

Laser in optometry

Sawa private university

College of health and medical

technology

third class

Seventh laser lecture



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Introduction

- - Nd:YAG = Neodymium:YAG crystal
- - Wavelength 1064 nm
- - Solid-state laser
- - Infrared, invisible beam
- - Used mainly for photodisruption
- - Important in ophthalmology
- - Safe when used properly



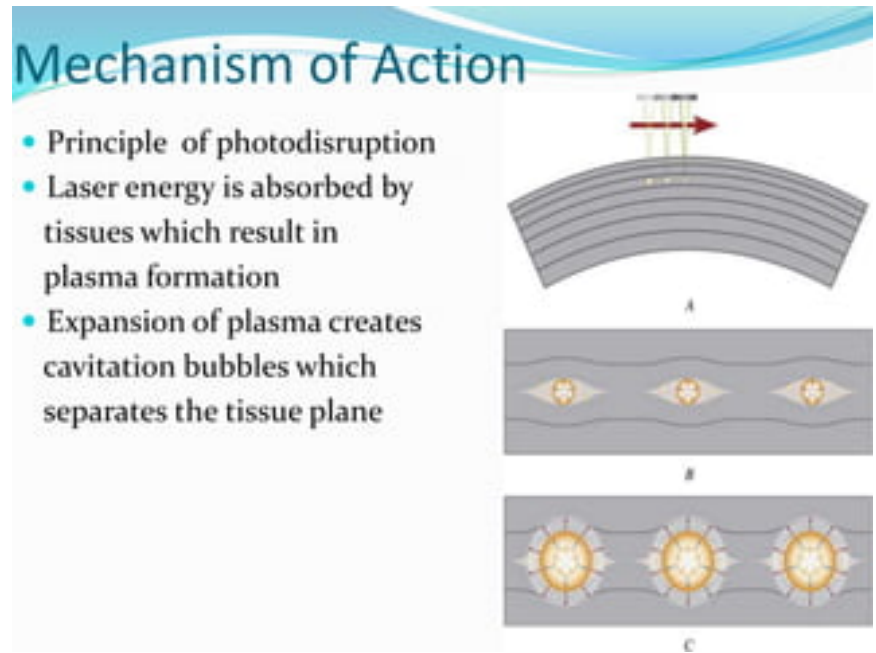
: Laser Physics

- - YAG crystal doped with Nd ions
- - Pumped by flashlamp or diode
- - Four-level laser system
- - Produces high-energy pulses
- - **Q-switching** increases peak power
- - Minimal thermal effect
- - Strong mechanical disruption



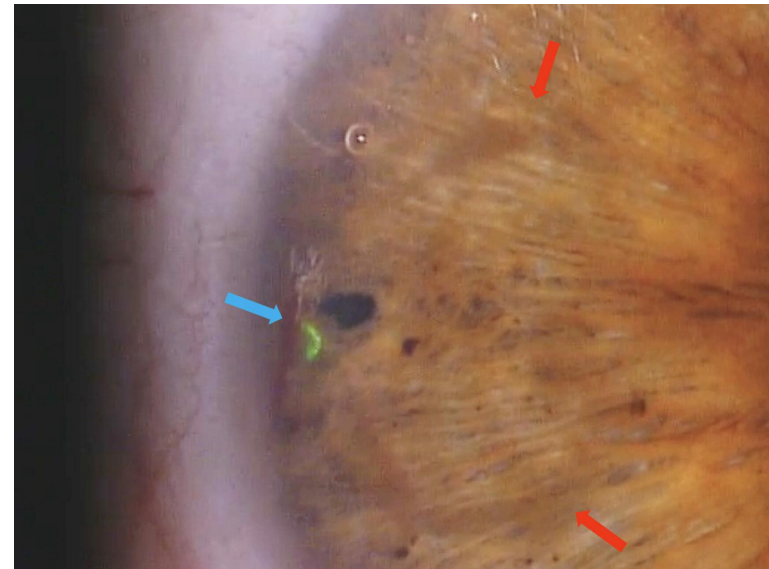
Tissue Interaction

- - Creates plasma at focal point
- - Shock wave disrupts tissue
- - Cavitation bubble forms
- - Precise cutting effect
- - **No thermal damage**
- - Requires accurate focusing
- - Needs special safety lens



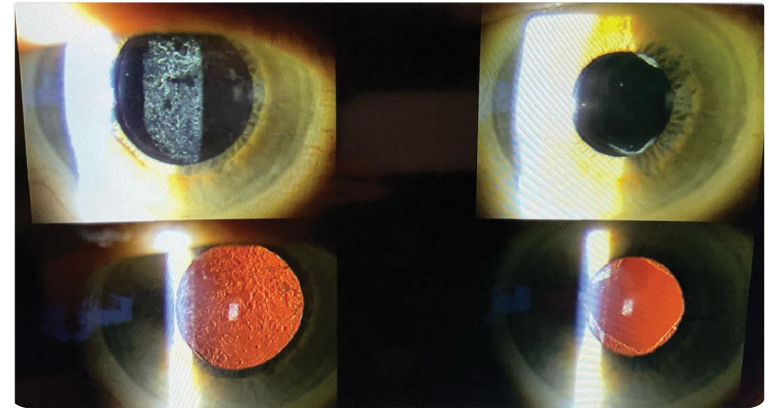
Ophthalmic Uses

- - Posterior capsulotomy
- - Peripheral iridotomy
- - Vitreolysis
- - Anterior capsulotomy
- - Capsular block relief
- - Synechiolysis
- - Membranectomy



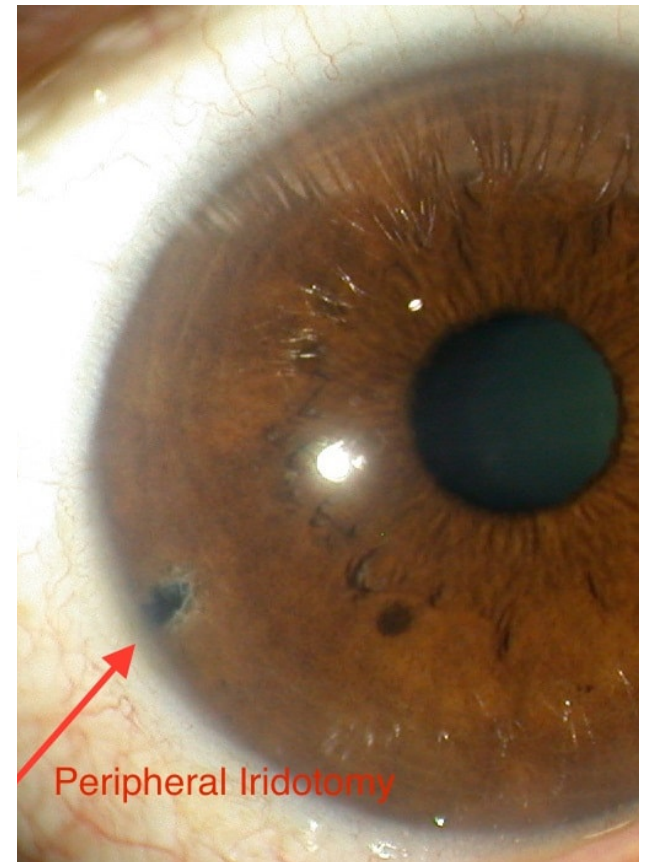
Posterior Capsulotomy

- - Treats PCO after cataract surgery
- - Restores visual axis
- - Improves vision rapidly
- - Energy 1–2 mJ typical
- - Create central opening
- - Avoid IOL pitting
- - Monitor IOP afterward



Peripheral Iridotomy

- - Treats narrow angles
- - Prevents angle-closure attack
- - Creates drainage hole
- - Energy varies by iris thickness
- - Dark iris needs more energy
- - Use Abraham lens
- - Check IOP after procedure



Pre-Procedure Assessment

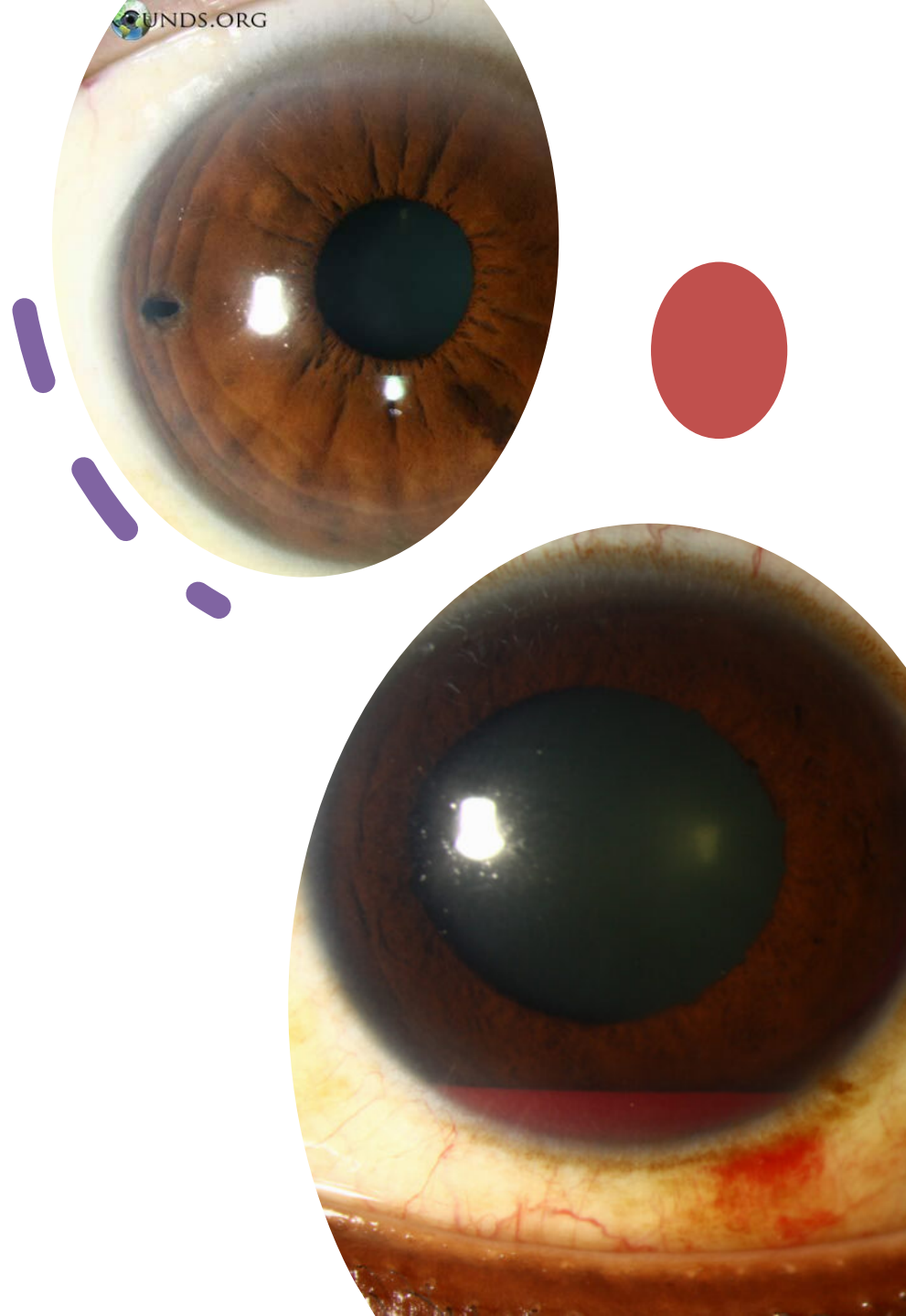
- - Check visual acuity
- - Measure IOP baseline
- - Slit-lamp exam
- - Evaluate angle status
- - Dilate if needed for PCO
- - Explain risks & benefits
- - Obtain informed consent

Contraindications

- - Active uveitis
- - Uncontrolled glaucoma
- - Corneal opacity blocking view
- - Severe retinal disease
- - Poor patient cooperation
- - Unstable IOL position
- - Very shallow anterior chamber

Complications

- - IOP spike common
- - IOL pitting possible
- - CME risk
- - Retinal detachment rare
- - Hyphema during PI
- - Corneal burn if mis-focused
- - Increased floaters



Post-Procedure Care

- - Check IOP 1–2 hrs later
- - Prescribe NSAID drops
- - Educate on symptoms
- - Monitor for CME
- - Fundus exam in high myopes
- - Ensure PI remains patent
- - Document findings

Optometrist Role

- - Pre-laser evaluation
- - Detect PCO & narrow angles
- - Counsel patient
- - Co-manage with ophthalmologist
- - Post-laser monitoring
- - Detect complications early
- - Visual rehab planning

Definitions

- - Photodisruption = mechanical cutting
- - PCO = capsule opacification
- - Capsulotomy = capsule opening
- - PI = iris hole creation
- - Cavitation bubble = tissue rupture
- - IOL pitting = accidental burn marks
- - CME = macular swelling

Case 1 (PCO)

- - 65-year-old pseudophakic
- - Blurred vision, glare
- - Slit-lamp: PCO
- - Treatment: YAG capsulotomy
- - Expected rapid improvement
- - Check IOP after
- - Watch for floaters

Case 2 (Narrow Angle)

- - 58-year-old female
- - Eye pain, halos
- - Gonioscopy: occludable angles
- - Treatment: YAG PI
- - Prevents acute closure
- - IOP may spike afterward
- - Confirm PI patency

Summary

- - Nd:YAG uses photodisruption
- - Key uses: PCO & PI
- - Accurate focusing essential
- - Monitor IOP carefully
- - Optometrist vital in co-management
- - Highly effective & safe
- - Requires proper training