

Gingivectomy of Congenital Gingival Hyperplasia using Er:YAG and Er,Cr:YSGG Laser Treatments with 4-Year Follow-up

Introduction

Congenital gingival hyperplasia, also known as congenital macrogingivae or hereditary gingival fibromatosis, is a congenital hypertrophy of Gingiva due to unknown reason. Gingival hyperplasia cell look like the same with normal gingival cell under microscope, no matter in color or appearance, but the gingival hyperplasia cell is more swollen and tighter than normal cell. Gingival hyperplasia appearance like the keratinized gingiva, and the probing depth of the tooth with gingival hyperplasia is normal. It usually occurs during eruption of permanent tooth, it may even affect the eruption of permanent tooth in some serious cases. And always found malocclusion of permanent tooth in these serious cases.

The hypertrophy makes the gums not so easy to clean, increasing the possibility to cause gingivitis or periodontitis, so the removal of the gingival hyperplasia is necessary. Congenital gingival hyperplasia may be caused by genetic factors, but patients with poor oral cavity hygiene, or patient which takes epilepsy drugs may have the same situation. Noticeable reasons like leukemia and thalassemia, these congenital blood diseases, are also cases of gingival hyperplasia. Aside from gum resection, the most important therapy of unidentified gingival hyperplasia is to find out the reason so that we can radically cure it, and to avoid incurring additional complications or recurrence.

In addition to treating cause of gingival hyperplasia, the most effective way is to treat with gingivectomy. The traditional way of gingivectomy requires local injection and a wide range of sutures after gum removal. Postoperative patients often suffer with intensive pain. If recurrent happens, patients will experience intensive pain again and again. Most of the patients' ages usually range from 6 to 9 years old. Behavior control of juvenile is difficult to achieve; therefore, general anesthesia is required which makes surgery more difficult to complete. During recurrent, retreatment may further deepen the fear to juvenile patients. It is therefore recommended to use Er:YAG or Er,Cr:YSGG (known as Er:YAG family) as a better option for lessening pain in oral surgery.

Methods and Materials

- Laser equipment and settings:
 1. Er:YAG laser: LiteTouch soft tissue mode at 4W ~ 5W with 40 ~ 50Hz (100mJ) and 50% of water (Fig. 1)
 2. Er,Cr:YSGG laser: Waterlase at 1.5W ~ 2W with 30% of water, 20% of air, at 20Hz (Fig. 2)
- Surface anesthesia gel is applied for large-scale removal.
- 1W with no water is used for coagulation after resection.
- After surgery, let patient take 250mg Panadol Q6H/PRN for relief pain if needed. and wound care introduction and using of Chlorhexidine 0.02% for mouth rinse.



Fig. 1 LiteTouch (Er:YAG laser) with no fiber



Fig. 2 Waterlase (Er,Cr:YSGG laser)

Cases Report

Patient: Male, 6 years old, came to clinic on 2006/08/22

Symptoms and sign: Upper and lower gingival has been swollen more than a year, but significant pain is not felt by patient.

No specific medical history or systemic diseases. Has been eating Chinese herbal medicine half a year ago, but discontinued since then.

Pictures of situations inside the mouth:



gingiva enlargement focused at the eruption of anterior teeth is revealed in intraoral examination, but similar situation is not founded in the first molar.

the situation of mandible

- The inspection of X-ray:
There is no difference except the caries of primary tooth.



- Tentative diagnosed as unidentified congenital gingival hyperplasia.
- Other diseases are suspected, therefore suggest transfer to bigger Hospital.
- The patient came back to our clinic on 2006-12-8, he already checked in Pediatric and Hematology-and-Oncology but nothing serious is diagnosed and no specific findings. Pathological section is also offered. It turned out that it was only a normal keratinized gingiva cell with thicker cells.

- Congenital gingival hyperplasia is diagnosed by the dental department, therefore suggest him for traditional gingivectomy operation under general anesthesia. But the patient's parents worry about the risk of general anesthesia, and know our clinic have dental laser instrument for gingivectomy, they agreed try to treated in our clinic with laser in the operation.

Treatment Plan

1. 2007/10/13 Using Er:Cr:YSGG laser for gingivectomy (1st therapy).

Because it was the first time to do the gingivectomy, in order to avoid pain and prevent growing of non-keratinized cell from the healing of gingiva, the area and thickness of resection is minimized. To make the result easier to obtain, operation is focused on the upper central permanent incisor area, and level of patient's pain is tested.



After gingivectomy



Laser coagulation



Before gingivectomy



After a week, Congenital gingival hyperplasia is lessen

2. 2007/12/08 Using Er,Cr:YSGG laser for gingivectomy (2nd therapy).

The lower jaw area was resected at the second time, in order to avoid pain the area of resection is minimized. Therefore the result after treatment is not obvious, and

the gum was rough.



Before



After



The result after one week, the gum was rough.

3. 2008/01/19 Using Er:Cr:YSGG laser for gingivectomy (3rd therapy).

After two times of resection, less pain was experienced by patient, the gum is healing better. Therefore the area and thickness of the third resection is bigger than before.



Before resection



Use Turtle technique doing the resection



Coagulation



Coagulation



After resection

4. 2008/05/03 Using Er:Cr:YSGG laser for gingivectomy (4th therapy).

Because poor oral hygiene of the patient, slight recurrence was found. Hence laser resection was applied again, and the result tuned out pretty good.



After



2008/05/09 After one week



After one week, little recurrence on lingual side



2008/05/17 After two weeks



After two weeks, healing pretty good.

5. 2008/08/12 Using Er:Cr:YSGG laser for gingivectomy (5th therapy).

Observed teeth 22 and 32 which are still eruption. Recurrence was found on teeth 33. Because of the lack of cleaning in the mouth cavity of the patient, the hyperplasia of the palatal side of teeth 22 is seriously recurred. Resection for these two areas are applied, but after the treatment, teeth 22 still recurred, the reason maybe that teeth 22, 32 and 33 are still growing.



the recurrence of teeth 22 before surgery The upper gum is almost healed before surgery.



After sugery



After resection of teeth 22



2008/08/29 The healing after two weeks there is still slight swell after two weeks, because of insufficient cleaning





2008/11/25 the situation is getting well



the situation after three months



After three months, the outside of teeth 22 recurred, especially proximal gingiva. Most likely due to insufficient cleaning resulting congenital gingival hyperplasia
Three months after surgery, recurrence is still found on mandible

6. 2009/01/02 Using Er,Cr:YSGG laser for gingivectomy (6th therapy).

The hyperplasia found on the facial gingiva of teeth 22, slight hyperplasia is also found at the palatal side. Therefore laser resection is used directed against these places, the result turned out well after healing.



Before



slight hyperplasia at cheek gum



After



2009/01/07 one week later

7. 2009/02/03 Using Er:YAG LiteTouch laser for gingivectomy (7th therapy).

The patient came back after one month for a further follow-up. The upper gingiva had already reverted to its normal size and there was no recurrence; but further observation is still needed. Since Er:YAG laser (LiteTouch, Syneron) was recently introduced into the clinic, so LiteTouch was used to resect the lower gingiva. Not only LiteTouch has much faster speed to resect thicker tissues, but also it gives a better healing with a slightly swollen wound.



**Immediate after resection
at the lower jaw**



**The upper gum has
recovered with no recurrence**



**The lower gums is a
little bit swollen after 10 days**

Discussion

The advantages of using Er:YAG family lasers for gingivectomy on the gingival hyperplasia include:

- Because patients who suffer from gingival hyperplasia are usually young, therefore using Laser for gingivectomy can reduce their pain. Anesthetic or local anesthesia are not necessary for surgery neither. Although pain after operation cannot be avoided, but it is more relieved, and the wound heals faster.
- If have the recurrence situation, because there is less pain on resection. The patient can accept resection for many times.
- At beginning can resection for smaller range, after operation it doesn't need to suture.

But there are some disadvantages to pay attention:

- Laser for large area resection's speed still too slow, it's easier to bleed (compare with traditional operation), it need longer time, sometimes the younger patient doesn't have much patience, but it can reduce a lot of pain, therefore can make up this defect.
- After operation the gingiva have many blood capillary, it will easier to bleed, but just need oppress 5-6 minutes can stop bleeding.
- Do not remove too deep gingival tissue, although seems didn't resection periosteum after heal over it can grow normal attached gingiva, in order to

prevent lost of the normal attached gingiva after healing, we can resection for many times avoid to resection too deep, and also can reduce the pain, the heal over speed faster.

In this case we found that the under eruption permanent teeth (the crown doesn't show over than 3/4), after resection it still has recurrence of gingival hyperplasia (e.g. the 22 teeth of this case), therefore we suggestion that doing the laser gingivectomy after the permanent tooth complete eruption. But it will has another question if resection too late it is easy to make the teeth pushing and make the dentition malocclusion or crowding, therefore we only can resection when the tooth still in eruption, if the dentition irregularity wait for all permanent teeth erupted that we do the orthodontic therapy, because of the permanent teeth eruption it will have the recurrence, that's why the time will be longer for the permanent teeth totally erupted, and also do the orthodontic therapy, the whole therapy will longer than 5-6 years, the patient need the patience.

After resection operation the wound will large, therefore will have the swelling condition. Sometimes it will show the granulation tissue, but of didn't fine the recurrence condition and swelling condition and granulation tissue will disappear and gingiva heal to normal size after a pirior of time, therefore if after operation still have the swelling situation, don't need to do the operation again immediately, wait and observe 3-6 months to see the swelling situation recurrence or not to decide do the operation again or not.

Besides the wound after the operation also need to pay more attention, it is not only use medicine to relief the pain, but also very important to clean the wound, give the Chlorhexidine 0.2% and rinse the mouth after the meals (the teeth part still need to use toothbrush to clean), or it will give rise to gums inflammation or wound inflammation, significant increase in recurrence rate after healing (such as chronic swollen gums), even healing well, the gum cleaning also need to do well, or it will give rise to Gingival inflammation, and it still have gingival hyperplasia recurrence condition again, we need to notice is, usually this kind of patients because of gingival hyperplasia cover the surface of teeth, the teeth didn't has self-cleaning function, therefore the cleaning will more difficult compare with other normal people, so we need to focus on the important of cleaning to patient and their family, or the treatment effect won't be good, in addition if the patient had bad occlusal habits (such as mouth breath, bite the finger) we need to treatment together.

Conclusion

For congenital gingival hyperplasia patients, it is a good option to use Er:YAG or Er,Cr:YSGG laser to perform gingival hyperplasia resection. But attention should be paid to recurrence and resection of too much keratinized gingiva. After operation, wound should be well taken care and orthodontic treatment for teeth malalignment may be required in the future. Patients should follow up with treatment for long term, and pay attention to systemic diseases.

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