Treatment Planning

Beginning With The End In Mind

Shankar Iyer DDS, MDS,
Clinical Asst. Prof.

When Can We Start?

Where Do We Begin?

Golden Principle # 1- Establish the Diagnosis

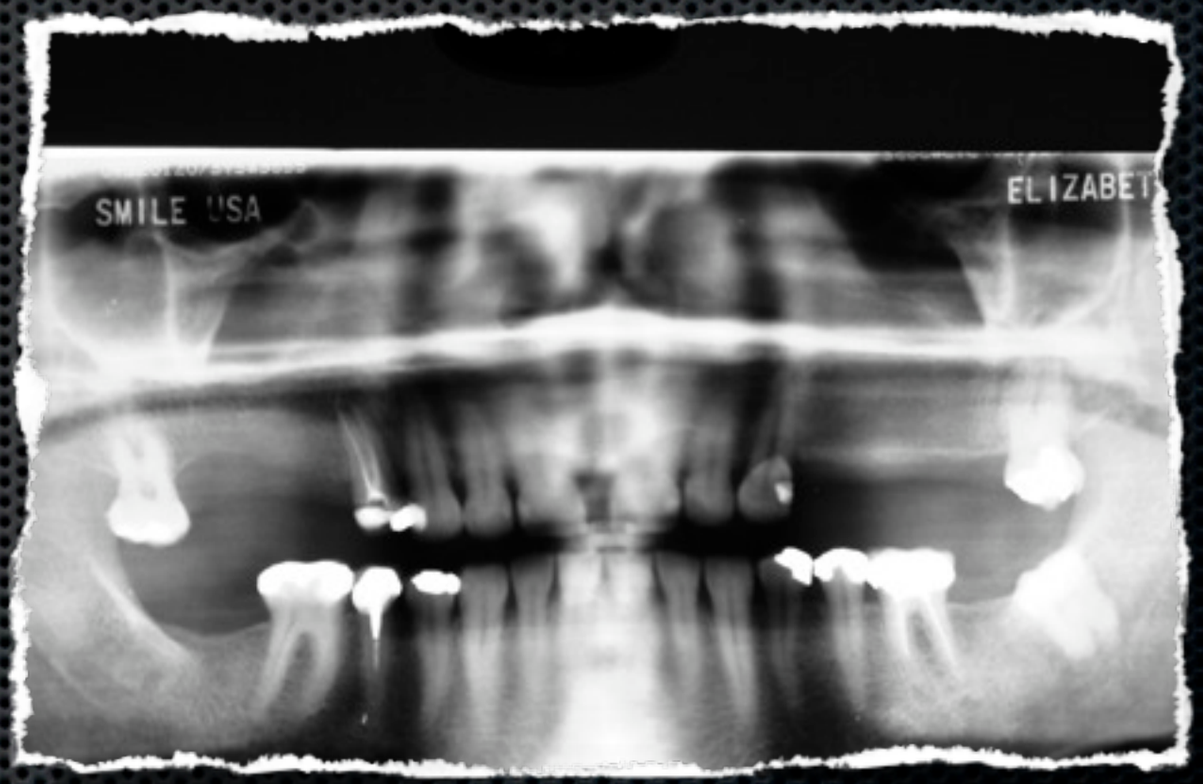
Diagnosis - Single Tooth

Golden Principle # 1- Establish the Diagnosis

Diagnosis - Single Tooth

Diagnosis For - Partially Edentulous

Diagnosis For - Partially Edentulous



Diagnosis For Complete Arch

Diagnosis For Complete Arch

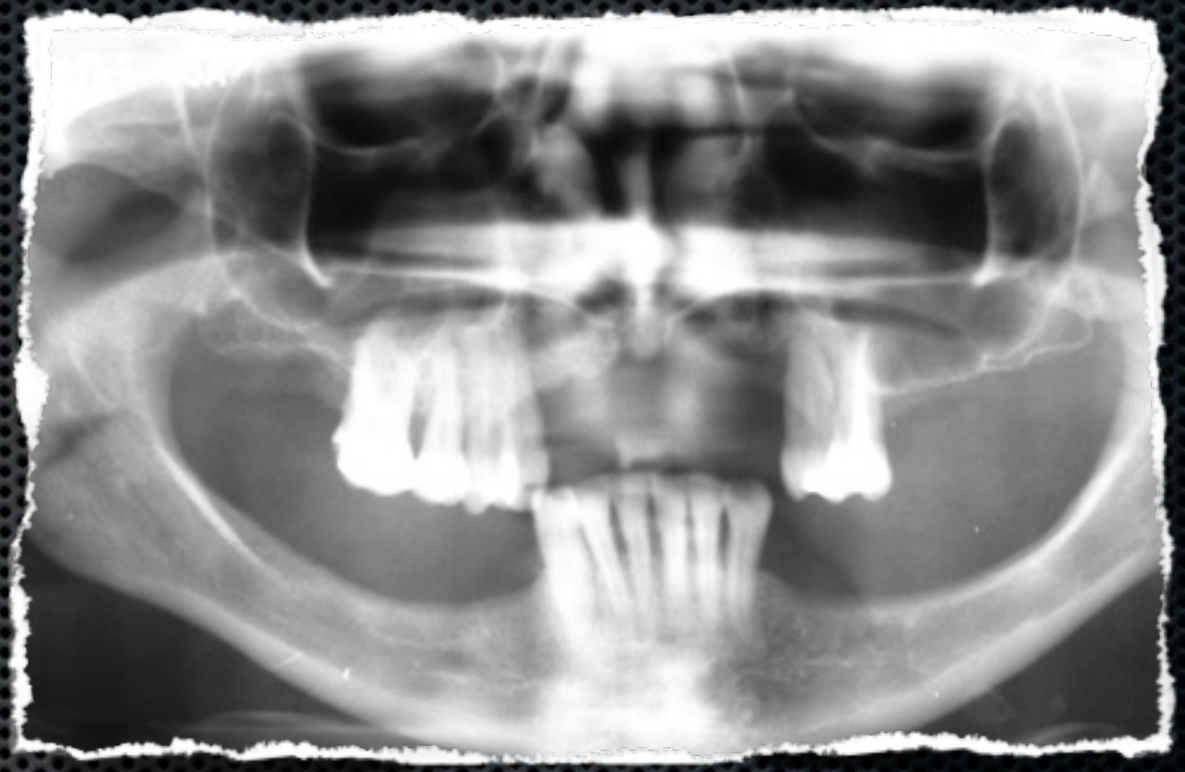
Golden Principle# 2: Succeed With An Interim First

Golden Principle# 2: Succeed With An Interim First

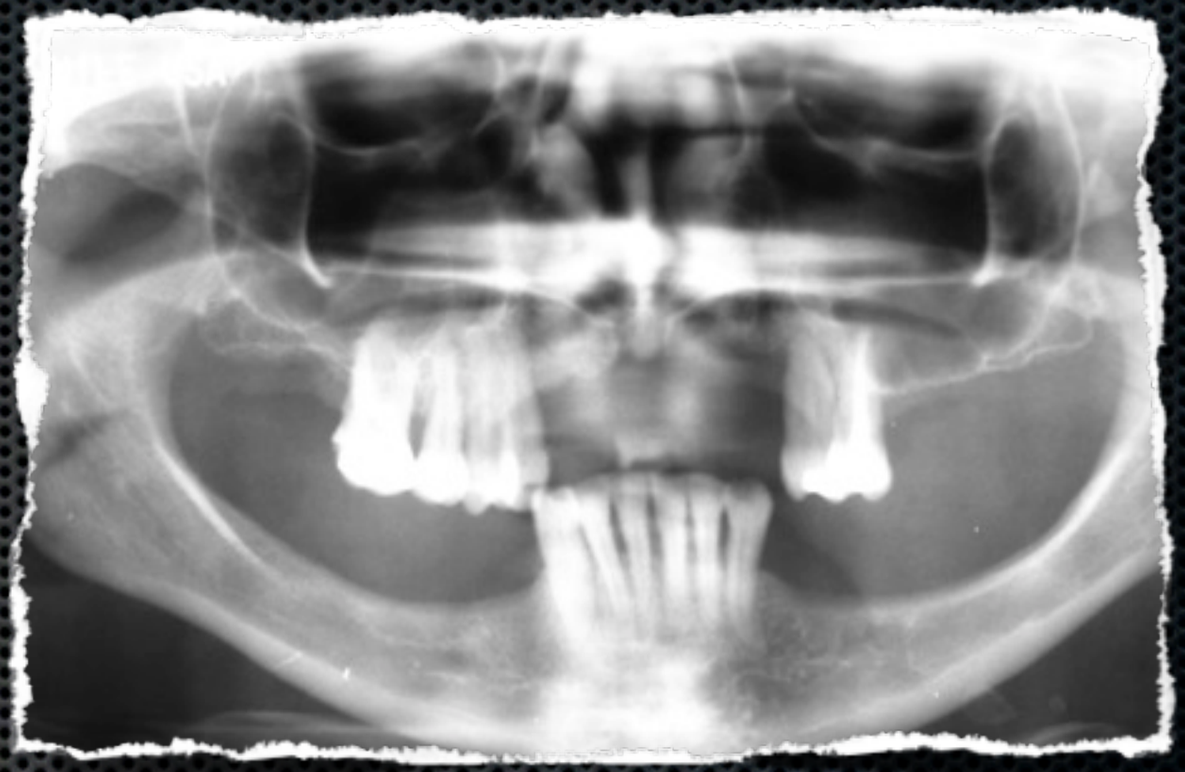
Golden Principle# 2: Succeed With An Interim Partial

Golden Principle# 2: Succeed With An Interim Partial

Golden Principle# 2: Succeed With An Interim - Complete



Golden Principle# 2: Succeed With An Interim - Complete



Golden Principle #3: Determine the Final Prosthesis (End in Mind)

Fixed

Single Tooth

Fixed Bridge

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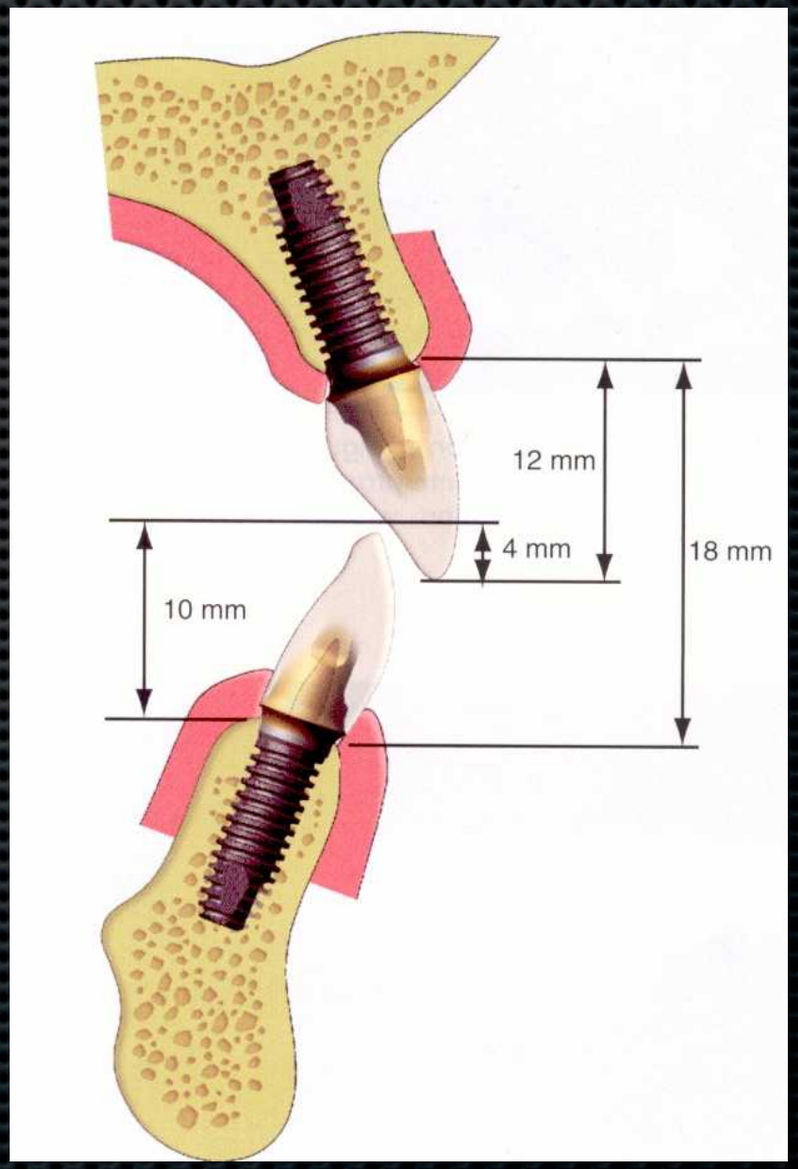

FP 1

Golden Principle #3: Determine the Final Prosthesis (End in Mind)

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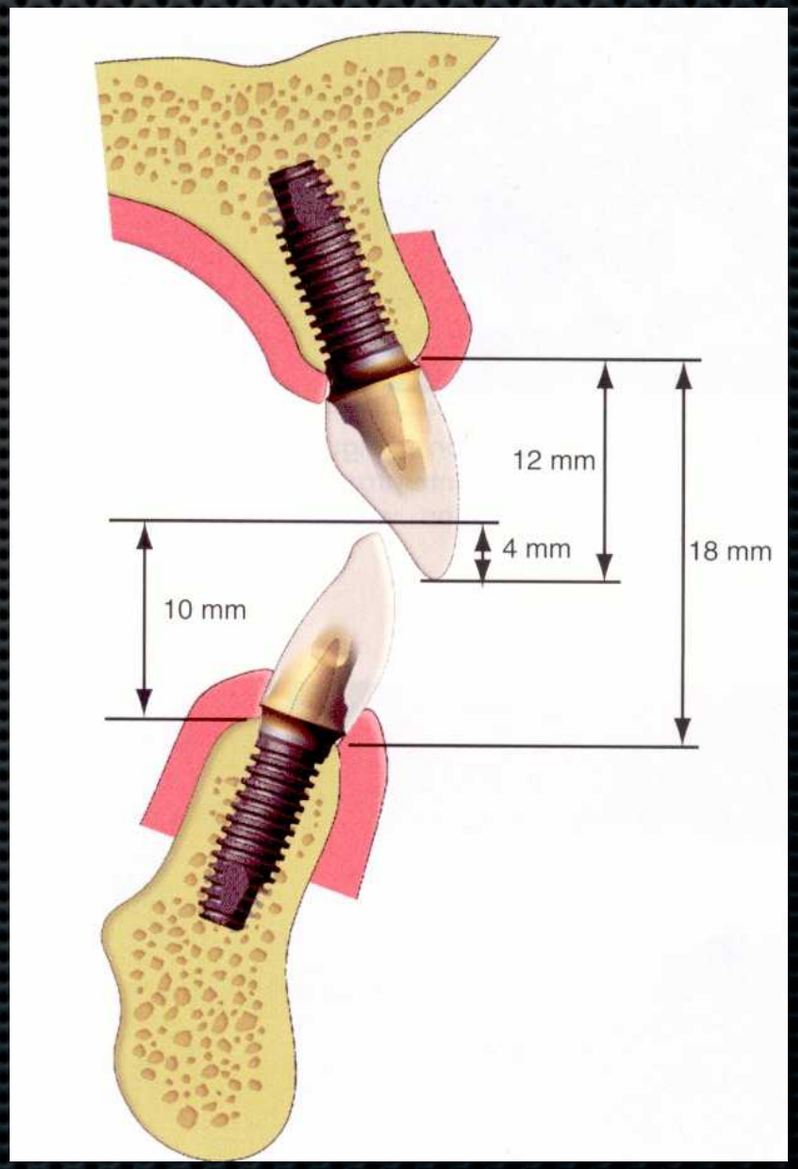

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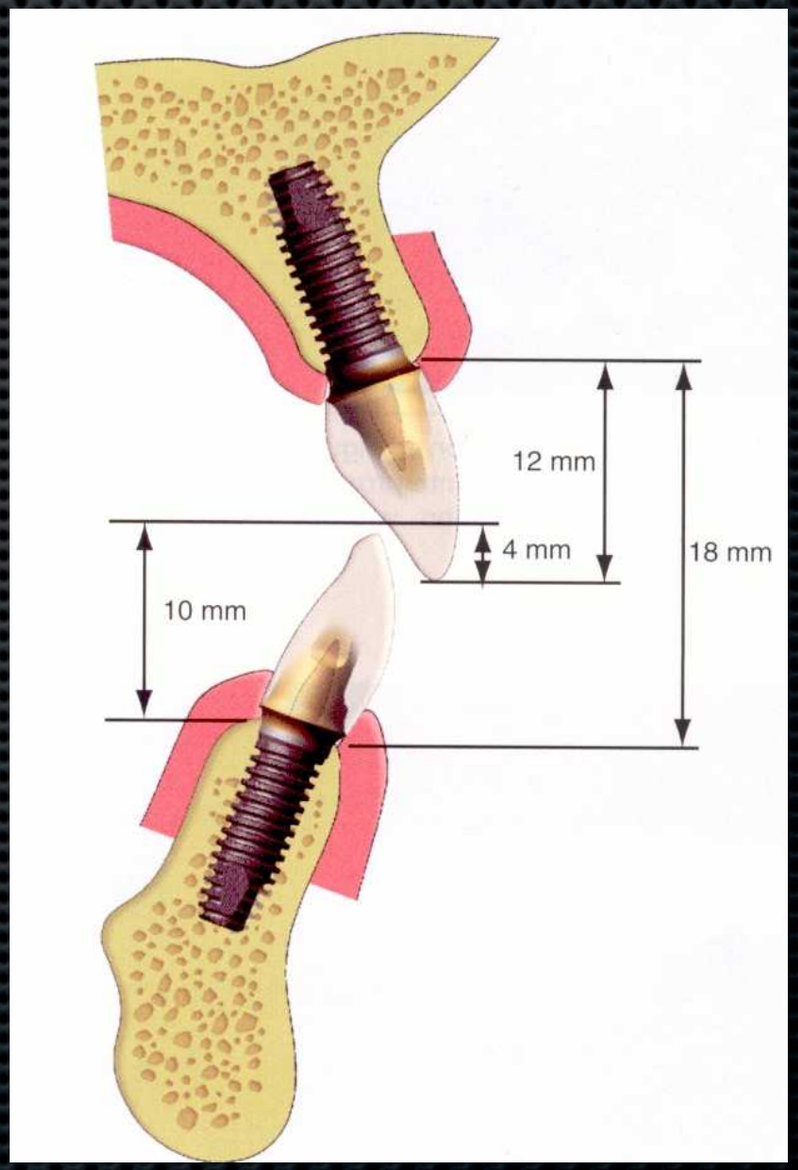

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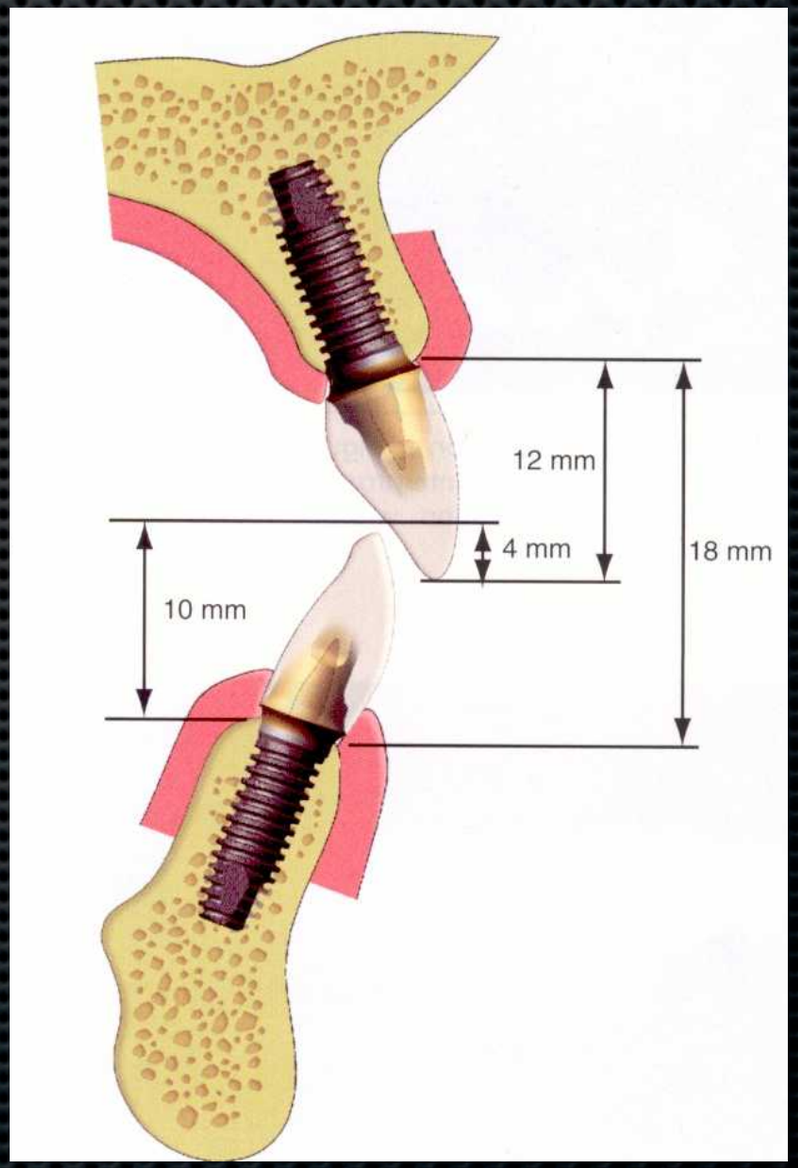

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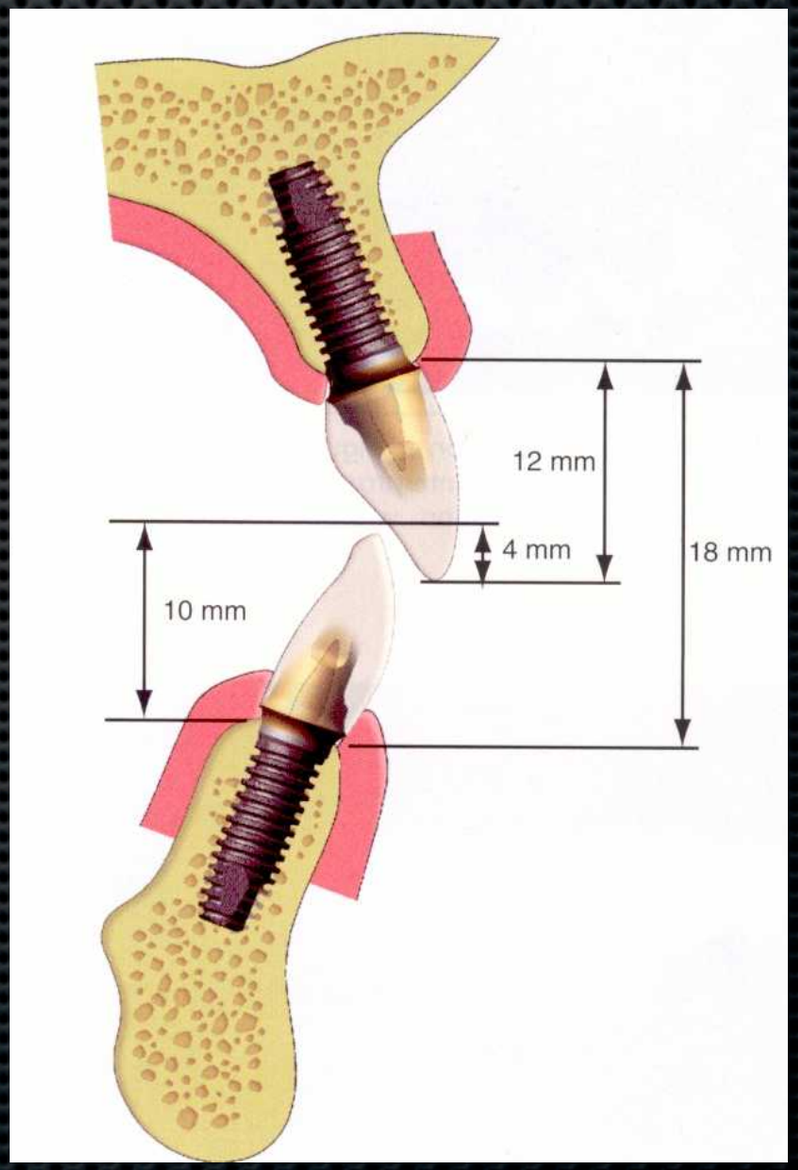

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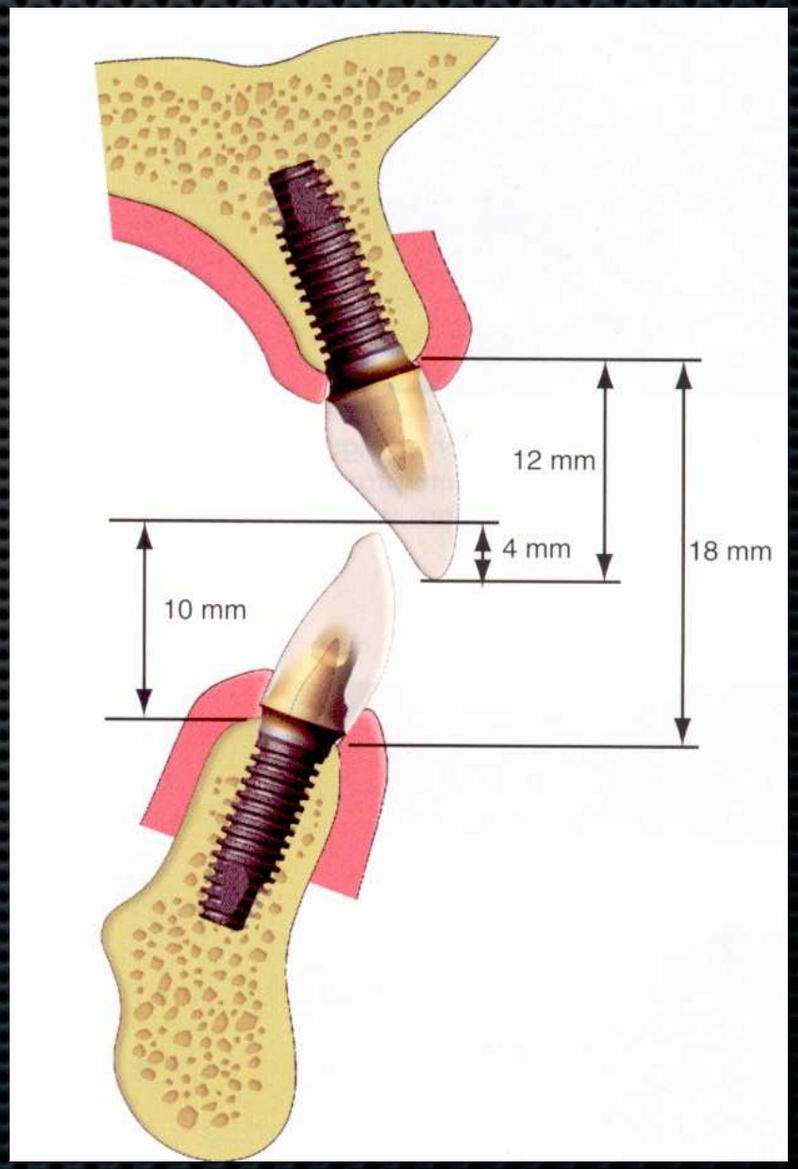

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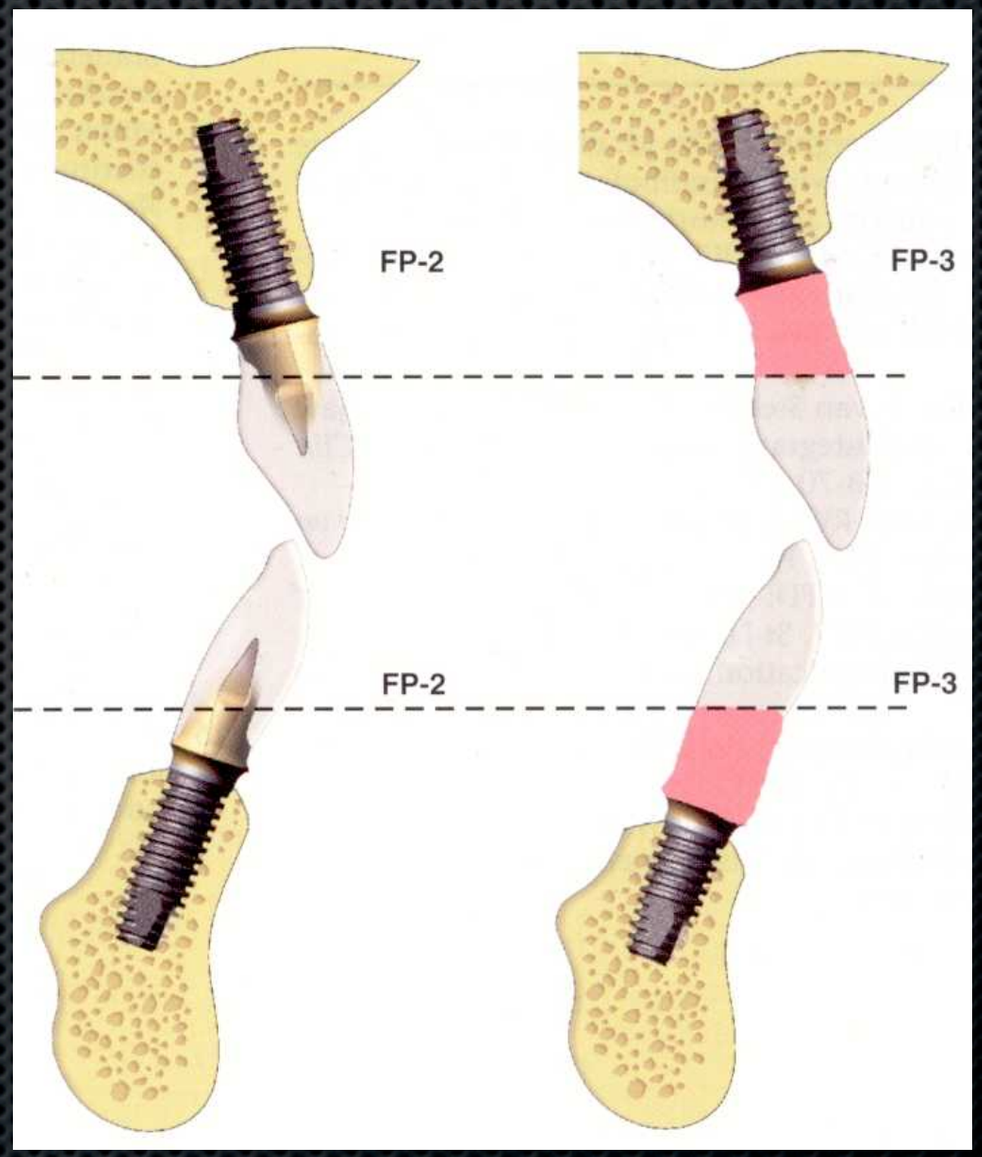
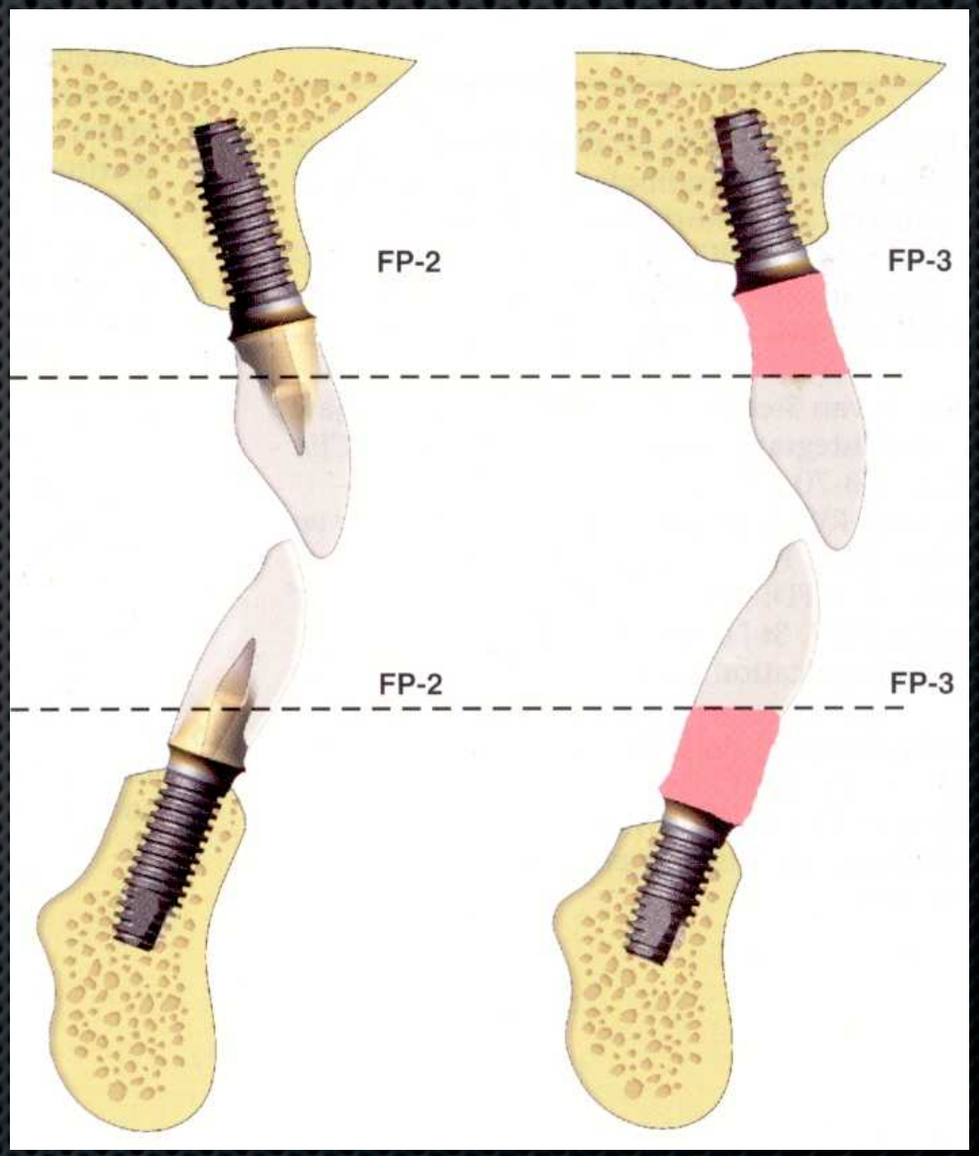


FP 2 and 3

Golden Principle #3: Determine the Final Prosthesis (End in Mind)

Fixed



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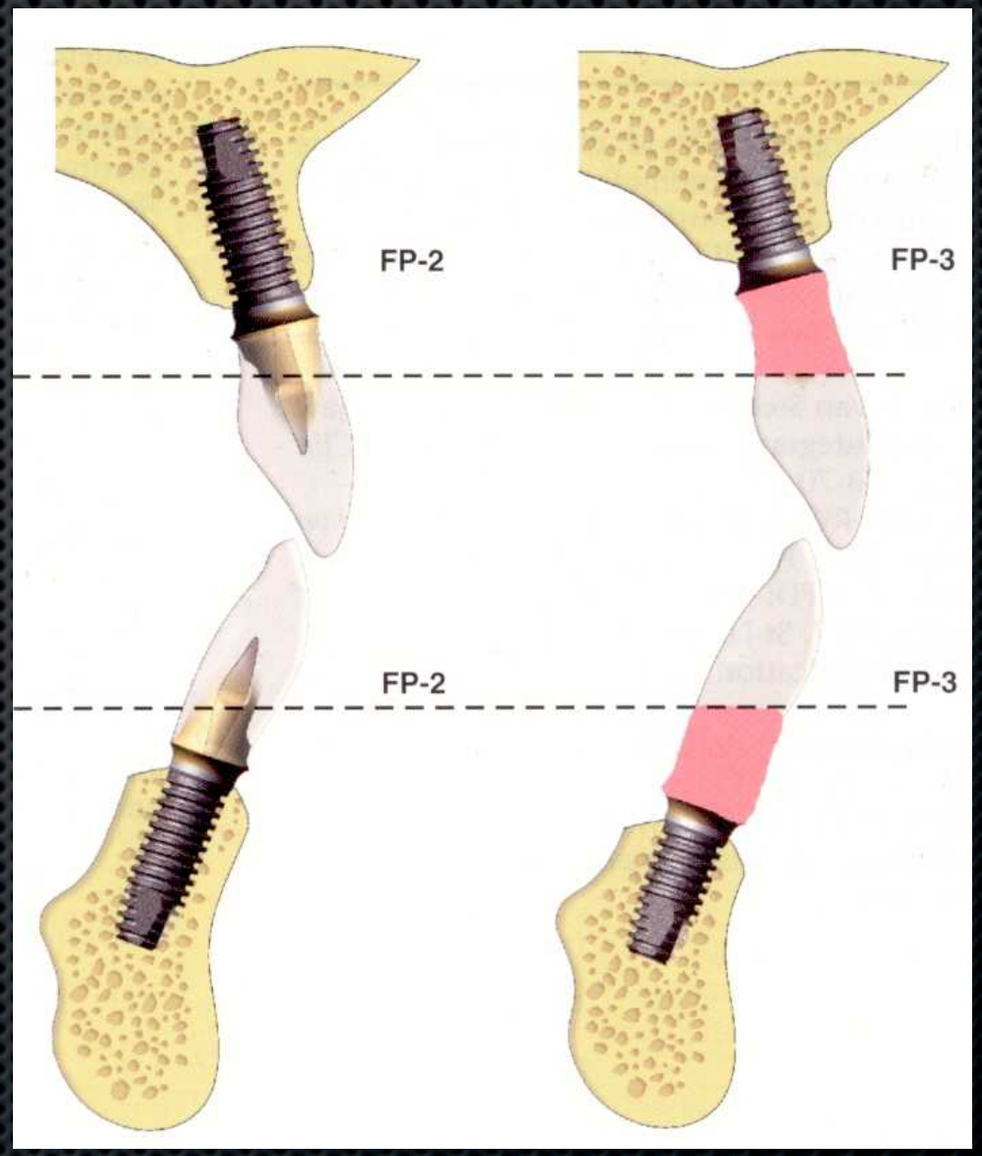

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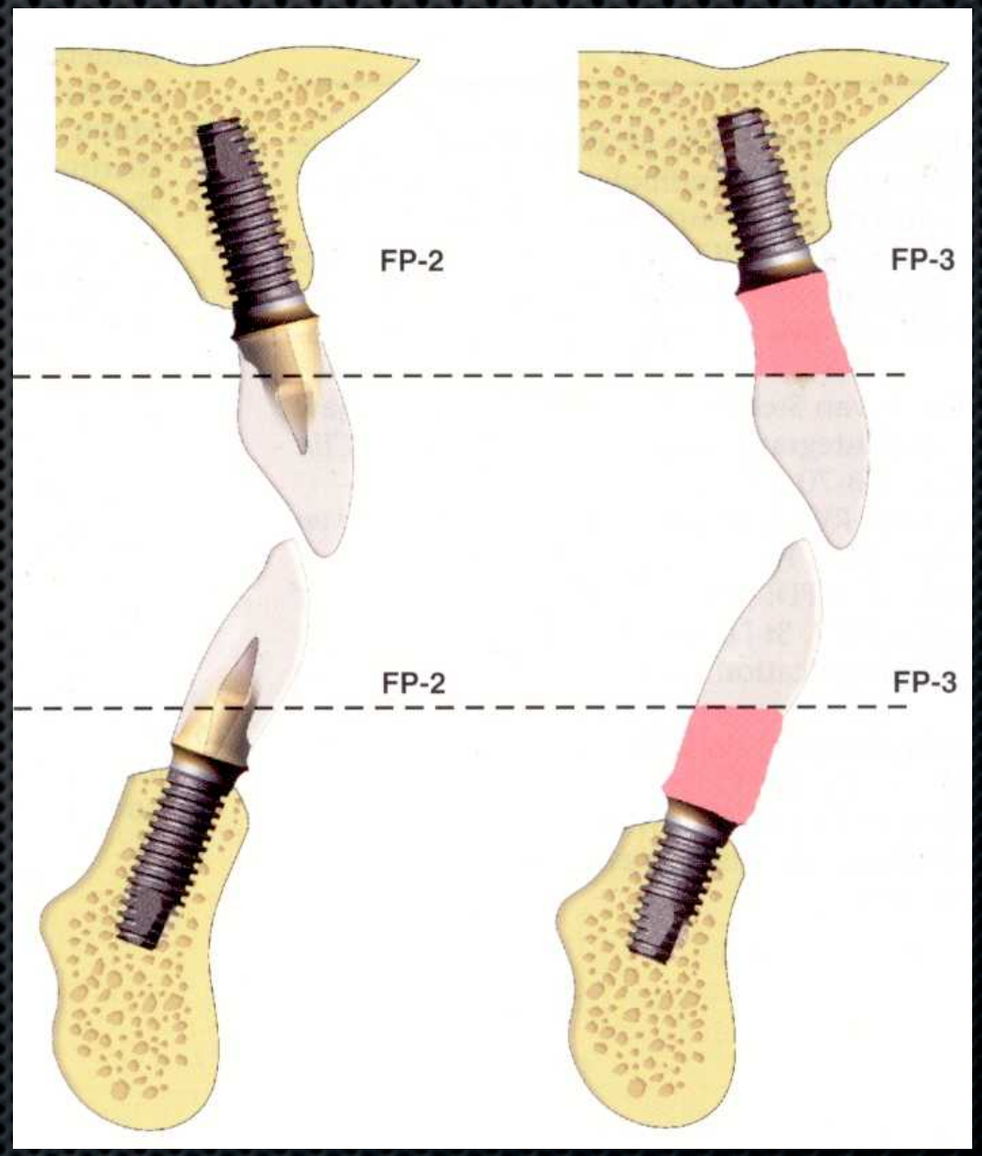

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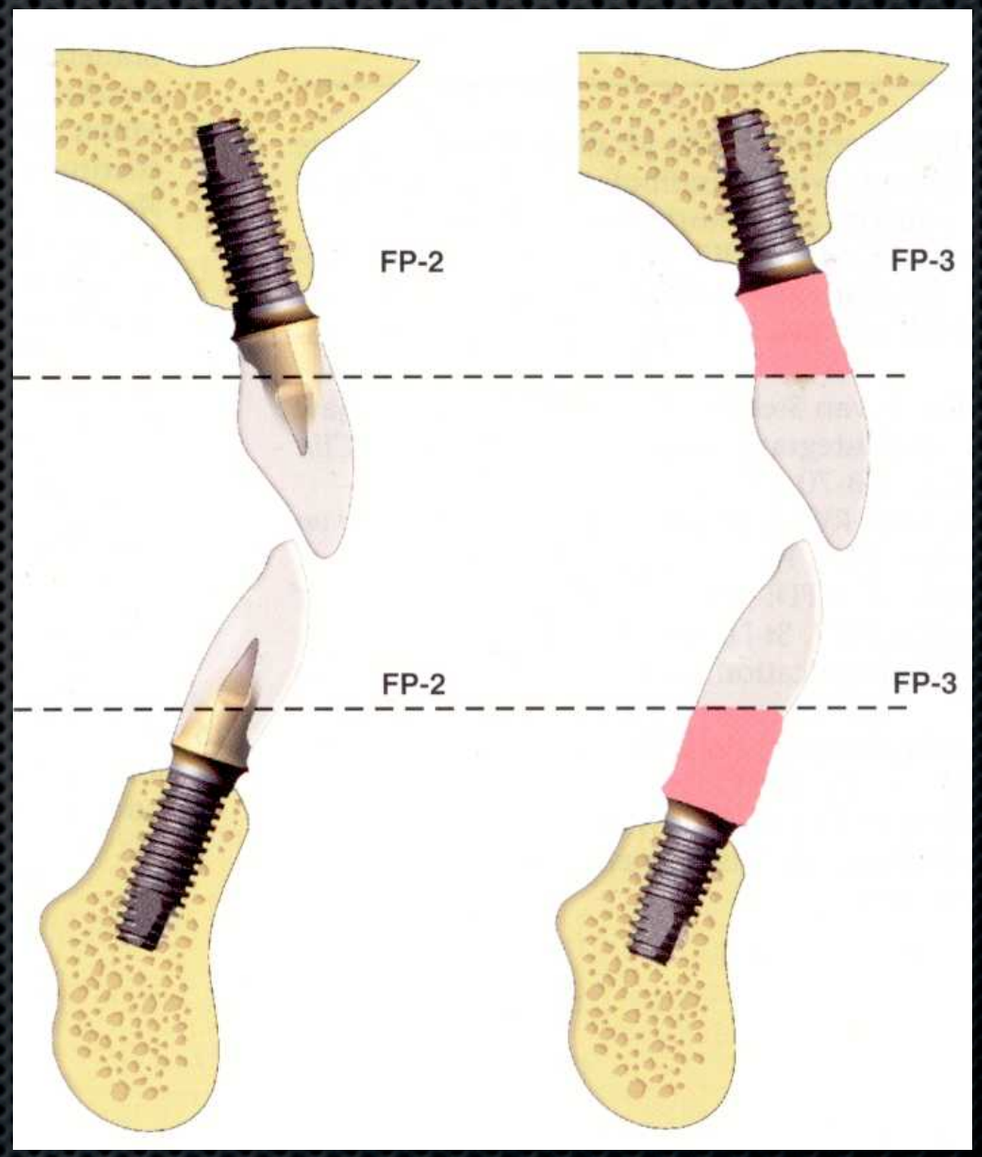

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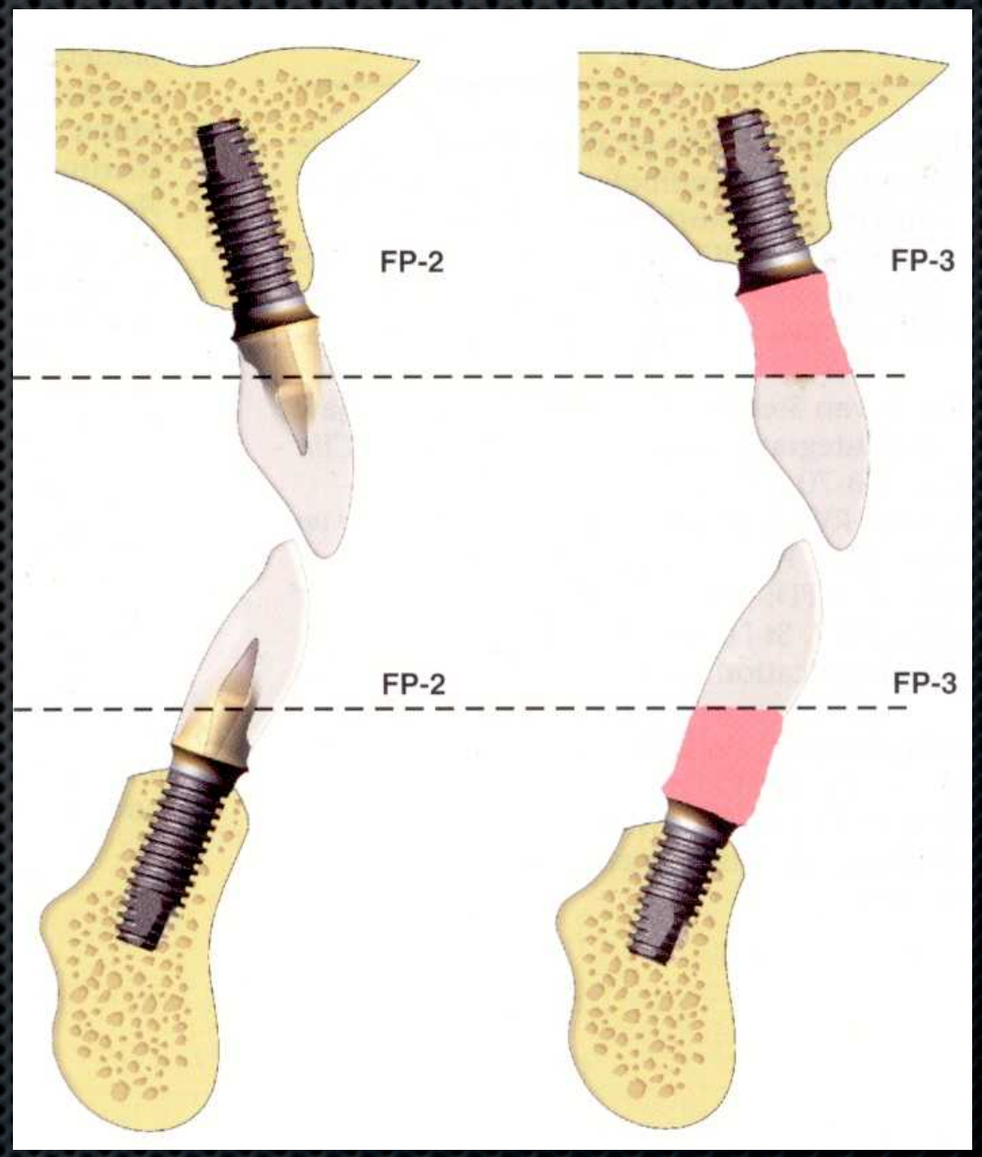

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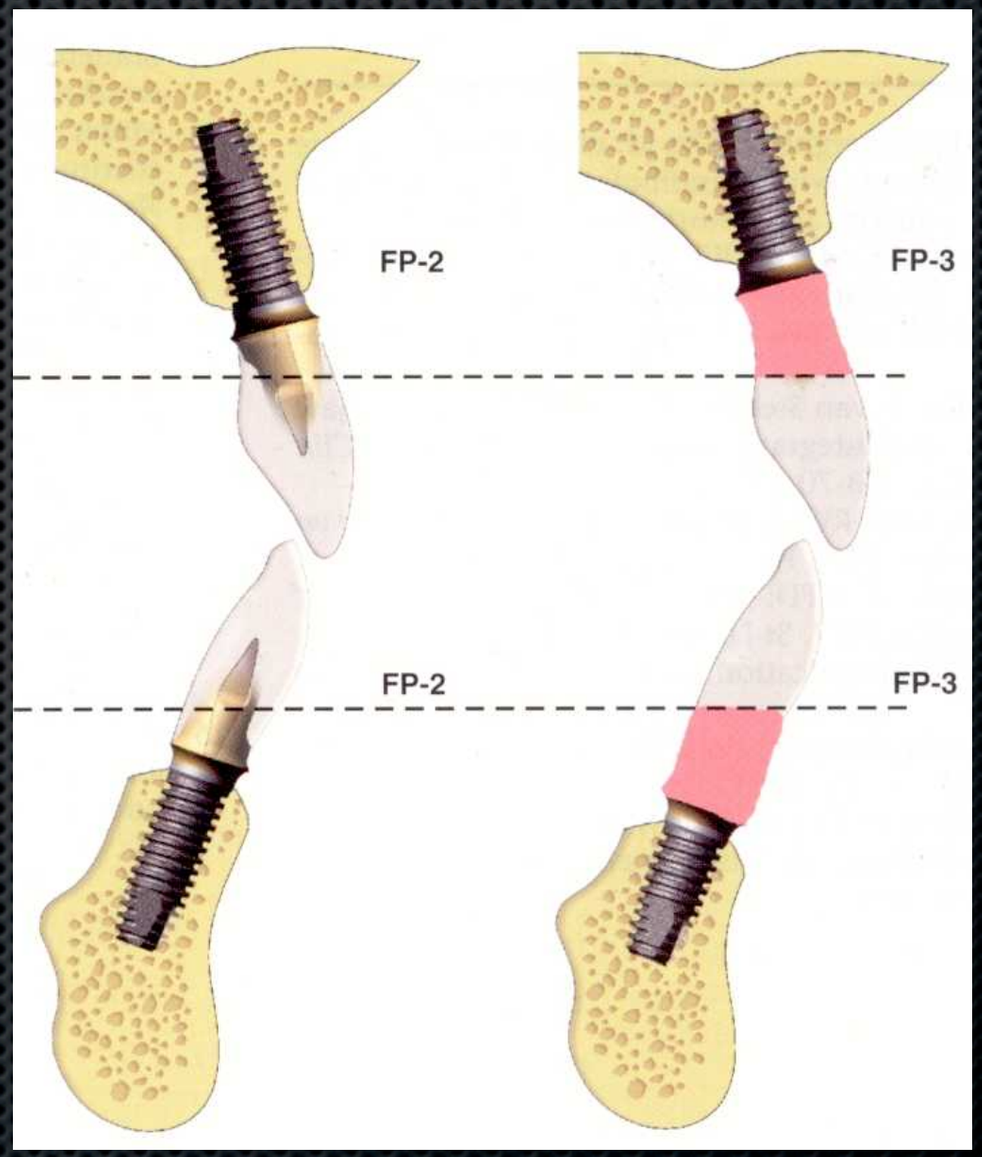
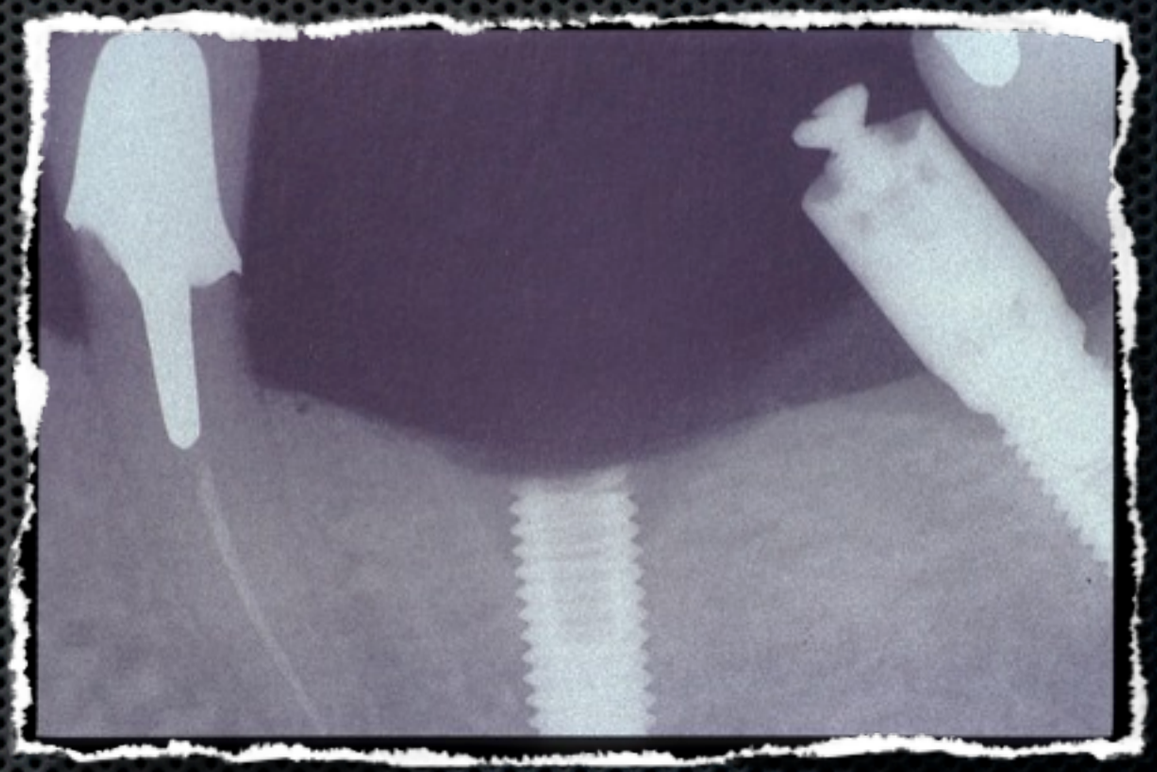


FP 2 and 3

Golden Principle # 4: The Primary Benefits of implants are support and retention

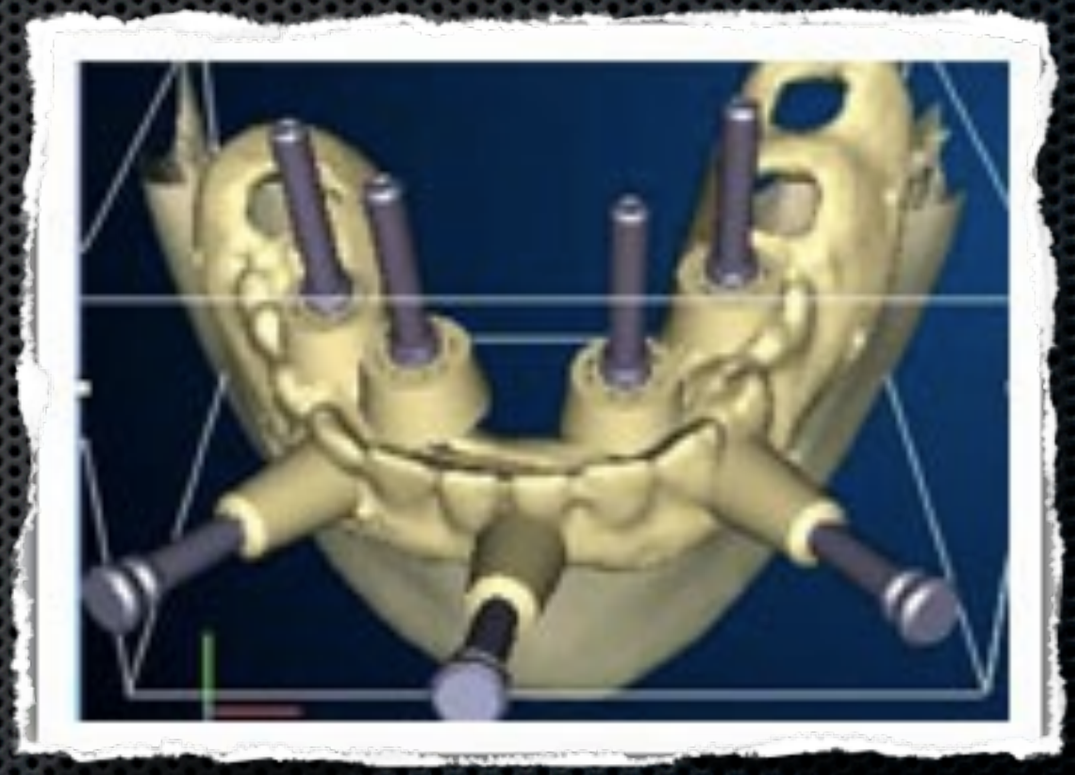
Corollary: Implants are never to be presented and sold primarily for Esthetic reasons

Golden Principle # 5: Dont Compromise Biomechanics for the sake of Economics



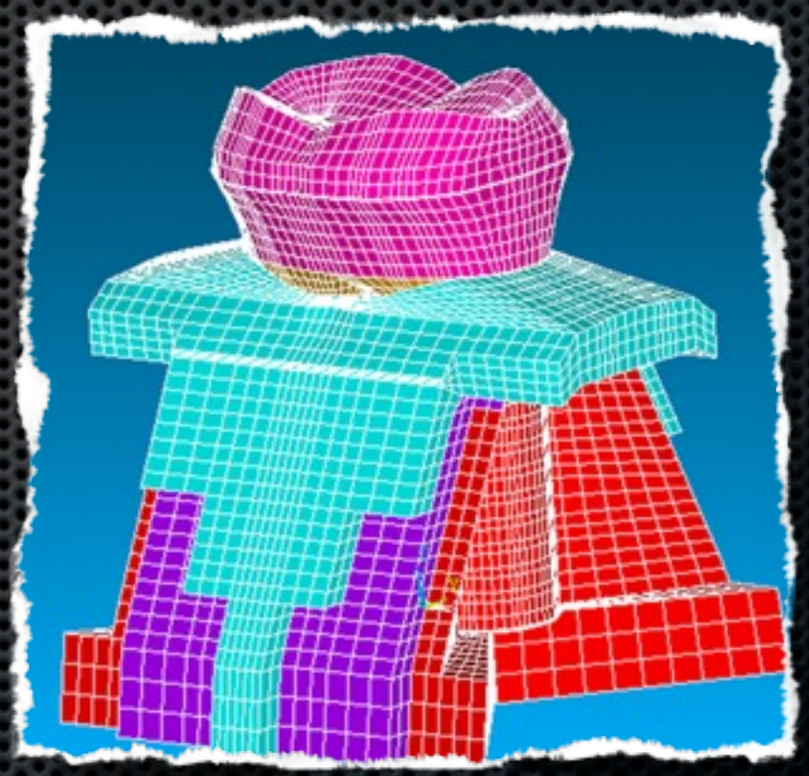
Corollary: Dont Compromise Biomechanics for the sake of Biologics

Golden Principle #6: Get Induced before being Seduced



Corollary: Technology is not a cop out for acquisition of skills

Golden Principle #7: What's New is New, What's Better Time Will Tell

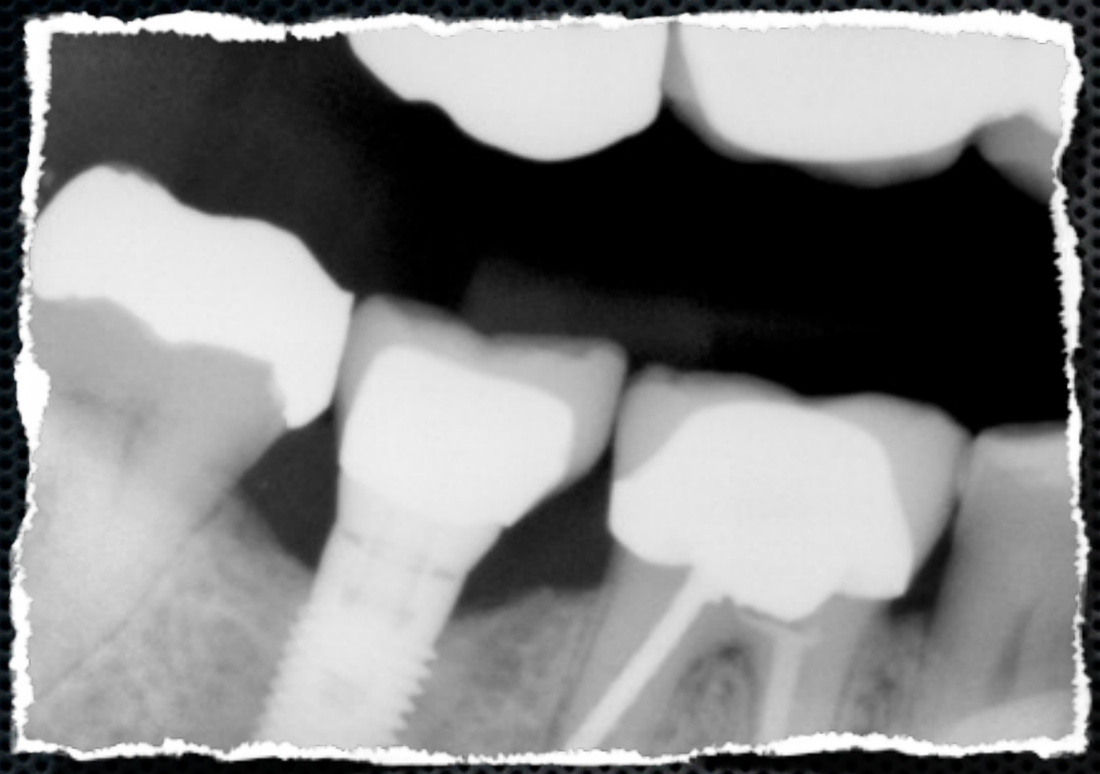


Corollary: Early Adopters are risk takers - HA, TPS, Sargon

Golden Principle #8: First Crawl, then Walk and then Run

Corollary: There is no medal for early finish

Golden Principle #8: First Crawl, then Walk and then Run



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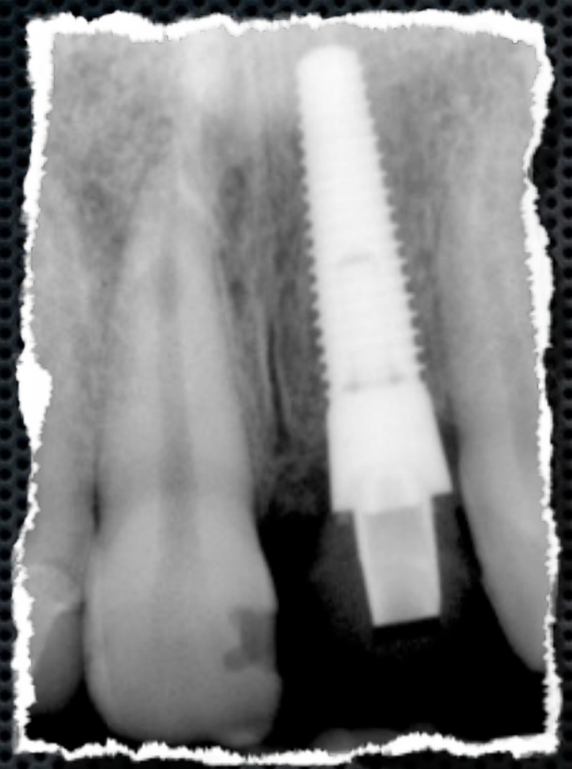

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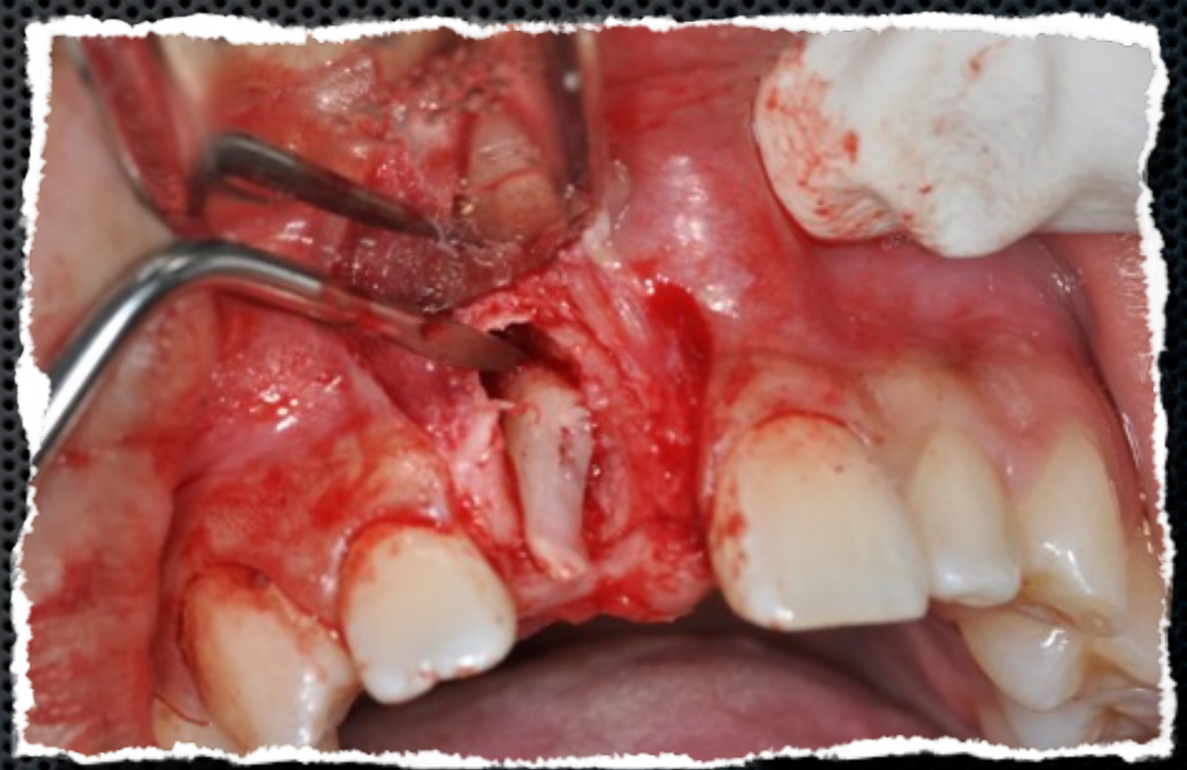

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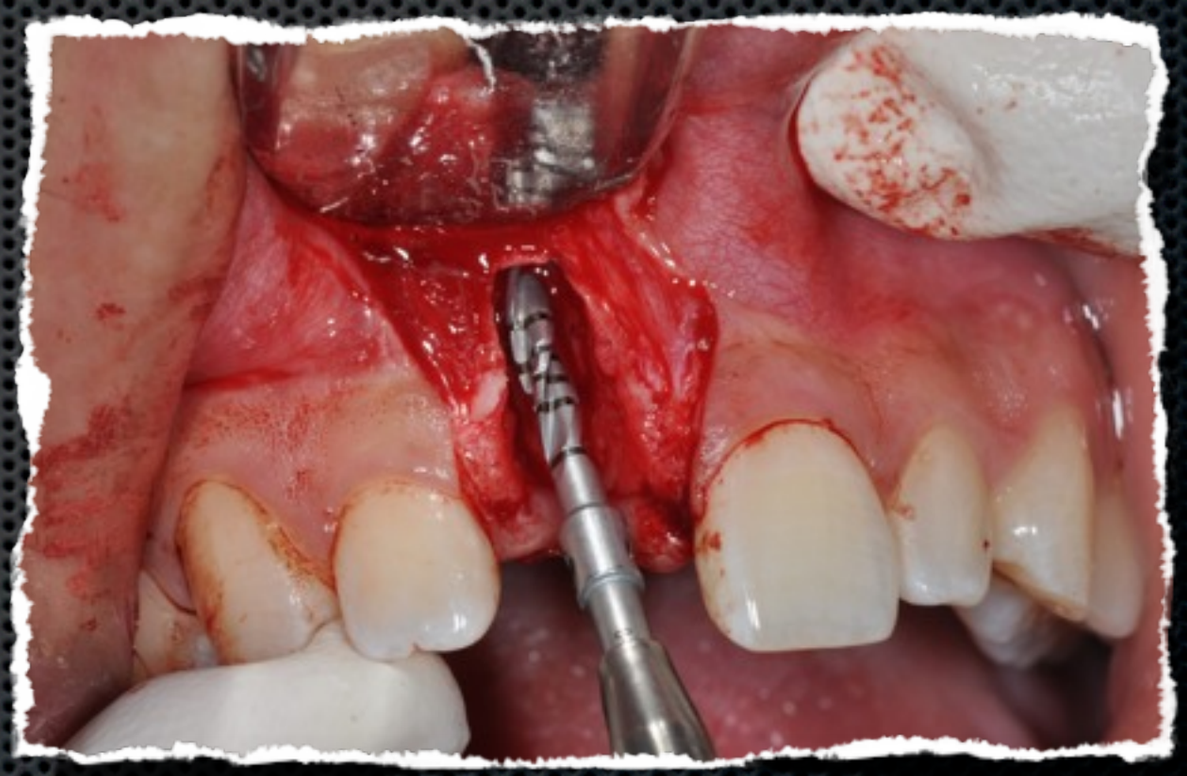

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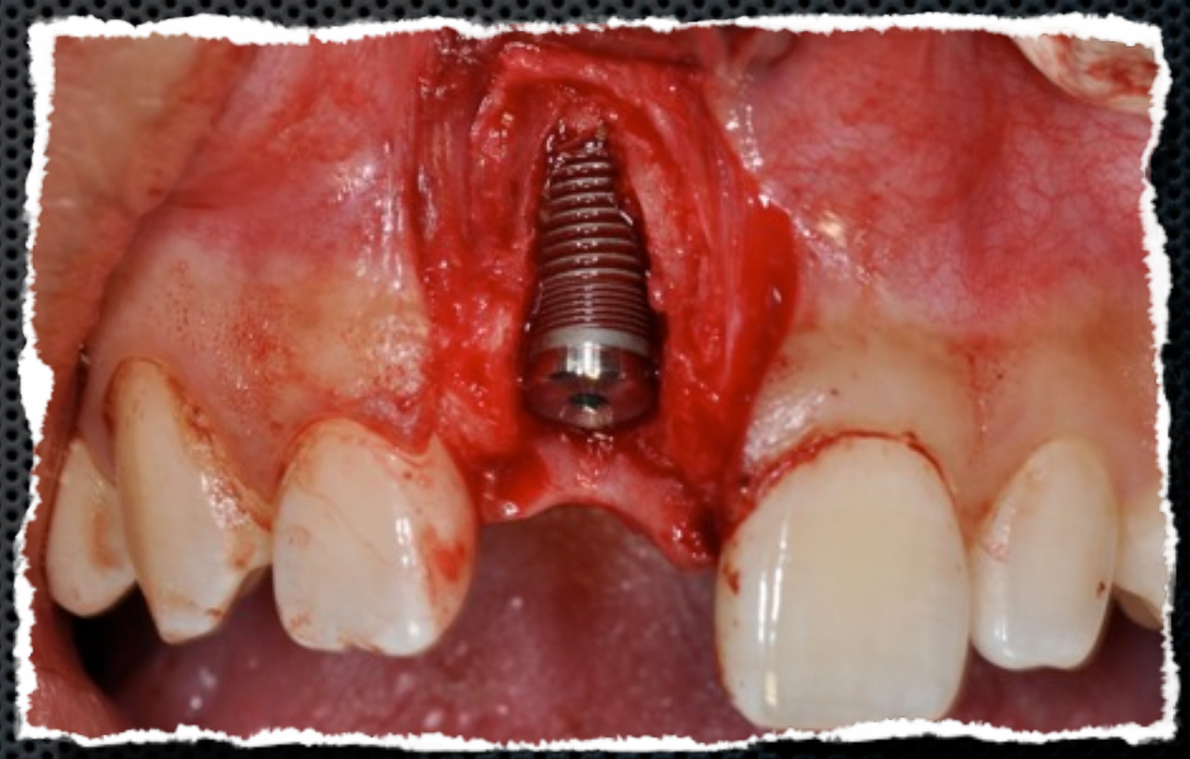

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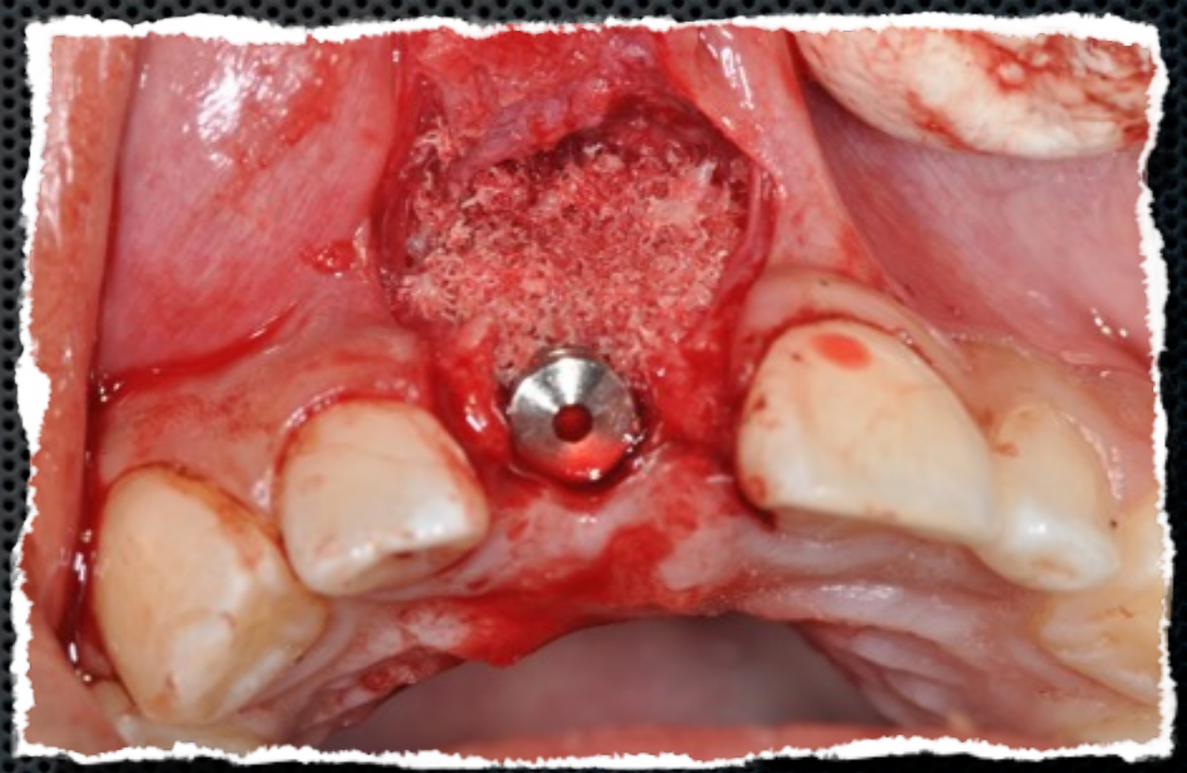

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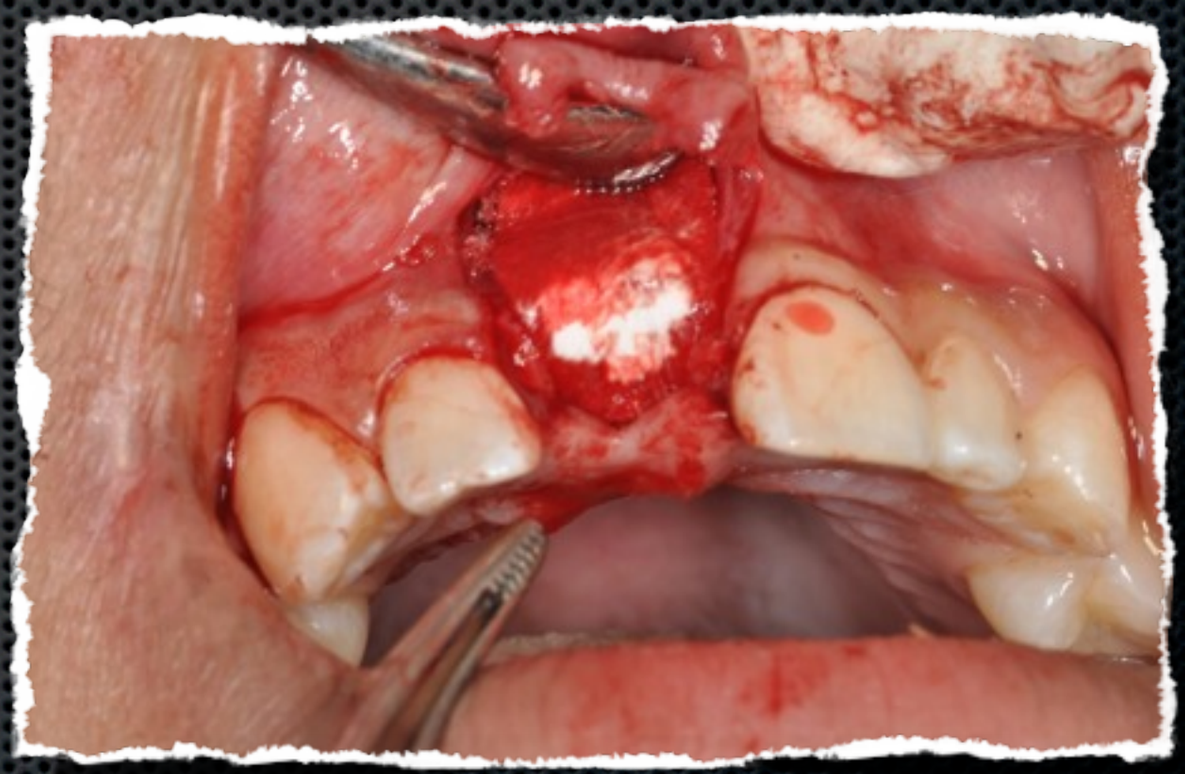

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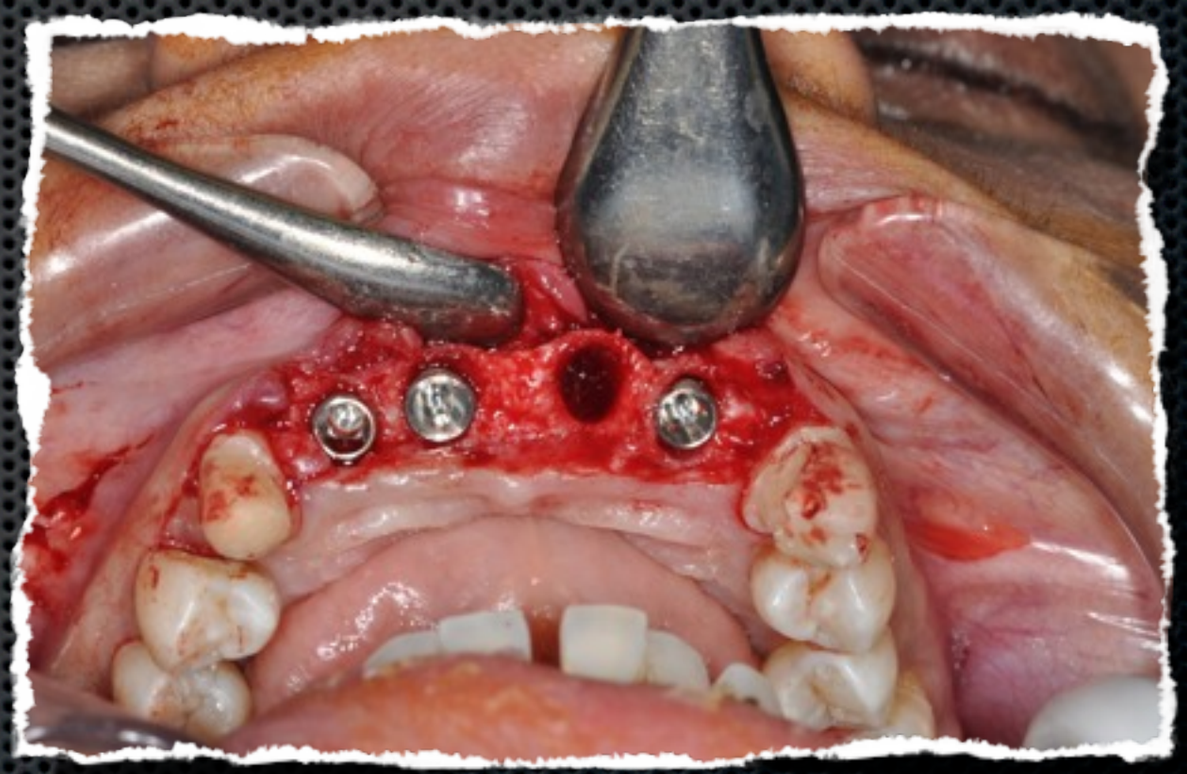

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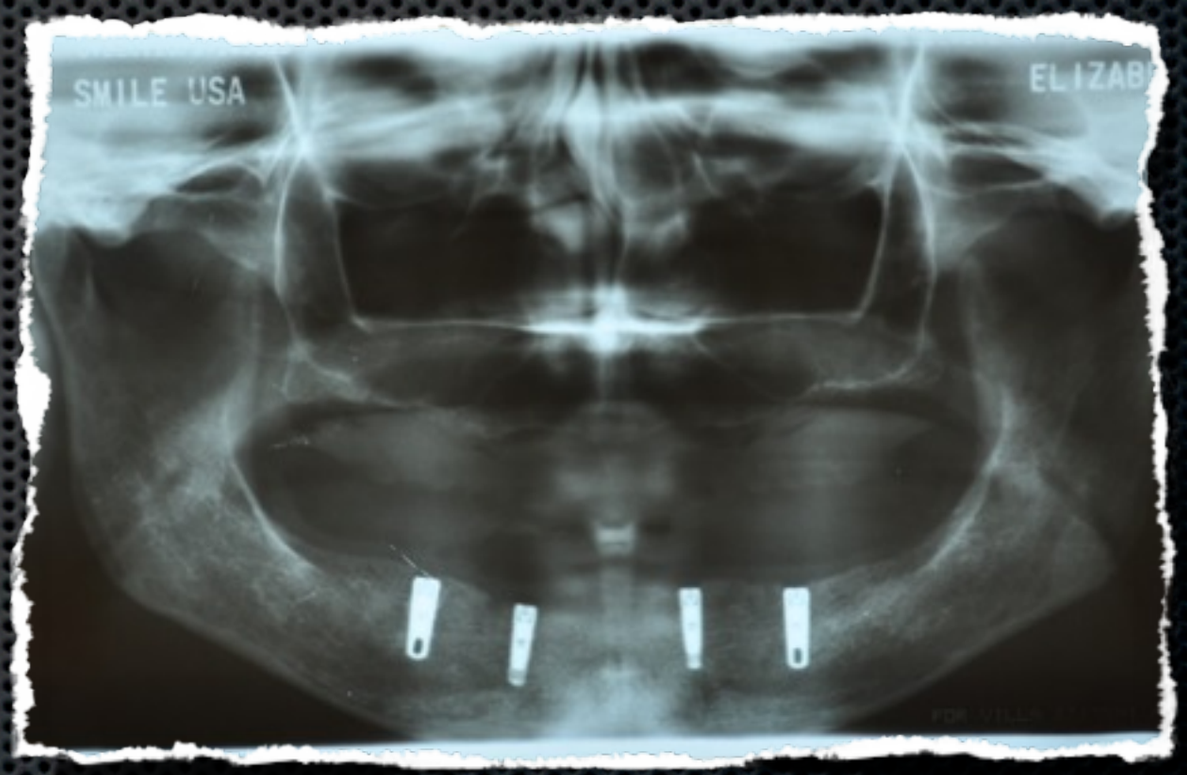

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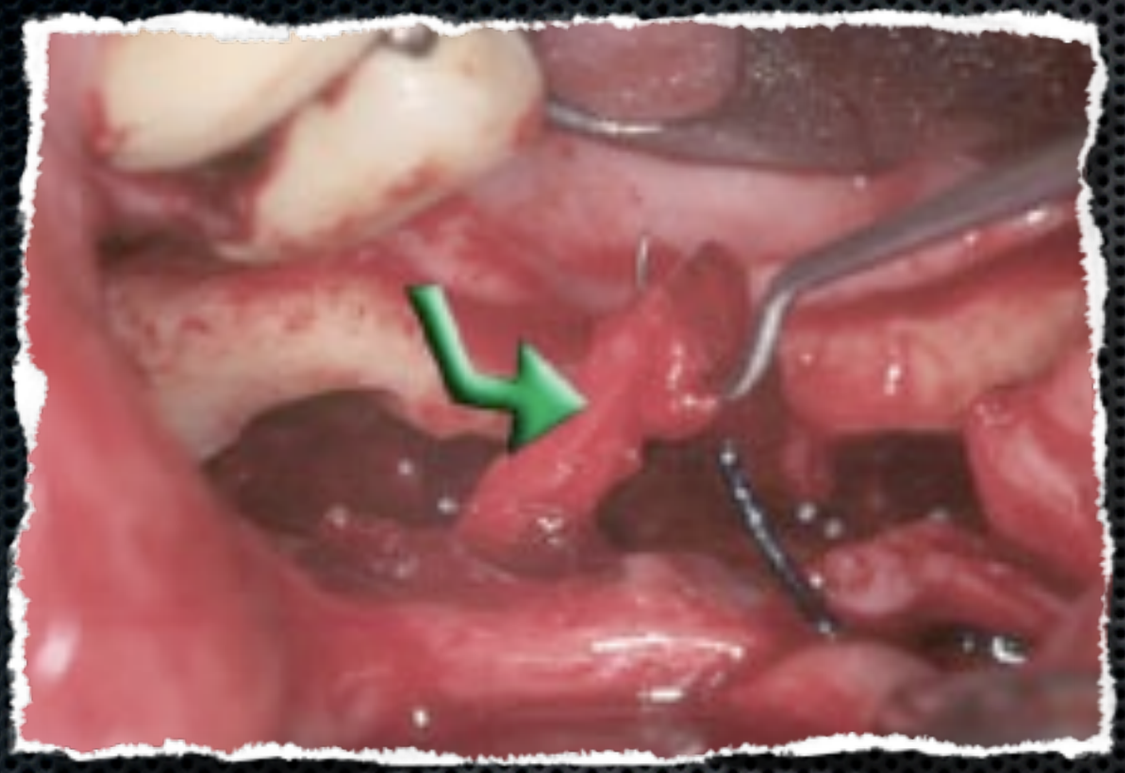
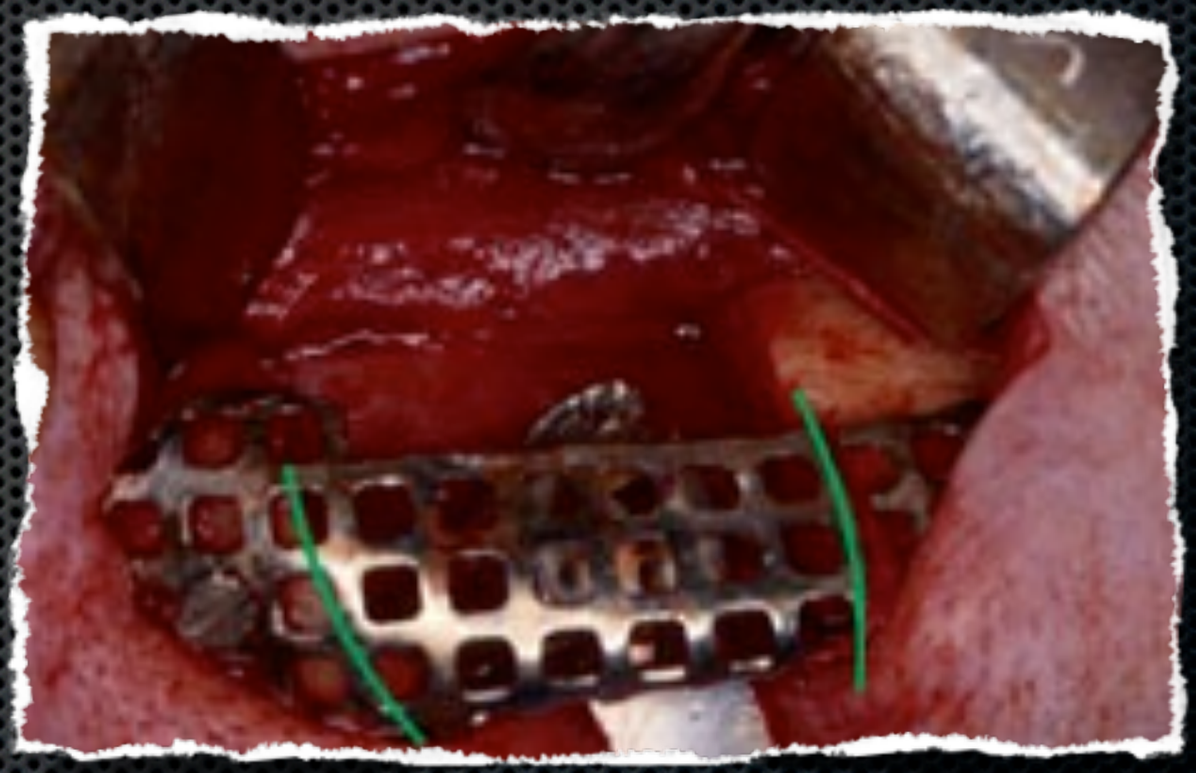
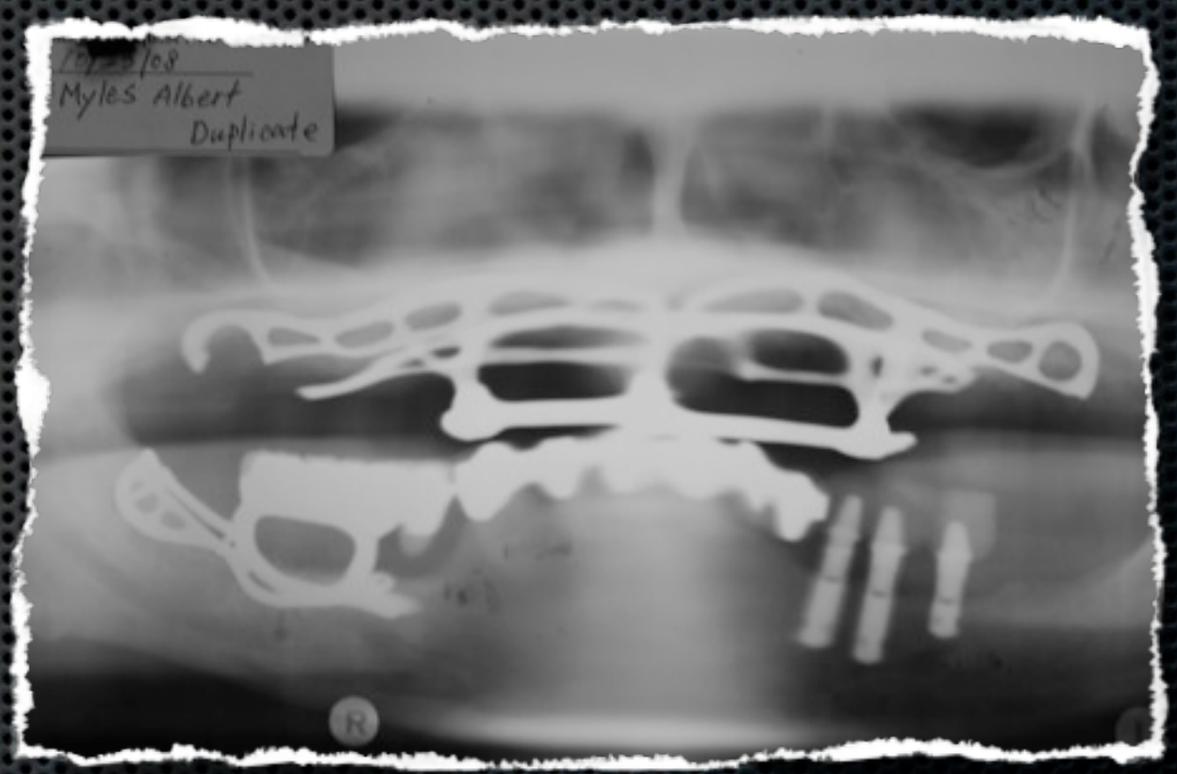
Golden Principle #9 : Know Your Limits and Take Measurable Leaps





Corollary: Refer when in doubt, and/or take additional training - interdisciplinary approach works best for the patient

Golden Principle #10 : Every technique works, but master that one that works in your hands



Corollary: Every Podium Presenter has a success story to narrate

Sequence of Planning

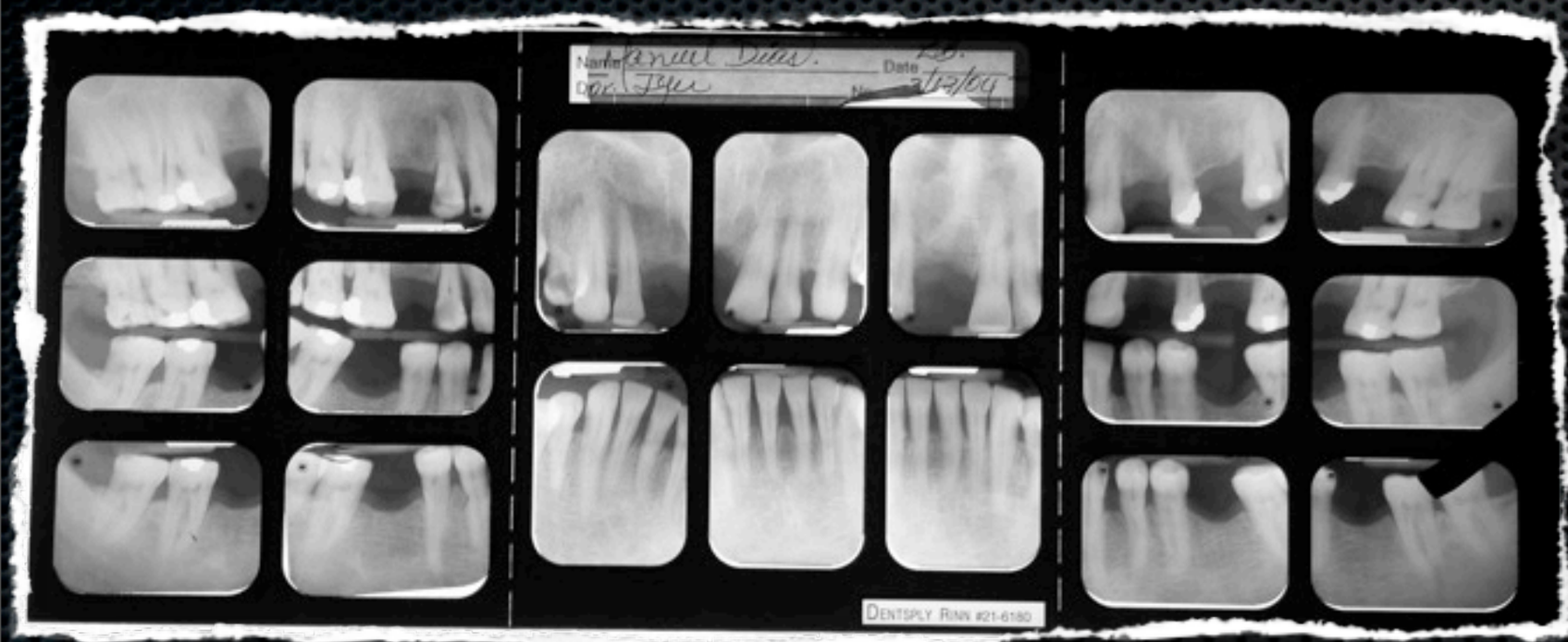
"Meet the patient Before meeting the mouth"
Leonard Abrams

Eliciting the Chief Complaint

Medical, Dental and Social Evaluations

Records: Diagnosic Casts (Mounted)

Records: FMS / Periapicals - Evaluation of Available Bone



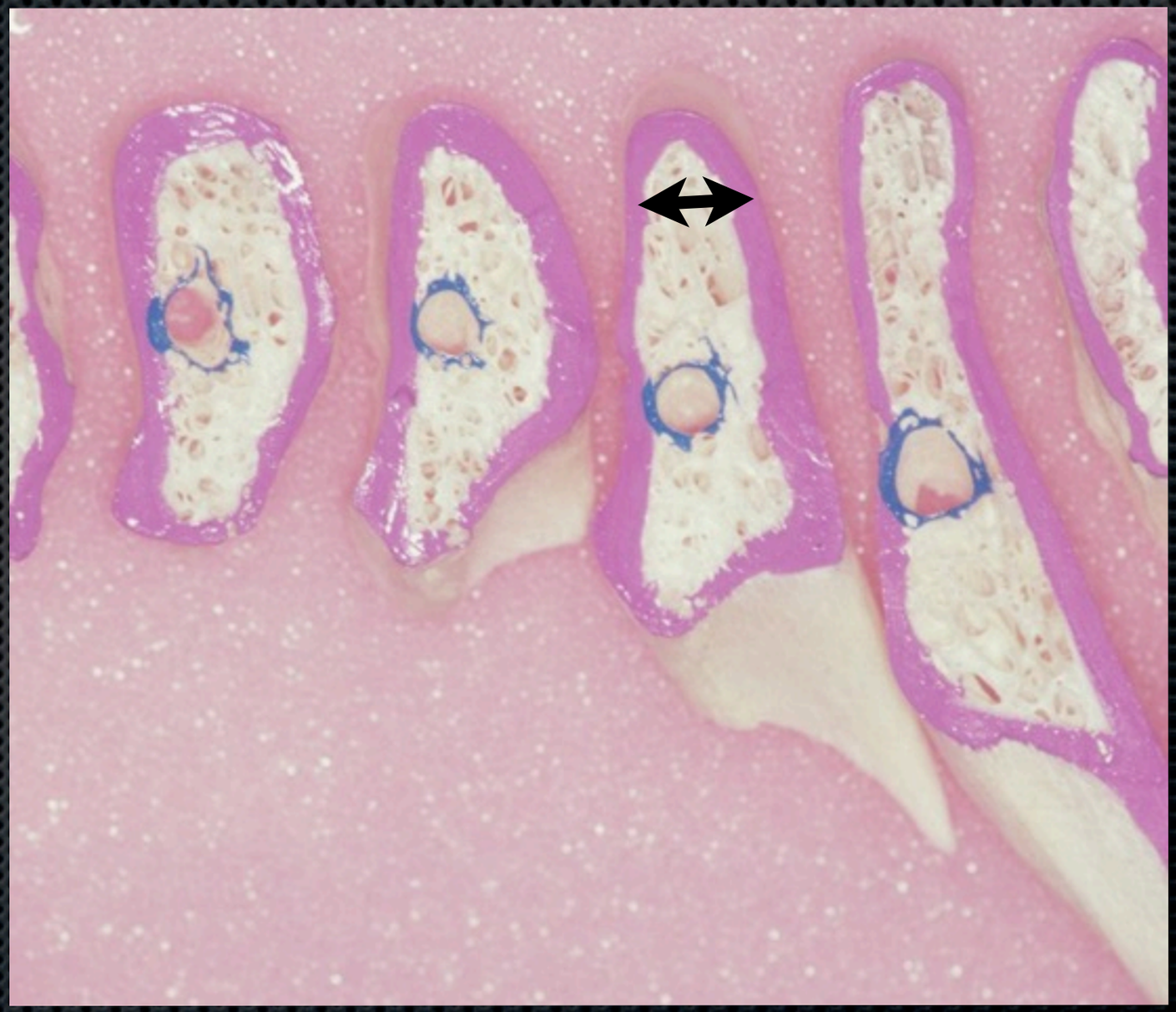
Rationale:

1. Minimal Distortion, almost 1:1
2. Excellent imaging for m/d & a/c
3. Quick intra-operative checks
4. Magnification ratios can be calculated

Quantification of Available Bone

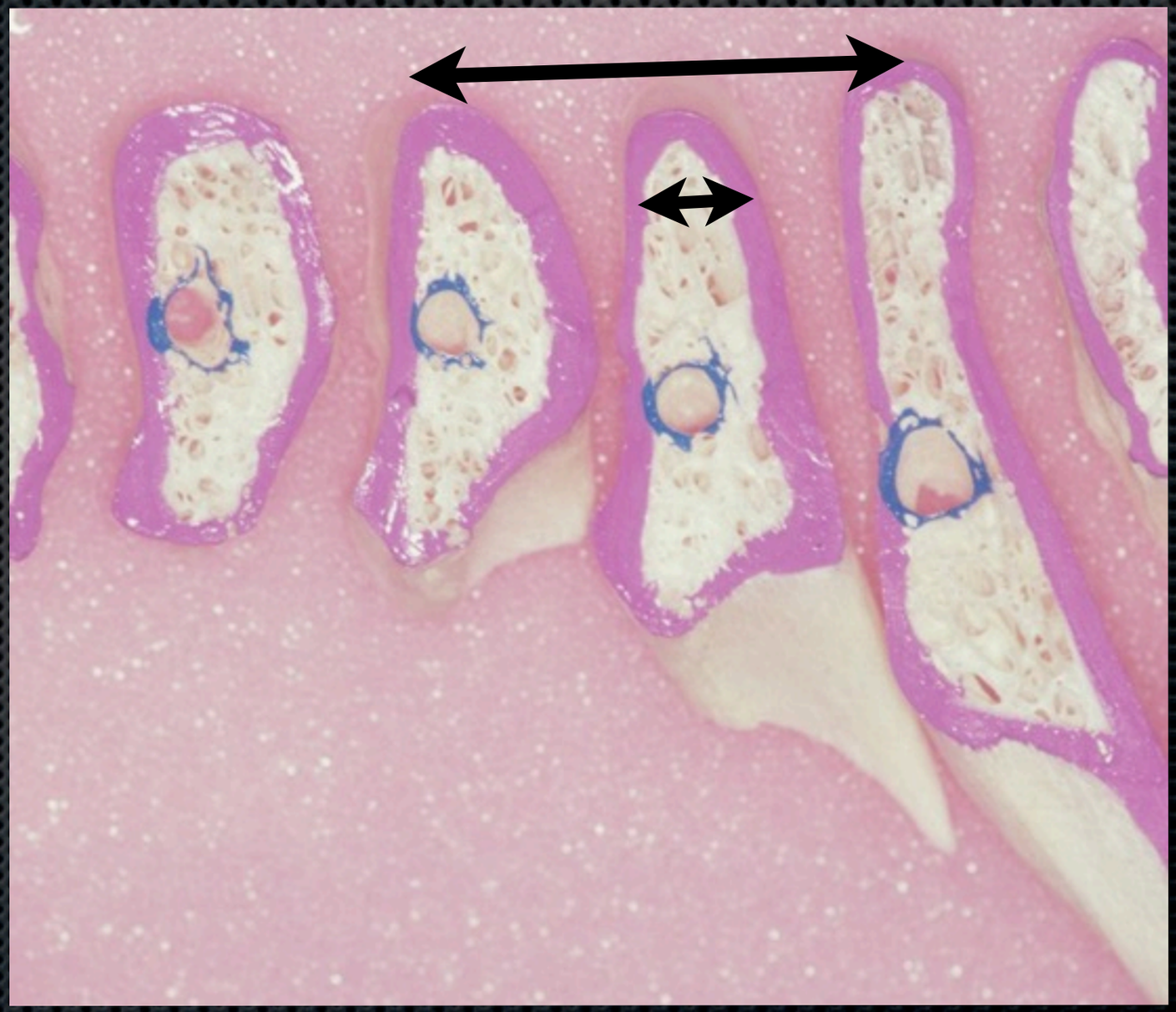
Quantification of Available Bone

- Width



Quantification of Available Bone

- Width
- Length



Quantification of Available Bone

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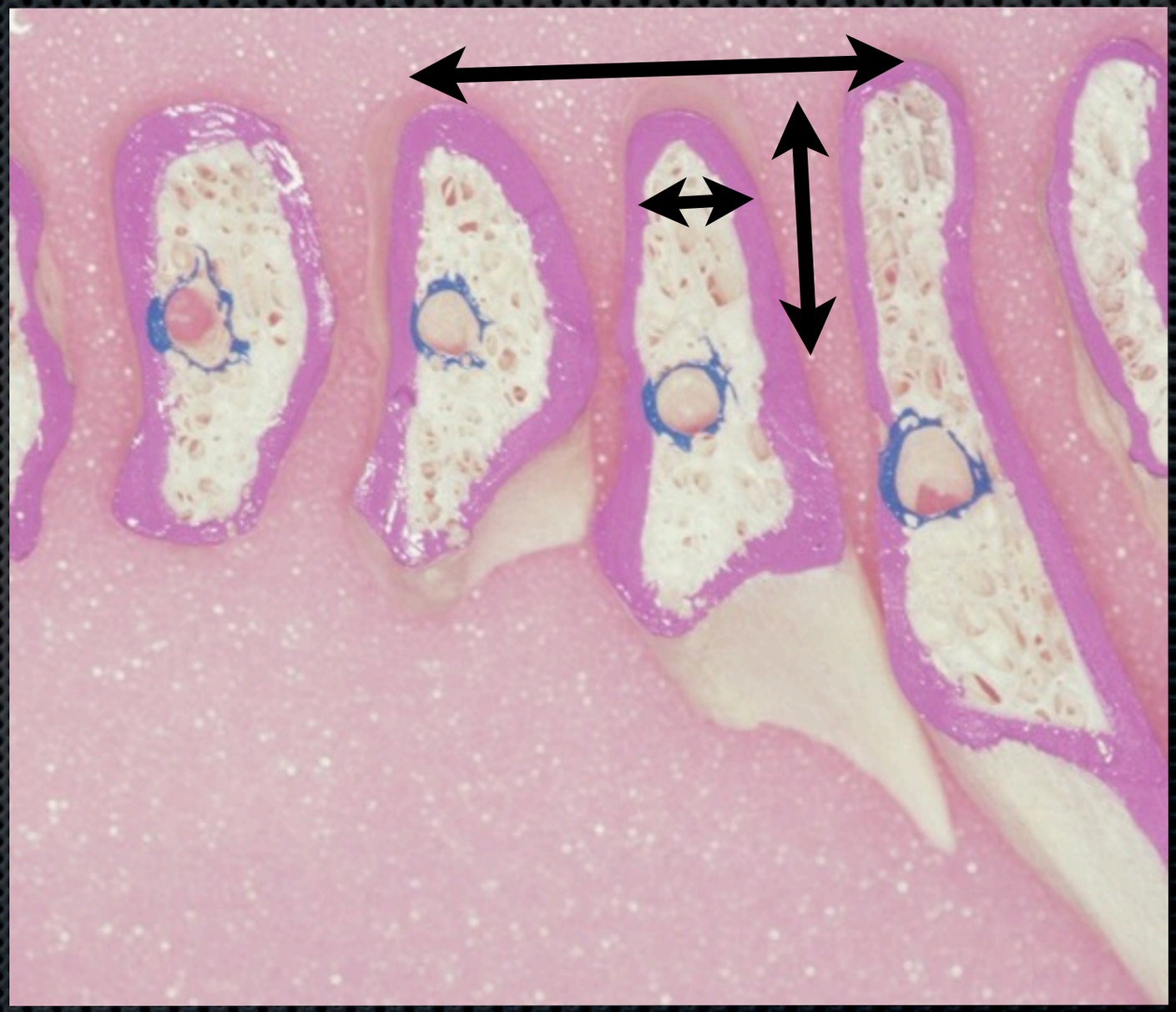
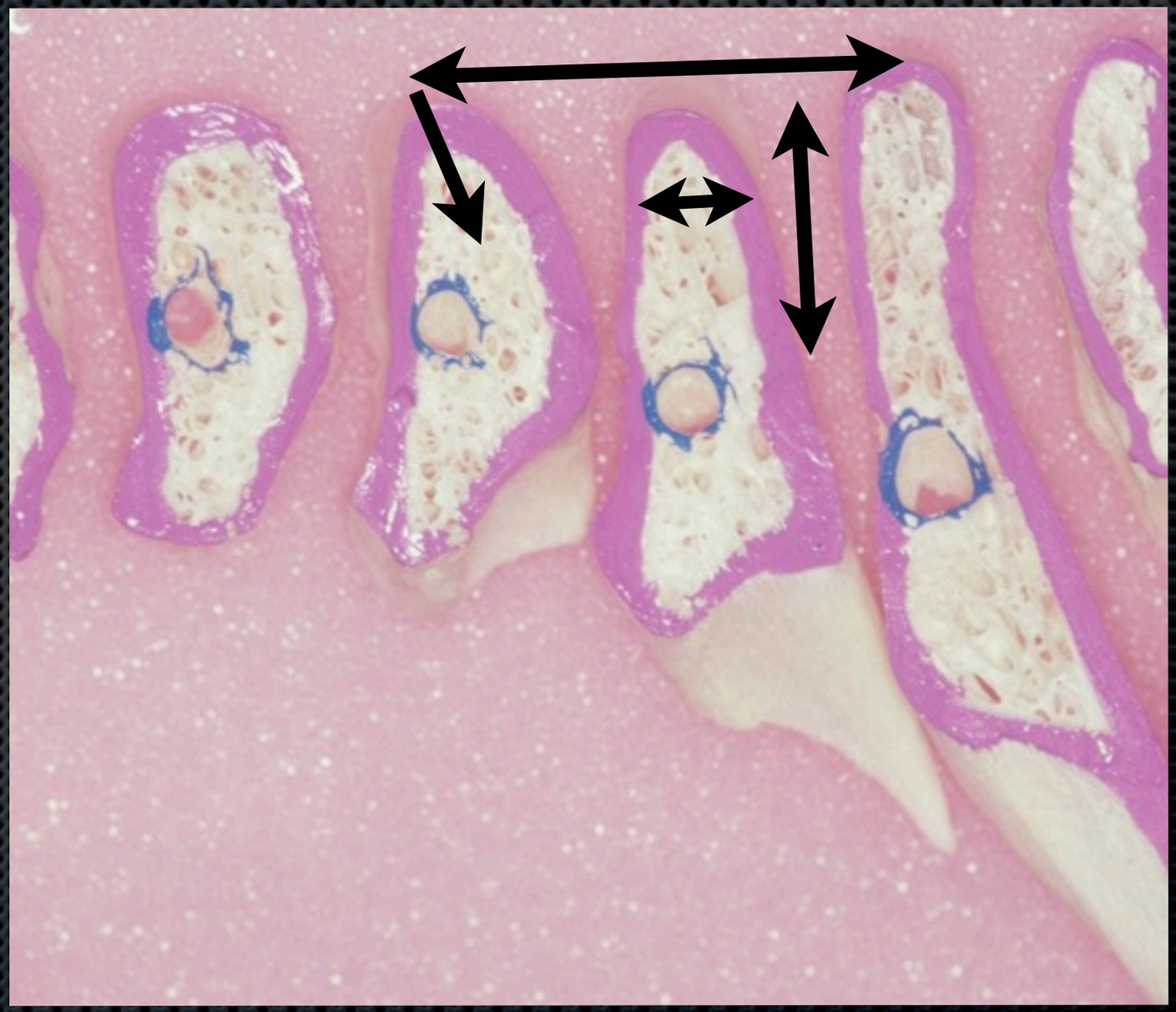
- Heignt

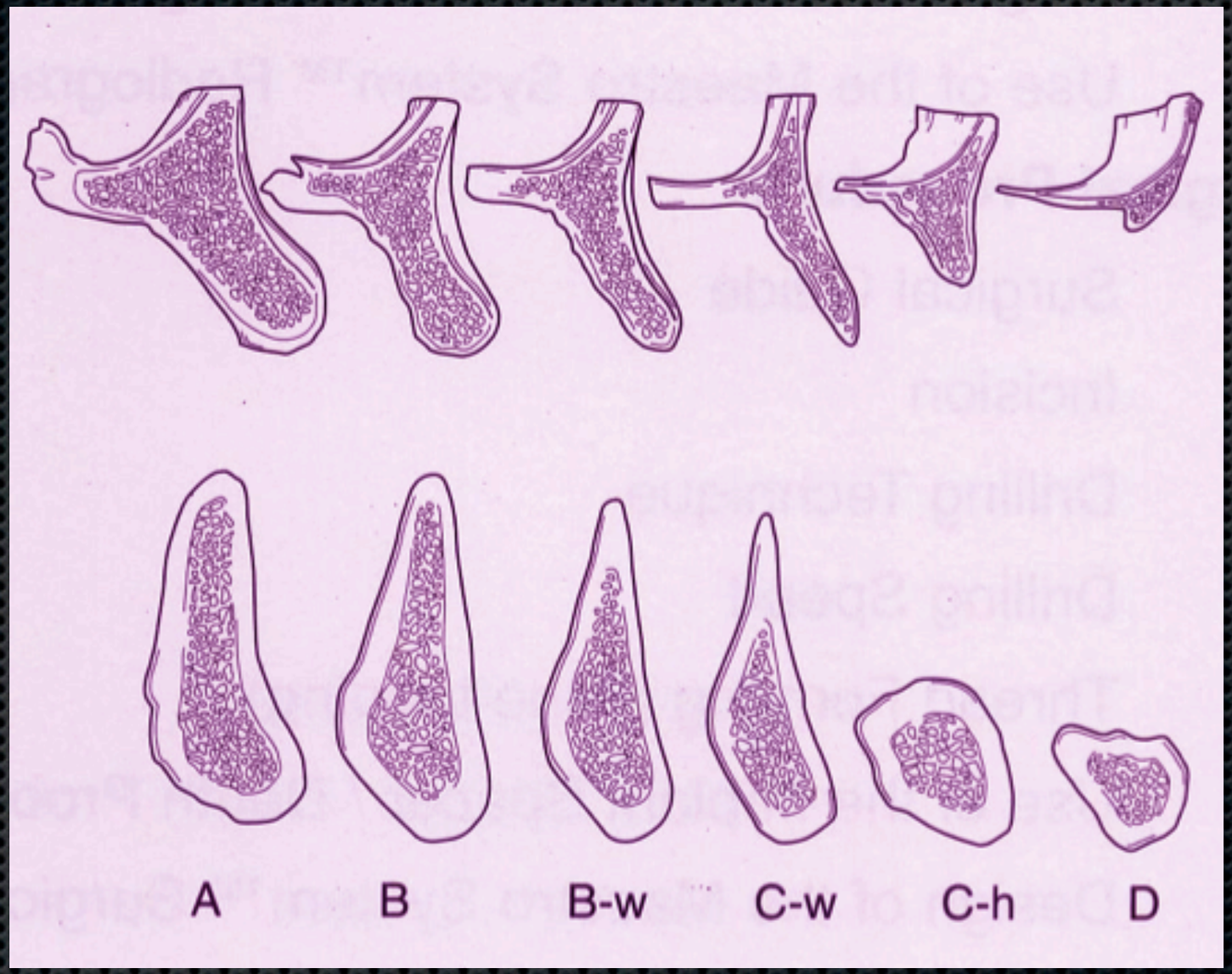


Quantification of Available Bone

- Width
- Length
- Heignt
- Trajectory



Classification of Available Bone



Misch Judy Classification

Division A - Available Bone (Abundant)



> 5mm of width
> 10 - 13mm of height
> 7 mm of length
< 30 degree angulation

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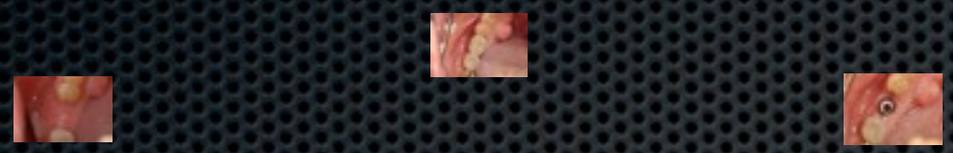

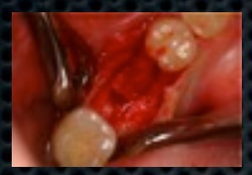

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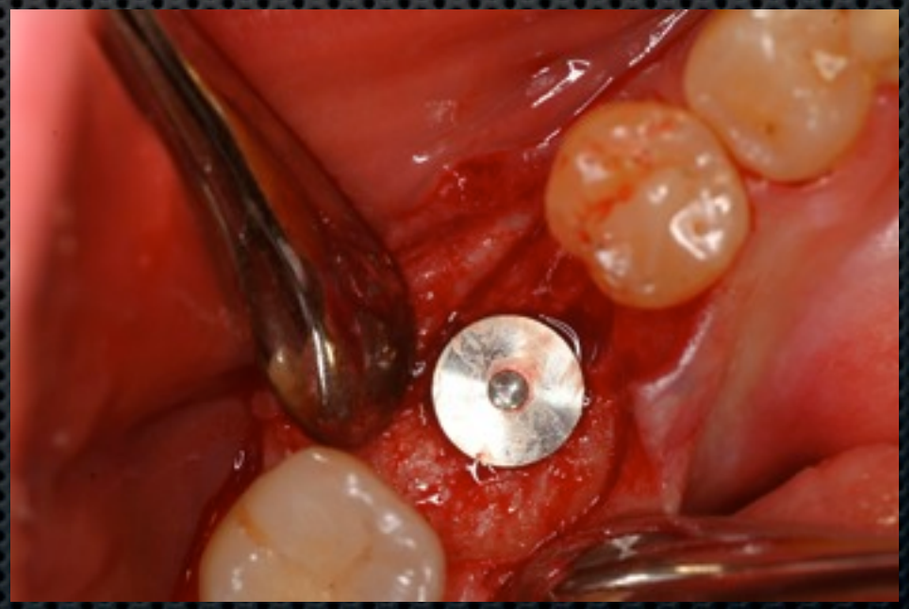

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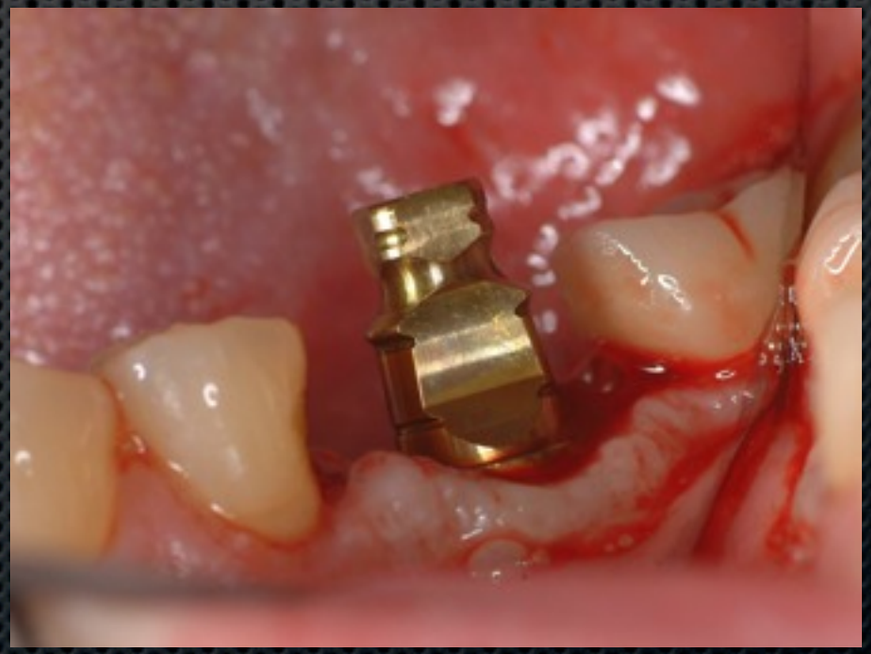

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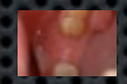

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> 7 mm of length
< 30 degree angulation

Division A - Available Bone (Abundant)

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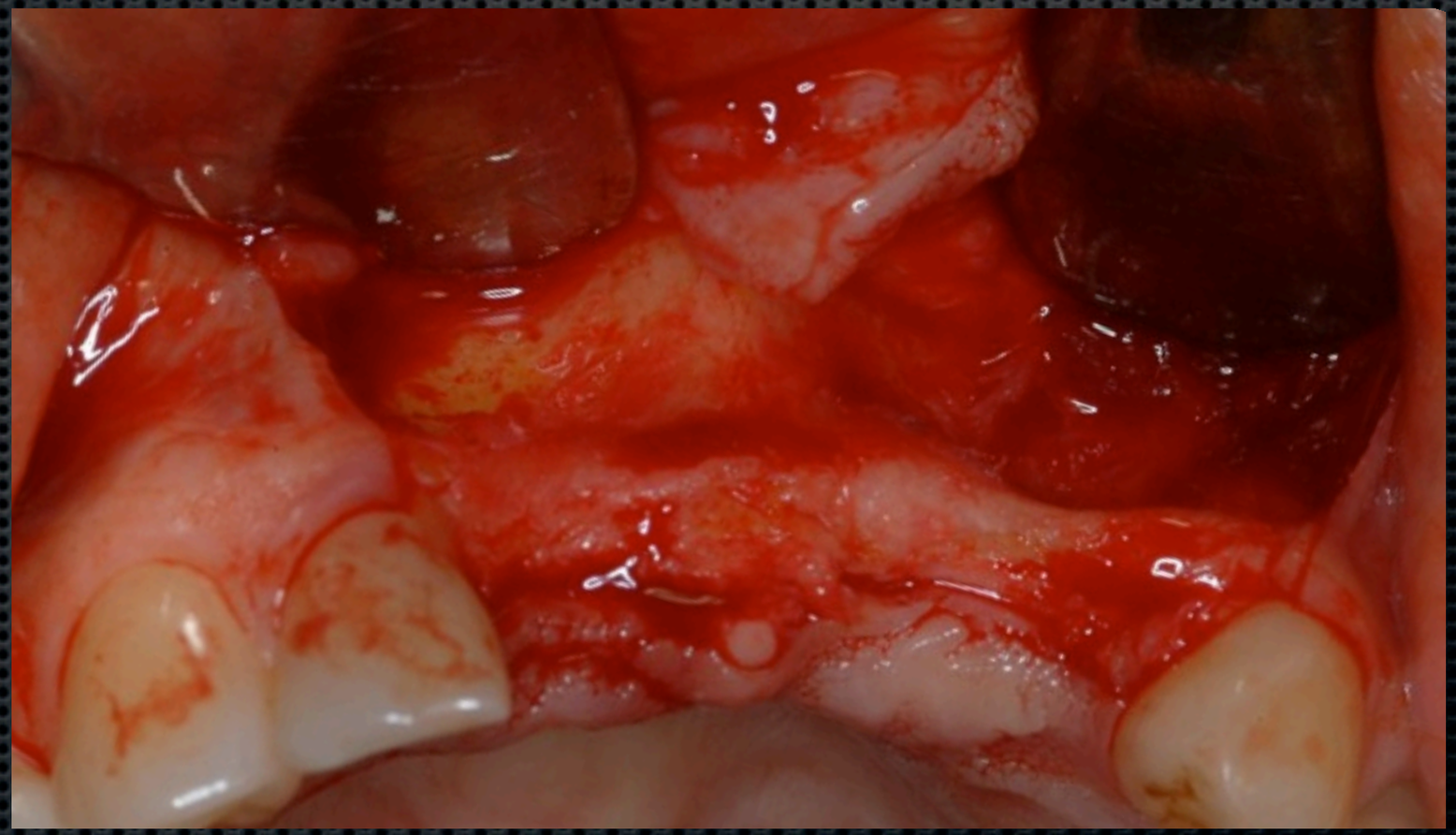
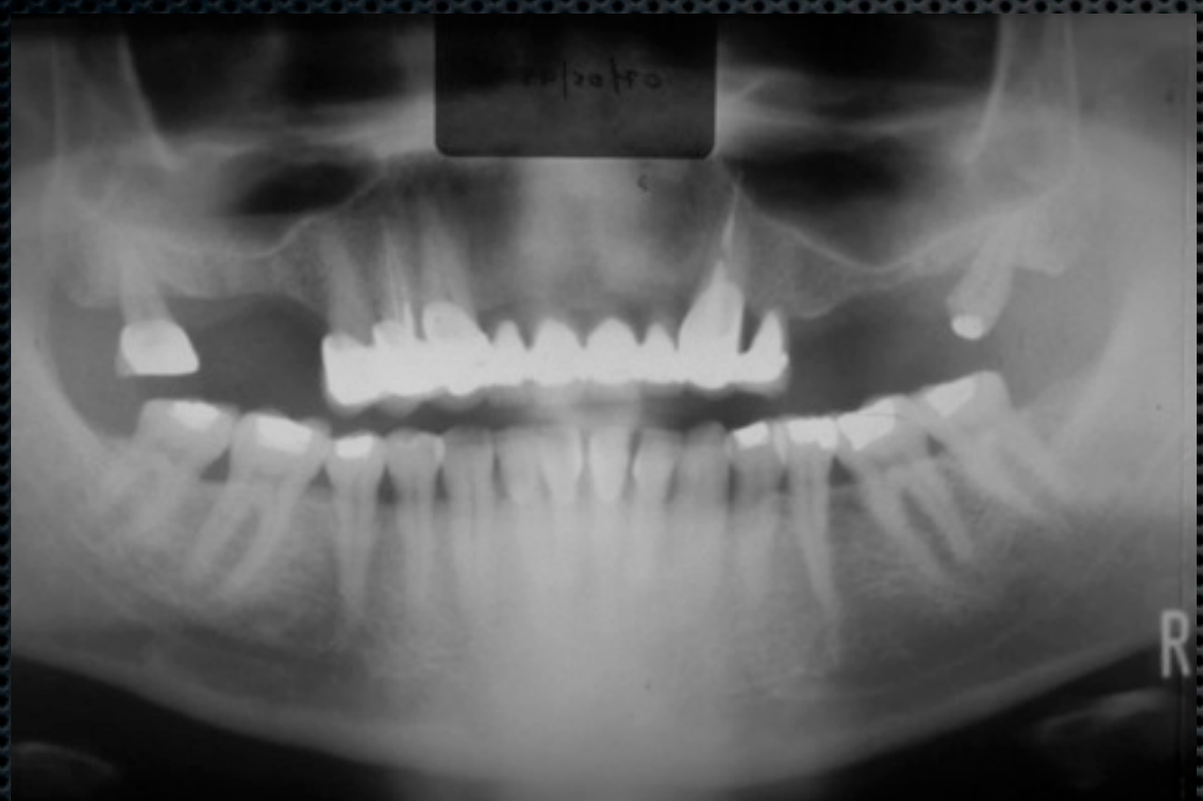
> 10 - 13mm of height
> 7 mm of length
< 30 degree angulation

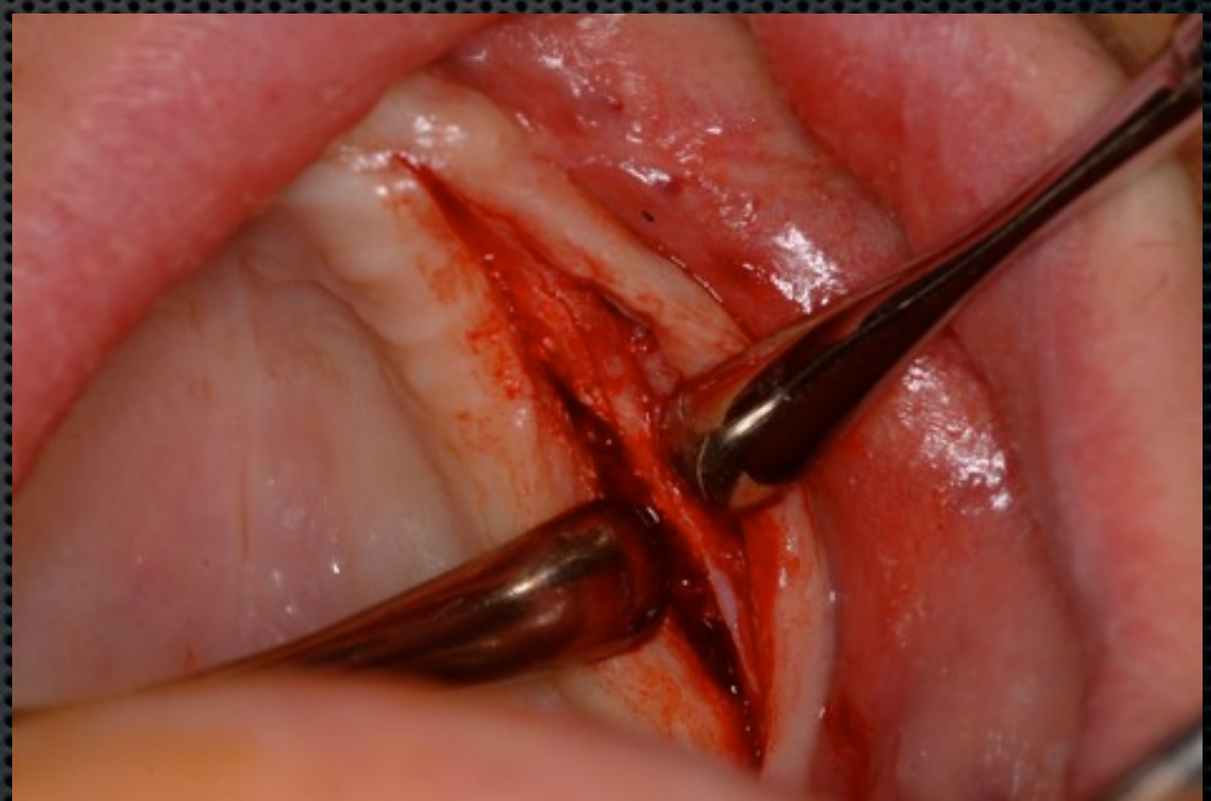
Divison B - Barely Sufficient

2.5 - 5mm width
10 -13 mm height
> 7 mm length
< 30 degree angulation

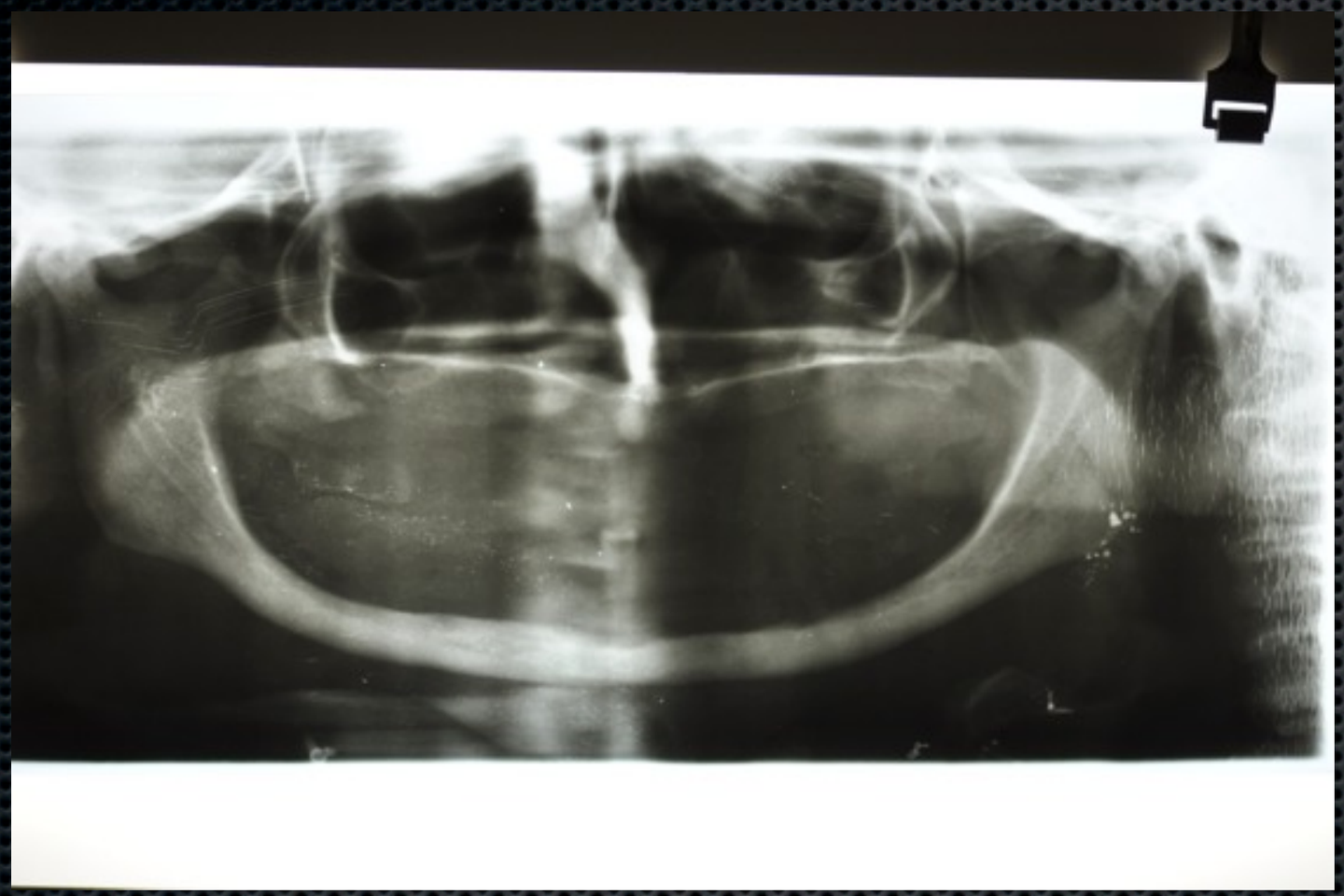


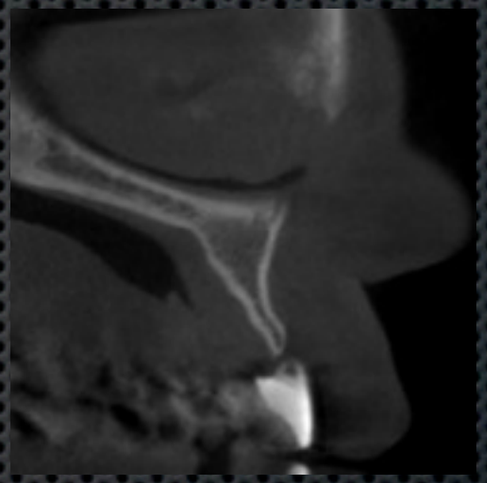
Division C - Compromised - Height and Width

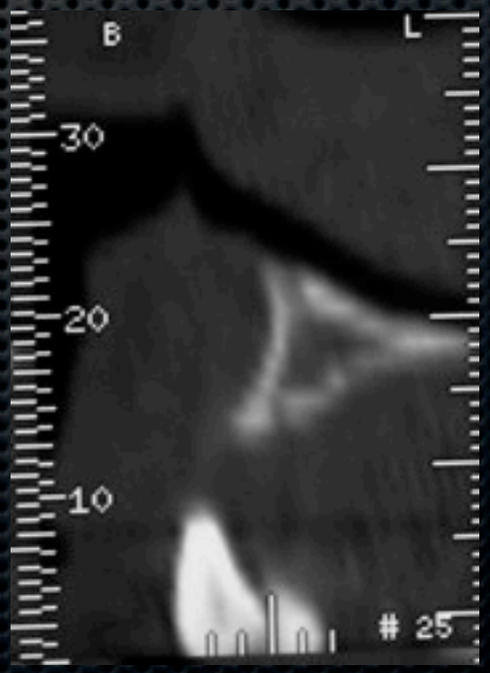




Division D - Deficient Bone







Periapical Quantification -

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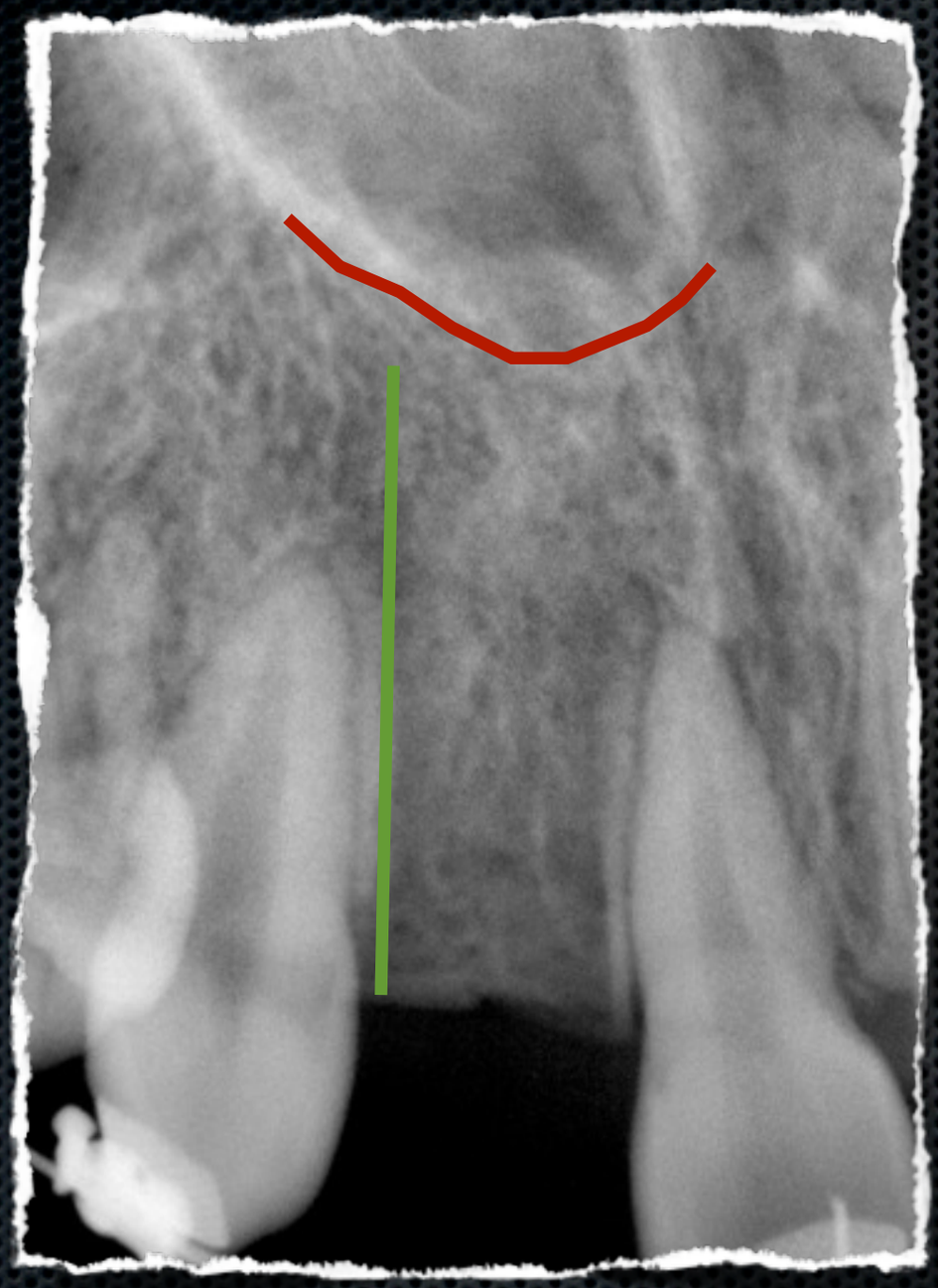

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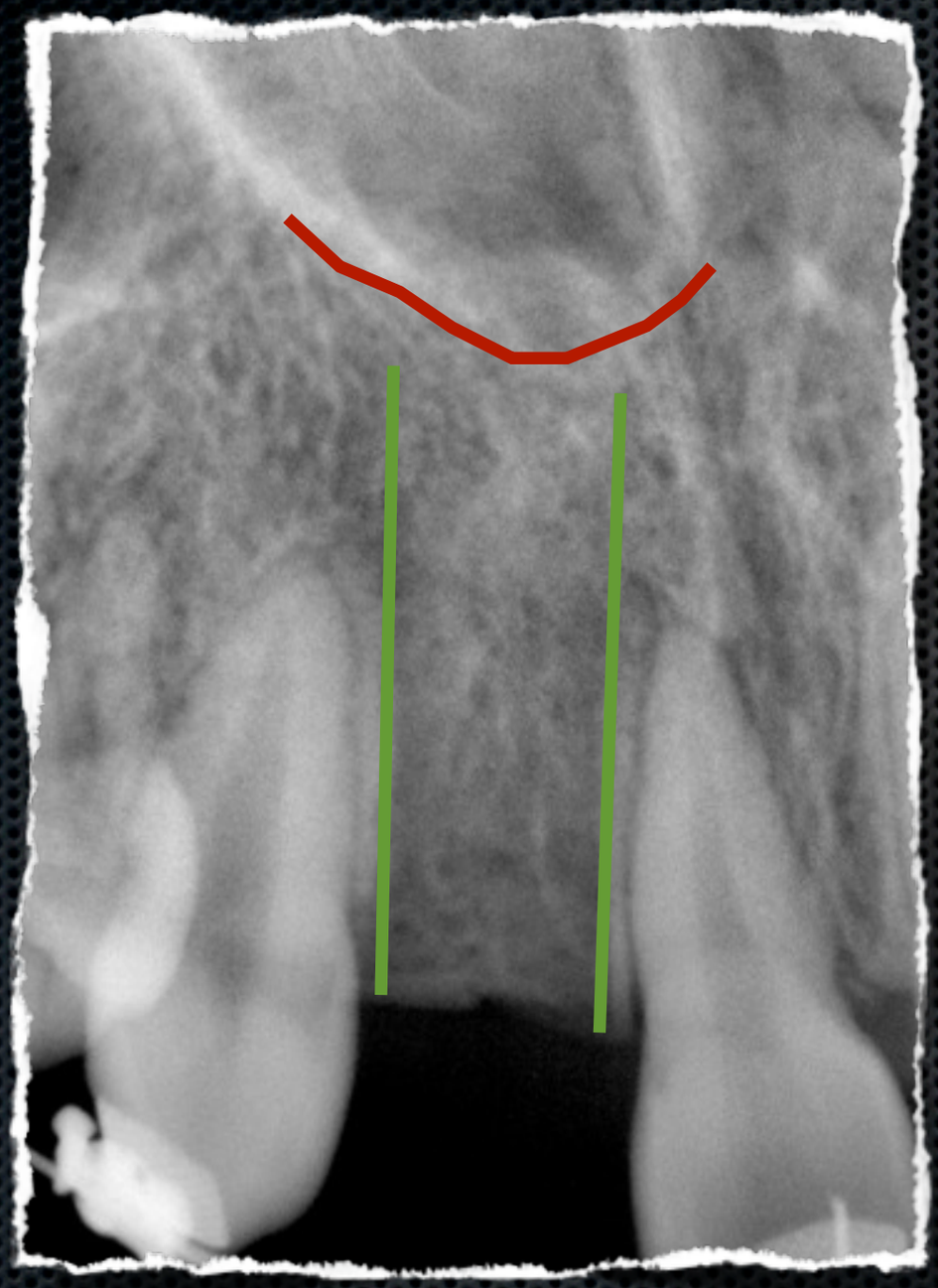

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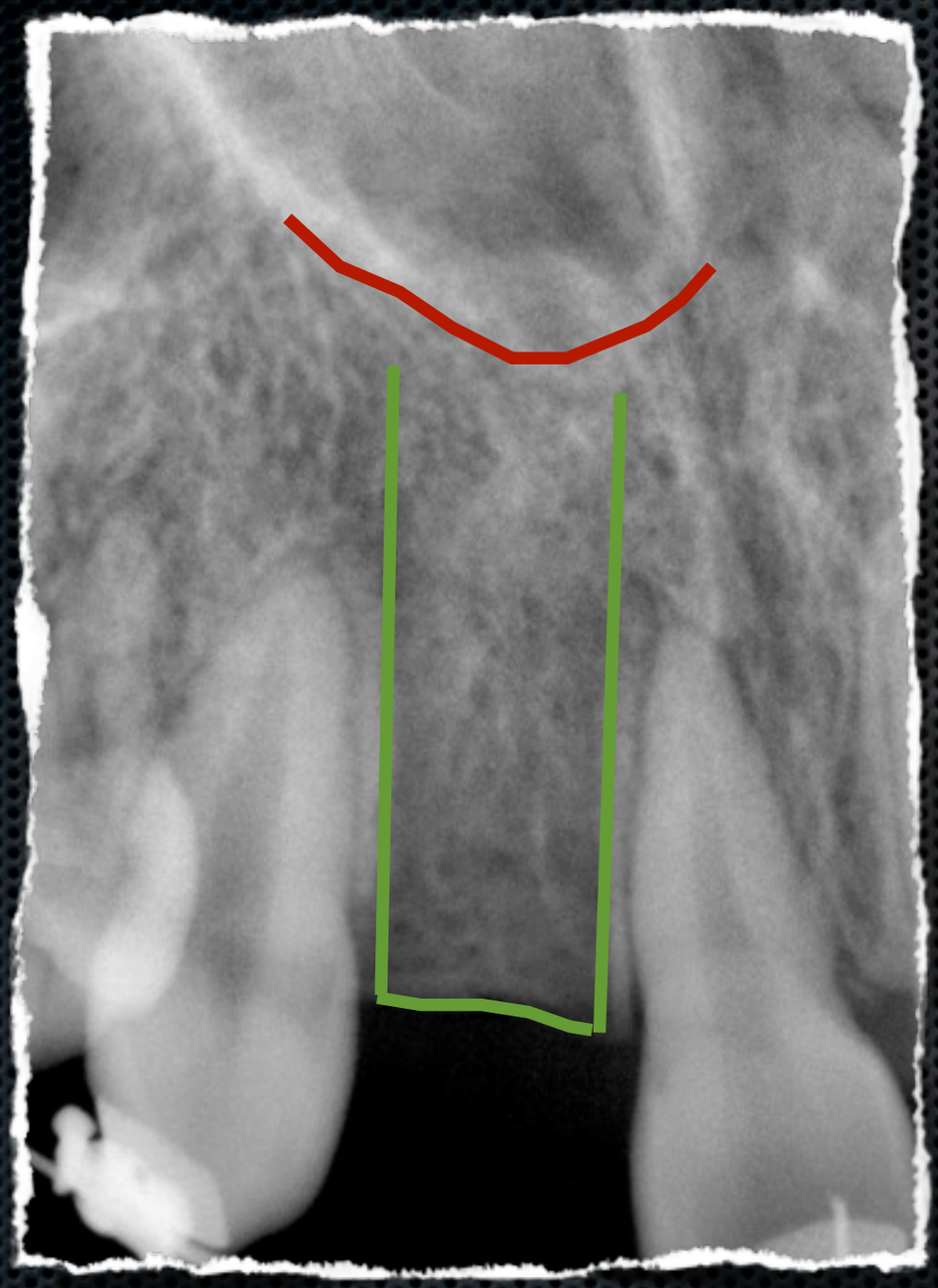

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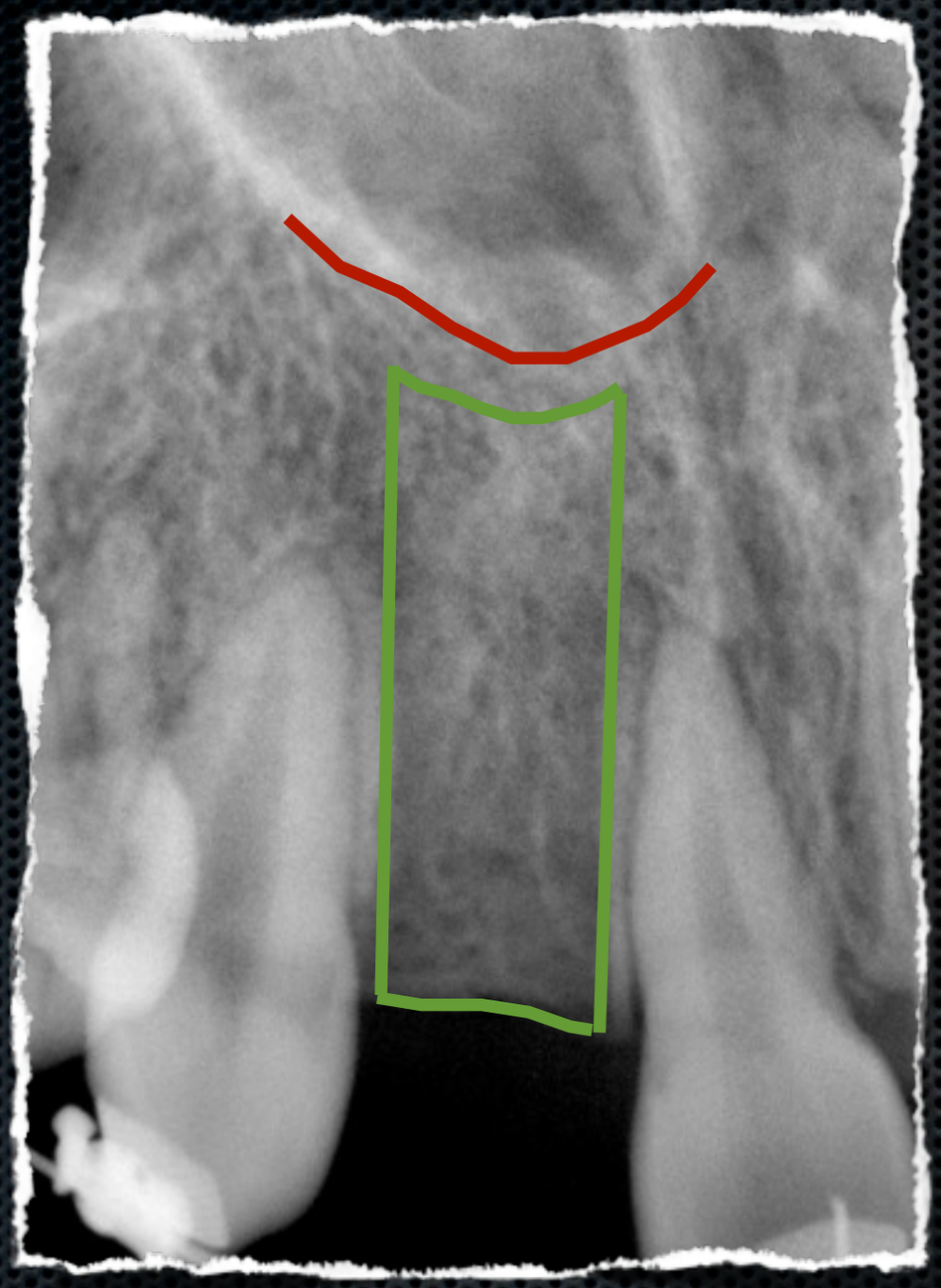

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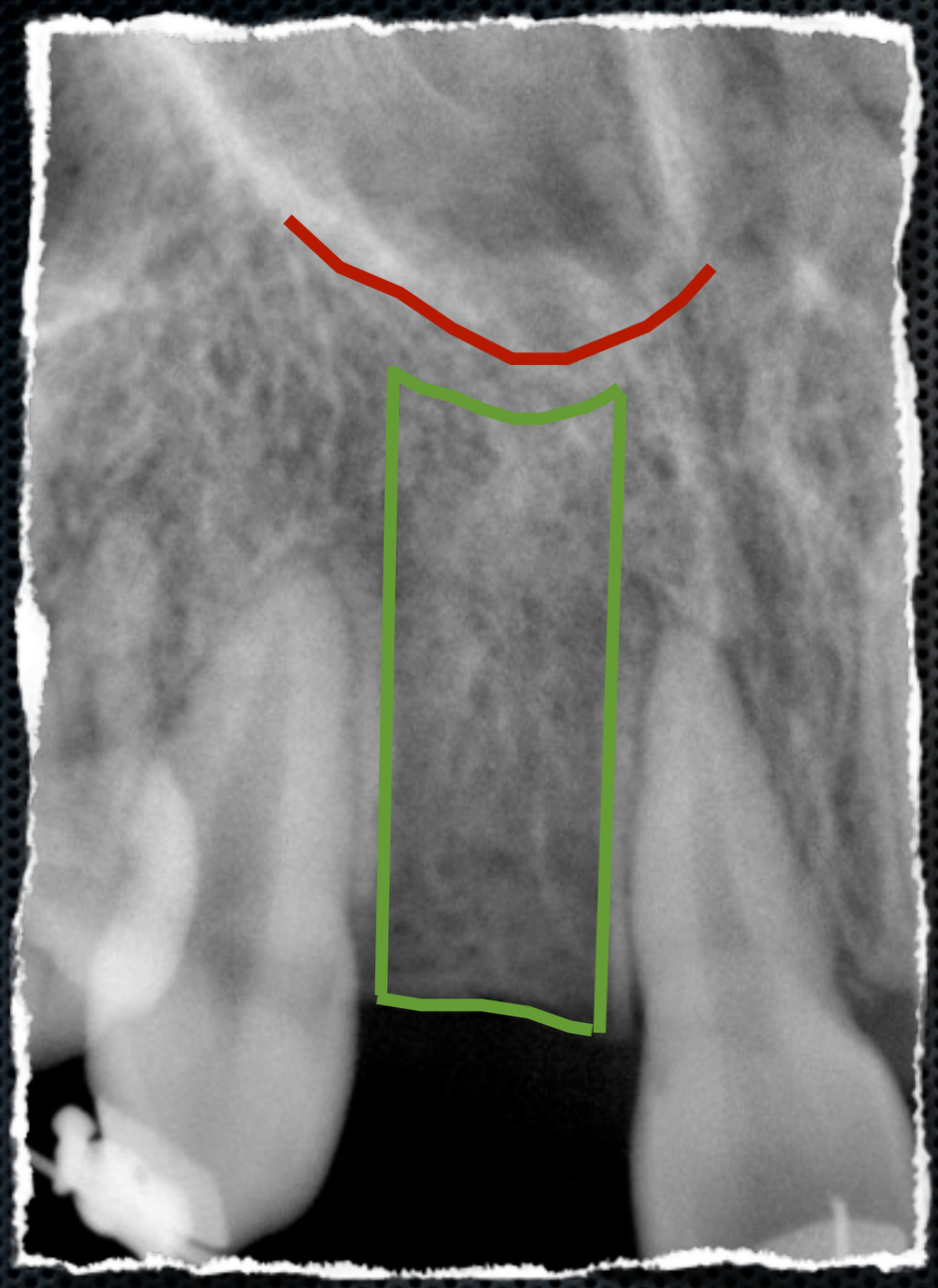

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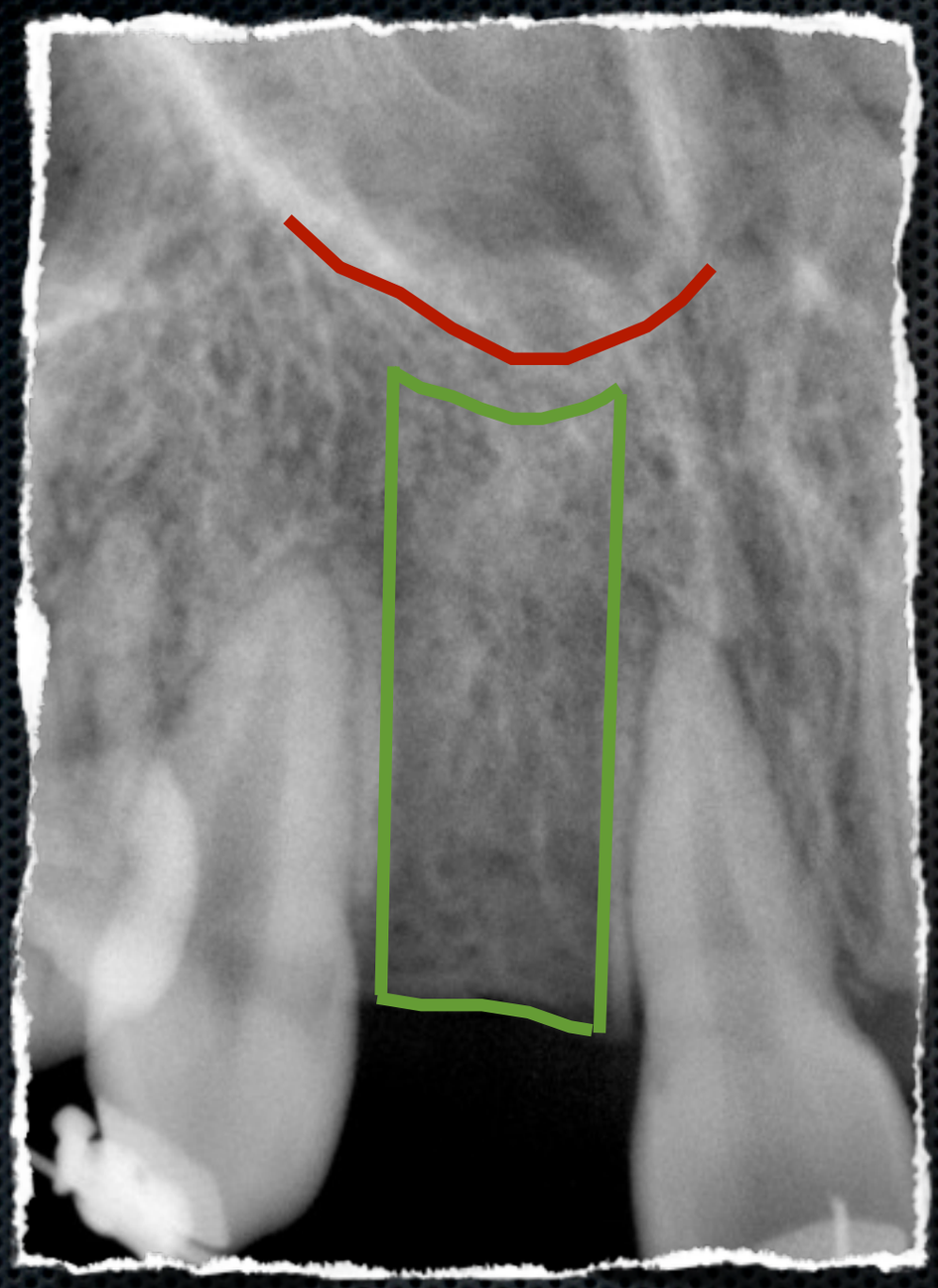

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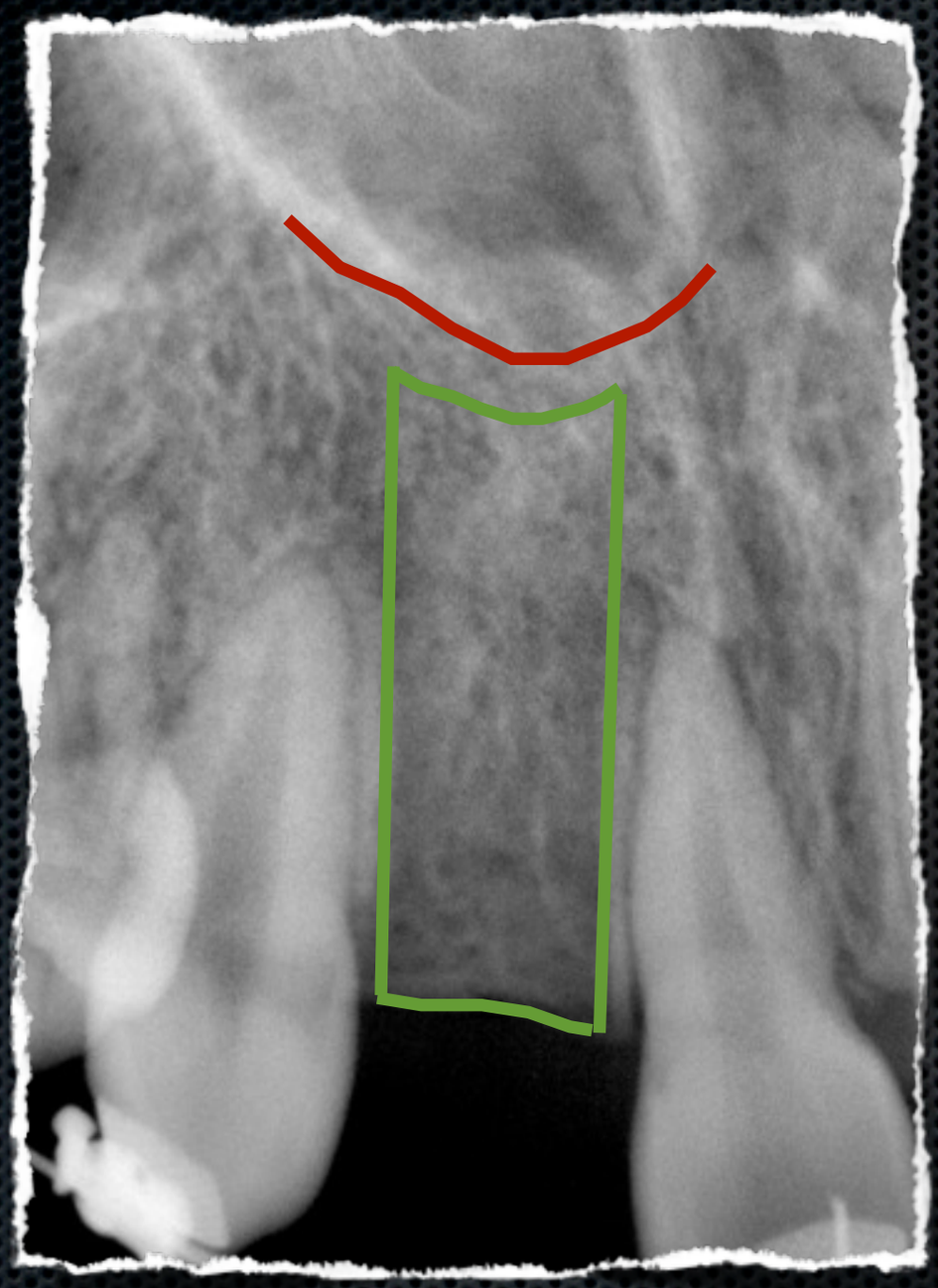

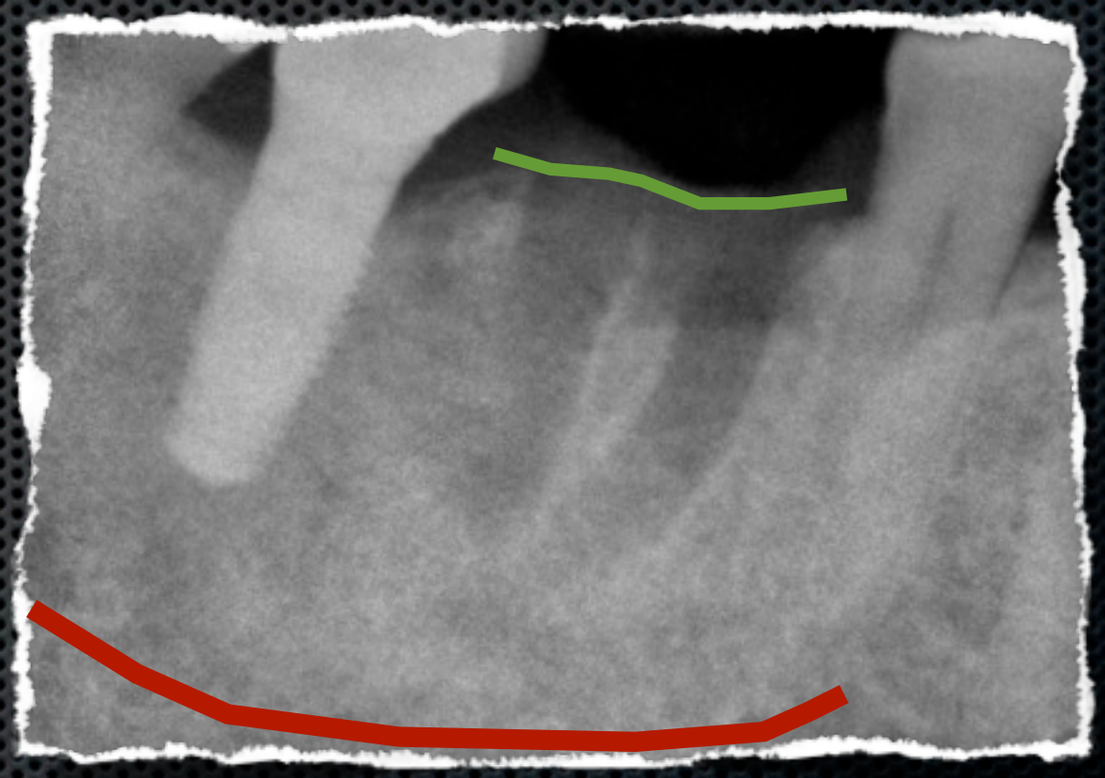

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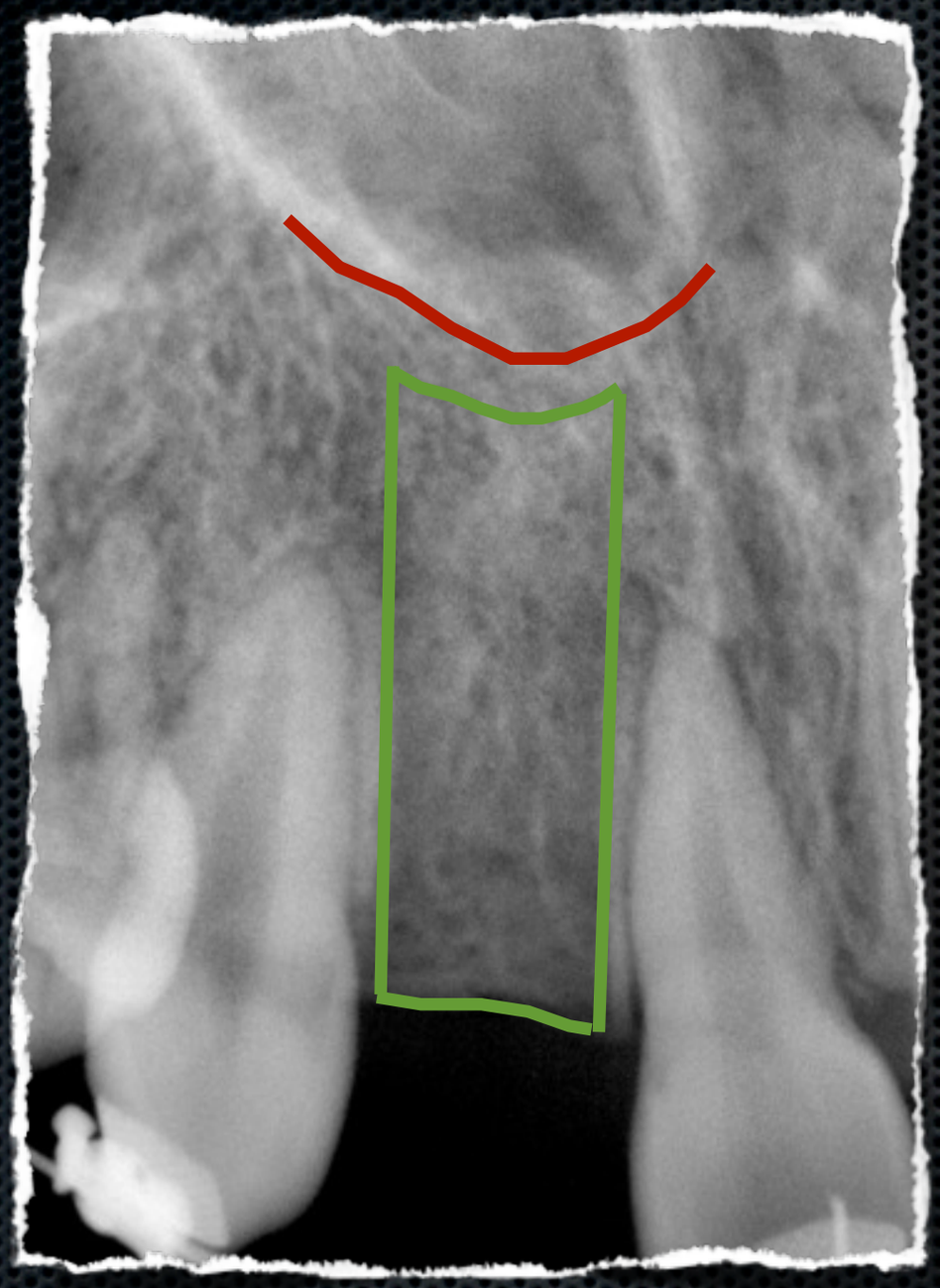

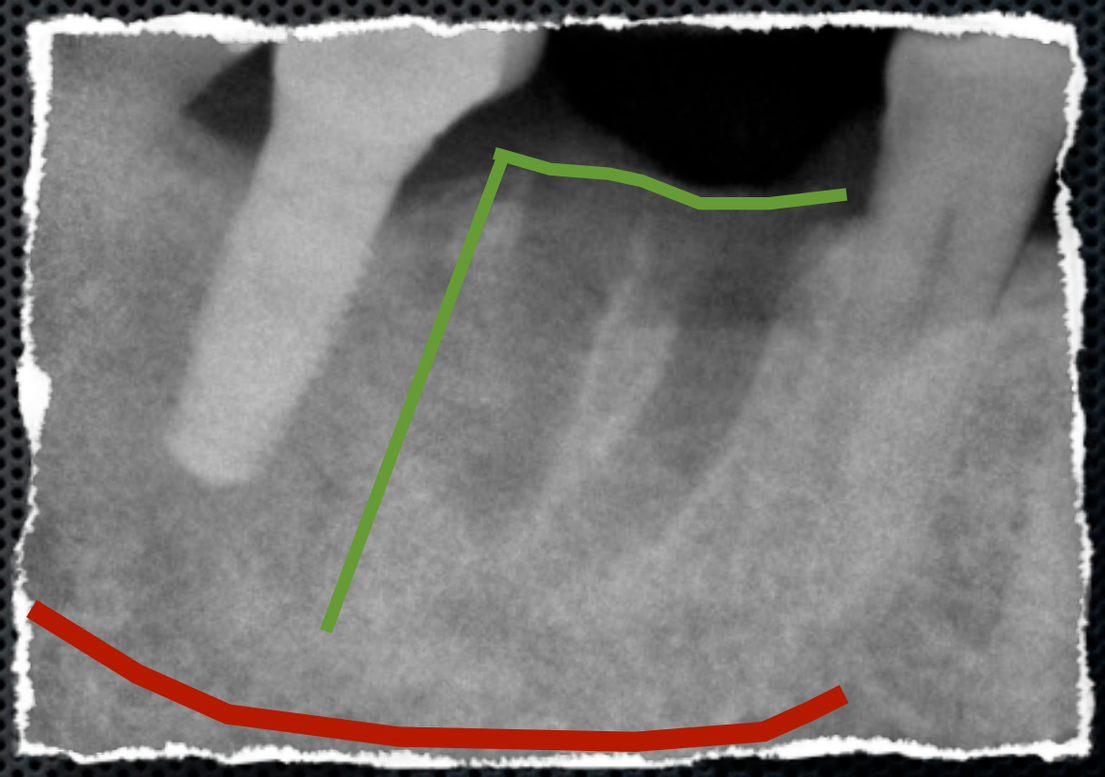

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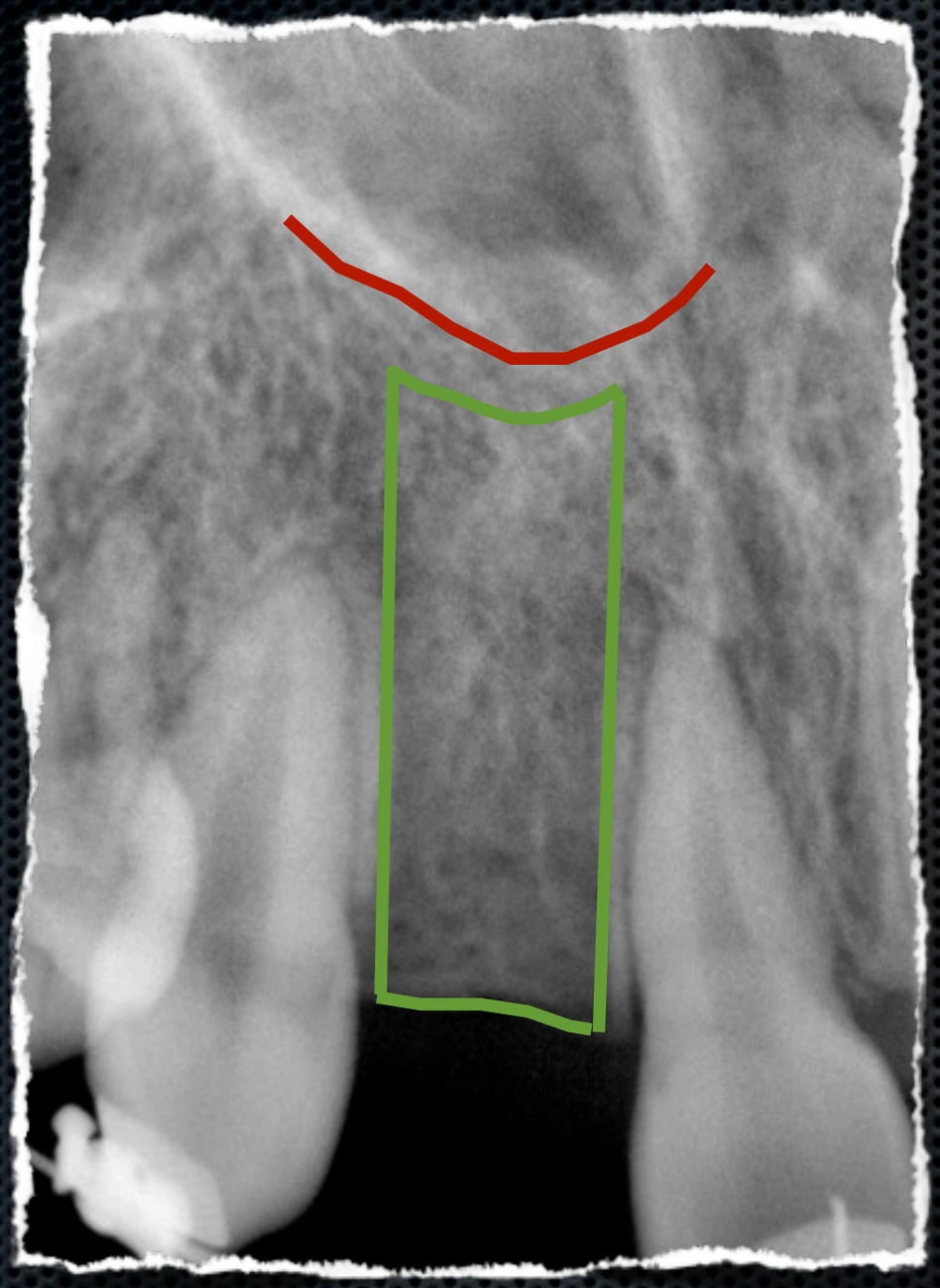

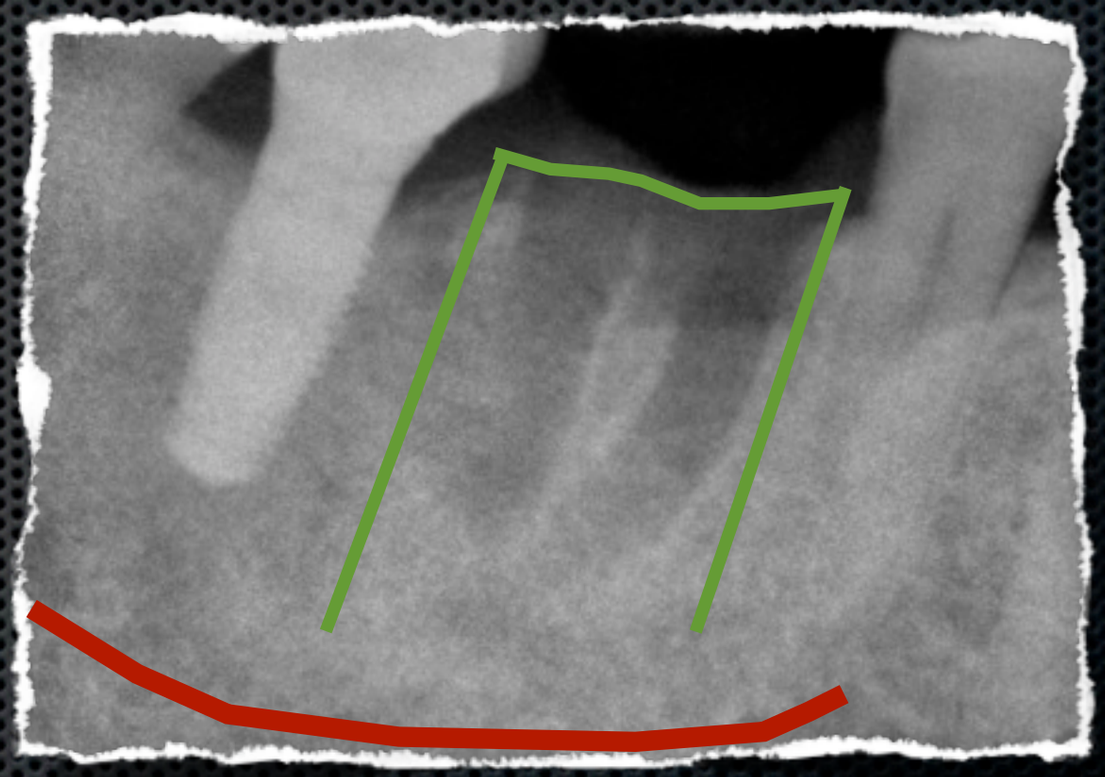

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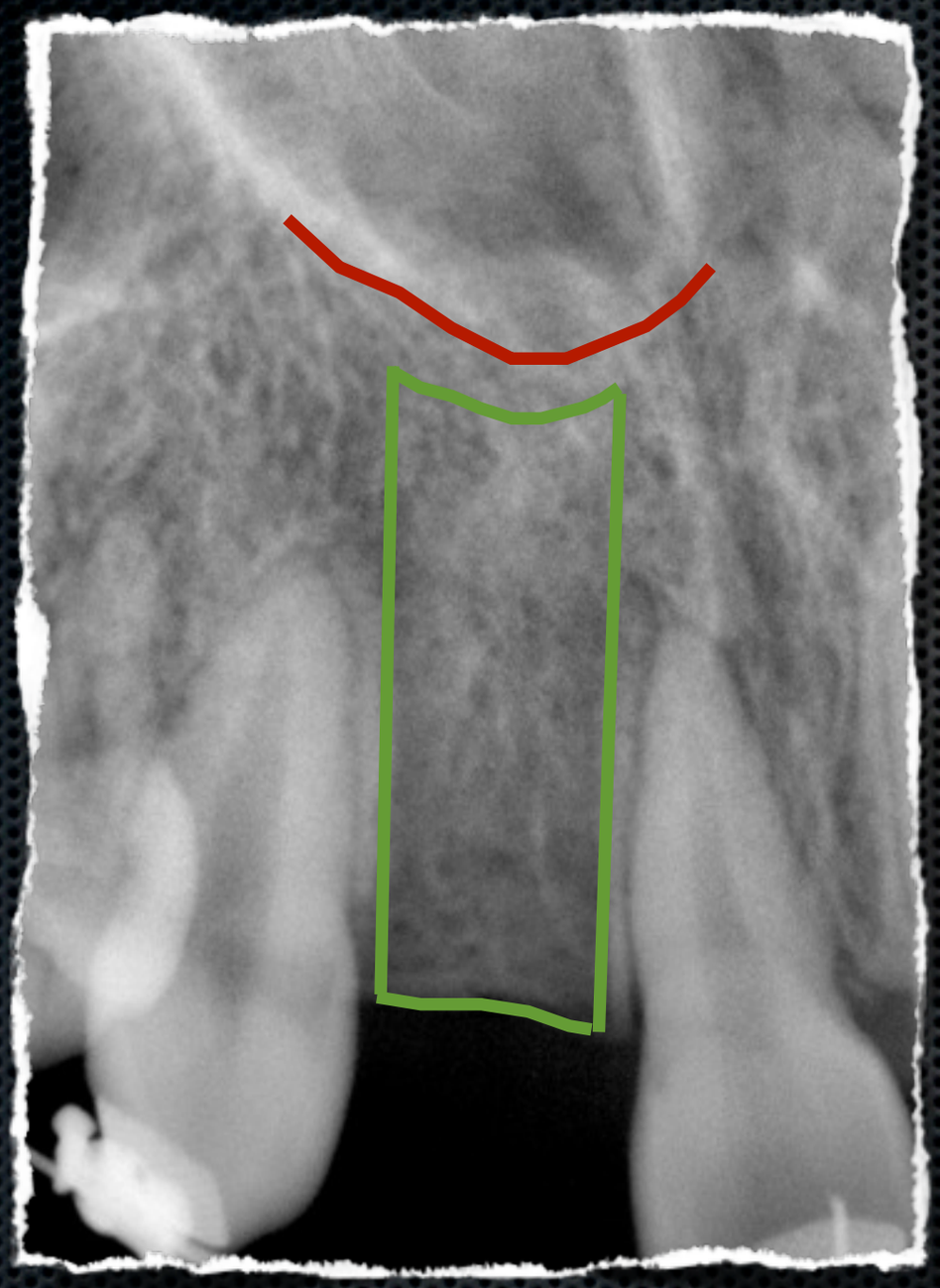

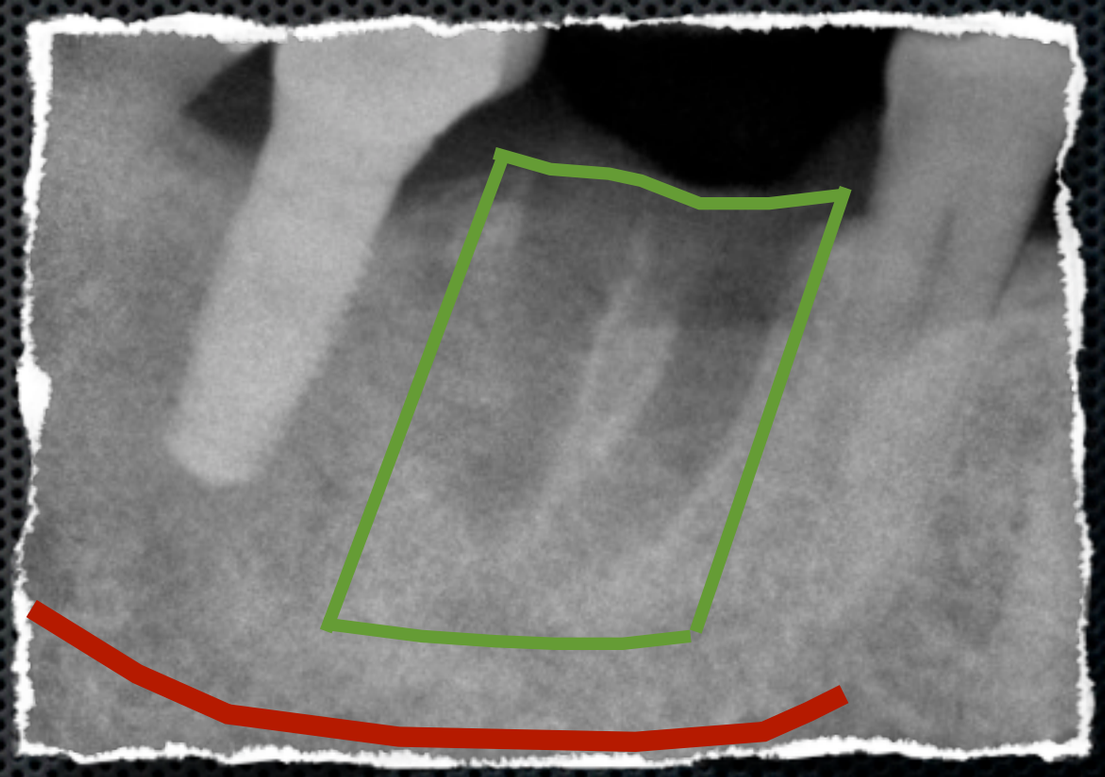

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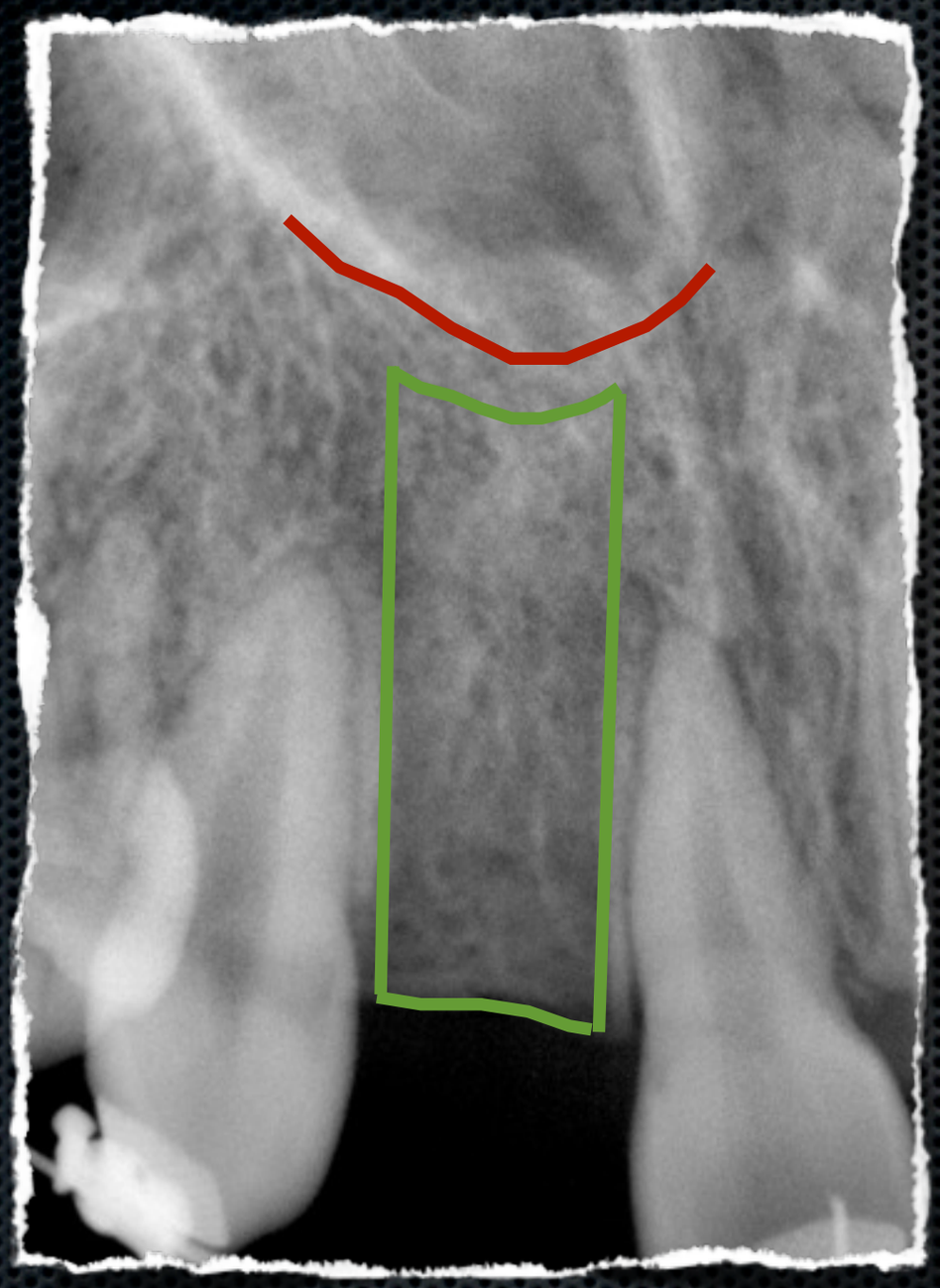
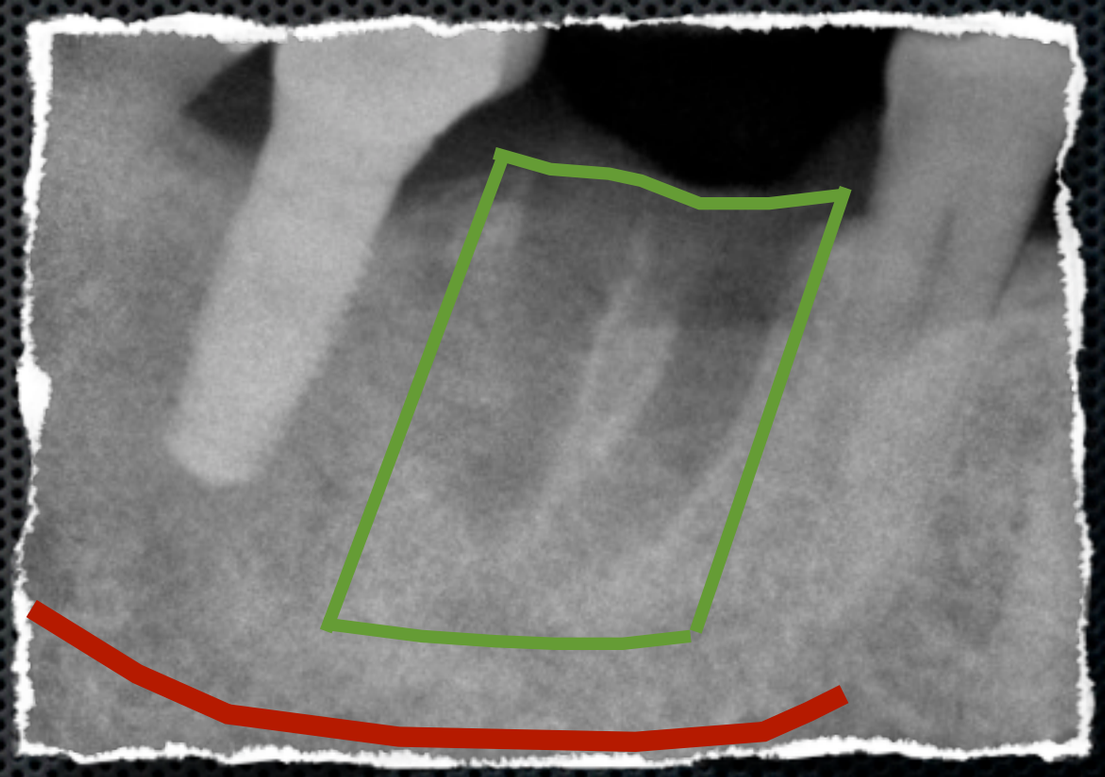
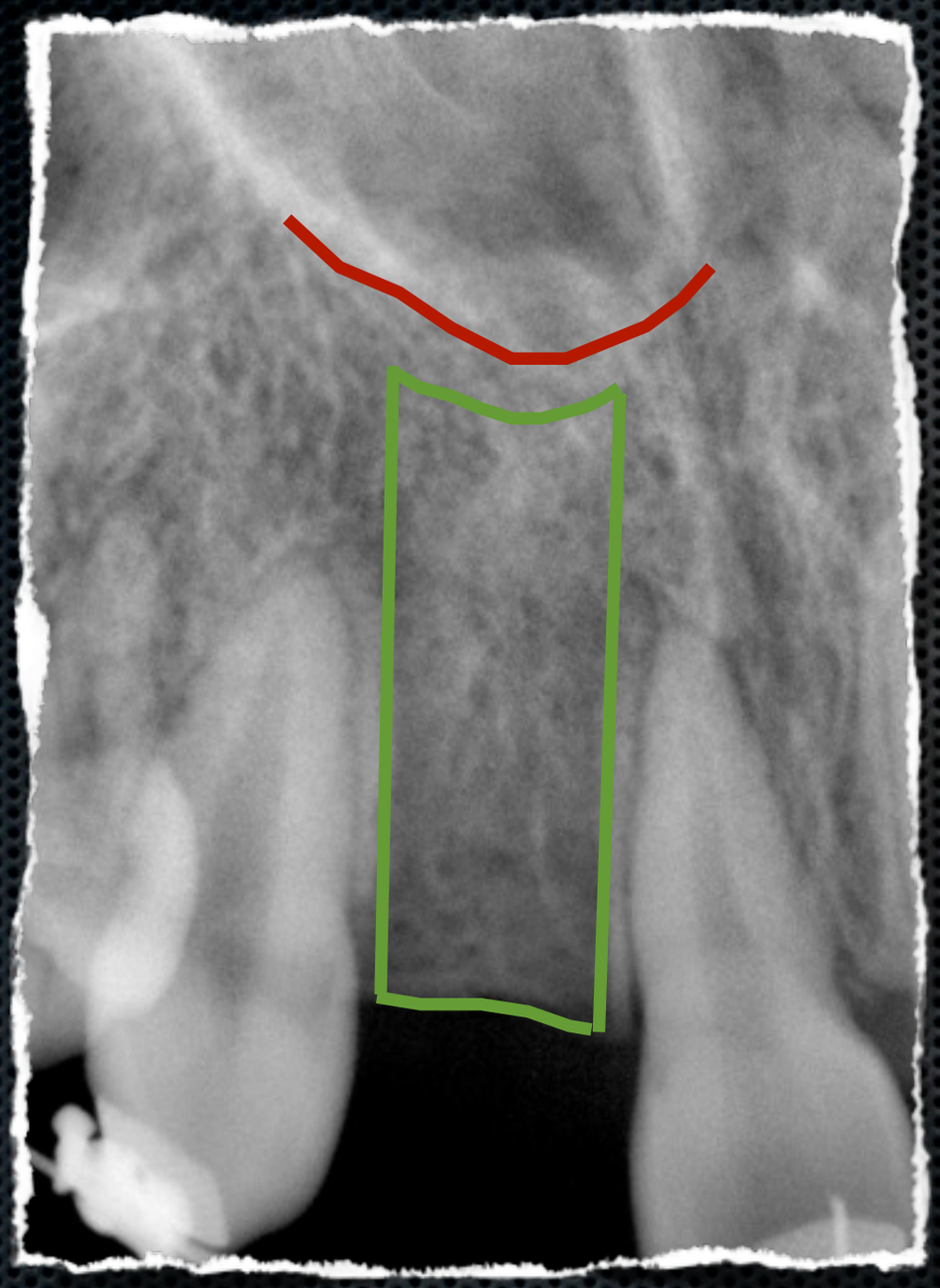
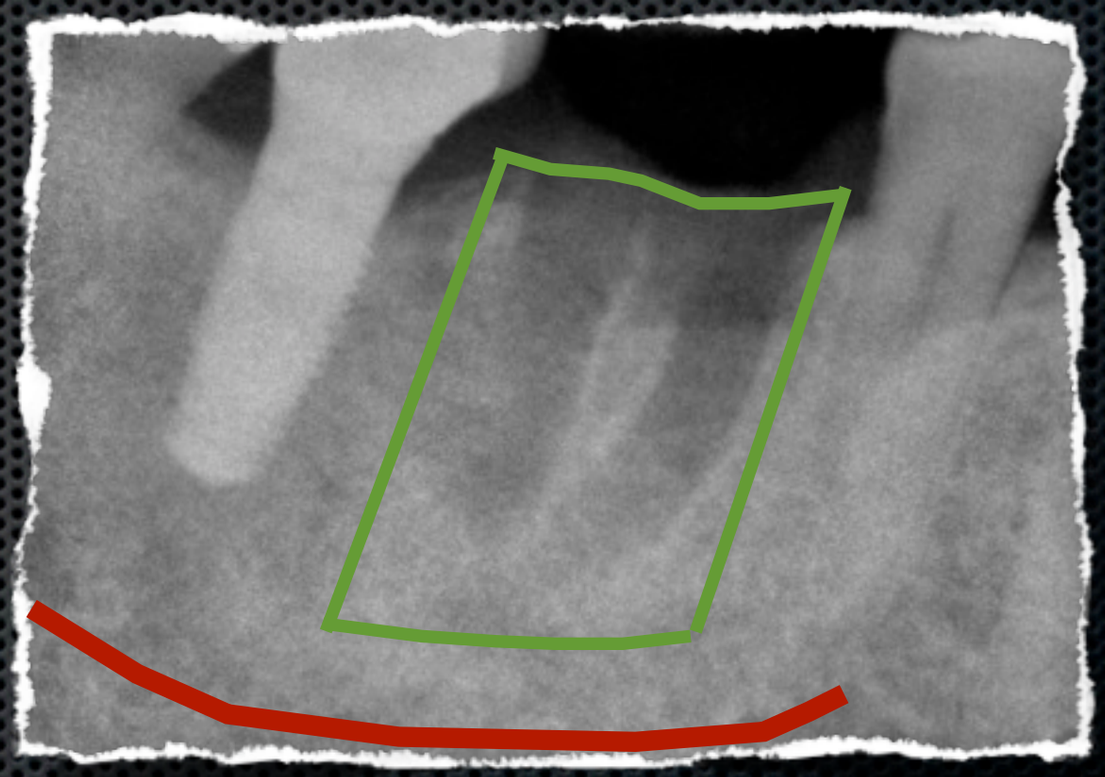




Potential available space

Periapical Quantification -



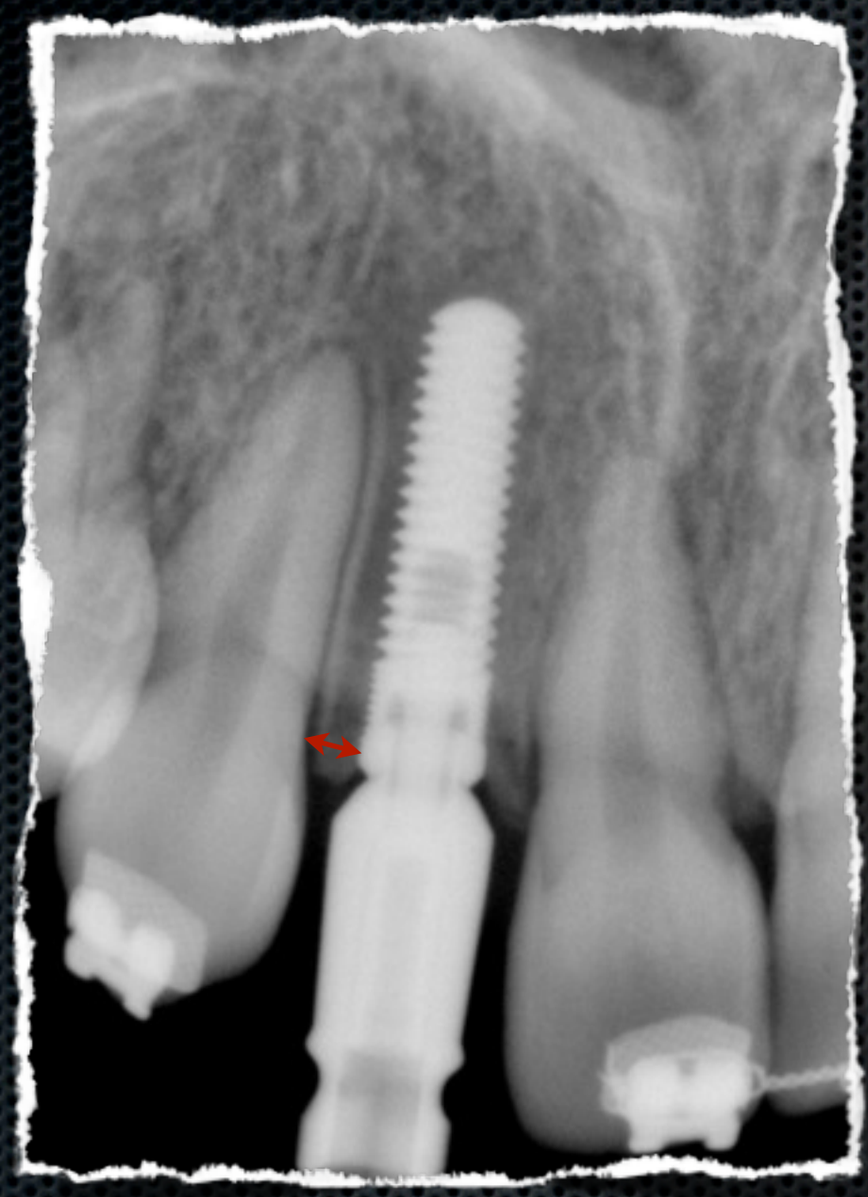


Potential available space

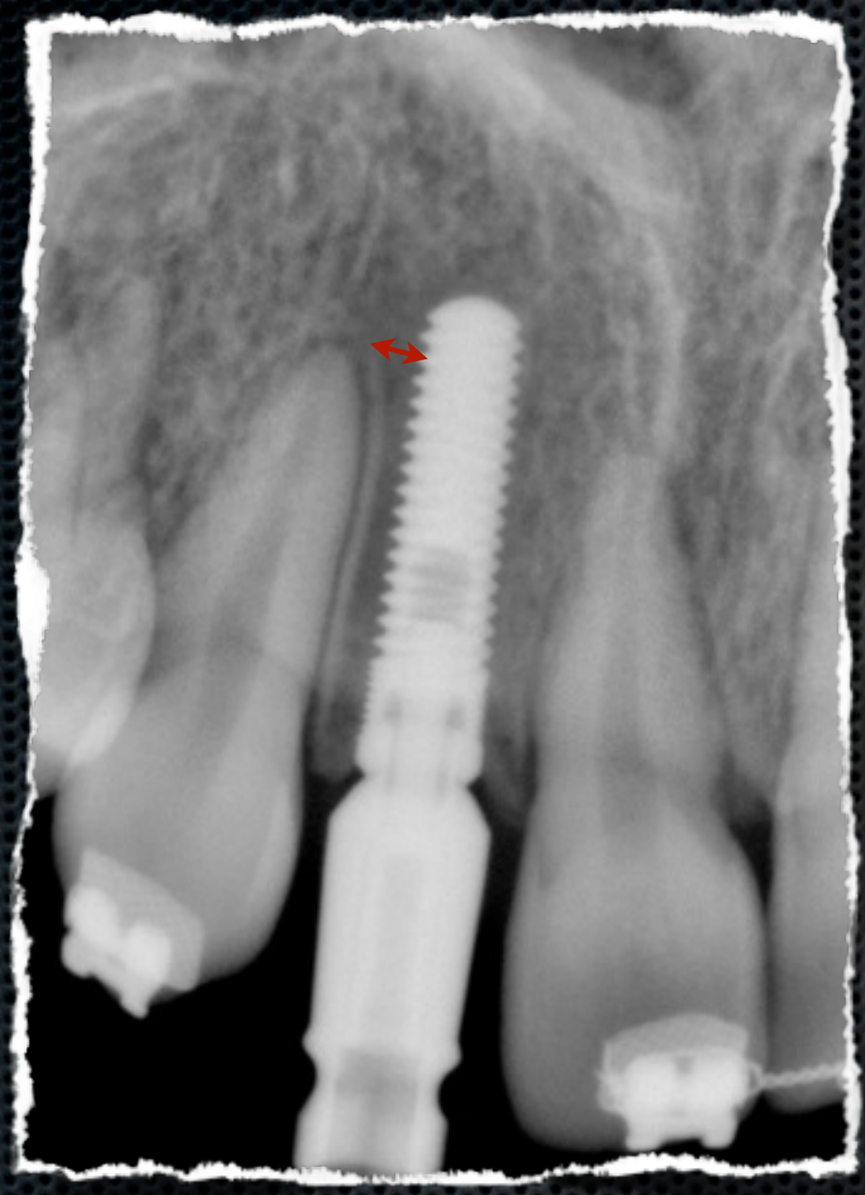
The Unknown: Width and Trajectory

Minimum Requirements of Available Bone

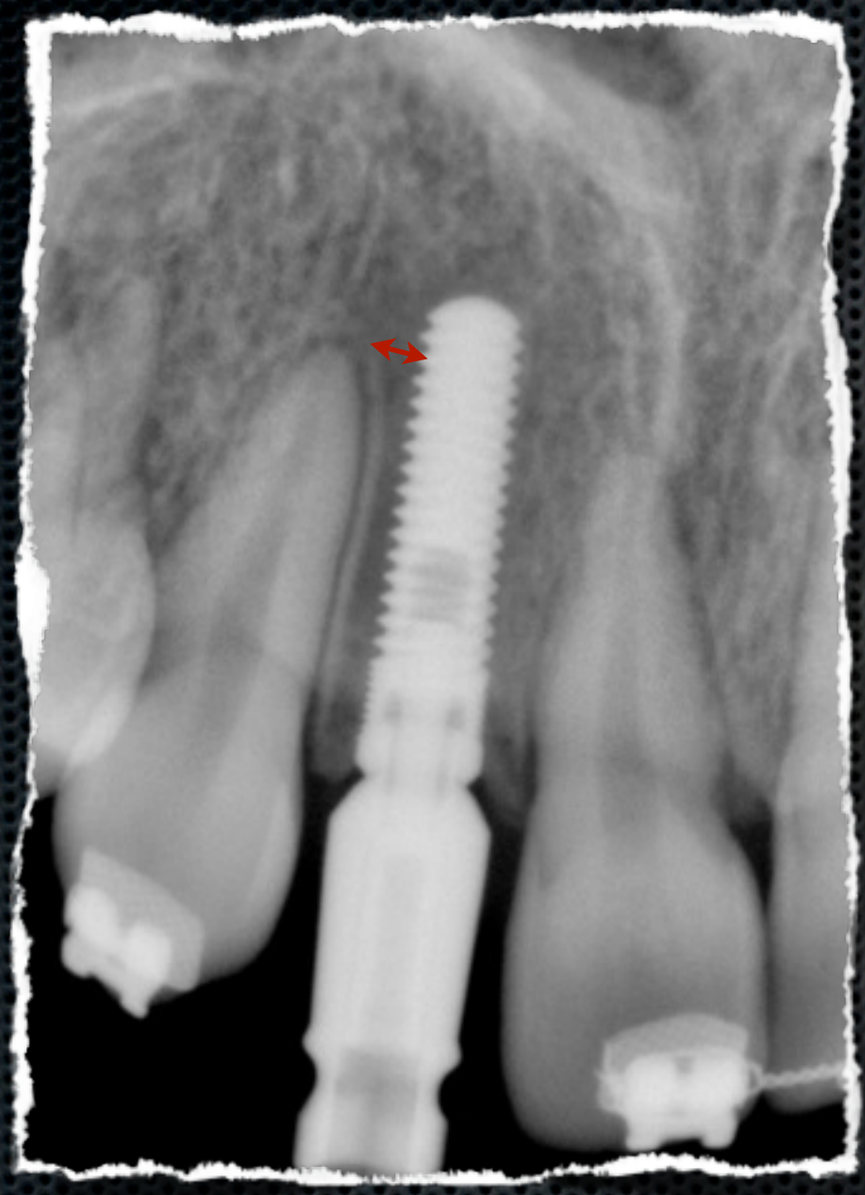
Minimum Requirements of Available Bone



Minimum Requirements of Available Bone

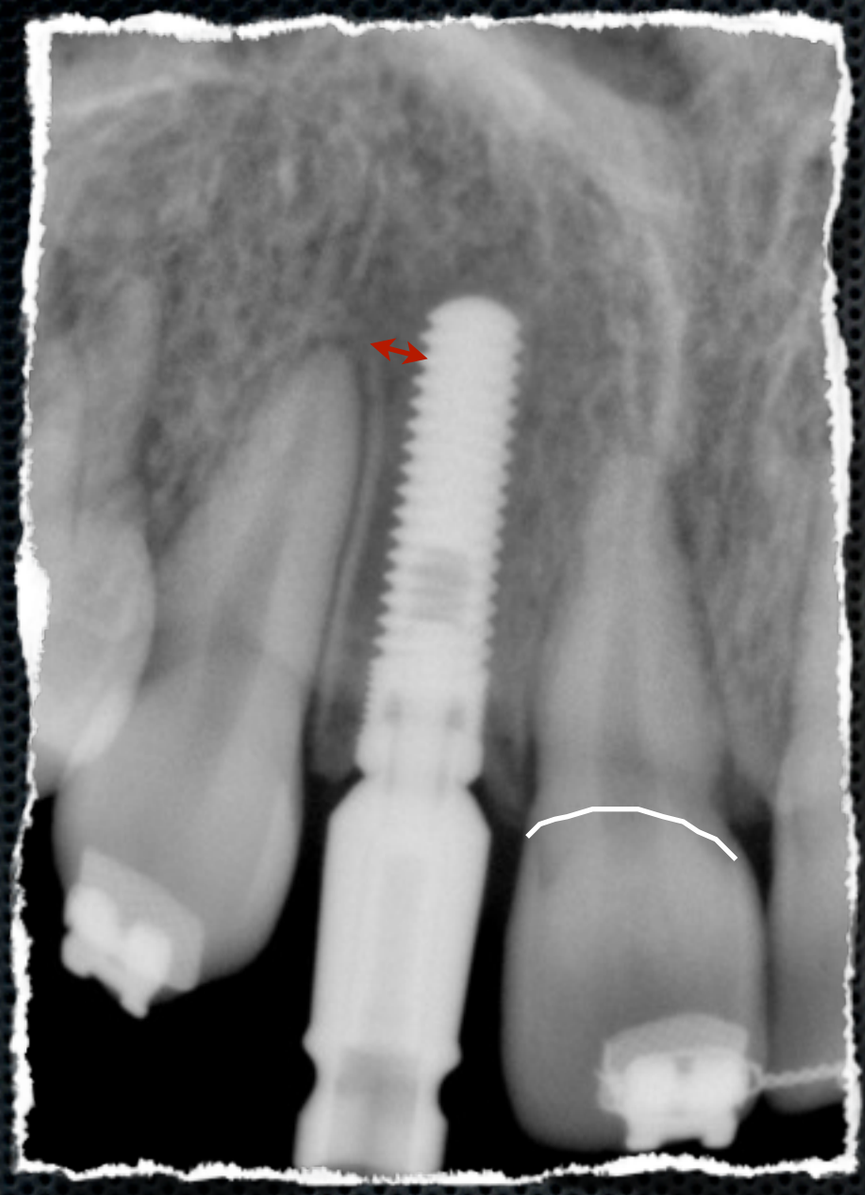


Minimum Requirements of Available Bone



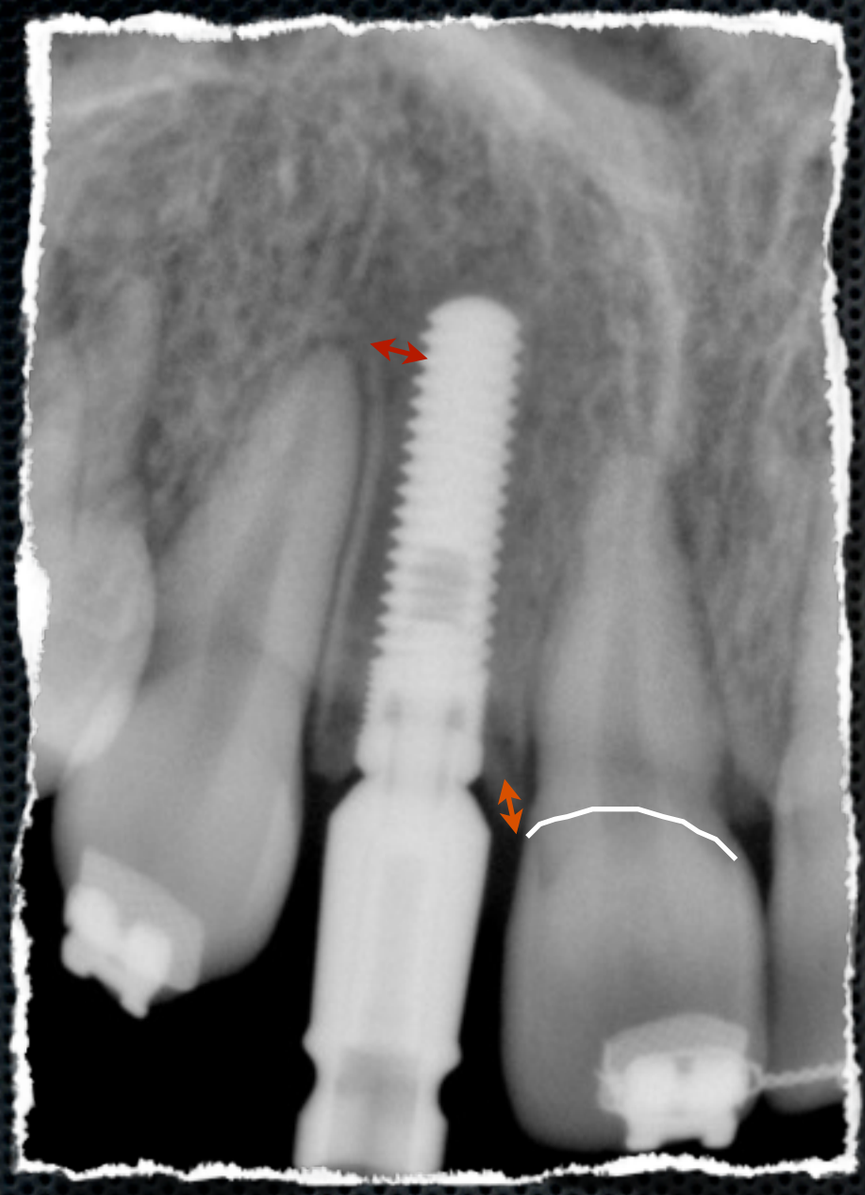
1-1.5mm from adjacent tooth

Minimum Requirements of Available Bone



1-1.5mm from adjacent tooth

Minimum Requirements of Available Bone



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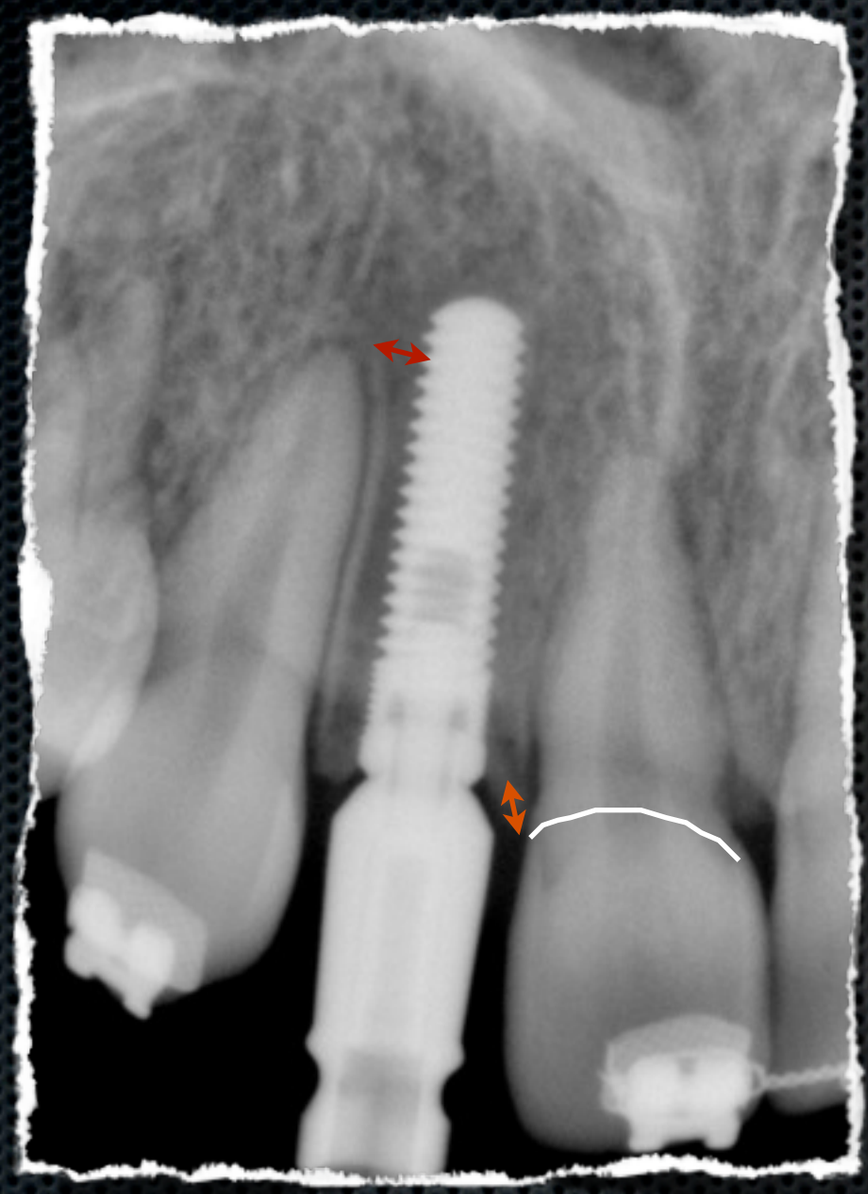
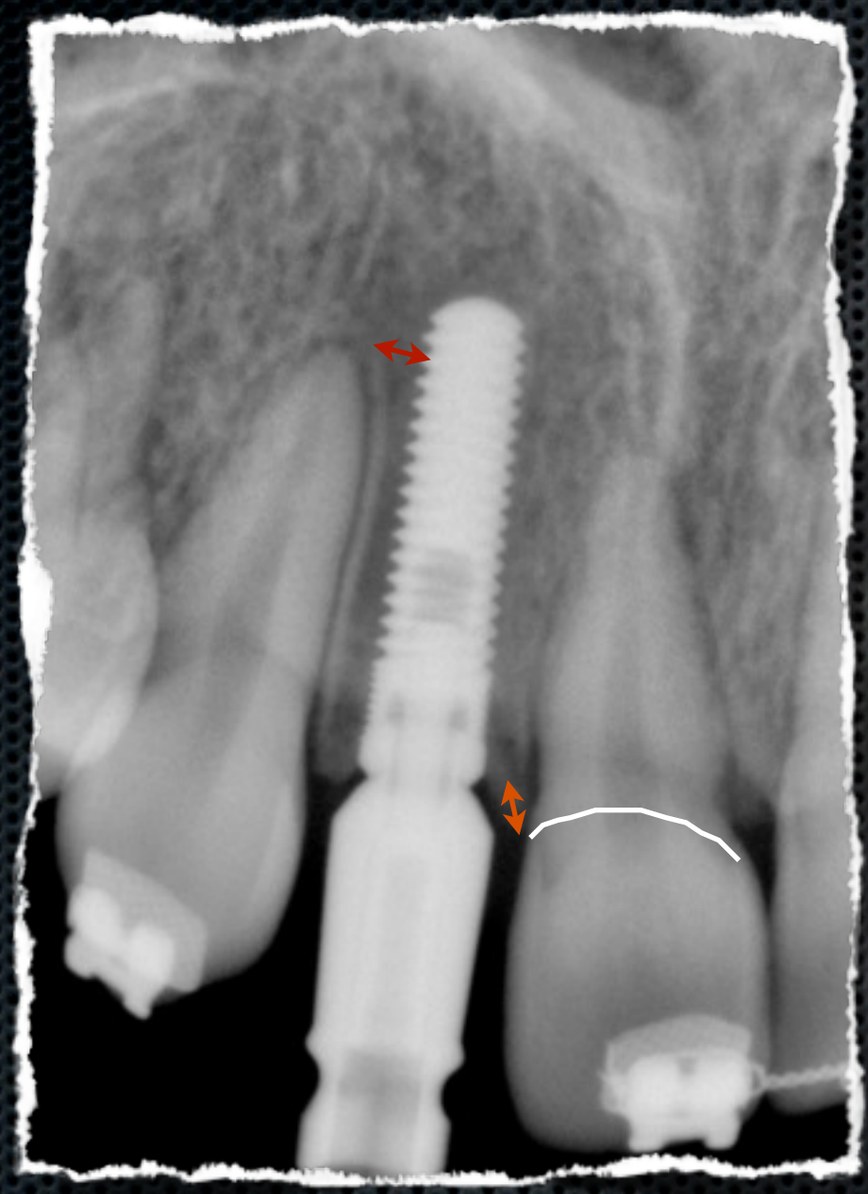
Minimum Requirements of Available Bone



1-1.5mm from adjacent tooth

The crest of the implant should be 2mm below the CEJ of adjacent tooth

Minimum Requirements of Available Bone



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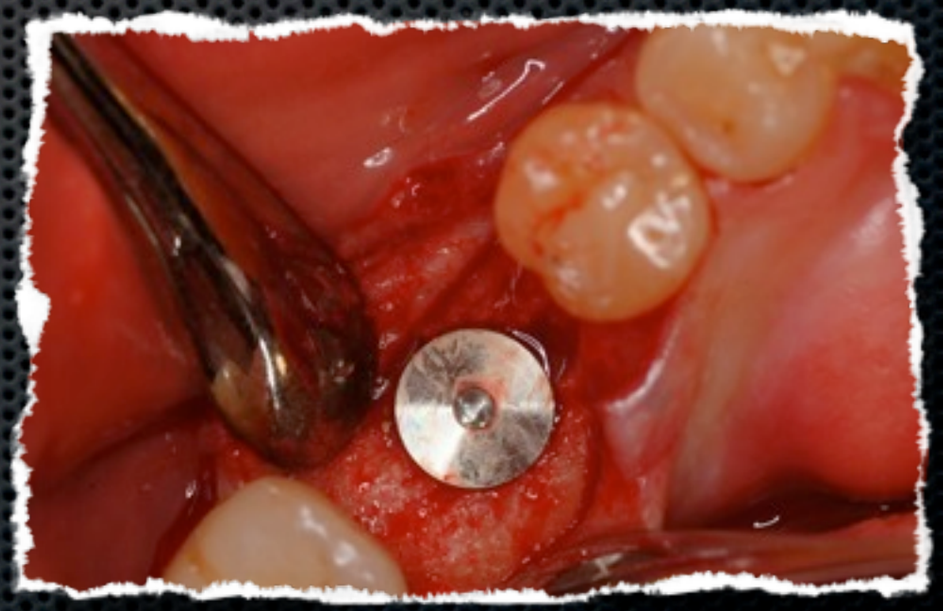
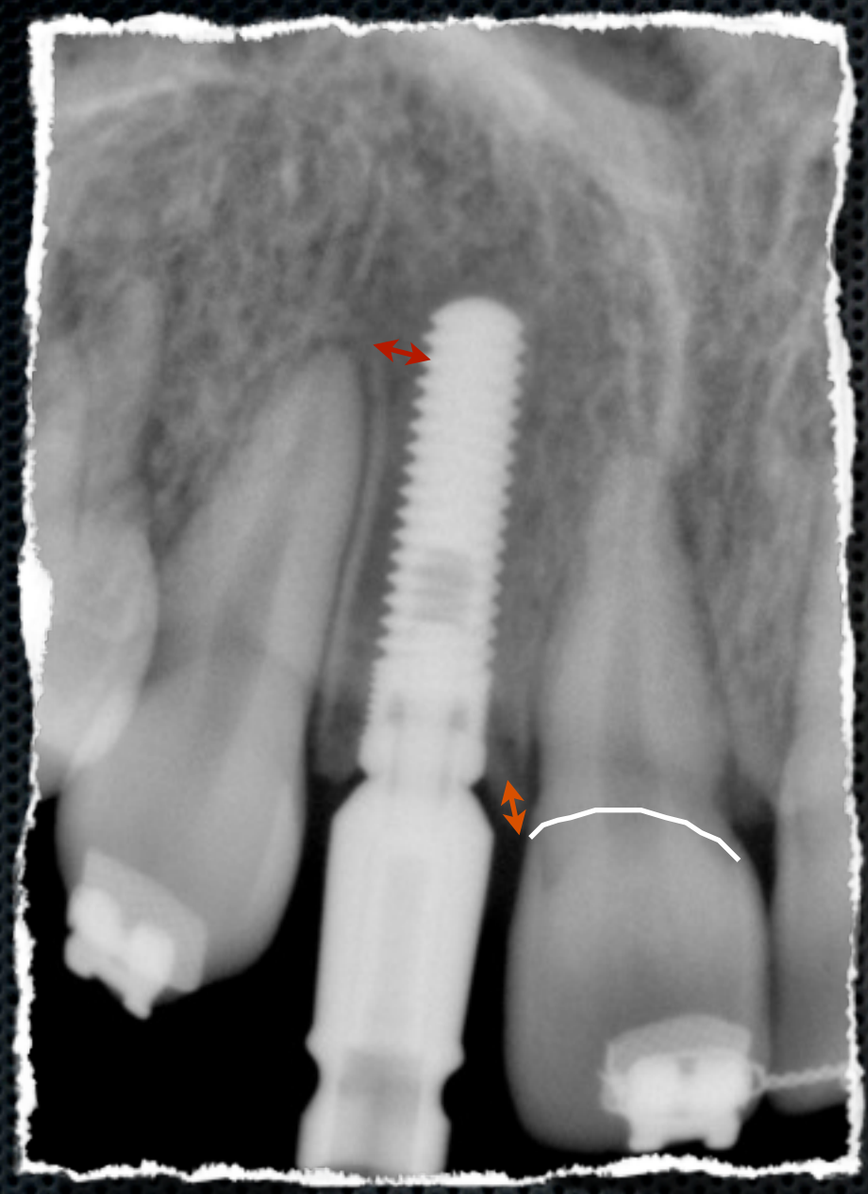


Minimum Requirements of Available Bone



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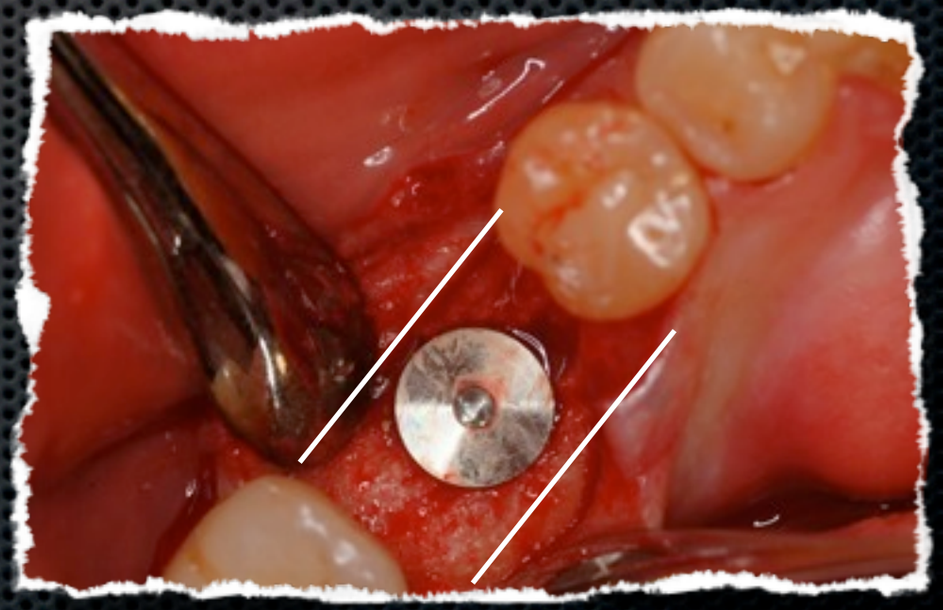
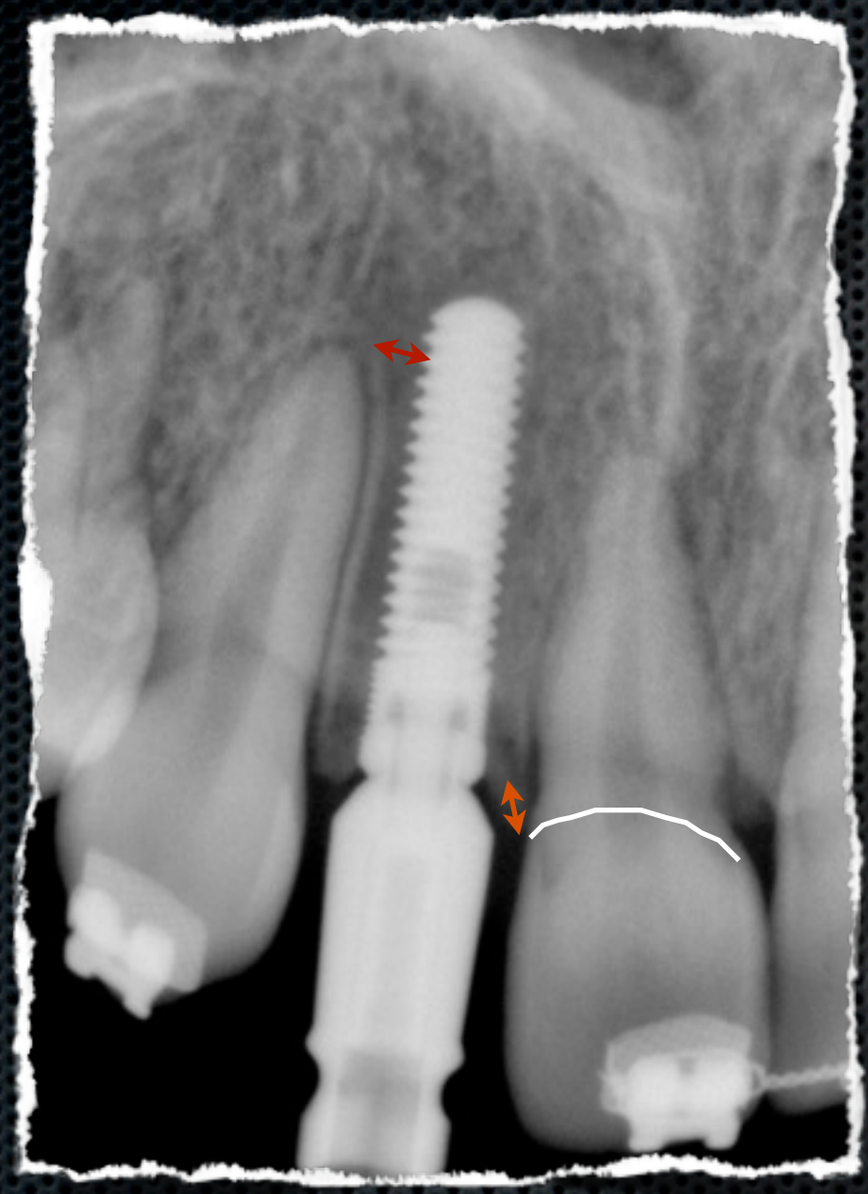


Minimum Requirements of Available Bone



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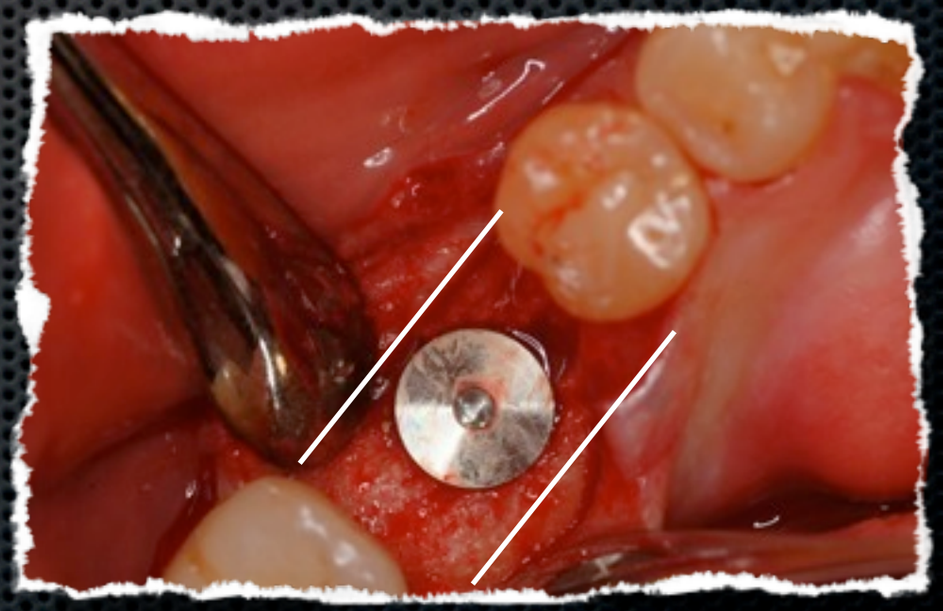


Atleast 1 mm of buccal and lingual bone

Intra-oral considerations

Intra-oral considerations

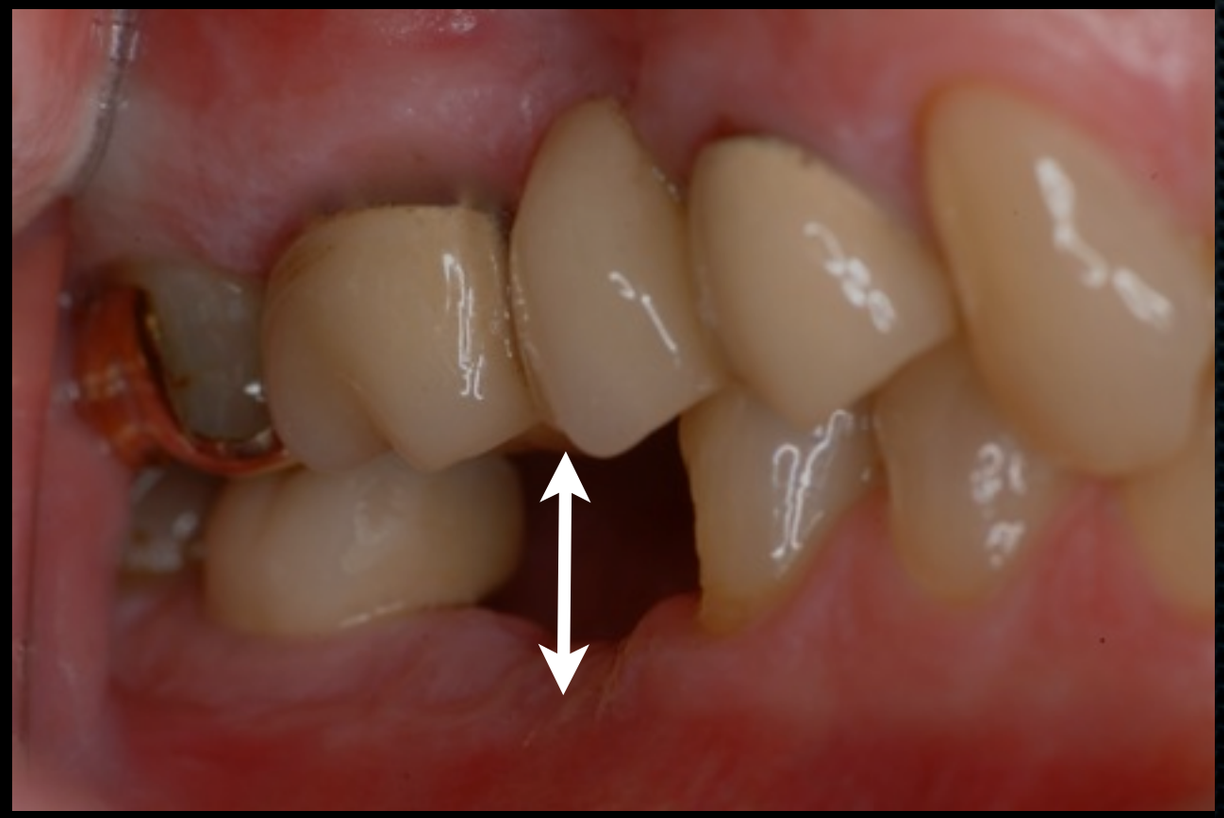
minimum 7 mm

Intra-oral considerations

minimum 7 mm

Intra-oral considerations

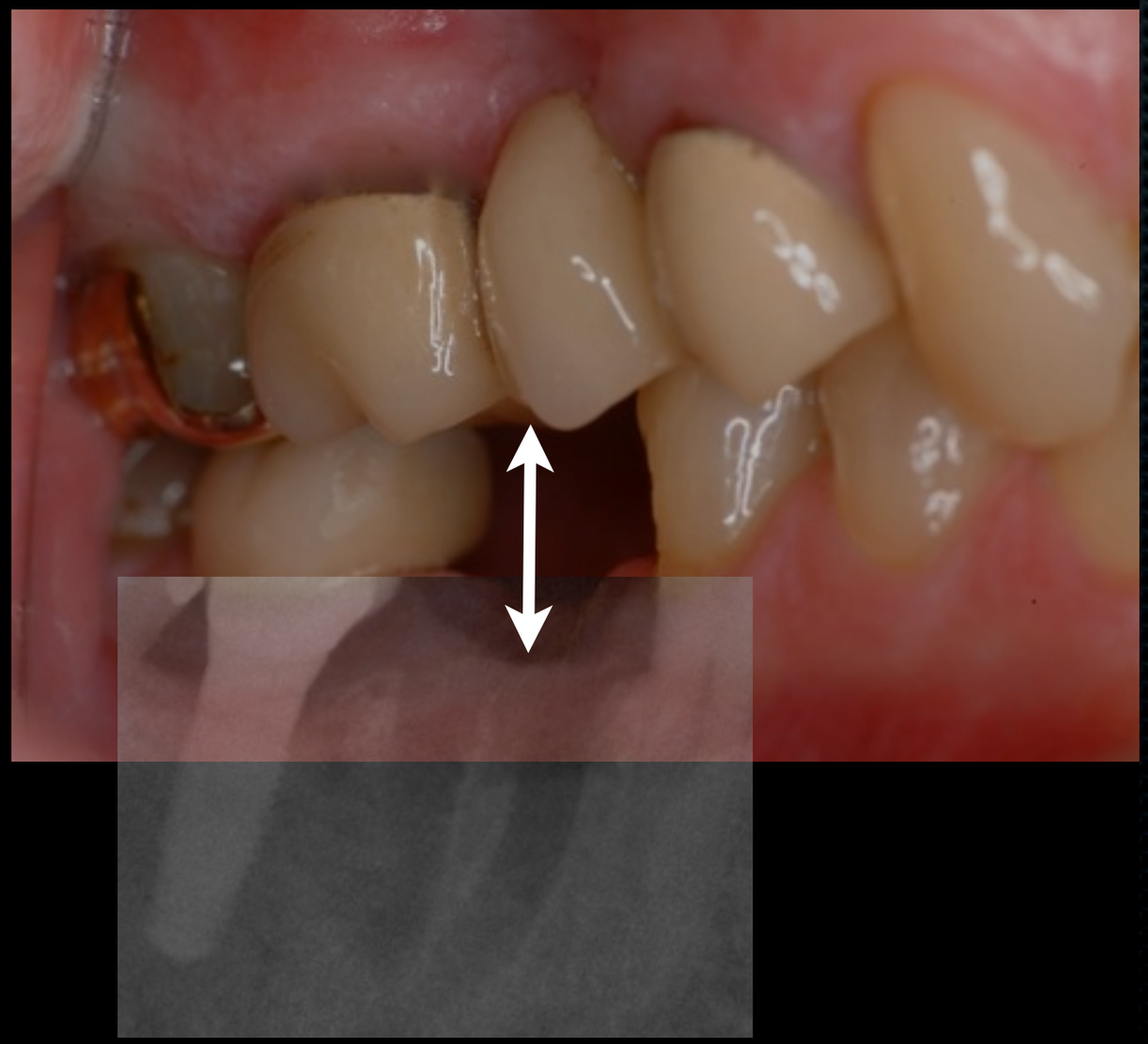
minimum 7 mm



minimum 6 mm

Intra-oral considerations

minimum 7 mm



minimum 6 mm

Quantification of Available Bone

- Bone Sounding, Ridge Mapping

Quantification of Available Bone

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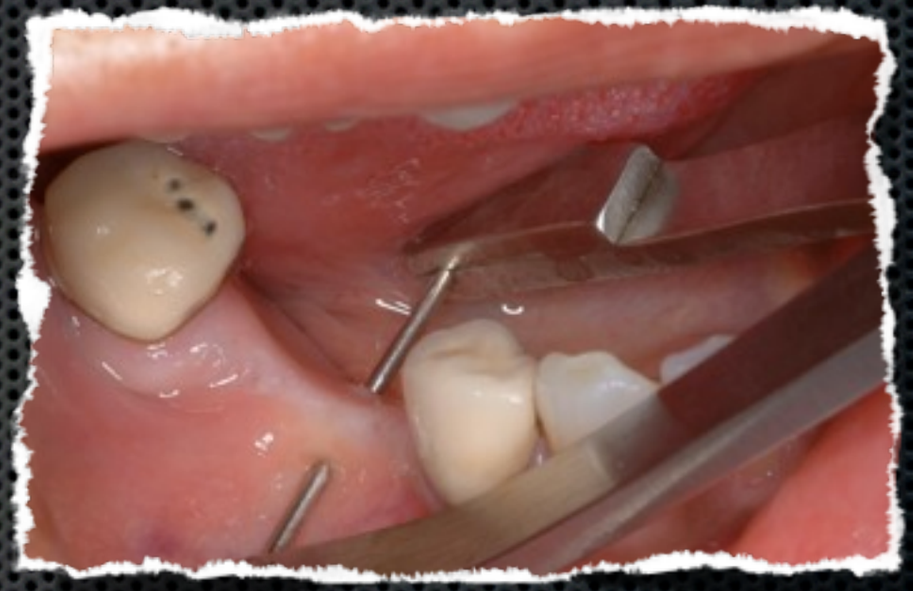
Quantification of Available Bone

- Bone Sounding, Ridge Mapping



Quantification of Available Bone

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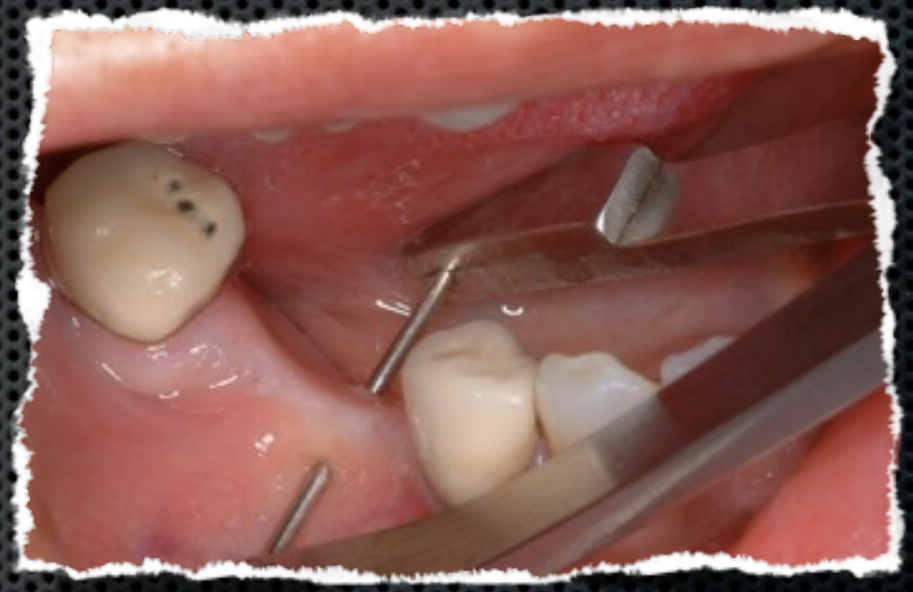
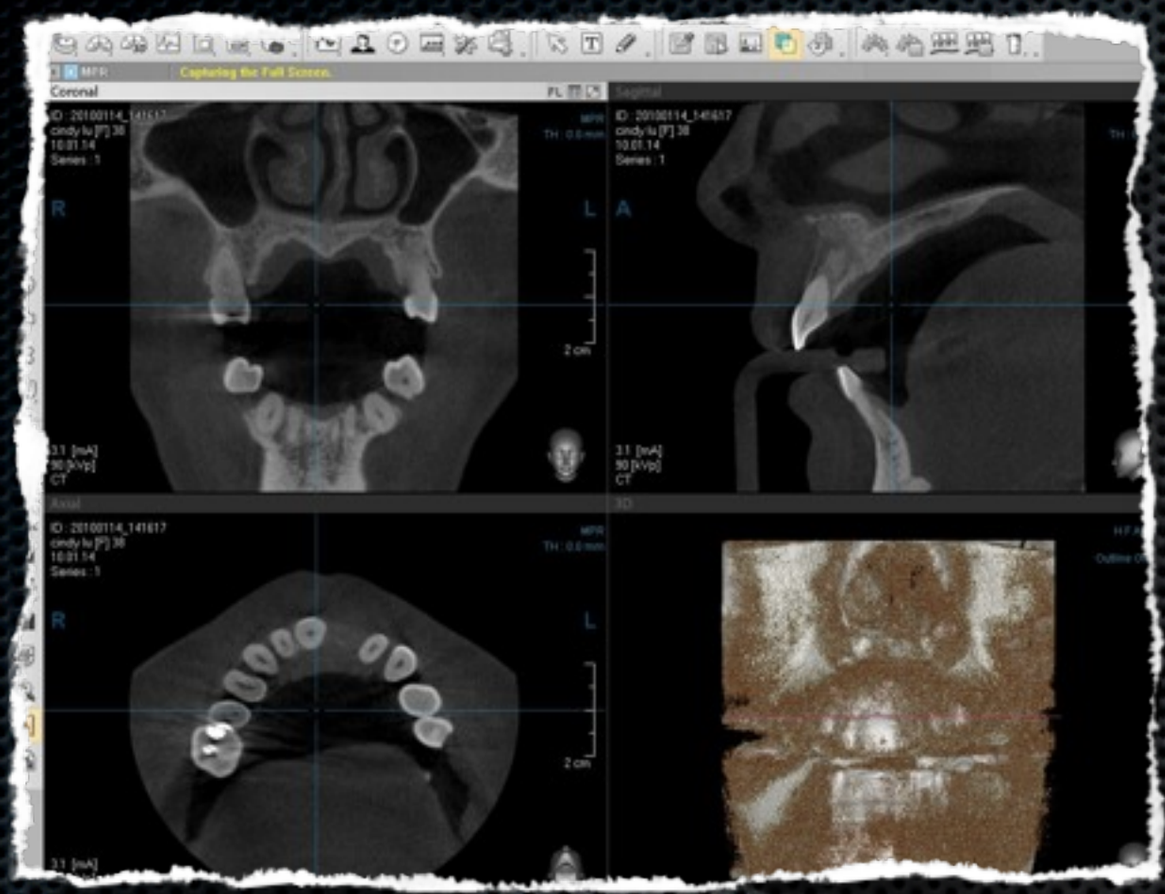
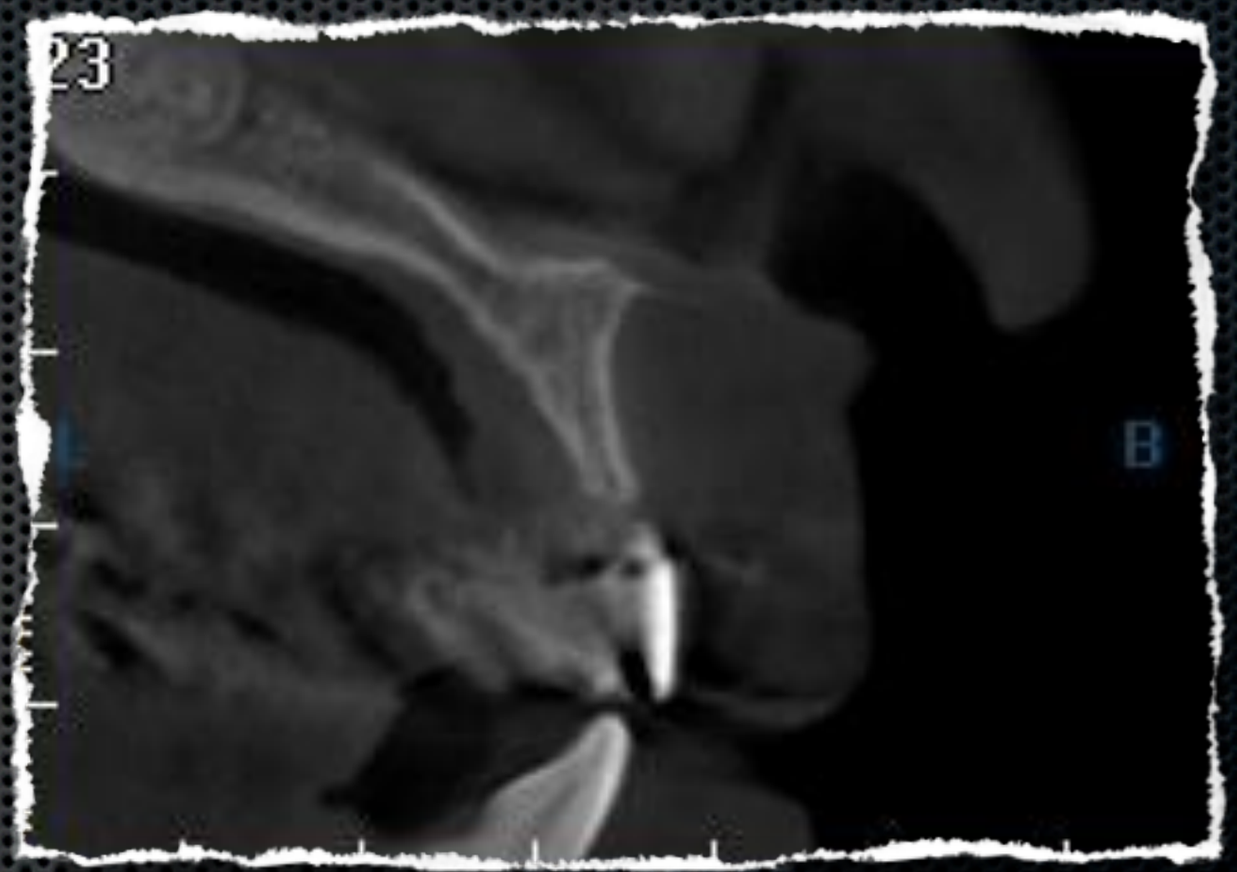


Multiple Implant Placement

Records: Panoramic Radiographs

CT Scans





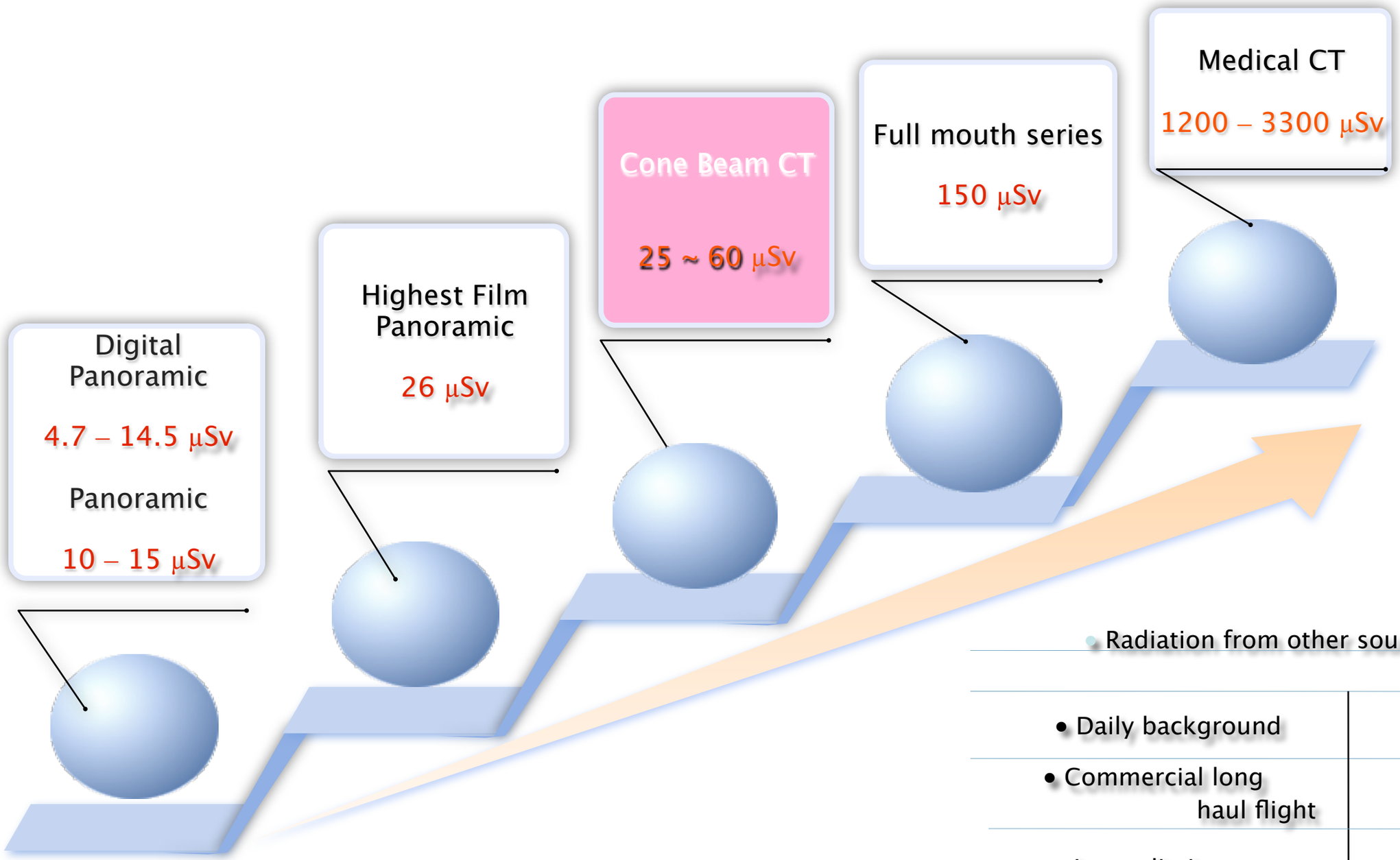
COMPARISON OF VARIOUS DENTAL IMAGING MODALITIES

Table 2-1 | Comparison of various dental imaging modalities

	Periapical (Paralleling technique)	Lateral skull (Cephalometric technique)	Dental panoramic tomogram (DPT)	Complex motion tomography	Computed tomography (MSCT)
Distance measurements					
Mesiodistal accuracy	< 1.0 mm	NA	Unreliable	Same as for DPT	< 0.5 mm
Bone height accuracy	< 1.0 mm	Midline only	Unreliable	< 1.0 mm	< 1.0 mm
Bone width accuracy	NA	Midline only	NA	< 1.0 mm	< 0.5 mm
Bone quality assessment					
Cortical plate thickness	NA	NA	NA	< 1.0 mm	< 0.5 mm
Cortical plate density	Qualitative	Unreliable	Unreliable	Qualitative	< 0.5%
Trabecular density	Qualitative	Unreliable	Unreliable	Qualitative	< 0.5%
General overview					
Anatomy and pathology	Local only	Good	Good	Same as for DPT	Very good
Identification of possible implant sites	Local only	Unreliable	Good	Same as for DPT	Very good

Background: dosage comparison

1Sv = 100rem



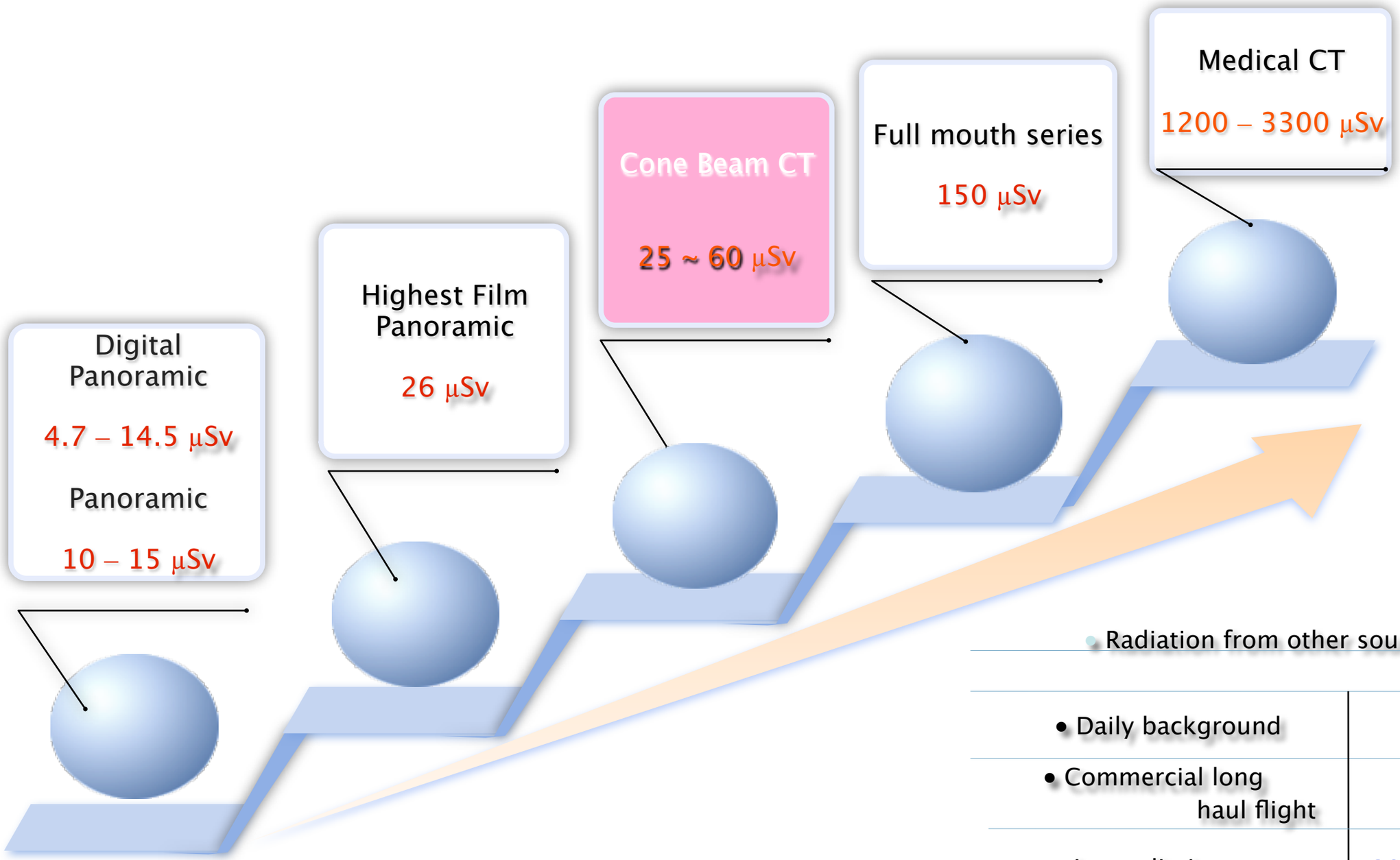
- Radiation from other sources

• Daily background	8 μSv
• Commercial long haul flight	6 μSv/hr
• Lower limits occupational exposure	

Dr. Sharon Brooks, Dept. of Radiology, University of Michigan
Dr. Stuart White, Dept. of Radiology, UCLA

Background: dosage comparison

1Sv = 100rem



- Radiation from other sources

• Daily background	8 μSv
• Commercial long haul flight	6 μSv/hr
• Lower limits occupational exposure	20,000 μSv/yr

Dr. Sharon Brooks, Dept. of Radiology, University of Michigan
Dr. Stuart White, Dept. of Radiology, UCLA

Radiation doses from dental x-ray examinations (ICRP 1990 tissue weightings)*

X-ray Mode	Technique	Typical effective dose (μSv)	Background equivalent radiation time	Theoretical cancer risk(per million exams)
Single periapical or bitewing	Digital, rectangular collimation Digital, round collimation E-speed film, round collimation	1 2 4	4 hrs 8 hrs 16 hrs	0.05 0.1 0.2
Lateral cephalogram	Digital/film with rare earth screen	2	8 hrs	0.1
Dental Panoramic tomogram	Digital/film with rare earth screen	20	3.5 days	1.0
Full-mouth set(20PAs)	Digital, rectangular collimation Digital, round collimation E-speed film, round collimation	20 32 80	3.5 days 5.5 days 13.5 days	1.0 1.6 4.0
NewTom cone beam CT	9000 Series 3G	36 43	6 days 7 days	1.8 2.1
i-CAT cone beam CT	20-second scan 40-second scan	29 68	5 days 11 days	1.5 3.4
Scanora	1 cycle 6 cycles	65 390	11 days 65 days	3.3 19.5
Hospital CT	Maxilla Mandible	250 480	42 days 80 days	12.5 24.0

Diagnostic Wax up

Diagnostic Wax up

Diagnostic Wax up

Diagnostic Wax up

What We Need To Gather From the Interims/Wax ups

What We Need To Gather From the Interims/Wax ups

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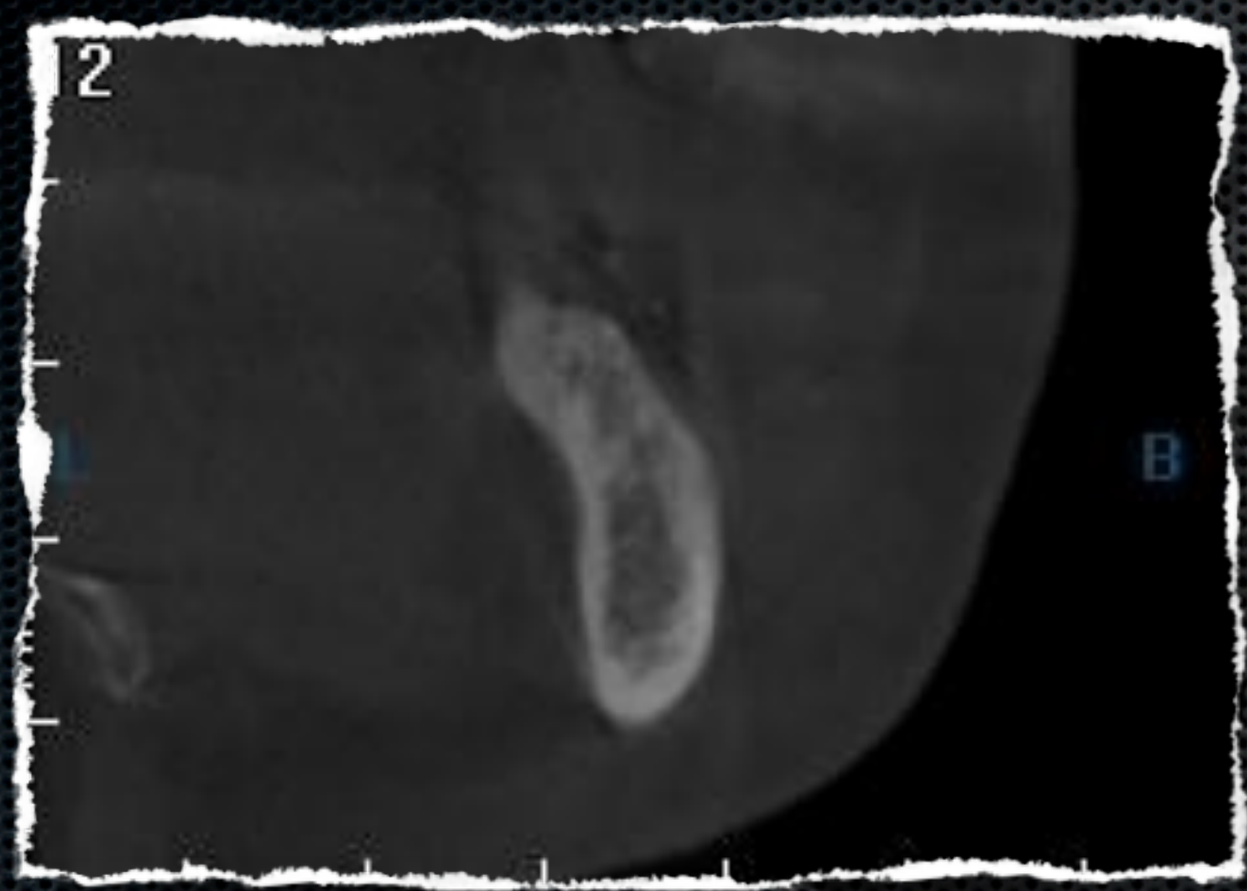
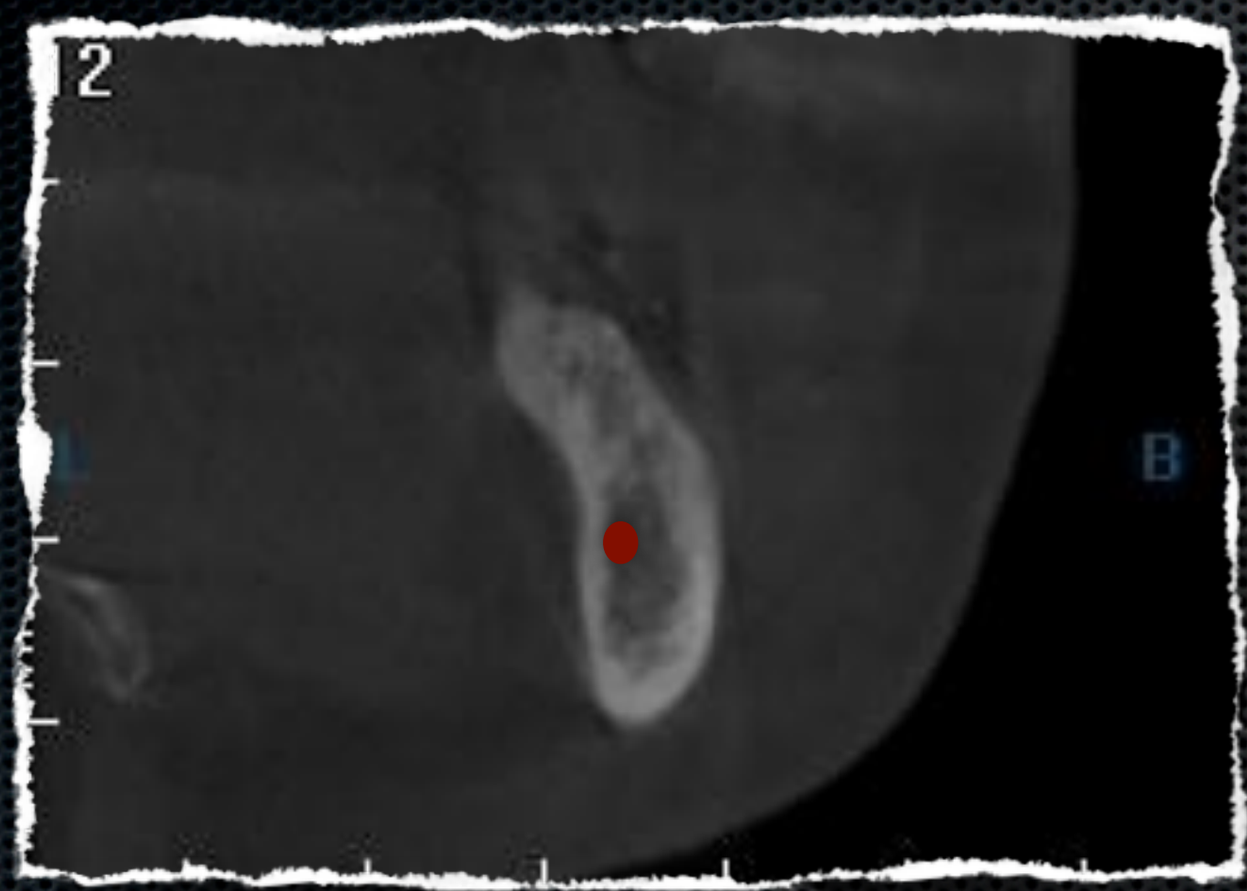
Duplicate Prosthesis for Radiographic Templates

Value of the Radiographic Template



Value of the Radiographic Template



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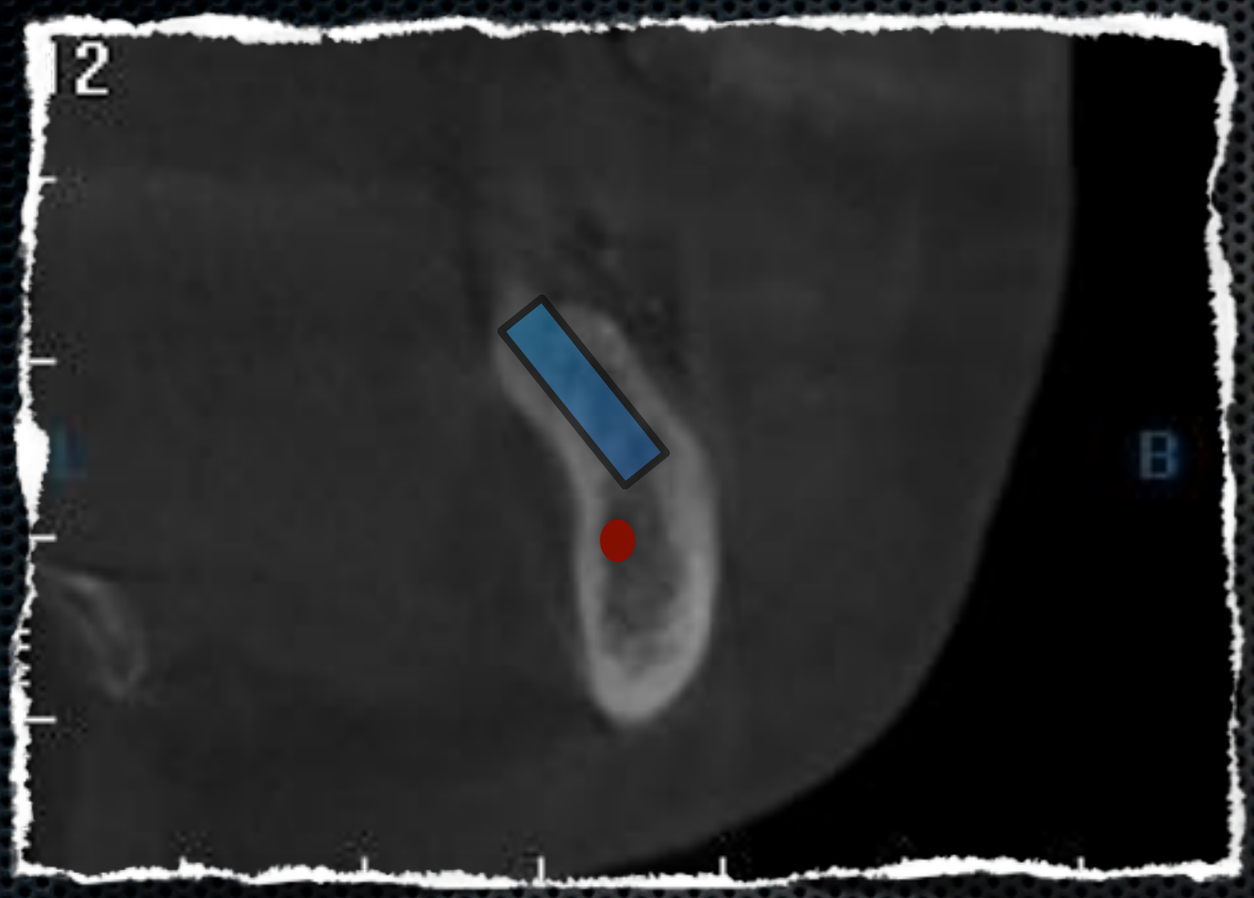

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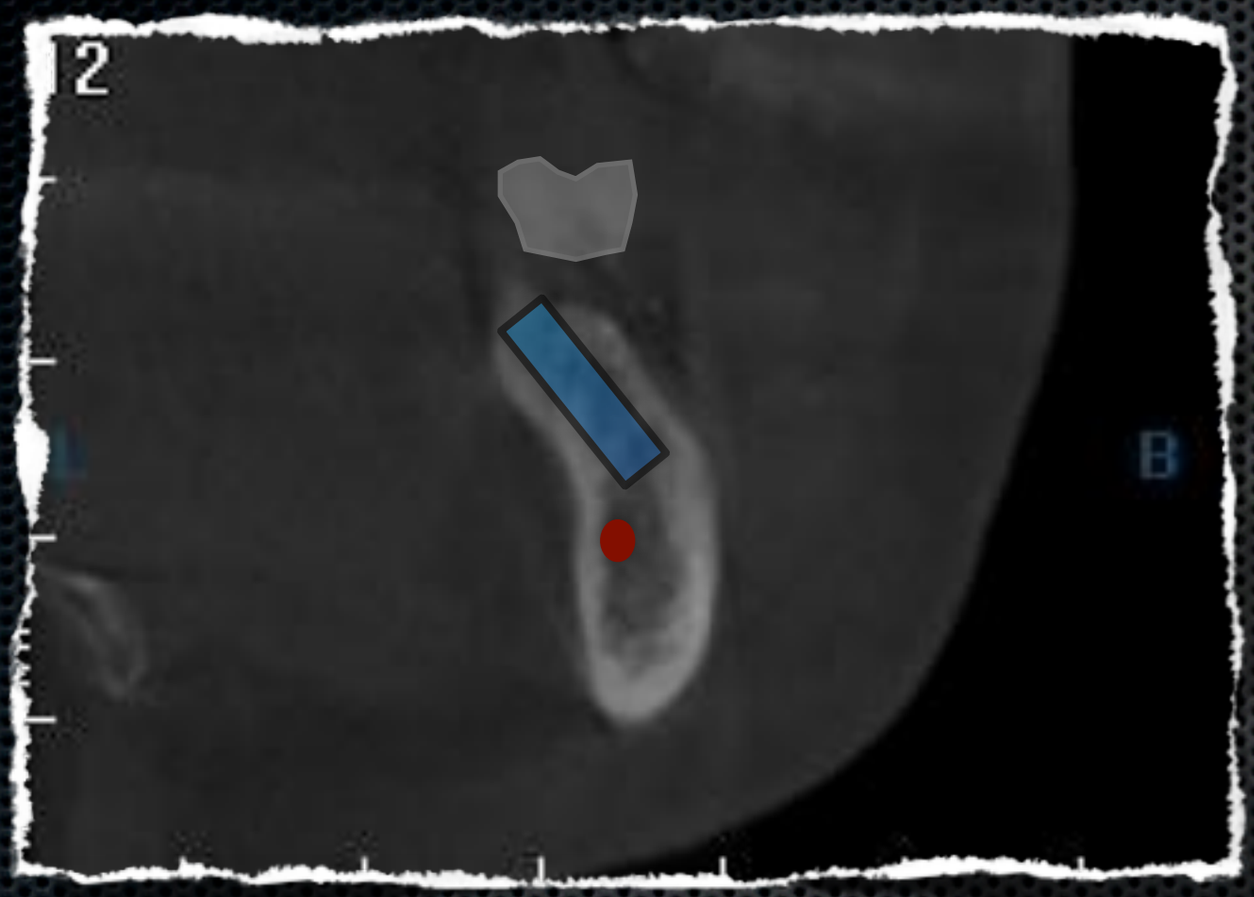

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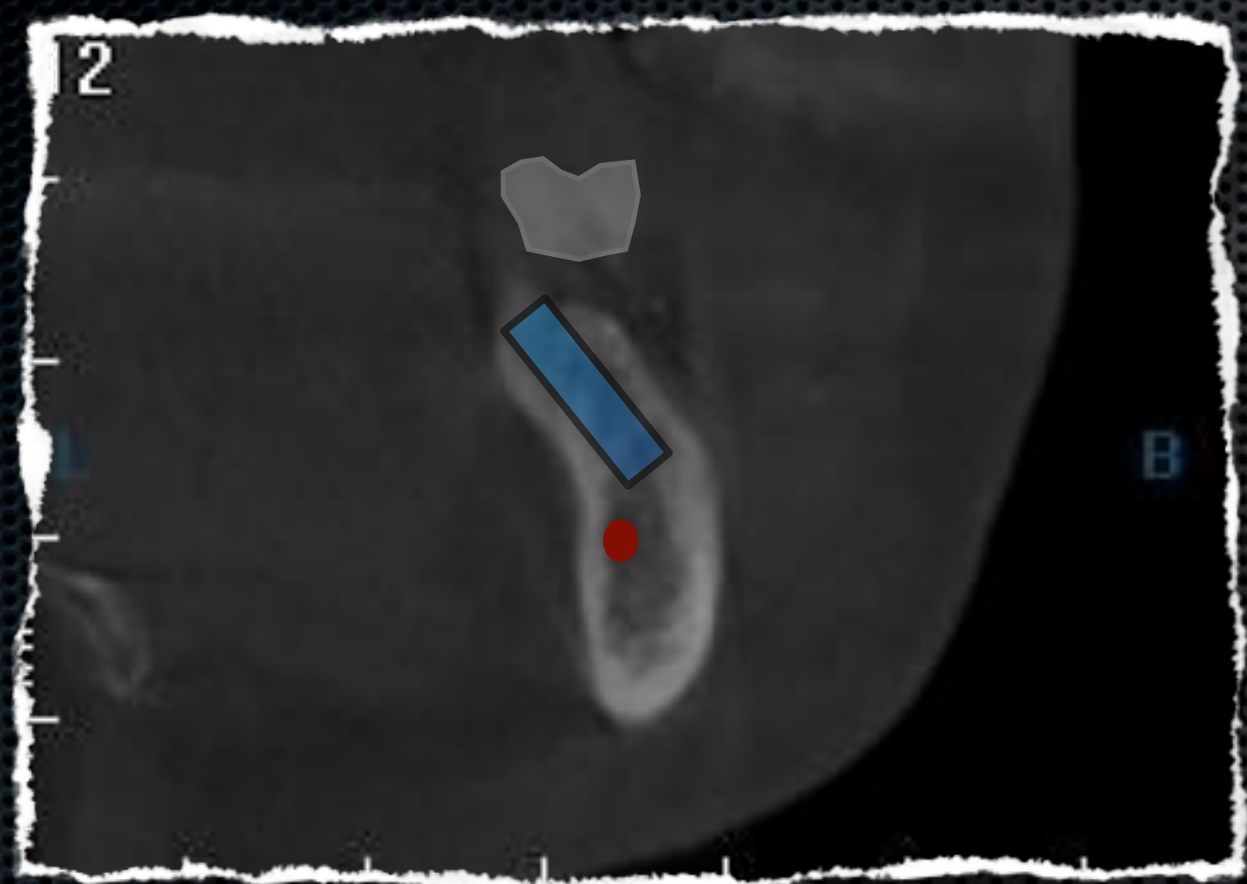

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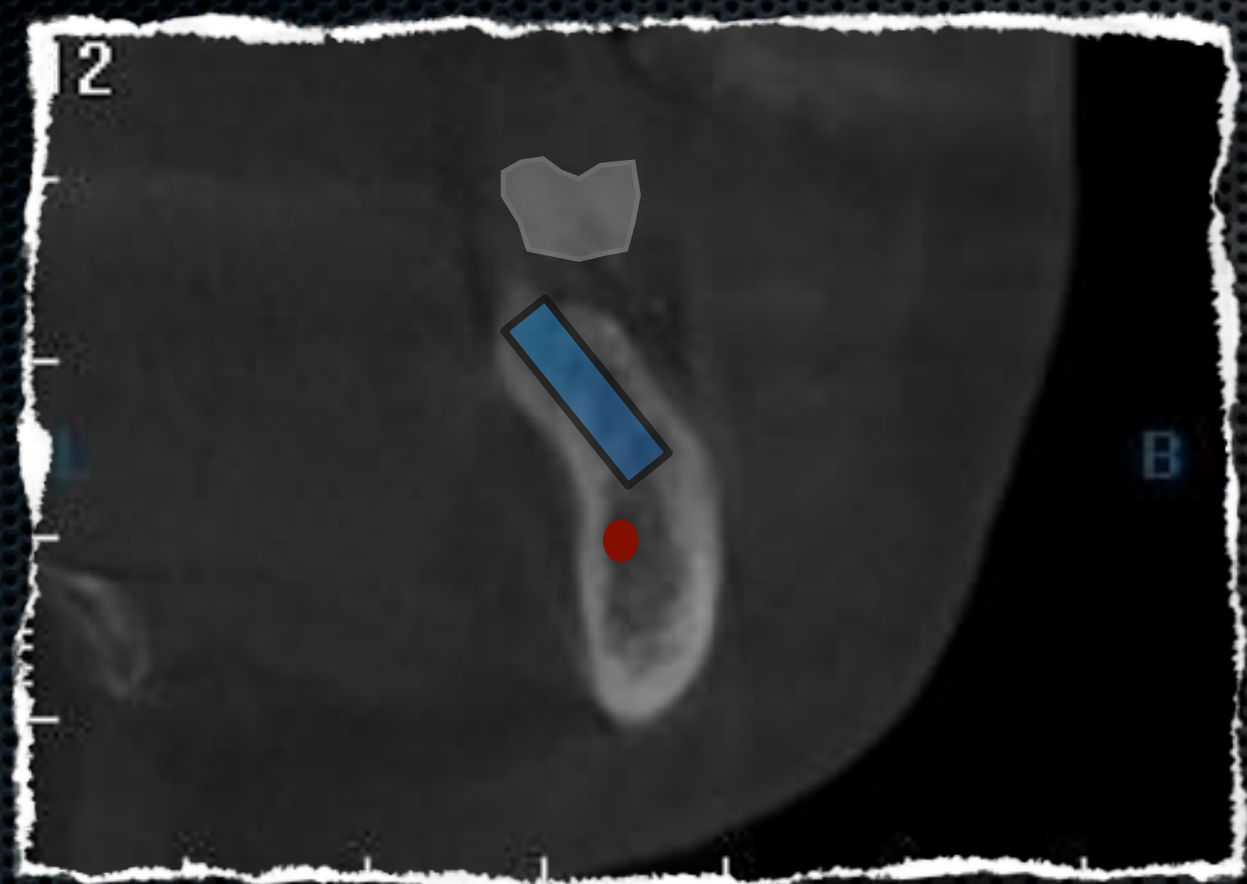
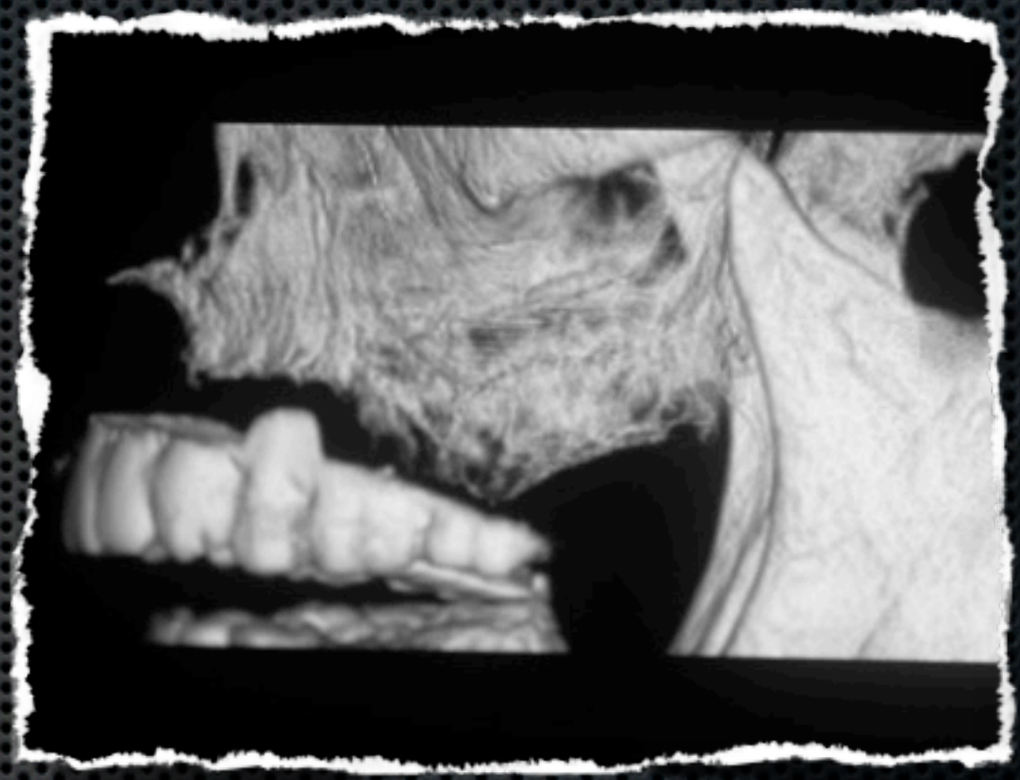
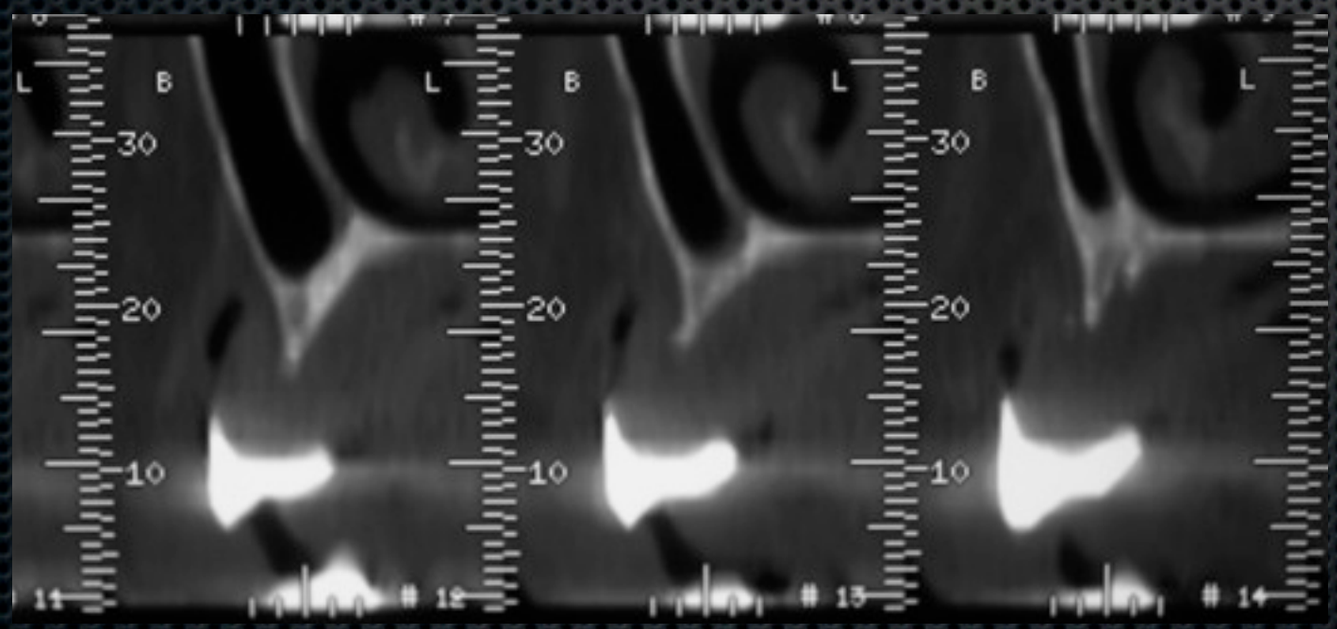
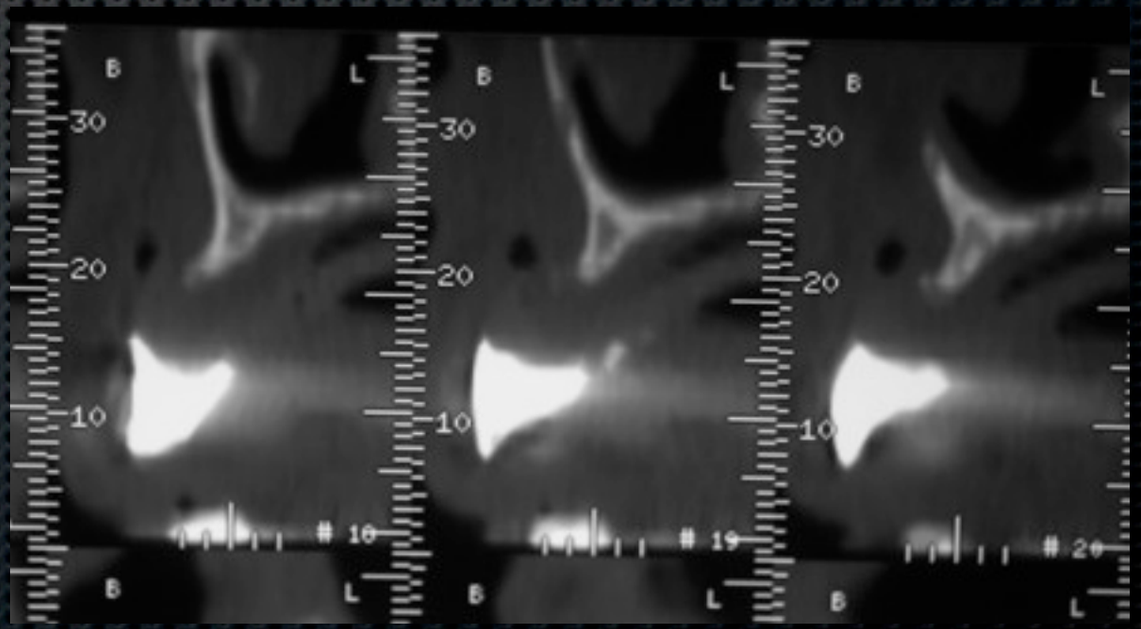


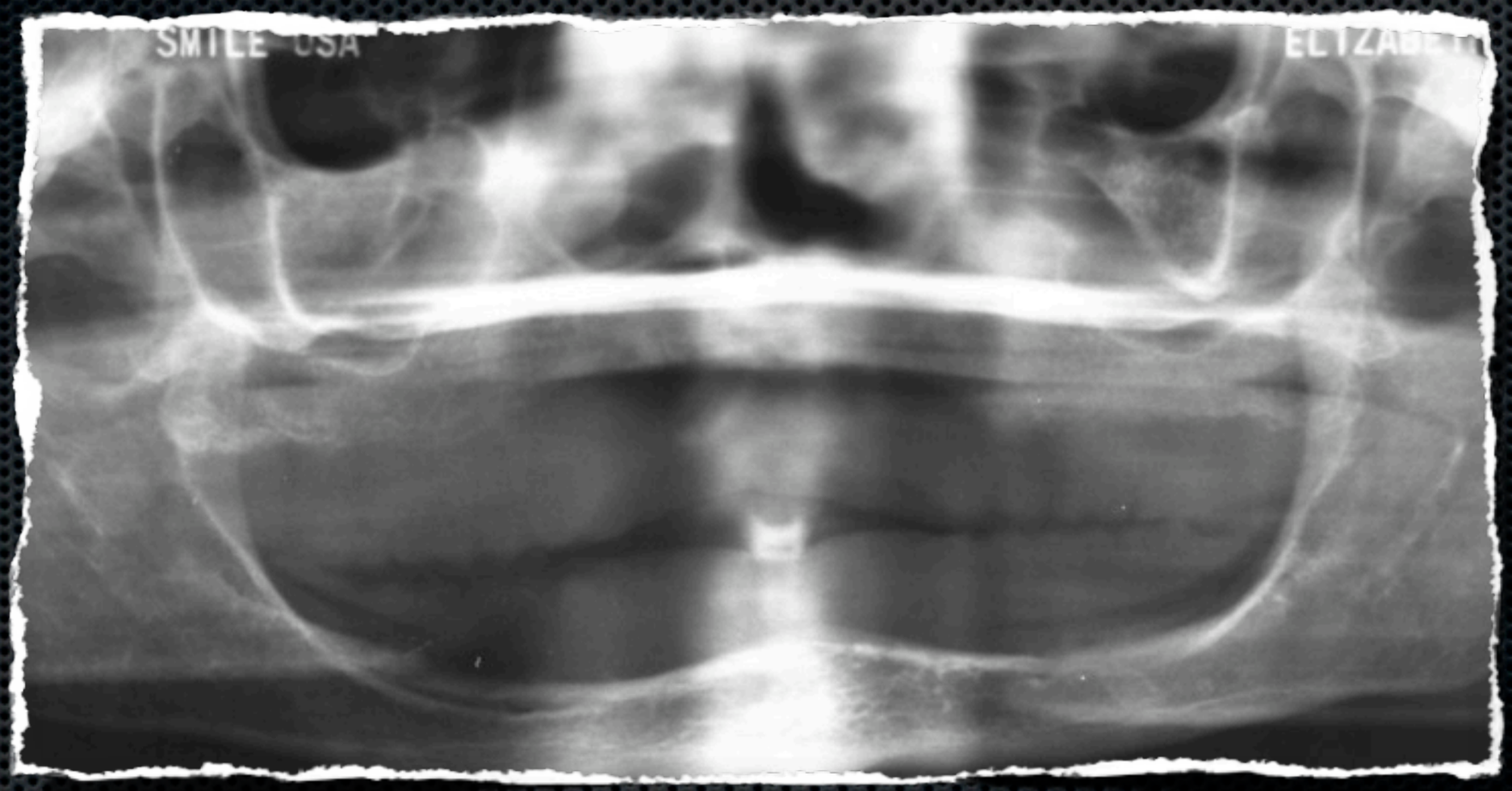
The Radiographic Template







The Value of Radiographic Template

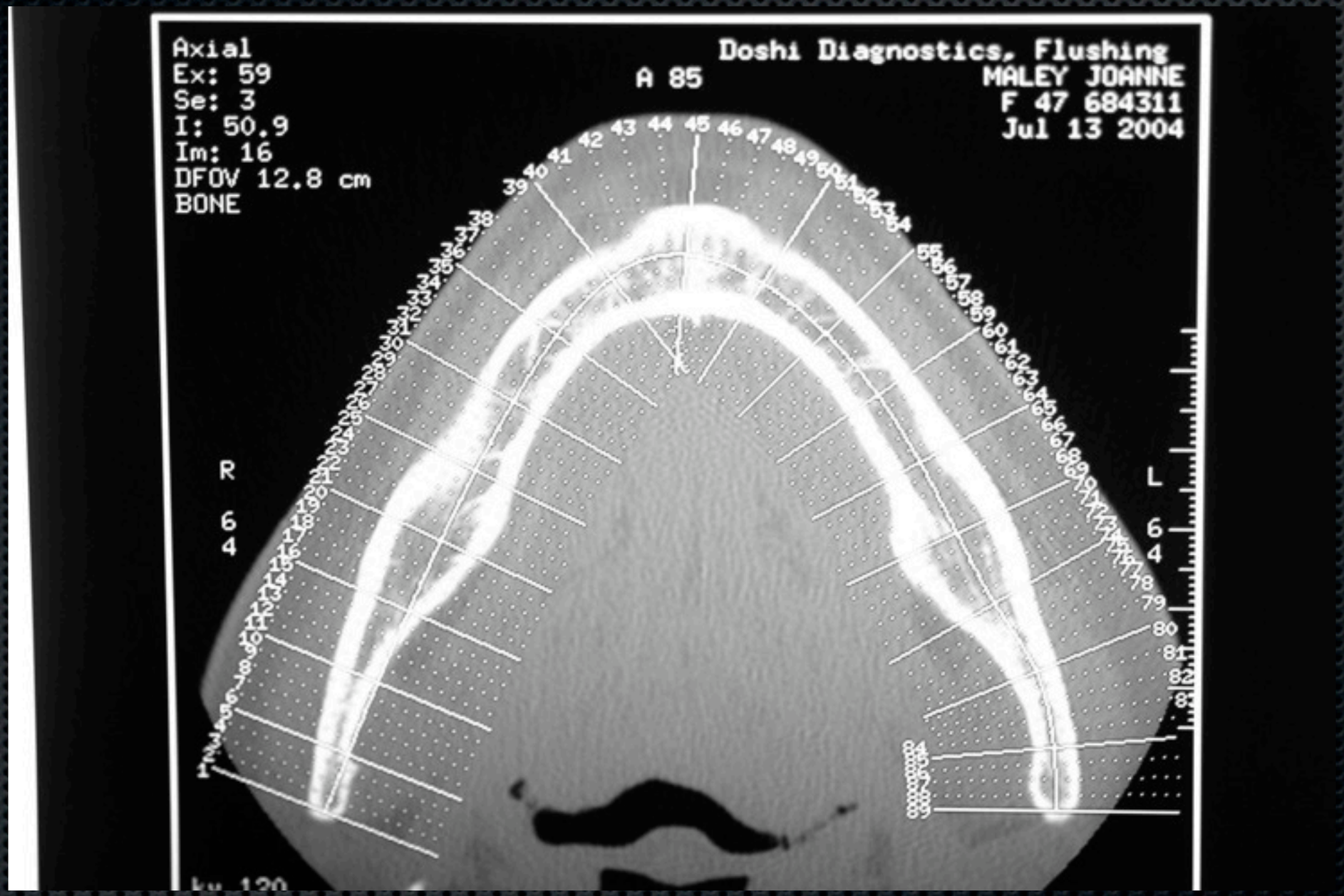


20% Barium Sulphate and Clear Ortho Resin

The Value of Radiographic Template

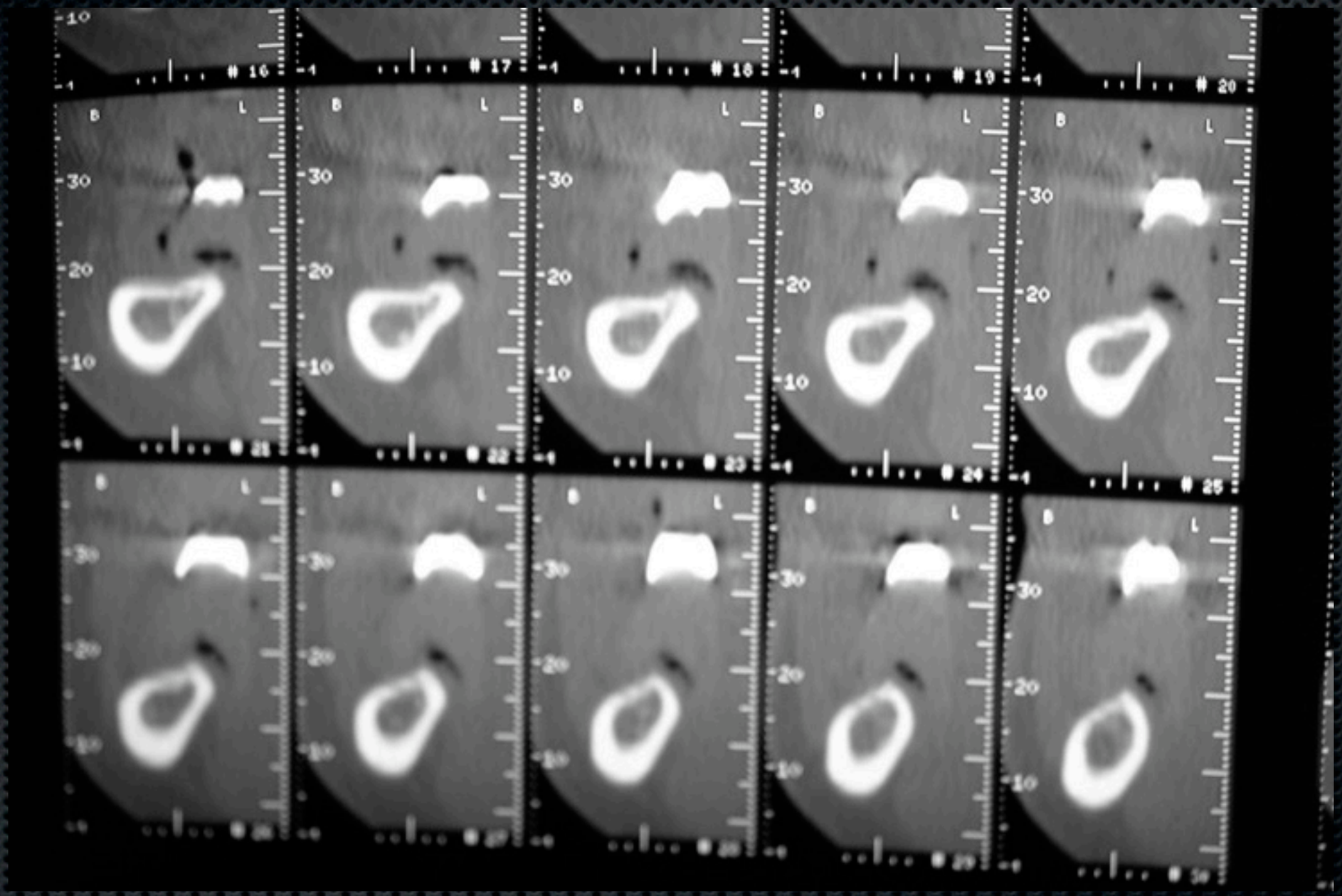
20% Barium Sulphate and Clear Ortho Resin

The Value of Radiographic Template



20% Barium Sulphate and Clear Ortho Resin

The Value of Radiographic Template



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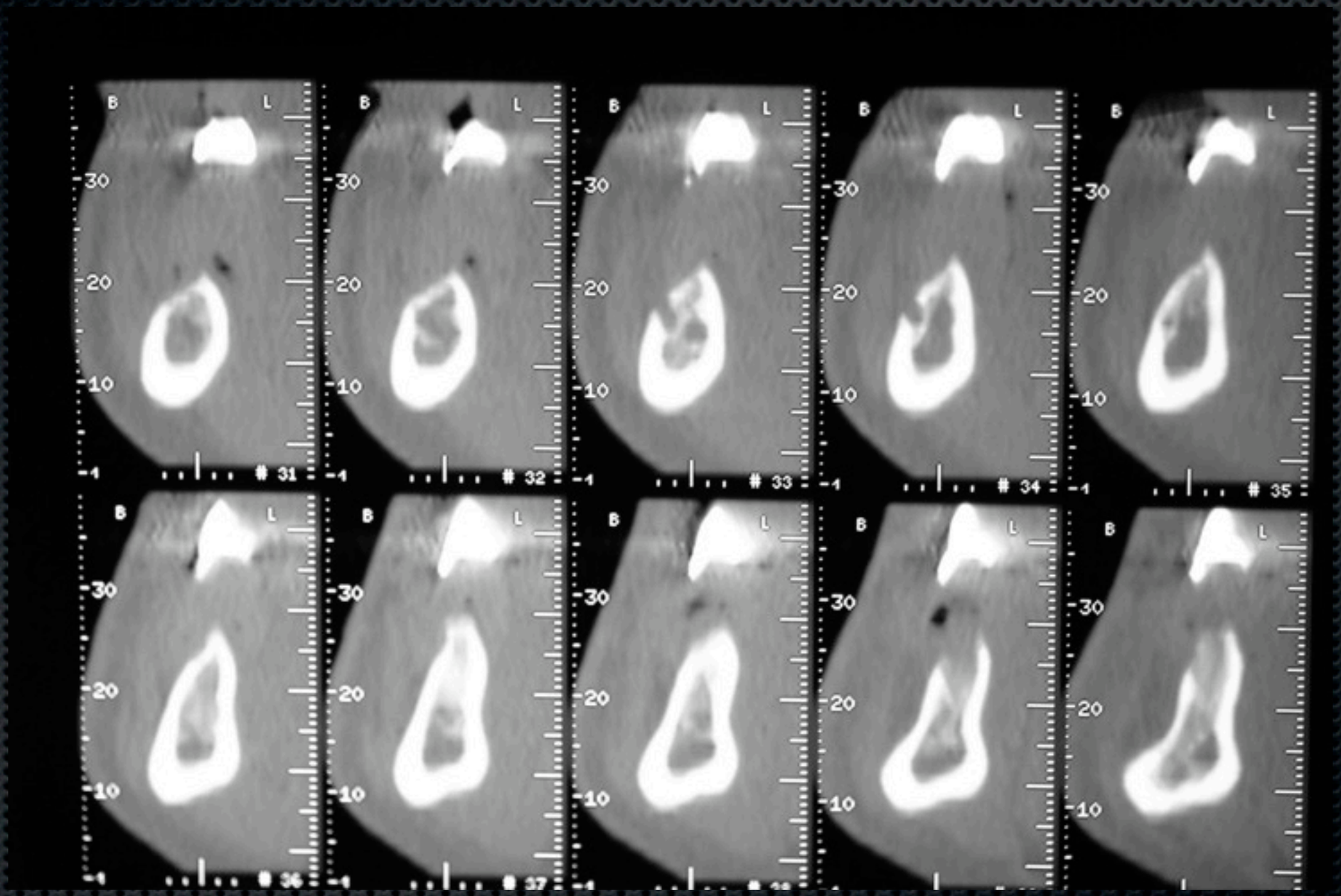
The Value of Radiographic Template



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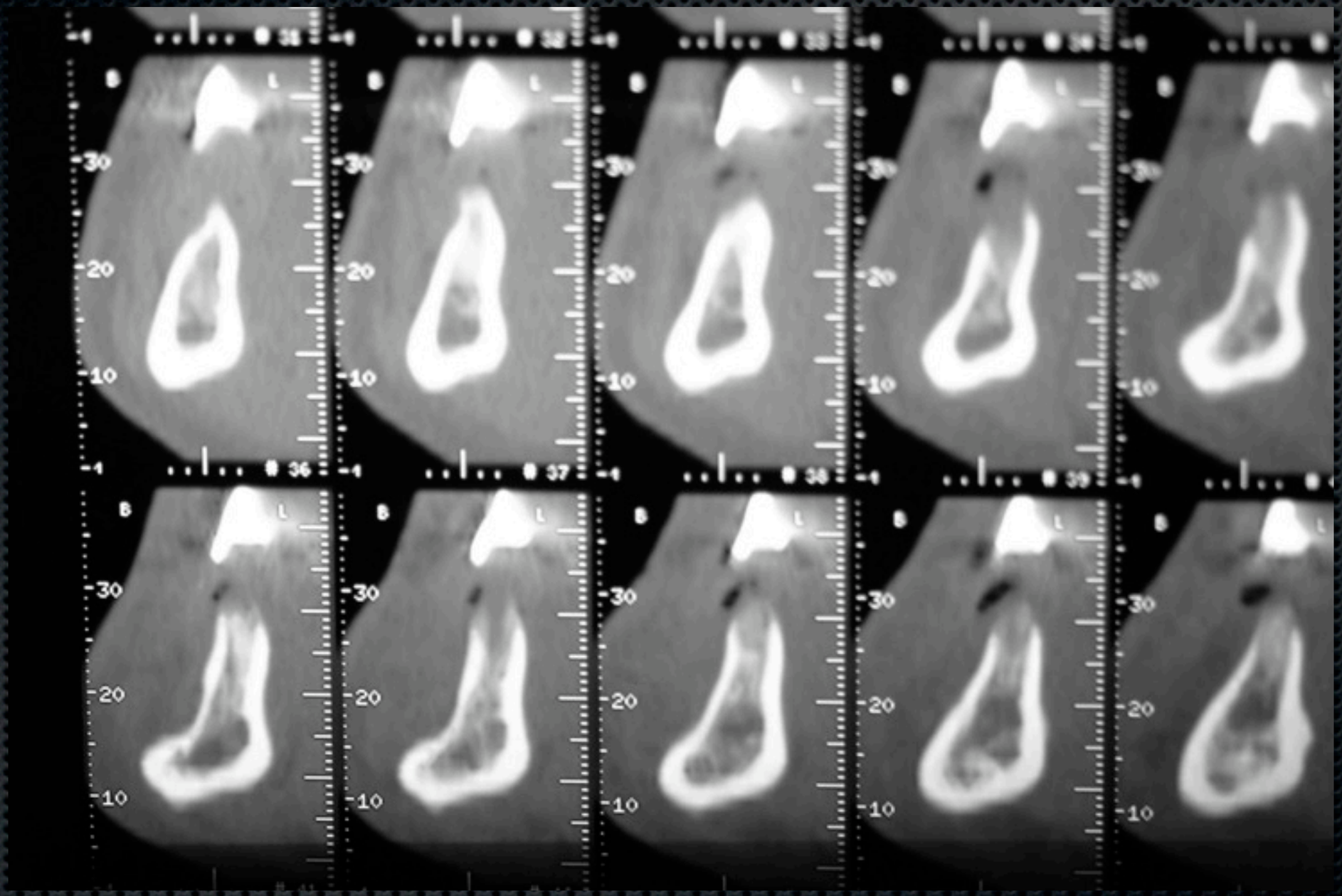
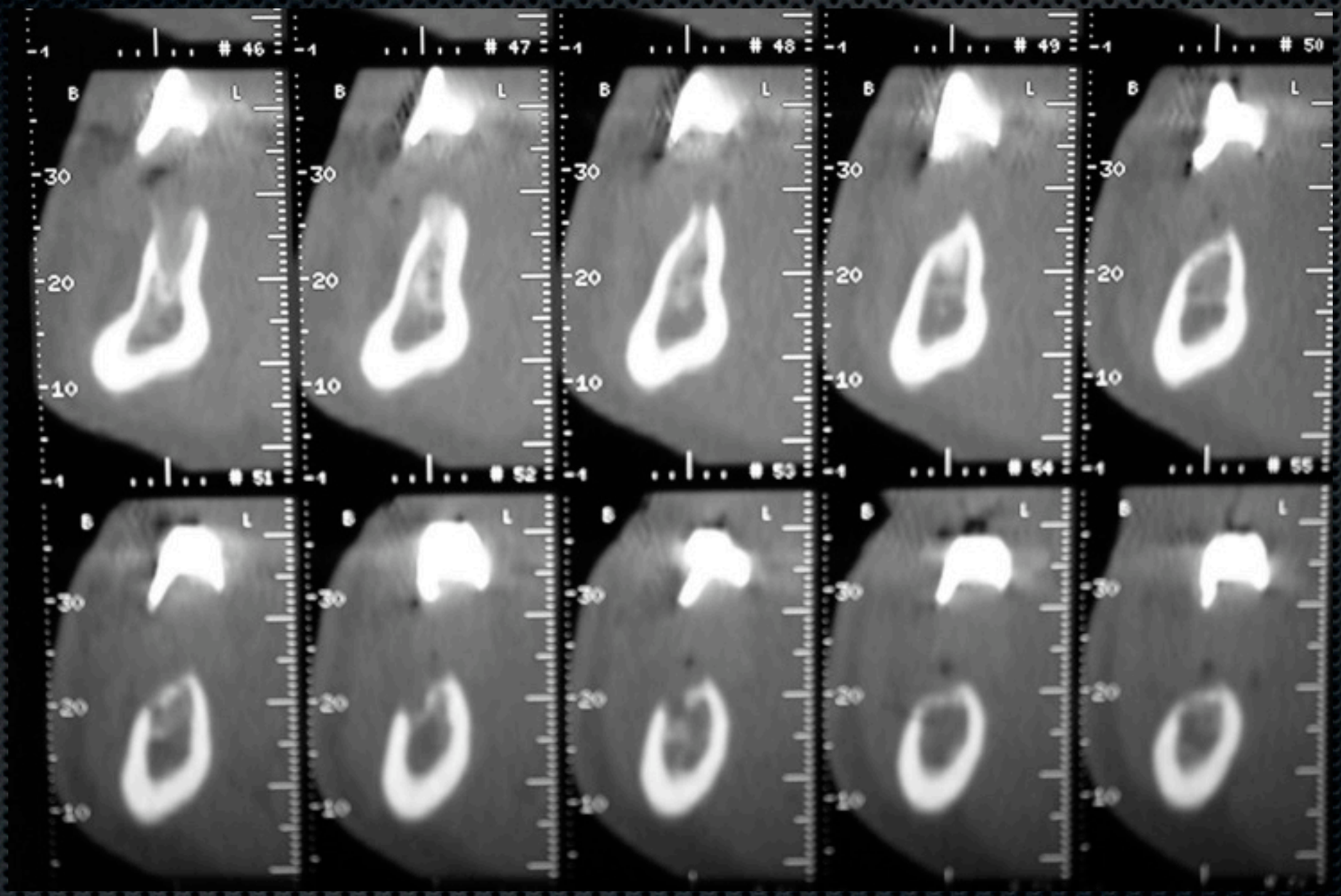
The Value of Radiographic Template



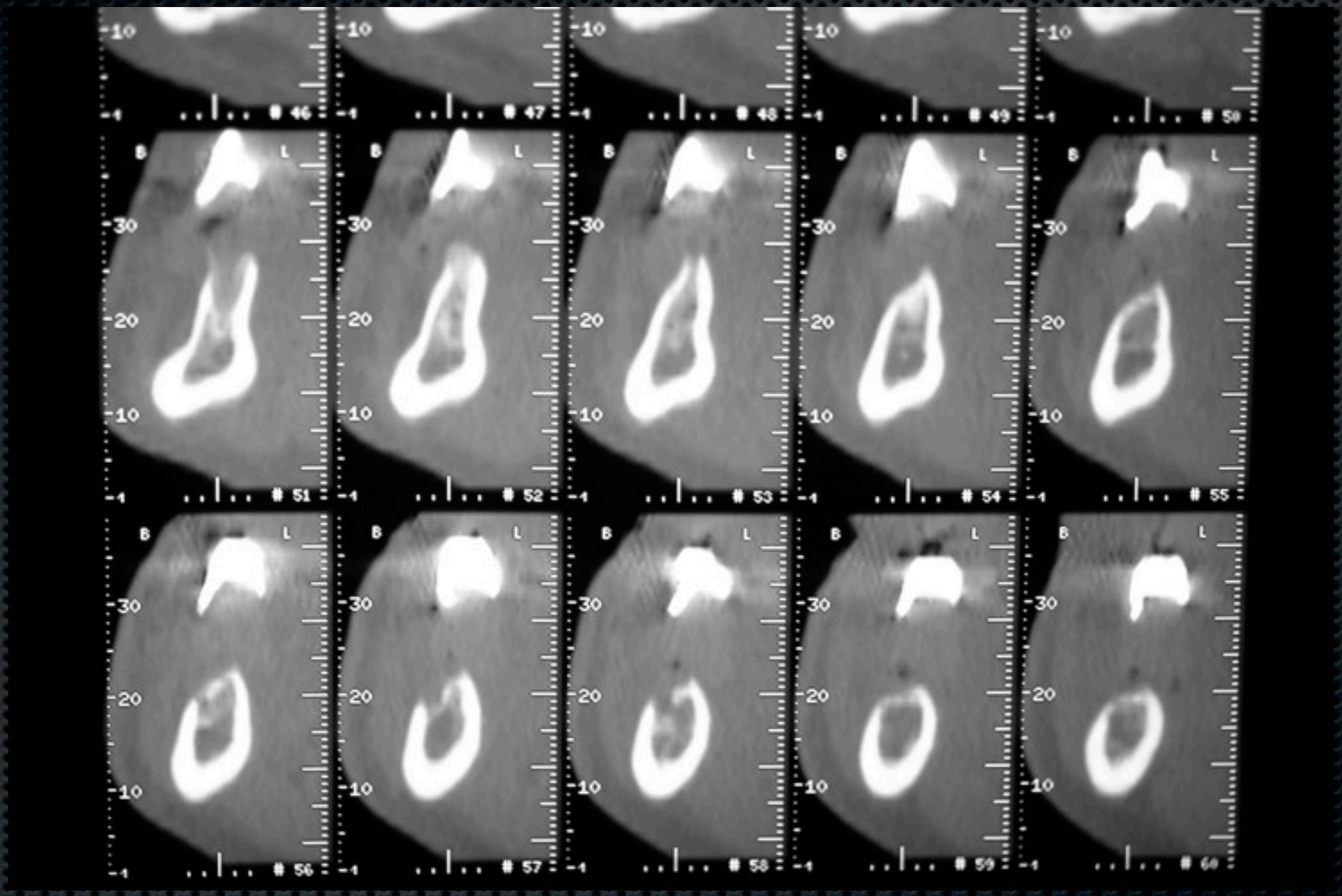
20% Barium Sulphate and Clear Ortho Resin

The Value of Radiographic Template



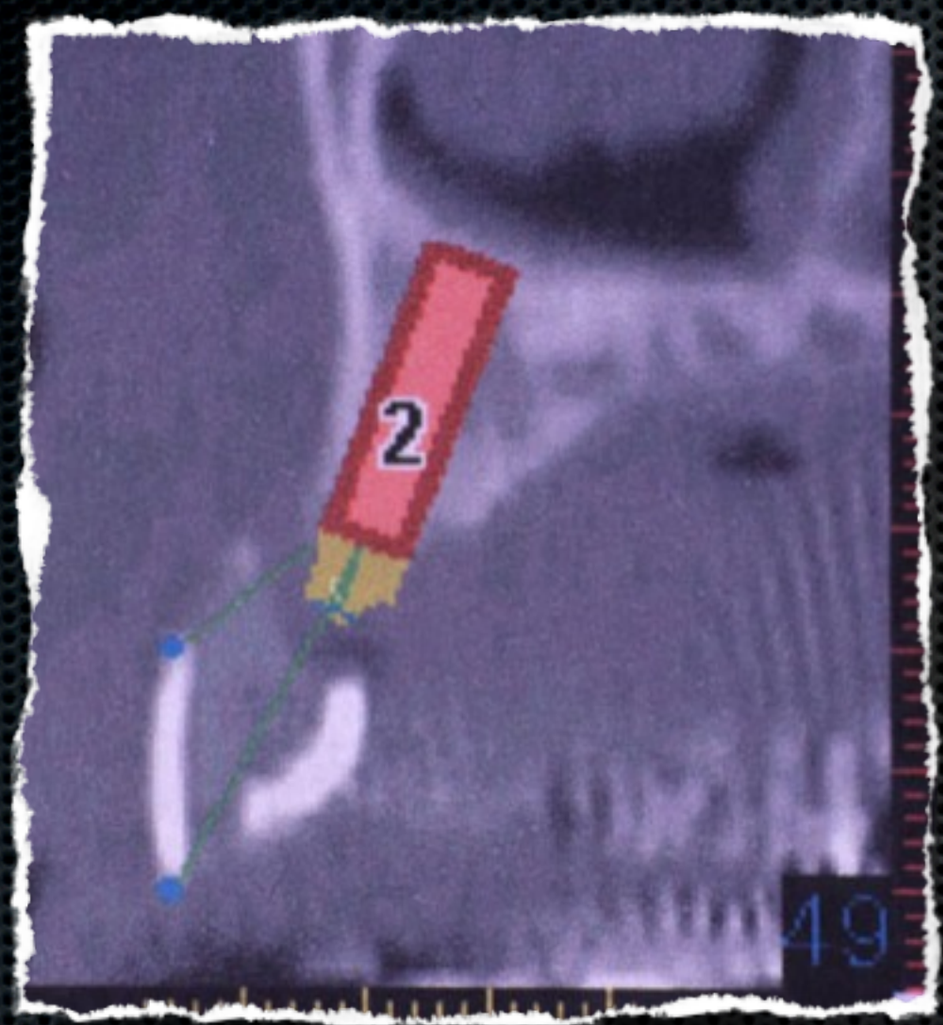
20% Barium Sulphate and Clear Ortho Resin

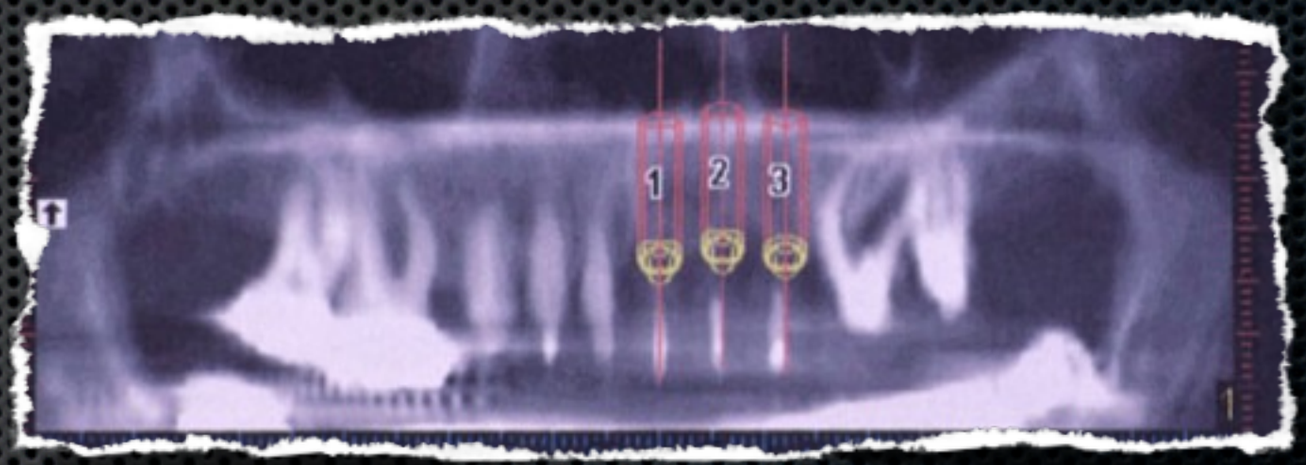
The Value of Radiographic Template



20% Barium Sulphate and Clear Ortho Resin

Implant planning softwares



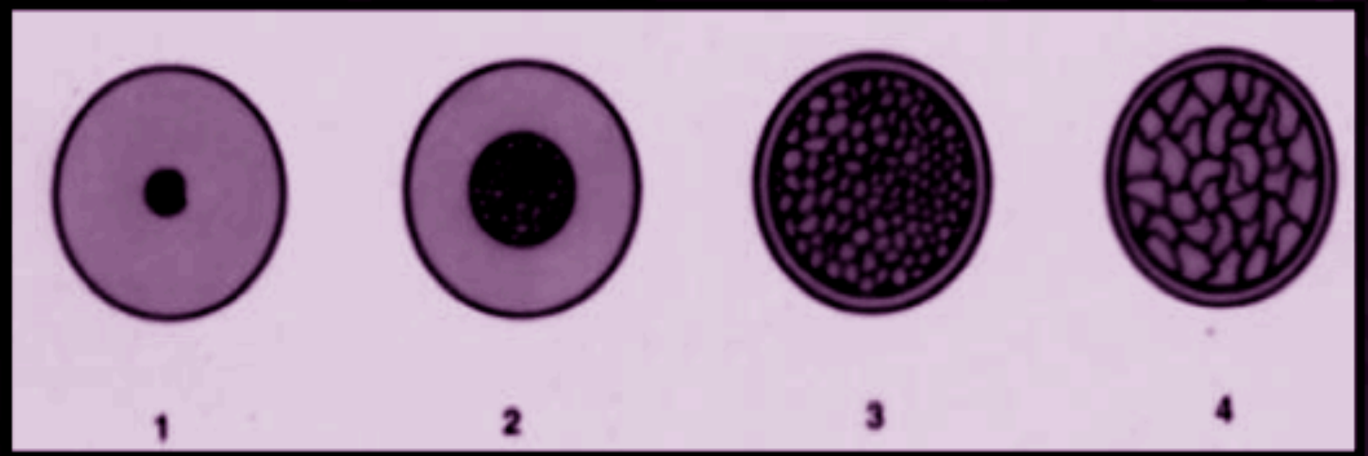


Bone Density Classifications:

- Lekholm and Zarb
- Type 1
- Type 2
- Type 3
- Type 4

- Misch
- D1
- D2
- D3
- D4

Lekholm-Zarb Bone Density Classification



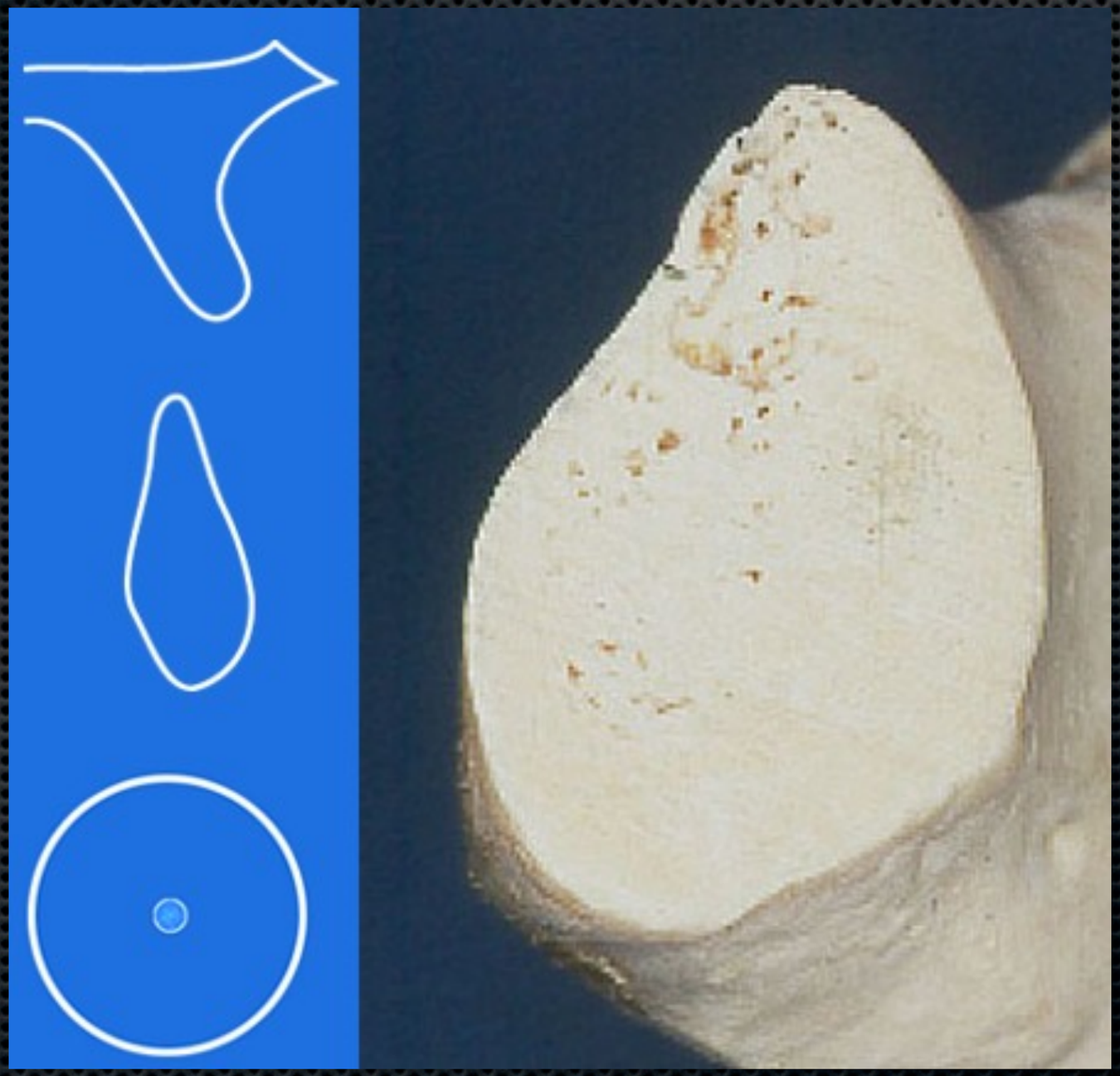
Bone	Density
Quality 1	Homogenous compact bone
Quality 2	Thick compact bone with dense trabecular bone
Quality 3	Thin cortical bone with dense trabecular bone of favorable strength
Quality 4	Thin cortical bone with low-density trabecular bone

Misch Bone Density Classification

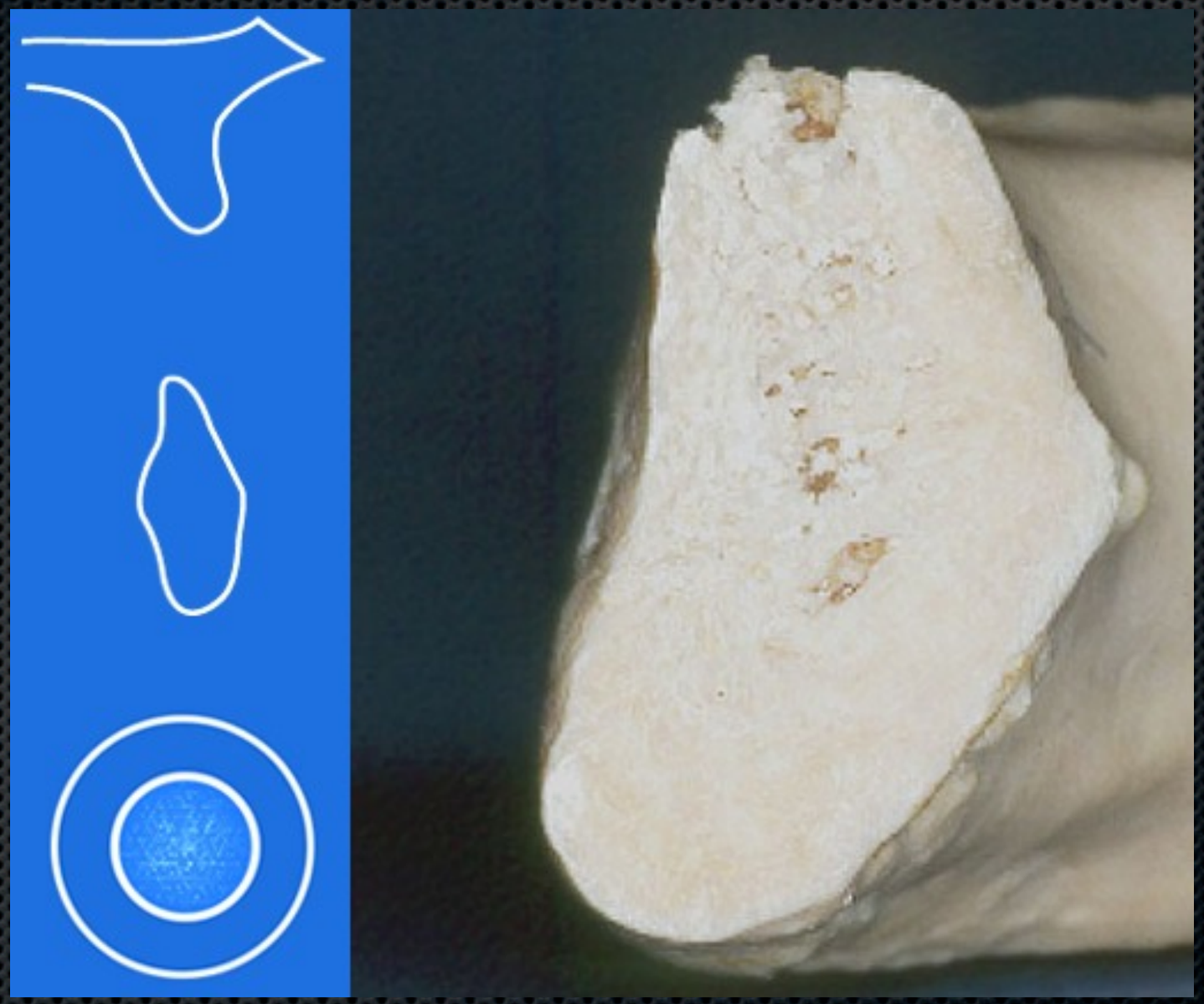
Bone Density	Description	Tactile Sense	Typical Anatomical Location
D1	Dense Cortical	Oak or Maple Wood	Anterior Mandible
D2	Porous Cortical, Coarse Trabecular	White Pine or Spruce Wood	Anterior Mandible, Posterior Mandible, Anterior Maxilla
D3	Porous Cortical (thin), Fine Trabecular	Balsa Wood	Anterior Maxilla, Posterior Maxilla
D4	Fine Trabecular	Styrofoam	Posterior Maxilla

Bone Density: Is it really a marker of Success??

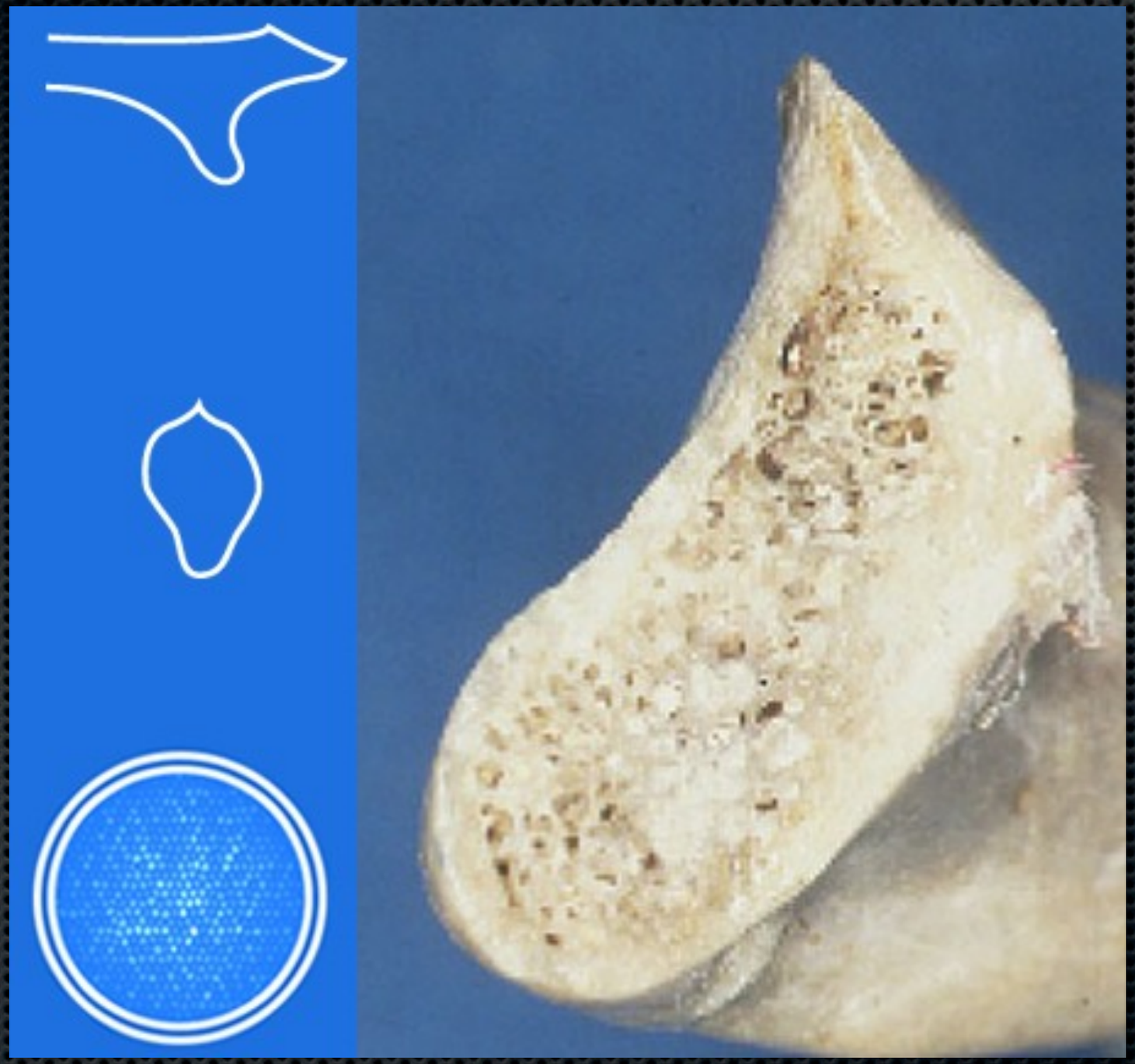
Bone Quality - Type I



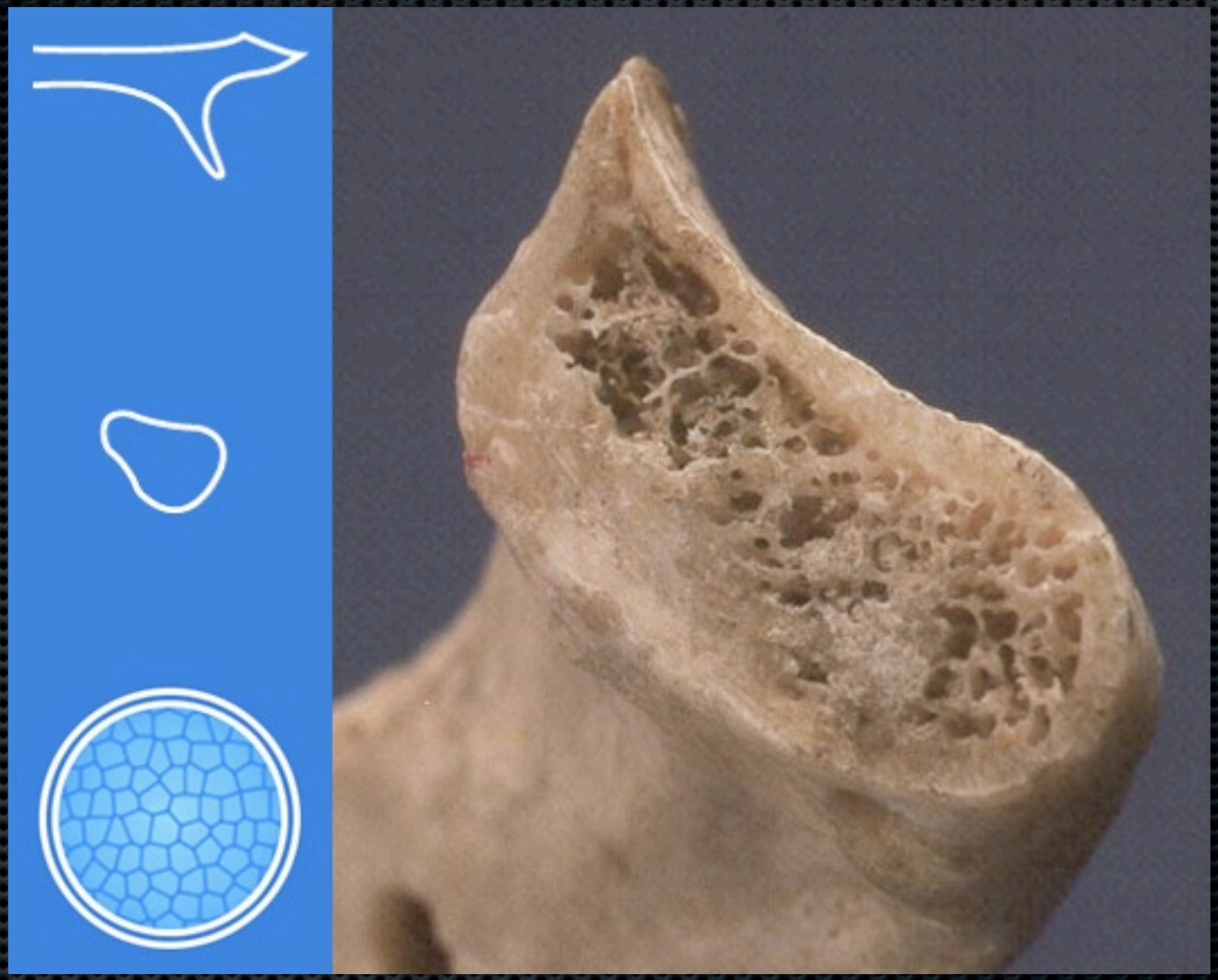
Type II Bone



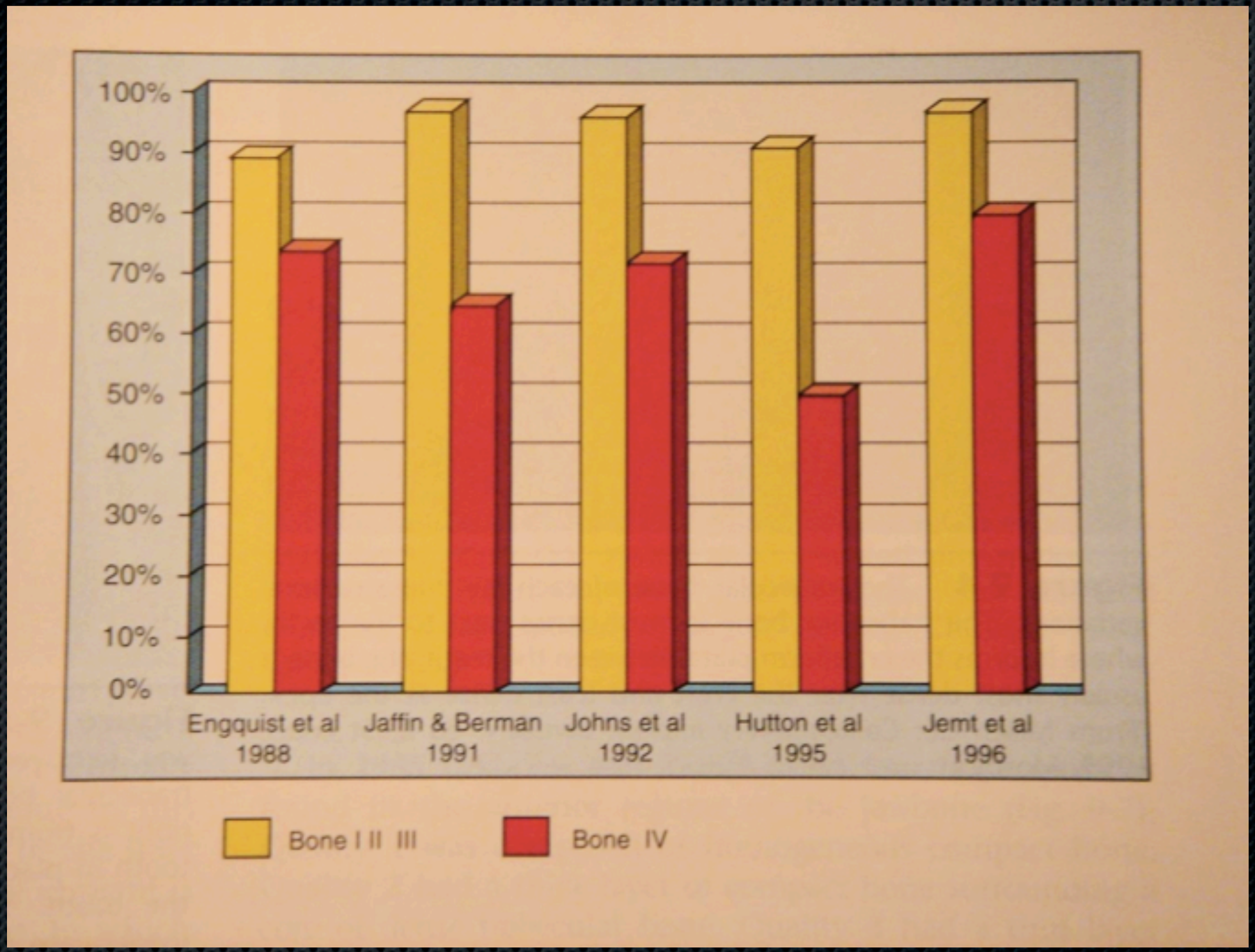
Type III Bone



Type IV Bone



Studies Reporting Higher Failures in Type IV Bone



Misch, 2005, Mosby

Myth: Bone Density Cannot be Determined from Radiographs

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A substantial extent of cortical erosion should take place before revealing the lesion in a periapical radiograph

Sequence of Treatment Planning