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Er:YAG Laser-Assisted Flapless Aesthetic Crown Lengthening guided by Digital Smile Design (DSD): a Case Report

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Digital smile design (DSD) is a precise and efficient software-based system for aesthetic rehabilitation that allows the clinician to visualize and estimate the discrepancies of orofacial and dentogingival tissues. Through the application of digital smile design principles, the necessary corrections for achieving a harmonious smile can be accurately determined. DSD in combination with Er:YAG laser seems to be a useful tool to achieve a satisfactory aesthetic result, especially in the management of aesthetically demanding cases of gummy smile. This case report describes how to do a minimally invasive Er:YAG Laser-Assisted flapless aesthetic crown lengthening, guided by Digital smile Design (DSD).

A 19-year-old female patient presented with the chief complaint of a non-aesthetic gummy smile. Digital Smile Design analysis showed increased gingival display on smiling. The initial diagnosis guided by the DSD led to a wax up of the 3D model (ITERO®, AmannGirrbach CBCT®) that was duplicated in an acrylic resin surgery guide. Laser aesthetic crown lengthening that includes gingivectomy and osseous recontouring was made to resolve altered passive eruption, a flapless osteotomy procedure was performed through the gingival sulcus using an Er:YAG laser, without the longer healing time required for open crown lengthening surgeries. During removal of the gingival tissue, a proper contour was restored to avoid rebound growth. A very aesthetic result was achieved.

One-stage flapless crown lengthening realized by the 2940 nm Er:YAG laser wavelength is less traumatic for gingival tissues, shortens the total treatment time, can cut and ablate tissue with excellent surgical precision, and has minimal collateral effects resulting in decreased tissue damage, causing less inflammation, less post-operative discomfort, and thus enhanced healing. The concept of minimally invasive dentistry can be well achieved by choosing laser treatment guided by DSD.

Star Wars in my dental office?

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The aim of this presentation is to show the advantages of using Er:YAG and Nd:YAG laser over standard treatment procedures at different stages of endodontic treatment: starting from preserving teeth from root canal therapy, to improving pre-endo build-ups and ending with better effects of root canal system cleaning using PIPS®/SWEEPS®.

The presentation shows three groups of cases: preserving tooth vitality with direct pulp capping and pulpotomy techniques, simplifying pre-endo build-ups during Er:YAG caries removal by saving interproximal enamel, and outcomes and follow-ups of complicated re-RCT treatment (removing separated instruments, negotiating calcified canals) using light-activated irrigant solution. The presentation will show four chosen cases in every group. All treatments were performed using the Fotona LightWalker ATS combined Er:YAG and Nd:YAG laser system.

The presentation shows just selected cases, but in every group of shown cases, over 100 patients were treated using the described methods with a success rate over 90%. For the success rate in first group of cases we recognized preserving tooth vitality in asymptomatic teeth (93% success rate), while in the second group a shortening of the reconstructing time and saving interproximal enamel (98% success rate), and in third group a healing of the periapical area in control RVG in asymptomatic teeth (94% success rate).

In addition, we noticed fewer side effects (post treatment pain) compared to standard procedures.

Compared to standard procedures, experience in my practice has shown that using Er:YAG and Nd:YAG laser in endodontic treatment shortens the time of procedures, reduces post operational side-effects and improves the effect of treatment comparing to standard procedures.