Principles of Cone Beam CT interpretation

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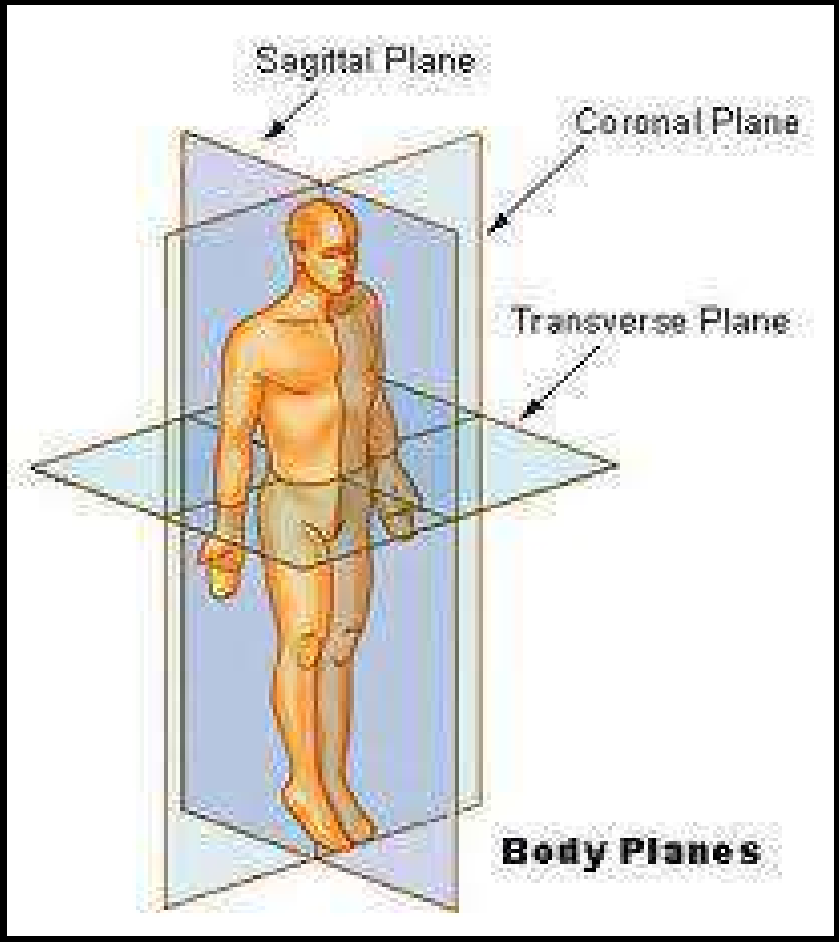
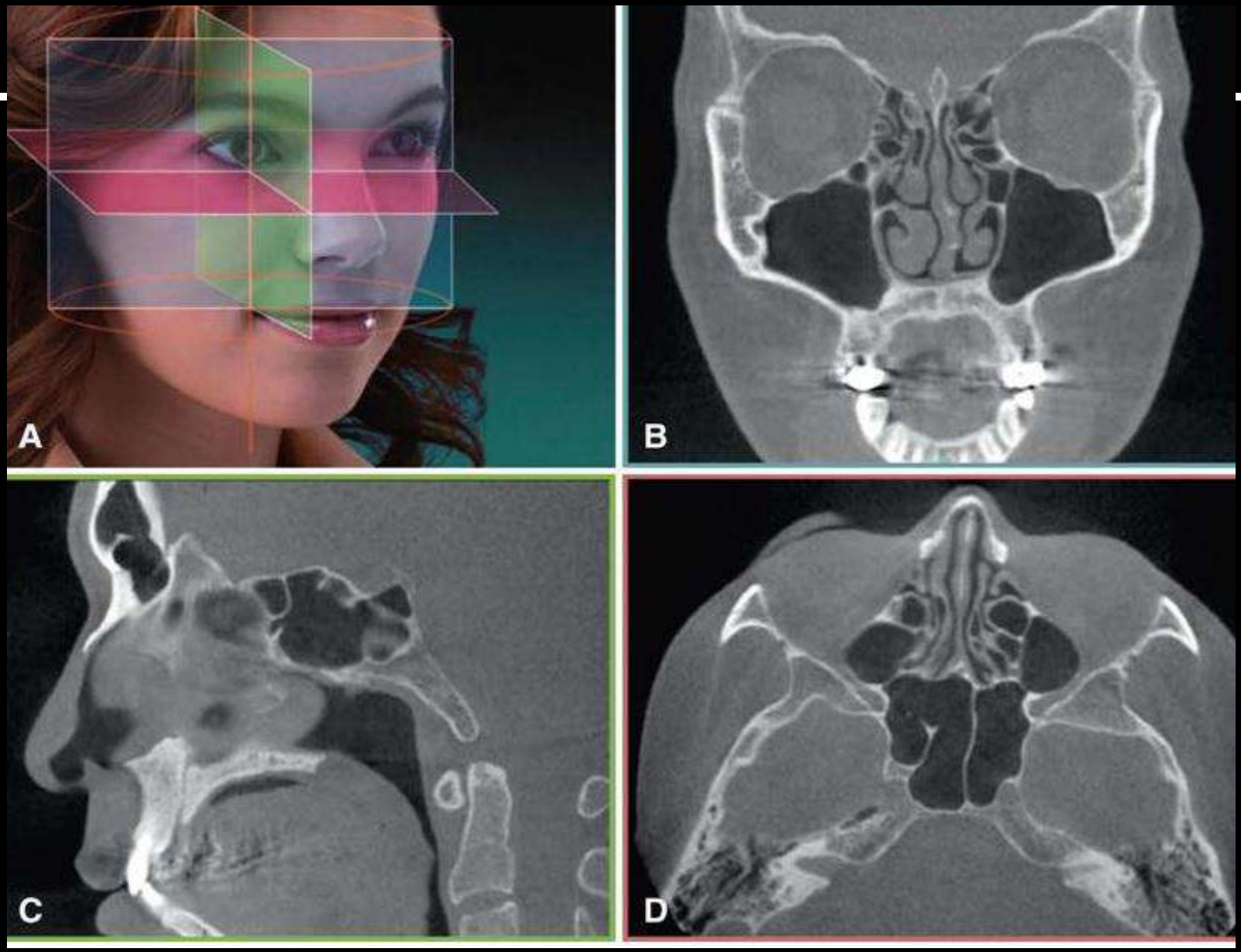
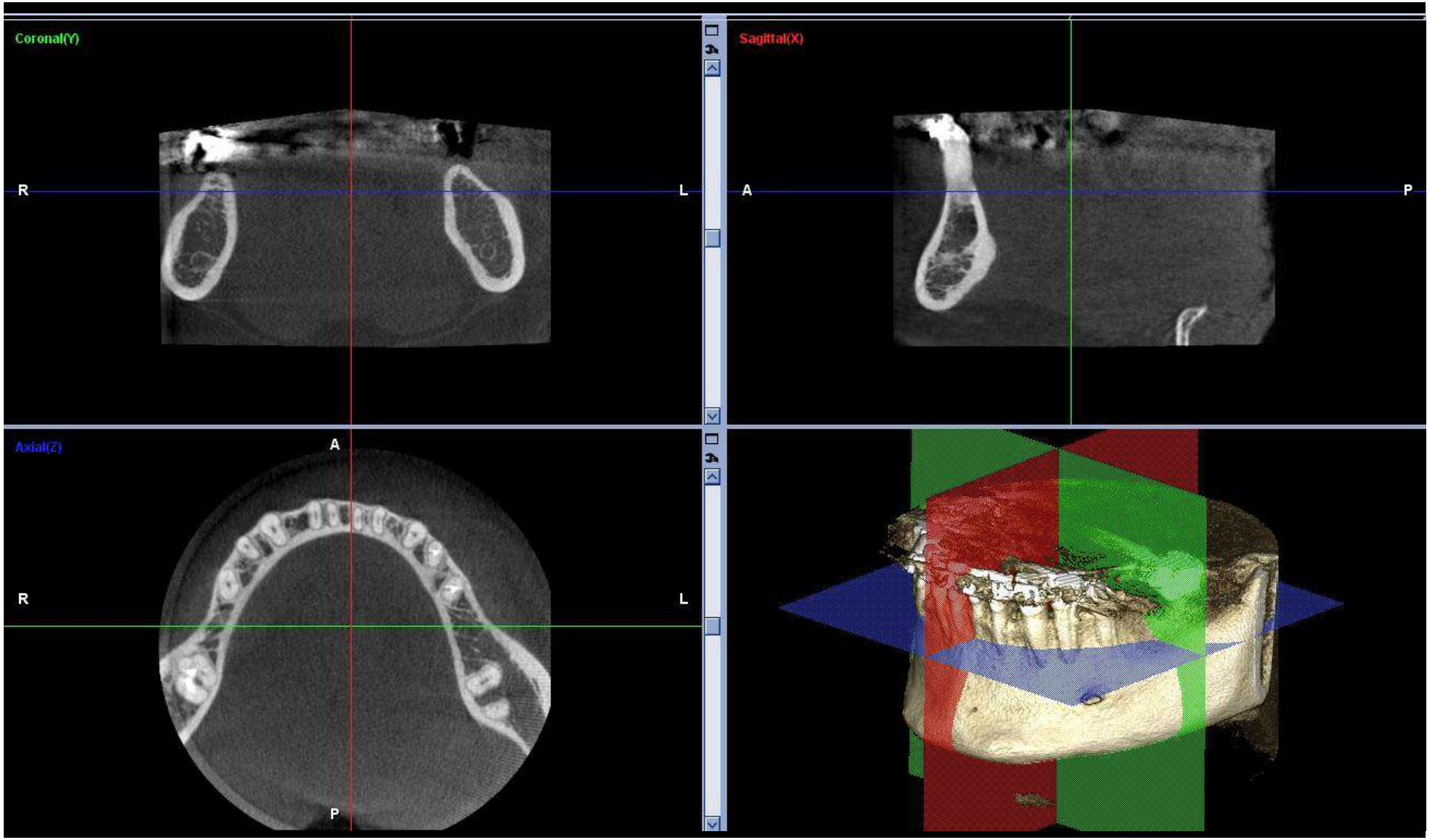
Orthogonal Planes

- *Transverse or Axial Plane*
- *Coronal or Frontal Plane*
- *Sagittal Plane*

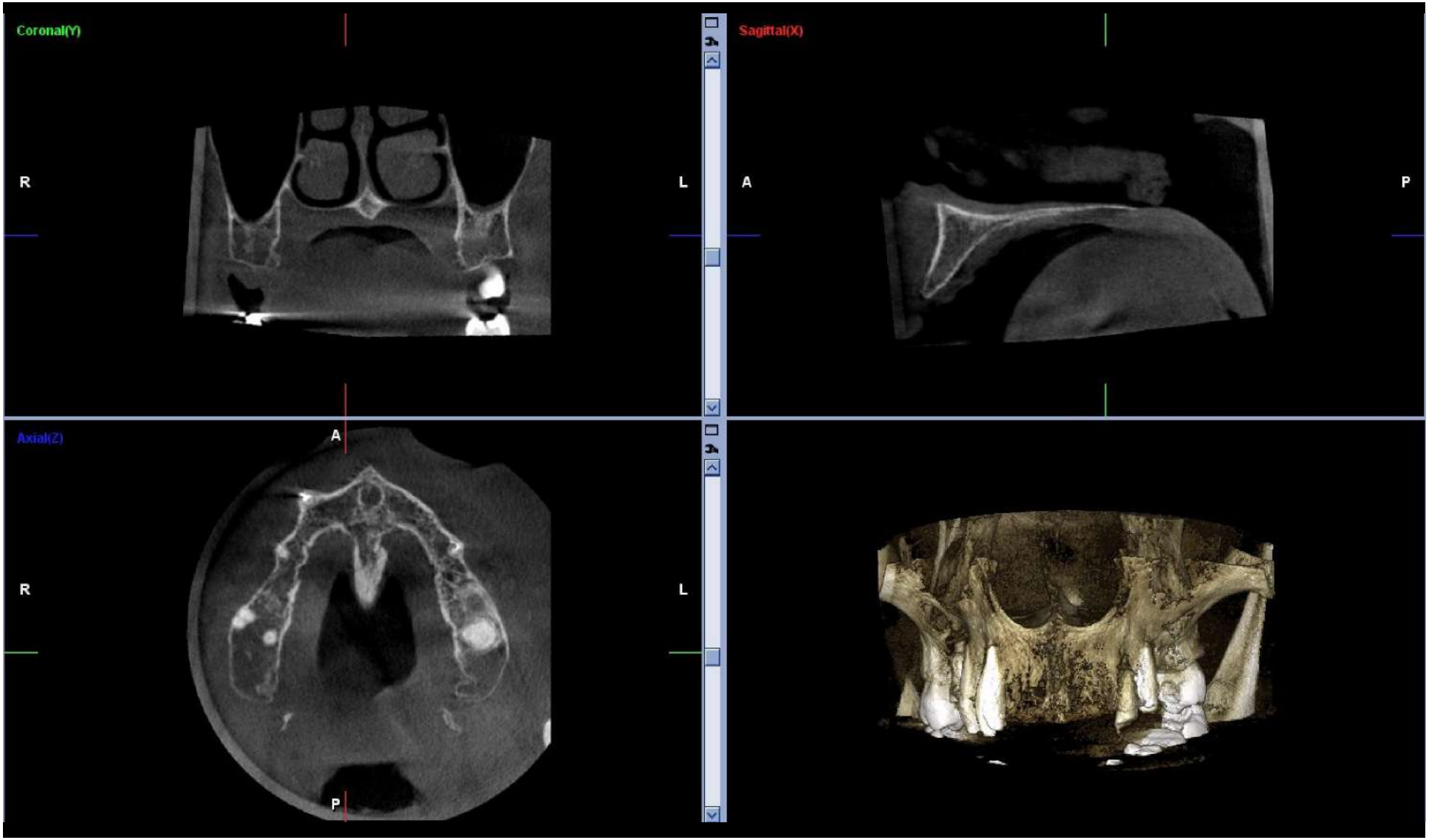



A
B
C
D

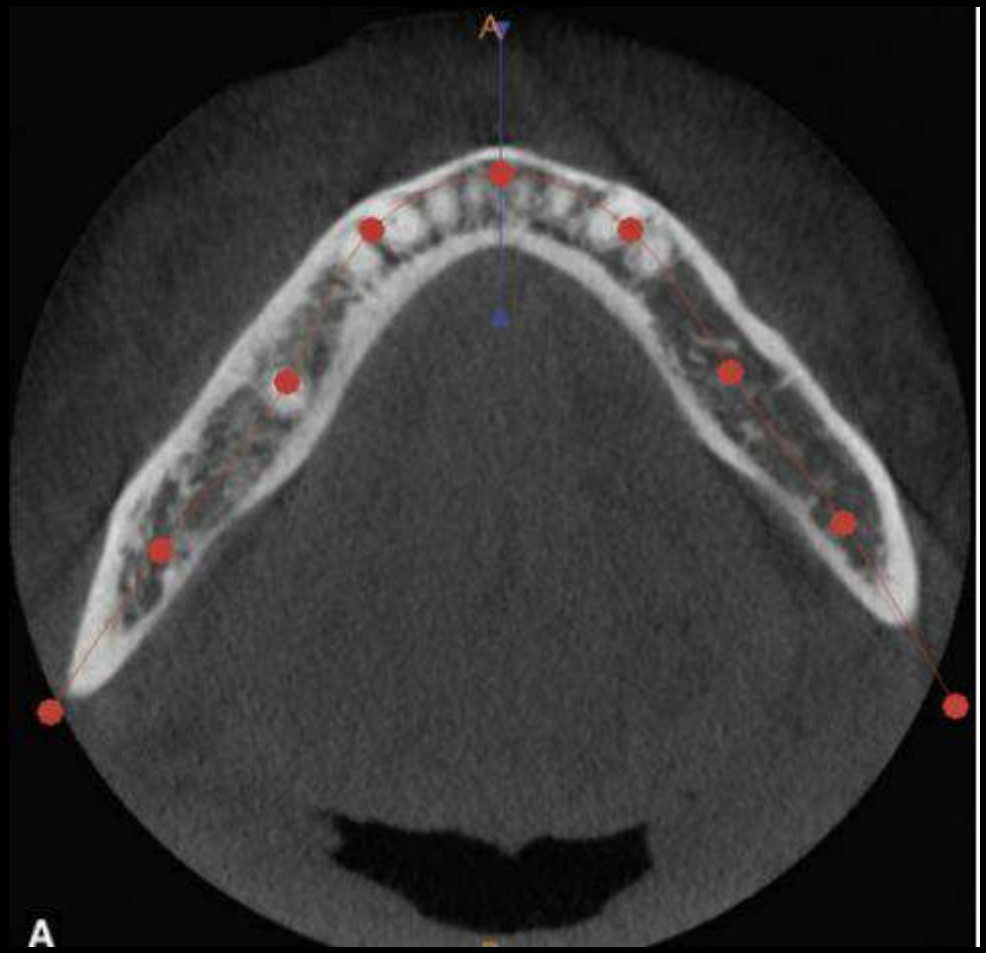
Orthogonal Plans in mandible



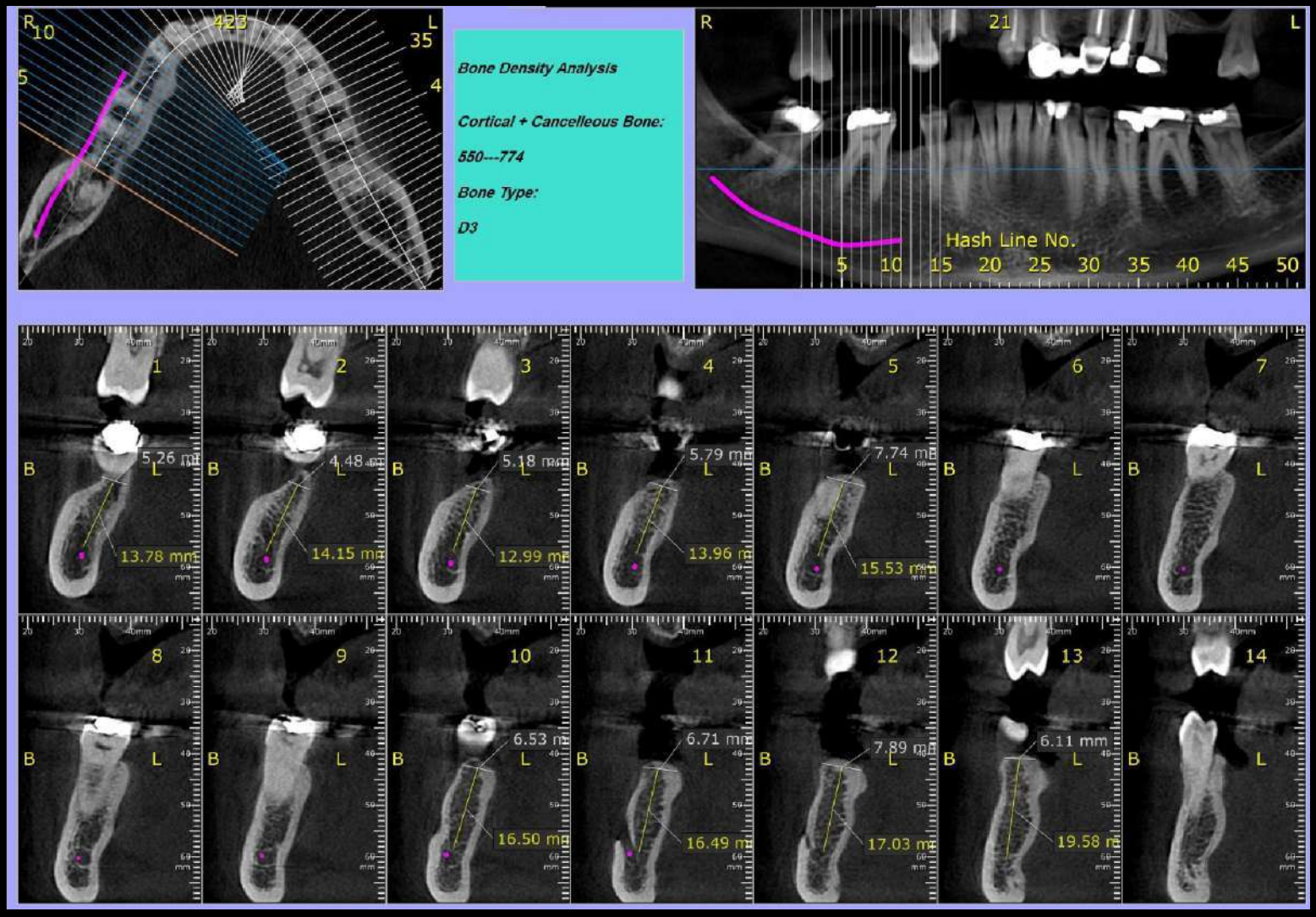
Orthogonal Plans in Maxilla



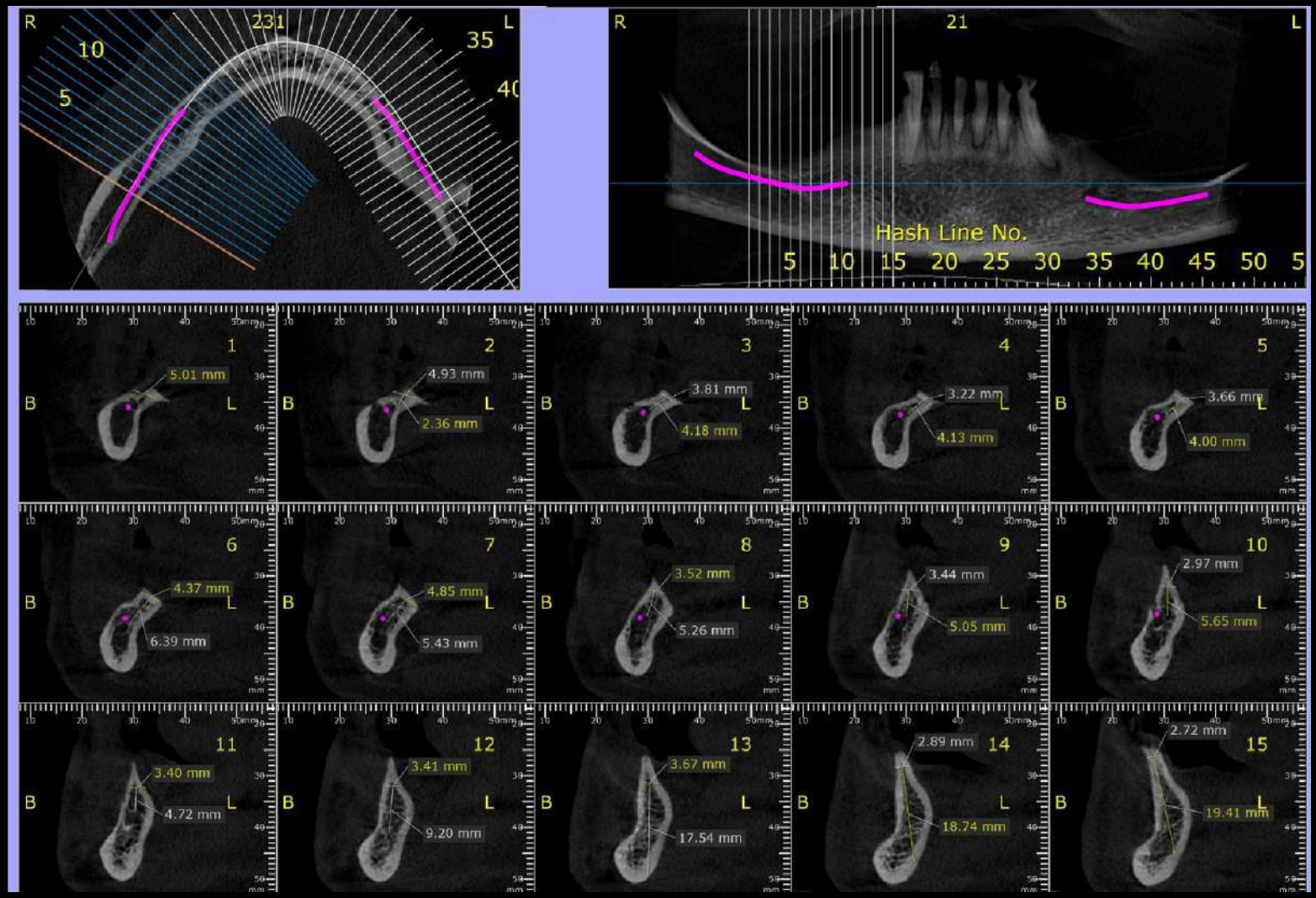
Cross section View



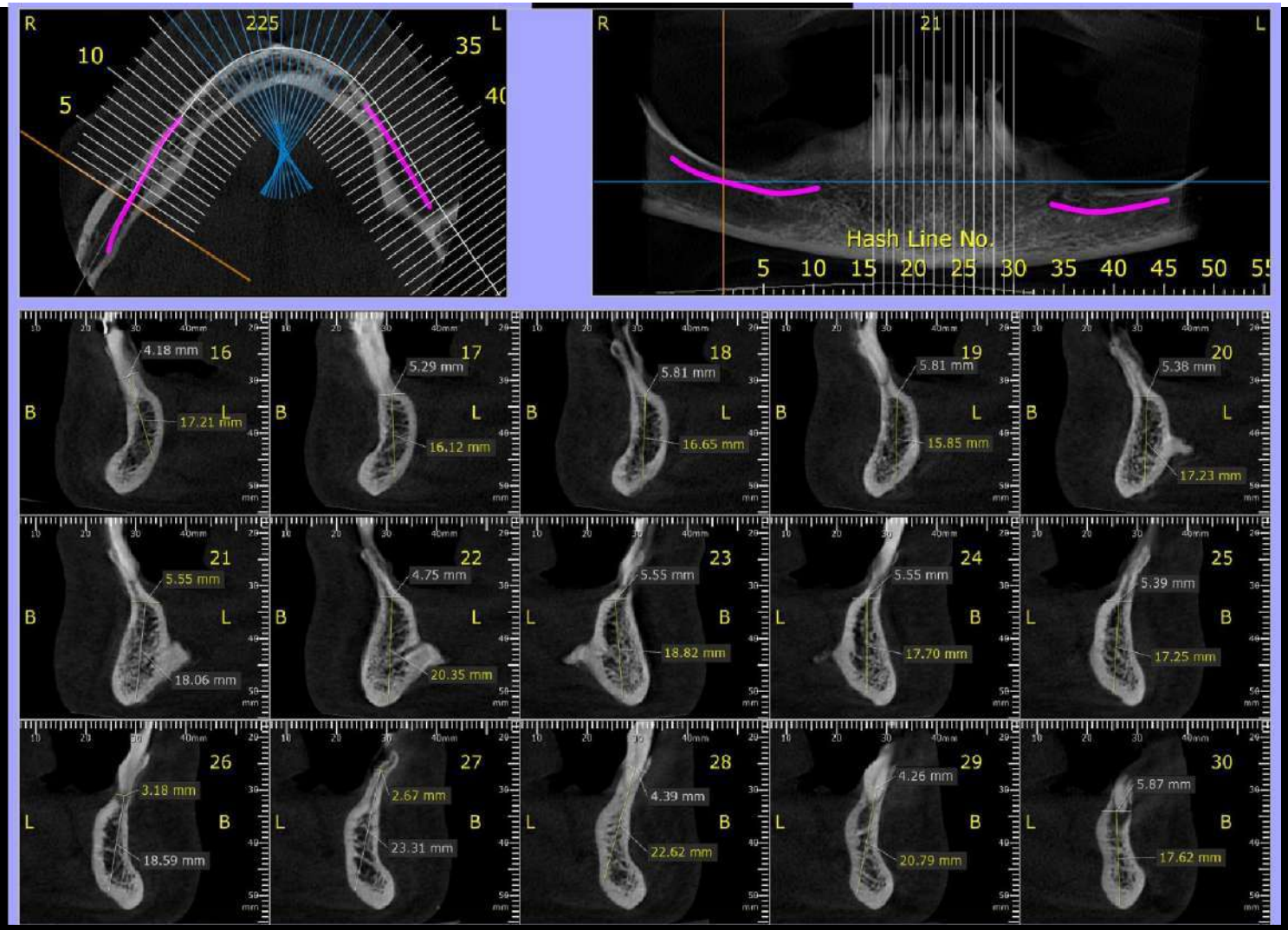
Cross section View



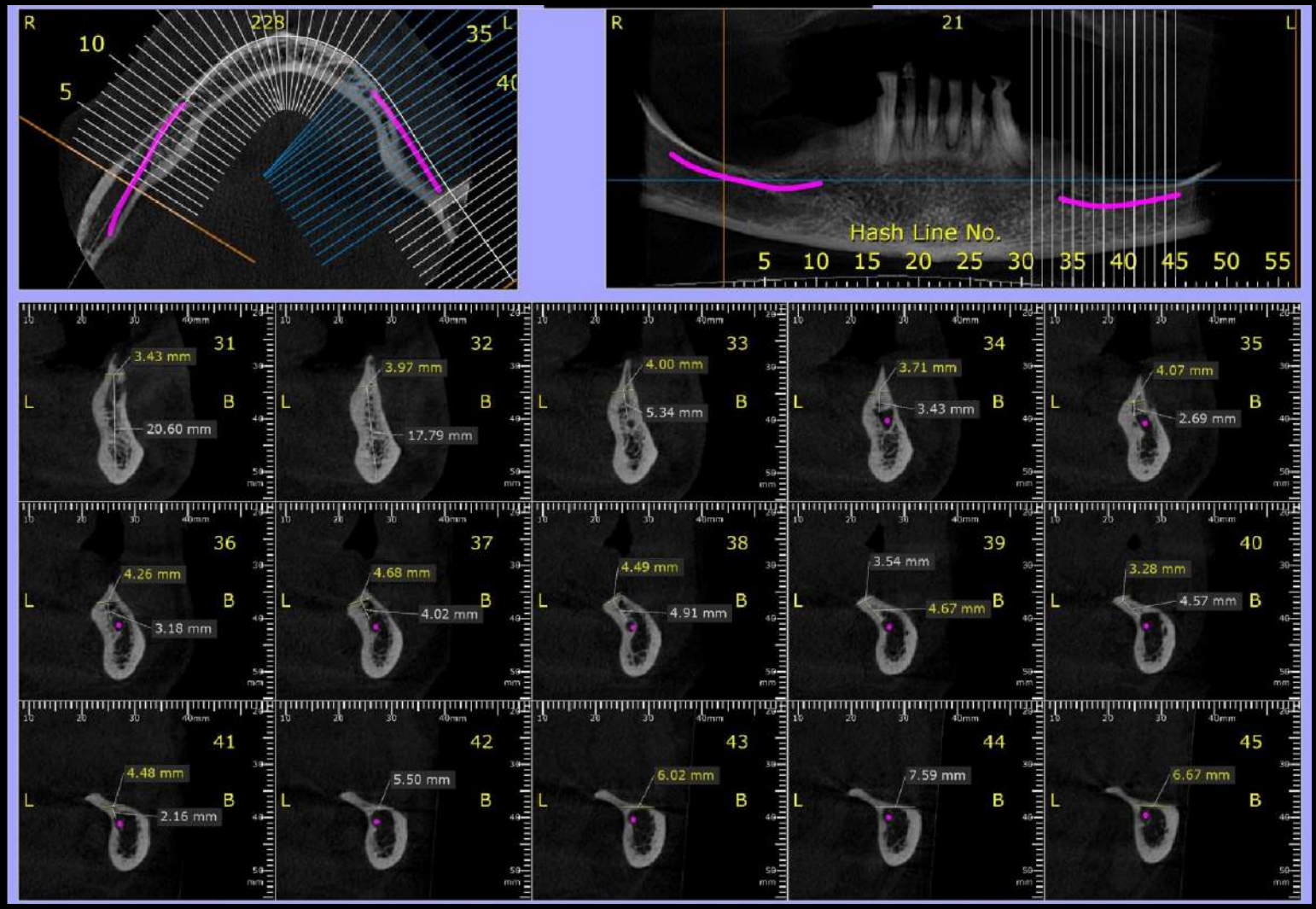
Cross section View



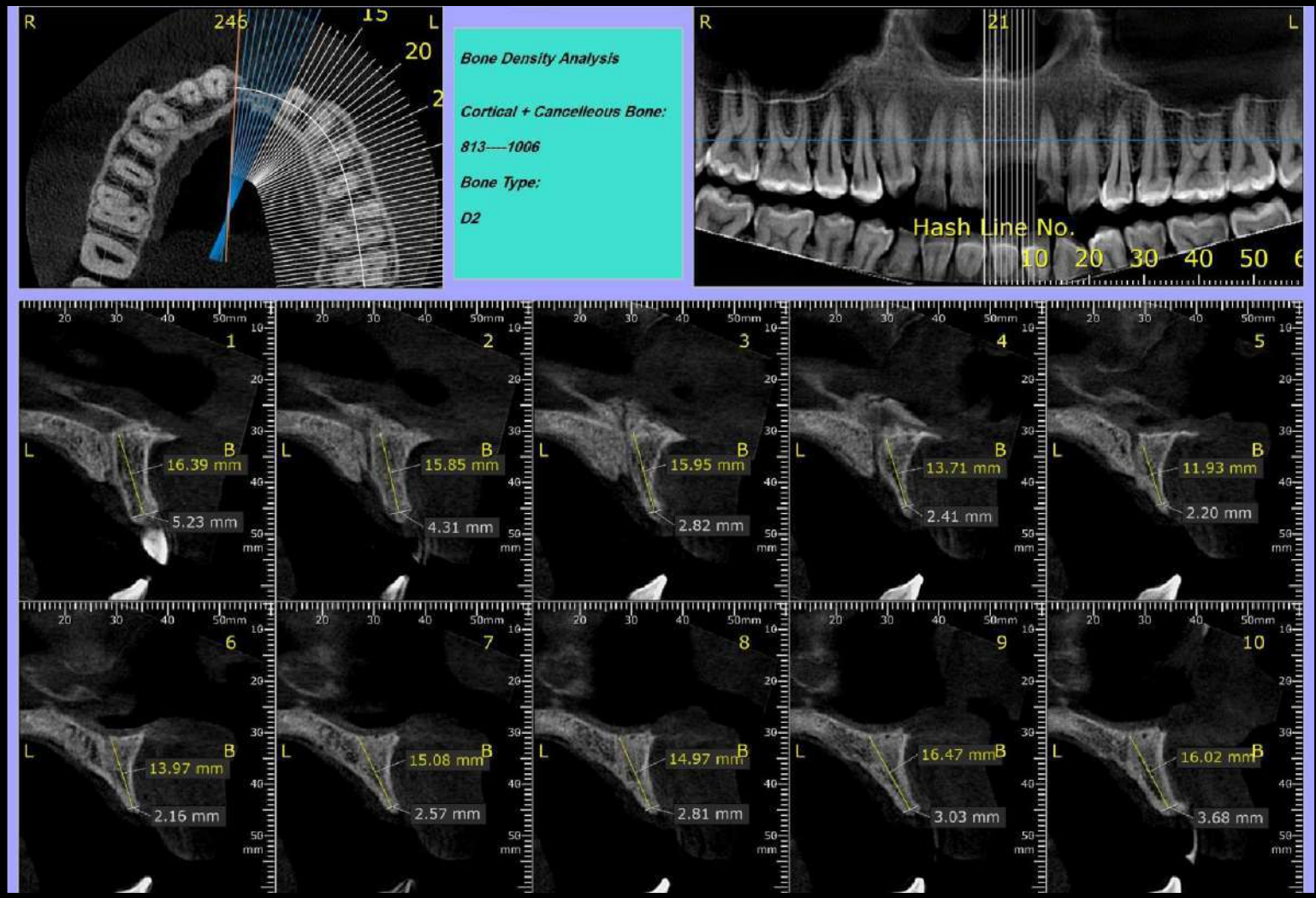
Cross section View



Cross section View

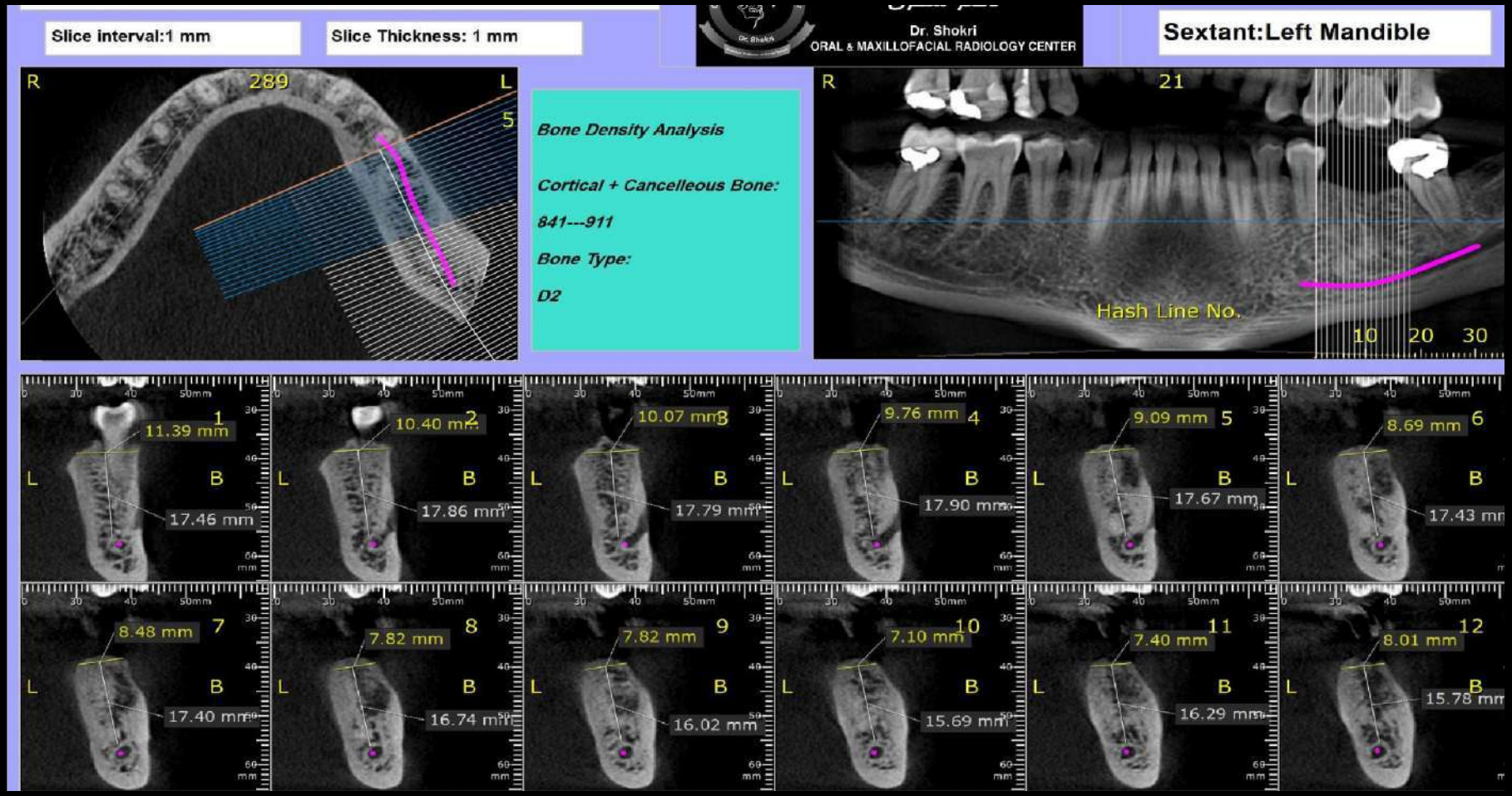


Cross section View

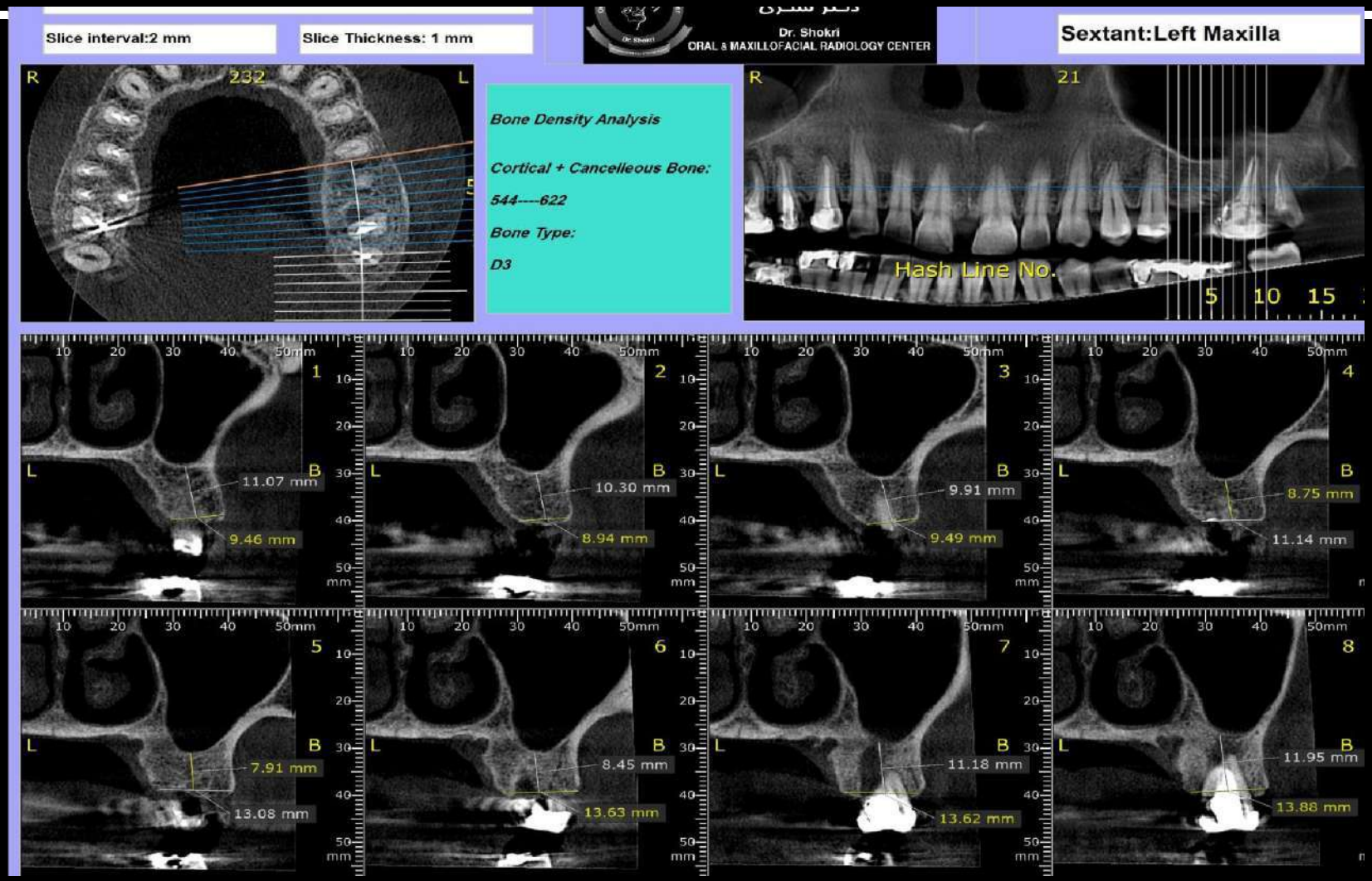


- Slice Thickness:
- Slice Interval:

Slice Interval : 1mm



Slice Interval: 2mm



- Evaluation of bone quantity
- Evaluation of bone quality

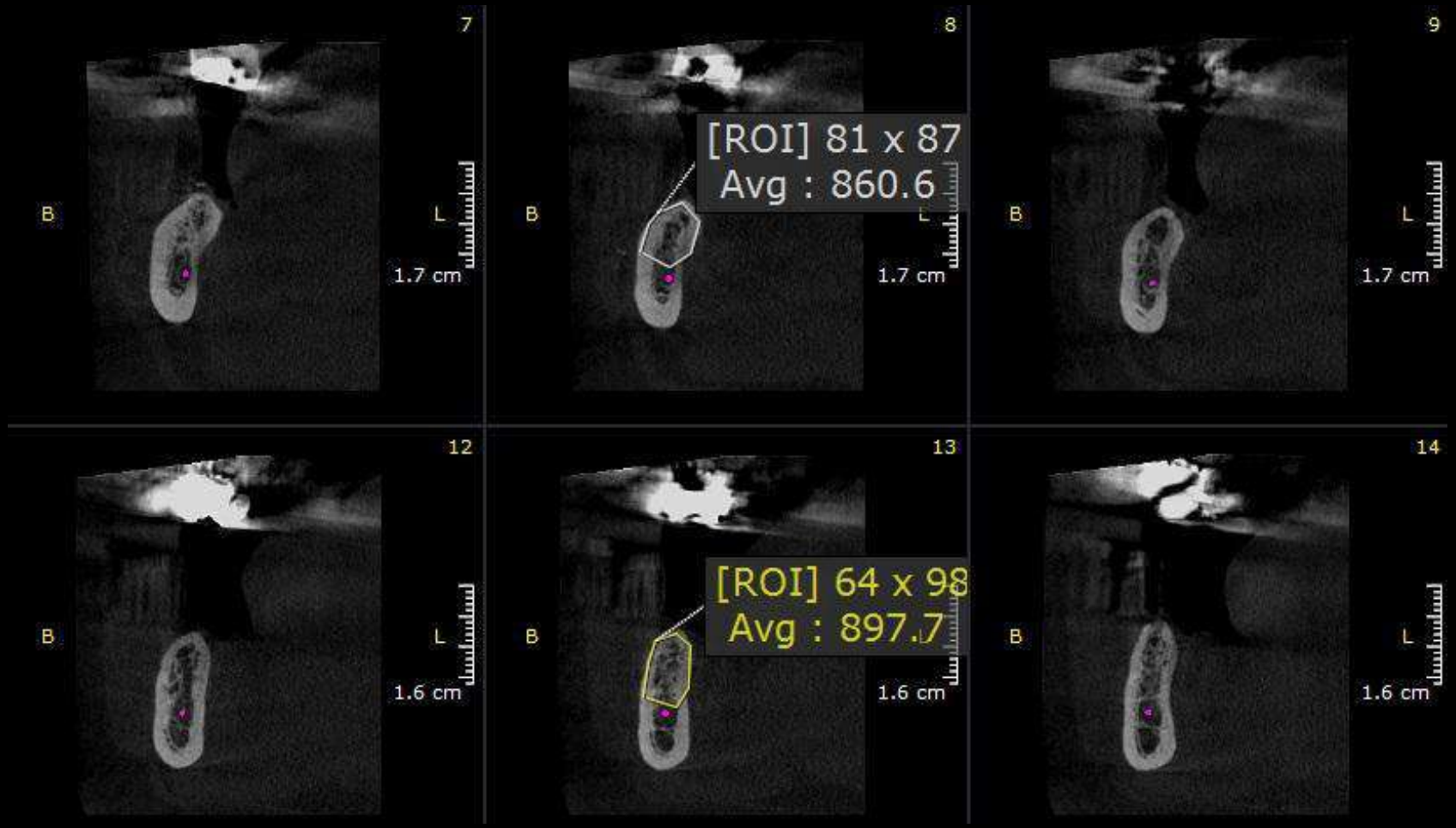
Bone Quality:

TABLE 15.2

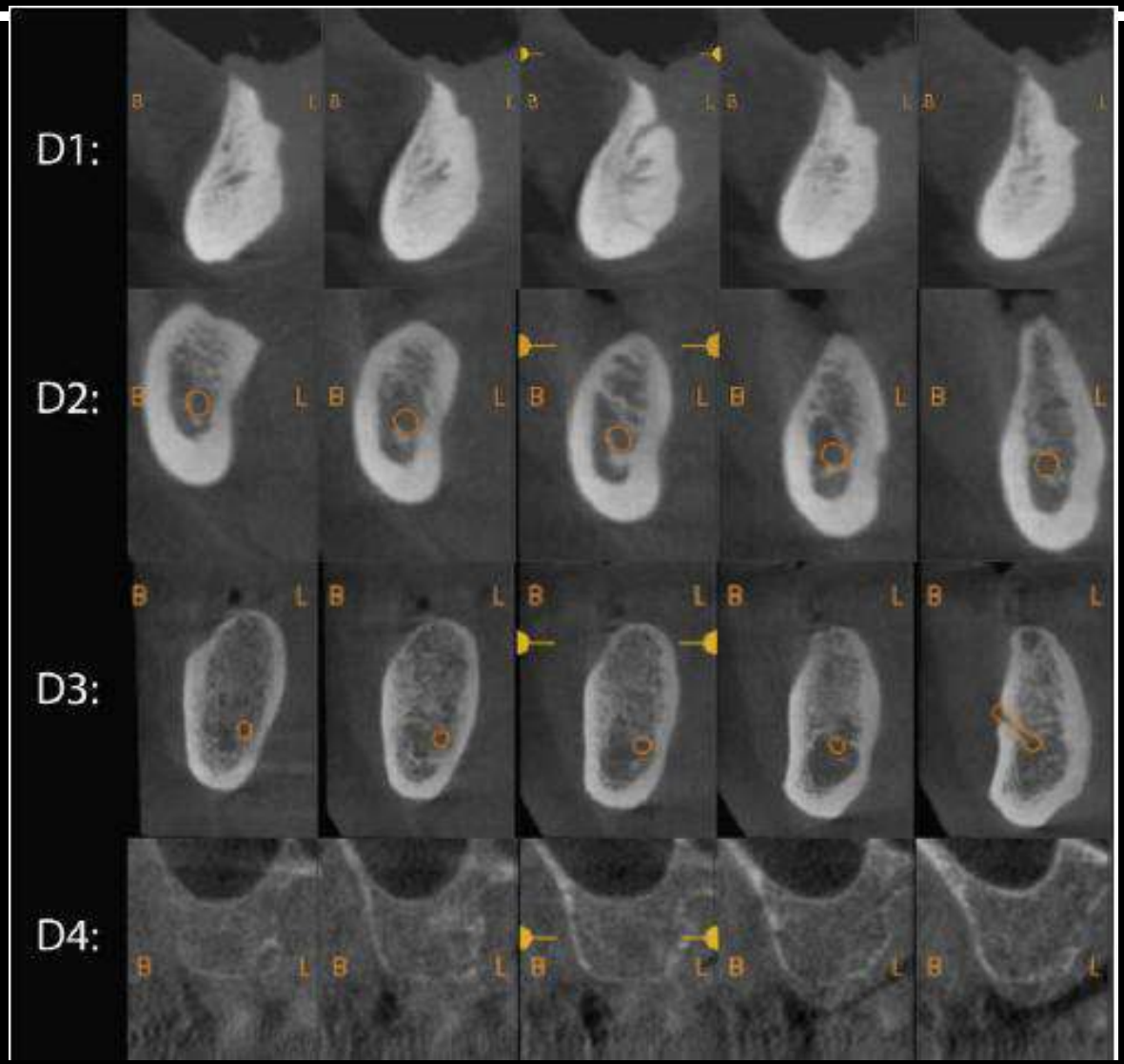
Misch Classification of Bone Density

Classification Type	Radiographic Appearance	Typical Anatomic Location	MDCT Density Range (HU)
D1	Primarily composed of dense cortical bone Marrow spaces are hardly visible	Occasionally in anterior mandible Rarely in posterior mandible	>1250
D2	Thick outer layer of porous cortical bone Coarse trabecular bone pattern	Commonly in anterior and posterior mandible Occasionally in anterior maxilla	850–1250
D3	Thinner layer of porous cortical bone Fine trabecular bone pattern	Commonly in anterior maxilla, posterior maxilla, and posterior mandible Occasionally in anterior mandible	350–850
D4	Faint to imperceptible outline of thin cortical bone Alveolar process is primarily composed of fine trabecular bone	Commonly in posterior maxilla Rarely in anterior maxilla	150–350

Bone Quality:



Bone Quality:



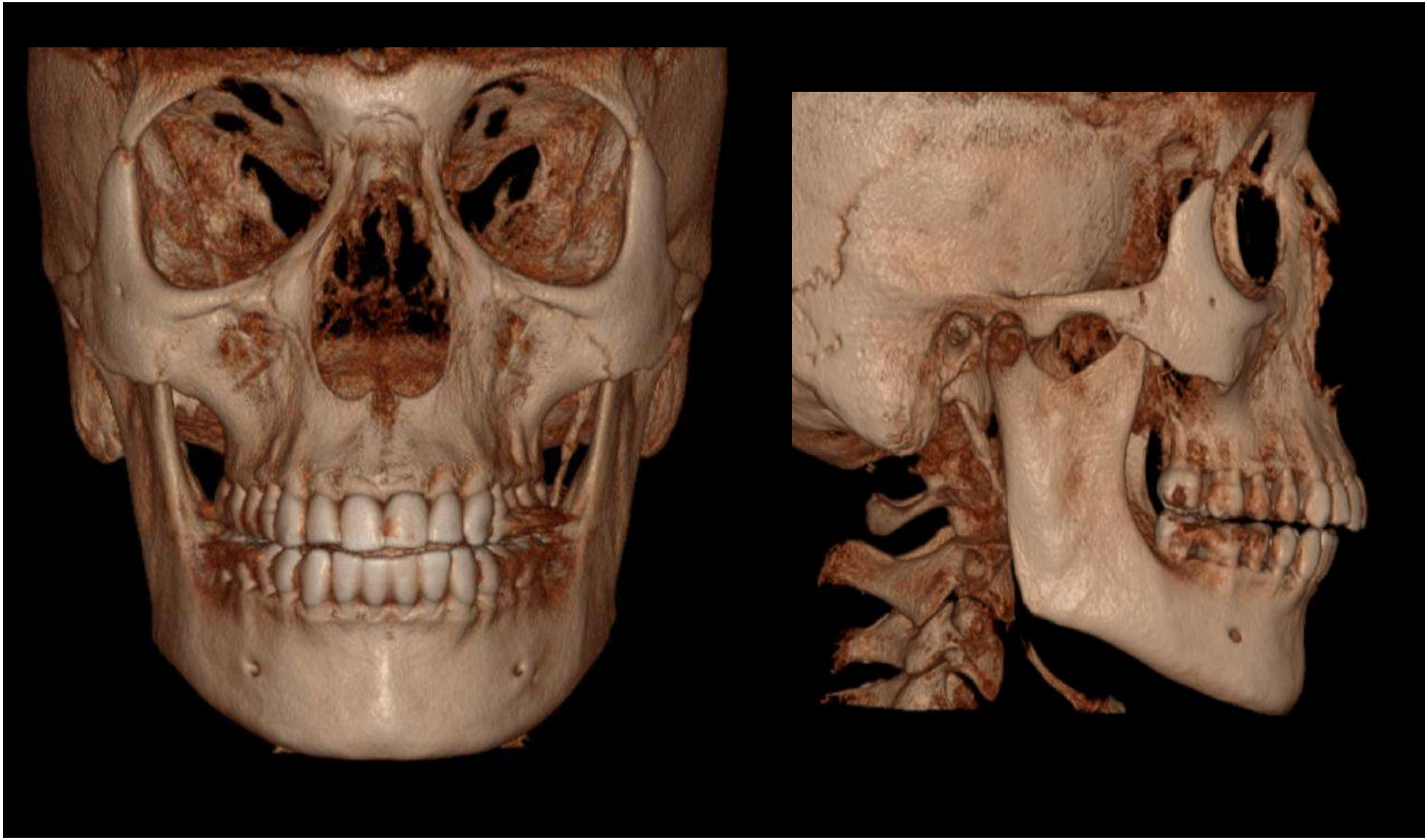
Different types of 3D view or volumetric data:

- ***Surface Rendering:***

1. ***Solid Surface***
2. ***Surface Transparency***

- ***MIP***

Surface Rendering:
Solid Surface

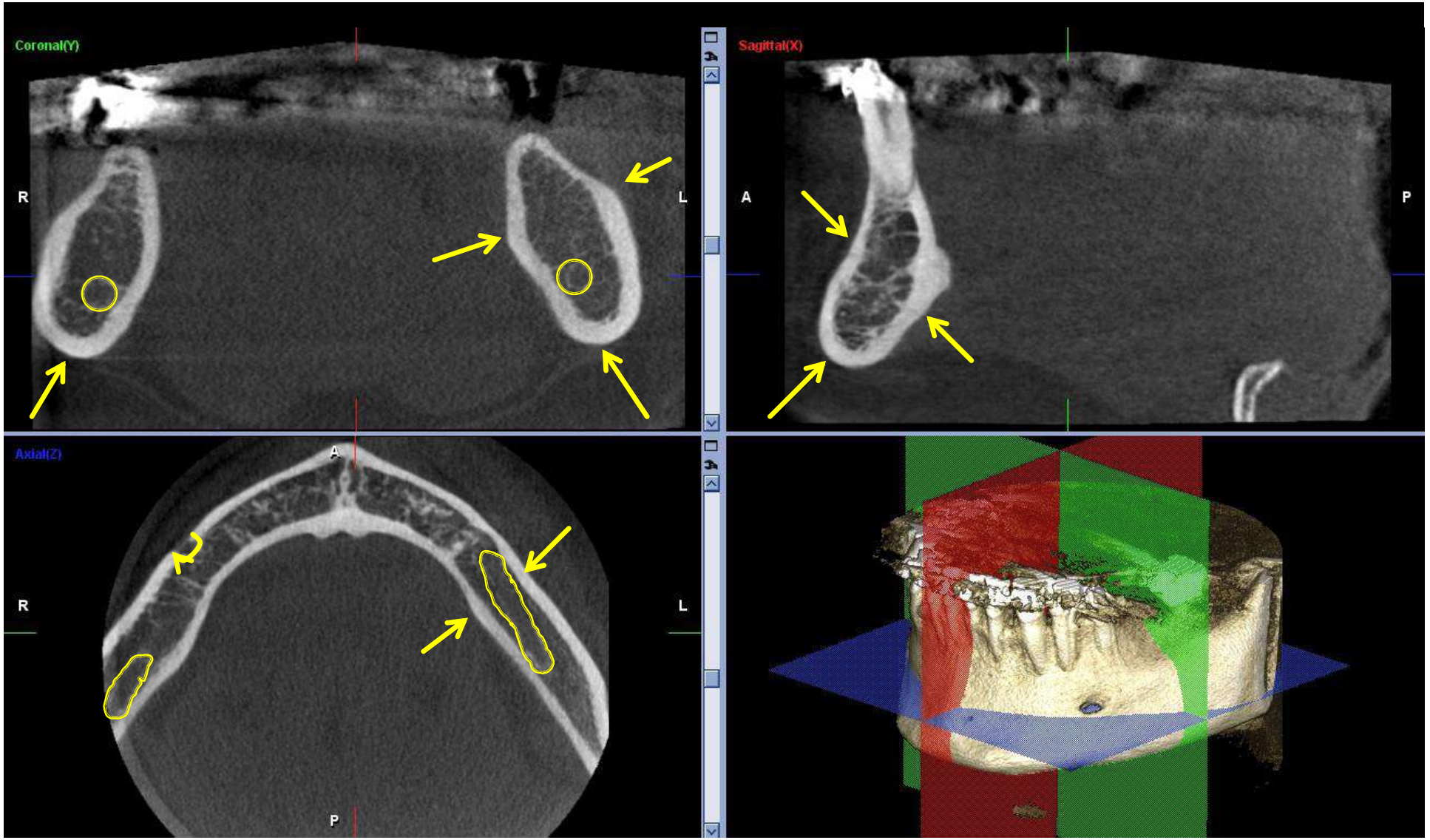


Surface Rendering:
Transparent Surface

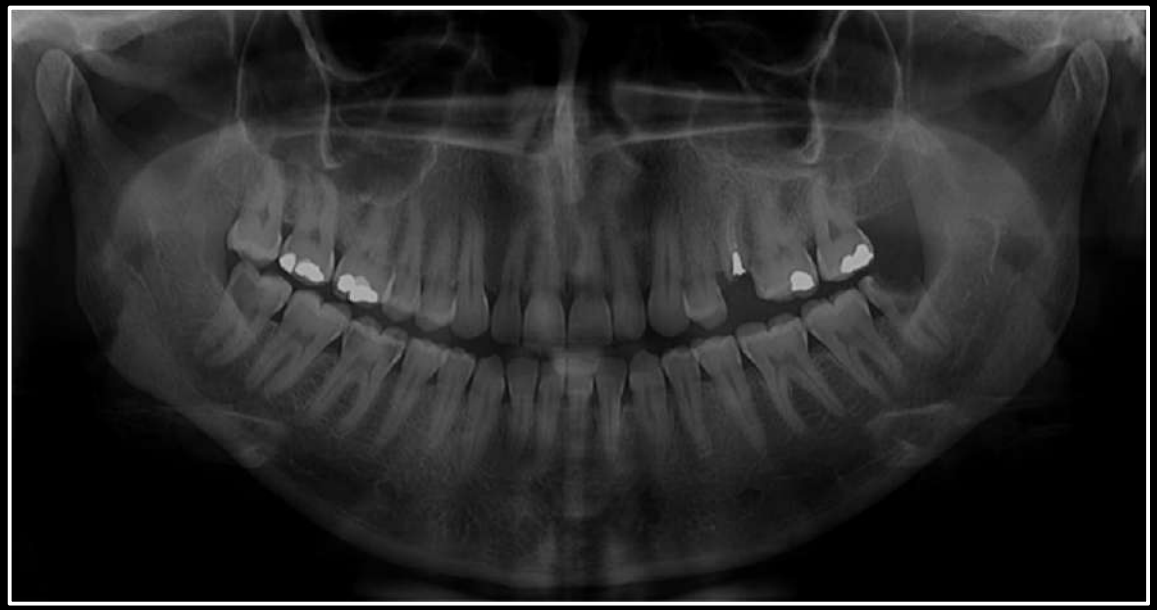
MIP:

Anatomic Landmarks :

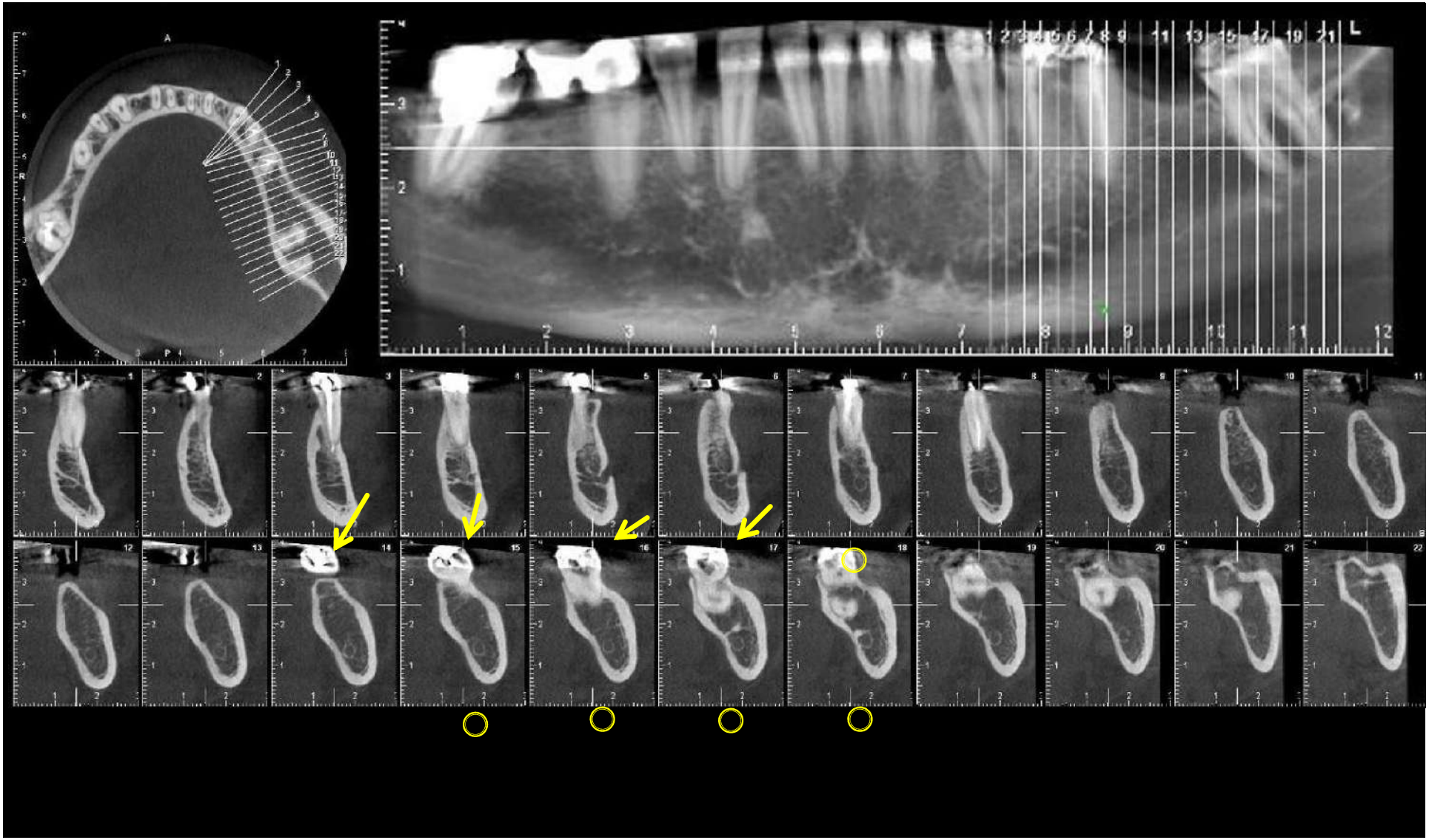
Mandible



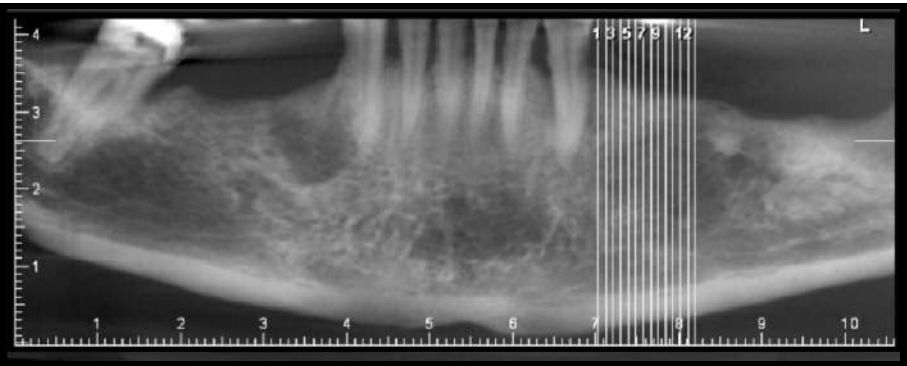
Inferior Alveolar Canal & Mental Foramen

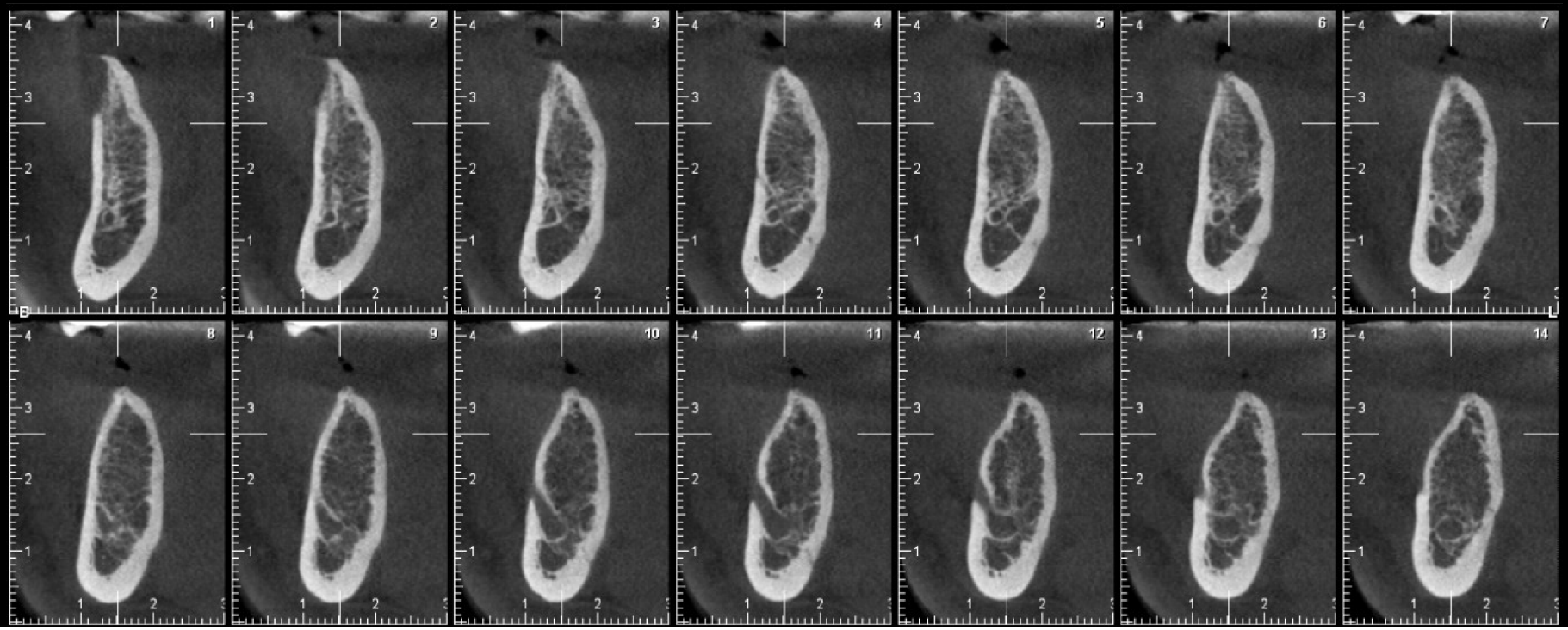


Inferior Alveolar Canal & Mental Foramen

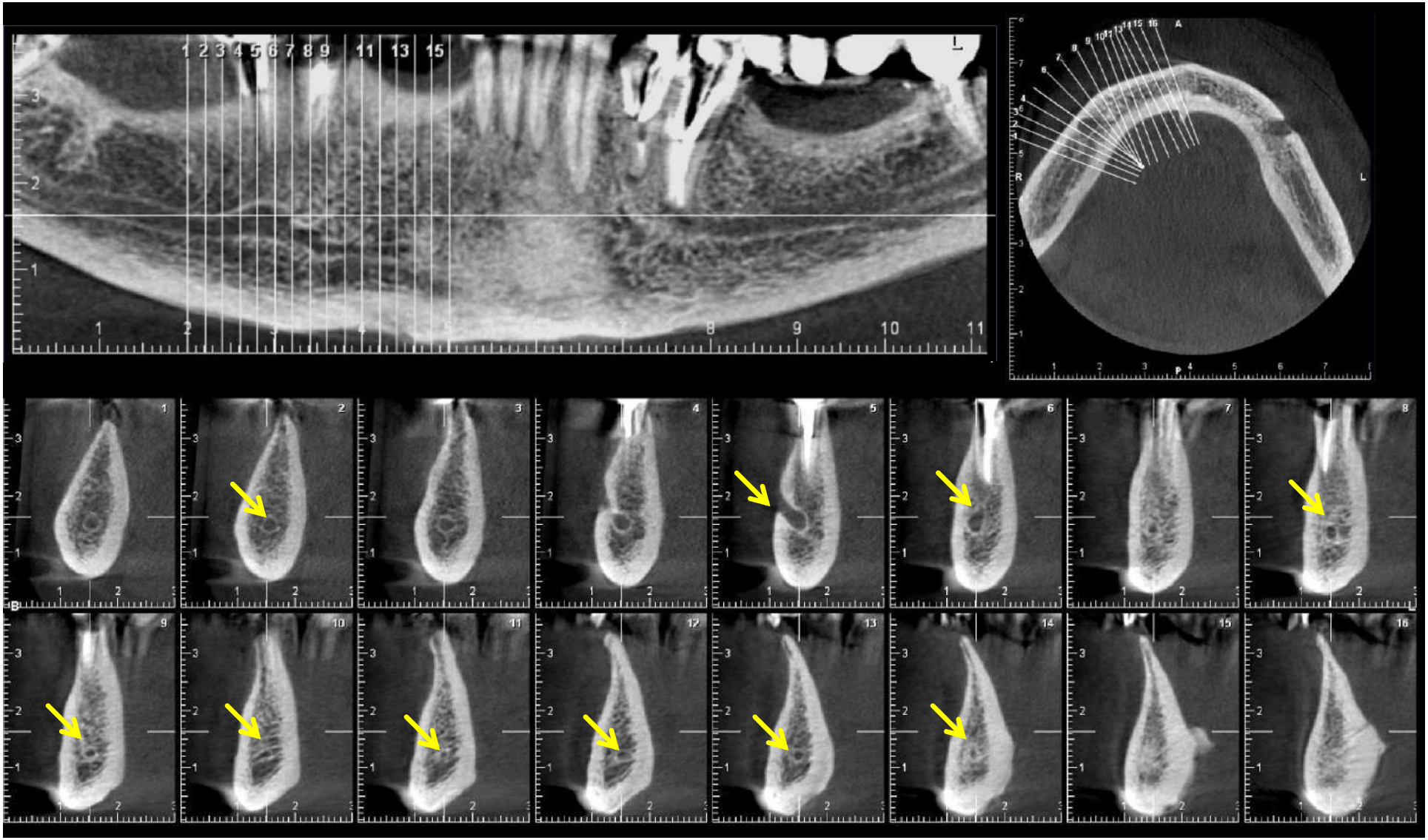


Inferior Alveolar Canal & Mental Foramen

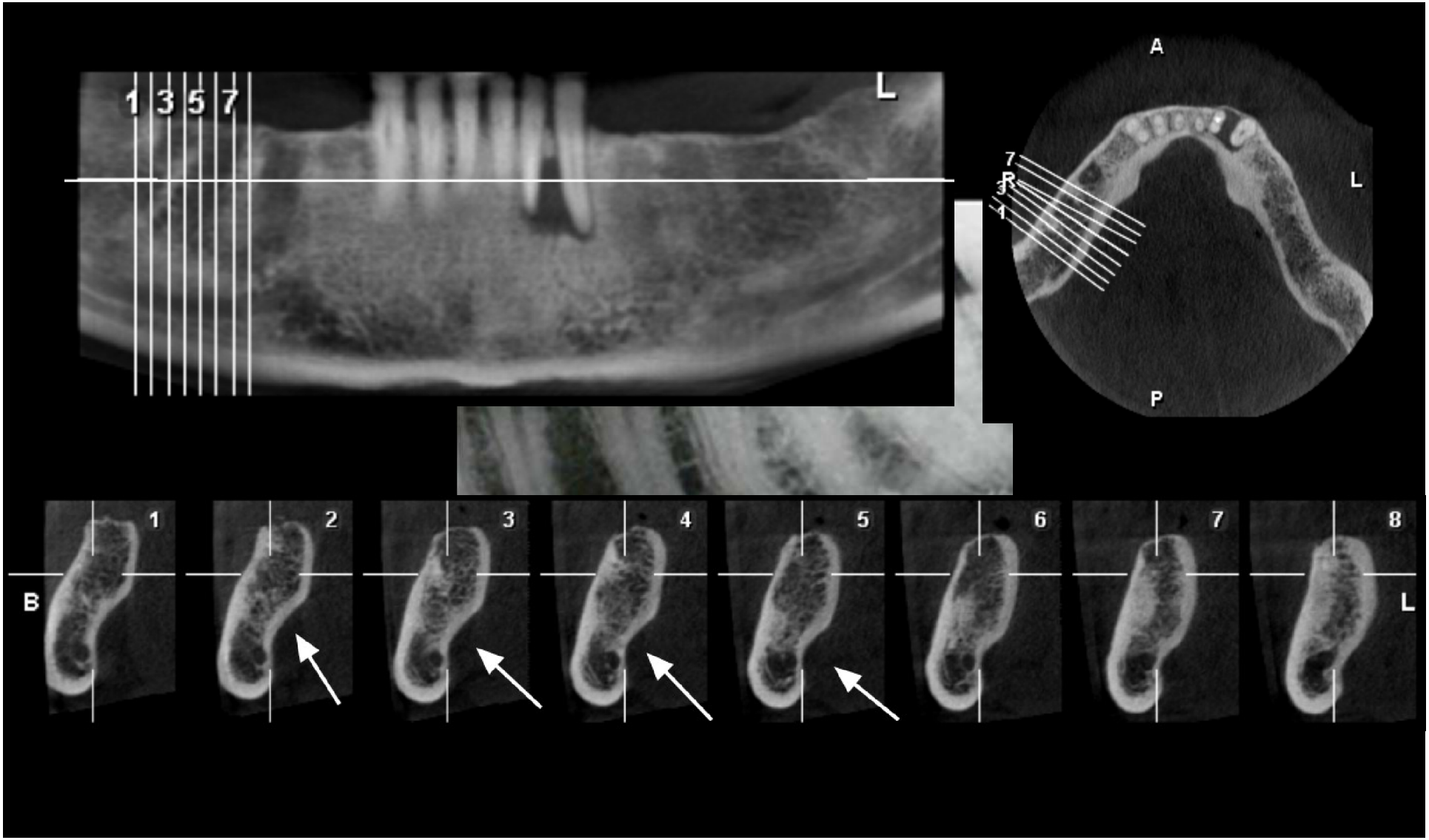




Ant. Loop & Incisive Canal

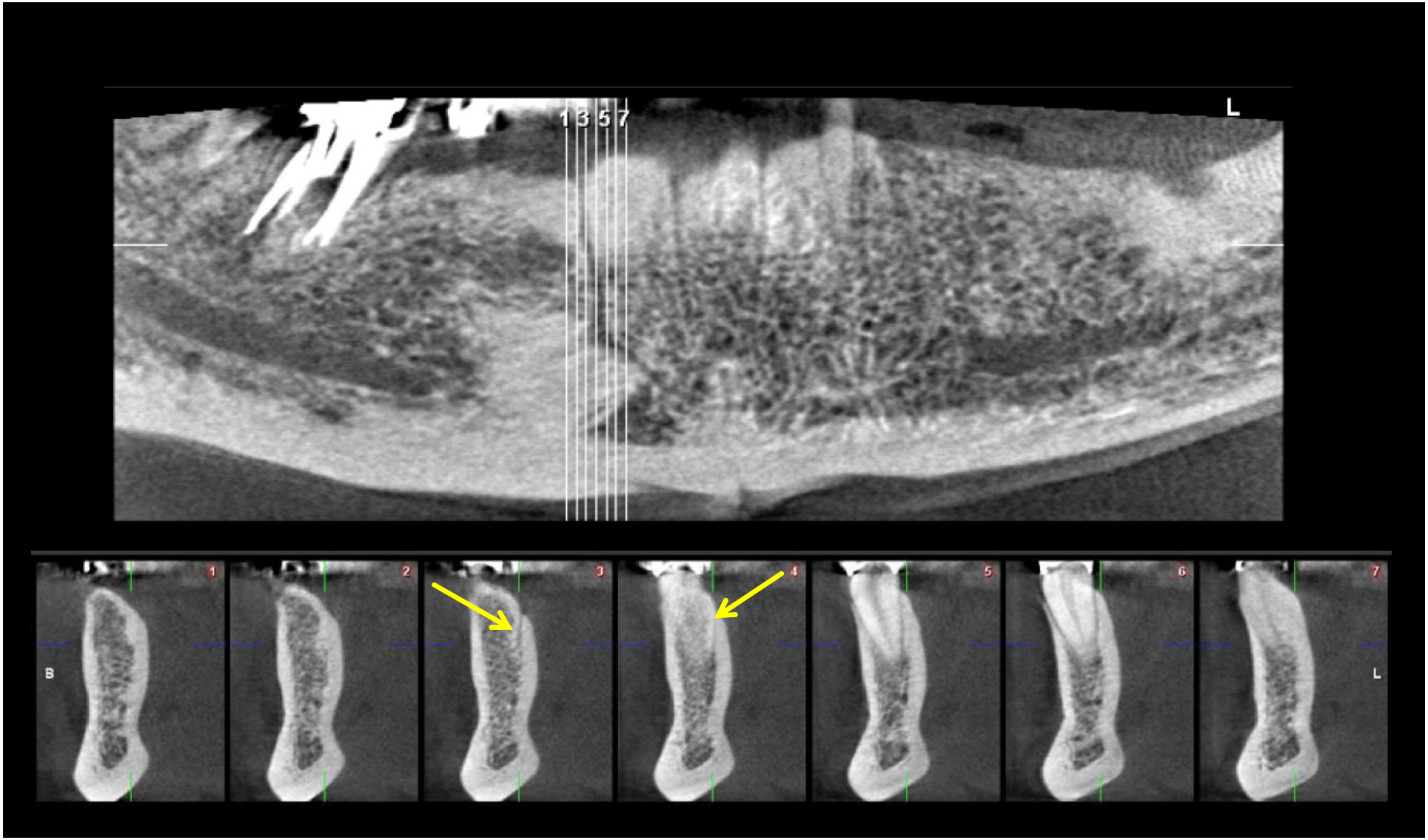


Submandibular Gland Fossa

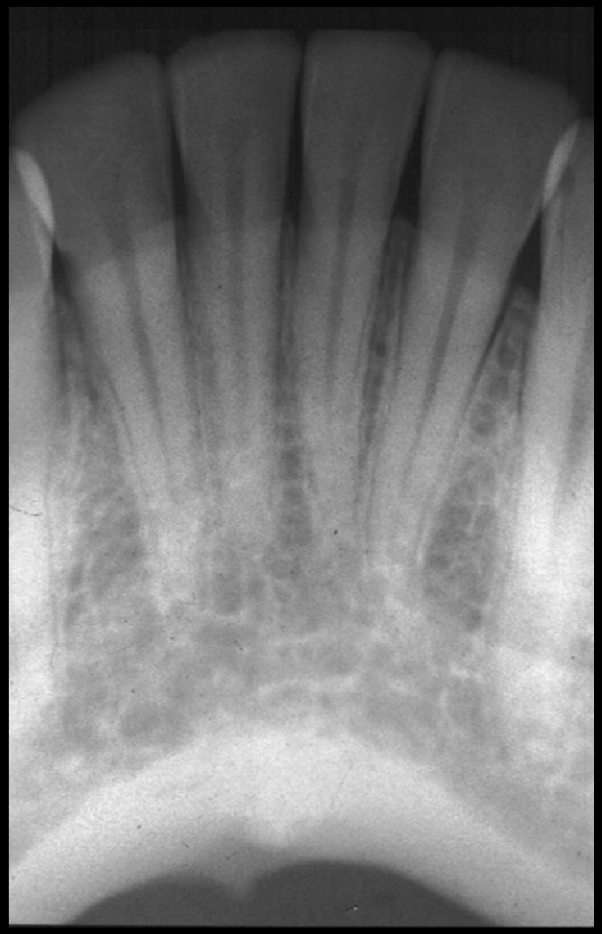


Mandibular Nutrient Canals

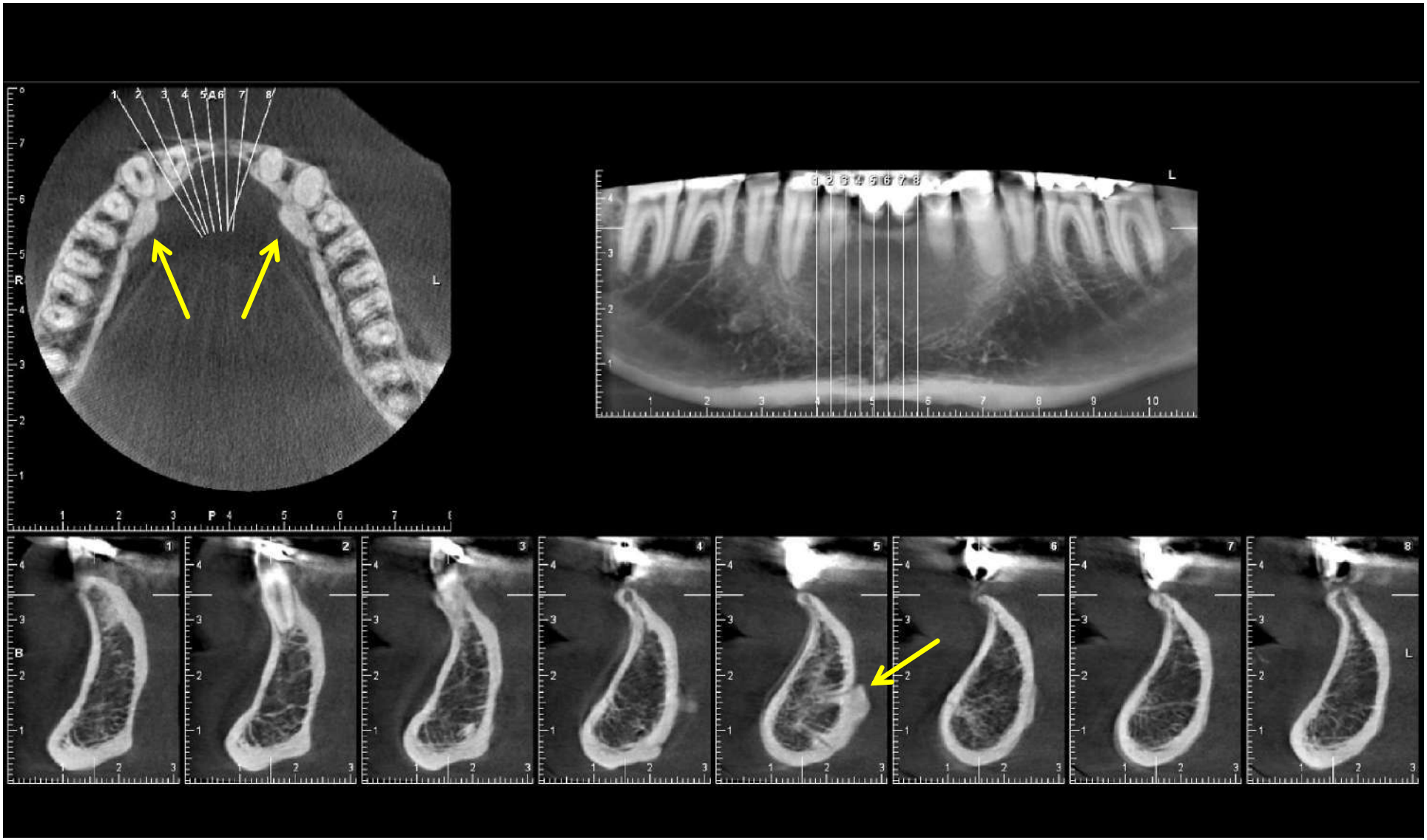
Mandibular Nutrient Canals



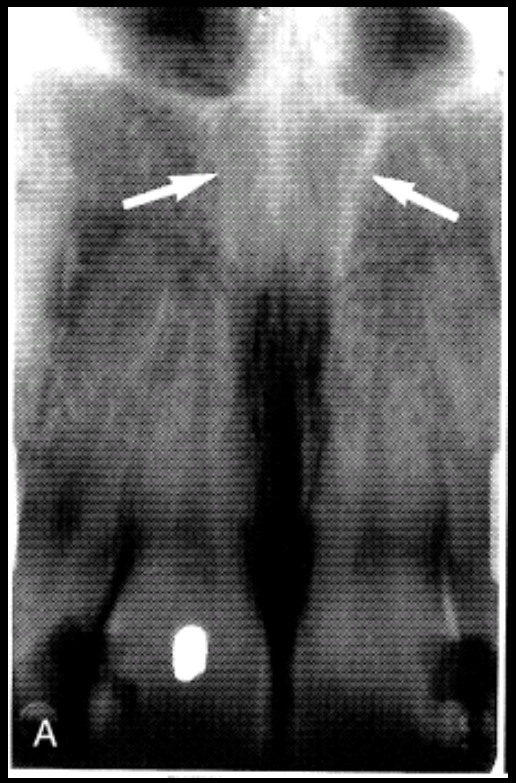
Torous Mandibularis & Genial tubercles

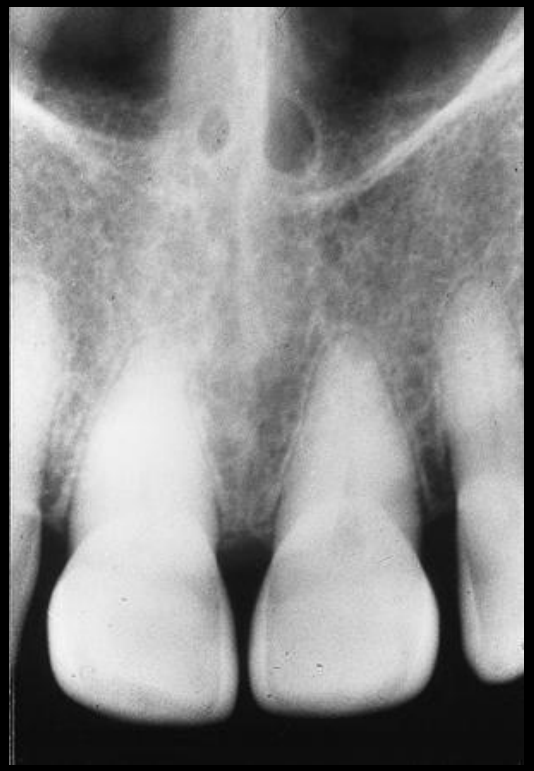


Torous Mandibularis & Genial tubercles

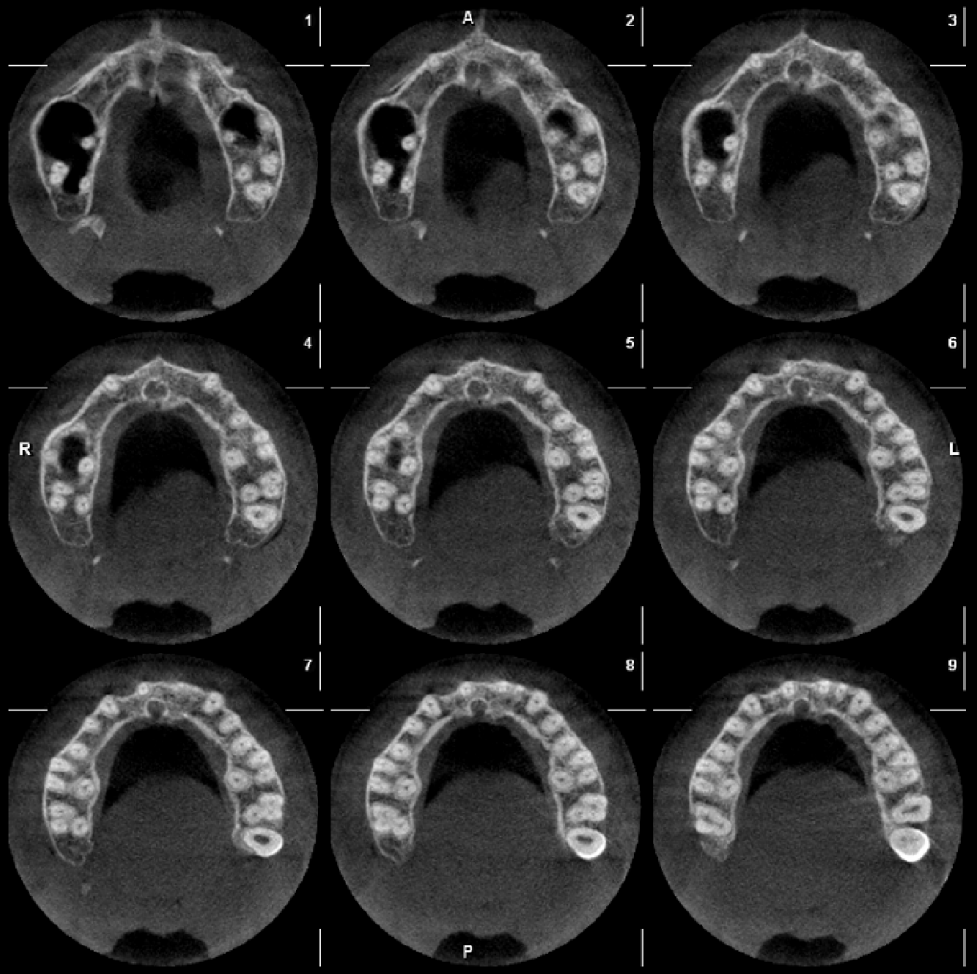


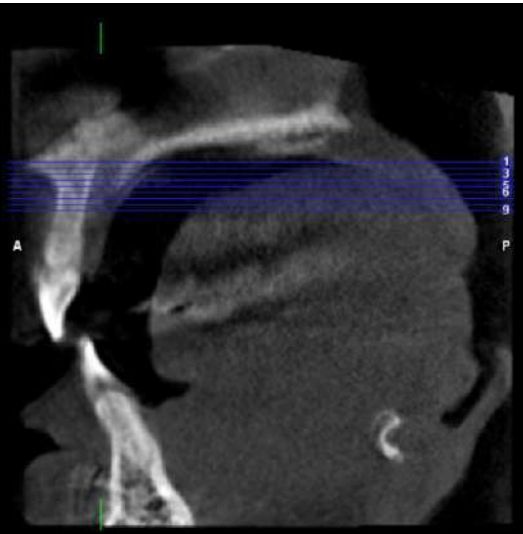
Incisive Canal (Nasopalatin Canal)

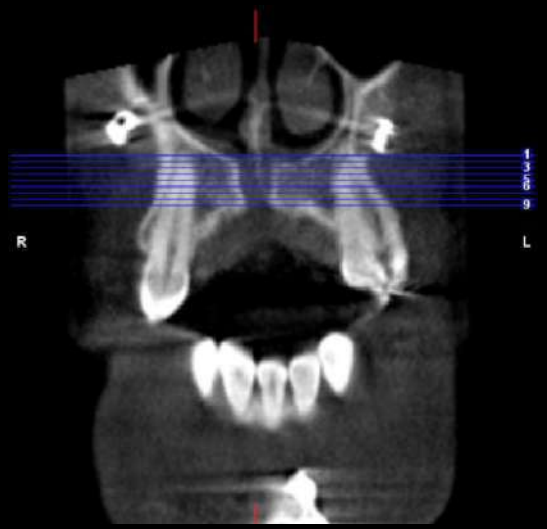




Incisive Canal (Nasopalatin Canal)

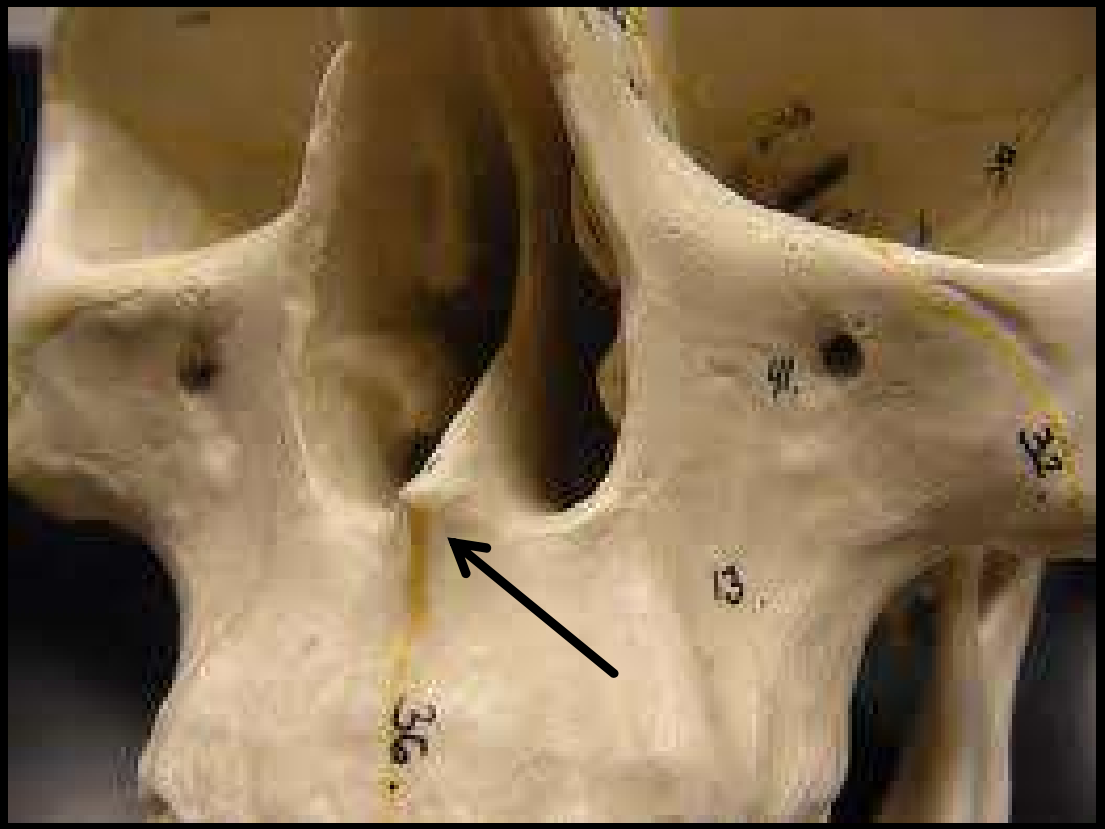




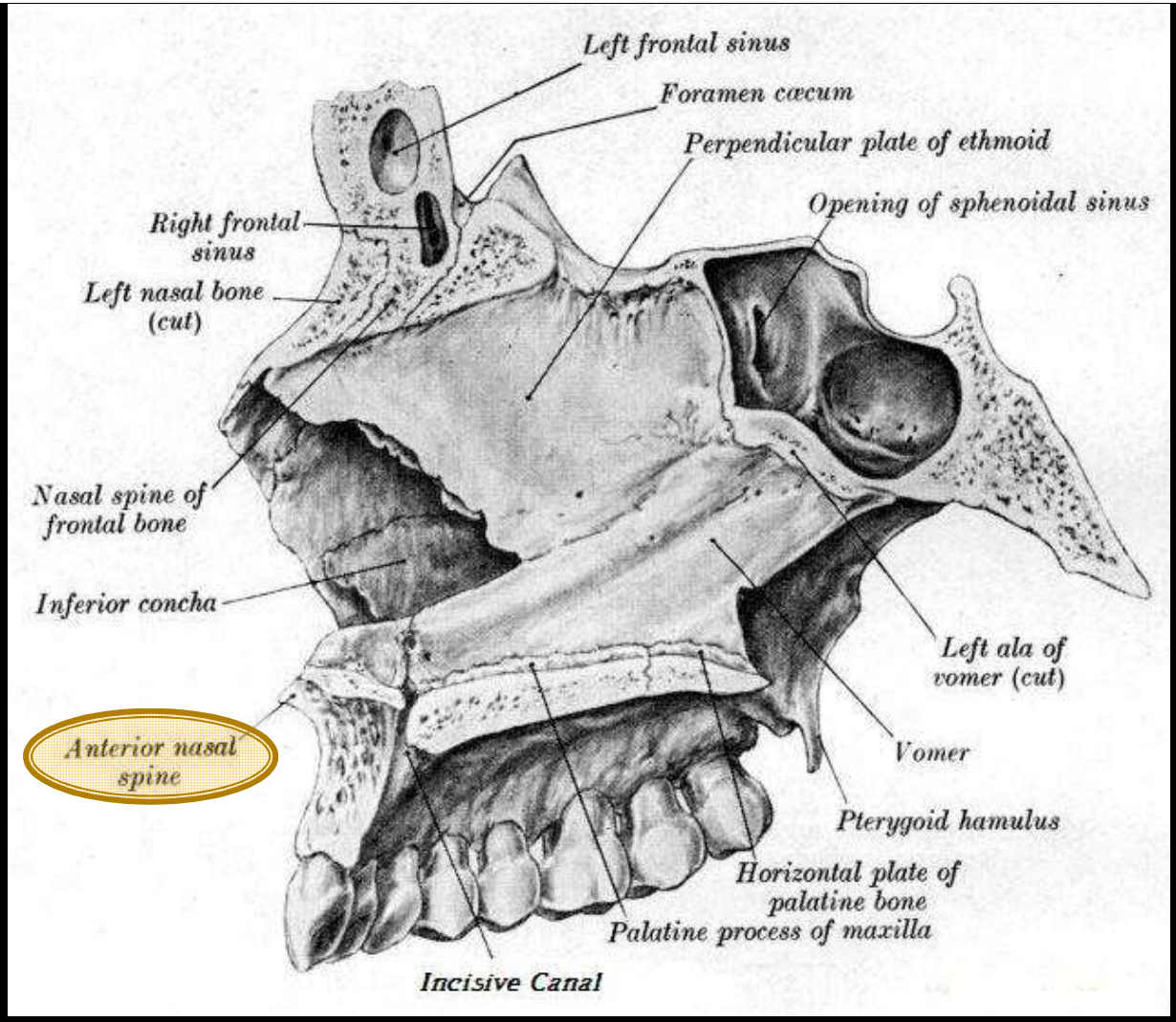


Incisive Canal (Nasopalatin Canal)

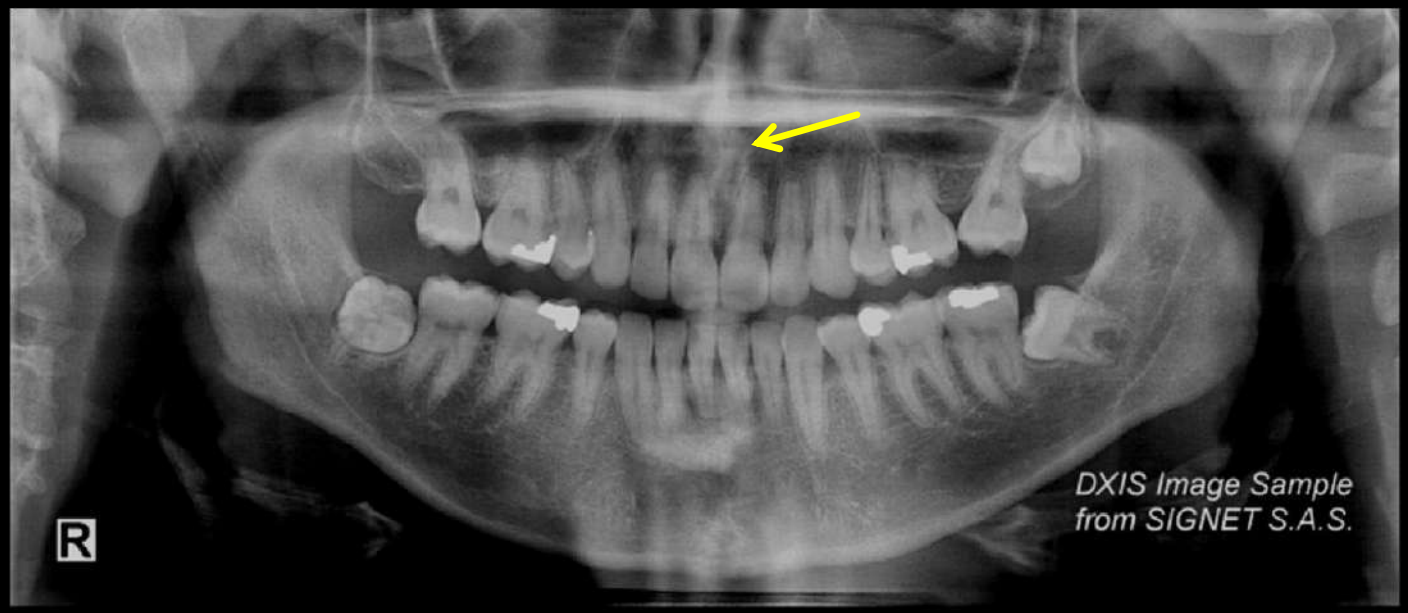
Anterior Nasal Spine



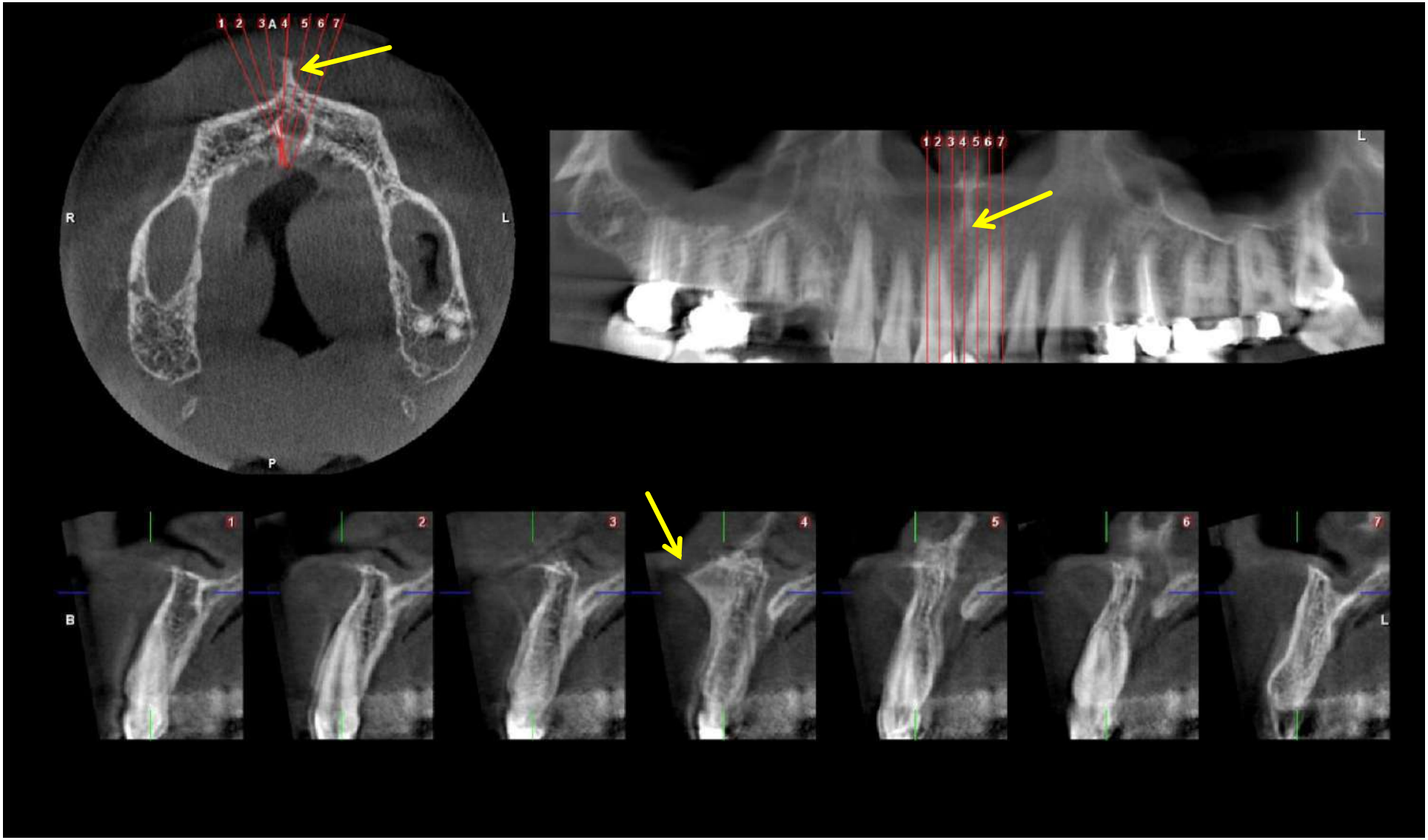
Anterior Nasal Spine



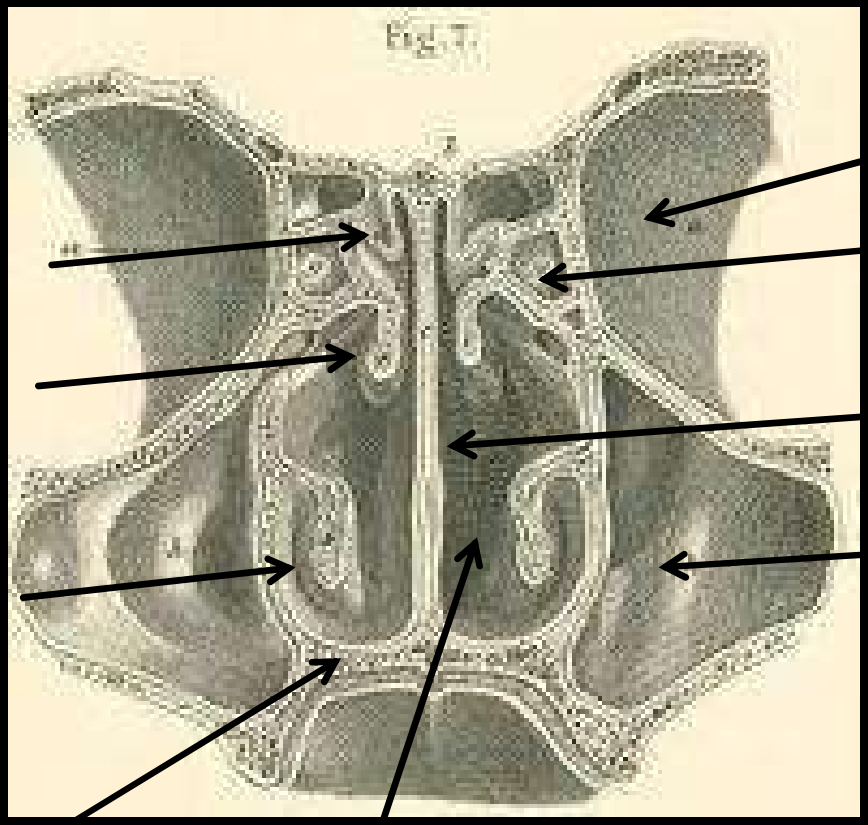
Anterior Nasal Spine



Anterior Nasal Spine



Nasal Cavity & Maxillary sinus



Superior conchea

Middle conchea

Inferior conchea

Orbit

Ethmoid Air Cells

Nasal septum

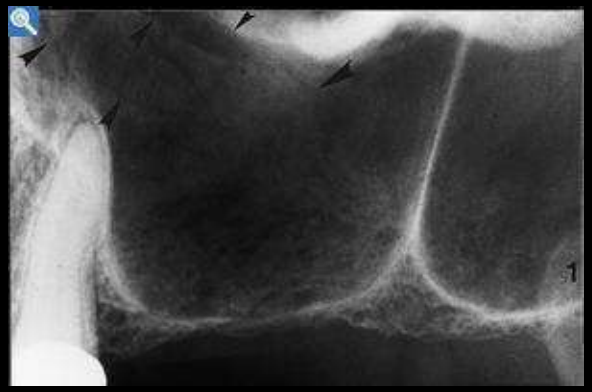
Maxillary sinus

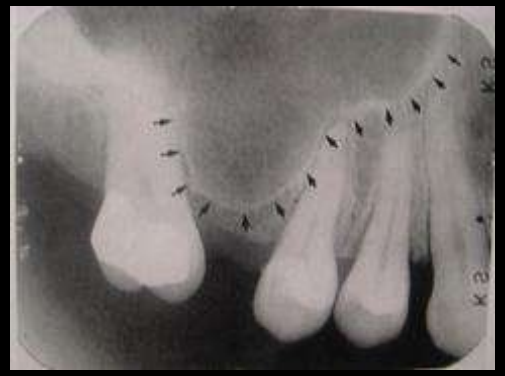
Nasal floor

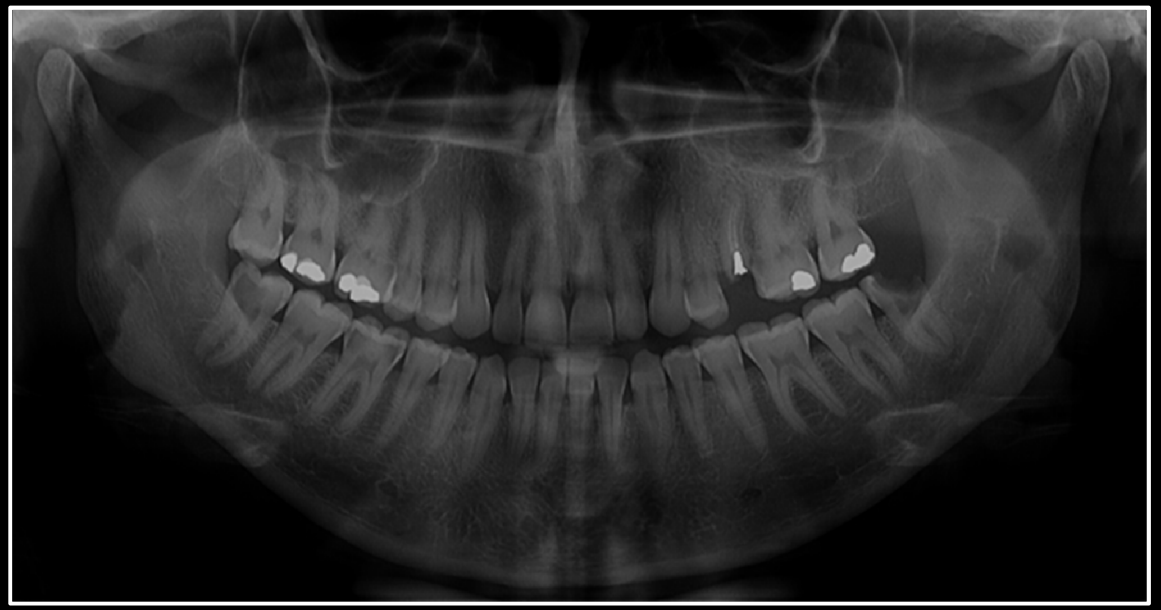
Nasal fossa

Nasal Cavity & Maxillary sinus

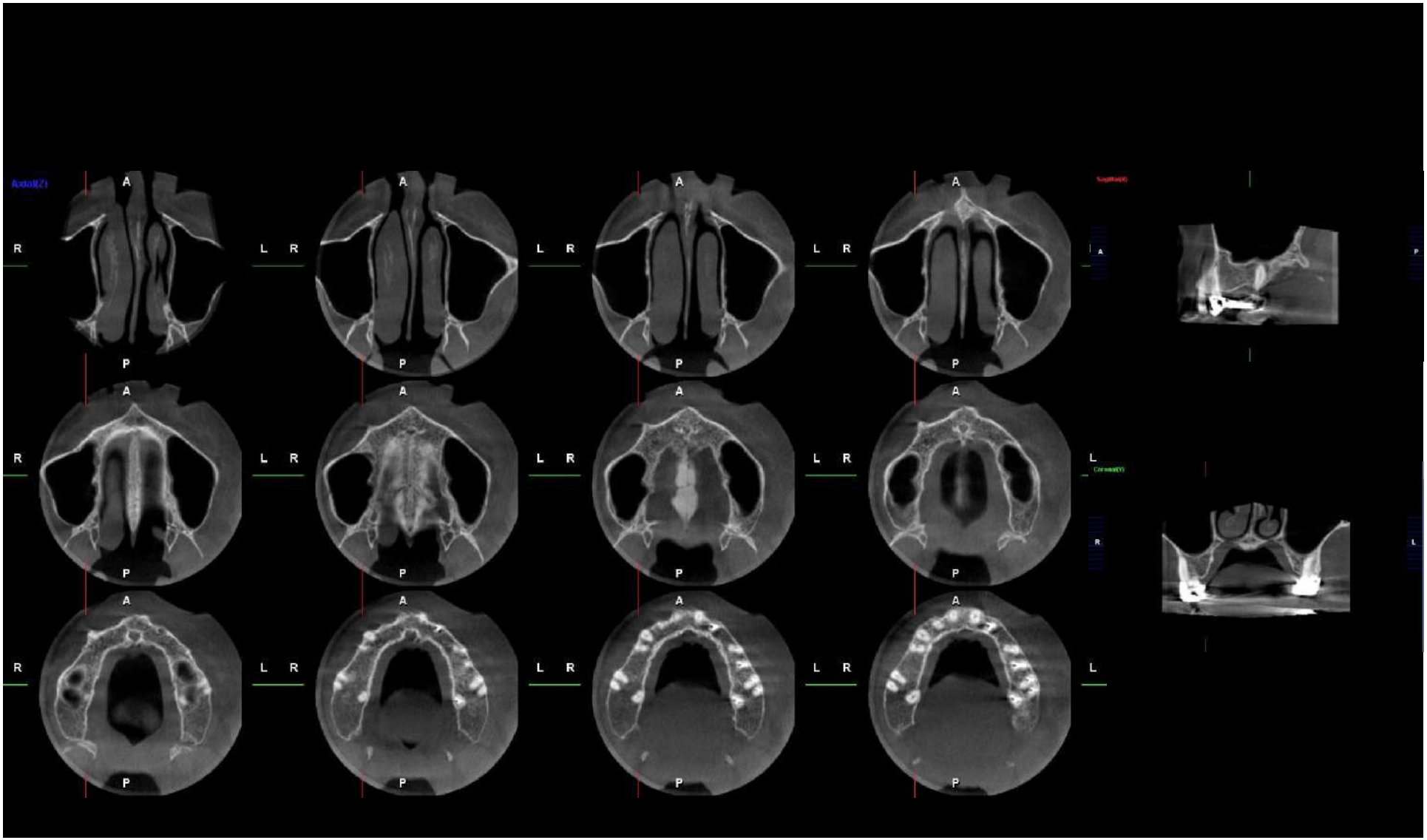
Nasal Cavity & Maxillary sinus



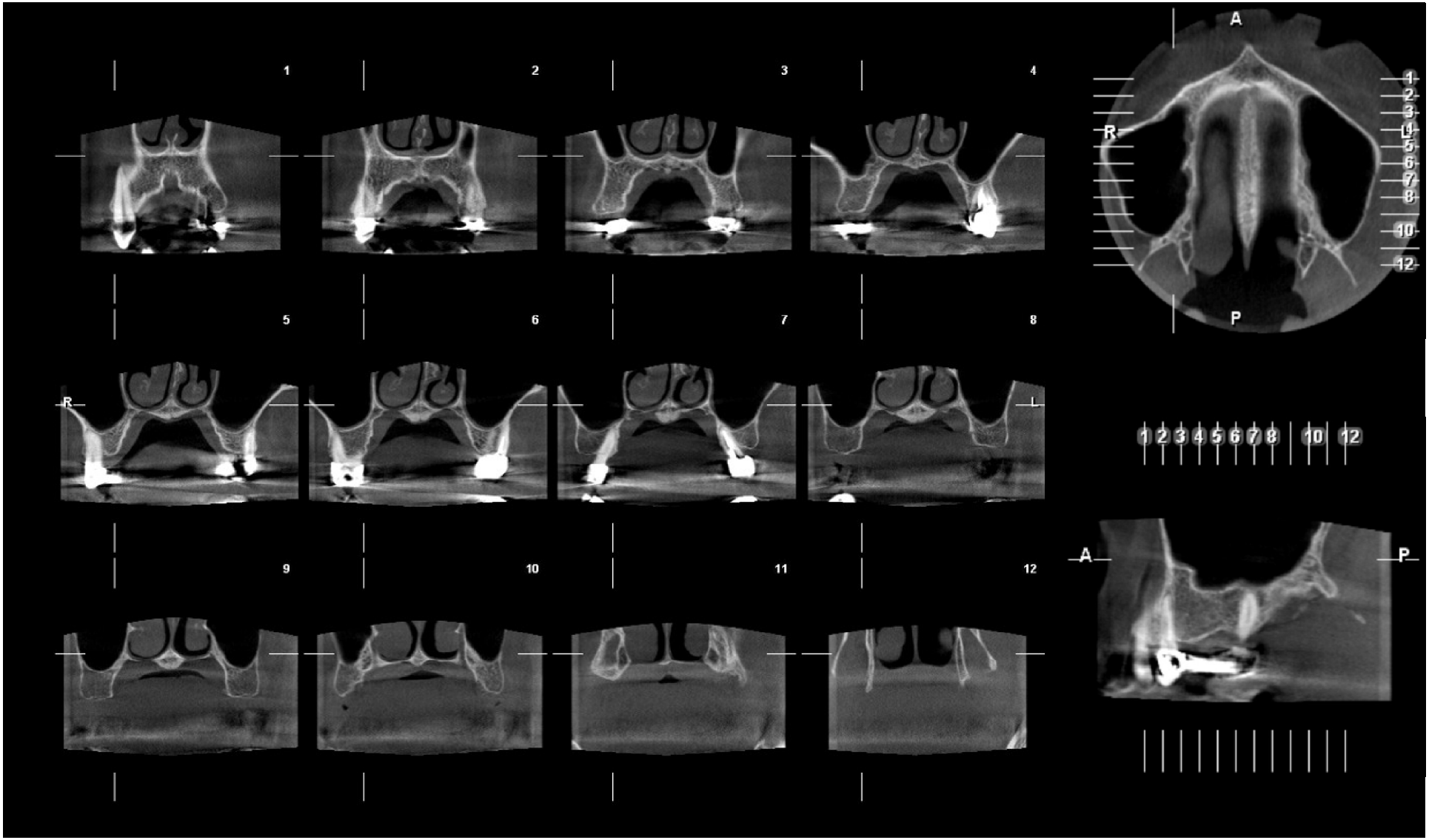


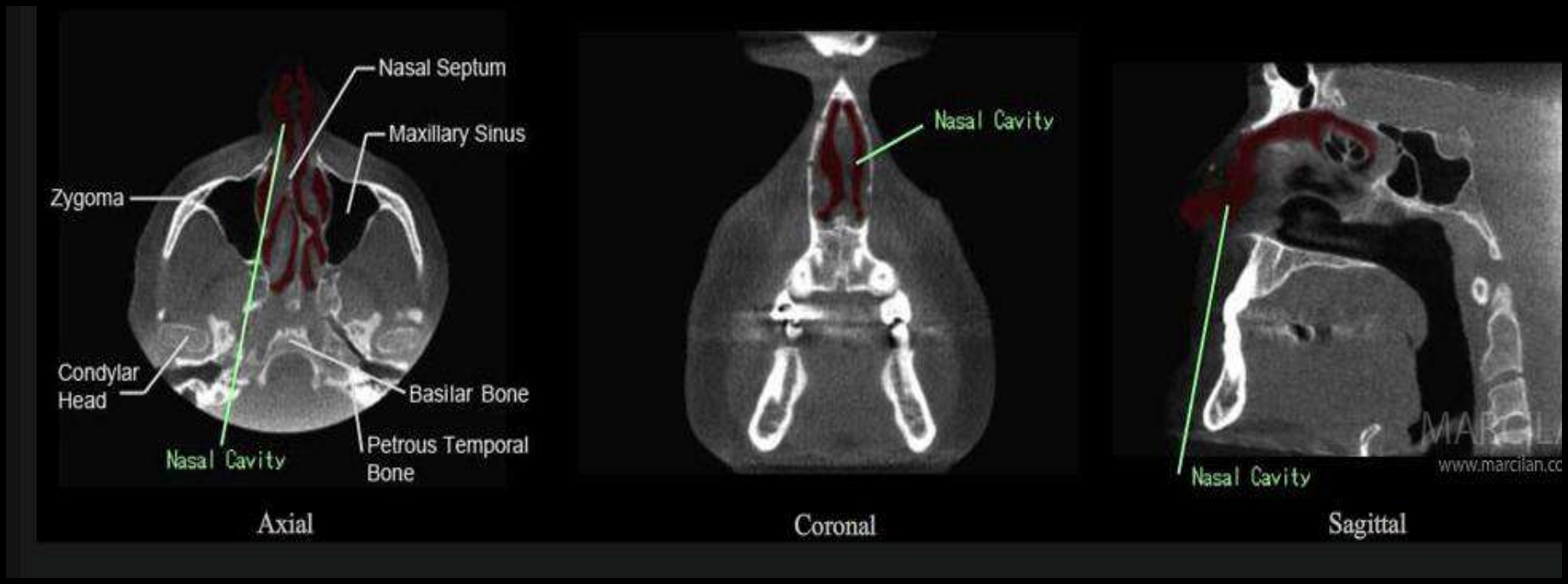


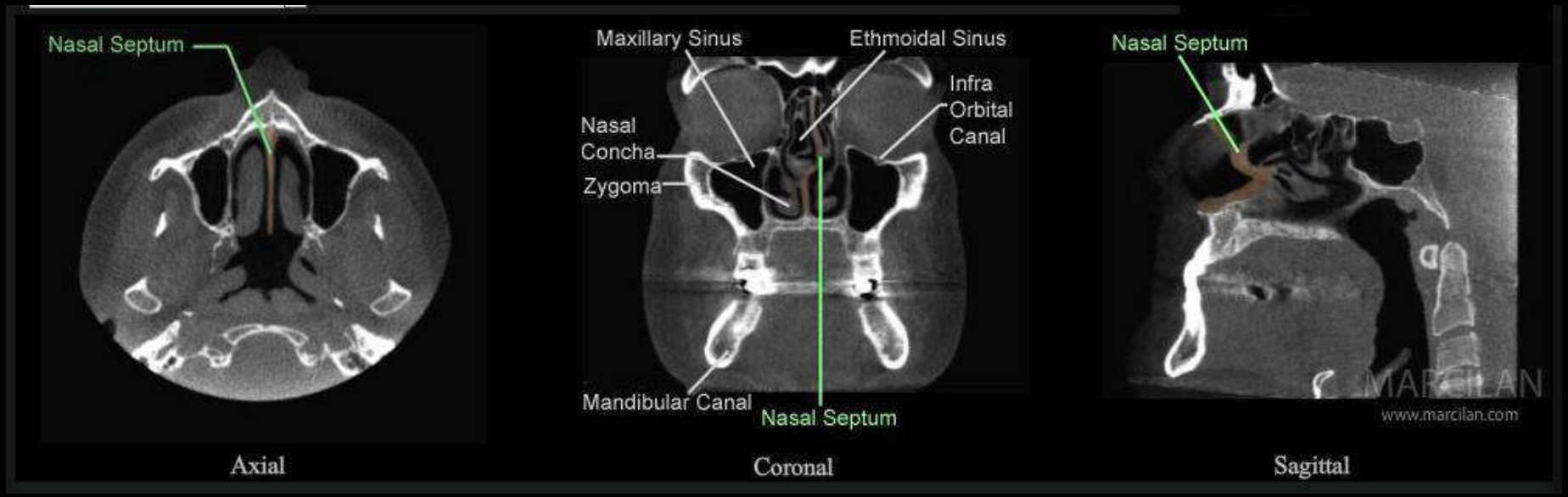
Nasal Cavity & Maxillary sinus



Nasal Cavity & Maxillary sinus




Nasal Septum
Maxillary Sinus
Zygoma
Condylar Head
Basilar Bone
Petrous Temporal Bone
Nasal Cavity
Axial
Nasal Cavity
Coronal
Nasal Cavity
Sagittal


Nasal Septum
Axial
Maxillary Sinus
Ethmoidal Sinus
Infra
Orbital
Canal
Nasal
Concha
Zygoma
Mandibular Canal
Nasal Septum
Coronal
Nasal Septum
MARCILAN
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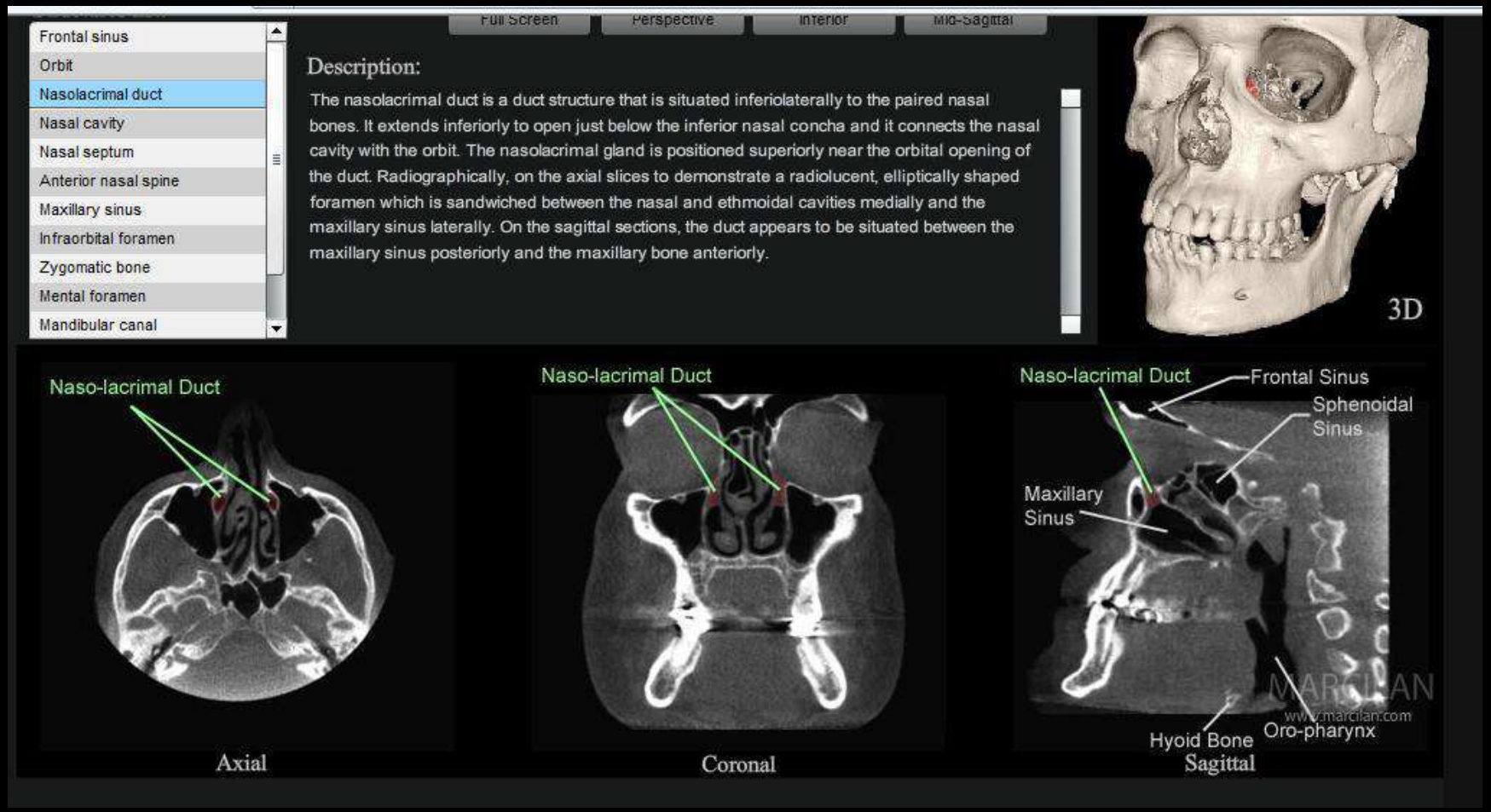
Sagittal


Full Screen
Perspective
Inferior
Mid-Sagittal
Frontal sinus
Orbit
Nasolacrimal duct
Nasal cavity
Nasal septum
Anterior nasal spine
Maxillary sinus
Infraorbital foramen
Zygomatic bone
Mental foramen
Mandibular canal
Description:
The nasolacrimal duct is a duct structure that is situated inferiolaterally to the paired nasal bones. It extends inferiorly to open just below the inferior nasal concha and it connects the nasal cavity with the orbit. The nasolacrimal gland is positioned superiorly near the orbital opening of the duct. Radiographically, on the axial slices to demonstrate a radiolucent, elliptically shaped foramen which is sandwiched between the nasal and ethmoidal cavities medially and the maxillary sinus laterally. On the sagittal sections, the duct appears to be situated between the maxillary sinus posteriorly and the maxillary bone anteriorly.
3D
Naso-lacrimal Duct
Axial
Naso-lacrimal Duct
Coronal
Naso-lacrimal Duct
Frontal Sinus
Sphenoidal Sinus
Maxillary Sinus
Hyoid Bone
Oro-pharynx
Sagittal
MARCIAN
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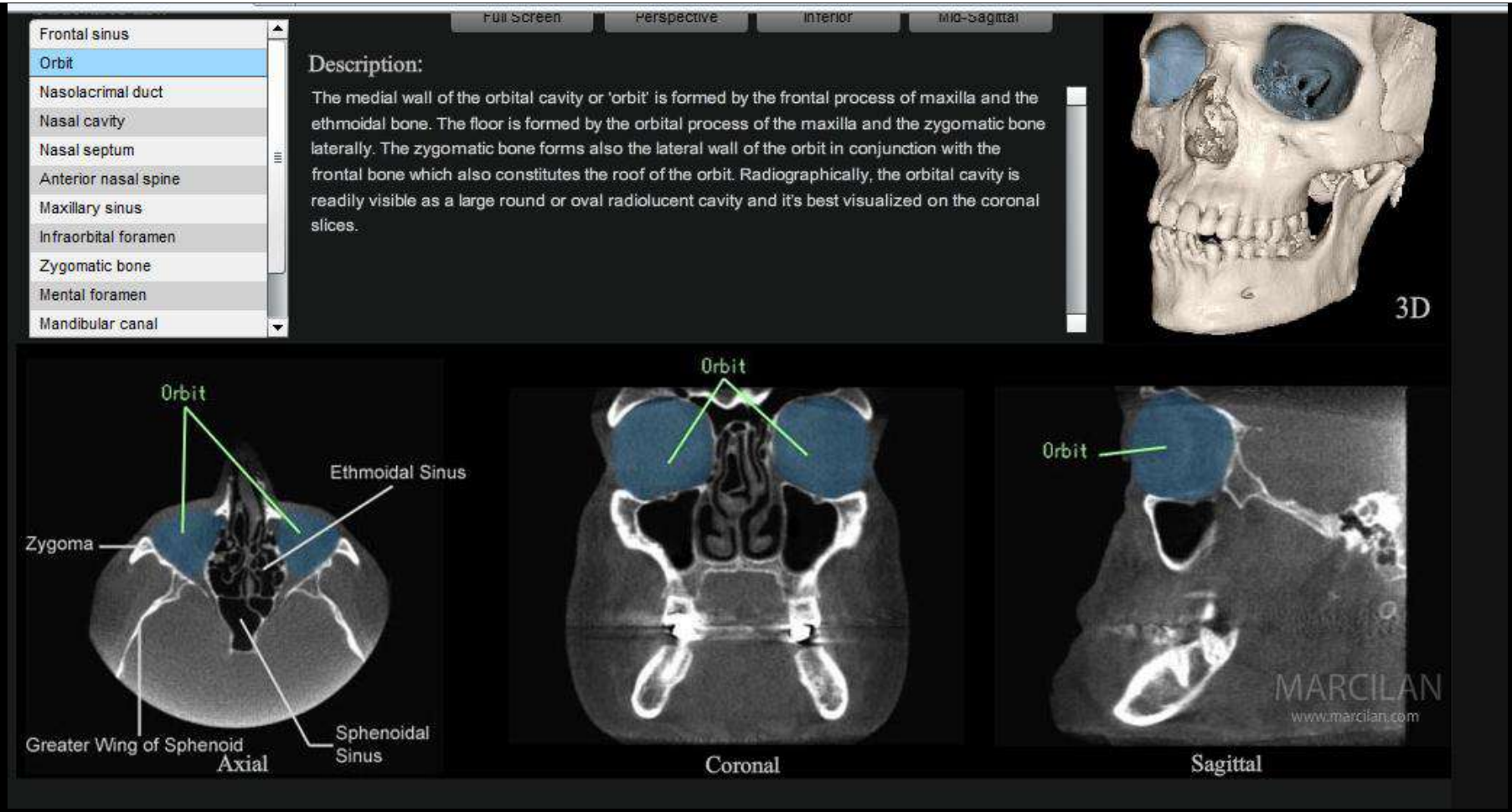
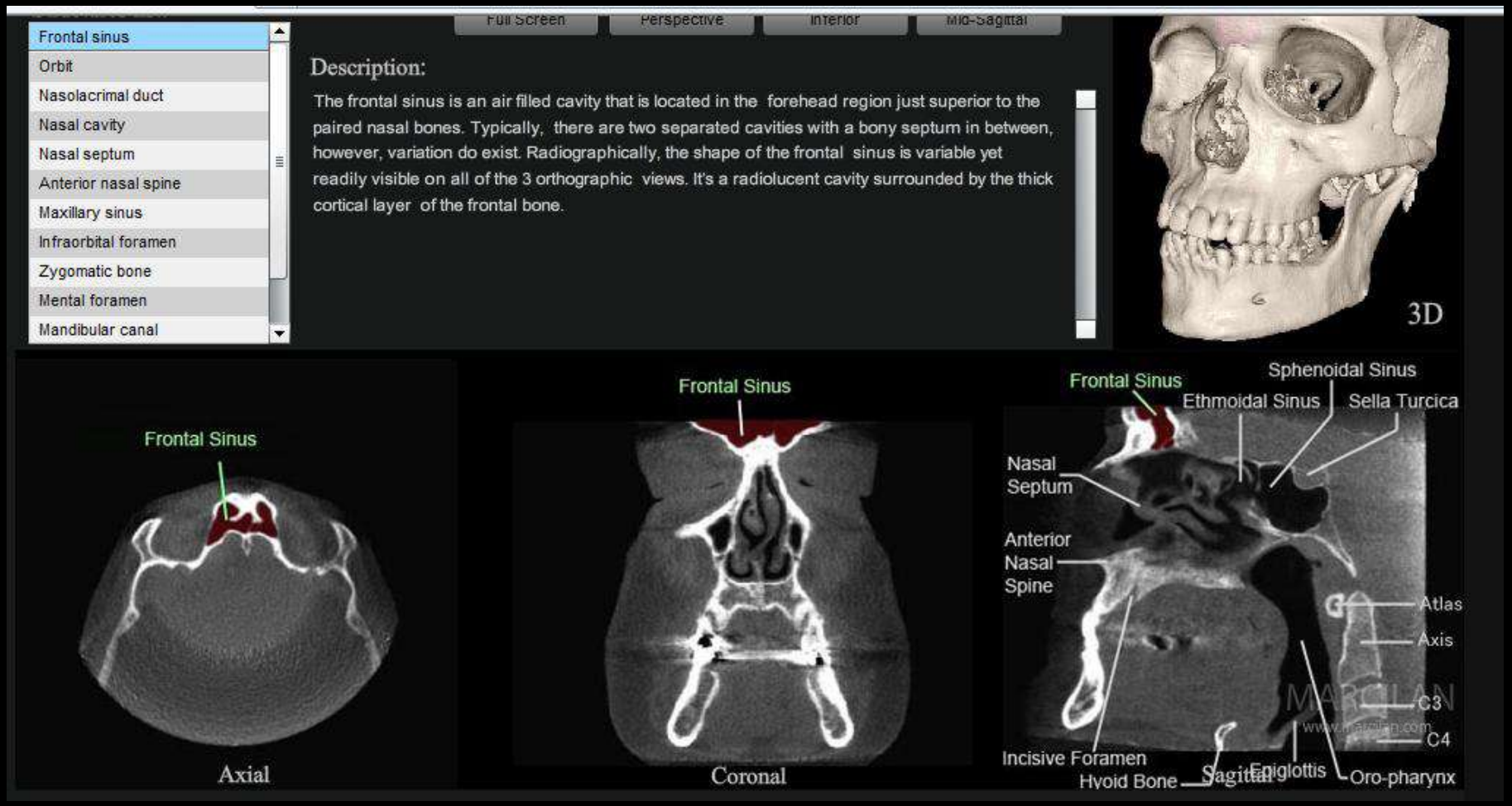
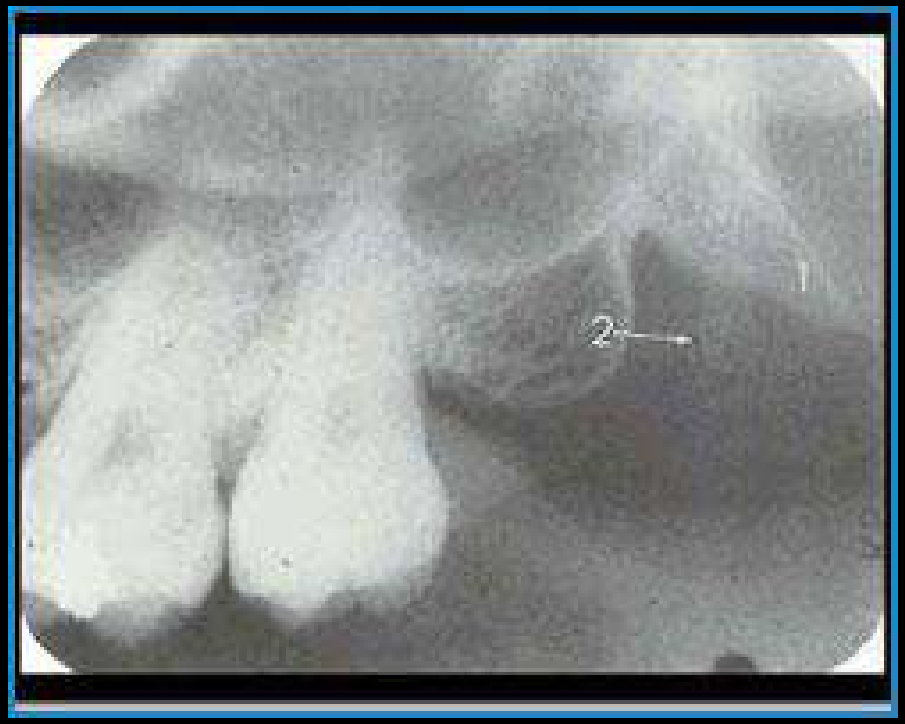
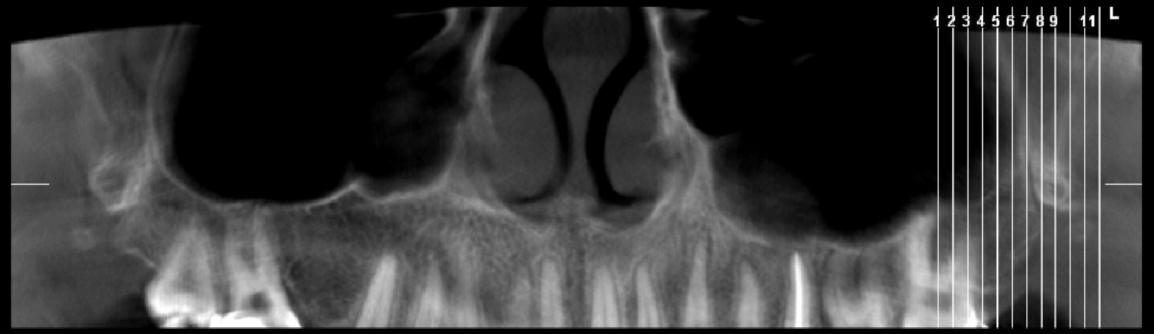

Full Screen
Perspective
Inferior
Mid-Sagittal
Frontal sinus
Orbit
Nasolacrimal duct
Nasal cavity
Nasal septum
Anterior nasal spine
Maxillary sinus
Infraorbital foramen
Zygomatic bone
Mental foramen
Mandibular canal
Description:
The medial wall of the orbital cavity or 'orbit' is formed by the frontal process of maxilla and the ethmoidal bone. The floor is formed by the orbital process of the maxilla and the zygomatic bone laterally. The zygomatic bone forms also the lateral wall of the orbit in conjunction with the frontal bone which also constitutes the roof of the orbit. Radiographically, the orbital cavity is readily visible as a large round or oval radiolucent cavity and it's best visualized on the coronal slices.
3D
Orbit
Ethmoidal Sinus
Zygoma
Greater Wing of Sphenoid
Sphenoidal Sinus
Axial
Orbit
Coronal
Orbit
Sagittal
MARCILAN
www.marcilan.com

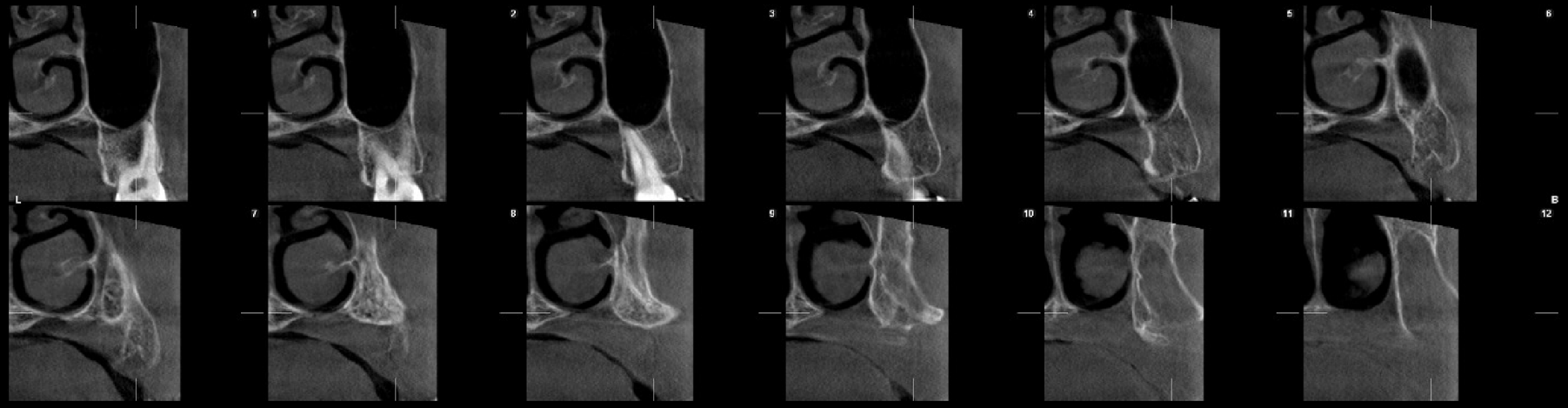

Full Screen
Perspective
Inferior
Mid-Sagittal
Frontal sinus
Orbit
Nasolacrimal duct
Nasal cavity
Nasal septum
Anterior nasal spine
Maxillary sinus
Infraorbital foramen
Zygomatic bone
Mental foramen
Mandibular canal
Description:
The frontal sinus is an air filled cavity that is located in the forehead region just superior to the paired nasal bones. Typically, there are two separated cavities with a bony septum in between, however, variation do exist. Radiographically, the shape of the frontal sinus is variable yet readily visible on all of the 3 orthographic views. It's a radiolucent cavity surrounded by the thick cortical layer of the frontal bone.
3D
Frontal Sinus
Axial
Frontal Sinus
Coronal
Frontal Sinus
Sphenoidal Sinus
Ethmoidal Sinus
Sella Turcica
Nasal Septum
Anterior Nasal Spine
Atlas
Axis
C3
C4
Incisive Foramen
Hyoid Bone
Sagittal
Epiglottis
Oro-pharynx

Maxillary Tuberosity & Pterygoid Plates

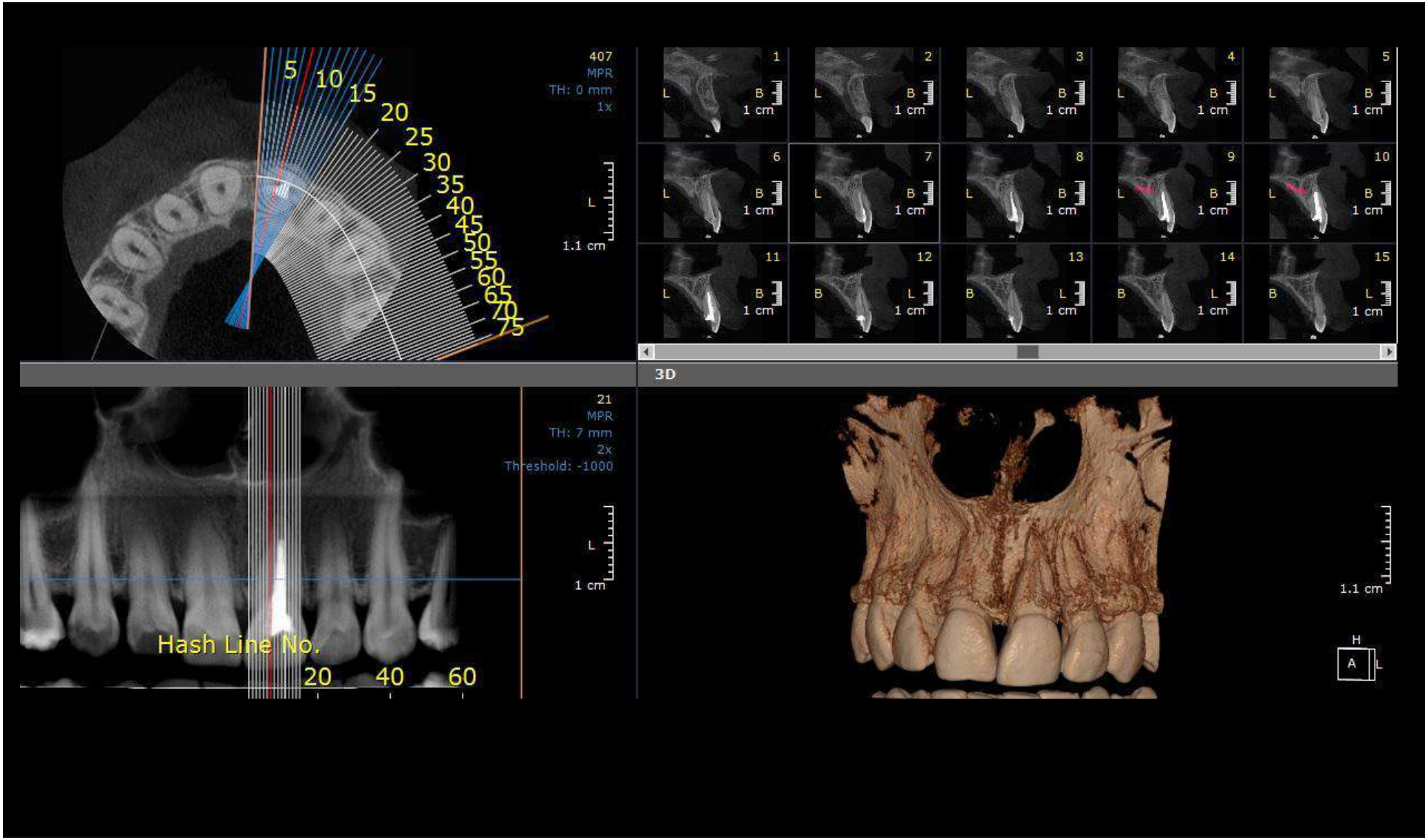


Maxillary Tuberosity & Pterygoid Plates

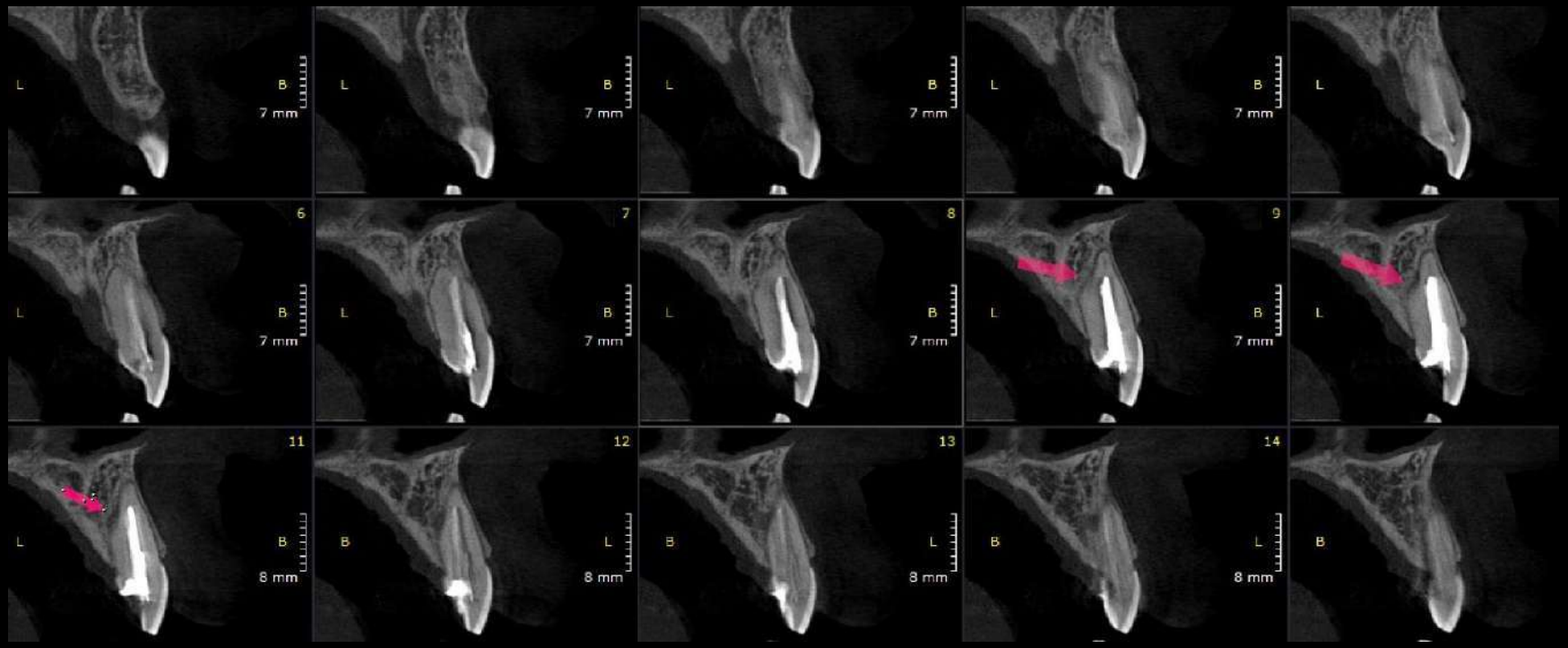


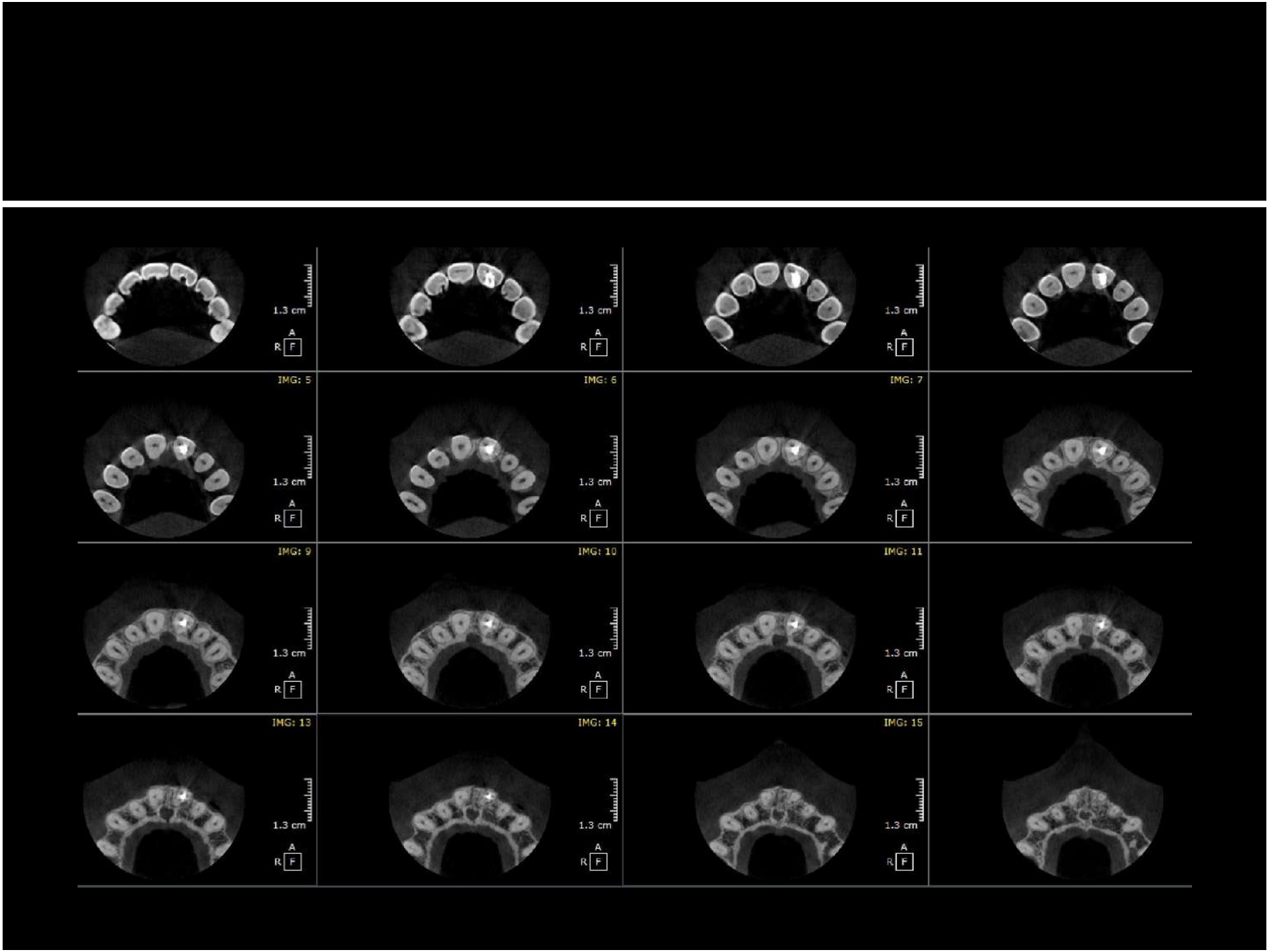


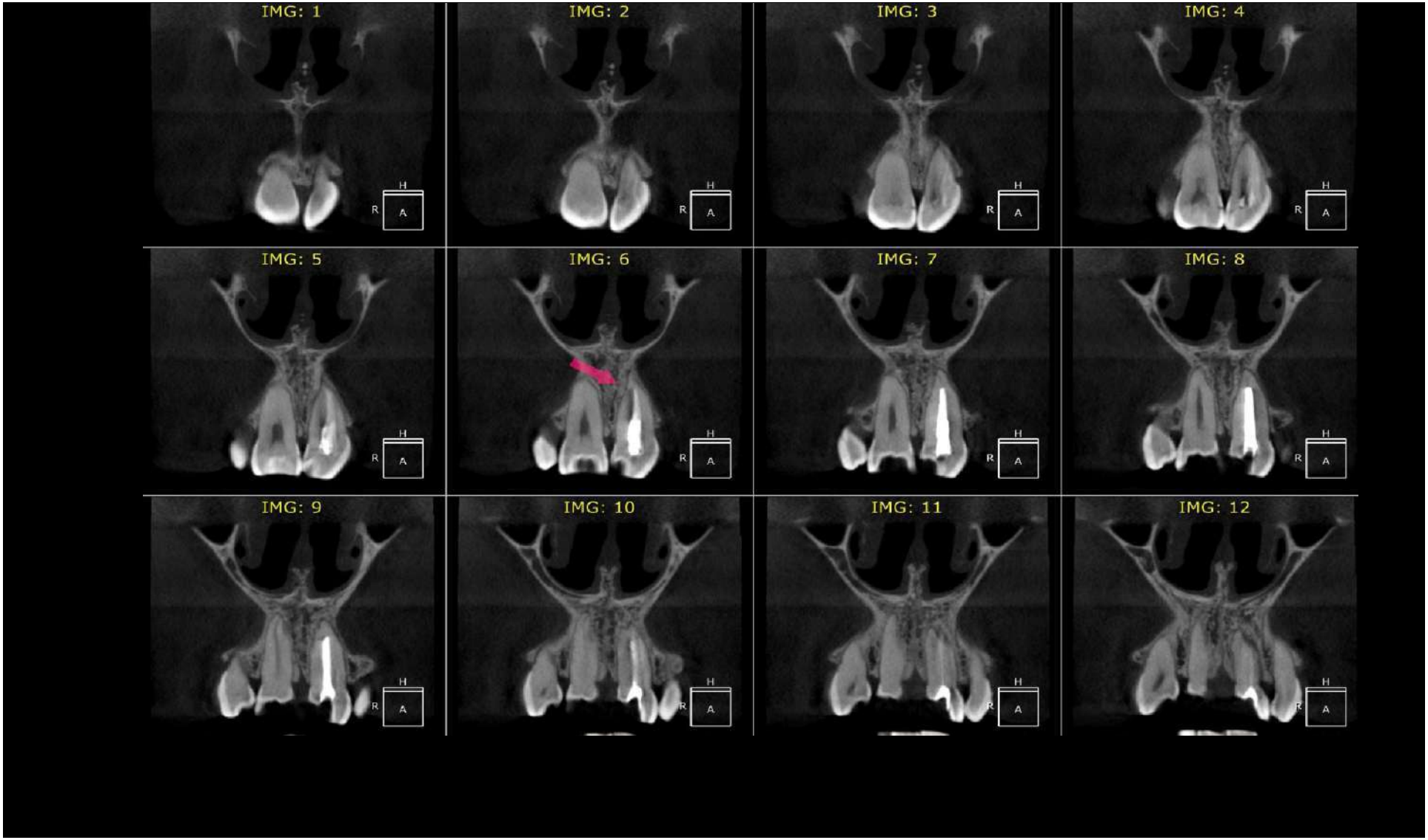
Case 1: Root Fracture



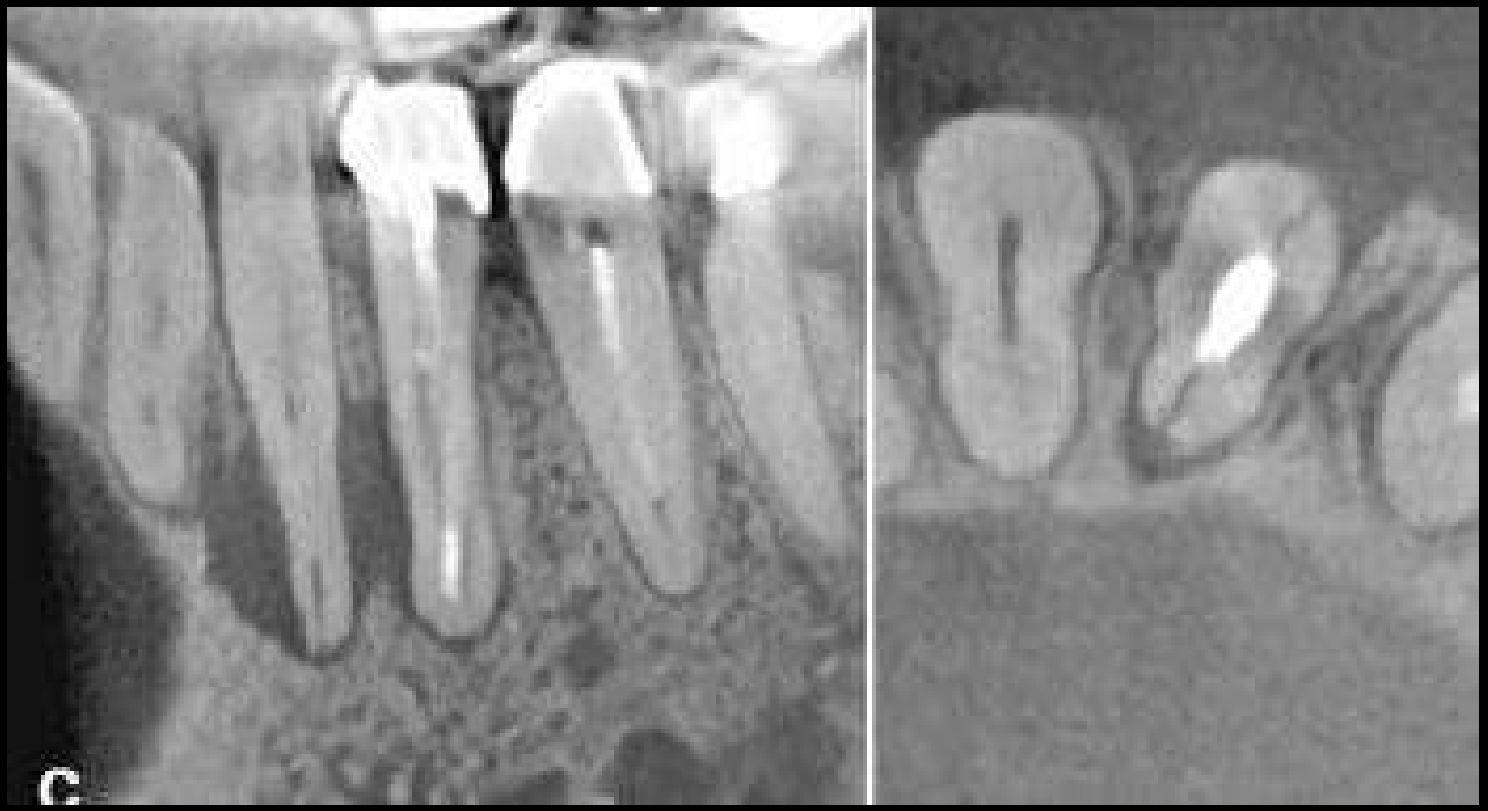
Case1:



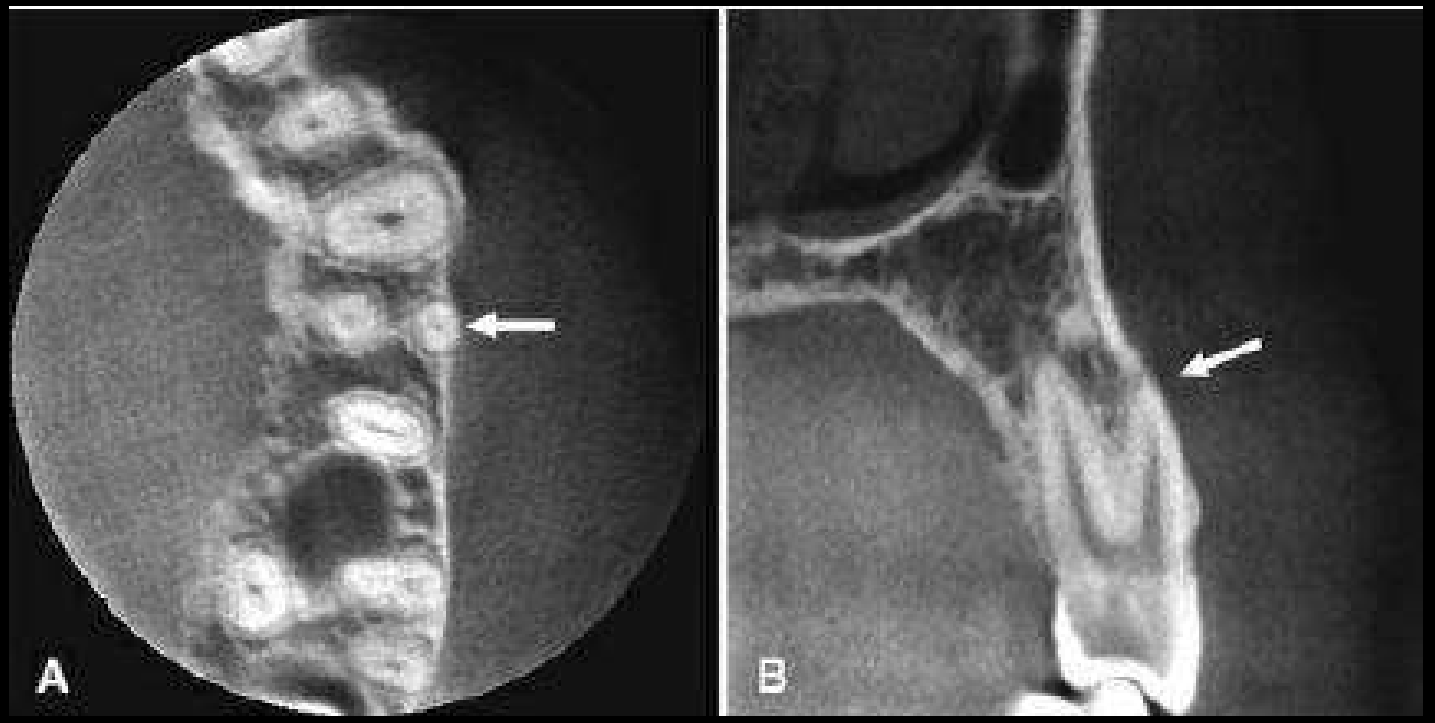

IMG: 5
IMG: 6
IMG: 7
IMG: 9
IMG: 10
IMG: 11
IMG: 13
IMG: 14
IMG: 15
1.3 cm
A
R
F


IMG: 1
IMG: 2
IMG: 3
IMG: 4
IMG: 5
IMG: 6
IMG: 7
IMG: 8
IMG: 9
IMG: 10
IMG: 11
IMG: 12

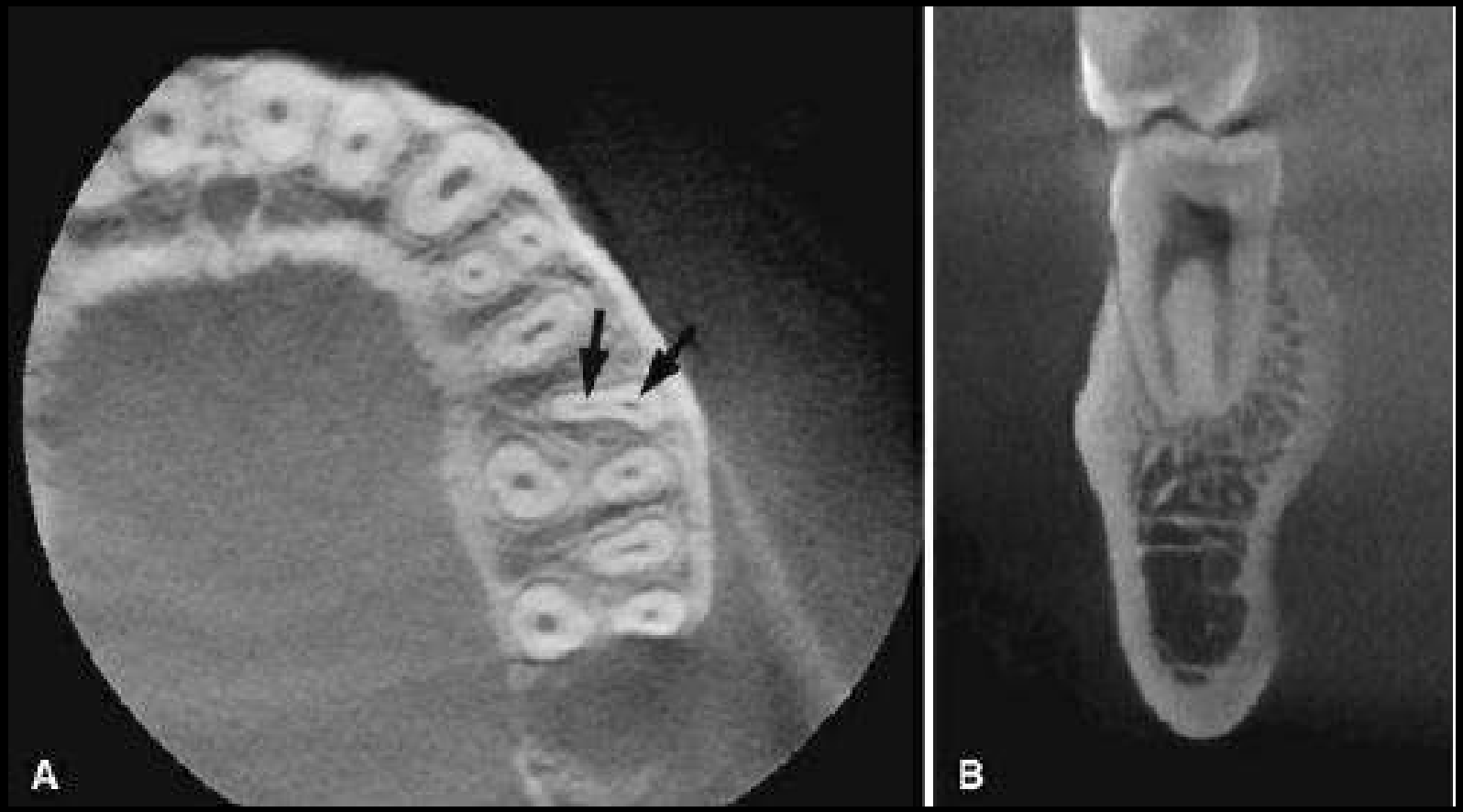
Other Case 1: Root Fracture



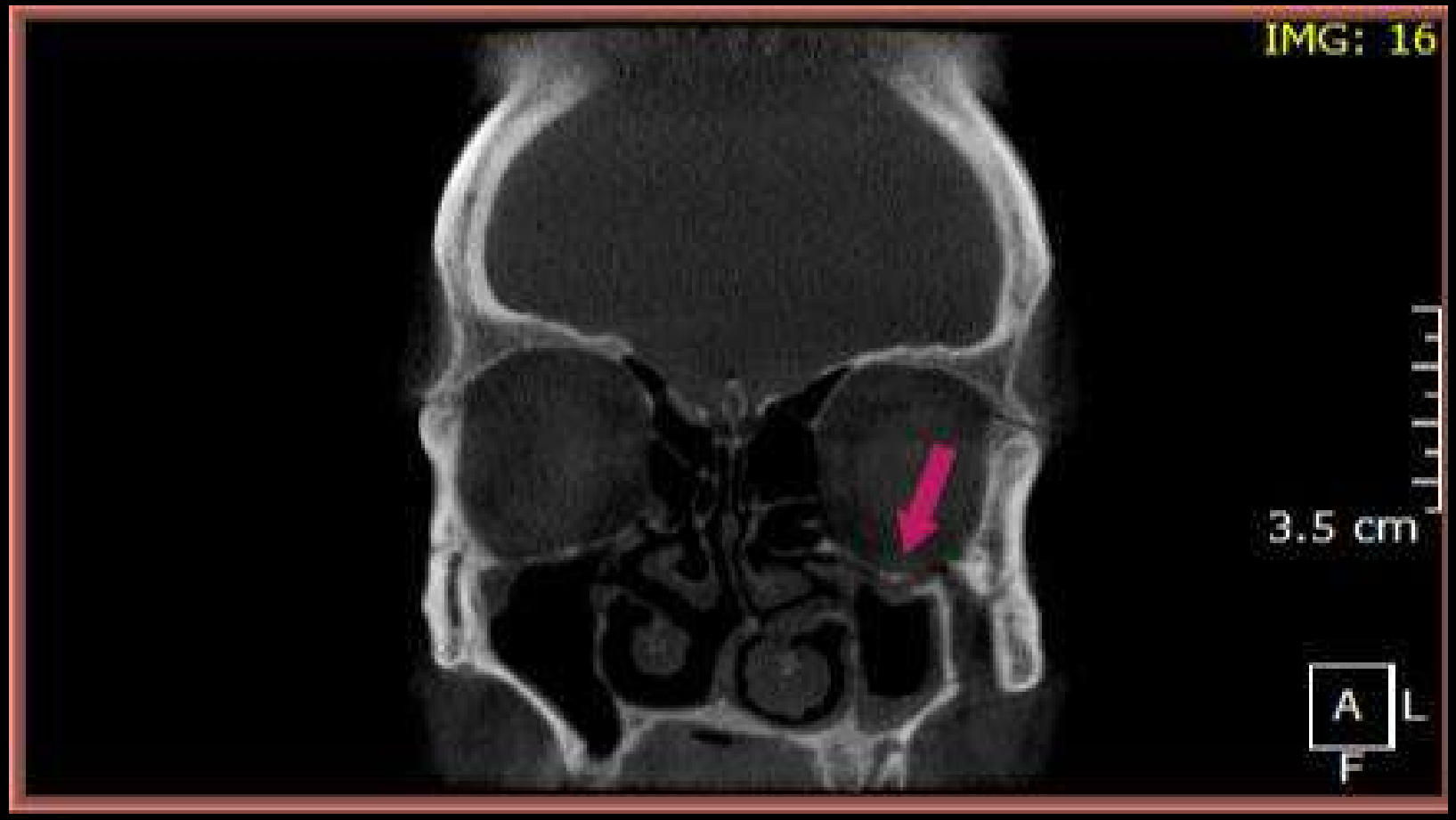
Root proximity to buccal cortical plate:

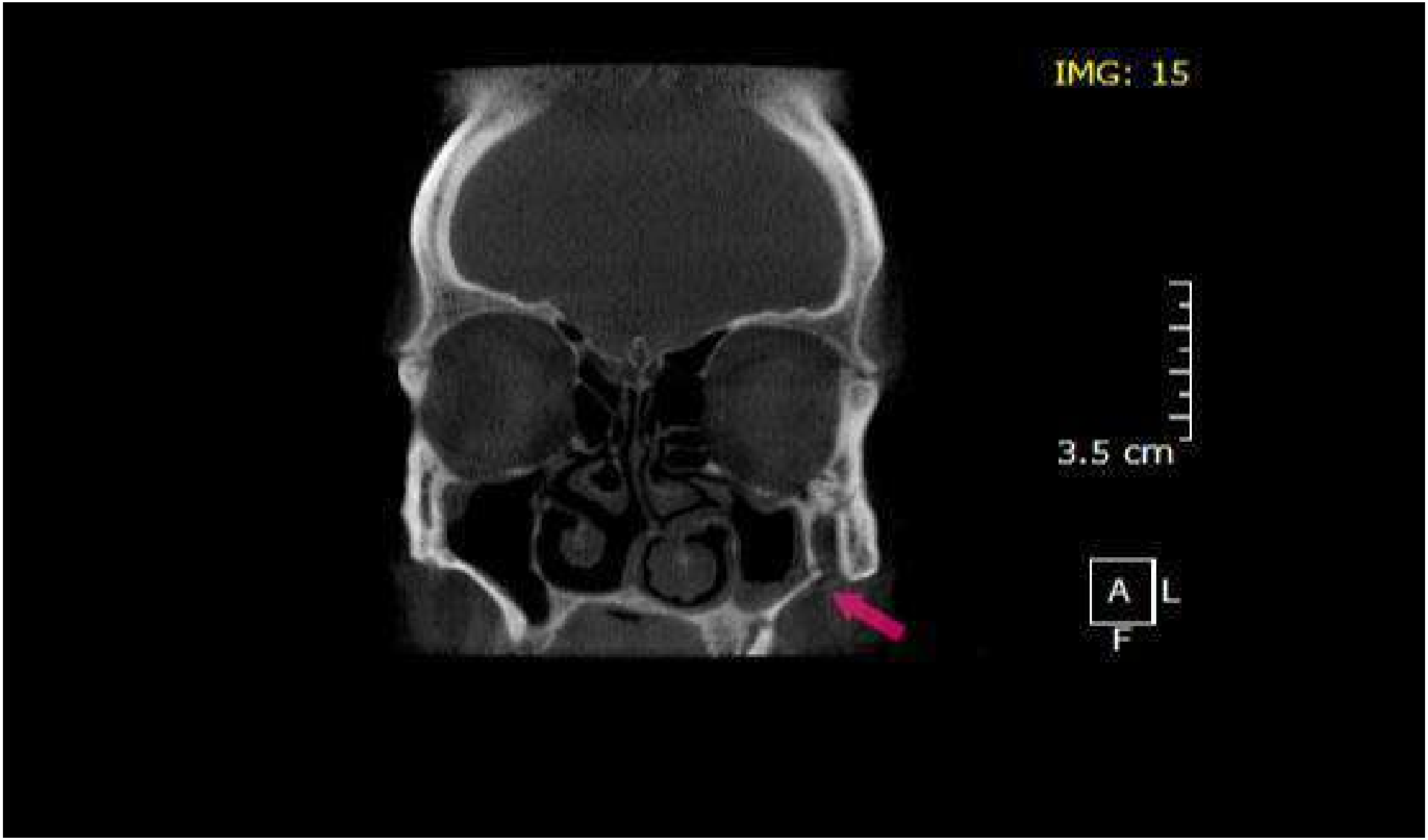


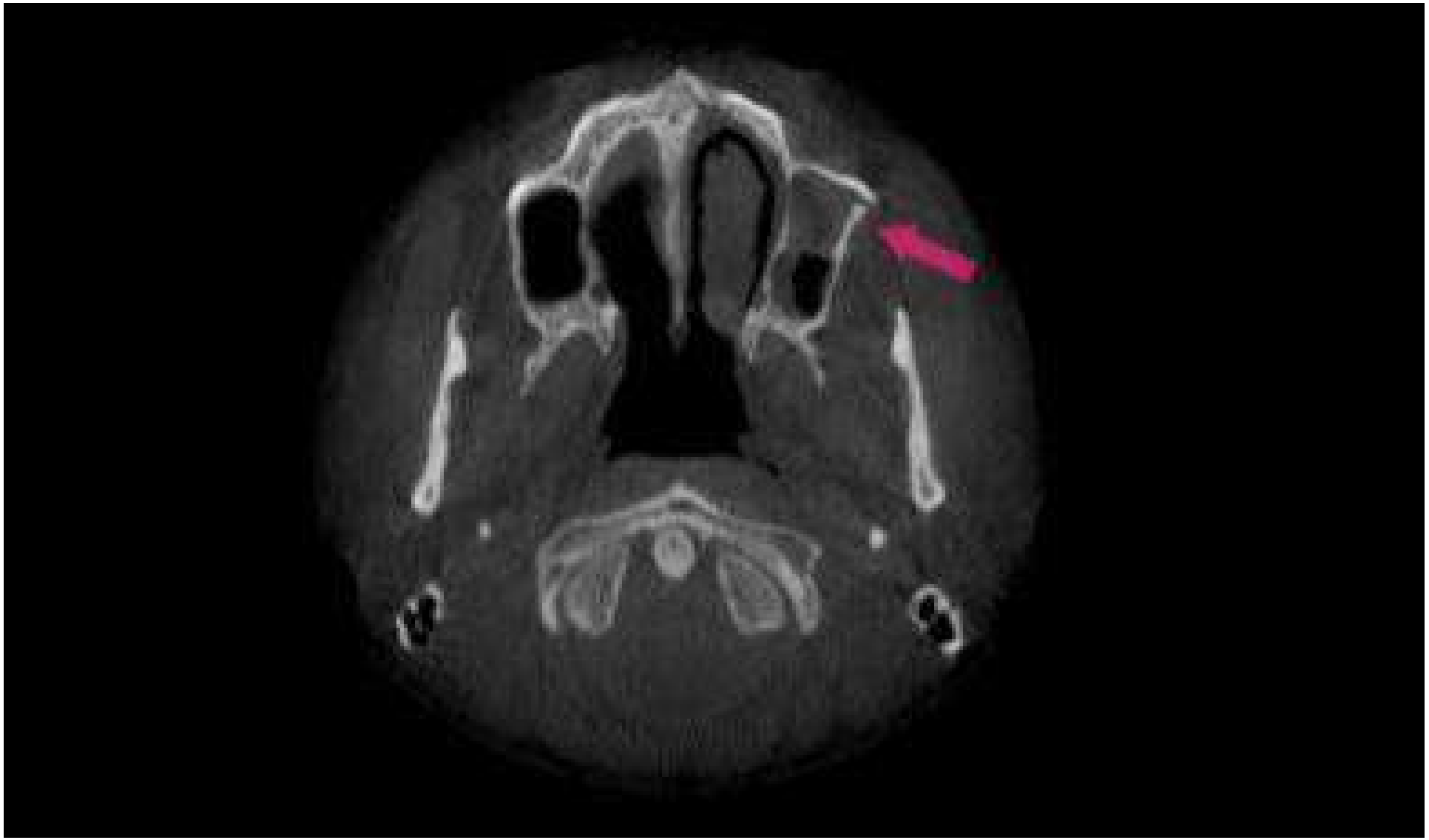
Root Morphology:

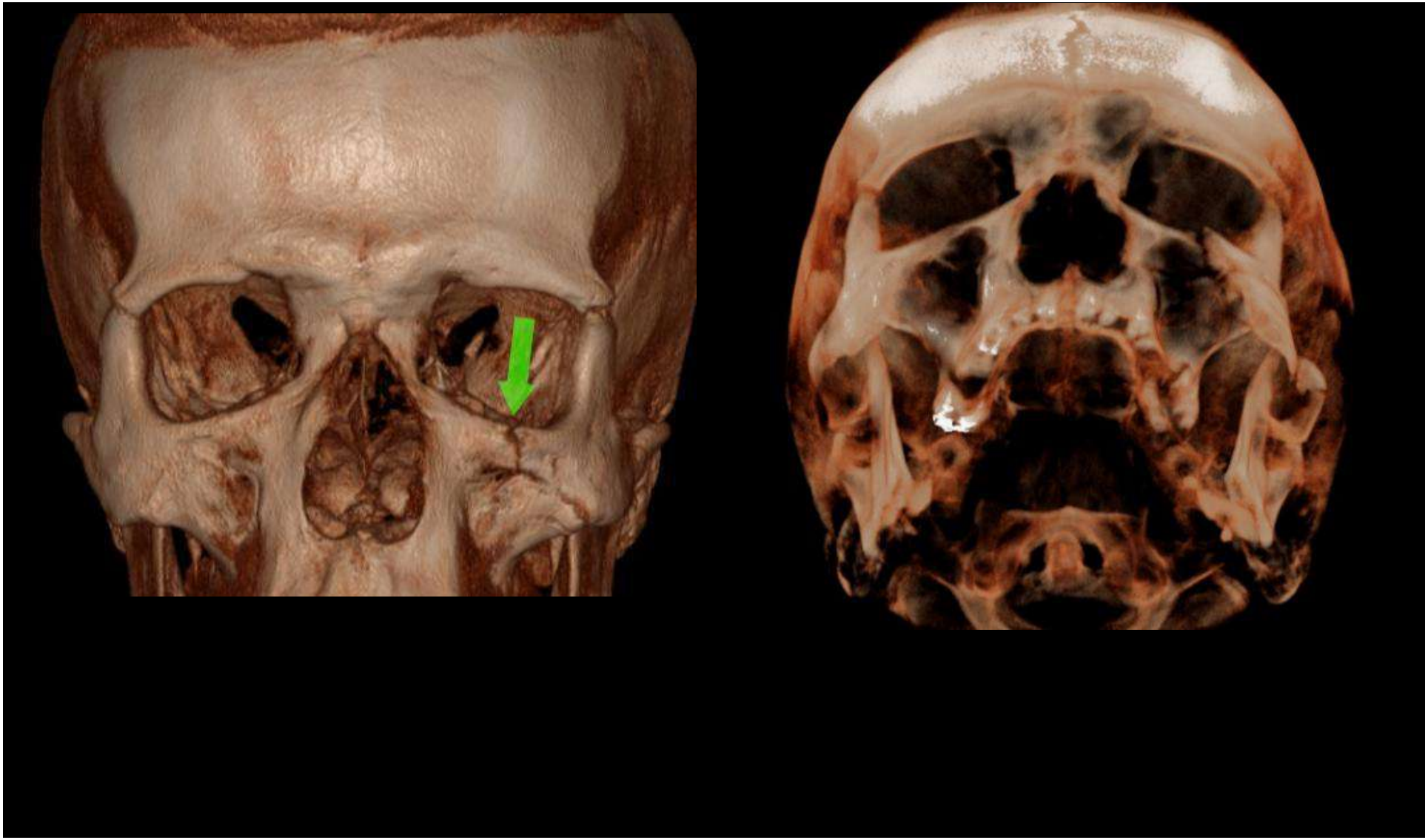


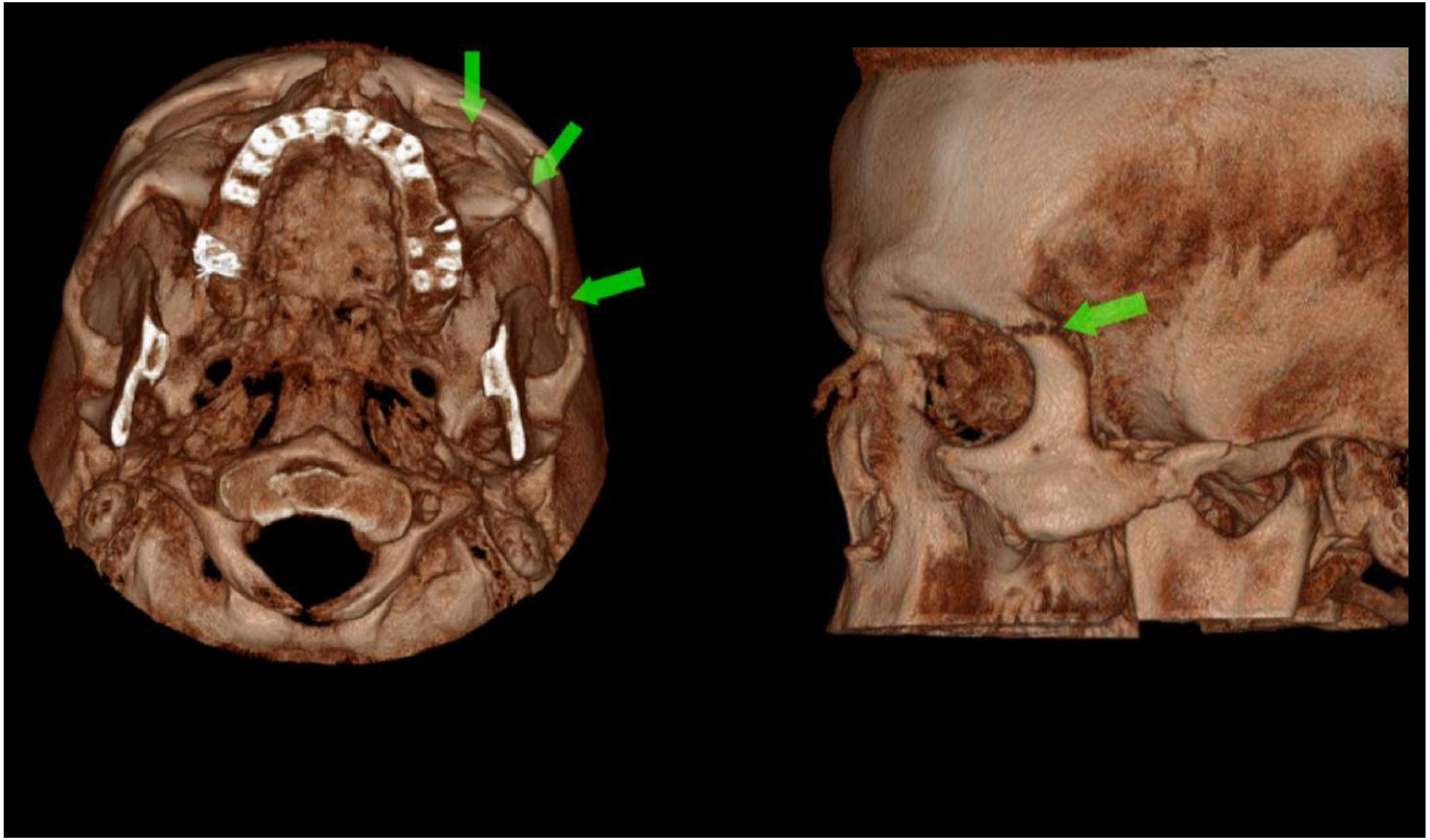
Case 2:Maxillofacial Fracture



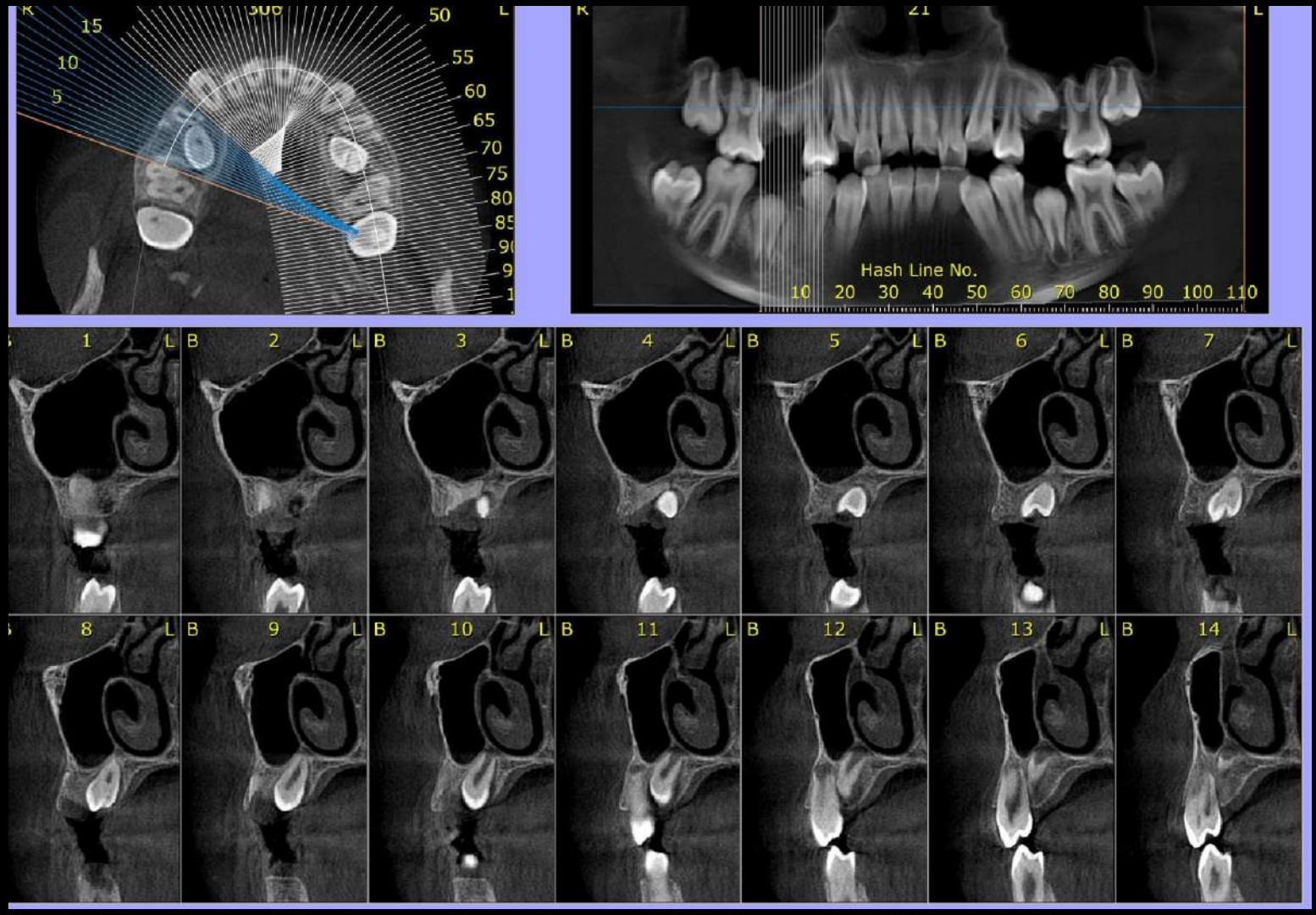

IMG: 15
3.5 cm
A
L
F



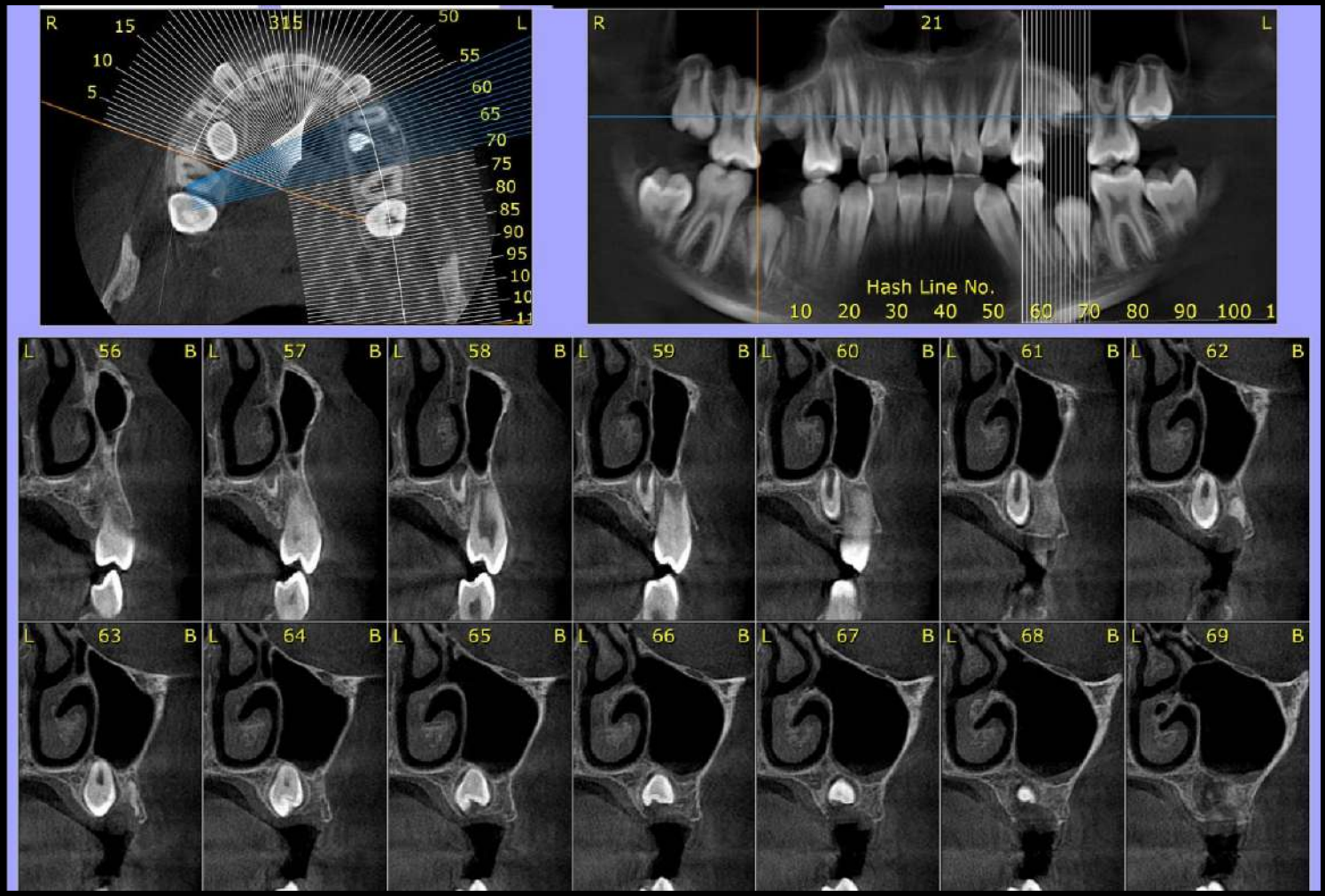


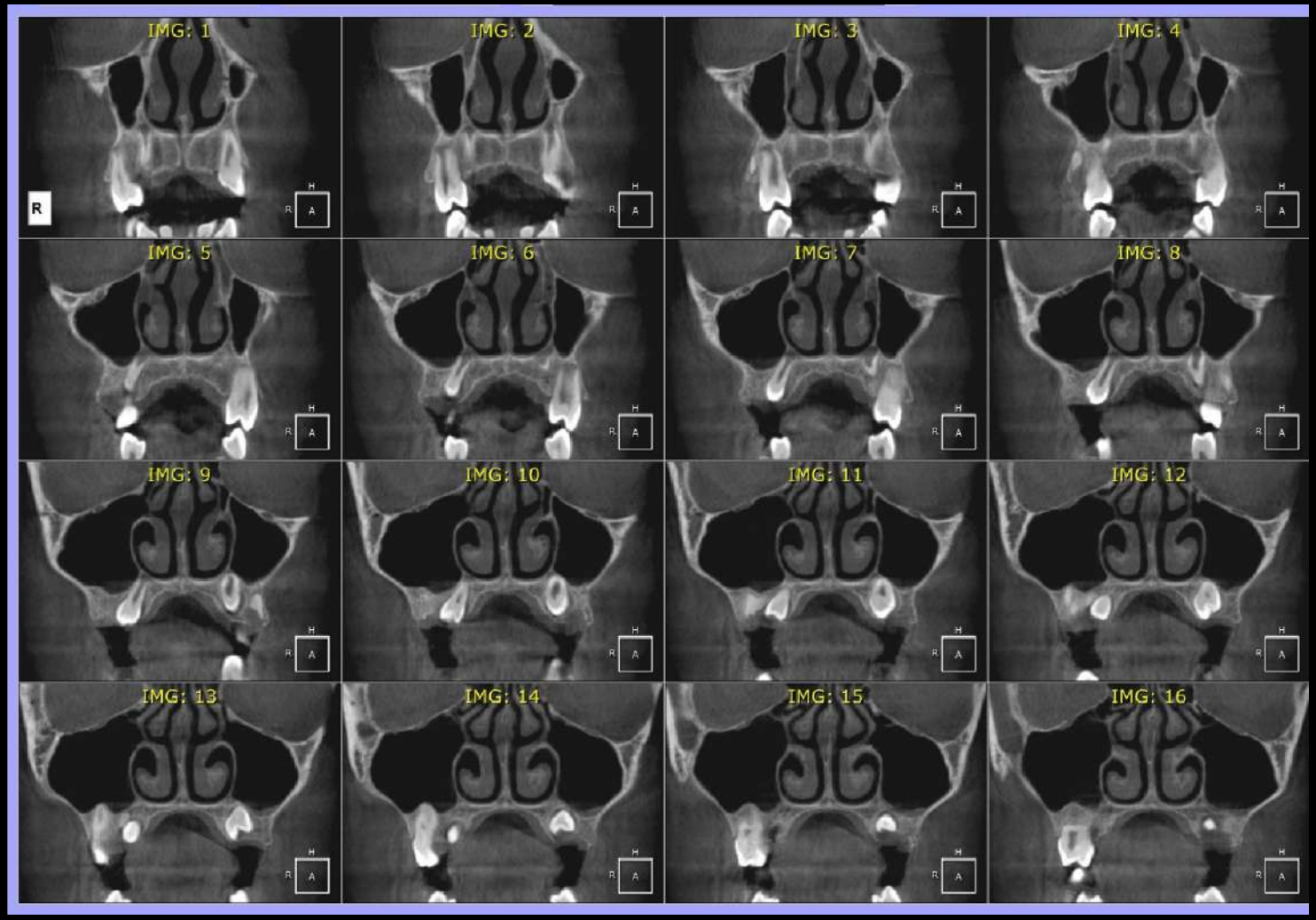


Case 3: Tooth Impaction

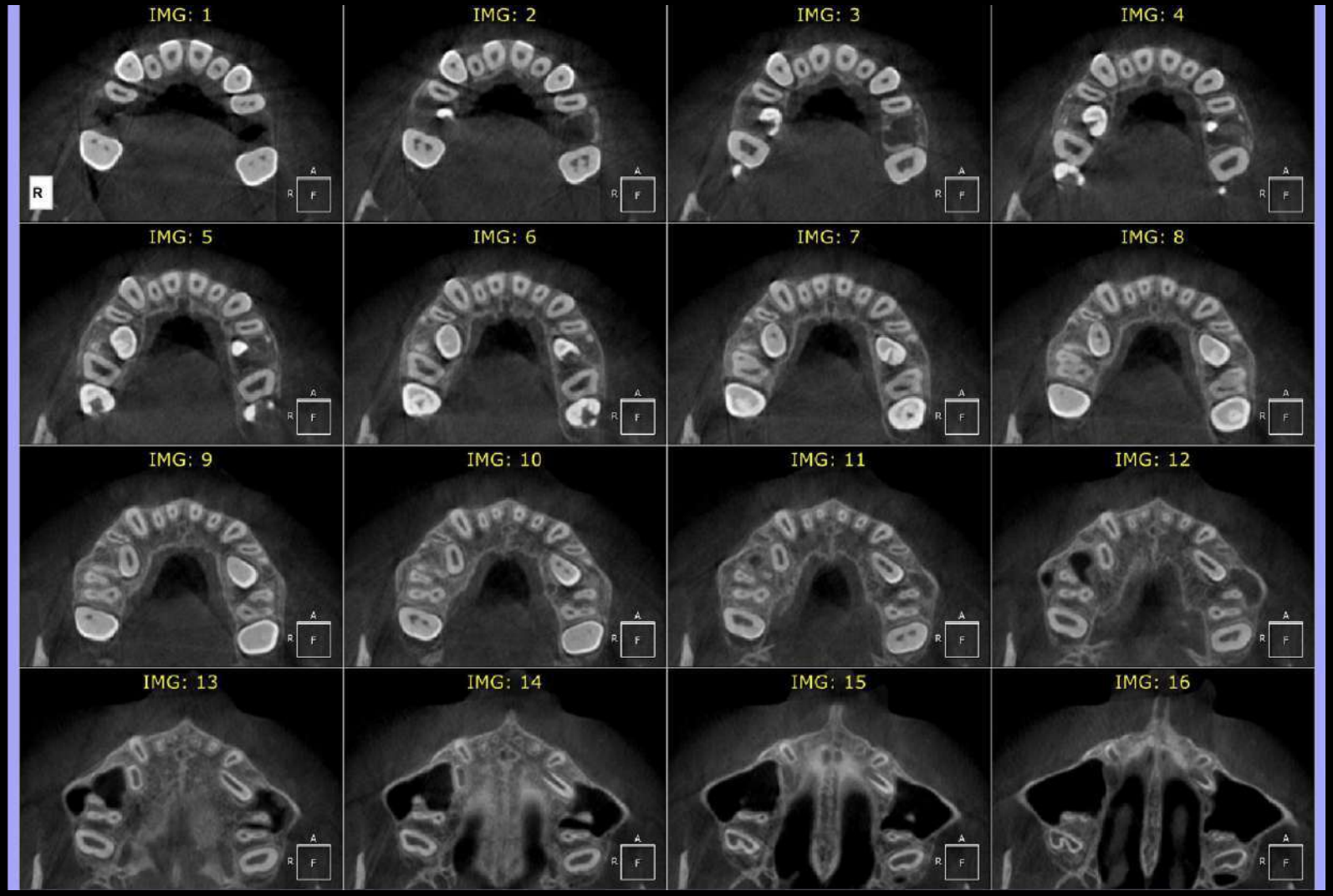


Case 3:

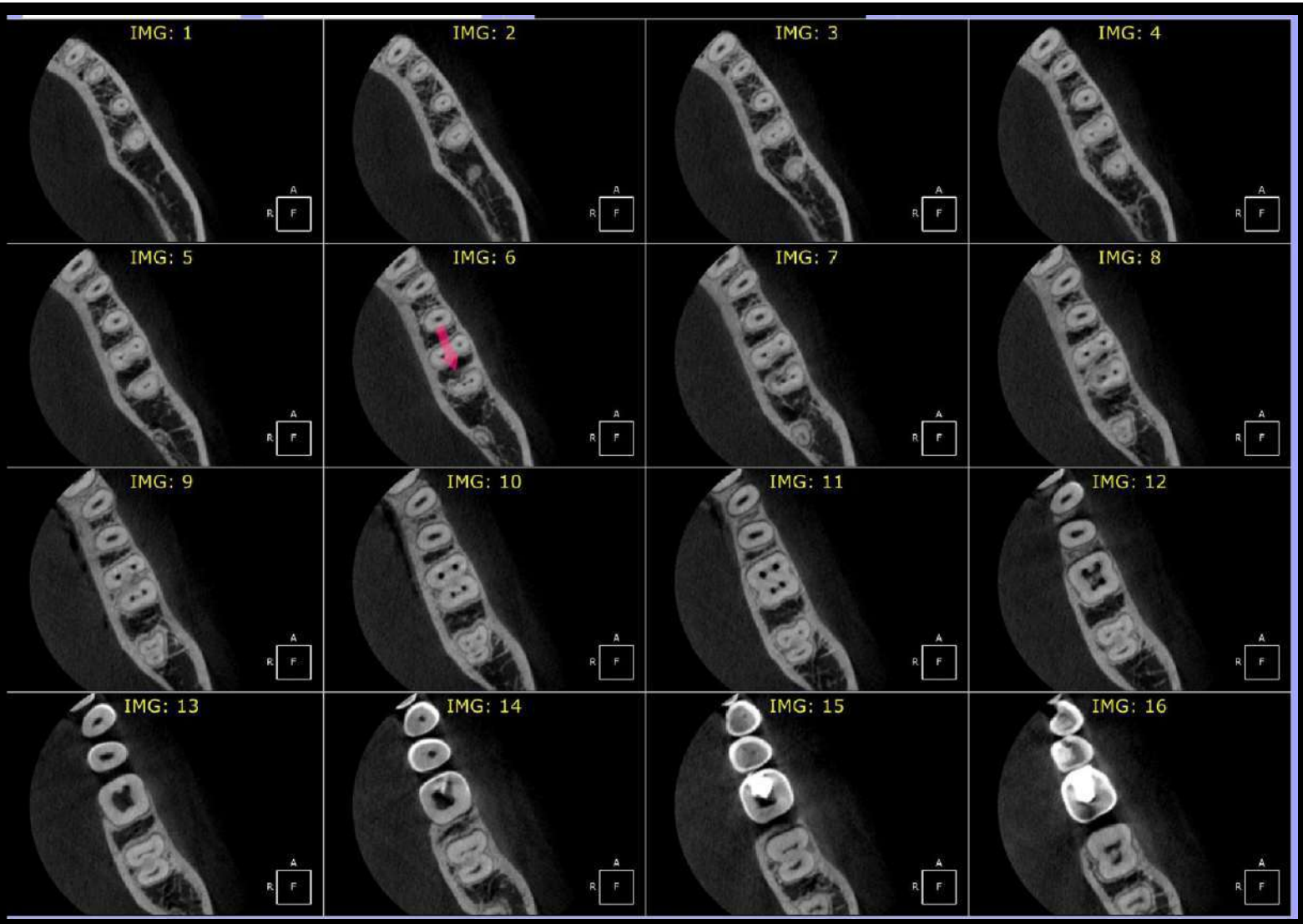

R
L
Hash Line No.
10 20 30 40 50 60 70 80 90 100
56
57
58
59
60
61
62
63
64
65
66
67
68
69

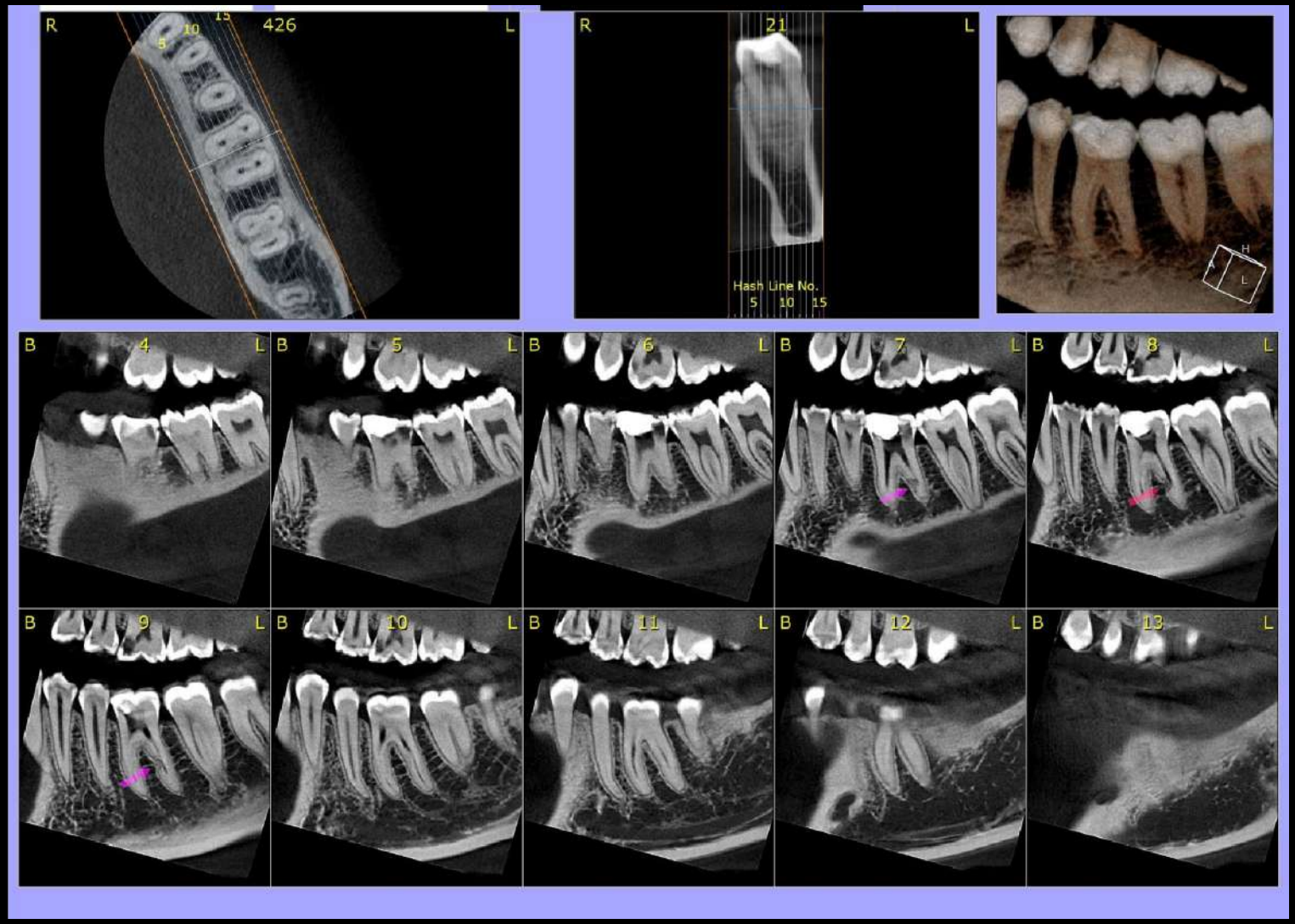

IMG: 1
IMG: 2
IMG: 3
IMG: 4
R
IMG: 5
IMG: 6
IMG: 7
IMG: 8
IMG: 9
IMG: 10
IMG: 11
IMG: 12
IMG: 13
IMG: 14
IMG: 15
IMG: 16

Case 3:

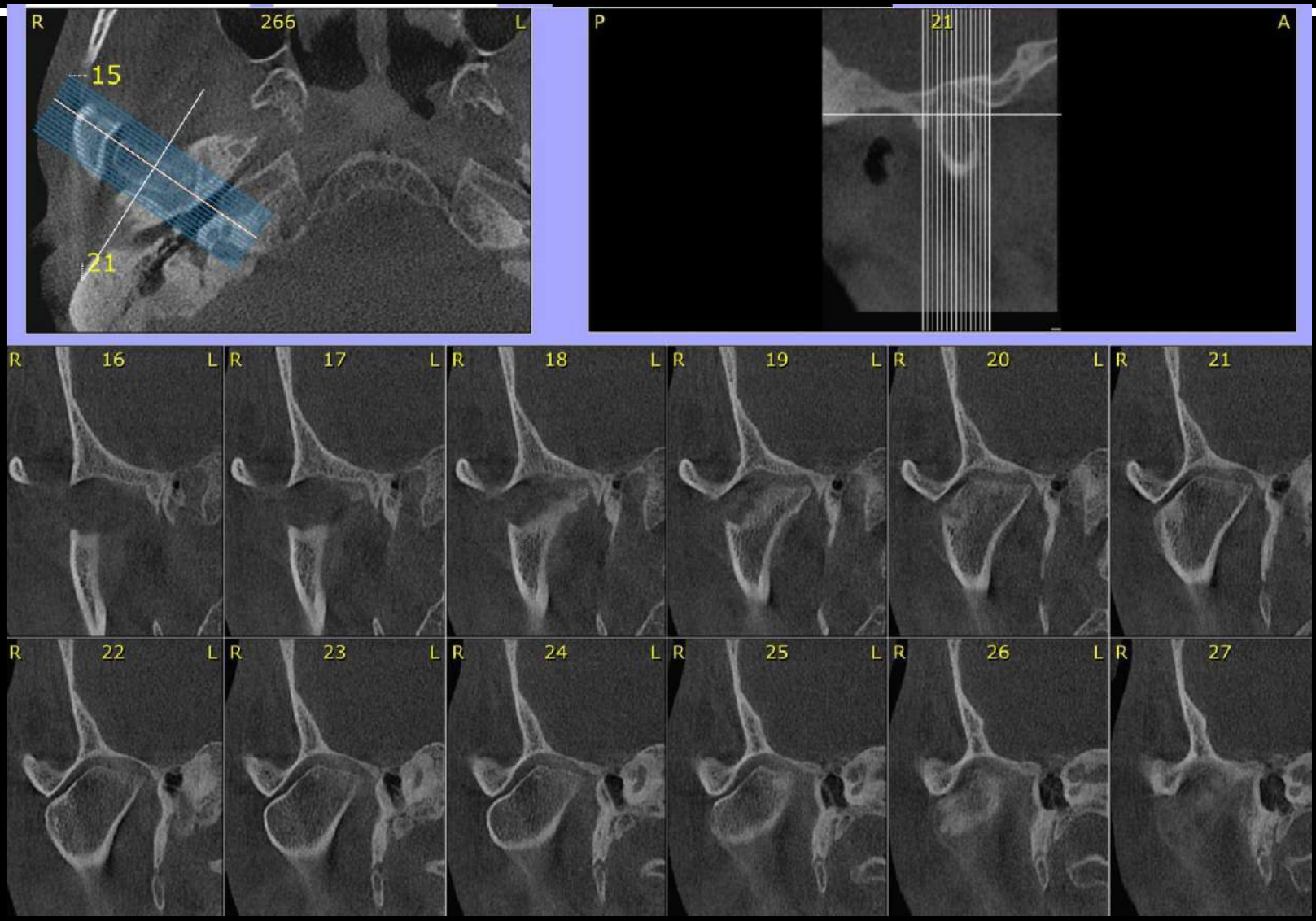

IMG: 1
IMG: 2
IMG: 3
IMG: 4
IMG: 5
IMG: 6
IMG: 7
IMG: 8
IMG: 9
IMG: 10
IMG: 11
IMG: 12
IMG: 13
IMG: 14
IMG: 15
IMG: 16
R

Case 4: Root Resorption

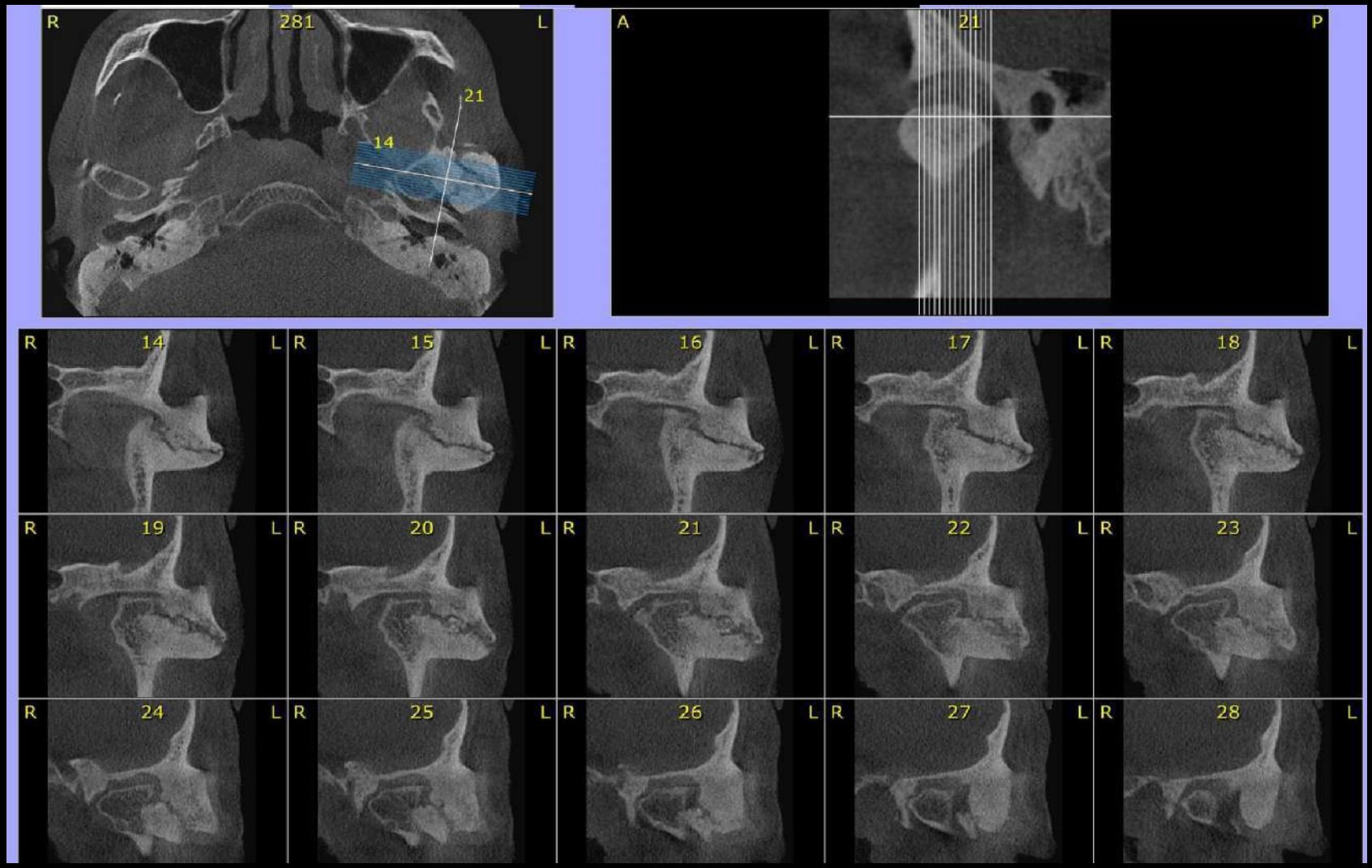

IMG: 1
IMG: 2
IMG: 3
IMG: 4
IMG: 5
IMG: 6
IMG: 7
IMG: 8
IMG: 9
IMG: 10
IMG: 11
IMG: 12
IMG: 13
IMG: 14
IMG: 15
IMG: 16

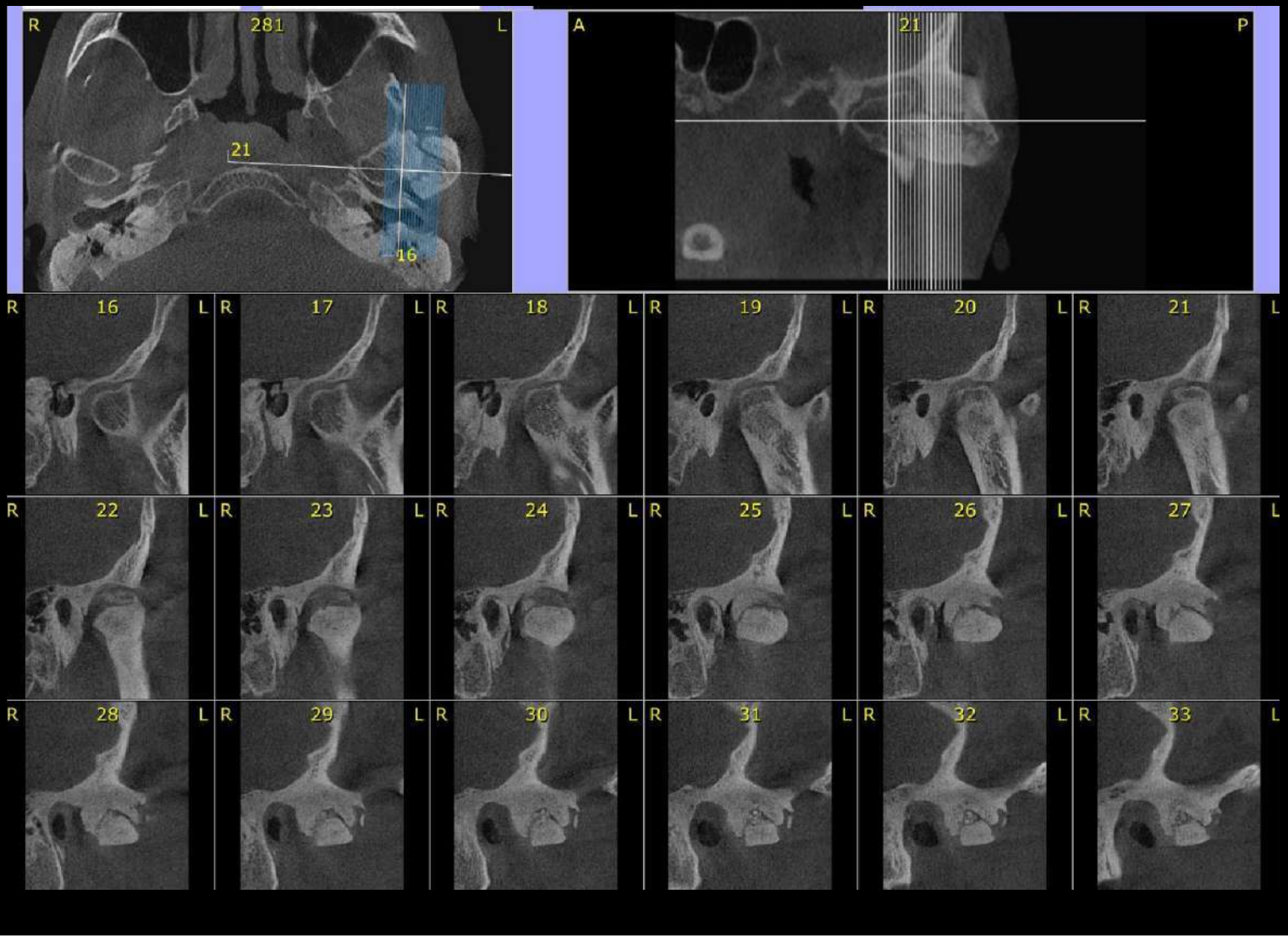

R
426
L
R
21
L
Hash Line No.
5 10 15
B 4 L
B 5 L
B 6 L
B 7 L
B 8 L
B 9 L
B 10 L
B 11 L
B 12 L
B 13 L

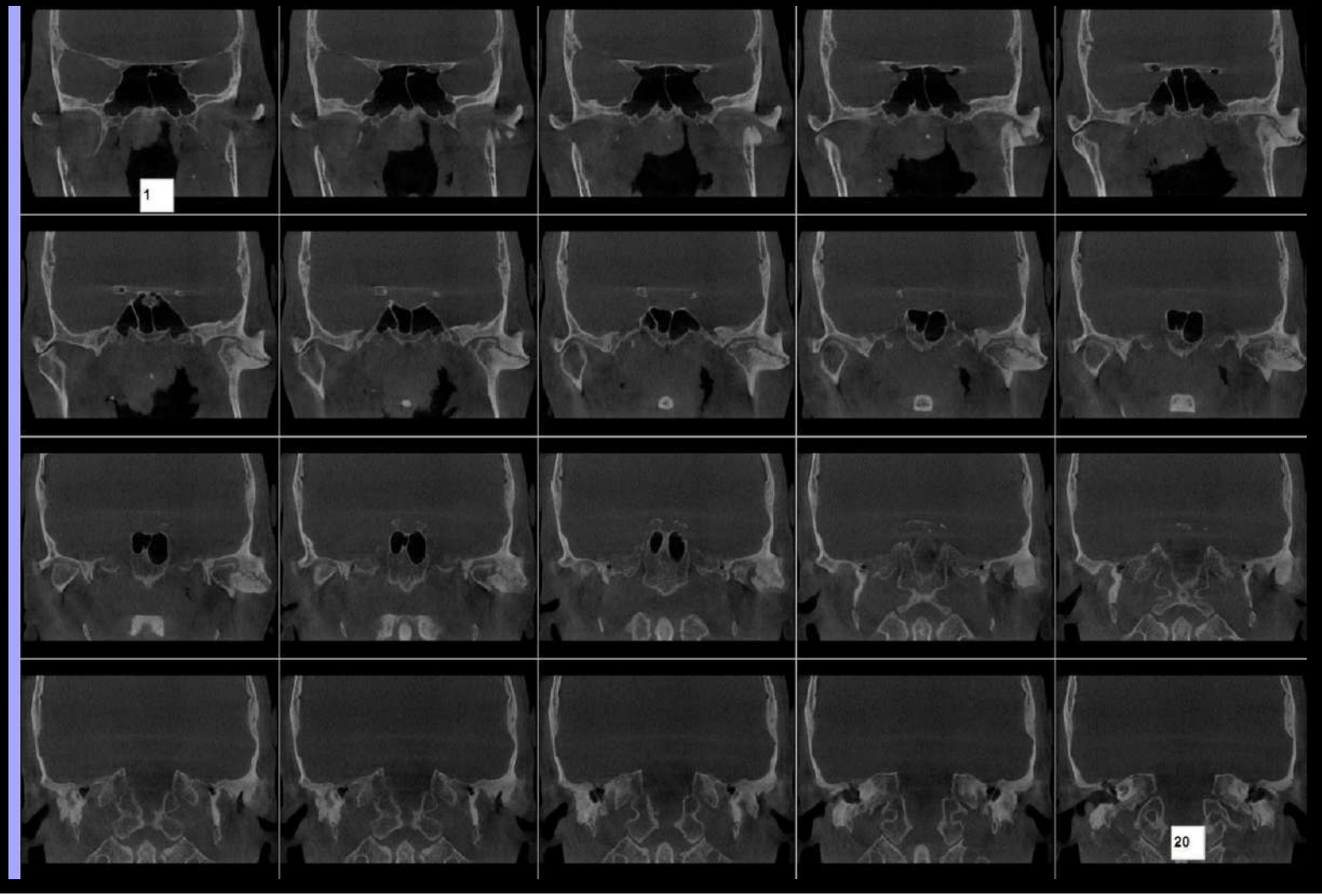
Case 5: TMJ ankylosis

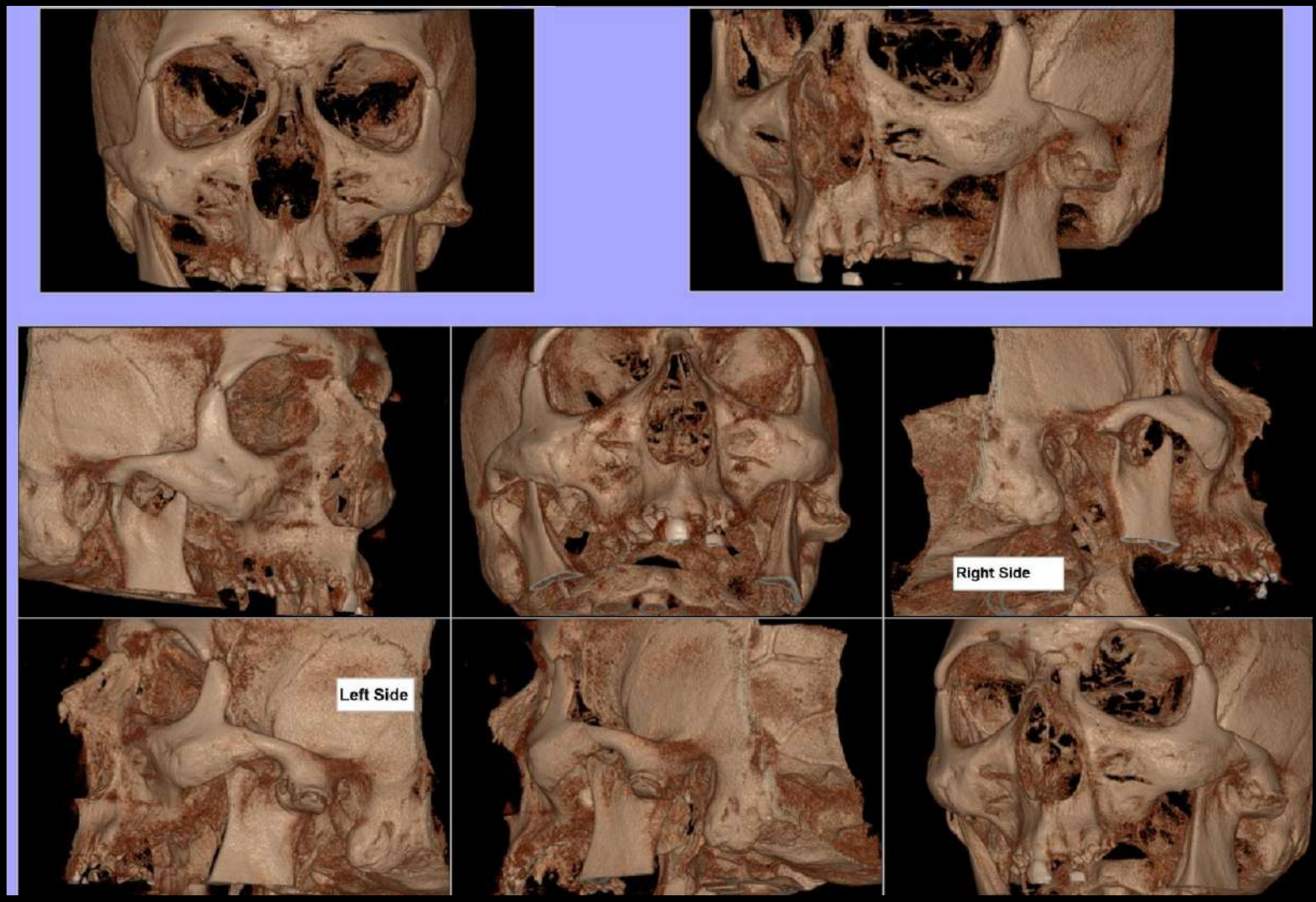


Case 5: TMJ ankylosis

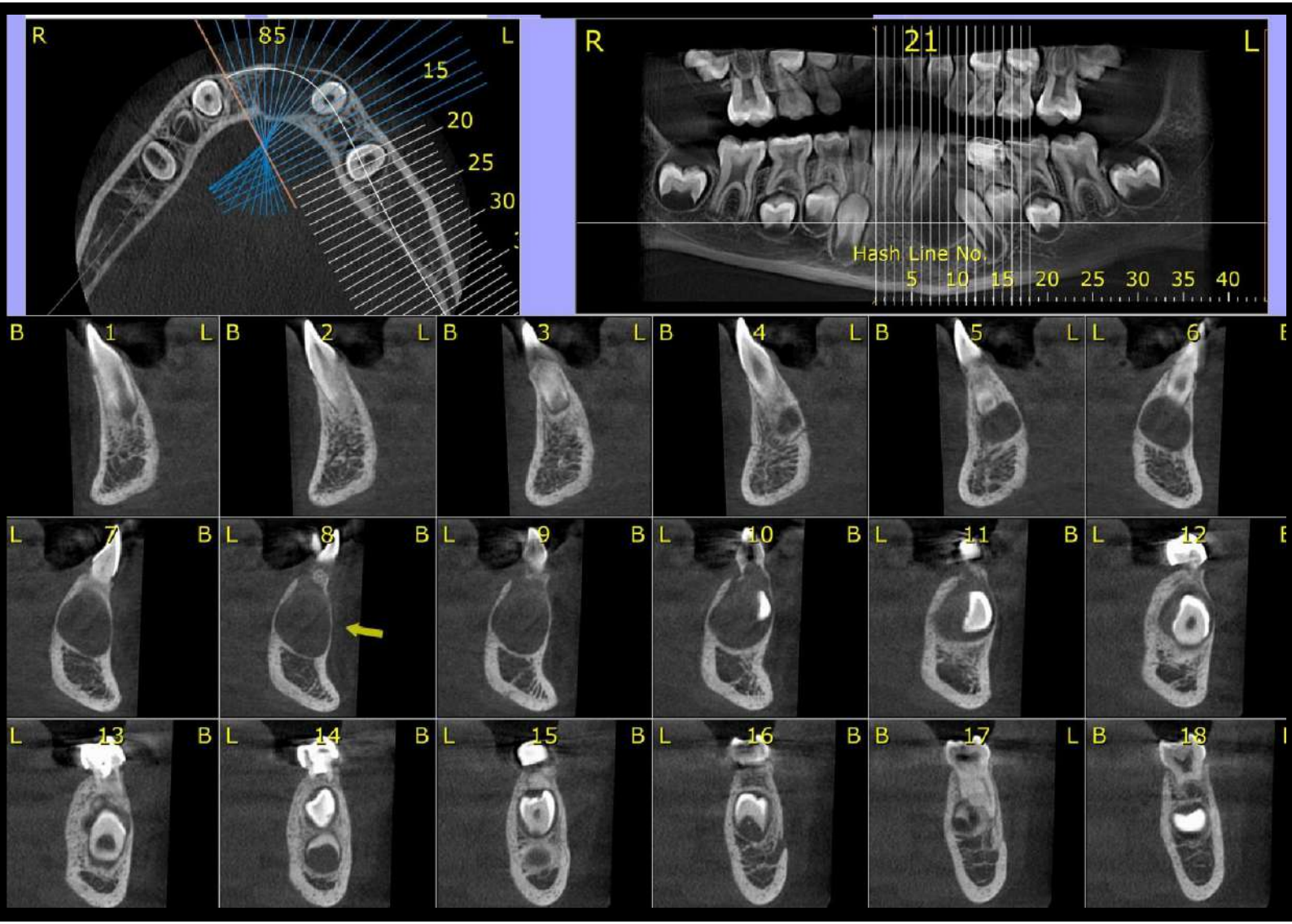



R
281
L
21
16
A
21
P
R 16 L
R 17 L
R 18 L
R 19 L
R 20 L
R 21 L
R 22 L
R 23 L
R 24 L
R 25 L
R 26 L
R 27 L
R 28 L
R 29 L
R 30 L
R 31 L
R 32 L
R 33 L

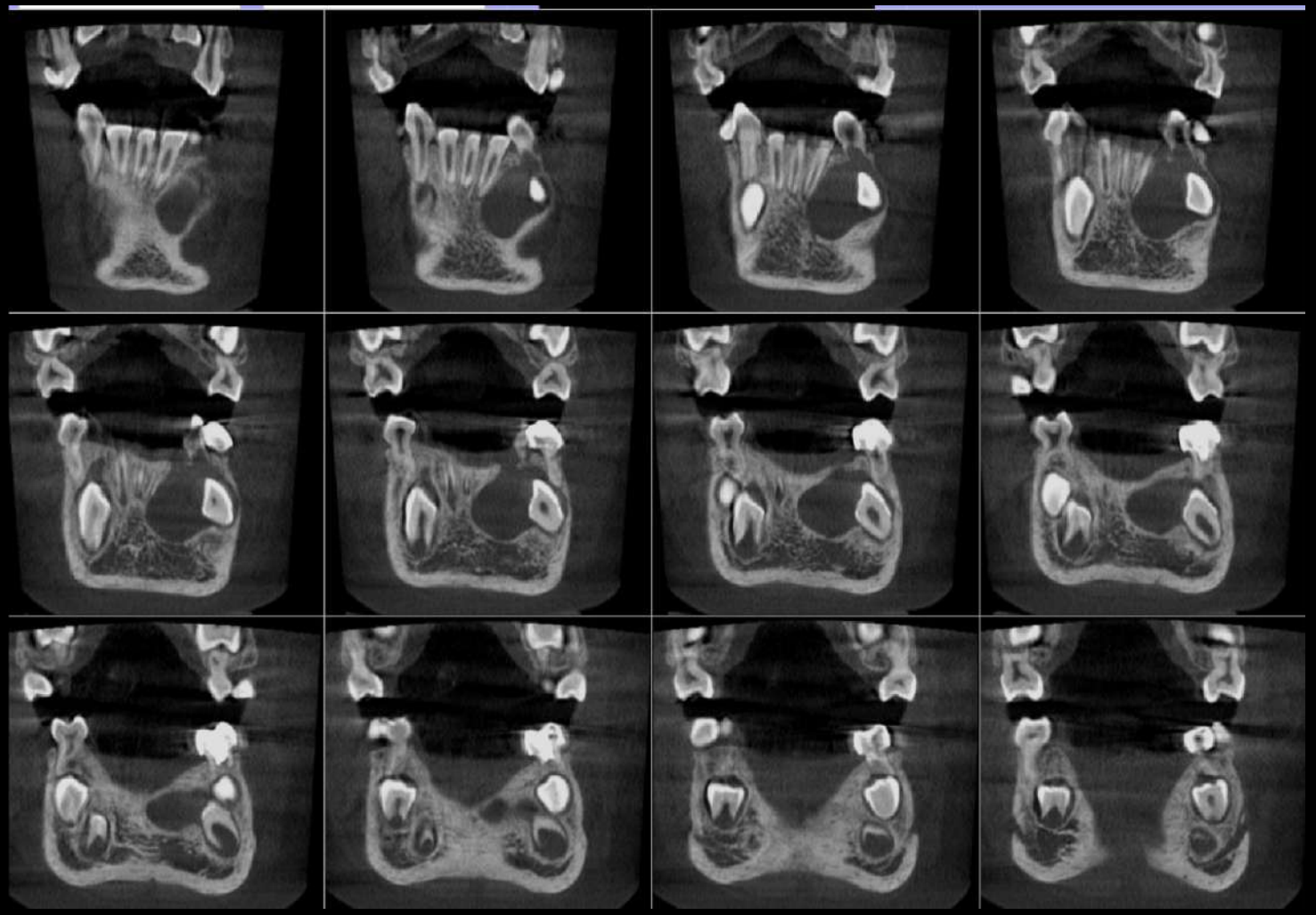

1
20

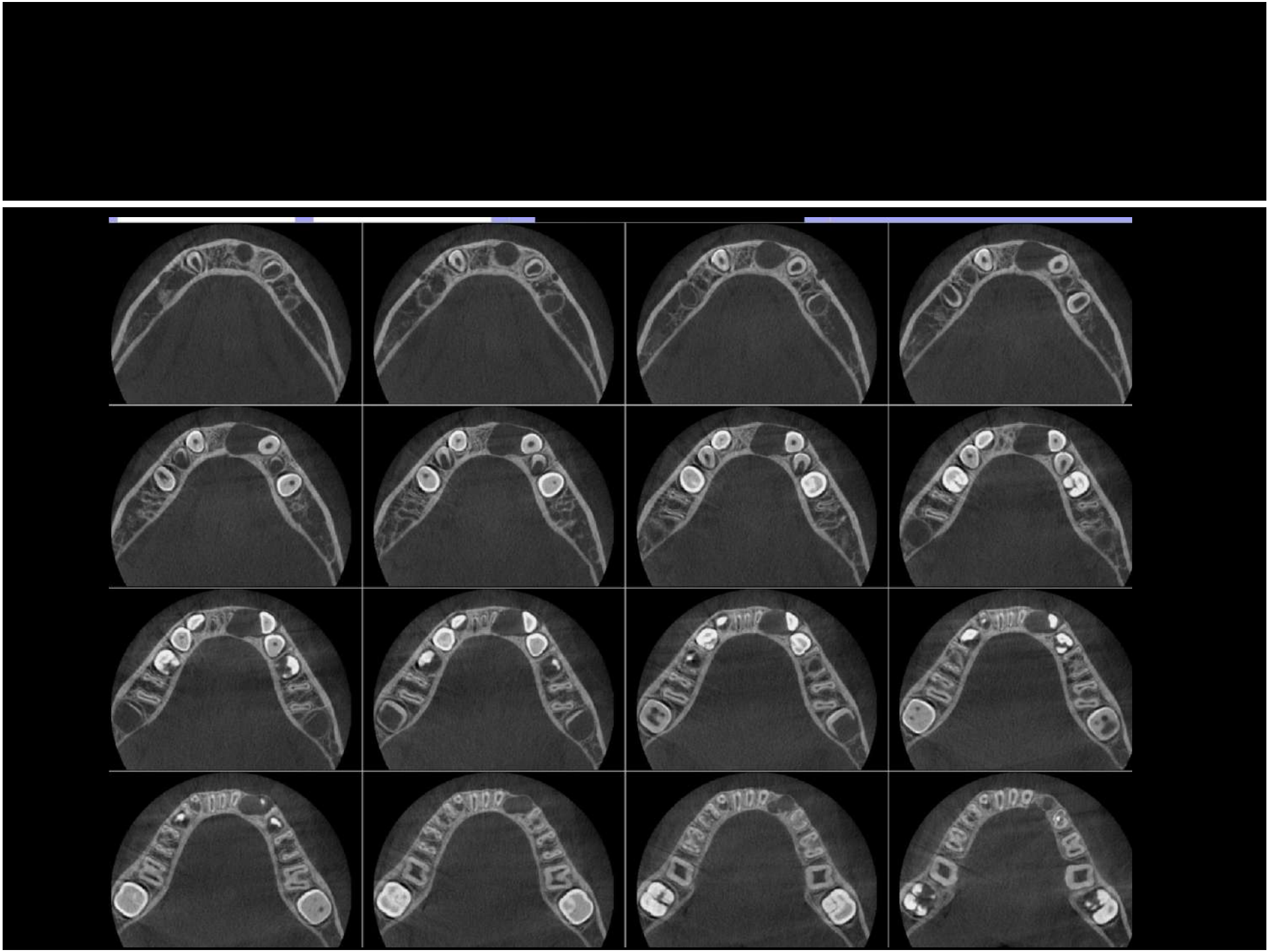

Right Side
Left Side

Case 6:Lesion



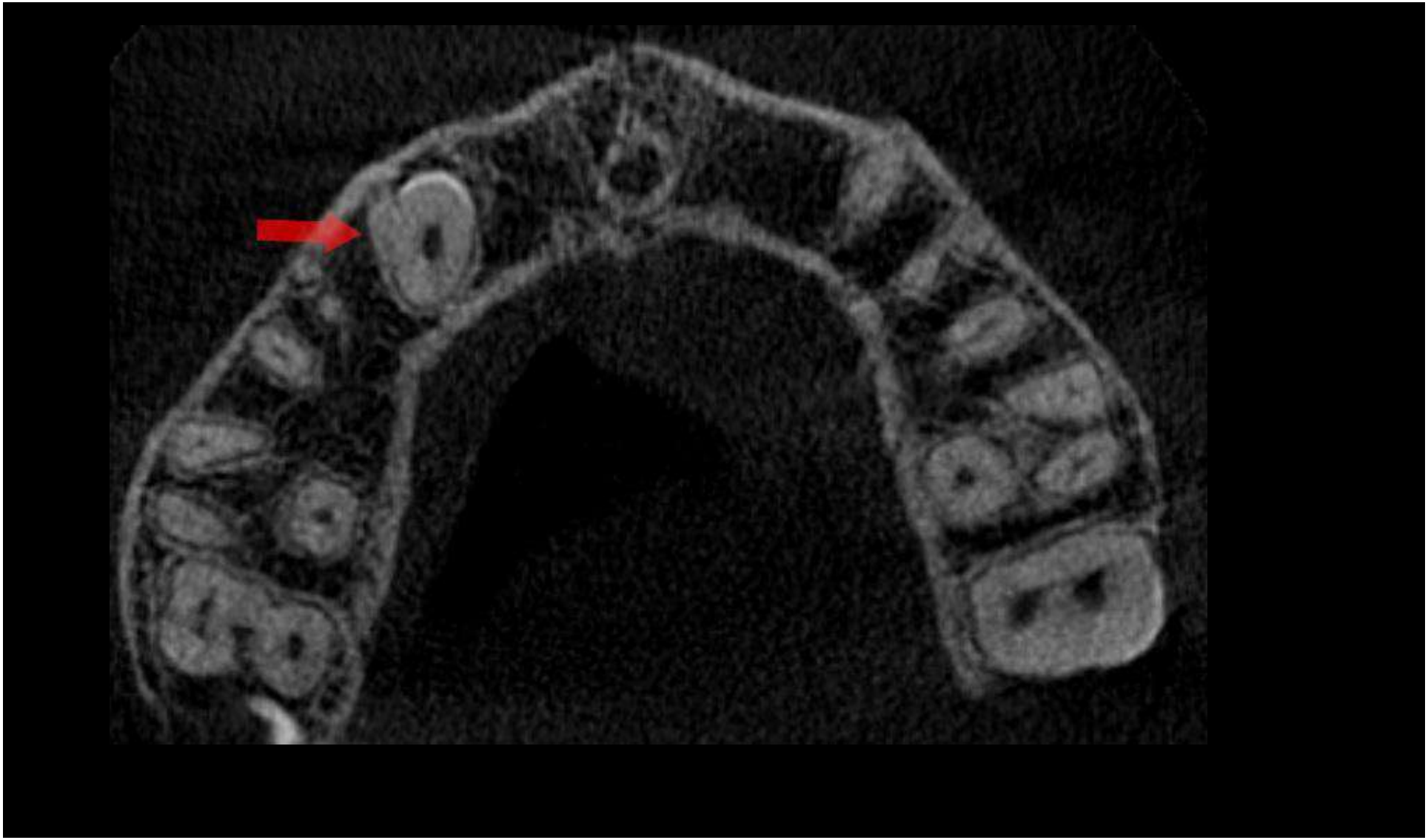
Case 6:Lesion

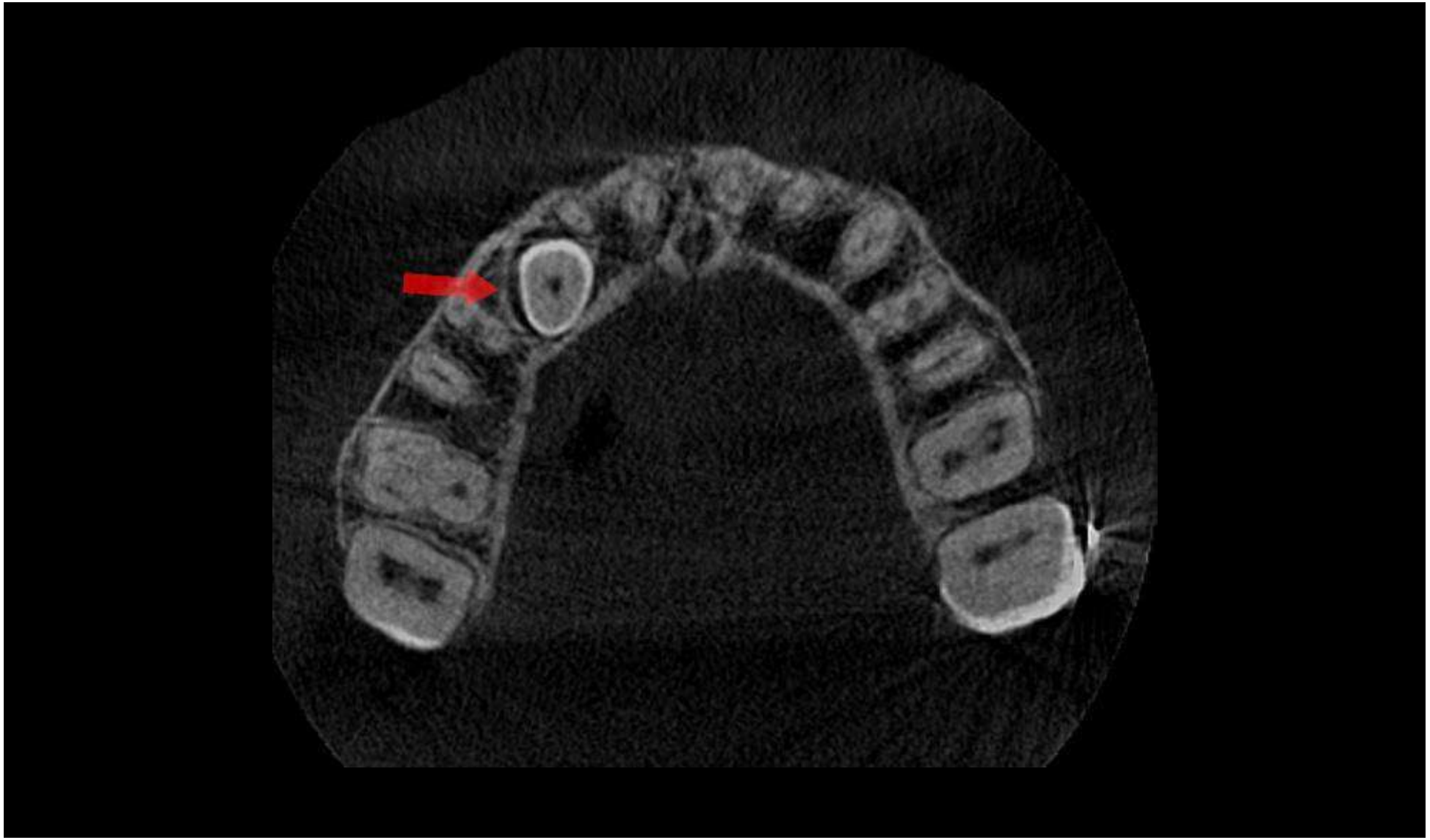




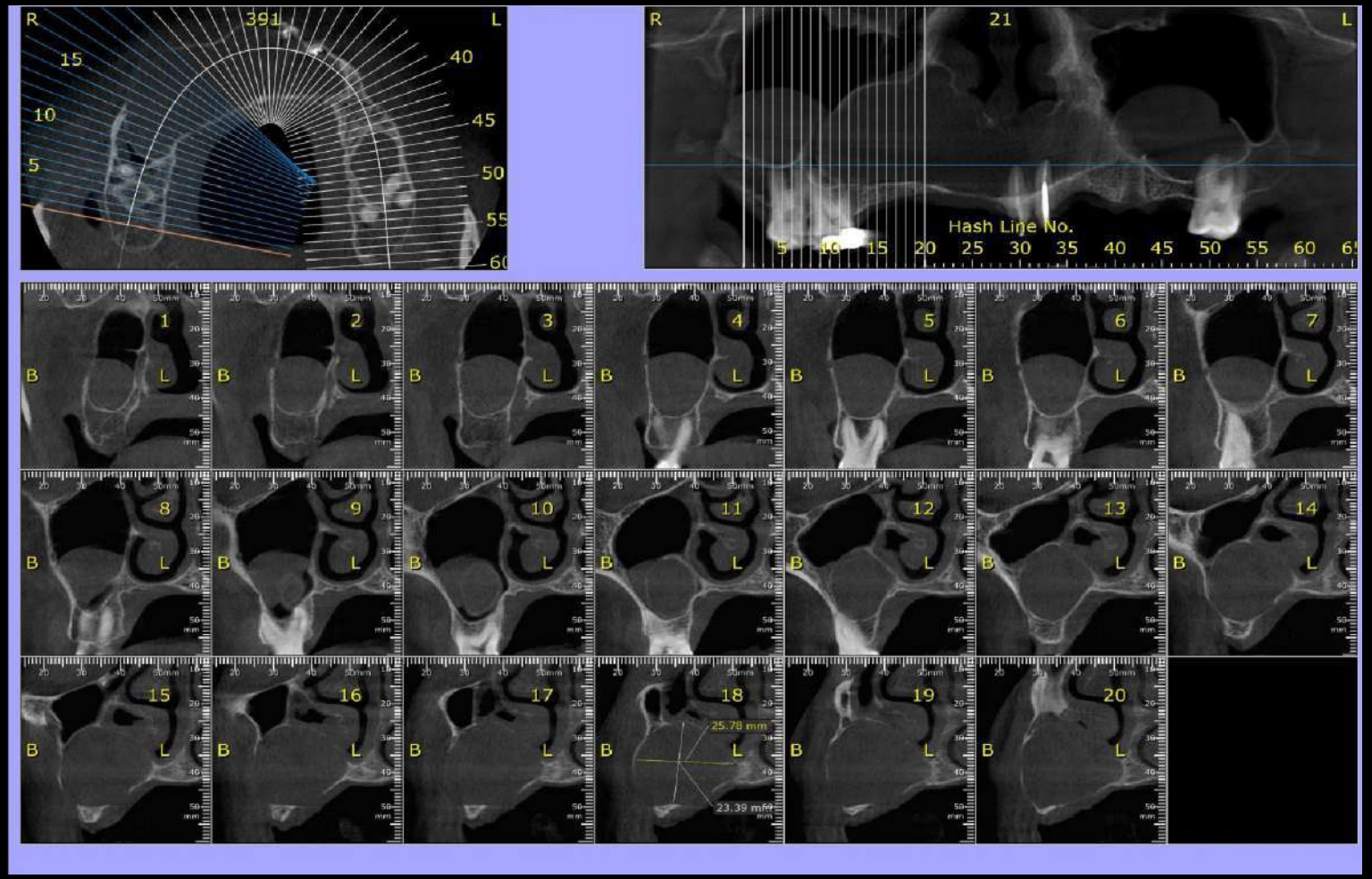
Case 7: Foreign Body

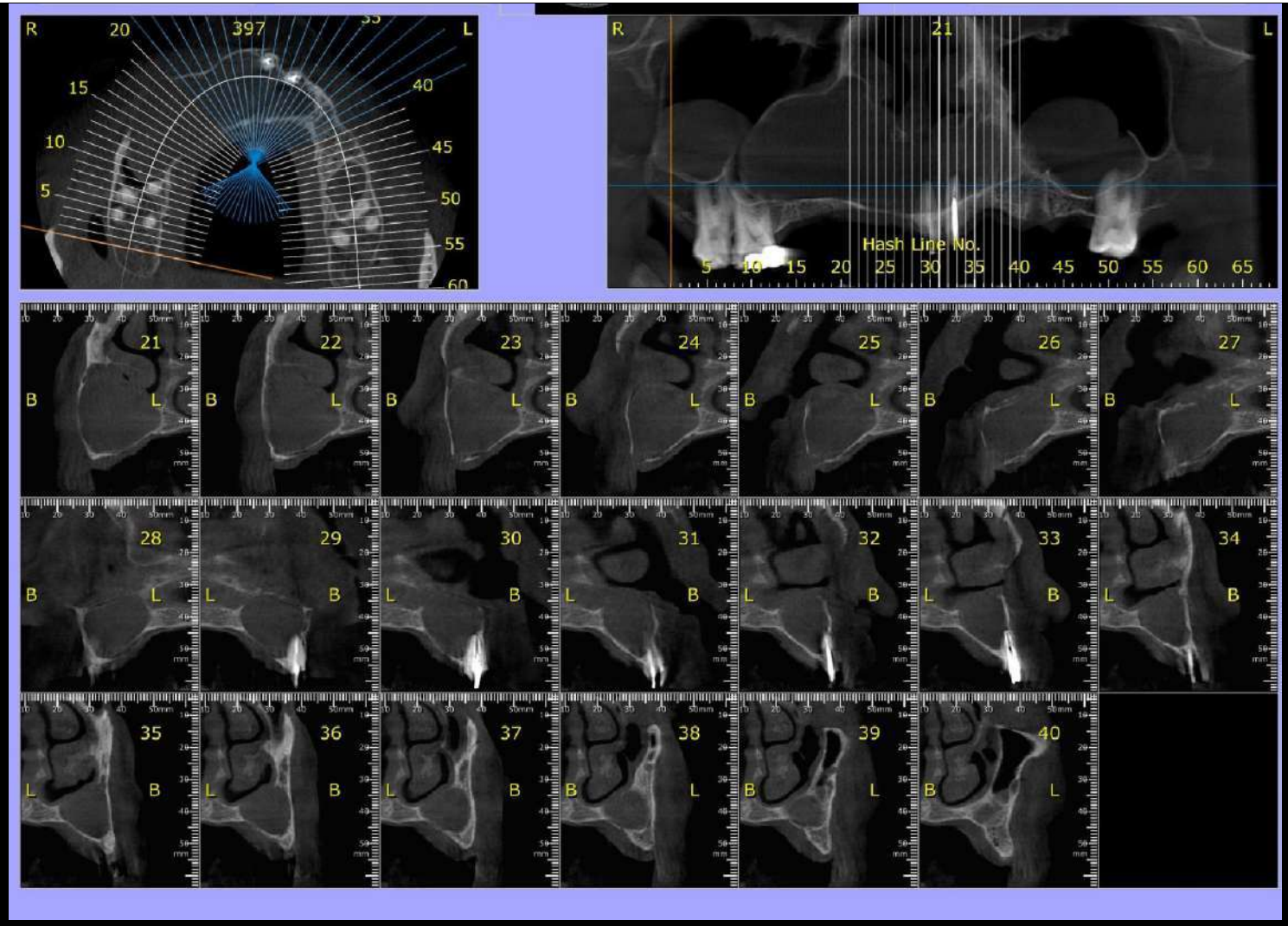
Case 8: Canine Ankylosis

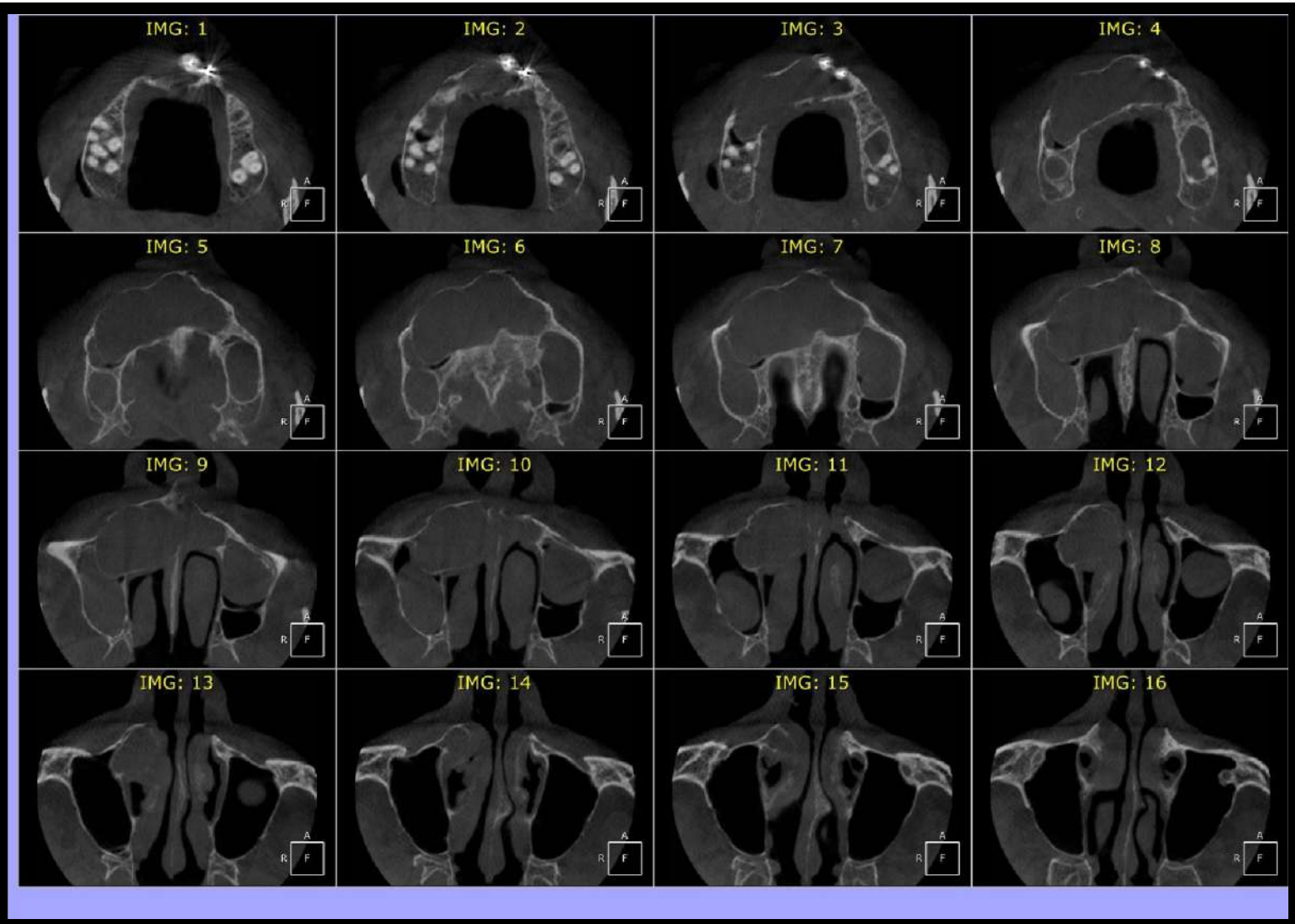




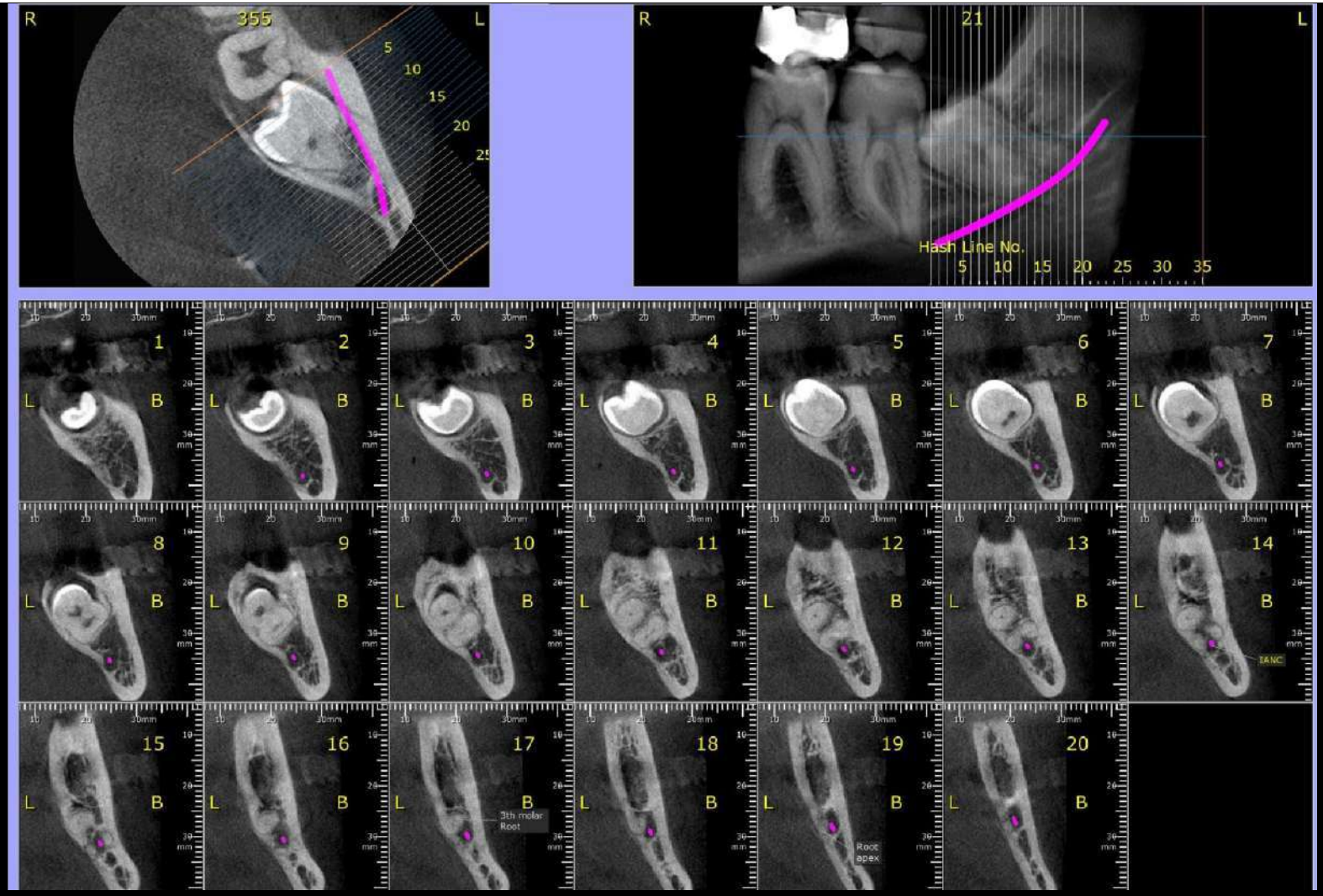
Case 9:Lesion

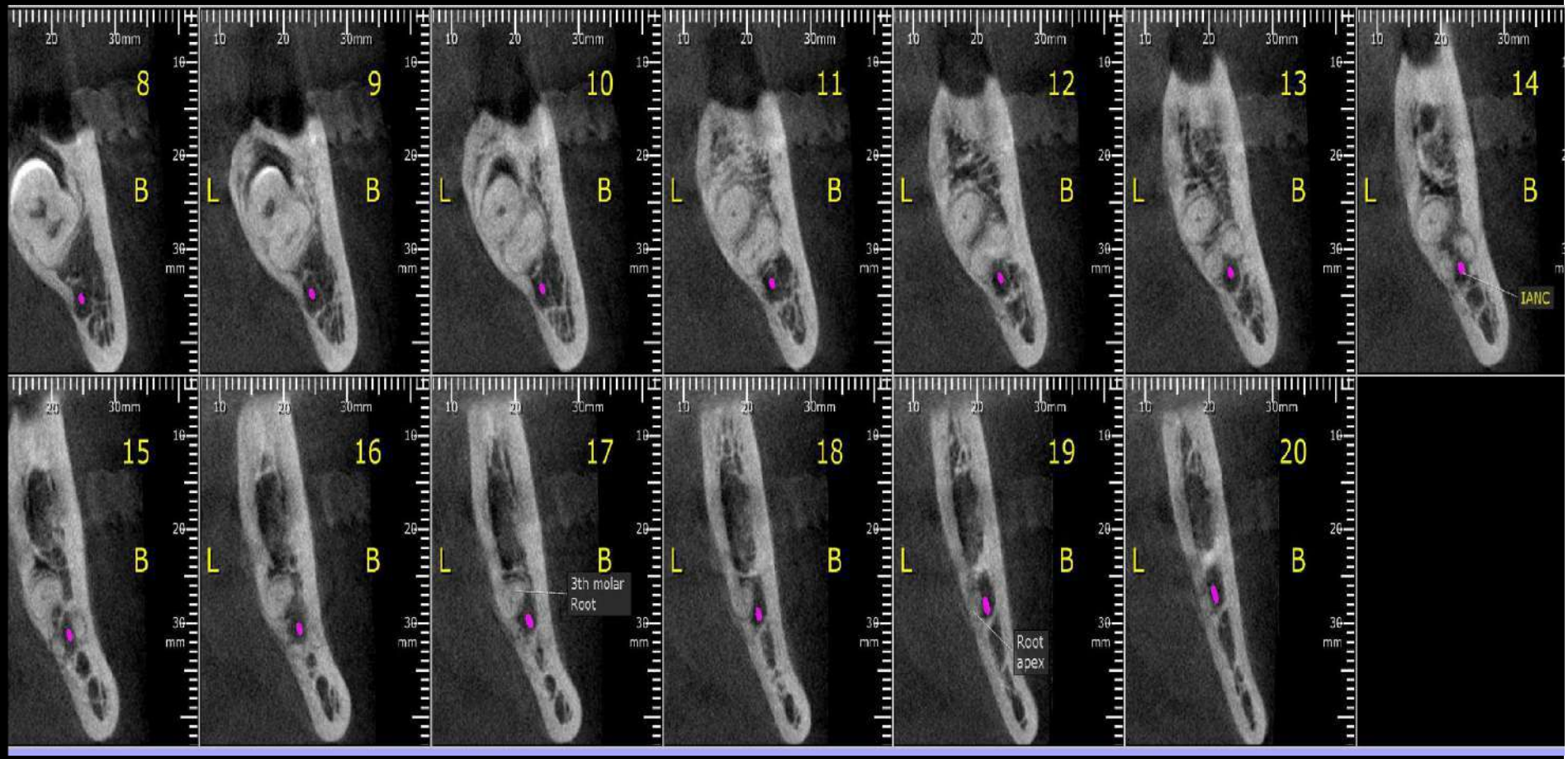



R
L
Hash Line No.
5 10 15 20 25 30 35 40 45 50 55 60 65
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
B
L

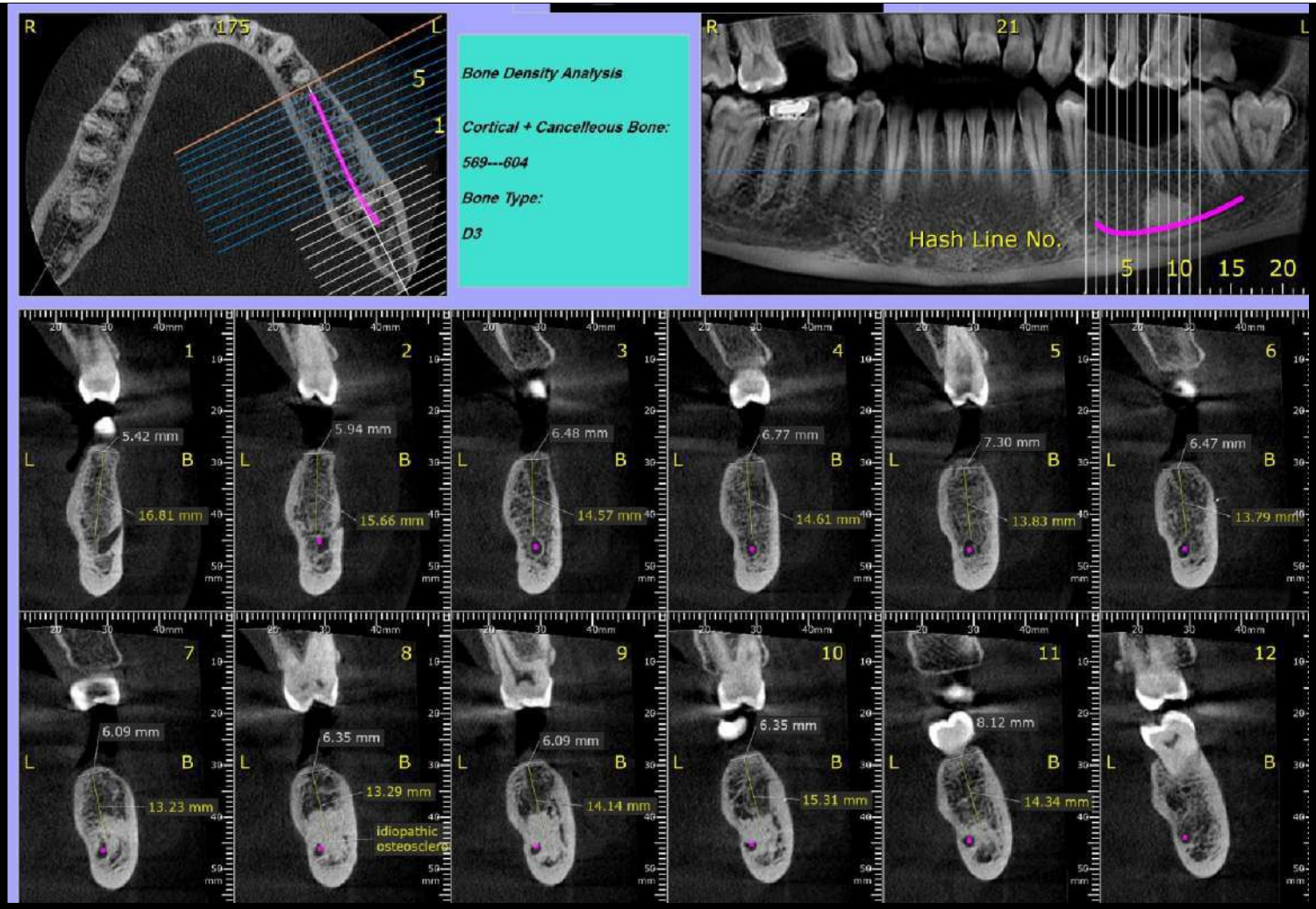

IMG: 1
IMG: 2
IMG: 3
IMG: 4
IMG: 5
IMG: 6
IMG: 7
IMG: 8
IMG: 9
IMG: 10
IMG: 11
IMG: 12
IMG: 13
IMG: 14
IMG: 15
IMG: 16

Case 10: 3th Molar impaction

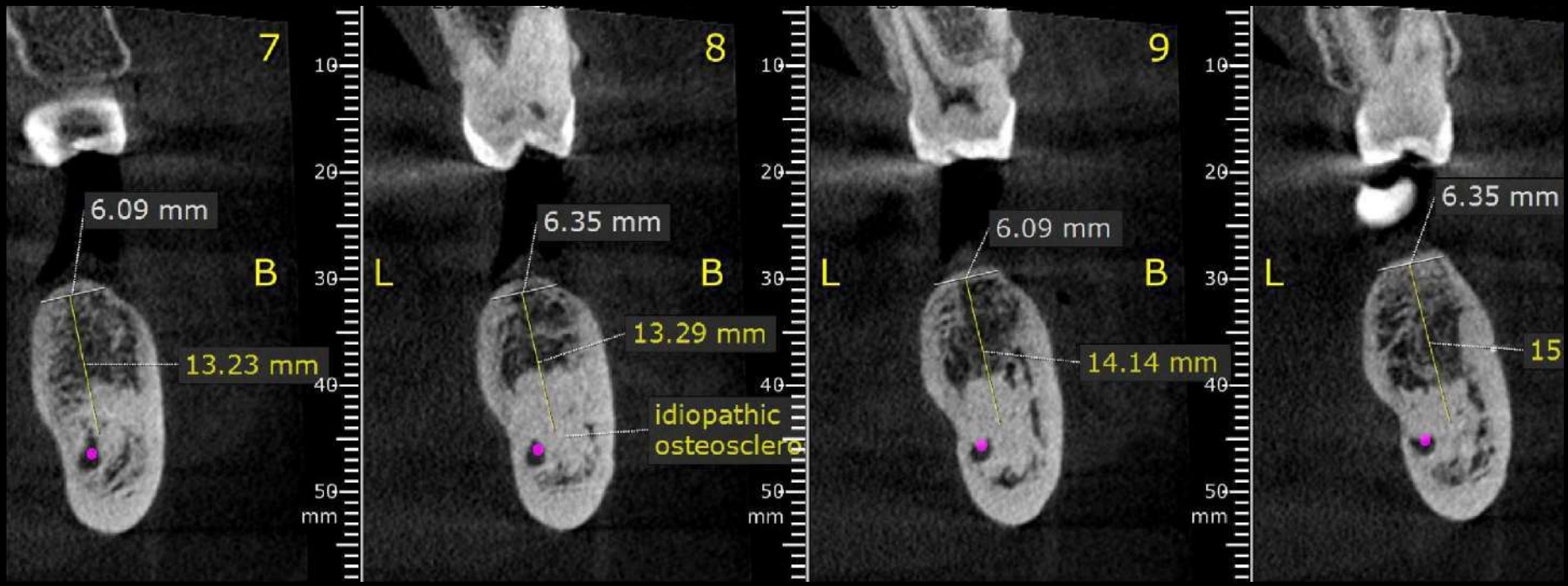



8
9
10
11
12
13
14
IANC
15
16
17
3th molar
Root
18
19
Root
apex
20

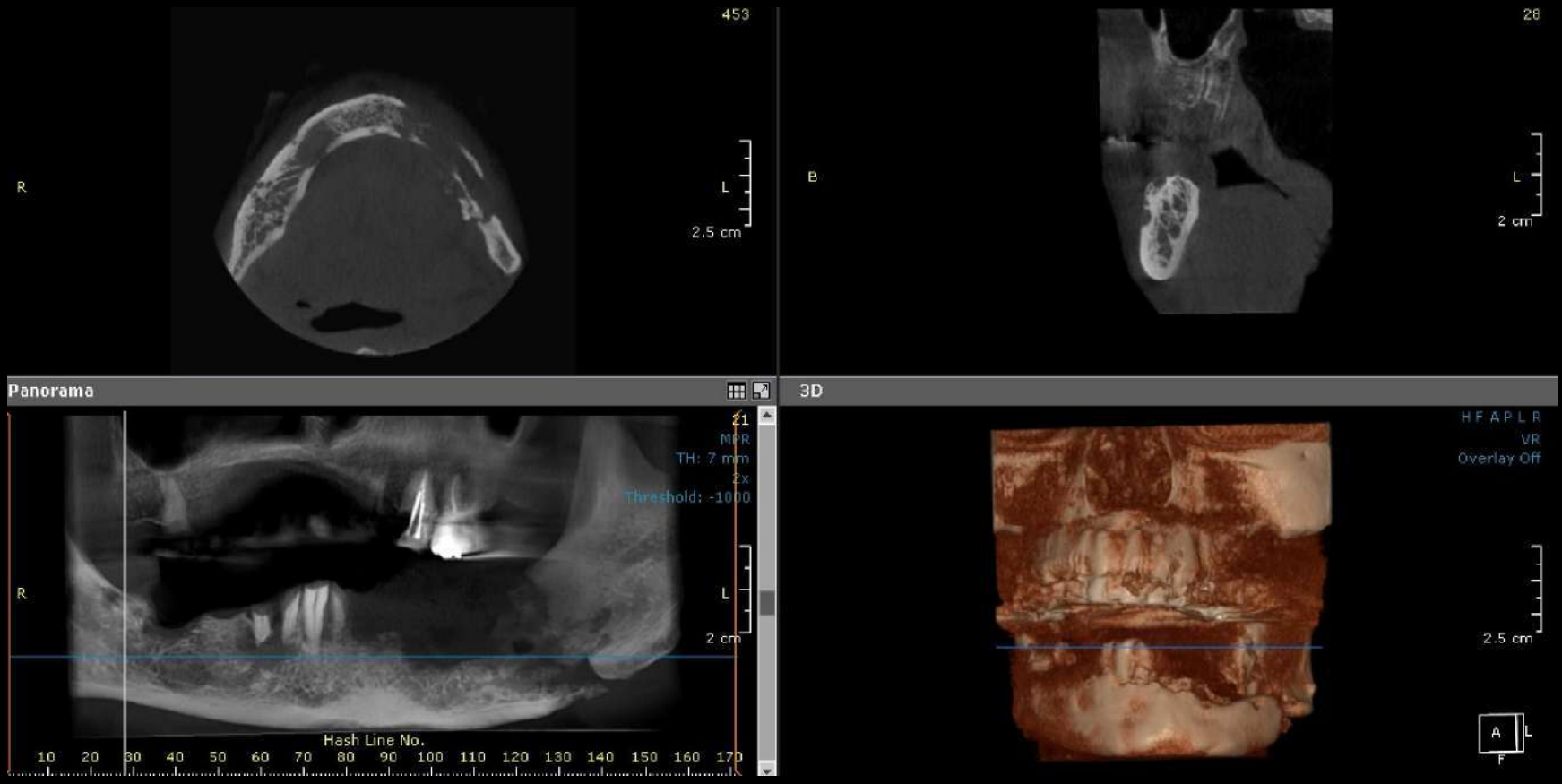
Case 11: Idiopathic Osteosclerosis or DBI

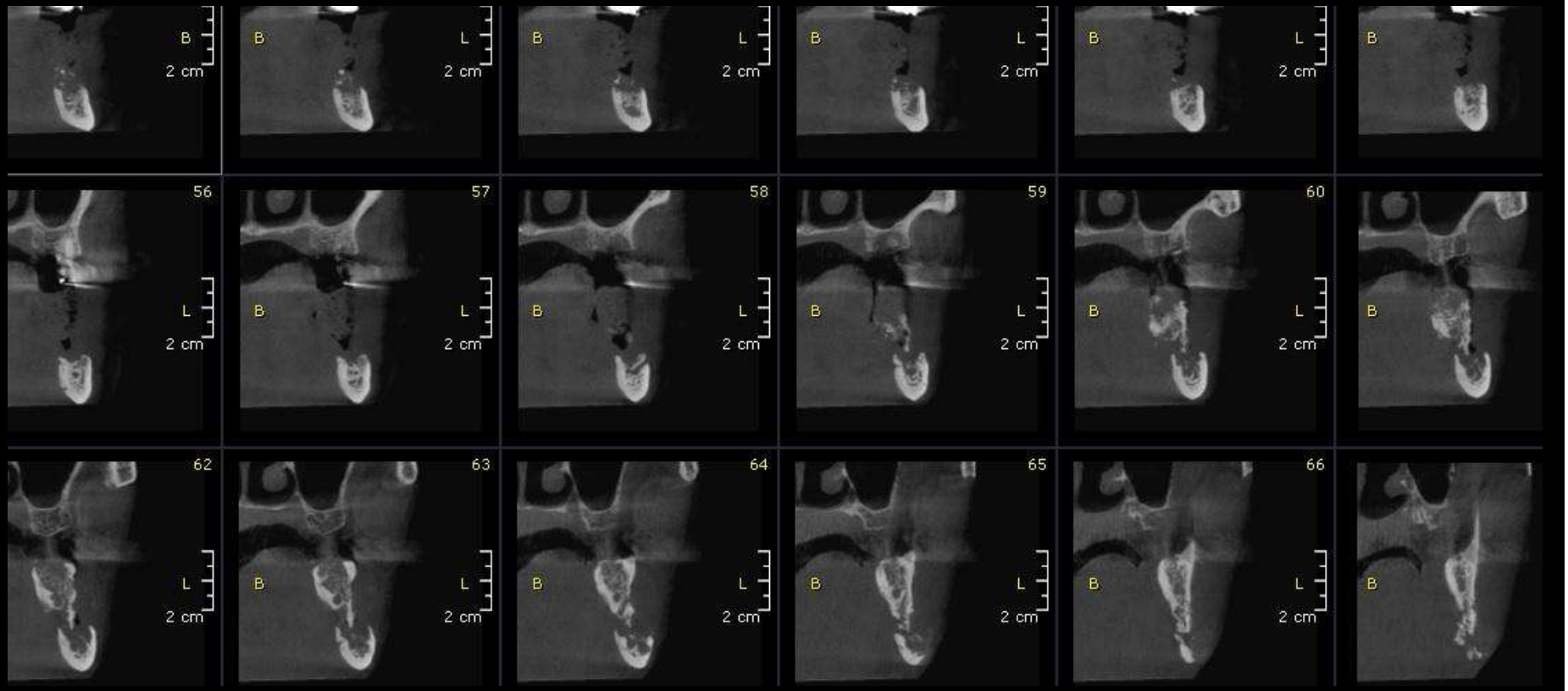


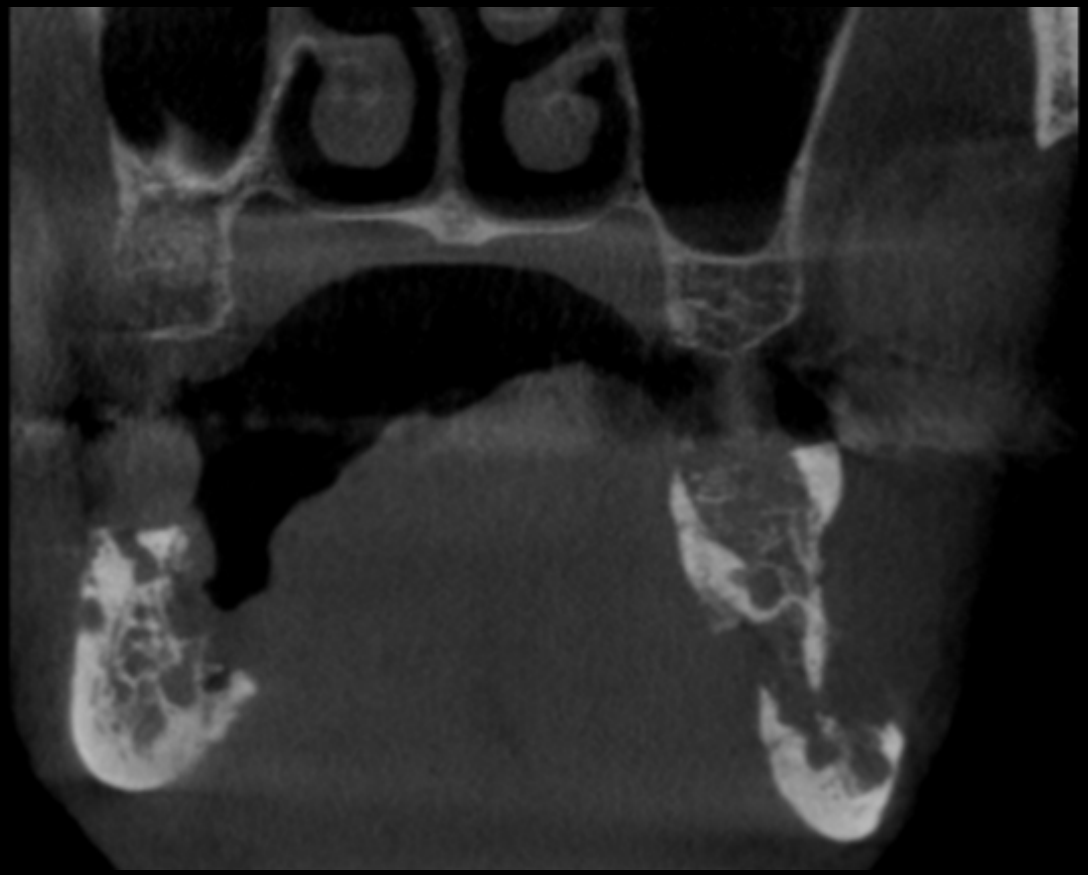
Case 11: DBI

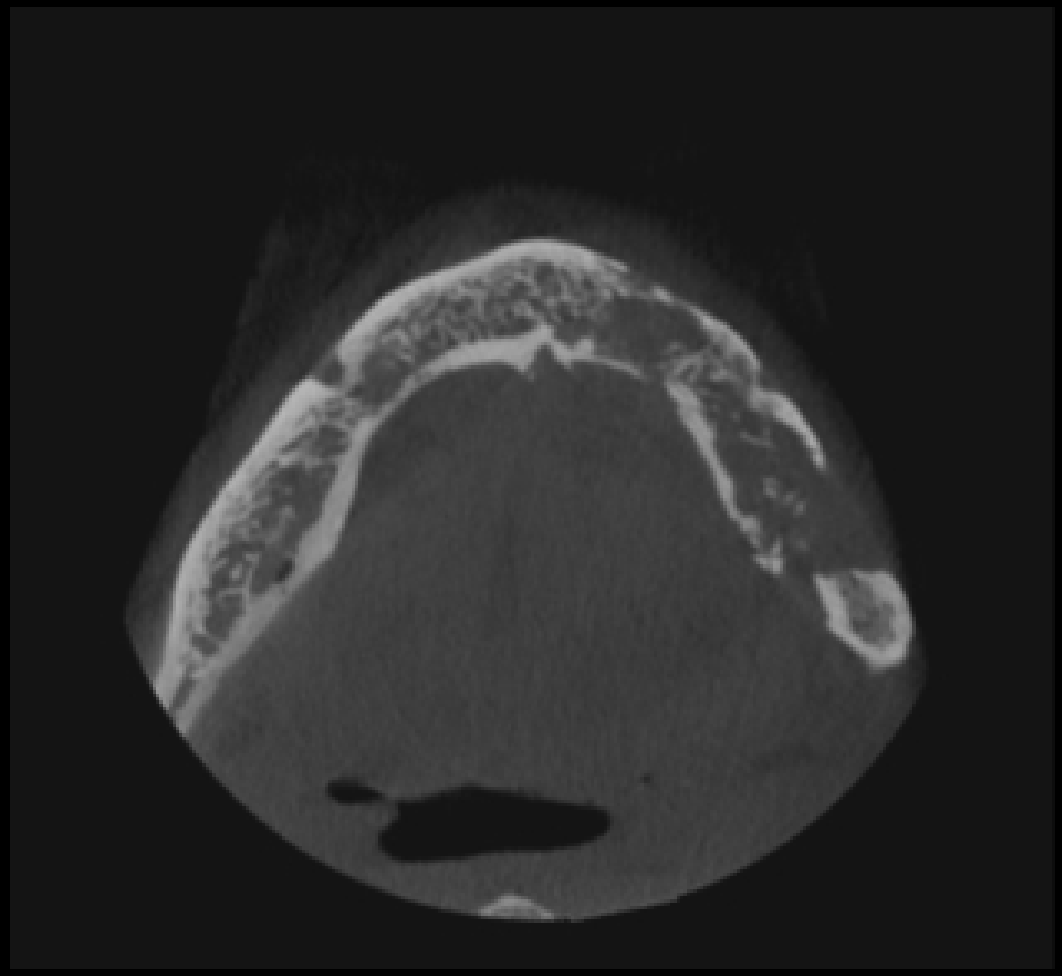

7
6.09 mm
B
L
13.23 mm
8
6.35 mm
B
L
13.29 mm
idiopathic
osteosclero
9
6.09 mm
B
L
14.14 mm
6.35 mm
L
15
10
20
30
40
50
mm

Case 12: Osteonecrosis

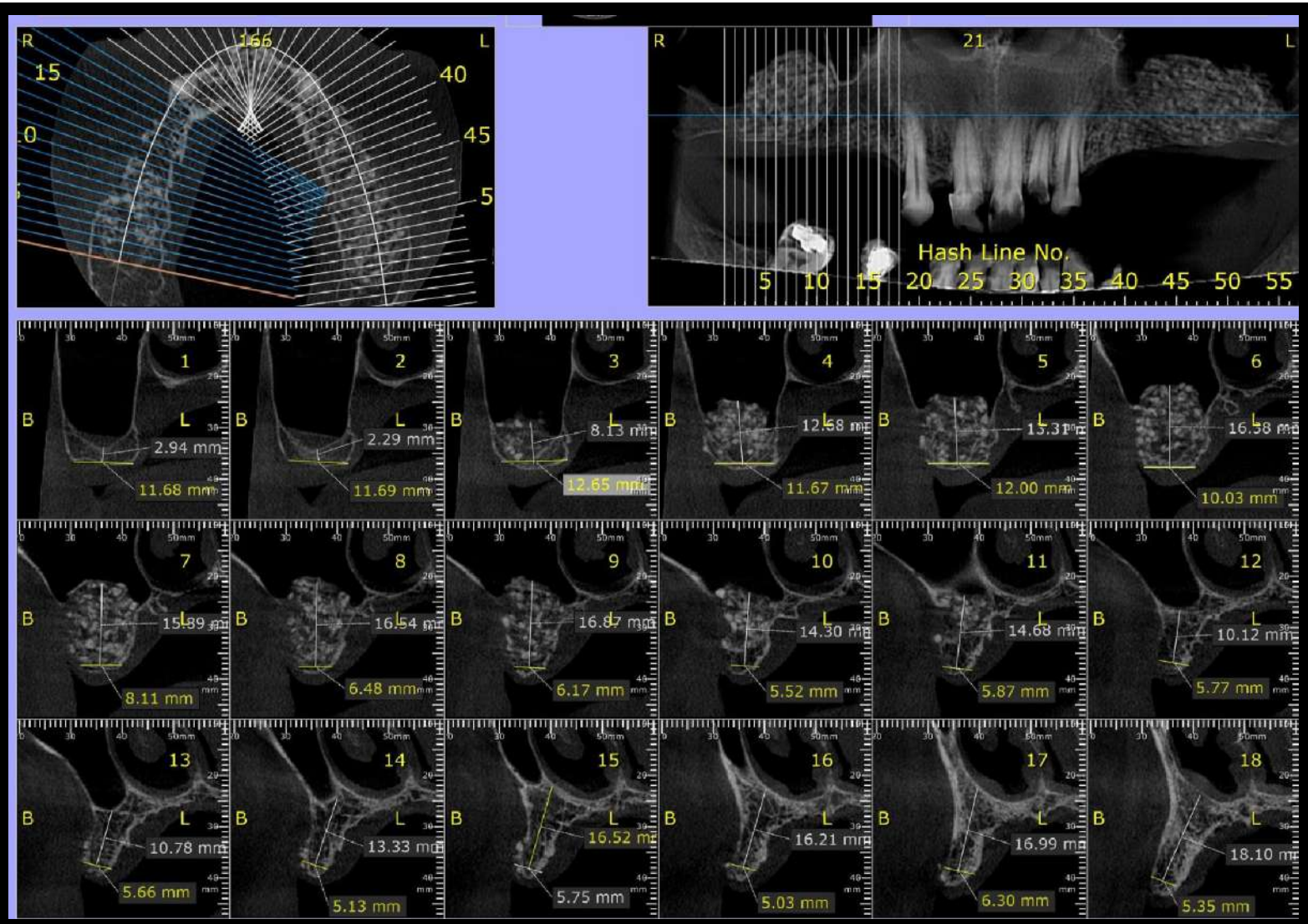


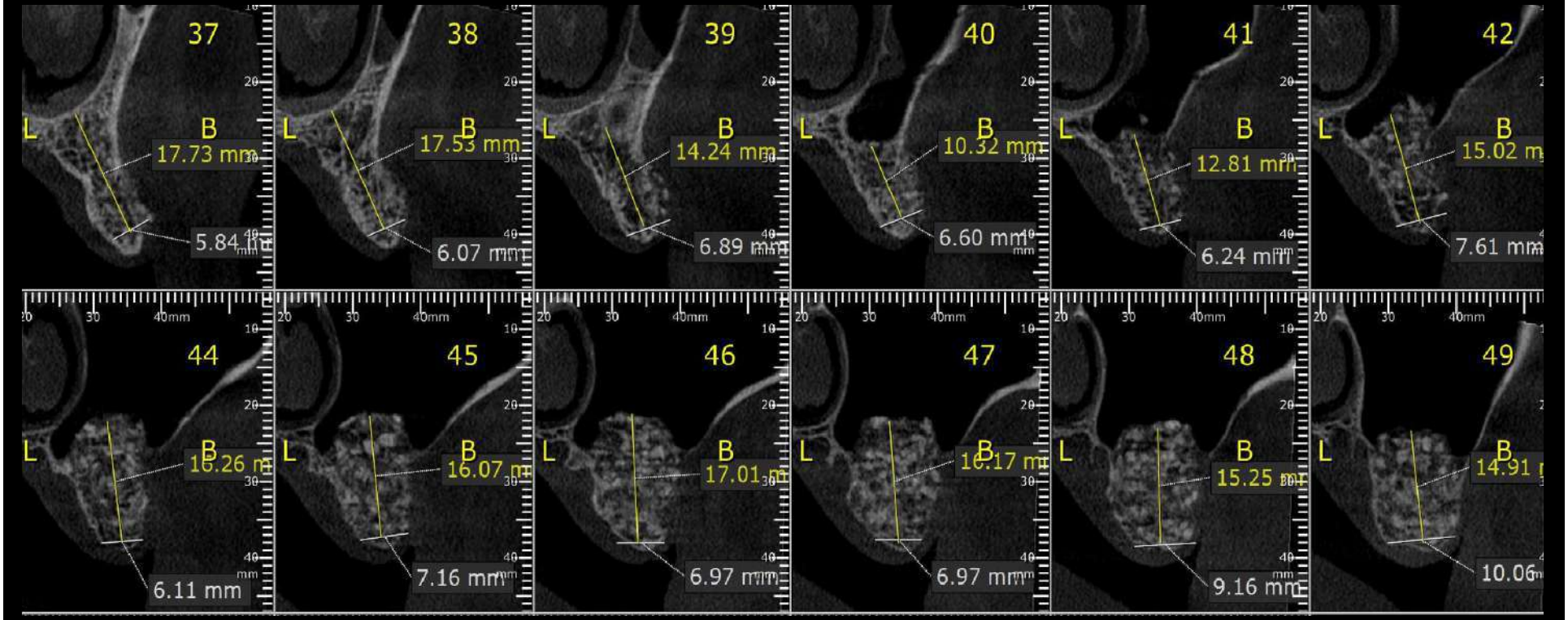

B
2 cm
B
L
2 cm
B
L
2 cm
B
L
2 cm
B
L
2 cm
B
56
L
2 cm
57
B
L
2 cm
58
B
L
2 cm
59
B
L
2 cm
60
B
L
2 cm
B
62
L
2 cm
63
B
L
2 cm
64
B
L
2 cm
65
B
L
2 cm
66
B
L
2 cm
B



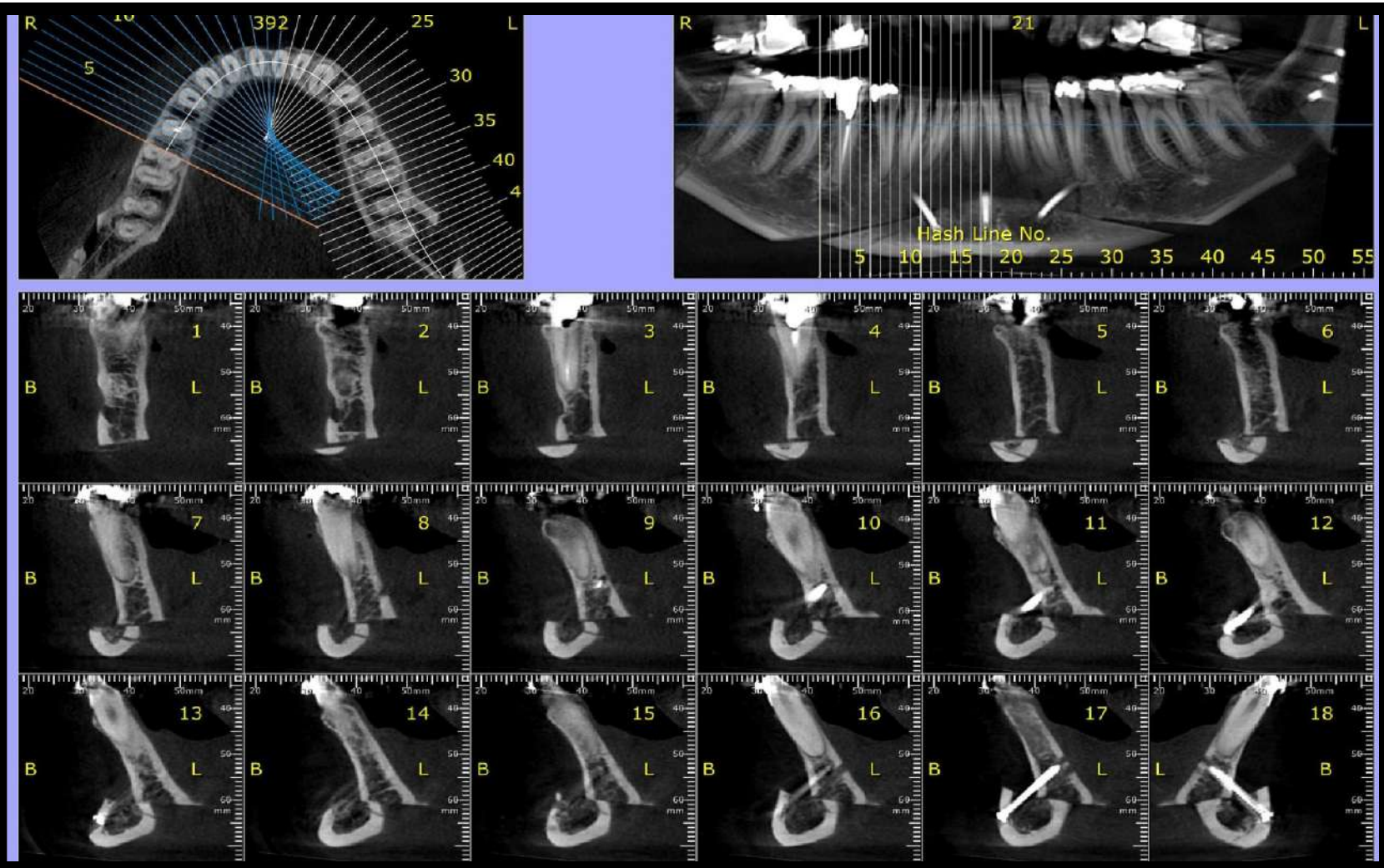


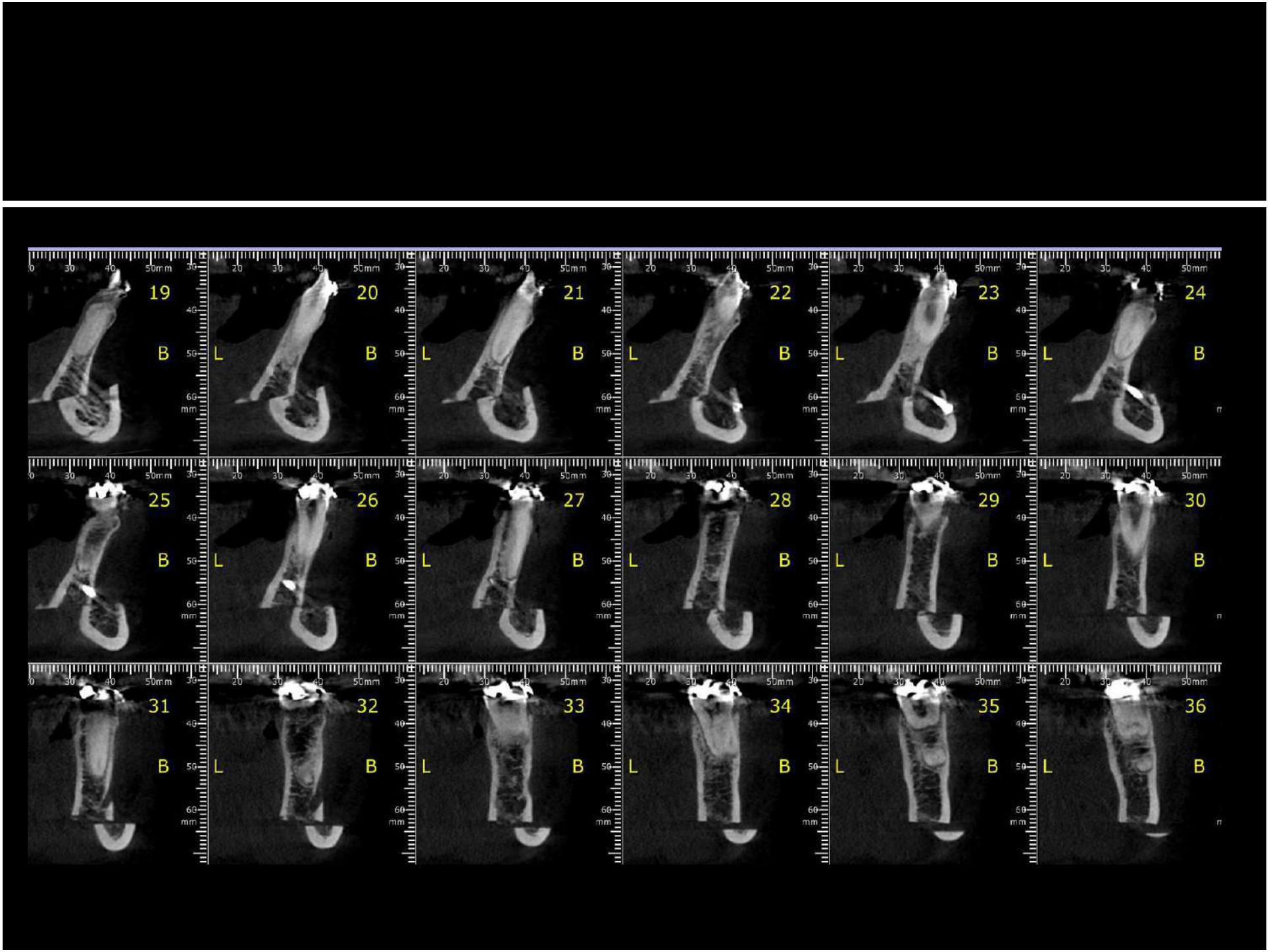
Case 13: Sinus Lift

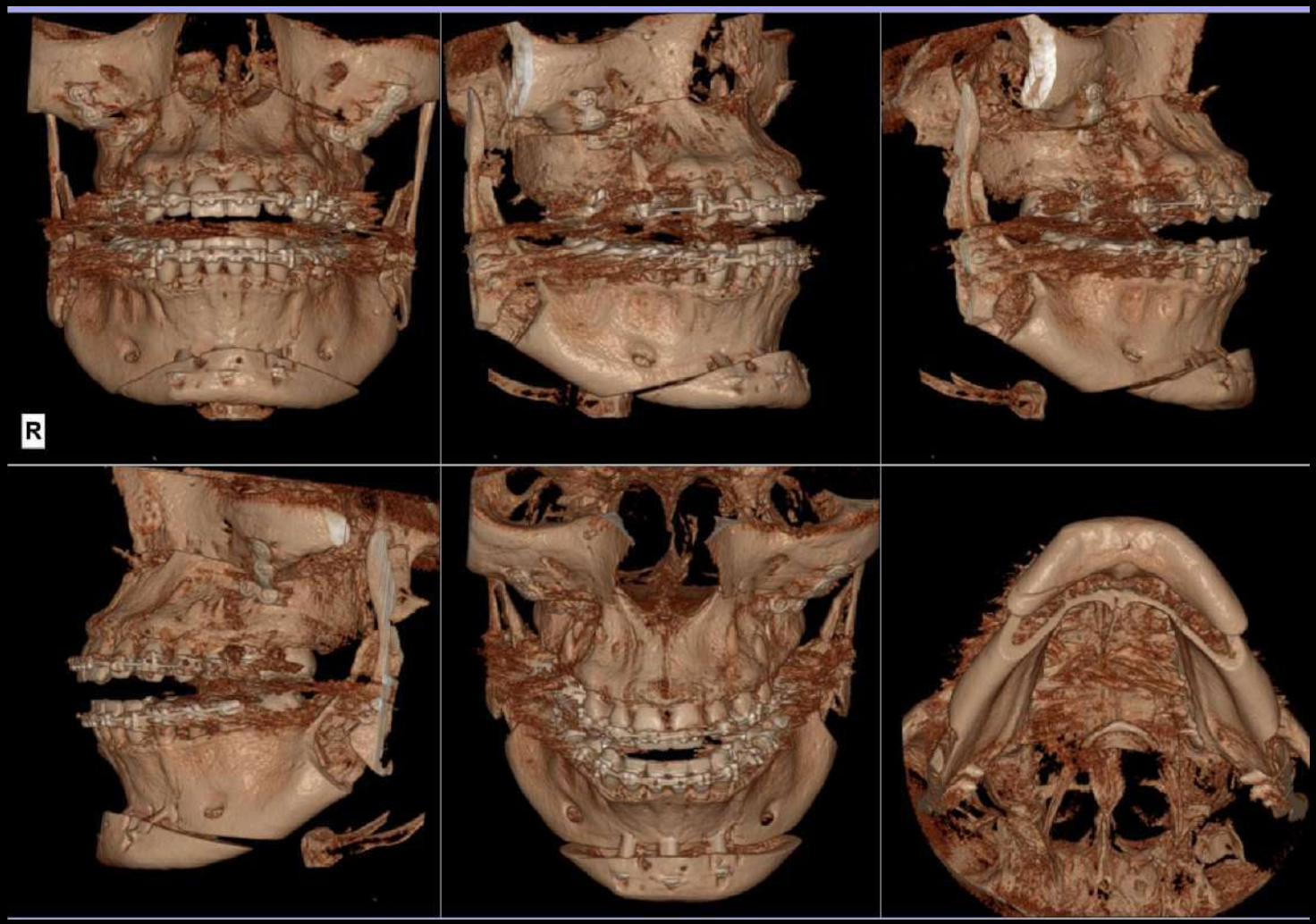



37
L
B
17.73 mm
5.84 mm
38
L
B
17.53 mm
6.07 mm
39
L
B
14.24 mm
6.89 mm
40
L
B
10.32 mm
6.60 mm
41
L
B
12.81 mm
6.24 mm
42
L
B
15.02 m
7.61 mm
44
L
B
16.26 m
6.11 mm
45
L
B
16.07 m
7.16 mm
46
L
B
17.01 m
6.97 mm
47
L
B
16.17 m
6.97 mm
48
L
B
15.25 mm
9.16 mm
49
L
B
14.91
10.06

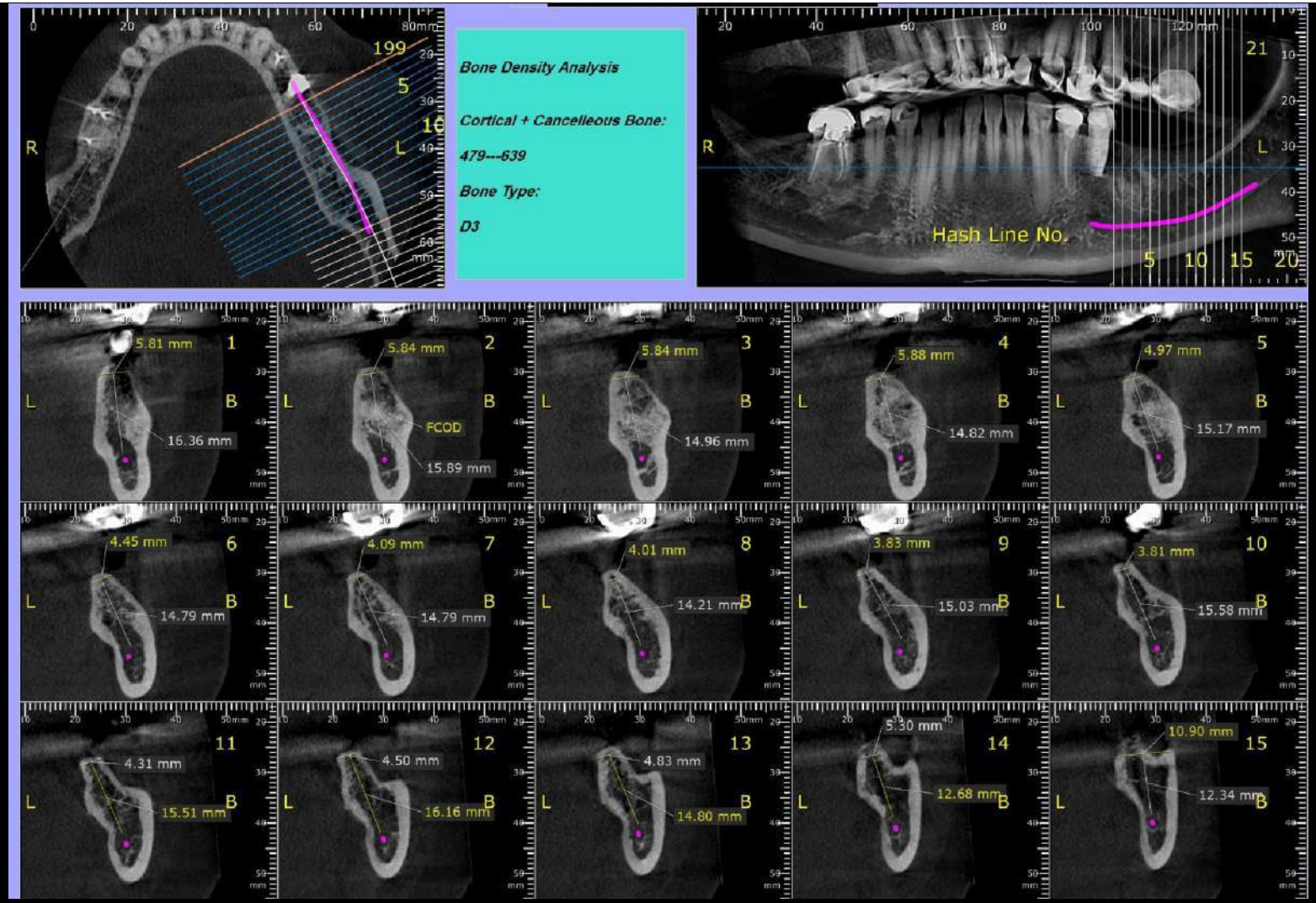
Case 14: Genioplasti

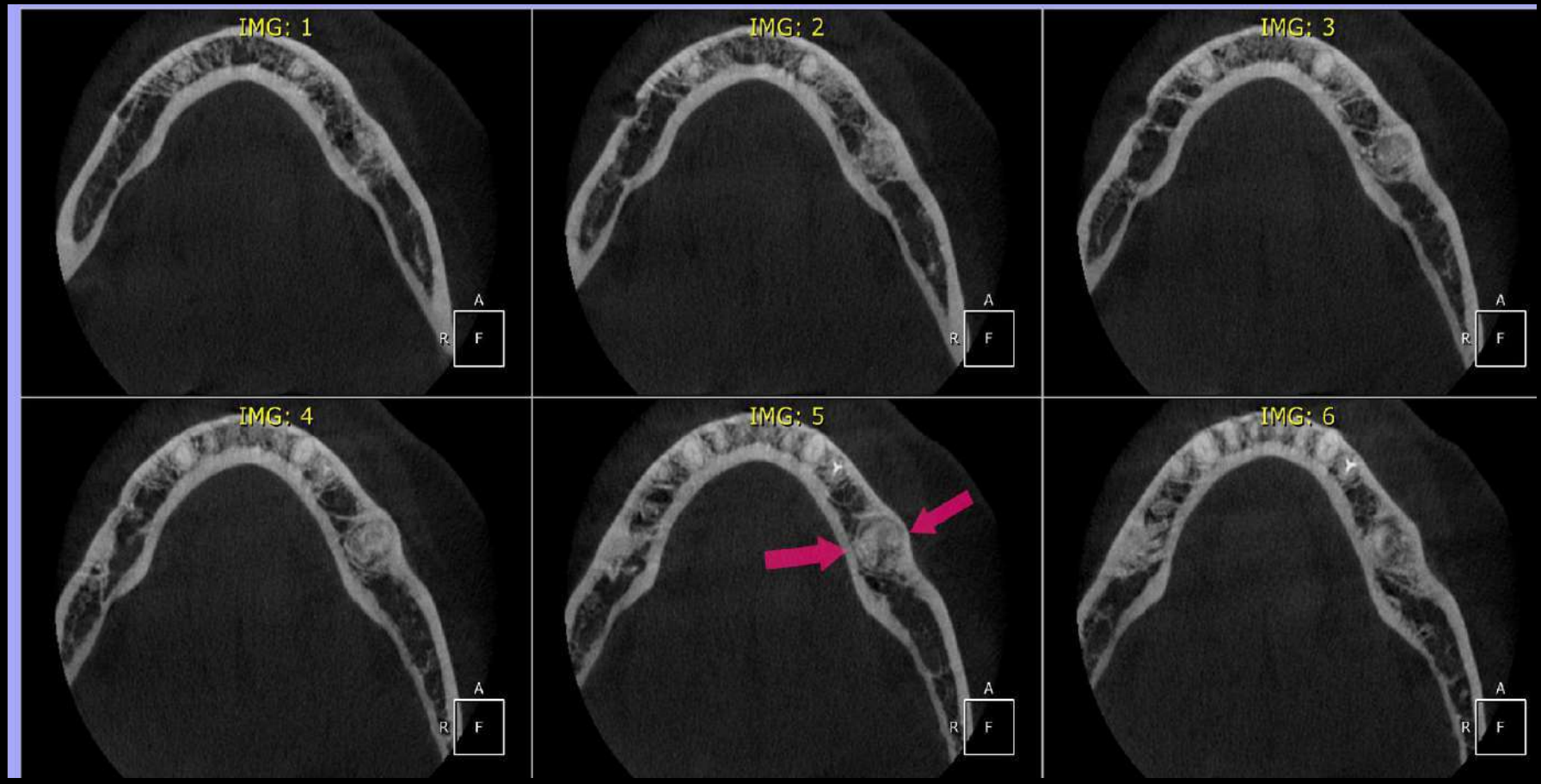



19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
B
L
mm

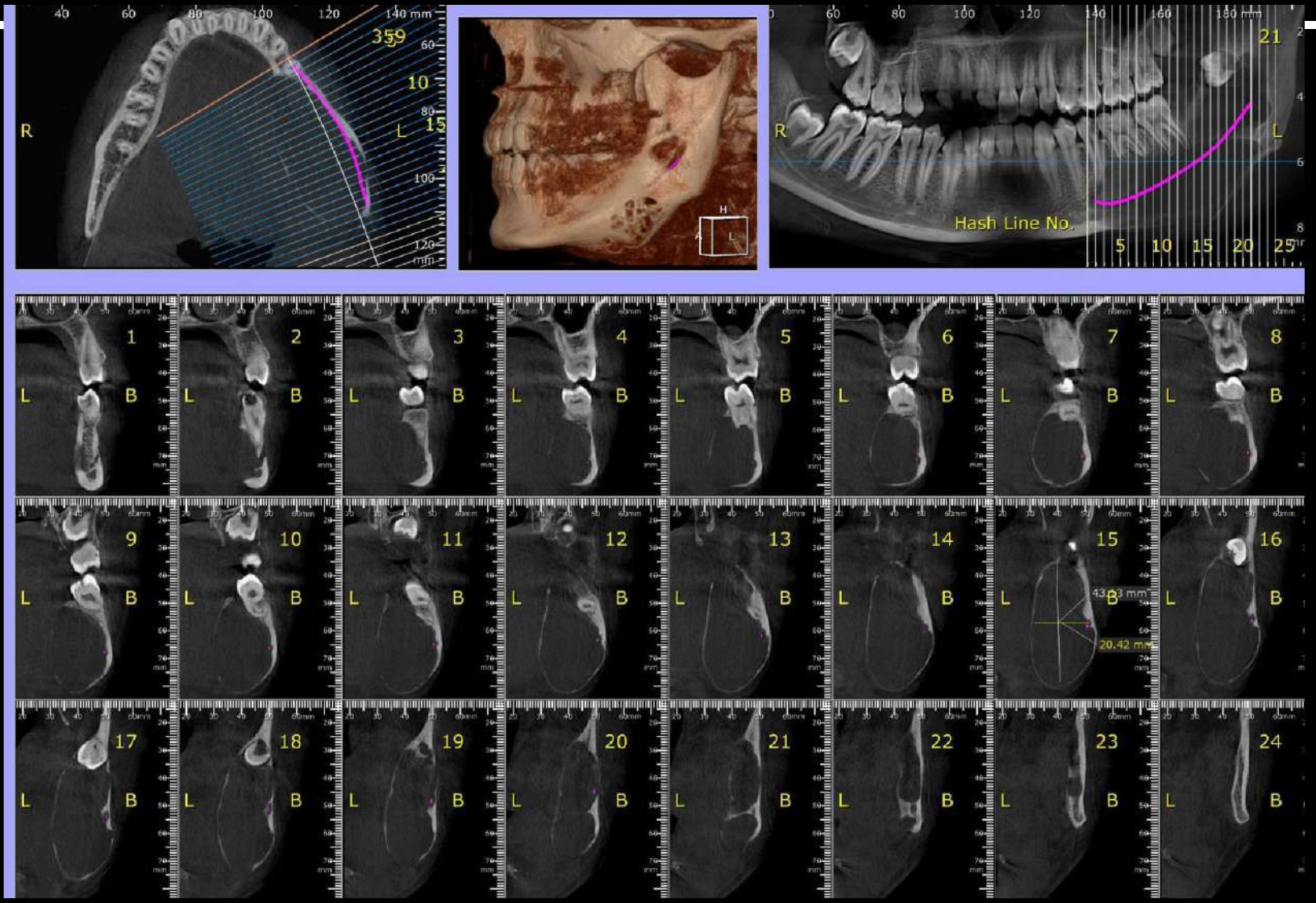

R

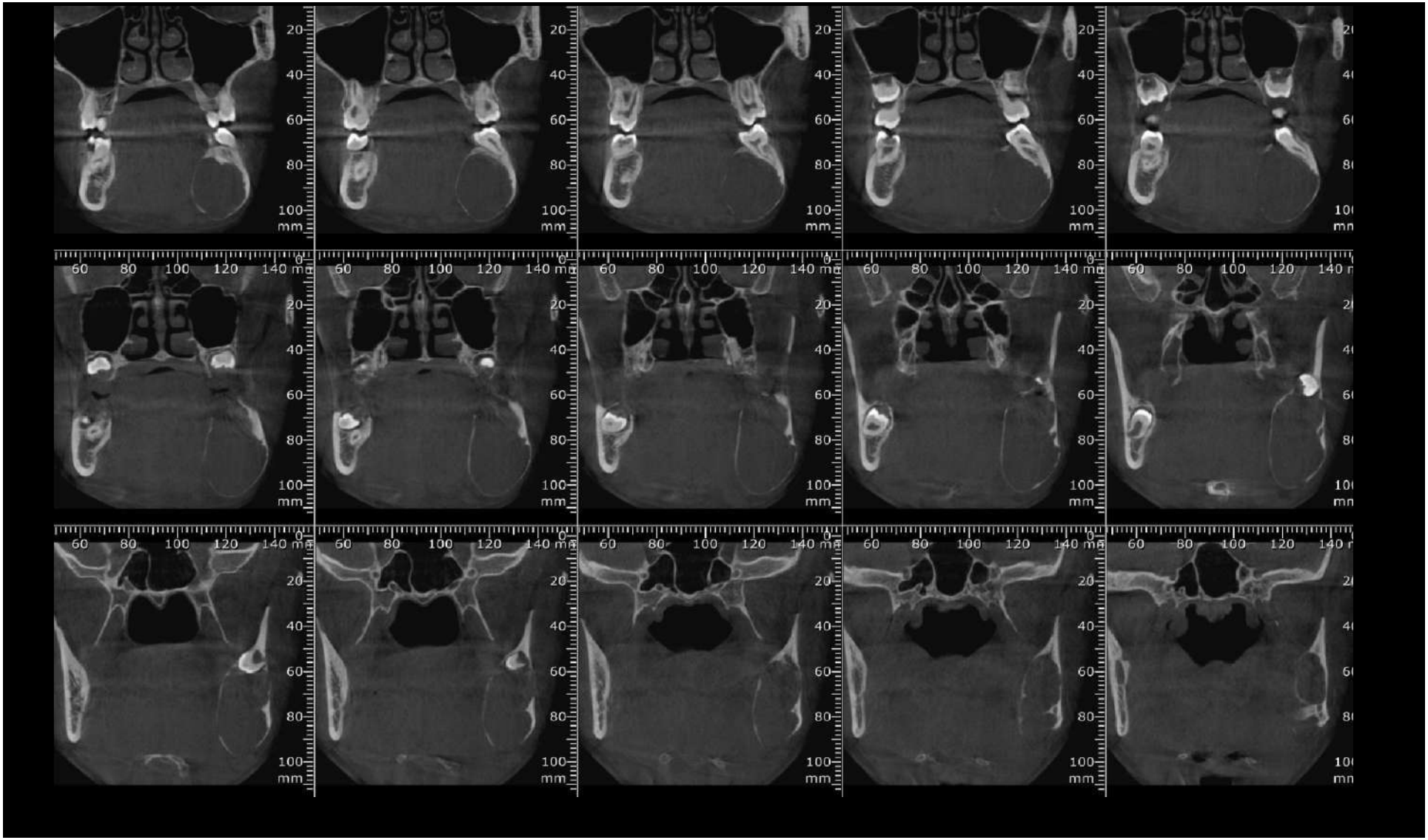
Case 15: FCOD


Bone Density Analysis
Cortical + Cancellous Bone:
479---639
Bone Type:
D3
Hash Line No.
5 10 15 20
5.81 mm
16.36 mm
5.84 mm
FCOD
15.89 mm
5.84 mm
14.96 mm
5.88 mm
14.82 mm
4.97 mm
15.17 mm
4.45 mm
14.79 mm
4.09 mm
14.79 mm
4.01 mm
14.21 mm
3.83 mm
15.03 mm
3.81 mm
15.58 mm
4.31 mm
15.51 mm
4.50 mm
16.16 mm
4.83 mm
14.80 mm
5.30 mm
12.68 mm
10.90 mm
12.34 mm

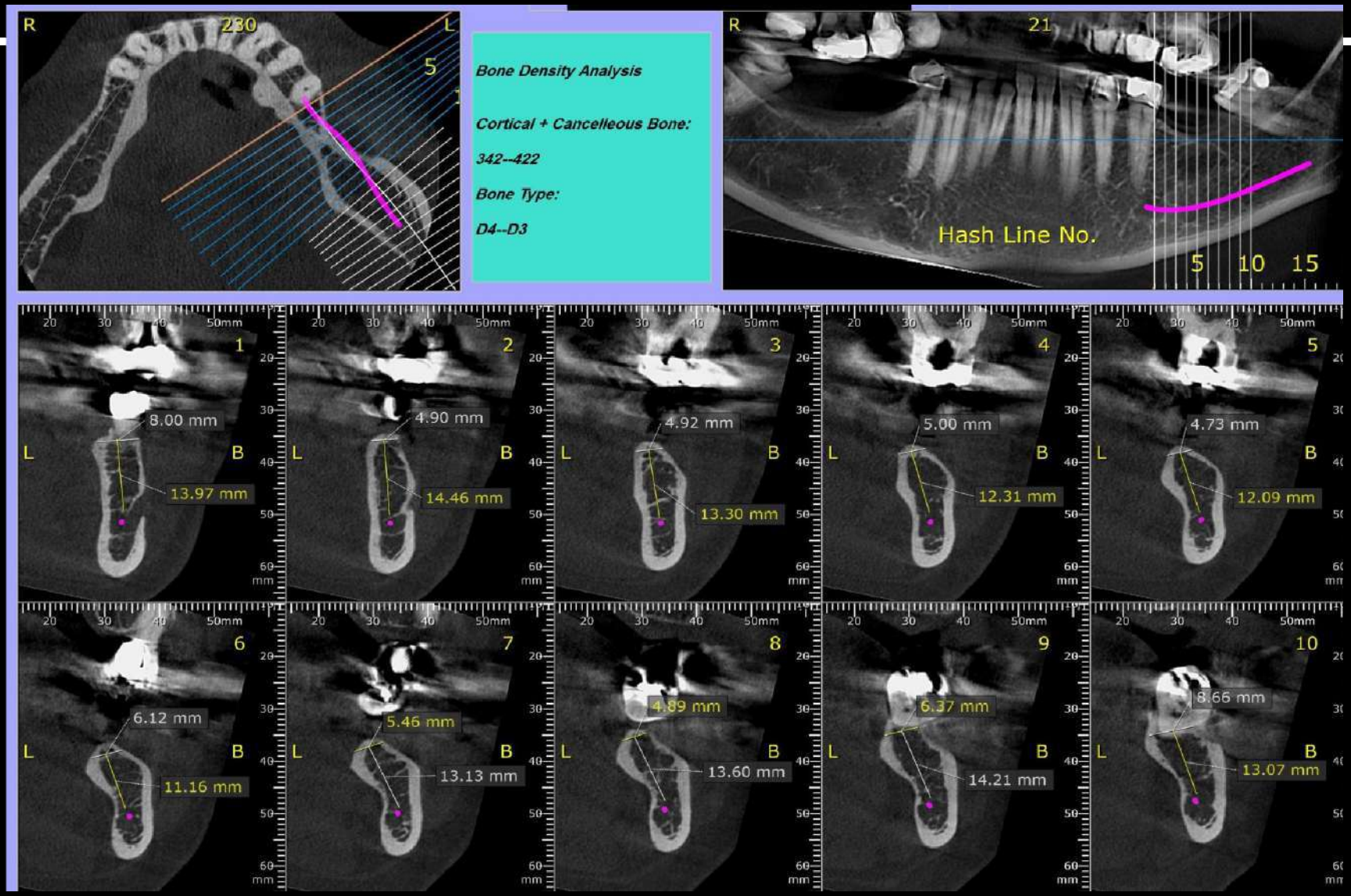

IMG: 1
IMG: 2
IMG: 3
IMG: 4
IMG: 5
IMG: 6
A
R
F

Case 16:Lesion

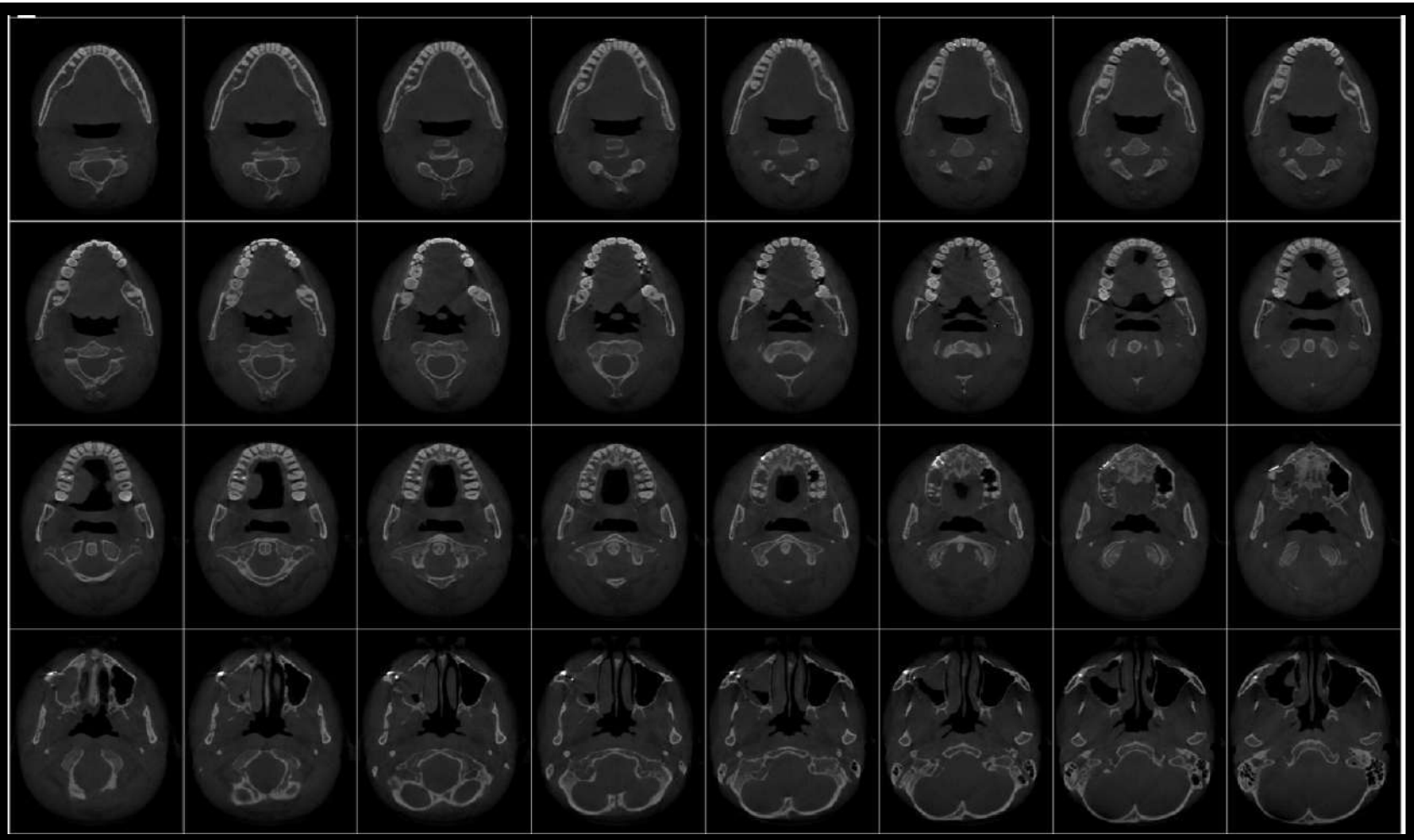



0
20
40
60
80
100
mm
60
80
100
120
140 mm

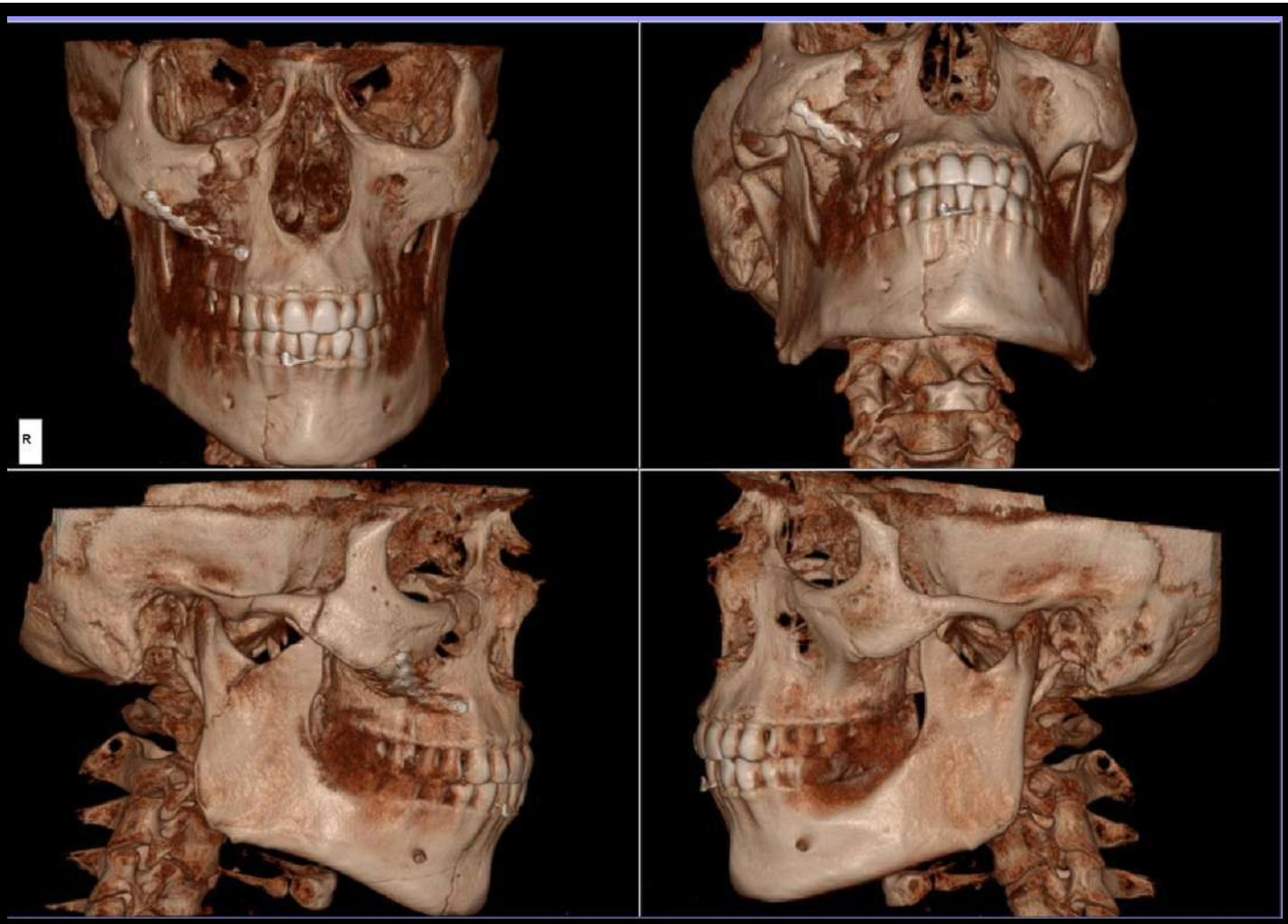
Case 17: Lingual undercut



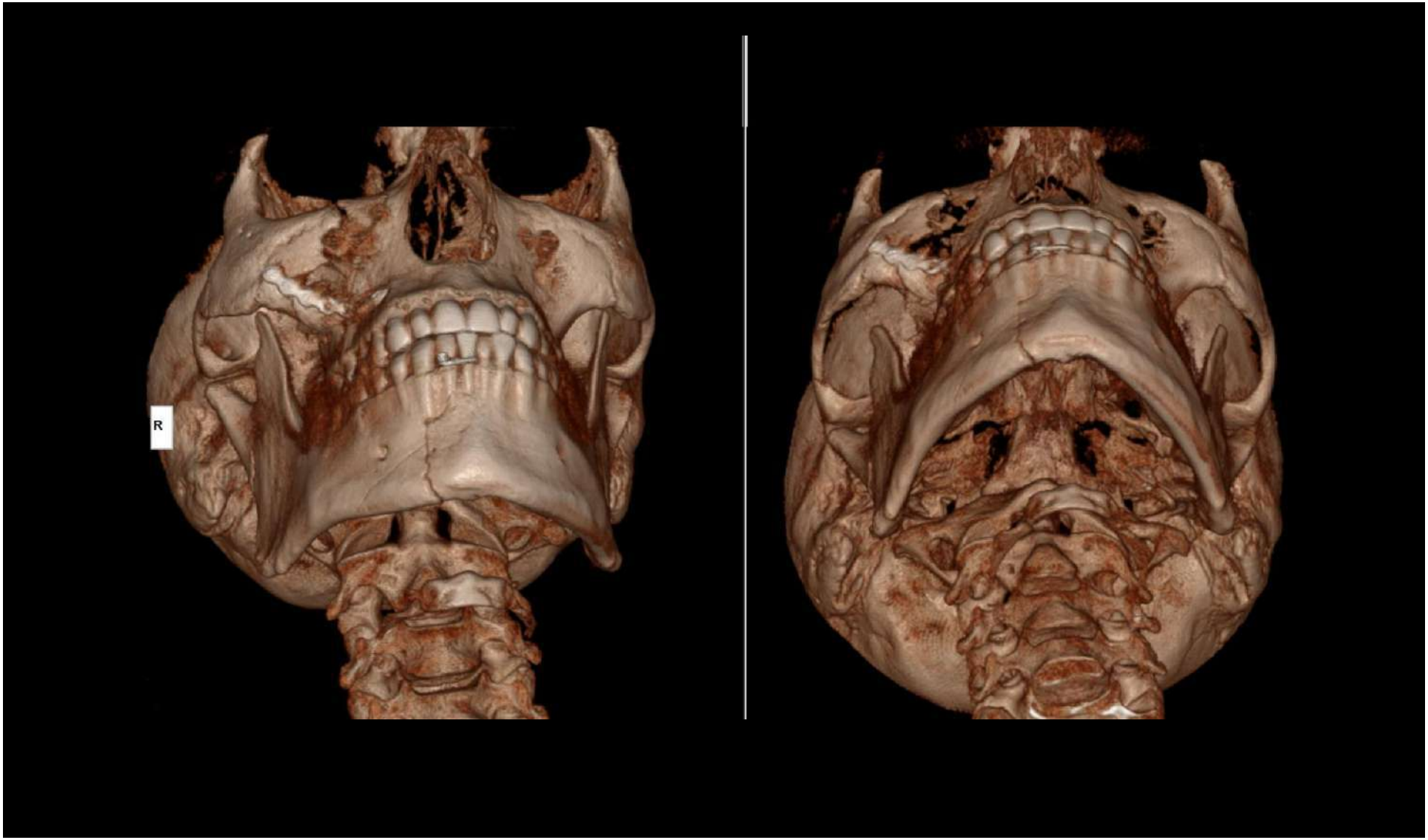
Case 18:Maxillofacial Fracture



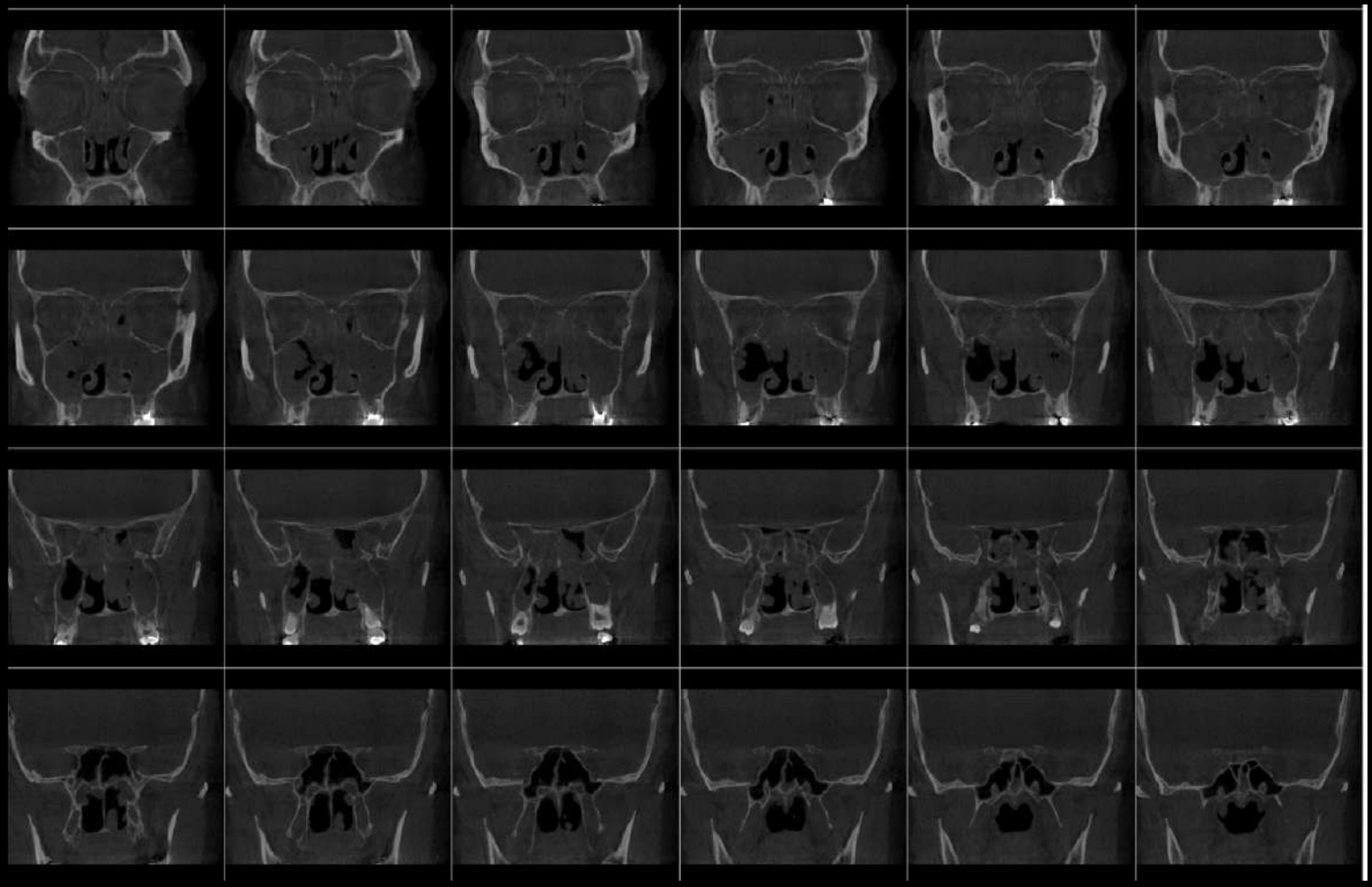
Case 18:



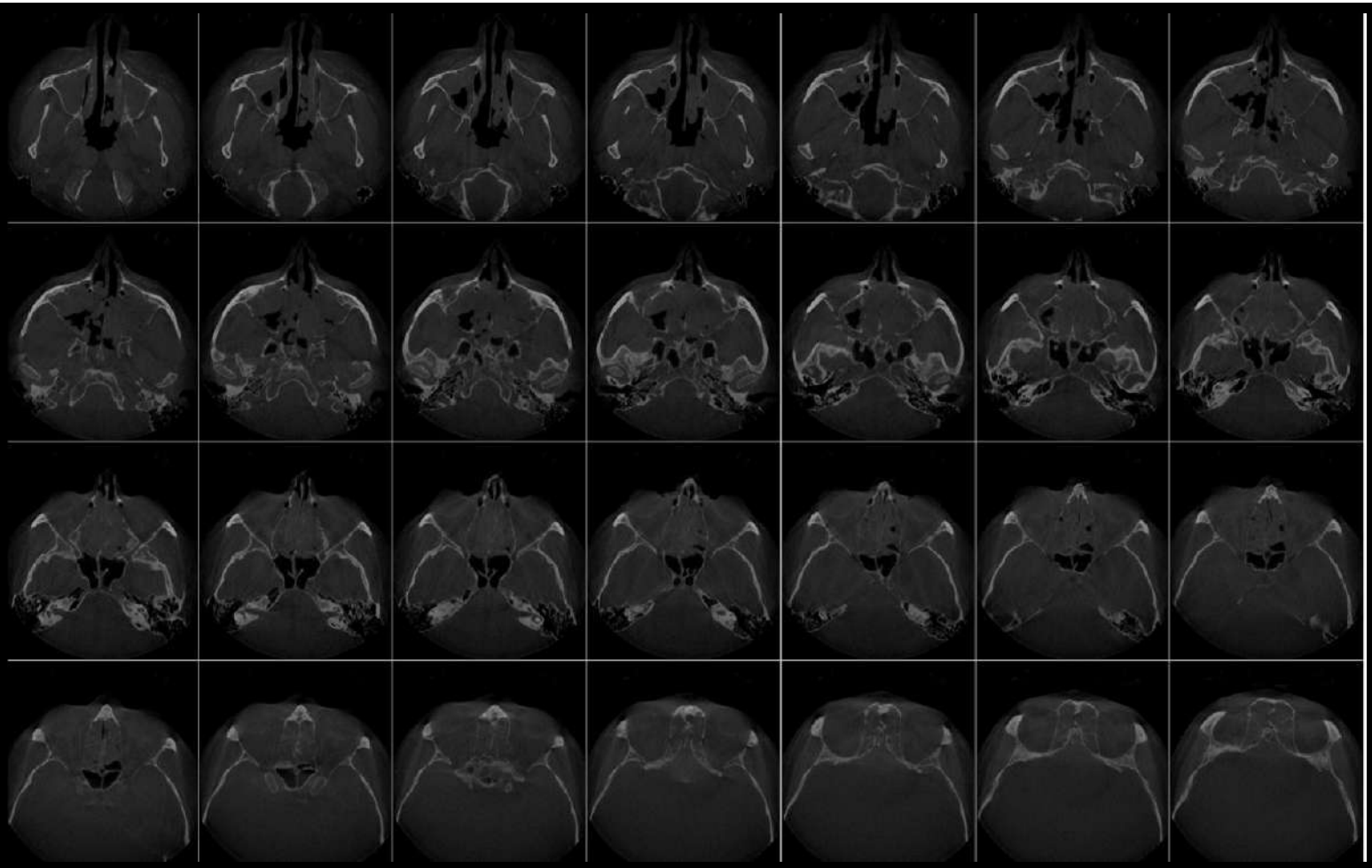
Case 18:



Case 19:Sinusitis



Case 19:



Thank You for Attention