

LASER ASSISTED RELEASE OF POST BURN CONTRACTURES**Pandey S¹, Chittoria RK^{2*}, Kumaran S³, Bibilash BS⁴, Friji MT⁵, Mohapatra DP⁶, Dineshkumar S⁷****Abstract**

Incision with surgical blade is being used traditionally in surgery. Surgeons feel cumbersome with skin bleeding while making surgical incisions using scalpel. Even though we are traditionally using scalpel for skin incisions, incisions made using electromagnetic radiation of high frequency in the form of laser are considered to be of more precision value, less time taking, less bleeding, less post-operative pain, no ill effects on wound healing.

Author Affiliations: ¹⁻⁷Department of Plastic Surgery, JIPMER, Pondicherry, India.**Keywords:** Contracture, Diode, Laser***Corresponding Author:** Dr Ravi Kumar Chittoria, Professor & Head, Department of Plastic Surgery, JIPMER, Pondicherry, India. Mobil: 9442285670, Email- drchittoria@yahoo.com.**INTRODUCTION**

Skin bleeding is a common problem after starting surgery. A continuous skin bleeding may obscure the operating field, and the surgeon feels discomfort, number of gauze pieces, suture material, and precious operating time is also wasted. The usage of laser decreases skin bleeding and total operative time also shortens.

Laser was introduced by Maiman in 1960, who used ruby to make laser. In medical field, laser was first used for photocoagulation of retina in 1960 ^[1,2].

Today, there are different types of lasers available for use: CO₂, 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, as ease of soft tissue ablation, hemostasis, instant sterilization,

reduced bacteremia, less wound contraction, reduced edema, minimal scar, reduced mechanical trauma, less operative and post-operative pain ^[4-7].

CASE SUMMARY

We present a case series of three patients of post burn contractures of various sites. In all the cases the contracture was released by incision made by diode laser (figure 1) instead of using conventional surgical blade. In case 1 (figure 2 a, b, c), after the release of contracture the defect was closed by Z plasty. In case 2 (figure 3 a, b) the defect was covered with split thickness graft and in case 3 (figure 4 a, b) full thickness graft was used to cover the defect. All the cases were done under general anesthesia after informed consent was obtained. No lignocaine, adrenaline infiltration was used as laser provided bloodless field. There was no blood loss during the release of contracture. In all the cases graft was fully

taken and wound healed completely. No complications were noticed.



Figure 1. Diode laser apparatus



Figure 2 a. Case of axillary contracture



Figure 2 b. Diode laser used for skin incision



Figure 2 c. Wound closed with Z plasty



Figure 3 a. Case of neck contracture released by incision using diode laser.



Figure 3 b. After release the wound covered with skin graft.



Figure 4 a. Contracture of finger released by incision using diode laser.



Figure 4 b. After release wound covered with full thickness skin graft.

DISCUSSION:

The diode laser was introduced in dentistry and oral surgery in the mid-90s. 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 980nm in surgical treatments. If selected correctly, application of diode lasers in soft tissue surgery, for example frenectomy, epulis, fissuratum, fibroma, facial pigmentation and vascular lesions, is safe and useful [8, 9, 10].

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 (CO₂) and erbium lasers. 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 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].

Our case series demonstrated that diode laser can be used for release of post burn contractures with precision and bloodless field.

CONCLUSION:

Laser assisted release of contracture provides bloodless field with precision, without any adverse effects on wound healing. However, large control study is required to compare its advantages over conventional method of release by scalpel.

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