



Modified Device For Better Accessibility And Isolation

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Abstract

While this arrangement would normally be acceptable, there is often need to isolate the area. A third hand then becomes essential, usually of an assistant to direct the suction tip in the patient's mouth. Therefore, it is important to develop a unit consisting of components that are modified to perform functions simultaneously in the limited area available and provide effective moisture control that will on the whole provide quality treatment to the patient. Another problem encountered during dental procedures is moisture contamination. Even though rubber dam is accepted as the most effective way of isolation, there is pooling of saliva in the mouth beneath the rubber dam as well as accumulation of irrigants used during the procedure above the rubber dam, both of which require the suction. This led to the development of the modified suction with flexible mirror and dual suction tip.

Keywords

Isolation, Mouth mirror, Suction, Rubber dam

Introduction

Any dental procedure requires adequate vision and access which are often impaired by the lips, cheek, tongue, saliva and the patient's inability to open the mouth. The standard hand-held dental mirror is a useful aid for retraction, illumination and indirect vision essential for diagnosis and precise tooth preparation (Vlazny 1984)

It is difficult for dentists and particularly challenging for dental students to perform procedures on the maxillary arch while operating unassisted. One hand is used to hold the mirror while the other is used to either hold the airtor or hand instruments. While this arrangement would normally be acceptable, there is often need to isolate the area. A third hand then becomes essential, usually of an assistant to direct the suction tip in the patient's mouth (Dental assisting ,ADA 2006)

However, dental schools and small dental setups do not always have the personnel available at that point of time to assist in such situations (Widstrom et al 2010).It is therefore desirable to provide means by which the

practitioner alone may control the tools for performing the dental procedure, the suction tip and a mirror simultaneously.

Another problem encountered during dental procedures is moisture contamination by saliva, blood, the gingival crevicular fluid, water from the rotary instruments or the 3-way syringe. The currently used methods for moisture control are suction tips, high volume evacuators, cotton rolls, rubber dam, pharmacological intervention etc. Even though rubber dam is accepted as the most effective way of isolation, there is pooling of saliva in the mouth beneath the rubber dam as well as accumulation of irrigants used during the procedure above the rubber dam, both of which require the suction. Excessive drooling may cause angular cheilitis. When 5.25% NaOCl (Pashley *et al.*, 1985) comes in contact with vital tissues, it may cause haemolysis, skin ulceration, marked cell injury in endothelial cells and fibroblasts, and inhibition of neutrophil migration. As there is a single suction tip available, rubber dam may have to be removed or the suction tip has to be adjusted to go beneath it as and when required, both of which take up vital time of the dentist.

Case Report

Case 1

Treatment plan included caries excavation followed by restoration. During caries excavation it was difficult to access and visualize the distobuccal area. Vision was also hindered by the thick buccal pad of fat (Fig 1). The close approximation of buccal pad of fat to the prepared cavity lead to moisture contamination during adhesive restoration. The procedure requiring simultaneous use of suction also becomes difficult without the presence of a dental assistant. Due to the limitations of the conventional equipments it was imperative to develop an apparatus to improve working efficiency specially in

such cases. This led to the development of the modified suction with flexible mirror which was fabricated as follows:

Modification of Mirror and Suction Apparatus

The unit consisted of a Y-shaped connector attached to a suction unit wherein one end is attached to a mirror with a flexible shaft (made of the conventional suction tip) which can be bent to access the desired areas, and the second end is attached to a suction tip that clears the saliva, water, blood etc from the field of operation (Fig 2).

Thus, the flexibility of the shaft of the mouth mirror allowed it to be bent to gain the desired access and was stabilized in position at the same time. Having the suction attached to the mirror also reduced the number of hands needed for the procedure. Not only did the modified apparatus improve the efficiency of the treatment provided in the case, it was also easy to fabricate.

Case 2

The patient had medical history of Parkinson's disease and thus, drooling of saliva was expected during the procedure. Clinical and radiographic examination revealed caries involving the pulp necessitating root canal treatment. As we began with the procedure under rubber dam, excessive drooling of saliva was seen which necessitated the need for suction below the rubber dam. The suction tip was needed to remove the irrigating solutions from above the rubber dam, having a single suction tip was not sufficient. Thus, a modification of the suction apparatus was needed which was fabricated as follows:

Modification of Suction Apparatus

The unit consisted of 2-in-1 attachment to a suction unit wherein both the ends consist of suction tips which can be placed both above and below the rubber dam

(Figure 2). The procedure was completed in a well isolated environment rendering efficient & comfortable treatment of patient.

Discussion

The most difficult areas to visualize during operative procedures are the distofacial surfaces of the maxillary & mandibular posterior teeth as well as distolingual surfaces of the mandibular posterior teeth (**Dis and Zitterbart, 1996**). A mouth mirror and suction are important units involved in the visualization of the operating field and to use them effectively it requires added assistance from an assistant or the patient. Also, the posterior most areas of the oral cavity are not visualized due to the rigid orientation of the mouth mirror. Therefore, the present modification was performed with the objective of overcoming the limitations and disadvantages of the conventional instruments. The flexible shaft of the mirror helps to adjust vision for the particular tooth receiving treatment. Articulated mirror attachment for dental suction tips (**John, 1993**) (**Patent number: US5230622A**) was previously developed based on the concept of a ball and socket joint for movement and flexibility of the mirror. However, a ball and socket joint confines the movement only in the axial direction leaving the most distal parts of the oral cavity inaccessible. Similarly, the combined dental mirror and suction instrument (**Schein, Catalog and Mirrors, 1991**) (**Patent number: USD320075S**) that was also developed previously had a suction inbuilt within the handle which could have the disadvantage of debris clogging the inlet. A reverse-angle dental mirror (**Dimashkieh, 2002**) has a shaft angulated at 45 ° which is not flexible. As authors stated, some amount of practice may be required to visualize the occlusal

surfaces of teeth with the modified mirror because of the altered angulation.

In addition to the above, in order to address the problem of moisture control when rubber dam is used, the second component of the unit was developed having a dual suction tip attached to the suction unit one end of which can be placed beneath and the other above the rubber dam providing simultaneous moisture control in these areas. A case of accidental skin injury caused by leakage of sodium hypochlorite solution from the rubber dam during root canal preparation has been reported. Even after placement of a rubber dam and initiation of root canal treatment, the patient often complained of a burning sensation following sodium hypochlorite irrigation(**Semra, Serper and Murat, 2004**). Another case of buccal mucosa necrosis due to leakage of 3% NaOCl through the rubber dam during the root canal treatment procedure of 46 and irrigation with 3% sodium hypochlorite has also been reported (**Deliverska, 2016**).Such situations can be avoided using the dual suction device.

The sippessor it is a commercially available suction device, which is controlled by the patient and the device can be turned on and off as and when required by the patient. However, the device is not compatible with the rubber dam system as it does not take care of the fluids accumulating over the rubber dam and is also a quadrant specific device.

Therefore, the present modifications having a mirror with a flexible shaft with an attached suction and the dual suction tip components alleviates many limitations in terms of accessibility to most areas of the mouth and reduces the number of hands required for efficient work. The dual tip suction can be used with the rubber dam for complete moisture control.

The clinical applicability and reliability of the unit was also checked among the practitioners in terms of visibility, ease of access to difficult areas, time required for treatment, comfort of the operator and patient and was compared with the conventional technique and the results were found to be promising. However, the clinical use needs to be evaluated among larger number of practitioners and also the material aspect of the unit can be researched upon to optimize its intended use. The components need to be further refined in terms of design and compatibility for infection control .

Conclusion

A good armamentarium facilitates efficient working by dentist which in turn improves the quality of treatment rendered. The modified armamentarium consisting of the flexible mirror attached to the suction as well as the dual suction tip has many advantages of being easy to fabricate, improved accessibility, providing additional isolation thereby improving clinical efficiency of treatment. This product has received a provisional patent.

References

1. deliverska, E. (2016) 'Oral Mucosa Damage Because Of Hypochlorite Accident – A Case Report', 22(3).
2. Dimashkieh, M. R. (2002) 'A Reverse-Angle Dental Mirror', (March), Pp. 345–346. Doi: 10.1067/Mpr.2002.122009.
3. Dis, M. L. Van And Zitterbart, P. A. (1996) 'Clinical EVALUATION Of AN ILLUMINATED Dental MIRROR', Pp. 180–185.
4. John, S. (1993) 'United States Patent (19)', (19).
5. Pashley, E. L. *Et Al.* (1985) 'Cytotoxic Effects Of Naoci On Vital Tissue Efecto Citotoxico Del Naoci En El Tejido Vital', 11(12), Pp. 30–33.

6. Schein, H., Catalog, D. And Mirrors, I. (1991) 'United States Patent 19 Sheet 1 Of 2'.
7. Semra, C., Serper, A. And Murat, O. (2004) 'Accidental Sodium Hypochlorite-Induced Skin Injury During Endodontic Treatment'.
8. Brochure For Dental Assisting ,ADA 2006
9. Vlazny Et Al, Quintessence Int. 1984; 15 659-661