

# Evidence Based Dentistry Rounds



Specialty: Perio

Group: 7B-3

Date: November 18, 2020



# Rounds Team

- **Group Leader: Dr. Rossi**
- **Specialty Leader: Dr. Ganzman**
- **Project Team Leader: Reema Daas**
- **Project Team Participants: Hannah Hamwi; Manika Luhano; Mikaella Sabinash**





## Patient: D. P.

- 84 year old Caucasian male
- CC: "My bridge broke off."



# Medical History

## ➤ **Significant For:**

- High cholesterol
- Vision problems
- Hearing impairment

## ➤ **Medications:**

- Simvastatin (cholesterol)
- Coenzyme Q10 (cholesterol)
- Multivitamin

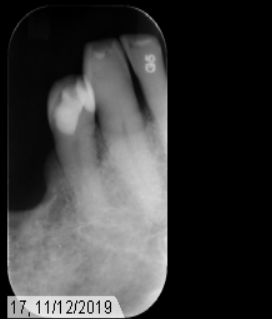
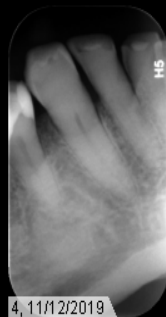
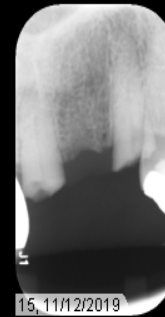


# Dental History

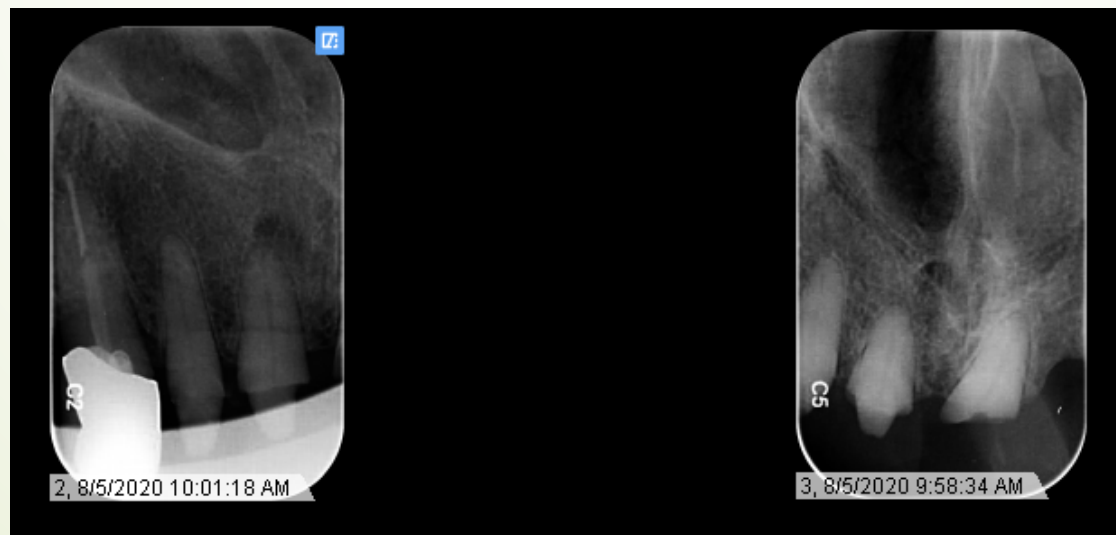
## ➤ Previous Treatments:

- Extractions
- Restorative
- Endodontics (RCT)
- Crowns and Bridges

# Radiographs



# Radiographs





# Radiographic Findings

- Retained root #9, #11
- Recurrent caries #7 D, #8 DF, #21 DO
- Primary caries #23 D
- Root canal treated #6
- Incisal wear (lower anteriors)



# Clinical Findings

- Retained root #9, #11
- Recurrent caries #7 D, #8 DF, #21 DO
- Primary caries #23 D
- Incisal wear (lower anteriors)
- Excessive gingival display
- Maxillary dentoalveolar extrusion





# Specific Findings

- Excessive gingival display due to maxillary dentoalveolar extrusion
  - Incisal wear present on the lower anteriors
- 







# Diagnosis

- ➡ Maxillary dentoalveolar extrusion
- 



# Problem List

- Perio: gingivitis
- Restorative: recurrent decay, primary dental caries, incisal wear (lower anteriors)

# Clinical Photographs





# Clinical Photographs






# Clinical Photographs



## D1 Basic Science: What is tooth eruption?

- Tooth eruption is defined as “the movement of a tooth from its site of development within the alveolar process to its functional position in the oral cavity” (Marks, S. & Schroeder, H.)
  - What causes tooth to begin and move eruptively and eventually stop movement is not fully understood
- Eruption time = time of root formation up until tooth appears in mouth (Kjaer, Inger)
- Importance in mastication, speaking, and smiling



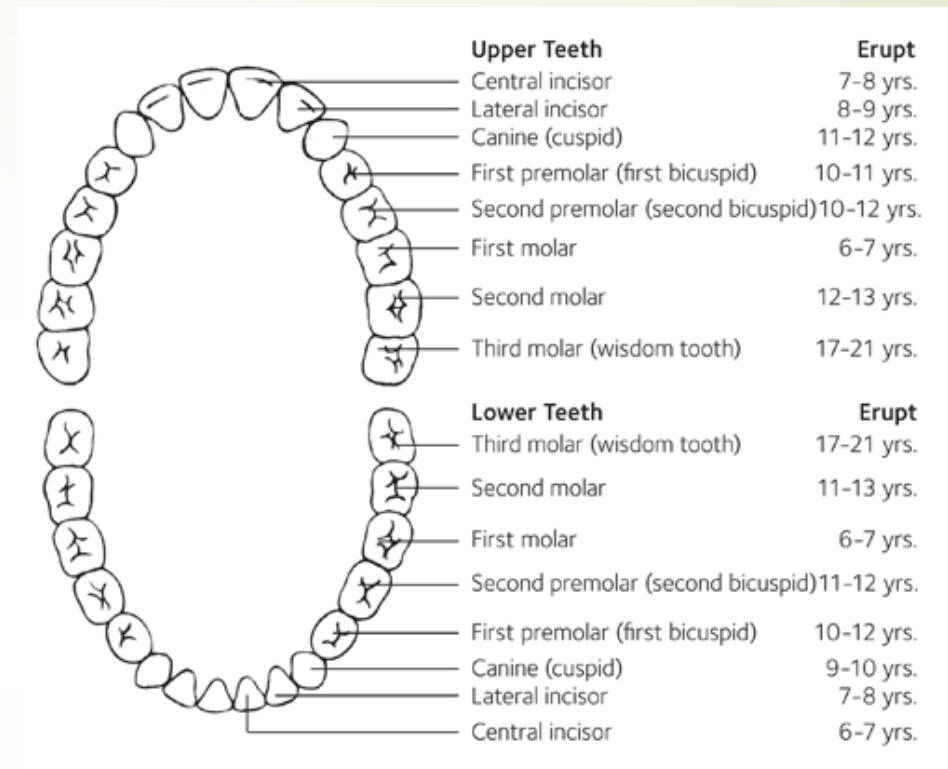
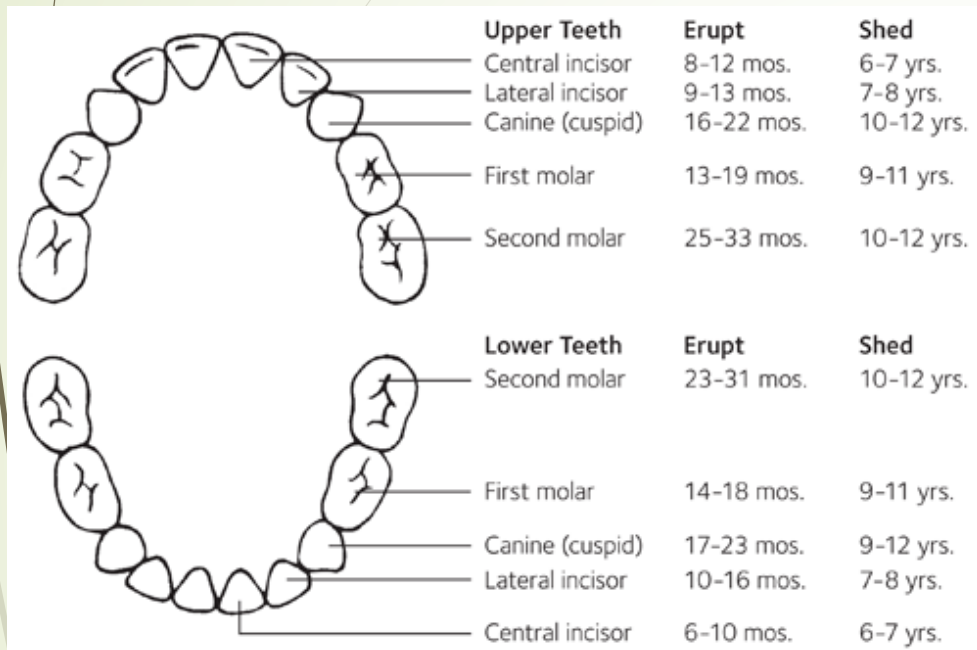
# Some influencing factors in tooth eruption

- Erupting teeth...
  - Move in a 3D space, not just along their axis
  - Erupt at varying stage specific speeds
  - Arrive at a functional position that is inheritable
- Root elongation
- Alveolar bone remodeling
- The periodontal ligament

(Marks, S. & Schroeder, H.)



# Tooth Eruption Pattern



Human dentition includes...

- 20 primary teeth which begin erupting at 6 months of age (primary dentition stage)
- Primary teeth shed throughout childhood (mixed dentition stage- primary & permanent teeth present)
- 32 permanent teeth replace the primary teeth by age 21 (permanent dentition stage)



## D2 Pathology: What is excessive gingival display?

- Excessive exposure of the maxillary gingiva while smiling is referred to as excessive gingival display commonly known as a “gummy smile”.
- This could be present because of a skeletal deformity with vertical excess of maxillary tissue, soft tissue deformity causing a short upper lip, or insufficient clinical crown length due to local factors i.e trauma or coronally shifted gingiva due to hypertrophy.

## D2 Pathology

- Based on the bone and soft tissue level appropriate periodontal surgery such as gingivectomy in combination with ostectomy can be performed to correct the excessive gingival display.





## D3 PICO

### **Clinical Question:**

What are the etiologies of excessive gingival display?



# PICO Format

**P:** Patients with excessive gingival display

**I:** Crown lengthening

**C:** Orthodontic intrusion or other treatments

**O:** Improvement of smile esthetics and long-term stability





# PICO Formatted Question

In patients with excessive gingival display, will crown lengthening lead to better smile esthetics and function compared to orthodontic intrusion or other treatment interventions?



## Clinical Bottom Line

In patients with excessive gingival display, it is essential to determine the etiology of the gummy smile in order to determine the treatment for a patient. The two treatments, crown lengthening and orthodontic intrusion, are not interchangeable and depend on the specific diagnosis.



# Search Background

- **Date(s) of Search:** 11/1, 11/3, 11/7
- **Database(s) Used:** Pubmed.gov, The International Journal of Dentistry, SPEAR Education
- **Search Strategy/Keywords:** Studies containing information about the etiologies of a gummy smile and the specific treatments developed for the diagnosis.





# Search Background

**MESH terms used:** Excessive gingival display, gummy smile, etiology, interventions, crown lengthening, orthodontic intrusion



## Article 1: Differential Diagnosis and Treatment of Excess Gingival Display

- **Citation:** Robbins JW. Differential diagnosis and treatment of excess gingival display. Pract Periodontics Aesthet Dent. 1999 Mar;11(2):265-72; quiz 273. PMID: 10321231
- **Study Design:** Expert opinion without explicit critical appraisal, narrative review
- **Purpose:** To describe a differential diagnosis for excess gingival display as well as recommendations for treatment.

# Article 1 Synopsis

**Diagnosis:** To diagnose the etiology of a gummy smile, a few parameters need to be evaluated:

- Face height
- Maxillary lip length
- Smile line
- Crown length of the maxillary incisors

Etiology	Treatment
Short or hyperactive maxillary lip	Lip repositioning/facial plastic surgery
Altered passive eruption	Mucoperiosteal flap with ostectomy and gingival recontouring
Dentoalveolar extrusion	Teeth repositioning orthodontically or surgically
Vertical maxillary excess	Orthognathic surgery



## Article 1 Synopsis

**Conclusions:** Face height, lip length and activity, and tooth length are all esthetic parameters that can determine the etiology of a gummy smile. Accurately diagnosing the patients excessive gingival display is essential in determining the treatment intervention to improve esthetics and ensure long-term stability.

**Limitations:** The level of evidence is limited as it is an expert opinion and it was published in 1999.



## Article 1 Selection

**Reason for selection:** This article presents several etiologies for gummy smiles and recommends specific treatment options for each etiology of excessive gingival display.

**Applicability to your patient:** The article discusses the etiology of dentoalveolar extrusion presented in our patient and the recommended treatment of orthodontia or surgical intervention.


**Implications:** Gives a differential diagnosis for excessive gingival display and how to select the best treatment invention for patients based on the etiology.

# Article 1 Level 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

<input type="checkbox"/>	<b>A</b> – Consistent, good quality patient oriented evidence
<input type="checkbox"/>	<b>B</b> – Inconsistent or limited quality patient oriented evidence
<input checked="" type="checkbox"/>	<b>C</b> – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening





## Article 2: Managing Over-eruption Following Tooth Wear

**Citation:** Spear, Frank. "Managing Over-Eruption Following Tooth Wear." *Spear Review RSS*, 10 Dec. 2015, [www.speareducation.com/spear-review/2015/12/managing-over-eruption-following-tooth-wear](http://www.speareducation.com/spear-review/2015/12/managing-over-eruption-following-tooth-wear).

**Study Design:** Expert opinion without explicit critical appraisal, narrative review

**Purpose:** This article focuses on the problem of the presence of isolated wear on segments of teeth, rather than generalized wear on all teeth and treatment interventions for this.

## Article 2 Synopsis

### Diagnosis of eruption:

- Dentoalveolar extrusion
  - Tooth, gingiva and alveolus all move coronally
- Continued active eruption
  - Tooth erupts but the gingiva and bone do not

Criteria/Diagnosis	Crown lengthening vs Orthodontic intrusion?
Root length in bone & furcation location	Crown lengthening due to shorter tx time
Tooth alignment/occlusal relationships	Orthodontic correction to reposition teeth
Inadequate amount of tooth structure	Crown lengthening is best option
Contact length/papilla height	With adequate tooth structure, intrusion is the better option
Periodontal status/existing bone levels	Crown lengthening for bone removal and tissue alteration





## Article 2 Synopsis

**Conclusions:** The types of eruption following tooth wear include dentoalveolar extrusion and continued active eruption; orthodontic intrusion and periodontal crown lengthening are the most common approaches to treating eruption following wear. To choose a treatment, the desired tooth position, gingival levels, papilla levels and occlusion must be determined. Evaluating several criteria can help to determine the appropriate treatment.

**Limitations:** If the wear on the teeth is isolated to the anterior teeth, it will not be necessary to increase the vertical dimension in order to create room for the restorations. This means that correcting the eruption of the anterior teeth will create the space needed for restorations and not need to alter the posterior teeth.



## Article 2 Selection

**Reason for selection:** This article discusses types of teeth eruption due to wear of teeth and the common treatment interventions of crown lengthening and orthodontic intrusion.

**Applicability to your patient:** This directly relates to our patient as it discusses isolated wear on the anterior teeth resulting in the diagnosis of dentoalveolar extrusion and the common interventions of crown lengthening and orthodontic intrusion.

**Implications:** Gives a differential diagnosis for managing over-eruption of teeth following isolated segments of wear and how to select the best treatment based on several criteria.

# Article 2 Level of Evidence

- ☐ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
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## Article 3: A Comparative Evaluation for Biologic Width following Surgical Crown Lengthening Using Gingivectomy and Ostectomy Procedure

- **Citation:** Ganji KK, Patil VA, John J. A Comparative Evaluation for Biologic Width following Surgical Crown Lengthening Using Gingivectomy and Ostectomy Procedure. Int J Dent. 2012;2012:479241. doi: 10.1155/2012/479241. Epub 2012 Aug 26. PMID: 22969804; PMCID: PMC3433145.
- **Study Design:** Individual RCT
- **Purpose:** To evaluate the positional changes of the periodontal tissues for a period of 6 months, specifically evaluating the biologic width before and after the two surgical crown lengthening procedures: gingivectomy and ostectomy with apically positioned flap.

# Article 3 Synopsis


## Methods:

- Clinical study included 30 patients (mean age 30) selected on basis of factors hampering proper restorative measures for placing a full crown
  - **Group A (control)** → 10 patients selected who required crown lengthening but the crown lengthening was NOT done and crown margins were placed subgingivally
  - **Group B1** → 10 patients selected who required crown lengthening and surgical procedure was gingivectomy (soft tissue removal only) and margins were placed supragingivally
  - **Group B2** → 10 patients selected who required crown lengthening and surgical procedure carried out was ostectomy (soft and hard tissue removal) with apically positioned flap and margins were placed supragingivally.

**Results:** Probing depths of Group A were recorded. Mean biologic width values from Group B1 and B2 at various intervals of weeks.

Study groups	1 week	3 weeks	6 weeks	12 weeks
Group A (PD)	2.7 mm	3.3 mm	4.4 mm	5.1 mm
Group B1 (BW)	2.55 mm	1.15 mm	1.65 mm	2.5 mm
Group B2 (BW)	1.95 mm	1.25 mm	1.85 mm	1.8 mm





## Article 3 Synopsis

**Conclusions:** The clinical study concludes that the ostectomy with apically positioned flap procedure is superior to gingivectomy for surgical crown lengthening. This is because the gingival margin shifted to a more coronal position during healing and remained unchanged during 5 to 7 years of maintenance after the ostectomy procedure.

**Limitations:** There were factors that influenced the amount of tissue displacement such as tissue biotype. More clinical research is needed to answer the question of how long a clinician should wait after surgical crown lengthening procedure to begin restorative procedures to ensure stable results.



## Article 3 Selection

**Reason for selection:** This article compares two surgical crown lengthening procedures to evaluate changes in the periodontal tissues and biologic width.

**Applicability to your patient:** This relates to our patient because crown lengthening using the ostectomy procedure was performed to correct their gummy smile.

**Implications:** This study compares the two crown lengthening procedures and how the tissues change to reestablish the biologic width; the ostectomy procedure proved to be more effective in reestablishing biologic width.



# Article 3 Level of Evidence

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## Conclusion & Advisement to D4

For patients with excessive gingival display, it is essential to determine the etiology by evaluating esthetic facial and intraoral parameters before developing a specific treatment intervention. In the case of our patient, it has been determined that the lower anterior teeth are severely worn resulting in maxillary dentoalveolar extrusion. Two treatment options are commonly performed in this case: crown lengthening or orthodontic intrusion. Ultimately, crown lengthening is the treatment of choice in this case due to the fact the patient is 84 years old and orthodontic intrusion would take a couple of years (too much time). To conclude, crown lengthening and orthodontic intrusion are both effective methods for correcting a gummy smile; however, it is essential to first determine the etiology in order to determine a successful course of treatment for the patient.



# Conclusions: D4

Based on your D3's bottom line recommendations, how will you **advise** your patient?

I would advise my patient by explaining to them the two treatment options, crown lengthening and orthodontic intrusion. I would then explain to them why crown lengthening is the ideal treatment option specifically for them – age being the primary factor.

How will you **help** your patient?

I will help my patient by treating their 'gummy smile' and fabricating new sets of crowns for teeth 7 and 8 along with a maxillary partial denture all to help restore esthetics and function.



# Discussion Questions

- What are the contraindications of crown lengthening?
- What are the contraindications of orthodontic intrusion?
- What are some patient considerations that would aid in making the decision between crown lengthening versus orthodontic intrusion?
- What are the alternative treatment options for excessive gingival display besides crown lengthening and orthodontic intrusion?
- How does the crown root ratio of a tooth impact whether you do crown lengthening versus orthodontic intrusion?