Fall 2020 Rounds: Perio Case Management

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Meghan Ryan, and Elyse Cao

Group Leader: Dr. Pelz

Specialty Leader: Dr. Dentino

Project Leader: Anna Goetz

Project Team: Chante Parker (D3), Courtney Pagenkopf (D2), Elyse Cao (D1) and Meghan Ryan (D1)

Patient

- 68 yo female
- African American
- CC: “I want to fix my broken teeth”

Medical History

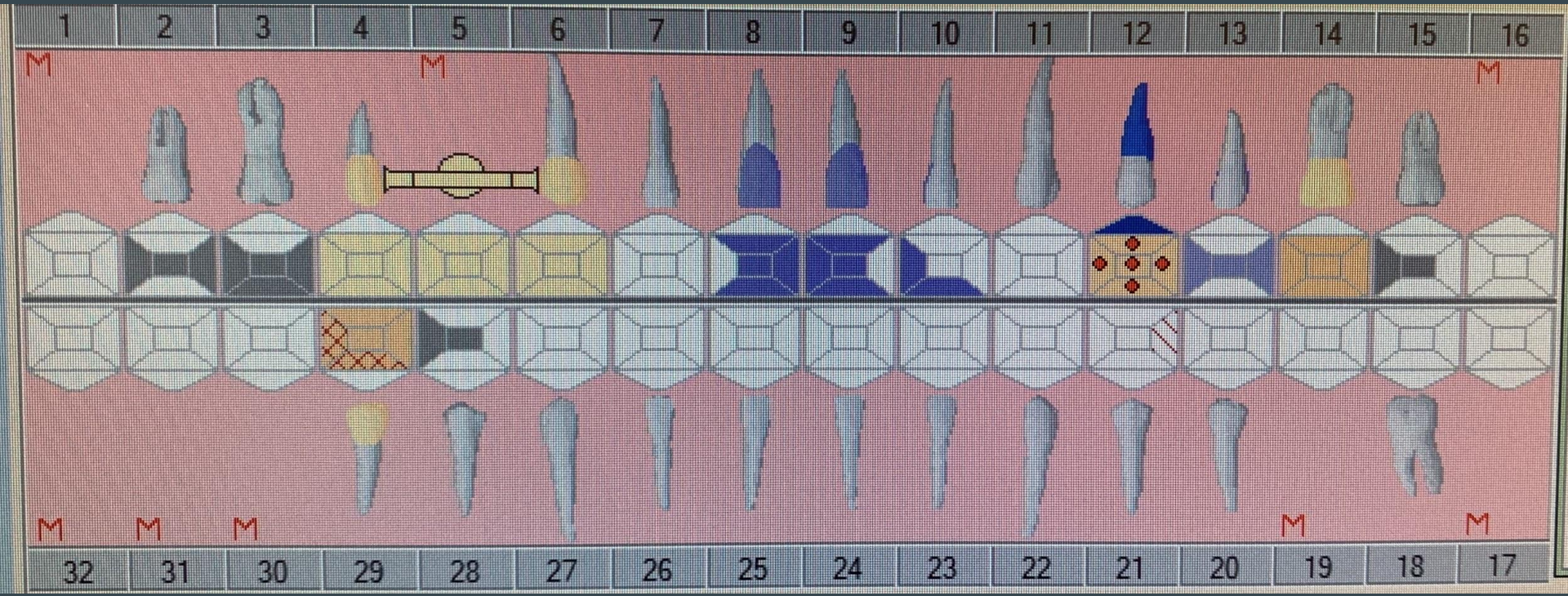
- Diagnoses & Conditions: High blood pressure, type 2 diabetes, seizures, anxiety, GERD, vision problems
- Medications: Keppra (levetiracetam) for treatment of seizures, Hydrochlorothiazide (diuretic for high blood pressure), Losartan (, Metformin, Metropolol Su-hydrochlorothiazide

Dental History

CORAH Score: 12

Moderate Anxiety that is manageable

- Bridge from #4-6
- Crown on #14
- Crown on #29
- Teeth 1, 16, 17, 19, 30, 31, 32 are missing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Radiographs

Radiographic Findings

- Teeth 1, 16, 17, 19, 30, 31, 32 are missing
- Fractured crown #12
- Fractured bridge #18-20
- #8 MIFL resin restoration
- #9 MIFL resin restoration
- #13 MOD resin restoration
- #14 PFM crown
- #15 MO amalgam
- #29 PFM crown
- #3 MODL amalgam
- #2 MOD amalgam

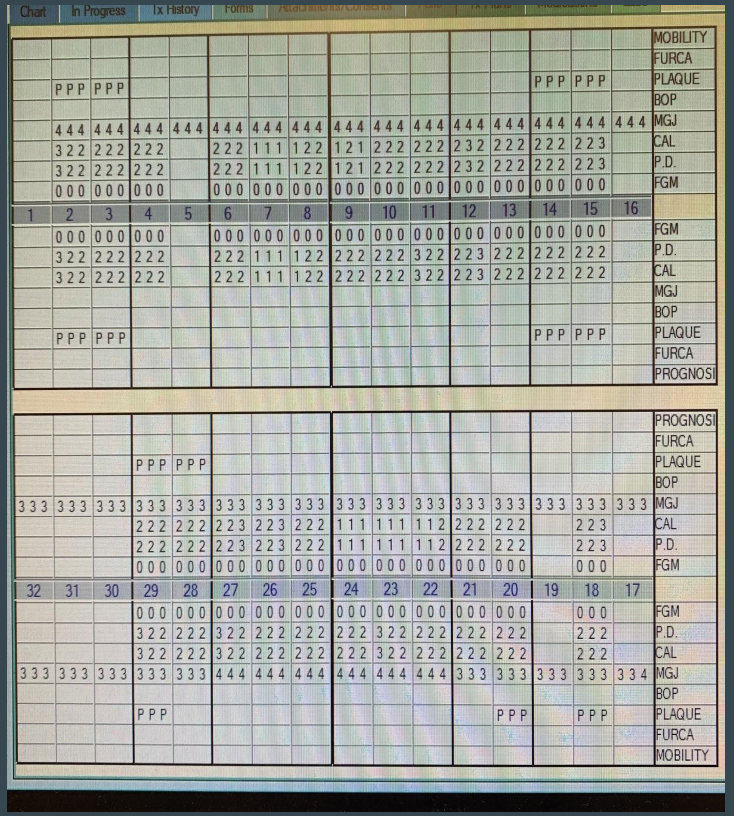
Clinical Findings

- Reduced ferrule amount on #12
  - Crown lengthening was indicated
- Missing bridge from #18-20
  - Endo, post, core, bridge is indicated

Specific Findings

- Fractured crown #12
- Fractured bridge #18-20

Periodontal Charting



Diagnosis

- Fractured crown #12
- Fractured bridge #18-20

Problem List

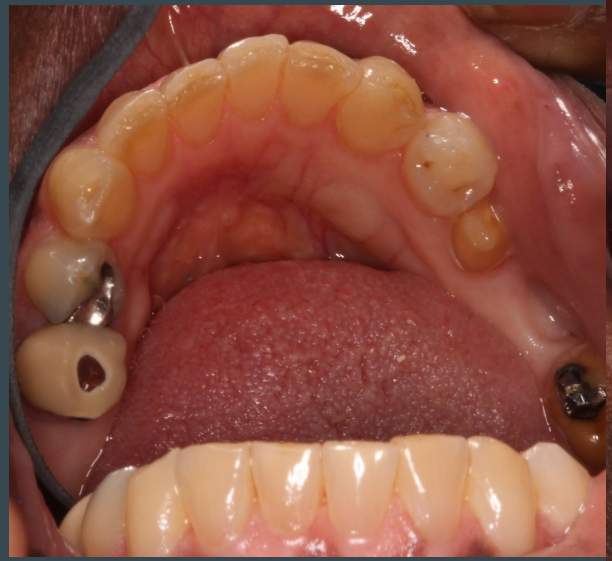
Fractured crown #12

Fractured bridge #18-20

#13 recurrent caries (restored with #13 MOD resin)

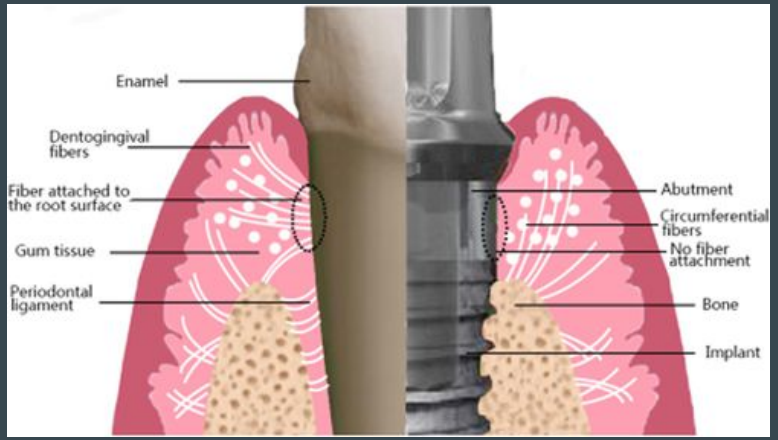
Clinical Photos

Clinical Photos



What is involved in the process of osseointegration?
D1: Meghan Ryan

- Connection between newly formed bone and load-carrying implant
- Three steps:
  - Early immune-inflammatory response
  - Angiogenesis
  - Osteogenesis
- Early immune-inflammatory response
  - 24 hours: neutrophils dominate area
  - 2-4 days: macrophages and monocytes migrate
    - Remove debris
    - Secrete cytokines and growth factors



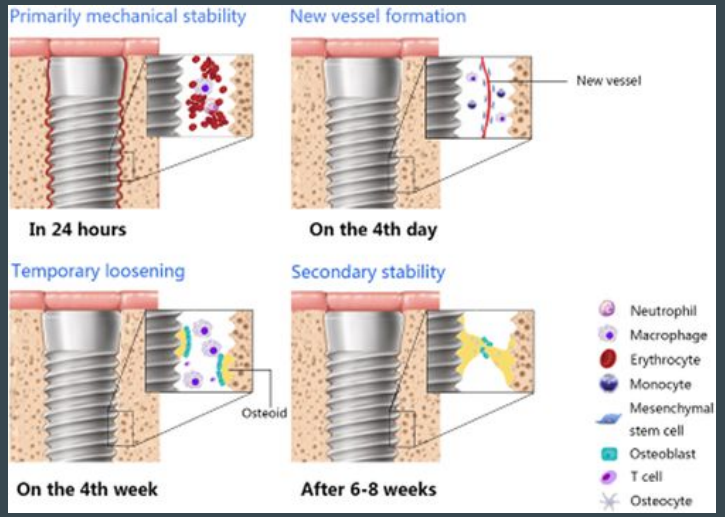
https://0-doi-org.libus.csd.mu.edu/10.1111/cid.12343

Parithimarkalaignan, S., & Padmanabhan, T. V. (2013). Osseointegration: an update. *Journal of Indian Prosthodontic Society*, *13*(1), 2–6.

Wang, Y., Zhang, Y., & Miron, R. J. (2016). Health, Maintenance, and Recovery of Soft Tissues around Implants. *Clinical implant dentistry and related research*, *18*(3), 618–634.

What is involved in the process of osseointegration?

- Angiogenesis
  - 24 hours: blood clot and new blood vessels form
  - 2-4 days: macrophages and monocytes migrate
    - Neovascularization increases
    - Mesenchymal cells are recruited and differentiate into osteoblasts
- Osteogenesis
  - 5-7 days: new woven bone forms
  - 4 weeks: contact and distant osteogenesis
    - Bone connecting with new bone on implant surface and host bone
  - 8-12 weeks: new woven bone completely replaced by mature lamellar bone



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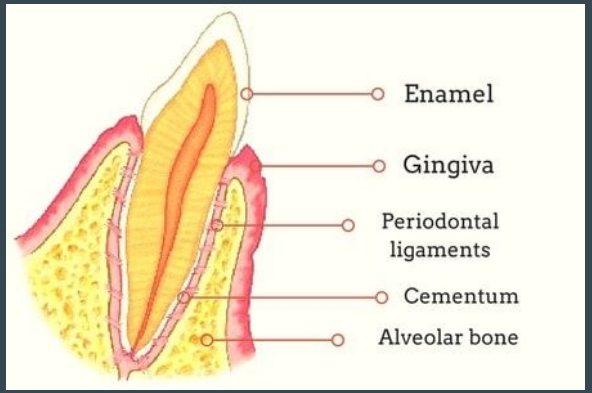
What are the parts and function of the periodontium?
D1: Elyse Cao

- Hard and soft tissue that anchors teeth into alveolar processes
- 3 epithelial layers covering the underlying tissue
  - Keratinized gingival epithelium is the visible portion
  - Parakeratinized or non-keratinized sulcular epithelium
  - Junctional epithelium forms attachment with the tooth surface
- Cemento-enamel junction (CEJ): border between apical part of enamel and coronal part of cementum
- Free gingiva: unattached gingiva
  - Healthy level would be at or slightly coronal to CEJ



Rose, Louis F, et al. *Periodontics: Medicine, Surgery, and Implants*. Mosby, 2004.

What are the parts and function of the periodontium?

- Cementum: thin layer of calcified connective tissue that overlays dentin
- Alveolar bone: forms the bony socket that house the roots of the teeth
- Periodontal ligament: fibers maintain teeth in bony socket
    - Sharpey fibers: ends of periodontal ligament that insert into the cementum and alveolar bone to help anchor the teeth

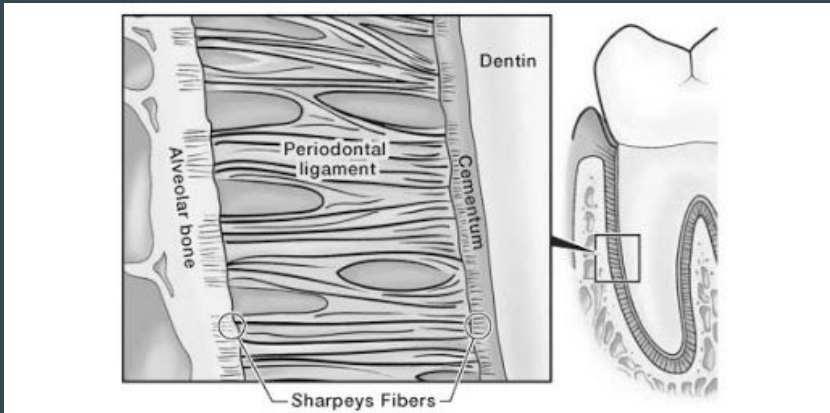


Figure 2.18. **Sharpey Fibers.** The ends of the periodontal ligament fibers that are embedded in the alveolar bone and the cementum are known as Sharpey Fibers.

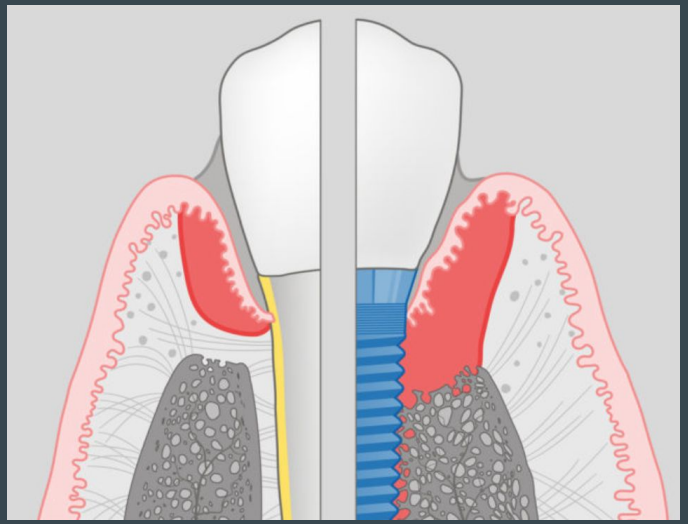
Rose, Louis F, et al. *Periodontics: Medicine, Surgery, and Implants*. Mosby, 2004.

D2: How does the inflammation process of the periodontal ligament on the tooth differ from the inflammation process around an implant when infected? (peri-implantitis vs periodontitis)

Peri-implantitis: peri-implant disease that occurs after the placement of an implant; inflammation of the mucosa and loss of supporting bone

Periodontitis: inflammatory disease that affects the hard and soft structures that support the teeth

These two diseases are more similar than they are different.



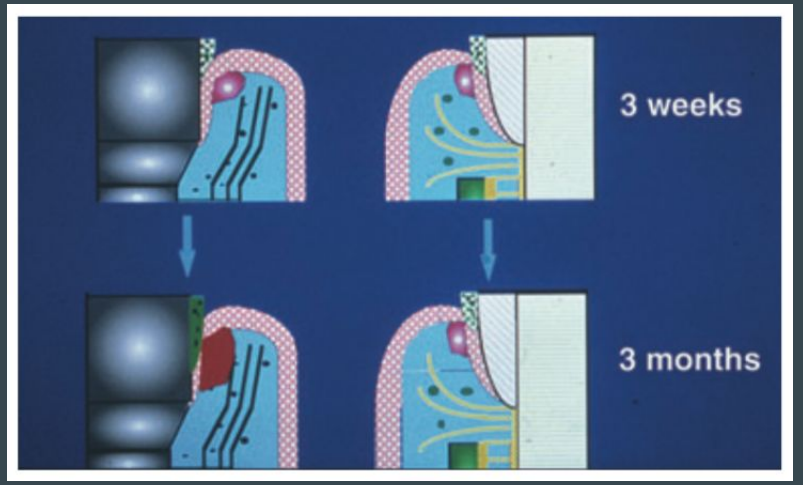
https://www.artedentalclinic.com/en/dental-implants-peri-implantitis/

Heitz-Mayfield, L. J., & Lang, N. P. (2010). Comparative biology of chronic and aggressive periodontitis vs. peri-implantitis. *Periodontology 2000, 53*(1), 167-181. doi:10.1111/j.1600-0757.2010.00348.x

Periodontology, A. (n.d.). Periodontal Disease Fact Sheet. Retrieved September 16, 2020, from https://www.perio.org/newsroom/periodontal-disease-fact-sheet

D2: Peri-implantitis vs Periodontitis

- Peri-implant Microbiota (health): gram-positive facultative cocci & rods
- Peri-implantitis Microbiota (disease): gram-negative anaerobic bacteria; members of the Red Complex
- Transmission of bacteria from teeth to implants
- Rapid progression of peri-implantitis
- Greater inflammatory infiltrate associated with implanto-mucosal unit compared to dentogingival unit (image)



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D3 PICO

In patients with periodontally stable teeth, is endo/post/core/crown or EXT and implant bridge placement more predictable and successful long-term?

PICO Format

P: Patients with periodontally stable teeth

I: Endo post/core/crown

C: EXT and implant bridge placement

O: more predictable and successful long term

PICO formatted question

In patients with periodontally stable teeth, is endo/post/core/crown or EXT and implant bridge placement more predictable and successful long-term?

Clinical Bottom Line

Patient wants to maintain and fix tooth #20. Research and clinical judgment/expertise lead us to suggest and support the patient's decision to elect for endo with post and core and a crown.

Why Research Supports Endo Tx v/s Implant Therapy:

- Good success/ survival rates (>90%)
- More predictable treatment and outcome
- Less chance of subsequent complications
- Less need for intervention
- Good overall patient acceptance

Search Background

Search Date: September 5th and 12th

Database: Pubmed

References: Journal of Prosthetic Dentistry, Journal of Endodontics, and Journal of Dental Research

Search Keywords: tooth extraction, dental implant, dental prosthesis- implant supported, endodontic therapy, root canal therapy, crowns, post and core technique

Article 1

Title: Comparison of long-term survival of implants and endodontically treated teeth

Study Design: Meta Analysis/ Systematic Review

Study Need: compares the advantages/benefits and disadvantages of both implant and endodontic therapy, discusses and compares success versus survival outcomes, and discusses the impact that technological and modern advancements have on the modern practice of endodontics and the effect on long term prognosis of tooth retention

Method: Searches performed in MEDLINE, Cochrane, and EMBASE databases were enriched by hand searches, citation mining, and expert recommendation. Data was compiled to offer clinical guidance and information for practitioners to better decide which treatment modality best suited patient's needs

Setzer, F C, and S Kim. "Comparison of long-term survival of implants and endodontically treated teeth." *Journal of dental research* vol. 93,1 (2014): 19-26. doi:10.1177/0022034513504782

Article 1

Results: When done appropriately, implant and endodontic therapy resulted in significant outcome rates. Clinical experience and expertise of the clinician (inexperienced, general, versus specialist practitioner) greatly influenced the rate of survival. Decision on treatment shoud be

Implant Therapy	Endodontic Therapy

Limitations:

Setzer, F C, and S Kim. “Comparison of long-term survival of implants and endodontically treated teeth.” *Journal of dental research* vol. 93,1 (2014): 19-26. doi:10.1177/0022034513504782

Article 2

Title: Outcomes of root canal treatment and restoration, implant-supported single crowns, fixed partial dentures, and extraction without replacement: a systematic review

Study Design: Meta Analysis/ Systematic Review

Study Need: compare the outcomes, benefits, and harms of endodontic care and restoration compared to extraction and placement of implant supported crowns, FPDs, or extraction without tooth replacement.

Method: Searches performed in MEDLINE, Cochrane, and EMBASE databases were enriched by hand searches, citation mining, and expert recommendation. Pooled and weighted mean success and survival rates, with associated confidence intervals, were calculated for single implant crowns, fixed partial dentures, and initial nonsurgical root canal treatments.

Torabinejad, M. et al. “Outcomes of root canal treatment and restoration, implant-supported single crowns, fixed partial dentures, and extraction without replacement: a systematic review.” *The Journal of prosthetic dentistry* 98 4 (2007): 285-311 .

Article 2

Results:

Limitations: Comparative studies were not found, success was defined very differently based on the treatment rendered, many complications were undescribed, and psychosocial outcomes were incompletely described. High level studies will require further research, time, and financial support from many stakeholders without conflict.

Torabinejad, M. et al. “Outcomes of root canal treatment and restoration, implant-supported single crowns, fixed partial dentures, and extraction without replacement: a systematic review.” *The Journal of prosthetic dentistry* 98 4 (2007): 285-311 .

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

Strength of Recommendation Taxonomy

☑	**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

Conclusion

D3: How does the evidence apply?

After 8 years, survival rates of restored endodontically treated teeth and implant restored teeth were similar and showed no statistical difference. However, the rate of complications and need for intervention was significantly higher in patients receiving implants. Most survival studies determine implant success only after successful loading. However, many implants fail prior to osseointegration and most failures occur in between the placement of the implant and placement of the suprastructure. The more predictable treatment with less rates of complication and intervention and good overall patient satisfaction rates is endodontically restoring the tooth.

D4: how will you advise pt?

I advised the patient that is best to keep her own teeth, especially in this case because they are periodontally stable. It is much more predictable to utilize the natural, healthy teeth versus placing implants.

Discussion Questions