

***Laser & Light Based Treatments  
for Ethnic Skin***

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***Laser & Light Treatment of Ethnic Skin***

*The following potential conflict of interest relationships are germane to my presentation.*

*Speakers Bureau:*

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***Differences in  
Ethnic & Caucasian Skin***

- Amount of epidermal melanin
- Melanosomes provide better photoprotection
- Greater melanin content increases risk for adverse events
  - Hypopigmentation
  - Hyperpigmentation
  - Depigmentation
- Thicker dermis
- Greater tendency for hypertrophic scarring

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***Determining Skin Types***

- Visual inspection alone not enough
- Skin Typing Classifications
  - Fitzpatrick Classification of Skin Type
  - Goldman World Classification of Skin Type
  - Lancer Ethnicity Scale

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***Fitzpatrick Classification of Skin Type***

- I: always burns, never tans
- II: burns easily, tans minimally with difficulty
- III: burns moderately, tans moderately and uniformly
- IV: burns minimally, tans moderately and easily
- V: rarely burns, tans profusely
- VI: never burns, tans profusely

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***Goldman World Classification of Skin Types***

- Considers genetic, racial heritage, and response to UV light and inflammation
- Five ethnicity groups
  - European/Caucasian; white
  - Arabic/Mediterranean/Hispanic; light brown
  - Asian; yellow
  - Indian; brown
  - African; black

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### *Goldman Classification*

- Choice of three categories within ethnic groups
  - a) Pale, cannot tan, burns easily, no PIH
  - b) Tan, rarely burns, rare PIH
  - c) Deep tan, never burns, develops PIH

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### *Lancer Ethnicity Scale*

LES SKIN TYPE	FITZPATRICK TYPE	BACKGROUND GEOGRAPHY
LES Type 3	Type II	Ashkenazi Jewish
LES Type 1	Type I	Celtic
LES Type 2	Type III	Central, Eastern European
LES Type 1	Type I-II	Nordic
LES Type 1-2	Type I	Northern European
LES Type 3-4	Type III	Southern European, Mediterranean, North American
LES Type 3	Type II	Native American
LED Type 4	Type IV	Chinese, Korean, Japanese, Thai, Vietnamese
LES Type 4	Type IV	Filipino, Polynesian
LES Type 4	Type IV	Central, South American Indian
LES Type 5	Type V	Central, East, West African
LES Type 5	Type V	Eritrean, Ethiopian
LES Type 5	Type V	North African, Middle East Arabic

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### *LES Ethnicity Scale*

- Find LES type numbers for all 4 grandparents
- Add numbers together and divide by 4
- Lower LES skin type, less risk for scarring, keloids, erythema, discoloration, pigmentation
- Risk factors
  - Type 1= very low risk
  - Type 2= low risk
  - Type 3= moderate risk
  - Type 4= significant risk
  - Type 5= considerable risk

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### ***Treating Ethnic Skin with Laser & Light***

- Risks due to melanin's wide absorption spectrum 250-1200nm
- Melanin can be targeted by visible, UV, and infrared light
- Epidermal melanin competes as significant chromophore and may lead to excessive heating of surrounding tissue
- Nonspecific thermal damage can occur resulting in blistering, transient or permanent dyspigmentation, textural changes, and scarring

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### ***Laser Hair Reduction***

- Goal: use highest fluence tolerable to achieve hair reduction while minimizing epidermal damage
- Considerations
  - Wavelength
  - Pulse width
  - Epidermal cooling

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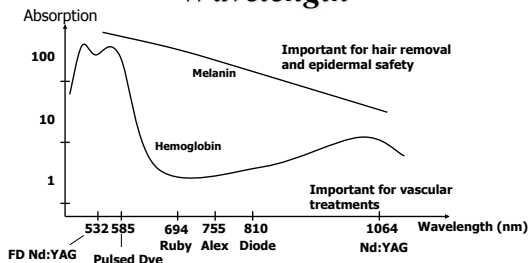
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### ***Laser Absorption vs. Wavelength***



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### ***Laser Hair Reduction***

- Skin types III-IV
  - Alexandrite
  - Diode
  - Nd:YAG 1064 nm (long-pulsed)
  - IPL (long wavelength, long pulse width)

*Garcia C et al. Alexandrite laser hair removal is safe for Fitzpatrick skin types IV-VI. Dermatol Surg 2000; 26:130-4.*

*Hussain M et al. A new long-pulsed 940 nm diode laser used for hair removal in Asian skin types. J Cosmet Laser Ther 2003;5:97-100.*

*Alster TS. Long-pulsed Nd:YAG laser-assisted hair removal in pigmented skin: a clinical and histological evaluation. Arch Dermatol 2001;137:885-9.*

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### ***Laser Hair Reduction***

- Skin types V-VI
  - Long pulsed Nd:YAG
  - Long pulsed diode

*Battle EF Jr. et al. Very long-pulsed (20-200 ms) diode laser for hair removal in all skin types. Lasers in Surg Med 2000; S12;85.*

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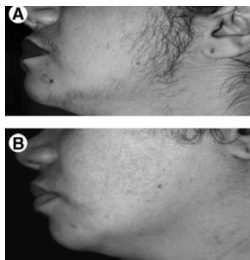
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### ***Diode Laser, Type IV skin***



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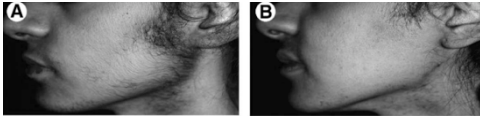
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***Nd:Yag, Type IV skin***



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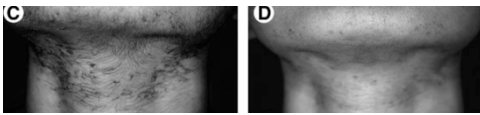
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***Nd:YAG, Type IV skin***



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***Nd:YAG, Type V skin***



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### *Vascular Lesion Treatment*

- Melanin competes strongly for light absorption in Asian skin
- Melanin acts as total barrier to light absorption for IPL in dark skin

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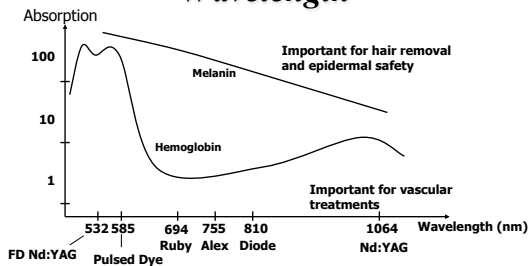
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### *Laser Absorption vs. Wavelength*



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### *Vascular Lesion Treatment*

- 585 nm or 595 nm pulsed dye laser with epidermal cooling appropriate for most vascular lesions in skin types III-IV
- Long pulsed Nd:YAG or IPL for resistant lesions (Note; IPL should be used by experience operator only)

Greve B, Raulin C. Prospective Study of port wine stain treatment with dye laser: comparison of two wavelengths (585 nm vs. 595 nm) and two pulse durations (0.5 ms vs. 20 ms). *Lasers Surg Med* 2004;34:168-73.

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### *Pigmented Lesions*

- Melanin absorption stronger at shorter wavelengths
- Longer wavelengths penetrate skin better
- Increasing melanin correlate with increasing adverse events
- Dark skin competes for the chromophore

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### *Epidermal Lesions*

- Lentigines, ephelides, café au lait macules, seborrheic keratoses
- Suggested wavelengths
  - 532 nm Q-switched Nd:YAG (Types III-IV)
  - 694 nm Q-switched Ruby (Types III-IV)
  - 510 nm Pulsed Dye (Type V)

*Suh DH et al. The use of Q-switched Nd:YAG laser in the treatment of superficial pigmented lesions in Koreans. J Am Acad Dermatol 2001;12:91-6.*

*Murphy M.J, Huang MY. Q-switched ruby laser treatment of benign pigmented lesions in Chinese skin. Ann Acad Med Singapore 1994;23:60-6*

*Alster TS, Williams CM. Café au lait macule in type V skin: successful treatment with 510 nm pulsed dye laser. J Am Acad Dermatol 1995;33:1042-3.*

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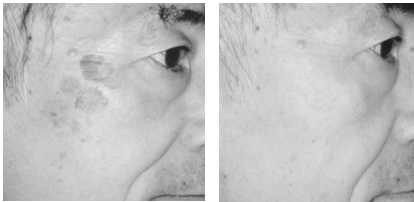
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### *Pigmented Lesion Treatment*



**Pigmented Lesion - Treated once with 532 nm.**

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**Medlite 532nm Treatment**



Images Courtesy of Clarence Wiley, MD, Shawnee, OK

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**Café Au Lait**



3 treatments , 6 months Post Op, 532nm, 3mm, 2.5J/cm2

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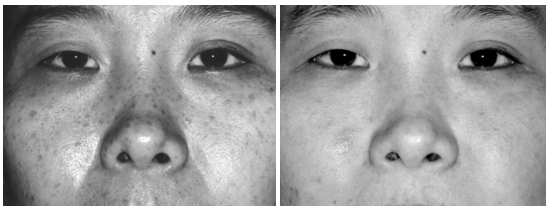
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**Epidermal Pigmented Lesions**



1 treatment, 4 months Post Op, 532nm, 3mm, 1Hz, 1.3J/cm2

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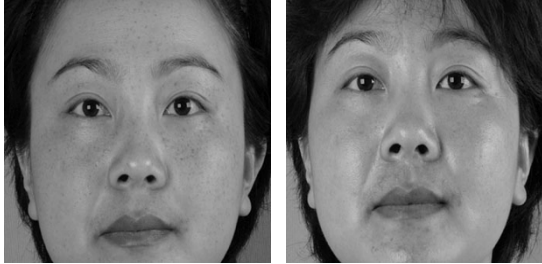
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Epidermal Pigmented Lesions



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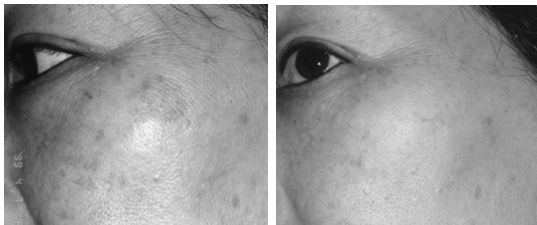
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Epidermal Pigmented Lesions



1 treatment, 6 months Post Op, 532nm, 4mm, 5Hz, 1.8J/cm<sup>2</sup>

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***Dermal Pigmented Lesions***

- Nevus of Ota, ABNOM, Hori's nevus
- Treatment for Asian skin
  - Q-switched alexandrite
  - Q-switched Nd:YAG (1064 nm)
  - Avoid Q-switched ruby

*Chan HH et al. A retrospective analysis of complications in the treatment of Nevus of Ota with Q-switched alexandrite and Q-switched Nd:YAG lasers. Dermatol Surg 2000; 26:1000-6.*

*Alister TS, Williams CM. Treatment of nevus of Ota by the Q-switched alexandrite laser. Dermatol Surg 1995;21:592-6.*

*Kono T et al. Retrospective study looking at the long term complications of Q-switched ruby laser in the treatment of Nevus of Ota. Lasers Surg Med 2001;29:157-59.*

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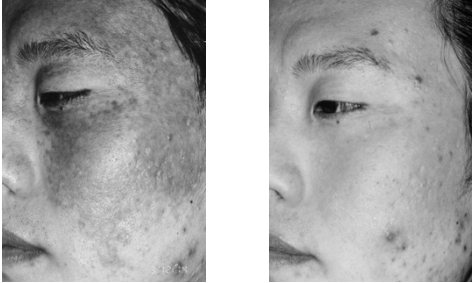
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### Dermal Pigmented Lesion



5 treatments, 3 months Post Op, 1064nm, 3mm-4mm, 10Hz, 6.1-8.3J/cm<sup>2</sup>

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### Dermal Pigmented Lesion



4 treatments, 6 months Post Op, 1064nm, 4mm, 10Hz, 6.6-7.6J/cm<sup>2</sup>

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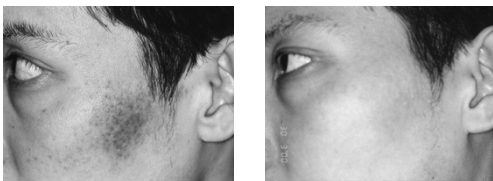
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### Dermal Pigmented Lesion



3 treatments, 4 months Post Op, 1064nm, 4mm, 10Hz, 5.2-8.5J/cm<sup>2</sup>

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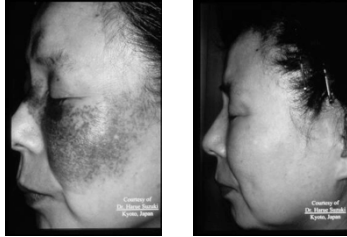
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***Dermal Pigmented Lesions***



Nevus of Ota, five 1064 nm treatments

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***Melasma or Ochrinosiis?***



1064nm, multiple treatments

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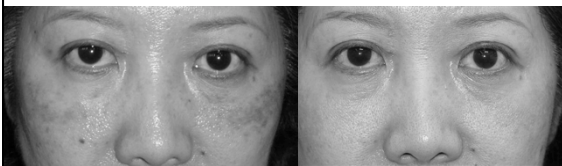
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***Dermal Melasma***



1064nm, 2 treatments, 4 mm spot 5 j/cm<sup>2</sup>

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***Melasma in Asian Skin***

- Melasma has been successfully treated in Asian patients using fractional photothermolysis
- 1550 nm wavelength non-ablative treatment

*Chan HL. Treating Asian Skin with Melasma using Fraxel SR. 2005 white paper;www.fraxel.com.*

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***Dermal Pigmentation-Melasma***

Melasma treated with 1064nm, 6.0 mm spot size, 3.5 J/cm2, 10 Hz. Treated once a day for initial first week and then once every 3 days after the initial first week. End point was moderate erythema.

Courtesy of Dr. Connie Ho, Hong Kong

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*FRAXEL LASER*



Before Treatment

After 4 Treatments

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*Tattoo Removal*

- 532 nm Q-switched Nd:YAG for red and yellow pigment
- 1064 nm Q-switched Nd:YAG for blue and black pigment
- Q-switched alexandrite or ruby for green pigment (increased risk of permanent hypopigmentation)

Lim Y et al. Effects of treatment according to tattoo color, site and duration with the Q-switched alexandrite laser. Kor J Dermatol 1998;36:844-9.  
Grevelink JM et al. Laser treatment of tattoos in darkly pigmented patients: efficacy and side effects. J Acad Dermatol 1996;34:653-6.

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*Ablative Resurfacing*

- Appropriate for treatment of photoaged skin and acne scarring
- Er:YAG resurfacing can be performed on skin types III-V
- Pre and Post treatment protocol important to reduce PIH
  - Retin-A
  - Lightening agent
  - No sun exposure

Polnikorn N et al. Er:YAG laser resurfacing in Asians. Dermatol Surg 1998;24:1303-7.

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***Complications in Laser Treatment of Ethnic Skin***

- Post inflammatory hyperpigmentation
- Hypopigmentation
- Scarring

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***Complication Prevention***

- No sun exposure 2-4 weeks pre and post procedure
- Sunblock SPF 30 or more
- Bleaching agent 2-4 weeks pre procedure
- Retin-A 2 weeks pre procedure
- Topical corticosteroid post procedure
- Restart topicals 2-4 weeks post procedure

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