In The Name of God

LASER In Dentistry

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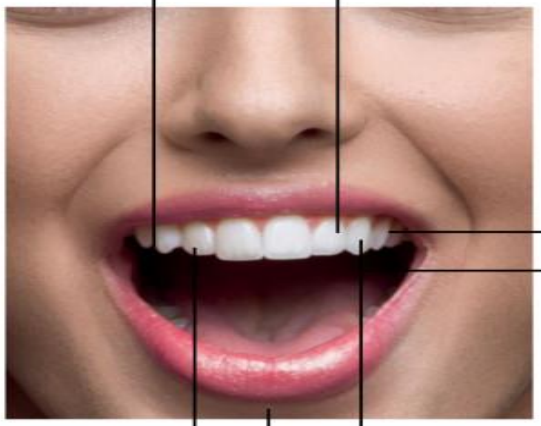


Implantology

- Mucositis
- Perimplantitis
- Sulcular debridement

Dental Surgery

- Abscess
- Angioma
- Epulis
- Fibroma
- Frenectomy
- Gingivectomy
- Gingivoplasty
- Haemostasis
- Implant uncovery
- Incision
- Operculectomy

Periodontology

- OHLLT tooth singlet oxygen
- OHLLT implant singlet oxsigen
- LLLT

Endodontia

- Root germ reduction
- Gangrene germ reduction
- Pulpotomy

Dental laser therapy

- Burning mouth
- Herpes
- LLLT
- Oral lichen planes
- Post-surgical swelling
- Post-surgical wound
- Ulcer/Stomatitis

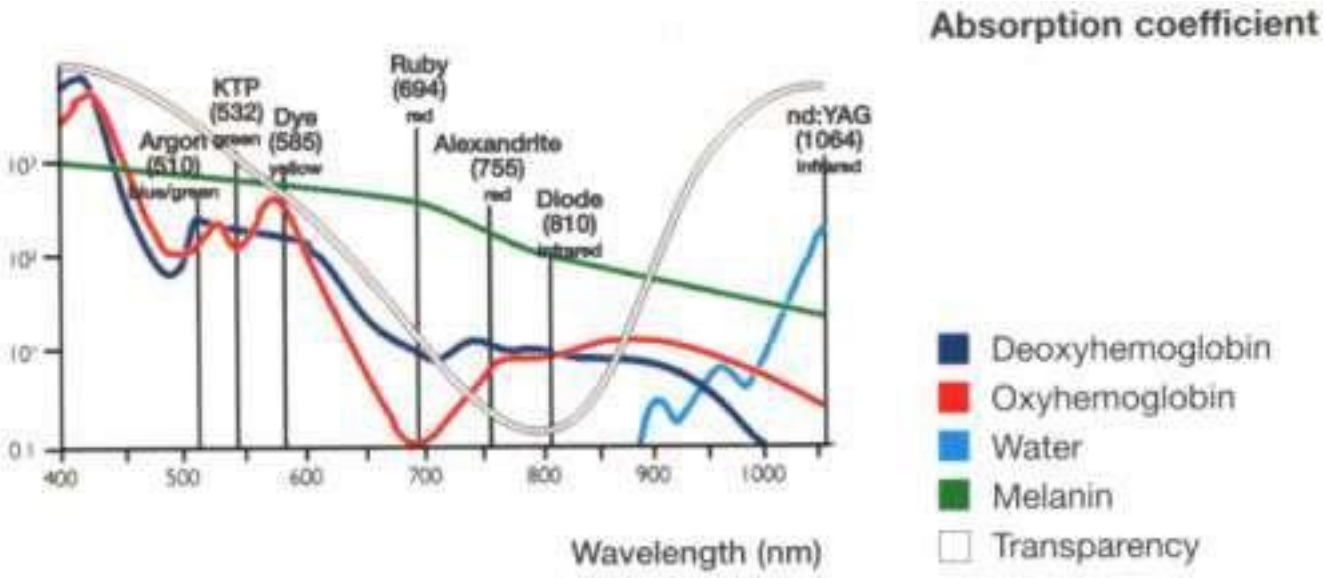
Aesthetic applications

- Senile lentigo solar
- Acne vulgaris
- Photorejuvenation
- Telangectasias

Restorative dentistry and dental hygiene

- Dentin hypersensitivity
- Sealant polymerization
- Tooth whitening

Absorption Target of Lasers



BLADE or LASER?

- • efficient cutting
- • good hemostasis
- • nearly without bleeding and therefore good visibility of the op site
- • mostly no sutures needed
- • no or only small post op edema
- • bactericidal effect
- • pain reduction post and intra op treatment
- • no secondary bleeding
- • precision of cut
- • reduced application of drugs (antibiotics, analgesics..)
- • high patient acceptance
- • low level of scar forming
- • good handling due to fiber optics
- • treatment duration shorter (no suture, not often change of instrument..)
- • biostimulation of the surrounding tissue

Applications of Lasers in Dentistry

- The rapid development of laser technology has seen its introduction into various fields of dentistry.

Clinical Applications

- Inert reactions : Diagnosis
- Destructive effects: surgical treatments
- Biostimulative effects: LLLT(PDD-PDT)

1. Diagnosis

- · Detection of pulp vitality
- · Doppler flowmetry
- · Laser fluorescence- Detection of caries, bacteria and dysplastic changes in the diagnosis of cancer

2. Hard tissue applications

- · Caries removal and cavity preparation
- · Re-contouring of bone (crown lengthening)
- · Endodontic (root canal preparation ,sterilization and Apicectomy)
- · Laser etching
- · Caries resistance

3. Soft tissue applications

- · Laser-assisted soft tissue curettage and peri-apical surgery
- · Bacterial decontamination
- · Gingivectomy and Gingivoplasty
- · Gingival retraction for impressions
- · Implant exposure

Soft tissue applications (cont.)

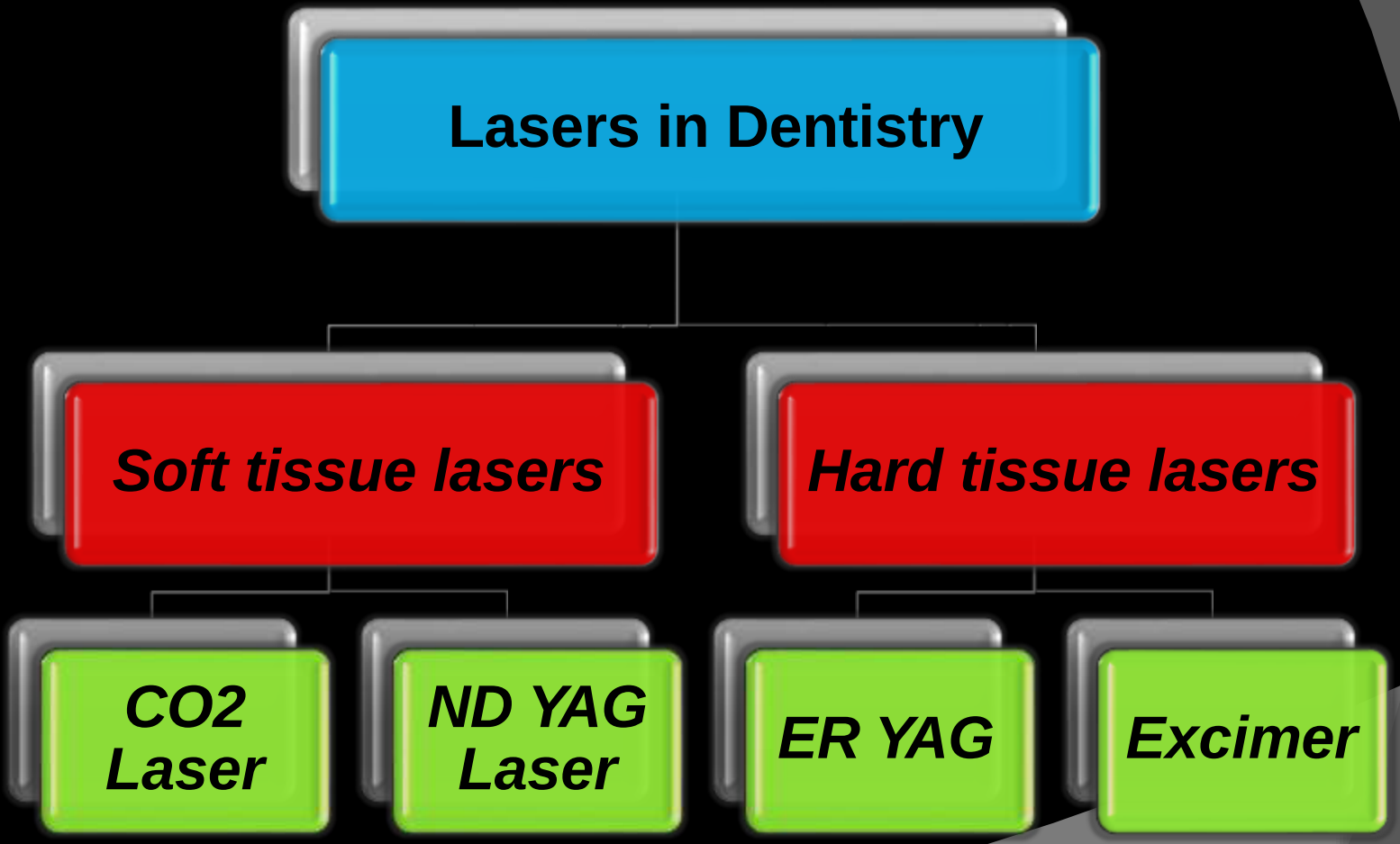
- · Biopsy incision and excision
- · Treatment of aphthous ulcers and Oral lesion therapy
- · Coagulation / Hemostasis
- · Tissue fusion - replacing sutures
- · Laser-assisted flap surgery
- · Removal of granulation tissue
- · Pulp capping, Pulpotomy and pulpectomy
- · Operculectomy and Vestibuloplasty
- · Incisions and draining of abscesses
- · Removal of hyperplastic tissues and Fibroma

4. Laser-induced analgesia

5. Laser activation

- · Restorations (composite resin)
- · Bleaching agents

Types of Lasers Used in Dentistry



Optical biopsy

DIAGNOdent

NEW ALTERNATIVE IN CARIES DETECTION

Diagnodent

Values	Diagnosis	Treatment plan
0 to 13	Sound tooth	professional tooth cleaning
14 to 20	caries in enamel	Intensive professional tooth cleaning, fluoridation or HealOzone
21 to 29	caries in the dentin -enamel junction	Intensive professional tooth cleaning, fluoridation or HealOzone and monitoring, minimal invasive restorations, look at other caries risk factors
>30	caries in dentin	Minimal invasive restorations and intensive professional tooth cleaning

Diode LASER

- Diode lasers were introduced in 1962.
- Diode lasers were used in dentistry. since1995.

- Mostly with a wavelength of 810 nm. Later the wavelength 980 nm. more economical

- In comparison to other lasers the diodes are more , more economical the construction is more simple.

- The laser beam is guided through a quartz-fiber.
-
- Unfortunately diode lasers are only applicable in soft tissue.

VitalQ

Surgical diode laser

Selectable Among
808 / 915 / 940 / 976 nm

- Selectable Wavelength
- Compact Size Device With Hand Grip
- Multifunctional Handpieces With Fiber
- Intuitive Handling
- Touch Screen Interface

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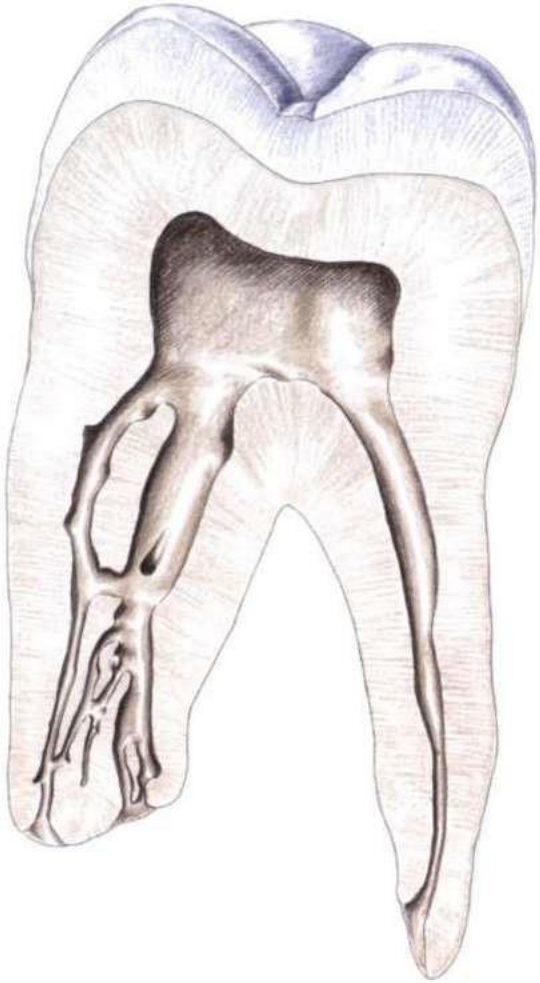
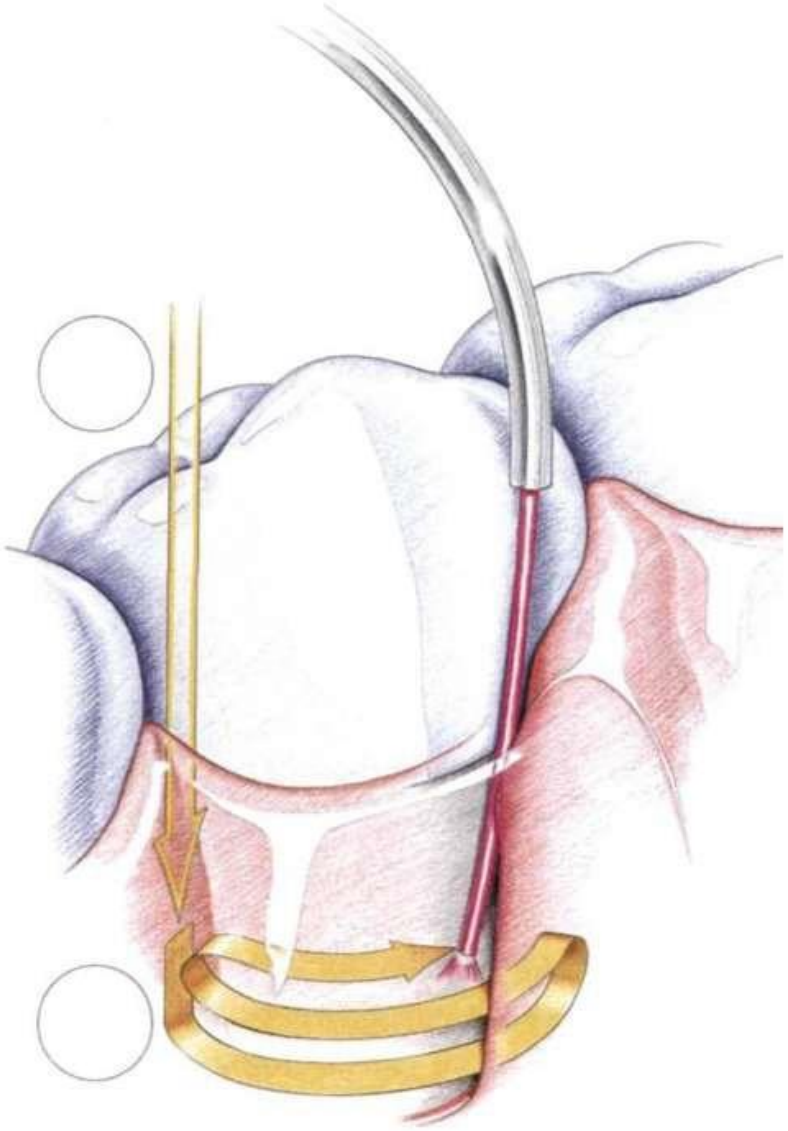
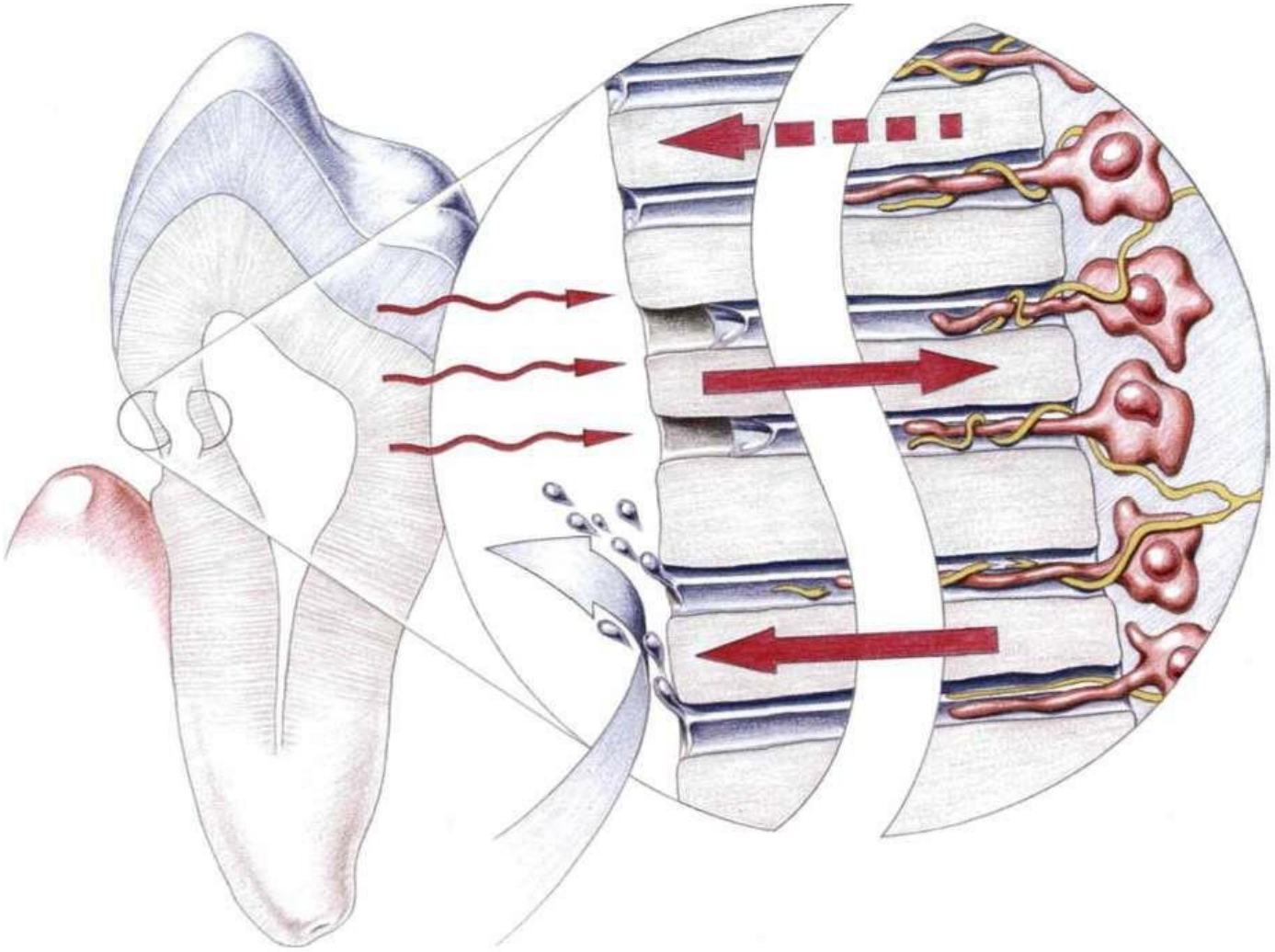
Diode in Endodontics



Diode Laser in Periodontics



Diode Laser and Hypersensitivity



Co2 LASER

- Most powerful gas laser
- Specification: 10600nm and 9600nm
- Consist of Co2 (10%), N2 (20%), He (70%)
- Modality: Vaporization or cutting (>100c).
- Delivery: articulated arms, hollow wave guide

GMP MFDS

DENTAL CO_2 LASER SYSTEM

CYMA Dental

High technical CO_2 dental laser

- 15 Indication modes
- Storage of personalized laser treatment data
- SuperPulse-, Pulse- and CW operating modes
- Cutting edge innovative
- Safe, Effective and Reliable
- Patient Satisfaction
- High Power Output

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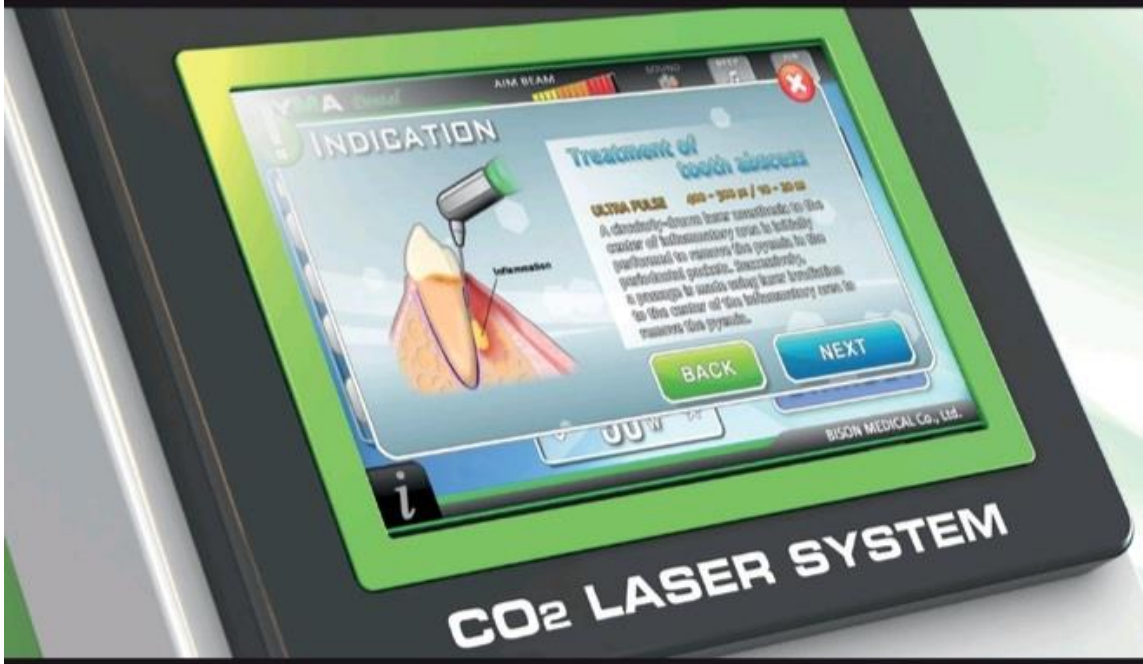


INDICATIONS

- Laser anesthesia
- Lingual frenectomy
- Fluoride application & tooth bleaching
- Cervical hypersensitivity
- Occlusal hypersensitivity
- Removal of tooth pigmentation
- Tooth canal irrigation
- Periodontal pocket irrigation
- Crown lengthening procedure
- Treatment of tooth abscess
- Gingival incision / gingivoplasty
- Pulp capping (disinfection / sterilization)
- Implant surgery
- Hemostasis after tooth extraction
- Herpetic stomatitis, etc.

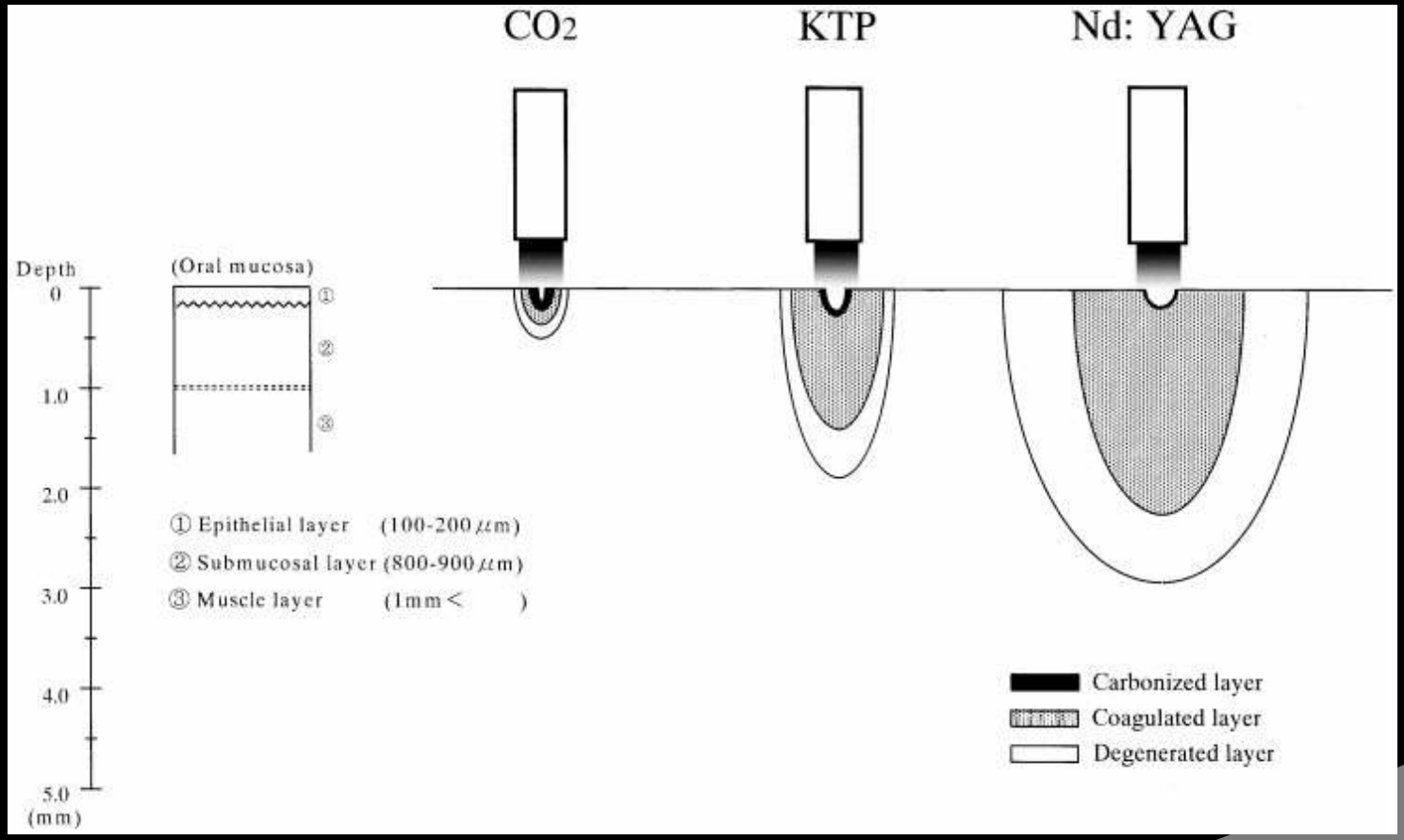
15 INDICATION MODES

ND-YAG Laser (Neodymium doped-Yttrium Aluminium Garnet)

- Mode: coagulation (>60˚c), central vaporisation
- Specification : 1064 nm wavelength

- Oral indications:
  - a. Coagulation of very vascular lesions or near major blood vessel
  - b. Excision in vascular areas such as posterior tongue
  - d. Gingivectomy
  - e. Frenectomy
- Disadvantages:
  - - Retina at risk
  - - Penetration could cause inadvertent spread
  - - Oedema more than CO2 laser

Comparison of The Lasers



Er Family of Lasers:

(Er:YAG and Er:YSGG)

- **Er:YAG (2940nm) laser is the best laser choice for hard dental tissue treatment due to the highest absorption in water and hydroxyapatite.**

- **Extremely high absorption in water results in effective microexplosion cutting mechanism .**

Preparation speed

- **The water content of the tissue plays a major role in the ablation process.**

Use of water spray elliminates thermal side effects

Brownish rims as thermal side effects

Clean edges without discoloration

Conclusion

Subject	Laser Surgery	Traditional Surgery
Anesthesia	No or mild	Yes
Bleeding	No or minimal	Yes depends on operating zone
Pain	Slight irritation	Sedation depended
Time	Less time	Time consuming
Suturing	No need	Yes in invasive procedures
Cost	Expensive	Less expensive
Postoperative complications	Minimal	More

Thank You.