces?			P-value	How do you sterilize instruments or orthodontic pliers?				P-value	
		In the autoclave	Wiping the outer surface with disinfectant solution	Total		Dry heat (oven)	Autoclave	Glass bead sterilizer	Wiping with a disinfectant solution		Total
GP	Count	14	37	51	0.002**	3	40	1	6	50	0.070
	% within Gp	27.5%	72.5%	100.0%		6.0%	80.0%	2.0%	12.0%	100%	
Specialist	Count	77	81	158		18	133	0	8	159	
	% within Specialist	48.7%	51.3%	100.0%		11.3%	83.6%	0.0%	5.0%	100%	

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

Table 3: Sterilization of Handpieces and Instruments

	Dose the instruments presoaked in a disinfectant solution?			Total	P-value	Packing of instruments to be sterilized in the autoclave			Total	P-value
		Yes	No			Cassettes	Wrap or Pouching	I do not pack		
GP	Count	45	6	51	0.627	34	9	8	51	0.001**
	% within Gp	88.2%	11.8%	100.0%		66.7%	17.6%	15.7%	100.0%	
Specialist	Count	136	23	159		54	71	30	155	
	% within Specialist	85.5%	14.5%	100.0%		34.8%	45.8%	19.4%	100.0%	

Table 4: Molar Bands Sterilization

Do you sterilize molar bands after purchase?				Total	P-value
		Yes	No		
GP	Count	17	34	51	0.133
	% within Gp	33.3%	66.7%	100.0%	
Specialist	Count	72	87	159	
	% within Specialist	45.3%	54.7%	100.0%	

Table 5: Recycled Material

Do you use recycled brackets/ orthodontic materials?				
	Yes	No	Total	P-value
GP	9	42	51	0.015*
	17.6%	82.4%	100.0%	
Specialist	10	148	158	
	6.3%	93.7%	100.0%	

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

Table 6: Disposing Material

		Where do you dispose of the bands, brackets, and archwires?					P-value
		Wastebasket	Sharp bin	Metal waste bin	Infected waste bin	Total	
GP	Count	35	7	3	6	51	0.002**
	% within Gp	68.6%	13.7%	5.9%	11.8%	100%	
Specialist	Count	62	58	11	27	158	
	% within Specialist	39.2%	36.7%	7.0%	17.1%	100%	

Table 7: Gloves Used During Cleaning Of Instruments

		Which type of gloves do you use during instrument cleaning?			P-value
		Examination gloves	Kitchen - type gloves	Total	
GP	Count	50	1	51	0.650
	% within Gp	98.0%	2.0%	100.0%	
Specialist	Count	152	5	157	
	% within Specialist	96.8%	3.2%	100.0%	

Table 8: Hepatitis B Vaccination

		Have you had a hepatitis B vaccine		Total	P-value
		Yes	No		
GP	Count	45	6	51	0.156
	% within Gp	88.2%	11.8%	100.0%	
Specialist	Count	123	32	155	
	% within Specialist	79.4	20.6	100.0%	

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

Table 9: Using Of Chlorhexidine Mouthwash

Do you use chlorhexidine mouth wash before treatment?					
		Yes	No	Total	P-Value
GP	Count	18	32	50	0.168
	% within Gp	36.0%	64.0%	100.0%	
Specialist	Count	74	83	157	
	% within Specialist	47.1%	52.9%	100.0%	

CONCLUSION

This research paper finds some practically significant differences between the work of the general dentist and that of the orthodontist in specific aspects, especially concerning their respective compliance with infection control guidelines. Postgraduate degrees and dental specializations have little bearing in this regard.

REFERENCES

1. Kulshrestha et al. Clinical Practice Management in Orthodontics: An Overview. Research and Reviews: Journal of Dentistry. 2016; 7(2): 7–17p.
2. Sharma L, Pradhan D, Todkar M, Sinha KP, Das M, Neha. Infection Control and Dentistry: A Review. Int J Oral Health Med Res 2018;5(3):27-29.
3. Yamalik N., Van Dijk W. Analysis of the attitudes and needs/demands of dental practitioners in the field of patient safety and risk management. Int Dent J. 2013;63:291–297. - PubMed
4. Bhanu Murthy M and Deepali Bajpai, Infection Control and Prevention in Dentistry. IJDA, July-September, 2011; 3(3): 577-582
5. Palenik CJ. Eye protection for the entire dental office. J. Ind. Dent. Assoc., 1981; 60: 23-25
6. Vergara B, Castro R. Use of mouthwashes against COVID-19 in dentistry. British Journal of Oral and Maxillofacial Surgery .58 (2020) 924–927
7. Yüzbasıoğlu E, Saraç D, Canbaz S, Saraç YS, Cengiz S. A survey of cross-infection control procedures: knowledge and attitudes of Turkish dentists. J Appl Oral Sci. 2009;17(6):565-569. doi:10.1590/s1678-77572009000600005.
8. Halboub ES, Al-Maweri SA, Al-Jamaei AA, Tarakji B, Al-Soneidar WA. Knowledge, Attitudes, and Practice of Infection Control among Dental Students at Sana'a University, Yemen. J Int Oral Health. 2015;7(5):15-19.
9. Younai FS, Murphy DC, Kotelchuck D. Occupational exposures to blood in a dental teaching environment: Results of a ten-year surveillance study. J Dent Educ. 2001;65(5):436–48. - PubMed
10. Rahman B, Abraham SB, Alsalami AM, Alkhaja FE, Najem SI. Attitudes and practices of infection control among senior dental students at college of dentistry, University of Sharjah in the United Arab Emirates. Eur J Dent 2013;7:15-9
11. Fawzia Butt, Hinal Thakkar, Jeremiah Munguti, Evelyne Waigayu . Infection Control Measures Among Dental Health Care Workers. Ann Afr Surg. 2019; 16(1):26–29
OI: <http://dx.doi.org/10.4314/aas.v16i1.6>
12. Mithun K, Ashith M V, Harshitha V, Valerie Anithra Pereira, Deesha Kumari. Infection Control in Orthodontics: A Review. Indian Journal of Forensic Medicine & Toxicology, April-June 2018, Vol. 12, No. 2
13. Rehab Al-Rawi, Noor Nourie, Fudhla Al- Zubaydi, Bassam Alsheekhly. Indian Journal of Forensic Medicine & Toxicology. 2020; Vol. 14 No. 2
14. Christopher S. Barker Microbial contamination of “as received” and “clinic exposed” orthodontic materials. Am J Orthod. Dentofacial Orthop 2013;143:317-23.
15. Rohit D, Sudhir M, Amandeep K, Amanpreet Singh N. Sterilization in orthodontics – A review. Int J Curr Res 2016;9:39056-9.
16. Shilpa K, Tulika T, Priyank R. Infection control in Orthodontics. Journal of Orthodontic and Endodontics 2015;1 No.1:1
17. Ambesh Kumar Rai, Bipin Kumar Yadav. Infection control of an orthodontist armamentarium: A clinically oriented review IAIM, 2015; 2(5): 218-224.
18. Ibrahim NK, Alwafi HA, Sangooof SO, Turkistani AK, Alattas BM. Cross-infection and infection control in dentistry: Knowledge, attitude and practice of patients attended dental clinics in King Abdulaziz University Hospital, Jeddah, Saudi Arabia. J Infect Public Health. 2017;10(4):438-445. DOI:10.1016/j.jiph.2016.06.002
19. Staggers JA, Margeson D. The effects of sterilization on the tensile strength of orthodontic wires. Angle Orthod. 1993 Summer;63(2):141-4.
20. Bhatnagar S, Bagga DK, Sharma P. Infection control strategies in orthodontic office. Euro J Gen Dent. 2013; 2(1): 1–7p.

Differences between Iraqi General Dental Practitioners & Orthodontists in Discharging Commitments towards Infection Control Guidelines

21. Blenkarn JI. Standards of clinical waste management in UK hospitals. *J. Hosp Infect.* 2006; 62: 300-3p.
22. Bhatnagar S, Bagga DK, Sharma P, Kumar P, Sharma R, Singh V. Infection control strategy in orthodontic office. *Eur J Gen Dent* 2013;2:1-7.
23. ADA Council on Scientific Affairs. Non-sterile latex examination gloves. *J Am Dent Assoc* 2002;133:225-7.
24. Molinari J, Jennifer A. H., Peri N. Instrument Cassettes: An Effective Infection Control Precaution. *Inside Dentistry* 2013:Vol. 9 No.
25. Lewis DL, Arens M, Appleton SS, Nakashima K, Ryu J, Boe RK, et al. Cross-contamination potential with dental equipment. *Lancet.* 1992;340:1252-4
26. Bavikati VN, Singaraju GS, Mandava P, Killamsetty SS, Nettam V, Kar-nati PKR. Evaluation of Mechanical and Physical Properties of Clinically Used and Recycled Superelastic NiTi Wires. *J Clin Diagnos Res.* 2016;10(7)

27. Ajoy Kumar Shahi, Rana Nagendra Prasad Singh, Dr Sandeep Kumar, Swati Sharma, Subhash Chandra, Virendra Kumar Prajapati. Awareness regarding practices related to infection control among dental students in Patna city. *International Journal of Contemporary Medical Research* 2019;6(9):11-16.
28. Gümrü Çelikel AD, Ekmekçiöğlü H, Külekçi G, Fıratlı S. Evaluation of the Compliance of the Orthodontists to Infection Control Procedures in Turkey. *Turk J Orthod* 2018; 31: 37-49.
29. Acquarulo B, et al. Mixed-methods analysis of glove use as a barrier to hand hygiene. *Infection Control & Hospital Epidemiology.* 2018, 1-3. DOI: 10.1017/ice.2018.293