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**EOS 2023**

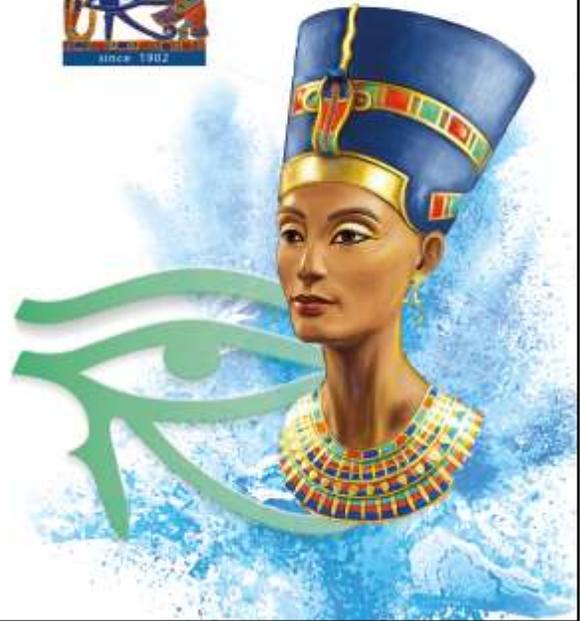


# Cataract Cornea Incision Burn

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## Corneal Incision Contracture CIC (Wound Burn)

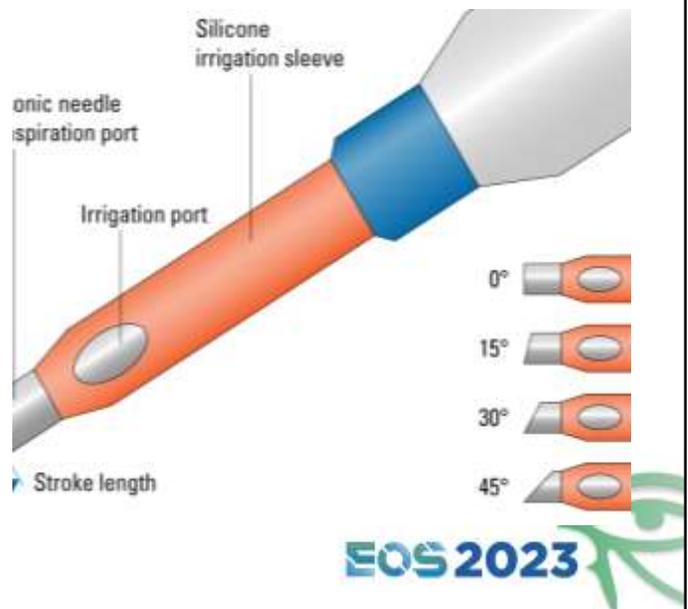
Phaco probes contain piezoelectric crystals that vibrate at ultrasonic range frequency (28000 to 60000 Hz) when stimulated.

### The vibration energy is

- transmitted to the titanium probe tip that oscillates back and forth.
- it can also generate microbubbles of gas that implode at ultrasonic speed releasing large amounts of energy, (cavitation effect).

### The phaco probe creates two sources of heat:

- conversion of electrical energy to mechanical energy,
- friction heat when the phacoemulsification needle vibrates against the sleeve that contains the probe.



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## Corneal Incision Contracture CIC (Wound Burn)

- If the flow of irrigation fluid surrounding the phacoemulsification needle is disrupted, the generated heat may contact the tissue, with the corneoscleral wound site being most susceptible to damage.
- Thermal damage to the collagen fibers in the corneal tunnel can occur once the temperature reaches 60 degrees Celsius, leading to a “phacoburn” over 1 to 3 seconds.
- The wound burn results in the contracture of the incision site and surrounding tissue.



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## Risk Factors

- Mature cataract
- **ultrasound energy used** with higher levels or prolonged use
- **The type of surgical approach used for nuclear disassembly**
  - **higher risk** on the use of ultrasound energy, **divide-and-conquer, carousel, and stop-and-chop.**
  - **lower risk** USE OF mechanical force & require less ultrasound energy, **full chop or dry chop**
- **obstruction by (OVD)**
- **high viscosity OVDs :**
  - can occlude the phaco tip and prevent the cooling effects of fluid flow, increasing the temperature at the incision site.
- Healon5
- Ocucoat and Viscoat, **OVER FILL.**



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## Risk Factors

- **Decreased irrigation around the phacoemulsification tip**

- irrigation fluid
- bottle is empty, positioned too low for sufficient flow,
- if the irrigation tubing is compressed.

- **Type of ultrasound used**

transverse ultrasound, such as the **OZIL and Ellips**,  
may produce less heat than longitudinal ultrasound

- **Importantly,**  
surgical incision size, power modulation, and type of ultrasound  
**were not found** to modulate the risk of corneal incision contracture



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## Complications

- Delayed wound healing,
- Fistula formation,
- Damage to corneal stroma and endothelium,
- Inability to close the incision,
- Increased surgically induced astigmatism.  
tight sutures used to close the wound.
- Flat anterior chamber and iris prolapse,  
inability to achieve a watertight closure



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## Prevention

- **Continuous irrigation on the outer surface of the phacoemulsification needle and aspiration through the central canal** to prevent the tip from increasing in temperature and causing subsequent thermal injury.
- **Verification of proper machine setup and adequate irrigation flow before insertion of phacoemulsification probe .**
- Irrigation and aspiration should be performed for up to 15 seconds at the beginning of the case (**fluid pocket**) ensures that the working space above the nucleus is free of the OVD, which protects against wound burn.<sup>1</sup>



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## Detection

- **Early**
- appearance of milky white fluid around the phaco tip
- whitening of the cornea and gaping at the incision site.
- **At the end of the procedure,**  
difficulty in maintaining watertight closure of the incision site



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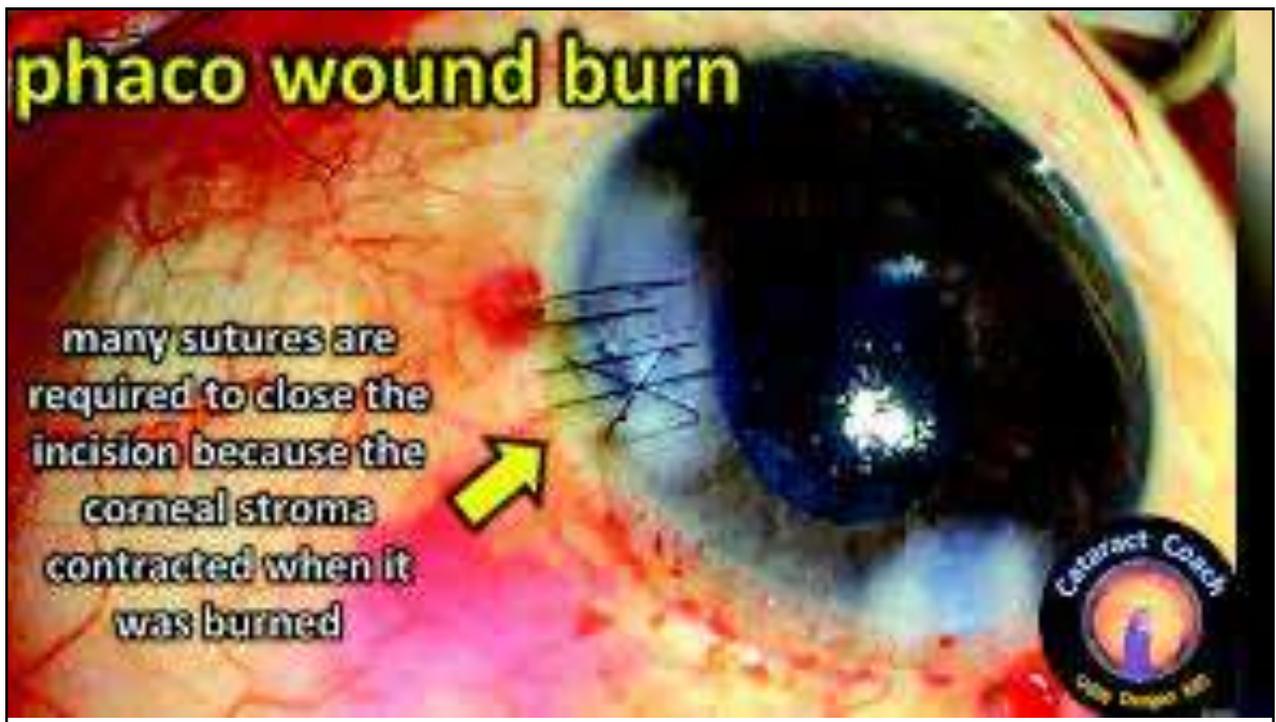
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## Management

- Radial sutures; join the anterior and posterior aspects of the wound
  - associated with higher surgical-induced astigmatism
- Horizontal suture :
  - a single horizontal suture that opposes the anterior aspect of the wound to the wound bed to reduce the development of astigmatism
- Soft contact lens
- Scleral patch grafts; severe thermal injuries and difficulties with closing the incision.<sup>1</sup>
- POST OPERATIVE TTT
  - Aqueous suppressants and antibiotic drops options



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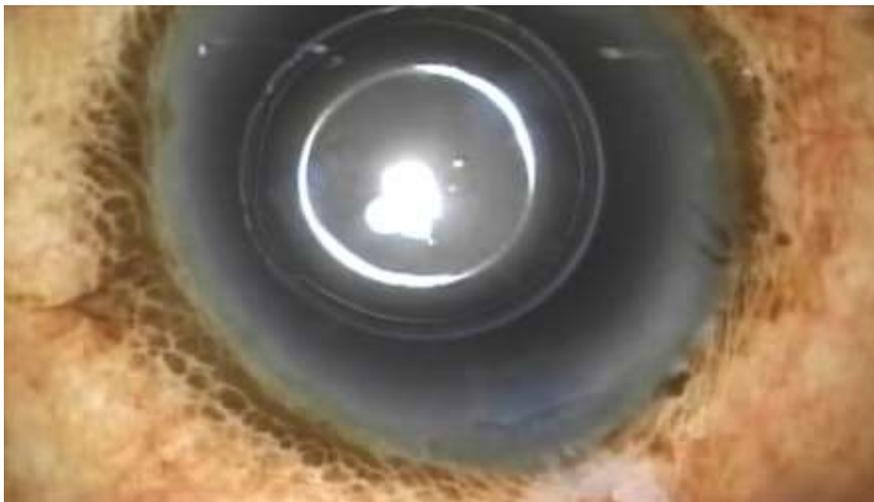


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## Cataract Cornea Incision Burn (Contracture) CIC



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## PCR Transformed to Posterior CCC



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# THANK YOU

*See you next year*

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