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Title: Using a 1064-nm Picosecond Neodymium-Doped Yttrium Aluminum Garnet Laser for Periorbital Hyperpigmentation

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Author Questionnaire

1. **Microscopy**: Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **No**

2. **Software:** Does the part of your protocol being filmed include step-by-step descriptions of software usage? **No**

3. **Filming location:** Will the filming need to take place in multiple locations?

Current Protocol Length

Number of Steps: 12
Number of Shots: 22

Introduction

1.1. **Fumin Fang:** Our research focuses on the laser treatment of pigmented diseases. We aim to provide clinicians with a robust foundation for screening and treating patients with periorbital hyperpigmentation, thereby ensuring both efficacy and safety.

1.1.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B.roll:2.8*

What advantage does your protocol offer compared to other techniques?

1.2. **Lei Huang:** Picosecond lasers safely treat periorbital hyperpigmentation by fragmenting pigment and targeting vessels, with fractional low-energy mode minimizing side effects on the delicate eye-area skin.

1.2.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

What research questions will your laboratory focus on in the future?

1.3. **Lei Huang:** Although various diseases currently have corresponding laser treatment endpoints, numerous uncertainties remain. We will continue to emphasize the standardization of treatment within the field of disease-related laser therapy.

1.3.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

Ethics Title Card

This research has been approved by the Ethics Committee at The First Affiliated Hospital of Soochow University

Protocol

2. Pre-Treatment Evaluation, Preparation, and Picosecond Laser Therapy for Pigmented Lesions

Demonstrator: Lei Huang

VIDEOGRAPHER'S NOTE: Some of the clips didn't have on-screen slate; therefore, I've changed the clip name to reflect their respective steps

2.1. To begin, review the patient's medical history, including medication and allergy history, contraindications to treatment, pigmentary changes, previous cosmetic treatments, and manual surgeries **[1]**.

2.1.1. WIDE: Talent sitting at a desk reviewing a patient's printed medical records ~~and digital chart on a tablet~~.

2.2. Perform a thorough physical examination of the patient **[1]**. Have both the therapist and patient hold mirrors simultaneously to examine the area to be treated **[2]**.
VIDEOGRAPHER'S NOTE: Shots filmed together

2.2.1. Talent examining the patient.

2.2.2. Shot of both therapist and patient holding mirrors to the target treatment area.

2.3. After the patient has signed a consent form, use a digital camera and a skin analysis imaging system to take image data of the treatment area **[1]**.

2.3.1. Talent capturing standardized pre-treatment photographs of the patient's face using a digital camera.

2.4. Next ask the patient to put on shoe covers when entering the treatment room **[1]**. Have the patient lie supine to expose the treatment area **[2]**. ~~Remove any jewelry and contact lenses **[3]**~~.

2.4.1. Talent handing over shoe covers to the patient.

2.4.2. Shot of patient lying on the treatment bed, exposing the treatment site.

2.4.3. ~~Talent placing a tray with removed jewelry and a contact lens case on a nearby table.~~
AUTHOR'S NOTE: This shot was not filmed

2.5. Use a makeup remover and clean the area using a gentle cleaning product **[1]**. Then shave the hair in the treated area to prevent hair burning and interference with melanin absorption **[2]**.

2.5.1. Talent applying makeup remover and gently cleaning the skin.

2.5.2. Talent using a disposable razor to shave the treatment site clean.

2.6. ~~Now turn on the laser treatment room lights **[1]**~~. Now, turn on the laser machine **[1]**. Disinfect the laser handpiece with 75% alcohol before use **[2]**.
2.6.1. Talent switching on the laser machine.
2.6.2. Talent using alcohol swabs to disinfect the tip and body of the laser handpiece.

2.7. Wash hands and wear a hat, mask, and gloves **[1]**. Take a comfortable seated position **[2]**. ~~Ensure the patient wears out-of-eye goggles and the therapist wears wavelength-specific laser safety goggles **[3]**.~~
NOTE: VO edited to match moved shots
2.7.1. Talent sitting and adjusting position.
2.7.2. Talent washing hands and wearing a disposable cap, surgical mask, and gloves.
AUTHORS'S NOTE: Move 2.7.2 before 2.7.1
2.7.3. ~~Talent placing protective goggles on the patient and adjusting personal laser-safety goggles.~~
Videographer's Note: Author suggested deleting this shot since it does not apply to actual protocol environment

2.8. For the laser treatment, Choose the Resolve 1064 *(ten-sixty-four)* handpiece **[1]**. Set the energy level between 2.1 and 2.9 millijoules per microbeam, with a pulse duration of 450 picoseconds and frequency of 5 hertz **[2]**.
2.8.1. Talent inspecting the Resolve 1064 handpiece from the equipment tray.
2.8.2. Talent sets the energy level to 2.1–2.9 mJ/microbeam, with 450 ps pulse at 5 Hz frequency.

2.9. Place the end of the treatment handpiece perpendicular against the skin **[1-TXT]**. Ensure the pulses overlap by 20 percent and cover the full treatment area, treating from the side to the middle of the face **[2]**.
2.9.1. Talent aligning and pressing the handpiece firmly and perpendicularly to the skin.**TXT: Ensure handpiece orientation is away from the eyeball in the periocular area**
2.9.2. Talent systematically applying the handpiece across the treatment area, ensuring pulse overlap and smooth transition from the side to the center of the face.

2.10. Aim for the ideal endpoint the treatment which is the mild darkening of the lesion with slight exudation and bleeding **[1]**.
2.10.1. Shot of treated lesion showing slight darkening, exudation, and pinpoint bleeding.
2.11. Once treatment is complete, apply an ice pack for 15 to 20 minutes **[1]**. Then apply medium-acting corticosteroid cream twice a day for 3 days **[2-TXT]**.
2.11.1. Talent placing a wrapped ice pack on the treated area.

2.11.2. Talent applying corticosteroid cream on the patient. **TXT: Use soothing and moisturizing products for 2 weeks post surgery**

2.12. Instruct the patient to avoid sun exposure for 4 weeks and advise daily use of a broad-spectrum sunscreen with a sun protection factor of 30 or higher, and the use of physical barriers like umbrellas, hats, and goggles **[1]**.

2.12.1. Talent explaining sun exposure guidelines using visual aids.

Results

3. Results

3.1. Photographic comparison before and after treatment showed visible reduction in dark pigmentation under the eyes in multiple patients following the three sessions of 1064-nanometer picosecond laser treatment **[1]**. Further image comparisons revealed decreased pigmentation and improved skin tone consistency around the eyes post-treatment in another patient **[2]**.

3.1.1. LAB MEDIA: Figure 2. *Video editor: Please highlight Image B*

3.1.2. LAB MEDIA: Figure 3. *Video editor: Please highlight Image B*

3.2. The treatment produced noticeable brightening and reduced hollow appearance in the periorbital region of a patient, suggesting improved skin texture and reduced pigmentation **[1]**.

3.2.1. LAB MEDIA: Figure 4. *Video editor: Please highlight Image B*

3.3. Majority of patients experienced improvement in pigmentation with 11 patients showing moderate improvement, 6 with mild improvement, and 2 with significant improvement **[1]**. Patient satisfaction data showed that 60% were satisfied and 25% were very satisfied, with an average satisfaction score of 4.1 out of 5, indicating high acceptance of the treatment **[2]**.

3.3.1. LAB MEDIA: Table 3. *Video editor: Please sequentially highlight the rows "moderate improvement", "mild improvement" and "significant improvement".*

3.3.2. LAB MEDIA: Table 3. *Video editor: Please sequentially highlight the rows "Satisfied", "Very satisfied" and "Likert satisfaction scale".*

~~3.4. Patient satisfaction data showed that 60% were satisfied and 25% were very satisfied, with an average satisfaction score of 4.1 out of 5, indicating high acceptance of the treatment **[1]**.~~

~~3.4.1. LAB MEDIA: Table 3. *Video editor: Please sequentially highlight the rows "Satisfied", "Very satisfied" and "Likert satisfaction scale".*~~

Pronunciation Guide:
1. picosecond
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/picosecond
IPA: /ˈpɪk.oʊˌsɛk.ənd/
Phonetic Spelling: PICK-oh-SEK-und

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2. neodymium
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/neodymium
IPA: /ˌniː.oʊˈdɪd.i.əm/
Phonetic Spelling: NEE-oh-DID-ee-um

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3. yttrium
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/yttrium
IPA: /ˈɪt.ri.əm/
Phonetic Spelling: IT-ree-um

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4. aluminum
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/aluminum
IPA: /əˈluː.mə.nəm/
Phonetic Spelling: uh-LOO-muh-num

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5. garnet
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/garnet
IPA: /ˈgɑːr.nɪt/
Phonetic Spelling: GAR-nit

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6. periorbital
Pronunciation link (Merriam-Webster - orbital):
https://www.merriam-webster.com/dictionary/periorbital
IPA: /ˌpɛr.iˈɔr.bɪ.təl/
Phonetic Spelling: PER-ee-OR-bi-tul

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7. hyperpigmentation
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/hyperpigmentation
IPA: /ˌhaɪ.pəˌpɪg.mɛnˈteɪ.ʃən/
Phonetic Spelling: HIGH-per-pig-men-TAY-shun

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8. corticosteroid
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/corticosteroid
IPA: /ˌkɔr.tɪˈkoʊ.stɪ.rɔɪd/
Phonetic Spelling: kor-ti-koh-STEER-oyd

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9. nanometer
Pronunciation link (Merriam-Webster):
https://www.merriam-webster.com/dictionary/nanometer
IPA: /ˈnæn.əˌmiː.tər/
Phonetic Spelling: NAN-uh-mee-ter

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10. microbeam
(Common technical compound—might be unfamiliar)
Pronunciation link (Merriam-Webster — micro-):
https://www.merriam-webster.com/dictionary/micro
Pronunciation link (Merriam-Webster — beam):
https://www.merriam-webster.com/dictionary/beam
IPA: /ˈmaɪ.kroʊ ˌbiːm/
Phonetic Spelling: MY-kroh beem