

Eruption cyst treated with a laser powered hydrokinetic system

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Eruption cysts are benign cysts that appear on the mucosa of a tooth shortly before its eruption. The majority disappear on their own. If they hurt, bleed or are infected they may require surgical treatment to expose the tooth and drain the content. Here we present a clinical case of a six-year-old child with an eruption cyst on the permanent maxillary central left incisor, which was handled using treatment with an Er,Cr-YSGG laser. It did not require suture, there was no haemorrhage, swelling, infection or postoperative pain. The treatment of eruption cysts with this technique facilitates obtaining the cooperation of pediatric patients and makes behavior management by the pediatric dentist easier.

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INTRODUCTION

The eruption cyst is a specific type of benign cyst of the soft tissue. It forms on the mucosa that covers the crown of a primary or permanent tooth in eruption shortly before its appearance in the mouth.¹⁻³ Eruption cysts are considered to be a form of dentigerous or follicular cyst, but are recognized as a separate clinical entity since they only appear in soft tissue.^{1,2,4,5} Both seem to result from the separation of the epithelium from the enamel of the crown of the tooth due to an accumulation of fluid or blood in a dilated follicular space,⁶ though there are a number of theories about their origin.⁷ It has recently been possible to observe this problem in patients taking cyclosporine A.^{8,9}

Differential diagnosis should be made with pyogenic granuloma, amalgam tattoo, Bohn's nodule and eruption hematoma.⁵ The eruption hematoma is due to bleeding of the gum tissue during eruption and the accumulation of blood is external to the epithelium of the enamel,⁷ while in the cyst it is the cystic fluid that

mixes with the blood. The difference between the two is not clear; the eruption cyst shows a glowing under transillumination but the hematoma does not.^{3,5}

Prevalence of these cysts in dental literature has not been thoroughly studied and is believed to be low, because there are authors that classify them among the dentigerous cysts; in addition, since they are benign, few studies do a definitive diagnosis using biopsy.^{1,5} Professionals normally only see symptomatic eruption cysts. The majority are cured spontaneously and go unnoticed.^{1,6} In retrospective studies, Anderson¹ reported on 54 histologically confirmed cases over 16 years; Aguilo et al.⁵ reported on 36 cases in 15 years; Bodner et al.⁷ presented 24 new cases from 10-year period; Bodner¹⁰ in 2002 found a prevalence of eruption cysts of 22% among various maxillary cystic lesions in 69 children.

The ages at which they appear range between 1 month and 12 years.^{1,3,5-7} They have also been described in association with natal teeth.^{7,11} However, the highest percentage has been associated with the eruption of permanent teeth between the ages of 6 and 11.^{1,3,5} They are more frequently found in males, with a ratio of 2:1,^{1,6,7} although some authors disagree on this point.^{3,5} They also appear to be more prevalent in the posterior maxillary arch and in Caucasians.^{1,6,7} The majority of them are isolated cases but bilateral or multiple appearances have also been reported.^{5,6} Boj and García-Godoy⁶ presented the case of a 14-month-old boy with 6 simultaneous eruption cysts.

Clinically, there is a raised swelling in the form of a dome in the mucosa of the alveolar ridge, that is soft to the touch and whose color ranges between transparent, bluish, purple or blue-black.^{1,3,5-7} The size depends on whether it is associated with a primary or permanent

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Figure 1. Eruption cyst, pre-operative view.



Figure 2. Initial incision using the Er,Cr: YSGG laser.



Figure 3. Elimination of the bloody fluid from the cystic cavity following the incision.



Figure 4. Immediately after the intervention.

tooth. The majority are asymptomatic but there can be pain on palpation due to secondary factors such as trauma or infection.¹

Radiographically, it is difficult to distinguish the radiolucent area of the cyst of the buccal cavity as there is no bone involvement, in contrast to dentigerous cysts, in which a well-defined unilocular radiolucent area is observed in the form of a half moon on the crown of a non-erupted tooth.^{1,12}

Histologically, the eruption cyst presents the same microscopic characteristics as the dentigerous cyst,¹¹ with connective fibrous tissue covered with a fine layer of non-keratinized cellular flaky epithelium.¹

Once the diagnosis has been made, treatment is not always necessary since the majority of the teeth affected erupt within a few months without consequences. However, when symptoms (pain, interference with chewing) or esthetic problems appear, surgery should be considered.^{1,6,7}

The treatment traditionally used is marsupialization. Incision or the partial excision (for biopsy) of the dome of the cyst to uncover the crown of the tooth involved

and drain the liquid content of the cyst,^{1,7,11} thus bringing about the eruption of the affected tooth.^{5,7} The treatment eliminates the cyst and preserves the developing tooth. However, on some occasions it may be necessary to extract the tooth associated with the cyst, as in the case in which the affected tooth is a natal or neonatal tooth with a very small root.^{7,12}

This article presents a clinical case of an eruption cyst treated with an Er,Cr:YSGG laser (erbium, chromium, yttrium, scandium, gallium and garnet).

CASE REPORT

A six-year-old child with a swelling of 7 days evolution in the alveolar ridge of the maxillary arch at the level of the unerupted permanent left central incisor, complaining of pain on palpation and mastication (July, 2004).

Clinically a mass of edematous tissue was observed in the area of the involved incisor that was bluish in color, bright and soft to the touch (Figure 1). The contralateral tooth had recently erupted. Radiographically, no significant alterations were observed, confirming the clinical diagnosis of an eruption cyst.



Figure 5. One year post-operative view.

The patient's clinical history revealed a number of previous traumas to the region. At 30 months the child was brought to the Pediatric dental clinic with necrosis of the right maxillary primary central incisor (tooth E) and enamel fracture on the left central incisor (tooth F). A pulpectomy was performed on the right central incisor (E) using iodoform paste and calcium hydroxide at equal parts and a composite restoration was placed on the left (F). At 5 years old (March, 2003) the patient was examined for sporadic discomfort on tooth F and 9 months later (January, 2004) we observed darkening. The tooth was removed since it was going to be replaced in a short time. Six months after the extraction the eruption cyst appeared. After confirming the absence of medical problems it was eliminated.

An Er,Cr:YSGG laser (*Waterlase-Biolase*®) was used. The *Waterlase* is a hydrokinetic system that emits a wavelength of 2780 nm. The hypothesis of the cutting system is that the laser liberates photons in an air-water spray. The energy of the laser is carried by a system of fiber optics to a terminal point made of a sapphire crystal.¹³⁻¹⁶ Cutting effectiveness reaches 1-1.5 mm from the sapphire point to the surface of the tissue to be cut.¹³

In this case, no sedation or anesthetic infiltration was used during the elimination of the cyst. Only topical anesthesia was applied in the form of a benzocaine gel at 20% for 3 minutes on the dry mucosa of the cyst. An incision was then made using the Er,Cr:YSGG laser on the mucosa at the level of the alveolar ridge of the non-erupted central incisor (Figure 2). An output of 1.5 watts was used, as recommended by the manufacturer for soft tissues. Bleeding was minimal. Once the tooth was uncovered the bloody fluid inside the cystic cavity was eliminated (Figure 3). It was not necessary to do any suturing or to administer any antibiotic, analgesic or anti-inflammatory medication after the intervention (Figure 4).

A week later no post-surgical complications were observed. After one year (July, 2005) the central incisor did not present any anomaly (Figure 5).

DISCUSSION

Even though the eruption cyst is a kind of dentigerous cyst, treatments of the two are quite different. While for the first we can use a conservative treatment (incision, maintaining the tooth involved) and even no treatment at all, the second requires more complicated surgical interventions such as enucleation.⁷

Within the etiology that could have produced the eruption cyst presented here we could cite the number of previous traumatism to the area.

There is more and more interest on the part of pediatric dentists and patients in the use of the laser for doing certain dental treatments in a more comfortable way.¹⁷ Lasers have played an important part in pediatric and maxillofacial surgery. In the clinical case described one of the many uses of the Er,Cr:YSGG laser, specifically oral surgery on soft tissue, is discussed.

The conventional treatment for eruption cysts is marsupialization, which consists in the removal of the tissue that covers the non-erupted tooth and exposure of the crown, or a simple incision to uncover the tooth involved and so drain the cystic fluid.^{7,11} To do this, application of a local anesthetic is necessary, along with the use of the scalpel and on occasion suture. In any of these clinical steps we can easily expect behavioral problems in some pediatric patients: due to the injection, to pre- or post-operative pain, to haemorrhaging on the edges of the wound or to not wanting to bite the gauze when the treatment is finished. Control of post-operative bleeding is important. Nunn² reported on a clinical case of surgical removal of a supposed eruption cyst that required hospitalization due to severe haemorrhage.

The hydrokinetic system of the laser is an excellent tool since it eliminates the need for local anesthesia in some cases, which is a big advantage in the treatment of eruption cysts, which can appear at early ages.^{16,18} The hypothesis of the painless character of the laser has been attributed to its transitory anesthetic effect due to the blocking of the nervous conduction in the Na/K pump. A study done by Boj et al.¹⁸ on perception of pain in various pediatric treatments done with Er,Cr:YSGG laser show a promising future for the laser in conservative and surgical treatments. Another advantage is that the laser does not produce heat or friction.¹⁴ The patient is comfortable, not noticing a sensation of vibration or observing the contact of the laser hand-piece with the mucosa.¹⁶

In cases that do not require anesthesia for the surgical procedures, we will also avoid the need for concern about the complications that can result from their use: allergic, toxicity, reactions brought on by medication, bites, etc.¹⁴ The hydrokinetic laser has bactericidal and coagulative effects. Compared to the conventional scalpel we will not have excessive operative bleeding, so the operation field will have better visibility.¹⁹⁻²¹

Tissue healing treated with laser is better and faster

than tissues treated with conventional surgery, with a reduction of the scar, tissue retraction, bleeding, edema and post-operative pain.¹⁹⁻²¹ The need to give analgesics and anti-inflammatory medication is reduced or eliminated.¹⁸

At this moment the use of lasers in Pediatric Dentistry is not widespread, but it will continue to win support as its advantages become better known. Among the disadvantages this system may have is that it requires the pediatric dentist to learn a new technique and the price of the laser.

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