PUBLIC HEALTH ROUNDS CASE

IB-5, 9/23/2019

ROUNDS TEAM

- **Group Leader: Dr. Smithy**
- **Specialty Leader: Dr. Bhagavatula**
- **Project Team Leader: Nisha Soni**
- **Project Team Participants:**
- **D1: Matthew Johnson**
- **D2: Christian May**
- **D3: Macy Lentz**

PATIENT:

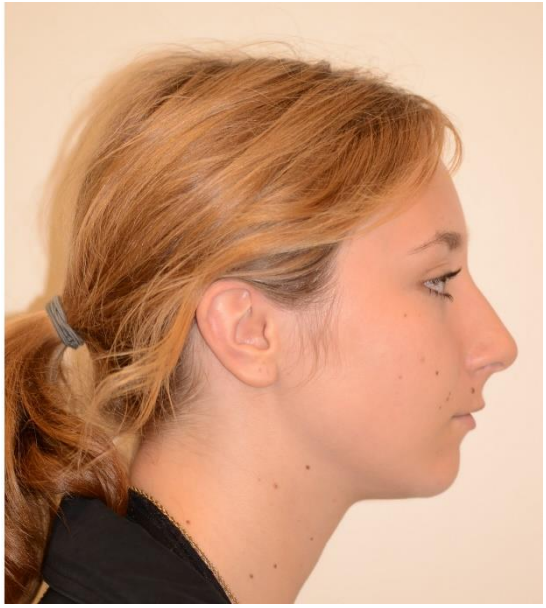
- 41 y.o.
- Female
- Hispanic
- “I want to my front tooth”
- Clinic A

MEDICAL HISTORY

- Asthma, low blood pressure, severe dairy allergy, anemia
- History of hip arthroscopy in march 2019-taking naproxen twice a day since surgery (stopped April 2019)
- Medications: albuterol sulfate, naproxen, Depo-provera

DENTAL HISTORY

- Regular prophies, sealants, resins, orthodontic treatment
- Peg lateral #7
- Congenitally missing #10
- Left-side popping of TMJ- no pain



CLINICAL PHOTOS

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RADIOGRAPHS

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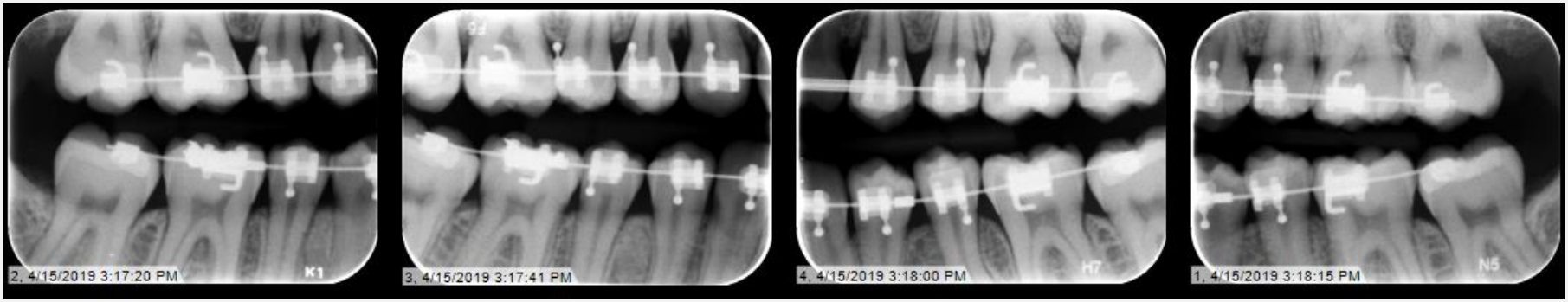
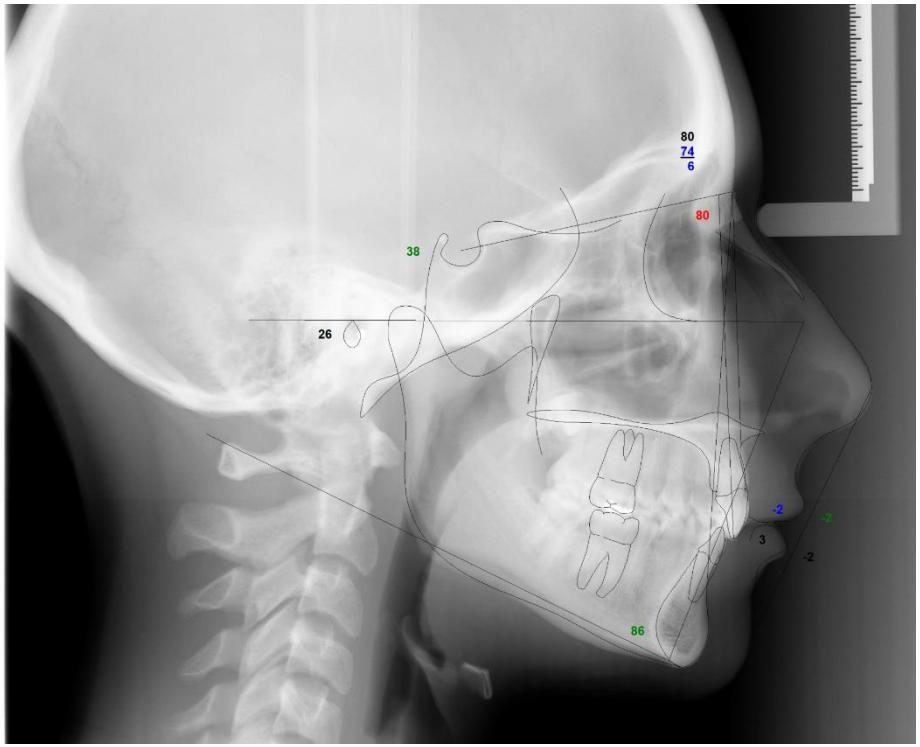


LATERAL CEPHALOGRAM



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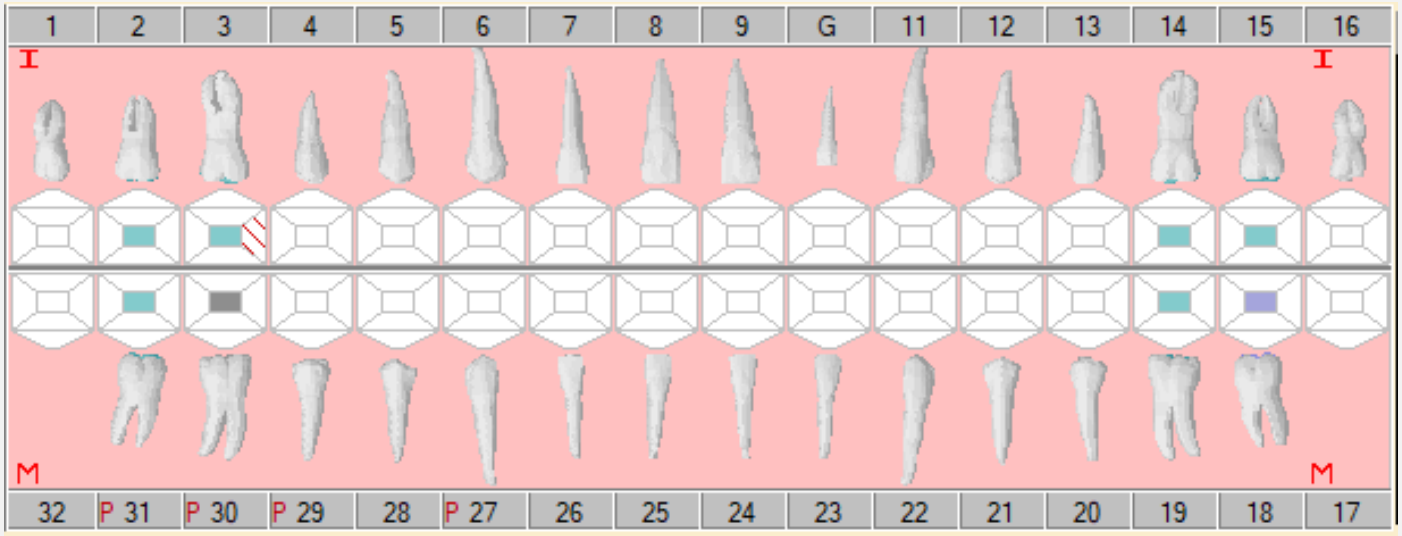

- #7 peg lateral
- #10 congenitally missing
- Retained primary tooth H
- Sealants: 2,3,14,15,19,31
- Occlusal resin: 18
- Occlusal amalgam: 30
- Deep bite
- Midline shift to right

SPECIFIC FINDINGS

- Notes from consult with Dr. Golden, Dr. Shah and Dr. Ahmed
- Veneer placement from #7-#10 and implant placement in H's spot.
- Midline needs to be shifted to the right

PERIODONTAL CHARTING

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

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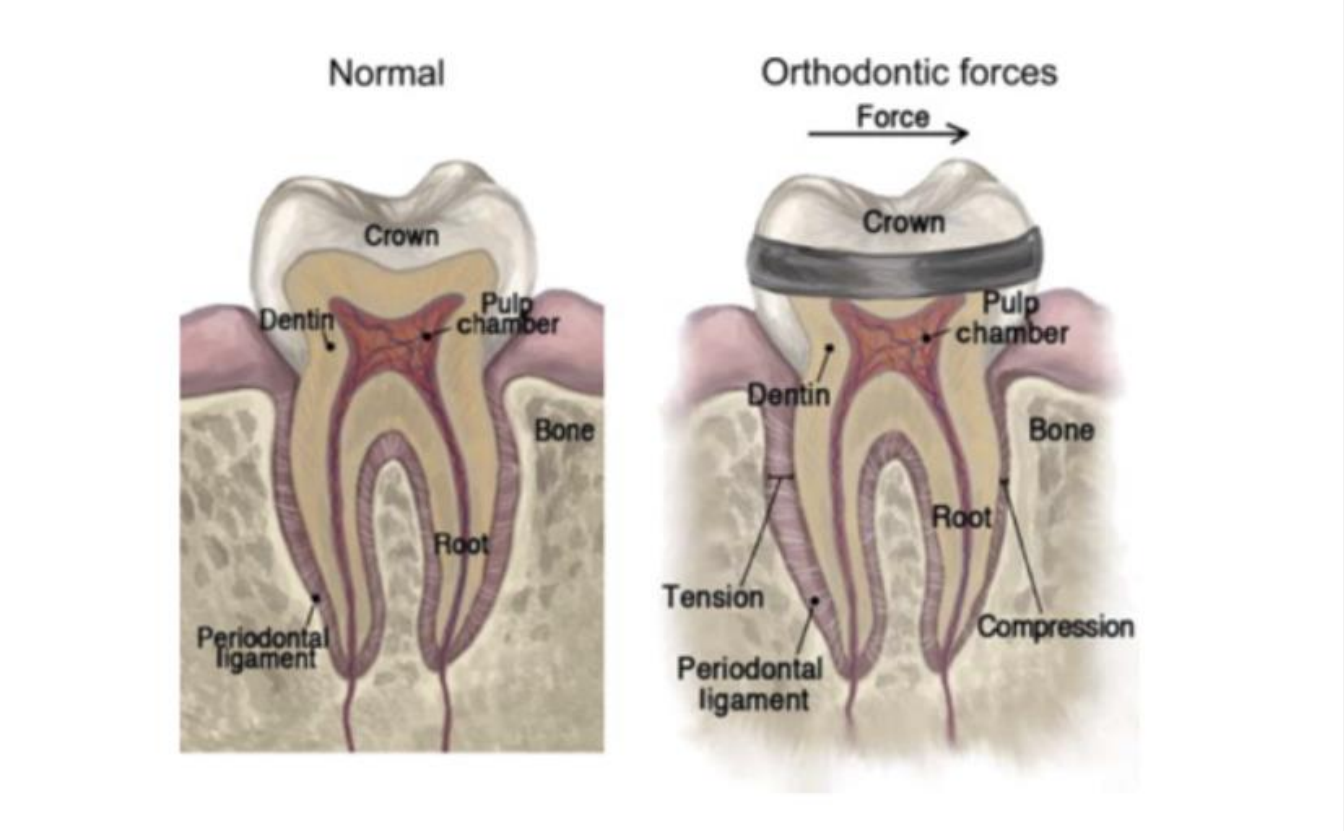
DIAGNOSIS

- Crowding - anterior maxilla
- Ortho treatment needed to create space for future maxillary anterior prosthodontic work

PROBLEM LIST

- Congenitally missing teeth
- Peg lateral
- Caries
- Spacing

WHAT FORCES ARE INVOLVED IN ORTHODONTIC MOVEMENT?



Graves, Dana T., et al. *Osteoimmunology – Interactions of the Immune and Skeletal Systems.* 2011.
Moshabab, Asiry A. "Biological aspects of orthodontic tooth movement: A review of literature." *Saudi Journal of Biological Sciences* (2018): 1027-1032.

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D2 PATHOLOGY

- Congenitally Missing Teeth:
  - Absence of a tooth due to genetic reasons
  - - 3rd molars > mandibular 2nd premolars > maxillary lateral incisors
  - - Hypodontia – one of the most common abnormalities in dentistry
- Peg Lateral:
  - - One or both lateral incisors underdeveloped
  - - Not the same as having primary laterals in permanent dentition
  - - Usually bilateral
  - - Present esthetic, periodontal and orthodontic problems for patient
- Etiology of Peg Laterals:
  - - Hereditary
  - - Congenital syphilis
- Incidence of Peg Laterals:
  - - Mongoloid, females, orthodontic patients
  - - Unilateral peg lateral more likely to have missing lateral on contralateral side

D3 PICO

- **Clinical Question**: Does patient age influence orthodontic treatment?

PICO FORMAT

P: Patients needing orthodontic treatment

I: Early intervention in adolescents

C: Delayed intervention in adults

O: Less time and be more effective

PICO FORMATTED QUESTION

In patients needing orthodontic treatment, will early intervention in adolescents compared to delayed intervention in adults require less time and be more effective?

CLINICAL BOTTOM LINE

There is no significant difference with age during orthodontic treatment.

SEARCH BACKGROUND

- **Date(s) of Search:** 9/23/2019
- **Database(s) Used: PubMed**
- **Search Strategy/Keywords:** Orthodontic treatment in relation to age.

SEARCH BACKGROUND

- **MESH terms used:**
  - **Orthodontics**
  - **Adults**
  - **Adolescents**

ARTICLE 1 CITATION, INTRODUCTION

- Citation: Dyers GS, Harris EF, Vaden JL, Age effects on orthodontic treatment: adolescents contrasted with adults, American Journal of Orthodontics and Dentofacial Orthopedices, December 1991, Vol100, 53-530.

- Study Design: Comparative Study

- Study Need / Purpose: "Quantitate differences in the nature of the correction of malocclusion dependent on the patient's age at the time of treatment."

ARTICLE 1 SYNOPSIS

Method:

- 30 female adolescents patients (mean age=12.5)
- 26 female adult patients (mean age=27.6)
- Criteria
  - Standard Edgewise mechanics used during treatment
  - Pre-Treatment and Post-Treatment Lateral cephalograms
  - Full complement of permanent teeth
  - Class II, Division 1 sagittal molar relationship
    - Half-cusp discrepancy

Data analysis:

- McNamara analysis using landmark coordinates
- Maxillary skeletal and dental changes
- Mandibular skeletal and dental changes
- Vertical dimension

Dyers GS, Harris EF, Vaden JL, Age effects on orthodontic treatment: adolescents contrasted with adults, American Journal of Orthodontics and Dentofacial Orthopedices, December 1991, Vol100, 53-530.

ARTICLE 1 SYNOPSIS

Results:

- Maxillary skeletal changes: midfacial length decreased significantly in both groups with a similar amount of change.
  - Comparable reductions observed in the SNA and the nasion perpendicular to point A due to retraction of maxillary incisors
- Maxillary dental changes:
  - Horizontal movement was statistically indistinguishable
  - Vertical molar component carried molar down 1.9 mm in adolescents vs. 1.0 mm of intrusion in adults

Results:

- Mandibular Skeletal
  - Adolescents had an increase in facial angle while adults had a decrease in facial angle.
- Mandibular Dental
  - Greater forward movement of the lower molar in adolescents that adults (4 mm vs 2 mm)
  - Vertical movement was statistically similar
  - Intrusion of the incisor was higher in the adult than the adolescent (3.8 mm vs. 1.5 mm)
  - Steepening of the sagittal plans
- Greater forces had to be employed in the adult population to compensate for substantive growth in adults.
- Elastics were employed much earlier in treatment and worn for a longer time

Dyers GS, Harris EF, Vaden JL, Age effects on orthodontic treatment: adolescents contrasted with adults, American Journal of Orthodontics and Dentofacial Orthopedices, December 1991, Vol100, 53-530.

ARTICLE 1 SYNOPSIS

Conclusions:

- Adult treatment does not equate longer duration of treatment
  - Both group were comparable at 2.56 years
- Vertical dimension in adults remained unchanged during treatment due to absence of growth

Limitations:

- Study was only observed in one orthodontic practice.
- Treatment was only observed in Class II, Division 1 patients
- Focused on female patients only

Dyers GS, Harris EF, Vaden JL, Age effects on orthodontic treatment: adolescents contrasted with adults, American Journal of Orthodontics and Dentofacial Orthopedices, December 1991, Vol100, 53-530.

ARTICLE 1 SELECTION

Reason for selection: directly answered the PICO question

Applicability to your patient: patient is female and in need of orthodontic treatment.

Implications: there are no significant dissimilarities to doing orthodontics as an adolescent or adult.

Dyers GS, Harris EF, Vaden JL, Age effects on orthodontic treatment: adolescents contrasted with adults, American Journal of Orthodontics and Dentofacial Orthopedices, December 1991, Vol100, 53-530.

ARTICLE 2 CITATION, INTRODUCTION

- Citation: Stuart, Sadowsky, Schneider, BeGole, Effectiveness and duration of orthodontic treatment in adults and adolescents, American Journal of Orthodontics and Dentofacial Orthopedics, October 1998, Vol 100,383-386.

- Study Design: Comparative study

- Study Need / Purpose: The purpose of this investigation was to compare the effectiveness and duration of orthodontic treatment in adults and adolescents, and variables that may influence treatment.

Stuart, Sadowsky, Schneider, BeGole, Effectiveness and duration of orthodontic treatment in adults and adolescents, American Journal of Orthodontics and Dentofacial Orthopedics, October 1998, Vol 100,383-386.

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ARTICLE 2 SYNOPSIS

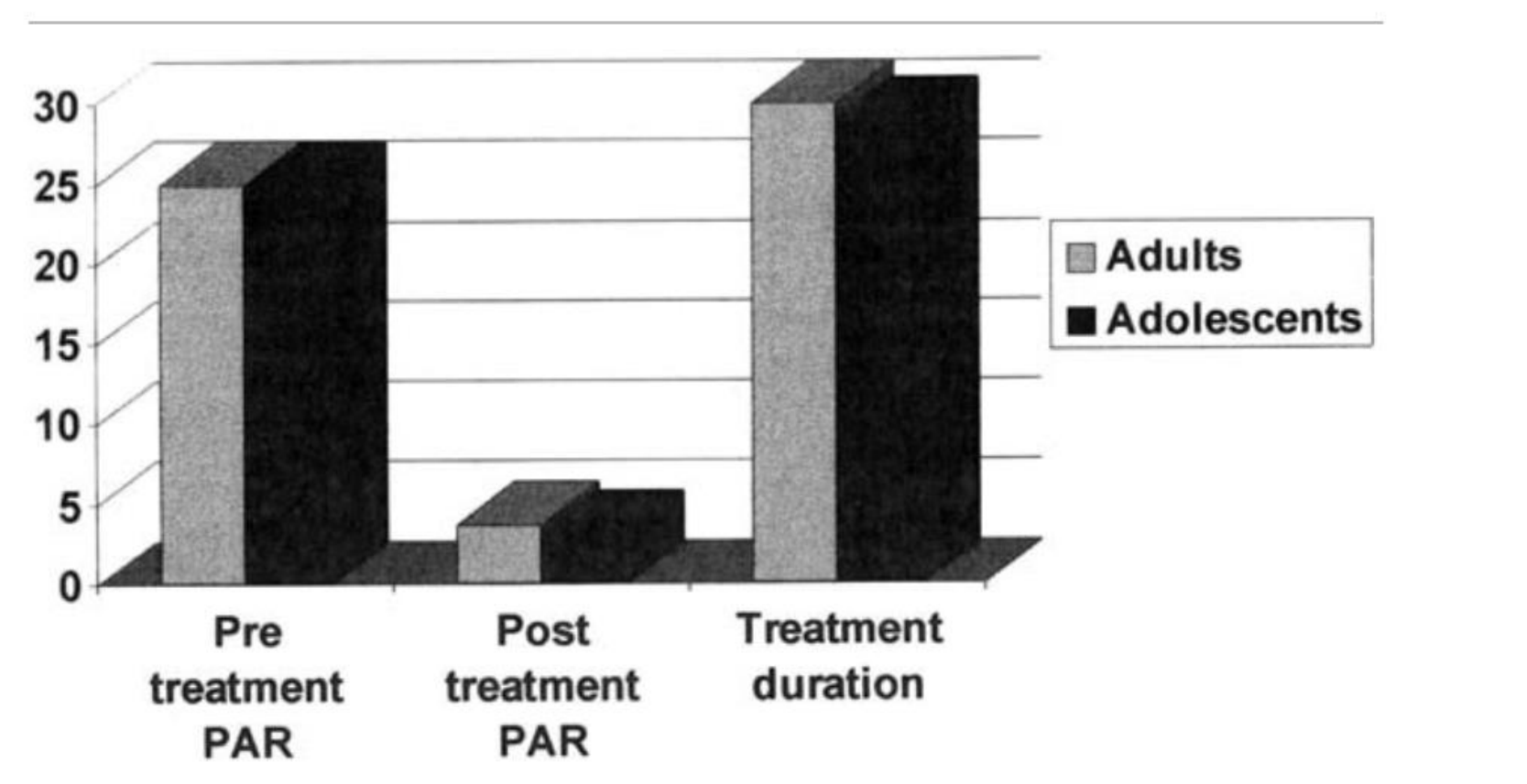
Method:

- Complete comprehensive orthodontic treatment from 3 practices
- Class 1 malocclusion, extraction of four premolars
- 32 Adults: 21 and older
- 40 Adolescents: 11-14
- Pretreatment and posttreatment were scored by the same examiner using the American weighted Peer Assessment Rating Index: maxillary anterior alignment, buccal occlusion, overjet, overbite, and midline.

Results

- No statistically significant difference ($P>0.05$) was found between the groups in both PAR scores or duration of treatment.
- Stepwise regression explained that variability in treatment was most likely due broken appointments and appliance repairs.
  - 24% reduction in effectiveness, 46% increased duration.
- Histological differences revealed only a 2-week delay in adults to reach a state of cellular proliferation.

Stuart, Sadowsky, Schneider, BeGole, Effectiveness and duration of orthodontic treatment in adults and adolescents, American Journal of Orthodontics and Dentofacial Orthopedics, October 1998, Vol 100,383-386.



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ARTICLE 2 SYNOPSIS

Conclusions

- No statistical difference was seen between the groups with respect to effectiveness or treatment duration
- Variability is often due to patient compliance and appliance repairs
- Buccal occlusion and overjet also presented with variability

Limitations

- Retrospective studies usually present bias as only study models and records that had progressed well were used.

Stuart, Sadowsky, Schneider, BeGole, Effectiveness and duration of orthodontic treatment in adults and adolescents, American Journal of Orthodontics and Dentofacial Orthopedics, October 1998, Vol 100,383-386.

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ARTICLE 2 SELECTION

- Reason for selection: directly answers the PICO question
- Applicability to your patient: discusses the variables that may potentially prolong duration of treatment and effectiveness of treatment.
- Implications: Patient compliance plays a large role in orthodontic treatment and its management.

Stuart, Sadowsky, Schneider, BeGole, Effectiveness and duration of orthodontic treatment in adults and adolescents, American Journal of Orthodontics and Dentofacial Orthopedics, October 1998, Vol 100,383-386.

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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 (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: how does the evidence apply to this patient? Age does not have a statistical difference in orthodontic treatment duration or effectiveness.
- D4: Patient compliance will greatly effect orthodontic treatment.

DISCUSSION QUESTIONS