

Musculoskeletal disorders and mental health related issues as occupational hazards among dental practitioners in the city of Bengaluru: a randomized cross-sectional study

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ABSTRACT

Background: Like in any profession, dentistry is also plagued by many occupational health hazards. Musculoskeletal disorders (MSD) and mental health related issues are very common among dental practitioners.

Objectives: A survey was conducted to find the prevalence of these two occupational health hazards among dental practitioners in Bengaluru city.

Materials and methods: A questionnaire survey was carried out among 150 randomly chosen dental practitioners in Bengaluru. Questions included their identification details and information about symptoms of MSD and mental health related issues experienced by them in the last 6 months. Descriptive and inferential statistical analysis was carried out in the present study. Chi-square and Fisher test were used to find the significance of the study parameters on categorical scale.

Results: MSD and mental health related issues were found to have a prevalence of 82% and 75.3% in our study.

Conclusion: The implementation of preventive measures is necessary, in view of the high incidence of these disorders in the fraternity of dental practitioners.

Key words: Occupational health hazards, dental practitioner, musculoskeletal disorders, mental health, pain, stress

Introduction

Occupational health hazards (OHH) are common in many sectors and have not left the profession of dentistry untouched. They can be broadly divided into infections (acquired through infectious bioaerosols, infectious body fluid exposures, respiratory and other communicable illness from patients); toxicity, hypersensitivity and allergy due to dental materials; contact dermatitis; ionising radiation injury, non- ionising radiation injury, noise induced hearing loss, peripheral neuropathy, burns and scalds from autoclaves, ergonomic risks like musculoskeletal disorders (MSD), varicose veins, haemorrhoids, Carpel

tunnel syndrome and eye injuries and stress. [1]

Musculoskeletal disorders (MSD), a common OHH seen among dental practitioners are caused by repetitive, awkward or stressful motions. [2] Among dental practitioners, constant forward bending position and rotation of the spine, keeping the arms in suspension, the number of patients treated daily and the years of activity all seen to be predisposing factors. [3] These MSD are characterized by the presence of discomfort, disability or persistent pain in the joints, muscles, tendons and other soft parts. [4] Mental health related issues like psychological stress, fatigue, nervousness etc. are also commonly

experienced by dental practitioners and result from long tedious working hours, job dissatisfaction, income related worries etc. [1, 5]

Since the cumulative effects of these OHH on the productivity of the dental practitioners may be detrimental, there is need to address these issues in the overall interest of the dental practitioners' health which is significant for his/her productivity. Therefore, a study was conducted with the aim of assessing the prevalence of MSD and mental health related issues among dental practitioners in Bengaluru, India.

Material and methods

Self administered questionnaires were distributed to 150 dental practitioners from different parts of Bengaluru city between July 2012 and September 2012. The questionnaire used in our study comprised of eight questions, adopted and modified from previous studies. [6] It was pre-tested for comprehensibility and relevance among six dental practitioners prior to the study. Apart from the dental practitioners' name, age and sex, it included questions pertaining to the number of years he/she has been in dental practice and the approximate number of hours/day he/she practiced dentistry. The questionnaire involved information on the location of symptoms of MSD in the last six months and whether it interfered with daily activities and compelled the practitioner to take pain killers or seek medical help. A similar question assessing whether the dental practitioner had in the last six months suffered from work related stress, fatigue, anxiety, nervousness etc. was also incorporated in the questionnaire. Data was anonymously coded and submitted for statistical analysis. Descriptive and inferential statistical analysis was carried

out in the present study with results on continuous measurement presented on Mean±SD (Min-Max) and results on categorical measurements were presented in number (%). Significance was assessed at 5% level of significance. Chi-square/ Fisher exact tests were used to find the significance of the study parameters on categorical scale between two or more groups.

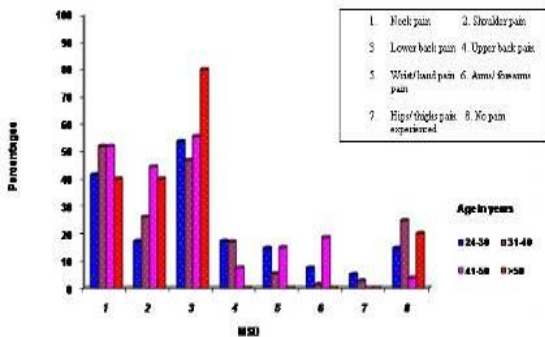
Results

Among the respondents of 150 questionnaires, majority belonged to the age group of 31-40 years (51.4%), where as 27.3%, 18.0% and 3.3% belonged to the age groups of 24-30 years, 41-50 years and 51-60 years respectively. The mean age of the study sample was 34.77 ± 6.93 (Mean±SD) with 55.3% being males and 44.6% being females.

A total of 61 dental practitioners (40.6%) had been practicing dentistry for the last 5-10 years. 21.3% were into dental practice since 10-20 years whereas about 5.5% had been practicing dentistry for more than 20 years. Majority of the dental practitioners (51.3%) worked for 6-8 hours per day while 23.4% worked for 1-5 hours per day, 24% for 9-12 hours per day and only 1.4% worked for longer than 12 hours per day. The mean number of years in clinical practice among the dental practitioners in our study was 8.89±6.10 (Mean±SD) and the mean approximate working hours per day was 7.15±2.24 (Mean±SD). In our study, 92.7% of the dental practitioners preferred to work in a sitting position while 26% preferred to work while standing. Majority (80.7%) had an assistant to help them while working whereas only 20% were not assisted while working.

Prevalence of MSD

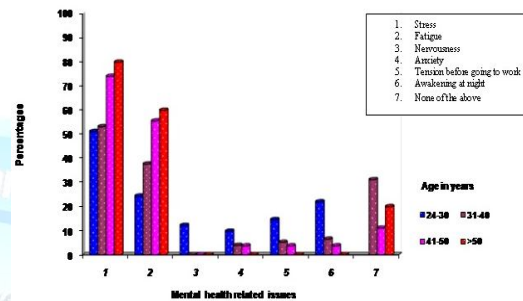
More than half (51.3%) of the dental practitioners in our study had experienced pain in the lower back region since last 6 months (Table 1). The percentages of the dental practitioners who had experienced pain in the neck, shoulder, upper back, wrist/hand, arms/forearms and hips/thighs was 48.8%, 27.3%, 14.7%, 9.3%, 6% and 2.7% respectively. However, 18% of the dental practitioners did not report with any pain since last 6 months. Out of the 27.3% dental practitioners who reported with shoulder pain, 17.1%, 26%, 44.4% and 40% belonged to the age groups of 24-30 years, 31-40 years, 41-50 years and greater than 50 years respectively. The P value of correlation of incidence of shoulder pain with age was suggestively significant (Table 2, Graph 1).



Graph 1: Correlation of incidence of MSD with age

Among 6% of the dental practitioners who had experienced pain in the arms/forearms 7.3%, 1.3%, 18.5% belonged to the age groups of 24-30 years, 31-40 years and 41-50 years respectively. However, no individuals older than 50 years reported with this complaint. The correlation of incidence of pain in arms/forearms with age was found to be moderately significant with a P value of 0.012 in the current study. The correlation of incidence of no pain

experienced with age of the dental practitioners was found to be suggestively significant with a P value of 0.066 (Table 2). Due to the MSD, 44.2% dental practitioners in our study had to consume pain killers, 10% had to abstain from dental practice, 10.7% had to seek medical help, 14% had to reduce their working hours and 10.7% had difficulty in sleeping (Table 1).



Graph 2: Correlation of incidence of Mental health related issues with age

Prevalence of mental health related issues

Stress related to work was the most prevalent mental health related issue reported by 57.6% of the dental practitioners in our study followed by fatigue (38%), awakening at night (8%), tension before going to work (7.3%), anxiety (5.3%) and nervousness (3.3%). However, 24.7% dental practitioners did not report with any of the mental health related issues (Table 3). The correlation of incidence of nervousness with age was strongly significant with a P value of 0.008. Also, the correlation of incidence with age of fatigue was moderately significant with a P value of 0.044 (Table 4, Graph 2). The overall incidence of MSD and mental health related issues in our study was found to be 82% and 75.3% respectively.

Table 1: Information related to MSD

Information related to symptoms of MSD	Number of patients (n=150)	%
In the last 6 months have you experienced pain in		
Neck	73	48.8
Shoulder	41	27.3
Lower back	77	51.3
Upper back	22	14.7
Wrist/hand	14	9.3
Arms/forearms	9	6.0
Hips/thighs	4	2.7
No pain experienced	27	18.0
Due to this in the last 6 months, did you have		
To take pain killers	66	44.2
To abstain from work	15	10.0
Seek medical help	16	10.7
Reduce your working hours	21	14.0
Difficulty in sleeping	16	10.7
None of the above	56	37.3

Table 2: Correlation of incidence of MSD with age

Physical Health problems	Age in years				P value
	24-30 (n=41)	31-40 (n=77)	41-50 (n=27)	>50 (n=5)	
Neck	17(41.5%)	40(51.9%)	14(51.9%)	2(40%)	0.711
Shoulder	7(17.1%)	20(26%)	12(44.4%)	2(40%)	0.074+
Lower back	22(53.7%)	36(46.8%)	15(55.6%)	4(80%)	0.496
Upper back	7(17.1%)	13(16.9%)	2(7.4%)	0(0%)	0.584
Wrist/hand	6(14.6%)	4(5.2%)	4(14.8%)	0(0%)	0.225
Arms/forearms	3(7.3%)	1(1.3%)	5(18.5%)	0(0%)	0.012*
Hips/thighs	2(4.9%)	2(2.6%)	0(0%)	0(0%)	0.692
No pain experienced	6(14.6%)	19(24.7%)	1(3.7%)	1(20%)	0.066+

* Significant(P< 0.05) ** Highly significant(P< 0.01) + Very highly significant (P< 0.001)

Table 3: Distribution of mental health related issues among dental practitioners

Information related to symptoms of mental health related issues	Number of patients (n=150)	%
Have you in the last 6 months experienced		
Stress	86	57.6
Fatigue	57	38.0
Nervousness	5	3.3
Anxiety	8	5.3
Tension before going to work	11	7.3
Awakening at night	12	8.0
None of the above	37	24.7

Table 4: Correlation of incidence of Mental related health problems with age

Mental Health problems	Age in years				P value
	24-30 (n=41)	31-40 (n=77)	41-50 (n=27)	>50 (n=5)	
Stress	21(51.2%)	41(53.2%)	20(74.1%)	4(80%)	0.151
Fatigue	10(24.4%)	29(37.7%)	15(55.6%)	3(60%)	0.044*
Nervousness	5(12.2%)	0(0%)	0(0%)	0(0%)	0.008**
Anxiety	4(9.8%)	3(3.9%)	1(3.7%)	0(0%)	0.238
Tension before going to work	6(14.6%)	4(5.2%)	1(3.7%)	0(0%)	0.261
Awakening at night	6(14.6%)	5(6.5%)	1(3.7%)	0(0%)	0.377
None of the above	9(22%)	24(31.2%)	3(11.1%)	1(20%)	0.183

Discussion

This study examined the prevalence and distribution of self-reported MSD among a cross section of the dental practitioners in the city of Bangalore. The dental practitioners were asked to note the occurrence of symptoms related to MSD and mental health related issues over the last 6 months. The questionnaire gave answers only with respect to the occurrence of symptoms and not to the frequency and intensity of these

symptoms. Almost all the published studies on MSD in dentistry have an observational design. Though studies based on questionnaires have their own limitations like difficulty in identifying risk factors and questionable utility for diseases of low incidence and short duration, they are useful to identify the prevalence of a disorder. This in turn helps in determining the clinical features of patients and designing possible preventive strategies.

MSD are characterized by the presence of discomfort, disability or persistent pain in the joints, muscles, tendons and other soft parts, caused or aggravated by repeated movements and prolonged awkward or forced body postures.^[7] In dental practitioners, constant forward bending and rotation of the spine combined with keeping the arms in suspension are the factors that contribute to MSD. The number of years of activity and the number of working hours/day are other predisposing factors. The practice of dentistry is characterized by high visual demands because of which the dental practitioners have to adopt fixed postures.^[8] The resultant muscular pain and soreness due to the awkward static position while performing precise procedures in the patients' mouth are slow to appear initially until they become chronic and permanent lesions are present.^[9] The body adaptation strategies probably contribute to changes of locomotor system patterns, producing variations in length and/or muscle stiffness and postural abnormalities.^[10, 11] Further, in a frequently activated muscle there could be enhancement of the number of Type I fibers.^[12] It is believed that the reduction in the length of these muscle fibers as well as the modification of their physical and anatomical properties may be responsible for modification of articular movement and postural disorganization.^[10, 11, 13] Also, strained posture at work disturbs the musculoskeletal alignment leading to stooped spine. The stooped posture involves certain groups of muscles and joints further contributing to MSD.^[14]

Among the various symptoms of MSD, lower back pain was the most prevalent (51.3%) in our study sample followed by pain in the neck (48.8%) and shoulder (27.3%). Constant, awkward

working positions accompanied with long working hours could be implicated as the causative factors for these MSD.

In a study conducted on 204 dental practitioners in Riyadh city of Saudi Arabia, 54.4% of the subjects reported with neck pain and 73.5% with back pain.^[15] In another study conducted as a survey in the faculty of dentistry, Mahidol University, Bangkok, among 164 questionnaires surveyed, 50.6% had low back pain and 70.3% reported with pain in the neck.^[16] In a review on MSD of neck and shoulder in dental professionals, neck symptoms were reported in 26-73% and shoulder symptoms in 20-65%.^[17] In yet another study, the prevalence of neck and back pain was found to be 81.9% and 88.1% respectively.^[18]

In our study, the prevalence of other MSD like upper back pain, wrist/hand pain, arms/forearms pain and hips/thighs pain was found to be 14.7%, 9.3%, 6% and 2.7% respectively. Pain in arms/forearms and hips/thighs have also been reported by other studies.^[19, 20] In spite of a high prevalence of MSD (82%) in our study subjects, only 10.7% sought medical help, 44.2% had to take pain killers, 14% had to reduce their working hours, 10% abstained from work and 10.7% had difficulty in sleeping. The findings of our study are in accordance with another study in which more than half of the sample subjects reported with MSD but only 37% sought medical help.^[15] In another questionnaire based survey among 430 dentists in Greece, 62% of dentists reported with at least one MSD but only 32% sought medical care while 16% had spells of absence from work.^[21] In another study based on self administered questionnaire distributed among 390 dental personnel, 34.8% of those with MSD reported with the usage of pain relieving medication, 32.3% sought

medical evaluation, 27.2% had to reduce their working hours, 22.8% had difficulty in sleeping while 10.8% had to abstain from work.¹⁶ The proportion of dental practitioners seeking medical attention for MSD in a Queensland study was 38%.^[22] In general, the findings of our study as well as many other studies conducted worldwide point towards a high frequency of MSD among dental practitioners along with negligence shown towards the treatment of the same. The high prevalence of MSD among dental practitioners probably reflects the specific work load in dentistry with high demands on vision and precision, fine manipulative hand movements and work with unsupported elevated arms. The symptoms might impair the work capacity and the future possibility to stay in the profession. Sick leaves may incur a considerable impact on the economics and goodwill of some dental practices. However, for those dental practitioners who did not report with any MSD, possible explanation can be that these practitioners were better at adjusting their working position and techniques in order to avoid musculoskeletal problems. Prevalence of mental health issues:

In our study, more than half of the dental practitioners (57.6%) had experienced stress while fatigue was experienced by 38% of the subjects. Awakening at night (8%), tension before going to work (7.3%), anxiety (5.3%) and nervousness (3.3%) were the other symptoms reported. Stress has been reported as a common cause of morbidity among dental practitioners.^[23] The findings of our study are similar to the study conducted on 2449 dentists in Lithuanian Dental Chamber License registry where work related stress, fatigue, nervousness, anxiety, tension before going to work and awakening at night

were the frequent complaints reported by dental practitioners.^[24]

Natural and artificial lighting is one of the basic factors determining the safety, efficiency and quality of dental practice.^[25] One of the foremost symptoms of long debilitating working hours which causes overall exhaustion of the dental practitioner is eye fatigue that reveals itself as the sensation of heavy eyelids, burning and stinging under the eyelids and deteriorated vision. This is often accompanied by blood shot eyes, blinking and lacrimation. Headache and eye pain may also occur. Temporally, visual acuity decreases and there may be decrease in critical fusion frequency, a delayed accommodative reflex, a reduced accommodation width and a shift of refraction towards myopia and hypermetropia.^[26, 27] Overall body fatigue is also an unwanted outcome of strenuous and precision-involved occupation of dentistry that consequently takes a toll on the performance of the dental practitioner. Mental health related issues among dental practitioners are thought to arise from many sources including job dissatisfaction business income, working hours and staff/ patient interaction.^[5] Limited amount of personal time may also be a contributing factor.^[28, 29] In a high demanding profession like dentistry, the dental practitioners tread a fine line between maintaining income and maintaining professional and technical standards. In this constant struggle, they get prone to multiple mental health related issues which, if not addressed on time can lead to significant morbidity.

Long working hours may have a significant role to play in being responsible for various MSD and mental health related issues among dental practitioners as they do not provide enough rest to their body and mind.^[30]

The indication towards prevalent MSD and mental health related issues among dental practitioners in ours as well as many other studies call for need for an increased awareness among dental practitioners regarding the same. Correct working postures need to be adapted and frequent breaks between successive patients should be taken. The applied occupational and environmental hygiene guidelines recommend at least six minutes of rest every hour for professionals who perform repetitive movements.^[31, 32] The etiology of MSD and mental health related issues experienced by dental practitioners is multi-factorial with involvement of biomechanical, individual and psychological factors related to work.^[4] Hence, the preventive strategies of MSD should focus on ergonomics, breaks at work, general health and physical exercise.^[33] Ergonomic factors could be summarized as^[9]

- Use of ergonomically designed dental chairs
- Use of instruments with large handles
- Support of upper limbs
- Use of indirect vision
- Correct patient positioning
- Proper lighting while working

Preventive role of physical exercise is also a key element to be considered. There is need for the dental practitioners to avoid various risk factors, perform personal rehabilitation exercises, stretching and regular aerobic activity.^[4]

MSD and mental health related issues are common among dental practitioners with lower back pain and stress related to work being the most prevalent symptoms. Due to MSD, the dental practitioners suffer morbidity ranging from use of pain killers to abstaining from work, reduction in working hours, difficulty in sleeping and seeking medical help. Mental health related issues also account for severe

debilitation in terms of tension, anxiety, nervousness etc. Altogether, the dental practitioners' productivity is affected negatively. There is need to recognize the underlying causes and devising techniques or adopting life style changes so that a dental practitioner can better adapt to the stressful occupation of dentistry for the overall benefit of himself/herself and the patients at large.

References

1. Leggat PA, Kedjarune U, Smith DR. Occupational health problems in modern dentistry: a review. *Industrial Health* 2007;45:611-621.
2. Laderas S, Felsenfeld AL. Ergonomics and the dental office: an overview and consideration of regulatory influences. *J Calif Dent Assoc* 2002;30(2):135-138.
3. Morse Z, Dravo U. Stress levels of dental students at the Fiji school of medicine. *Eur J Dent Educ* 2007;11(2):99-103.
4. Harutunian, Gargallo-Albiol J, Figueiredo R, Gay-Escoda C. Ergonomics and musculoskeletal pain among postgraduate students and faculty members of the school of dentistry of the university of Barcelona (Spain): a cross-sectional study. *Med Oral Patol Oral Cir Bucal* 2011;16(3):e425-9.
5. Scully C, Cawson RA, Griffiths M. Mortality and some aspects of morbidity. In. *Occupational Hazards to Dental staff*. London: British Medical Press;1990.p.1-21.
6. Kuorina I, Jonsson B, Kilbom A, Vinterberg H, Biering SF, Andersson G, et al. Standardized Nordic questionnaires for the analysis of musculoskeletal symptoms. *Appl Ergon* 1987;18(3):233-7.
7. Harutunian K, Gargallo-Albiol J, Figueiredo R, Gay-Escoda C.

- Ergonomics and musculoskeletal pain among postgraduate students and faculty members of the school of Dentistry of the university of Barcelona (Spain): a cross sectional study. *Med Oral Patol Oral Cir bucal* 2011;16(3):e425-9.
8. Runderantz B, Johnsson B, Moritz L. Cervical pain and discomfort among dentists: epidemiological, clinical and therapeutic aspects. *Swed Dent J* 1990;14:71-80.
 9. Valachi B, Valachi K. Preventing musculoskeletal disorders in clinical dentistry: strategies to address the mechanisms leading to musculoskeletal disorders. *J Am Dent Assoc* 2003;134:1604-12.
 10. Sahmann SA. Does postural assessment contribute to patient care? *JOSPT* 2002;2 (8):376-379.
 11. Adams M, Bogduk N, Burton K, Dolan P. Functional pathology. In: *Biomechanics of low back pain*. Edinburgh: Churchill Livingstone; 2002.
 12. Ng JKF, Richardson CA, Kippers V, Parnianpuor M. Relationship between muscle fiber composition and functional capacity of back muscles in healthy subjects and patients with back pain. *JOSPT* 1998;27(8):389-402.
 13. Ferrari S, Monticone M. Efficacy of a multimodal rehabilitation programme in a dental hygienist with upper quadrant disorders: description of a case report with one year follow up. *G Ital Med Lav Erg* 2009;31(4):407-13.
 14. Ayatollahi J, Ayatollahi I, Ardekani AM, Bahrololoomi R, Ayatollahi J, Ayatollahi A, Owlia MB. Occupational hazards to dental staff. *Dent Res J (Isfahan)* 2012;9(1):2-7.
 15. Al-Wazzan KA, Almas L, Al Shethri SE, Al-Qahtani MQ. Back and neck problems among dentists and dental auxiliaries. *J Contemp Dent Pract* 2001;2(3):17-30.
 16. Dajpratham P, Ploypetch T, Kiattavorncharoen S, Boonsiriseth K. Prevalence and associated factors of musculoskeletal pain among the dental personnel in a dental school. *J Med Assoc Thai* 2010;93(6):714-21.
 17. Morse T, Bruneau H, Dussetschleger J. Review of musculoskeletal disorders of neck and shoulder in the dental professionals. *Work* 2010;35(4):419-29.
 18. Abiodun-Solanke IM, Agbaji JO, Ajayi DM, Arotiba JT. Prevalence of neck and back pain among dentists and dental auxiliaries in South –Western Nigeria. *Afr J Med Sci* 2010; 39(2):137-42.
 19. Hayes M, Cockrell D, Smith DR. Asystematic review of musculoskeletal disorders among dental professionals. *Int J Dent Hyg* 2009;7(3):159-65.
 20. Shaik AR, Rao SB, Husain A, D'sa J. Work related musculoskeletal disorders among dental surgeons: a pilot study. *Contemp Clin Dent* 2011;2(4):308-12.
 21. Alexopoulous EC, Stathi IC, Charizani F. Prevalence of musculoskeletal disorders in dentists. *BMC Musculoskeletal Disord* 2004;5(16):Epub Jun 9.
 22. Leggat PA, Smith DR. Musculoskeletal disorders self reported by dentists in Queensland, Australia. *Aust Dent J* 2006;51:324-7.

23. Rankin JA, Harris MB. Stress and health problems in dentists. *J Dent Pract Adm* 1990;7:2-8.
24. Puriene A, Aleksejuniene J, Petrauskiene J, Balciuniene I, Janulyte V. Occupational hazards of dental profession to psychological well being. *Stomatologija* 2007;9(3):72-8.
25. Kihara T. Dental care works and work-related complaints of dentists. *Kurume Med J* 1995;42:21-27.
26. Szymanska J. Work related vision hazards in the dental office. *Ann Agric Environ Med* 2000;7:1-4.
27. Dubois-Poulsen A. La fatigue visuelle. *Ophtalmologica* 1969;158:157-180.
28. Logan HL, Muller PJ, Berst MR, Yeane DW. Contributors to dentists' job satisfaction and quality of life. *J Am Coll Dent* 1997;64:39-43.
29. Wells A, Winter PA. Influence of practice and personal characteristics on dental job satisfaction. *J Dent Educ* 1999;63:805-12.
30. De Wet E, Truter M, Ligthelm AJ. Working patterns of male and female dentists in South Africa. *J Dent Assoc S Afr* 1997;52:15-7.
31. Ratzon NZ, Yaros T, Mizlik A, Kanner T. Musculoskeletal symptoms among dentists in relation to work postures. *Work* 2000;15:153-158.
32. Valachi B, Valachi K. Mechanisms leading to musculoskeletal disorders in dentistry. *J Am Dent Assoc* 2003;134:1344-50.
33. Andrews N, Vigoren G. Ergonomics: muscle fatigue, posture, magnification and illumination. *Compend Contin Educ Dent* 2002;23:261-6.

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