

Why the Er:YAG Laser is a MUST in Implantology?

如何利用鈔雷射提高即拔即種的成功率與降低患者的不適感？

Purposes:

1. Easy to remove infective bone & granulation tissues.
2. Easy to extract problematic teeth for immediate implantation.
3. Less pain, less swelling, and more comfortable.

Aim of Study

即拔即種已經是目前許多病患植牙時的重要選項之一，由於可減少療程的次數與時間，促使牙醫師必須於療程中能更精準解決病患的所有問題，以有效地提升植牙成功率與病患的舒適度。

基於鈔雅各雷射的特性，如何應用於各種狀況之病患身上，一方面治療患者疾病，另一方面又能花比傳統更少的時間且達到更高的成功率與更舒適的植牙療程，乃是本文所欲深入探討的主題。



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Case Report

A 41-year-old woman was assessed of spontaneous pain at lower left teeth. The chief complaint was intermittent and diffused pain which started 2 months ago. To resolve discomfort, the patient was treated with removal of bridge #35 36 37 and tooth #35 crown was reset to rule out the pulpitis in other clinic.

After clinical examination, tooth #37 was found with percussion pain (+) and was diagnosed as periodontitis. Patient denied any systemic disease, and there was no a. b. c. history.

Treatment Plan

Extract tooth #37 and immediately insert an implant with Er:YAG laser :

PHASE I

1. Laser scaling: use the Er:YAG laser (LiteTouch, Syneron) with setting of 50mJ/10Hz and 100% of water for full mouth scaling and then use ultrasonic scaling tip for supragingival scaling (Fig.1).



Fig.1 Full mouth laser scaling

2. Laser sterilization : use 50mJ/ 30Hz with 100% of water for subgingival sterilization and then ultrasonic round tip for subgingival curettage.
3. Laser tooth extraction: extract problematic tooth using 100mJ/4 Hz with 100% of water for detachment of the surrounding periodontal tissue and then remove the tooth (Fig.2).
4. Laser ablation: remove infective bone & granulation tissues with setting of 400mJ/15Hz and 75% of water for granulation tissue ablation and 300mJ/20Hz 100% for infective bone ablation (Fig.3).
5. Insertion of adjustable implant with primary closure.
6. Laser wound dressing : coagulate the wound area with Er:YAG laser after primary closure. The setting was 50mJ / 10Hz with 12.5% water (Fig.4).

PHASE II

7. Laser uncover: laser gingiva incision with 100mJ/40Hz and 75% of water;



Fig.2 Laser tooth extraction



Fig.3 Laser ablation of tissues



Fig.4 Laser coagulation



Fig.5 Second stage uncover



Fig.6 Gingiva former setting

and bone removal on cap with 300mJ /20Hz and 75% of water to perform second stage uncover (Fig.5).

Setting of gingiva former (Fig.6)

Discussion

Old endodontic treated teeth may lead to bone ankylosis. During extraction, the treated teeth tend to be fractured and may increase possibility of bone structure damage and socket trauma which become serious problem for immediate implantation. The use of the Er:YAG laser will result in less bone destruction and easier extraction of problematic teeth for immediate implantation.

Periodontal disease is a chronic inflammation caused by bacteria and endotoxin. Using laser therapy in periodontal disease to remove bacteria has been well documented for more than 10 years. Laser bone surgery may facilitate some mechanisms that explain bone regeneration due to low level laser therapy-like effects and bactericidal

effects in periodontal disease.

The power settings and use of water volume as a coolant during Er:YAG laser irradiation are important to avoid harmful effects to the irradiated tissues. The unique properties of the Er:YAG laser (highly absorbed by water and hydroxyapatite) make it possible for bone ablation with minimal thermal damage to the surrounding intact tissues.

Conclusion

1. 藉由 Er:YAG laser 創造出一有利於即拔即種之牙床組織。Lipopolysaccharide 為 G(-) bacteria 產生之 endotoxin 容易附著於 Titanium 表面，可利用 Er:YAG laser 特性將之去除，以免產生 Implantitis，並使 Osteogenesis 更迅速完整。
2. 正確使用雷射特性，一方面去除已感染組織上的細菌及毒素（文獻已知使用雷射可較傳統器械容易且徹底去除），另一方面同時促進血液循環並增加血氧濃度，改變牙周整體狀況，方能真正解決病人問題，並確保牙周治療與植牙的成功率。
3. 如何化繁為簡，化不可能為可能，乃當今醫學與科學所欲追求的終極目標。

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