

Al-Mustaqbal University (الاجهزة الطبية) Department (الرابعة) Subject (نظم الليزر الطبية) (أ.د علاء حسين علي) Lecturer

2ndterm – Lect. (Medical laser applications part 2)

Types of Medical Lasers and Their Applications

Laser Type	Wavelength	Common Uses	
CO ₂ Laser	10,600 nm (infrared)	Precise cutting and vaporization in dermatology, gynecology, ENT, general surgery	
Er:YAG Laser	2,940 nm	Skin resurfacing, dental hard tissue procedures	
Nd:YAG Laser	1,064 nm	Vascular lesions, tumor ablation, ophthalmology, urology	
Diode Laser	800–980 nm	Hair removal, dental and soft tissue surgery, varicose vein treatment	
Argon Laser	488–514 nm (blue- green)	Retinal photocoagulation, treatment of vascular lesions	
Excimer Laser	193 nm (UV)	LASIK, corneal reshaping	
Pulsed Dye Laser (PDL)	585–595 nm	Vascular lesions, port-wine stains, scars	
Q-Switched Lasers	Various	Tattoo removal, pigmented lesions	
Femtosecond Lasers	Ultrafast (10 ⁻¹⁵ sec pulses)	LASIK flap creation, cataract surgery, corneal transplants	



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Advanced and Emerging Applications

Photodynamic Therapy (PDT)

Combines a **photosensitizing drug** and a **laser** to selectively kill abnormal cells (e.g., in skin cancer, esophageal cancer).

Minimally invasive and highly targeted.

Neurosurgery

Laser interstitial thermal therapy (LITT) for:

Brain tumors

Epilepsy (ablation of seizure foci)

Allows deep tissue ablation via a small probe under MRI guidance.

Respiratory Tract

Bronchoscopic laser resection of airway tumors or obstructions (e.g., Nd:YAG lasers).

Neonatology & Pediatrics

Laser treatment of retinopathy of prematurity (ROP).

Correcting tongue-tie (ankyloglossia) in infants.



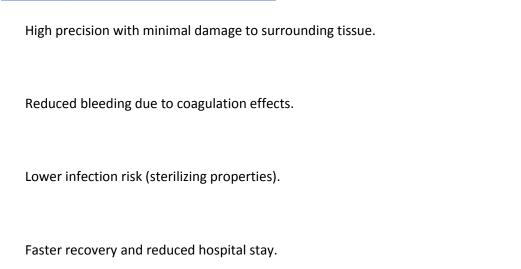
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Laser Ablation in Genomics & Biotech

ı	Precision	dissection	of cells	or tissues.

Microarray scanning and DNA analysis using fluorescence lasers.

Advantages of Laser Use in Medicine



Less postoperative pain



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