



## Knowledge, attitude and practice toward using dental magnification

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### ABSTRACT

**Introduction:** Dentistry is not only an evolving science but also an art with good eye-hand coordination. A variety of magnification devices are used in dentistry to increase the clarity and accuracy of examinations and surgeries. The purpose of this study is to evaluate knowledge, attitude and practice toward using dental magnification among dental residents and dental professors.

**Materials and Methods:** In this cross-sectional descriptive study, all professors and residents were studied by census. A questionnaire was administered to the clinical faculty to assess three parameters: knowledge, attitudes and practice of magnification devices among dental residents and masters. The questionnaire consisted of 4 parts: demographic information, knowledge (11 questions), attitude (7 questions), and practice (4 questions). Data were analyzed by SPSS 23 statistical software and analyzed by T-tests and one-way analysis of variance (ANOVA) and Chi-Square.

**Results:** A total of 81 dentists completed the research questionnaire, of which 50 (61.7%) were male and 31 (38.3%) were female. Most dentists answered knowledge questions about depth and field of view changes with increasing magnification and the ability to adjust eye convergence under a microscope (74.1%). Also, the results of ANOVA statistical test did not show a significant difference between the scores of dentists' attitudes according to the field of specialization.

**Conclusion:** Although the skill of dentists was acceptable at using magnifying devices, they had little knowledge about the importance of this issue. The most important reasons were mentioned lack of access and high cost of using these devices.

**Keywords:** Attitude; Dentistry; Knowledge; Magnifying devices; Practice.

## Introduction

Having professional dental skills and working with dental tools is very important to achieve accurate results. Since, performing dental procedures requires great care and delicacy, dentists for improving their vision requires a good distance [1]. Improper position of the distance between the head and neck of dentists and the patient is very dangerous and can predispose dentists to

musculoskeletal problems [2,3]. Magnification is generally considered to be one of the great revolutions in science and especially in dentistry. Studies have shown that the use of magnifying devices reduces the need to change the position of the body and makes the work of dentists easier. Some instruments such as loops and microscopes are used to magnify to see more details of the oral cavity [4].

Magnifying instruments are used to examine lesions and wounds in the oral cavity, radiographic analysis, endodontic treatments, surgical procedures, periodontal procedures, dental prostheses, as well as brackets in orthodontics, etc [5]. The benefits of using magnifying tools include improving the quality of treatment, achieving better posture during tooth restoration, and reducing visual stress [5,6]. In addition, numerous studies have shown that proper use of loops greatly reduces or eliminates chronic back and neck pain. These studies have shown that proper use of magnification systems facilitates sitting in a vertical position [7,8]. Some studies focus on the benefits of magnification in diagnosis. One study showed that the number, extent, and direction of fracture lines in teeth could be seen by magnifying and transmitting light [5]. Also, laboratory studies on the teeth showed that the magnification significantly increased the accuracy of diagnosis [9,10]. Another study demonstrated the benefits of using magnification while making fixed prostheses in laboratories [11,12].

In contrast, Donaldson et al. did not observe a significant improvement in the practice of dental students who used the loop for a period of time [9]. Lussi et al. Showed that the use of loops in the proximal cavities did not reduce the risk of pathogenic damage to adjacent teeth [13]. It has been noted that ophthalmologists agree that routine use of these devices will not weaken or otherwise damage the eye. Unfortunately, practice standards for dentistry are not yet comprehensive and complete, and any attempt to gauge dentists' skills and the effects of magnification on treatment outcomes is a necessity [14]. Due to the importance of the above, the present study was conducted with the aim of examining the knowledge, attitude and practice of the hands of dental residents and dental professors of Shahid Sadooghi University of Yazd regarding the use of dental magnifying devices.

## Materials and Methods

The data collection tool in this study was a researcher-made questionnaire about the use of magnifying devices in the dental clinic. A total of 81 dentists completed the research questionnaire. Using other articles, a number of questions were selected and then the questions were refined and finally distributed among professors and residents to determine validity and reliability. The validity of the questionnaire was confirmed by 5 professors of endodontics. In order to evaluate the reliability of the questionnaire, 15 questionnaires were distributed among dental residents and dental profes-

sors, and Cronbach's alpha coefficient for the questionnaire was 0.78. The questionnaire included 4 parts of demographic information (age, gender, work experience and academic rank), questions related to awareness (11 questions) and a question about the source of knowledge, attitude (7 questions) and practice (4 questions) [5]. Scoring was considered as the wrong answer "score 0", the answer does not know "score 0.1" and the correct answer "score 1" (minimum score 0 and maximum 11). Measuring awareness was considered in the form of 11 multiple choice questions based on the correct answer, do not know and wrong answer. There were 7 phrases to measure attitude. Respondents rated their opinions based on a five-point Likert scale. For scoring, the items "totally disagree, disagree, have no opinion, agree and strongly agree" were given scores of one to five (minimum score of 7 and maximum of 35), respectively. Achieving more than half of the total score of knowledge and attitude was considered as high awareness and good attitude. Inclusion criteria included passing a specialized dental course and obtaining informed consent to participate in the study. Incomplete questionnaires were excluded from the study. This study was approved by the institutional ethical committee under the number IR.SSU.REC.1998.015.

## Statistical Analysis

Data were analyzed using the SPSS23 statistical program. The results were expressed as the mean $\pm$ SD. Simple descriptive statistics were used to define the characteristics of the variables using numbers and percentages for categorical variables. The data were analyzed by T-test, one-way analysis of variance (ANOVA) and Chi-Square test. And statistical significance was recognized when  $p < 0.05$  [15,16].

## Results

### Demographic information

A total of 81 dentists completed the research questionnaire, of which 50 (61.7%) were male and 31 (38.3%) were female. The mean age of them was  $32.57 \pm 6.88$  years. Only 45.7 % of the participants in the study were professors of the dental school and 54.3% were dental residents. The mean dental work experience of the subjects was  $6.06 \pm 6.23$  years.

### Knowledge assessment

The mean score of knowledge of dentists about the use of magnifying devices was  $4.69 \pm 2.41$ . The relative frequency of dentists' answers to knowledge questions

was given in table (Data not shown). Most dentists had acceptable answers for questions regarding knowledge of depth and field of view changes with increasing magnification and the ability to adjust eye convergence under a microscope (74.1%), but most dentists had low knowledge of other questions. The dentists reported that they were aware of magnifying devices while studying at university (58%), friends and colleagues (22.2%), social networking sites (12.3%), workshops or internships (4.9%), and others (2.6%). The results of t-test showed that the mean score of knowledge of women was significantly higher than men ( $P=0.014$ ). There was no statistically significant difference between the mean knowledge score in the two age groups ( $P=0.569$ ) (Table 1). Also, there was no significant difference between the mean score of dentists' knowledge in terms of academic rank and dental work experience ( $P>0.05$ ). Also, according to the ANOVA statistical test, there was a statistically significant difference between the dentists' knowledge scores according to the specialized field ( $P=0.000$ ) (Table 2).

**Attitude assessment**

The mean score of dentists' attitudes about using magnifying devices was  $28.55\pm 4.06$  points. The relative frequency of the answers of the dentists to the attitude questions was given in the table (Data not shown). According to the T-test analysis, there was no significant difference between the mean scores of attitude in the male and female dentists and also in the two age

groups ( $P>0.05$ ) (Table 3). According to the results of the t-test, there was no statistically significant difference between the mean score of dentists' attitudes in terms of academic rank and dental work experience ( $P>0.05$ ). Also, the results of the ANOVA statistical test did not show a statistically significant difference between the scores of dentists' attitudes according to the field of specialization ( $P>0.05$ ) (Table 2).

**Practice assessment**

The relative frequency of dentists' answers to practice questions was not shown. Only 59.3% of dentists stated that they had never used magnifying devices, and most of them (66.7 %) did not use magnifying devices for specialized treatments. The main reasons for not using magnifying devices were lack of access to magnifying devices (39.5%) and the high price percentage of these devices (25.9%). The results of the Chi-Square test showed that the difference between the male and female dentists was marginally insignificant ( $P=0.055$ ), but this difference was significant between the two age groups ( $P=0.032$ ) (Table 4). There was no statistically significant difference in the use of magnifying devices by dentists in terms of scientific rank ( $P=0.638$ ), but this difference was significant in terms of dental work experience ( $P=0.026$ ). Also, the results of this test showed a significant difference in terms of the specialty of professors and assistants ( $P=0.000$ ) (Table 5).

*Table 1.* Comparison of the mean score of knowledge of dentists in terms of demographic variables.

Demographic variable		Mean±SD	P-value
Knowledge			
Sex	Male	4.18±2.34	0.014
	Female	5.52±2.32	
Age	<30	4.54±1.92	0.569
	≥30	4.84±2.82	

*Table 2.* Comparison of the mean score of knowledge and attitude of dentists in terms of educational and occupational variables.

		knowledge	
Group	Academic and occupational variable	Mean±SD	P-value
Science ranking	Professor	4.23±2.72	0.125
	Assistant	5.08±2.06	

Group	Academic and occupational variable	Mean±SD	P-value
Dental work experience	<5	4.57±2.30	0.566
	≥5	4.91±2.62	
Specialized field	Restorative	4.71±1.91	0.000
	Endodontics	6.21±2.32	
	Surgery	7.30±1.98	
	Diagnosis	2.37±1.77	
	Orthodontic	2.63±1.43	
	Pediatric Dentistry	3.07±1.65	
	Prosthesis	4.89±2.09	
	Periodontology	6.11±2.46	
	Pathology	6.30±2.68	
	Community-oriented	4.25±1.91	
	Radiology	4.69±2.41	
Science ranking	Professor	28.64±3.70	0.849
	Assistant	28.47±4.39	
Dental work experience	<5	28.29±4.36	0.403
	≥5	29.03±3.49	
Specialized field	Restorative	29.20±4.05	0.108
	Endodontics	27.72±4.51	
	Surgery	28.28±3.35	
	Diagnosis	26.75±1.70	
	Orthodontic	28±3.50	
	Pediatric Dentistry	32.70±4.32	
	Prosthesis	28.72±4.10	
	Periodontology	26.28±5.15	
	Pathology	27±1.41	
	Community-oriented	29.50±4.95	
	Radiology	27.37±1.76	

Table 3. Comparison of the mean score of the dentists' attitudes in terms of demographic variables.

Demographic variable		Mean±SD	P-value
Sex	Male	28.78±3.85	0.546
	Female	28.19±4.43	
Age	<30	29.15±4.22	0.196
	≥30	27.97±3.87	

Table 4. Comparison of the use of magnifying devices (practice) by dentists examined in terms of demographic variables.

Use of magnifying devices (practice)		Yes	Yes	P-value
		Number (%)	Number (%)	
Demographic variable				
Sex	Male	12 (24)	38 (76)	0.055
	Female	14 (45.2)	17(54.8)	
Age	<30	8 (20)	32 (80)	0.032
	≥30	18 (43.9)	23 (56.1)	

Table 5. Comparison of the use of magnifying devices (practice) by dentists under study in terms of educational and occupational variables.

Use magnifying devices (Practice)		Yes	Yes	P-value
		Number (%)	Number (%)	
Academic and occupational variables				
Science ranking	Professor	11 (28.9)	27 (71.1)	0.638
	Assistant	15 (34.9)	28 (65.1)	
Dental work experience	<5	12 (23.1)	40 (76.9)	0.026
	≥5	14 (28.3)	15 (51.7)	
Specialized field	Restorative	3 (30)	7 (70)	0.000
	Endodontics	9 (81.8)	2 (18.2)	
	Surgery	9 (81.8)	1 (14.3)	
	Diagnosis	1 (25)	3 (75)	
	Orthodontic	0 (0)	9 (100)	
	Pediatric Den- tistry	0 (0)	10 (100)	
	Prosthesis	4 (36.4)	7 (63.6)	

### Discussion

In dentistry, in addition to manual dexterity, vision is also extremely important to achieve accurate results. In dentistry, work is done on teeth and soft tissues that require good visual acuity that can be enhanced using magnifying devices [17]. This study was designed to evaluate the knowledge, attitude and practice of dentists in Yazd about these devices. Today, a variety of magnifying devices, including simple loops and surgical prism microscopes, are available for use by dentists

[18]. Some studies have also shown that the use of magnifying devices leads to more predictable treatment results, reduces patient discomfort, closes wounds more accurately, and thus improves faster and higher aesthetic results compared with macrosurgery [19,20]. A limited number of studies have been published on the use of dental magnification among dental students and residents. Fifty-eight percent of the dentists reported that they had acquired knowledge about dental magnifying devices while studying at university. This finding

is consistent with the study of Penmetsa et al. in which the knowledge rate at university was 59.5%. It could be said that most of the education is in the university and there is not much education after that, so the topics related to the use of modern technologies during the study period should be taught [4].

Most dentists correctly answered questions about depth and field of view changes by increasing magnification and the ability to adjust ocular convergence under a microscope, but most dentists had low knowledge of other questions. Overall, dentists' knowledge in this study was assessed as low. According to the study by Penmetsa et al. [4] and Farook et al., [21] most of the subjects had poor knowledge of magnifying devices. Penmetsa et al. and Farook et al. evaluated assistants and general students, respectively, while in this study specialists and dental residents were evaluated. Although dentists' knowledge in this field was not significantly related to their academic degree and work experience, knowledge of surgeons, pathologists and endodontics was significantly higher than in other fields. The reason for the high knowledge of pathologists is the use of non-clinical microscopy to view tissue samples. This issue could be accounted for as a confounding factor. A similar study by Alhazzazi et al. showed that 90% of participants found the use of magnifying devices useful for endodontics and 50% for surgical treatments [5].

According to the Meraner et al. study, the most use of magnifying devices was in the two disciplines of endodontics and periodontics [14]. In the study of Penmetsa et al., it was the most used in endodontics and oral surgery by dentists and specialists [4]. The attitude of the participants in this study was high regardless of other indicators (age, sex, degree and specialty) and the majority agreed on the usefulness of magnifying devices in dentistry. Although the attitude towards learning and using magnifying devices was positive, due to the low access of Yazd dentists to these devices, low practice was reported. In addition, our result indicated that only 32% of the participants had experienced using a magnifying glass by the time of the study. The experience of using a magnifying glass in the study of Alhazzazi et al. was 21%. The participants in that study reported that they did not use magnifying devices in specialized treatments [5]. Meraner et al. showed that the experience of professors at a university in California using a magnifying glass was 53%. All endodontists and periodontists in that study used magnifying devices. Eighty-two percent of people said they were more likely to use magnifying devices in routine patient sessions at private medical centers [14]. According to de-

mographic indicators; the mean score of knowledge of women was higher than men. Since the subjects were highly educated and often considered their source of knowledge to be university education, women seemed to remember their teachings more than men [22]. In these studies, as in the present study, no significant relationship was observed for other demographic indicators. Professors and assistants aged  $\geq 30$  years and those with work experience  $\geq 5$  years used significantly more magnifying devices, which might be due to the compensation of reduced vision and better ergonomics for skeletal problems. Other reasons include the economic ability of buying this device or receiving it as a gift. Although this study was conducted as a census, due to the limited number of dental professionals and assistants in Yazd and their poor cooperation, the number of participants in this study is lower than in similar studies in other countries.

## Conclusion

The questionnaire-based study was conducted in an attempt to assess the awareness, attitude and prevalence of usage of magnification devices among dental residents and dental professors of Shahid Sadoughi University of Medical Sciences of Yazd. The majority of the dentists reported that they had acquired knowledge about dental magnifying devices while studying at university, so the topics related to the use of modern technologies during the study period should be taught. In addition, a small number of professors and assistants had announced that they were using these devices, the most important reasons being the lack of access and the high cost of using these devices.

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## Conflict of Interest

There is no conflict of interest to declare.

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