

# Dental Students and Post-operative Hypersensitivity Management

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## Abstract

**Introduction:** Dentinal Hypersensitivity (DH) is a widely prevalent dental health problem encountered in clinical practice. The study was conducted with the aim to assess knowledge regarding DH diagnosis and management in dental students. **Methods:** Total 473 dentists participated in this cross sectional questionnaire survey conducted through electronic approach (Survey monkey). The questionnaire included variables eliciting socio-demographic and knowledge assessors regarding DH management and identification. **Results:** The most frequent stimuli triggering post-operative hypersensitivity following composite Class I and Class II restorations was the hot stimuli, with 264 (55.9%) and 201 (42.5%) respectively. 304 (63.3%) of the respondents felt that the best way was to reassure the patient. The most commonly employed intervention approach of dental students was to prescription of desensitizing agents for home use. **Conclusion:** The conclusions from the present study show acceptable knowledge levels among dental students regarding diagnosis and management of DH.

**Keywords:** Composite restoration; Dental hypersensitivity; Knowledge; Management

## Introduction

Dental hypersensitivity (DH) is defined as “a distinctive short sharp pain arising from exposed dentine, characteristically in response to an array of stimuli including thermal, tactile, evaporative, osmotic or chemical, which cannot be attributed to any other form of dental defect, disease or pathology.”<sup>[1]</sup> Pain of sharp nature and brief in duration is a characteristic of this condition which is responsive to stimuli such as thermal, tactile and chemical.<sup>[2]</sup> In dentine exposed tooth, with no other explainable pathology, it is diagnosed as such for the symptoms of pain.<sup>[3]</sup> The natural history of hypersensitivity progresses from dentine exposure, followed by dentinal tubules opening exposed external environment and hydrodynamic stimulus transmission through the dentinal tubules. Important predisposing factors to this condition are the physical and chemical factors resulting in trauma.<sup>[4]</sup>

Dental students begin to interact with patients in their clinical years of undergraduate program. This makes it necessary for them to have appropriate knowledge regarding diagnosis and management of oral diseases. Specifically those problems encountered routinely must be understood properly as remains critical for their clinical dental practice.<sup>[5]</sup> Prevalence of DH is reported to be in-between 40% to 90% across the globe.<sup>[6,7]</sup> Considering the wider documented prevalence of this disease, it is imperative to understand the management thoroughly. The study of Cunha – Cruz J et al. reported an average occurrence of 3.5 hypersensitive teeth manifested in 12.3% of their patients.<sup>[8]</sup>

Literature evidence shows a lack of knowledge regarding the management of hypersensitivity. In a Canadian study conducted on 331 dentists, knowledge gaps were reported regarding the diagnosis and management of hypersensitivity.<sup>[1]</sup> Hence, this study was undertaken to assess the knowledge regarding dental hypersensitivity management in dental students.

## Research Methodology

A cross sectional study was conducted among dental students of Riyadh city (Kingdom of Saudi Arabia). Ethical clearance was granted from Institutional Review Board (IRB) of Riyadh Elm University (RC/IRB/2018/1072) to conduct the study and adhered to accordance of World Medical Association Declaration of Helsinki (2008). Agreeing to fill the questionnaire was taken as consent for the study participation.

The questionnaire distributed through modified electronic survey was adapted from Alf.<sup>[9]</sup> Questionnaire was in English and circulated by Survey monkey tool to all dental students of Riyadh city after obtaining their contact from the student portal. An accompanying letter requesting to participate in the survey intending its purpose and ensuring participant’s confidentiality was mailed along with the questionnaire. A reminder mail was sent to non – respondents 1 week later for participation. Finally, 473 filled questionnaire forms were returned. Incomplete or duplicate questionnaires were excluded.

The questionnaire elicited socio demographic characteristics of age, gender, level of education and nationality in its first part. The knowledge assessor focused on various questions regarding the management of dentinal hypersensitivity.

Data analysis was performed with SPSS version 21.0 (IBM Corp, Chicago). The knowledge variables were cross tabulated against age, gender and level of education to check for its

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association. Chi – square test was used for association, with statistical significance set at P<0.05.

### Results

A total of 479 completed forms were returned, out of 510 sent out accounting to a response rate of 92.7%. 6 forms had to be excluded as they were incomplete, resulting in a final sample size of 473. The socio – demographic characteristics of the study respondents is summarized in Table 1. Out of 473 students, 289 (61.1%) were males and 184 (38.9%) were females. The participants were grouped into three age groups; 20 – 25 years (77.4%), 26 – 30 years (19.7%) and 31 – 35 years (3%). 366, 93 and 14 students were in each of the age groups respectively.

Total 146 male students and 118 female students were of the

opinion that hot stimuli was most frequent type to trigger post-operative sensitivity in Class I composite restoration, which was significant at p<0.001. Table 2 presents knowledge variables distribution amongst dental students cross tabulated with gender. A total 248 (52.4%) of students in age group of 20 – 25 years reported that reassuring the patient proved to be better management therapy than to either refer or treat them, which was statistically significant at p<0.001 [Table 3].

In Table 4, 22 (4.7%), 108 (22.9%), 112 (23.7%) and 105 (22.2%) of Level 1, level 2, level 3 and Intern dental students respectively felt that proximal or class II restoration is frequent cause of hypersensitivity. Knowledge assessor analysis cross tabulated with level of education. It was a generalized finding in regards to gender, age and educational level that the most frequent stimuli triggering post-operative sensitivity in class I composite restoration was cold stimuli.

**Table 1: Demographic variables of the study participants.**

Variables	Number	Percentage
<b>Age</b>		
20 – 25	366	77.4
26 – 30	93	19.7
31 - 35	14	3.0
<b>Gender</b>		
Males	289	61.1
Females	184	38.9
<b>Level of education</b>		
Level 8	42	8.9
Level 9, 10	148	31.3
Level 11, 12	155	32.8
Interns	128	27.1
<b>Nationality</b>		
Saudi Arabia	409	86.5
Non – Saudi Arabia	64	13.5

**Table 2: Responses to hypersensitivity management based on gender.**

Questions	Choices	Gender		Total	Chi square value	d.f	P value
		Males	Females				
In your opinion, what is the most frequent stimuli triggering post-operative sensitivity in class I composite restoration?	Hot	146 (30.9%)	118 (25.0)	264 (55.9)	21.257	3	<0.001**
	Cold	15 (3.2)	21 (4.4)	36 (7.6)			
	Chewing	107 (22.7)	37 (7.8)	144 (30.5)			
	Spontaneous	20 (4.2)	9 (1.7)	29 (5.9)			
In your opinion, what is the most frequent stimuli triggering post-operative sensitivity in class II MO/DO composite restoration?	Hot	112 (23.7)	89 (18.8)	201 (42.5)	17.833	3	<0.001**
	Cold	24 (5.1)	31 (6.6)	55 (11.6)			
	Chewing	113 (23.9)	45 (9.5)	158 (33.4)			
	Spontaneous	40 (8.5)	19 (4.0)	59 (12.5)			
In your opinion, which type of preparation causes more frequent postoperative sensitivity?	Occlusal/Class I restoration	74 (15.7)	51 (10.8)	125 (26.5)	.295	1	.330 (NS)
	Proximal/Class II restoration	215 (45.6)	133 (28.0)	348 (73.5)			
		138 (29.2)	89 (18.9)	227 (48.1)			
		80 (16.9)	61 (12.9)	141 (29.9)			
What is the frequency of postoperative sensitivity in your patients?	24 hrs after restorative treatment				14.781	4	0.005**
	7 days after restorative treatment						
	30 days after restorative treatment	13 (2.8)	18 (3.8)	31 (6.6)			
	90 days after restorative treatment						
	None	4 (0.8)	1 (0.2)	5 (1.1)			
When your patient is complaining of postoperative sensitivity your management usually is:	Reassure the patient	53 (11.2)	15 (3.2)	68 (14.4)	19.530	2	<0.001**
	Refer the patient	208 (44.0)	96 (20.3)	304 (64.3)			
	Treat the patient	19 (4.0)	24 (5.1)	43 (9.1)			
		62 (13.1)	64 (13.5)	126 (26.6)			

		202 (42.7)	133 (28.1)	335 (70.8)			
Have you ever prescribed one or more of the following treatment modalities for your patient who's complaining of postoperative sensitivity?	Desensitizing tooth paste or mouth rinse	45 (9.50)	55 (11.6)	100 (21.1)	21.769	2	0.244 (NS)
	Topical tubular occluding agent	95 (20.08)	81 (17.12)	176 (37.7)			
	Adhesives resins and restorations	17 (3.59)	11 (2.3)	28 (5.9)			
	Gingival grafting						

NS = Nothing Significant; \* = Significant; \*\* = Statistically significant

**Table 3: Responses to hypersensitivity management based on age.**

Questions	Choices	Age group			Total	Chi square value	d.f	P value
		20 - 25	26 - 30	31 - 35				
In your opinion, what is the most frequent stimuli triggering post-operative sensitivity in class I composite restoration?	Hot	199 (42.2)	58 (12.3)	7 (1.5)	264 (55.9)	5.347	6	0.5 (NS)
	Cold	31 (6.6)	5 (1.1)	0 (0.0)	35 (7.6)			
	Chewing	115 (24.4)	23 (4.9)	6 (1.3)	144 (30.5)			
	Spontaneous	20 (4.2)	7 (1.5)	1 (0.2)	28 (5.9)			
In your opinion, what is the most frequent stimuli triggering post-operative sensitivity in class II MO/DO composite restoration?	Hot	154 (32.6)	42 (8.9)	5 (1.1)	201 (42.5)	10.316	6	.112 (NS)
	Cold	35 (7.4)	17 (3.6)	3 (0.6)	55 (11.6)			
	Chewing	131 (27.7)	24 (5.1)	3 (0.6)	158 (33.4)			
	Spontaneous	46 (9.7)	10 (2.1)	3 (0.6)	59 (12.5)			
In your opinion, which type of preparation causes more frequent postoperative sensitivity?	Occlusal/Class I restoration	100 (21.2)	20 (4.2)	5 (1.1)	125 (26.5)	1.809	2	.405 (NS)
	Proximal/Class II restoration	266 (56.4)	72 (15.3)	9 (1.9)	347 (73.5)			
What is the frequency of postoperative sensitivity in your patients?	24 hrs after restorative treatment	183 (38.8)	38 (8.1)	6 (1.3)	337 (48.1)	11.504	8	.175 (NS)
	7 days after restorative treatment	102 (21.6)	35 (7.4)	4 (0.8)	141 (29.9)			
	30 days after restorative treatment	21 (4.4)	7 (1.5)	3 (0.6)	31 (6.6)			
	90 days after restorative treatment	3 (0.6)	2 (0.4)	0 (0.0)	5 (1.1)			
When your patient is complaining of postoperative sensitivity your management usually is:	None	56 (11.9)	1 (2.3)	1 (0.2)	68 (14.4)	19.812	4	<0.001**
	Reassure the patient	248 (52.4)	54 (11.4)	2 (0.4)	304 (64.3)			
	Refer the patient	30 (6.3)	9 (1.9)	4 (0.8)	43 (9.1)			
Have you ever prescribed one or more of the following treatment modalities for your patient who's complaining of postoperative sensitivity?	Treat the patient	88 (18.6)	30 (6.3)	891.7	126 (26.6)	7.357	4	0.758 (NS)
	Desensitizing tooth paste or mouth rinse	258 (54.54)	68 (14.37)	9 (1.9)	335 (70.8)			
	Topical tubular occluding agent	66 (13.9)	27 (5.7)	7 (1.4)	100 (21.1)			
	Adhesives resins and restorations	130 (27.4)	38 (8.0)	8 (1.6)	176 (37.7)			
	Gingival grafting	18 (3.8)	9 (1.9)	1 (0.2)	28 (5.9)			

### Discussion

The vast prevalence of DH has made it an increasingly imperative issue necessitating it to be tackled from both diagnostic and management point of view. DH has become to be a common dental health disease manifesting in more than one tooth across adult population globally. [10] Popularity and demand for composite or esthetic restoration has increased in the recent years resulting in surge of complications. Dentinal hypersensitivity is one among them posing a great challenge for the dental professionals to manage.

The most commonly employed approaches to manage hypersensitivity in literature is educational motivation stressing appropriate tooth brushing technique, home desensitizing agent application and in office medication application. The study of Gillam et al. [11] and Muhammad et al. supports these management preferences.

The most frequent stimuli triggering post-operative hypersensitivity following composite Class I and Class II restorations was the hot stimuli, with 264 (55.9%) and 201 (42.5%) respectively. The frequency of DH was maximum within 24 hours (48.1%) of restorative treatment followed by 7 days, 30 days and 90 days and occurs most commonly in class II or proximal restorations.

Majority of the study respondents (70.8%) in the present study reported that use of desensitizing agents such as tooth paste and mouth rinse was the preferred choice of intervention for DH. This is in accordance to studies of Amarsena et al. [12,13] A clinical trial also reported significantly decreased scores for Oral Health Impact Profile (OHIP) in patients treated with desensitizing agents as compared to those put on placebo. [14] Literature shows no consensus on a standard management approach for DH management. [15]

**Table 4: Responses to hypersensitivity management based on level of education**

Questions	Choices	Level of education				Total	Chi square value	d.f	P value
		Level 1	Level 2	Level 3	Interns				
In your opinion, what is the most frequent stimuli triggering post-operative sensitivity in class I composite restoration?	Hot	16 (3.4)	83 (17.6)	87 (18.4)	78 (16.5)	264 (55.9)	21.208	9	0.012*
	Cold	9 (1.9)	10 (2.1)	12 (2.5)	5 (1.1)	36 (7.6)			
	Chewing	12 (2.5)	45 (9.5)	51 (10.8)	36 (7.6)	144 (30.5)			
	Spontaneous	5 (1.1)	9 (1.9)	5 (1.1)	10 (1.9)	29 (5.9)			
In your opinion, what is the most frequent stimuli triggering post-operative sensitivity in class II MO/DO composite restoration?	Hot	9 (1.9)	56 (11.8)	70 (14.8)	66 (14.0)	201 (42.5)	19.789	9	.019*
	Cold	11 (2.3)	18 (3.8)	15 (3.2)	11 (2.3)	55 (11.6)			
	Chewing	16 (3.4)	56 (11.8)	51 (10.8)	35 (7.4)	158 (33.4)			
	Spontaneous	6 (1.3)	18 (3.8)	19 (4.0)	16 (3.4)	59 (12.5)			
In your opinion, which type of preparation causes more frequent postoperative sensitivity?	Occlusal/Class I restoration	20 (4.2)	39 (8.3)	43 (9.1)	23 (4.9)	125 (26.5)	14.529	3	.002**
	Proximal/Class II restoration	22 (4.7)	108 (22.9)	112 (23.7)	105 (22.2)	347 (73.5)			
		15 (3.2)	78 (16.5)	74 (15.7)	60 (12.7)	227 (48.1)			
What is the frequency of postoperative sensitivity in your patients?	24 hrs after restorative treatment	13 (2.8)	40 (8.5)	44 (9.3)	44 (9.3)	141 (29.9)	19.893	12	.069 (NS)
	7 days after restorative treatment								
	30 days after restorative treatment	8 (1.7)	8 (1.7)	8 (1.7)	7 (1.5)	31 (6.6)			
	90 days after restorative treatment								
None		0 (0.0)	1 (0.2)	1 (0.2)	3 (0.6)	5 (1.1)	61.662	6	<0.001**
		6 (1.3)	20 (4.2)	20 (4.2)	14 (3.0)	68 (14.4)			
		18 (3.8)	92 (19.5)	105 (22.2)	89 (18.8)	304 (64.3)			
		17 (3.6)	16 (3.4)	7 (1.5)	3 (0.6)	43 (9.1)			
When your patient is complaining of postoperative sensitivity your management usually is:	Reassure the patient	7 (1.5)	40 (8.5)	43 (9.1)	36 (7.6)	126 (26.6)	17.807	5	0.134 (NS)
	Refer the patient	27 (5.7)	95 (20.0)	117 (24.7)	96 (20.2)	335 (70.8)			
	Treat the patient	10 (2.1)	30 (6.3)	34 (7.1)	26 (5.4)	100 (21.1)			
		15 (3.1)	55 (11.6)	53 (11.2)	53 (11.2)	176 (37.7)			
Have you ever prescribed one or more of the following treatment modalities for your patient who's complaining of postoperative sensitivity?	Desensitizing tooth paste or mouth rinse	5 (1.0)	3 (0.6)	14 (2.9)	6 (1.2)	28 (5.9)			
	Topical tubular occluding agent								
	Adhesives resins and restorations								
	Gingival grafting								

NS = Nothing Significant; \* = Significant; \*\* = Statistically significant

Studies have shown that a definite association exists between gender and academic excellence, with females performing significantly better than male counterparts. This finding even applies to dental health and disease knowledge. Our study also presented significantly higher knowledge regarding diagnosis and management of DH amongst female students which was in concordance to study of Muhammad et al. [5]

DH progresses in two phases. In the first phase termed as lesion localization occurs when the dentine gets exposed, either due to loss of enamel or by gingival recession. The tooth is not sensitive in this phase, and clinically, it is seen that not all of the exposed dentine is sensitive. Therefore, factors like enamel loss or gingival recession is not to be implicated as primary etiologic factors, but as factors which predispose to the consequent development of DH. Hypersensitivity symptoms manifest only after lesion initiation (tubular exposure), that is the second phase in the DH development. The localized lesion of exposed dentine has to be initiated, occurring with the removal of smear layer or tubular plugs, opening the dentinal tubules to the oral environment. It is at this phase that pain symptoms flare up.

The dental fraternity bears the responsibility to educate their

patients regarding appropriate treatment to combat dentinal hypersensitivity. DH as a condition seems to under report owing to lack of diagnosis as dentists remain unaware of this condition, as stressed by various studies. [1,16-18] This in turn poses obstacles to appropriate management plan, raising concerns about its prevalence. Knowledge dissipation regarding the diagnosis and management of DH forms the key to tackle this problem. Hence, proper guidelines must be laid down to treat patients adequately. Educational strategies such as IEC materials (Information, Education and communication) materials must be distributed in the dental clinical environment along with display of short informative videos in the waiting rooms. Along with this, dental students and professionals must be updating their knowledge regularly through CDEs, conferences and training programs.

### Conclusion

The present study results show an acceptable understanding about dentinal hypersensitivity diagnostic concepts and management in dental students. Clearly, educational strategies are to be implemented and practiced in the dental curriculum to appropriately address this issue.

## Competing Interests

The authors declare that they have no competing interests.

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