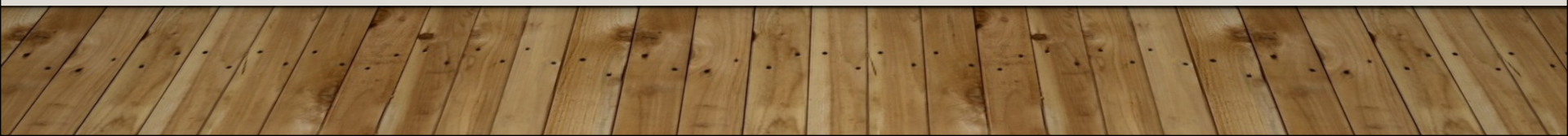# RELATIONSHIP BETWEEN DENTAL ANXIETY AND CLINICAL PAIN

BEHAVIORAL SCIENCES
GROUP 5A-4
EYAD KHOLOKI, BRETT MILLER, SADIE KROLL, RACHEL NIESEN
11/11/2020

ROUNDS TEAM

- **Group Leader: Dr. Dix**

- **Specialty Leader: Drs. Bartfield and Urtz**

- **Project Team Leader: D4 – Eyad Kholoki**

- **Project Team Participants:**
  - **D1: Rachel Niesen**
  - **D2: Sadie Kroll**
  - **D3: Brett Miller**

PATIENT

- Age: 28

- Gender: Female

- Ethnicity: White

- Chief Complaint:
  - "I want to fix my smile."
  - Pt acknowledges that she realizes she has lots of dental work to be done, and says that her current appearance has affected her confidence

MEDICAL HISTORY

- Medical Conditions:
  - None

- Medications:
  - None

- Allergies:
  - Pneumonia vaccine

- Medical History:
  - Trauma to face in mid-2018 – resulted in severe concussion, laceration to upper lip and bruised arm
  - Current smoker (cigarettes)
  - Past history of recreational drug use

DENTAL HISTORY

- Five years since last visit to dentist

- Dental Procedures:
  - Extractions
  - Root canal therapy

- Dental Problems:
  - Sensitivity to cold, hot, sweets, pressure
  - Trouble chewing
  - Headaches, earaches, neck pain
  - Clicking, discomfort, and limited opening of jaw
  - Serious injury to head and mouth
  - Unhappy with appearance of teeth and smile
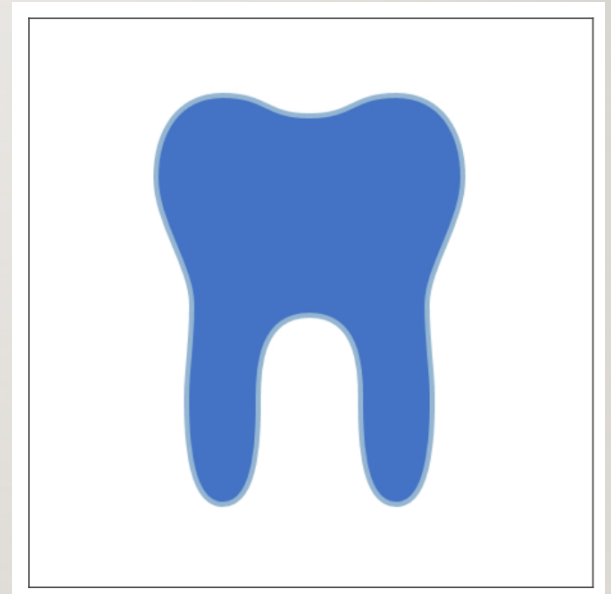
DENTAL HISTORY (CONT.)

- Experienced trauma to face in 2018, resulting in fractured crowns and dislodged restorations

- Detailed poor past experiences with dentistry including excessively forceful deep cleanings and unnecessary procedures performed

- Reports that previous dentist extracted wrong tooth in UR, then had trouble with anesthesia before extracting LR wisdom tooth anyways, without proper anesthesia

RADIOGRAPHS - PAN

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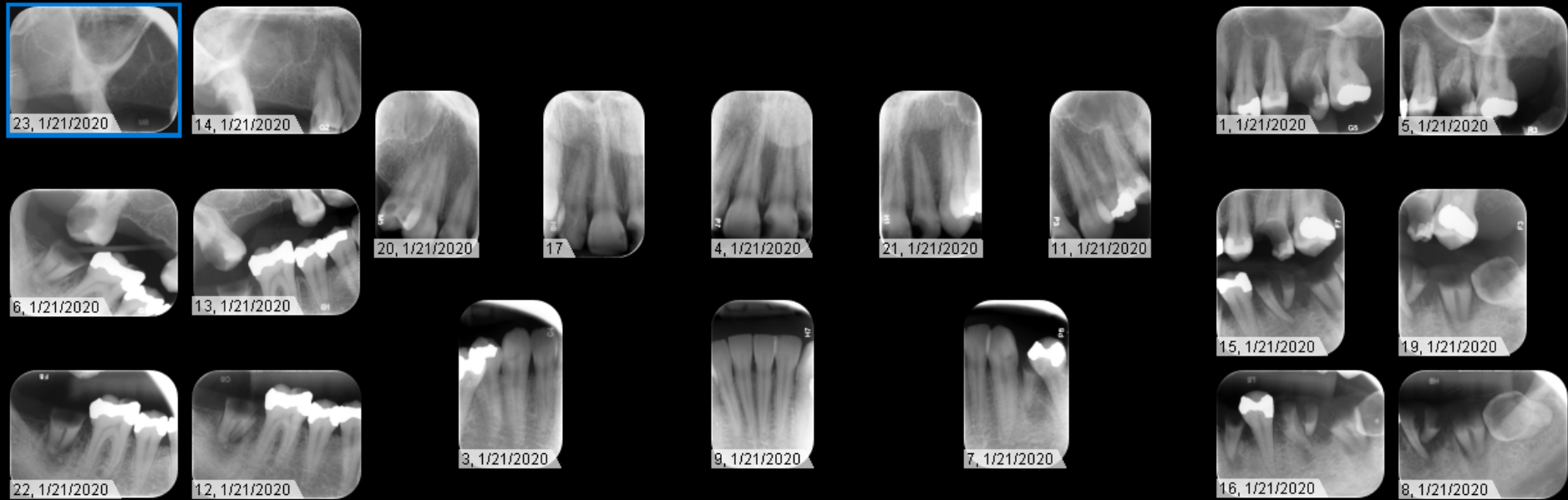
RADIOGRAPHS - FMX

RADIOGRAPHIC FINDINGS

- Generalized gross decay

- Missing teeth

- Retained root tips

CLINICAL FINDINGS

- Gross decay: #2, 5, 6, 9, 10, 14, 17, 18, 19, 21, 31

- Hopeless teeth: #2, 14, 17, 18, 19, 21, 31 – later extracted in OS clinic

- Primary caries: #7 MDL, #8 MDL

- Recurrent caries: B amalgam #15, MODB amalgam #30

- Current restorations: DO amalgam #20, B amalgam #15, DO amalgam #28, MOD amalgam #29, MODB amalgam #30

- Soft tissue: WNL

CLINICAL PHOTOS
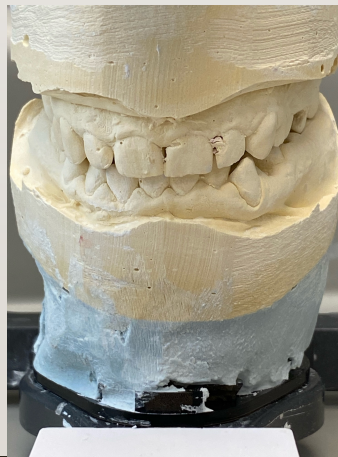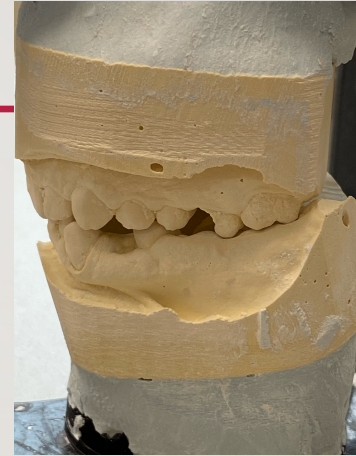
SPECIFIC FINDINGS

- Pt demonstrated severe anxiety to periodontal probing both because of gingival sensitivity and past traumatic experiences with dentistry

  - Used cetacaine to decrease sensitivity

- Not currently interested in quitting smoking

PERIODONTAL CHARTING

Maxillary (teeth 1–16)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MOBILITY																
FURCA																
PLAQUE																
BOP											B	B B	B B			
MGJ					8 8 8	8 8 8	7 7 7	7 7 7	7 7 7	7 7 7	6 6 6	6 6 6	6 6 6			
CAL					2 2 2	2 2 2	2 2 2	2 2 1	1 2 1	1 1 1	2 2 2	3 2 3	4 2 3			
P.D.					3 2 3	3 2 3	3 2 3	3 2 2	2 2 2	2 1 2	3 2 3	4 2 4	5 2 4			
FGM					-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1			
Tooth	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FGM					-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1	-1 0 -1			
P.D.					2 2 3	3 2 3	3 2 3	2 1 2	2 1 2	2 2 2	2 2 3	3 2 3	3 2 3			
CAL					1 2 2	2 2 2	2 2 2	1 1 1	1 1 1	1 2 1	1 2 2	2 2 2	2 2 2			
MGJ																
BOP						B B	B			B	B		B B			
PLAQUE																
FURCA																
PROGNOSI																

Mandibular (teeth 32–17)

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

DIAGNOSIS

- Gross decay

- Very high caries risk

- Moderate chronic periodontitis

PROBLEM LIST

- Gross Caries

- Very high caries risk

- Primary caries

- Periodontal Disease

- Dental Anxiety

- Dental pain

- Unhappiness with smile

D1: WHAT IS THE IMPORTANCE OF THE CORAH ANXIETY SCALE?

- Questionnaire measuring a patient's anxiety in dental-related situations

- Informs clinicians of a patient's subjective feelings surrounding visits to a dental office and procedures

- Frequently used in an experimental setting to measure the success of a clinical intervention relating to dental anxiety

D1 BASIC SCIENCE (CONT.)

- Made up of four scenarios encountered by patients during a dental-related visit

- Patients can choose one four responses matching their reaction to the specified scenario

- Potential scores range from 4-20, with a score of 15 or higher indicating dental phobia

- More recent modifications of Corah's DAS include the addition of a fifth scenario related to injection of anesthetic, a change in response scale, and mean values for phobic and non-phobic patients

- Has high internal consistency and retest reliability

D2: WHAT ARE THE PHYSIOLOGICAL PROCESSES OF ACUTE AND CHRONIC PAIN?

Acute Pain

- Triggers: tissue damage, traumatic injury, surgery, inflammation

- Lasts a few days to weeks

- Activates the SNS: hypertension, tachycardia, increased respiration, agitation, anxiety, restlessness

Chronic Pain

- Can progress from untreated/resolved acute pain
- Lasts 3 months or longer
- Long-term, unresolving pain
- Decreased QOL, takes a toll mentally, physically and emotionally

ASCENDING PAIN PATHWAY

Afferent Sensory Nerve Fibers

- **A-delta fibers**:
- Myelinated
- Fast, Sharp, Acute Pain

- **C fibers**:
- Unmyelinated
- Dull, Slow, Throbbing, Chronic Pain

Cerebral cortex

Thalamus

Brainstem

Dorsal root ganglion

Cell bodies

Dorsal horn

C fiber (unmyelinated, slow; chronic pain)

Spinothalamic tracts

Source of pain

A-delta fiber (myelinated, fast; acute pain)

T cell
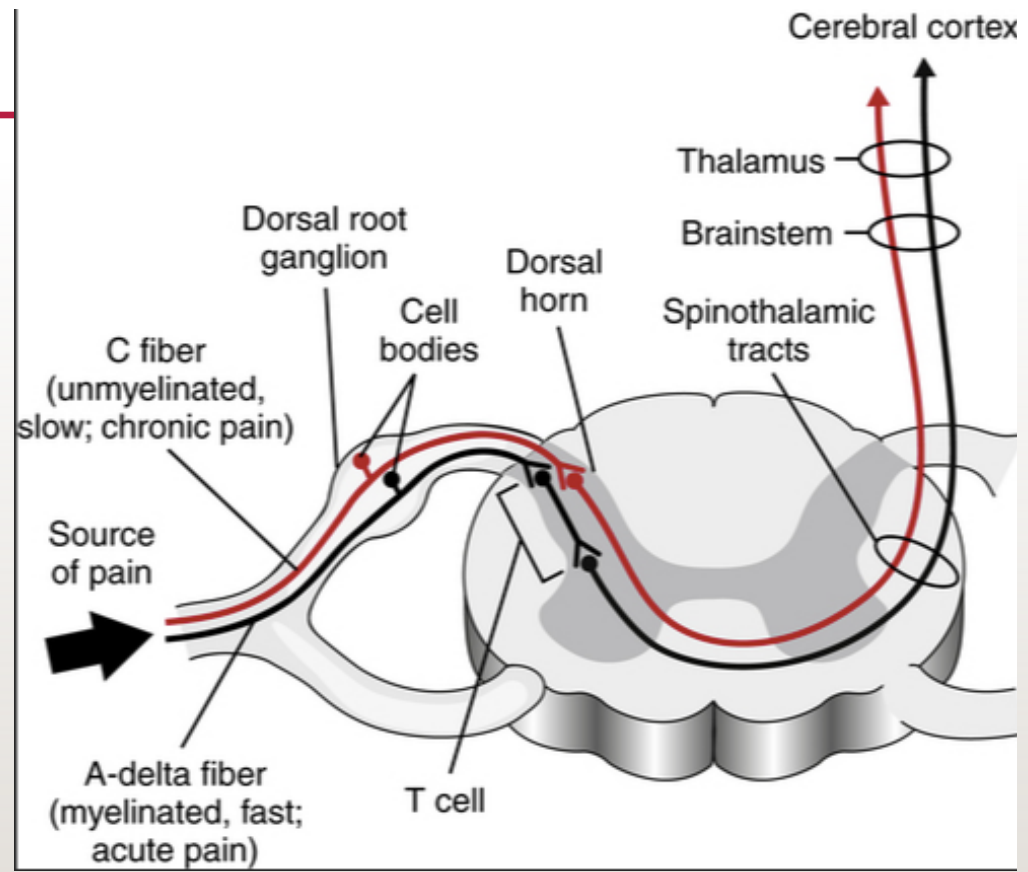
D3 PICO

- **Among patients with dental anxiety, is the clinical pain experienced increased compared to patients who do not experience dental anxiety?**

PICO FORMAT

P: Patients with dental anxiety

I: Dental Anxiety

C: No dental related anxiety

O: Changes in clinical pain

PICO FORMATTED QUESTION

- **Among patients with anxiety who suffer from dental pain, will management of their anxiety decrease the clinical dental pain they experience?**

CLINICAL BOTTOM LINE

- **The relationship between dental anxiety and clinical pain is significant with a positive association. Therefore, management of the patient's dental anxiety should decrease the expected pain from a dental procedure.**

SEARCH BACKGROUND

- **Date(s) of Search: November 2nd, 2020**

- **Database(s) Used: PubMed**

- **Search Strategy: Searched for articles addressing dental anxiety and its relationship to pain. Filtered results based on level of evidence and relevance to the PICO question. Many articles were found but three stood out as most relatable and useful in answering the PICO question.**

SEARCH BACKGROUND

- **MESH terms used: Dental; Anxiety; Pain; Prevalence; Associated factors; Fear; Oral Health**

ARTICLE 1: ASSOCIATION BETWEEN ANXIETY AND PAIN IN DENTAL TREATMENT: A SYSTEMIC REVIEW AND META-ANALYSIS

- Citation:

  - Lin C-S, Wu S-Y, Yi C-A. Association between Anxiety and Pain in Dental Treatment: A Systematic Review and Meta-analysis. Journal of Dental Research. 2017;96(2):153-162. doi:10.1177/0022034516678168

- Study Design: Systematic Review and Meta-analysis

- Study Purpose: Assess the impact of dental anxiety on pain

ARTICLE 1: ASSOCIATION BETWEEN ANXIETY AND PAIN IN DENTAL TREATMENT: A SYSTEMIC REVIEW AND META-ANALYSIS

- Method
    - Meta-analysis was performed using statistical software Comprehensive Meta-analysis 2(biostat)
    - Participants: Sample drawn from clinical group consisting of dental patients about to receive a procedure (both surgical and non-surgical procedures included)
    - Studies where pharmacological or equipment intervention was used to modify anxiety or pain were excluded from this analysis
    - Before the analysis, anxiety and pain scores were normalized as assessed by different scales to a 0-1 scale.

ARTICLE 1: ASSOCIATION BETWEEN ANXIETY AND PAIN IN DENTAL TREATMENT: A SYSTEMIC REVIEW AND META-ANALYSIS

- Results
    - The overall dental anxiety between the studies for surgical compared to non-surgical treatment was non-significant
    - Pre-treatment anxiety has a significant impact on expected pain
    - Dental anxiety has a consistent impact on pain at all different treatment stages
    - Findings support the notion of "train dental anxiety" → individual attitude toward dental situations shaped by a negative dental experience
    - A patient with high dental anxiety will perceive stronger state anxiety before treatment, regardless of the nature of the dental treatment
        - Furthermore, the patient who experiences high dental anxiety will consistently experience stronger pain, regardless of the treatment stage.

ARTICLE 1: ASSOCIATION BETWEEN ANXIETY AND PAIN IN DENTAL TREATMENT: A SYSTEMIC REVIEW AND META-ANALYSIS

- Conclusion – 3 Major Findings

  - 1. An interpretation of anxiety scores should be based on the content of the assessment items to aid in categorizing the results of the score.

  - 2. Clinically, anxiety and fear are different experiences. This is supported by experimental evidence showing that anxiety and fear have divergent effects on pain. Therefore, multiple tools should be used to assess different constructs (pain related fear, trait anxiety, depression) to better characterize the emotional experience of patients.

  - 3. Anxiety assessment should be a critical step in anxiety management for high dental anxiety patients and in pain management for all dental patients. These assessments should be included in the initial evaluation of the patient's condition to aid dentists in evaluating treatment outcomes.

ARTICLE 1: ASSOCIATION BETWEEN ANXIETY AND PAIN IN DENTAL TREATMENT: A SYSTEMIC REVIEW AND META-ANALYSIS

- Limitations:
    - Clinical categorization of surgical vs non-surgical procedures can be over-simplified with limited studies completed on each procedure type. Due to the limited number of studies on all treatment procedures, it is difficult to perform an analysis on each type of procedure.
    - Many of the studies analyzed did not consider the presence of mental disorders. Therefore, the results cannot exclude potentially confounding effects from these psychological factors.

ARTICLE 1: ASSOCIATION BETWEEN ANXIETY AND PAIN IN DENTAL TREATMENT: A SYSTEMIC REVIEW AND META-ANALYSIS

- Reason for selection – Directly relates to the PICO question

- Applicability to your patient – The patient has dental anxiety

- Implications – The patient's dental anxiety should be assessed and evaluated prior to developing a treatment plan to ensure tolerance, acceptance and success of the plan.

ARTICLE 2: THE PREVALENCE OF DENTAL ANXIETY AND ITS ASSOCIATION WITH PAIN AND OTHER VARIABLES AMONG ADULT PATIENTS WITH IRREVERSIBLE PULPITIS

- Citation:
  - Dou, Lei et al. "The prevalence of dental anxiety and its association with pain and other variables among adult patients with irreversible pulpitis." *BMC oral health* vol. 18,1 101. 7 Jun. 2018, doi:10.1186/s12903-018-0563-x

- Study Design: Cross-sectional Study

- Study Purpose: To evaluate the prevalence of dental anxiety and its association with pain and other related factors in adult patients with irreversible pulpitis

ARTICLE 2: THE PREVALENCE OF DENTAL ANXIETY AND ITS ASSOCIATION WITH PAIN AND OTHER VARIABLES AMONG ADULT PATIENTS WITH IRREVERSIBLE PULPITIS

- Method
  - Cross-sectional study of 130 patients with irreversible pulpitis. The patients were given a series of questionnaires to assess their level of dental anxiety, pain at their first/most recent visit, and pain intensity before/during the present endodontic treatment.
  - Dentists also assessed the level of anxiety experienced by the patient during the present treatment/appointment using an anxiety rating scale.

- Results
  - About 83% of the patients suffered from moderate or high dental anxiety
  - Patients with higher modified dental anxiety scale (MDAS) scores were more likely to postpone their dental visits.
  - Patients who had bad experiences at their most recent dental visits were more anxious.
  - Pain at the most recent dental visit or before the present dental visit was the most important factor correlating with dental anxiety

ARTICLE 2: THE PREVALENCE OF DENTAL ANXIETY AND ITS ASSOCIATION WITH PAIN AND OTHER VARIABLES AMONG ADULT PATIENTS WITH IRREVERSIBLE PULPITIS

- Conclusions
  - Pain at the most recent dental visit and during endodontic treatment has a strong positive association with dental anxiety.
  - In effective pain management in endodontics, it is beneficial to also manage the patient's anxiety.

- Limitations
  - This study is not able to make a valid conclusion about the causation among dental anxiety, pain and bad experiences. More prospective controlled studies are required to confirm the causation between the variables in question.

ARTICLE 2: THE PREVALENCE OF DENTAL ANXIETY AND ITS ASSOCIATION WITH PAIN AND OTHER VARIABLES AMONG ADULT PATIENTS WITH IRREVERSIBLE PULPITIS

- Reason for selection – Directly responds to the PICO question

- Applicability to your patient – This patient has a history of dental anxiety and endodontic treatment

- Implications – The patient's dental treatment history should be considered in determining their dental related anxiety. This will help to predict patient acceptance and tolerance of proposed treatment.

ARTICLE 3: DENTAL PAIN AND ORAL HEALTH-RELATED QUALITY OF LIFE IN INDIVIDUALS WITH SEVERE DENTAL ANXIETY

- Citation:
  - Svensson L, Hakeberg M, Wide U. Dental pain and oral health-related quality of life in individuals with severe dental anxiety. Acta Odontol Scand. 2018 Aug;76(6):401-406. doi: 10.1080/00016357.2018.1473892. Epub 2018 May 21. PMID: 29782197.

- Study Design: Cross-sectional Study

- Study Purpose: Analyze the level of dental pain in adult individuals with severe dental anxiety and the association between dental pain and oral health related quality of life

ARTICLE 3: DENTAL PAIN AND ORAL HEALTH-RELATED QUALITY OF LIFE IN INDIVIDUALS WITH SEVERE DENTAL ANXIETY

- Method
    - Study based on 170 adult patients, each asked to fill out a questionnaire designed to assess their dental anxiety. The questionnaire was followed by a clinical exam and panoramic radiograph to assess their oral status.
    - The study also assessed if/how dental anxiety and pain are related to Oral Health Related Quality of Life (OHRQoL)

- Results
    - Presence of dental pain was high (77% of participants reporting pain) and the pain reported was at an increased intensity.
    - About 85% of the participants reported one or more problems during the last 6 months with the mouth/teeth affecting their daily activities
    - Dental pain reported more commonly with lower OHRQoL

ARTICLE 3: DENTAL PAIN AND ORAL HEALTH-RELATED QUALITY OF LIFE IN INDIVIDUALS WITH SEVERE DENTAL ANXIETY

- Conclusions
    - High prevalence of dental pain, at an increased intensity, was discovered in patients with a high level of dental anxiety
    - Dental pain was associated with a lower OHRQoL

- Limitations
    - Patient oral status was evaluated using panoramic radiograph and clinical examination which may underestimate the amount of oral disease.
    - Cross-sectional design only allows results to be interpreted as associations rather than causations
    - The study did not include a control group, limiting the interpretation of the results

ARTICLE 3: DENTAL PAIN AND ORAL HEALTH-RELATED QUALITY OF LIFE IN INDIVIDUALS WITH SEVERE DENTAL ANXIETY

- Reason for selection – Directly responds to the PICO question

- Applicability to your patient – This patient has a history of dental anxiety

- Implications – This study gives a provider more information on the association between their patient's pain, anxiety and oral health related quality of life. Each of these variables should be considered before developing an individualized treatment plan.

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

How does the evidence apply to this patient?

- For this patient, the evidence suggests the provider should consider the patient's history with dental treatment and dental anxiety before creating an individualized treatment plan. Since the patient has an extensive dental treatment history and claims to have dental anxiety, the evidence shows it is likely this patient will also experience increased pain during future treatment.

Based on the above considerations, how will you advise your D4?

- I recommend the provider considers the patient's history of dental anxiety when attempting to manage the patient's pain.

CONCLUSIONS: D4

- Based on the research regarding the link between dental anxiety and clinical pain, it is imperative to seek a better understanding of the reasons for the patient's anxiety and attempt to decrease it over time

- By allowing the patient to speak openly, the provider is able to express empathy and compassion and strengthen the trust between the two

- Encouraging patients to let the provider know when uncomfortable or in pain is extremely important

CONCLUSIONS – D4 (CONT.)

- Offering accommodations as simple as a neck pillow show the patient that the provider cares, shedding a better light on dentistry as a whole

- Alleviating or lessening feelings of anxiety will in turn lead to a higher level of comfort, which is essential in cases that are extensive

- In this case, was able to create a relationship based on trust, leading to the fluid completion of extractions, SR/P, and large fillings – crowns and removable prostheses make up Stage II treatment plan

DISCUSSION QUESTIONS

- What methods can be practiced by the dentist to aid patients who experience dental anxiety and thus consequent clinical pain?

- Which age groups is dental anxiety most prevalent in?

DISCUSSION QUESTIONS

- Effective methods to manage anxiety include:
  - Exploring the reasons behind the anxiety
  - Developing rapport
  - Listening openly
  - Giving options and control to the patient when possible

- Dental anxiety is found most commonly in the 25-35 age group, and more commonly in women than in men

THANK YOU