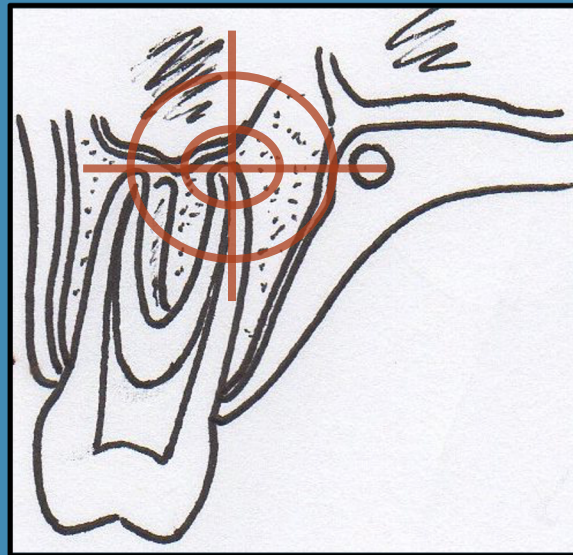


TARGETED ENDODONTIC MICROSURGERY: IMPLICATIONS OF THE GREATER PALATINE ARTERY



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DISCLAIMERS

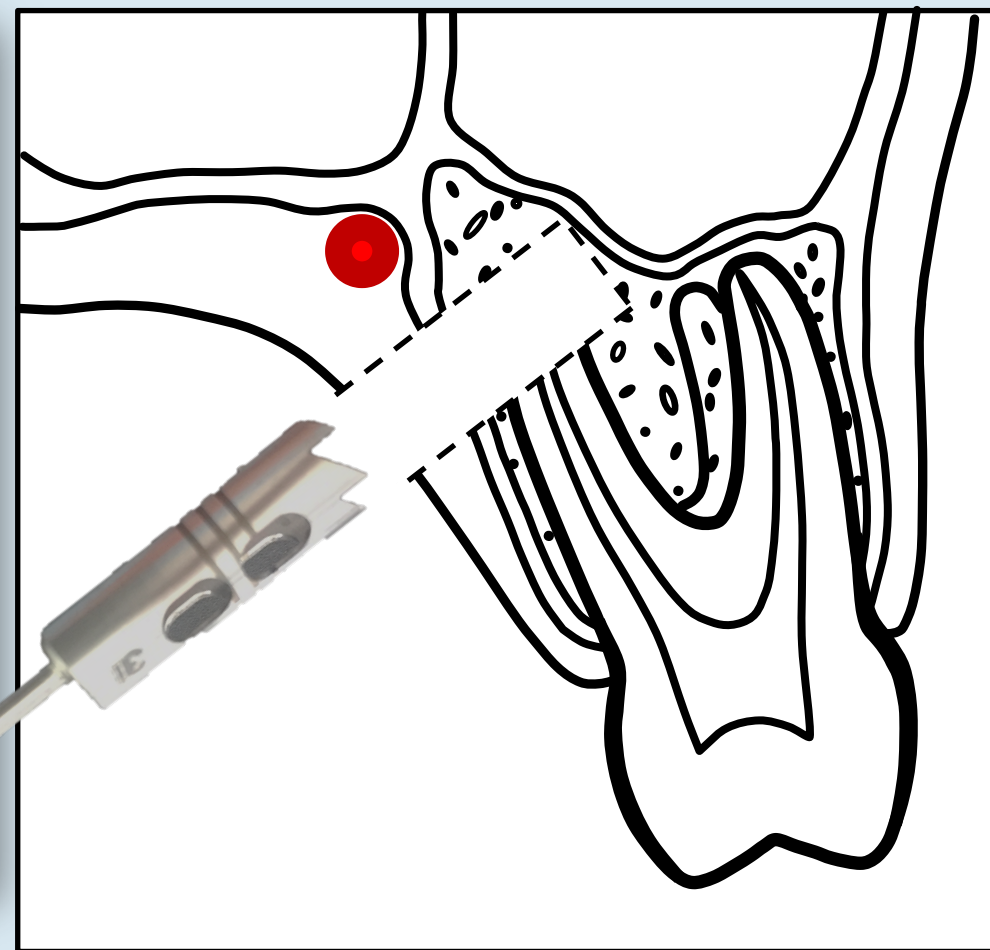
The speaker has no conflict of interest related to this presentation.

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TARGETED ENDODONTIC MICROSURGERY

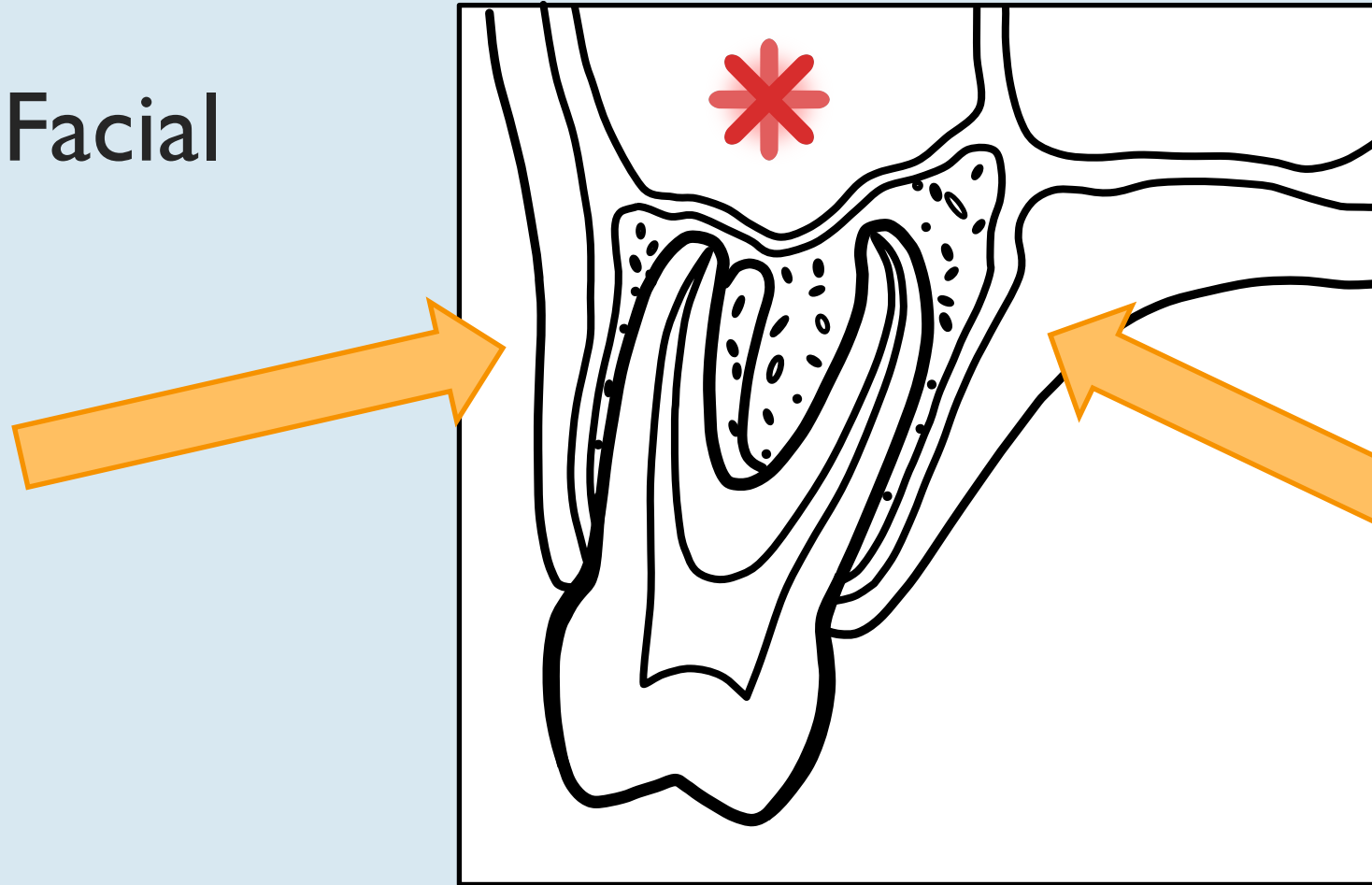


Photo courtesy Dr. Julie Anderson



ENDODONTIC MICROSURGERY

Facial



Palatal

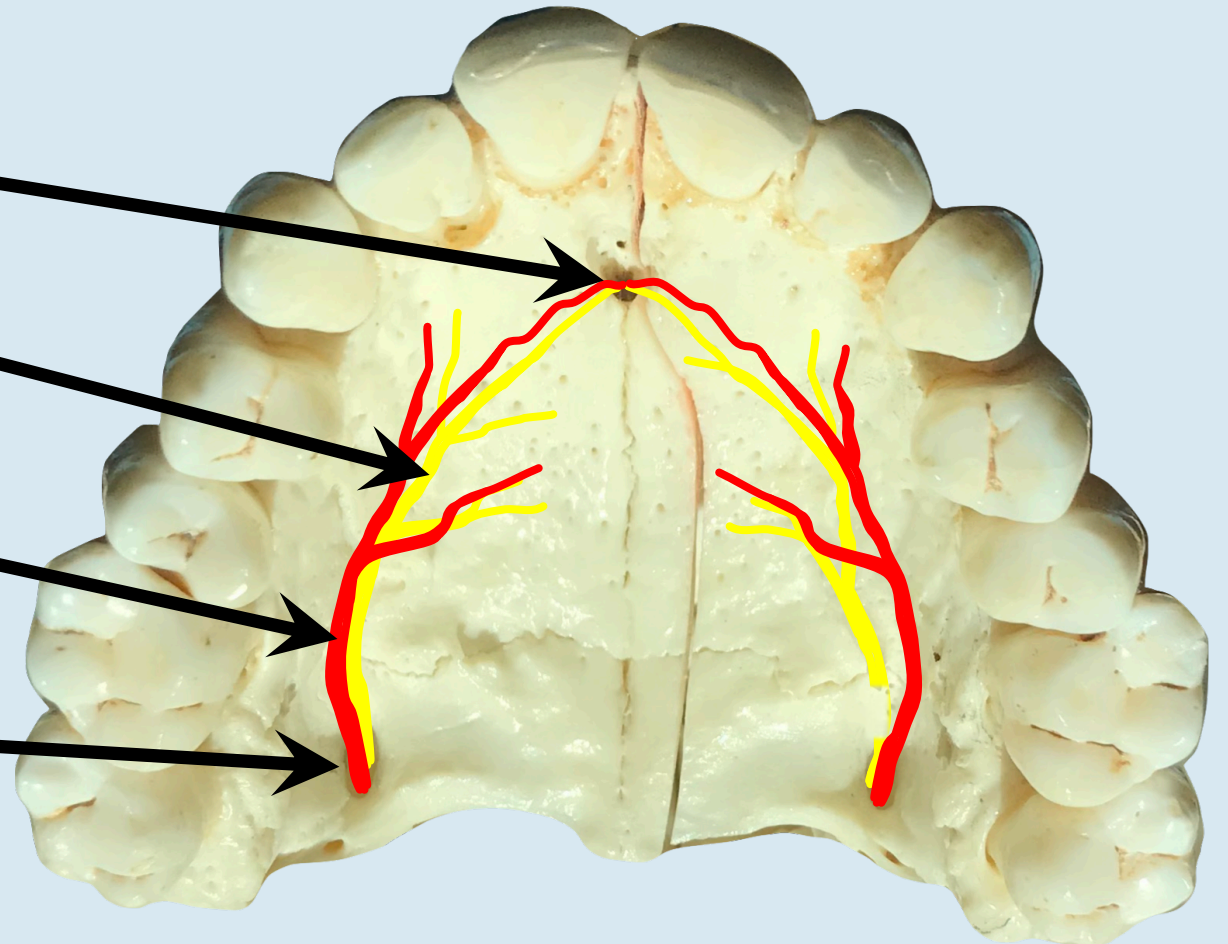
PALATAL VITAL STRUCTURES

Incisive Foramen

Greater Palatine Nerve

Greater Palatine Artery

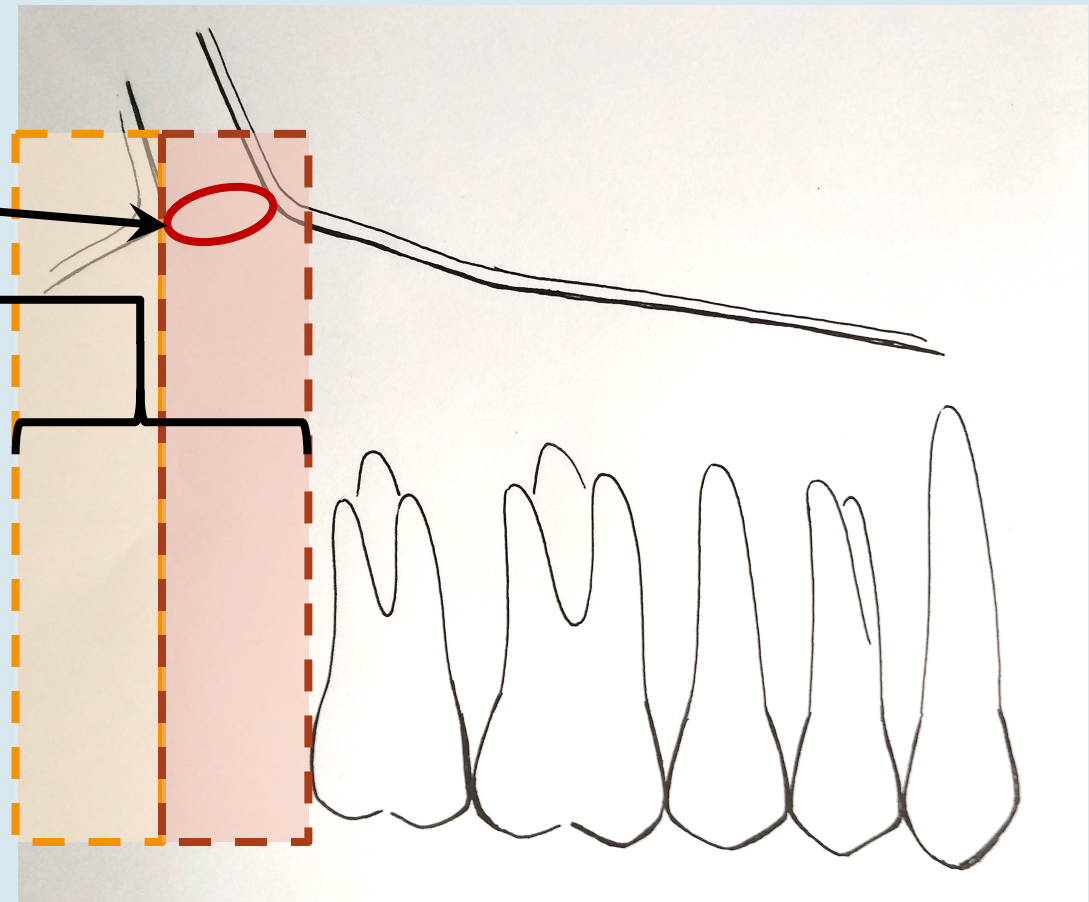
Greater Palatine Foramen



GREATER PALATINE ARTERY COURSE & DIAMETER

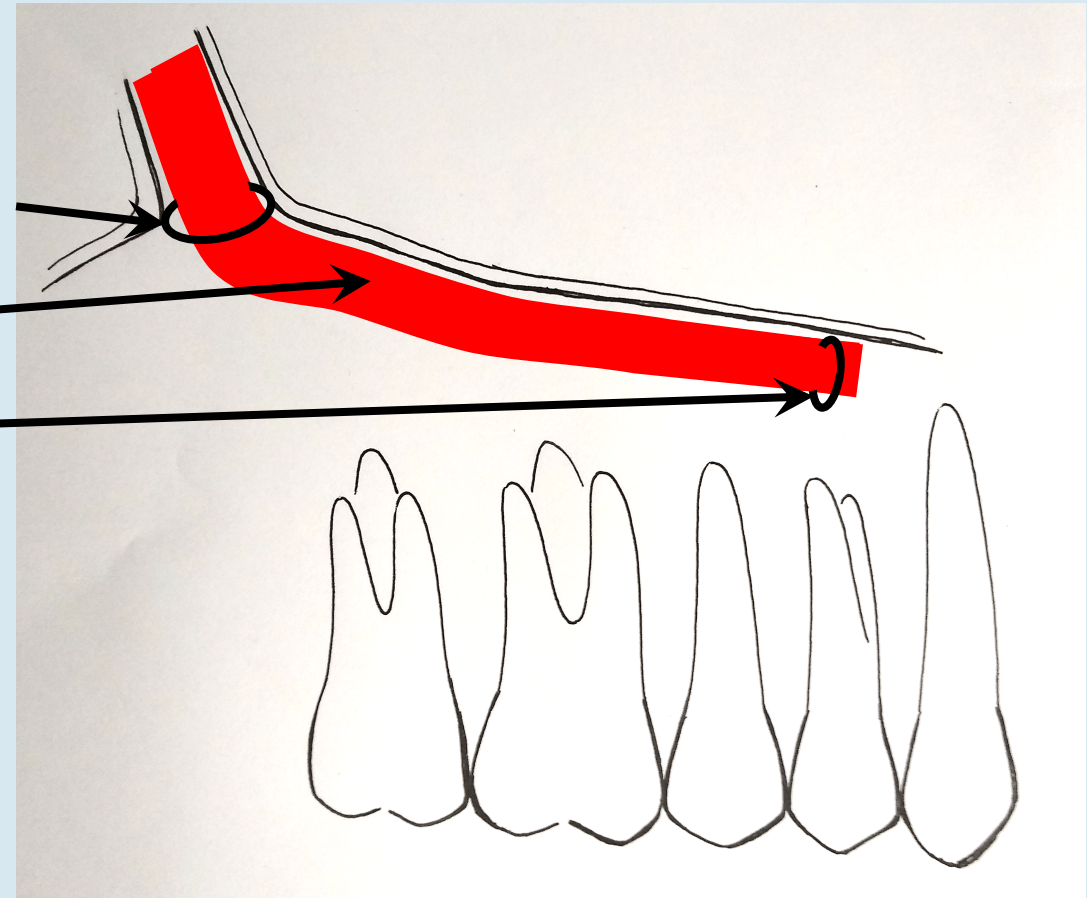
- Course (Sagittal View)
- Greater Palatine Foramen

Location by Population:	D to 3 rd M	3 rd M	Total
European	2%	75%	77%
African	37%	69%	106%?
Asian	7%	42%	49%
Brazilian	22%	74%	96%
Indian	7%	70%	77%
African & Indian	15%	67%	82%



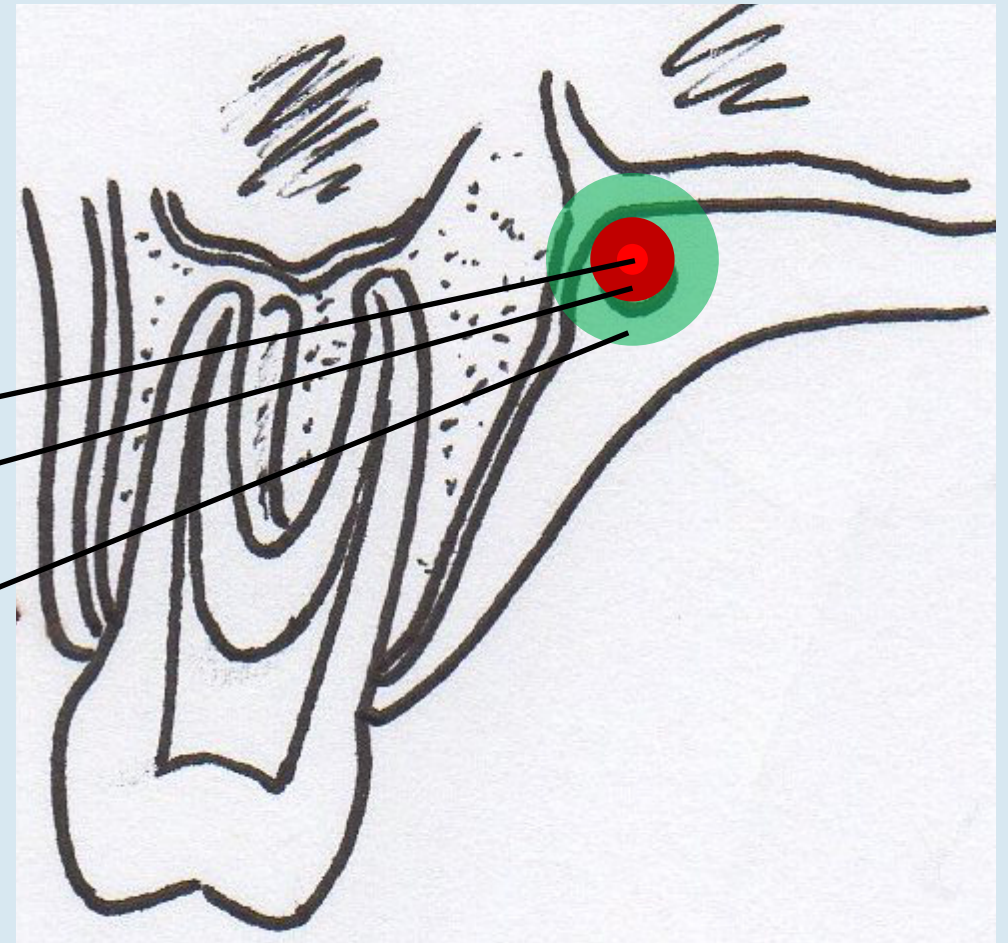
GREATER PALATINE ARTERY COURSE & DIAMETER

- Diameter (Sagittal View)
 - Outer (GP Foramen): 2.65 ± 1.3 mm
 - Inner (2nd Molar): 1.48 ± 0.34 mm
 - Outer (1st PM): 1.96 ± 0.9 mm
- Projected Diameter
 - Outer (2nd Molar): 2.5 mm
 - Outer (1st Molar): 2.35 mm



GREATER PALATINE ARTERY COURSE & DIAMETER

- Location (Coronal View)
 - Junction of hard palate & alveolus
 - Lateral, deep, & inferior to GPN
- Projected Diameter
 - Outer (2nd Molar): 2.5 mm
 - Outer (1st Molar): 2.35 mm
- Safety Margin
 - 2 mm from vital structures



GREATER PALATINE ARTERY PALATAL TRANSITION MORPHOLOGY

- Location (Coronal View)
 - Junction of hard palate & alveolus
 - Lateral, deep, & inferior to GPN
- Variations
 - Spine
 - Bridge
 - Groove covered by fibrous connective tissue
 - Smooth
 - Indistinct vertical to horizontal transition



GREATER PALATINE ARTERY PALATAL TRANSITION MORPHOLOGY

- Location (Coronal View)
 - Junction of hard palate & alveolus
 - Lateral, deep, & inferior to GPN
- Variations
 - Spine or Greater Palatine Crest
 - Bridge
 - Groove covered by fibrous connective tissue
 - Smooth
 - Indistinct vertical to horizontal transition

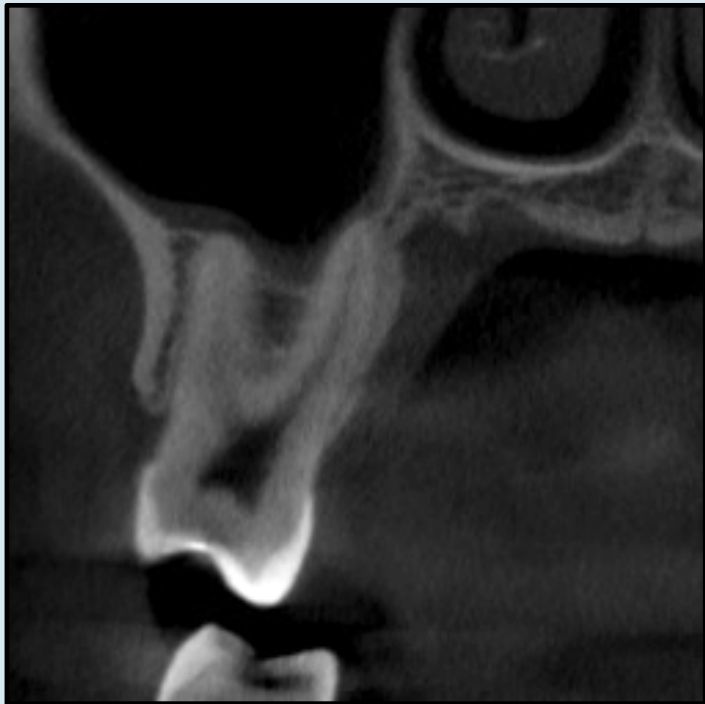


GREATER PALATINE ARTERY PALATAL TRANSITION MORPHOLOGY

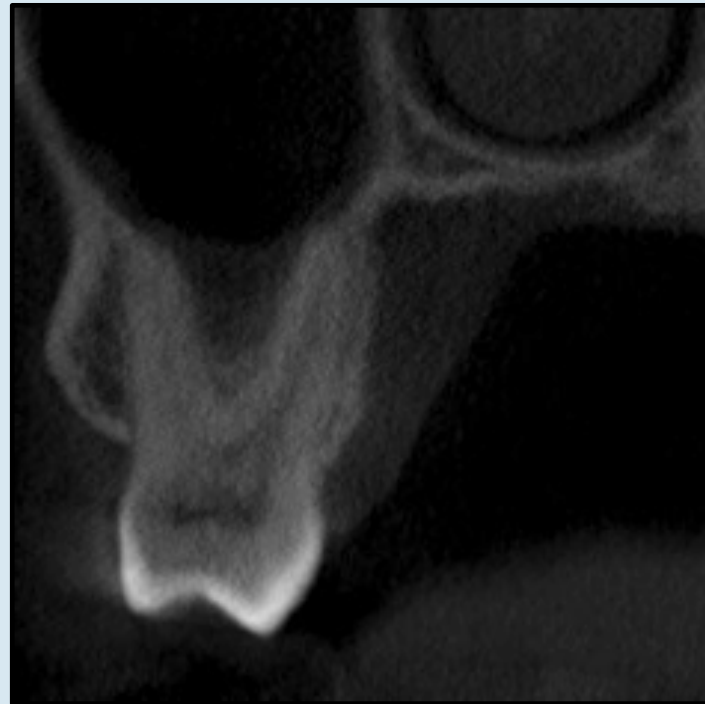
- Location (Coronal View)
 - Junction of hard palate & alveolus
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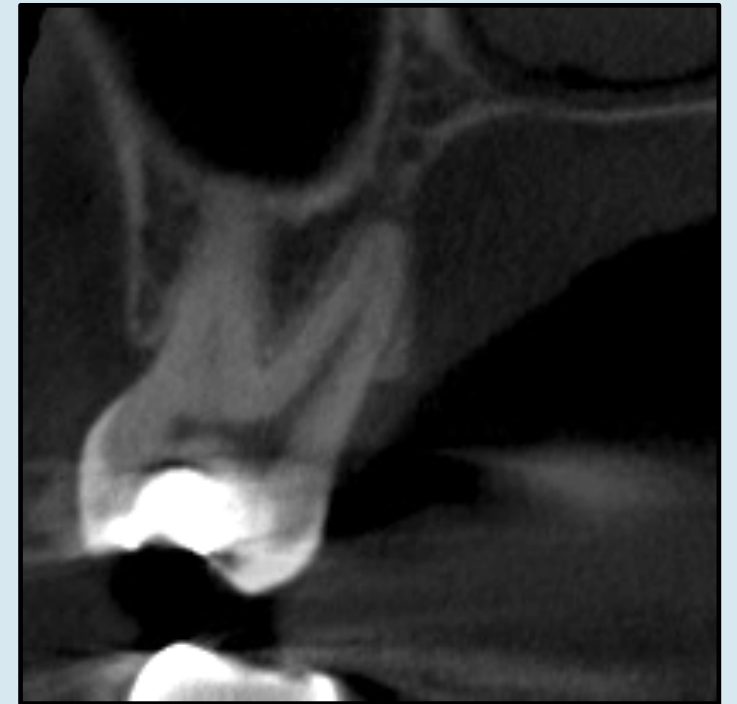
GREATER PALATINE ARTERY PALATAL TRANSITION MORPHOLOGY



Spine

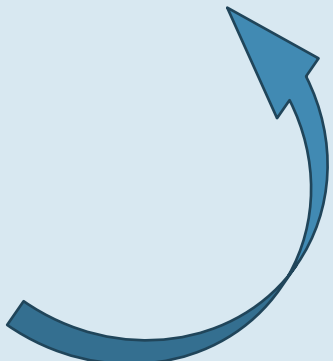


Bridge



Smooth

TARGETED ENDODONTIC MICROSURGERY KNOWLEDGE GAP

- Knowledge Gap
 - Proximity of Maxillary 1st & 2nd Molar Palatal Roots
 - Greater Palatine Foramen
 - Greater Palatine Neurovascular Bundle
 - Feasibility of TEMS via Palatal Approach
- 

TARGETED ENDODONTIC MICROSURGERY RESEARCH OBJECTIVES

- Research Objectives
 - 1) To classify the GPA relative to maxillary first and second molar palatal root apices
 - 2) To assess the feasibility of maxillary first and second molar palatal root TEMS based on CBCT analyses.
 - 3) To provide morphometric analyses of CBCT images relating the maxillary first and second molar palatal root apices to the greater palatine foramen & greater palatine artery

TARGETED ENDODONTIC MICROSURGERY RESEARCH DESIGN

- *Institutional Review Board Approval*
 - Obtain approval from the USAF 59th Medical Wing IRB.
- *Image Selection*
 - Obtain 100 previously acquired CBCT scans
 - 3D Accuitomo at AFPDS Endo & Perio Departments
 - January 2017 through October 2018
 - Inclusion/Exclusion Criteria

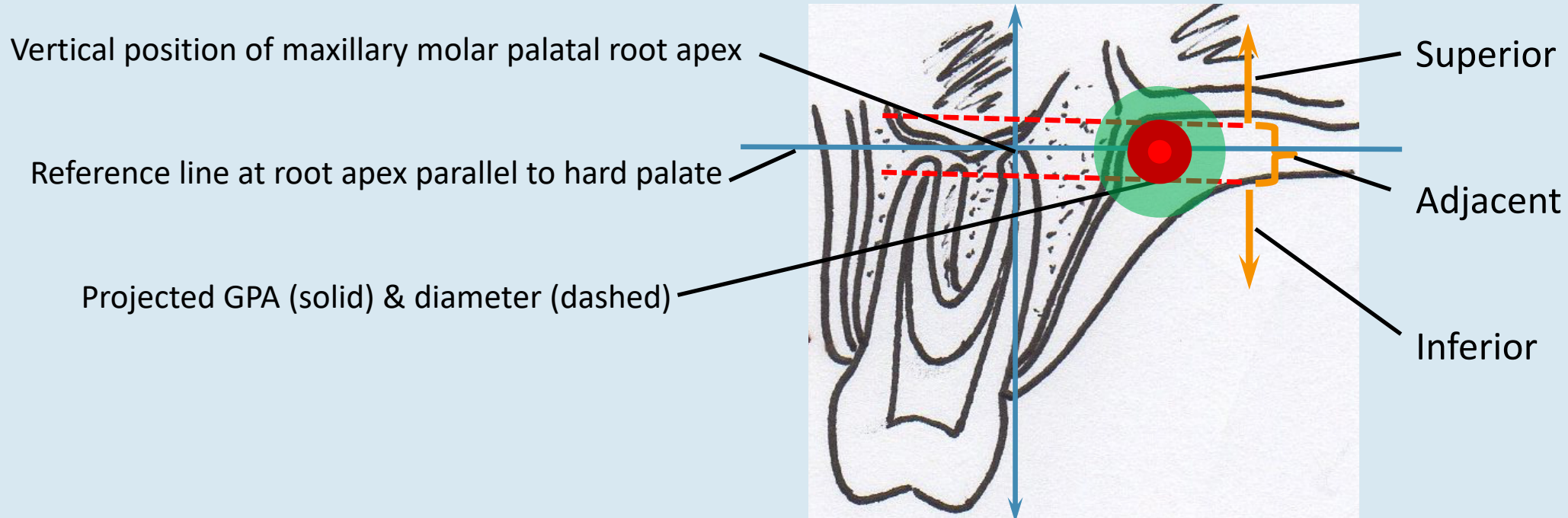
TARGETED ENDODONTIC MICROSURGERY RESEARCH DESIGN

- *Image Selection*
 - Anonymize CBCTs; no identifiers retained with images
 - Store and view from encrypted, non-network hard drive
- *Image Evaluation*
 - Analyze CBCTs with i-Dixel and obtain the following data:
 - A. Classification of maxillary molar palatal roots in relation to GPA
 - B. Feasibility of TEMS pathways to palatal roots
 - C. Distances from maxillary molar palatal roots to GPF & GPA

TARGETED ENDODONTIC MICROSURGERY RESEARCH DESIGN

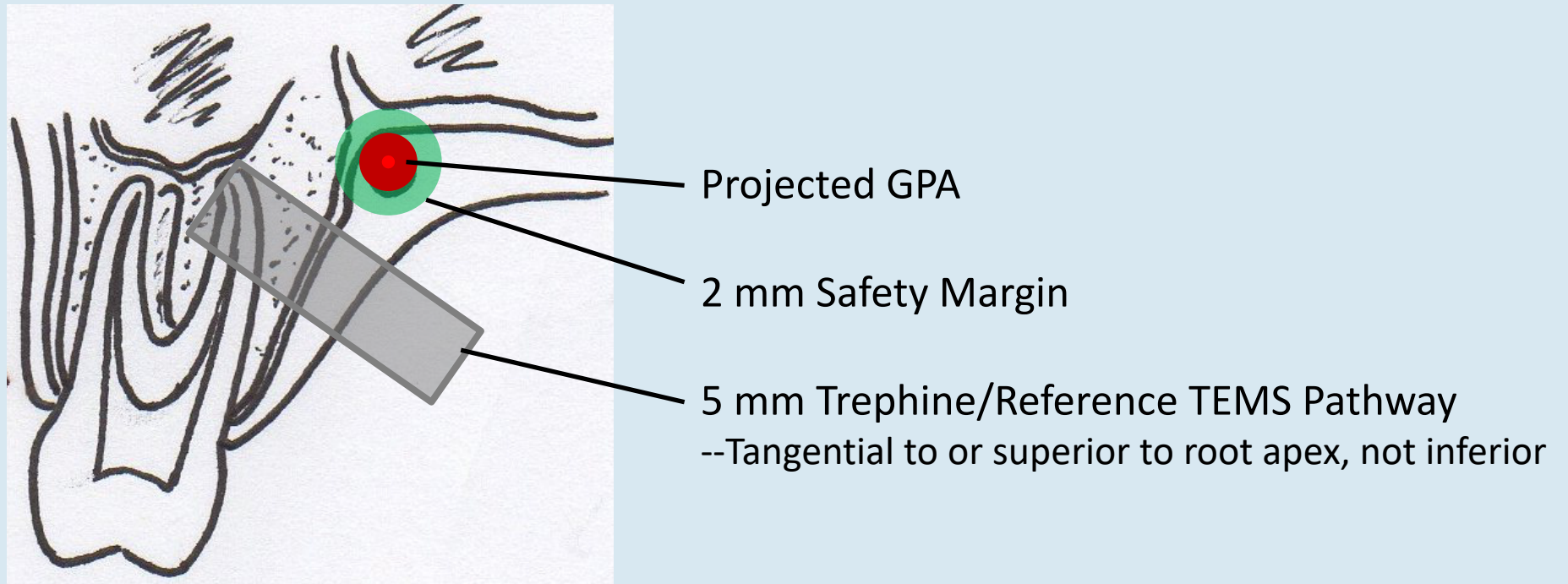
- *Image Evaluation*

- 1) Classify the GPA relative to maxillary molar palatal root apices



TARGETED ENDODONTIC MICROSURGERY RESEARCH DESIGN

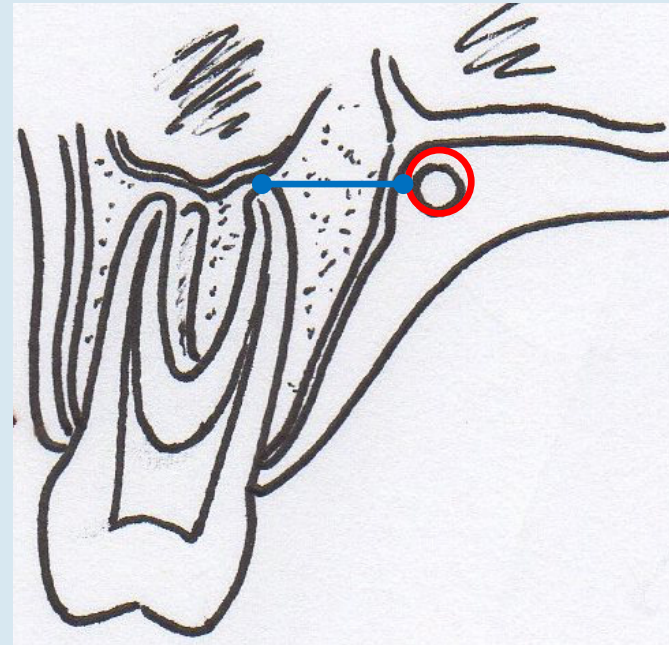
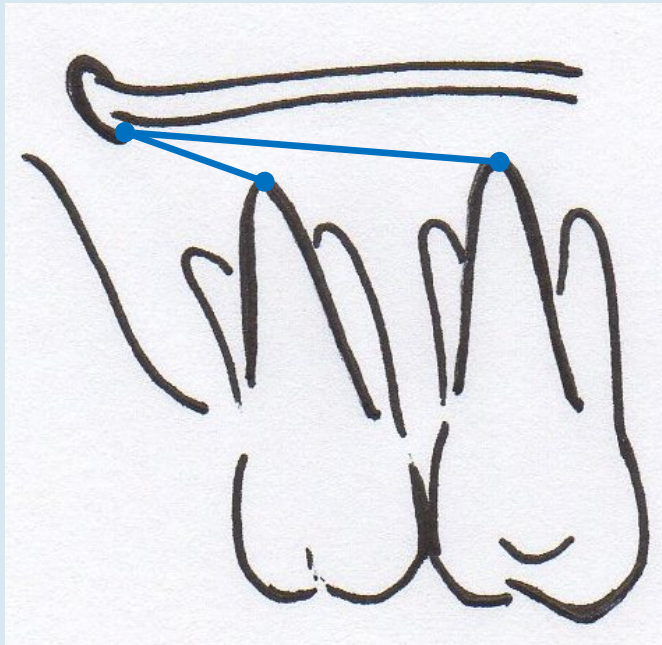
- *Image Evaluation*
 - 2) Determine the feasibility of TEMS



TARGETED ENDODONTIC MICROSURGERY RESEARCH DESIGN

- *Image Evaluation*

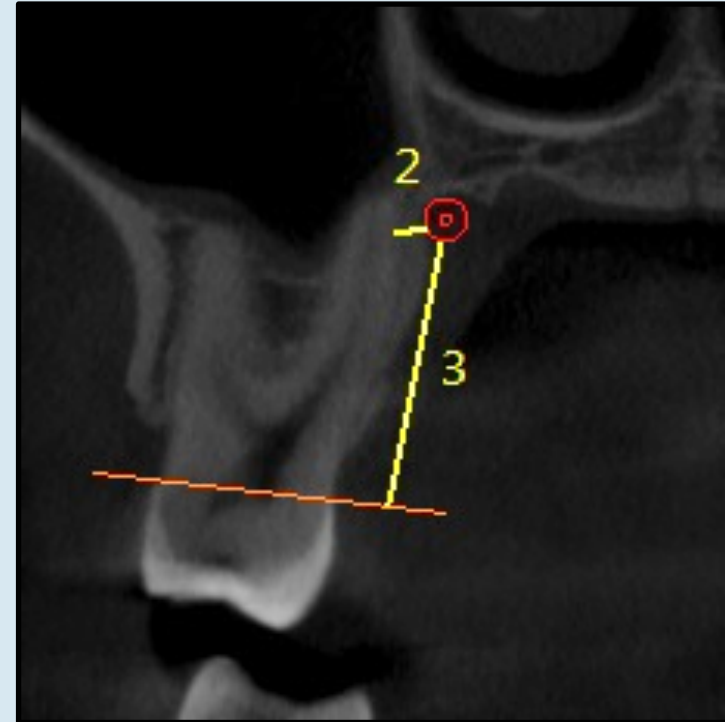
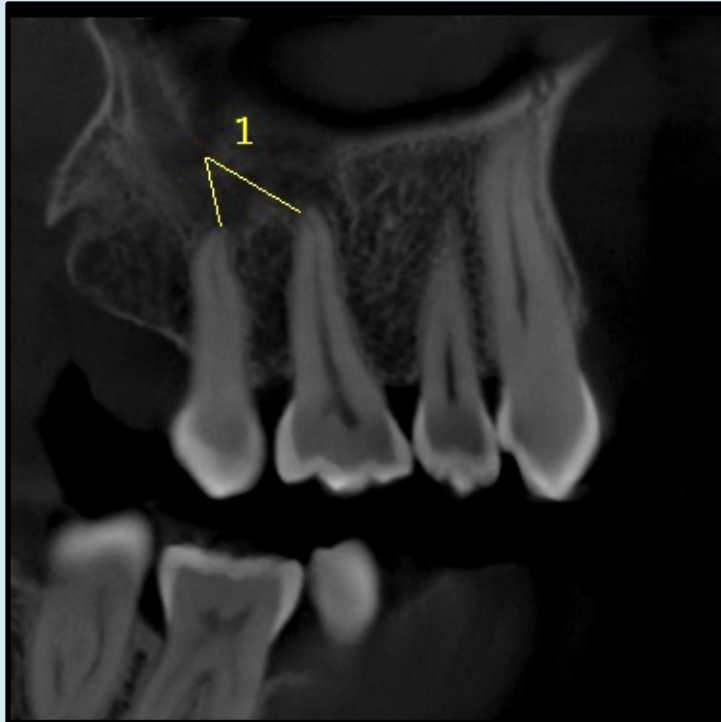
3) Measure distances from maxillary molar palatal roots to GPF & GPA



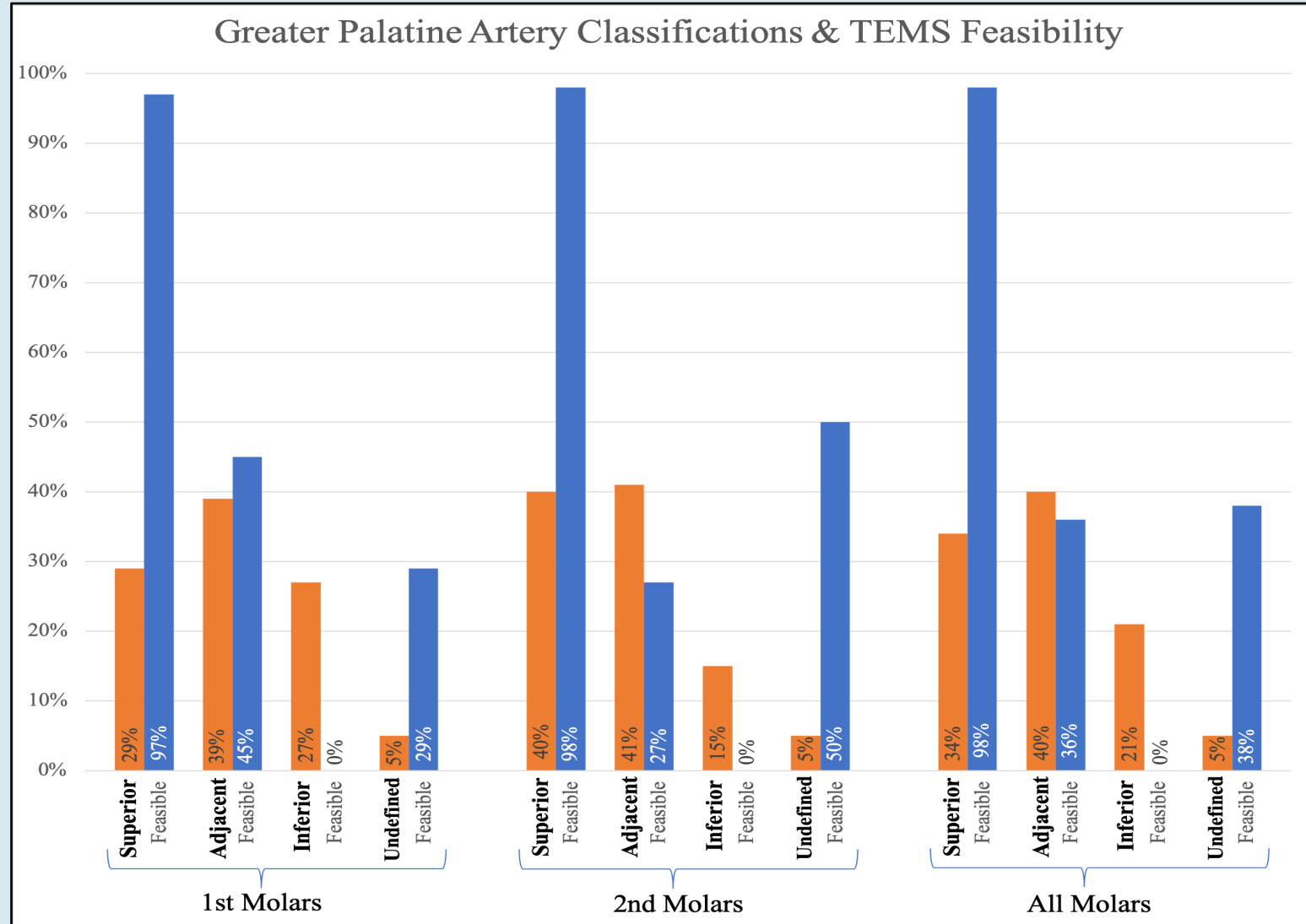
TARGETED ENDODONTIC MICROSURGERY MEASUREMENTS

- *Image Evaluation*

3) Measure distances from maxillary molar palatal roots to GPF & GPA



TARGETED ENDODONTIC MICROSURGERY RESULTS



TARGETED ENDODONTIC MICROSURGERY RESULTS

Measurement	1st Molars				2nd Molars				p Value
	N	Mean	SD	Range	N	Mean	SD	Range	
Root--GPF	126	11.13	2.68	5.30 - 18.46	124	4.94	2.55	0.25 - 12.25	< 0.0001
Root--GPA	126	2.37	1.46	0.18 - 8.13	124	2.53	1.77	0.29 - 7.90	0.45
CEJ--GPA	126	12.86	2.29	7.30 - 18.44	124	14.05	2.52	7.08 - 19.88	0.0001

All Molars			
N	Mean	SD	Range
250	8.06	4.06	0.25 - 18.46
250	2.45	1.62	0.18 - 8.13
250	13.45	2.47	7.08 - 19.88

TARGETED ENDODONTIC MICROSURGERY RESULTS

Measurement	Female				Male				<i>p</i> Value
	N	Mean	SD	Range	N	Mean	SD	Range	
Root--GPF	122	7.95	3.84	0.60 - 14.93	128	8.17	4.27	0.25 - 18.46	0.66
Root--GPA	122	2.51	1.50	0.18 - 7.90	128	2.39	1.72	0.25 - 8.13	0.57
CEJ--GPA	122	12.54	2.56	7.08 - 19.88	128	14.33	2.04	10.36 - 18.83	< 0.0001

All Molars			
N	Mean	SD	Range
250	8.06	4.06	0.25 - 18.46
250	2.45	1.62	0.18 - 8.13
250	13.45	2.47	7.08 - 19.88

TARGETED ENDODONTIC MICROSURGERY **DISCUSSION**

- *Palatal Transition Morphology*
- *Greater Palatine Artery Position*
 - Direct visualization
 - Indirect visualization
- *Safety Margin*
- *TEMS Feasibility*

TARGETED ENDODONTIC MICROSURGERY CONCLUSIONS

- Palatal transition morphology aided in projecting the position of the GPA
- Maxillary 2nd molar roots were closer to the GPA than 1st molar roots
- Palatal-approach TEMS feasibility was relative to the palatal root-to-GPA distance.

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THANK YOU!

Questions?

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