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Assessment of the Use of a Dental Mouth Mirror

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Abstract*: An assessment of the use of a dental mouth mirror among students of a dental school. A study was conducted to investigate the use of a dental mouth mirror among pre-clinical and clinical dental students in a private dental school. 20 questions were fabricated in the form of a questionnaire to evaluate the use of a mouth mirror first, among pre clinical students who were using the instrument as part of pre clinical exercises in Year II of dental school and second, among clinical dental students in Year III of dental school who had just begun to use the instrument in the treatment of patients. The use of a dental mouth mirror is important forseveral reasons including retraction, illumination and indirect vision. The results obtained indicate that while most students routinely used a dental mouth mirror, a few did not use a mirror to its full advantage during all procedures. This may be resolved by enabling students to understand the usefulnessof such an instrument in improving the ergonomics of dental treatment and enabling a better treatment outcome as a result of better visualization.*
Keyword:*Mouth mirror, retraction, visualization, illumination, indirect vision, dental school.*

I. Introduction:

The dental mouth mirror is one of the most common instruments used in dentistry. It finds a common place in the dental armamentarium for use in a variety of procedures in dentistry. The head of a dental mouth mirror is usually round and the most commonly used sizes are number 4 and number 5. A number 2 mirrorispopular where smaller sizes are used such as in the back of the mouth when space is limited or in the visualization of the pulp chamber. The three most important functions of the mouth mirror are retraction of the buccal and lingual soft tissues, indirect and direct visualization and illumination when used along with alight sources [1]. When used properly, a mouth mirror can improve the ability of the operator to see clearly, enabling better diagnosis and treatment [1]. This is achieved by a combination of all the advantages offered by a mouth mirror. In addition, a mouth mirror also helps better ergonomic position for the operator thereby preventing occupational injury [3].The use of a mouth mirror is therefore fundamental to most dental treatment and every dental student should ideally be taught to incorporate a mouth mirror as part of his pre clinical instrument use during various procedures. A student should thereafter ideally transition his use of thedental mouth mirror into clinical use during various treatment procedures on patients. The retraction of soft tissues using the mouth mirror is also of benefit to the patient as it helps to prevent the injury from instruments such as rotating burs.

II. Materials And Method:

A carefullydesigned questionnaire was prepared and distributed to 120 II Year and III Year students in Saveetha Dental College, a reputed dental school. The students were not obliged to return the forms but all respondents returned the form immediately. This emphasized the ease of filling the questionnaire andthe design of the questions. Students were generally asked what they found to be the most important use of a mouth mirror, the degree of training received in the use of one and their level of comfort with the regular use of a mouth mirror. Variables that could affect results such as year of study and gender were also recorded.Multiple questions regarding preference of size, use of a mouth mirror for specific functions and difficulties with use of a mouth mirror were also incorporatedinto the questionnaire. Statistical analysis was done using the Chi square test and used for comparison of data to generate results.

III. Results:

Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	57	47.5	47.5	47.5
	Female	63	52.5	52.5	100.0
	Total	120	100.0	100.0	

TABLE 1: Participation of dental students based on gender

Which year of study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	II YEAR	58	48.3	48.3	48.3
	III YEAR	62	51.7	51.7	100.0
	Total	120	100.0	100.0	

TABLE 2: Participation of dental students based on year of study:

Other than for diagnosis, where else do you use mouth mirror

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Retraction of soft tissues	20	16.7	16.7	16.7
	Illumination	1	.8	.8	17.5
	Vision	12	10.0	10.0	27.5
	All of the above	87	72.5	72.5	100.0
	Total	120	100.0	100.0	

TABLE 3: Opinion of dental students of use of mouth mirror other that diagnosis

How do you feel about your college training in using mouth mirror

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Adequate	76	63.3	63.3	63.3
	Inadequate	44	36.7	36.7	100.0
	Total	120	100.0	100.0	

TABLE 4: Opinion of dental students on the adequacy of college training

Do you prefer mouth mirror in all your procedures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	104	86.7	86.7	86.7
	No	16	13.3	13.3	100.0
	Total	120	100.0	100.0	

TABLE 5: Answers given by dental students regarding the regular use of mouth mirror

Most common reason not to use mouth mirror during procedure is?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Inconvenience	74	61.7	61.7	61.7
	Lack of practice	46	38.3	38.3	100.0
	Total	120	100.0	100.0	

TABLE 6: Reasons given by dental students for why they do not use mouth mirror

Do you prefer any particular mouth mirror size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	42	35.0	35.0	35.0
	No	78	65.0	65.0	100.0
	Total	120	100.0	100.0	

TABLE 7: Opinion of dental students regarding preference of mouth mirror size

While handling maxillary teeth do you use indirect vision

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	105	87.5	87.5	87.5
	No	15	12.5	12.5	100.0
	Total	120	100.0	100.0	

TABLE 8: Opinion of dental students on whether they use indirect vision

Do you think indirect vision plays an important role in ergonomics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	44	36.7	36.7	36.7
	No	76	63.3	63.3	100.0
	Total	120	100.0	100.0	

TABLE 9: Opinion of dental students on the mouth mirror's influence on ergonomics

Do you personally feel with practice indirect vision can be improved?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	111	92.5	92.5	92.5
	No	9	7.5	7.5	100.0
	Total	120	100.0	100.0	

TABLE 10: Opinion of dental students on whether indirect vision can be improved

According to the degree of illumination available in your work environment, do you think your indirect vision is affected?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	75.0	75.0	75.0
	No	30	25.0	25.0	100.0
	Total	120	100.0	100.0	

TABLE 11: Opinion of dental students on whether illumination affects indirect vision

While giving prosthesis/restoration do you observe any colour changes with indirect vision?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely	91	75.8	75.8	75.8
	Frequently	25	20.8	20.8	96.7
	Always	4	3.3	3.3	100.0
	Total	120	100.0	100.0	

TABLE 12: Opinion on usefulness of indirect vision to detect colour changes on prosthesis

Is your accuracy improved with indirect vision?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	60	50.0	50.0	50.0
	No	60	50.0	50.0	100.0
	Total	120	100.0	100.0	

TABLE 13: Opinion of dental students on improvement of accuracy with indirect vision

While using mouth mirror in the oral cavity, how do you defog your mouth mirror?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 way syringe	30	25.0	25.0	25.0
	Wipe with gloves	46	38.3	38.3	63.3
	Use cotton	44	36.7	36.7	100.0
	Total	120	100.0	100.0	

TABLE 14: Opinion of dental students on different ways of defogging mouth mirror

Do you sterilise your mirror after every use?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	114	95.0	95.0	95.0
	No	6	5.0	5.0	100.0
	Total	120	100.0	100.0	

TABLE 15: Answer on whether the mouth mirror is sterlised after every use

What is the shelf life of your mouth mirror?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 months	31	25.8	25.8	25.8
	4 months	43	35.8	35.8	61.7
	6 months	46	38.3	38.3	100.0
	Total	120	100.0	100.0	

TABLE 16: Opinion of dental students on the shelf life of the mouth mirror

Are you aware of any of the following different types of mouth mirrors?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Front surface	2	1.7	1.7	1.7
	Concave surface	4	3.3	3.3	5.0
	Plane surface	11	9.2	9.2	14.2
	All of the above	103	85.8	85.8	100.0
	Total	120	100.0	100.0	

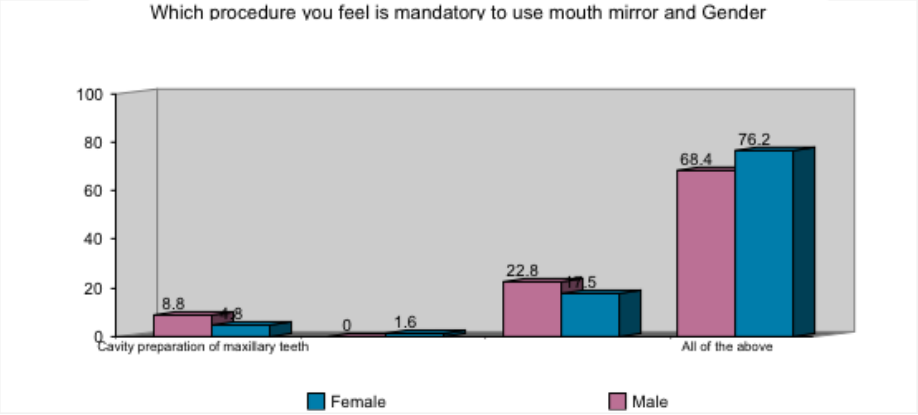
TABLE 17: Opinion of dental students on the awareness of different mouth mirror types

Which procedure you feel is mandatory to use mouth mirror?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cavity preparation of maxillary teeth	8	6.7	6.7	6.7
	Working on lingual surface of maxillary anterior teeth	1	.8	.8	7.5
	Tooth preparation of posterior teeth	24	20.0	20.0	27.5
	All of the above	87	72.5	72.5	100.0
	Total	120	100.0	100.0	

TABLE 18: Opinion on which procedure they feel is mandatory to use mouth mirror

	Male	Female
Cavity preparation of maxillary teeth	8.8	4.8
Working on lingual surface of maxillary anterior teeth	0	1.6
Tooth preparation of posterior teeth	22.8	17.5
All of the above	68.4	76.2



The results of the questionnaire were carefully analysed and tabulated according to variousparameters that were measure using the questions in the questionnaire. The results were analysed using the Chi Square test. The study included 57 males and 63 females adding upto120 questionnaires that were distributed as a result the study sample included 47.5% males and 52.5% females differentiated by year of study 48.3% of the respondents were IIyear students while 51.7% were III yearstudents. Most respondentsutilized the mouth mirror for most of its important functions such as retraction, illumination and vision. There was a marked preference howeverfor use of a mouth mirror mainly for retraction among those who did not use it for all three purposes.

With regard to adequacy of training to use a mouth mirror, only 63.3% of respondents felt adequately trained with regard to the use of a mouth mirror. 36.7% of respondentsstated that they did not feel adequately trained to utilise a mouth mirror. 61.7% of respondents actually found it inconvenient to use a mouth mirror and 38.3% expressed lackof practice as a reason for not using a mouth mirror. Nevertheless 86.7% of respondents actually preferred a mouth mirror in all their procedures and only 13.3% did not use one in all procedures.

With regard to the actual use of a mouth mirror, there was a wide variation in preference for a particular mouth mirror size with 35% of the respondent's preferringa particular size whereas 65% indicated no preference. When using a mouth mirror on maxillary teeth, a total of 87.5% percent of the respondents preferred to use the mouth mirror for indirect vision but only 36.7% of respondents actually thought that indirect vision played an important role in ergonomics. This was also indicated by the fact that 92.7% of the respondents that indirect vision could be improved with practice. 75% of respondents also felt that the degree of illumination available in their work environment directly influenced the quality on indirect vision. But only 50% of respondents felt that their accuracy would actually be improved. Only 3.3% of the respondentsused indirect vision to observecolor changes while giving a prosthesis or restoration. 20.8% of the respondents used a mouth mirror for this function frequently if not always, but the major 75.8% never used a mouth mirror for this purpose through indirect vision.

While using a mouth mirror in the oral cavity, it is common to see fogging of a mouth mirror either from water spray or patient breath. 38.3% of respondents used their glovesto wipe a mirror and clear the surface for better vision. 36.7% of respondents used cotton and only 25% of respondents used a 3-way syringe. With regard to the sterilizationofa mouth mirror after use, 95% of the respondents felt that it was important to do so

while the remaining 5% felt that it was unnecessary and did not do so. 38.3% of therespondents found that they were able to use a mouth mirror for at least 6 months while 35.8% found that they were able to use one for only 4 months. 25.8% felt that theycould use the mouth mirror for 2 months.

With regard to the availability of different types of mouth mirrors, 85.8% of respondents were aware of the existence of different mirrors with different surfaces. 9.2%were aware of only a plane surface while 3.3% were only aware of a concave surface and only 1.7% were aware of a front surface.

With regard to types of procedures that influence mouth mirror use, respondents were asked to comment on whether they felt mouth mirror was mandatory in cavity preparationof maxillary teeth, lingual surface of maxillary anterior teeth and tooth preparation of posteriorteeth. 72.5% of respondents used the mouth mirror for all three purposeslisted above. 20% felt that it was mandatory to use a mouth mirror during tooth preparation of posterior teeth, while 6.7% found it necessary for using it during cavity preparationof maxillary teeth. Only 0.8% of respondents found that it was mandatory to use the mouth mirror while working on the lingual surface of maxillary anterior teeth.

95.8% of respondents felt that their patients had no complaints regarding use of a mouth mirror, whereas 4.2% felt that they did have complaints. All of the respondentsindicatedthat their patients, if they had complaints, found it inconvenient to have a mouth mirror used.

IV. Discussion:

The study seemed almost equally balanced depending on the gender of the questions survey. There was only a minor difference between male and female respondents. In anycase the influence of gender on the use of the mouth mirror should ideally be very minimal, although it perhaps can be argued that females are more adept at the use of a mirror and are therefore possibly more likely to use a mouth mirror.

The study was also equally balanced with regard to II year pre clinical students and III year clinical students who were surveyed. This means that those using a mouth mirror in a pre clinical environment and those employing it for us in clinical dentistry on patients equally influenced the study.

72.5% of respondentsutilised the mouth mirror for all three functions discussed above 16.7% of respondents used the mouth mirror only for retraction. While 10% of respondentsuseda mouth mirror only for indirect vision, a disappointing 0.8% only used the mouth mirror for illumination [Table 3]. This suggests that most students are not using the mouth mirror to itsmaximum advantage and are either unaware of its potential for use or are simply not employing it for all its functions. The use of mouth mirror for retraction is undoubtedly one ofits common uses but the use of a mouth mirror for indirect vision should be something that every dental student uses it for. 17.5% of the respondents were obviously not using the mouth mirror for vision at all and this means that they are possibly working only with direct vision. Surprisingly, an overwhelming percentage of 63.3% of respondents were unaware of theergonomic advantages that the mouth mirror offered [Table 9]. This ergonomic advantage is obviously gained mostly through indirect vision, although retraction also plays a role [3]. These respondents are likely to have long-term injuries as a result of poor ergonomics and operating posture.

Poor ergonomics can also have an influence on treatment outcomes as well as the comfort of the patient during procedures. It could be argued however that 87.5% of respondents did use indirect vision when working on maxillary teeth even if they were unaware of the ergonomicadvantages that this offered. Nevertheless 92.5% of respondents felt that their indirect vision could be improved with practice indicating that a majority was not completely comfortable with the use of indirect vision [Table 10]. This could be for many reasons but one of the factors that emerge from this survey was that 25% of respondents were not aware thatthe degree of illumination in the work environment would affect indirect vision [Table 11]. 50% of respondents did not feel that indirect vision affected their accuracy whereas the reality is that several procedures in dentistry could only be performed accurately with indirect vision given compromised operating position in several situations [Table 13]. Surprisingly 72.5% of respondents feltthat it was mandatory to use indirect vision for cavity preparation of maxillary, working on lingual surfaces of maxillary anterior teeth and tooth preparation of posterior teeth[2].[Table 18]

Most respondents (75.8%) rarely used indirect vision to observe color changes with a prosthesis or restoration. These respondents were obviously unaware of the extended uses of indirect vision. There iscertainly scope to make students more aware of the advantages of indirect vision and focused training on the use of indirect vision will help many students incorporate thisergonomically useful technique into their clinical technique.

One of the most common difficulties with indirect vision is the fogging of the mouth mirror and all respondents seemed to use some technique or the other to wipe theirfoggedmirrors with most of them opting to wipe the mirror. Very few used the 3-way syringe although this is possibly a very common technique when assistance is available. Students couldpossibly be educated as well about the use of defogging sprays, which prevent a mouth mirror from becoming fogged by affecting surface tension of the mirror.

A few respondents (1.7%) were unaware of the existence of special types of mirrors, particularly front surface and concave surface mirror. The use of these special mirrors can enhance the accuracy factor that indirect vision brings to dentistry. It was also heartening to note that most respondents believed in sterilizing their mouth mirror after every use [Table 17]

However a large percentage of respondents were using mouth mirrors for a prolonged period. Mouth mirrors become easily corroded or the mirror surface developsscratchesfrom use. It is very important to replace mirrors regularly if one is to gain maximum advantage from using them. Good instruments also increase a clinician's ability to enjoyhis work and instruments that have been damaged affect the ability of a clinician to be accurate. This directly affects treatment outcome and results in professional dissatisfaction.

Most respondents in the study (95.8%) did not feel that patients had any complaints with regard to the use of the mouth mirror during the treatment procedure.A very small percentage of respondents mentioned that their patients found the use of mouth mirror inconvenient. The reality is that the mouth mirrors canactuallyhelp to make a treatment procedure more comfortable for a patient, if used correctly.

V. Conclusion:

The study clearly demonstrates deficiencies in the understanding of the use of a mouth mirror by dental students. There are also definite voids in the use of this very usefulinstrument even among respondents who clearly understand its advantages. It is therefore obvious that pre clinical education should focus on stressing the advantagesof use of mouth mirror while more pre clinical and clinical training is necessary to help students to clearly experience them. Dentistry often involves many years of long hours of intensely focused work in a poor ergonomic environment. The use of a mouth mirror particularly in indirect vision is probably the most importantskill that will save any dentist from ergonomic related injury. It is therefore an essential skill to understand and master.

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