EVIDENCE BASED DENTISTRY

Conventional Ortho Treatment vs. Invisalign

EVIDENCE BASED DENTISTRY ROUNDS ORTHODONTICS

GROUP 10A-5

NOVEMBER 11, 2020

ROUNDS TEAM

- Group Leader: Dr. Yray
- Specialty Leader: Dr. Liu
- Project Team Leader: Kate Collelo
- Project Team Participants: Nwadiuto Ekeh, Carneisha Cain, Jacklyn Moon

PATIENT

- 14-year-old female
- Caucasian
- “I need braces to fix my smile”

MEDICAL HISTORY

- No medications
- NKDA
- Medical history is non-contributory

DENTAL HISTORY

- Previously treated in MUSoD pediatric clinic
  - Sealants on 1st and 2nd molars
- Ortho consult in May, 2019 at which time pt's mother inquired about Invisalign
- Ortho treatment initiated in August, 2019
- DPOW State Insurance

RADIOGRAPHS

RADIOGRAPHS

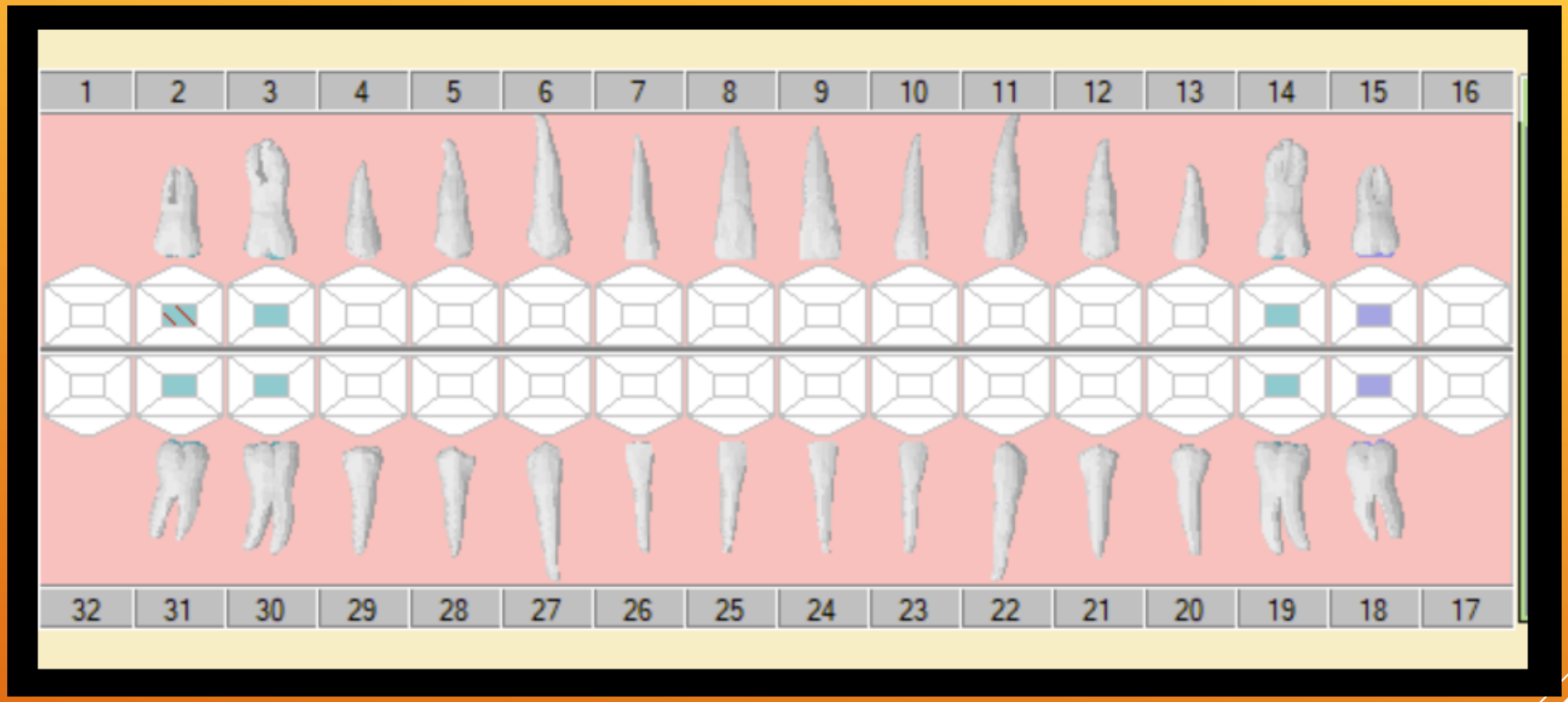
RADIOGRAPHIC FINDINGS

- Occlusal caries on #2 O, #15 O, #18 O
- Slight mesial rotation of #11

CLINICAL FINDINGS

- Malocclusion due to slight anterior crowding
- Mandibular midline deviated 3 mm to the left
- Canted occlusal plane in frontal view with slight chin deviation to the left
- Bilateral Class I molar relationship
- Class I canine relationship on the right, with slight Class II canine relationship on the left

SPECIFIC FINDINGS


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17

ODONTOGRAM

- Class I malocclusion, due to slight lower anterior crowding and midline deviation

DIAGNOSIS

- Esthetics
- Home care/ compliance

PROBLEM LIST

D1 BASIC SCIENCE QUESTION

How does tooth movement and bone remodeling occur?

Force loading

Sites of compression and tension

Bone remodeling cell activity

Tooth movement

D2 PATHOLOGY

WHAT IS ANGLE'S CLASSIFICATION ?

In the early 1900s, Edward H. Angle classified occlusions using the relationship between the first molars of both arches as the key factor in determining occlusions. The three classes according to Angle's classification will be discussed on the next slide

HOW TO DETERMINE ANGLE'S CLASSIFICATION ?

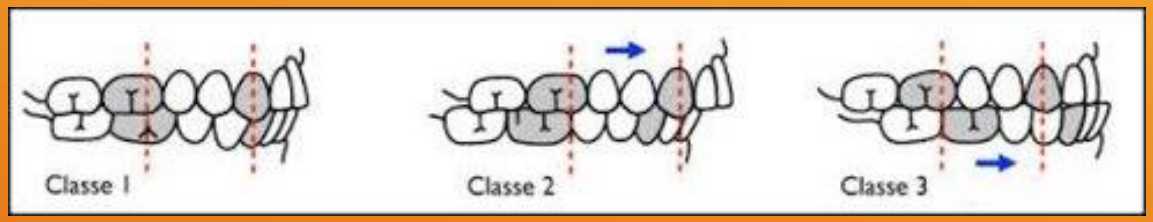
- **Canine relationship**
- **Class I: Mesial slope of upper canine coincides with distal slope of lower canine**
- **Class II: Mesial slope of upper canine is ahead of distal slope of lower canine**
- **Class III: Mesial slope of upper canine is behind to distal slope of lower canine**

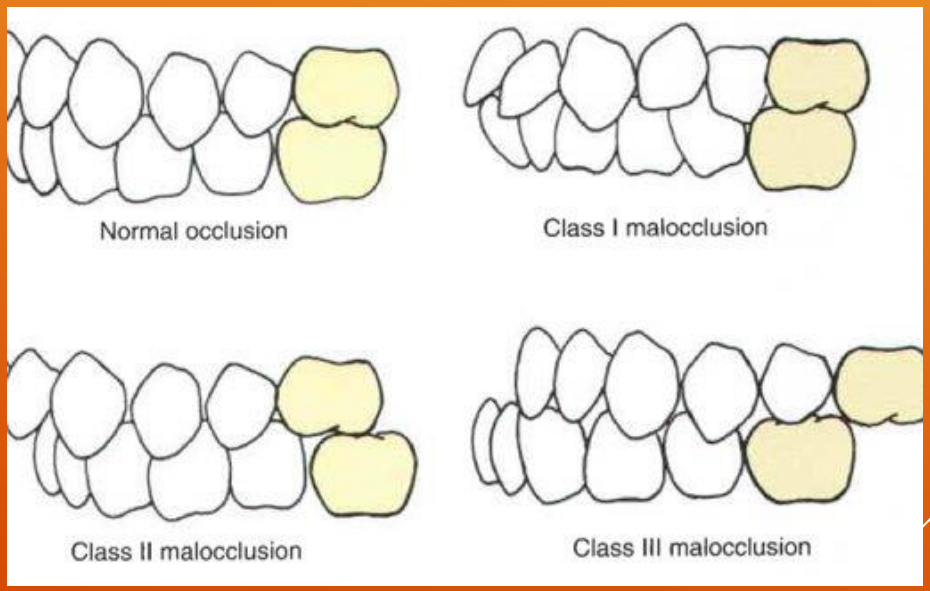
•**Normal occlusion**: The mesiobuccal cusp of the upper first molar occludes with the buccal groove of the lower first molar.

•**Class I malocclusion**: Same as normal occlusion but characterized by crowding, rotations, and other positional irregularities.

CLASSIFICATION FOR OUR PATIENT

- The patient has a Class II canine relationship on the left side but is Class I molar on both sides and Class I canine on the right, so basically it comes down to the degree of crowding of the lower anteriors that puts her into the Class I malocclusion category.





- **Clinical Question: Is conventional ortho treatment or Invisalign better for treating a Class I malocclusion?**

D3 PICO

P: Patients with Class I malocclusion

I: Conventional orthodontic treatment

C: Invisalign

O: Efficiency in correction of malocclusion

PICO FORMAT

PICO FORMATTED QUESTION

- For patients with a Class I malocclusion, is conventional orthodontic treatment or Invisalign more efficient at producing a desirable outcome?

- Must consider gingival conditions and long-term outcomes of Invisalign vs. FOA
- Patient oral hygiene, compliance, and finances
- Which will be most effective treatment for the patient in terms of longevity and oral health?

CLINICAL BOTTOM LINE

SEARCH BACKGROUND

- **Date(s) of Search:** 10/28/2020
- **Database(s) Used:** Pubmed.gov
- **Search Strategy/Keywords:** Traditional orthodontic treatment, Fixed appliance therapy, Invisalign, Patient satisfaction, Effectiveness, Oral impacts, periodontal health

MESH TERMS

- Malocclusion, Angle Class I/ therapy
- Orthodontic appliances, removable
- Orthodontics, Corrective/ methods
- Tooth movement techniques
- Treatment outcomes

ARTICLE 1 CITATION, INTRODUCTION

- Daniel Kuncio, Anthony Maganzini, Clarence Shelton, Katherine Freeman; Invisalign and Traditional Orthodontic Treatment Postretention Outcomes Compared Using the American Board of Orthodontics Objective Grading System. *Angle Orthod* 1 September 2007; 77 (5): 864–869.
- **Study Design:** Comparative Cohort Study
- **Study Need / Purpose:** Comparison of post-retention outcomes of Invisalign and conventional orthodontic treatment

Method

- Used patient records of one ABO board-certified and Invisalign-certified orthodontist in New York City
- Dental casts and panoramic radiographs were analyzed for two groups of patients (Invisalign and fixed appliance) using the ABO OGS at two timepoints: immediately after appliance removal and three years after removal (postretention).
- A Wilcoxon rank sum test was used to analyze outcomes between the groups for each of the eight categories in the OGS. A Wilcoxon signed rank test was used to determine the significance of changes from the two timepoints.

ARTICLE 1 SYNOPSIS

Results

- (1) Difference in total alignment score was significantly higher in the Invisalign group
- (2) Significant changes in total alignment and mandibular anterior alignment in both groups
- (3) Significant changes in maxillary anterior alignment only in the Invisalign group

Conclusions

- The alignment of the patients treated with Invisalign deterioriate more postretention than patients treated with fixed appliances
- Within both groups, total alignment and mandibular anterior alignment deterioriated postretention.

Limitations

- Sample size
- Self reporting protocol (patient compliance with following instructions and wearing retainers)

ARTICLE 1 SYNOPSIS

- Azaripour, A., Weusmann, J., Mahmoodi, B. *et al.* Braces versus Invisalign: gingival parameters and patients' satisfaction during treatment: a cross-sectional study.*BMC Oral Health* 15, 69 (2015).

- **Study Design:** Cross-Sectional Study
- **Study Need / Purpose:** Comparing oral hygiene and patient satisfaction of Invisalign and braces

ARTICLE 2 CITATION, INTRODUCTION

Method

- 100 patients (50 Invisalign, 50 braces) who underwent treatment for 6+ months (exclusion criteria: periodontal conditions, diseases that affect periodontal conditions, smoking, pregnancy)
- All patients received the same OHI and same prophylaxis treatment prior
- Clinical data for periodontal condition before and after treatment
- Patient questionnaire about oral hygiene, satisfaction, and dietary habits

ARTICLE 2 SYNOPSIS

Results

- Significantly better gingival health conditions were recorded in Invisalign patients
  - GI: 0.54 ± 0.50 for braces vs. 0.35 ± 0.34 for Invisalign
  - SBI: 15.2 ± 7.6 for braces vs. 7.6 ± 4.1 for Invisalign
- Amount of dental plaque was also less but not significantly different in Invisalign group
- Questionnaire results showed greater patient satisfaction in Invisalign group

Conclusions

- Invisalign has less negative impact on the gingival condition and well-being of patients
- Invisalign is gentler for gingival tissue due to simpler oral hygiene

Limitations

- Braces group – mostly teenagers and young adults, Invisalign group – mostly adults

ARTICLE 2 SYNOPSIS

ARTICLE 3 CITATION, INTRODUCTION

- Lu H, Tang H, Zhou T, Kang N. Assessment of the periodontal health status in patients undergoing orthodontic treatment with fixed appliances and Invisalign system: A meta-analysis. Medicine (Baltimore). 2018 Mar;97(13):e0248.
- **Study Design:** Meta-analysis
- **Study Need / Purpose:** To assess the periodontal health of patients in FOA vs. Invisalign

Method

- Databases were retrieved for articles on this topic, including the referenced articles within the retrieved articles
- Stata 12.0 software for data analysis
- Results are estimated by odds ratio (OR) and 95% confidence interval (CI)
- 7 articles (368 patients)

ARTICLE 3 SYNOPSIS

Results

- (1) No statistically significant difference of gingival index (GI) and sulcus probing depth (SPD) status between the Invisalign group and the FOA group, at different time intervals
- (2) Invisalign group presented a lower plaque index (PLI) and sulcus bleeding index (SBI) status
- (3) However, there was no statistically significant difference between the 2 groups when using other measure methods

Conclusions

- Periodontal health in Invisalign group was better - however, more studies necessary to confirm this conclusion.

Limitations

- Inconclusive - more data and analysis needed

ARTICLE 3 SYNOPSIS

☒ **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

LEVELS OF EVIDENCE

☐	**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

STRENGTH OF RECOMMENDATION TAXONOMY (SORT)

Factors to consider:

- Patient age
- Patient oral hygiene
- Patient compliance
- Length of treatment

Advise: Conventional ortho treatment

CONCLUSIONS: D3

CONCLUSIONS: D4

DISCUSSION QUESTIONS?