

# Laser therapy on dental emergencies of patients with hemophilia as an alternative for hemostasis and reducing the use of factor VIII concentrate

## Introduction

Hemophilia is a hereditary disease, where the coagulation system is affected by the reduction of one of the coagulating factors, in this case factor VIII. In patients with hemophilia, oral bleeding is common, antihemophilic factor is not always available and it is extremely important to achieve hemostasis with other resources such as laser therapy.

## Laser (Light amplification by stimulated emission of radiation)

Laser classification depends on low and high intensity. Bioestimulatory, analgesic and antinflammatory action are achieved by low intensity machines such as As, Ga (Gallium arsenide); As, Ga, Al (Gallium and aluminum arsenide); He, Ne (hHelium, neon). High intensity laser machines produce visible and physical effects in oral tissues and can be a substitute for cold scalpel or for conventional high rotatory instrument. Er:YAG (Erbium:Ytrium-Aluminum-Garnet) Laser has bactericidal effects against periodontal pathogenic bacteria and also eliminate bacterial endotoxins. Different tissue effects according to the temperature reached in a laser machine are showed in Table 1. In these cases series the temperature oscilated between 70-90 Celsius degrees to achieve hemostasis in different types of emergency oral bleeding.

**Table 1** Tissue effects according to the temperature reached

Temperature	Tissue effects
42-45°C	Transient hyperthermia
>65°C	Desiccation and protein denaturation
70-90°C	Coagulation and tissue fusion
> 100°C	Vaporization
> 200°C	Carbonization

## Objective

To optimize the use of factor VIII in emergencies and dental treatment through the use of Er:YAG laser therapy.

## Material and methods

This case series included 6 patients with an age range between 4-11 years who had different types of emergency oral bleeding (extractions, lip laceration and pulp polyp removal) for which the Er: YAG laser emission was used in order to achieve hemostasis and optimize the use of factor VIII. In extraction cases (3), a single initial dose of 25 IU/kg / body weight was applied in two patients and the other received a dose of 50 IU/kg/body weight. In the cases of lip laceration and pulp polyp, factor was not used. In the case of dentoalveolar trauma a single initial dose of 25 IU/kg/body weight was applied (Figures 1-6).

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**Figure 1** Extraction case 1.



**Figure 2** Upper lip lacerations (Case 2).



Figure 3 Pulp polyp removal (Case 3).



Figure 4 Extraction (Case 4).



Figure 5 Multiple extractions (Case 5).



Figure 6 Dentoalveolar traumas (Case 6).

## Results

In all the cases, after the first application of the Er: YAG laser,

hemostasis was achieved and that allowed observation for a second application of Er: YAG if necessary. Only a second application was done in one case (Table 2).

Table 2 Reduction of Factor VIII owing to the management of the Er:YAG laser therapy

	Dental diagnosis	Required factor VIII	Factor viii owing to the management of the Er: yag laser
1	Temporary tooth extraction (73)	750 IU every 12hrs /1st day (2 dose) y 3rd dose 24 hrs after=2,250 IU	25 IU/kg (25 kg) single dose=750 IU
2	Laceration of upper lip	25 IU/Kg/12 hrs for 2 days=2600 IU	25 IU /kg=750 IU single dose
3	Pulp polyp removal	25 UI/Kg/12 hrs for first 24 hrs=1,250 IU	750 IU single dose
4	Temporary tooth extraction (53)	750 IU/8 hrs*24hrs=2,250 UI, e/12*48hrs=3000UI, Total dose= 5,250 IU	25 IU/kg=750 IU single dose
5	Multiple extractions (52,51,61,62)	50 UI /Kg /8hrs *1st day, e/12 hrs *2nd &3rd days, 25IU/Kg/24 4th & 5th day, same dose if necessary until recovery Total dose=10,000 IU	50 IU /kg (15)=750 IU 1st dose ; 750 IU 2nd dose/ 24 hrs after=1,500 IU
6	Dentoalveolar trauma	25 IU /kg (15Kg)=375 IU for 3 days every 12 hrs =2,250 U.I **3000 IU**	25 IU/kg (15 kg)=375 IU=*500 IU single dose*

## Conclusion

In all the cases the use of the factor was reduced between 60-80%, and this also reduces the possibility to develop inhibitors. The saved factor can be used for other medical emergencies of hemophilic patients. The new alternative therapies for oral management in hemophilia patients such laser therapies, reduces pain, inflammatory responses and also patient stress.

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## Conflicts of interest

The author declares that there is no conflicts of interest.