Fall 2020 Rounds

Evidence Based Dentistry Rounds

TMD

Group 1A-3

10/14/2020

Rounds Team

- Group Leader: Dr. Smithy
- Specialty Leader: Dr. Thompson
- Project Team Leader: Aakeeb Amin
- Project Team Participants: Josephine Tokarev, Josephine Hayes-Birchler, Tristan Rostagno

Patient

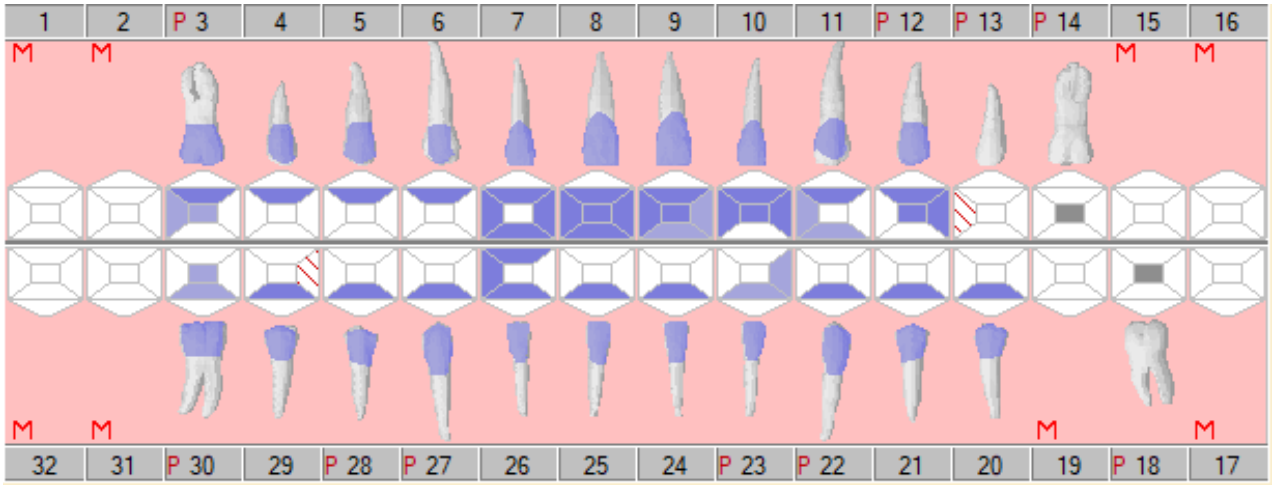
- 40 y/o
- Male
- Caucasian
- Chief Complaint: "I'm here because of my jaw and exam!

Medical History

- Medical conditions: retinis pigmentosa, cognitive disability, motor delay, anxiety
- Medications: Rosuvastatin, buspirone, fluoxetine, GNP vitamin B-1, HM Vitamin D3, Hydrocortisone, ketoconazole, nystatin, pysyllium husk powder
- Allergies: sulfa drugs
- Past smoker, quit 15 years ago

Dental History

- Caries
- Extractions
- Abfractions
- Resins
- Amalgam



Radiographs

Radiographs

Radiographic Findings

- #4 dilacerated root
- Distinct lamina dura

Clinical Findings

- Furcation involvement #3
- Missing #1,2, 15, 16, 17, 19, 31, 32
- Amalgams: #14 O, #18 O
- Resin crown: #8
- Resins: #3 DO, #4 B, #5 B, #6 F, #7 MLDF, #9 MIDF, #10 MIDF, #11 ML, #12 DO, #20 B, #21 B, #22 F, 23 DF, #24 F,#25 F, #26 F #24 F, #25 F, #26 F, #27 F, #28 F, #29 B, #30 OB

Clinical Findings

Specific Findings

- Resins: #4 B, #5 B, #6 F, #12 DO, #20 B, #21 B, #22 F, 23 DF, #24 F,#25 F, #26 F #24 F, #25 F, #26 F, #27 F, #28 F, #29 B, #30 OB

Periodontal Charting

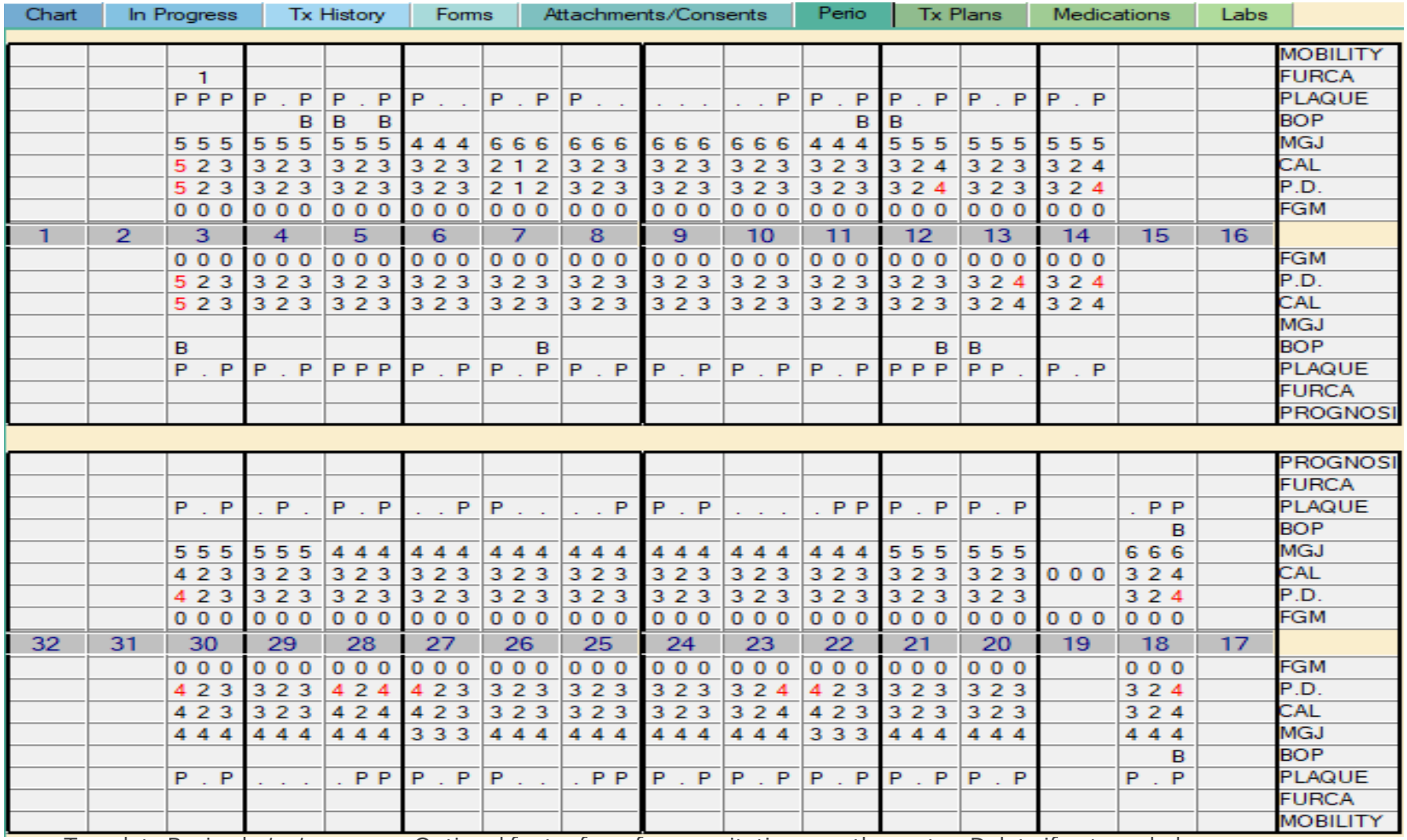


Chart	In Progress	Tx History	Forms	Attachments/Consents	Perio	Tx Plans	Medications	Labs

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

Diagnosis

- Perio diagnosis: stage I, grade A, gingivitis
- Caries risk: low
- Oral cancer risk: medium
- Myofascial pain syndrome (TMJ)

Problem List

- Defective Restorations
- TMJ pain
- Bruxism
- Home care

D1 Basic Science

What is myofascial tissue?

- "Myo-" = muscle + "-fascia" = connective tissue → muscle connective tissue
- Can be thought of as the glue that holds the muscles (& beyond) together
- Main role is to support form and function of the muscles
- Classified into a few subcategories

Classification	Function (examples)	Components	CT Type
Linking-dynamic	Aid in movements & stability (investing fascia)	• Types 1, 12, 14 Collagen • Free nerve endings • Pacinian corpuscles	Dense regular
Linking-passive	Continuity & proprioception (tendons, sheaths)	• Types 1, 3, 12, 14 Collagen • Elastin • Ruffini & Pacinian corpuscles	Dense regular
Fascicular	Force transmission, proprioception, compartmentalization (endomysium, perimysium, epimysium)	• Types 1, 3, 4, 5, 12, 14 Collagen • Neurovascular bundles	Dense regular; dense irregular; Loose

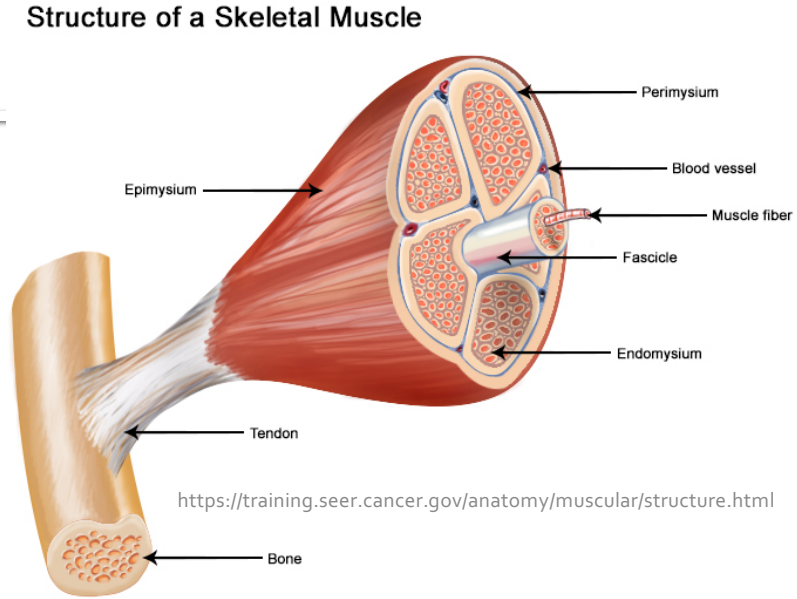
McKenney, K., Elder, A.S., Elder, C., & Hutchins, A. (2013).

What is myofascial tissue cont.

- Fibroblasts are the main cell type responsible
- Fascia within the body is continuous throughout
  - E.g. fascicular myofascia is continuous with linking-passive myofascia

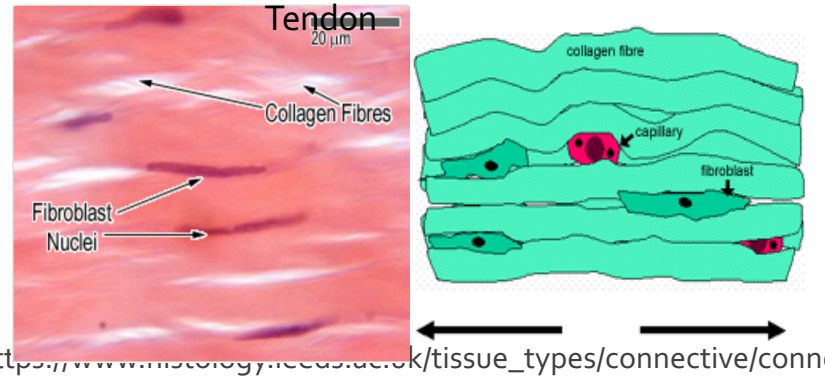
Connection between superficial, compression and myofascia

https://fasciainfo.wordpress.com/connection-between-superficial-compression-and-myofascia/



https://training.seer.cancer.gov/anatomy/muscular/structure.html

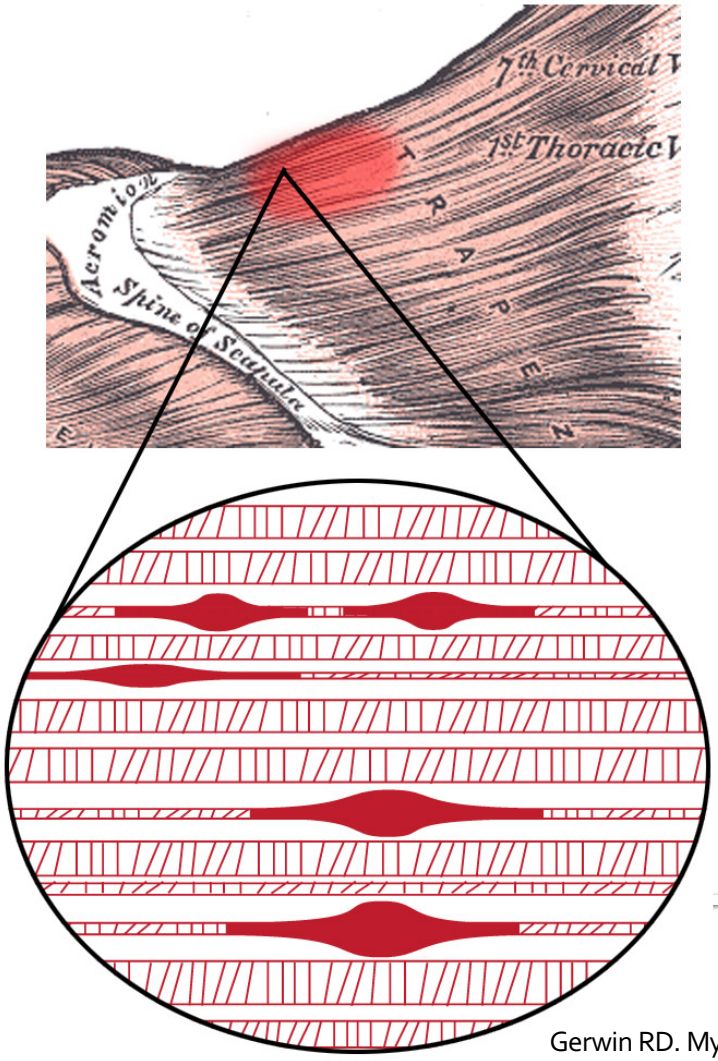
Structure of a Tendon



https://www.histology.leeds.ac.uk/tissue_types/connective/connective_tissue_types.php

References

1. Kumka, M. & Bonar, J. (2012). Fascia: a morphological description and classification system based on a literature review. *The Journal of the Canadian Chiropractic Association*. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3430451/).
2. McKenney, K., Elder, A.S., Elder, C., & Hutchins, A. (2013). Myofascial Release as a Treatment for Orthopaedic Conditions: A Systematic Review. *Journal of Athletic Training*. (https://0-www-ncbi-nlm-nih-gov.libus.csd.mu.edu/pmc/articles/PMC3718355/).



MYOFASCIAL TRIGGER POINT(S)

These are hard discrete, palpable nodules in a taut band of skeletal muscle(s) that may be spontaneously painful or painful on compression.
They usually lead to a syndrome known as Myofascial pain Syndrome.
They often arise from sustained repetitive activities , like lifting heavy objects, poor posture, lack of sleep, nutritional deficiency, etc… However no single factor is responsible for their development.

Gerwin RD. Myofascial Trigger Point Pain Syndromes. Semin Neurol. 2016 Oct;36(5):469-473. doi: 10.1055/s-0036-1586262. Epub 2016 Sep 23. PMID: 27704503.
Shah JP, Thaker N, Heimur J, Aredo JV, Sikdar S, Gerber L. Myofascial Trigger Points Then and Now: A Historical and Scientific Perspective. *PM R*. 2015;7(7):746-761. doi:10.1016/j.pmrj.2015.01.024

D3 PICO

- **Clinical Question:**

What is the effectiveness of occlusal guards in patients with myofascial pain?

PICO Format

P: Patients with myofascial pain

I: Splinting therapy

C: Non-splinting therapy

O: Relieve pain

PICO Formatted Question

In patients with myofascial pain, does splinting therapy compared to nonsplinting therapy result in a better prognosis?

Clinical Bottom Line

- Patients who are prescribed an occlusal splint are more likely to have pain reduction.
- Choosing what kind of splint, differs depending on the origin of the myofascial pain
- An occlusal guard is a type of occlusal splint that may be utilized for myofascial pain, but a stabilization splint and counseling should also be considered

Search Background

- **Date(s) of Search:**
  - 10/5/20-10/7/20
- **Database(s) Used:**
  - Pubmed
- **Search Strategy/Keywords:**
  - Myofascial pain, splints, occlusal splints

Search Background

- **MESH terms used:**
  - **temporomandibular joint disorders, occlusal splints, splints, myofascial pain**

Article 1 Citation, Introduction

Effectiveness of occlusal splint therapy in the management of temporomandibular disorders: network meta-analysis of randomized controlled trials

- Study Design: Meta-Analysis of RCTs

This study aimed to address the lack of review of whether the duration of splint therapy, hard vs soft splinting therapy, as well as whether combining splint therapy with forms of counseling/self-management, would affect the prognosis.

Al-Moraissi EA, Farea R, Qasem KA, Al-Wadeai MS, Al-Sabahi ME, Al-Iryani GM. Effectiveness of occlusal splint therapy in the management of temporomandibular disorders: network meta-analysis of randomized controlled trials. Int J Oral Maxillofac Surg. 2020 Aug;49(8):1042-1056. doi: 10.1016/j.ijom.2020.01.004. Epub 2020 Jan 22. PMID: 31982236.

Article 1 Synopsis

- **Method**
  - Clinical questions established
    - "Does occlusal splint therapy treat TMDS?"
    - "What is the most effective oral occlusal splint for reducing pain intensity and TMJ clicking, and improving mouth opening for patients with arthrogenous and myogenous TMDs?"
    - "Does the pattern of hard stabilization splint wearing time have an impact on its efficacy in the treatment of TMDs"
  - The search complied with **PICOTS** criteria, and articles published between **1977 and 2019** were evaluated for inclusion.
  - Interventions were anterior repositioning splints, partial coverage splints, prefabricated splints, non-occluding splints, full coverage soft or resilience stabilization splint, counseling therapy & self management, counseling therapy and hard stabilization splint
  - Control was no treatment
  - Comparison was flat stabilization splint like a Tanner, Fox, or centric relation appliance
  - The **GRADE** system was used to evaluate the RCTs
    - Even though an RCT is a high level of evidence, the researchers downgraded any that had limitations/biases

Article 1 Synopsis

- **Results**
  - Of 600 RCTs evaluated, only **48** were included in the study
    - Bias risk
      - 25 = unclear , 13 = low risk, **10 = high risk**
      - Follow up time ranged from 1-12 months
  - **Pain reduction**
    - Arthrogenous origin
      - Dichotomous data (top 2)
        - Anterior repositioning splint (86.5%)
        - Counseling therapy + self-management plus hard stabilization splint (76.5%)
      - Continous data
        - Anterior repositioning splint (92%)
        - NTI-tss (76.99%)
    - Myogenous
      - Dichotomous
        - NTI-tss (81.3%)
        - Pre-fabricated splint (74.4%)
      - Continous
        - NTI-tss (86.8%)
    - **Meta regression analysis:** For both types of TMD wearing a hard stabilization splint at night reduced pain more effectively than 24-hour wear.
    - **Sensitivity analysis:** No actual difference in pain reduction during or post Tx

Conclusions

- **All occlusal splints** are more effective in managing pain than no treatment
- **Hard stabilization splints** make little difference than soft for arthrogenous origin TMD and **do make a difference for myogenous origin**
- Duration of wear does in fact affect pain reduction with night-time wear being most effective

Limitations

- Although most did, not all RCTS used the same diagnostic tool
- Blinding was not possible because of the use of occlusal splints
- Pain is based on patient's perception
- Evidence is mostly moderate to low quality

Article 1 Selection

- **Reason for selection**
  - Journal
    - International Journal of Oral and Maxillofacial Surgery
  - Publication Date
    - 2020
  - No biases report from researchers
  - Level of evidence – Meta analysis
- **Applicability to our patient**
  - When recommending an occlusal guard, this article provides evidence as to how long it should be worn and that it should be a hard night-guard and post counselling treatment would improve odds.
- **Implications**
  - Splinting therapy does result in more pain reduction than non-splinting therapy alone

Article 2 Citation, Introduction

Stabilization Splint Therapy for the Treatment of Temporomandibular Myofascial Pain: A Systematic Review

- Study Design: Systematic Review

  The aim of the study was to evaluate how effective it would be to diminish the symptoms of myofascial pain via stabilization splint therapy.

- Citation:
  - Al-Ani Z, Gray RJ, Davies SJ, Sloan P, Glenny AM. Stabilization splint therapy for the treatment of temporomandibular myofascial pain: a systematic review. J Dent Educ. 2005 Nov;69(11):1242-50. PMID: 16275687.

Article 2 Synopsis

- **Method**
  - Reviews consist of **RCTs.** The main intervention considered was splint therapy and treatments that were considered as non-splinting therapy include physiotherapy, relaxing appliances, pharmacological interventions, other occlusal appliances.
  - Patients on all sides of the myofascial pain spectrum were included from mild to severe. Patients who exhibit myofascial pain that is not mostly of muscular origin were excluded.
  - **Databases**
    - Cochrane Central Register of Controlled Trials from 1966 to 2001 using Cochrane Sensitive Search Strategy for RCTs
    - MEDLINE
  - Pain measure with VAS scale (visual analogue scale), PSS (Pain Severity Scale), Muscle palpation Index (PPI) & a pain diary

- **Results**
  - **12 RCTs** were included
    - Range of patient sample size = **20-80**
  - **Pain reduction greatest with SS** compared to all groups
  - No statistically significant difference between improvement of pain intensity at rest between SS and control group
  - No difference between SS and non-occluding splints on palpation or pain diary scores

Article 2 Synopsis

- **Conclusions**
  - Low quality evidence showing SS efficacy is higher compared to no Tx
  - No evidence that SS has better efficacy than other conventional treatments
- **Limitations**
  - Small number of patients
  - Increased risk of selection bias
  - Quality of evidence after evaluation factors applied

Article 2 Selection

- Reason for selection
  - Level of evidence
  - Journal of publication
- Applicability to our patient
  - If patient returns and their occlusal guard is not relieving symptoms, then a stabilization splint such as a Michigan splint should be considered.
- Implications
  - While SS provides better prognosis than no Tx, there is no consistent evidence showing that SS provides better prognosis than other conventional Tx

Article 3 Citation, Introduction

Occlusal stabilization splint for patients with temporomandibular disorders: Meta-analysis of short and long-term effects

- Study Design: Meta-analysis of RCTs

  The aim of this study was to evaluate the differences between short and long-term stabilization splints for the treatment of TMDs along with what factors affect the outcomes.

- Citation:
  - Kuzmanovic Pficer J, Dodic S, Lazic V, Trajkovic G, Milic N, Milicic B. Occlusal stabilization splint for patients with temporomandibular disorders: Meta-analysis of short and long term effects. *PLoS One*. 2017;12(2):e0171296. Published 2017 Feb 6. doi:10.1371/journal.pone.0171296

Article 3 Synopsis

- **Method**
  - RCTs were found in MEDLINE, Web of Science, and EMBASE
  - Treatment modalities
    - Occluding splint, occlusal oral appliances, physiotherapy, behavioral therapy, counseling, no treatment
  - Patients with mild to severe levels of TMD
  - GRADE was used to evaluate evidence along with the use of meta-regression analysis
  - Short = (≤ 3 months), Long = (> 3 months)
  - Pain reduction = categorical & Pain intensity = VAS (visual analogue scale)
- **Results**
  - 33 RCTS
  - 10 studies = non-occluding splints, 9 = SS vs. occlusal appliances, 5 = control group with physical therapy, 4 studies = SS vs. behavioral Tx, 3 studies = minimal treatment (exercise & counseling, 1 study = counseling was control
  - Stabilization splints
    - Positive effects on pain reduction and intensity for those of myogenous origin vs. control groups
    - Decrease of muscle tenderness
    - Improved mouth opening
    - **No difference between stabilization splints and other oral appliances**
  - Continued use of stabilization splints throughout the day affects prognosis
  - Long term results = no difference between any treatment modality
  - Depression for long term use was better for the control group
  - Effect of SS better in patients if splint was worn 24 hours

Article 3 Synopsis

- **Conclusions**
  - For short-term effects, SS = benefits
  - For long term, SS = same as any other therapy
  - SS better than non-occluding splint patients with myofascial pain of myogenous origin
- **Limitations**
  - 80% of studies = high risk for performance bias of author's judgments
    - But none for pain reduction or pain intensity
  - Low quality studies because of the comparison to control groups
  - Not all studies used the same time frame when comparing effects

Article 3 Selection

- **Reason for selection**
  - Level of evidence
  - Sample size
    - 1779 individuals
    - 33 RCT studies
  - Modest journal impact factor score
  - Cited over 43 times
  - Authors show no bias for research
- **Applicability to our patient**
  - The goal is to provide the patient with the best long-term effect. Our patient's myofascial pain is myogenous in origin, thus, this study supports utilizing a stabilization split for short term effects
  - Implications
    - In the short term the Tx modality should be a stabilization splint but its effects for long term use, subside.

Levels of Evidence

- [x] **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

- Although RCTs within reviews are of moderate-low quality, they do suggest that any kind of occlusal splint is the preferred choice
  - In the long-term the splint chosen does not affect the prognosis

- The patient should be given a stabilization splint to alleviate myofascial pain if the occlusal guard still does not provide relief. Previous pharmacological intervention that was prescribed did not aid the patient. For best results, the patient should also add counseling/behavioral management strategies to post-treatment management, although this part will be more extensive because the patient is cognitively delayed and has reported feelings of anxiety.

Conclusions: D4

- Based on our bottom line, I will advise the patient to continue using the occlusal guard for a few months to see if it can alleviate his myofascial pain.
- Patient will proceed with this treatment.

Discussion Questions

Should there be immediate relief with occlusal guards in TMD? Or how much time should you allow before deciding if the occlusal guard is effective or not ?
Should you try an occlusal guard as the first line of treatment?
What are some alternative treatment options used to treat TMD?
How long does the relief from trigger point injections last?
Why would an occlusal guard positively effect a TMD? What is the physical reasoning?
In what situations do you use soft vs hard occlusal guards?
What is splinting therapy and how can it help patients with Temperomandibular Disfunction?
Are occlusal guards indefinitely effective, or do benefits wane with time?
How do you treat myofascial pain in patients who are either partially or fully edentulous?
Has reducing muscle activity through botox treatment been shown to alleviate myofascial pain?
Are there any major risk factors associated with myofascial pain, and if so, what are they?
Should the thickness of an occlusal nightguard vary depending on the severity of clenchinggrinding?
Is an occlusal guard effective if the patient does not utilize it as often as recommended?
Are there certain factors that can increase the chance of someone developing myofascial pain?
What type of medications can we prescribe for severe myofascial pain?
Does the patient use stimulants such as tobacco or coffee that could irritate the muscles perpetuating their myofascial pain?

THANK YOU