World Clinical Laser Institute

Practical All-Tissue Laser Assisted Dentistry

141st SCDA Annual Session

May 1st, 2010

Embassy Suites Hotel Kingston Plantation

Myrtle Beach, SC

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Professional Disclosure

I am not an employee nor do I own stock in any company or product mentioned in this presentation. I am paid per diem for presenting informational programs by Biolase Technology or an honorarium by meeting sponsors. Treatment photos are authentic and not altered to misrepresent treatment results. I am national chair of PACE for the Academy of General Dentistry.

prac·ti·cal (pr k t -k l)
adj.
1. Of, relating to, governed by, or acquired through practice or action, rather than theory, speculation, or ideals: *gained practical experience of sailing as a deck hand.*
2. Manifested in or involving practice: *practical applications of calculus.*
3. Actually engaged in a specified occupation or a certain kind of work; practicing.
4. Capable of being used or put into effect; useful: *practical knowledge of Japanese.* See Usage Note at practicable.
5. Intended to serve a purpose without elaboration: *practical low-heeled shoes.*
6. Concerned with the production or operation of something useful: *Woodworking is a practical art.*
7. Level-headed, efficient, and unspeculative.
8. Being actually so in almost every respect; virtual: *a practical disaster.*

History of Laser Dentistry

History of Laser Dentistry

L ight

A mplification by

S timulated

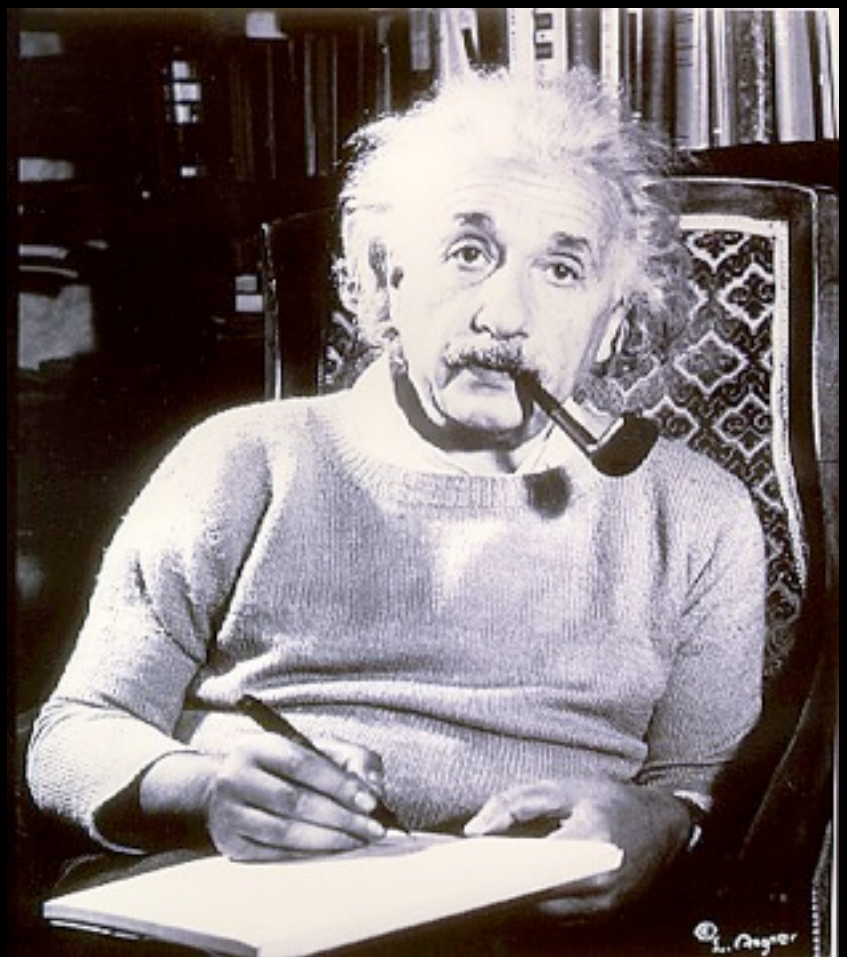
E mission of

R adiation

History of Laser Dentistry

…Albert Einstein

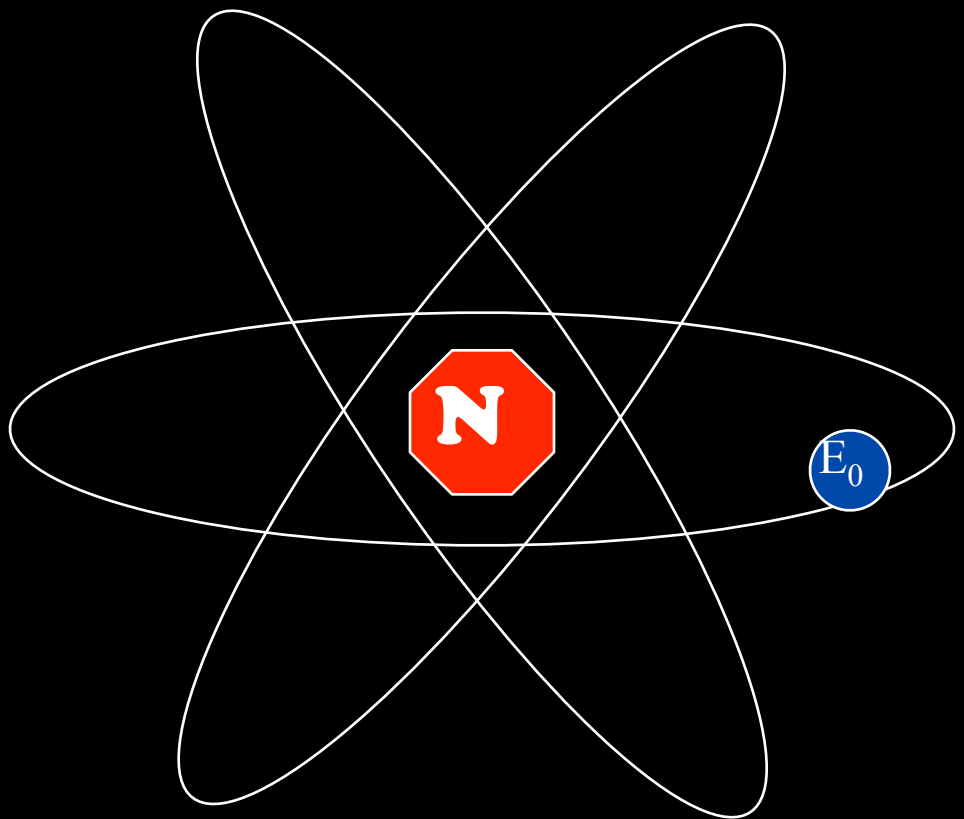
In 1916 he developed the theory of stimulated emission of radiation. This was possible because of the work of Niels Bohr…



Tuesday, April 6, 2010

Bohr's Model

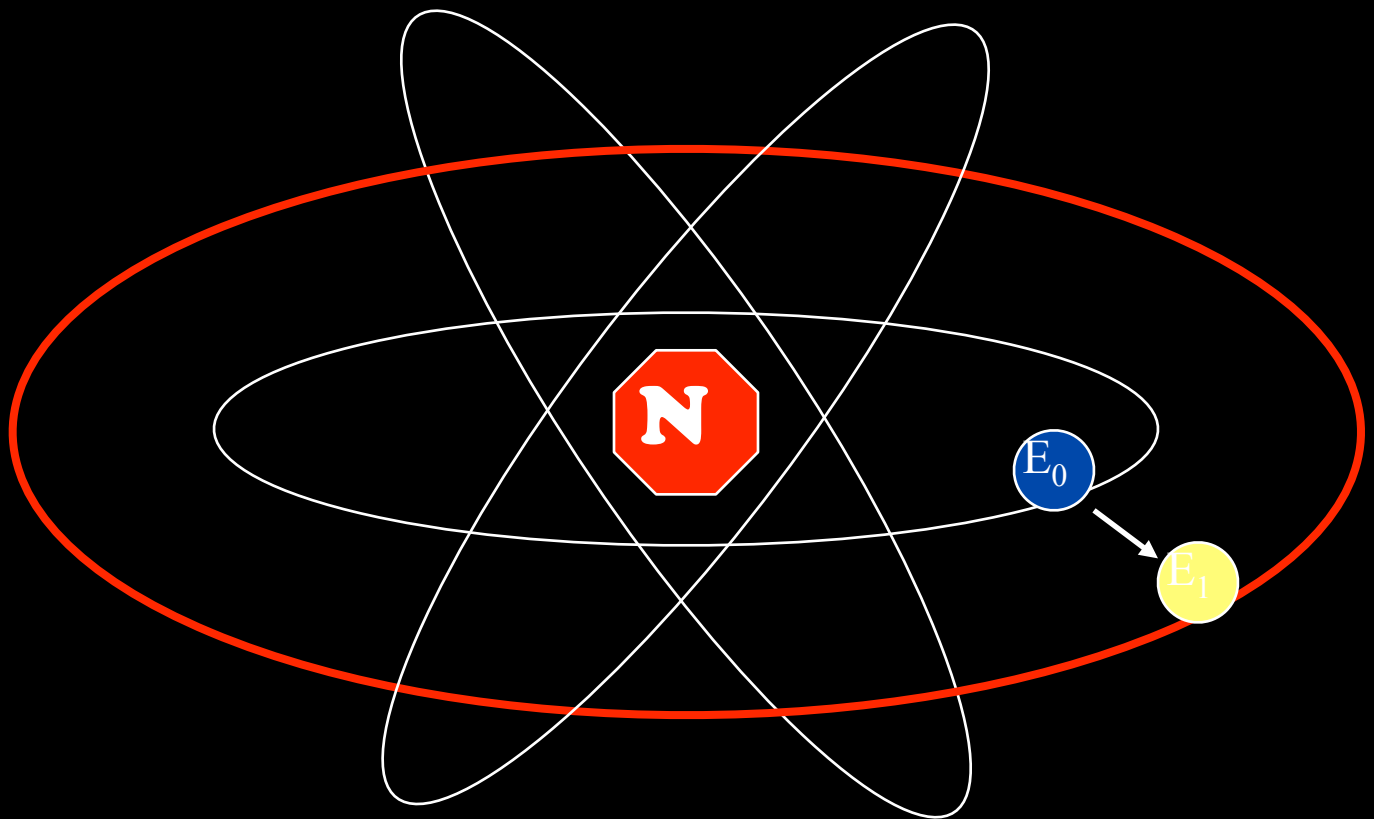
Electrons have separate energy levels, E_0 and E_1.



A quantum of energy can be gained or lost by the atom, and there will be movement from one level to another. The atom prefers the stable, normal state of E_0. This is the model of spontaneous emission.

Bohr's Model

Electrons have separate energy levels, E_0 and E_1.



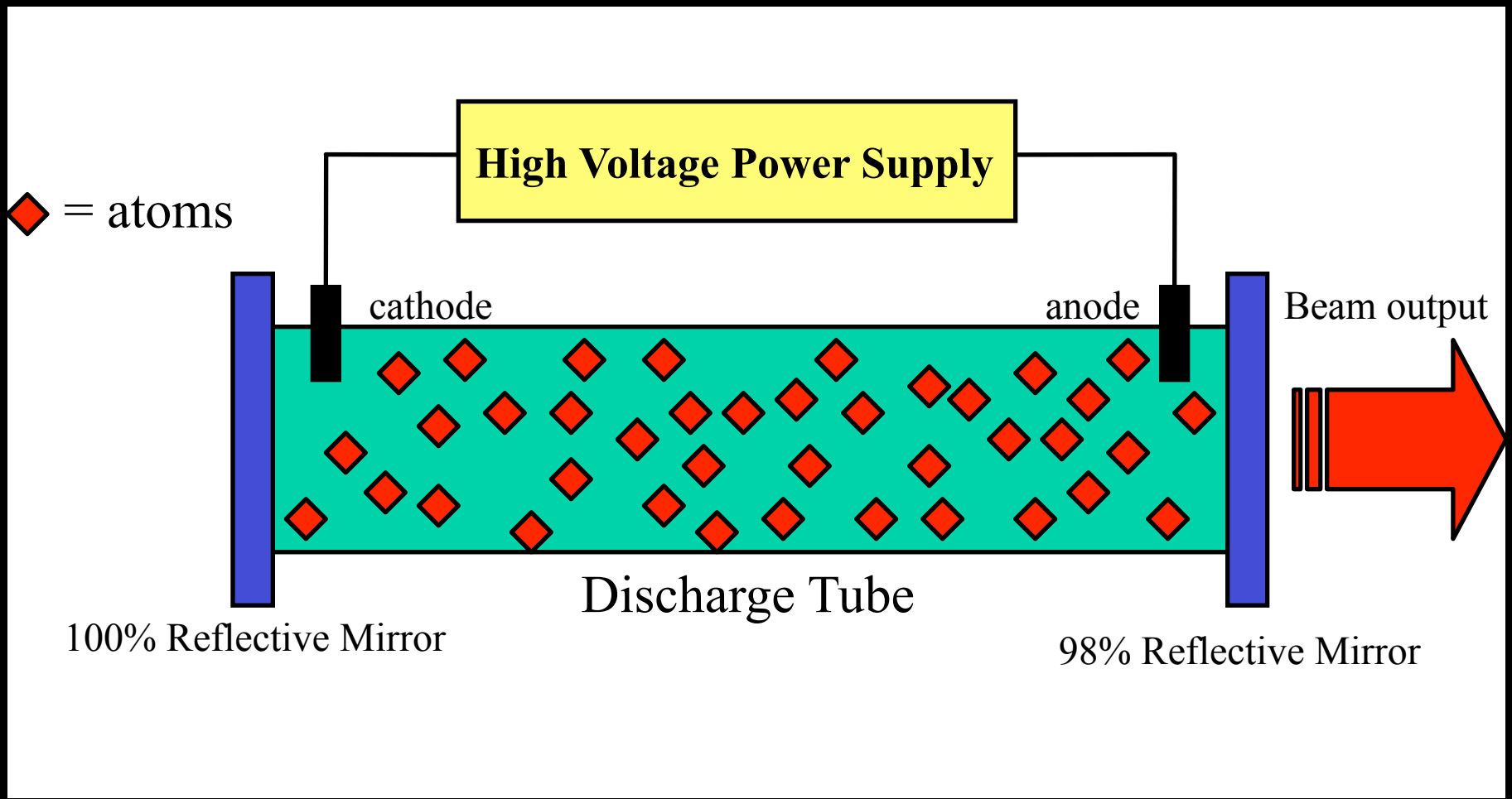
A quantum of energy can be gained or lost by the atom, and there will be movement from one level to another. The atom prefers the stable, normal state of E_0. This is the model of spontaneous emission.

Stimulated Emission

In stimulated emission, a power source is used to excite the already excited atoms to release stored energy. Here, the excited photon and the released photon stimulate two more excited atoms producing a chain reaction.

The end result is photons of identical wavelength traveling in the same direction as well as oscillating together in phase.

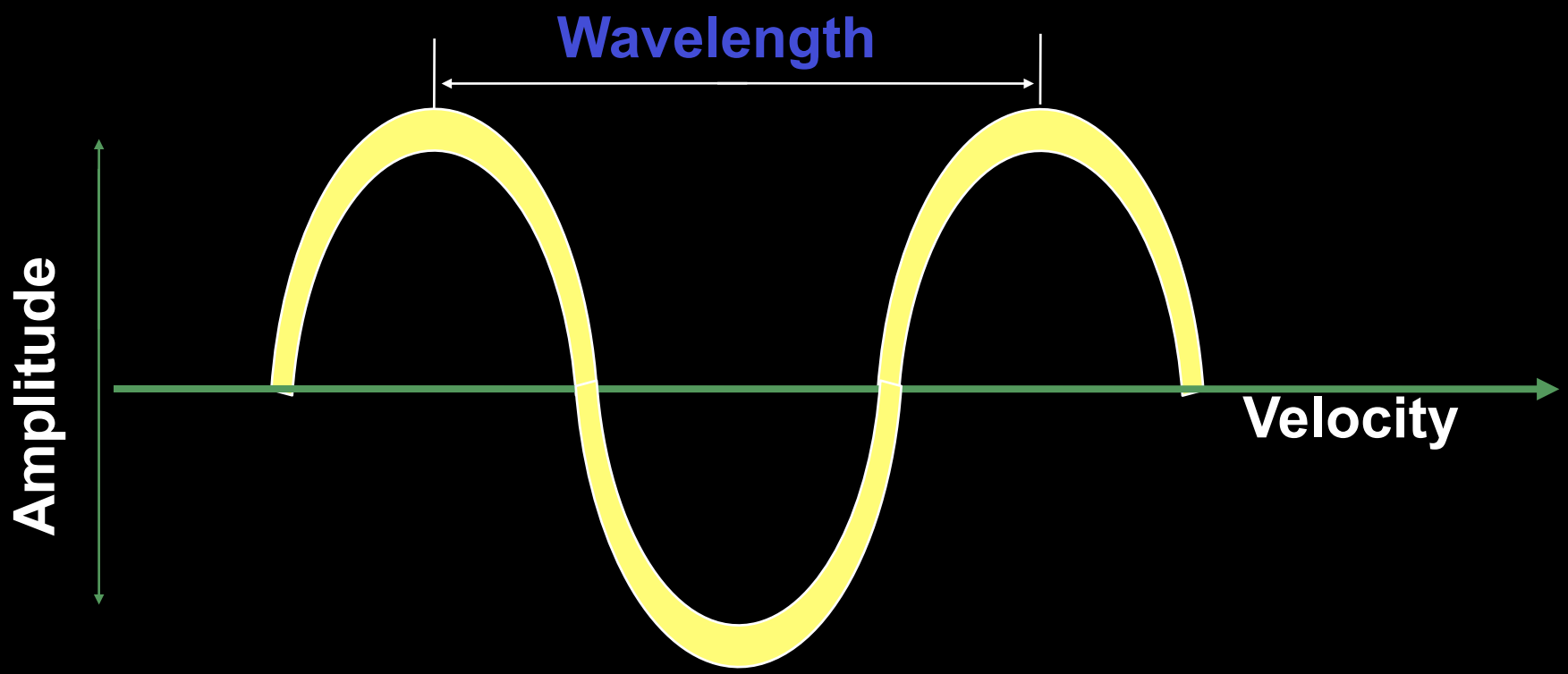
Laser Operation



Electromagnetic Waves

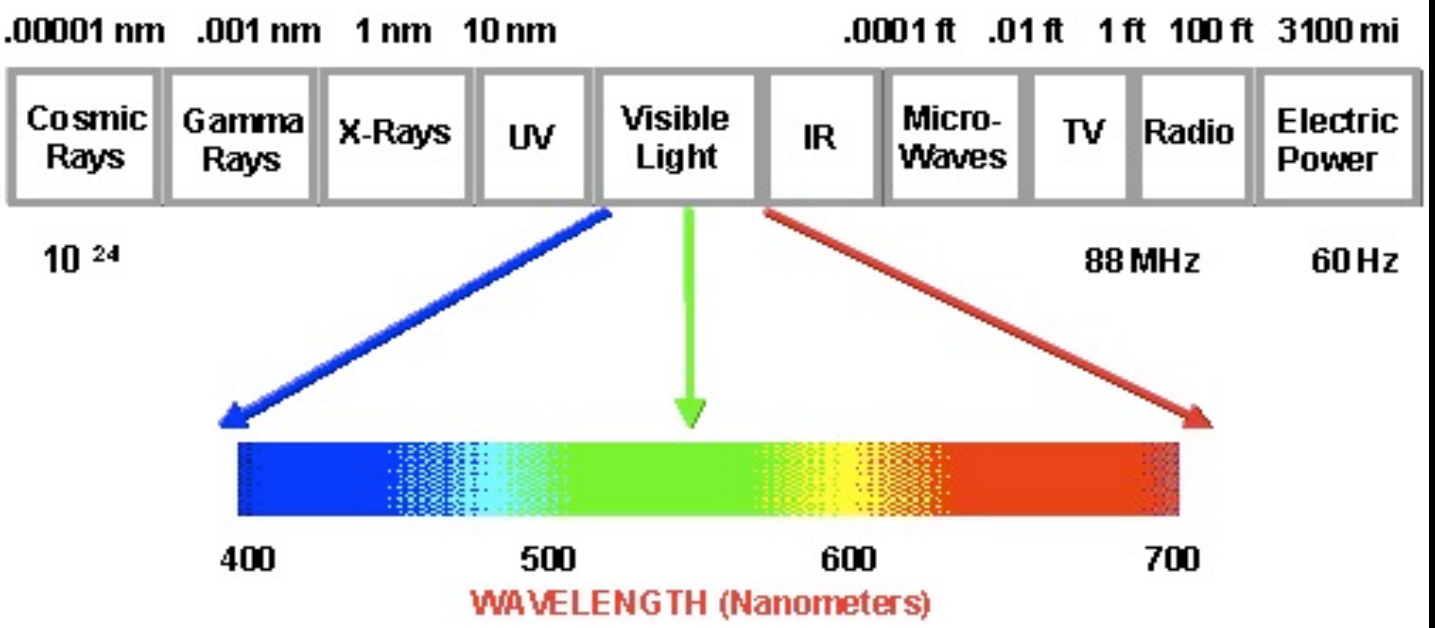
Frequency is the number of complete oscillations of the wave per second.

Electromagnetic Waves

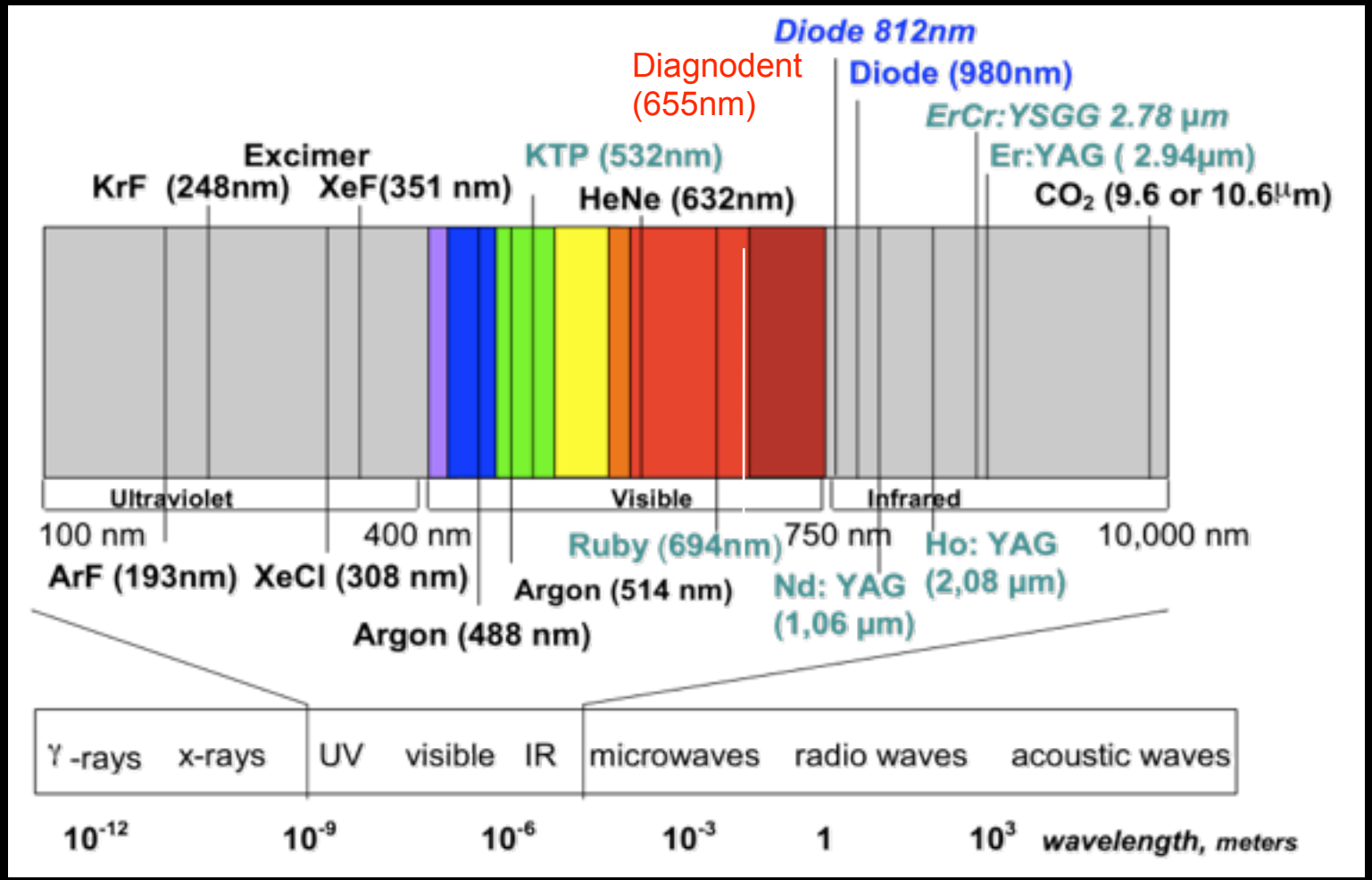


Frequency is the number of complete oscillations of the wave per second.

electromagnetic spectrum



Diagnodent
(655nm)


Diode 812nm
Diagnodent (655nm)
Diode (980nm)
ErCr:YSGG 2.78 µm
Er:YAG (2.94µm)
Excimer
KrF (248nm)
XeF(351 nm)
KTP (532nm)
HeNe (632nm)
CO2 (9.6 or 10.6µm)
Ultraviolet
Visible
Infrared
100 nm
400 nm
750 nm
10,000 nm
ArF (193nm)
XeCl (308 nm)
Argon (514 nm)
Ruby (694nm)
Nd: YAG (1,06 µm)
Ho: YAG (2,08 µm)
Argon (488 nm)
γ -rays
x-rays
UV
visible
IR
microwaves
radio waves
acoustic waves
10-12
10-9
10-6
10-3
1
103
wavelength, meters

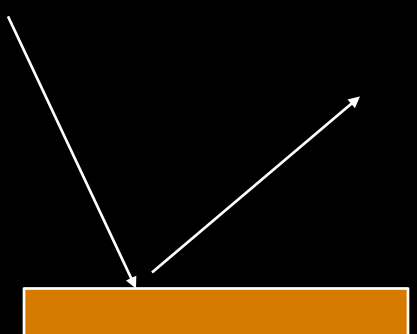
Laser-Tissue Interaction

- Reflection
- Absorption
- Transmission (Refraction)
- Scattering

Laser-Tissue Interaction

- Reflection

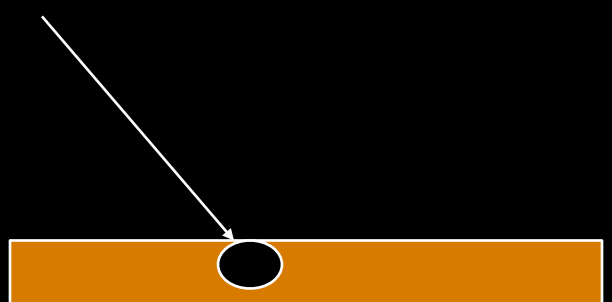
  Laser energy has no effect on tissue.



Laser-Tissue Interaction

- Absorption

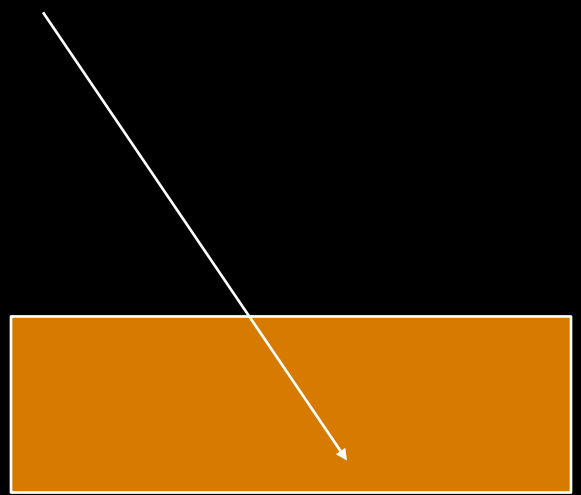
  Dependent on laser wavelength, tissue composition, pigmentation and water content.



Laser-Tissue Interaction

- Transmission (Refraction)

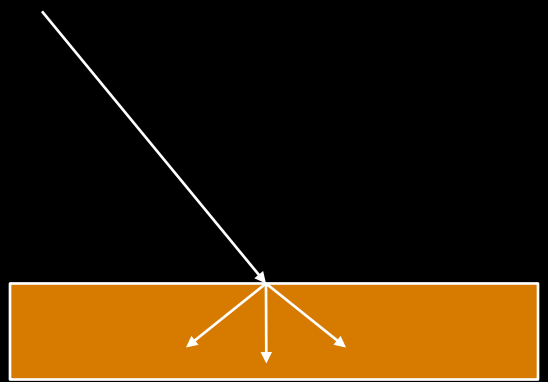
  Laser energy travels through tissue with no effect.



Laser-Tissue Interaction

- Scattering

  Dependent on wavelength, absorption may obscure effect.



Laser Energy Absorption Characteristics

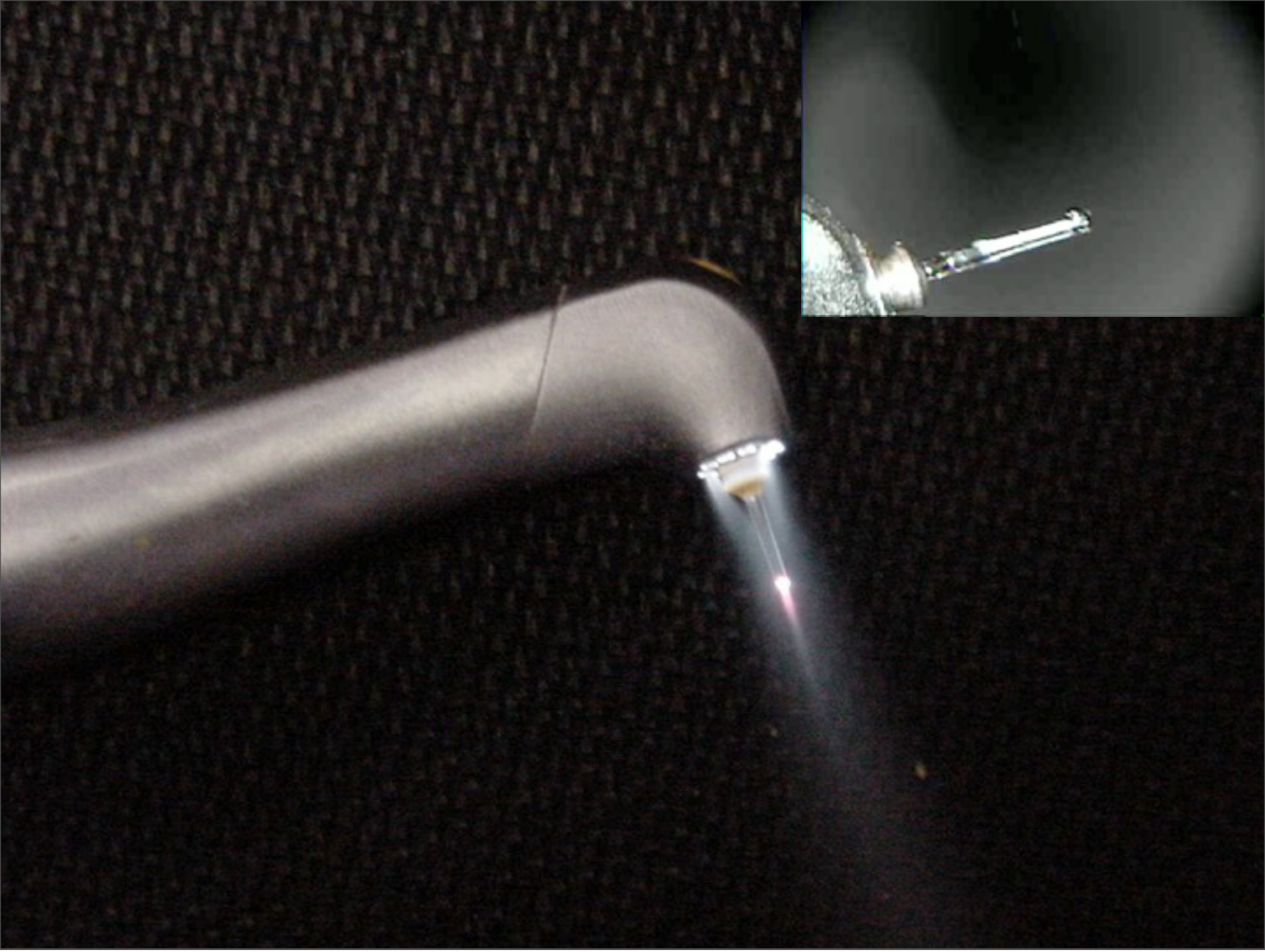
Absorption Characteristics of Dental Lasers:

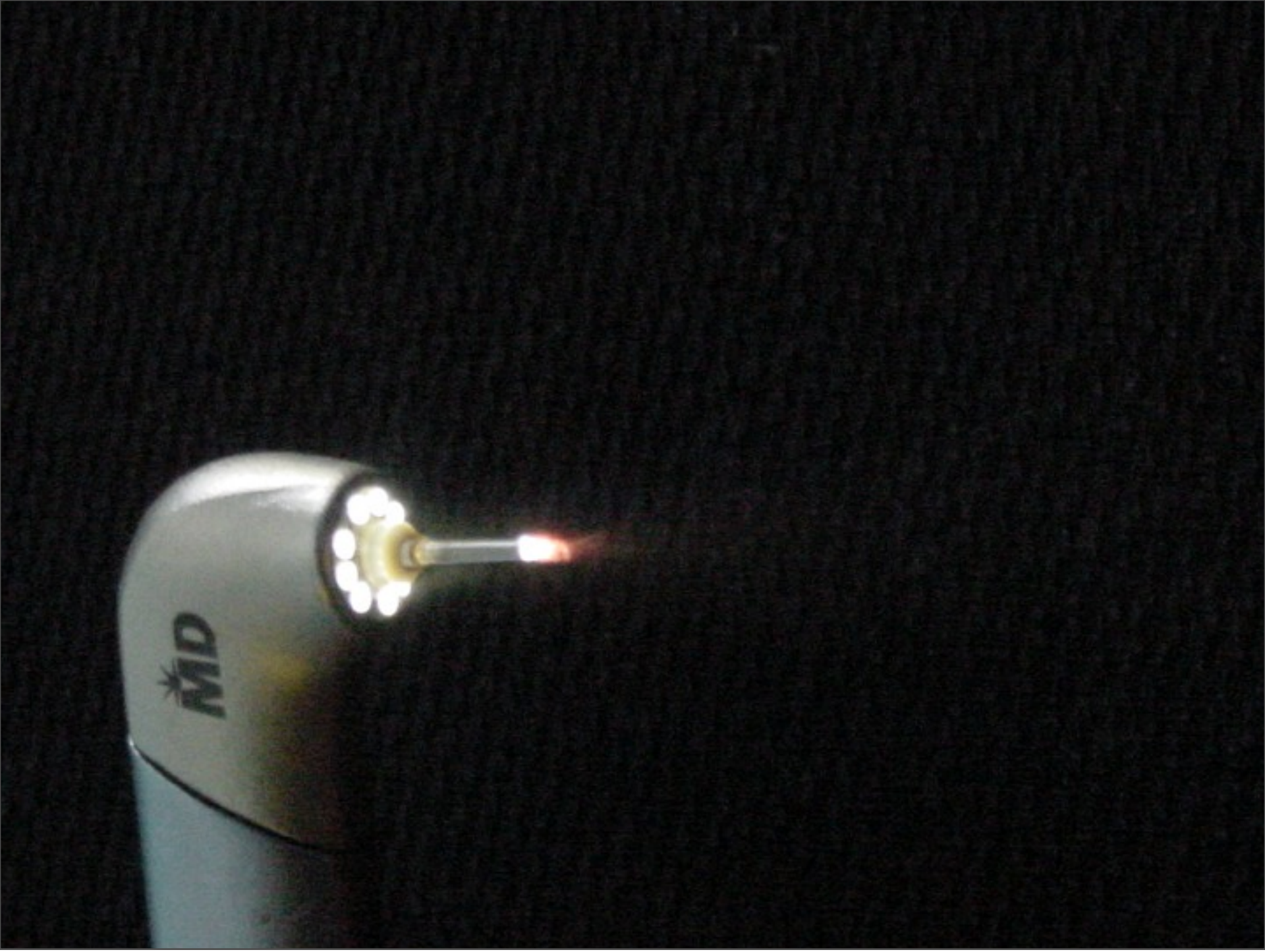
Alexandrite	377nm	Solid	Calculus
Argon	488-515nm	Gas	Hemoglobin, Melanin
HeNe	632 nm	Gas	Melanin
Diode	812-980 nm	Solid	Melanin, Water
Nd:YAG	1064 nm	Solid	Melanin, Water, Dentin
Ho:YAG	2120 nm	Solid	Water, Dentin
Erbium	2780-2940 nm	Solid	Water, Hydroxyapatite
CO2	*9.3, *9.6, 10.6 um	Gas	Hydroxyapatite, Water

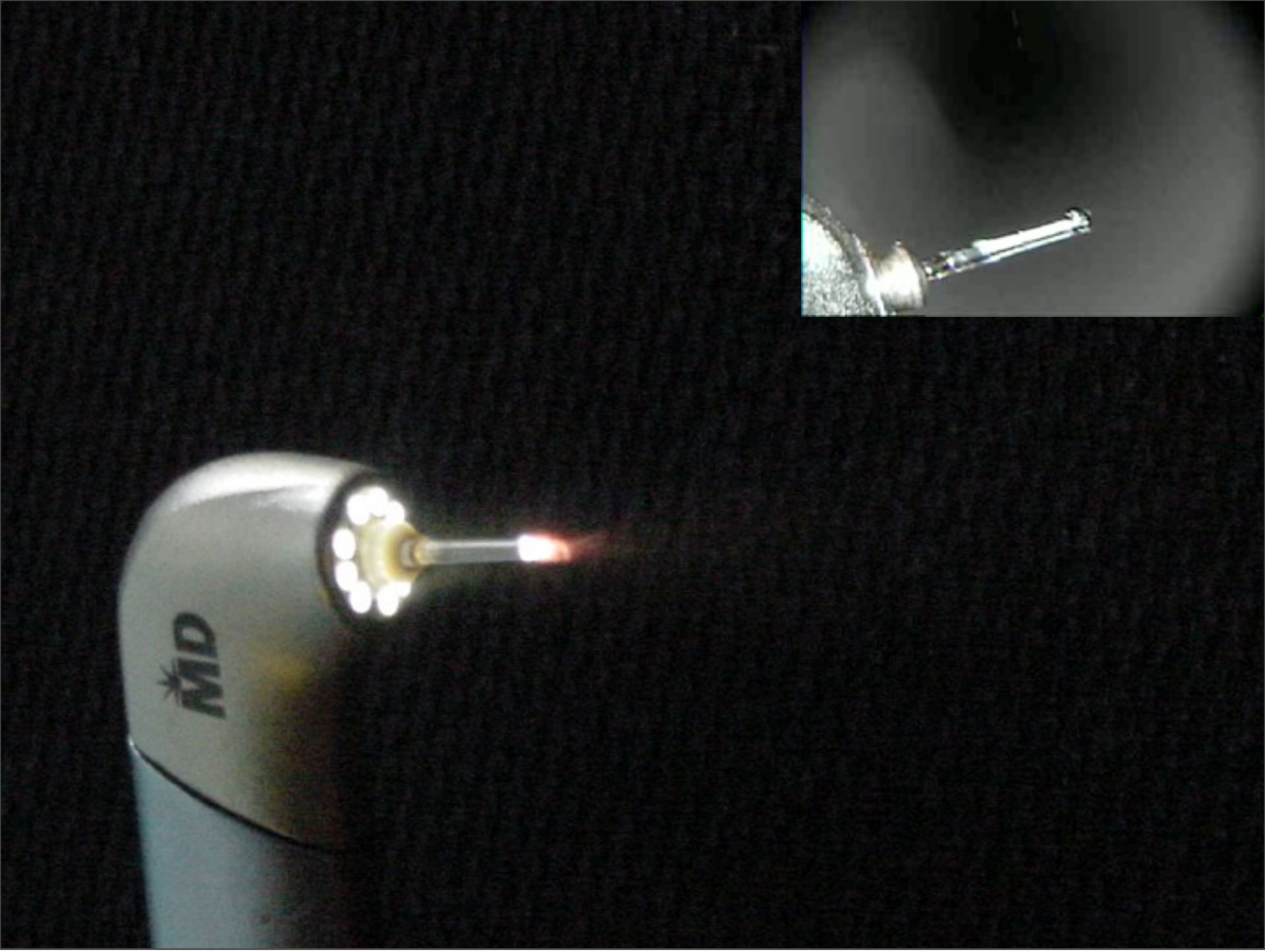
*not commercially available

YSGG
The All Tissue Laser

YSGG
The All Tissue Laser




MD


MD


YSGG

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The All Tissue Laser

YSGG
The All Tissue Laser

- Waterlase MD Technology

YSGG
The All Tissue Laser

- Waterlase MD Technology
  (HydroPhotonics)

YSGG
The All Tissue Laser

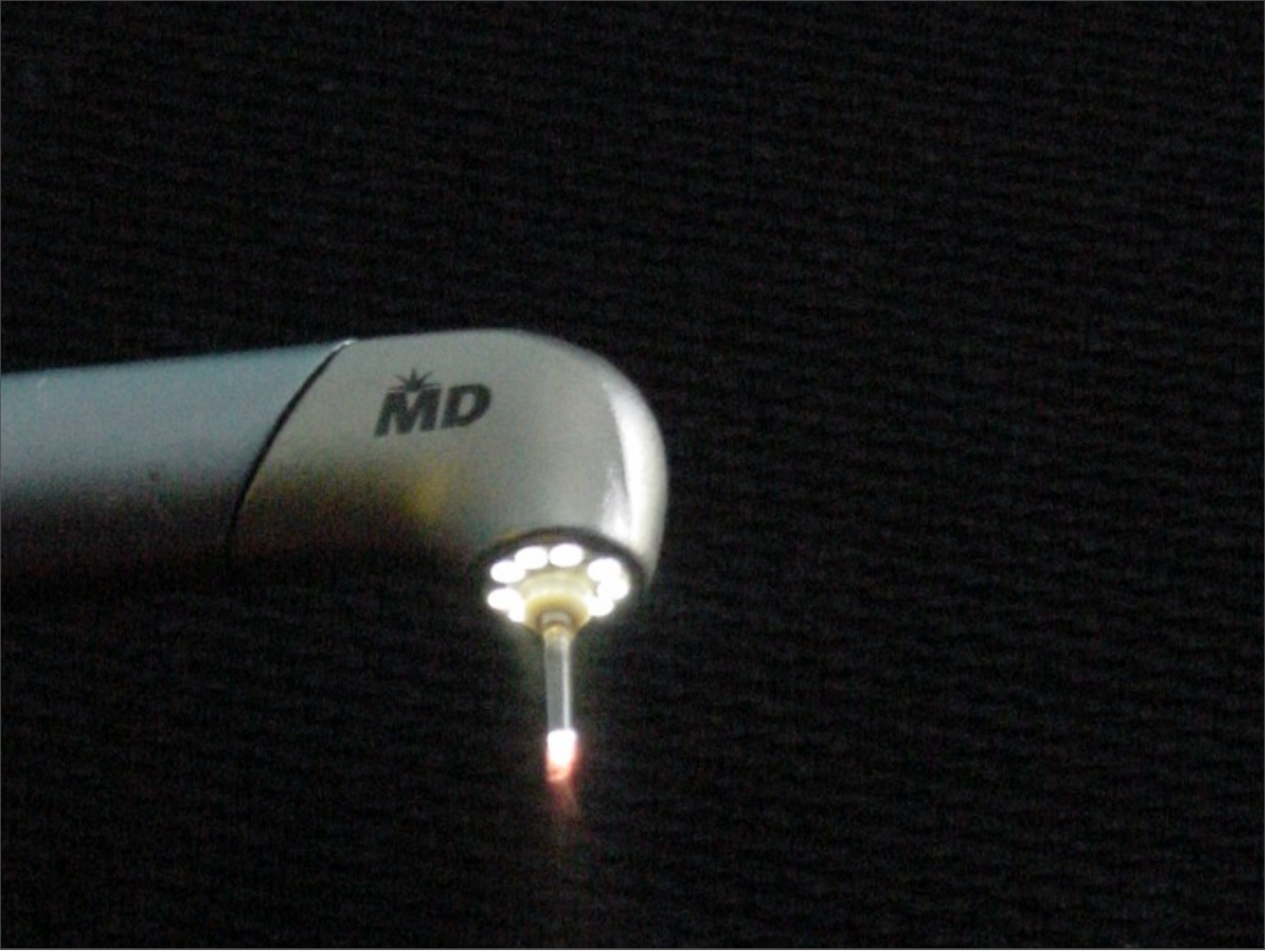
- Waterlase MD Technology
  (HydroPhotonics)

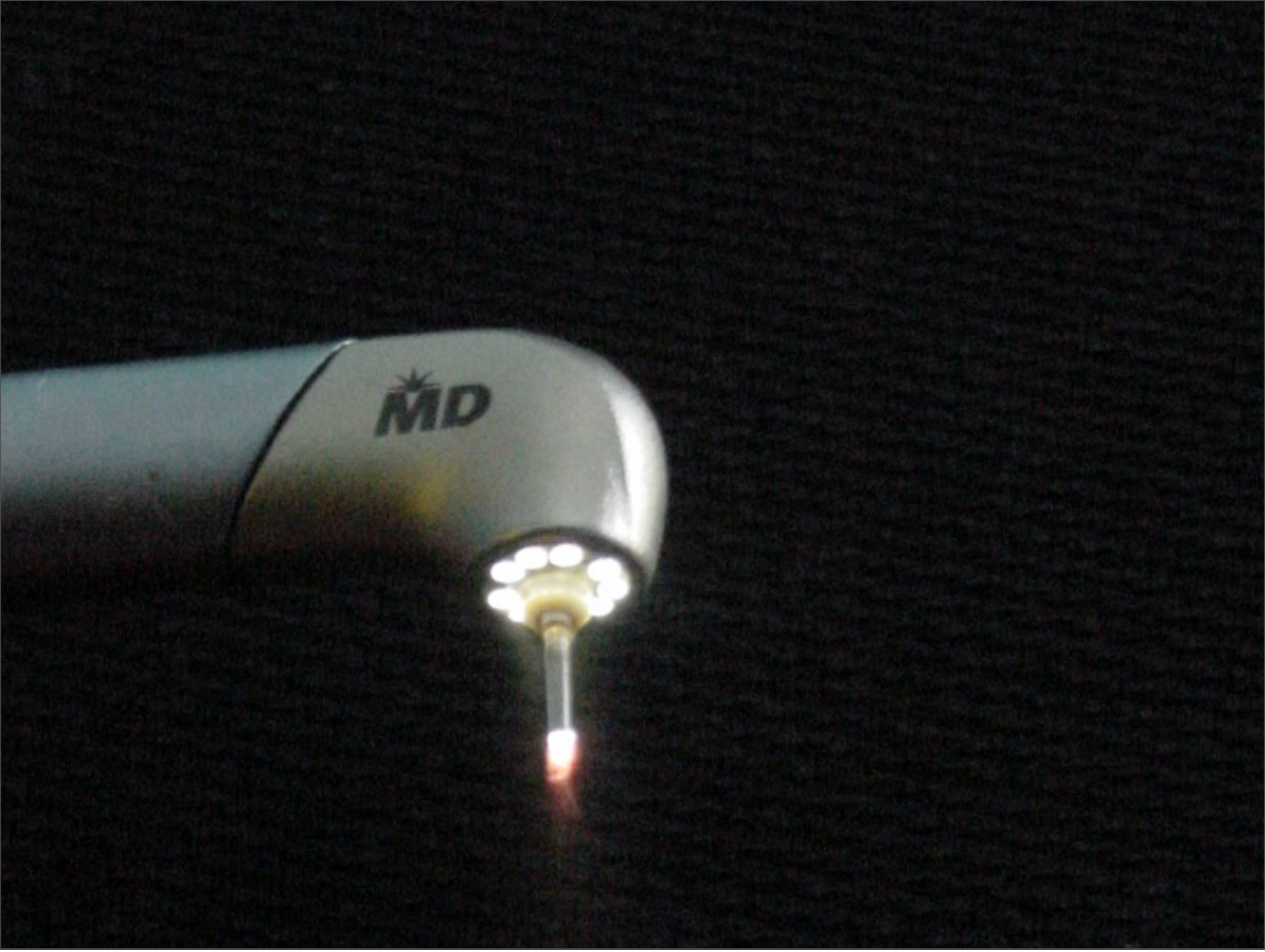
  Laser energy is absorbed by the atomized water particles creating a microexplosion or micropropulsion of the water molecules which is the mechanical cutting force on the target tissue.

YSGG
The All Tissue Laser

- Waterlase MD Technology
  (HydroPhotonics)

  Laser energy is absorbed by the atomized water particles creating a microexplosion or micropropulsion of the water molecules which is the mechanical cutting force on the target tissue.

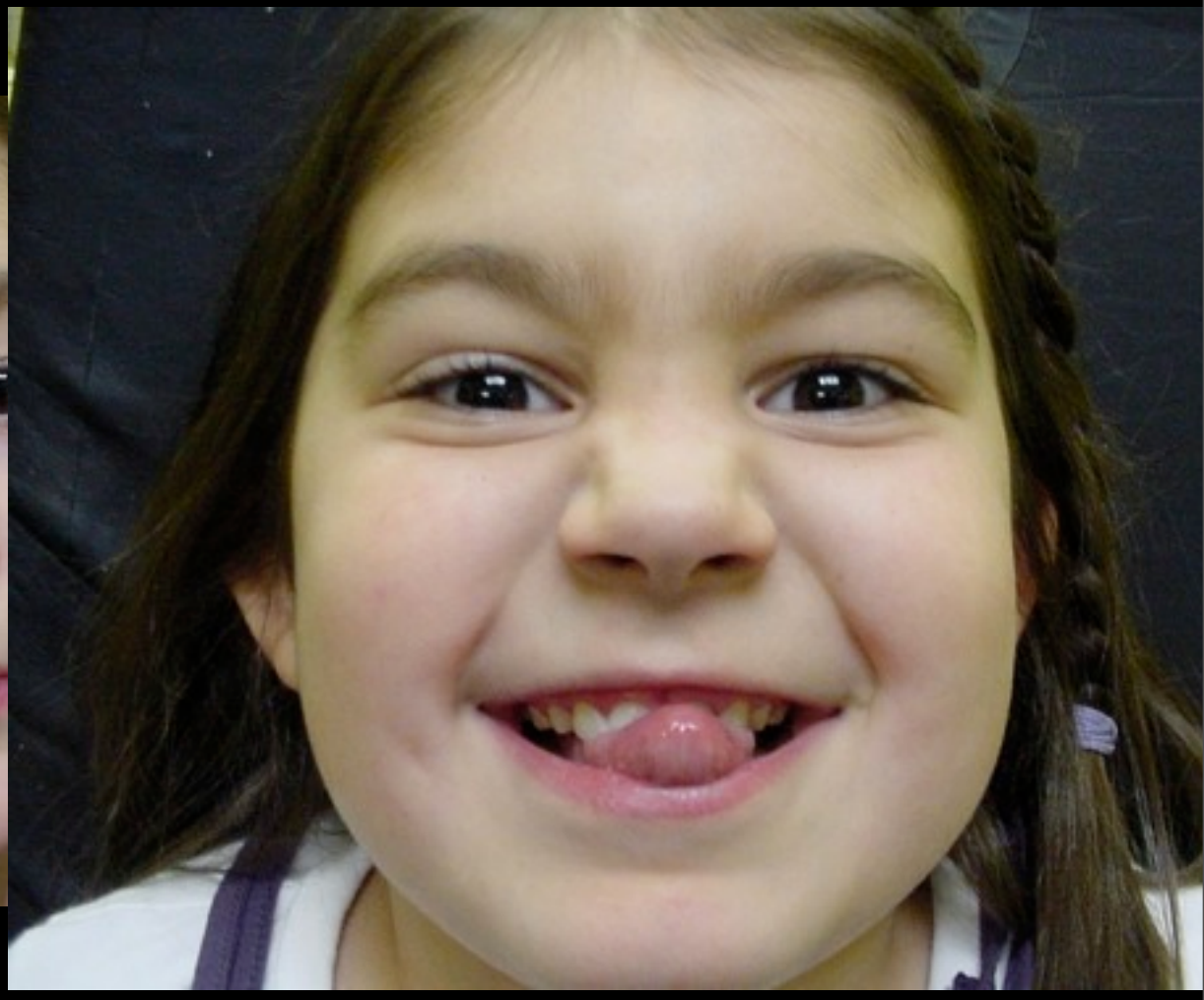

MD


MD

Aphthous Ulcer Treatment

Aphthous Ulcer Treatment

Aphthous Ulcer Treatment



immediate pain relief

no scarring

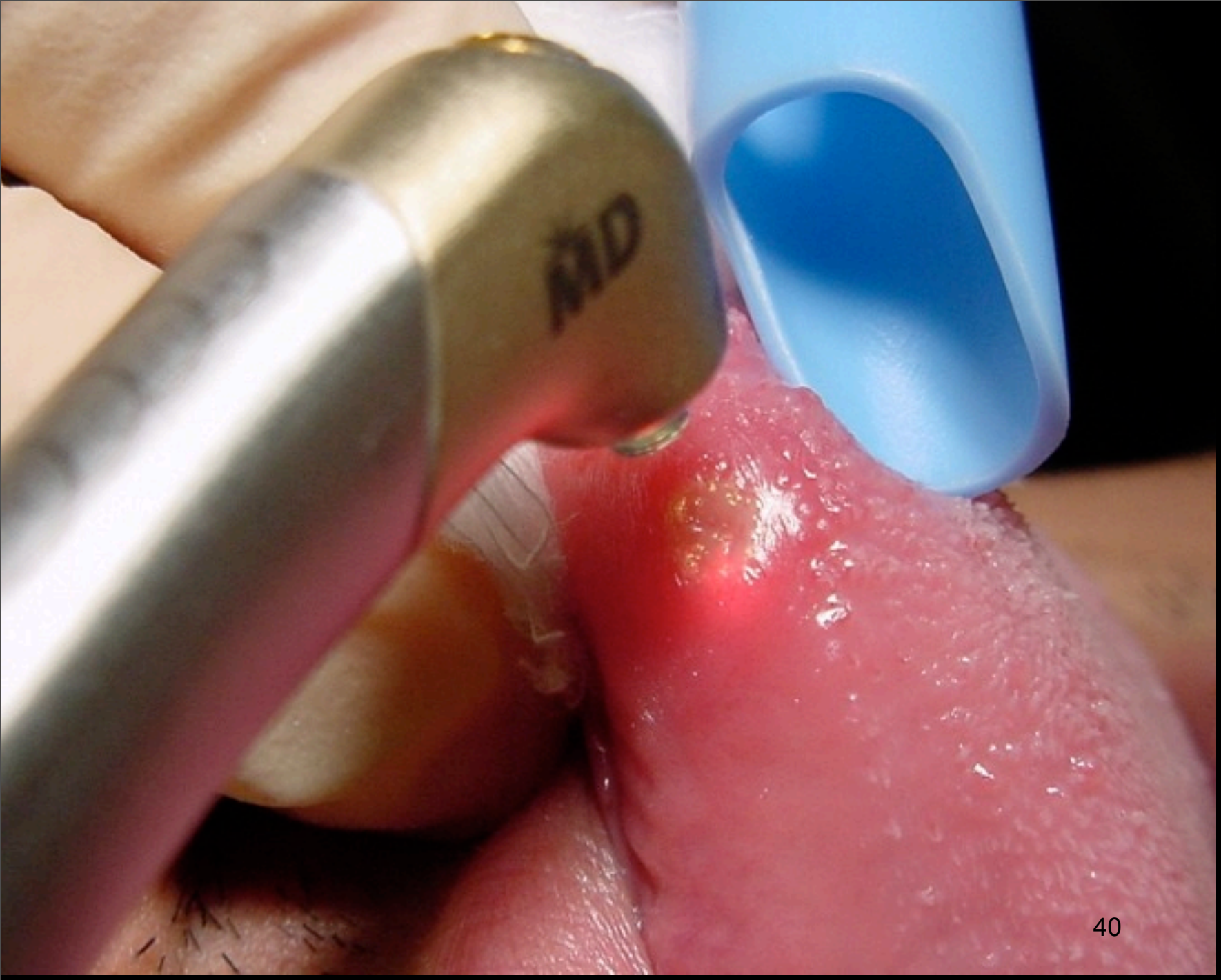
immediate pain relief

no scarring

Lesion Destruction 7465

ten days postop

ten days postop


AID

Oral Cancer

At risk profile:

1. Over 40
2. Tobacco
3. Alcohol

Oral Cancer

At risk profile:

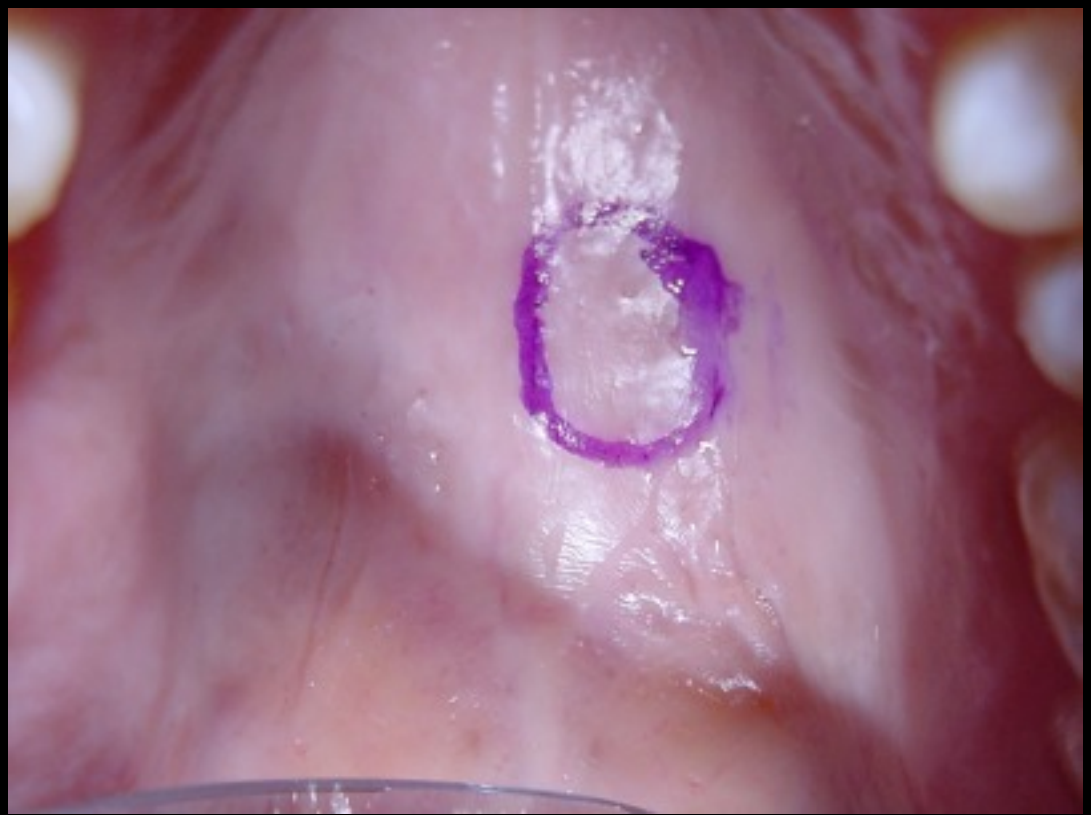
1. Over 40
2. Tobacco
3. Alcohol

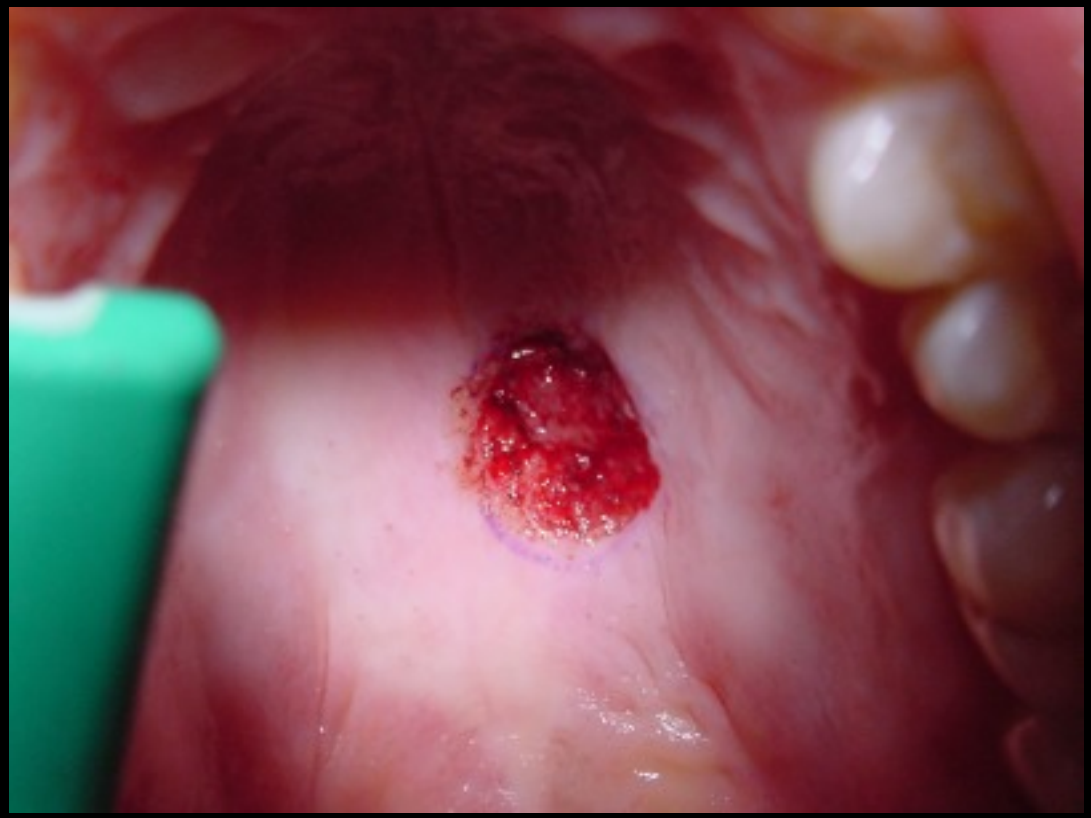
Highest growth rate is younger people: HPV-16 or 18

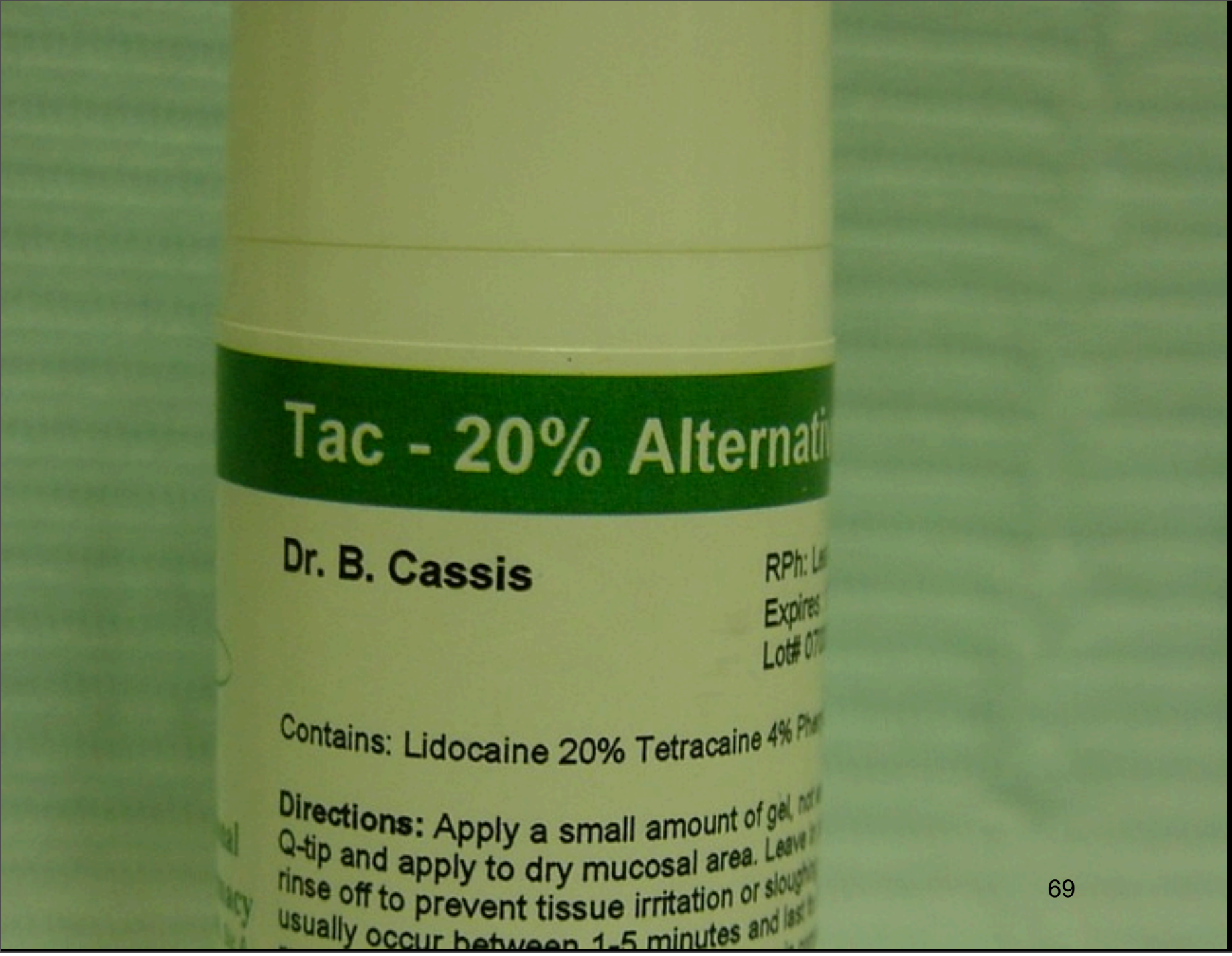

VELscope

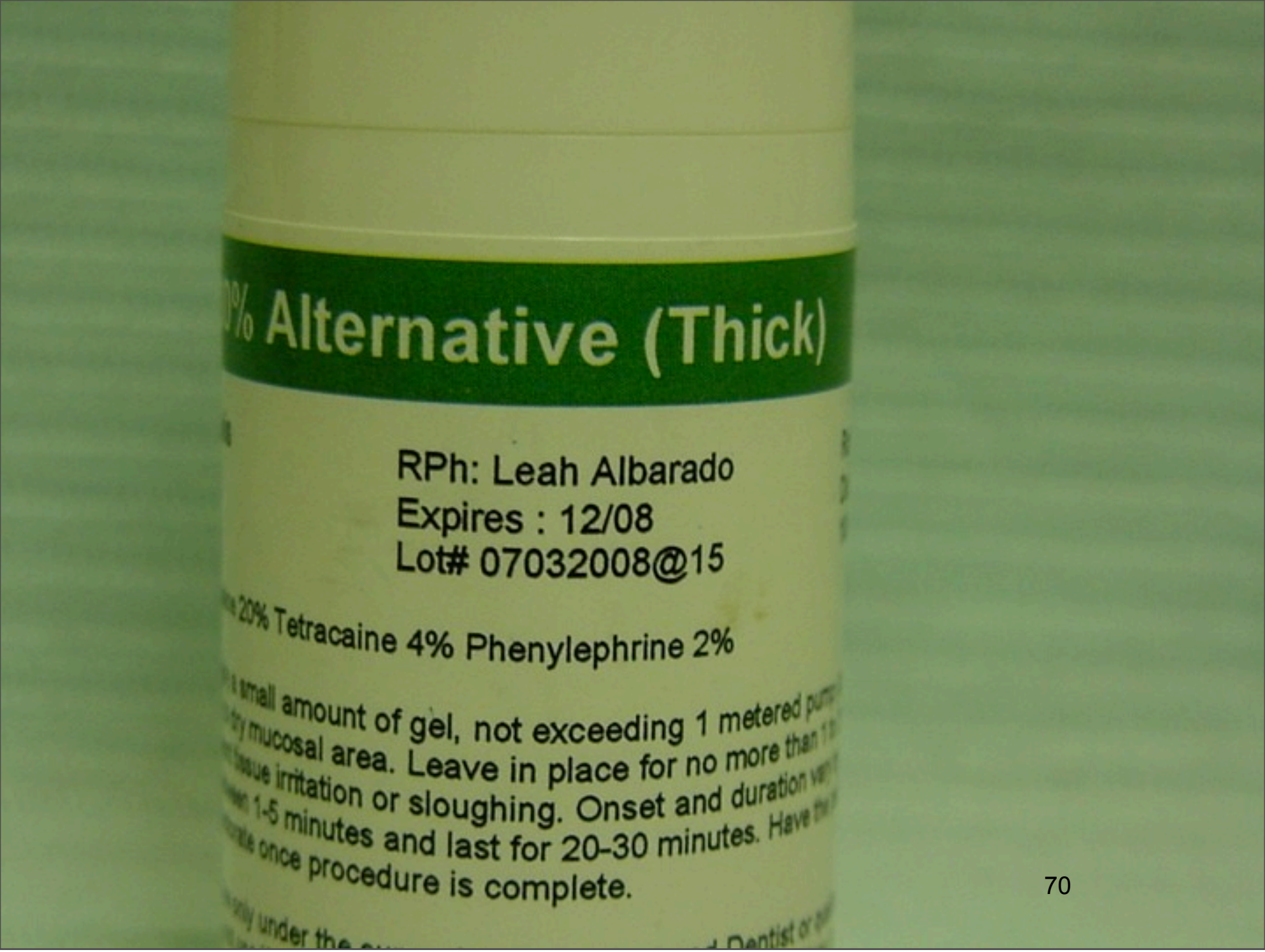
Velscope

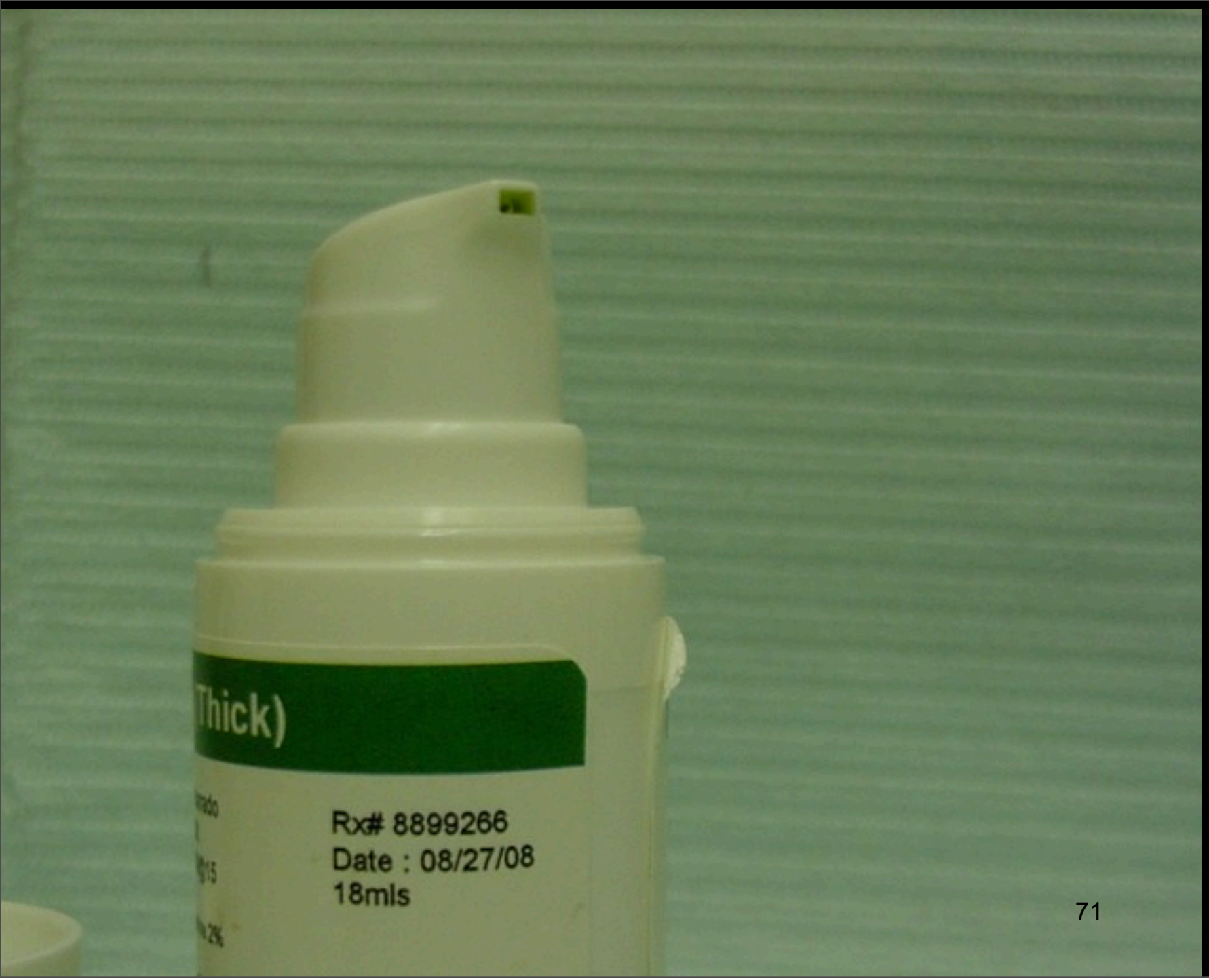
Velscope

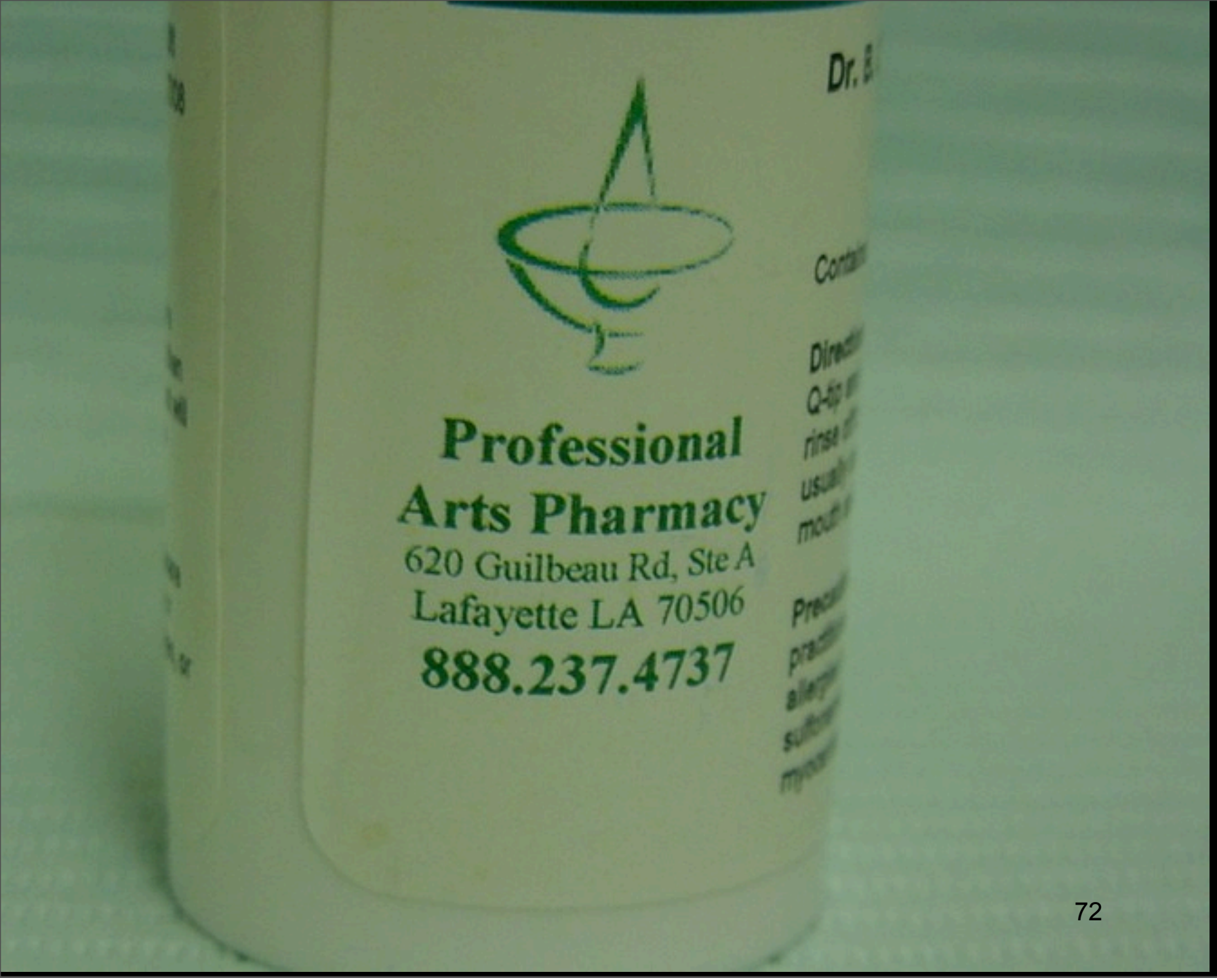





Tac - 20% Alternati
Dr. B. Cassis
RPh:
Expires
Lot#
Contains: Lidocaine 20% Tetracaine 4%
Directions: Apply a small amount of gel,
Q-tip and apply to dry mucosal area.
rinse off to prevent tissue irritation or
usually occur between 1-5 minutes and


% Alternative (Thick)
RPh: Leah Albarado
Expires : 12/08
Lot# 07032008@15
20% Tetracaine 4% Phenylephrine 2%
small amount of gel, not exceeding 1 metered
mucosal area. Leave in place for no more than
tissue irritation or sloughing. Onset and duration
1-5 minutes and last for 20-30 minutes. Have
once procedure is complete.


Thick)
Rx# 8899266
Date : 08/27/08
18mls


Professional
Arts Pharmacy
620 Guilbeau Rd, Ste A
Lafayette LA 70506
888.237.4737

gingivectomies


NDC 10223-0202-2
Cetacaine®
Topical Anesthetic
LIQUID
Control Pain


ve Only on
us Membrane
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1


NDC 10223-0202-2
Cetacaine
LIQUID
Control Pain
Mucous Membrane

Laser assisted diagnosis

Visual inspection and probing:

Visual inspection and probing:

58% accuracy

Visual inspection and probing:

58% accuracy

Bitewing radiographs:

Visual inspection and probing:

58% accuracy

Bitewing radiographs:

67% accuracy

Visual inspection and probing:

58% accuracy

Bitewing radiographs:

67% accuracy

Laser diagnostics:

Visual inspection and probing:

58% accuracy

Bitewing radiographs:

67% accuracy

Laser diagnostics:

90% plus accuracy

Visual inspection and probing:

58% accuracy

Bitewing radiographs:

67% accuracy

Laser diagnostics:

90% plus accuracy


KaVo DIAGNOdent
-6
94
MOMENT
PEAK
A
B
C

YSGG Pedolase

#S & T, preop

C & D laser preps

YSGG Pedolase

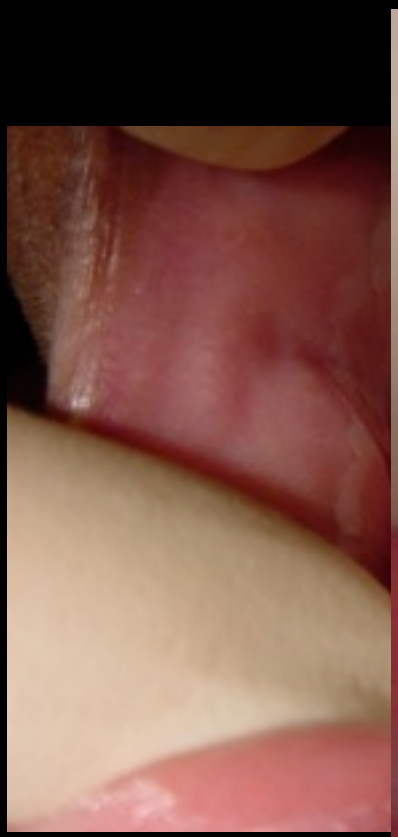
#S & T with Fuji IX

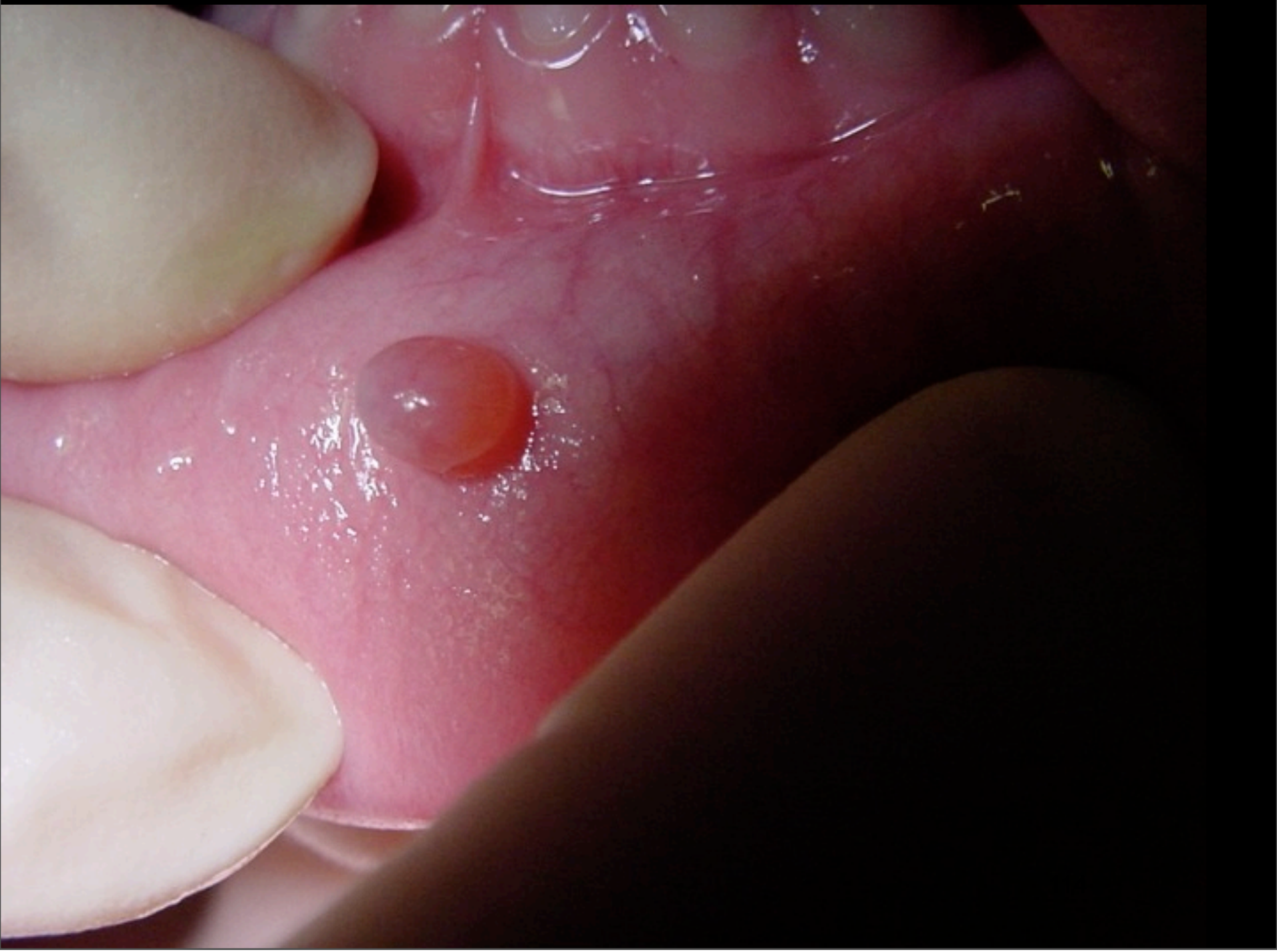
#C & D with resin

Turbo Pedolase

Turbo Pedolase

Turbo Pedolase






YSGG


YSGG


Prom

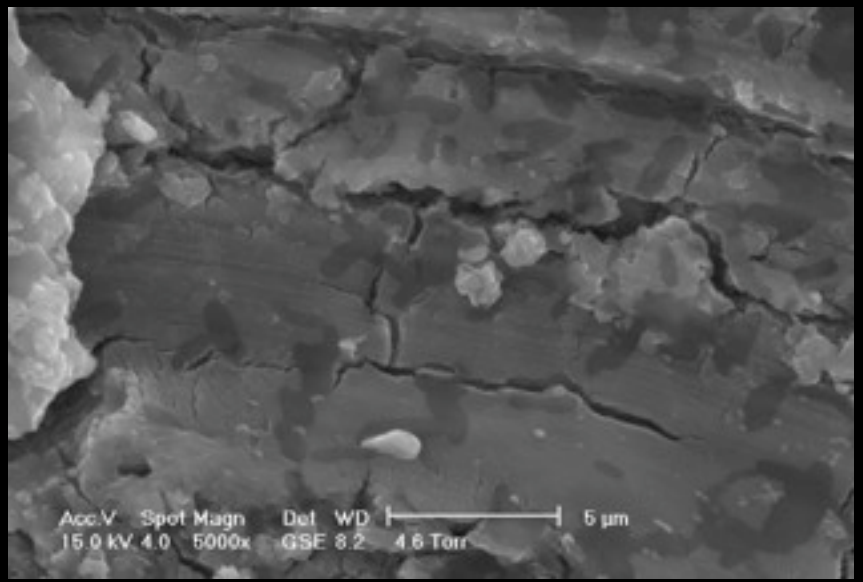
- Why lase restorable, bondable, cementable surfaces?

- Why lase restorable, bondable, cementable surfaces?

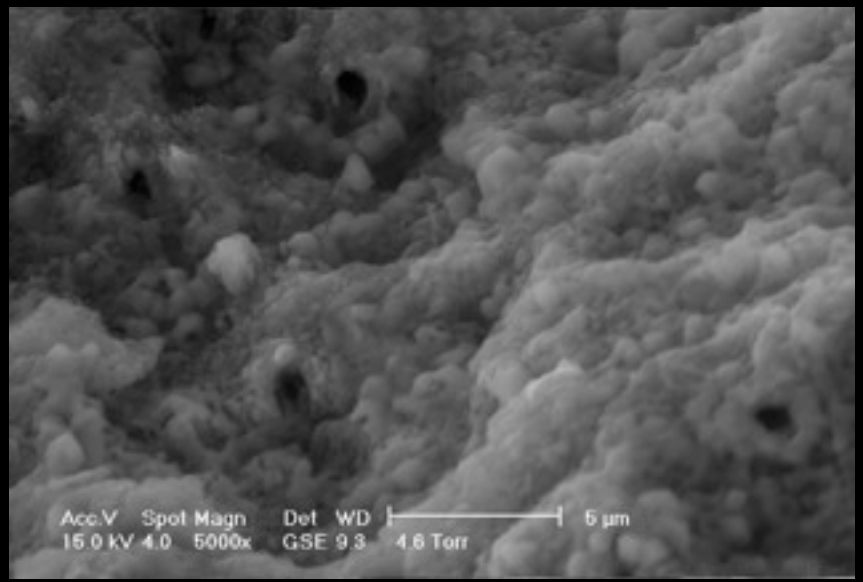
TO REMOVE THE SMEAR LAYER!

YSGG Restorative

Drill vs. YSGG
SEM Analysis



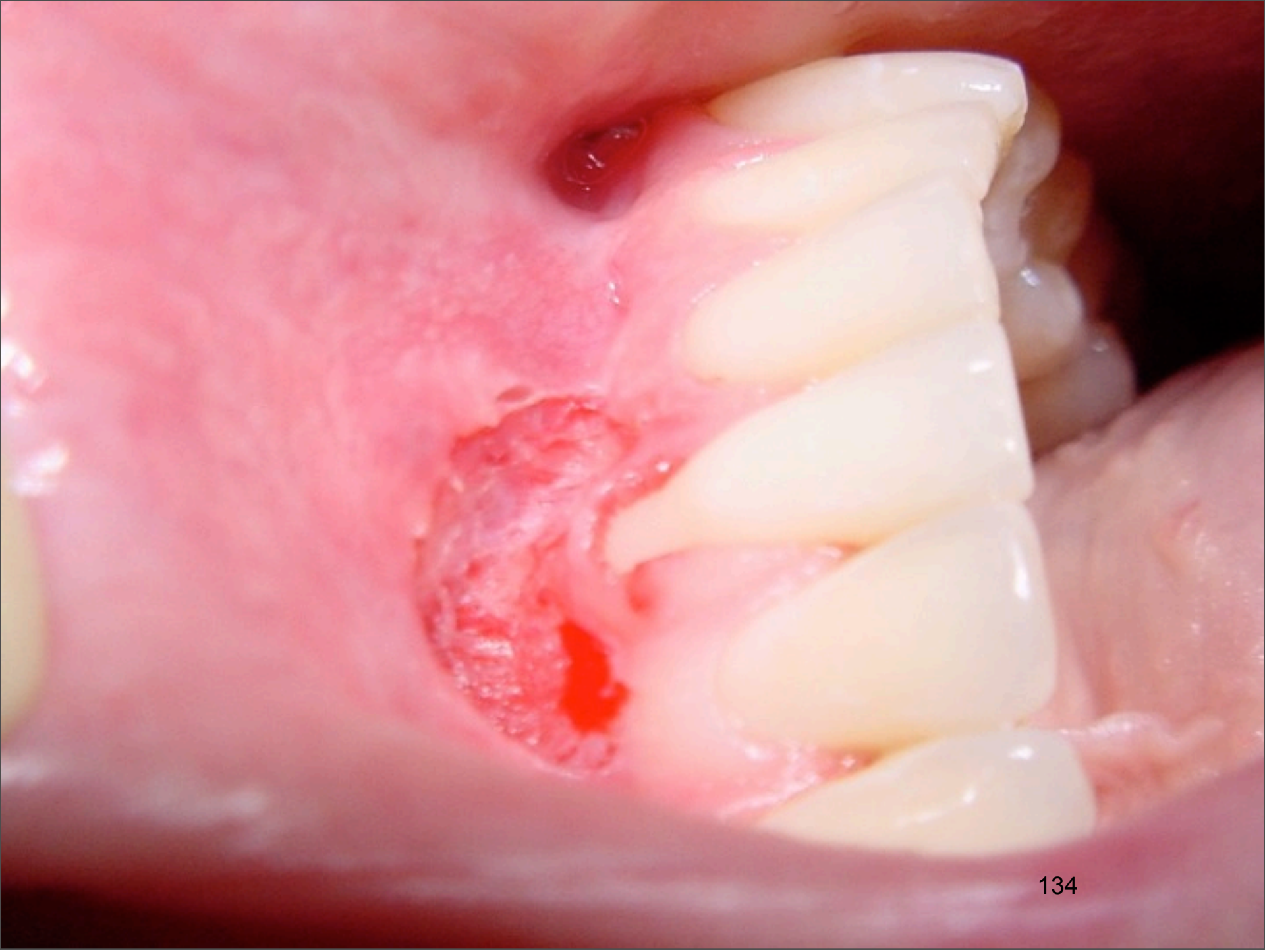
Drill – bottom of cut; x5000 mag. Microfractures reach about 1µm in width. Debris particles also left behind.

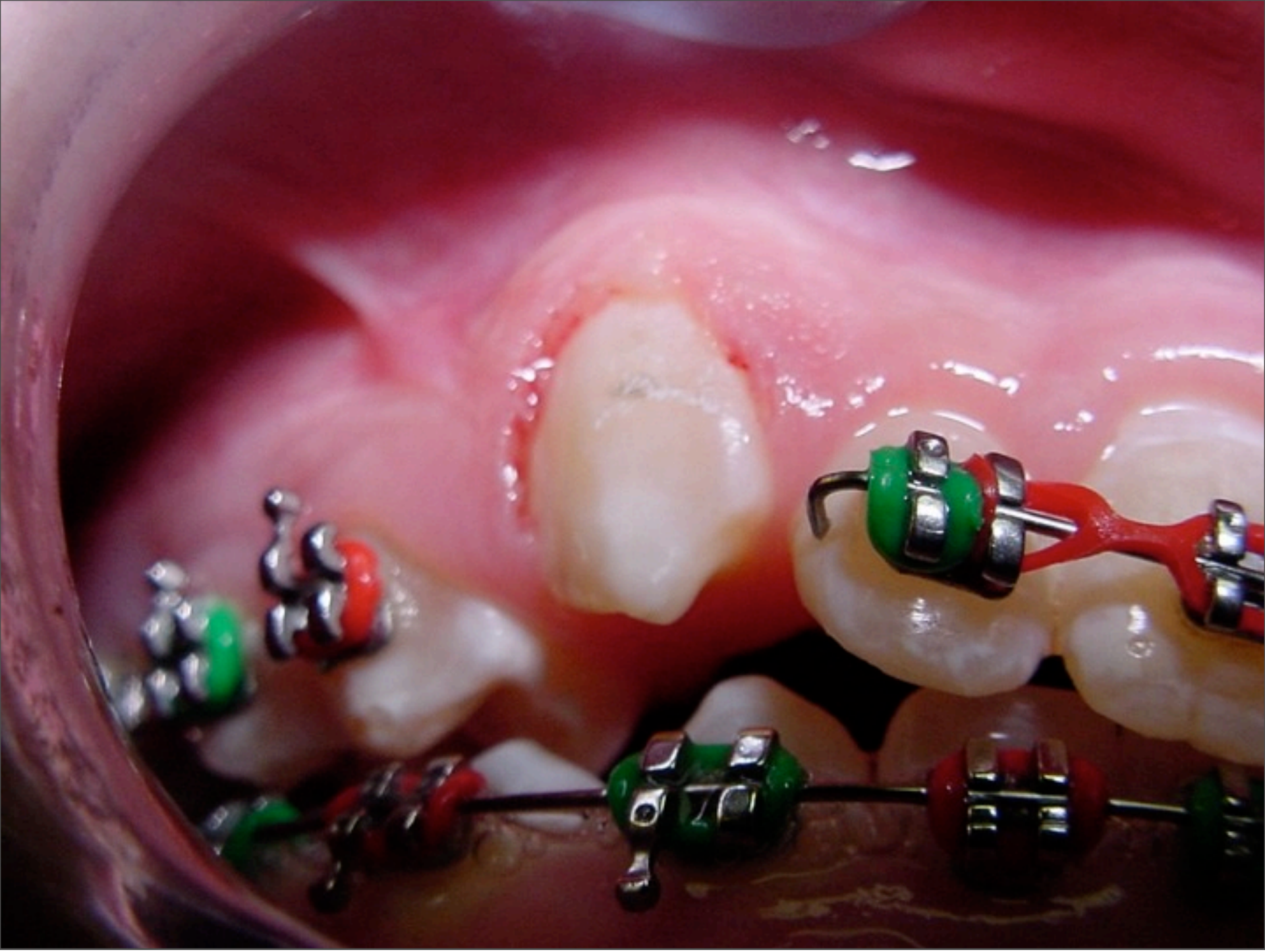


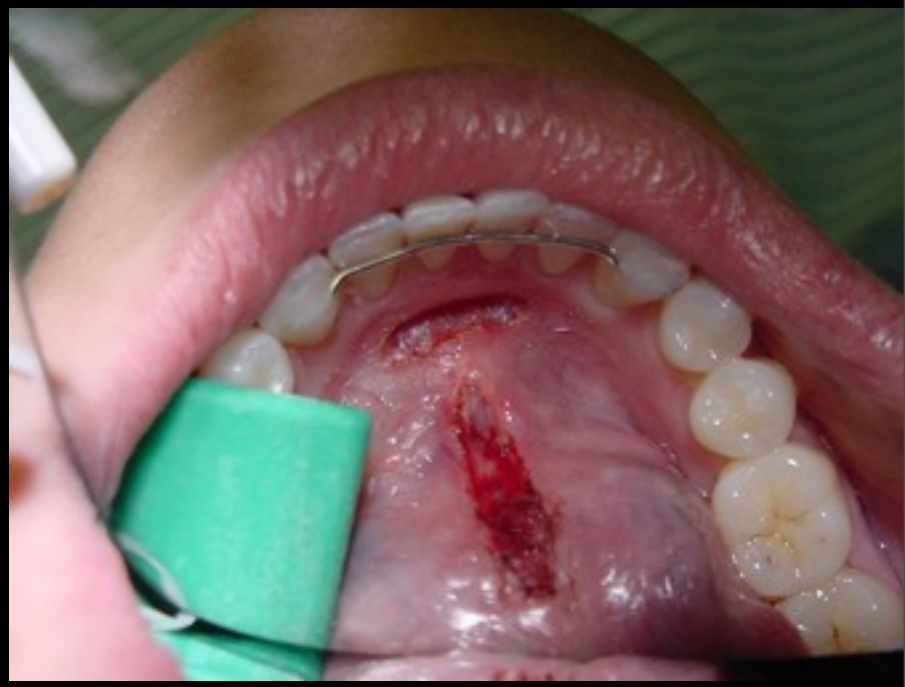
Waterlase – bottom of cut; x5000 mag. Open tubules with no microfractures. No smear layer.

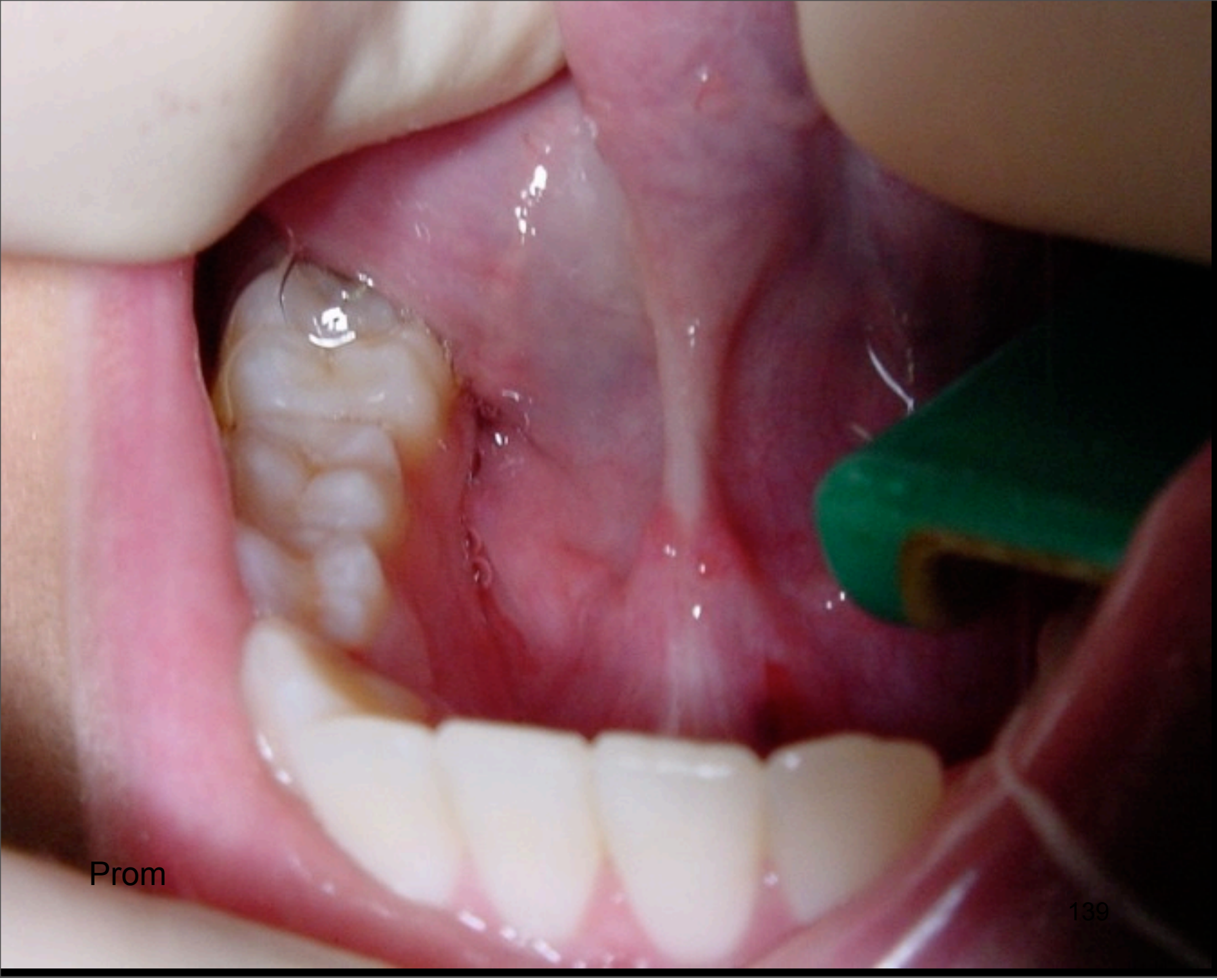
- Frenectomies

1. Soft tissue surgery at 1-1.5W, 4% water, 15% air, no contact, OR 1.25W, 8% water, 15% air, S mode.
2. Elliptical, diamond-shaped design.
3. Tincture of benzoin and myrrh.
4. Barrier, if required, to prevent tissue from adhering to itself, OR Scarring Technique.





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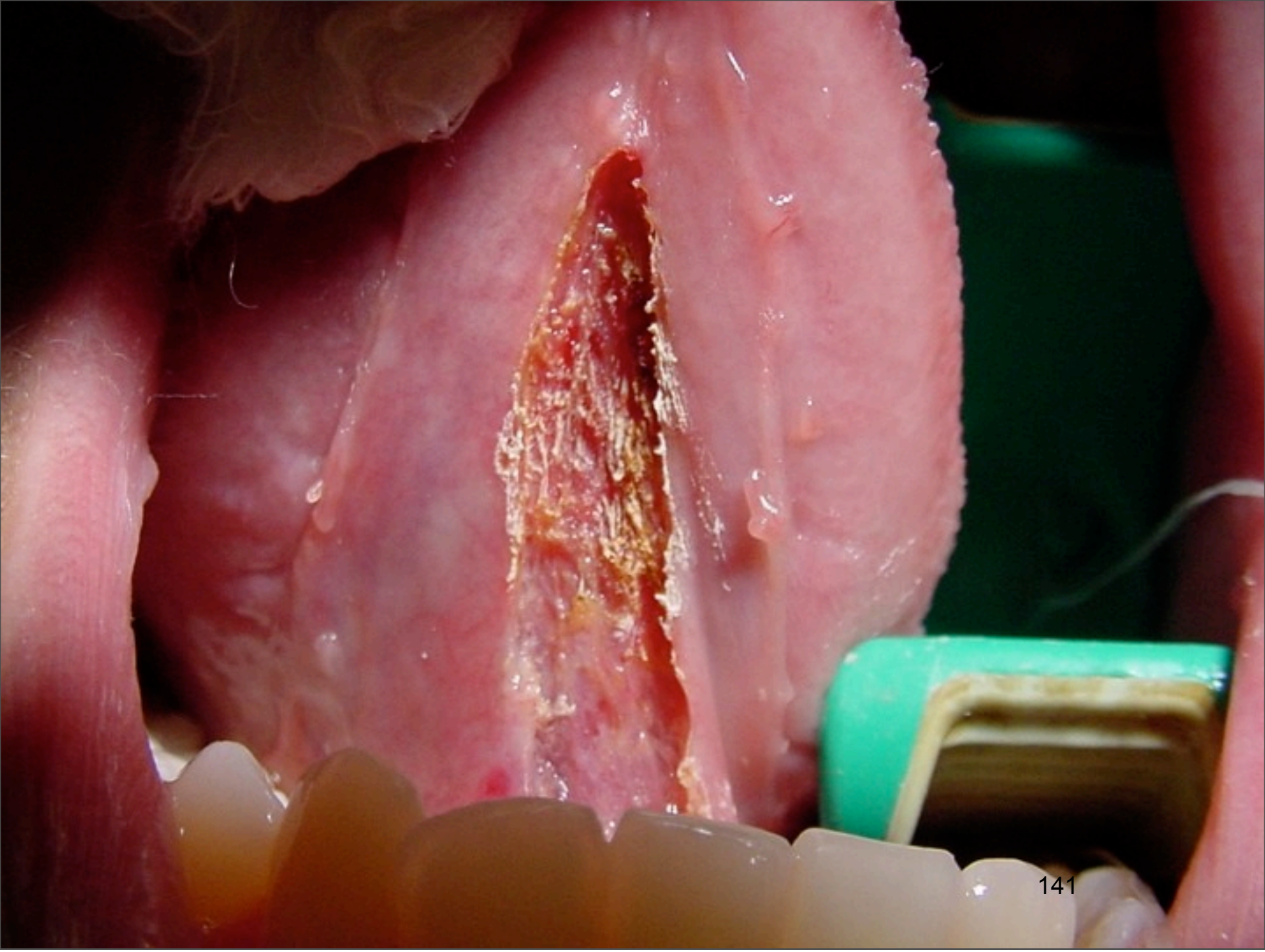
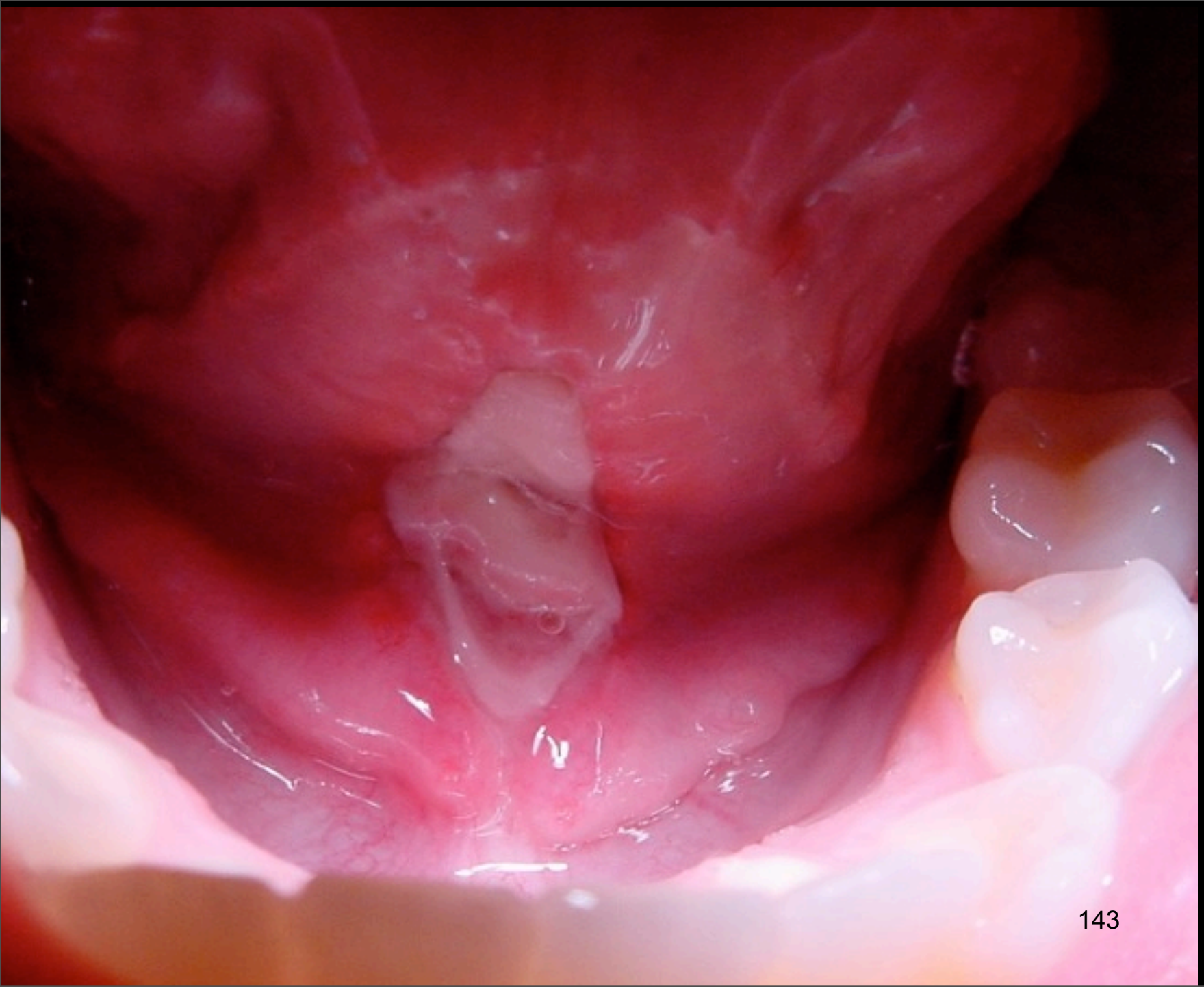
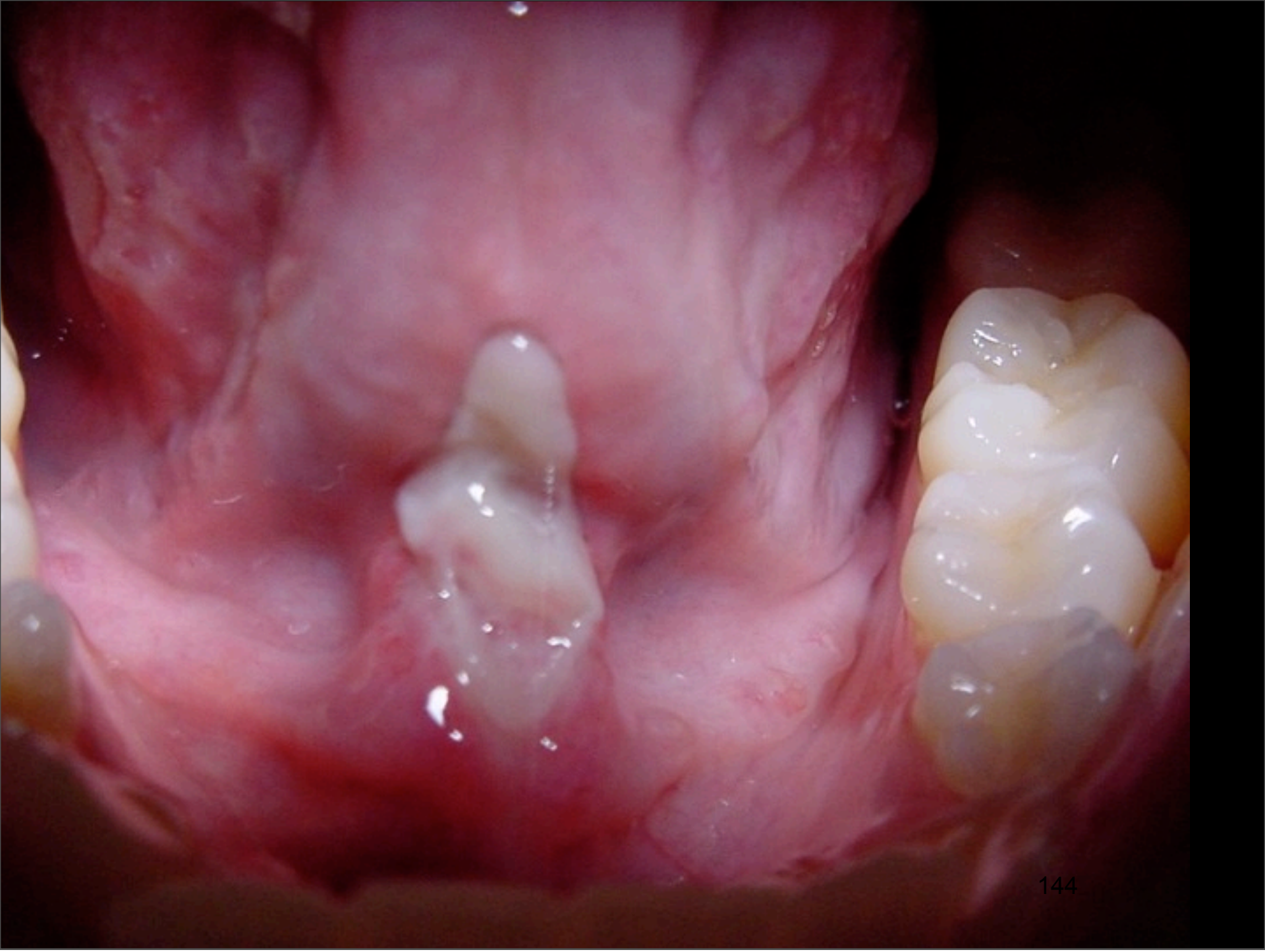
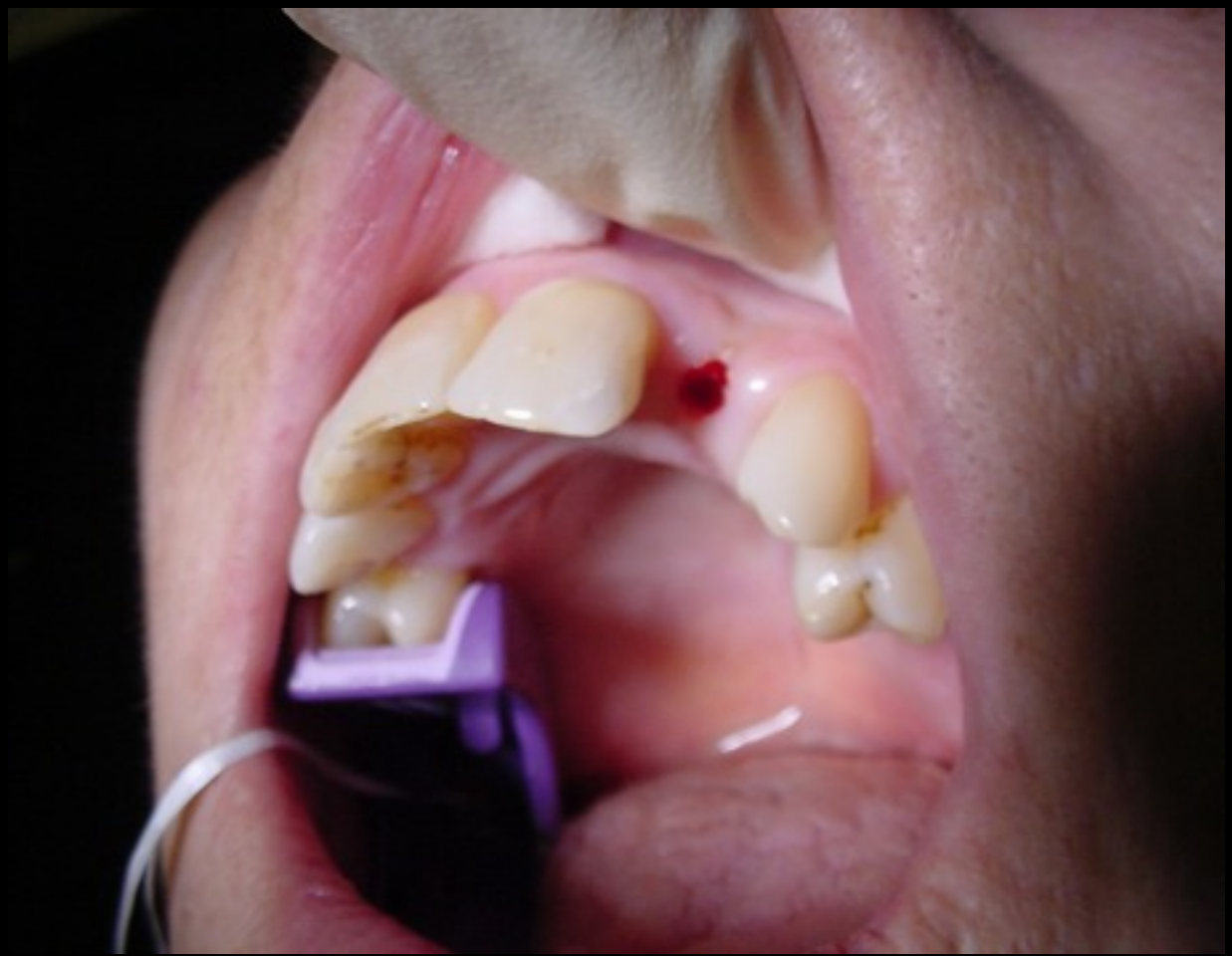
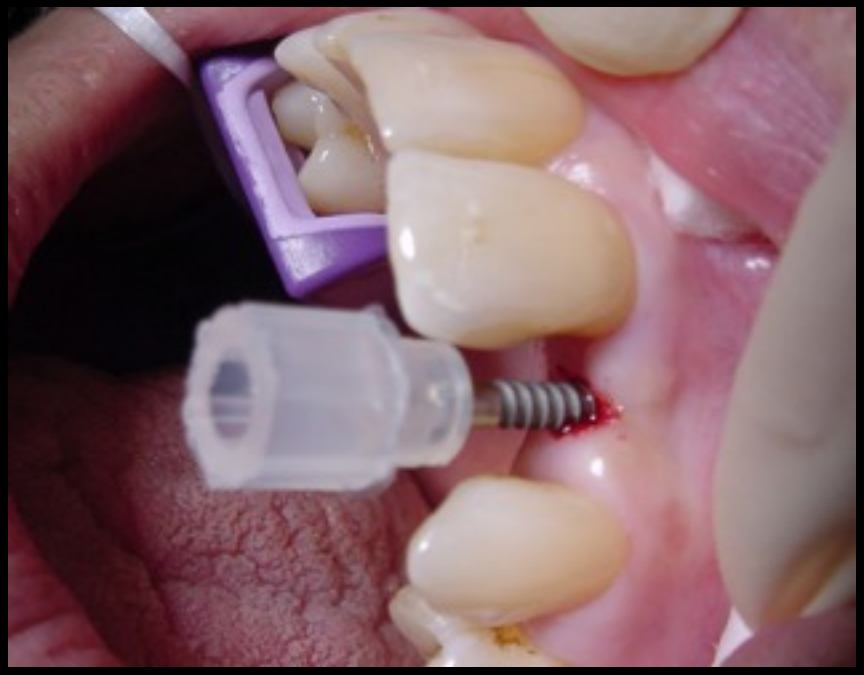
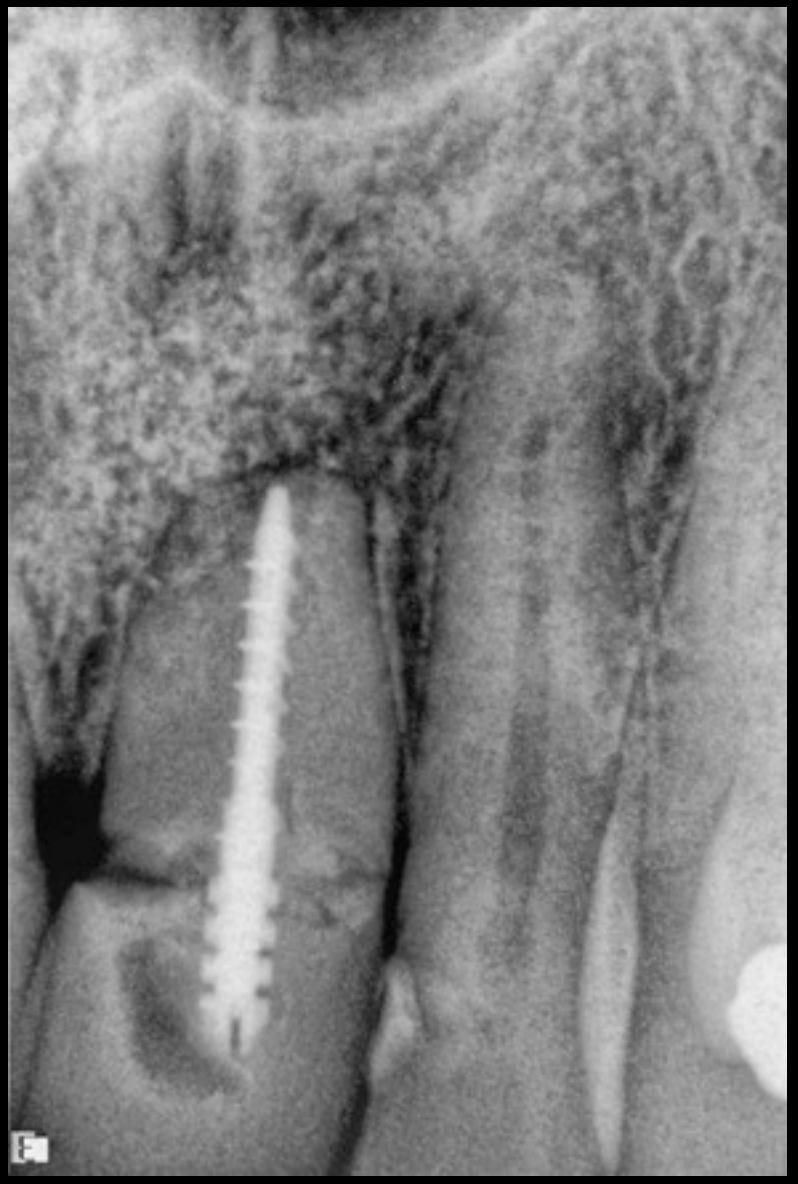




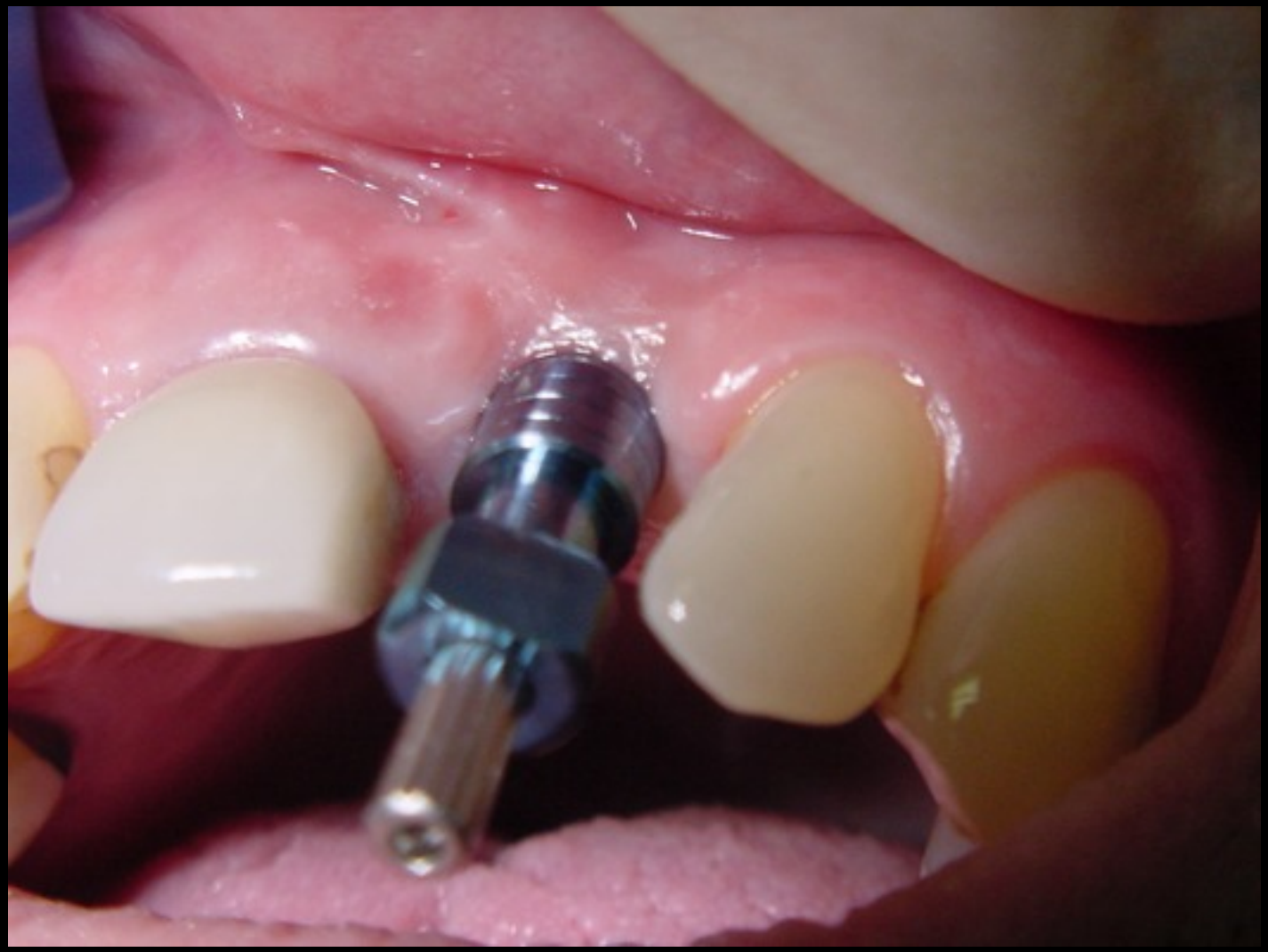


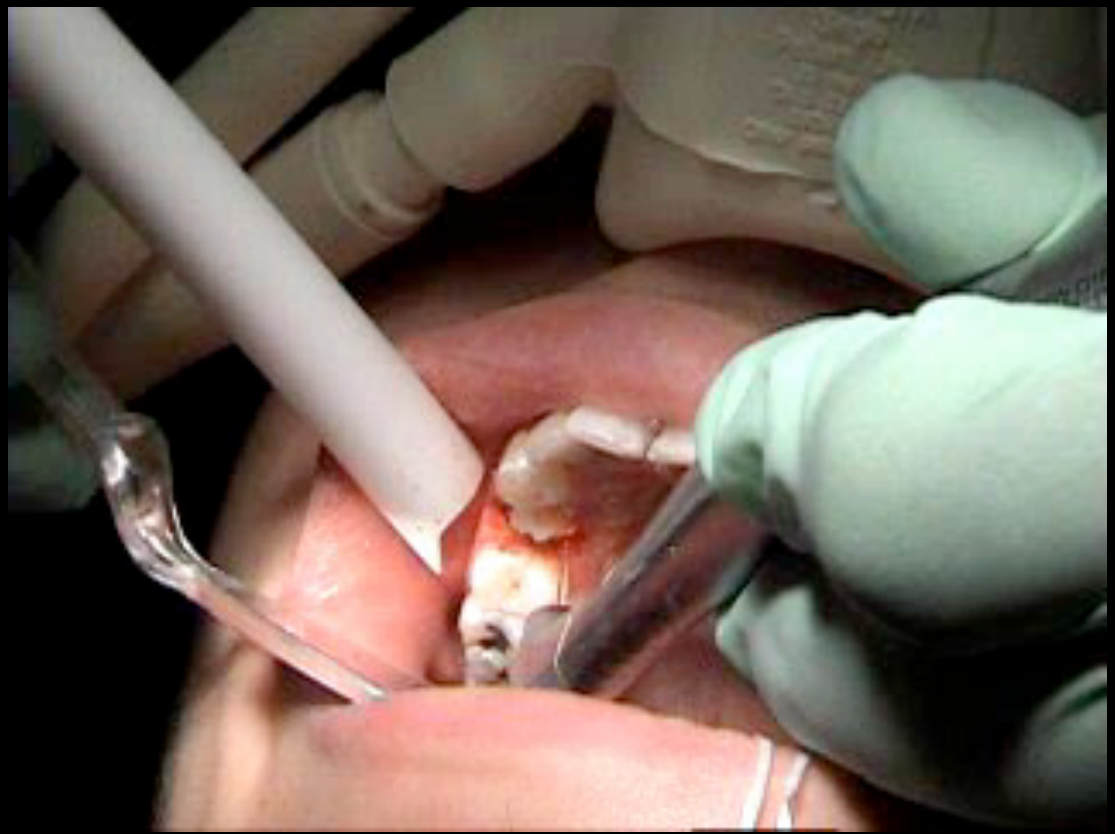


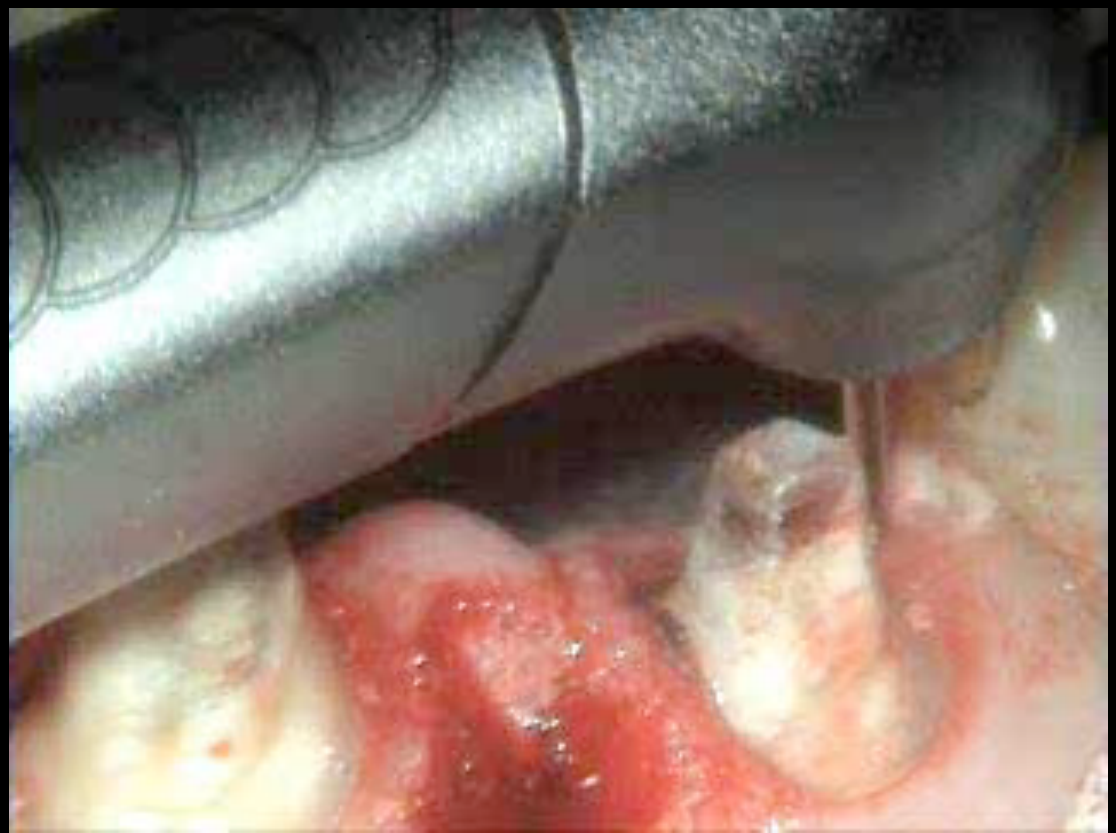


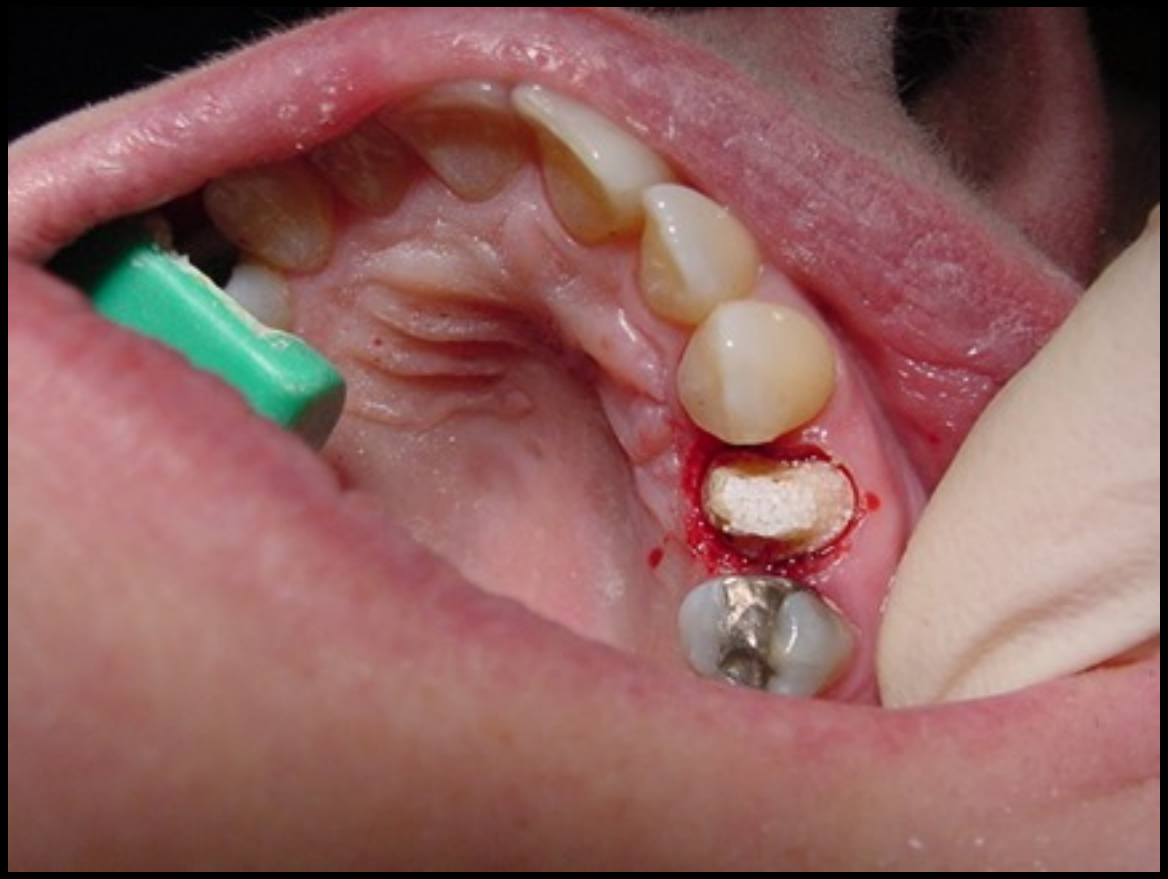


four day postop





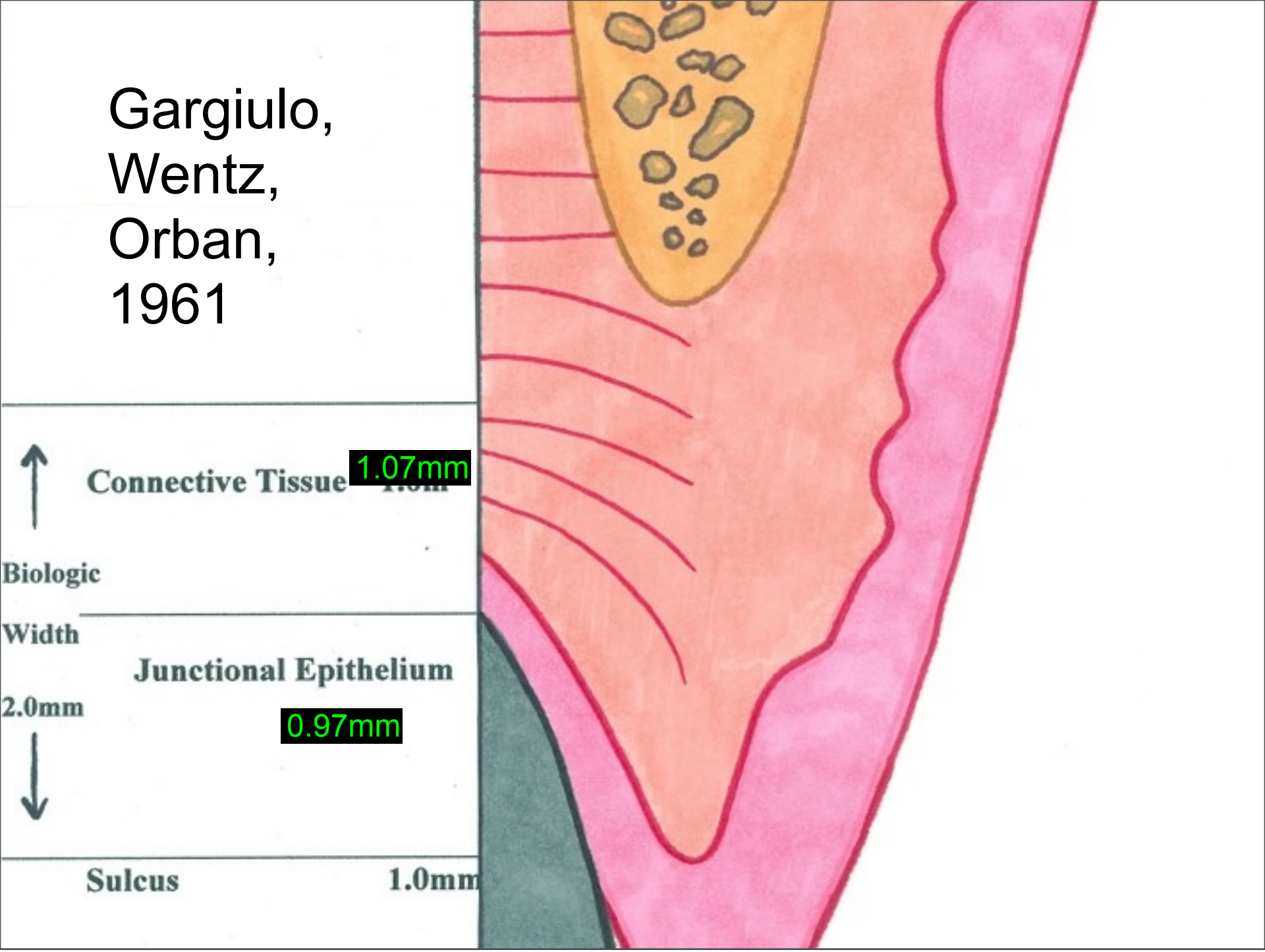




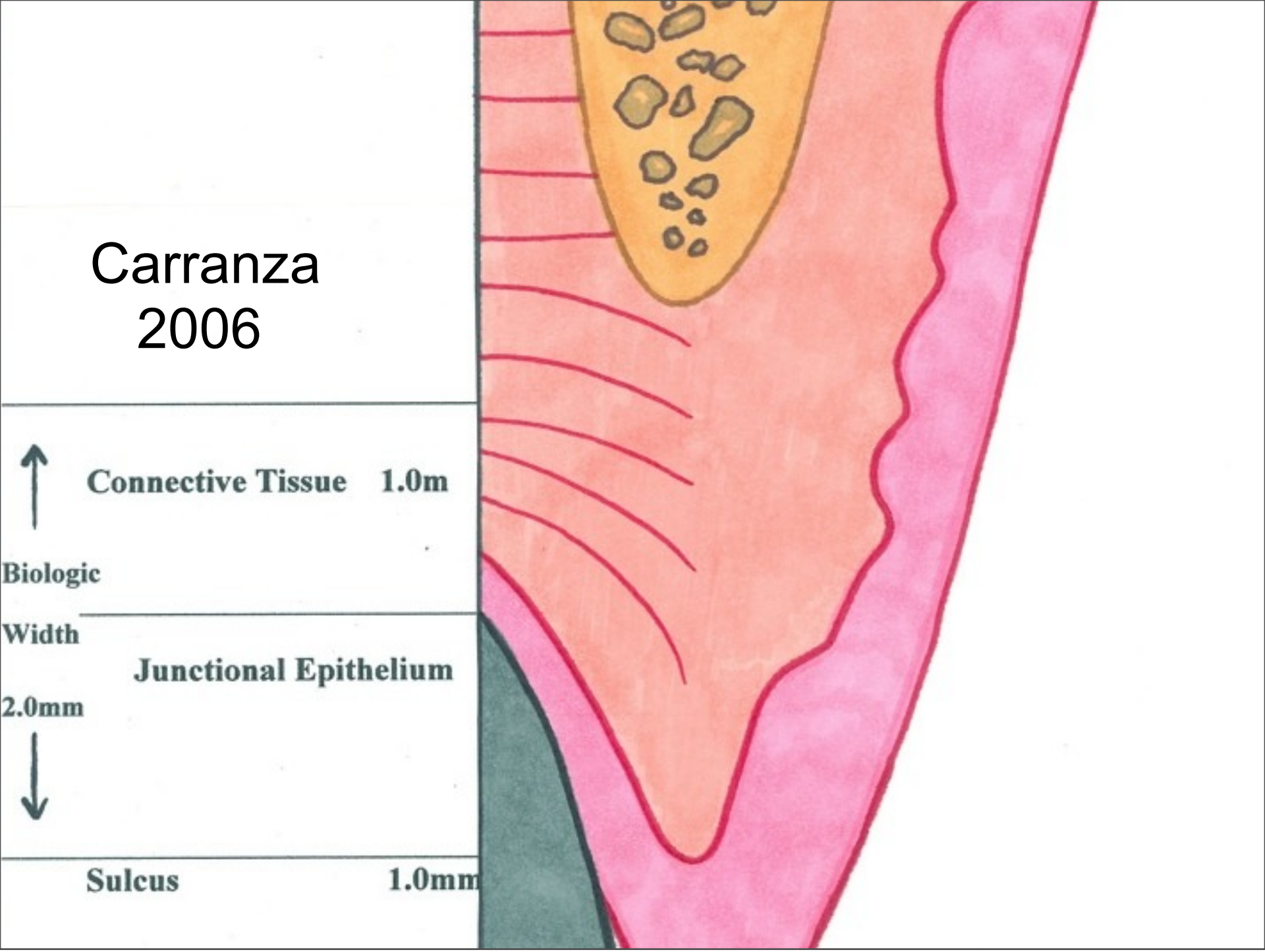
1.07mm

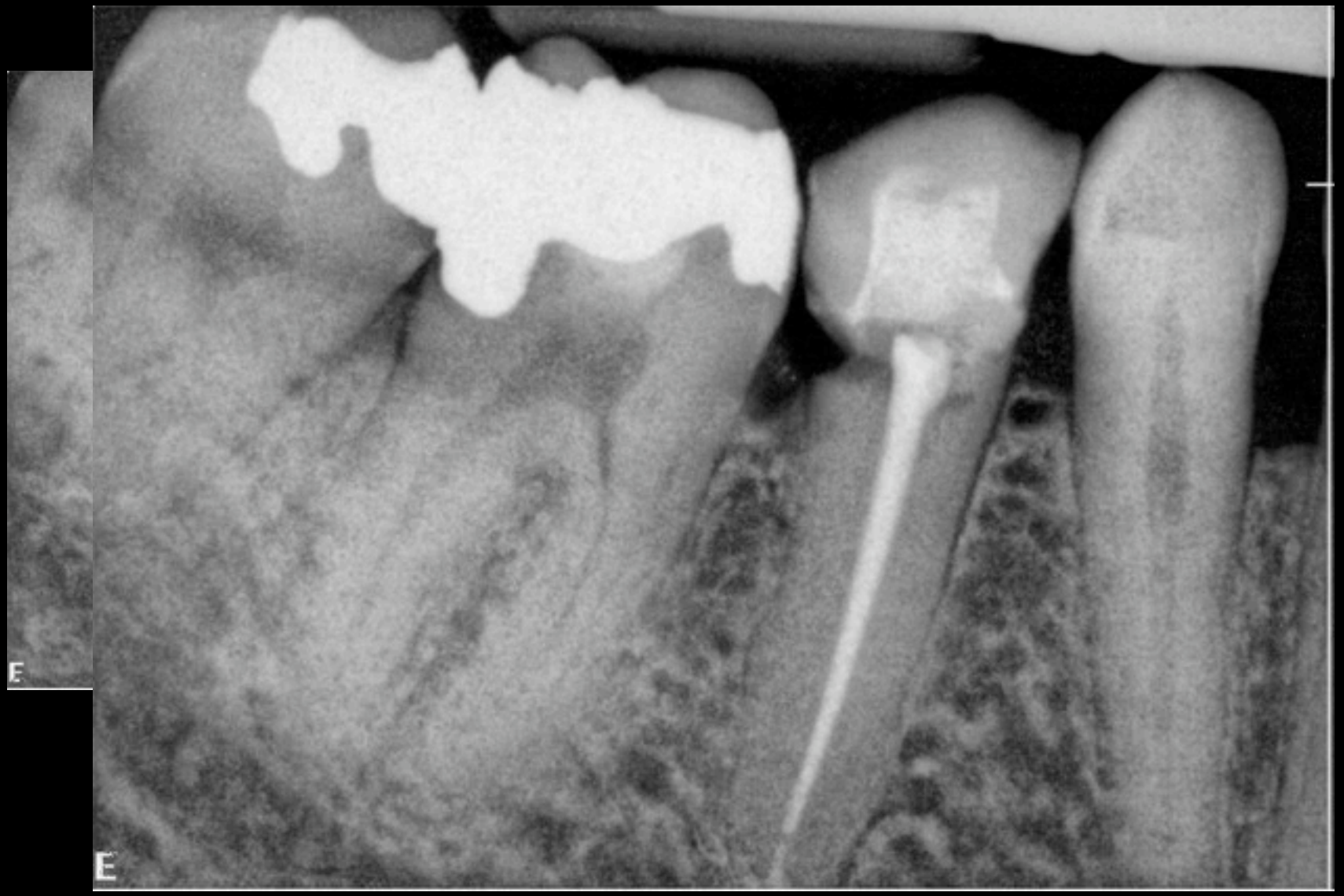
0.97mm

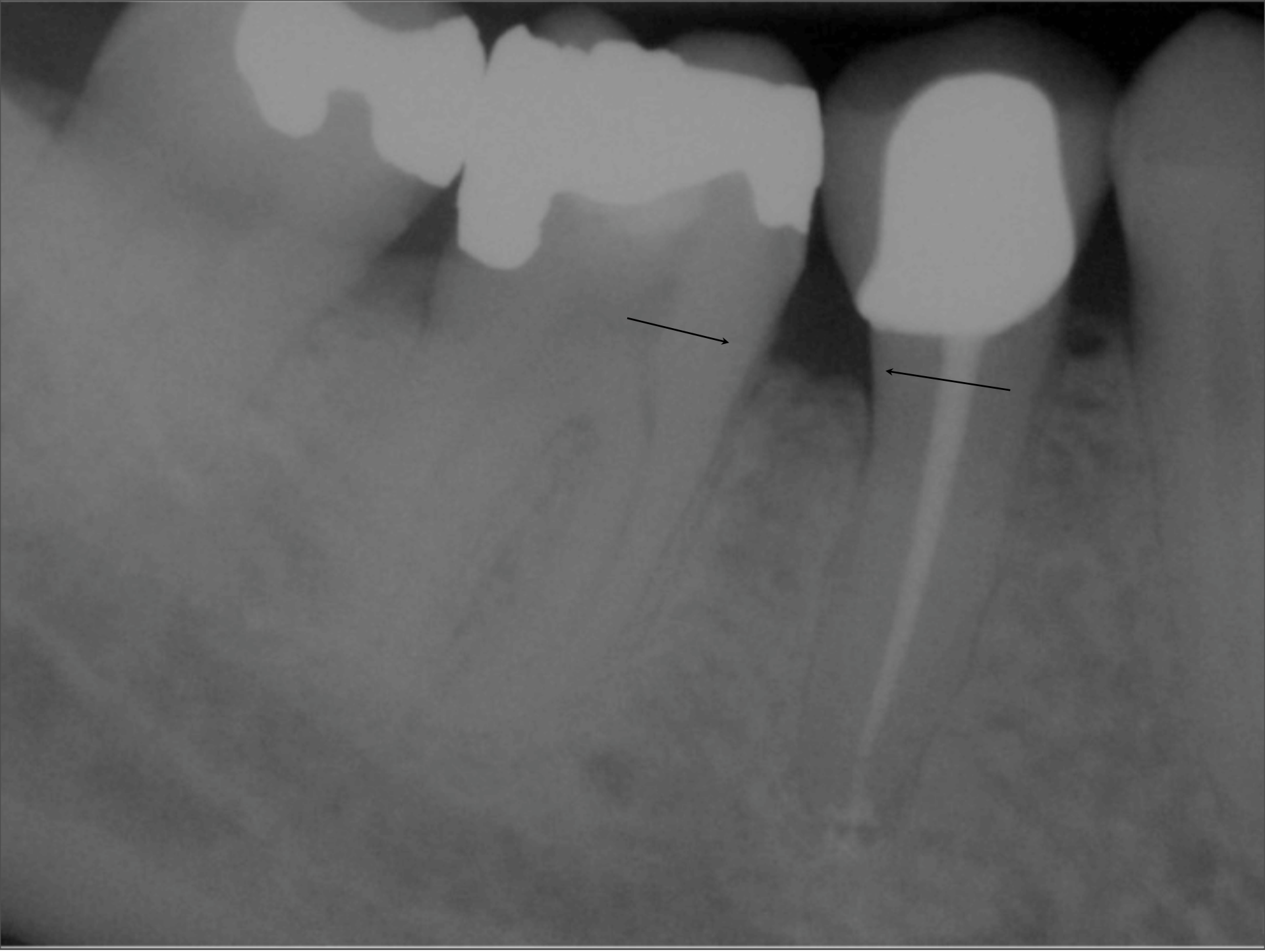
Gargiulo, Wentz, Orban, 1961

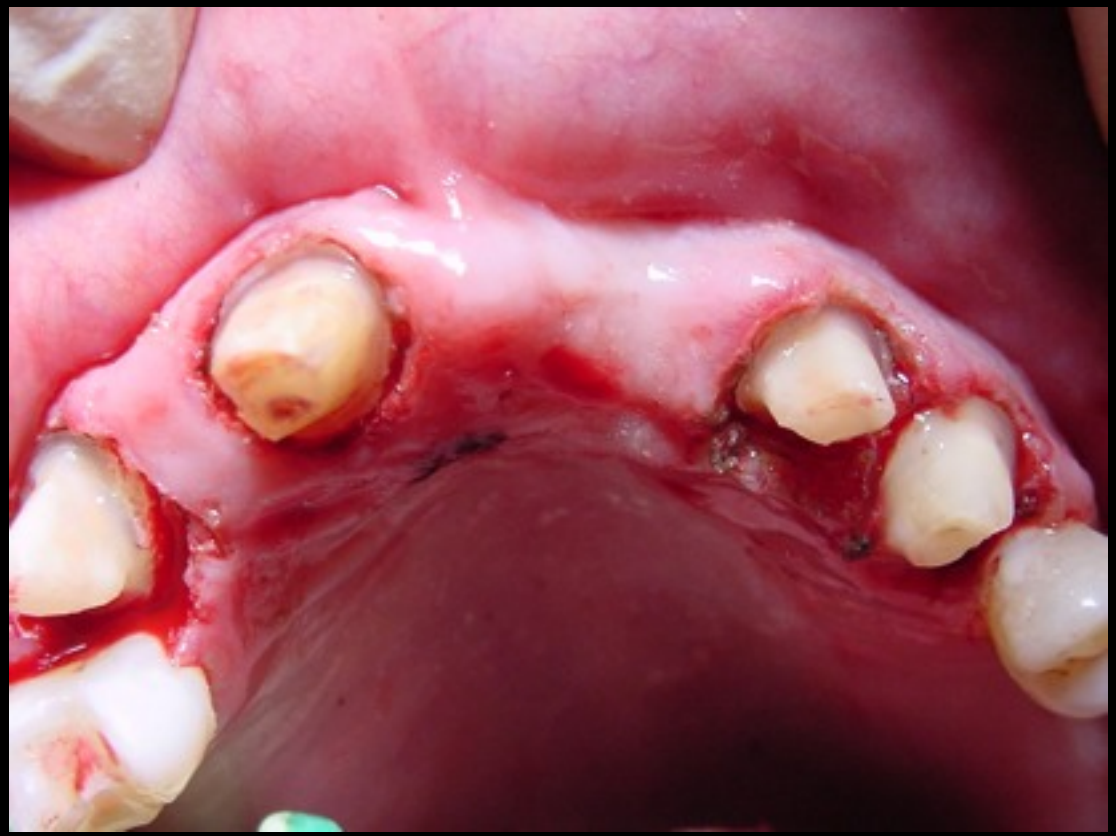


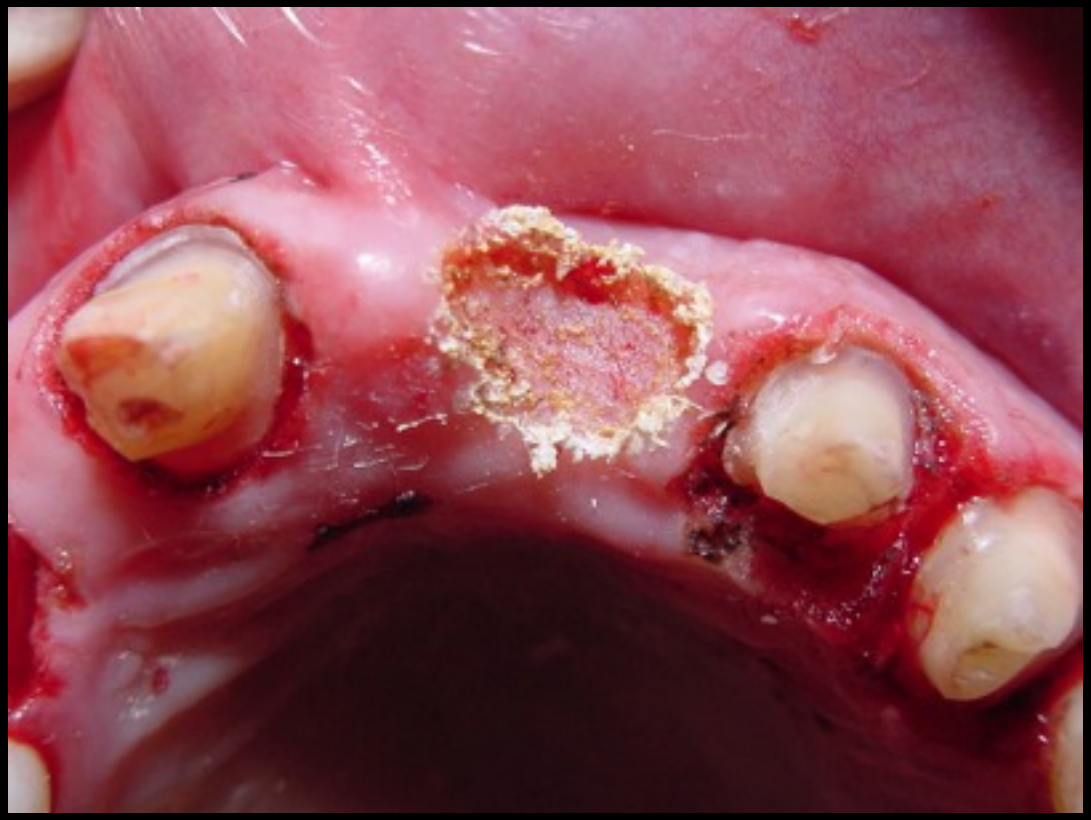
Carranza 2006

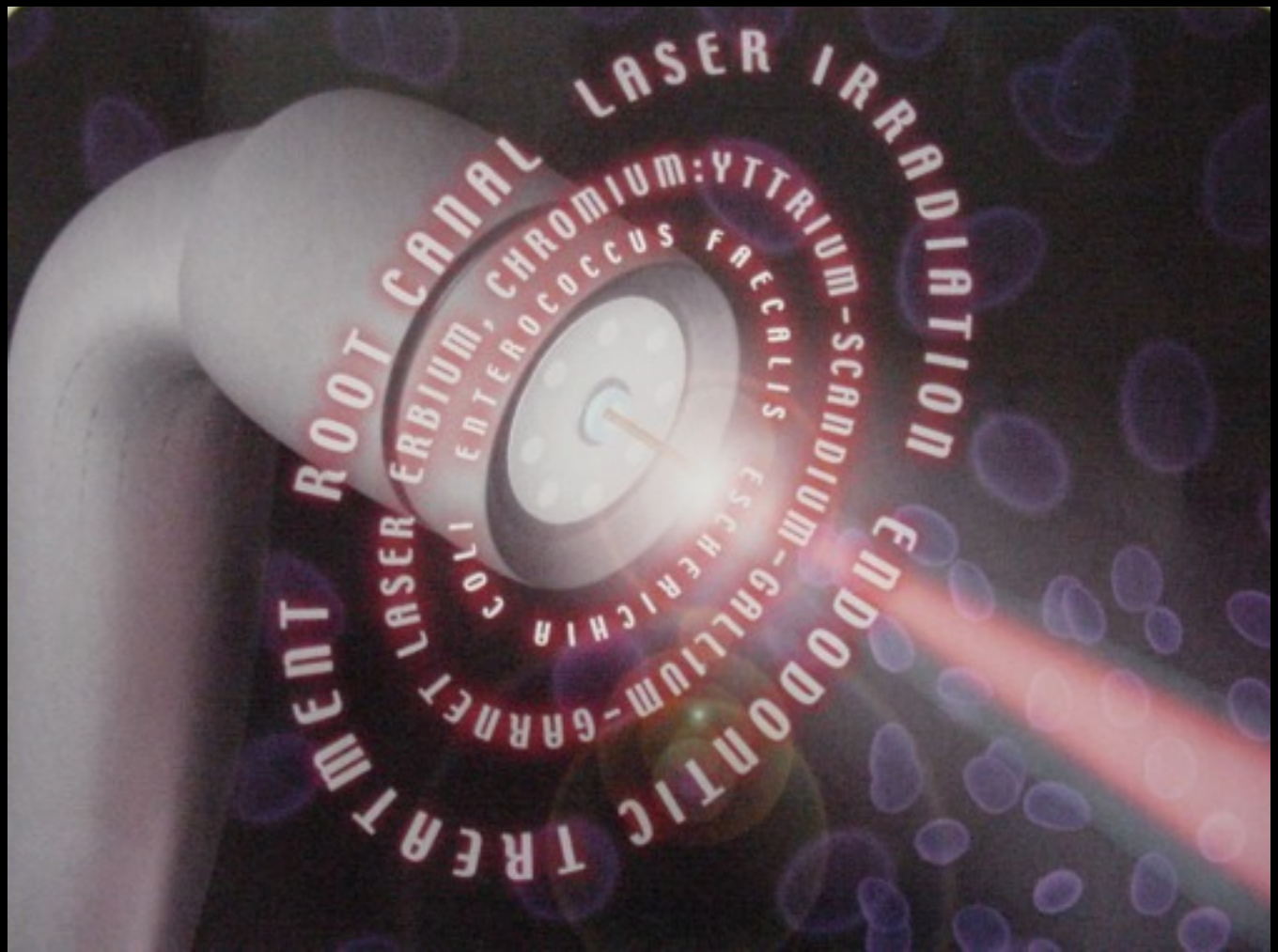


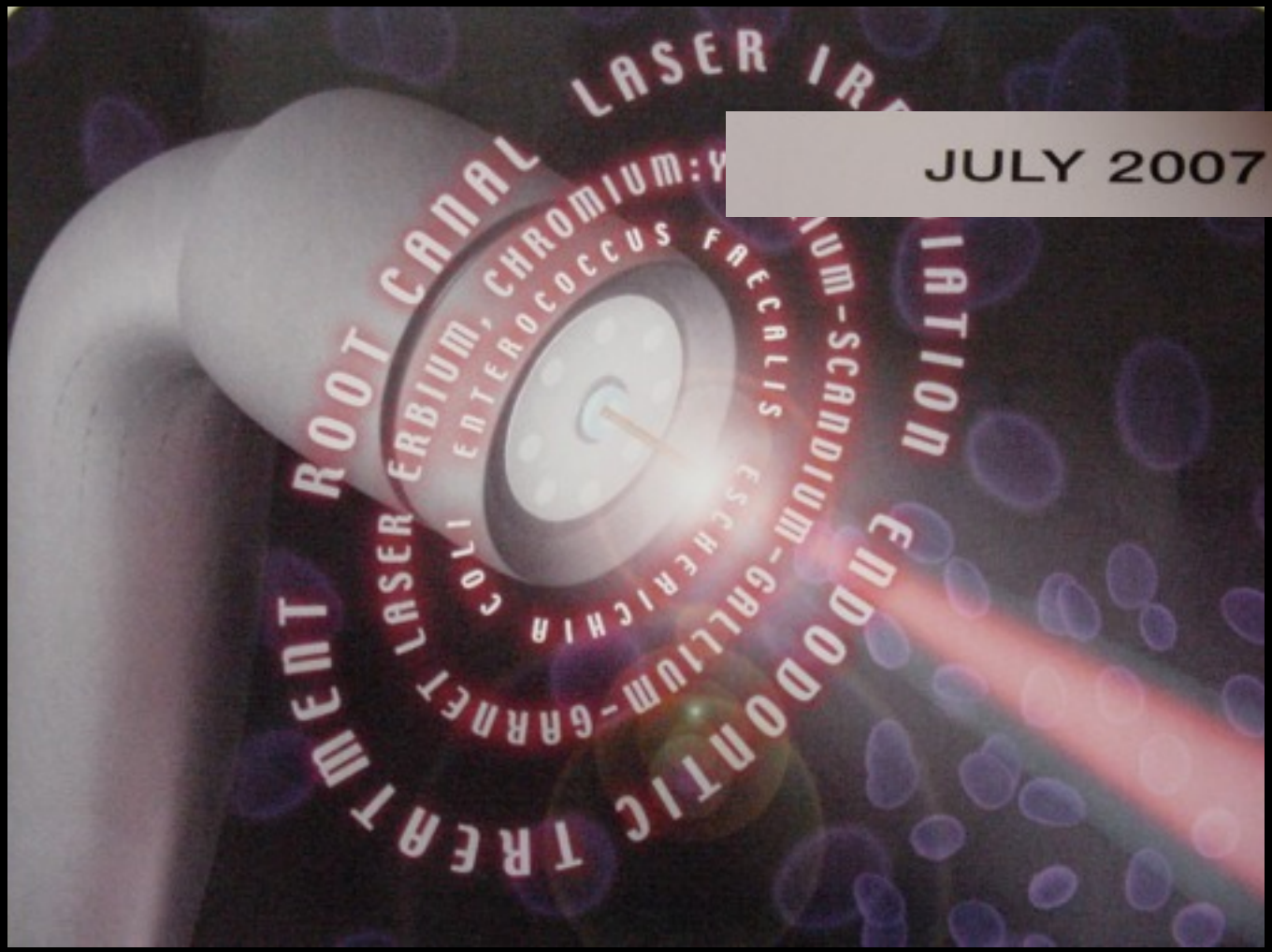









ENDODONTIC TREATMENT ROOT CANAL LASER IRRADIATION
ERBIUM, CHROMIUM:YTTRIUM-SCANDIUM-GALLIUM-GARNET LASER
E COLI ESCHERICHIA ENTEROCOCCUS FAECALIS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ENDODONTIC TREATMENT ROOT CANAL LASER
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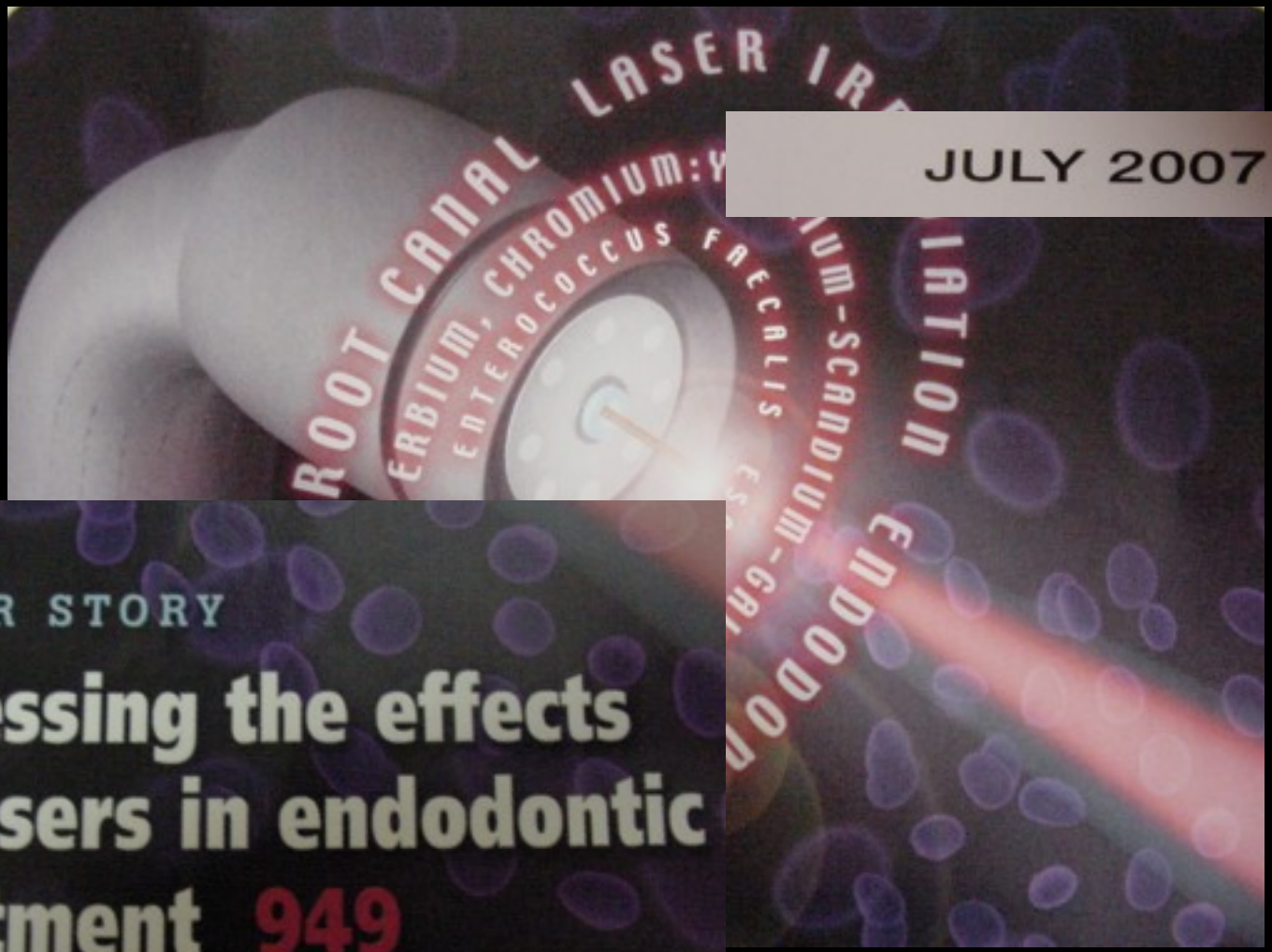
ENTEROCOCCUS FAECALIS
ESCHERICHIA COLI
-SCANDIUM-GALLIUM-GARNET
JULY 2007


ROOT CANAL LASER IR
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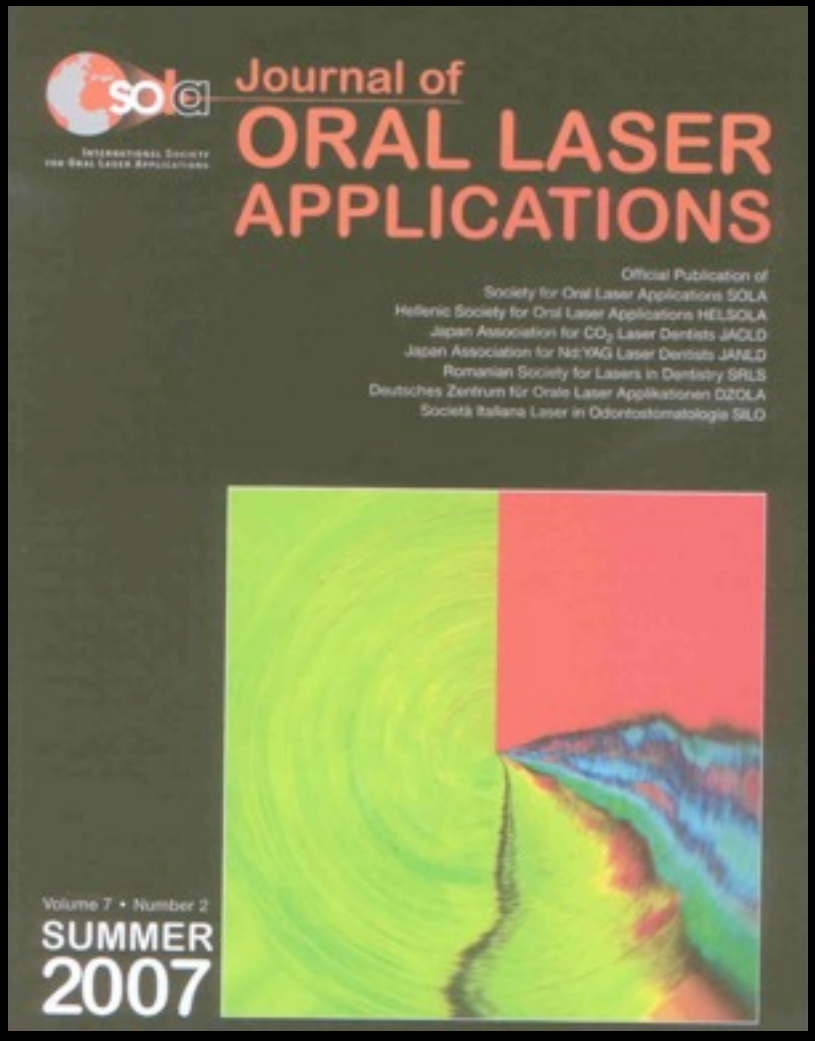
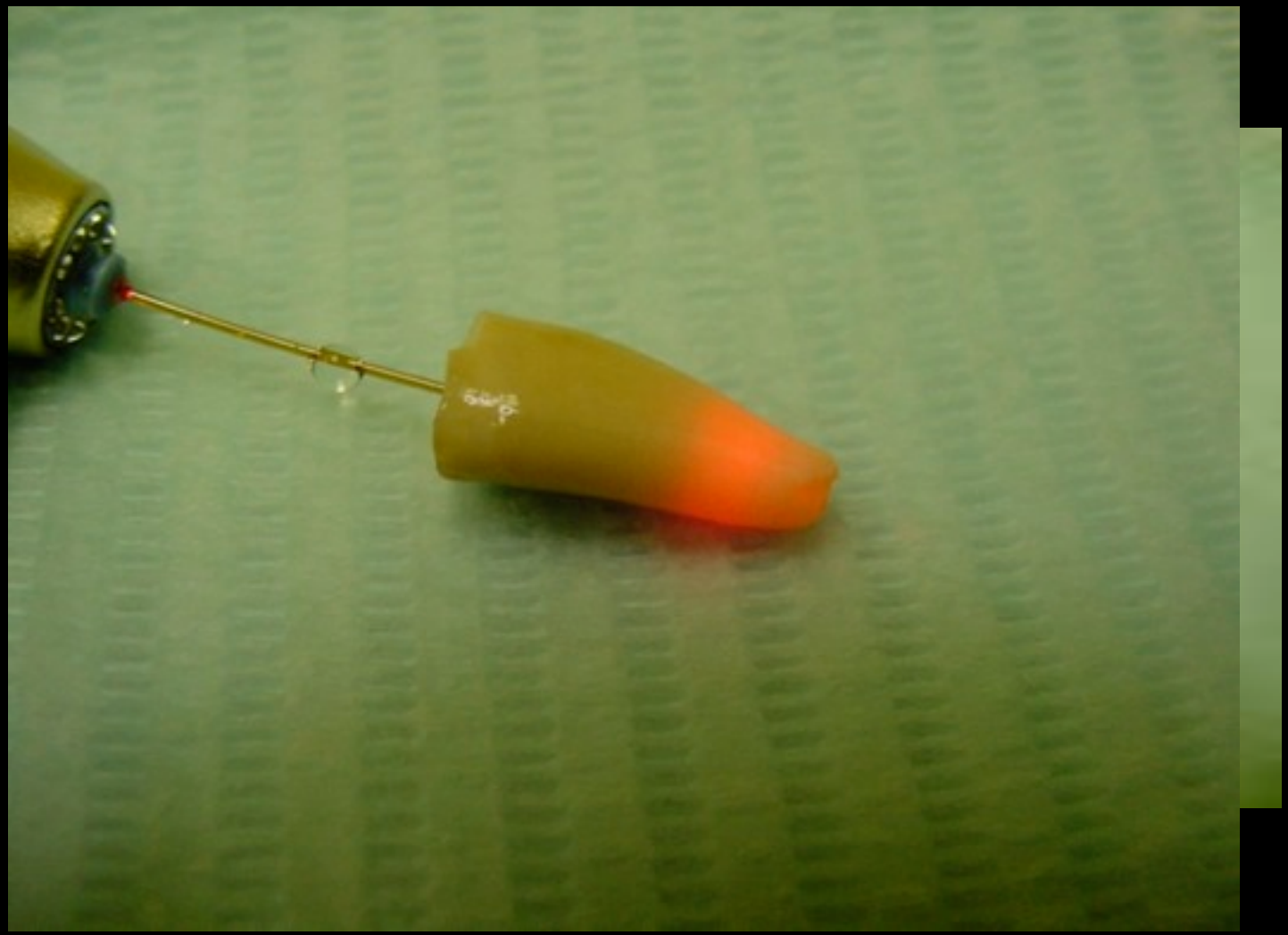
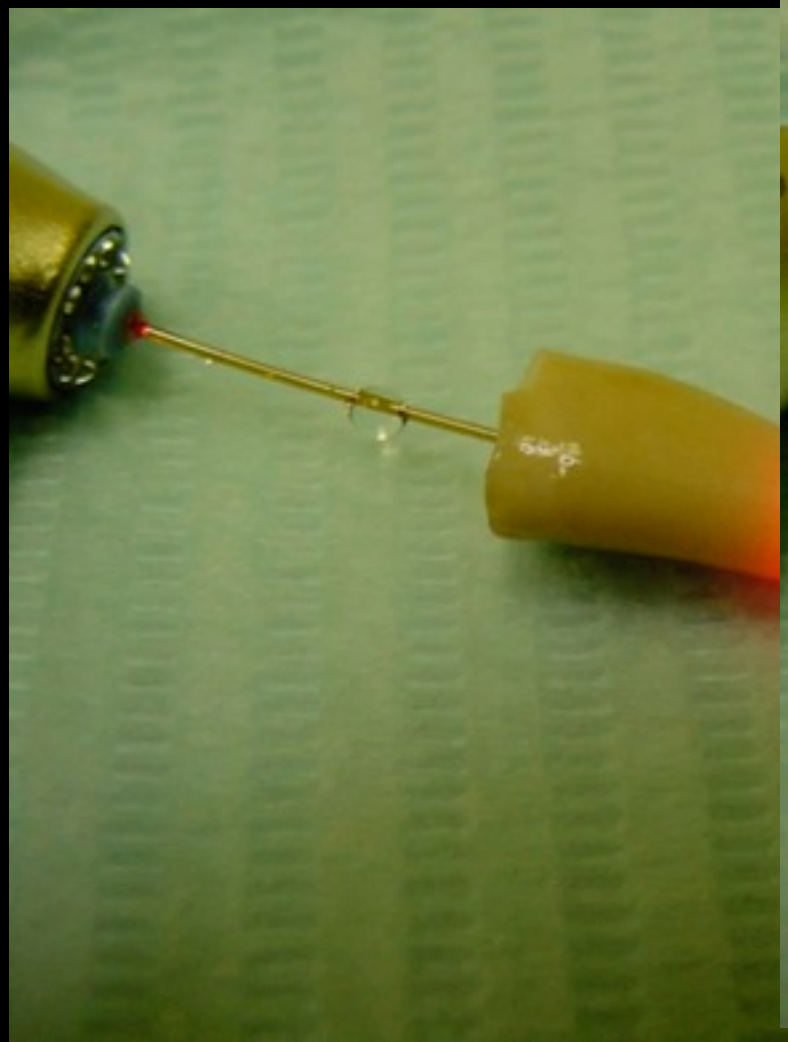
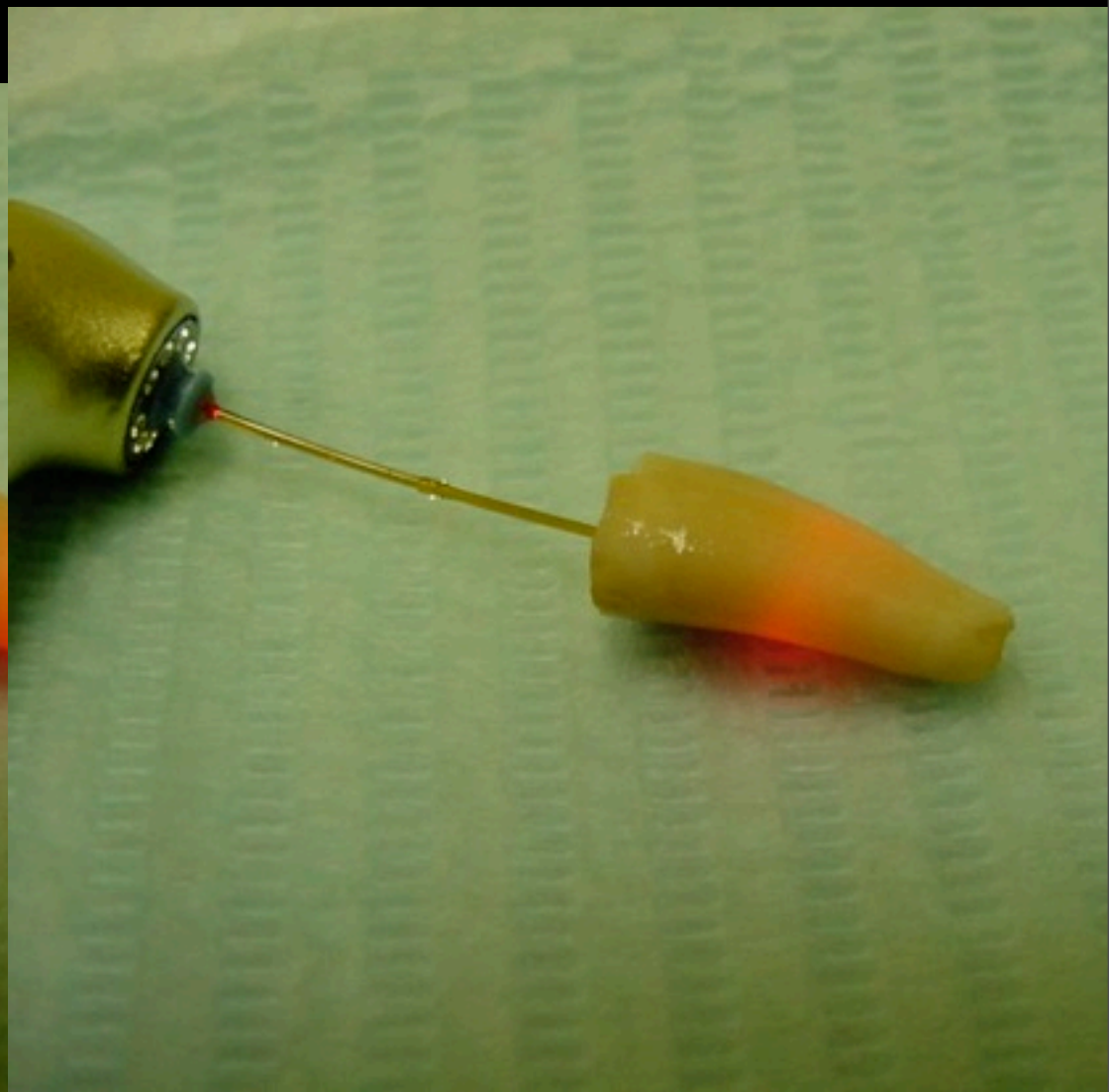
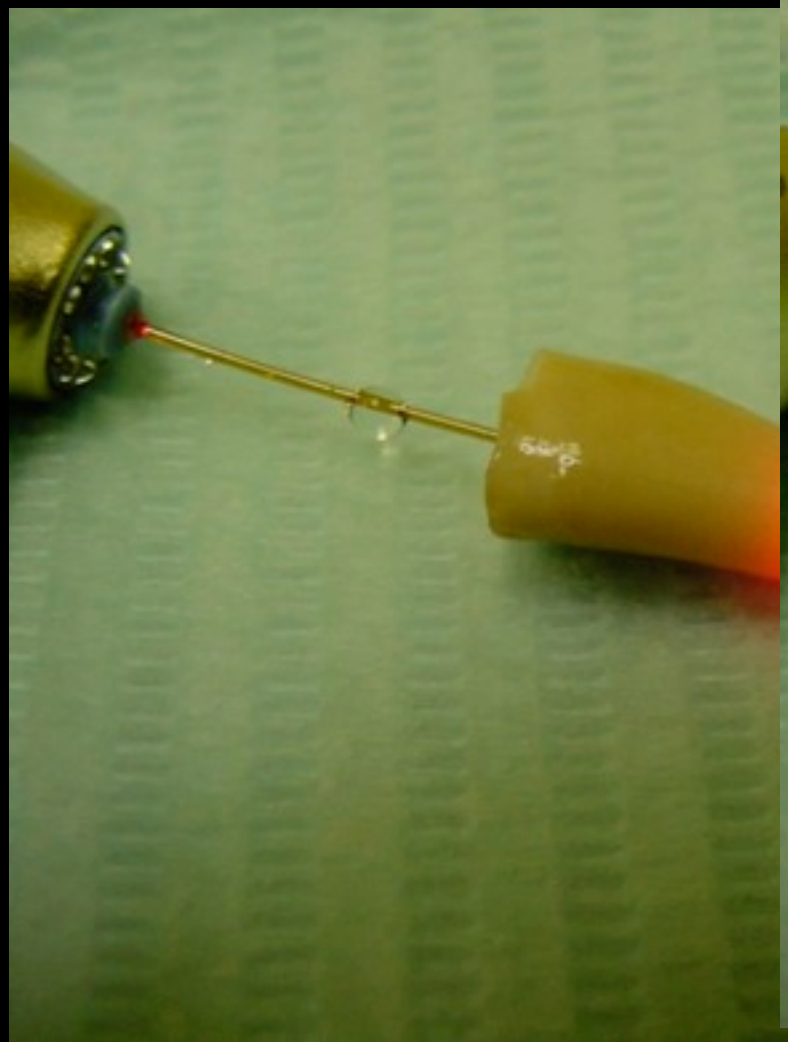
IATION ENDOD
JULY 2007
COVER STORY
Assessing the effects of lasers in endodontic treatment 949

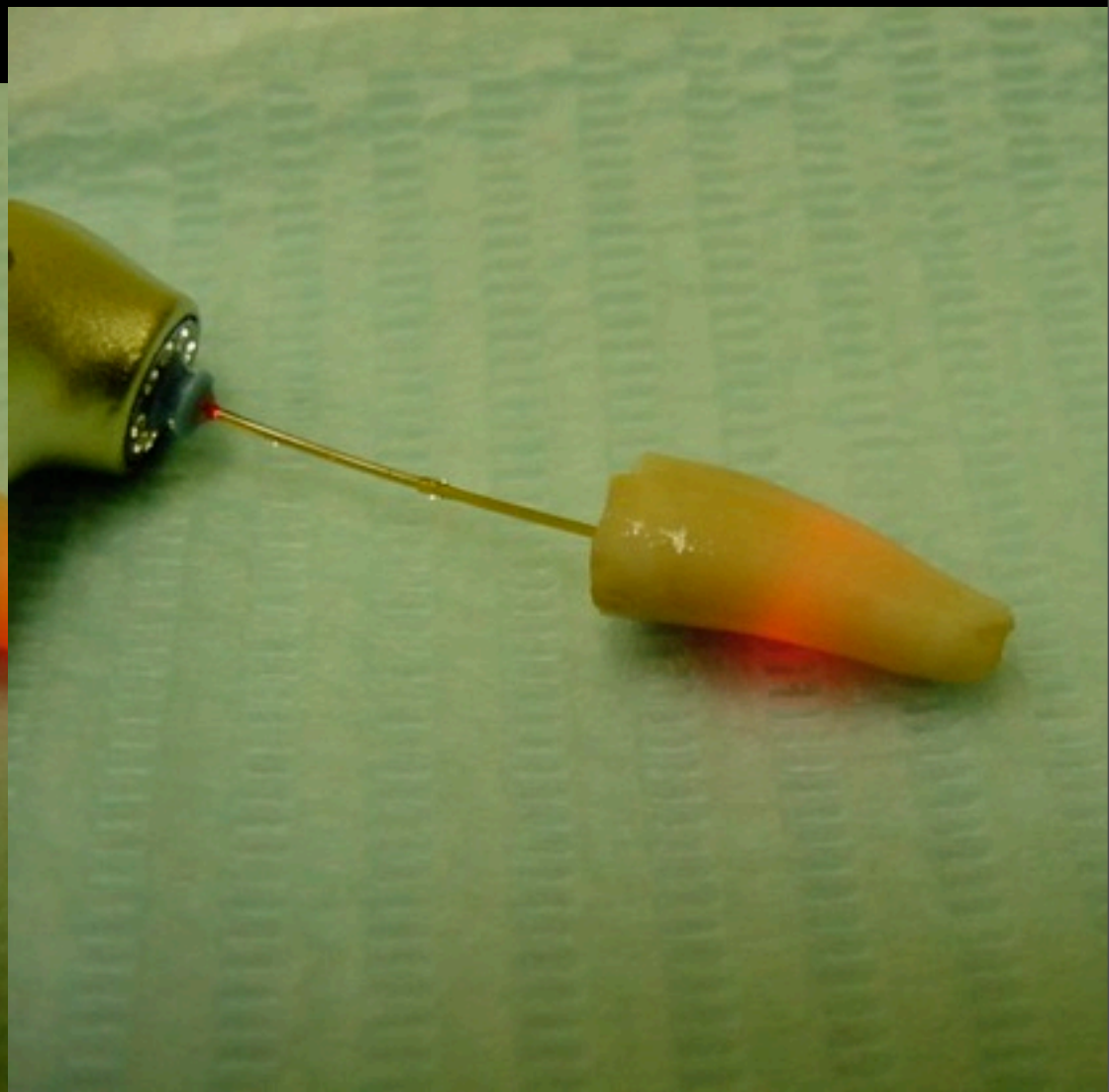

SOLA
International Society for Oral Laser Applications
Journal of
ORAL LASER APPLICATIONS
Official Publication of
Society for Oral Laser Applications SOLA
Hellenic Society for Oral Laser Applications HELSOLA
Japan Association for CO_2 Laser Dentists JACLD
Japan Association for Nd:YAG Laser Dentists JANLD
Romanian Society for Lasers in Dentistry SRLS
Deutsches Zentrum für Orale Laser Applikationen DZOLA
Società Italiana Laser in Odontostomatologia SILO
Volume 7 • Number 2
SUMMER
2007



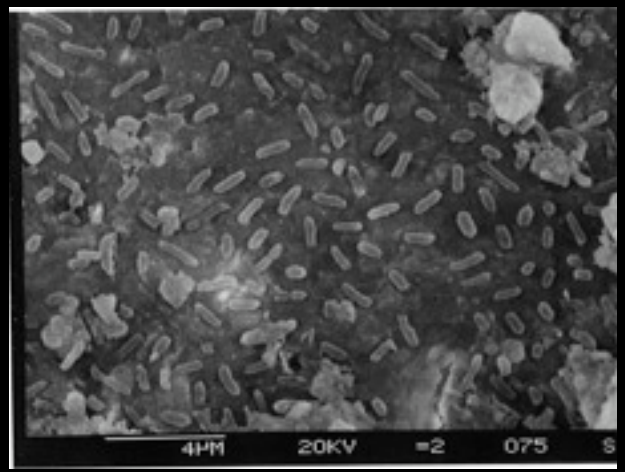




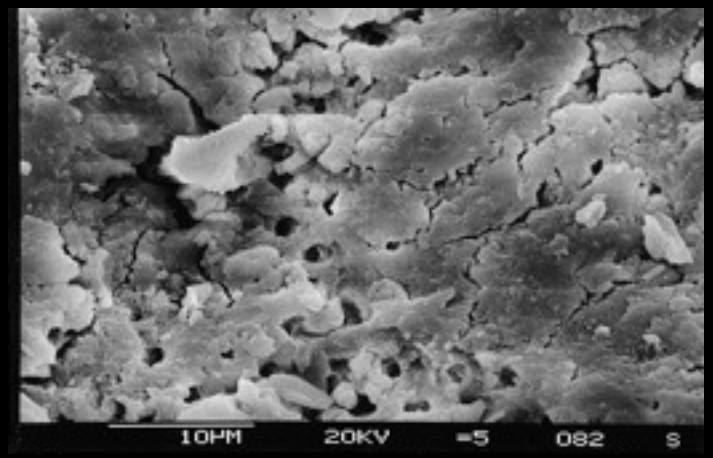




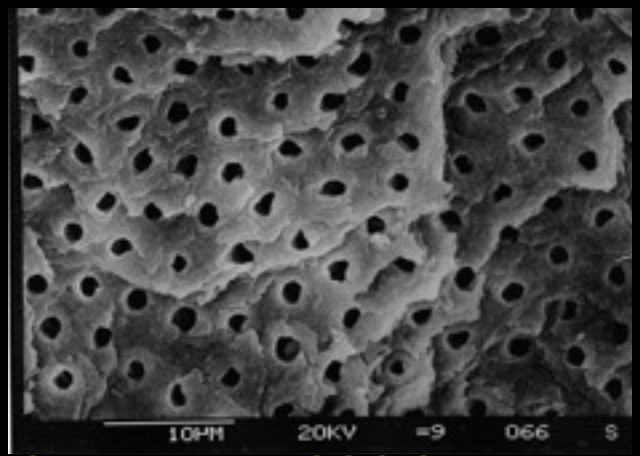
Laser Assisted Endodontics



Crown Down-Profile

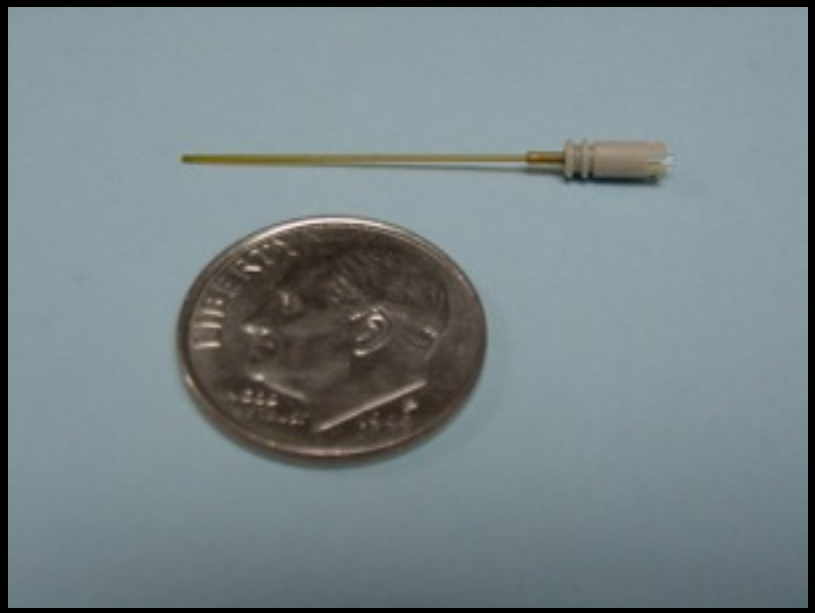


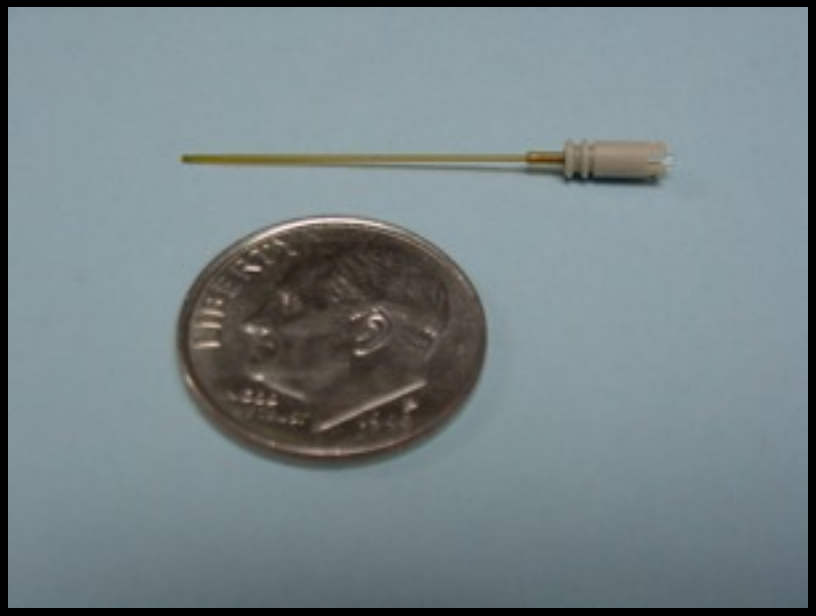
K-File Stepback

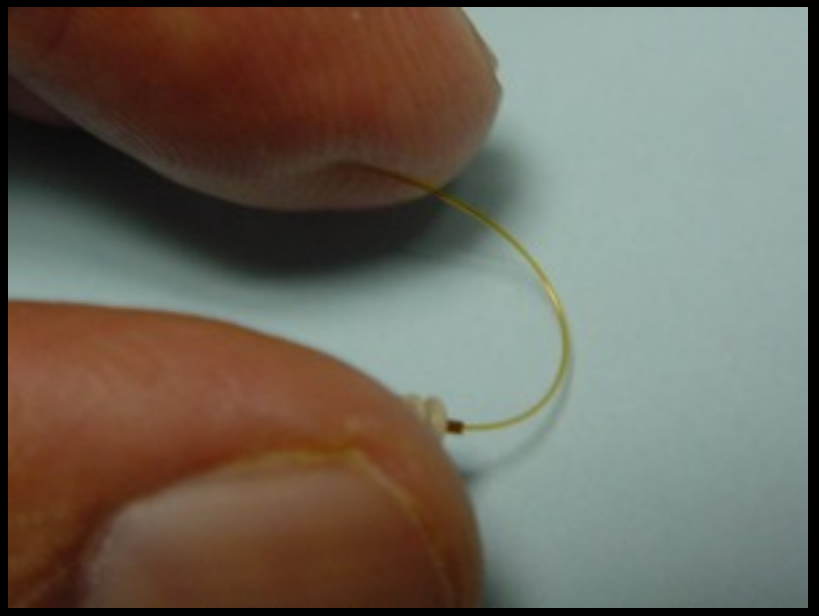


Crown Down-YSGG Stepback

SEM@2000 mag







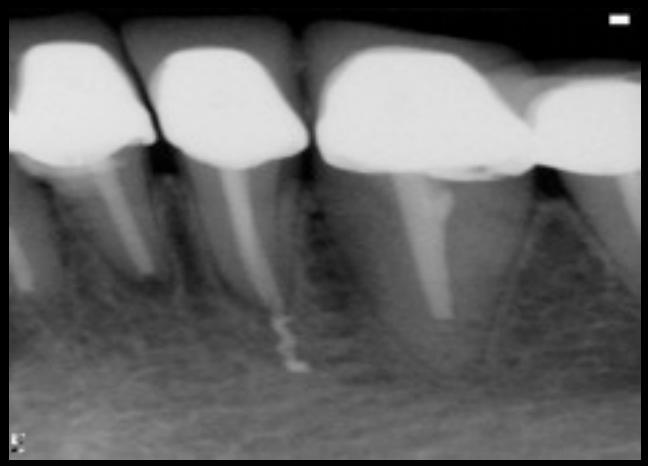
preop

postop

preop

postop in 6 weeks

preop



postop in 6 weeks

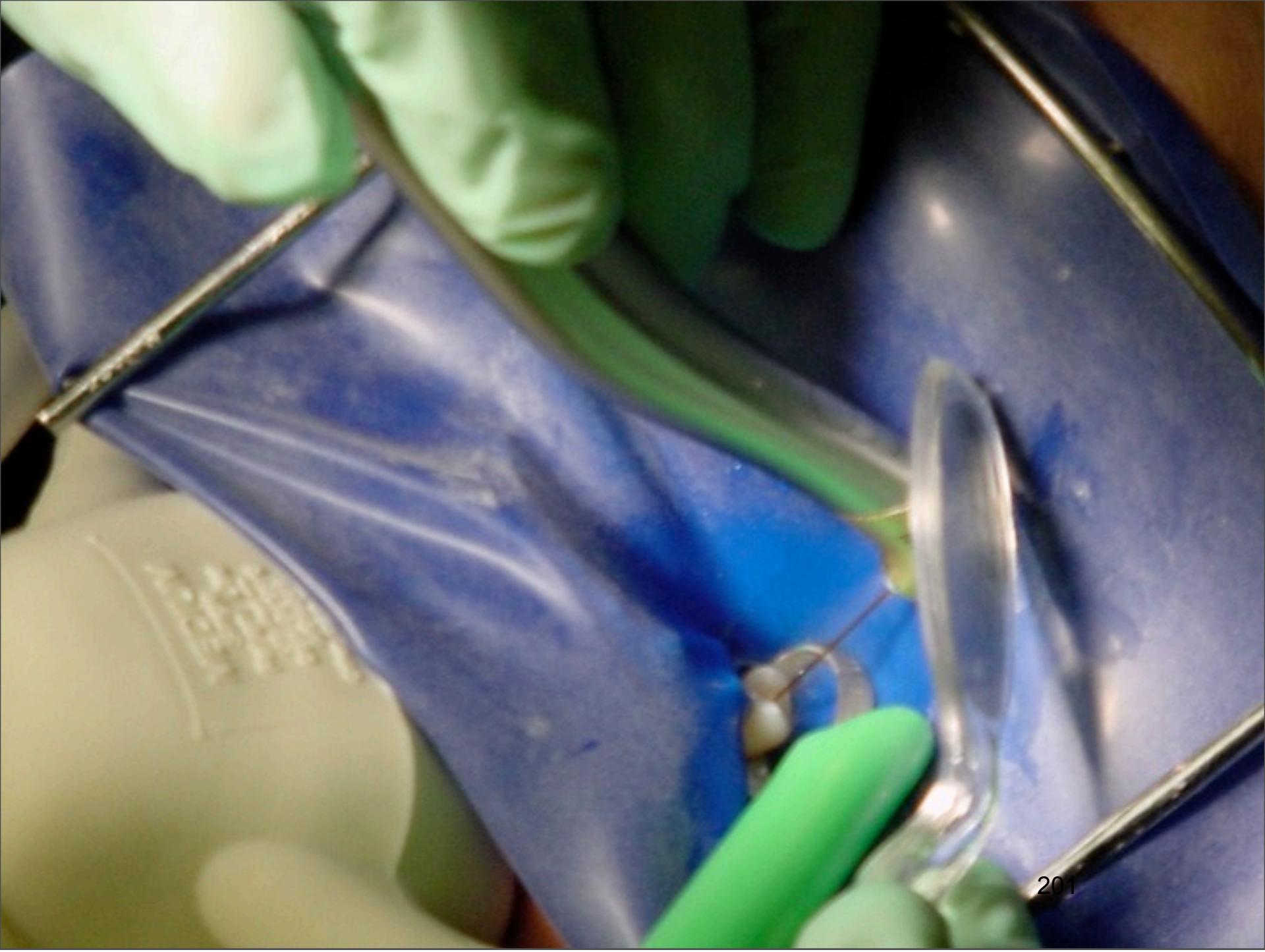
Penetration Depths

Bacteria 1000microns

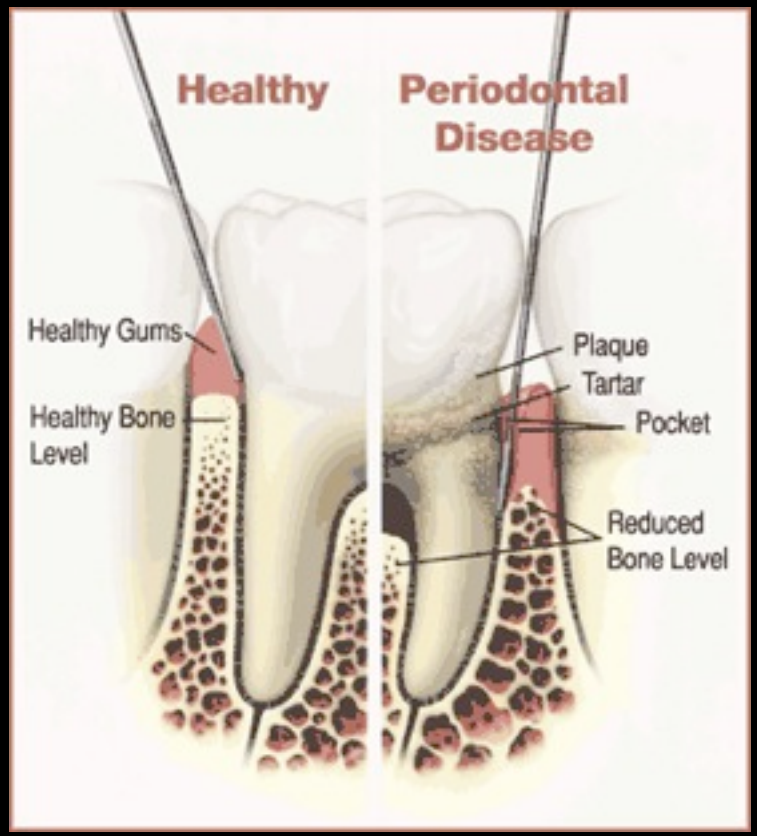
Chemical Rinses 100microns

YSGG greater than 1000microns

*Laser energy can penetrate deeper than bacteria can hide!



- Periodontal disease is a chronic BACTERIAL infection that affects the gum and bone supporting the teeth



- What if you had a tool that could accomplish treating the gum and bone?
- Key Factor in Decision Making: Periodontal Disease is a BACTERIAL Infection

- What if you had a tool that could accomplish treating the gum and bone?
- Key Factor in Decision Making: Periodontal Disease is a BACTERIAL Infection


BugOut
Flying Insect
Spray
Kills Mosquitoes,
House Flies, Moths
and Gnats
Patent Pending Technology
Fresh
Scent

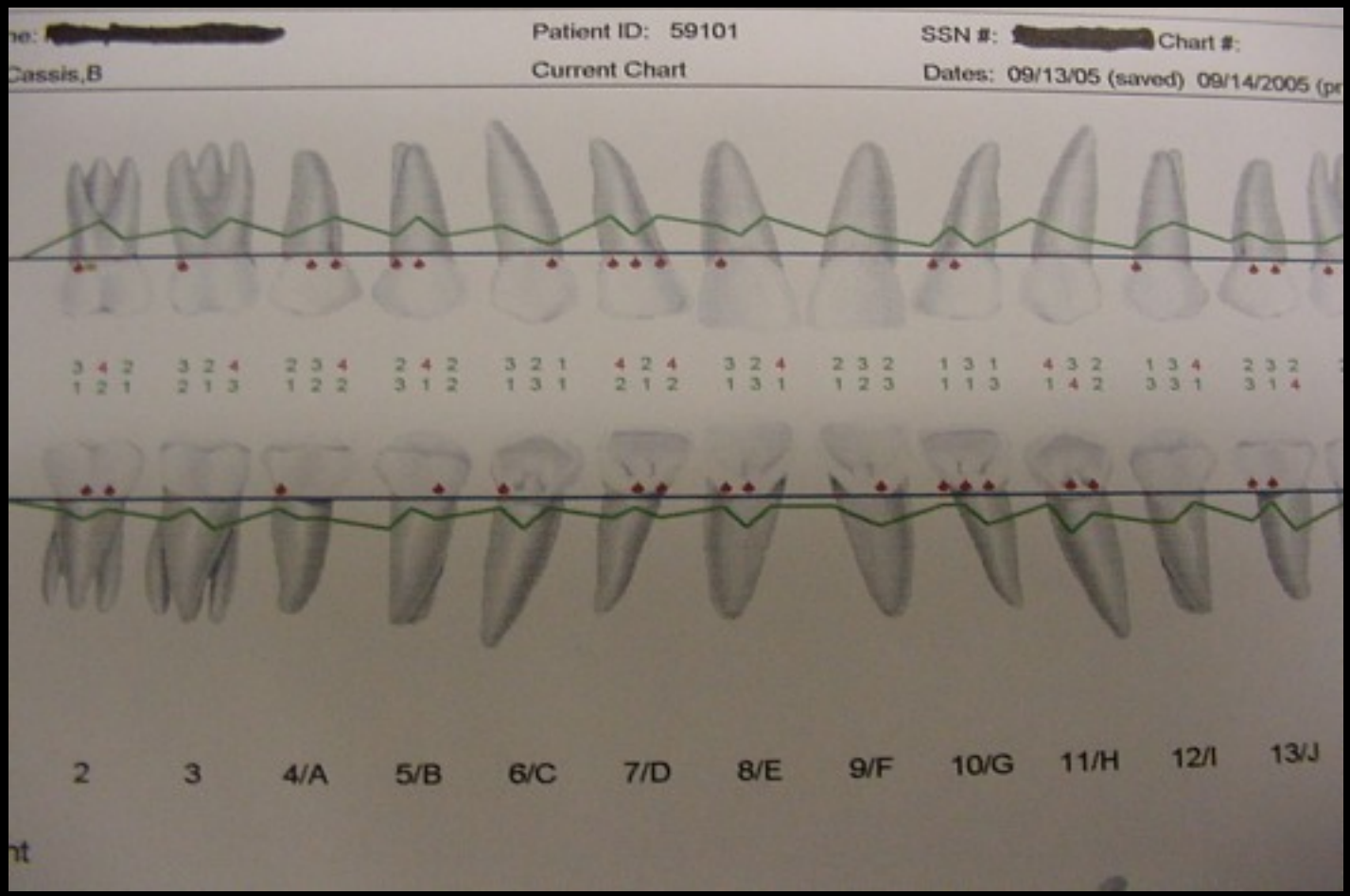

Cassis
DENTAL CENTER
CONGRADULATIONS
SARA WILSON L.M.T.
574-0424

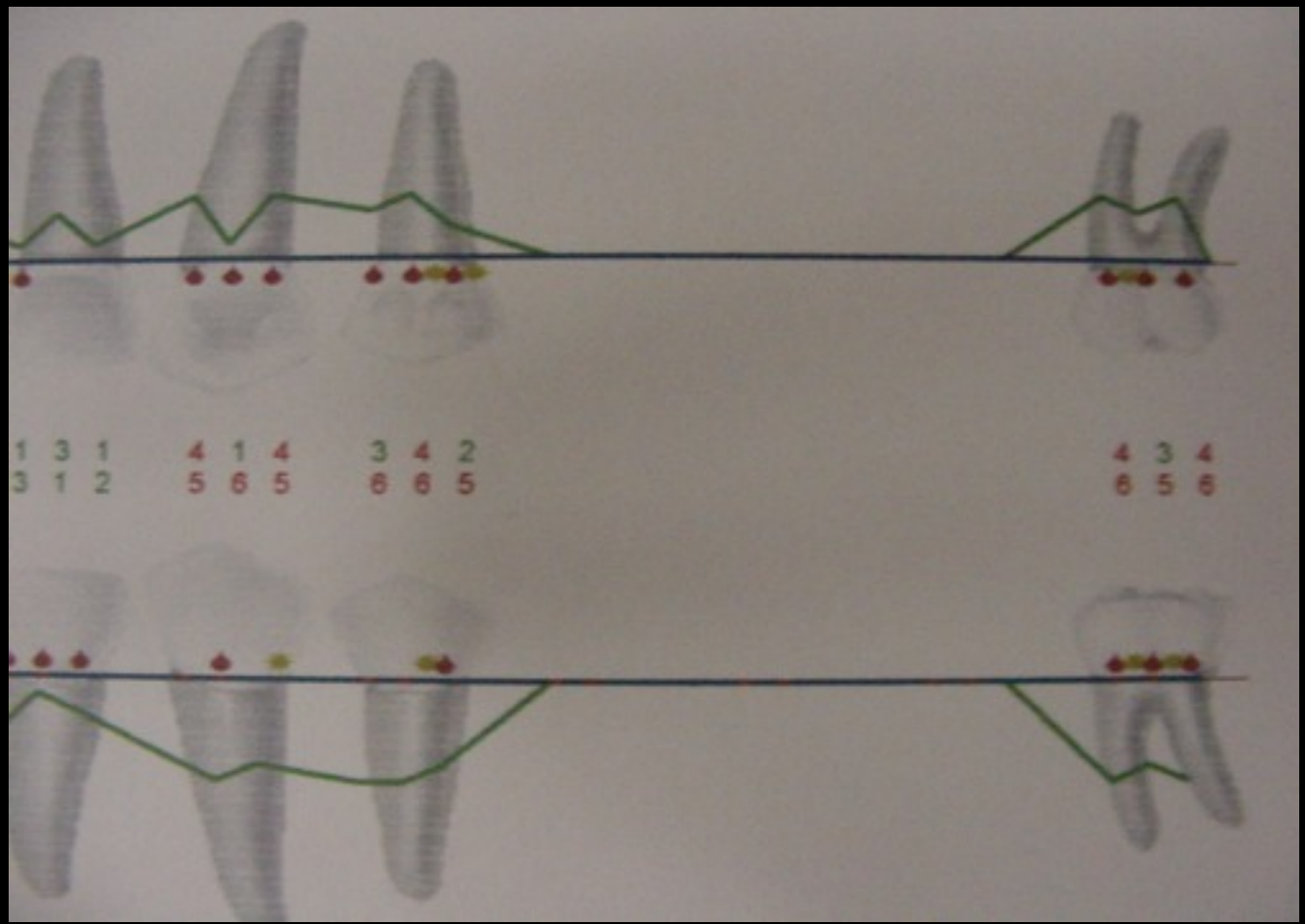
May 2004

1200+ laser hygiene procedures

General Guidelines

- Document full probe readings, including bleeding on probing, at initial appt. (should include a gross supragingival scaling of teeth)
- Lase any areas that bleed on probing, even if less than 4mm. Pockets under 4mm may only need to be decontaminated.
- Determine whether sulcular debridement is necessary by the appearance of the tissue. If the tissue is bulbous, debridement followed by pocket decontamination is indicated.
- Review probing depths and devise a treatment plan, starting with the deepest pockets as these areas will be retreated at subsequent sessions.


Patient ID: 59101
SSN #:
Chart #:
Current Chart
Dates: 09/13/05 (saved) 09/14/2005
2 3 4/A 5/B 6/C 7/D 8/E 9/F 10/G 11/H 12/I 13/J


1 3 1
3 1 2
4 1 4
5 6 5
3 4 2
6 6 5
4 3 4
6 5 6

- Healthy 1-3mm Initial
- Gingivitis 1-3mm Plus Laser
- Early Perio 4mm 1 session
- Slight Perio 5mm 2 sessions
- Mod. Perio 6mm 3 sessions
- Adv. Perio 7+mm 4+ sessions
- Rule of Thumb: deepest pocket measurement-3= # sessions needed

- Typical Session

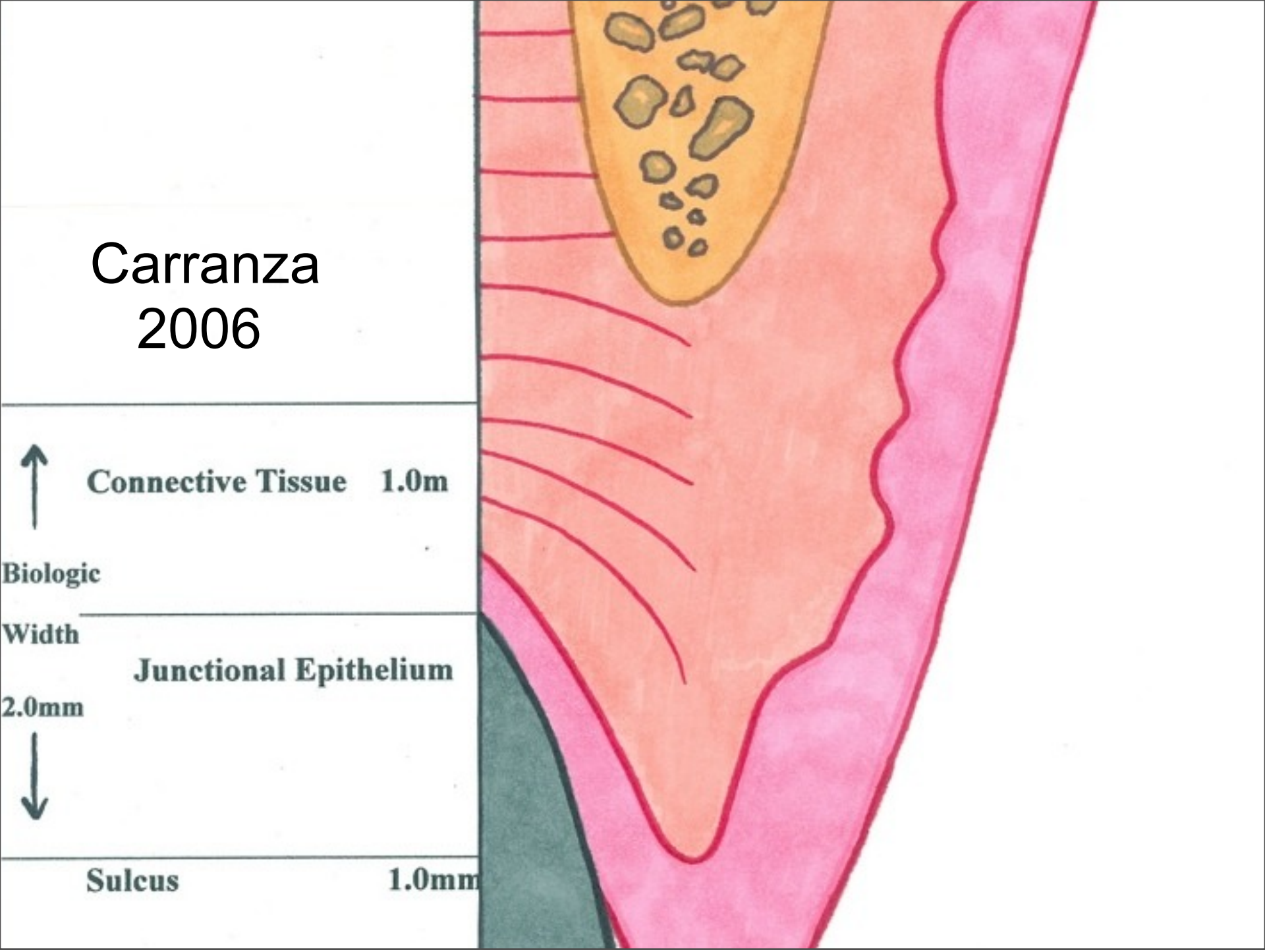
1. Anesthesia/Analgesia if necessary
2. Laser Bacterial Reduction (Decontamination)
3. Ultrasonic Scaling
4. Hand Instrumentation
5. Laser Debridement (curettage) pockets above 4mm

- Typical Session continued

6. Subgingival Irrigation with HP-CHX
7. Repeat LBR
8. Post-op Instructions
9. Home Care Instructions

THIS PROGRAM IS CONTINUAL!

Carranza 2006



.25W 7% water 11% air 20 PPS

Laser Bacterial Reduction

.25W 7% water 11% air 20 PPS

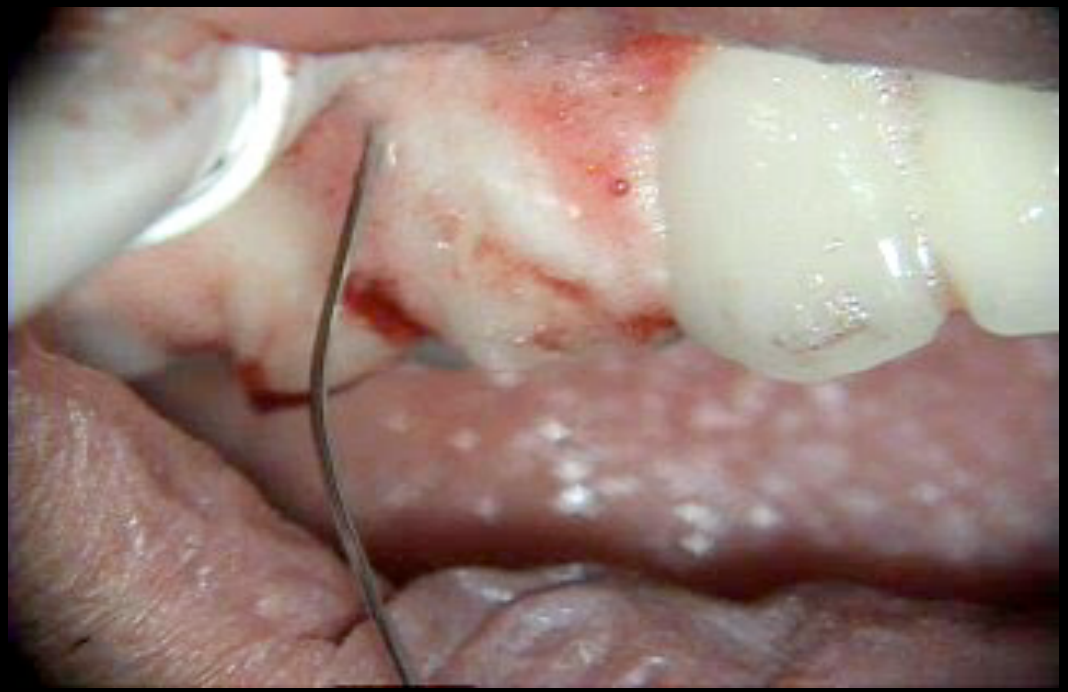
Laser Bacterial Reduction

- PSRP

- PSRP

- Hydrogen peroxide and Chlorhexadine

- Hydrogen peroxide and Chlorhexadine



- Flush thoroughly with water

- Flush thoroughly with water

- .5-.75W 15% water 25% air 20 PPS

Laser Debridement

- .5-.75W 15% water 25% air 20 PPS

Laser Debridement

.25W 7% water 11% air 20 PPS

.25W 7% water 11% air 20 PPS

- The ultimate goal is to reduce pocket depth below 4mm and no bleeding on probing.
- The picture of health is always beautiful!


Cassis
DENTAL CENTER
IMPROVING LIVES ONE
SMILE AT A TIME

Time for Hard and Soft Tissue Demonstrations!

Hangin' Out in Chattanooga!

Hangin' Out in Chattanooga!

Do your work with your whole heart and you will succeed-there is so little competition.

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Elbert Hubbard, 1865-1915
American writer


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