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KNOWLEDGE, ATTITUDE, AND PREVALENCE OF USAGE OF MAGNIFICATION LOUPES AND SURGICAL OPERATING MICROSCOPE AMONG THE DENTAL PRACTITIONERS IN THE AHMEDABAD CITY – A QUESTIONNAIRE SURVEY

Periodontology

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ABSTRACT

Background: In dentistry, precise visual clarity is essential for working with tiny biological and non-biological structures. To enhance vision, magnification is commonly employed, enabling high-precision micro-dentistry. **Aim:** This study aims to attain the information and evaluate level of knowledge and prevalence of usage of magnification loupes and surgical operating microscope among the dental practitioners in Ahmedabad city. **Method:** Proposed study was conducted among the dental practitioners of Ahmedabad city using self-administered questionnaire regarding knowledge, attitude, and prevalence of magnification devices which includes 16 questions. Collected data was entered at the end of the study in the master chart prepared in Microsoft Excel 2010 on the computer and statistical analysis was conducted. **Result:** Among the participants, majority were aware about magnification devices used in dentistry (92%) but only 42.26% of the total participants were exposed to the usage. On the other hand, when asked the the reason for not using magnification devices, 38% felt that devices are too expensive, 29% attributed that it is time consuming and, 33% are not using them due to lack of skill. **Conclusion:** This study revealed that even though majority of the practitioners were aware of magnification in dentistry, it's implementation in routine practice was very limited. Dental practices should strongly encourage the use of magnification devices to achieve high precision in microdentistry atleast either at postgraduation level or via workshops.

KEYWORDS

Magnification devices, Precision, Micro dentistry

INTRODUCTION

Critical visual evaluation is the crucial part of oral health care. According to Worschech CC et al. improved lighting and magnification made it possible to distinguish clearly between surfaces that may look similar in color and texture under normal working settings.[1] It increased the precision in both diagnostic and treatment procedures since the clarity and details obtained through magnification are so accurate and revealing.

Apotheker and Jako (1981) pioneered the first surgical microscope for dental surgery. Magnification loupes and surgical microscopes enhance treatment quality by bringing objects closer to the eyes, reducing tissue trauma and promoting faster healing.[2] They improve precision, posture, and reduce visual strain and musculoskeletal injuries. Integrated with cameras and monitors, they aid in patient education and record documentation.[3] Recommended for various dental procedures like caries excavation, microsurgery, crown placement, and grafting, these devices require proper training and manual dexterity for effective use.[4]

Dental professionals strive to adjust their posture to align with their field of vision and instrument handling principles. Musculoskeletal issues are prevalent among dentists, largely attributed to ergonomic challenges.[5-7] Solutions such as ergonomic seating and proficient use of magnification devices are recommended to mitigate these issues in the dental field.[8]

Although using magnification equipment in various dental specialties can be expensive and may require a longer period of time to master, it is substantiated that their usage should be encouraged. By using microscope, an evolution from the conventional methods of macrodentistry to a high precision microdentistry is possible.

METHOD

The proposed study was conducted among the dental practitioners of Ahmedabad city with a qualification of BDS and/or MDS and a minimum of 1 year of clinical experience and who were willing to participate in the study were included using a self-administered questionnaire which included 16 questions. The questionnaire was sent to the participants via online mode (emails, WhatsApp, or the web) and Data was collected and compiled into an Excel sheet, and Descriptive statistical analysis was done using appropriate statistical software.

RESULT

Out of 105 participants 92% were aware about magnification devices used in dentistry (Figure 1). 91.75% were aware about magnifying loupe while only 58.76% were aware about surgical operating microscope. This study illustrated that only 42.26% of the total participants were exposed to the use of magnification devices. 34.02% participants gained the knowledge and awareness about magnification pursuing post graduation, whereas 26.80% through colleagues and friends, 20.63% through social networking sites and 18.55% gained acquaintance through workshops.

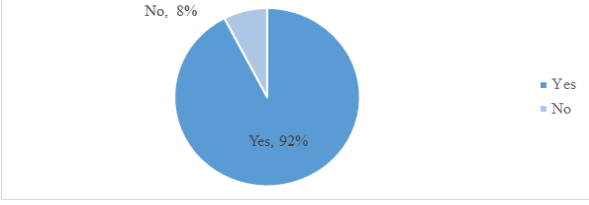

Figure 1: Are you aware of magnification devices used in dentistry?(n=105)

When asked regarding the benefits of using magnification device, 75.60% believed in better treatment outcome, 73.17% affirmed ergonomic benefit and 65.85% in optical advantage (Figure 2). When asked if magnification devices improve the accuracy of work, 93% believed that improvement occurs and 7% were uncertain (Figure 3).

In the present study 87.63% participants were aware of various ranges of magnifications available in different devices. When asked regarding

preference of range of magnification while using a dental loupe, 51.81% preferred x3.5 to x4.5 and 48.78% preferred x2.0 to x3.5, 41.46% prefered x10, 21.95% prefered x6.0, and 36.58% prefered x20.0 when using a surgical operating microscope.

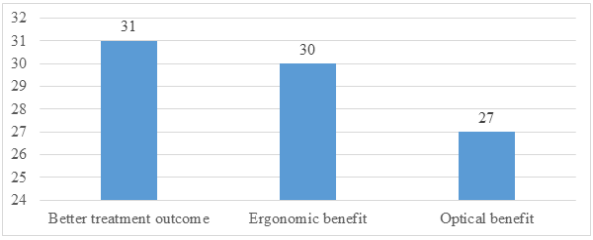

Figure 2: According to you what are the benefits of using magnification device?(n=41)

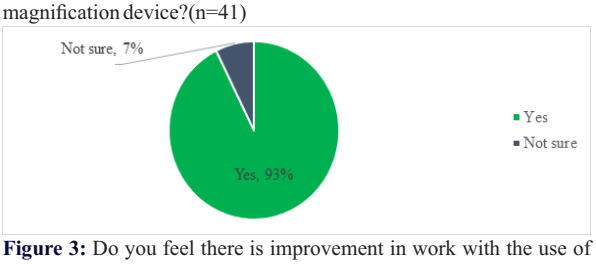

Figure 3: Do you feel there is improvement in work with the use of magnification device?(n=41)

When the question regarding health issues they faced during usage of magnification devices was posed, 14.63% stated obscured vision, 12.19% stated pain in neck and shoulder, 9.75% stated pain in hand and wrist while 68.29% agreed that the usage of magnification devices do not lead to health complications (Figure 4). When considering the reason for not utilising magnification devices, 38% believed that the devices were too expensive, 29% attributed that it is time consuming, and 33% were not using them due to lack of skill (Figure 5).

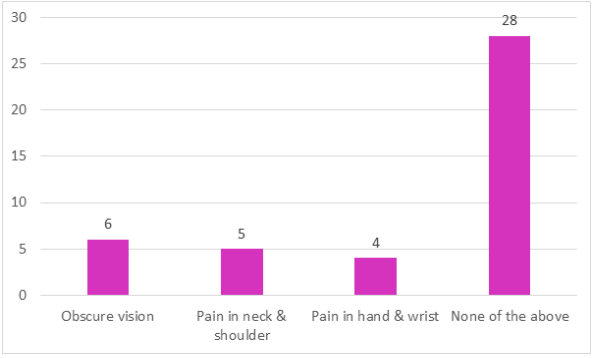

Figure 4: What health issue you experienced during usage of magnification device?(n=41)

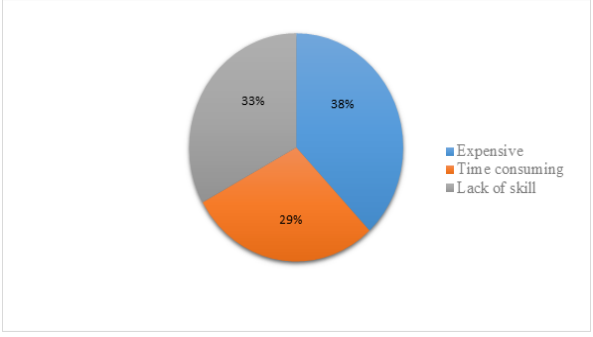

Figure 5: What is the reason for not considering the use of mafnification device to perform dental procedures? (n=56)

When asked if they were aware of recent advances of camera mounted to loupes, 75.25% of participants responded was affirmative. In response to the question about the employment of magnification equipment at various levels, 52% were in favour of reinforcing it at undergraduate level, 42% at postgraduate level, and 6% in clinical practise (Figure 6). The attitude of practitioners towards learning about magnification devices in future was very good, as 89.06% of participants responded positive.

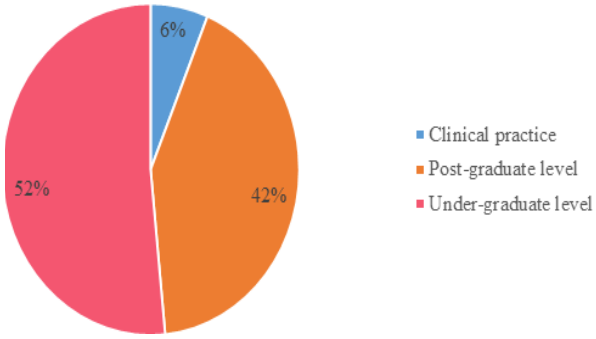

Figure 6: At which level magnification device should be reinforced in clinical practice?(n=64)

DISCUSSION

In dentistry, precision relies on manual dexterity, skill, and vision.[9] Various magnification systems, from surgical microscopes to telescopic loupes, enhance care significantly. Integrating magnification with microsurgical tools improves surgical effectiveness, offering more predictable outcomes, less invasive procedures, reduced patient discomfort, better healing, enhanced cosmetic results, and higher patient satisfaction compared to traditional methods.[10] Magnification devices mark a shift from macrodentistry to precise microdentistry.[9]

James and Gilmour (2010) recommended the use of magnifying loupes in dentistry to improve clinical outcomes, reduce eye strain, and enhance musculoskeletal comfort. They emphasized the need for more research to further support these recommendations.[11]

Dental surgeons often contort their head, neck, and torso to gain better access and visibility during procedures, risking musculoskeletal issues due to poor posture.[12] Studies by Forgie et al. (1999),[13] Meraner and Nase (2008),[14] and Congdon et al. (2012)[15] suggest that using magnifying devices can mitigate these risks by improving visibility of oral structures and promoting better posture of the neck and back muscles.[16]

Using magnifying loupes and lighting, Corbella et al. (2018) investigated the clinical and patient-centered effects of supragingival scaling and found that it had reduced the full-mouth bleeding and plaque scores which demonstrated a discernible difference from the control group.[16]

This study explores the knowledge and attitudes of dental practitioners in Ahmedabad regarding dental magnification tools and their integration into daily practice. Most participants demonstrated a strong awareness of magnification equipment, with a significant number acquiring knowledge through dental courses (34.02%) and colleagues (26.80%). These findings align with research by Eichenberger et al. (2015), highlighting colleagues as key influencers in decisions to adopt magnification aids, while courses, exhibitions, and scientific studies were cited less frequently.[17]

When the reason for not using magnification devices was taken into consideration, 38% felt that the devices were too expensive, 29% attributed that it was time consuming, and 33% were not using them due to a lack of skill which was in accordance with the studies done by Farook et al. (2013)[18] and Meraner and Nase (2008)[14]who found that the majority of participants felt that the magnification devices were overpriced. A significant number of participants in this study gave their opinion that magnification aids should be reinforced at the undergraduate level of study.

Many participants have also felt at ease using magnification tools because it results in upgraded treatment quality while also cutting down on procedure time. It goes without saying that using microsurgical instruments help in reducing tissue trauma thereby enhancing the healing process and the quality of treatment.[19]

CONCLUSION

With the development of technology, the field of dentistry is evolving, and as a result, dental practitioners are more aware of and accepting novel treatment modalities. The results of the current survey-based investigation showed that although most people were aware of the use

of magnification in dentistry, it was very less implemented in routine clinical practice. Dental practices should strongly encourage the use of magnification devices to achieve high precision in microdentistry atleast either at postgraduation level or via workshops.

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Conflicts Of Interest: There are no conflicts of interest.

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