

Past And Present Status Of Ultrasonic Scaling- From Then To Now – A Mini-Review


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Introduction

Periodontal therapy and treatment focus at ceasing the infection and thereby maintaining a healthy periodontium. Regular mechanical removal of microbial biofilms found sub gingivally is obligatory for management of inflammatory periodontal conditions. Mechanical periodontal therapy comprises of gingival curettage, root planning and scaling.

Historical Perspective

There were a lot of works committed in the field of surface mechanics of ultrasonic scaling. During 1950's there was introduction of first commercially available ultrasonic equipment used for cleaning of tooth surface, which later came into use as a relatively inexpensive home instrument in the 1970's. Since decades, the industrial use of ultrasonic scaling, in cleansing of complex areas and increasing the procedures for treatment of the surface has shown to have promising results. During the last era of the 19th century, Curie brothers reported the efficacy of piezoelectric pressure of several crystals, that was used as a property for manufacturing of ultrasonic devices combined with advanced characteristics. In spite of the fact that, the first ultrasonic instrument came into existence since 1950, the first application in dentistry in general and periodontics in particular was during 1957 with introduction of Cavitron®, manufactured by Dentsply for doing adequate mechanical removal of calculus[1-3].

During 20th Century with the introduction of ultrasounds in dentistry, the initiation of the first applications for removal of calculus was done, due to the properties of their cavitation effect and mechanical energy. Ultrasonic scalers have various actions such as mechanical, thermal and biologic actions. Hence, because of these biologic actions ultrasonic scalers are considered as the best method to obtain mechanical debridement. There are different advantages and disadvantages of using of ultrasonic scalers. The

use of ultrasounds is associated with many dangerous effects in the field of health for the patients [4]. These are associated with thermal changes on the gingival tissues and pulp, contamination of air and blood with aerosols production, alteration in the tactile and pressure perception due to vibrations, interference of the electromagnetic field and surface of restoration or tooth damage due to incorrect application of the inserts.

Conventional Approach

The presence of greater than 700 bacterial species forming a mature biofilm is associated with the progression of the periodontal disease. The patient's immune system and the bacterial response along with the periodontopathogens affects the development of the periodontal disease. The saliva produces bacterial toxins and calculus that are required for elimination, which is necessary to keep under control of the disease. After the removal of the local factors, supportive periodontal treatment program, as well as following a strict oral hygiene is required for the elimination of subgingival biofilm and calculus which is mainly responsible for bone and attachment loss [5]. Traditionally the treatment was depended on the mechanical removal of calculus and plaque, with the help of ultrasounds and hand instrumentation making it possible for the biofilm survival, by an open flap procedure or directly. In 1970's and during 1980's longitudinal studies, concluded that many of the advanced cases of periodontitis, which were well maintained and treated, remained stable through the years, as compared to those patients who did not receive any treatment and who suffered a worsening of periodontal parameters and considerable tooth loss.

Recent Advancement In Ultrasonics

With the continuous usage and growth of ultrasonic scalers, there is an introduction of advancements of both units and tips for

better performances and easier instrumentation. Nowadays, few recent advancements which are indicated in designing of ultrasonics is the establishment of source of light to the handpiece and tips. These newer advancements provide increased visual range in the inaccessible areas and the need for continuously adjusting the dental light which is at the overhead is also eradicated. The comfort of the patient and operator is increased by introduction of a light-emitting diode (LED) which emits a powerful light without heat generation [6,7]. An ultrasonic insert which is magneto strictive in nature called as Insight LED is introduced by Discus Dental, that combines a comfortable grip made of silicon, an activated LED light and a swivel handle of angle of 3600. There is improved clinical visibility, decreased stress to the hands, and increased ability to easily roll the handle when the position of the operator is changed, with a grip that is more comfortable. The design of the handpiece includes a light that is directly incorporated into it. The advanced piezoelectric ultrasonic scaler and irrigator called Pro-Select® Platinum, is planned out for providing greater comfort and increased field of vision to the clinician.

Instrumenting Implants and Restorations

A piezoelectric plastic tip used for the lenient cleaning of implants and analogous restorations was designed by Perio Implant Tip from EMS. The tip is tightened with a flat wrench and an endo chuck is attached to it. There are two new ultrasonic units i.e the Symmetry IQ and the SWERV3 which have been introduced by Hu-Friedy. The Symmetry IQ is a multi-functional piezoelectric device that is available in 2000 series, 3000 series, and 4000 series [8,9]. The 3000 series are available in three color-coded power modes having a memory characteristic with touchpad controls. The 4000 series includes a single supply of irrigation with large capacity that is helpful for the clinician to change the source to tap water with the aid of a switch [10].

Conclusion

Ultrasonic and sonic instruments share a common usage of application in dentistry due to their synergistic effects in mechanical periodontal treatment. Although, more often a deleterious practice which seems to be easy to the clinicians may cause damage of the tooth eventually leading to tooth loss. There might be chances of some irreversible or reversible pathologies for both the patient as well as the operator if proper attention is not given to possible

ill effects of the instrumentation. Therefore, the ultrasonic and sonic equipment should be used always keeping in mind their probable ill-effects. Hence, the ultrasonics have a promising future in the field of dentistry in general and periodontics in particular. Although there are lot of side effects with the use of ultrasonics but they are considered as the gold standard treatment in mechanical debridement. With the new advancements which are already introduced and those which are yet to take place in future, ultrasonics have a very essential role to play in the field of dentistry. In recent times due to the various ill effects of the ultrasonic scalers, there is incorporation of some modifications resulting in an increased efficiency to perform scaling.

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