



Comparative Evaluation Of Efficacy Of Various Anti Fog Agents To Prevent Hazy Vision On Mouth Mirrors - An Invitro Study

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Abstract

Brief Background

Mouth mirrors are one of the most common and significant instrument used in dentistry. The challenges of fogging mirrors have existed since mouth mirrors were introduced in dentistry. Several anti fogging agents as well as anti fogging mouth mirrors have been introduced to overcome the rate of fogging and improve visualization for the operators. So considering the daily and essential use of mouth mirrors this study was conducted to compare the efficacy of anti fogging agents to prevent the hazy vision on mouth mirrors.

Material And Methods

Sixty front surface mouth mirrors were used to check the efficacy of five different anti fog agents to prevent the hazy vision on mouth mirrors.

Results

On obtaining the results there was a statistical difference between the 5 agents used in the study.

The mean value and standard deviation obtained for Agent 5-Tobacco was found to be highest - 571 and 37.8 respectively whereas it was least with agent 1- saline. The time taken for fog to appear on the mirror was much later when rubbed once with tobacco leaves than any other agent.

Conclusion

The study showed clearly that tobacco can be one of the promising agent to prevent the hazy and blurred vision on mouth mirror thus decreasing the working time by operators and increasing their efficiency during work.

Keywords: mouth mirror, anti fog, fogging, clarity, vision

Introduction

Mouth mirrors are one of the most common and significant instrument used in dentistry. While conducting any routine examination or dental treatments dentists rely on mouth mirrors to see the working area accurately and without impinging soft tissues or hindering the field of interest. These are also effective in retraction of tongue, improve indirect visibility of limited areas in the mouth and

illuminate the workspace. They are used as indirect light sources that project illumination light on the treatment environment, aid to take precise photographs of difficult-to-reach teeth, used for tooth stimulation or to test tooth mobility of periodontally compromised tooth in our day to day work. It might be helpful in acting as an assistant to hold pieces of any filling material like gold or amalgam

before being dispensed into the cavity.[1] Different forms of mouth mirrors are usable like front surface, concave or flat plane surface. Dental mouth mirrors present a variety of problems in their use which may contribute to stress induced short-term or permanent disabilities[2]. Bad ergonomics is one of the most common cause and is strongly related to issues of mouth mirror FOGGING [3]. As patients inhale and exhale, the air forms condensation, creating fog on the mirror and distorting the pictured seen. The 'fogged' or 'smudged' vision reduces the accessibility of an often limited visual environment and poses a constant difficulty during the treatment procedures. Different approaches are available to overcome the problem of haziness of mouth mirror while working with patients. Some of them being-rubbing water on the surface of mouth mirrors or cleaning the mouth mirror on the buccal mucosa. An experiment performed by Dr. Peterson in 1997 published an article in JADA stating the use of heated water method in Potpourri pot to prevent mouth mirror fogging[4]. There are various commercially available anti fog mouth mirrors like Nuview's EverClear and anti fog agents like Dee Fog by Cetylite Company; Sunstars Americas called Clear Dip or Mirror-Wipe System from Holmes Dental, Mirror Magic solutions are available[2]. However, these commercially available products are difficult to purchase because of cost issues. Hence this study was conducted to compare the efficacy of various anti fog agents to prevent the haziness of the mouth mirror and reduce occupational hazard.

Materials And Methodology

An in vitro study was conducted to check the efficacy of 5 different anti-fog agents on haziness of the mouth mirrors in the department of Conservative dentistry and endodontics, College of dental sciences-

Time In Seconds

Davangere- Karnataka. Phantom heads were used in the present research, where tooth preparation was done on maxillary typodont central incisors under indirect vision using front surface mouth mirrors. Sixty front surface mouth mirrors were allowed to be dipped in each of the anti fog agents for 5 seconds to act as surfactants. The mouth mirrors were divided into groups of 12 each based on the different anti fog agents used in the study.

The anti fog agents were:

AGENT 1-Normal saline

AGENT 2- Chlorhexidine mouth wash AGENT 3- Johnson baby shampoo AGENT 4-NT FOG spray

AGENT 5- Tobacco.

The time period required for haziness of vision to occur on the mouth mirror was measured for each agent in seconds using stop watch. Statistical research was conducted using One Way ANOVA; f and p values were determined. The results were analyzed using version 21 of the SPSS and the Descriptive Figures were used for analysis purposes. $P < 0.05$ was considered to be statistically significant.

Results

According to results the mean value and standard deviation obtained for Agent 5-Tobacco was found to be highest - 571 and 37.8 respectively. Whereas the least mean value and standard deviation obtained was for Agent 1- Normal saline- 6.2 and 1.7 respectively. f value - 1346.4 p value - .0001 were found to be statistically significant for Agent 5 -tobacco. The average time duration for first fog to appear on the mouth mirror after being rubbed with the dried tobacco leaves was 9minutes 51 seconds (571 sec) whereas the first fog appeared in just 6 seconds when dipped with normal saline.

TABLE 1

MOUTH MIRROR NUMBER	AGENT 1-NORMAL SALINE	AGENT 2-CHLORHEXIDINE MOUTHWASH	AGENT 3-JOHNSON BABY SHAMPOO	AGENT 4-NT FOG SPRAY	AGENT 5-TOBACCO
1.	6	31	50	360	548
2	5	32	52	380	532
3	3	31	53	400	611
4	10	50	49	320	534
5	6	50	47	400	560
6	8	46	48	350	611
7	5	50	50	413	582
8	6	48	70	345	548
9	6	36	52	367	555
10	7	28	42	410	523
11	6	32	41	329	632
12	7	21	50	427	617

TABLE 2

AGENT NAME	MEAN VALUE	STANDARD DEVIATION
Normal saline	6.2	1.7
Chlorhexidine mouthwash	37.5	10.2
Johnson baby shampoo	50.3	7.2
NT fog spray	375	35.1
Tobacco	571	37.8

FIGURE1- Clarity on mouth mirror after being rubbed with dried tobacco leaves



Discussion

A lack of visibility in the visual area contributes to dissatisfaction and a rise in working hours for clinicians. Until the time, insufficient evidence and work have been conducted on the steps to be taken to minimize haziness in the mouth mirrors. Most surfactants become readily available when applied at a lower concentration of adsorbents on the water, which in effect changes the free energy barrier. This decreases surface tension and creates a non-dispersing water layer as opposed to separating droplets. Several experiments have been performed for LLF (Laparoscopic Lens Fogging)[5] utilizing techniques such as heat range, surfactants such as chlorhexidine, betadine, immersion in hot saline or FRED (Fog reduction and elimination device) anti fog solution with documented and satisfactory performance.[6] Johnson Baby shampoo has also been found to be an effective anti-fogging agent during nasal endoscopy relative to other commonly available anti- fogging agents as its easily available and causes less nasal irritation.[7] Such agents adopt a mechanism to minimize surface tension by avoiding the condensation of water droplets. Using the same principle, these strategies were considered to be separate agents in the present analysis. Tobacco plant belongs to Nicotiana genus and the Solanaceae (nightshade) family. More than 70 species of tobacco are known, but the chief commercial crop is *N. tabacum* and the more potent variant *N. rustica* is used around the world. Tobacco is a plant which is dried and fermented into various tobacco products. The World Bank Report, says out of the 33 million

people are engaged in tobacco farming, 3.5 million are in Indians making India third largest producer of tobacco in the world[8]. Stewart in 1860 mentioned the ‘successful’ uses of tobacco against poisonous reptiles and insects, used in constipation and diarrhoea when administered through rectum or in nasal polyps through inhalation, thus helping in alleviating pain[8]. Nicotine being one of the most important ingredient and the only active medicinal constituent present in tobacco is anti-herbivore alkaloid which is responsible for reducing the surface tension on the mouth mirrors hence providing a clear vision for longer period of time. This in turn helps in reducing the stressful hours while working with mouth mirrors. The other advantage is its easy availability and accessibility. The clarity on the mouth mirror is improved as well the operator can work more efficiently for several hours. Hence this study proves that tobacco gives more promising results than the other 4 agents used in the study.

Limitations Of Study

1. The agents in the study were not blinded
2. The agents were not present in a single form
3. No scientific cause known behind tobacco being used as an anti fog agent.

Conclusion

Its been rightly quoted - “You cannot do well if you cannot see well.” Despite the lack of evidence there are presently various methods used in dentistry to prevent the appearance of fog on mouth mirrors. The results obtained from this study showed that tobacco

leaves took maximum time to form fog on mouth mirror than any other agent used in the study. Hence it can be concluded that Tobacco is one of the promising agent having the capacity of giving clearer vision for an extended period of time. However further studies are required to identify the exact chemical responsible for its permissible use in a clinical scenario. Since this research was conducted in vitro I would like to further carry out in vivo study to know the impact of tobacco as anti fog agent.

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