



Cutting the Guttapercha in the root canal

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ABSTRACT

As you know, in the canal tooth, After the removal of the nerve, the nerve canal was created to replace gutta-percha. For cutting the excess points, in traditional method, they use heat. In this system, exactly like a traditional one, we used heating for cutting the points but it has some differences. In this model the temperature does not apply on the rod and the generation of heat is very low. Because the hot spot is small with low surface area, greater length of the rod can be kept by the doctor, so it causes to increase his focus and bring the cutter into the correct place. By this device the mouth of the patient does not damage and reduce the risk of burns in the mouth caused by a lack of physician dominance that reducing the stress-induced in patient. Another reason for rejecting the traditional system is infected but this device can be sterilized in an autoclave.

Key words: cutting, guttapercha point, canal, dentist, autoclave

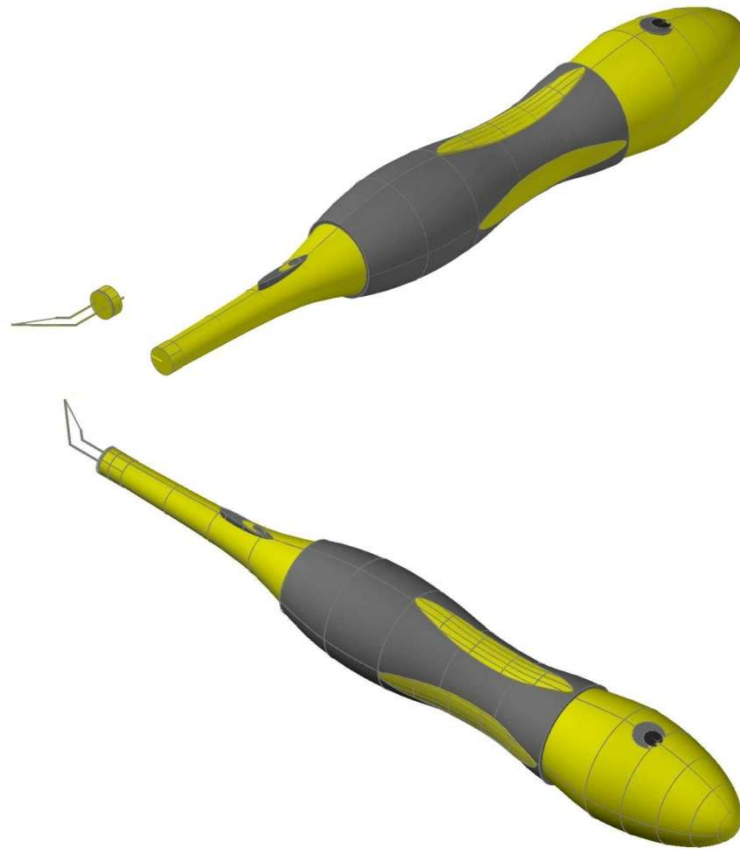
INTRODUCTION

The guttapercha cutter is made of a body and a interchangeable head. In the head part, a wire with high resistance was used as the point for producing thermal energy. The majority of this device is that it converts electrical energy into heat energy by nickel-cadmium batteries. By holding the start button that is placed on the body, the wire becomes warm up to 60°C less than 2 seconds and it becomes cool immediately when you hold it off. Therefore in a shortest time, it produces the best temperature in the low surface area and the most efficiency. This device is wireless and its weight is around 50gr that makes it more suitable for operations. Using the rechargeable nickel-cadmium batteries in a comparison with alkaline batteries that is not recycled after using causes that it is economical. When it is full charged it can be used at most 50times. In addition the dentist doesn't need any co-worker for the operation. This device gets all recognized international standards for medical devices. Voluntarily it's used in some dental specialty clinics such as Dental Clinic in faculty of dentistry of Babol university, Jaam-e-Jam boarding dental clinic in Sari and so on in Mazandaran province, Iran.

SCIENTIFIC DESCRIPTION

In process of canal, the hole in the root can be reached after cleaning and removing the caries. These canals should be formed after cleaning from microbes and nerves. The hole of the nerves must be replaced by the gutta-percha. Filling tooth is so important because if it's not filling well, it will be caused the treatment with failure. As regards, in traditional method, the points should be cut by a metal rod that is heated with alcohol burner because the depths of the teeth is different from one tooth to another and also the height of the gutta-percha points are the same that makes a lot of problems. Generally, cutting by heating that is reached experimentally by the dentists is a useful way. A gutta-percha gum is made from tropical trees. The best way for cutting and forming these points is heating. Using a metal rod that is heated by the alcoholic burner causes that the whole rod becomes warm, burns the operator's hand and reduces his focus when he wants to put the rod in the mouth of the patient. It may damage the inner lining of the oral cavity and cause burns. There may also be approached to induce stress with a hot body in the patient's mouth and most importantly, it is possible to localize the cross bar too low to operate the hot rod and it may cause damage to the enamel at the canal. In order to solve this problem, we decide to design and produce the gutta-percha cutter. In this device the electrical energy which is reached by nickel-cadmium batteries change to thermal energy by holding the start button that is placed on the body. The

wire that is placed on the head becomes warm up to 60°C and less than 2 seconds it becomes cool immediately when you hold it off. As a result, because of the low surface area of the head of the device, it provides easy access to the canal and the points of the gutta-percha would be cut at the right place.



What problem does it solve?

In traditional method used hot metal rod by a bunsen burner that creates lot of problems, including ; in this method all the rod is hot and In contact with the teeth and the other sides of the point, which no need to cut may be affected by heat while heat is needed just to cut a small point that this large surface area reduces the efficiency of the operation. also, since the entire length of the metal rod will be hot and may burn the doctor and thus to heat the metal rod the doctor had to keep the end of the rod which leads to lack of focus in importing and delivering rod to the desired point. Meanwhile, it may burns the inner lining of the oral cavity of the patient. Another thing that can be noted is that using a metal rod heated by a bunsen burner can be a factor for enter the infected microorganisms to the patient's mouth. mean while the patient is afraid of hot rod close to his/her mouth by the doctor the induction of stress can be very annoying and abusive for the patient. In this invented device used heat generated to cut the base like traditional system and the difference is that the heat does not apply on the rod and the time required to generate heat is very low and also heads can be sterilized in an autoclave and the patient does not have to stress about getting hot body in his/her mouth. In this system cause of having little hot spot with a low surface area, more of the device can be kept by the doctor thereby increasing his control to focusing and deliver the cutter to the goal area. Heat was applied localize and caused to maintain the enamel in endodontic therapy and the patient's mouth doesn't injure and reduce the risk of burns in the mouth that can be caused by lack of doctors dominance.

INNOVATION

This devices' operating system is generating heat by electronic power with this innovation that used a wire with high electrical resistance to produce energy. This way, when the voltage(this voltage is not harmful and palpable in any way) due to the wires' Losses passes through the wire with high electrical resistance, the temperature is ideal for cutting in less than two seconds, thus, in the shortest time, the most suitable temperature in the minimum surface area provides maximum efficiency. This cut is quite precise and secure. the head of this device provides an easy access to the tooth cavity and the extra sections of guttaperchas' points can be cut exactly in the respective channels. reach to the desired temperature in less than two seconds by keeping the corresponding button and immediately cooled by

release the button. This method Prevents loss of filler material. This device is wireless and weighs only 50 grams so that will be easier to control in the doctors' hands. Cause of using nickel-cadmium rechargeable batteries in this system in comparison with other devices that using alkaline batteries (which are discarded after expire) are more affordable in terms of economic. The batteries which are used have 1000 mAh and 1.2 V voltage , 50-60Hz frequency , 1.5 watts power and have a charger with 220-240 volt. When charging is completed the device can be used up to 50 times. meanwhile, the doctor does not need any assistant for this operation. the device according all recognized international standards intended for medical devices. In number of dental clinics of mazandaran province.

The difference with other samples

In foreign cases of this device (Such Coxo, Endo remover, etc.) to produce heat energy from electrical energy have attempted to build a metal alloy so that the electrical resistance increases. While this reduces the mechanical strength and make alloy leads a higher cost and increase the cost of their production. While this despite in this developed device the wire with high strength is used as a substitute that there is no alloy with low mechanical strength. in addition, these wires are available in abundance in the domestic markets , their price is so low , production process is simple and consequently, the cost is very low and the sample is incomparable with its foreign sample. this device in the shortest possible time (less than two seconds) provides the most appropriate temperature (60°C) with minimal cross-sectional area and maximum efficiency.

Descriptions about the inventions' commercialization and surplus value:

Samples of relatively similar foreign products have failed to provide the required performance due to high price and also the difficulties that there are in their operation and after sale services. While this invention can be an excellent alternative for foreign samples due to its very low price, removing the foreign sample problems and applying innovative by using high resistance wire. Meanwhile, we can so increase our country's foreign exchange earnings and Prevent the loss of foreign exchange serves, provide causing the realization of the supreme Leader's order to domestic production with exporting this device. Considering that most of our dentists prefer the traditional way due to the high costs of foreign devices can be expected good market will be for this invented device and It should be noted that the questionnaire was published in the dental clinics shows that great demand is for the use of this device and even some of dental clinics in Mazandaran province (such as Jaam-e-Jam boarding dental clinic, Dental Clinic in faculty of dentistry of Babol university ,etc) voluntarily use this device and expressed satisfaction from the performance and have confirmed it in writing. Estimate the price of the product in industrial scale by taking the appropriate number of production reaches about 50,000 Tomans and market supply price will be under 100,000 Tomans. It should be noted that this product is approved by Babol university of medical sciences, general directorate of medical equipment, development and health center of mazandaran university of medical sciences and NoavaranTeb-Tabarestan company is building its industrial prototype.

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