

# Laser Highlights

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## CO<sub>2</sub> Laser Excision of the Interdigital Neuroma

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### Abstract

The purpose of this article is to provide the laser surgeon with an advanced technique for the removal of the interdigital neuroma. The procedure will be outlined and its advantages and disadvantages discussed in detail.

### Introduction

Previously the excision of the interdigital neuroma was limited to conventional instrumentation including those instruments that provide sharp and blunt dissection as well as the infamous tourniquet in foot surgery. The benefit of the laser as a light scalpel for incision and dissection of the interdigital neuroma is to provide a more efficient and less traumatic deliverance of the neoplastic mass. The technique described retains the greater percentage of tissue for pathological evaluation and decreases the risk of compromise to the vascularity.

### Precautions

Protective eyewear is a must in the use of CO<sub>2</sub> lasers in any surgical environment. The operative protocol must include the use of sterile nonflammable draping as well as the avoidance of flammable fluids or gases.

### Equipment

The CO<sub>2</sub> laser with a 0.1 mm spot size and 40 watt to tissue capability is utilized in the continuous mode. The resultant power density based on average power density calculation is 200,000 to 400,000 watts per centimeter squared.

### Operative Procedure

With the patient in the supine position under local or general anesthesia the area is surgically prepped and draped in the usual

sterile fashion. Attention is directed to the suspected interspace where the CO<sub>2</sub> laser in a focused mode at maximum output is utilized to perform a 4 cm linear longitudinal incision extending 1/2 to 1 cm interdigitally and 3 to 3 1/2 cm proximally. These authors have found the incisional



process to be best performed in two steps. Using anodized instrumentation, the skin edges are lightly underscored both medially and laterally. Since a tourniquet is not employed in this surgical procedure the existing venous endarterial supply is full, and easily identifiable. The major vessels are freed with the CO<sub>2</sub> laser in a focused mode and retracted from the surgical site. Care should be taken not to sever the major vessels in the underscoring process. The interdigital fatty tissue is then incised in double passes with the CO<sub>2</sub> laser in a focused mode. Periodic sponging of the surgical site may be necessary. As the CO<sub>2</sub> laser incises the fatty tissue, the surgeon will note that it appears to roll medially and laterally with each incisional pass. After three or four pairs of passes have been performed the surgeon should be able to now dorsiflex the metatarsal heads and concurrently plantarflex the associated digits and find the neuroma mass protruding from the surgical site. The digital nerves are identified and clamped with mosquito hemostats. These proper digital nerves are then severed with the CO<sub>2</sub> laser. The adjacent sides of the neuroma mass are freed from other tissue and the hemostats are then lifted dorsally providing access for plantar dissection. In a rocking chair or scooping action, the CO<sub>2</sub> laser is then utilized to dissect the neuroma mass from the fatty padding of the ball of the foot. The mass is

dissected following the nerve trunk to a level of non-neoplastic activity. The nerve trunk is then severed with the CO<sub>2</sub> laser. The surgeon will note there is no bleeding or tissue weeping into the surgical site. The fatty tissue is then reapproximated with two or three simple interrupted sutures of 3-0 Vicryl. The subcutaneous tissue is coapted with two or three simple interrupted sutures of 4-0 Vicryl. The skin edges are closed with a surgeon's routine suture. The surgical site is then infiltrated with 0.25% Marcaine with epinephrine and 1/2 cc of Decadron.

### Dressing

A dry sterile dressing is then applied with xeroform gauze, sterile 3x3's and 2 or 3 inch cling and 4 inch Ace Wrap. This dressing remains in tact for five to seven days. The patient is seen post operatively and on the ninth to twelfth post operative day the stitches are removed. The patient is instructed to then change a bandage consisting of Polysporin powder, large butterfly bandaids, and regular bandaids twice daily for five days.

### Medications

Anesthesia may be accomplished by either local or general. Post operative injections of 0.25% Marcaine with epinephrine and Decadron are used routinely. The patient is placed on post operative antibiotics, anti-inflammatories and the equivalent of Tylenol III tablets.

### Advantages

This procedure offers a method of removing the neuroma preserving a pathological sample, creating minimal operative trauma, reducing disruption of vascularity, reducing post operative pain and fibrosis, and reducing the frequency of stump or bulb neuroma pain.

### Discussion

This technique has been applied for approximately four years with great success. Of 238 cases, 218 required no post-op pain medication. Of the 238 cases, a scant 7 experienced the pebble syndrome post operatively. This paper addresses the techniques used by these authors and is not intended as a panacea but simply for consideration in a surgeon's repertoire. ■