



Use of OmniGuide CO₂ Laser Fiber in Otologic Surgery

Jonathan R. Moss MD MPH, David M. Kaylie MD

Vanderbilt University, Department of Otolaryngology, Head & Neck Surgery

Jonathan.Moss@Vanderbilt.Edu, David.Kaylie@Vanderbilt.Edu



ABSTRACT

The aim of our review is to look at the safety, efficacy and outcomes with the use of a handheld carbon dioxide (CO₂) laser in middle ear surgery.

We reviewed our experience with the first three patients using the OmniGuide® CO₂ laser fiber and surgical handpiece (figure 1) in otologic surgery. Specific variables of interest were hearing loss, facial nerve paralysis, vertigo or other complications.

We hypothesized that the OmniGuide CO₂ laser fiber would not result in increased risk of hearing loss, facial paralysis, vertigo or other complications when used in middle ear surgery.

We found that the handheld CO₂ laser was beneficial in removing disease in difficult to reach places and as a coagulator. There were no cases of hearing loss or vertigo.

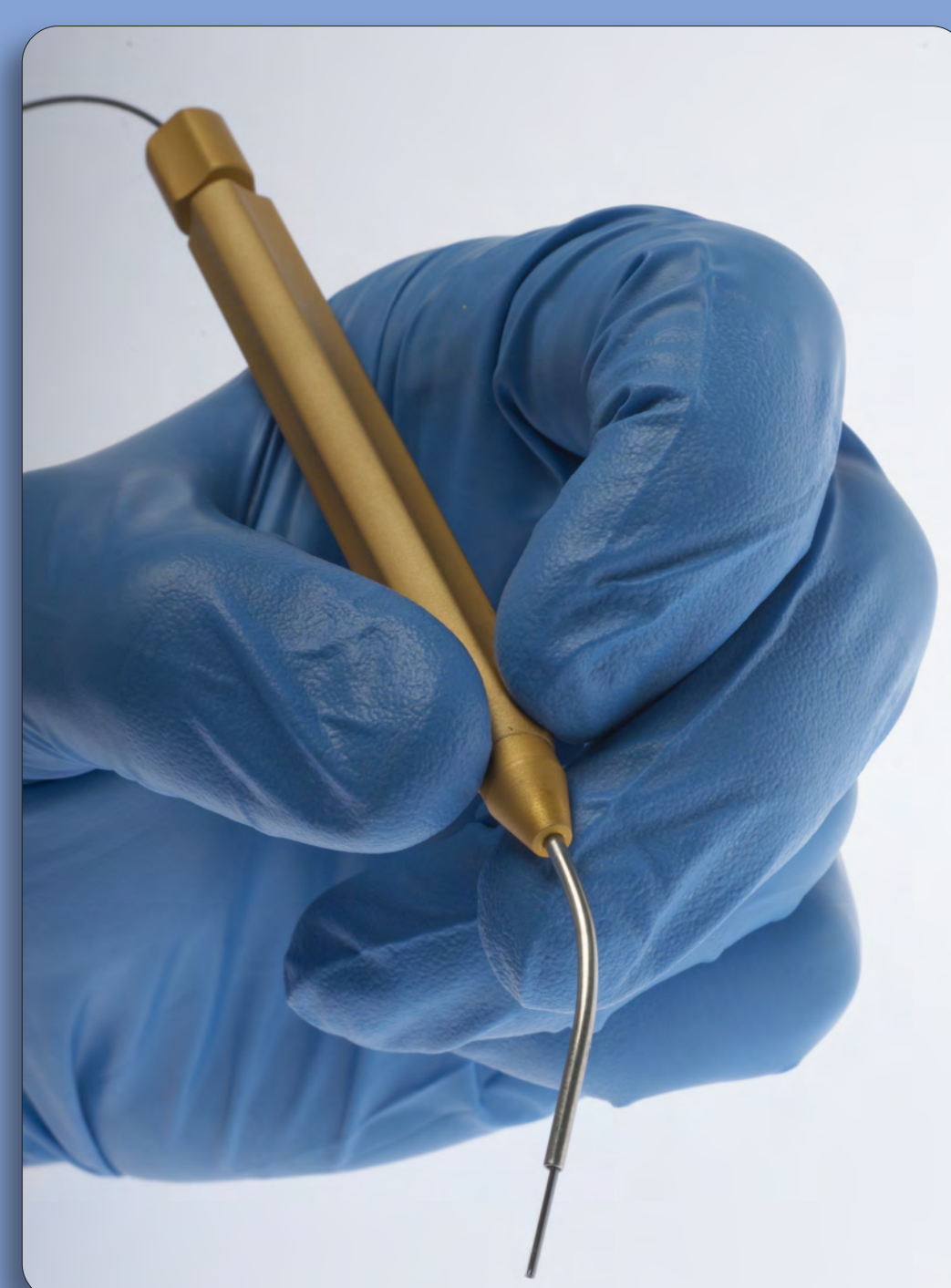


Figure 1
Handheld CO₂
Laser Fiber

INTRODUCTION

Difficulties in clearing the middle ear of disease are frequently encountered in otologic surgery. Management consists of repeated procedures which can result in a long-term, difficult process for the surgeon and patient. The CO₂ laser has been utilized for quite some time in many surgical fields. The clinical benefits of CO₂ laser energy, namely, precision cutting and coagulation with minimal thermal spread previously had limited applications in otology due to the absence of a delivery system. OmniGuide's flexible CO₂ laser fiber product allows this beneficial energy source to be accurately controlled when operating in the middle ear. We discuss our experience using the CO₂ laser delivered through the OmniGuide flexible fiber and handpiece in otologic surgery.

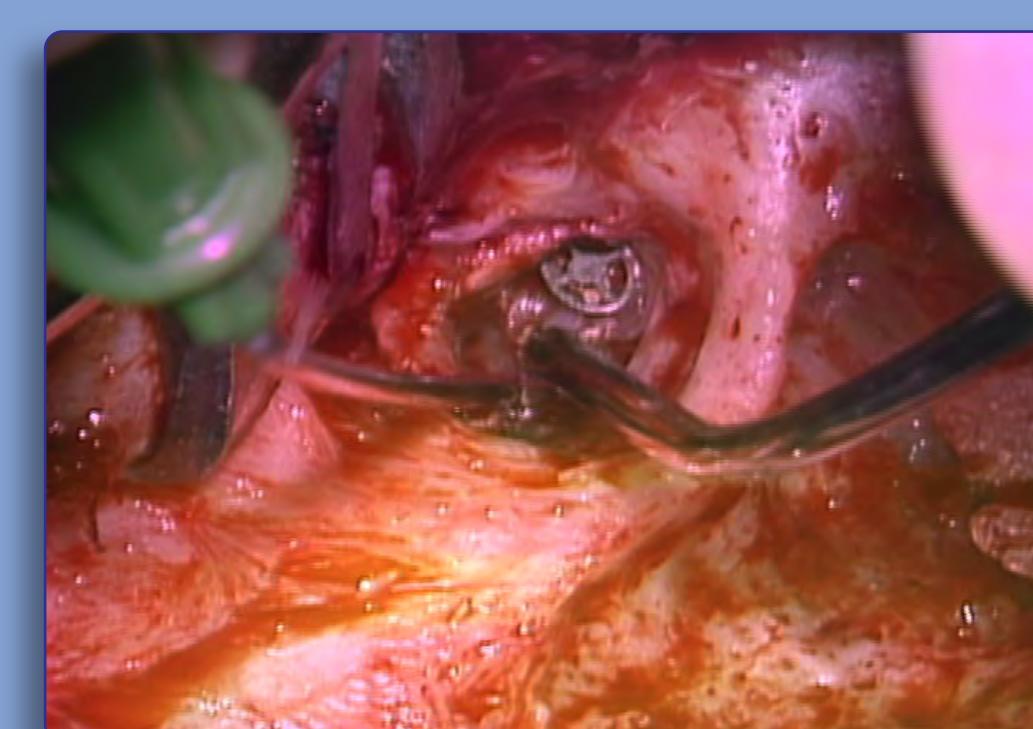
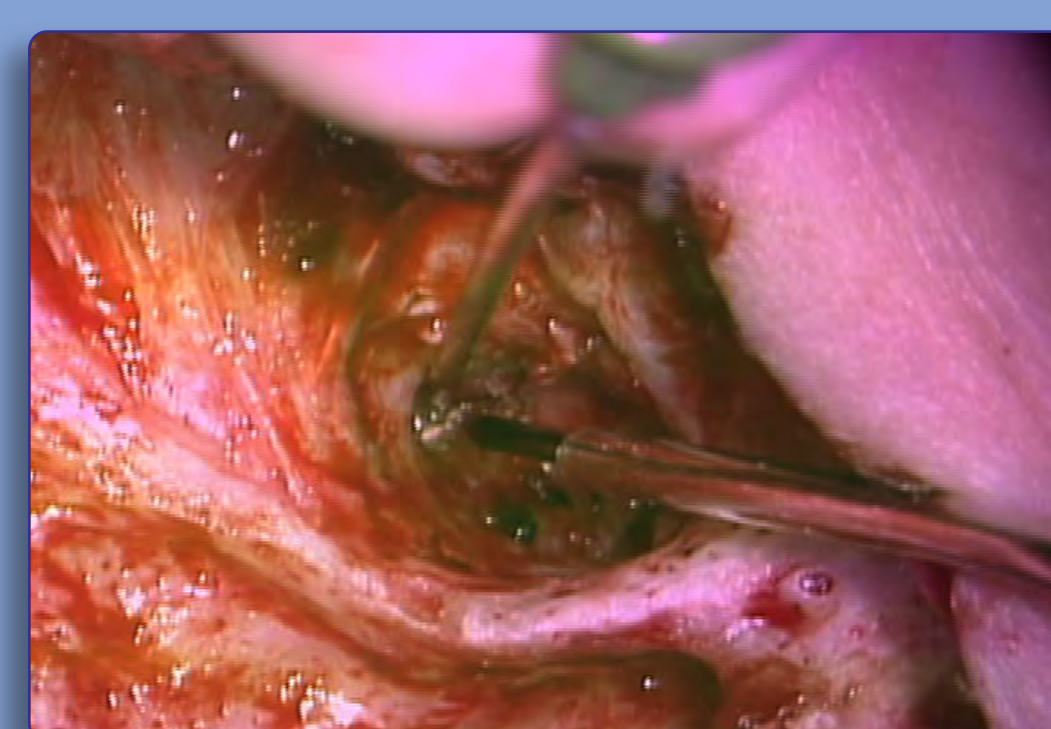
METHODS AND MATERIALS

This is a case series reviewing the first three patients who underwent middle ear surgery for chronic ear disease where a handheld CO₂ laser was deemed beneficial for the removal of disease. The OmniGuide CO₂ laser flexible fiber was used in each case with settings between 4 – 6 watts on continuous wave.

All patients had pre-operative and post-operative audiograms that were obtained at a minimum of four weeks post-operatively. Follow-up ranged from four weeks to four months. Adverse events were ascertained using telephone records and clinic visits.

Figure 2

*Revision Tympanoplasty-Mastoidectomy
Dissection of Granulation & Scar Tissue*



RESULTS

Patient 1: Resection of a Glomus Tympanicum

- The CO₂ laser was used for coagulation, ablation and clean dissection of the tumor using a facial recess approach.
- At surgery the stapes was mobile and ossicular reconstruction was not necessary as the tumor was easily dissected off the ossicles.
- After complete removal of tumor, the CO₂ laser was used for hemostasis.
- Post-operative audiogram at 2 months revealed hearing gain of 5 decibels.
- No complications were reported or found on physical examination.

Patient 2: Revision Tympanoplasty-Mastoidectomy (Fig. 2)

- Patient presented with an extruded total ossicular prosthesis placed at previous surgery for a large cholesteatoma.
- Extensive granulation tissue and scarring was found in the middle ear.
- The CO₂ laser was used to dissect the scarred prosthesis and vaporize granulation tissue, allowing complete removal of all granulation tissue with minimal bleeding.
- Total ossicular reconstruction was then repeated.
- One month post-operative audiogram revealed a 20 – 35 dB improvement in hearing.
- There were no complications.

Patient 3: Separation of Cholesteatoma & Granulation Tissue from the Incus & Stapes

- The incudostapedial joint was fused and the CO₂ laser was able to separate the joint facilitating removal of the malleus and incus.
- The stapes was mobile and a partial ossicular prosthesis was placed.
- An audiogram test at four months revealed an unchanged score.
- At this visit a perforation was discovered and the patient is scheduled to undergo revision tympanoplasty.
- No other complications were present.

CONCLUSIONS

Advantages of the Omniguide CO₂ laser flexible fiber and handpiece:

- Allows precise placement of the CO₂ laser beam due to the flexible fiber and the convenient handpiece
- Enables easy access to target area and good maneuverability
- Provides cutting and coagulation with minimal thermal spread
- Enhances ability to precisely peel away granulation/scar tissue layer by layer

We were able to direct the laser beam to dissect middle ear disease in difficult to reach anatomic areas and utilize its coagulative properties to control the bleeding frequently seen with granulation tissue and glomus tympanicum tumors. There has been no evidence of hearing loss or damage to inner ear structures.

The Omniguide handheld CO₂ laser provided a safe and effective tool for removing middle ear disease without damaging underlying structures. It greatly facilitates speed and ease of dissection in primary and previously operated ears where granulation or cholesteatoma obscures vital structures.

Figure 3

*Portable CO₂
Laser System, with Fiber*

