Complete Dentures & Ridge Resorption

Group 10B-5, 10/21/20

Rounds Team

- Group Leader: Dr. Yray
- Specialty Leader: Dr. Hjertstedt
- Project Team Leader: Nathan Pinsky
- Project Team Participants: Christian Montes; Aliyah Wilson; Michael Feeney

Patient: *Mr. U*

- Age: 73
- Gender: Male
- Chief Complaint: “I need a new dentures”
- Mr. U has a 20+ year old maxillary denture, but has never had a mandibular denture. His remaining mandibular teeth were extracted in December of 2019.

Medical History

- Conditions:
  - High blood pressure, coronary heart disease, atrial arrhythmia, type II diabetes, remission of prostate cancer, history of renal insufficiency, osteoarthritis, high cholesterol and nerve pain in legs
- Medications:
  - Arrhythmia: warfarin
  - Hypertension: metoprolol,hydrochlorothiazide, atenolol, amlodipine, & atorvastatin
  - Type II Diabetes: glipizide
  - Nerve Pain: gabapentin
- Allergies:
  - NKDA

Dental History

- Patient visits Marquette University School of Dentistry regularly & presents with:
  - History of extractions
  - 20+ year old maxillary denture
  - Advanced resorption of anterior mandibular residual ridge

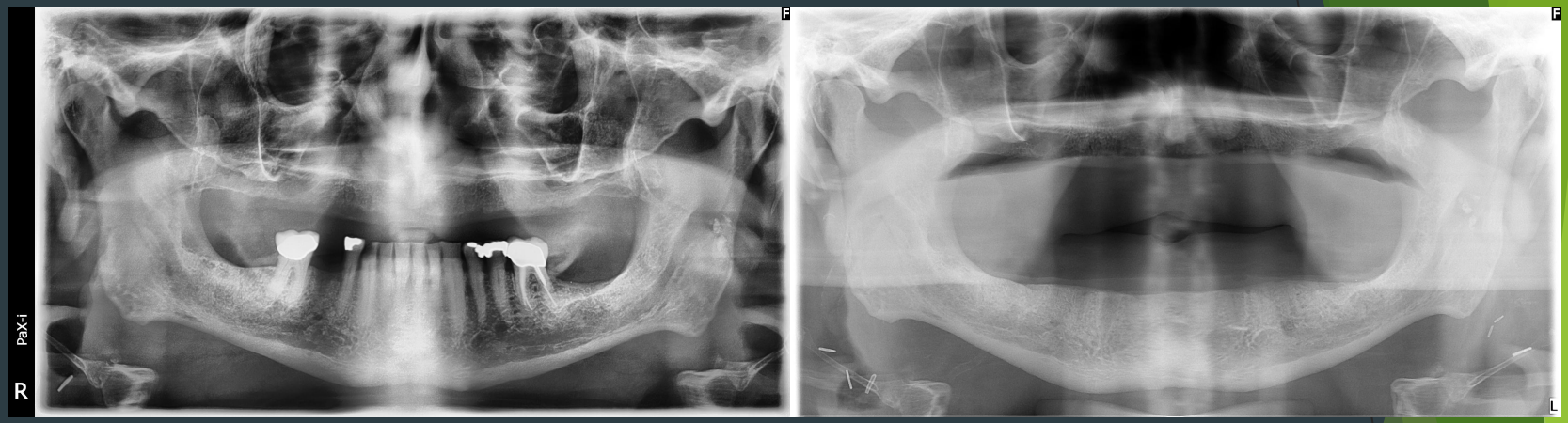
Radiographs

Pre-Extraction PAN from 6/18/19

Radiographs

Current PAN from 9/18/20

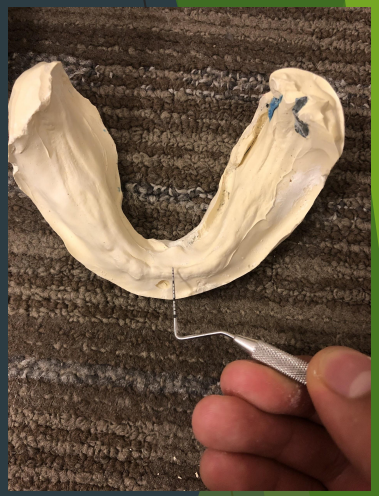
Radiographic Findings



- Resorption is noted radiographically, but the true extent of the resorption is best seen in the clinical photos

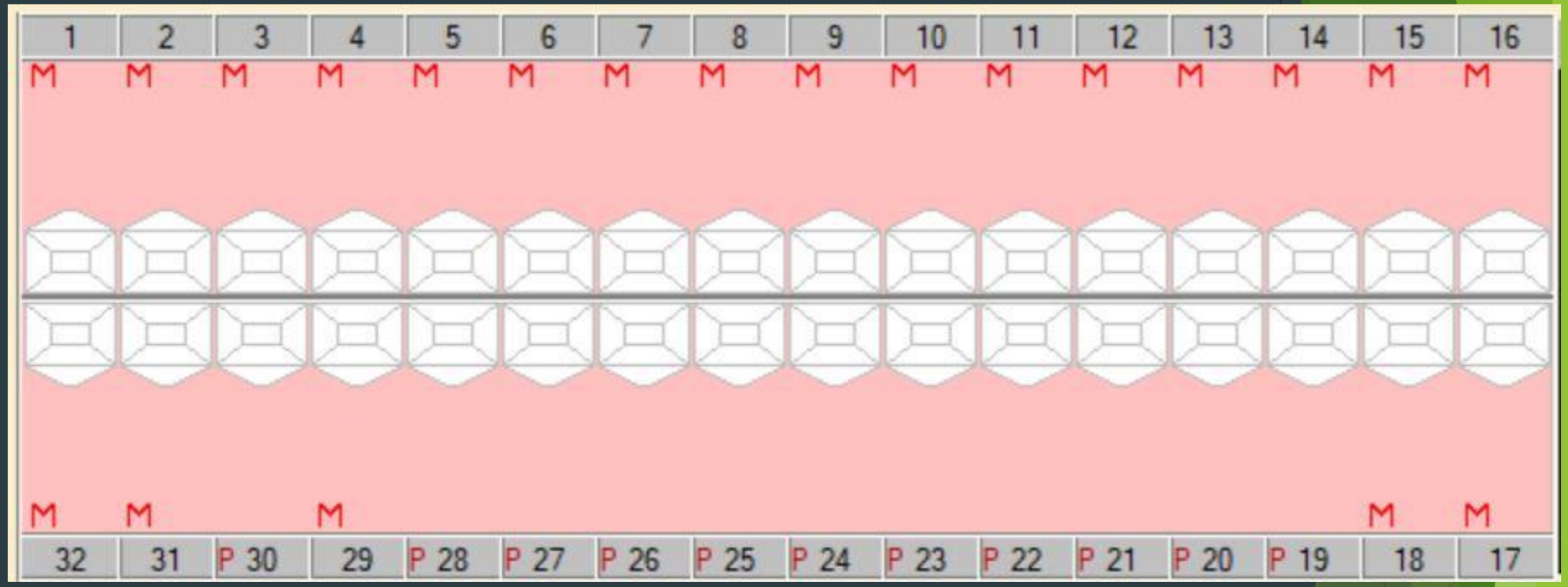
Clinical Findings



- Clinically, the anterior mandibular ridge measures 1mm high and 3mm wide
- The posterior mandibular ridge has large, supportive buccal shelf
- Maxillary residual ridge presents with a shallow palatal arch

Odontogram



#19-28 & #30 were extracted at MUSoD

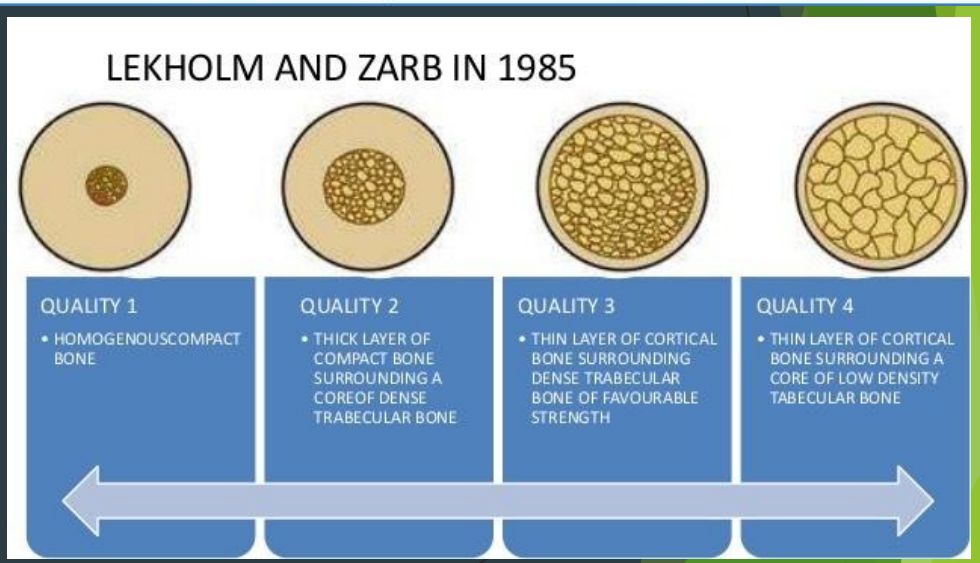
Problem List

- Denture retention
- Progression of ridge resorption with systemic disease
  - Type II Diabetes
  - Osteoarthritis

Basic Science: What is residual ridge resorption?

- Resorption of the bone in the residual ridge after tooth extraction
  - Alongside bone growth into empty socket, bone resorption and remodeling of the residual ridge via osteoclasts occurs
  - 3-4 weeks after extraction: changes in contour of the residual ridge most active
  - Most significant bone loss occurs within first 6 months...
  - However, continues slowly throughout life
- Key determinant is bone quality...

BONE DENSITY	DESCRIPTION	TACTILE ANALOGUE	TYPICAL ANATOMIC LOCATION	HOUNSFIELD UNITS
D1	Dense cortical	Oak/maple	Anterior mandible	>1250
D2	Porous cortical & coarse trabecular	White pine/spruce	Anterior and posterior mandible, anterior maxilla	850–1250
D3	Porous cortical (thin) & fine trabecular	Balsa wood	Posterior mandible, anterior and posterior maxilla	350–850
D4	Fine trabecular	Styrofoam	Posterior maxilla	150–350



D2 Pathology

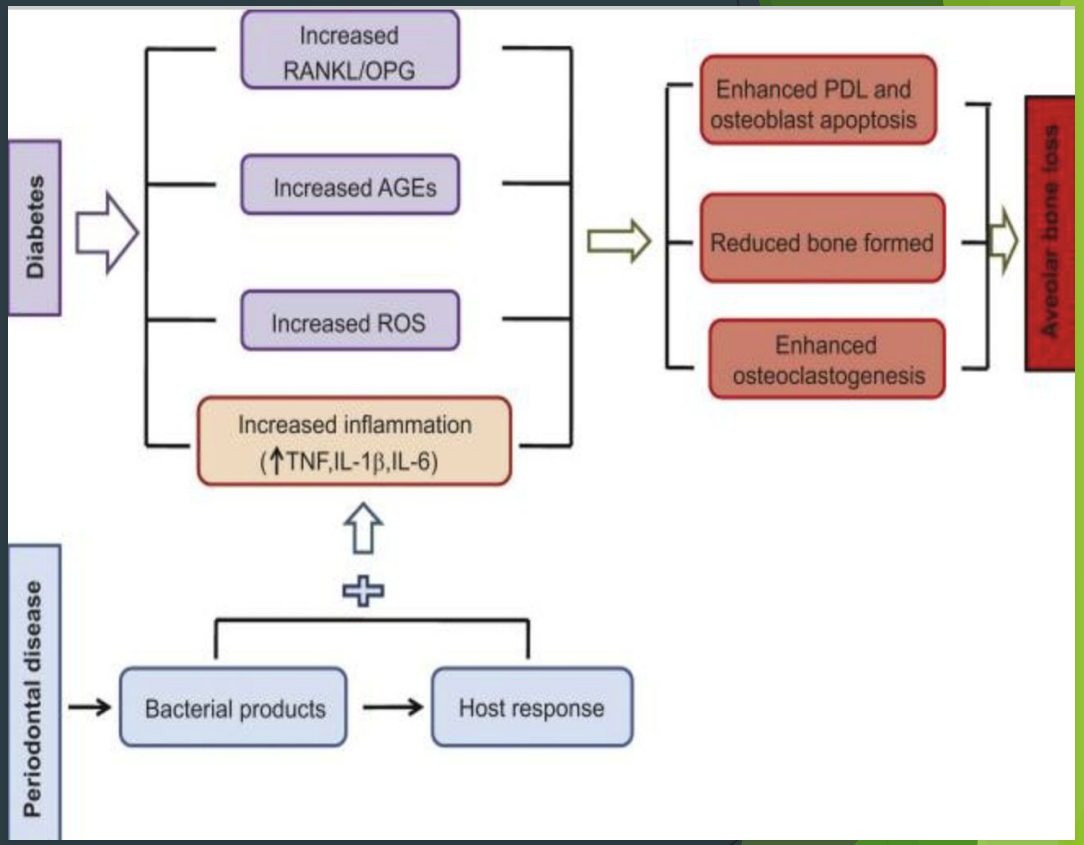
Describe the relationship between ridge resorption and diabetes.

- Periodontal disease is considered the most widespread oral diseases
  - Periodontal Disease Risk Factors
    - *Smoking/Tobacco usage*
    - *Stress*
    - *Diabetes mellitus*
- Diabetes potentiates the severity of periodontitis and accelerates bone resorption

D2- Pathology

Diabetes effects osteoclast and osteoblast in the periodontium:

- **Enhanced osteoclast formation in inflamed areas**
- **Imparied resolution in inflamed areas**
- **Prevent the downregulation of genes that are associated with host defense**



- ***Reference citation(s):*** Wu, Ying-Ying et al. *"Diabetes mellitus related bone metabolism and periodontal disease."* International journal of oral science vol. 7,2 63-72. 26 June. 2015, doi: 10.1038/ijos.2015.2

D3 PICO

- Clinical Question: In an edentulous patient, what brings more patient satisfaction: traditional denture or implant retained overdenture?

PICO Format

P: Edentulous patient with bone resorption and systemic disease.

I: Implant supported overdenture on the mandibular arch.

C:Traditional denture.

O:Satisfaction with prosthesis.

PICO Formatted Question

- **Clinical Question: In an edentulous patient, what brings more patient satisfaction: traditional denture or implant retained overdenture?**

Clinical Bottom Line

The studies show that overdentures are proven to be more satisfactory to traditional dentures due to increased retention, which is a common problem with traditional dentures.

Search Background

- **Date(s) of Search: 10/05/2020 - 10/14/2020**
- **Database(s) Used: PubMed**
- **Search Strategy/Keywords:**
  Denture/Overdenture/Ridge Resorption

Search Background

- **MESH terms used:**

1. **“Overdenture”**
2. **“Denture”**
3. **“Ridge”**

Article 1

- Sivaramakrishnan, G, and K Sridharan. “Comparison of Implant Supported Mandibular Overdentures and Conventional Dentures on Quality of Life: a Systematic Review and Meta-Analysis of Randomized Controlled Studies.” *Australian Dental Journal*, vol. 61, no. 4, 2016, pp. 482–488., doi:10.1111/adj.12416.

- Study Design: Systematic Review with Meta-Analysis

- Study Need / Purpose: To compare the oral-health results of dentures to implant-supported overdentures

Article 1 Synopsis

- Methods: A literature search of Medline, Cochrane Central Register of Clinical Trials, and the Database of Abstracts of Reviews of Effects were performed. Five viable systematic-review studies were found through this method, and were compiled and analyzed to form the results.
- Results: Using the OHIP questionnaire found in 441 patient cases in the 5 studies, the results were pooled and found that there was a statistical difference in improvement among the implant overdenture group compared to the conventional denture groups.
- Conclusions: The group with the implant overdenture, according to their OHIP questionnaire, performed better in improvement of quality of life than the conventional dentures.
- Limitations: With only five viable studies, more patients and studies need to be done to get more conclusive data.

Article 1 Selection

This article was chosen for comparing the quality of life results of conventional dentures vs implant-supported overdentures.

Article 2 Citation, Introduction

- Nogueira, T. E., et al. “Mandibular Complete Denture versus Single-Implant Overdenture: a Systematic Review of Patient-Reported Outcomes.” *Journal of Oral Rehabilitation*, vol. 44, no. 12, 2017, pp. 1004–1016., doi:10.1111/joor.12550.

- Study Design: Systematic Review and Meta-Analysis

- Study Need / Purpose: To compare the traditional dentures and implant supported overdenture.

Article 2 Synopsis

- Method: A literature search on PubMed, Scopus and Cochrane Central databases were searched to find viable arguments for the studies. In the search, 11 articles were found to be viable to compare single-implant overdentures (SIMO) and conventional dentures.
- Results: After pooling the 11 studies (3 of which were to inconsistent and were thrown out) to average results, it was found that each study showed an increase in quality of life more with the SIMO.
- Conclusions: SIMO provides a better quality of life than conventional dentures.
- Limitations: Because there were so many inconsistencies among studies, more research and studies should be done to get more conclusive results.

Article 2 Selection

- Similar to the last article, this article highlighted the improvement in quality of life after rehabilitation of the implant surgery in SIMO compared to regular dentures.

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

Double click table to activate check-boxes

Conclusions

- D3: With the evidence here, it shows that an implant supported overdenture could work well for this patient.

Conclusions

- Ideal Treatment Plan: Implant supported overdenture
- Alternative Treatment Plan: Traditional complete denture
- Accepted Treatment Plan: Traditional complete denture trial period, progressing to implant supported overdenture for the mandibular if patient is not satisfied with traditional denture at 2-month recall

Clinical Photo of Delivered Traditional Complete Dentures

Discussion Questions

Discussion Questions