



Surgical Applications

1. Cutting and Tissue Removal

Used in place of traditional scalpels.

Minimizes bleeding due to cauterization.

Common in:

- Dermatology (e.g., mole, wart, or tattoo removal)
- ENT surgeries (e.g., tonsillectomies)
- Gynecological procedures (e.g., endometriosis treatment)

2. Laser-Assisted Tumor Removal

Used to shrink or destroy tumors.

Often combined with other therapies in oncology.

Dermatology & Cosmetic Medicine

1. Skin Resurfacing & Wrinkle Reduction

Ablative lasers (e.g., CO₂, Er:YAG) remove skin layers to improve texture.

Non-ablative lasers stimulate collagen production.

2. Acne & Scar Treatment

Targets sebaceous glands or reduces scar tissue.

3. Hair Removal

Laser targets melanin in hair follicles to reduce hair growth.



4. **Tattoo Removal**

Q-switched lasers break down ink particles for the body to absorb.

5. **Pigmented Lesion & Vascular Treatment**

Treats age spots, melasma, spider veins, port-wine stains.

Ophthalmology

1. **Refractive Eye Surgery**

LASIK, PRK: Reshape the cornea to correct vision.

2. **Cataract Surgery**

Femtosecond lasers assist in lens removal.

3. **Retinal Treatments**

Laser photocoagulation for diabetic retinopathy, macular edema.

4. **Glaucoma Management**

Laser trabeculoplasty improves fluid drainage.



Dentistry

1. Cavity Preparation & Tooth Whitening

2. Soft Tissue Surgery

Gingival reshaping, treatment of periodontal disease.

3. Sterilization of Root Canals

Oncology

- **Photodynamic Therapy (PDT)**

Combines light-sensitive drugs and lasers to destroy cancer cells.

Other Applications

1. Urology

Laser lithotripsy for breaking kidney/bladder stones.

Prostate surgery (e.g., HoLEP for BPH).

2. Vascular Surgery

Endovenous laser therapy (EVLT) for varicose veins.



Al-Mustaqbal University

Department (الأجهزة الطبية)

Class (الرابعة)

Subject (نظم الليزر الطبية)

Lecturer (أ.د. علاء حسين علي)

2nd term – Lect. (Medical laser applications part 1)

3. Gastroenterology

Ablation of polyps or lesions.

Hemostasis for bleeding ulcers.

4. Pain Management & Rehabilitation

Low-level laser therapy (LLLT) reduces inflammation and promotes healing.