

KAP Survey On The Usefulness Of Magnification During Dental Procedures Amongst Specialists And General Dental Practitioners

Research Article

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Abstract

Introduction: The magnification plays a major role in learning, teaching and treatment of the patients with microanatomy structures, narrower canals and instrument retrieval etc. In the past fifteen years, there has been a greater explosion of new instruments, technologies and various new materials in the field of endodontics. One of those advances is magnification, this helps the clinician to perform extremely talented [1, 2]. The aim of this survey is to evaluate the knowledge, attitude and practice of specialists and general dentists on the usefulness of magnification.

Methods: It was a cross sectional questionnaire study conducted, questionnaire were formulated and sent through social sources to general dentists and specialists. A total of 101 dental practitioners underwent this survey. A 15 item questionnaire was generated to measure the knowledge, attitude and practice of dental practitioners in the usefulness of magnification.

Results: 46% of study participants are general dentists, followed by 29% of endodontists. On applying Pearson's correlation, it was determined that the knowledge regarding magnification was significantly ($p < 0.01$) correlated to attitude and practice among study participants. On applying anova test, it was assessed that the practice among study participants was statistically significant ($p < 0.05$) between the groups.

Conclusion: From the above results, it is concluded that the poor knowledge, attitude and practice regarding the magnification. The knowledge regarding the magnification was significantly associated with the attitude and practice of the study participants. The endodontists participants had a significant effect on the knowledge regarding the magnification.

Keywords: Magnification; Loupes; Microscope; Clinical Practice; Endodontics.

Introduction

Endodontics deals in treating smaller dimensions basically. Before the invention of microscopes in the dentistry, endodontics were working on patients only with the belief of radiographs. Magnification is used for more than decades in other medical practices such as ophthalmology, reconstructive surgery, neurosurgery, vascular surgery and otorhinolaryngology. In the past fifteen years, that is after the introduction of magnification in dentistry, the clinicians deal with the cases which they have thought complicated before. The non surgical and surgical treatment become more feasible to perform because of the magnification.

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Endodontics deals with the complex tooth morphology. Diagnosis of broken or fractured restoration can be done with the help of magnification. The magnification helps in detecting the cracks such as in crack tooth syndrome, remaining filling material on the walls, clear view of the canal orifices, perforation repair, fractured instrument management and retrieval etc.

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Endodontics is more confined to a narrow operating space as it deals with micro structures. Hence the dental operator treating the patients needs a better vision and clear anatomy of the tooth to be treated. There is a high demand for higher visual acuity for the better treatment outcome of the patients. In fact the tools such as intraoral cameras, magnifying glass and endoscope were there, they were not convenient for the clinicians to perform their procedure [3]. Previously our team has a rich experience in working on various research projects across multiple disciplines [4-18]. Now the growing trend in this area motivated us to pursue this project.

Dental operating microscope was introduced by Apotheker in 1981 [19, 20]. Magnifying loupes are designed to address the problem of decreased depth of field, proximity and eyestrain when moving closer to the field. Loupes are classified into three types of binocular magnifying loupes as a dioptr, surgical telescope with a galilean system configuration and surgical telescope with a keplerian system [21, 22].

Materials And Methods

The questionnaire (Table 1) was designed for general dentists and specialists and sent to through social sources. A cross sectional survey was carried out among 101 general dentists and specialists. Data collection was done and the results were analysed (Table 2).

Interpretation of results

Gender: Sixty three percent of females and about thirty seven percentage of males have answered for this questionnaire.

Years of practice: About seventy five percent of dentists who have clinical experience less than five years actively took part in the survey.

Area of speciality: Forty six percent of general dentists are involved in the survey, followed by twenty nine percent of endodontists.

Awareness of magnification: Sixteen percent of dentists were not aware of magnification usage in routine dental procedure.

Mode of magnification: Fifty three percent were aware of using 2.5x in dentistry.

Knowledge about magnification: Twelve percent were not aware about the usage of magnification.

Loupes among manufactures: Eighteen percent were not aware that the loupes differ among manufactures.

Therapeutic outcome of treatment: Eight percent were not aware that the treatment outcome will be better if done under magnification.

New equipment in practice: Twenty eight percent still believe in conventional methods.

Courses on magnification: Twenty one percentage would not like to attend any courses on magnification.

Magnification in dental procedures: Fifty seven percent have not used any of the magnification in dental procedures.

Not using magnification: Thirty nine percentage of dentists were not aware of proper handling of magnification.

Common magnification aids: Twenty six percentage dentists were using magnifying glass in practice.

Frequency of magnification: Twenty two percent equally use only for surgical procedure and compulsory for all procedures.

Magnification in practice: Twelve percent were not ready to use magnification in practice even if training is given.

Results And Discussion

The statistical analysis was done in SPSS software. Independent t tests were done to compare between the gender, independent sample tests were done for descriptive statistics one way- ANOVA were done, ANOVA, post hoc tests for multiple group comparisons, pearson correlation were done (Table 3 &4).

Our institution is passionate about high quality evidence based research and has excelled in various fields [8, 23-32].

Endodontists were the first odontological dentistry professionals to use microscopes in day today practice both for surgical and conventional endodontics [33]. Endodontists work with the right endodontic tools to achieve a success rate in their treatment. It is a great challenge for endodontists to work in a very conservative manner without a magnification. Magnification is the process of visualizing an object bigger than they appear to be. The endodontist worked blindly with believing only on radiographs before the introduction of magnification in dentistry.

As mentioned earlier loupes are classified into three types, the dioptr system is a simple magnifying lens. That is one diopter(D) means that a ray of light which would be focused at infinity, would now be focused at 1 meter (100cm or 40 in). The Galilean or keplerian design is with a multiple lens system, which would be placed at a working distance of 1 and 20 inches (28-51 cm) [34, 35]. The prism loupes or keplerian system use refractive prisms and provide magnification up to 6X, it uses two prisms and five lens [36, 37].

The loupes have disadvantages like it has a magnification upto 4.5X. Though higher magnification loupes are available it will be heavy and cause head and neck fatigue and constrained physical posture [38, 39]. The factors we should keep in mind while buying loupes are working distance, declination angle and frame size.

Operating microscopes have four basic advantages including enhanced ergonomics, ease of digital documentation, improved precision of treatment and increased ability to communicate through video [40]. It also helps to teach others by connecting it to a projector, the video teaches them to do their procedure in a well improved manner.

The parts of the operating microscope are the supporting struc-

Table 1. Questionnaire.

S.No	Questions	Options – answers
1	What is your gender?	Male Female
2	Total number of years of clinical practice?	0-5 years 5-10 years 10-15 years >15 years
3	What is your area of speciality?	Endodontics Periodontics Prosthodontics Pedodontics Oral surgery General dentist
4	Are you aware of usage of magnification for routine dental procedures?	Yes No
5	Which is the most commonly used mode of magnification?	2.5 x 3.0 x 3.5 x 4.0 x 5.0 x 6.0 x
6	How did you gather knowledge about usage of magnification in dentistry?	Through journals and articles By interaction with other practitioners Through curriculum I have no knowledge on magnification
7	Does magnification with loupes differ amongst various manufacturers?	Yes No
8	Do you think that the therapeutic outcome of the treatment will improve with the usage of magnification in dentistry?	Yes No
9	How often do you introduce new equipment or technology in your practice?	As and when it is launched Every month Every six months I believe in conventional methods
10	Would you like to attend special courses on usage of magnification in dentistry?	Yes No
11	Have you ever used magnification for any of the dental procedures?	Yes No
12	What is the reason for not using magnification in your practice?	Neck and eye problem High cost of magnification aids Don't know how to handle them technically
13	What do you use commonly for magnification of dental procedures?	Dental loupes Dental operating microscope Magnifying glass
14	How frequently do you use magnification in your dental practice?	For all procedures compulsorily Hardly use Only for surgical procedures
15	Would you like to incorporate usage of magnification in your practice if special training is provided for the same?	Yes No

ture, the body of the microscope and the light source [41]. Eyepieces are available in 10x, 12.5x, 16x and 20x. The light source is very important along with magnification both in loupes and operating microscopes. Operating microscopes are useful in cases like cracks, microfracture, managing calcifying canals, broken instrument retrieval, retro preparation etc.

Other than loupes and operating microscope, endoscope and oroscope are used in magnification [42]. Modern endoscopes are shorter, when the lens is angled beyond 30 degree, the fish-eye effect is not present [43].

The magnification increases the quality of restorations and finishing, in treating challenging cases and improves the confidence level of the operator. Endoscopes are used in accurate diagnosis and in periapical surgery [44, 45]. Endoscope, videoscopes are used in various treatment procedures in dentistry. The advantages of using an operating microscope are maintaining a posture, lighting without shadows, decreased physical, postural and occupational stresses and easier to make reports, document cases. The error that operators make in the beginning is to drill teeth with excessive magnification, cutting their depth of vision too much and losing perspective. Dental loupes enhance the efficiency and depth of work.

Table 2. Results of the Survey.

S.No	Questions	Response (n=101)	
1	What is your gender?	Male Female	36.90% 63.10%
2	Total number of years of clinical practice?	0-5 years 5-10 years 10-15 years >15 years	74.80% 19.40% 2.90% 2.90%
3	What is your area of speciality?	Endodontics Periodontics Prosthodontics Pedodontics Oral surgery General dentist	28.70% 7.90% 5.90% 5% 6.90% 45.50%
4	Are you aware of usage of magnification for routine dental procedures?	Yes No	84.50% 15.50%
5	Which is the most commonly used mode of magnification?	2.5 x 3.0 x 3.5 x 4.0 x 5.0 x 6.0 x	53.30% 12% 22.80% 9.80% 0% 2.20%
6	How did you gather knowledge about usage of magnification in dentistry?	Through journals and articles By interaction with other practitioners Through curriculum I have no knowledge on magnification	24.30% 35.90% 28.20% 11.70%
7	Does magnification with loupes differ amongst various manufacturers?	Yes No	81.80% 18.20%
8	Do you think that the therapeutic outcome of the treatment will improve with the usage of magnification in dentistry?	Yes No	92.20% 7.80%
9	How often do you introduce new equipment or technology in your practice?	As and when it is launched Every month Every six months I believe in conventional methods	22.10% 7.40% 42.10% 28.40%
10	Would you like to attend special courses on usage of magnification in dentistry?	Yes No	78.60% 21.40%
11	Have you ever used magnification for any of the dental procedures?	Yes No	43.60% 56.40%
12	What is the reason for not using magnification in your practice?	Neck and eye problem High cost of magnification aids Don't know how to handle them technically	18.60% 42.30% 39.20%
13	What do you use commonly for magnification of dental procedures?	Dental loupes Dental operating microscope Magnifying glass	56.70% 23.30% 25.60%
14	How frequently do you use magnification in your dental practice?	For all procedures compulsorily Hardly use Only for surgical procedures	22.10% 55.80% 22.10%
15	Would you like to incorporate usage of magnification in your practice if special training is provided for the same?	Yes No	88.30% 11.70%

Various studies showed that there is great success in treating cases with the help of magnification [46-48]. Thus the magnification in day to day practice helps in improving the knowledge of work done, assessing our work, and improves the quality of treatment done.

Conclusion

Within the limitations of this survey, reveals that most of the general dentists and endodontists have average knowledge about

Table 3: Correlations.

		knowledge score	attitude score	practice score
knowledge score	Pearson Correlation	1	.406**	.267**
	Sig. (2-tailed)		0	0.007
	N	101	101	101
attitude score	Pearson Correlation	.406**	1	.332**
	Sig. (2-tailed)	0		0.001
	N	101	101	101
practice score	Pearson Correlation	.267**	.332**	1
	Sig. (2-tailed)	0.007	0.001	
	N	101	101	101

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Table 4. Anova - multiple groups comparisons.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
knowledge score	Between Groups	22.331	3	7.444	3.127	0.029
	Within Groups	230.897	97	2.38		
	Total	253.228	100			
attitude score	Between Groups	21.488	3	7.163	3.445	0.02
	Within Groups	201.68	97	2.079		
	Total	223.168	100			
practice score	Between Groups	45.564	3	15.188	3.823	0.012
	Within Groups	385.387	97	3.973		
	Total	430.95	100			

magnification. It can be concluded that if more training were given on magnification to the general dentists and endodontist, they would further apply them in practice which favours the better clinical outcome of the treatment.

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