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Title: Clinical Application of Intense Pulsed Light Therapy and Radio Frequency for Treatment of Ocular Surface Diseases

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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? **No**

Current Protocol Length

Number of Steps: 25

Number of Shots: 51

Introduction

Videographer: Obtain headshots for all authors available at the filming location.

- 1.1. **Anna Tichenor**: My research focuses on ocular surface disease with an emphasis on dry eye. I am especially interested in translating emerging technologies and treatments into clinical practice to improve patient outcomes.

1.1.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B.roll:5.3*

What are the current experimental challenges with technology for treating dry eye?

- 1.2. **Anna Tichenor**: Right now, there is no universally accepted treatment protocol for IPL in dry eye management. We hope to begin setting the standard by demonstrating and publishing this protocol.

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

What advantage does your protocol offer compared to other techniques?

- 1.3. **Anna Tichenor**: Our IPL protocol treats meibomian gland dysfunction with evidence-based precision, addressing co-morbidities like ocular rosacea and emphasizing gland expression plus objective treatment metrics for optimal dry eye relief.

1.3.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B.roll:4.9*

Videographer: Obtain headshots for all authors available at the filming location.

Protocol

2. Intense Pulsed Light (IPL) Therapy Preparation for Rosacea and Dry Eye Disease Treatment

Demonstrator: Anna Tichenor

- 2.1. To begin, assess the patient's Fitzpatrick skin type by administering the Fitzpatrick skin type questionnaire [1]. The intense pulsed light energy level will be set based on the skin typing score [2-TXT].
 - 2.1.1. WIDE: Talent sitting across from the patient and presenting the Fitzpatrick questionnaire.
 - 2.1.2. Talent referencing the patient's completed questionnaire. **TXT: If unsure or first treatment, use next higher Fitzpatrick level**
- 2.2. Clean the patient's face thoroughly of all makeup and tinted creams using an unscented commercial makeup remover wipe, eyelid wipe, or facial cleansing cloth [1].
 - 2.2.1. WIDE: Talent gently wiping the patient's forehead and cheeks with a facial cleansing cloth.
- 2.3. To protect the patient's eyes, use Cox II metal laser corneal eye shields if the treatment will be applied directly on the eyelids [1].
 - 2.3.1. Shot of Cox II metal laser corneal eye shields.
- 2.4. Place one drop of anesthetic eye drop in each eye [1], followed by two to three drops of a thick artificial tear [2]. Insert the metal shield under the eyelids while lifting them away from the globe to avoid contact with the cornea [3].
 - 2.4.1. Talent holding the patient's eyelids open and instilling anesthetic drops.
 - 2.4.2. Talent applying thick artificial tear drops into each eye.
 - 2.4.3. Close-up of the metal shield being inserted under the eyelid without touching the cornea.
- 2.5. If treatment will not be applied directly on the eyelids, place commercial grade light-blocking stickers or goggles over the patient's closed eyes [1].
 - 2.5.1. Talent aligning and securing stickers over the patient's closed eyelids.
- 2.6. Next, use a tongue depressor or similar tool to apply a two-millimeter-thick layer of clear ultrasound gel [1] over the entire face from tragus to tragus, including the nose, forehead, and chin [2]. If treating the eyelids, apply a thin layer over the upper closed eyelids, avoiding gel entry into the eyes [3-TXT].

2.6.1. Talent applying gel across the cheeks and nose using a tongue depressor.

Videographer's Note: 2.6.1 and 2.6.3 were filmed together

2.6.2. Shot of the face after applying gel.

2.6.3. Talent gently spreading a thin layer of gel over the upper eyelids. **TXT: If patient has facial rosacea, start with rosacea treatment before dry eye treatment**

2.7. Confirm that the water-cooling reservoir in the intense pulsed light device is filled [1] and turn on the device by pressing the green button [2].

2.7.1. Shot of the fluid level in the reservoir.

2.7.2. Talent pressing the green button on the device control panel.

3. Rosacea Treatment

3.1. Press the IPL (*I-P-L*) button on the touchscreen of the device after unlocking the interface using a passcode if required [1]. Select the **Skin Treatments** option under **Application** on the device interface [2].

3.1.1. Talent enters the pass code and presses the **IPL** button.

3.1.2. Talent selects **Application** and then taps **Skin Treatments**.

3.2. In the **Skin Treatment** preset window, select the patient's skin type based on the Fitzpatrick questionnaire [1], choose the primary condition to be treated [2], and select the lesion depth as either **Shallow** or **Medium** based on the condition [3]. Then select rectangular light guide [4].

Videographer's Note: All shots were filmed together

3.2.1. Talent selecting Fitzpatrick skin type from a dropdown menu.

3.2.2. Talent choosing **Rosacea/Telangiectasia** as the condition.

3.2.3. Talent selecting **Shallow** lesion depth from preset options.

Added shot: Talent selecting rectangular light guide.

3.3. Ensure the large rectangular lightguide and the recommended light filter are inserted into the handpiece based on the selected skin treatment settings [1]. Use an alcohol wipe to clean the lightguide [2].

Videographer's Note: There is movement in the camera on this step

3.3.1. Talent inserting the rectangular lightguide and filter into the IPL handpiece.

3.3.2. Talent wiping the lightguide lens thoroughly with an alcohol pad.

3.4. Then press the **Ready** button on the touchscreen [1] and remove the handpiece from its holder [2].

3.4.1. Talent pressing **Ready** on the touchscreen.

3.4.2. Talent lifting the handpiece from its cradle.

3.5. Gently appanate the rectangular applicator on the patient's skin, beginning at the lateral malar region near the tragus [1].

Videographer's Npte: 3.5.1 and 3.6.1 were filmed together

3.5.1. Talent gently placing the applicator on the patient's right cheek near the tragus, keeping it flat against the skin.

3.6. Press the yellow button on the device handpiece to deliver the first treatment pulses, then lift the applicator off the skin immediately after [1-TXT]. Observe the skin for a very slight flush [2].

3.6.1. Talent pressing the yellow trigger button and applying initial pulses. **TXT: Adjust fluence as needed; Apply 1 - 2 test pulses on lateral malar region before treatment**

3.6.2. Close-up of the skin showing slight flushing.

3.7. Apply the next pulse adjacent to the previous one with approximately 10 percent overlap [1]. Continue applying the pulses using the device handpiece, moving towards the nose but staying below the orbital rim [2].

Videographer's Note: 3.7 to 3.9 were filmed together. Only 3.9.2 was filmed seperately

3.7.1. Talent repositioning the handpiece slightly forward for overlapping pulses.

3.7.2. Shot of pulses being applied towards the nose.

3.8. Continue treating across the cheek, jawline, chin, and forehead on the same side, avoiding facial hair areas in men [1]. Repeat on the other side so the entire face receives a full pass [2].

3.8.1. Talent applying pulses along the jaw and chin, avoiding beard region.

3.8.2. Talent completing the treatment pass on the opposite side of the face.

3.9. Repeat the treatment application with the lightguide starting from the initial lateral malar region and moving toward the opposite tragus, including the nose [1], maintaining 10 percent overlap and keeping the lightguide as flat and parallel to the skin as possible [2].

3.9.1. Talent starting second pass from the initial lateral malar region and moving toward the opposite tragus, including the nose.

3.9.2. Shot of the lightguide being placed as flat as possible.

4. Dry Eye Treatment

4.1. Select the **OptiLight** treatment on the touchscreen from the home screen [1]. Choose the patient's skin type based on the Fitzpatrick questionnaire using the available presets [2].

Videographer's Note: All shots were filmed together

4.1.1. Talent navigating to the home screen and selecting **OptiLight** treatment.

4.1.2. Talent selecting the Fitzpatrick skin type from dropdown options under **OptiLight** presets.

- 4.2. Confirm that the the large rectangular lightguide and the OptiLight filter are inserted into the device handpiece [1]. Then press the **Ready** button on the touchscreen [2] and remove the handpiece from its holder [3].

Videographer's Note: All shots were filmed together

4.2.1. Talent securing the lightguide and OptiLight filter into the IPL handpiece.

4.2.2. Talent pressing **Ready**.

4.2.3. Talent lifting the handpiece from the cradle.

- 4.3. Gently appanate the rectangular lightguide onto the patient's skin, starting on either side of the face near the tragus in the lateral malar region, keeping the applicator flat without applying pressure [1]. Press the yellow trigger button on the device handpiece to apply the first treatment pulses, then lift off the skin immediately after [2].

Videographer's Note: 4.3-4.4 were filmed together

4.3.1. Talent placing the lightguide lightly on the patient's cheek, ensuring a flat interface with the skin.

4.3.2. Talent triggering and lifting the applicator quickly from the first treatment zone.

- 4.4. Inspect the skin response. If redness or discomfort is reported, reduce the energy or increase the Fitzpatrick level [1-TXT].

4.4.1. Talent examining the treated skin area and adjusting energy settings on the touchscreen. **TXT: Repeat test pulse until an acceptable response is seen**

- 4.5. Apply the next pulse with 10 percent overlap from the previous area [1]. Continue moving across the face below the orbital rim to the opposite lateral malar area while keeping the applicator flat [2-TXT].

Videographer's Note: 4.5 to 4.6 were filmed together

4.5.1. Talent repositioning the applicator for overlapping pulse near the nose.

4.5.2. Talent completing the sweep toward the opposite tragus, maintaining even contact. **TXT: Ensure the light guide is well approximated with the skin**

- 4.6. Repeat the same tragus-to-tragus pulse application, including the nose, for a second pass in the same direction as the first to allow dermal cooling [1]. Once done, press **Standby** on the touchscreen [2].

NOTE: VO edited to accommodate moved shot

4.6.1. Talent initiating the second treatment pass along the same trajectory across the face.

4.7. ~~Once done, press **Standby** on the touchscreen [1].~~ Remove the rectangular lightguide [1], ~~wipe the gel off the patient's skin with a tissue [3],~~ and insert the rectangular pen attachment into the handpiece with a fresh tip [2]. Press **Ready** on the touchscreen after connecting the pen attachment [3].

4.7.1. Talent pressing **Standby**.

AUTHOR'S NOTE: Please move shot 4.7.1. (Talent pressing Standby) to after shot 4.6.1.

4.7.2. Talent detaching the lightguide.

~~4.7.3. Shot of the patient's face being wiped.~~

4.7.4. Talent attaching a pen tip into the handpiece.

4.7.5. Talent pressing **Ready** on the screen.

Videographer's Note: 4.7.2, 4.7.4, 4.7.5 were filmed together

4.8. Beginning near the lateral canthus of either the right or left eye, touch the pen tip to the skin [1]. Press the yellow button to deliver a pulse [2].

Videographer's Note: 4.8 and 4.9 were filmed together

4.8.1. Talent applying the pen tip to the lateral eye region.

4.8.2. Shot of a pulse being triggered.

4.9. Continue applying pulses along the infraorbital rim, maintaining a three-millimeter distance from the eyelashes [1-TXT]. If corneal shields are in place, apply additional pulses directly over the upper eyelids [2].

4.9.1. Talent moving the pen smoothly along the orbital rim, staying clear of the lash line. **TXT: Repeat application for a total of 2 passes in the same direction**

4.9.2. Talent gently applying the pen to the upper eyelid area, ensuring shield protection.

Results

5. Results

5.1. Facial redness visibly decreased in Patient 1 after treatment with Optical Pulse Technology intense pulsed light and radiofrequency therapy [1].

5.1.1. LAB MEDIA: Figure 2. *Video editor: Sequentially highlight A and then B*

5.2. In Patient 4, severe ocular and facial rosacea, including visible telangiectasia around the eyelids and cheek, improved noticeably following Optical Pulse Technology intense pulsed light therapy [1].

5.2.1. LAB MEDIA: Figure 3. *Video editor: Sequentially highlight A and then B*

5.3. All patients showed a decrease in Ocular Surface Disease Index scores after treatment indicating subjective improvement in dry eye disease symptoms [1].

5.3.1. LAB MEDIA: Table 3. *Video editor: Highlight the "OSDI score pre-treatment" and "OSDI score post-treatment" rows for all patients*

Pronunciation Guide:

1. Fitzpatrick (*skin type scale*)

Pronunciation link (Merriam-Webster):

<https://www.merriam-webster.com/dictionary/Fitzpatrick>

IPA: /'fɪts.trɪk/

Phonetic Spelling: FITZ-trik

2. meibomian (*as in meibomian gland dysfunction*)

Pronunciation link (Merriam-Webster — meibomian):

<https://www.merriam-webster.com/dictionary/meibomian>

IPA: /ˌmaɪbəˈmoʊniən/

Phonetic Spelling: my-buh-MOH-nee-un

3. telangiectasia

Pronunciation link (Merriam-Webster):

<https://www.merriam-webster.com/dictionary/telangiectasia>

IPA: /ˌtɛləŋˌdʒi.ɛkˈteɪ.ʒə/

Phonetic Spelling: tel-an-jee-ek-TAY-zhuh

4. applanate

(as in “gently applanate the applicator”)

Pronunciation link (Merriam-Webster — applanate):

<https://www.merriam-webster.com/dictionary/applanate>

IPA: /'æpləˌneɪt/

Phonetic Spelling: AP-luh-nayt

5. periocular

Pronunciation link (Merriam-Webster — ocular):

<https://www.merriam-webster.com/dictionary/periocular>

IPA: /ˌpɛriˈɑkjələr/

Phonetic Spelling: per-ee-OK-yoo-ler

6. radiofrequency

Pronunciation link (Merriam-Webster — radio-):

<https://www.merriam-webster.com/dictionary/radio>

Pronunciation link (Merriam-Webster — frequency):

<https://www.merriam-webster.com/dictionary/frequency>

IPA: /ˌreɪdi.ooˈfriːkwənsi/

Phonetic Spelling: RAY-dee-oh-FREE-kwuhn-see

7. anemic (*used as “slight exudation and pinpoint bleeding” context might imply anemic-looking blanching*)

Pronunciation link (Merriam-Webster):

<https://www.merriam-webster.com/dictionary/anemic>

IPA: /əˈni:mɪk/

Phonetic Spelling: uh-NEE-mik

8. infraorbital

Pronunciation link (Merriam-Webster — infra-):

<https://www.merriam-webster.com/dictionary/infraorbital>

IPA: /ˌɪnfɹəˈɔrbɪtəl/

Phonetic Spelling: in-fruh-OR-bi-tul

9. synchronized (if used in context of pulses overlapping)

Pronunciation link (Merriam-Webster — synchronize):

<https://www.merriam-webster.com/dictionary/synchronize>

IPA: /ˈsɪŋkrəˌnaɪzd/

Phonetic Spelling: SING-kruh-nyzd

10. telogen (related to eyelashes cycle, implied in lash-safe distance statement)

Pronunciation link (Merriam-Webster — telogen):

<https://www.merriam-webster.com/dictionary/telogen>

IPA: /ˈteləˌdʒɛn/

Phonetic Spelling: TEL-uh-jen