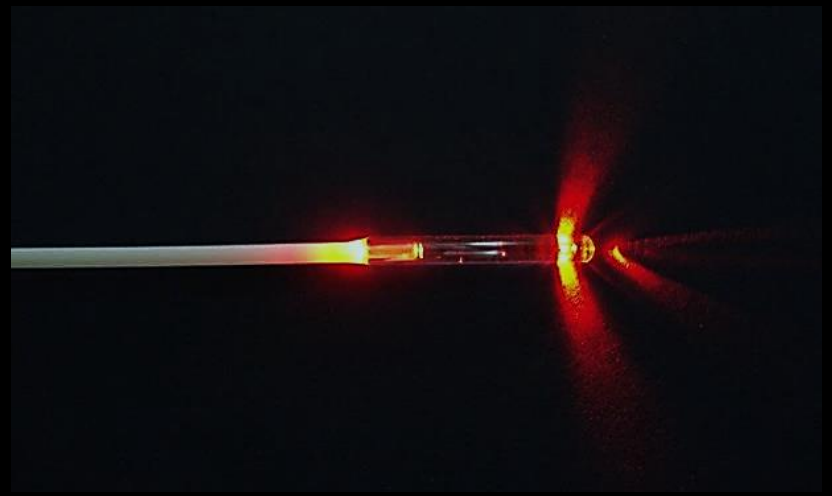
Laser e patologie cutanee cervico-facciali

University of l'Aquila
Department of Life, Health & Environmental Sciences
Plastic and Reconstructive Surgery
Prof. M. Giuliani
CASA DI CURA PRIVATA DI LORENZO

Laserchirurgia e sistemi laser

- Chirurgia generale
- Oculistica
- Ginecologia
- Urologia
- Dermatologia
- O.R.L.
- Chirurgia Plastica
- Odontoiatria

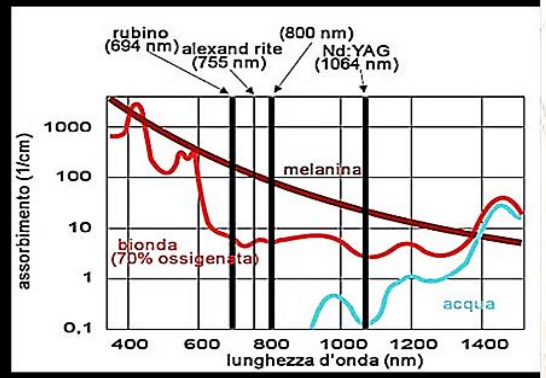


- Alessandride
- $C0_2$
- Diodo
- Rubino
- Nd:YAG
- Er:YAG
- Vapori di rame
- Argon
- Q-switched
- Kripton

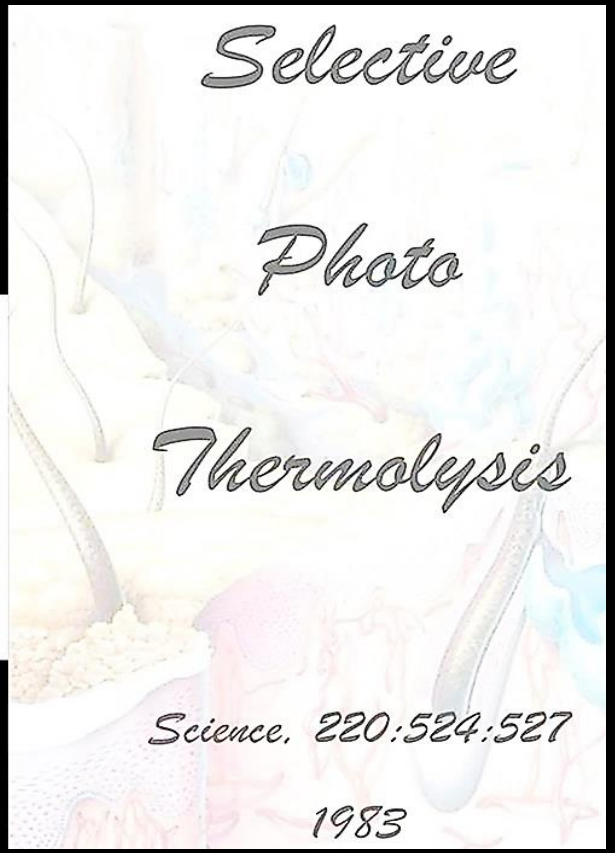
Evoluzione del laser

Fototermolisi Selettiva

- Lunghezza d'onda
- Fluenza
- Rilasciamento termico



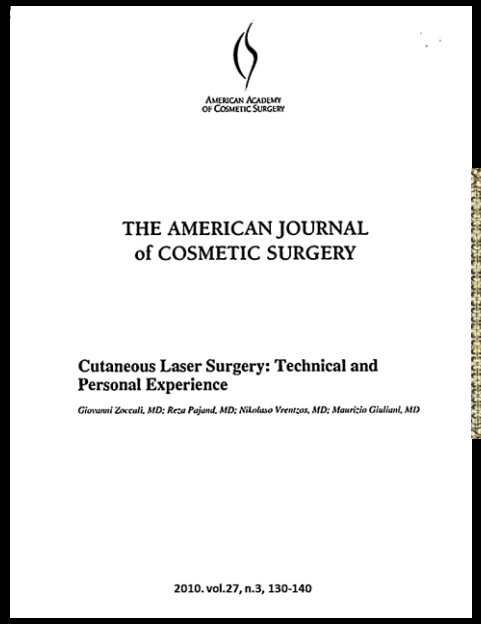
John Parrish
Rox Anderson



➢Nelson AA, Lask GP. Principles and practice of cutaneous laser and light therapy. Clin Plast Surg. 2011 Jul;38(3):427-36,

- CO_2
- Er:YAG
- Nd:YAG
- DYE (FPDL)
- IPL

Casistica personale 3436	Anni 2000-2008	Laser
Uomini	829 (24,13&)	
Donne	2607 (75,87%)	
Range di età	10 mesi-89 anni	
Gruppo A	2319 (67,49%)	Dye-Nd.YAG
Gruppo B	721 (20,98%)	CO_2-Er:YAG
Gruppo C	159 (4,63%)	Nd:YAG (Ipertricosi)
Gruppo D	10 (0,29%)	MEL 308nm
Gruppo E	227 (6,61%)	IPL



American Academy of Cosmetic Surgery

THE AMERICAN JOURNAL of COSMETIC SURGERY

Cutaneous Laser Surgery: Technical and Personal Experience

Giovanni Zoccali, MD; Reza Pajand, MD; Nikolaos Vrentzos, MD; Maurizio Giuliani, MD

2010. vol.27, n.3, 130-140

American Academy of Cosmetic Surgery

Presents

Maurizio Giuliani, MD

2010 Best Scholarly Manuscript

The Richard B. Aronsohn, MD Founder's Award

"Cutaneous Laser Surgery: Technical and Personal Experience"

Published in Volume 27, Number 3

The American Journal of Cosmetic Surgery

Mark Berman, MD
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Jane A. Petro, MD
Editor-in-Chief

Risultati		
Ottimo	1196	34,80%
Buono	1623	47,23%
Discreto	561	16,32%
Scarso	56	1,62%
Complicanze	328	9,54%

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☛ Laser chirurgici

- Il laser CO_2 (miscela di anidride carbonica, elio, azoto) emette un raggio infrarosso con una lunghezza d'onda di 10600nm.
- Cromoforo: l'acqua.
- Capacità di ablazione ~50µ, danno termico accessorio di ~60-80µ.
- Coagula vasi sanguigni e linfatici fino a 0,5mm, sigilla piccole terminazioni nervose riducendo edema e dolore postoperatorio.

Il CO_2 può essere utilizzato in modo CW, UP, Frazionato.

- Cheratosi attiniche e seborroiche
- Cheilite attinica, leucoplachia
- Rinofima
- Nevi epidermici
- Xantelasmi
- Adenomi sebacei
- Granuloma piogenico
- Molluschi contagiosi
- Angiofibroma, angiocheratoma
- Tumori benigni della cute
- Verruche
- Condilomi
- Siringomi
- Fibroma mollusco
- Cicatrici patologiche
- Malattia di Paget
- Rejuvenation – Resurfacing

Nevo dermico

Cheratosi senile

Fibroangioma

Melanosi di Dubreuilh-Hutchinson


Cheratosi seborroica


Nevo sebaceo
di Jadassohn


Rosacea
Rinofima


Adenoma sebaceo gigante

Lupus Eritematoso Discoide del cavo orale

Lupus (2014) 23, 845–849
http://lup.sagepub.com

LETTER TO THE EDITOR

Oral lupus erythematosus successfully treated with CO_2 laser: a case report

Sir,

Lupus erythematosus (LE) is an autoimmune disorder characterized by attack of an individual's immune system against his or her own healthy tissues, especially nuclear components. Classically, LE can be divided into systemic lupus erythematosus (SLE) and cutaneous or discoid lupus erythematosus (DLE), which is milder and usually affects only the skin, causing a red, raised rash on the face and scalp. About 5%–10% of patients with DLE will progress to SLE.[1]

The mucous membranes may be also affected by changes that are clinically similar to those of the skin. Although involvement of the oral cavity is rare, oral manifestations of LE can appear on the mucosa of the gum, palate, and inferior lip, and sometimes these regions are involved simultaneously.[2]

The therapeutic approach toward oral LE is still under debate. In practice, patients usually have undergone unsuccessful treatment using nonsteroidal anti-inflammatory drugs and immunosuppressive therapy, as well as radical surgery after neoplastic degeneration.[3]

Here, we report the case of a 54-year-old Caucasian woman with a three-year history of oral LE.

She was treated locally with steroids and two sessions of diathermocoagulation, and also received systemic therapy with prednisone. No signs of improvement had been recorded and then no other pharmacological treatments were administered.

She had three distinct lesions on her lower lip and one lesion on the vestibular mucosa of the right cheek, and no other morbidities. She complained of burning pain and difficulty while chewing and phonation (Figure 1(a), (b)). However the diagnosis was confirmed by incisional biopsy performed two weeks before our treatment.

After administering local anesthesia (2% mepivacaine plus epinephrine and bicarbonate), we treated the patient using a CO_2 laser equipped with a 5 × 5 mm scanner at 5 W/cm² of power. The treatment was repeated 30 days later. The lesions resolved and the patient was seen monthly for follow-up evaluation. At 24 months, the patient remained free of oral lesions, confirming successful control using CO_2 laser vaporization (Figure 1(c), (d)).

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2Immunopathology Section.

Discussion

Oral mucosal involvement is seen in 9%–45% of patients with SLE and in 3%–20% of patients with DLE.[3,4] Because the oral lesions of LE do not respond to conventional pharmacologic treatments for LE, treatment usually consists of diathermocoagulation or surgical excision.[4]

The CO_2 laser emits light in the near infrared region at 10.600 nm, which is absorbed by tissue water. The laser-tissue interaction heats cells instantly to more than 100°C, resulting in: vaporization of superficial tissue layers, coagulation and necrosis of cells, denaturation of matrix proteins and non-fatal damage in a deeper zone.

CO_2 laser is usually indicated to treat several cutaneous diseases such as benign tumors (keratosis, warts, dermic or verrucous nevus) or aesthetic defects as skin aging and wrinkles.

Following the principle of selective photothermolysis, this laser allows to the surgeon to achieve optimal precision during the treatment, and by also reducing the thermal damage of surrounding tissues, as happens in DTC diathermocoagulation, the healing process starts immediately.[5]

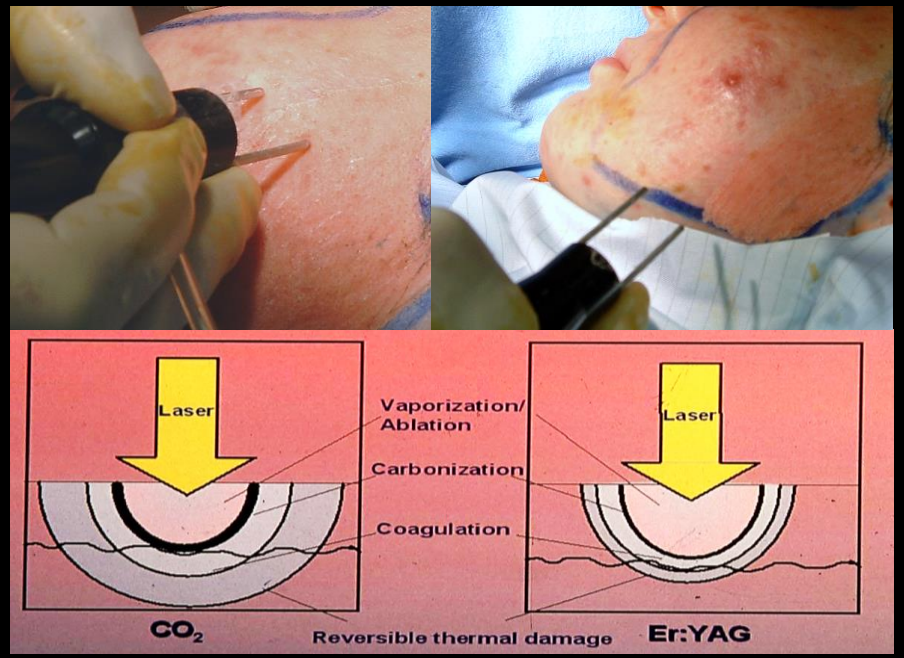
Zhao et al. reported on the effects of CO_2 laser irradiation of the oral mucosa, and emphasized the speed of healing after surgery.[6] They also did not observe any inflammation during the healing process. They postulated that the absence of inflammation was due to the sealing of small blood and lymphatic vessels, which reduced the release of inflammatory mediators.[6]

We therefore decided to use CO_2 laser surgery because it would reduce our patient's discomfort during the rapid healing process. Although clinical healing was observed after the first treatment, we decided to repeat the procedure because a limitation of this technique is the difficulty in determining the depth of epithelial tissue, and we wanted to ensure adequate treatment. To the best of our

10.1177/0961203314528554

➢**Ranginwala AM, Chalishazar MM, Panja P, Buddhdev KP, Kale HM. Oral discoid lupus erythematosus: A study of twenty-one cases. J Oral Maxillofac Pathol. 2012 Sep-Dec; 16(3): 368–373.**

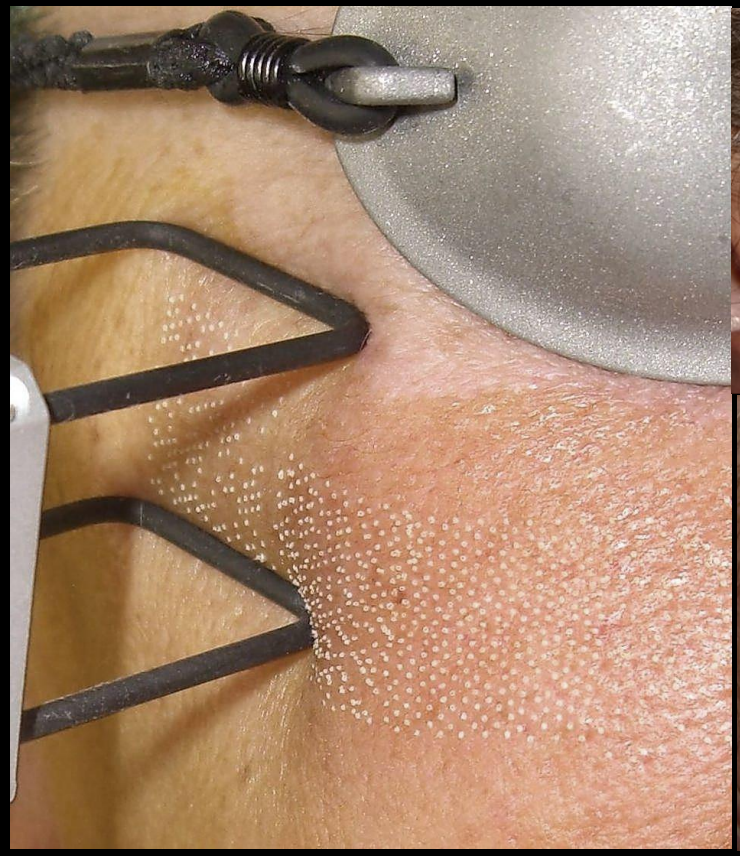
- Il laser **Erbio:YAG** (cristallo di ittrio, alluminio, granato drogato con erbio) emette un raggio infrarosso con una lunghezza d'onda di 2940nm.
- Cromoforo: **l'acqua**.
- Capacità di ablazione ~15-20μ, danno termico accessorio di ~5μ.
- Non coagula vasi sanguigni e linfatici.

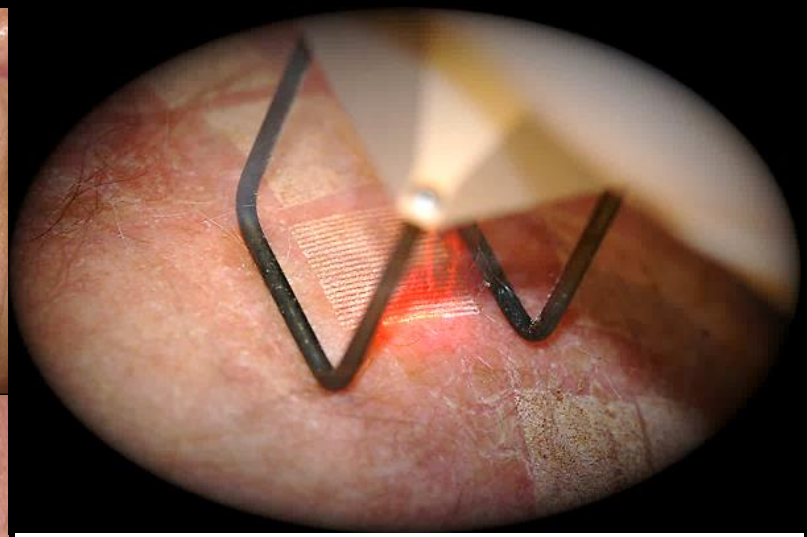


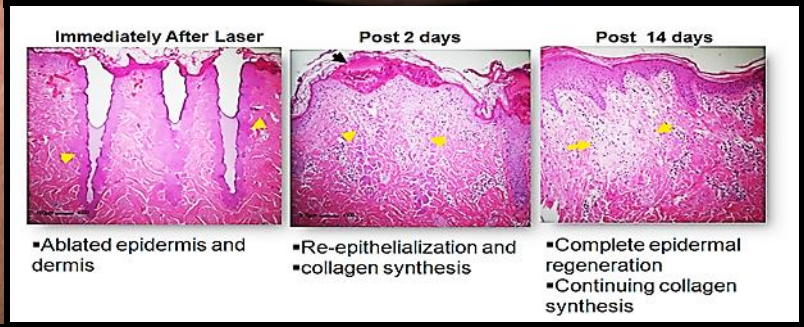
- Verruche piane
- Neurofibromi
- Xantelasmi
- Adenomi sebacei
- Siringomi
- Cheratosi attiniche e seborroiche
- Macchie
- Nevi epidermici,dermici
- Rinofima (rimodellamento)
- Cicatrici patologiche
- Cheiliti attiniche
- Tricoepiteliomi
- Resurfacing - rejuvenation

- Sanniec K, Afrooz PN, Burns AJ. Long-Term Assessment of Perioral Rhytide Correction with Erbium: YAG Laser Resurfacing. Plast Reconstr Surg. 2019 Jan;143(1):64-74.

Laser CO_2 frazionato







➢**Il CO_2 frazionato coagula/rimuove microcolonne dermo-epidermiche con effetti terapeutici sovrapponibili al CO_2 UP e con un significativo miglioramento dell'outcome del paziente.**

- Xiao A, Ettefagh L. Laser Revision Of Scars. StatPearls Publishing; 2019, Apr 29.
- Sarnoff D, Gotkin H., Doerfler B., Gustafson J., Hanke CW. The Safety of Laser Skin Resurfacing With the Microablative Carbon Dioxide Laser and Review of the Literature. J Drugs Dermatol. 2018 Nov 1;17(11):1157-1162.
- Bhargava S, Cunha PR, Lee J, Kroumpouzos G. Acne Scarring Management: Systematic Review and Evaluation of the Evidence. Am J Clin Dermatol. 2018 Aug;19(4):459-477.

CO_2 full-face resurfacing

The Fitzptrick TB scale

Skin type	Skin color	Features
I	White or freckled	•Always burns, never tans
II	White	•Burns easily, tans poorly
III	Olive	•Mild burn, gradually tans
IV	Light - brown	•Burns minimally, tans easily
V	Dark - brown	•Rarely burns, tans easily
VI	Black	•Never burns, always tans

Indice di sicurezza		
Grado e Area	Epidermide + Derma (μm)	%
Indice basso		
1.collo	253	54.5
2.palpebre	345	62.3
3.glabella	468	69.2
Indice intermedio		
4.fronte	1171	79.3
5.guancia	1050	86.6
Indice elevato		
6.labbro superiore	1217	87.2
7.punta del naso	1029	89.2
8.labbro inferiore	1086	89.6
9.mento	1524	90.2

✓4 settimane precedenti: crema a base di ac. glicolico + ac. Kojico + filtri solari).
✓3 giorni precedenti: profilassi antivirale (altri 7 gg nel postoperatorio).
✓Il giorno precedente: terapia antibiotica per 3-5gg (in base al farmaco).

➢Barrera JE, Adame MJ, Lospinoso JA, Beachkofsky TM. Efficacy of Laser Resurfacing and Facial Plastic Surgery Using Age, Glogau, and Fitzpatrick Rating. PRS Global Open; 2018, 1-5.

Laser vascolari

- Il laser **DYE (FLPD – Flashlamp Pumped Dye Laser)** utilizza un flash allo xenon o al kripton per eccitare il colorante rodamina e produrre fotoni alla lunghezza d'onda di 585-600nm con una profondità terapeutica di 1,5mm. determina agglutinazione eritrocitaria e coagulazione intravasale.
- Cromoforo: **ossiemoglobina**.

- Eritrosi
- Couperose
- Angiomi piani
- Angiomi rubino
- Angiomi port-wine
- Teleangectasie

- L'effetto clinico del laser è caratterizzato da una lesione purpurica circolare che in 7-14gg si risolve con lo sbiancamento della lesione.
- Il setting della macchina varia in base alla patologia ed al paziente: sono necessari uno o più test prima di procedere con il trattamento.

➢Garden BC, Garden JM, Goldberg DJ. Light-based devices in the treatment of cutaneous vascular lesions: An updated review. J Cosmet Dermatol. 2017 Sep;16(3):296-302.

➢Il laser **Nd:YAG** emette un raggio di 1064nm ottenuto dalla stimolazione di un cristallo (ittrio-alluminio-granato) con un fascio di luce continua o pulsata: possiede una capacità di penetrazione nel tessuto superiore agli altri sistemi (6-8mm).

➢Cromoforo: **melanina**.

- Patologie vascolari anche nel derma medio
- Epilazione permanente
- Tatuaggi monocromatici neri o blu

➢Nelle patologie vascolari è utile l'associazione con il Dye-laser per la coagulazione dei vasi profondi (effetto termico).

➢Zutt M. Laser treatment of vascular dermatological diseases using a pulsed dye laser (595 nm) in combination with a Neodym:YAG-laser (1064 nm). Photochem Photobiol Sci. 2019 May 24.









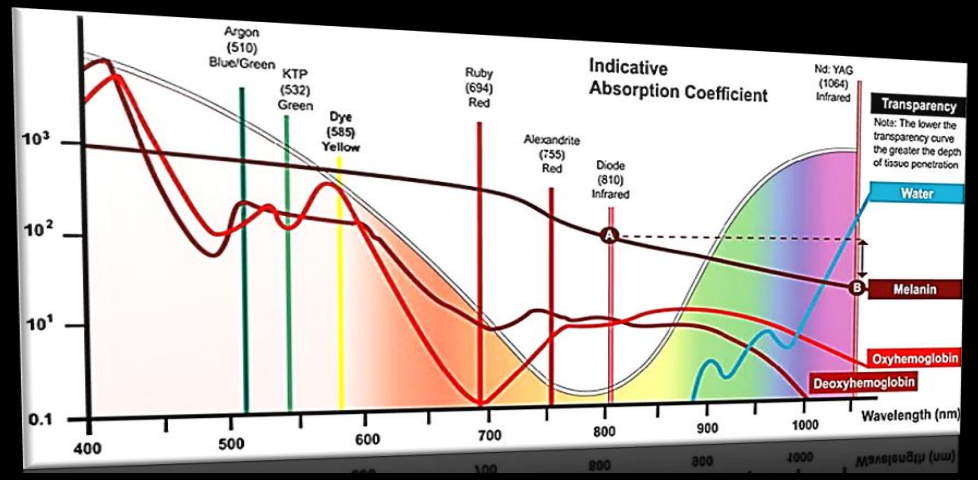












👉Ipertricosi

➢<u>L'ipertricosi</u>, genetica o acquisita, può interessare entrambi i sessi e prevede un aumento della pelosità, diffusa o localizzata, senza pattern androgeno dipendente.

👉Irsutismo

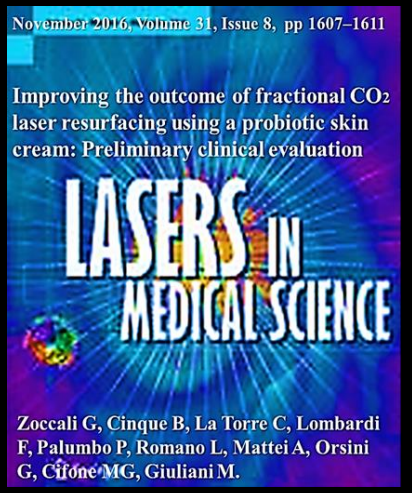
➢<u>L'irsutismo</u> **è caratterizzato da un abnorme sviluppo di peli** ***(guance, labbro superiore, mento, braccia, cosce, regione addominale)*** **riconducibile a differenti condizioni patologiche** ***(farmaci, ovaio policistico, m. del sistema endocrino e del metabolismo, tumori)*****.**

➢Thomas MM, Houreld NN. The "in's and outs" of laser hair removal: a mini review. J Cosmet Laser Ther. 2019; Apr 24:1-7.
➢ Vaidya T, Kumar DD. Laser Hair Removal. StatPearls Publishing; 2019; Mar 22.

Laser - Complicanze

Laser chirurgici

1. Infezioni batteriche, virali (Herpes), micotiche
2. Discromie
3. Eritema persistente
4. Esiti cicatriziali

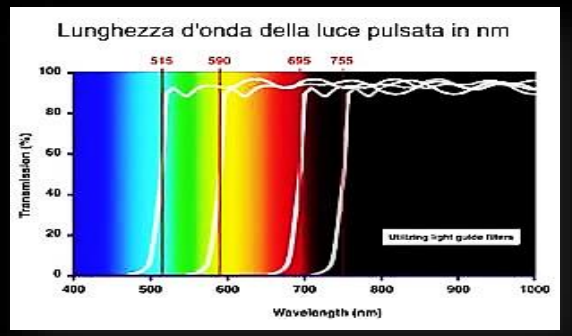


Laser vascolari

1. Iperpigmentazione
2. Ipopigmentazione persistente
3. Pustolosi amicrobica transitoria
4. Esiti cicatriziali

- Prohaska J, Badri T. Laser Complications. StatPearls Publishing; 2019; Apr 4.
- Cohen SR, Goodacre A, Lim S, Johnston J, Henssler C, Jeffers B, Saad A, Leong T. Clinical Outcomes and Complications Associated with Fractional Lasers: A Review of 730 Patients. Aesthetic Plast Surg. 2017 Feb;41(1):171-178.

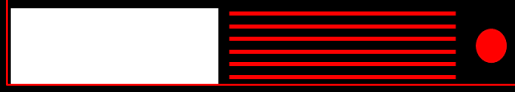
👉 Luce Pulsata Intensificata (IPL)



➢L'IPL è una sorgente di energia luminosa pulsata **non monocromatica e collimata** ma con uno spettro più ampio (modificando il cristallo del manipolo si ottengono lunghezze d'onda differenti 390→1200nm). L'energia può essere erogata in un unico spot o frazionata in 2–3 impulsi.

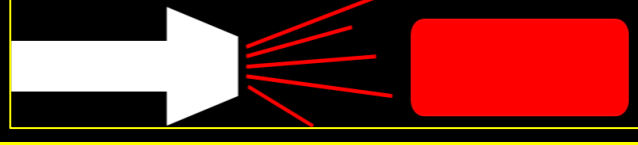
Laser

- ➢Monocromaticità (solo una lunghezza d'onda)
- ➢Coerenza (le onde sono sempre in fase)
- ➢Luce collimata



Luce Pulsata

- ➢Non-monocromaticità (una banda di lunghezze d'onda)
- ➢Non coerenza (le onde non sono in fase)
- ➢Luce defocalizzata



➢L'IPL fotocoagula i piccoli vasi e riduce la concentrazione di melanina.

➢Stimola i fibroblasti e la neocollagenogenesi.

➢Azione di contrasto all'aging cutaneo.

- **Patologie vascolari** (spider nevi, rosacea, couperose)
- **Ipercromie cutanee** (cheratosi seborroiche, lentigo solare, melasma)
- **Acne**
- **Ipertricosi**
- **Photoaging**
  - ✓Tipo I: macchie solari, capillari, rosacea
  - ✓Tipo II: elastosi cutanea e rughe
  - ✓Tipo III: cheratosi attiniche
- •L'IPL è indicata nel Photoaging I-III

Aesth Plast Surg
DOI 10.1007/s00266-010-9485-y

ORIGINAL ARTICLE

Melasma Treated with Intense Pulsed Light

Giovanni Zoccali · Domenico Piccolo ·
Piergiorgio Allegra · Maurizio Giuliani

Received: 12 September 2009 / Accepted: 11 February 2010

Abstract
Background Hypermelanosis includes a diverse group of genetic and acquired skin anomalies that appear as darker, hyperpigmented areas. Melasma, in particular, is a hypermelanotic condition that affects sun-exposed skin in females. Whether this condition is acquired or genetic is still controversial. However, it clearly correlates with exposure to UV light, a genetic predisposition, and hormonal variations (from pregnancy or oral contraceptives).
Methods Between October 2006 and March 2008, 38 patients with melasma were treated with intense pulsed light (IPL) at the LASER Center of the Department of Health Science, Plastic and Reconstructive Surgery Session, University of L'Aquila. Diagnosis was based on medical history, physical examination, and video microscopy.
Results Results were graded as excellent, good, moderate, or poor. Grades were given according to outcome scale and reported complications. All 38 patients had follow-up checks at 30 days, 3 months, and 6 months and someone at more than 1 year. Results were excellent in 18 patients (47.37%), good in 11 (28.95%), moderate in 5 (13.16%), and poor in 4 cases (10.52%).
Conclusion From a careful review of the scientific literature and according to our personal clinical experience, IPL stands out as an effective tool in the treatment and healing of a high percentage of hypermelanosis and melasma, with a very low risk of complications and an excellent satisfaction rate among patients.

Keywords Pregnancy mask · Melasma · Chloasma · Intense pulsed light (IPL) · Hypermelanosis · Epiluminescence · Dermoscopy

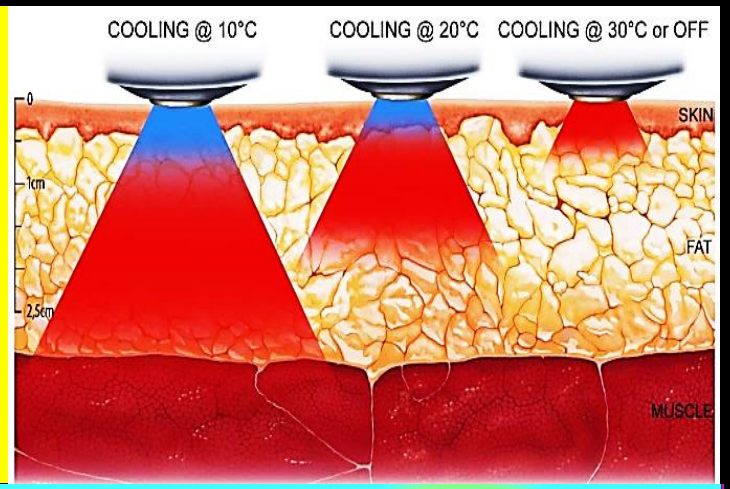
Melasma is an acquired hypermelanosis of unknown origin that affects sun-exposed skin. Ninety percent of those affected are female [1, 2]. Although all wavelengths of sun radiation can induce melasma, including the visible spectrum, overexposure to UV rays seems to be the main cause of the abnormal deposition and accumulation of melanin. Ultraviolet light induces peroxidation of lipids in cellular membranes, formation of free radicals, and ultimately abnormal melanin production. Other etiologic conditions that may cause melasma include a nonspecific genetic predisposition (30%) and variations in female hormonal balance from pregnancy or oral contraceptives. Melasma has also been described in patients with ovarian dysfunction, thyroid autoimmune disease, and liver disease, and in association with photosensitizing drugs (Phenitoin, Mephenitoin) or cosmetics [2–5].

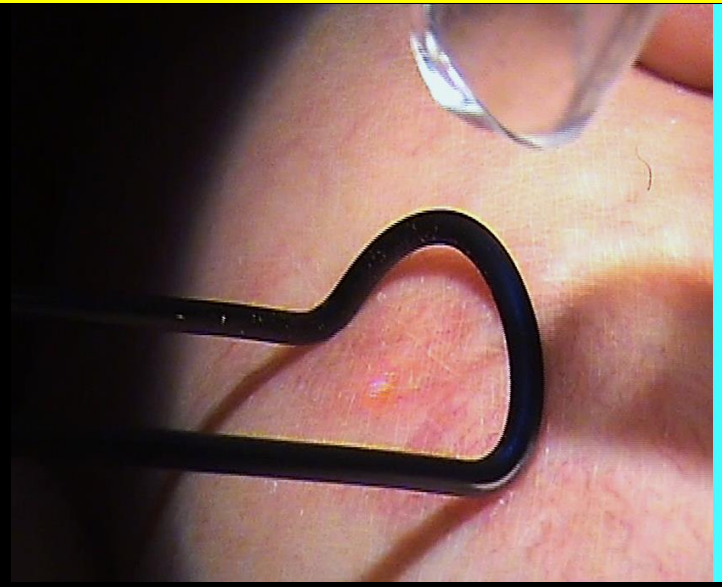
From a clinical standpoint, melasma affects both sides of the face with irregular, asymmetric, intensely pigmented, and well-demarcated areas. The areas vary in number, size, and color, ranging from ochre-yellow to dark gray. Melasma can be classified according to location, histological pattern, and morphology under Wood's lamp [1, 2, 6].

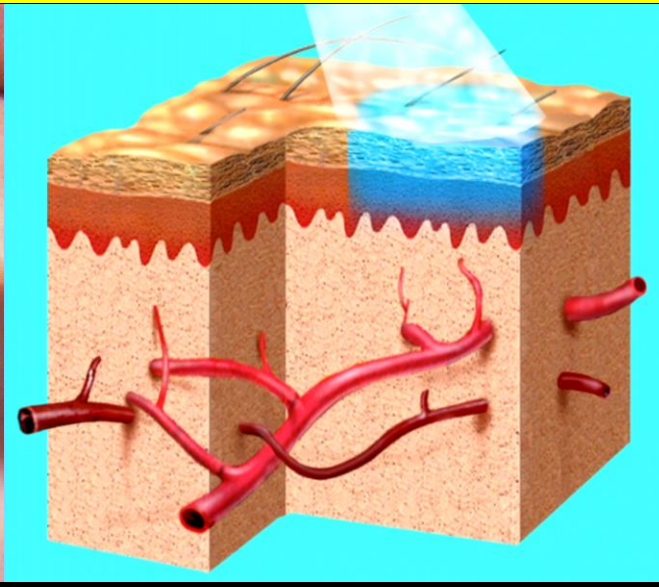
➢Passeron T, Genedy R, Salah L, Fusade T, Kositratna G, Laubach HJ, Marini L8, Badawi A. Laser treatment of hyperpigmented lesions: position statement of the European Society of Laser in Dermatology. J Eur Acad Dermatol Venereol. 2019 Jun;33(6):987-1005.

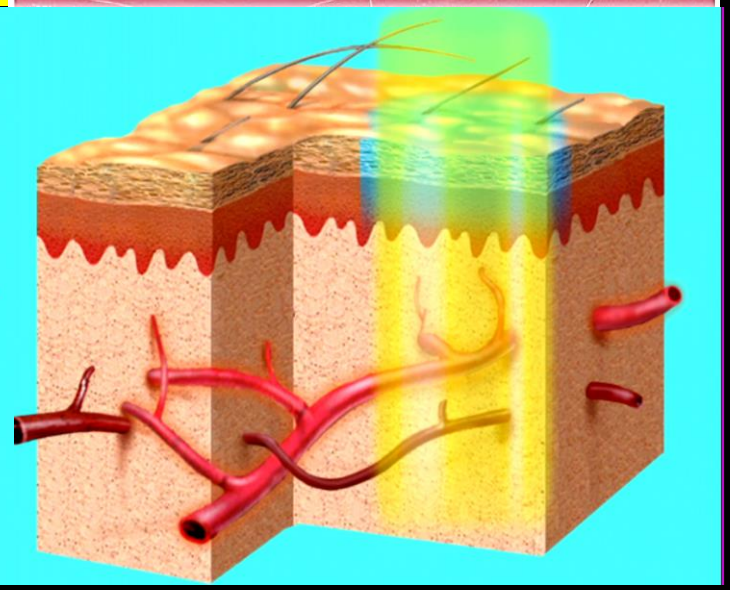
☛ Il raffreddamento cutaneo

➢**Il raffreddamento della cute è indispensabile perché tutela la superficie cutanea; consente fluenze più elevate con risultati clinici migliori, minore numero di sedute e basso rischio di effetti collaterali e/o complicanze.**

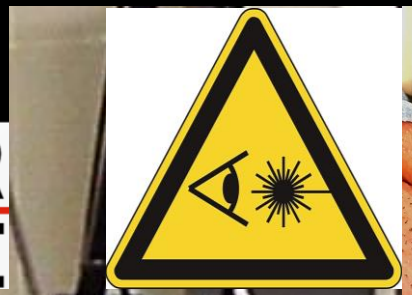






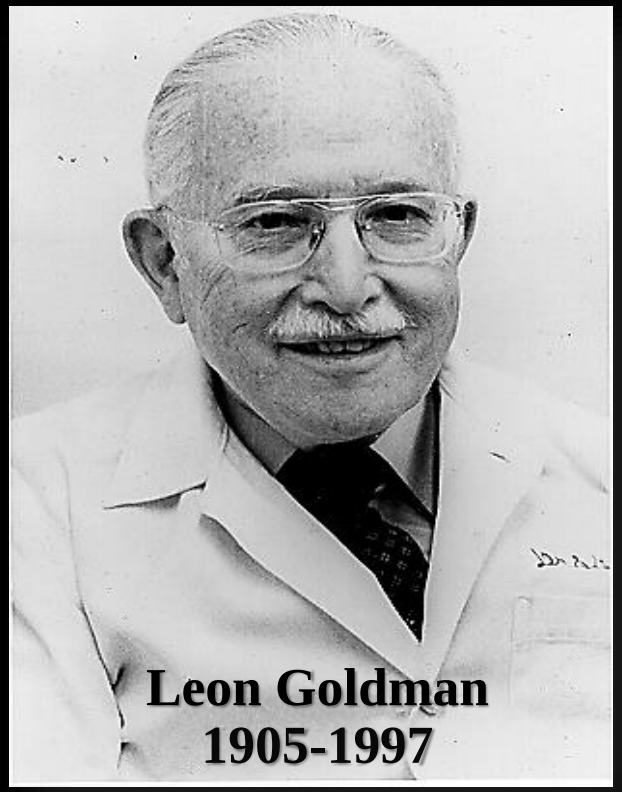


☛ Sicurezza e Laser



Rischi legati al raggio laser

- ✓Incendio
- ✓Fumi di origine chirurgica
- ✓Danni oculari
- ✓Danni agli elementi dentari



Leon Goldman
1905-1997

“Se non avete bisogno del laser … NON USATELO!”

Maurizio Giuliani MD
maurizio.giuliani@cc.univaq.it