Intense Pulsed Light: Understanding treatment mechanism and therapeutic applications.

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Description: An introduction to the therapeutic mechanism of intense pulsed light (IPL) and the history of its development. We will discuss the role of FDA approved IPL treatments for the signs of dry eye disease due to meibomian gland dysfunction. The presentation will also include a discussion of additional therapeutic applications of IPL.

Objectives:

1. Understand the mechanism of action of intense pulsed light (IPL).
2. Review early treatment applications of IPL.
3. Understanding of the therapeutic benefit IPL has in the management of dry eye disease due to meibomian gland dysfunction.
4. Discussion of how IPL fits in the modern treatment of dry eye disease.
5. Discussion of other treatment applications of IPL.
6. Discussion of other therapeutic modalities on the horizon for the management of dry eye disease and meibomian gland dysfunction.

Course outline:

I. Intense pulsed light (IPL): The basics
  A. What is IPL
    1. It is not LASER!
    2. Light pulses are generated by bursts of an electrical current passing through a xenon gas-filled chamber.
    3. The light output is then directed toward a handpiece that contains a light filter.
    4. Light energy pulse passes through the distal end of the handpiece where a sapphire or quartz block releases the energy pulse onto the surface of the skin.
  B. How does IPL work
    1. The basic mechanism of action
      a. The role of the light filters
    2. The original treatment application
    3. Other early (and ongoing) treatments

II. IPL and eye care
  A. How did IPL make its way to eye care
    1. Aesthetic treatments of skin of the face
    2. Idea of potential use to treat disorders that effect ocular health
  B. Food and Drug Administration (FDA) approval
    1. Targeted research
    2. Approval designation
  C. Original approval for dry eye disease due to meibomian gland disease
  D. How IPL may fit into your practice?
    1. Identifying the dry eye patient
      a. Epidemiology of dry eye disease, MGD

b. The most common patient symptoms of DED, MGD
1.) Sounds basic… But we must listen closely to patient's chief complaint(s)
2.) Surveys & questionnaires to quantify symptoms
a.) Should this be a component of every patient visit?
c. The most common clinical signs of DED, MGD
1.) Biomicroscopic examination
a.) Most common adnexa and eyelid signs
b.) Most common ocular surface findings
d. Diagnostic testing for DED, MGD
1.) Tear production testing
2.) Point of care testing for DED, MGD
3.) Meibomiography
2. The algorithm of care of the patient presenting with DED & MGD
a. Attempt at identifying a cause that can be mitigated to improve status
1.) Environmental conditions
2.) Medical diagnoses and treatments
3.) Behaviors
a.) Smoking
b.) Cosmetics
c.) Diet
d.) Hygiene
b. Treatment interventions: consider the studies
1.) Artificial tears
a.) Various frequency of use
b.) Various viscosity, gels
2.) Oral preparations
a.) Over-the-counter supplements
b.) Prescription options?
3.) Supportive intervention
a.) Lid hygiene including lid hygiene (compresses and scrubs)
(1). Demodex treatment
b.) As above, education regarding mitigation of
4.) Prescription medications
a.) Topical steroids
b.) Specific to dry eye syndrome
5.) Punctal occlusion
a.) Plugs, considered a temporary, reversible procedure
b.) Cautery

III. IPL treatment program
A. Patient has been identified as having dry eye disease due to meibomian gland deficiency.
B. Patient education of diagnosis and is introduced to the IPL procedure.
C. Provide information regarding pretreatment and posttreatment protocols.
D. Review of consent form and the most important potential risks, side effects of treatment.

1. Contraindications to treatment
   a. Open wounds
   b. Skin cancers
   c. Prior adverse response to treatment

E. The IPL treatment program – based on use of the only FDA approved device*
1. As of 08/01/2023, Lumenis OptiLight is the only FDA approved device
   a. Others are on the market in US: I-MED PHARMA, others
2. Fitzpatrick skin type identification
   a. A classification system used to describe a person's type in response to UVR exposure.
      1). Type I (very fair) to Type VI (very dark)
      2). Survey questions assist with identification
   b. Treatment safety protocols limiting IPL to Type I thru Type 3
      1). Risk of skin depigmentation of darker skin tones
      2). Darker skin tone, uptake of more energy, increased discomfort during procedure
      3). Includes Mediterranean, Asian, Latino, African descent.
3. Based on skin type, treatment protocol is established.
   a. Perimeters for care
      1). Millijoules (mJ) are determined by protocol
      2). Original protocol for OptiLight, pre-programed mJ settings
         a). Lui, Am J Ophth 2017
         b). Yin, Curr Eye Res 2018
         c). Kassir, J Cormet Laser Ther 2011
         d). Toyos, Clin Exp Ophthamol 2016
   b. Protocol customarily includes 4 sessions, 2 to 4 weeks between treatments
      1). Review of consent, what happens during procedure, time-out
      2). Patient positioning and treatment area preparation
         a). Comfortable in exam chair
         b). Provider awareness of posture (reputative injury prevention)
         c). Application of aquasonic gel to face (is applied after protective eye shields)
      3). Safety protocols
         a). Patient eye protection (IPL eye shield options)
         b). Staff eye protection
      4). Test treatment spot
         a). Assess response to treatment settings (comfort and skin appearance)
         b). Allow suggested 5 minutes to determine response to treatment
         c). May adjust treatment settings based on response to test spot
      5). Area of face and adnexa to be treated
         a). Treatment protocol based on FDA approved use with OptiLight
            (1). Provider must wear eye protection
         b). Two passes with IPL handpiece (larger size).
            (1). Various crystal sizes
            (2). Broad-based treatment delivery
         c). Two passes with OPT handpiece (smaller size)
            (1). Disposable tip is used

(2). Patented sized handpiece allows for more localized delivery of energy

6). Immediately after treatment

a). Removal of gel THEN eye patient eye shields

b). Gross assessment of treatment area

c). Slit-lamp assessment

(1). Meibomian assessment and expression

(2). Tear film assessment

d). Take the time to review post-treatment instructions

(1). Sun protection thru sunscreen, SPF clothing, UV avoidance

(2). Inform clinic of any adverse response

F. Assessment of response to treatment

1. Status of patient symptoms
2. Update on daily management of symptoms (is the burden of use reduced)
3. Clinical signs during assessment
4. Determination if additional IPL is indicated (is a modification in treatment necessary)

IV. Future treatment and expanded applications

A. With regards to IPL

1. Management of other diagnoses such as acne rosacea
2. Facial, not directly ocular health include acne, pigmented spots, others

B. How to care for Fitzpatrick skin types III thru VI

1. Most likely with radiofrequency (RF)
   a. Pending FDA approval, stay tuned.
   b. Different mechanism of action a IPL, has other benefits.
2. Thermal modalities
   a. Aid in meibomian gland function
   b. Frequently used in conjunction with IPL