

ATTITUDE ON WEARING LOUPES DURING CLINICAL HOURS AMONG DENTAL PRACTITIONERS - A QUESTIONNAIRE BASED STUDY

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ABSTRACT

Objective: The dental loupes are special devices which aid in magnifying the tooth surface for easy reach and access during dental procedures. Some of the advantages of the use of loupes include enhanced ergonomics of the dentist, development of psychomotor and social skills apart from decrease in the time for each procedure. However loupes also pose certain disadvantages such as smaller and darker field of view.

Materials and Methods: A self assessable survey consisting of 18 questions were prepared and circulated among 100 dental students and the results were analyzed to determine the use and effects of dental loupes.

Results and discussion: On analyzing the results, the majority of the participants felt that the fine details in the oral cavity were enhanced when loupes were used. More awareness on the use of dental loupes, its mechanism and its effect on the different dental practitioners are essential.

Keywords: Efficiency, Ergonomics, Innovative technology, Magnification, Vision.

INTRODUCTION

In the modern day, dentistry as a profession requires the use of highly skilled and trained dental professionals. The performing minute procedures by dentists not only requires accurate precision but also employs the use of technology and various devices which aid in the easy visualization of structures present in and around the tooth ^[1]. One such instrument is the dental loupes which magnifies the tooth surface for ease of dental procedures. Dental loupes are of two major types namely front-mouthed loupes and flip up loupes which differ in their magnification power ^[2]. In addition to magnification, loupes significantly contribute to improving the dentists' vision, developing psychomotor and social skills and increasing the comfort of the patient ^[3]. For a dental professional in practice, a declination angle of 15 degrees is considered to be accurate. The dental loupes can aid in improving the ergonomics of the dentist by adjusting the angle of declination thus performing dental procedures with ease ^[4,5].

The working principle behind dental loupes depends on the refraction of light through the lenses thus magnifying the image obtained. The material of the lens also affects the magnification of the object ^[6]. Plastic lenses are generally lighter and are proven to be more comfortable ^{[7], [8]}. Added factors such as size of the lens, resolution, field depth and view, presence of light source and weight of the lens also affect the magnification and prove to be more effective in microdentistry such as root canal treatments ^[9]. Further, the effect of loupes was found to be enhanced when used in accordance with proper isolation such as rubber dam sheets ^[10] In contrast to this, the use of loupes also possesses certain disadvantages such as vision dependency, infection control and restricted depth of vision ^{[11], [12]},

Despite previous research conducted, there is a lack of substantial awareness and knowledge on the importance of using loupes when performing preclinical procedures in the early stages of an undergraduate career. Our research and knowledge have resulted in high-quality publications from our team ^[13-26]

The present study aims at indicating the importance and advantages of loupes and paves way for advanced research on the importance of dental loupes.

MATERIALS AND METHOD

For the study, a self-assessable survey consisting of 18 questions was prepared and circulated among 100 dental practitioners of the Chennai population belonging to various age groups via an online google forms platform. The responses provided by the practitioners were collected, diagrammatically represented and analyzed to determine the comprehension levels and understanding of the usage and effects of dental loupes.

The questionnaire consisted of close ended questions and the validity checking was conducted by the faculty members of the institution. Google forms were used for the collection of data and the statistical software used was the SPSS software version 22. The statistical analysis was descriptive statistics to summarize demographic data and chi square analysis to analyze the survey data. The p value less than 0.05 was considered statistically significant.

RESULTS

The data obtained from the survey was collected and analyzed and it was found that most of the dental practitioners were aware of only one of the many uses of dental loupes. A majority of the participants felt that the use of dental loupes provided accurate details of the patient's oral cavity but affected the normal vision of the eye and the ergonomics of the dental professional.

DISCUSSION

In the present study, 24.8% of the population belonged to the age group 18-25 years, 50.5% to the age group 25-40 years and 24.8% were above 40 years (Table.I). 63.4% of the participants were males while 36.6% were females (Table.I).

When asked about the usage of loupes during dental procedures, 96% of the dental practitioners perform dental procedures with the help of loupes while 4% did not use loupes (Table.I). 15.8% of the participants felt that wearing loupes during dental procedures could improve the comfort of the patient, 23.8% felt that it reduces the strain on the eye, 50.5% chose greater precision and 9.9% felt that all these reasons were the advantages of wearing dental loupes (Figure.1). The study conducted by Khalid Aboalshamat reports that the use of dental loupes can increase the work efficiency and comfort of the patient which is in agreement with the findings of the present study^[27]. On comparing the effect of loupes on the ability to provide accurate details of the patient's oral cavity, 93.1% of the practitioners felt that loupes could provide accurate details while 6.9% felt otherwise (Table.I). Philippe Perrin in his article states that although different types of dental loupes are used, the result parallels the fact that the details of one's oral cavity is more accurate when compared to the absence of loupes^[28]. On comparing the present finding with the article posed by Martina Eichenberger, there is similarity in the fact that normal vision remains compromised on prolonged use of loupes and other magnification devices^[29].

From the data obtained, 22.8% of the participants were unaware that the power of the loupes could be adjusted according to the power of the human eye while 77.2% posed knowledge on the same (Table.I). On analyzing the additional benefits of wearing loupes, 26.7% of the respondents responded to development of psychomotor skills, 26.7% responded to self evaluation skills while 46.5% responded to both of these reasons (Table.I). 46.5% of the participants felt that the use of loupes improved their ergonomics while 54.5% opposed this fact (Table.I). The practice of using dental loupes can improve the posture and ergonomics of the dental professional^[30].

Based on the different magnification of loupes available, 23.8% chose that 2.5x was the most accurate magnification, 34.7% responded to 3.5x, 40.6% chose 4.5x and 0.1% of the practitioners chose all of these magnifications (Figure.2). The article proposed by Gautami Subhadra states that around 91% of the dental professionals were aware about the different magnifications of loupes available which is contraindicated to the present findings^[31]. 75.2% of the dentists believed that the use of loupes affected pedodontic patients while 24.8% did not (Table.I). 90.1% of the population said that the use of dental loupes could potentially decrease the time for each dental procedure and 9.9% felt that the time for each procedure remained unaffected with the use of loupes (Table.I). 23.8% chose a smaller field of view, 24.8% chose a darker field of view, 17.8% responded to steeper learning curves and 33.7% responded to all of these reasons when questioned about the supplementary

disadvantages associated with the use of loupes (Figure.3). The article cited by Jennifer Thomas opposes the fact that dental loupes provide the above mentioned disadvantages ^[32].

On comparing the overall results obtained with the association graphs plotted, it was found that dental practitioners belonging to the age group 25-40 years processed the highest knowledge on the types, uses, advantages, working and disadvantages of dental loupes. Similar results were obtained by a study put forth by Turki Alhazazzi which states that the accuracy and quality of work was enhanced by the use of dental loupes and the awareness of the same was considerably high among dental practitioners ^[33].

The present study highlights the importance of the use of loupes during dental procedures, its effect in reducing the time for each procedure and some of its disadvantages. Thus it was inferred that although dental loupes were used frequently by practitioners, the awareness and knowledge on the advantages, negative effects and magnifications of loupes was moderate. The results obtained in the present study correlated with the findings of previous studies. However, the present study also posed certain limitations due to the small sample size and limiting the study to dental practitioners only from South India.

CONCLUSION

The present study concludes that the awareness levels among the dental practitioners on the usage, function, advantages and disadvantages of dental loupes was moderate and provides scope for future researches conducted on the same.

Authors Contribution

Kaviyaselvi G- Contributed to conception, design, data acquisition and interpretation.

Dr. Adimulapu Hima Sandeep - Contributed to conception, design, and critically revised the manuscript.

All authors gave final approval and agreed to be accountable for all aspects of the work.

Conflict of interest

The authors declare no conflict of interest

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Table I: Showing the frequency distribution

S. No	Question	Options	Response Percentage
1.	Age	18-25 years	24.75%
		25-40 years	50.50%
		Above 40 years	24.75%
2.	Gender	Female	36.63%
		Male	63.37%

3.	Do you perform dental procedures with the help of loupes?	Yes	96.04%
		No	3.96%
4.	Are you aware of the advantages of wearing loupes?	Improves comfort of the patient	15.84%
		Provides greater precision	50.50%
		Reduces the strain on the eye	23.76%
		All of the above	9.90%
5.	Do you think wearing loupes provides accurate details of the patient's oral cavity?	Yes	93.07%
		No	6.93%
6.	Does the use of loupes affect the normal vision of the eye?	Yes	66.34%
		No	33.66%
7.	Are you aware that the power of the loupes can be adjusted according to the power of the eye?	Yes	77.23%
		No	22.77%
8.	How often do you think loupes should be replaced?	6-12 months	61.39%
		90 days	21.70%
		Every few years	8.91%
9.	Which of these are the other advantages of usage of loupes?	Development of psychomotor skills	26.73%
		Self evaluation skills	26.73%
		Both	46.53%
10.	Do you think wearing loupes can improve the ergonomics of the dentist?	Yes	45.54%
		No	54.46%
11.	Can dental loupes provide protection against light cure?	Yes	50.50%
		No	49.50%
12.	What is the magnification of loupes used in dental procedures?	2.5x	23.76%
		3.5x	34.66%
		4.5x	40.99%
		All of the above	0.99%

13.	Do you think the use of loupes affects pedodontic patients?	Yes	75.25%
		No	24.75%
14.	Do you think wearing loupes makes the dental procedure uncomfortable?	Yes	46.53%
		No	53.47%
15.	Do you think wearing loupes increases eye power?	Yes	55.45%
		No	44.55%
16.	Can the use of loupes decrease the time for each dental procedure?	Yes	90.90%
		No	9.10%
17.	Do you think loupes are more effective in people wearing spectacles?	Yes	39.60%
		No	60.40%
18.	Which of these are the added disadvantages of using loupes?	Smaller field of view	23.76%
		Darker field of view	24.75%
		Steeper learning curves for newer users	17.82%
		All of the above	33.66%

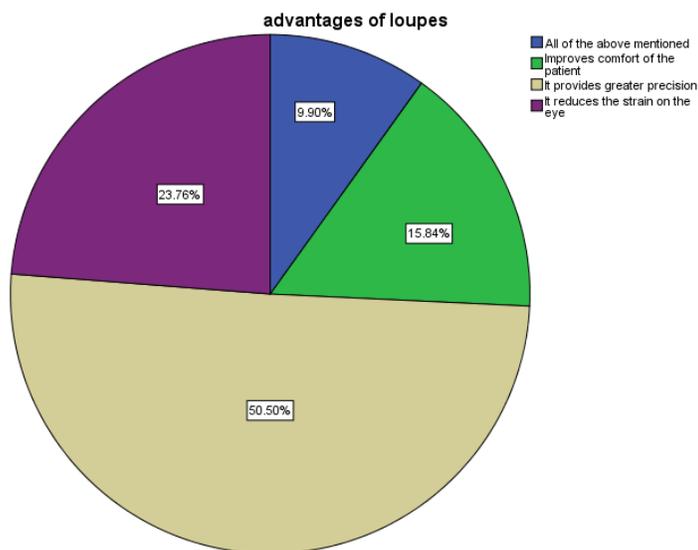


Figure.1: Pie chart showing percentage distribution of responses on awareness on the advantages of loupes. About 15.8% responded to improving comfort of the patient (green), 50.5%- greater precision (brown), 23.8%- reduced eye strain (purple), 9.9%- all of the above (blue). Higher number of participants had responded to greater precision (50.5%).

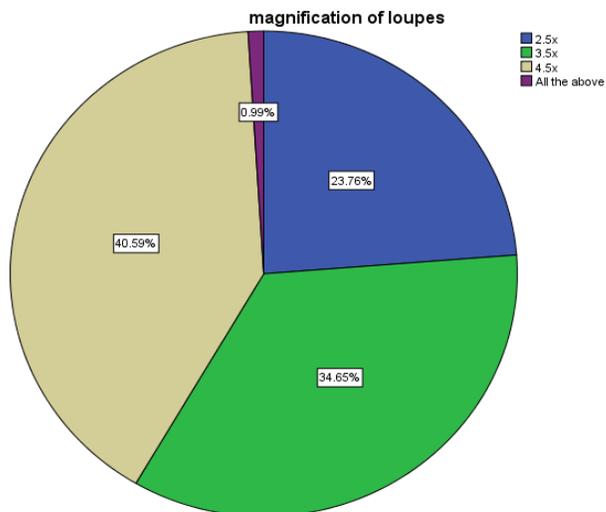


Figure.2: Pie chart showing percentage distribution of responses on awareness on the magnification of loupes. About 23.8% responded to 2.5x (blue), 34.7%- 3.5x (green), 40.6%- 4.5x (brown), 0.1%- all of the above (purple). Higher number of participants had responded to 4.5x (50.5%).

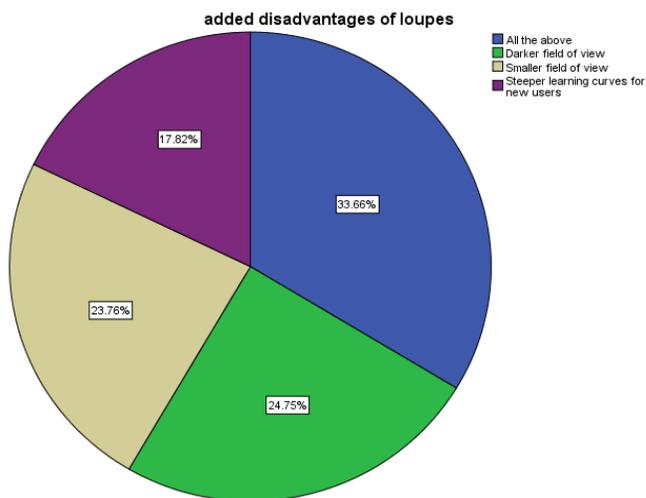


Figure.3: Pie chart showing percentage distribution of responses on awareness on the added disadvantages of loupes. About 23.8% responded to the smaller field of view (brown), 24.8%- darker field of view (green), 17.8%- steeper learning curve (purple), 33.7%- all of the above (blue). Higher number of participants had responded to all three disadvantages (33.7%)

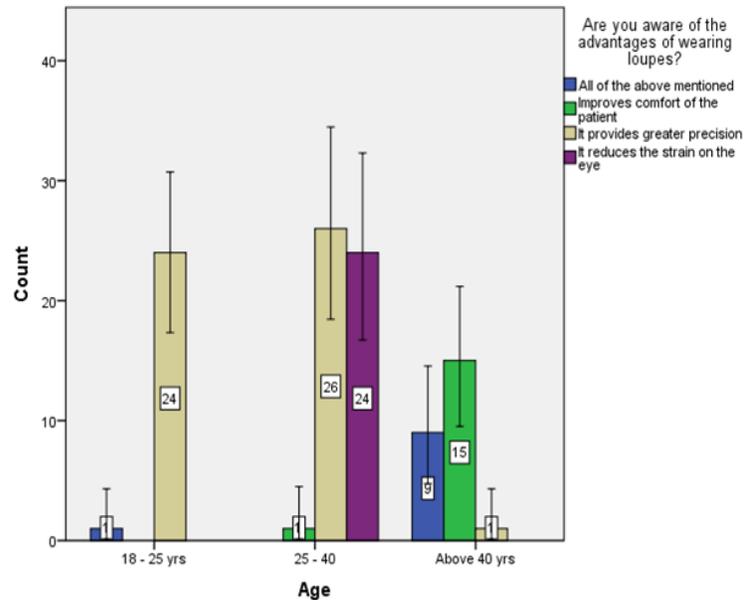


Figure.4: Bar graph showing association between age and awareness on the advantages of dental loupes. X-axis represents age and y-axis represents the number of participants responded. Green colour represents improved comfort of the patient, brown colour represents greater precision, purple represents reduction in the strain of the eye while blue colour represents all the advantages of loupes. Greater precision was the most responded option and it was highest among dental practitioners of the age group 25-40 years. Chi square test showing $p= 0.000$ ($p<0.05$ indicating statistically significant).

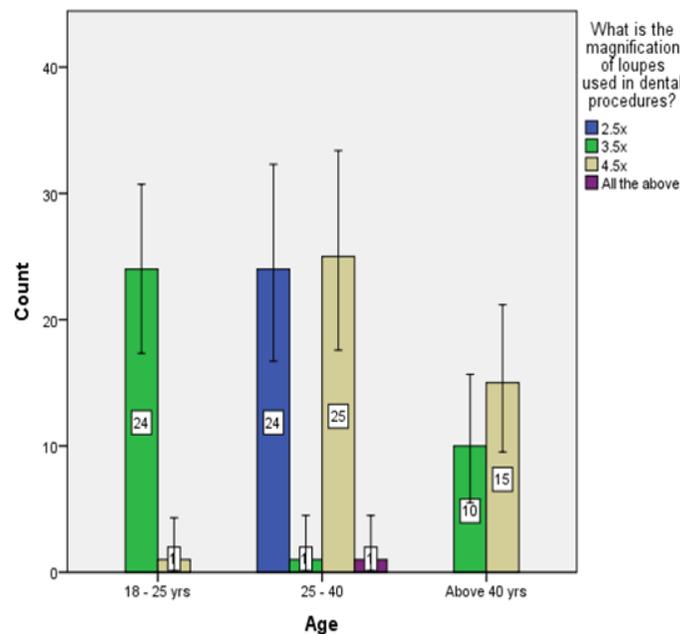


Figure.5: Bar graph showing association between age and awareness on the different magnification of dental loupes. X-axis represents age and y-axis represents the number of participants responded. Blue colour represents 2.5x, green colour represents 3.5x, brown colour represents 4.5x while purple colour represents all the three magnifications. 4.5x was the most responded option and it was highest among dental practitioners of the age group 25-40 years. Chi square test showing $p= 0.000$ ($p<0.05$ indicating statistically significant).

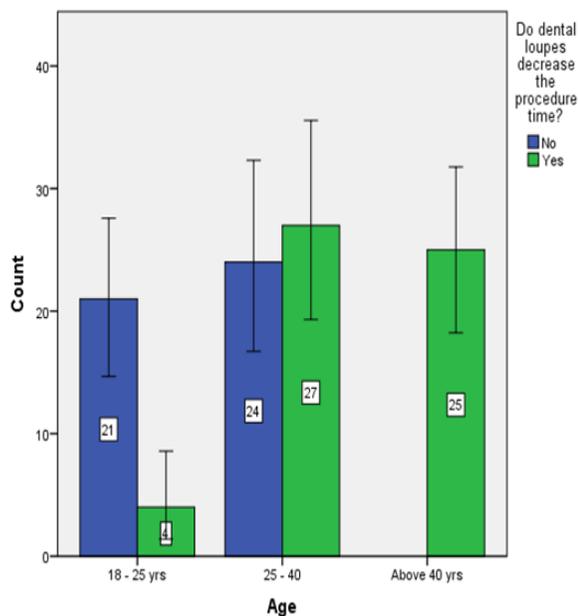


Figure.6: Bar graph showing association between age and awareness on whether dental loupes decrease the time for each dental procedure. X-axis represents age and y-axis represents the number of participants responded. Green colour represents yes while blue colour represents no. The use of loupes decreased the procedure time was the most responded option and it was highest among dental practitioners of the age group 25-40 years. Chi square test showing $p= 0.000$ ($p<0.05$ indicating statistically significant).

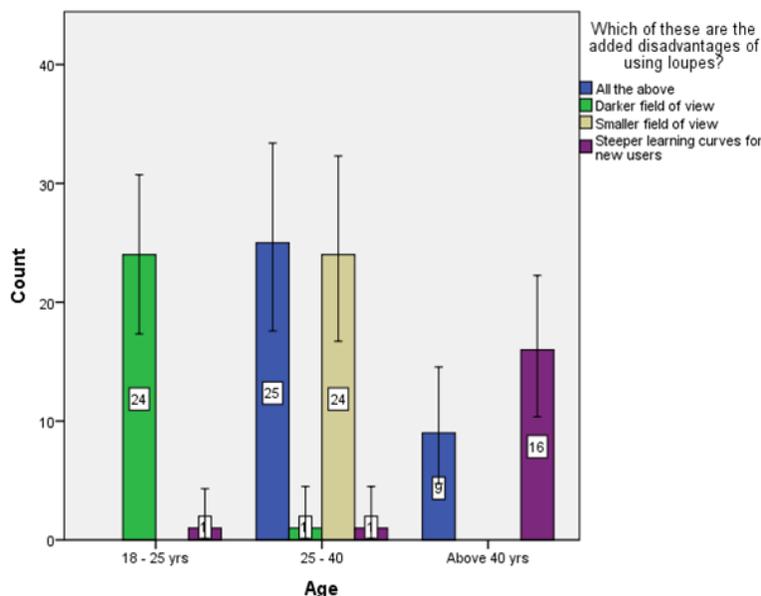


Figure.7: Bar graph showing association between age and awareness on the disadvantages of dental loupes. X-axis represents age and y-axis represents the number of participants responded. Green color represents a darker field of view, brown color represents a smaller field of view, purple color represents steeper learning curves for new users while blue color represents all the three disadvantages. All the three disadvantages were the most responded option and it was highest among dental practitioners of the age group 25-40 years. Chi square test showing $p= 0.000$ ($p<0.05$ indicating statistically significant).