# Er:YAG as a global team player, an application overview trough the actual choice of fiber tips on H14

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**SUMMARY**

Two considerations are basic to unterstand the extended range of indications for the Er:YAG laser. The wavelenght has water as main chromophore, so almost every oral tissue can be managed by Er:YAG, when blood is not dominantly interfering to the target tissue, e.g. vascular lesions. Due to the specific amount of vol% of water in different tissues, we are able to precisely adapt the settings to our target. Settings mean beside the energy/power, pulse rate, water/air ratio also pulse durations, as our second basic main consideration.

The range of pulse durations from 50µs to 1000µs and the nature of the pulse, including QSP, offers us the widest field of evidence based indications in laser assisted dentistry, spacing from conservative dentistry to esthetics and cosmetics, endodontics, soft and hard tissue oral surgery, periodontology and photobiomodulation. Instead of showing the indications trough the different application fields, I would like to show the choice of different fiber tips for the tissue management, a prospective analysis from a point of view of the optical system touching the target tissue.

In our wide selection of tips, we have three general categories : cylindrical and conical sapphires of different sizes for hard- and soft tissue management, scisseled sapphires and varian quartz fibers for perio and two different systems for laser assisted endo, either with preciso or pips quartz tips. We are able to mix interactively the categories and use tips in indications which differ from the basics, moving so outside the general categories.

The most universal ones, the cylinders in different sizes, are indicated for dental soft and hard tissues, oral surgery, periodontology and pbm. The cones with reduced end sizes manage the same indications, where thinner ablation and narrow areas or margins are involved (e.g. fissure sealings, small ClV fillings, very narrow prep areas, biopsies).

Treating dental hard tissues, we involve all class of fillings/tooth areas in conservative and pediatric dentistry, in orthodontics (brackets bonding, de-bonding) and in esthetic and cosmetic dentistry, from (partial) veneers, veneer removals (the „one minute procedure“) to crowns & cad/cam solutions like Cerec & Co.


Fig. 1 : Cylinder, Cone, Chisel and Varian fiber tips

The dental soft tissue management includes indirect and direct pulp capping, pulpotomies and pulpectomies.

In oral surgery hard tissue represents an exclusive domain for Er:YAG, spacing from osteotomies of any kind, trough apical resections, extractions, implant surgery into surface bone modifications. Crown lenghtening represents the bridge from hard to soft tissue surgery. Due to the actual choice of long pulse durations from 600µs up to 1000µs we perform easely gingivectomies, gingival remodellings, biopsies, ablation of larger tissue areas, frenectomies, vestibuloplasties and implant releases. For an efficient coagulation pulse durations between 800µs and 1000µs are essential.

In periodontology Er:YAG is the main team player for all open flap procedures, from incision, internal and external flap trimming and de-epithelialisation, granulomatous tissue removal and root surface management, to open flap peri-implantitis procedures including the the removal of biofilm and granulomatous tissue and subsequent decontamination on implant surfaces and the in office removable prosthetic parts.

The defocused scanning in cases of tooth neck sensitivities and during analgesia on primary teeth complete the indications from the aspect of photobiomodulation.

The chisel sapphire is one of my favorites, not only for periodontology, but also for hard and soft tissue surgery, having a similar shape to a thin cold blade.

In perio, its main indication field, the chisel is ideal for the sulcular debridement, for root surface decontamination, internal and external flap trimming and de-epithelialisation, and all treatment steps of a open flap peri-implantitis surgery.

Ostetomies (in narrow areas) and apical root resections are additional highlights in hard tissue surgery, followed by many indications on soft oral tissue, like biopsies, incisions, gingivectomies, surface (re)modellings, and all kind of frenectomies, where a precise cut is needed. New additional thin quartz fibers for perio and endo completes this journey.

The primary indication for the Varian tip of 500µm and 600µm is the sulcular debridement of hard and soft tissue, with additional action during flap trimming in perio.

But the innovative indications in soft oral surgery are highlighting its potential: gingvectomies in very narrow areas and even more the possibility of very precise cuts in flap surgery.

In endo we have the choice of two systems, integrated in a dual wavelenght protocol with Nd:YAG as essential step for the final decontamination. Preciso works for smear layer removal and a first lateral decontamination till 400µm, supporting the laser activated irrigation with the rinsing solution of choice. Pips covers the photon induced photo activated streaming, producing shockwaves of the rinsing solutions of choice towards the apical area, by coronal tip placement at very low almost athermal energy level. Smear layer removal, first decontamination and root canal prep are the pilars of this protocol, included in our office as a part of the TwinLight procedure.

Fig. 2: Gingivectomy prep with Cylinder, pulp capping with Cone, final w. Cerec.

The view trough the optical window of those basic tips shows the great variation of indications for each single tip and the unique evidence based use of the Er:YAG trough its pulse durations, becoming easely the main leader in evidence based laser assisted dentistry.

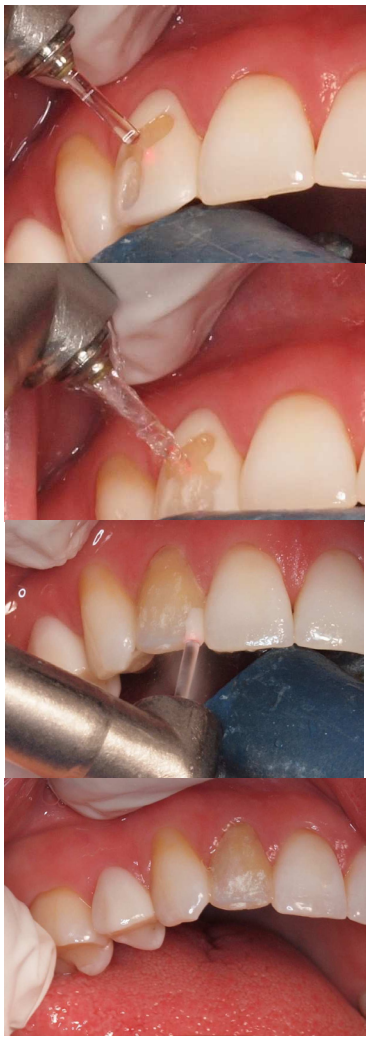

Fig. 3 : Veneer removal with Cylinder, the one minute procedure".

Fig. 4: Veneer prep with Cylinder, finishing (margins) with Cone, intraop and final.

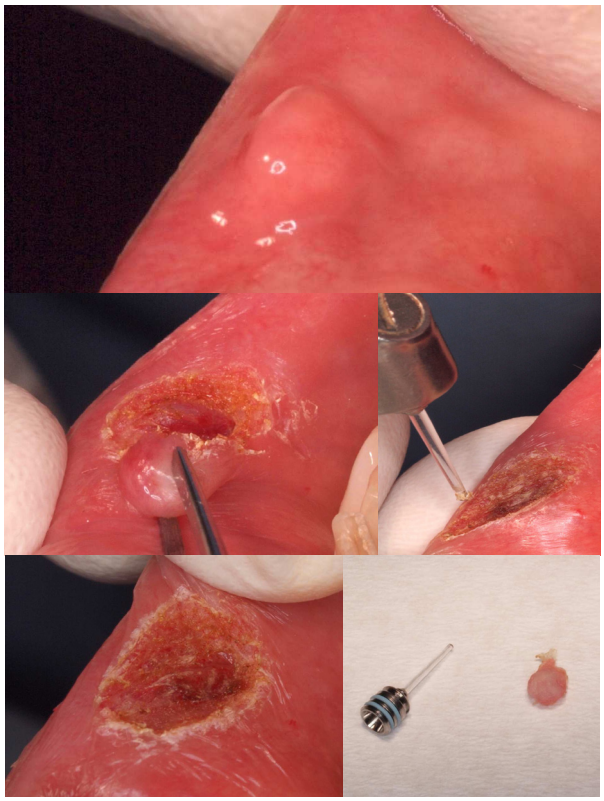

Fig. 5 : Biopsy, soft tissue management and biological wound protection w. Cone.

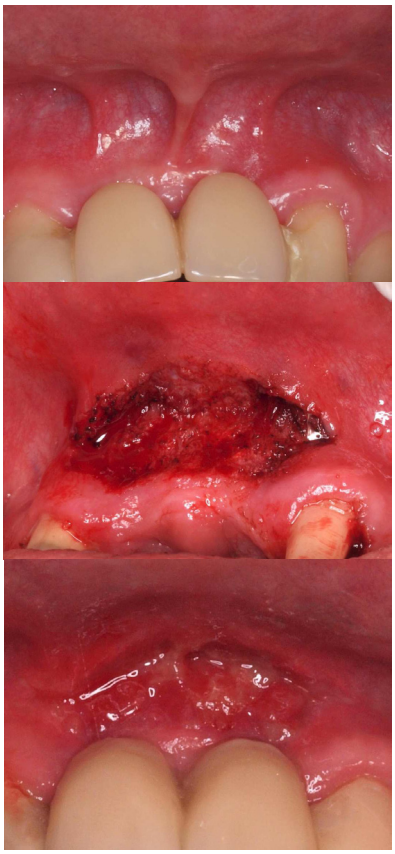

Fig. 6: Vestibuloplasty/frenectomies w. Varian 500 for incision, Scissel for soft tissue management, before, intraop and 8d postop.

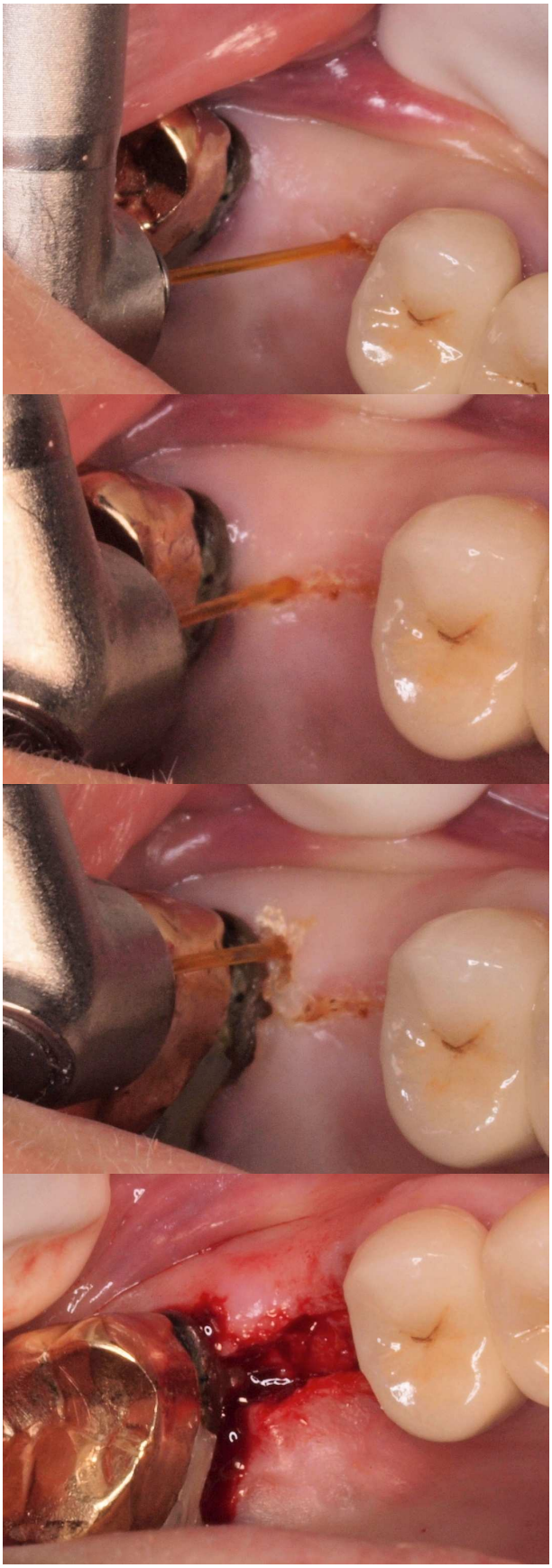

Fig. 7 : Incison for flap with Varian 500, before implant placement.

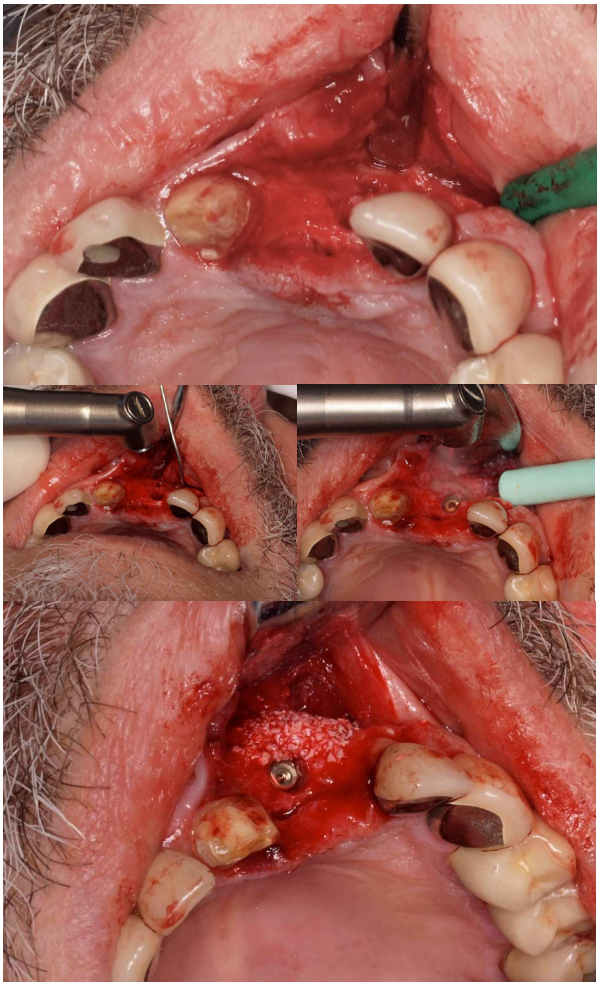

Fig. 8 :Iimplant placement : incision w. Varian, bone reshaping w. Cylinder, implant bed rinsing w. Preciso/Pips and saline solution, bone surface modification w. RO2, bone augmentation w. BioOss and BioGide (Geistlich, CH).

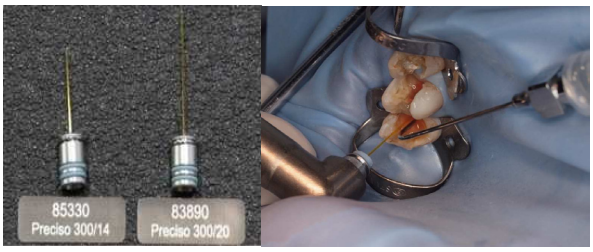


*Fig. 9 : Preciso on display and in action.*

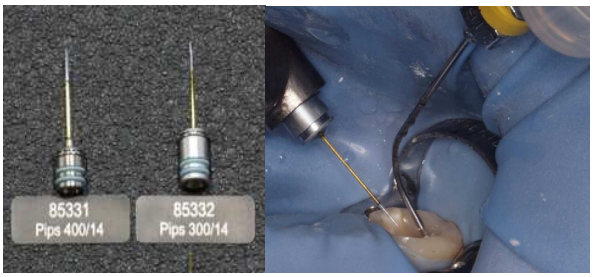


Fig. 10 : Pips on display and in action.