SCUOLA DERMATOLOGICA
SERGIO CHIMENTI

Laser per patologie infettive virali e onicomicosi

Domenico Piccolo

ROMA, 8-9 GIUGNO 2018

SUMMER MEETING

Published in final edited form as:
Antiviral Res. 2014 October ; 110: 70–76. doi:10.1016/j.antiviral.2014.07.012.

Ultrashort pulsed laser treatment inactivates viruses by inhibiting viral replication and transcription in the host nucleus

Shaw-Wei D. Tsen[1], **Travis Chapa**[2], **Wandy Beatty**[2], **Baogang Xu**[1], **Kong-Thon Tsen**[3,4], and **Samuel Achilefu**[1,5,6,#]

Ig Sanita Pubbl. 2015 Jul-Aug;71(4):369-85.

Efficacy of the ND:YAG laser therapy on EBV and HSV1 contamination in periodontal pockets.

Martelli FS[1], Bacci G[2], Martelli ML[1], Nobili P[3], Boddi A[1], Rosati C[1], Fanti E[1].

Author information

Abstract

AIM: The aim of this retrospective multicenter study was to verify the efficacy of Nd:YAG laser in the treatment of periodontal pockets infected by Epstein-Barr Virus (EBV) and Herpes Simplex Virus 1 (HSV1).

METHODS: Subgingival plaque samples of 291 Italian periodontal patients were analyzed by Real Time PCR to evaluate the frequency of both viruses before and after Nd:YAG laser-assisted periodontal treatment.

RESULTS: Before treatment, EBV and HSV1 were observed in 29.9% and in 3.8% of periodontal patients respectively, while co-infection with both viruses was detected in 1.7% of cases. Periodontal Nd:YAG laser treatment ("Periodontal Biological Laser-Assisted Therapy", PERIOBLAST) produced statistical significant benefits, especially in EBV periodontal infection: 78.2% of EBV positive patients became EBV-negative following treatment.

CONCLUSIONS: Results of this preliminary study highlight that EBV is found in periodontal pockets more frequently than HSV1, supporting the theory of the potential role of EBV in the onset and progression of periodontal disease. Moreover, our data showed that Nd:YAG laser-assisted periodontal treatment (Perioblast) is also effective in case of viral infection, validating evidences that it represents a successful alternative approach to traditional periodontal protocols.

PMID: 26519745

Lasers Med Sci. 2015 Feb;30(2):747-51. doi: 10.1007/s10103-013-1401-7. Epub 2013 Aug 13.

Human papilloma virus lesions of the oral cavity: healing and relapse after treatment with 810-980 nm diode laser.

Angiero F[1], Buccianti A, Parma L, Crippa R.

Author information

Abstract

This study evaluated the therapeutic efficacy of laser therapy in treating oral human papilloma virus (HPV) lesions. In particular, mode of action, healing, postoperative patient compliance, visual numeric scale (VNS) pain index, and recurrence were analyzed. During 2001-2012, in 170 patients (80 women and 90 men), 174 intraoral and lip HPV lesions were detected and excised by diode laser of different wavelengths (810-980 nm), with an average power of 2.1 W, in continuous wave mode, using 300 to 320 μm optical fibers. In most cases (95.4%), complete healing occurred in the first 30 days. There were no adverse effects and all patients were carefully followed up until complete healing occurred, documenting any complications. There was only one recurrence, which was later treated successfully; the mean VNS pain score was below one. In treating HPV lesions, the diode laser is not only a valuable tool for their eradication but especially it reduces relapses, thanks to the characteristics of the laser light.

PMID: 23942804 DOI: 10.1007/s10103-013-1401-7

The Scientific World Journal
Volume 2012, Article ID 546528, 11 pages
doi:10.1100/2012/546528

Research Article

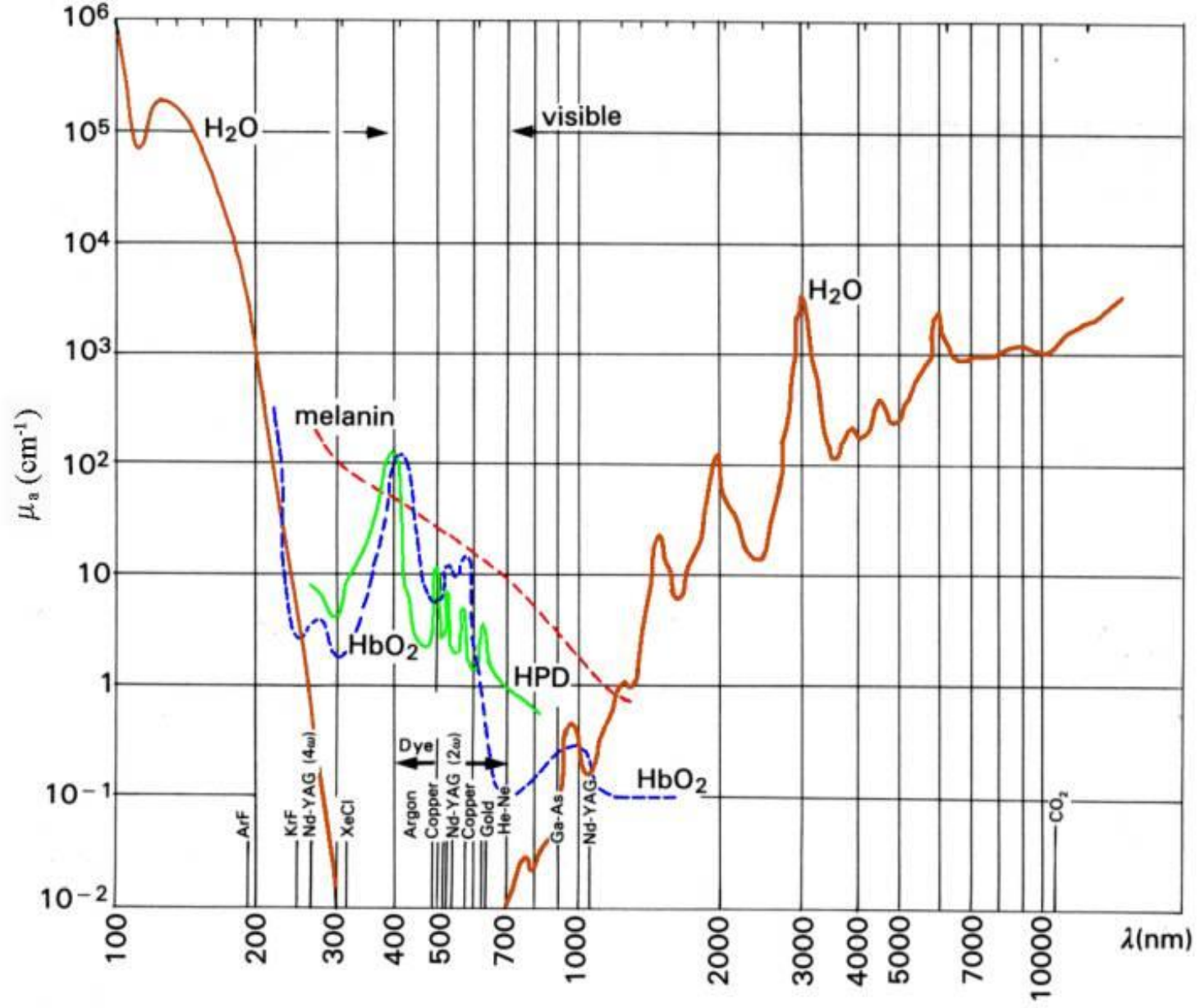
Highlights of Thirty-Year Experience of CO_2 Laser Use at the Florence (Italy) Department of Dermatology

Piero Campolmi, Paolo Bonan, Giovanni Cannarozzo, Andrea Bassi, Nicola Bruscino, Meena Arunachalam, Michela Troiano, Torello Lotti, and Silvia Moretti

Section of Clinical, Preventive and Oncologic Dermatology, Department of Critical Care Medicine and Surgery, University of Florence, Villa S.Chiara, Piazza Indipendenza 11, 50129 Florence, Italy

Table 1: Treated lesions.

Benign epidermal tumours		
Seborrheic keratoses	35.720	
Follicular inverse keratoses	75	
Epidermal and sebaceous nevi	5706	Power: 0.5–3 W
Benign pilar and sebaceous tumours		
Facial Milia	12.230	
Trichoepitheliomas	2.570	Frequency: 10 HZ
Sebaceous adenoma	8.040	Power: 0.5–1 W
Small sebaceous cysts	425	
Benign tumours of eccrine glands		
Syringomas	1235	Frequency: 10 HZ Power: 0.5–1 W
Malign epidermal tumours		
Basal Cell carcinoma (Bcc)		
Superficial (also extensive)	2505	Frequency: 10 HZ Power: 0.5–5 W
Nodular (<1 cm diameter)		
Viral lesions		Frequency: 10 HZ
Warts	12.235	Power: 0.5–3 W
Acuminate condylomas	8.503	For Plantar Warts:
Squamous papillomas	58	Continuous Mode
Oral cavity		(Power 10–15 W)
Dermal hypertrophy		
Pendulous fibromas	45.023	Frequency: 10 HZ
Skin neurofibromas	150	Power: 0.5–1 W
Scars		
Acne, surgical, traumatic, post-chickenpox	7.502	Frequency: 10 HZ Power: 0.5–1 W
Fatty accumulation		
Xanthelasmas	7.234	Frequency: 10 HZ Power: 0.5–1 W
Facial dermatosis		Frequency: 50–100 W
Rhynophymas (glandular type)	506	Power: 6-7 W
Otophyma	35	(Superpulse or
		Continuous Mode)
Precancerous		
Actinic keratoses	25.213	
Actinic cheilitis	807	Frequency: 10 HZ
Leukoplakia	503	Power: 0.5–3 W
Others		
Favre-Racouchot's disease	124	
Pringle-Bourneville's disease	304	Frequency: 10 HZ
Chondrodermatites nodularis helicis	432	Power: 0.5–1 W

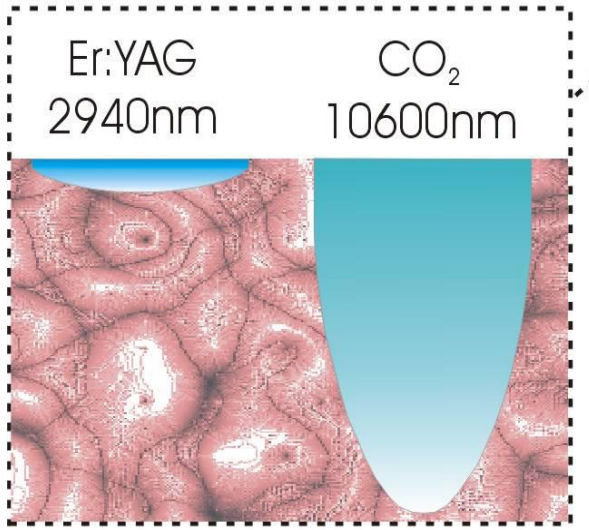

10^6
10^5
10^4
10^3
10^2
10
1
10^{-1}
10^{-2}
μ_a (cm^{-1})
H_2O
visible
H_2O
melanin
HbO_2
HPD
HbO_2
ArF
KrF
Nd-YAG (4ω)
XeCl
Dye
Argon
Copper
Nd-YAG (2ω)
Copper
Gold
He-Ne
Ga-As
Nd-YAG
CO_2
100
200
300
400
500
700
1000
2000
3000
4000
5000
7000
10000
λ(nm)

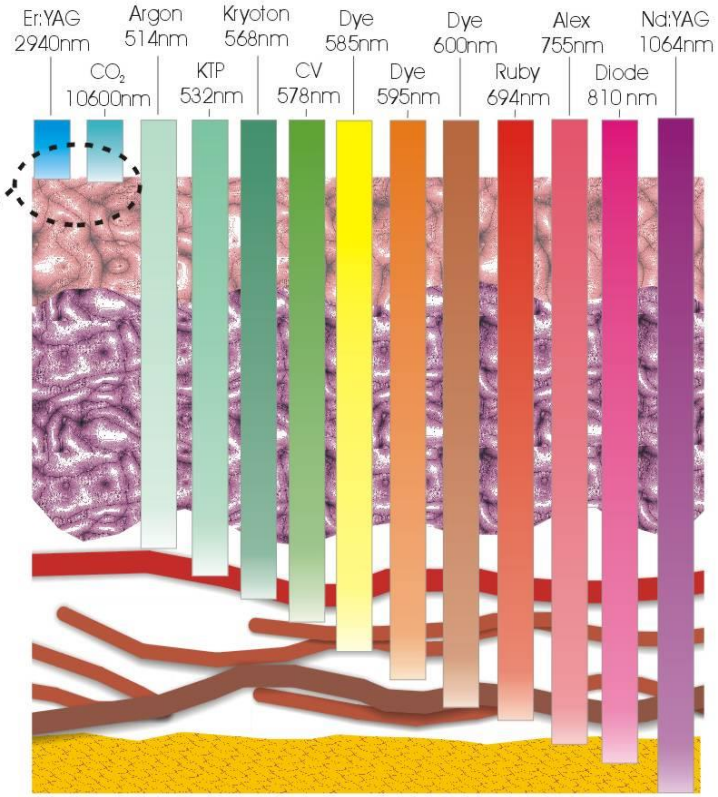
Profondità di penetrazione CO_2 e Erbium LASER

μ_a per l'acqua*:

$CO_2 \approx 790\ \mu m^{-1}$

$Er:YAG \approx 13000\ \mu m^{-1}$



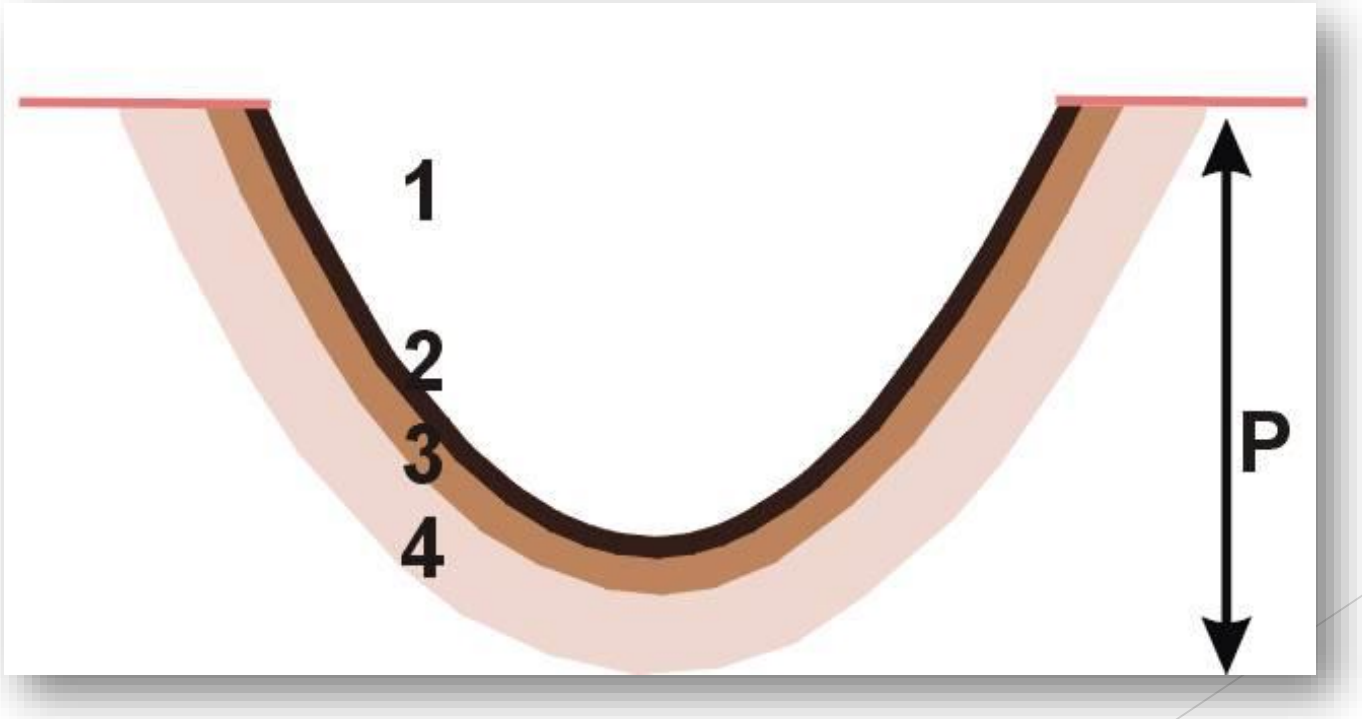


Il coefficiente di assorbimento per l'acqua del laser ad erbio è più di 16 volte maggiore rispetto a quello del laser a CO_2.

(*): MP Goldman, RE Fitzpatrick *Cutaneous Laser Surgery* Copyright © 1999 by Mosby, Inc.

1. Ablation
2. Carbonization
3. Coagulation
4. Hyperthermia

Residual Thermal Damage



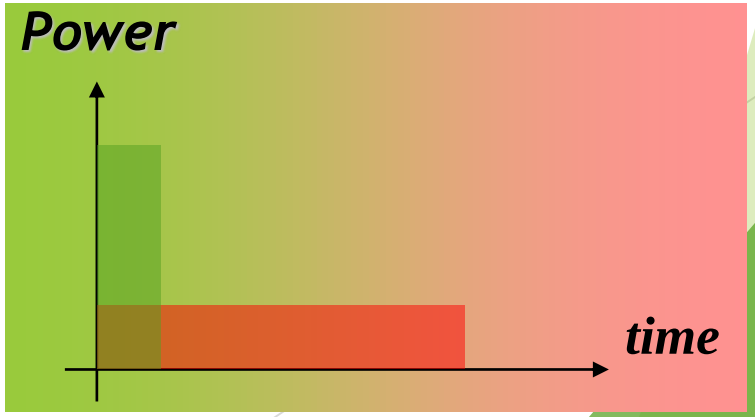
Tipi di Impulsi Laser

1. **Ultrapulsato:**
    1. Emissioni < 1 ms
    2. Molto Ablativo
    3. Poco Termico
    4. Poco Coagulativo

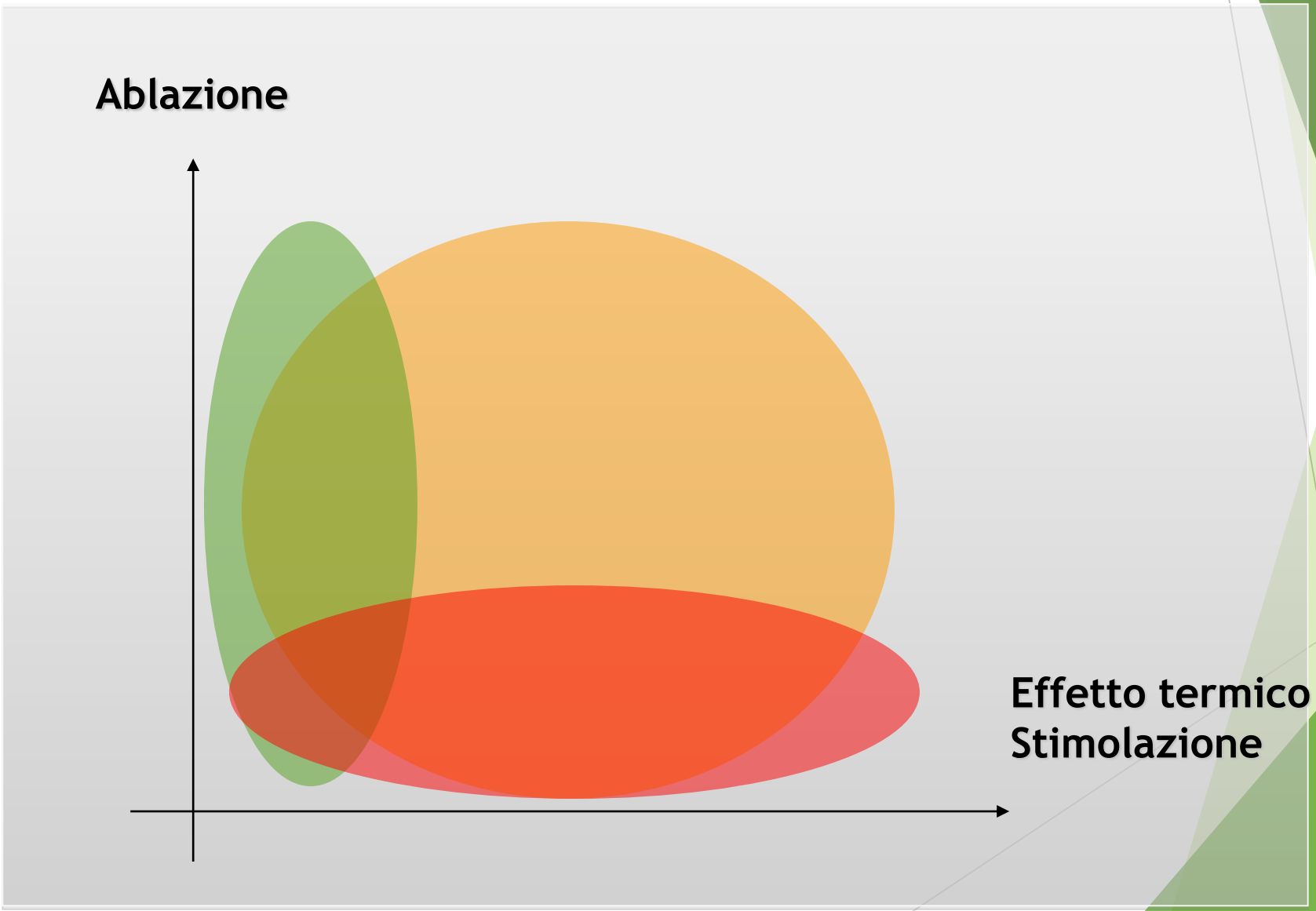
1. **CW Gated:**
    1. Emissioni > 1 ms
    2. Poco ablativo
    3. Più Caldo
    4. Più Coagulativo

1. **SmartPulse:**

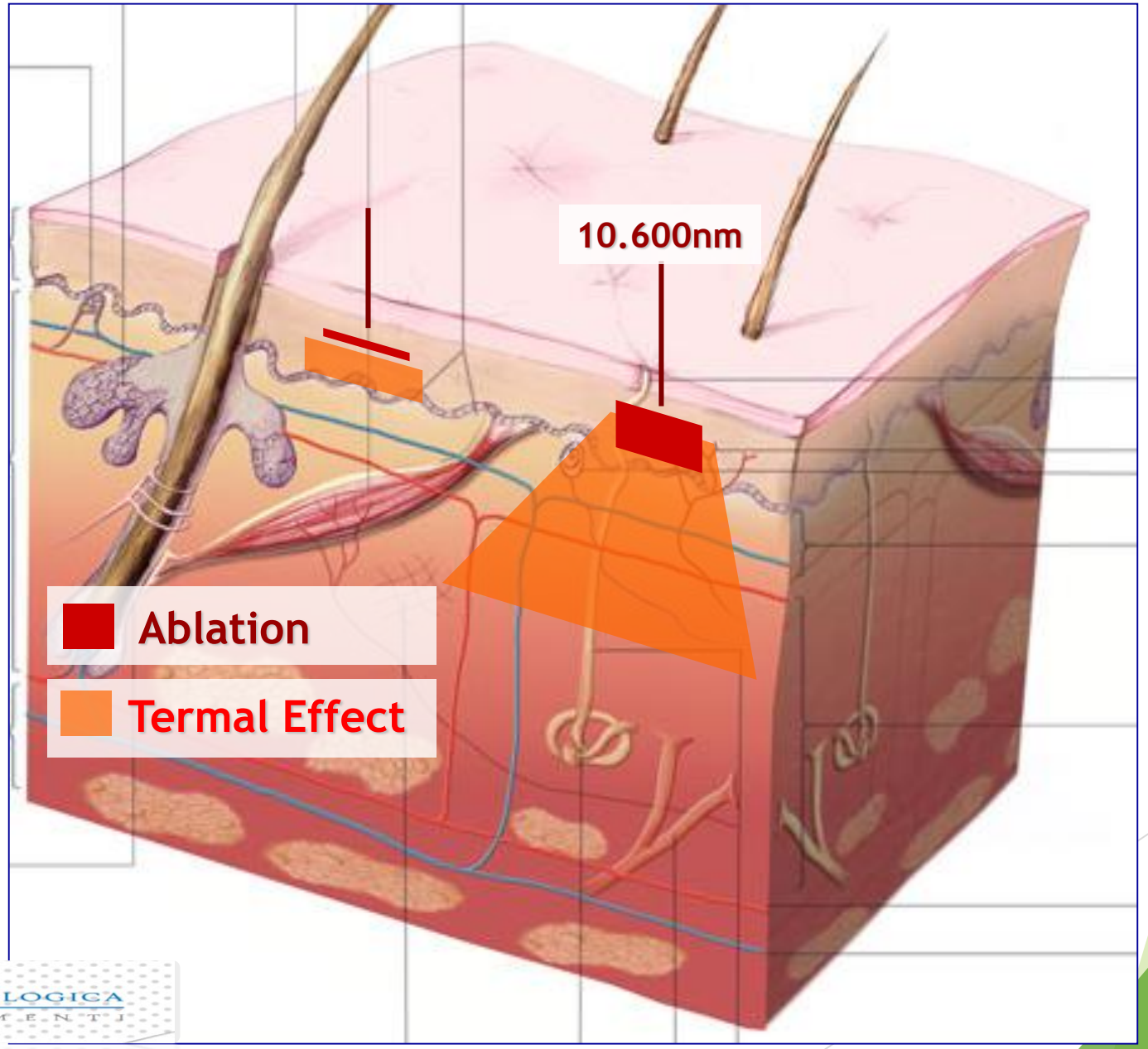
Ultrapulsato + CW Gated



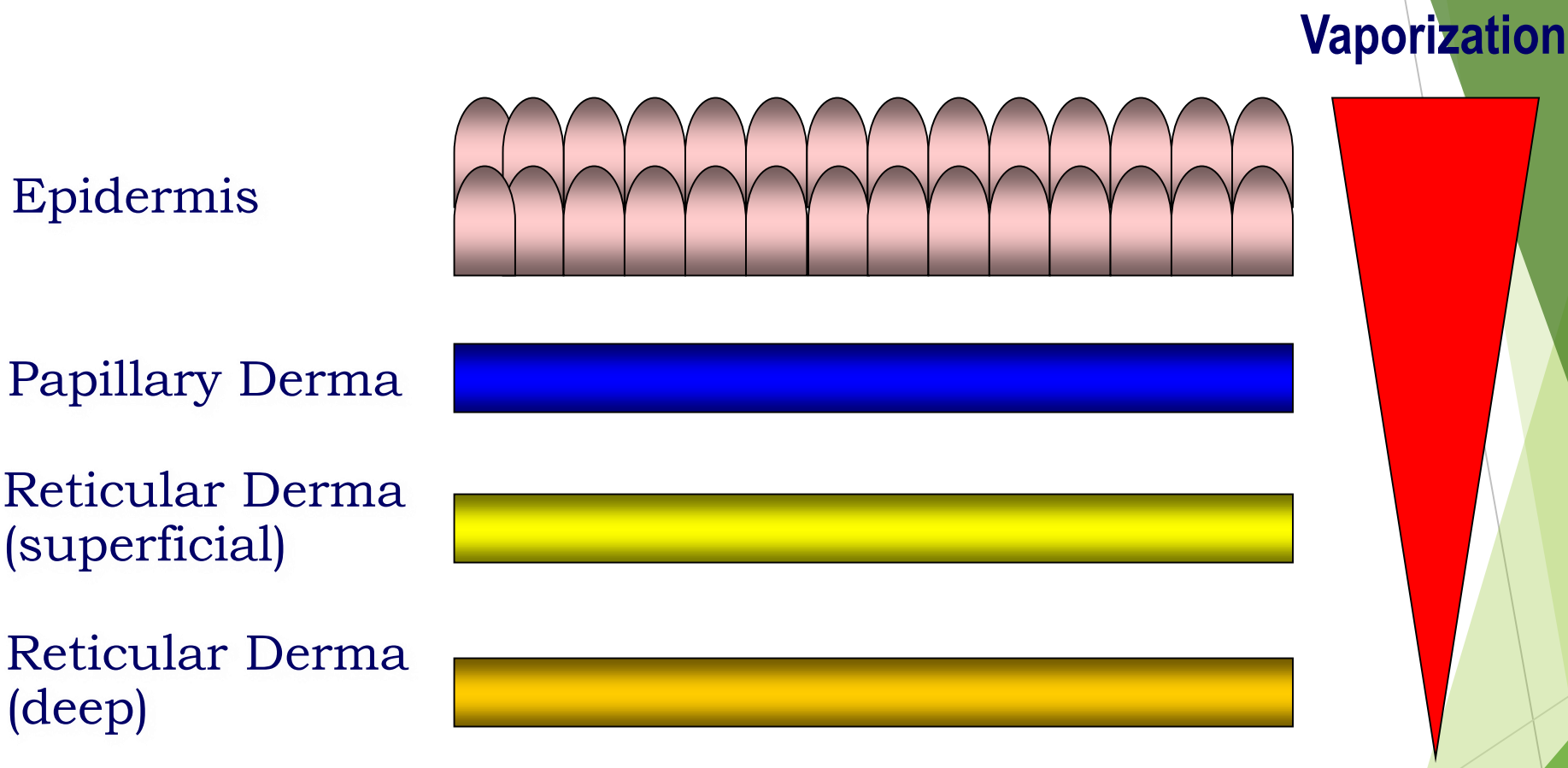
Tipi di Impulsi Laser



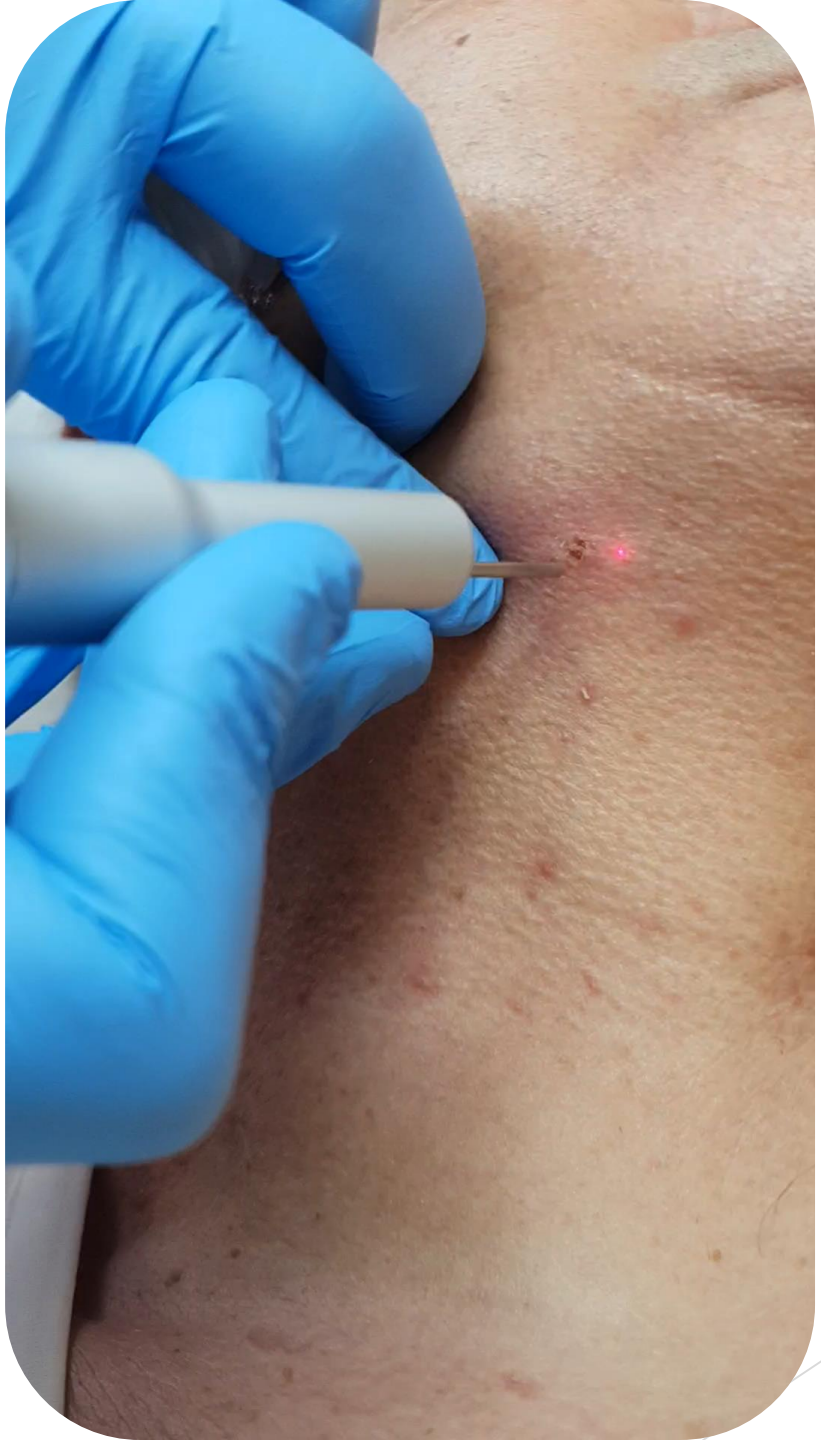
WAVELENGHTS ACTIONS



Thermal ablation



Reid R. : Physical and surgical principles governing CO2 surgery on the skin. Dermatol Clin 1991; 9: 297.



Laser CO_2 e HPV

Laser CO_2 frazionale

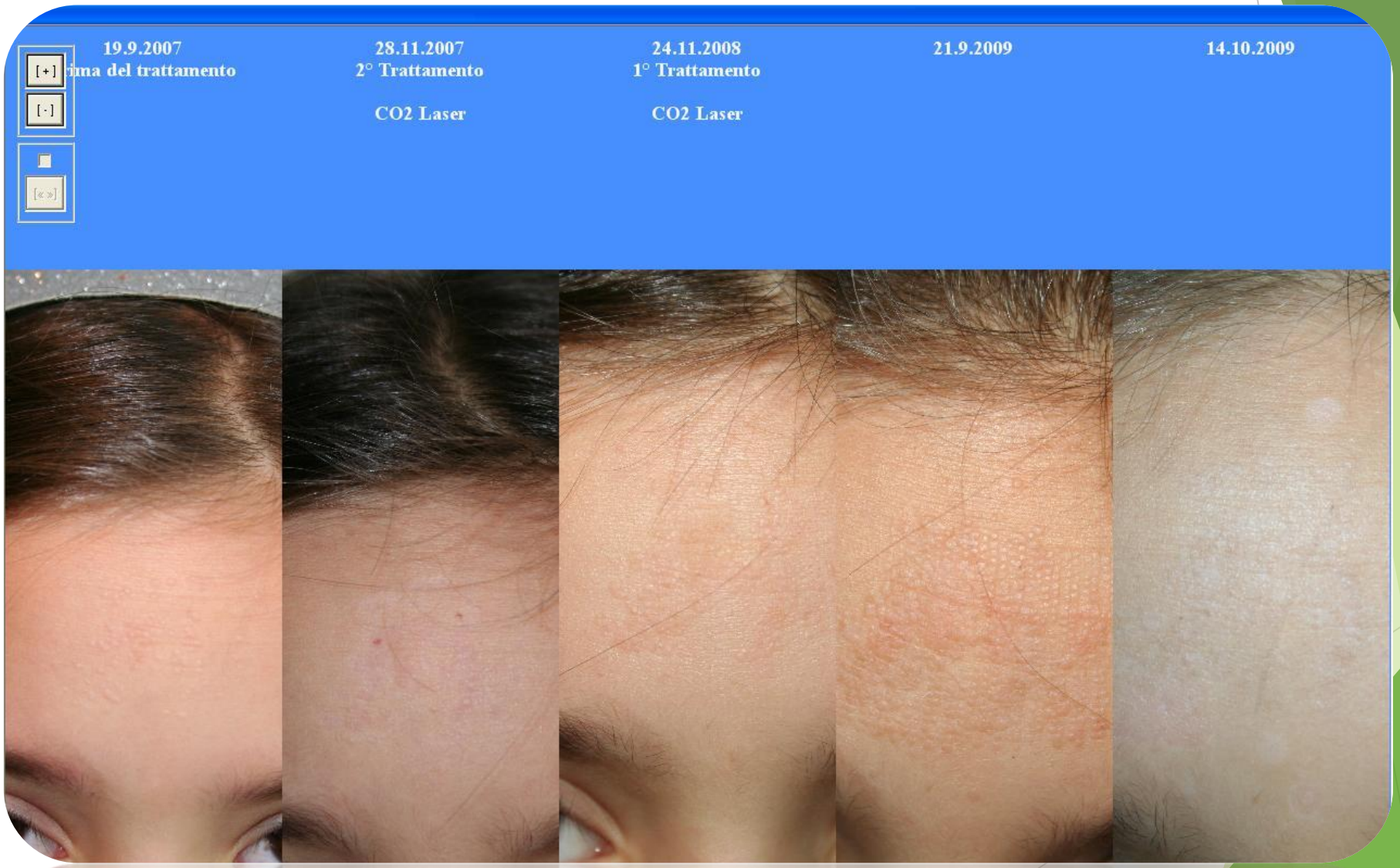
Verruche piane

Prima del trattamento

Dopo un trattamento

Laser CO_2 frazionale

Laser CO_2 frazionale

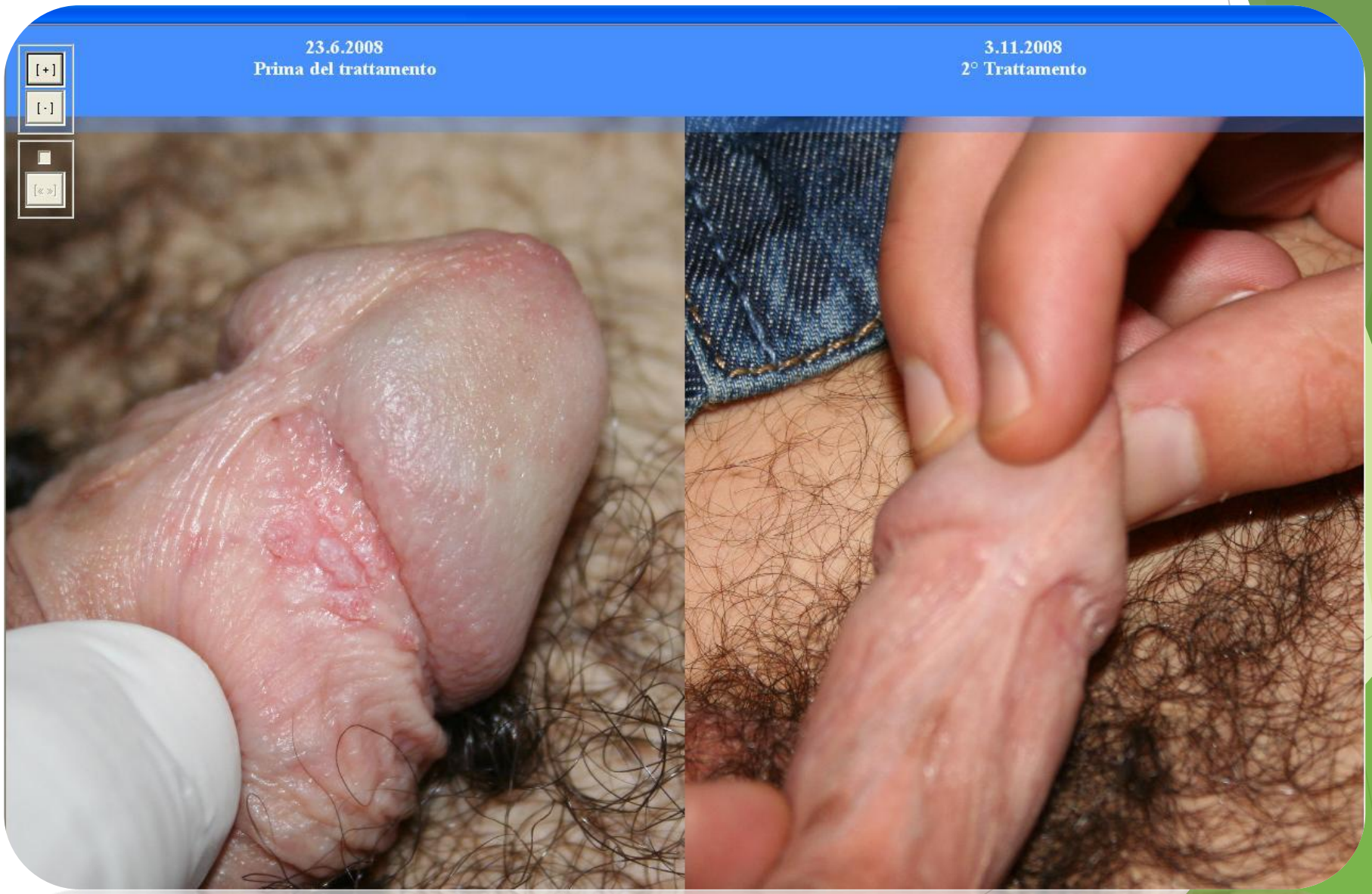


Laser CO_2 e HPV

Laser CO_2 e HPV

Laser CO_2 e HPV

Laser CO_2 e HPV



Laser CO_2 e HPV

Laser CO_2 e HPV

Photomed Laser Surg. 2011 Feb;29(2):83-90. doi: 10.1089/pho.2009.2744. Epub 2010 Oct 22.

Herpes virus reactivation by low-intensity diode and CO_2 lasers.

Saleh HM[1], Shaker AS, Saafan AM, Ibrahim AK.

Author information

Abstract

BACKGROUND: The herpes virus enters into latency after symptomatic or asymptomatic herpetic infection. During latency, the virus has no impact on infected cells. However, internal or external stimuli, including certain lasers, can induce virus reactivation.

OBJECTIVE: The aim was to study the reactivation power of the low-intensity diode and CO(2) lasers on the latent herpes virus.

MATERIALS AND METHODS: The bovine herpesvirus 1 (BHV-1) was inoculated in either the nasal cavity or the lacrimal film of an animal model. Once the virus entered into latency, the trigeminal ganglia of animals were exposed to either a low-intensity diode or CO(2) laser. The reactivation of the virus was then explored by PCR, RT-PCR, and dot-blot hybridization on nasal or lacrimal swabs. The accuracy, sensitivity, and specificity of the aforementioned techniques were compared.

RESULTS: The low-intensity diode laser reactivated the herpes virus less than the CO(2) laser. The nasally inoculated virus was more liable for reactivation by both lasers. PCR was considered as the standard method for the detection of the reactivated virus.

CONCLUSIONS: Low-intensity diode and CO(2) lasers can induce herpes virus reactivation, with the diode laser less likely to reactivate the virus than the CO(2) laser.

PMID: 20969439 DOI: 10.1089/pho.2009.2744

Cortesy G. Cannarozzo

J Dermatol. 2008 Aug;35(8):491-8. doi: 10.1111/j.1346-8138.2008.00509.x.

Pulsed dye laser treatment for viral warts: a study of 120 patients.

Park HS[1], Choi WS.

Author information

Abstract

A prospective, non-blinded, non-randomized study on 120 wart patients treated with pulsed dye laser was performed to evaluate the efficacy and safety of pulsed dye laser treatment for viral warts and to demonstrate the proper application and effective technique of this method. The overall clearance rate was 49.5%. The clearance rates of flat warts, periungual warts, plantar warts and common warts were 67.6%, 51.1%, 47.6% and 44.3%, respectively. Overall, the response rates of pediatric warts, recalcitrant warts and old warts were superior to those of adult warts, simple warts and non-old warts, respectively; however, those trends were not statistically significant. We concluded that pulsed dye laser treatment is a safe, tolerable and relatively effective treatment method for viral warts. Pulsed dye laser treatment may be a more efficacious method for flat warts and recalcitrant periungual warts, and it can be an effective modality for newly-developed warts. The highest clearance rate was noted at a fluence of 9.5 J/cm2 ($P < or = 0.05$) and it is recommended that practitioners perform pulsed dye laser treatments for viral warts at the fluences of 9.0-9.5 J/cm2. A replacement of pulsed dye laser treatment should be considered unless prominent improvement is observed after three treatment sessions.

PMID: 18789068 DOI: 10.1111/j.1346-8138.2008.00509.x

Dermatol Ther. 2014 Jan-Feb;27(1):31-5. doi: 10.1111/dth.12038. Epub 2013 Apr 10.

Pulsed dye laser treatment for facial flat warts.

Grillo E[1], Boixeda P, Ballester A, Miguel-Morrondo A, Truchuelo T, Jaén P.

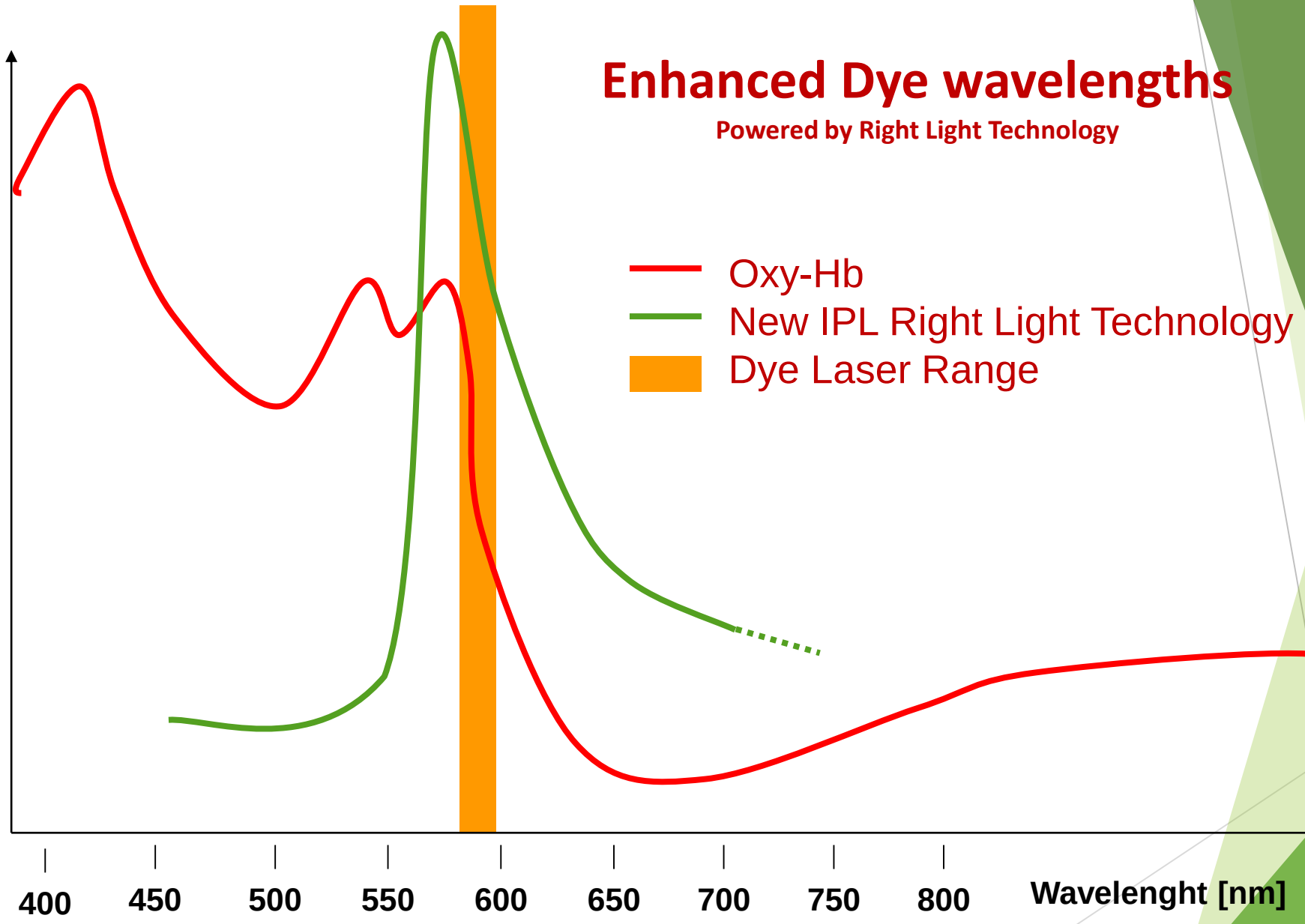
Author information

Abstract

The facial flat wart is not only a contagious viral disease, but also a cause of a distressing cosmetic problem. Although there are many therapeutic options, including salicylic acid, imiquimod, cryotherapy, retinoids, intralesional immunotherapy, and topical 5-aminolevulinic acid photodynamic therapy among others, no monotherapy has been proved to achieve complete remission in every case. Treatment with pulsed dye laser (PDL) seems to be a promising therapeutic option. To assess the efficacy and safety of PDL in a series of patients with viral flat warts on the face, in this prospective study, 32 patients were treated with PDL at 595-nm wavelength, a laser energy density of 9 or 14 J/cm(2) with a spot size of 7 or 5 mm, respectively, with air cooling and a pulse duration of 0.5 millisecond. A complete response was noted in 14 patients (44%), and an excellent response was observed in 18 patients (56%) with 1-year follow-up, with only four recurrences. No significant side effects were reported except intense transitory purpuric response. We consider that PDL is a good option of treatment for flat warts on the face due to its good clinical results, fast response, and low incidence of side effects.

Enhanced Dye wavelengths

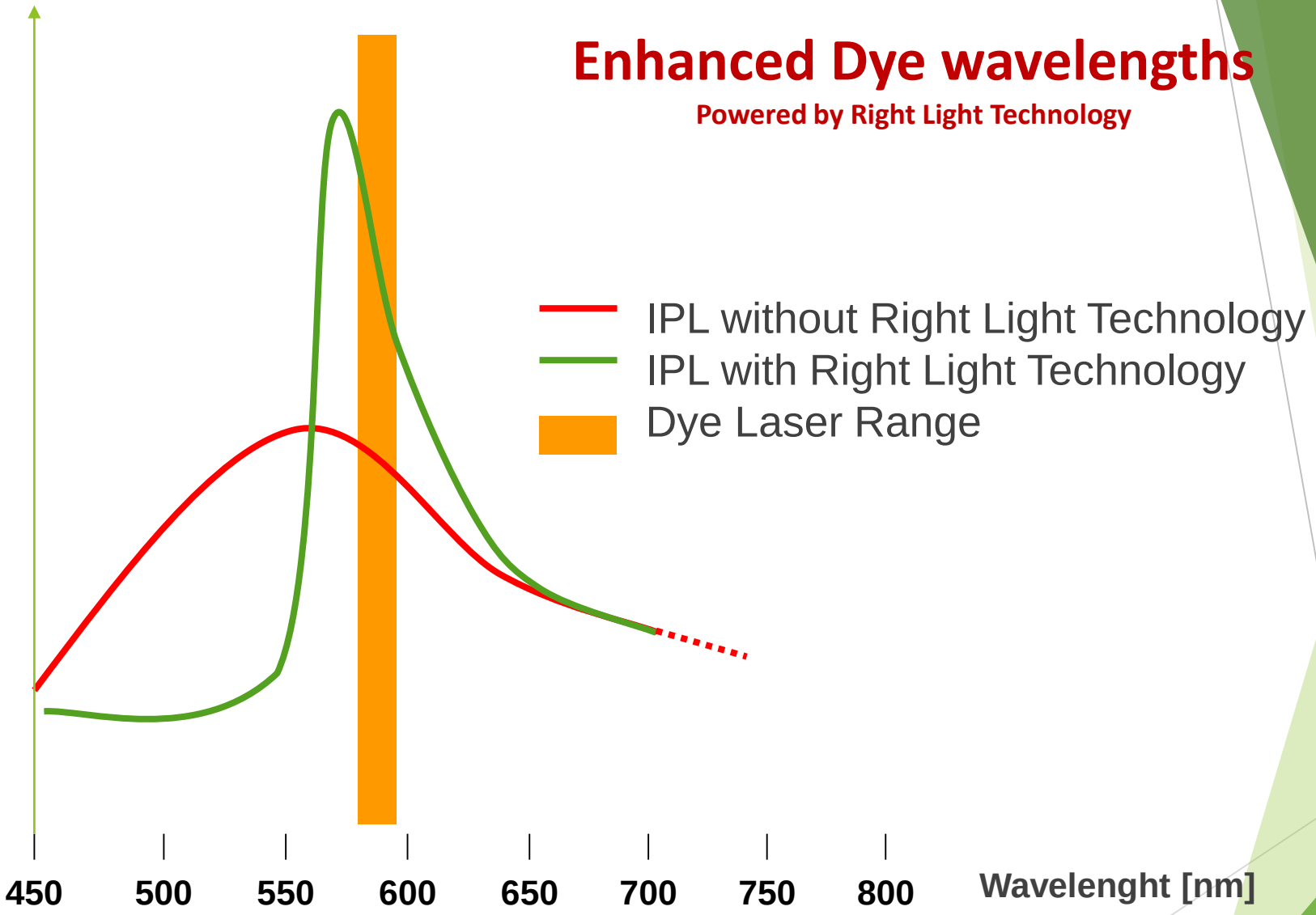
Powered by Right Light Technology



SCUOLA DERMATOLOGICA SERGIO CHIMENTI

Enhanced Dye wavelengths

Powered by Right Light Technology



SCUOLA DERMATOLOGICA SERGIO CHIMENTI


SCUOLA DERMATOLOGICA
SERGIO CHIMENTI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SERGIO CHIMENTI

Laser Dye e HPV

Laser Dye e HPV

Laser Dye e HPV

Cortesy G. Cannarozzo

Lasers Surg Med. 2006 Apr;38(4):273-6.

Pulsed dye laser treatment of genital warts.

Komericki P[1], Akkilic M, Kopera D.

Author information

Abstract

BACKGROUND AND OBJECTIVES: Genital warts represent benign epithelial proliferations induced by human papillomavirus. The goal of treatment is the clearance of visible warts. Different regimens are available. Flashlamp-pumped pulsed dye laser (FPDL) represents one of many treatment options for the management of viral warts (verrucae vulgares), its effectiveness being comparable with that of conventional therapies. We evaluated the effectivity of FPDL light for the treatment of genital warts.

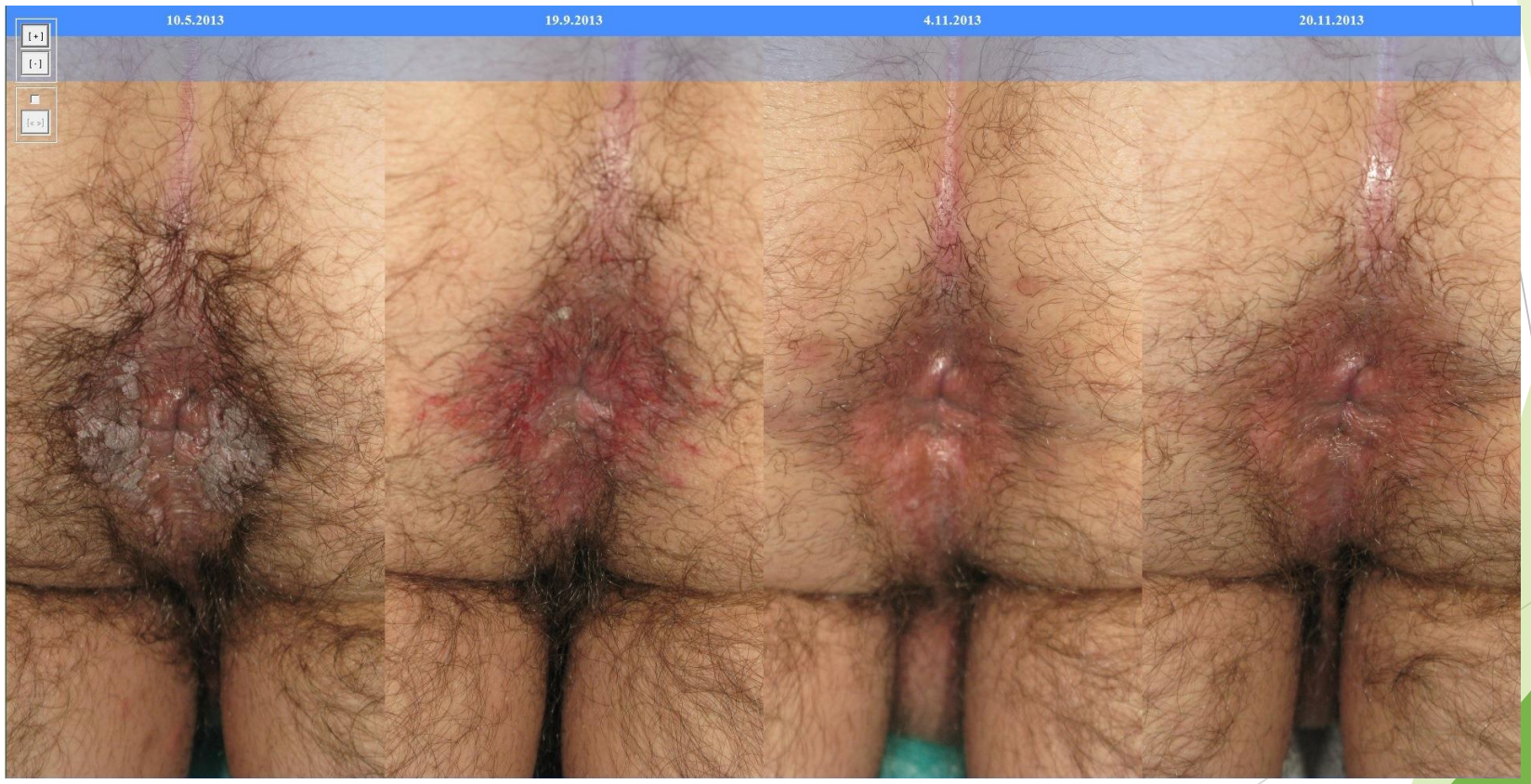
STUDY DESIGN/MATERIALS AND METHODS: A prospective study was performed to examine the efficacy of FPDL in untreated genital warts in which 22 patients were included.

RESULTS: All patients showed complete remission after 1.59 (1-5) laser sessions and no scarring was observed.

CONCLUSIONS: This study demonstrate that FPDL is a simple and safe, cost and time saving alternative treatment option for genital warts and should be listed in genital warts treatment guidelines.

PMID: 16470844 DOI: 10.1002/lsm.20293

Laser Dye e HPV



Cortesy G. Cannarozzo

J Dermatolog Treat. 2011 Aug;22(4):226-8. doi: 10.3109/09546631003681078. Epub 2010 Aug 1.

Treatment of recalcitrant viral warts with pulsed dye laser MAL-PDT.

Fernández-Guarino M[1], Harto A, Jaén P.

Author information

Abstract

BACKGROUND: Photodynamic therapy (PDT) has been explored for the treatment of recalcitrant viral warts (VW) with good results in recent publications.

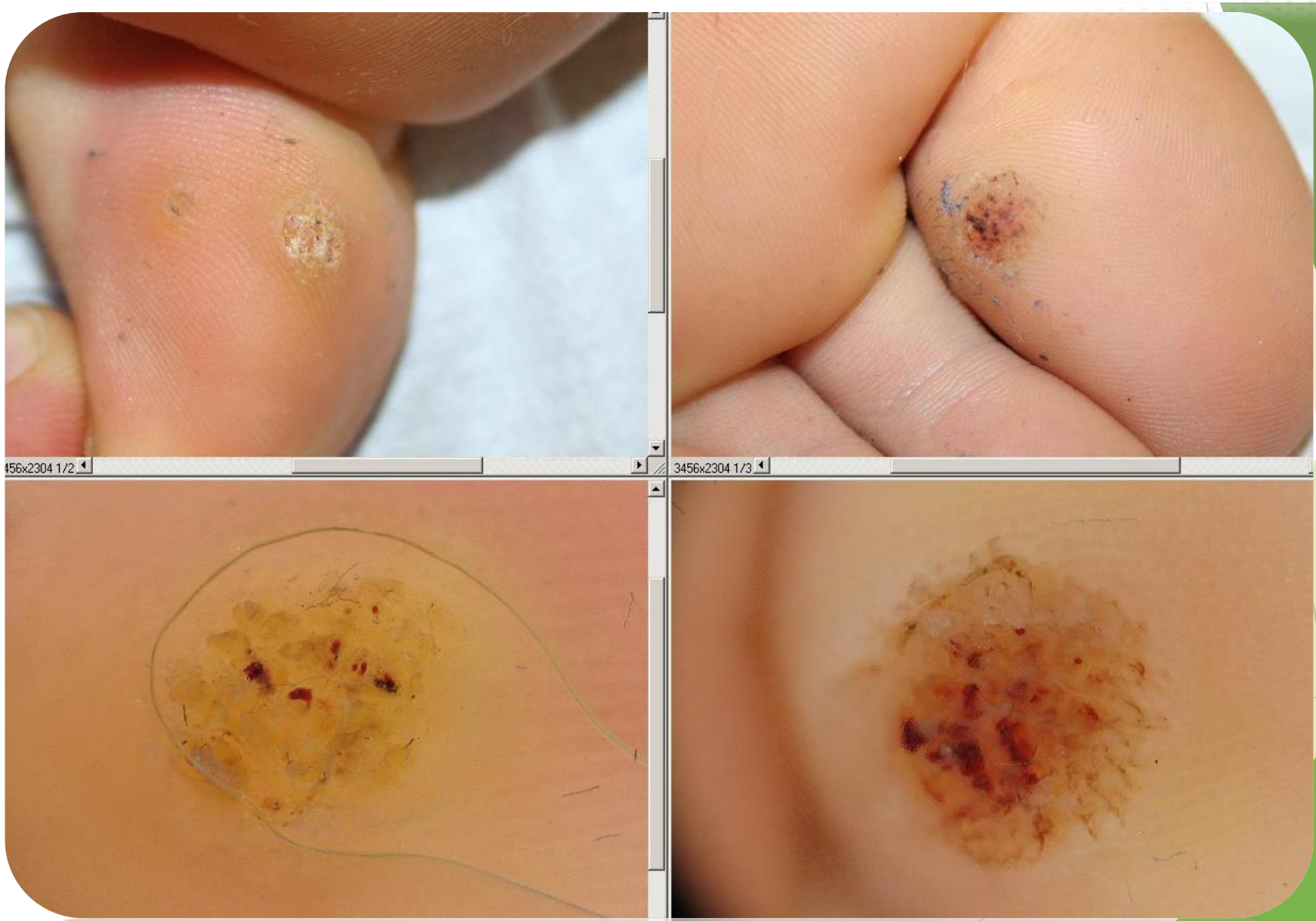
METHODS: We carried out a descriptive and observational study in 19 patients with recalcitrant VW. Methyl aminolaevulinic acid (MAL) was occluded for 3 hours and pulsed dye laser (PDL) was used as the light source. VW were treated weekly until they were clear or for a maximum of six sessions.

RESULTS: A total of 53% of the VW cleared, and 26% of the patients demonstrated complete clearance of all their VW. The treatment was well tolerated and no adverse events were recorded.

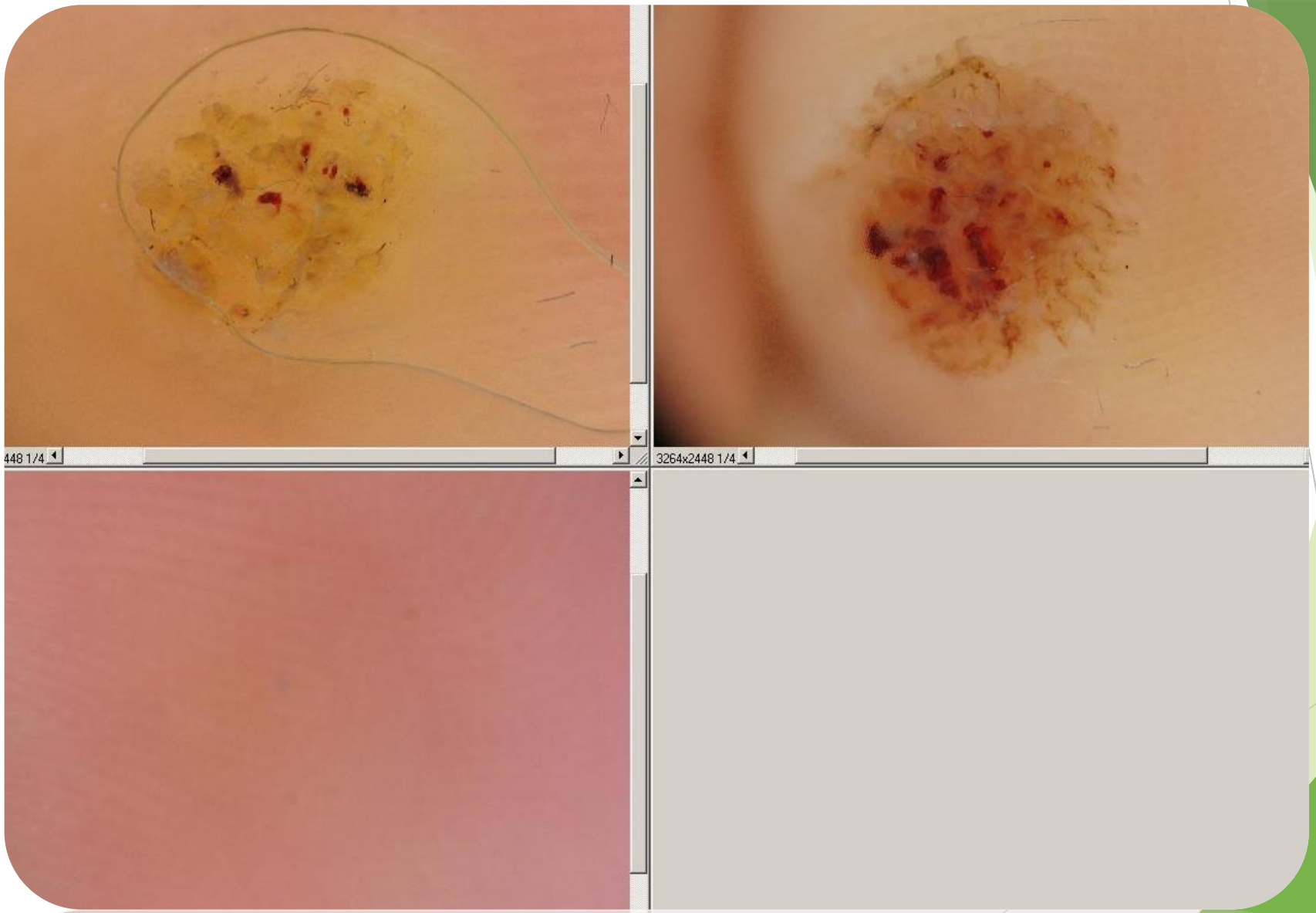
CONCLUSIONS: PDL-PDT is an effective and well-tolerated treatment option for patients with recalcitrant VW. Though only half of patients show any improvement, responders are likely to show complete clearance of their warts.

PMID: 20673158 DOI: 10.3109/09546631003681078

Laser CO2 + IPL + ALA 10%



Laser CO2 + IPL + ALA 10%



Laser CO2 + IPL + ALA 10%

Photomedicine and Laser Surgery
Volume XX, Number XX, 2017

Pp. 1–4
DOI: 10.1089/pho.2016.4153

Original Research

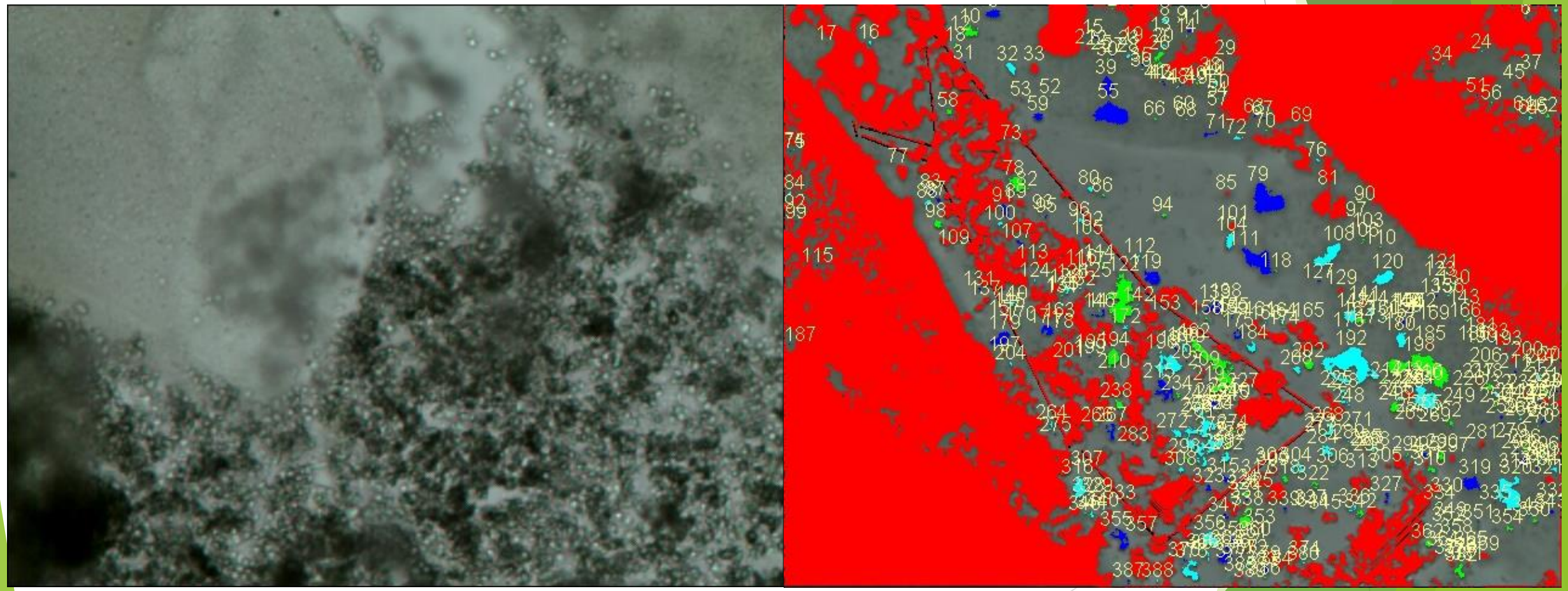
Long-Pulsed 1064-nm Nd: YAG Laser for the Treatment of Onychomycosis

Domenico Piccolo, MD,[1] Dimitra Kostaki, MD,[2] Ester Del Duca, MD,[3] Giovanni Cannarozzo, MD,[4] Mario Sannino, MD,[4] and Steven Nisticò, MD[5]

Based on these findings, we conducted a study to observe the effect of long pulse 1064-nm Nd: YAG laser for onychomycosis in terms of clinical cure using both clinical e dermoscopic pictures, before and after each treatment. The diagnosis was established in each patient on the basis of clinical findings, dermoscopic pictures and mycological coltures.

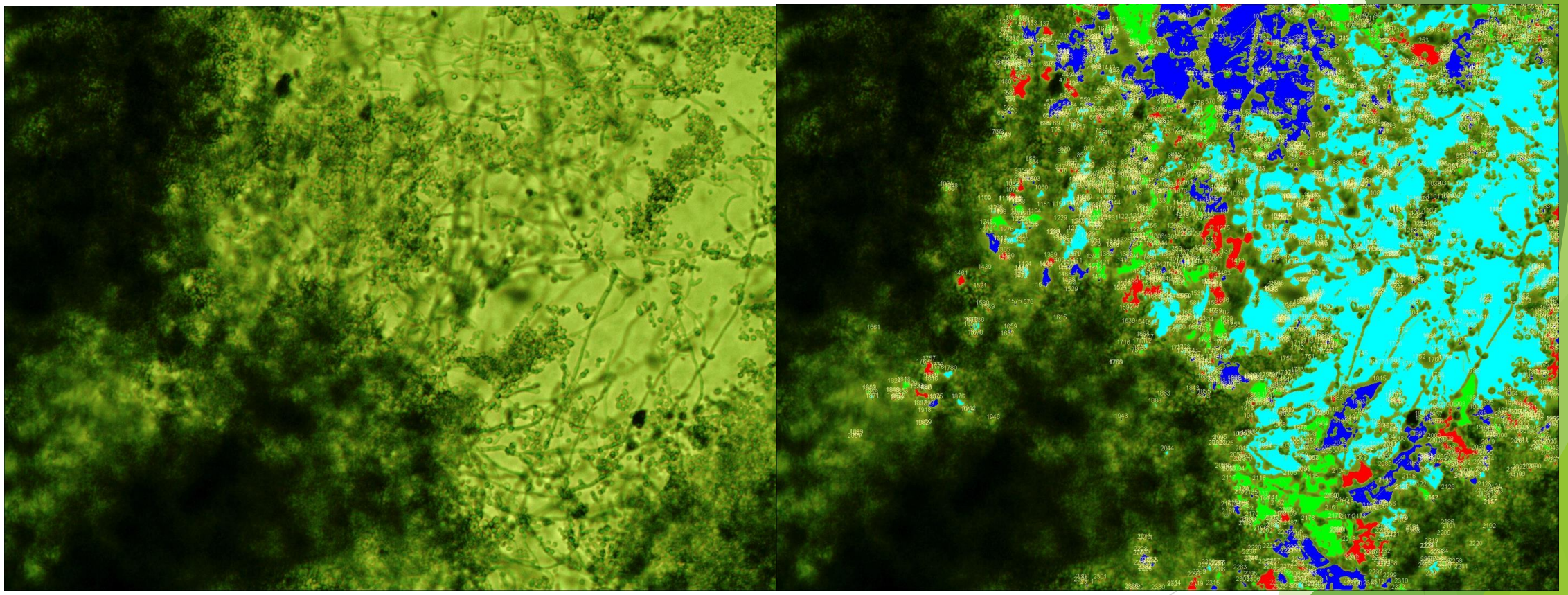
Onicomicosi

Test colturale positivo per T. Rubrum



Onicomicosi

Colonie di Candida albicans

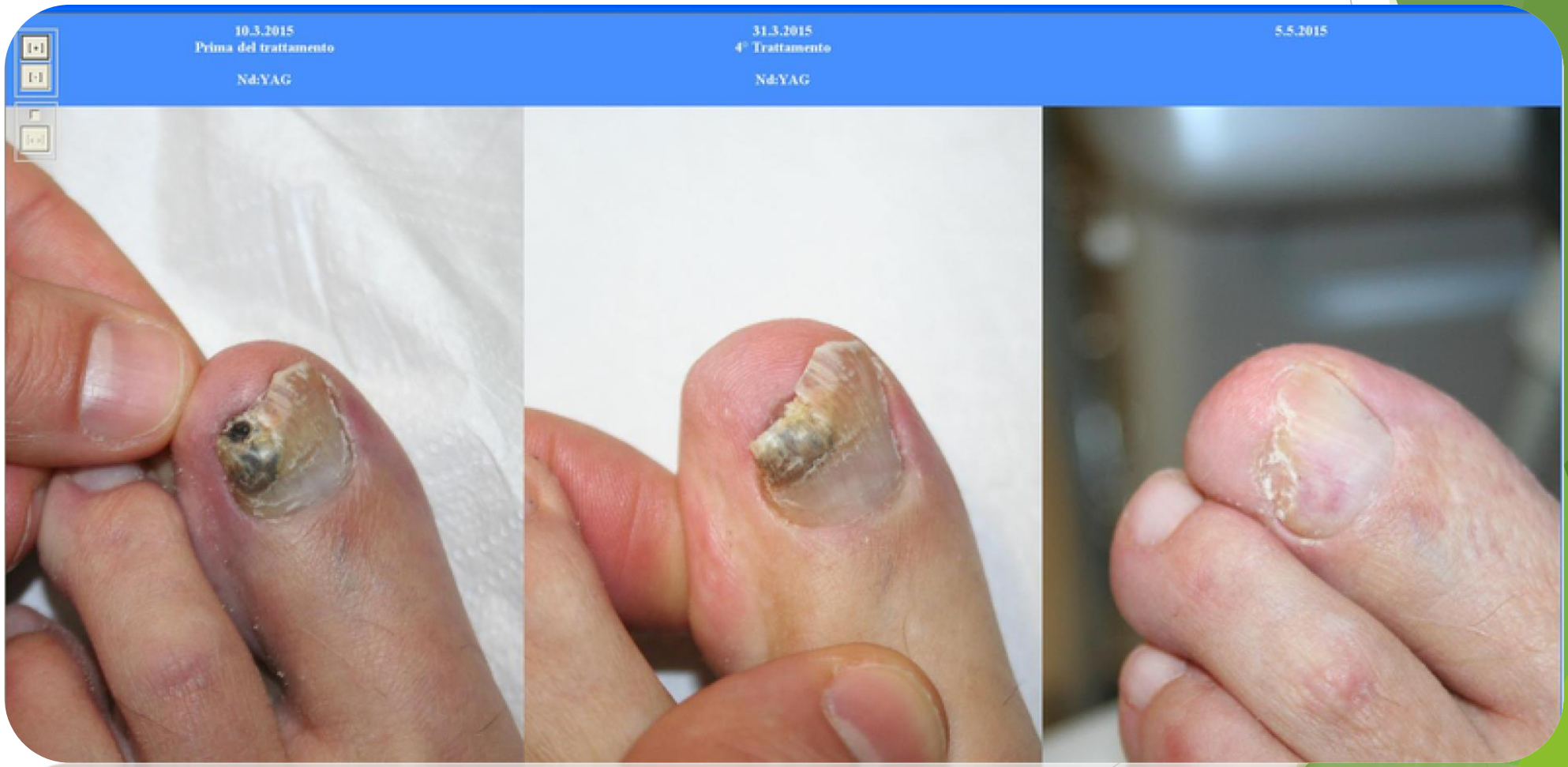


A long pulse 1064-nm Nd: YAG device was used and set to 4mm spot size, 3.77 J fluence, 5 ms pulse duration, and 1 Hz repetition rate without epidermal cooling. Patients were treated at intervals of one week for a total of 4 sessions.
In one session 3 passes across each nail plate were performed with 1 minute pauses between each pass.

Twenty patients enrolled in the study (16 females and 4 males with a age ranged from 21 to 72 years – media: 42 years). Fourteen patients (70%; 11F; 3M) obtained excellent results with an important reduction of chromonychia, onycholysis, opacity, longitudinal striae and jagged proximal edge.

Onicomicosi

Prima e dopo 4 trattamenti con laser Nd:Yag



Onicomicosi

Prima e dopo 4 trattamenti con laser Nd:Yag

Onicomicosi

Prima e dopo 4 trattamenti con laser Nd:Yag

Onicomicosi

Prima e dopo 4 trattamenti con laser Nd:Yag

Four patients (20%; 4F) obtained good results with a fair to good reduction of chromonychia, onycholysis, opacity, longitudinal striae and jagged proximal edge.

Two patients (10%; 1M and 1F) did not obtain results after treatments.


10.3.2015
Prima del trattamento
Nd:YAG
5.5.2015
4° Trattamento

10.3.2015
Prima del trattamento

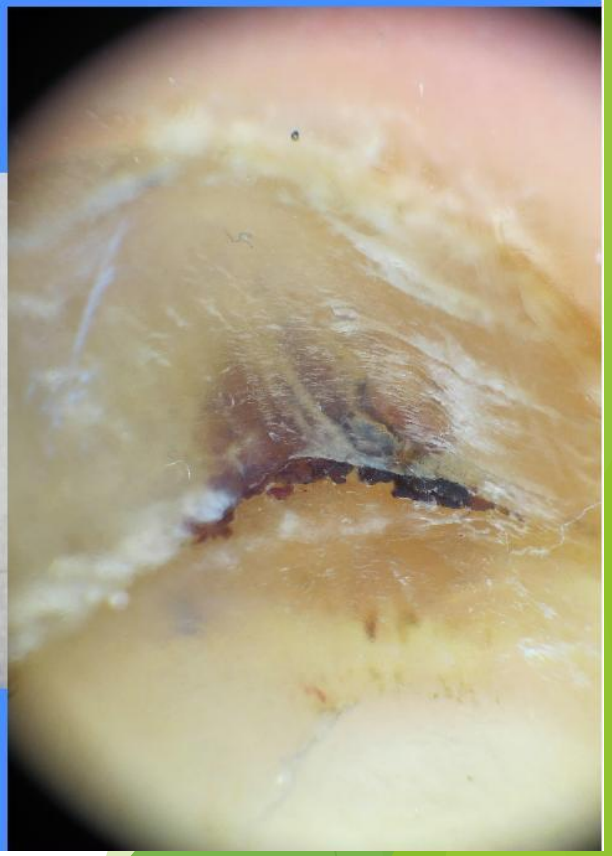
Nd:YAG

10.3.2015
Prima del trattamento

Nd:YAG

5.5.2015
4° Trattamento

5.5.2015
4° Trattamento



Onicomicosi

Prima e dopo 4 trattamenti con laser Nd:Yag

Onicomicosi

Prima e dopo 4 trattamenti con laser Nd:Yag

The results were already visible after the end of the second session especially in the patients with mild mycotic involvement. All patients of this first group who claimed pain before treatment due to onychomycosis declared its complete disappeared after one or two treatments.

Although some patients reported mild pain and a “burning” sensation during the laser treatment, all patients underwent all 3 passes.