

## Er,Cr:YSGG Laser for Treatment of Peripheral Giant Cell Granuloma: A Novel Technique

Vandana Sangwan, Zainab Chaudhary, Mahesh Verma, Manish Naithani

### ABSTRACT

**Background:** Peripheral giant cell granuloma is a benign reactive lesion of the oral cavity, originating from the periosteum or periodontal membrane in response to local irritation or chronic trauma. It may develop at any age but is frequently seen in the fifth to sixth decade and shows female predilection.

**Materials and methods:** Various techniques ranging from conventional scalpel to electric scalpel and cryosurgery have been used for the excision of this lesion. This article describes a case reporting the successful use of Er,Cr:YSGG laser for complete excision of the lesion with minimal discomfort to the patient.

**Results:** Immediate coagulation was achieved without any use of sutures and excellent wound healing was observed after 1 week.

**Conclusion:** The benefits offered by the use of this laser excision technique indicates that it should be considered as an efficient tool for similar soft tissue lesions in the oral cavity.

**Keywords:** Laser, Excision, Healing, Palate, Giant cell granuloma.

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### INTRODUCTION

Peripheral giant cell granuloma (PGCG) is an infrequent exophytic lesion of the oral cavity, also referred to as giant cell epulis, osteoclastoma, giant cell reparative granuloma or giant cell hyperplasia.<sup>1</sup>

Clinically, this lesion manifests as a soft to firm, reddish blue sessile mass located interdentially at the level of alveolar margin. These lesions may bleed easily. Pain is not a common factor; however, growth is induced in most of the cases by any irritating factor like repeated trauma, calculus, etc.<sup>2</sup>

Treatment comprises of complete surgical resection, suppression of any contributory factor and elimination of the lesion from entire base of the bone. Surgical excision with blade and extensive cleaning of the base of lesion is most common means to avoid relapse.<sup>3</sup>

In the case described here, Er,Cr:YSGG laser was used to excise a biopsy proven PGCG. The main advantage of this technique is the simplicity of its use along with a clean operating field since the bleeding is minimal. Surgical

technique is not difficult and involves basic understanding of the laser machine. Only Lignocaine 0.2% locally was sufficient for the procedure. The excision using laser showed excellent results in terms of healing and patient compliance.

### CASE DESCRIPTION AND RESULTS

A 20-year-old female patient with non-contributory medical history, reported in our department with a chief complaint of reddish, painless mass in relation to right posterior teeth of upper jaw which increased to a present size in the last 5 to 6 months.

Inspection of the area revealed the presence of a soft, painless, reddish blue mass which bled easily when touched. The smooth surfaced lesion, 2.2 × 3.5 cm in diameter, was located in relation to first and third molar in the first quadrant, extending both buccally and palatally also involving the edentulous area in relation to second molar region (Fig. 1).

Radiographic examination showed slight bone resorption in interdental areas with the loss of vertical alveolar crest but normal trabecular pattern.

The lesion was completely removed with Waterlase Er,Cr:YSGG laser using 600 μm sapphire cylindrical tip under local anesthesia in a non-contact mode (Fig. 2).

The laser was used at low power initially followed by lasing at settings of 1.5 W, 10% water and 13% air until complete excision of lesion. Finally, coagulation was achieved by setting laser at 0.5 W, 0% water and 0% air. The healing was uneventful without any postoperative side



Fig. 1: Smooth surfaced lesion extending both buccally and palatally



**Fig. 2:** Immediately after excision using Er,Cr:YSGG laser

effects such as swelling, pain, inflammation. Second day wound healing is demonstrated in Figure 3.

Advanced wound healing was observed after 1 week (Fig. 4). Patient is on regular follow-up after surgery and there have been no complaints in the last 18 months.



**Fig. 3:** Second day wound healing



**Fig. 4:** Advanced healing after 1 week

## DISCUSSION

Jaffe in 1953 first distinguished giant cell reparative granuloma from giant cell tumor that is usually found in epiphyseal regions of long bones. He described giant cell granuloma as an idiopathic, non-neoplastic proliferative lesion termed as a reparative granuloma. He established two pathological entities in the jaw—the central giant cell granuloma (CGCG) arising within the bone and Peripheral giant cell granuloma (PGCG) arising in the soft tissue mass.<sup>4</sup> Current consensus, however, is that these are not reparative lesions and that if not treated they are progressive. It has been suggested that it may be an inflammatory lesion, a reactive lesion, a true tumor or an endocrine lesion.<sup>5</sup>

PGCG is a reactive lesion occurring on gingival and alveolar ridge usually as a result of local irritating factor, such as tooth extraction, poor dental restoration, food impaction, ill-fitting dentures, plaque and calculus.<sup>6</sup> Females are more commonly affected than males with a male to female ratio of 1:1.5 or 1:2 according to Philipsen or Giansanti and Waldron respectively.<sup>7,8</sup>

Reichart and Philipsen considered the peak incidence to be between 20 and 60 years while Anderson et al in a series of 97 cases reported marked prevalence between 5 and 15 years.<sup>8,9</sup> Mandible is more commonly affected jaw (55%) and this lesion generally develops in the gingival tissue or alveolar process of anterior teeth.<sup>7</sup> However, according to Pindborg, the preferred location is premolar and molar region.<sup>10</sup>

Radiographs are important for determining whether the lesion is peripheral or of bony origin. In PGCG, bone involvement may be present as in this case, in the form of superficial alveolar bone resorption or destruction of alveolar crest or interdental bone or widening of periodontal space associated with dental mobility. In some cases the cortical bone exhibits a concave resorption zone beneath the lesion known as leveling effect.<sup>11</sup>

The treatment of PGCG comprises of excision and suppression of underlying etiological factors with elimination of entire base of the lesion. There are reports of lesion being eliminated using various methods ranging from conventional blade, an electric scalpel to cryosurgery using liquid nitrogen or cryoprobe.<sup>12,13</sup>

In the case reported, the lesion was removed with a new technique using Er,Cr:YSGG laser. LASER is an acronym of Light Amplification by Stimulated Emission of Radiation. It is an organized and coherent form of electromagnetic energy.

Different types of lasers are available for different tissue types. Erbium (Er) containing lasers are good for their versatile use in both hard and soft tissues.<sup>14</sup> In our case

Er,Cr:YSGG Waterlase C100 laser was used. It is a laser powered hydrokinetic system that works on 2,780 µm wavelength which has a high affinity for water and hydroxyapatite. The laser energy from Er,Cr:YSGG is absorbed by water droplets causing expansion and subsequent removal of tissue present at a distance within 5 mm from laser emitting tip.<sup>15</sup>

There are numerous benefits of using this type of laser in surgical treatments. As reported in the literature, the Er,Cr:YSGG laser system is an effective soft tissue surgical device, wound healing is comparable to that associated with conventional surgical wound.<sup>16</sup> Rapid healing can be observed within a few days of the treatment and as blood vessels are sealed there is both a reduced need for postsurgical dressings and improved hemostasis and coagulation. It also depolarizes nerves, thus reducing postoperative pain and has a sterilizing effect as it destroys many bacterial and viral colonies that may potentially cause infection.

Hence, the need for antibiotics, analgesics and anti-inflammatory drugs has also been reduced considerably. In the case described here, no sutures were needed and the patient did not require any postoperative analgesic or anti-inflammatory medication.

Recent reports in the dental literature describes the successful use of Er,Cr:YSGG laser for various surgical procedures, such as ablation and resection of hard and soft tissues in the mouth and adjacent areas with no thermal side effects and an additional ability to achieve considerable hemostasis throughout the treatment. The advantages over conventional surgical techniques are shorter operating time, faster healing, less morbidity and better patient compliance.

## CONCLUSION

Er,Cr:YSGG laser is a versatile laser which is a useful tool in the hands of dental surgeons to carry out various procedures with minimum use of anesthesia in a near bloodless field, causing minimal discomfort to the patient and with no postoperative side effects or scar. The successful use of the Er,Cr:YSGG laser in PGCG has again proved that this laser can be efficiently used in similar soft tissue procedures.

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## ABOUT THE AUTHORS

### Vandana Sangwan (Corresponding Author)

Senior Resident, Department of Oral and Maxillofacial Surgery Maulana Azad Institute of Dental Sciences, New Delhi, India, e-mail: drvandana27@yahoo.co.in

### Zainab Chaudhary

Assistant Professor, Department of Oral and Maxillofacial Surgery Maulana Azad Institute of Dental Sciences, New Delhi, India

### Mahesh Verma

Professor and Head, Department of Prosthodontics, Maulana Azad Institute of Dental Sciences, New Delhi, India

### Manish Naithani

Consultant, Department of Anesthesia, Maulana Azad Institute of Dental Sciences, New Delhi, India