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STUDY OF TECHNIQUE OF DISSECTING SOFT TISSUE

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Abstract:
This paper describes Study of dissecting soft tissue by the surgical diathermy and laser technique and also shows the difference between them. Electro surgery is defined as the cutting and coagulation of oral tissue with a high frequency current. It is an application of electrically generated heat energy to tissue to alter it for therapeutic purposes. Methods such as scalpel, electro surgery and laser cutting techniques are used for cutting oral soft tissue in dentistry. However, they differ from the standpoints of homeostasis, healing time, cost of instruments, width of the cut, anesthetic required and disagreeable characteristics, such as smoke production, the odor of burning flesh and undesirable taste.

I. INTRODUCTION

Electro surgery is the use of radiofrequency (RF) alternating current (AC) to raise intracellular temperature in order to achieve vaporization or the combination of desiccation and protein coagulation. These effects can be translated into cutting or coagulation of tissue, the latter usually to attain homeostasis, but also to occlude lumen-containing structures, or to destroy large volumes of tissue such as soft tissue neoplasms. The concept of RF electro surgery must be distinguished clearly from the process of cattery, derived from the Greek *kauterion* (hot iron), in which the destruction or denaturation of tissue is by the passive transfer of heat from a heated instrument. Electrical energy has been used in the performance of surgical procedures since the late nineteenth century. However, it wasn't until the introduction of the first electrosurgical generator (or electrosurgical unit) (ESU) by Bovine as reported in 1928 that the potential of RF electro surgery was popularized [1].

Electro surgery has been used in dentistry for more than half a century. Since 1914 it has been routinely used in various aspects of medicine as well as dentistry. Most dentists' use electro surgery successfully on routine basis [2].There is abundant literature on electro surgery dating back more than a century. During the past three decades, a substantial increase in minimally invasive surgery and microvascular surgery prompted greater use of electro surgery in dissecting soft tissue [3].

II. ELECTROSURGICAL TECHNIQUE AND INSTRUMENTATION

There are three classes of electrodes: single-wire electrode for incising or excising, loop electrodes for planning tissues and heavy or bulkier electrodes for coagulation purpose.

The four basic types of electrosurgical techniques are electro section, electro coagulation, electro fulguration, electrodessication. Electro section is used for incision, excisions and tissue planning. Incisions and excisions are performed with single-wire active electrodes that can be bent or adapted to accomplish any type of cutting procedure. Electrocoagulation provides a wide range of coagulation or hemorrhage control by using the electrocoagulation current. The active electrodes used for coagulation are much bulkier than the fine tungsten wire used for electro section. The other two techniques electro fulguration and electrodessication are not used general dentistry [6].

III. LASER TECHNIQUE AND INSTRUMENTATION

Lasers have truly been one of the greatest inventions of the 20th century and are finding applications in all walks of human endeavor. Lasers are presently used for a variety of applications in the medical field. Medical use of laser is possible, where there is a favorable interaction between laser radiation and the human tissue. Laser therapy is successful in medical treatment like treatment of detached retina, neurosurgery, dermatology in removal of skin imperfections by laser irradiation and in ear, nose and throat surgery, etc [8]. Laser light is monochromatic and is one specific wavelength. Laser light is coherent and organized, directional, strong and concentrated. The most popular type of laser in American dentistry is semiconductor, specifically diode, at a wavelength of 800 to 900 nanometers. Diode lasers are also used in printers, compact disc players and laser pointers [6].

IV.APPLCATIONS, ADVANTAGES AND DISADVANTAGES OF ELECTROSURGERY

Device, et al [9] had presented a series of clinical cases of frenectomy which were approached by various techniques, like Miller's technique, V-Y plasty, Zplasty and frenectomy by using electrocautery. Among all the procedures, electrocautery offered the advantage of minimal time consumption and bloodless field during the surgical procedure, with no requirement of sutures.

Verco P.J.W [10] had presented a case report on management of tongue tie using argon beam electrocautery in children. An 8 year old girl with lingual tongue tie showing restricted movement was treated using Explorer plasma cutting electrode. Postoperative results showed uneventful healing with little or no post-operative pain and lack of Escher at 4 months follow up.

Gregory M, Kurtz man, and Lee H. Silverstein [11] had presented a case report on usage of bipolarelectrocautery for gingival modification in passive eruption cases. A female patient with excessive gingival display was treated using Bidet Bipolar 3303gingivectomyhandpiece to remove excess gingival and to taper the gingival margin to ideal contour. A 4 week postoperative examination demonstrated a more aesthetic smile with improved width-crown proportions
And elimination of excessive gingival display.

KusumBashetty et al [12] presented a series of case reports where monopolarelectrosurgery unit was used for gingival recontoring, excision of gingival tissue extending into carious lesion**,** excision of gingival tissue extending into fractured area of the tooth suggesting electro surgery to be of immense use in clinical dentistry.

The use of electro surgery offers various advantages in the field of dentistry; the unit cost much less than lasers, the electrode cuts on its sides as well as on its tip, the electrode may be bent to meet the clinical need, cuts are made with ease when the device is set correctly, homeostasis is immediate; cutting is consistent, the wound is nearly painless after the procedure, the soft tissue has minimal trauma, the tip is self-disinfecting.

Apart from various advantages electro surgery suffers from various disadvantages, An anesthetic is required for cutting, both the name and the use ofelectrosurgery cause fear in some patients, there is an unavoidable burning-flesh odor, the operator has only a low tactile sense of exactly what is being cut, the heat developed by monopolar electrosurgery units does not allow for their use around implants (careful use of bipolar electro surgery is acceptable around implants because it produces less heat), bone can be damaged, electro surgery is dangerous in an explosive environment, although this issue is controversial, electro surgery may disrupt the action of pacemakers, patients who have undergone irradiation, have diabetes or have blood dyscrasias can experience poor postoperative healing[13-20].

V.APLICATIONS ADVANTAGESAND DISADVANTAGES OF LASER

Laser emits light energy that can interact with biologic tissues, such as tooth enamel, dentin, gingival or dental pulp. The interaction is the effect in currently the application of laser results in the modification or removal of tissue. In root canal treatment, lasers may be used to remove the dental pulp and organic debris, and to modify the dentinal walls by inducing melting and resolidification cycles resulting in the enlargement the walls of the root canal system. Once the preparation is completed, the root canal is obdurate, and the laser may be used to soften and mold the objurgating material to the prepared root canal system. These procedures are accomplished by the interactions between the laser light, dentin and objurgating materials. The net result of laser tissue interaction will depend upon the degree of laser energy that is absorbed or scattered by the tissue or the tissue fluid. Different parameters such as laser wavelength, energy level, and mode of application and tissue characteristics will influence the effect of a particular laser on the tissue. The interaction of laser in root dentin is primarily a thermal effect (increased temperature). The use of laser offers various advantages in the field of dentistry for dissecting soft tissue, it requires minimal or no anesthetic, they do not harm dental hard tissues, their judicious use does not injure the dental pulp, because of low or no heat production, they can be used around dental implants, they are antimicrobial; they remove end toxins from root surfaces; there is growing evidence that laser use may be positive therapy for periodontal disease, laser technology is considered state of the art by the lay public, so patients are more accepting obits use in their treatment than of electro surgery.

Apart from various advantages laser suffers from various disadvantages, the cost of laser is significantly higher than that of typical electro surgery units, most of the techniques suggested

for laser overlap with those for the much less expensive electrosurgery; because of the potential hazard of laser light, laser use requires a learning period and strict precautions, laser can cause eye damage, so protective glasses are required during its use, cutting with lasers usually is slower than that with electro surgery, there is a burning flesh odor, some techniques are time consuming, combustible gases must be turned off during laser use, laser plume requires use of high-filtration facemask, because of the possible presence of pathogens in the plume.[22-36]

VI.SIMULTANEOUS USE OF ELECTROSURGERY AND LASER

In Pericoronitis flap Electro surgery is much faster and easier, in Frenectomy Electrosurgery is faster, but laser is often less traumatic, for removal of soft tissue coronal to an implant, laser is best because of lower heat production and lack of electrical conduction during cutting, for removal of a lesion from the tongue electro surgery is preferred because they allow a precise and fast cut. However, laser can certainly be used for this purpose. Removal of a small piece of soft tissue while making impressions for crown an electro surgery tip sharpened to a pencil point makes a very narrow and precise cut laser can be preferred but it removes more soft tissue. For removal of soft tissue growth around a metal bar laser is best because of lower heat production and lack of electrical conduction. For removal of soft tissue very close to bone laser is less problematic when close to bone. For removal of any large piece of soft tissueelectrosurgery is best because of the ease and speed of cutting [4].

VII. COMPARISON OF ELECTROSURGERY AND LASER TECHNIQUE

There are various factors on which the comparison of the two soft tissue dissecting technique can be done. On the factor of cost surgical diathermy is cheaper than laser, in the width of cut surgical diathermy is moderate but laser is widest, on the factor of healing time both takes almost equal time for healing, on the factor of hemostats both are equivalent, on the factor of smoke produced electro surgery always produces smoke but laser surgery occasionally produces smoke called as laser plume, on the requirement of anesthesia it is compulsorily required in electro surgery but occasionally required in laser surgery[37-40].

Fig1. Electrosurgical unit for Dentistry [4]

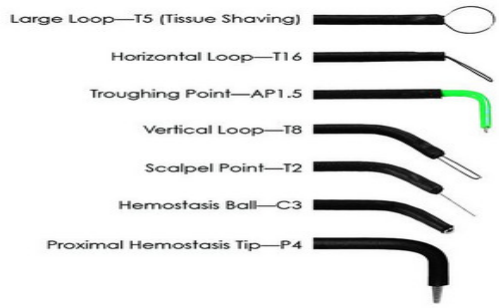

Fig 2.Types of surgical electrodes [5]

Fig3. Laser Unit used in Dentistry [7]

VII. CONCLUSION

Both electro surgery and laser have a legitimate place in typical dental practices, both works well for simple cutting of oral soft tissue. Commercial advertisements have stimulated use of dental lasers by highlighting its advantages. Some practioners will be benefitted from buying both and using them in the situation. From the popularity point of view laser technique can be preferred over surgical diathermy. Electro surgery is used in dentistry for many purposes such as for, gingivectomy, pulpotomy, frenectomy, operculectomy and hemostasis. Laser also has received significant commercial emphasis in the past few years. This paper compares laser technique with electro surgery for cutting soft tissue, some advantages and

disadvantages of each of these two soft tissue cutting methods on the basis of comparisons in the literature and clinical observations have been carried out to remove any sort of confusion in the mind of dentists to select ***the best technique in dentistry for cutting soft tissue.***

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