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Modified apparatus for improved access and isolation

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Abstract

The standard hand-held dental mirror is a useful aid foretraction, illumination and indirect vision essential for diagnosis and precise tooth preparation. 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 airotor 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. 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

The oral cavity is a complex area to work, considering the space available to accommodate the tools required for rendering an effective treatment. 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 airotor 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.

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.

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.

Case Report

Case 1: 41 year old male patient, presented to Department of Conservative dentistry and Endodontics, FDS, RUAS, Bangalore with a complaint of food lodgment in upper right posterior region. On clinical and radiographic examination, the tooth was diagnosed as reversible pulpitis. 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

Case 2: 69-year-old male patient reported to the clinic with the complaint of pain with respect to lower left back tooth region. 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:

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. 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% Nalco 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 suppressor 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.

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.

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