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The Utility Model Relates to a Branch Salivary Suction Device for Oral Cavity

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Abstract: Background: In the process of dental diagnosis and treatment, a large number of pathogenic microorganisms and aerosols in the mouth of patients are easy to spread into the office, resulting in microbial contamination of the office air. In order to reduce the formation of droplets and aerosols and reduce the dissemination of blood and saliva, negative pressure suction is usually used to reduce most of the aerosols. Objective: In order to reduce the formation of droplets and aerosols and the dissemination of blood and saliva, a branch saliva suction device with both strong and weak suction functions is needed. Methods: A branch saliva suction device with both strong and weak suction functions was designed. Including grip, extension rod, bending pipe, strong straw, pressure sensor, hard pipe, weak straw, sliding block. By inserting a weak straw at the outside of the extension rod, and setting a strong straw at the end of the extension rod, the strong straw and weak straw are combined, so as to improve the applicability of the device and facilitate the user to operate with one hand. By setting a sliding block on the outside of the extension rod, the sliding block can be connected with the outside of the weak straw, and the length of the weak straw can be freely adjusted according to the need, which is convenient to adjust the weak straw, and at the same time, the weak straw can be collected. Results: A branch oral salivary suction device was designed to improve the efficiency of diagnosis and treatment and the comfort of patients. Conclusion: To design a branch saliva suction device for oral use.

Keywords: Salivary Suction Tube, Branch, Sliding Block

1. Introduction

The salivary aspirator is an indispensable instrument in the process of oral diagnosis and treatment. Due to the widespread use of high-speed turbines, ultrasonic dental cleaners and high-pressure cooling water, a large number of pathogenic microorganisms in the mouth of patients and aerosols produced by cutting teeth are easy to spread into the clinic, leading to microbial pollution in the air of the clinic [1]. In order to reduce the formation of droplets and aerosols and the diffusion of blood and saliva, the use of strong suction can reduce most of the aerosols, but the oral mucosa is fragile, and the strong suction head is close and easy to cause mucosal damage. Therefore, a weak suction tube is needed to suck out the patient's saliva, cooling water, and blood to keep the oral surgical field clear. In addition, during the process of filling or planting teeth, the existing saliva suction tube can easily suck out the expensive bone powder while sucking out the blood. At present, strong suction and weak suction are needed in clinical operation, but it is inconvenient for doctors to operate with a single hand, which takes time and effort. Therefore, a branch mouth saliva suction device with both strong suction and weak suction functions was designed.

2. Materials and Methods

In the process of treatment, the dentists need to make the saliva suction tube suck out the saliva in the mouth cavity. The traditional saliva suction tube is a head, which is less efficient. The branch salivary suction device for oral use includes an extension rod inserted at the front end of the grip, and the end of the extension rod is connected with a bending pipe. One end of the bending pipe is connected with a strong straw, and the bottom of the grip is installed with a pressure sensor for detecting the pressure intensity. The inside of the extension rod is arranged with a fanned hard tube, and the side of the hard tube is inserted with a weak straw, the outer wall of the weak straw is connected with an arc slide block, the outside of the extension rod is extended up and down the chute, the slide block is located in the inside of the chute, the back end of the weak straw is connected with the connecting pipe installed in the handle through the bellow. It can ensure that the weak straw is always connected with the connecting pipe in the process of moving up and down, so as to maintain the stability of the suction of the weak straw. The outside of the grip has a non-slip bulge, which can prevent the grip from separating from the hand of the staff and improve the stability of the connection. The outside of the handle has a groove, and the inner wall of both sides of the groove has an inward sloping guide groove, and a disk-like sliding wheel is installed between the two groups of guide grooves. With an inward-sloping guide slot, the spacing between the sliding wheel and the hard tube can be adjusted as the pulley slides.

3. Results

A branch oral salivary suction device was designed to improve the efficiency of diagnosis and treatment and the comfort of patients.

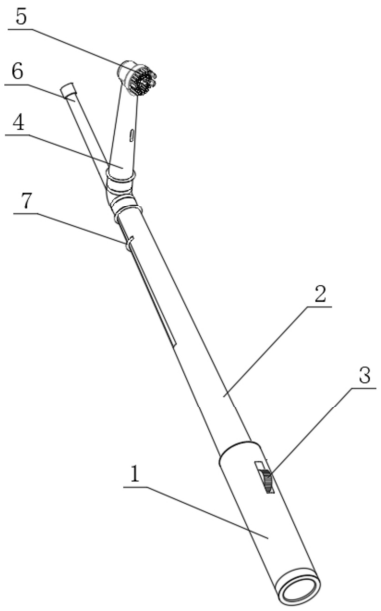

Figure 1. *1. Handle; 2. Extension rod; 3. Sliding wheel; 4, strong straw; 5, end; 6. Weak straw; 7. Sliding block.*

When in use, the external end of the strong straw is in contact with the user's oral cavity, and the rubber contact set outside the end of the end is in contact with the inner wall of the user's oral cavity. The liquid in the patient's mouth enters the outside of the liquid inlet tube through the gap between the rubber contacts, and then enters the hard tube from the liquid inlet tube. Other objects in the mouth cannot enter the liquid inlet tube, which can prevent the liquid inlet tube from being blocked. Improve the stability of the device when used.

4. Discussion

Iatrogenic infection in stomatology department is not only a local problem of oral instrument infection, but also an important part of the contamination of dental unit waterline system. [2] Water and aerosols emitted by mobile phones and dental cleaners are easy to cause air pollution. The first function of saliva absorption is to avoid air pollution [3-4]. The second function of saliva suction is to make the patient more comfortable; the patient's mouth is constantly secreting saliva, and the exudate and secretion in the mouth are removed to avoid the patient sitting up frequently [5-6].

By inserting a weak straw on the outside of the extension rod and setting a strong straw on the end of the extension rod, it can combine strong suction and weak suction well, so as to improve the applicability of the device and facilitate the user to operate with one hand [7-8]. By setting a sliding block outside the extension rod, the sliding block is connected with the external connection of the weak straw, and the length of the weak straw can be freely adjusted according to the need, which is convenient to adjust the weak straw and accommodate the weak straw at the same time [9].

By setting a groove with a sliding wheel on the outside of the handle, the suction of the weak straw can be adjusted according to the need to improve the applicability of the device [10]. The rubber contact and liquid inlet pipe are arranged outside the end, which can prevent the liquid inlet pipe from being blocked and improve the stability of the device when used. By setting the rubber tube at the bottom of the weak suction, the rubber tube corresponds to the sliding wheel, which can reduce the air volume of the weak straw and reduce the suction when the sliding wheel is squeezed inward [11-12]. The groove is opened close to the weak straw, and the outer wall of the sliding wheel is fitted to the weak straw. When weak straws needed to be used, the sliding block was pushed up manually so that the weak straws moved up together and out of the extension rod [13]. Therefore, the connecting tube is connected with the saliva suction device before use, so that the suction generated by the saliva suction device acts directly on the weak straw and the hard tube, and then the user can use the weak straw and the strong straw at the same time, and can be operated with one hand [14].

5. Conclusions

The salivary suction technique refers to the use of a saliva

suction device to suck away water mist, debris, blood and saliva in the oral cavity during the process of oral diagnosis and treatment, so as to maintain a clear operating field and assist the smooth operation [15]. A branch saliva suction device for oral use combines strong suction and weak suction, which is convenient for operation; In addition, the length of the weak straw can be adjusted as needed, and the suction force of the weak straw can be adjusted as needed, which improves the quality of treatment.

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References

[1] World Health Organization. Considerations for the Provision of Essential Oral Health Services in the Context of COVID-19: Interim Guidance, 3 August 2020. World Health Organization; Geneva, Switzerland: 2020. pp. 1–5.

[2] Matys J, Grzech-Leśniak K. Dental aerosol as a hazard risk for dental workers [J]. Materials (Basel), 2020, 13 (22): 5109. doi: 10. 3390/ma13225109.

[3] Ortega K., Rech B., El Haje G., Gallo C., Pérez-Sayáns M., Braz-Silva P. Do hydrogen peroxide mouthwashes have a virucidal effect? A systematic review. J. Hosp. Infect. 2020; 106: 657–662.

[4] Peng J., Sun J., Zhao J., Deng X., Guo F., Chen L. Age and gender differences in ACE2 and TMPRSS2 expressions in oral epithelial cells. J. Transl. Med. 2021; 19: 1–11.

[5] Ogeswaran S., Muthumalage T., Rahman I. Comparative Reactive Oxygen Species (ROS) Content among Various Flavored Disposable Vape Bars, including Cool (Iced) Flavored Bars. Toxics. 2021; 9: 235.

[6] Watanabe A, Tamaki N, Yokota K, et al. Monitoring of bacterial contamination of dental unit water lines using adenosine triphosphate bioluminescence [J]. J Hosp Infect, 2016, 94 (4): 393-396.

[7] Fleres G, Couto N, Lokate M, et al. Detection of legionella anisa inwater from hospital dental chair units and molecular characterization by whole genome sequencing [J]. Microorganisms, 2018, 6 (3): 71.

[8] Lizon J, Florentin A, Martrette JM, et al. Microbial control of dental unit water: feedback on different disinfection methods experience [J]. Am J Infect Control, 2016, 44 (2): 247-249.

[9] Dahlen G. Biofilms in dental unit water lines [J]. Monogr Oral Sci, 2021, 29: 12-18.

[10] Hamilton KA, Kuppravalli A, Heida A, et al. Legionnaires' disease in dental offices: quantifying aerosol risks to dental workers and patients [J]. J Occup Environ Hyg, 2021, 18 (8): 378-393.

[11] Li-Wei Lin, Chee-Fah Chong. Saliva ejector assisted laryngoscopy (SEAL) for protective intubation [J]. American Journal of Emergency Medicine, 2020, 43.

[12] Muramoto Takashi, Aoki Ayumi, Suzuki Yuichiro, Hishida Maki, Ohata Ken. Continuous saliva suction tube to prevent aspiration pneumonia during upper GI endoscopy [J]. VideoGIE, 2020.

[13] Hatta W., Koike T., Okata H., et al.: Continuous liquid-suction catheter attachment for endoscope reduces volume of liquid reflux to the mouth in esophageal endoscopic submucosal dissection. Dig Endosc 2019; 31: pp. 527-534.

[14] Watari J., Tomita T., Toyoshima F., et. al.: The incidence of "silent" free air and aspiration pneumonia detected by CT after gastric endoscopic submucosal dissection. Gastrointest Endosc 2012; 76: pp. 1116-1123.

[15] Katzka D. A., Smyrk T. C., Chial H. J., et. al.: Esophageal leiomyomatosis presenting as achalasia diagnosed by high-resolution manometry and endoscopic core biopsy. Gastrointest Endosc 2012; 76: pp. 216-217.