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DIODE LASER ASSISTED CLEFT LIP REPAIR: A CASE REPORT

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Abstract

Cleft lip repair is a surgical procedure which requires clear and précised dissection to help in fine line closure of wound for optimum result. Face is highly vascular and skin incision site bleeding can be a cause of concern and poor dissection of deeper layers including muscles can lead to suboptimal cosmetic results. Surgeons use 11 or 15 number blade to make incision over skin. Even though we traditionally use scalpel blade for making skin incisions, use of electromagnetic radiation of high frequency in the form of laser may be considered to minimize bleeding. Other benefits of laser incisions include reducing the time for performing the procedure, less post-operative pain, no ill effects on wound healing and higher cosmetic value.

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INTRODUCTION

Skin bleeding is a common problem after starting surgery. A continuous skin bleeding may obscure the operating field, and the surgeon feels discomfort because of small operative field and continuous need of mopping by assistant. Number of gauze pieces, suture material, and precious operating time is also wasted. Multiple use of electrocautry to arrest bleeding can damage surrounding healthy skin and even can damage blood vessels. The usage of laser decreases skin bleeding; helps in smooth dissection and shortens total operative time.

Laser was first introduced by Maiman in 1960[1], who used ruby to make laser. After that, (Carbon Dioxide Laser) CO_2 and Neodymium Doped Yttrium Aluminium Garnet (Nd: YAG) lasers were developed. In medical field, laser was first used for photocoagulation of retina in 1960 [2].

Today, there are different types of lasers available for use: CO_2, Nd: YAG, Holmium Yttrium Aluminium Garnet (Ho: YAG), (Erbium, Chromium doped Yttrium Scandium Gallium Garnet) Er,Cr: YSGG, Neodymium doped Yttrium Aluminum Perovskite (Nd: YAP), Gallium arsenide (GaAs) (diode), and Argon [3].

In comparison with conventional scalpel, laser has many benefits, such as ease of soft tissue ablation, hemostasis [4], instant sterilization, reduced bacteremia, and little wound contraction, reduced edema, minimal scar, reduced mechanical trauma, less operative and post-operative pain [5-7].

CASE SUMMARY:

The patient, an eight month old male child was brought to the Department of plastic surgery JIPMER with a left incomplete cleft lip. After evaluation child underwent rotation advancement flap method of lip repair under general anesthesia.

Wavelength specific goggles were put on to the patient, operating surgeons and persons in the operating room to protect the eyes.

Measurements and markings were made by the operating surgeon. The skin incision was made using diode laser with a frequency of 50 Hz and 1.5 W.

The muscle incision was made with a scalpel, flaps elevated, abnormal attachment of muscle released. After achieving homeostasis, incision was closed in layers using 5.0 sutures.

Figure 1: Pre-operative photo of patient

Figure 2: Diode laser console and probe

Figure 3: Intra-operative photo demonstrating laser being used for incision

Figure 4: Post-operative photo

The skin incision had no deleterious effect on the skin and the wound healed cosmetically acceptable.

DISCUSSION

One of the most widely used applications of lasers is soft tissue surgery and ablation of lesions. The advantages of laser application are relatively bloodless surgery, minimal swelling, scarring and coagulation, reduction in surgical time and less or no post-surgical pain. Also, the laser instantly disinfects the surgical wound as well as allowing a noncontact type of operative procedure and therefore no mechanical trauma to the tissue.

Laser transmits energy to the cells causing warming, welding, coagulation, protein denaturation, drying, vaporization and carbonization. The diode laser was introduced in dentistry and oral surgery in the mid-90s 6, 8. The diode laser devices have specifications such as relatively small size, portable and lower cost that attract the dental practitioners and oral surgeons for use in various surgical indications in comparison to other laser equipment. The pump source is an electrical current, the photons are produced by electric current and laser active medium is semiconductor. The diode lasers have been used in three wavelengths 810, 940 and 980 nm in surgical treatments [9]. Provided correct selection and application of diode lasers in soft tissue surgery, for example frenectomy, epulisfissuratum, fibroma, facial pigmentation and vascular lesions, they are safety and useful [4]. In almost all researches the scientists declared the unique specialties of lasers and particularly diode lasers such as; sharp and definite cutting edge, hemostasis and coagulation after surgery in addition to small size and better maneuver during application, which makes this laser very effective and a useful alternative device in soft tissue surgery in comparison to other lasers types such as Carbon Dioxide Laser (CO_2) and erbium lasers [10]. The disadvantages reported in researches on diode laser application were somehow similar to other lasers, like, delayed repair which is prominent in larger lesions and charring tissue in smaller lesions compared to the application of conventional scalpel surgical procedures and laser plume in excision of exophytic lesions produced by human papilloma virus and may be creates similar lesions in upper respiratory tract of laser operator not high enough to do so. Laser induced wounds because of definite and clean wound, generally heal well compared to scalpel incisions. This is may be due to the minimal degree of wound contraction following laser irradiation which occurs through induction and formation of smaller number of myofibroblasts and collagen [11, 12].

CONCLUSION

Our case demonstrated diode lasers can be used in cleft lip surgery safely as an alternative to scalpel because of easy application, better coagulation with less bleeding, less operative time and no undesirable cosmetic effects.

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