Light Amplification by Stimulated Emission of Radiation (LASER)

**CO2:**
- **Wavelength** = around 9.4 to 10.6 micrometers (primarily 10.64 microns)
  - Water absorbs this frequency of light very well therefore superficial absorption (useful in sx)
- **Advantages**:
  - Thermal precision - max impact on target and min damage to other tissue
  - Absolut hemostasis <0.5mm diameter
  - Accelerated healing of tissue - lack of mechanical trauma
  - Minimal post op pain - sealing axonal tubules in small cutaneous nerves
  - Sterilization of target sight - inactive bacteria, fungi, or virus
- **Procedures used in Podiatry**
  - Plantar Verruca Ablation
  - Porokeratoma Ablation
  - Nail Matrixectomy Ablation
  - Fungal Nail Treatment
  - Heel Fissure Debridement/Ulcer Debridement/Sterilization
  - Incisional Procedures for soft tissue component (of neuroma, bunion, etc.)
  - Keloid and hypertrophic scar treatment - lack of fibroblast stimulation

**Nd:YAG lasers:** (neodymium-doped yttrium aluminum garnet)
- **Wavelength** = 1.064 microns: 1060 nm
  - Poorly absorbed by hemoglobin, chromophores, protein, or water
  - 99% of Podiatric use is with **contact laser scalpels**
- **Advantages**:
  - Fast dissection, seals small nerves/vessels, cell necrosis is min, high precision, cuts w/light energy
- **Procedures in Podiatry**
  - Nerve releases and neuromas, neurectomy, bunionectomy (soft tissue), ganglions, tendon transplants/lengthening, heel spur (soft tissue), plantar fasciotomy, dissection
- **Used in**:
  - Situations contraindicating tourniquet particularly where a dry field is essential
  - Dissection of delicate tissue planes
  - Patients where surgical trauma may stimulate adverse reactions
- **Cutera**- FDA clearance for the **temporary** increase of clear nail in patients with Onchomycosis

**Argon system**
- **Wavelength** (dual output: Blue- 488nm, Green 514nm)
  - Indicated for tissue coagulation and necrosis procedures (acisional)
  - 1-2 mm penetration depth
  - Argon passes epidermis to absorb in the dermal **hemoglobin** selectively
- **Object** = delivery of energy to the superficial dermis (papillary plexus)- vessels feeding the wart
  - Absorption is first absorbed in the hemoglobin of the reticular dermis ➔ vessels are stenosed via selective photoablation ➔ Able to coagulate vessels less than 1 mm in diameter
- **Advantages**
  - Minimal exposure to blood
  - Decreased laser plume
  - Good treatment for immunocompromised patients
  - Faster than CO2 laser
- **Procedures in Podiatry**
  - Large verrucae on the plantar aspect of the foot and the posterior aspect of the heel
  - Multiple disseminating lesions or mosaic warts on the plantar foot
  - Vascular lesions of a superficial nature
  - Patients having communicable diseases when a bloodless field is desired

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**References:**

Crozer Chester Medical Center ©