Fall Rounds 2020

Evidence Based Dentistry Rounds

Specialty: Oral Surgery

5B-1

October 7, 2020

Rounds Team

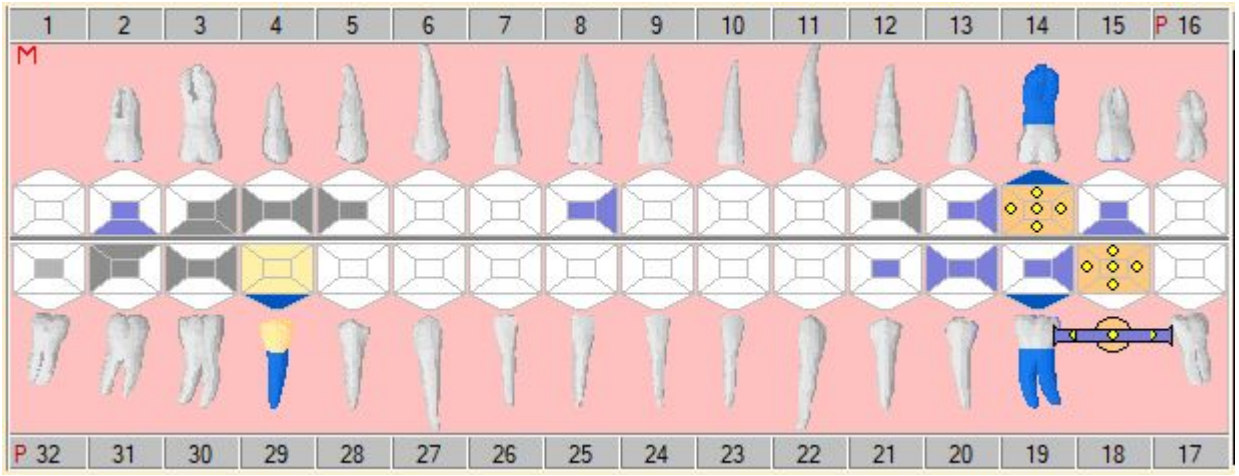
- **Group Leader: Dr. Dix**
- **Specialty Leader: Dr. Camejo**

- **D4: Damien Nelson**
- **D3: Annamarie Ciancio**

- **D2: Madison Dolen**
- **D1: Jenny Kim**

Patient: 775131

- 32 year old, caucasian female
- Chief Complaint: “I have a constant pain. I was told [it] was due to a fracture and it will require a restoration more extensive than a crown. I would also like to get to a point where my oral hygiene is adequate.”

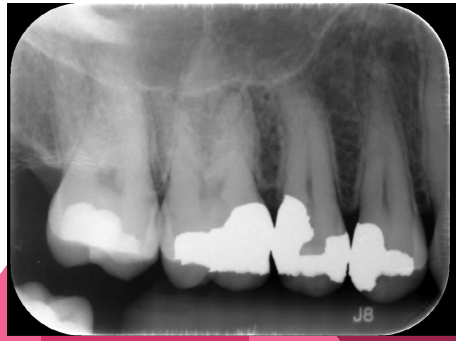


Medical History

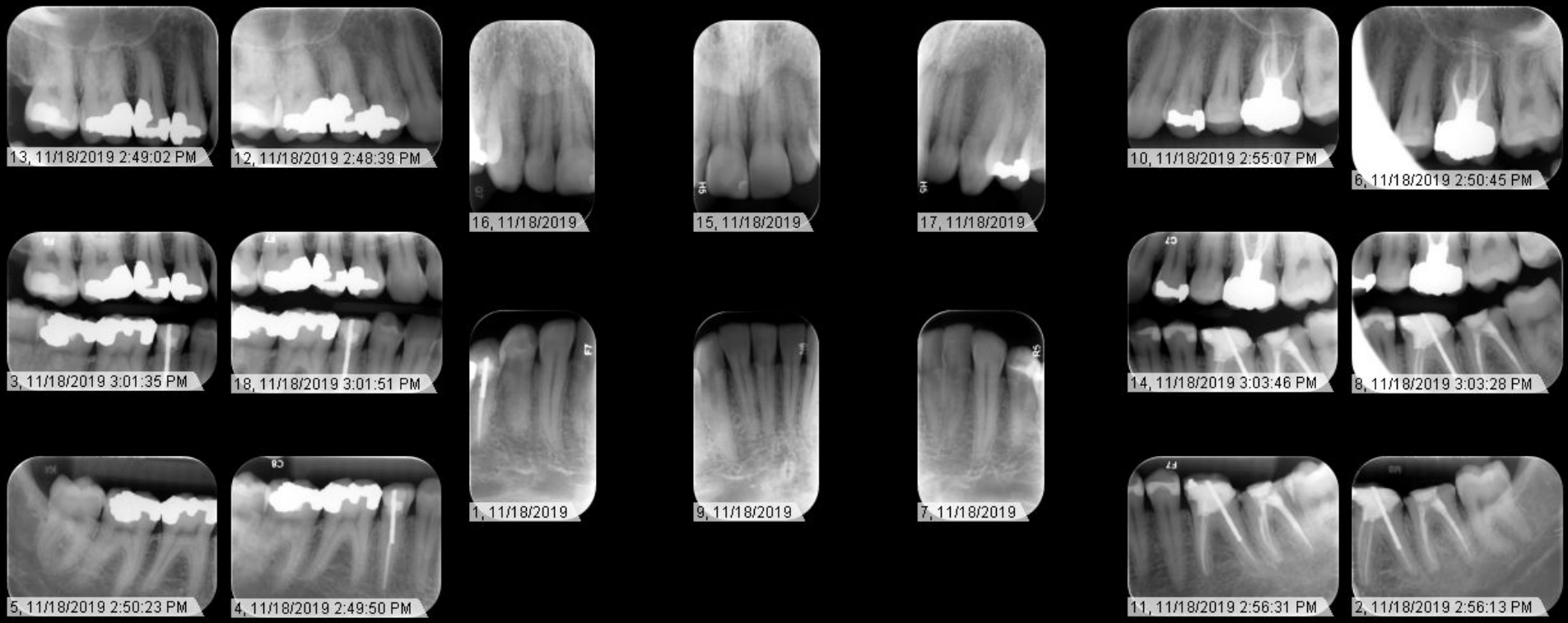
- Patient was 26 weeks pregnant as of September 26, 2020. (Patient is 27.5 weeks as of today)
- Current & past:
  - Medications: rizatriptan (PRN for migraines), topical steroid (rashes), nitrofuran (PRN for UTIs), Vit. D 50,000 mg 1x week, Vit. B12, Calcium, Multi-vitamin
  - Allergies: black pepper (anaphylaxis), neosporin (skin reaction - boil)
  - Conditions: seizure in 2016, heart murmur and arrhythmia (patient could not specify), metabolic syndrome, frequent migraines, frequent skin rashes, frequent UTIs, gall bladder removed February 2020
  - Treatment considerations: use Lidocaine for local anesthesia (Category B), avoid supine position (pregnancy), limit epinephrine (heart)

Dental History

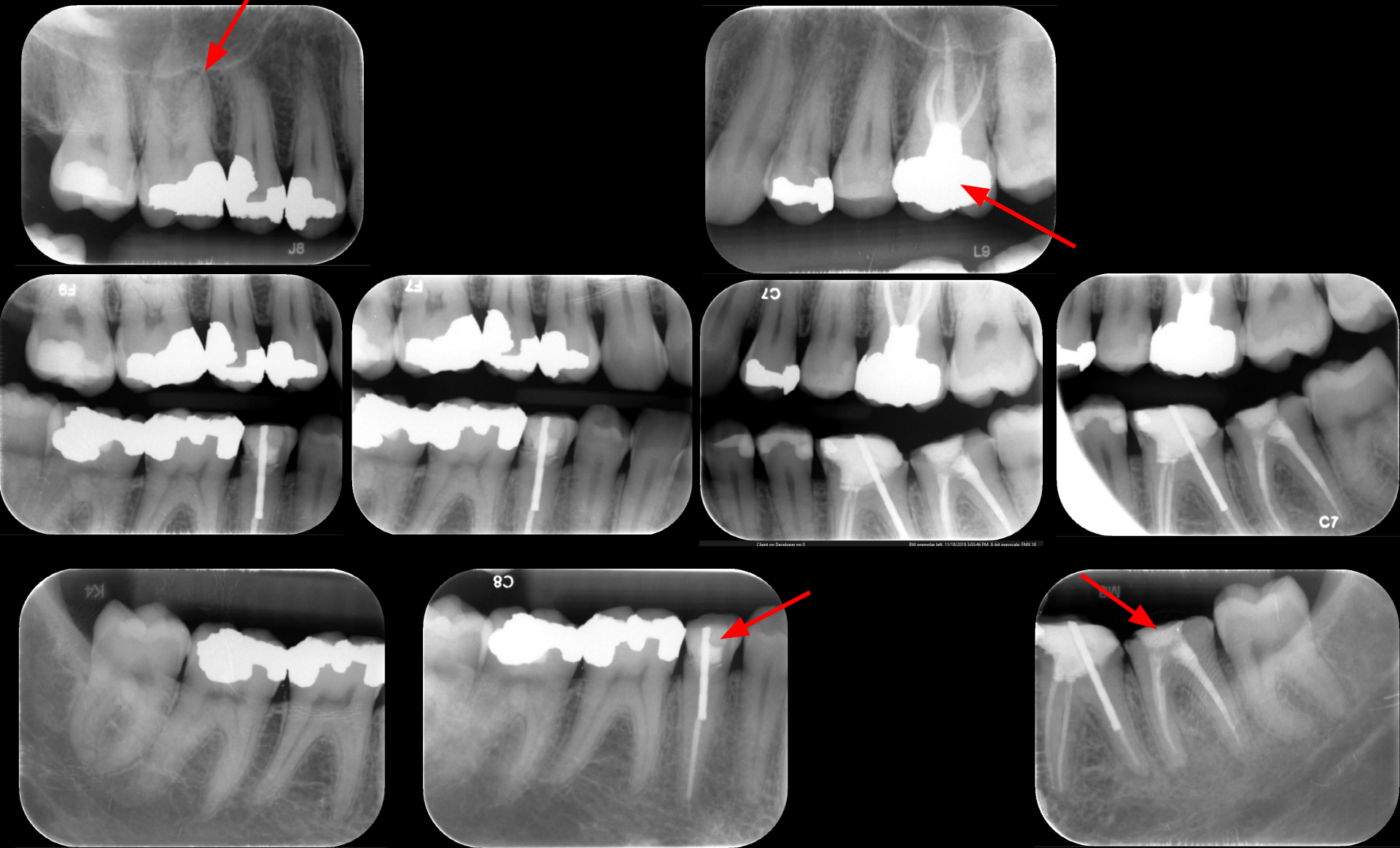
- Patient received routine dental care prior to becoming a patient at MUSoD (0-6 months)
- Patient became a patient at MUSoD due to financial considerations ("... require a restoration more extensive than a crown")
- Patient received routine dental care prior to becoming a patient at MUSoD (0-6 months) and is motivated to improve oral hygiene
- Pain to hot, cold, and sweets that the patient can localize to tooth #3
- Vitality Testing and Endo Consult with Dr. Ibrahim determined patient was experiencing hypersensitivity and not pulpal or periradicular pathology



Radiographs

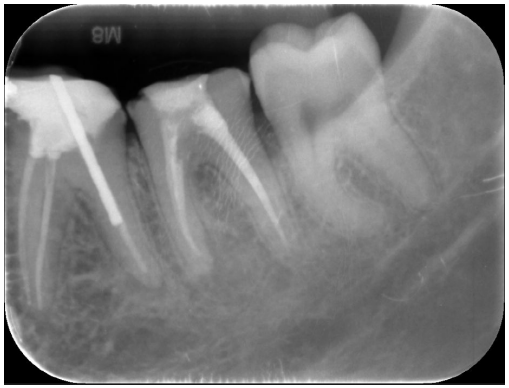


Radiographic Findings: Pertinent PAs and BWs



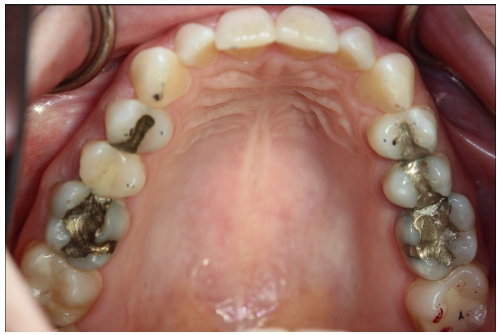
Clinical Findings

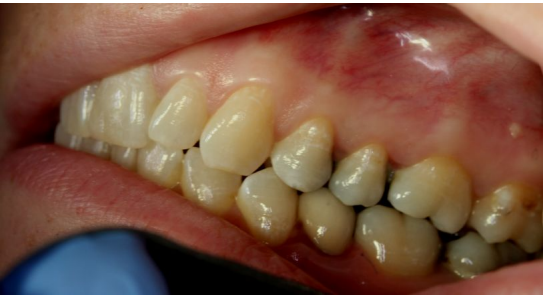
- M fracture line on #18
  - Tooth's long-term prognosis deemed poor at Prosth consult with Dr. Abere
  - 3-unit FPD #17-19 allows us to restore #18 and 19

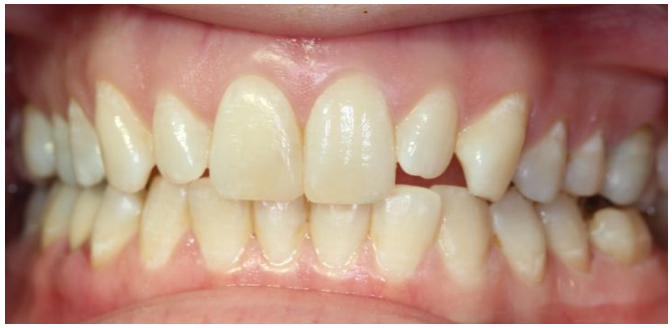


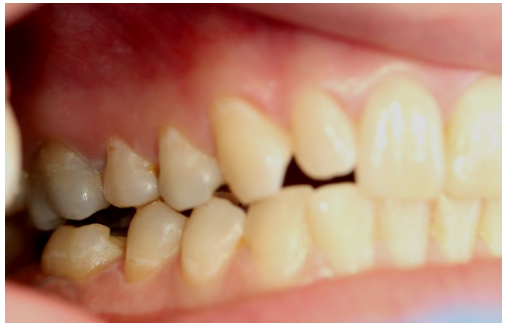
- Primary caries O #32

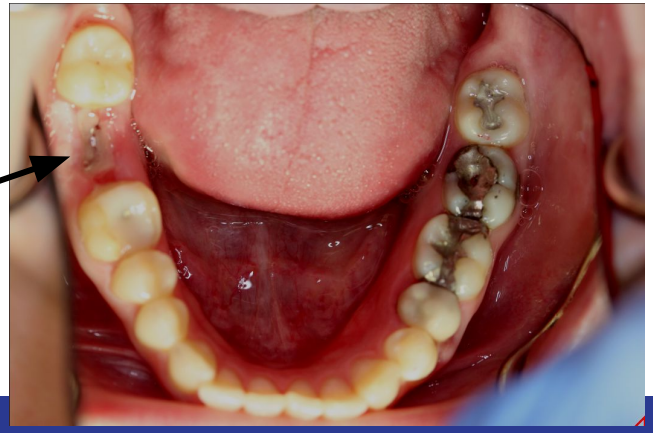
Clinical Photos: Extraction 9/22/2020



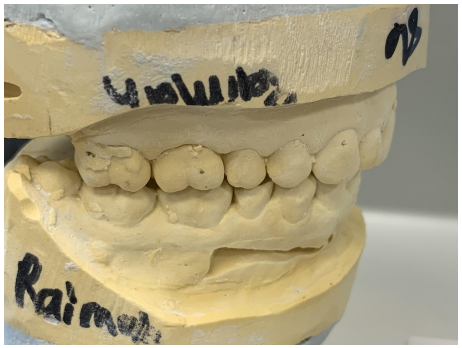


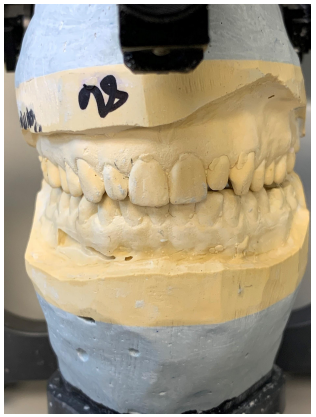


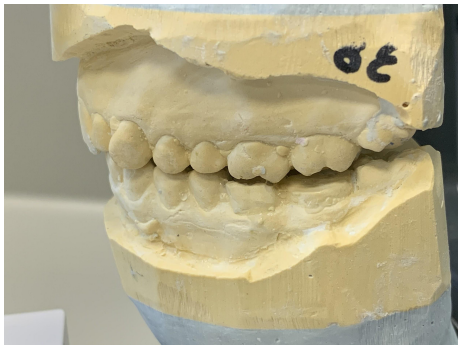


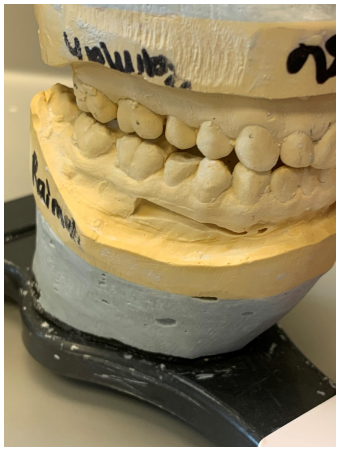


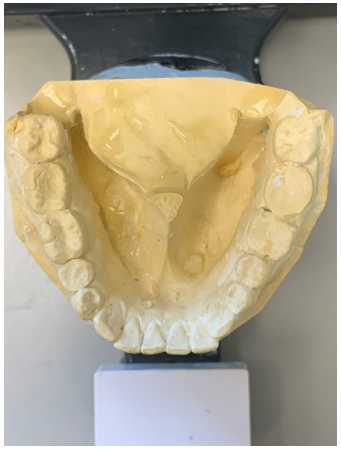
Clinical Photos: Articulator

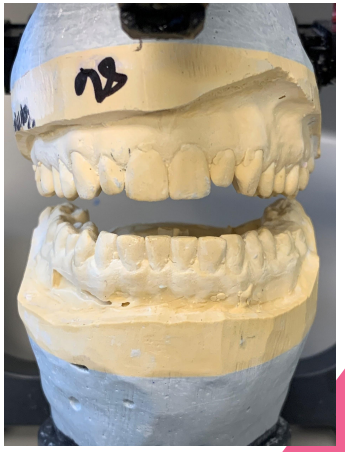


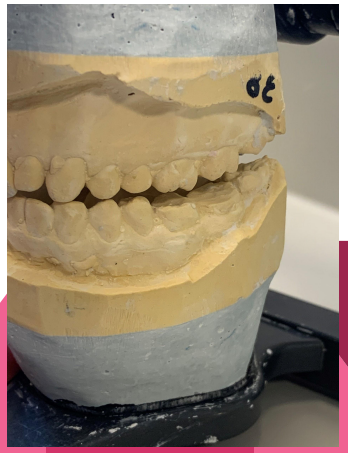












Periodontal Charting

																MOBILITY
																FURCA
	P P	P P	P P	P P	P P							P P	P P	P P	P P	PLAQUE
													B		B	BOP
	5 5 5	5 5 5	5 5 5	5 5 5	7 7 7	6 6 6	6 6 6	5 5 5	5 5 5	6 6 6	5 5 5	5 5 5	5 5 5	6 6 6	5 5 5	MGJ
	2 2 2	2 2 2	2 2 2	2 2 1	1 1 1	1 1 1	1 1 1	1 1 1	2 1 2	2 1 2	2 2 2	2 2 2	3 2 3	3 2 2	3 2 9	CAL
	2 2 2	2 2 2	2 2 2	2 2 1	1 1 1	1 1 1	1 1 1	1 1 1	2 1 2	2 1 2	2 2 2	2 2 2	3 2 3	3 2 2	3 2 9	P.D.
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	FGM
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	FGM
	2 3 2	2 2 2	2 1 2	1 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 2	2 1 2	2 2 2	2 2 2	3 2 4	P.D.
	2 3 2	2 2 2	2 1 2	1 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 2	2 1 2	2 2 2	2 2 2	3 2 4	CAL
																MGJ
																BOP
	P P	P P	P P	P P	P P						P P	P P	P P	P P	P P	PLAQUE
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																PROGNOSI
																FURCA
P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	PLAQUE
																BOP
8 8 8	8 8 8	8 8 8	8 8 8	7 7 7	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	6 6 6	6 6 6	8 8 8	8 8 8	8 8 8	MGJ
2 3 2	2 2 2	2 2 2	2 1 2	2 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	2 1 2	2 1 2	2 2 2	2 2 2	2 2 2	CAL
2 3 2	2 2 2	2 2 2	2 1 2	2 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	2 1 2	2 1 2	2 2 2	2 2 2	2 2 2	P.D.
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32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	
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3 7 2	3 2 2	2 2 2	2 1 2	2 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	2 1 2	2 2 2	2 2 2	2 2 2	P.D.
3 7 2	3 2 2	2 2 2	2 1 2	2 1 2	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	2 1 2	2 2 2	2 2 2	2 2 2	CAL
5 5 5	4 4 4	3 3 3	4 4 4	3 3 3	5 5 5	5 5 5	6 6 6	6 6 6	5 5 5	4 4 4	4 4 4	4 4 4	5 5 5	5 5 5	5 5 5	MGJ
B																BOP
P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P	P P P	P P P	P P	P P	PLAQUE
																FURCA
																MOBILITY

Diagnosis

- Fracture line on the M of the remaining crown on #18, extending to the root surface (diagnosed upon removal of core material)

Problem List

- Caries → Treated
- Fractured Tooth → Missing Tooth (#18)

- Root Canal Treated Teeth without Full Coverage Restorations → #14, #19, **#29**

D1 Basic Science: When is the safest time to administer local anesthetic for dental care during a pregnancy and why?

- **First trimester (week 1 – 12):** Embryo develops into a fetus and organogenesis continues to take place
  - Exposure to chemicals that can act as teratogens
- **Second trimester (week 13 – 27):** Major organs are in place and the baby continues to grow.
  - Teratogenic effects are lower
  - However, increased risk for hypotension starting from week 20
- **Third trimester (week 28 – 40):** Many organs finish maturing, brain continues to develop.
  - Uterus enlarged, leading to higher risk for hypotension

References:
Lee JM, Shin TJ. Use of local anesthetics for dental treatment during pregnancy; safety for parturient. J Dent Anesth Pain Med 2017; 17: 81-90

D1 Basic Science Continued

- **Safest time:** Second trimester, ideally before the 20th week of pregnancy.
  - Lower risk of teratogenic effects
  - Lower risk of hypotension in the supine position

References:

Lee JM, Shin TJ. Use of local anesthetics for dental treatment during pregnancy; safety for parturient. J Dent Anesth Pain Med 2017; 17: 81-90

D2 Pathology: What are the causes of maternal and fetal methemoglobinemia due to the administration of local anesthesia during pregnancy?

Methemoglobinemia: **a condition characterized by the inability of hemoglobin (in RBC's) to carry oxygen to the tissues**

- **due to ferrous iron (Fe2+) being oxidized to ferric iron (Fe3+) which is unable to bind oxygen → hypoxia**

<u>Causes of Methemoglobinemia:</u>

1. **Congenital (less common)**
   - **Type 1: cyanosis, shortness of breath, weakness (can be maintained)**
   - **Type 2: cytochrome b5 reductase deficiency (much more severe/fatal)**
     - **cyanosis along with *neurological dysfunction***
   - **Hemoglobin M disease**
2. **Acquired (more common)**
   - **exposure to oxidizing substances or drugs***
   - **fetal hemoglobin chemically oxidizes easier to methemoglobinemia**

"Autosomal Recessive Congenital Methemoglobinemia - Genetics Home Reference - NIH." *U.S. National Library of Medicine*, National Institutes of Health, ghr.nlm.nih.gov/condition/autosomal-recessive-congenital-methemoglobinemia.

D2 Pathology Continued

How to prevent:

- avoid use of **prilocaine** (along with benzocaine and dapsone) during pregnancy
  - these substances oxidize hemoglobin to methemoglobin
- avoid nitrates in food or water and aniline dyes
- avoid certain medications and oxidant substances (antimalarial drugs and phenacetin for example)

How to treat:

- In non-pregnant patients
  - methylene blue or ascorbic acid
- In pregnant patients
  - methylene blue requires a risk/benefit analysis (teratogen)
  - ascorbic acid (Vitamin C) with transfusion of packed RBCs

Faust, Andrew C., et al. “Local Anesthetic−Induced Methemoglobinemia During Pregnancy: A Case Report and Evaluation of Treatment Options.” *The Journal of Emergency Medicine*, Elsevier, 5 Mar. 2018.

D3 PICO

- **Clinical Question: When is the safest time to administer local anesthetic and perform elective dental procedures on a pregnant patient, prior to the fabrication of a 3-unit FPD 17-19?**

PICO Format

P: Pregnant patients

I: Elective dental procedure with local anesthetic

C: Waiting until after delivery

O: Successful extraction without complications

PICO Formatted Question

- Do pregnant patients requiring the administration of local anesthetic for elective dental procedures possess an increased risk for adverse complications from the local anesthetic compared to nonpregnant patients?

Clinical Bottom Line

When is it safest to perform elective dental procedures, with local anesthetic, on pregnant patients?

Search Background

- **Date(s) of Search:** 9/24/20, 9/27/20
- **Database(s) Used:** PubMed
- **Search Strategy/Keywords:** Pregnant, pregnant patients, tooth extractions, dental care, dental, local anesthetic, indications

Search Background

- **MESH terms used: pregnant, tooth extractions, local anesthetic, dental care**

Article 1 Citation, Introduction

- Citation: Steinberg BJ et al., Oral health and dental care during pregnancy. Dent Clin North Am. 2013 Apr;57(2):195-210.

- Study Design: Clinical Practice Guidelines

Article 1 Synopsis

- Older, reliable anesthetics should be the first choice for local anesthetic
  - Few clinical drug trials include pregnant women
  - Lidocaine 2% with 1:100,000 epi and Mepivacaine 3% are deemed safe due to their solid track record
- Data from Obstetrics and Periodontal Therapy Trial showed women who received extractions during the second trimester did not experience higher rates of adverse birth outcomes compared to women who did not receive dental treatments

Article 1 Selection

- Directly answered PICO question
  - Older, reliable anesthetics are safe during pregnancy
  - Extractions during second trimester did not experience adverse outcomes
- High level of evidence

Article 2 Citation, Introduction

- Fayans EP et al., Local anesthetic use in the pregnant and postpartum patient. Dent Clin North Am. 2010 Oct;54(4):697-713.
- Study Design: Clinical Practice Guideline

Article 2 Synopsis

- Lidocaine is the local anesthetic of choice in the pregnant patient
- Accidental intravascular injection is most problematic during 1st and 3rd trimester
- First Trimester
  - Normally used local with epi does not impose an increased risk to mother or developing fetus
- Second Trimester
  - Maximum dose of Lidocaine (5 mg/kg without epi or 7 mg/kg with epi) is too small to cause harm to the fetus
- Third Trimester
  - No significant contraindications to use the use of Lidocaine with epi

Article 2 Selection

- Directly answered PICO question
  - Article gave a breakdown of each trimester of pregnancy and different risks associated with each trimester
  - Article suggested a recommended local anesthetic
- High level of evidence

Article 3 Citation, Introduction

- Michalowicz BS et al., Examining the safety of dental treatment in pregnant women. J Am Dent Assoc. 2008 Jun;139(6):685-95.
- Study Design: Randomized Control Trial

Article 3 Synopsis

- 823 women randomly assigned to either receive essential dental treatment (EDT) at 13-21 weeks gestation, up to 3 months post delivery or to receive no treatment
- EDT in pregnant women at 13-21 weeks' gestation was not associated with an increased risk of experiencing serious medical adverse events or adverse pregnancy outcomes
- Use of topical and local anesthetics are safe in pregnant women at 13-21 weeks

Article 3 Selection

- Directly answered PICO question
  - Lidocaine is safe to use in the second trimester
  - Essential dental treatment is safe in the second trimester
- High level of evidence

Levels of Evidence

- ☒ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
- ☒ **1b** – Individual RCT
- ☐ **2a** – Systematic Review of Cohort Studies
- ☐ **2b** – Individual Cohort Study
- ☐ **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
- ☐ **4a** – Systematic Review of Case Control Studies
- ☐ **4b** – Individual Case Control Study
- ☐ **5** – Case Series, Case Reports
- ☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
- ☐ **7** – Animal Research
- ☐ **8** – In Vitro Research

Double click table to activate check-boxes

Strength of Recommendation Taxonomy (SORT)

☒	**A** – Consistent, good quality patient oriented evidence
☐	**B** – Inconsistent or limited quality patient oriented evidence
☐	**C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusions: D3

- Elective dental procedures are safe during pregnancy
  - Second trimester is the safest time to perform procedures
- Lidocaine is the local anesthetic of choice
- Care needs to be taken during all trimesters to prevent intravascular injection

Conclusions: D4

Extraction of #18 using lidocaine as the local anesthetic is safe for this patient, especially because she is in her 2nd trimester of pregnancy.

Discussion Questions

THANK YOU