

AL- Mustaqpal University

Science College

Dep. Medical physics



Third Stage

Lec 10

Laser skin treatment

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What is laser skin resurfacing?

Laser resurfacing uses lasers to reduce the appearance of wrinkles and scars, to even out skin coloring (pigmentation), to tighten skin and to remove lesions, both benign (non-cancerous) and malignant.

The laser technique directs short, concentrated pulsating beams of light at irregular skin. Laser skin resurfacing removes skin very precisely, layer-by-layer by vaporizing it. Lasers remove the outer layer of your skin – the epidermis – and heats the underlying layer, called the dermis. The lasers stimulate the growth of new collagen fibers resulting in new skin that is smoother and firmer. This popular procedure is known by several other names, including lasabrasion, laser peel or laser vaporization.

Who is a good candidate for laser skin resurfacing ?

We may be an ideal candidate for laser skin resurfacing if we have:

- Scars from acne or chickenpox.
- Uneven skin pigmentation.
- Skin scars or birthmarks.
- Age spots, liver spots.
- Sun-damaged skin.
- Non-responsive skin after a facelift.
- Fine lines or wrinkles around or under the eyes, forehead or mouth
- Enlarged oil glands on our noses.

We may not be a good candidate for laser skin resurfacing if we have:

- Active acne.
- Very dark skin.
- Deep wrinkles.
- Excessive or sagging skin.

How does laser skin resurfacing work ?

There are two forms of laser resurfacing. **First** there's carbon dioxide (**CO₂**) and erbium lasers. These lasers create a uniform injury to the skin in the treatment area. **The other** form of laser resurfacing is called fractionated (**CO₂**) laser treatment. Fractionated (**CO₂**) laser resurfacing involves using the laser to drill numerous narrow columns of holes deep into the layers of your skin, but with the surrounding skin remaining untreated and intact.



CO₂ laser resurfacing

CO₂ laser resurfacing has been used for years to treat different benign and malignant skin conditions. A newer generation of **CO₂** laser resurfacing uses very short pulsed light energy (ultrapulsed) or continuous light beams that are delivered in a scanning pattern to very precisely remove thin layers of skin with minimal heat damage to the surrounding structures.

CO₂ laser resurfacing has been successfully used to treat wrinkles and scars as well as other benign skin growths such as warts, birthmarks, rhinophyma (enlarged oil glands on the nose), and other skin conditions. Recovery time with **CO₂** laser resurfacing is up to two weeks.

Erbium laser resurfacing

Erbium laser resurfacing is designed to remove superficial and moderately deep lines and wrinkles on the face and should require only local anesthetic. This laser can also be used on the hands, neck or chest. One of the benefits of erbium laser resurfacing is minimal injury of surrounding tissue. This laser causes fewer side effects than **CO₂** lasers, such as swelling, bruising and redness, so our recovery time should be more rapid. If we have a darker skin tone, erbium laser resurfacing may be a good choice for us.

Recovery time with erbium laser resurfacing is one full week.

Fractional laser resurfacing

Because fractional **CO₂** laser resurfacing delivers many narrow columns of laser light to the skin, much of our skin is not injured. our skin tightens as the collagen between the treated laser holes contracts. The benefit of this type of laser is that less skin is injured. The risk is that because the laser light penetrates more deeply than other lasers, there's a greater risk of complicated healing and scarring.

Recovery time with fractional laser resurfacing is one full week.

The doctor will determine which type of laser resurfacing treatment is best for our after a full evaluation of our medical history, current physical condition and desired results.

What can be expected during and after laser skin resurfacing?

In general, all forms of laser resurfacing are performed on an outpatient basis, using local anesthesia in combination with orally or intravenously administered sedative medications. Wrinkles around the eyes, mouth or forehead may be treated individually, or a full-face laserabrasion may be performed. Here is what to expect during and after resurfacing:

- Areas of the face to be treated are numbed with a local anesthetic. General anesthesia may be used when the entire face is treated. A partial-face laserabrasion takes **30 to 45** minutes, and the full-face treatment takes **1.5 to 2** hours.
- Your face or area to be treated will be thoroughly cleaned.
- Following laser resurfacing, a nonstick dressing is applied to the treatment sites for 24 hours. You will then clean the treated areas two to five times a day with saline or a diluted vinegar solution. An ointment such as Vaseline® or moisturizing creams such as Eucerin®, or Aquaphor® are then applied. The purpose of using ointments or creams is to prevent any scab formation. In general, the areas heal in five to 21 days, depending on the nature of the condition that was treated and type of laser used.
- Once the areas have healed, makeup may be worn to camouflage the pink to red color that is generally seen after laser skin resurfacing. Green-based makeups are particularly good choices for camouflage since they neutralize the red skin color as the skin heals. Oil-free makeups are recommended after laser resurfacing. The redness in the laser-treated sites generally fades in two to three months but may take as long as six months to up to a year to disappear. The redness generally persists longer in people with blonde or red hair.
- If we have a darker skin tone, we have a greater risk of healing with darker pigmentation (hyperpigmentation). A bleaching agent after laser skin resurfacing may be used to lighten our skin color.



Risks / Benefits

What are possible laser resurfacing complications ?

- Milia, which are small, white bumps, may appear in the laser-treated areas during healing (up to a month after treatment). These may be removed by gentle cleansing with a washcloth.
- Hyperpigmentation, and more rarely, hypopigmentation, may result in the laser-treated areas. In general, the hyperpigmented areas may be treated with bleaching cream to speed fading of the pigment. In addition, you should use broad-spectrum sunscreens for 2 weeks before and after the treatment to prevent pigmentary changes.
- Reactivation of a herpes simplex cold sore may occur, especially after laser skin resurfacing around your mouth. You can prevent this by asking your doctor for an antiviral medication, which you can begin taking before your surgery and continue taking for seven to 10 days after laser resurfacing.
- You can also prevent bacterial infections by taking an antibiotic before the surgery and continuing to take it for seven to 10 days afterwards.

- You should expect swelling after laser skin resurfacing. Oral steroids can be prescribed to manage swelling around your eyes.
- Scarring after laser skin resurfacing, although very rare, may occur in laser-treated areas.

What outcome can I expect after laser skin resurfacing?

You should see an immediate difference in your treated skin. Depending on the laser treatment, your skin may stay pink or red for a few months. Your skin may continue to improve up to a year and the improvement may last for several years. Normal aging will eventually lead to new wrinkles, which can be treated with laser resurfacing again.

You should avoid the sun as much as possible and apply sunscreen every day.

Discussion

1. What is laser skin resurfacing primarily used for?

- A) Reducing hair growth
- B) Enhancing skin texture and removing lesions
- C) Treating varicose veins
- D) Whitening the skin
- E) Removing body tattoos

Answer: B

2. **What layer of skin does laser skin resurfacing target and remove?**

- A) Dermis
- B) Epidermis
- C) Subcutaneous tissue
- D) Basal layer
- E) Stratum corneum

Answer: B

3. **What is another name for laser skin resurfacing?**

- A) Laser bleaching
- B) Lasabrasion
- C) Phototherapy
- D) Skin grafting
- E) UV peeling

Answer: B

4. **Which of the following is NOT a good candidate for laser skin resurfacing?**

- A) A person with active acne
- B) A person with uneven pigmentation
- C) A person with fine lines around the mouth
- D) A person with age spots
- E) A person with chickenpox scars

Answer: A

5. **What type of laser is recommended for darker skin tones?**

- A) Fractional CO₂ laser
- B) Continuous CO₂ laser
- C) Erbium laser
- D) Ultrapulsed laser
- E) Nd:YAG laser

Answer: C

6. **What does fractional CO₂ laser resurfacing involve?**

- A) Heating only the epidermis
- B) Creating narrow columns of treated skin
- C) Removing the entire epidermis
- D) Targeting hair follicles
- E) Tightening skin with ultrasound

Answer: B

7. **What is the main advantage of erbium laser resurfacing over CO₂ lasers?**

- A) Treats deeper wrinkles
- B) Causes less swelling and redness
- C) Has no side effects
- D) Is quicker than other lasers
- E) Works well with all skin tones

Answer: B

8. **What is the recovery time for CO₂ laser resurfacing?**

- A) 3 days
- B) 7 days
- C) Up to 2 weeks
- D) 1 month
- E) Immediate

Answer: C

9. **What substance can be applied post-procedure to prevent scab formation?**

- A) Alcohol-based solutions
- B) Petroleum jelly
- C) Powder makeup
- D) Aloe vera gel
- E) Baking soda

Answer: B

10. What side effect might occur due to hyperpigmentation in laser-treated areas?

- A) Scarring
- B) Skin thickening
- C) Darkened skin tone
- D) Cold sore reactivation
- E) Skin flaking

Answer: C

11. What condition is CO₂ laser resurfacing specifically effective for?

- A) Enlarged oil glands on the nose
- B) Hair removal
- C) Melasma
- D) Stretch marks
- E) Spider veins

Answer: A

12. What anesthetic is typically used for erbium laser resurfacing?

- A) General anesthesia
- B) Local anesthesia
- C) Topical cream
- D) Sedatives only
- E) Nerve block

Answer: B

13. Which complication is common during healing post-laser treatment?

- A) Herpes simplex reactivation
- B) Formation of milia
- C) Excessive bleeding
- D) Keloid formation
- E) Cellulitis

Answer: B

14. What is the typical recovery time for fractional CO₂ laser resurfacing?

- A) 2 days
- B) 5 days
- C) 1 week
- D) 3 weeks
- E) 1 month

Answer: C

15. What is a key benefit of fractional laser treatment?

- A) Treats all skin without injury
- B) No downtime required
- C) Less overall skin injury
- D) Completely removes deep wrinkles
- E) Eliminates pigmentation issues

Answer: C

16. What is an essential post-treatment care tip to prevent pigmentation changes ?

- A) Avoid makeup
- B) Apply sunscreen
- C) Use antibiotics
- D) Massage the skin
- E) Avoid saline solution

Answer: B

17. Which of the following is an example of a benign condition treated with CO₂ lasers?

- A) Psoriasis
- B) Warts
- C) Skin cancer
- D) Eczema
- E) Vitiligo

Answer: B

18. What is the typical duration of redness after laser resurfacing?

- A) 1 week
- B) 2 weeks
- C) 2-3 months
- D) 6-12 months
- E) Immediate resolution

Answer: C

19. How can cold sore reactivation be prevented after laser resurfacing?

- A) Applying sunscreen
- B) Taking antiviral medication
- C) Using cold compresses
- D) Avoiding antibiotics
- E) Using topical steroids

Answer: B

20. What is the term for lightening skin tone with treatment?

- A) Hyperpigmentation
- B) Depigmentation
- C) Bleaching
- D) Hypopigmentation
- E) Pigmentation neutralization

Answer: C

21. What should be avoided to ensure the best outcome post-treatment?

- A) Direct sunlight
- B) Makeup
- C) Moisturizers
- D) Sedatives
- E) Saline rinses

Answer: A

22. What is a rare but possible complication of laser resurfacing?

- A) Permanent pigmentation changes
- B) Bacterial infections
- C) Swelling around the eyes
- D) Scarring
- E) Redness persisting for a week

Answer: D

23. What is the primary purpose of laser skin resurfacing?

- a) To cure skin cancer
- b) To enhance blood circulation
- c) To reduce wrinkles, scars, and improve skin tone
- d) To improve muscle tone
- e) To promote weight loss

Correct Answer: c

24. What layer of the skin does laser resurfacing remove?

- A) Dermis
- B) Epidermis
- C) Hypodermis
- D) Subcutaneous
- E) Adipose tissue

Correct Answer: b

25. Which of the following is a benefit of laser skin resurfacing?

- A) Permanent Immunity To Skin Conditions
- B) Stimulates Collagen Growth
- C) Causes Permanent Scarring
- D) Prevents All Future Wrinkles
- E) Reduces fat deposits

Correct Answer: b

26. Which type of laser is known for minimal heat damage to surrounding tissues?

- A) Fractionated Laser
- B) Erbium Laser
- C) CO₂ Laser
- D) Ultrapulse Laser
- E) Infrared laser

Correct Answer: c

27. Which of the following individuals might NOT be a good candidate for laser resurfacing?

- A) Someone With Acne Scars
- B) Someone With Active Acne
- C) Someone With Uneven Pigmentation
- D) Someone With Sun-Damaged Skin
- E) Someone With enlarged oil glands

Correct Answer: b

28. What is the recovery time for erbium laser resurfacing?

- A) Two Weeks
- B) One Week
- C) Five Days
- D) One Month
- E) Three days

Correct Answer: b

29. What distinguishes fractional CO₂ laser resurfacing?

- A) It Removes the entire skin surface.
- B) It creates narrow columns of treated skin while sparing surrounding skin.
- C) It Only Works On Light Skin Tones.
- D) It has no risk of complications.
- E) It is faster than erbium laser treatments.

Correct Answer: b

30. What is a potential side effect of laser resurfacing, especially in darker skin tones?

- A) Permanent Scarring
- B) Hypopigmentation
- C) Hyperpigmentation
- D) Both B And C
- E) None of the above

Correct Answer: d

31. What should be applied to treated areas to prevent scab formation after laser resurfacing?

- A) Sunscreen
- B) Ointments Or Moisturizing Creams
- C) Bleaching Agents
- D) Antiseptic Sprays
- E) Alcohol-based solutions

Correct Answer: b

32. How long does redness from laser resurfacing usually persist?

- A) 1-2 Days
- B) 2-3 Months
- C) 5-6 Days
- D) 6-12 Months
- E) Permanently

Correct Answer: b

33. Which makeup type is recommended for camouflaging redness after treatment?

- A) Oil-Based Makeup
- B) Green-Based Makeup
- C) Powder Foundation
- D) Water-Based Makeup
- E) Silicone-based makeup

Correct Answer: b

34. What condition is effectively treated with CO2 laser resurfacing?

- A) Deep Wrinkles
- B) Birthmarks
- C) Rhinophyma
- D) All Of The Above
- E) None of the above

Correct Answer: d

35. Why might erbium laser resurfacing be preferred for darker skin tones?

- A) Less Heat Damage
- B) Deeper Penetration
- C) Longer-Lasting Results
- D) Shorter Recovery Time
- E) No Risk of complications

Correct Answer: a

36. Which condition increases the risk of complications from fractional laser resurfacing?

- A) Very Light Skin Tone
- B) Deep Wrinkles
- C) Large Pores
- D) Sunburn
- E) None of the above

Correct Answer: b

37. What is milia, a possible side effect of laser resurfacing?

- A) Dark spots
- B) Small White Bumps
- C) Persistent Redness
- D) Skin Flaking
- E) Enlarged pores

Correct Answer: b

38. What type of laser is ideal for superficial lines and wrinkles?

- A) Erbium Laser
- B) CO2 Laser
- C) Fractional Laser
- D) Excimer Laser
- E) Infrared laser

Correct Answer: a

39. What is a preventive measure for hyperpigmentation after laser resurfacing?

- A) Avoiding Sunscreen
- B) Applying Bleaching Agents
- C) Using Oil-Based Makeup
- D) Wearing Tight Bandages
- E) Avoiding moisturizer

Correct Answer: b

40. What medication is recommended to prevent herpes reactivation?

- A) Antibiotics
- B) Antiviral Medication
- C) Steroids
- D) Antihistamines
- E) Anti-inflammatory drugs

Correct Answer: b

41. How does fractional laser resurfacing tighten the skin?

- A) By removing the entire epidermis
- B) By Contracting Collagen Fibers
- C) By Increasing Melanin Production
- D) By Reducing Oil Glands
- E) By stimulating blood flow

Correct Answer: b

42. What is the usual duration for using antibiotics after laser resurfacing?

- A) 3 days
- B) 5 days
- C) 7-10 days
- D) 14 days
- E) 1 month

Correct Answer: c

43. Which area is commonly treated with erbium laser resurfacing?

- A) Forehead
- B) Neck
- C) Chest
- D) Hands
- E) All of the above

Correct Answer: e

44. Which laser treatment has the shortest recovery time?

- A) CO₂ Laser Resurfacing
- B) Erbium Laser Resurfacing
- C) Fractional Laser Resurfacing
- D) Infrared Laser
- E) Laser dermabrasion

Correct Answer: b

45. What should be avoided to prevent pigmentation issues after treatment?

- A) Moisturizers
- B) Sunscreen
- C) Sun Exposure
- D) Bleaching Agents
- E) Gentle Cleansing

Correct Answer: c

46. What is the expected improvement duration post-laser resurfacing?

- A) One Month
- B) Six Months
- C) Up To One Year
- D) Two Years
- E) Permanent

Correct Answer: c

47. What should you apply daily to protect the skin post-treatment?

- A) Petroleum Jelly
- B) Broad-Spectrum Sunscreen
- C) Makeup
- D) Antiseptic Cream
- E) Bleaching Agents

Correct Answer: b