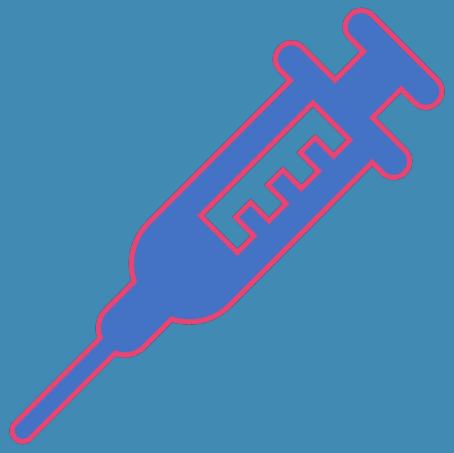


EFFECTIVENESS OF TRIGGER POINT INJECTIONS

EVIDENCE BASED DENTISTRY ROUNDS
TMD
7B-2
11/18/2020

ROUNDS TEAM

Group Leader: Dr. Rossi

Specialty Leader: Dr. Abere

Project Team Leader: Viktoriia Senych

Project Team Participants: Tom Gorski, Daniel Stein, Alexandra Pentala

PATIENT

- 16 y. o. Middle Eastern Female
- Presented for LOE in March of 2020
- CC: “I have pain that radiates to my ears and it’s worse at night”

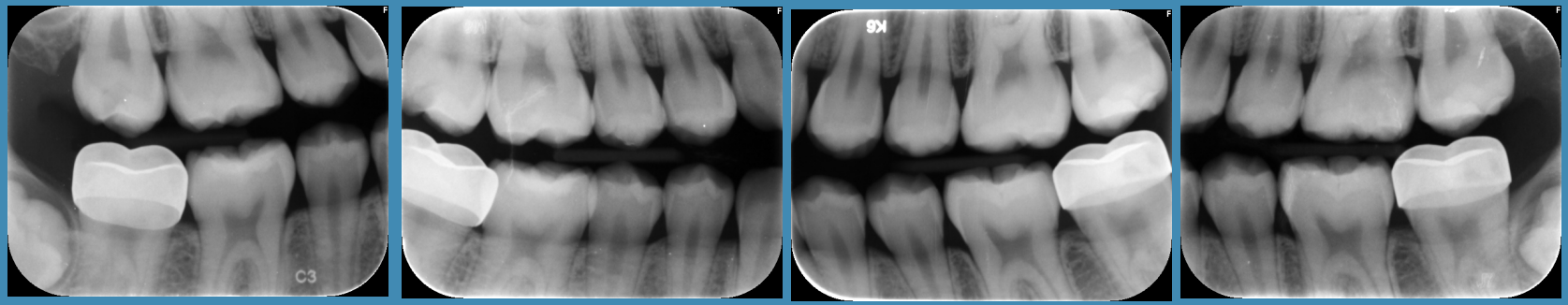
MEDICAL HISTORY

- OTC Multivitamins
- NKDA

DENTAL HISTORY

- #2 OB amalgam
- #15, #30 occlusal resin
- #18, #31 stainless steel crowns
- #3, #14 & #19 sealants

RADIOGRAPHS



RADIOGRAPHS

RADIOGRAPHIC FINDINGS

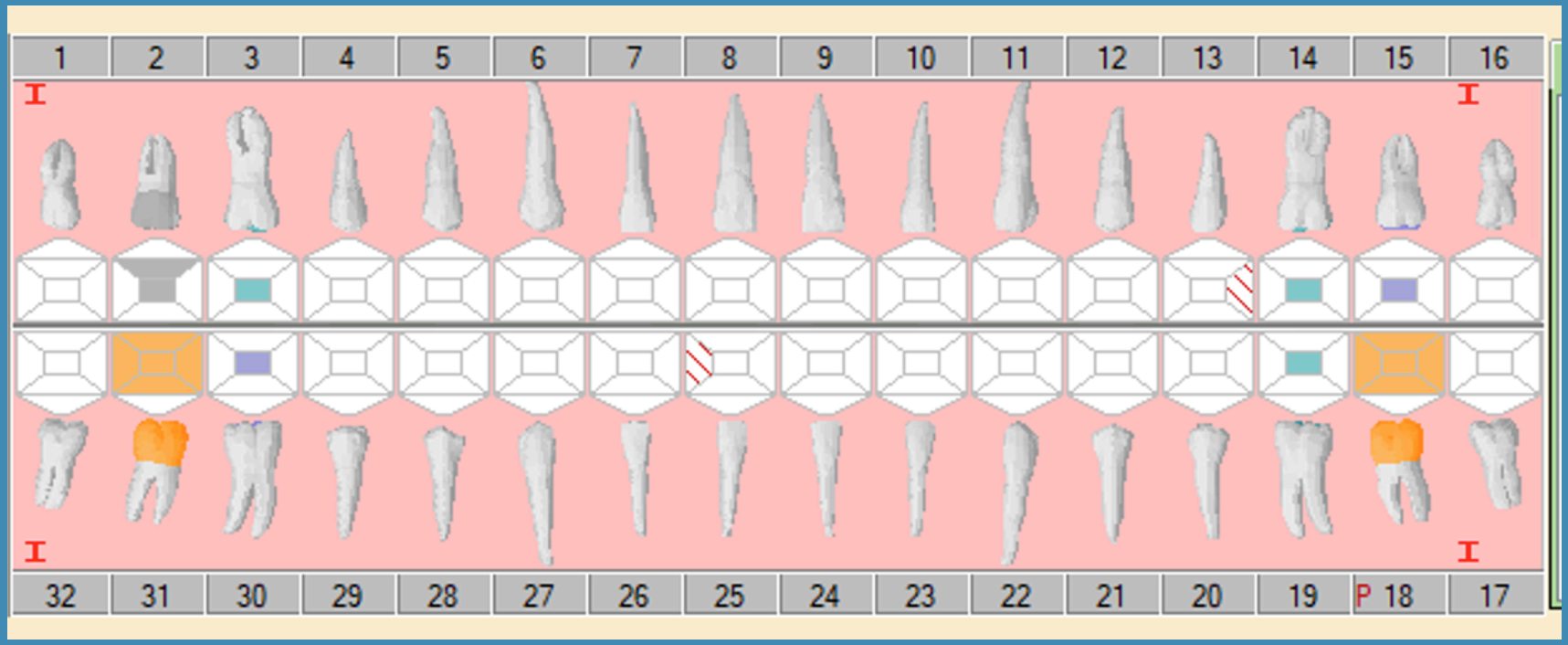
- Impacted third molars

CLINICAL FINDINGS

- Myofascial and TMJ pain
- Anterior open bite
- Wear facets due to bruxism

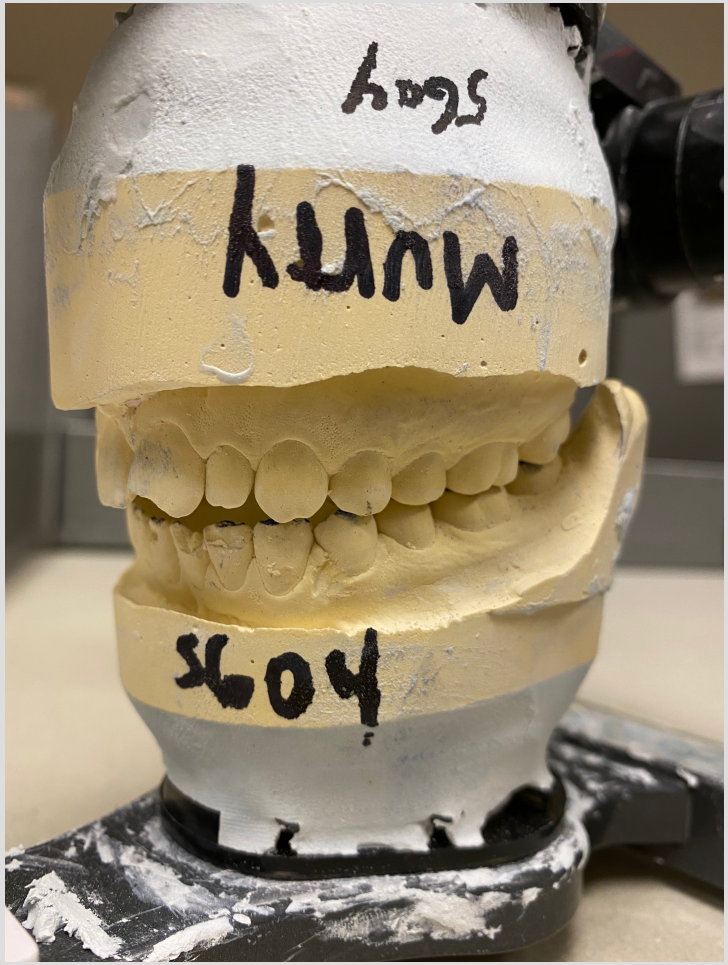
SPECIFIC FINDINGS

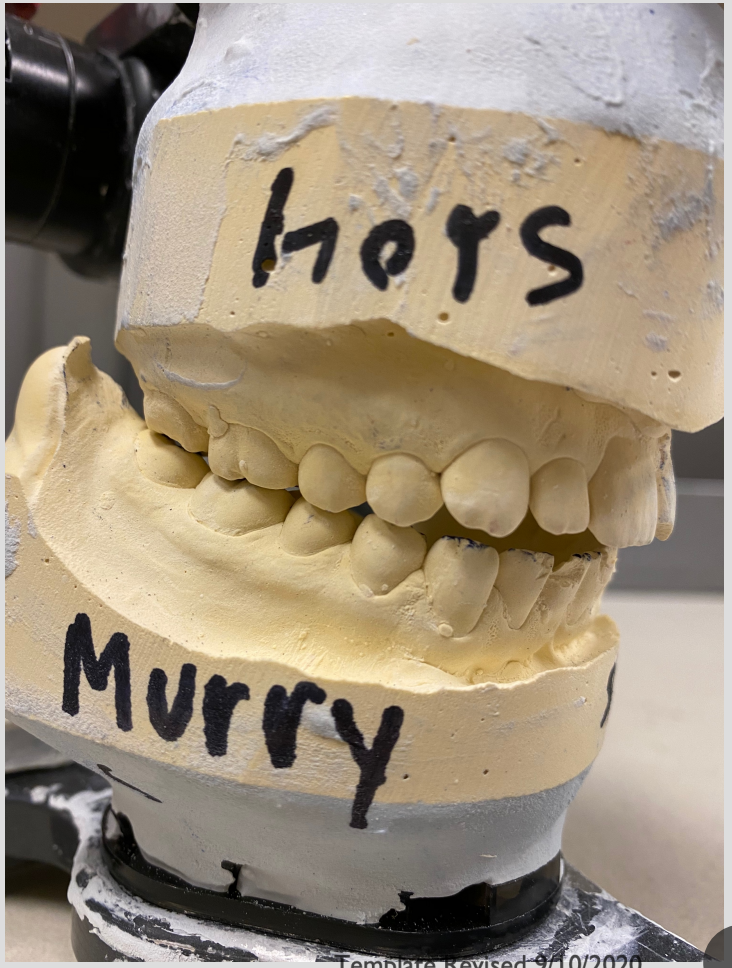
- Pain on opening and closing with slight jaw deviation to the right upon opening
- Pain 5/10 noted on the upper left cervical palpation
- Sharp pain beneath zygoma and across masseter upon palpating


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 P 18 17

ODONTOGRAM

DIAGNOSTIC CASTS





DIAGNOSIS

- Bilateral moderate capsulitis
- Parafunctional habit (bruxism)
- Mild to moderate myofascial pain related to the masseter, SCM and trapezius bilaterally.

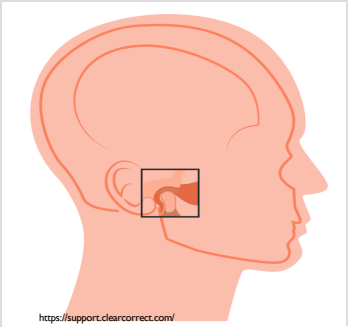
PROBLEM LIST

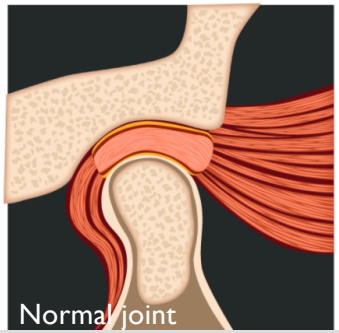
- Bruxism
- Myofascial and TMJ pain
- Anterior open bite

DI BASIC SCIENCE

Temporomandibular Disorder

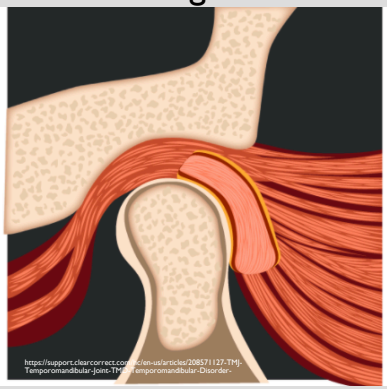
Pain and dysfunction involving temporomandibular joints (TMJ) and surrounding muscles of mastication
Signs and symptoms: limitations to jaw movement and function, noise from TMJ during chewing, chronic pain in muscles and joints





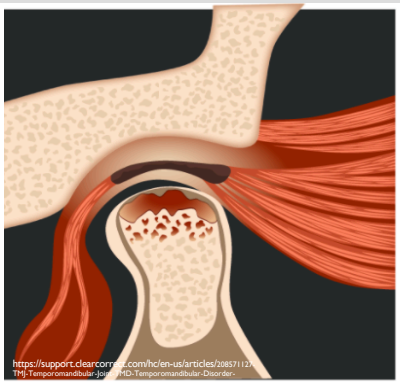
https://support.clearcorrect.com/hc/en-us/articles/208571127-TMJ-Temporomandibular-Joint-TMD-Temporomandibular-Disorder-

Internal derangement of TMJ



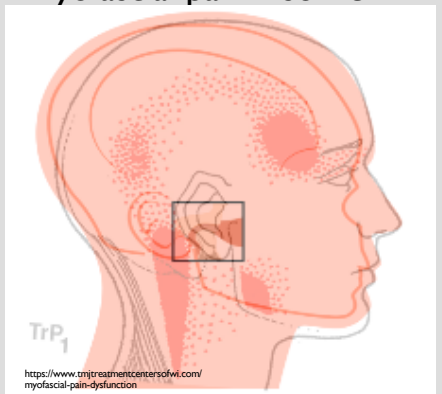
- structural displacement of articular disc
- disc positioning maintains normal joint movement

Degenerative joint disease



- degeneration and inflammation of disc and joint
- result of osteoarthritis or overloading of the joint

Myofascial pain disorder



- pain and discomfort of surrounding jaw muscles
- abnormal muscular and skeletal function, clenching, and grinding

Chang, C., Wang, D., Yang, M., Hsu, W., & Hsu, M. (2018). Functional disorders of the temporomandibular joints: Internal derangement of the temporomandibular joint. *The Kaohsiung Journal of Medical Sciences,*

List, T., & Jensen, R. H. (2017). Temporomandibular disorders: Old ideas and new concepts. *Cephalalgia, 37*(7), 692-704.

Liu, F., & Steinkeler, A. (2013). Epidemiology, Diagnosis, and Treatment of Temporomandibular Disorders. *Dental Clinics of North America, 57*(3), 465-479.

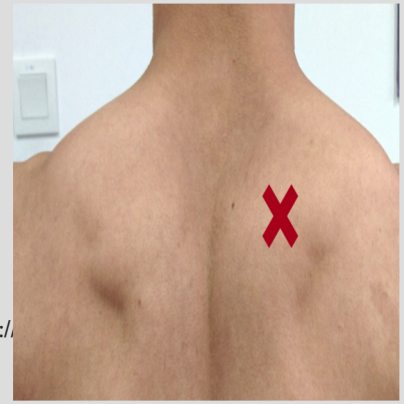
Tanaka, E., Detamore, M., & Mercuri, L. (2008). Degenerative Disorders of the Temporomandibular Joint: Etiology, Diagnosis, and Treatment. *Journal of Dental Research, 87*(4), 296-307.

D2 PATHOLOGY

D2 Question: What is trigger point injection?

<u>Trigger Points:</u> Sites within muscle and surrounding connective tissue that are under chronic tension and respond by forming tight nodules known as muscle knots.

- Frequent finding in pts with TMD
- Stimulation can cause radiating pain in muscles around the TMJ
  - Headaches/face pain
  - Jaw dysfunction
  - Clicking



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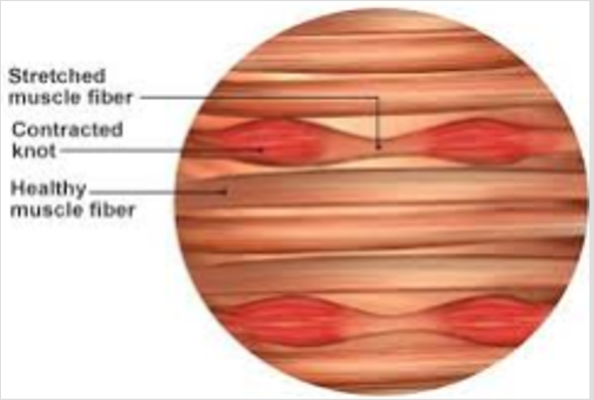

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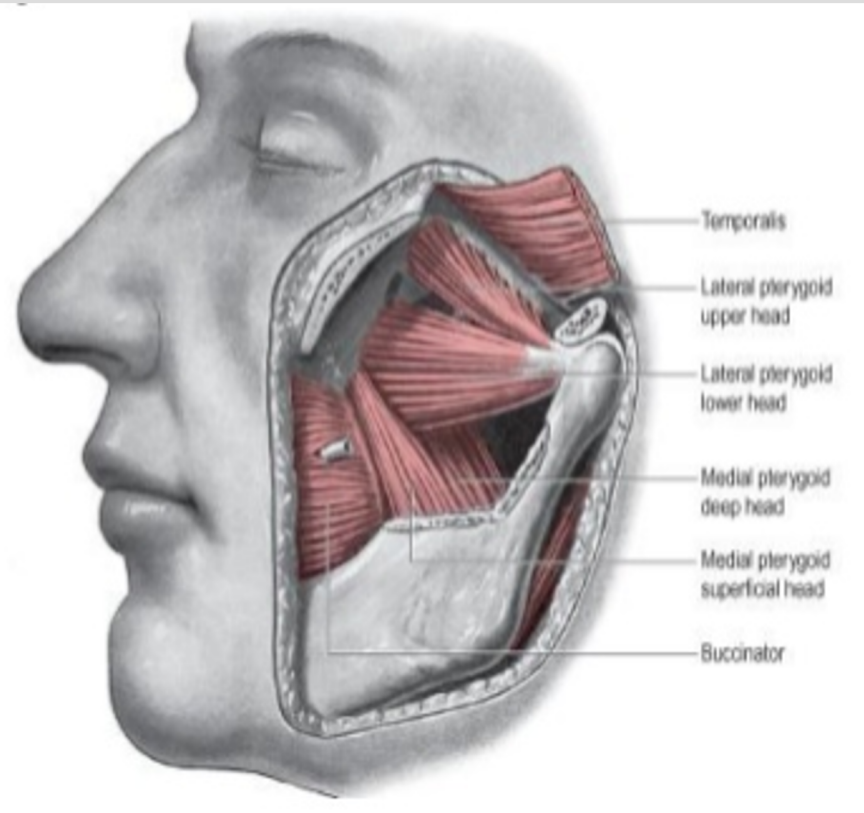
D2 PATHOLOGY

Trigger Point Injections: Form of therapy designed to relieve tension at trigger points by administering a drug and increasing circulation directly at the site.

- Injection types:
  - Local anesthetic
  - Corticosteroid
  - Botulinum toxin
  - Dry needle (no drug)
- TMD associated sites:
  - Masseter
  - Lateral pterygoid
  - Temporalis



https://images.app.goo.gl/xgRFvdNKS2jVL3Bd7

Aksu Ö, Pekin Doğan Y, Sayıner Çağlar N, Şener BM. Comparison of the efficacy of dry needling and trigger point injections with exercise in temporomandibular myofascial pain treatment. Turk J Phys Med Rehabil. 2019;65(3):228-235. Published 2019 Aug 20. doi:10.5606/tftrd.2019.1802
Wong CS, Wong SH. A new look at trigger point injections. Anesthesiol Res Pract. 2012;2012:492452. doi:10.1155/2012/492452

D3 PICO

- **Clinical Question:**

  Do trigger point injections prove effectiveness in the management of TMD?

PICO FORMAT

P: management of TMD

I: treatment using trigger point injections with Lidocaine

C: trigger point injections with Botox and dry needling

O: effectiveness

PICO FORMATTED QUESTION

- **For patients with TMD, is treatment with trigger point injections using Lidocaine superior to using Botox and dry needling?**

CLINICAL BOTTOM LINE

- When treating TMD with trigger point injections, substance use (lidocaine or Botox) yield better results than dry needling.
- When choosing between lidocaine and Botox, both yield similar results, choice therefore should be based on price, patient preference, and allergies/ other medical contraindications for either.

SEARCH BACKGROUND

- Date(s) of search: 11/02/2020
- Database(s) used: PubMed
- Search strategy/ keywords:
  - TMD/TMJ pain
  - Trigger point
  - Injection
  - Botox, lidocaine, dry needling

SEARCH BACKGROUND

- MESH terms used:
  - TMD
  - Trigger point
  - Lidocaine
  - Botox
  - Dry needling
  - Pain management

ARTICLE 1 CITATION, INTRODUCTION

- Citation: Roberta de Abreu Venancio, Francisco Guedes Pereira Alencar & Camila Zamperini (2009) Botulinum Toxin, Lidocaine, and Dry-Needling Injections in Patients with Myofascial Pain and Headaches, CRANIO®, 27:1, 46-53, DOI: 10.1179/crn.2009.008

- Study Design: Randomized controlled trial
  - Patients were divided into 3 groups for treatment of TMD and headaches: Lidocaine at 0.25%, Botox at 0.25% and dry needling. Doctors used digital palpation to locate trigger point, then each patients associated treatment was administered. Injections were given until a "local twitch response" was no longer seen in each case. With follow ups, doctors used a set of criteria to evaluate the effectiveness of Botox vs lidocaine (see pg 48 of article).

- Study Need/ Purpose:
  - To evaluate how lidocaine, Botox and dry needling compare in terms of effectiveness in treating myofascial pain and headaches.

ARTICLE 1 SYNOPSIS

Method

- Patients were divided into 3 groups for treatment of TMD and headaches: Lidocaine at 0.25%, Botox at 0.25% and dry needling. Doctors used digital palpation to locate trigger point (maximum of 3), then each patients associated treatment was administered. Injections were given until a "local twitch response" was no longer seen in each case. With follow ups, doctors used a set of criteria to evaluate the effectiveness of Botox vs lidocaine
  - *(see pg 48 of article).*
- Follow ups were 1, 4, and 12 weeks

Limitations:

- Small sample size
- Limited to 3 trigger points/ injections
- Limited knowledge of technique

ARTICLE 1 SYNOPSIS

- Results
  - All methods showed positive results (decrease in severity of pain)
  - Methods showed effective MANAGEMENT, but not TREATMENT
  - Responsiveness to treatment is patient based, not very predictable
- Conclusions
  - Based on this article, this type of treatment should only be considered as a management of pain in emergency situations while the underlying etiology is addressed. The article notes that the results of such techniques are temporary and should not be used as a final treatment for myofascial pain.

Table 1
Means and Standard Deviations for Symptom Serverity Index (SSI)

Group	Baseline	1-week	4-week	12-week
DN	0.52 (0.09)	0.34 (0.08)	0.42 (0.08)	0.36 (0.17)
L	0.60 (0.21)	0.40 (0.09)	0.46 (0.19)	0.46 (0.24)
BT	0.44 (0.19)	0.33 (0.22)	0.38 (0.14)	0.44 (0.19)

)N: dry-needling; L: lidocaine; BT: botulinum toxin

ARTICLE 1 SELECTION

- Reason for selection: Studies the 2 comparison we addressed in our PICO question, and demonstrated an understanding of the treatment option we elected.
- Applicability to patient:
  - Very
  - Outcome of study showed similar results to our patient
- Implications:
  - As the study demonstrated, the techniques we used with our patient are only a temporary solution to a bigger problem that needs to be addressed to fully treat the patient's symptoms

ARTICLE 2 CITATION & INTRODUCTION

- Citation: Bilici IŞ, Emes Y, Aybar B, Yalçın S. Evaluation of the effects of occlusal splint, trigger point injection and arthrocentesis in the treatment of internal derangement patients with myofascial pain disorders. J Craniomaxillofac Surg. 2018 Jun;46(6):916-922. doi: 10.1016/j.jcms.2018.03.018. Epub 2018 Mar 31. PMID: 29692327.

- Study Design: Randomized controlled trial

- Study Need/ Purpose:
  - "In temporomandibular disorders (TMDs), unless splints are effective, combined therapies are performed. The aim of this study is to show the effectiveness of the local anesthetic injections (trigger point injections) to the masticatory muscles."

ARTICLE 2 SYNOPSIS

- Method: “The study was composed of TMD patients and the predictor variables were therapy combinations including stabilization splint (SS) therapy, SS+trigger point injection therapy (TPI) and arthrocentesis. The primary outcome variables were pain and jaw movements. The follow-ups were done at 1st and 3rd months. 56 patients who were treated for TMD with only SS or combined therapies were included in the study. The effects of additional TPIs were compared to SS therapy alone. Also the effect of arthrocentesis was evaluated too.”
- Limitations:
  - Only single therapy they compared to was SS (splint only)

ARTICLE 2 SYNOPSIS

- Results
  - All methods showed positive outcomes
  - Those in group B (Splint + trigger point injections) showed significantly less pain (smaller VAS) compared to group A (Splint without injections)
  - Combination therapies were found to be most effective
  - "They reported that TP injection with SS showed better results than SS therapy alone. TP injection reduced pain more quickly and shortened the treatment time" – Ozaken.
- Conclusions
  - "TPI+SS therapy over splint use alone was shown to be a more effective method for decreasing VAS pain scores in TMD patients in this study."

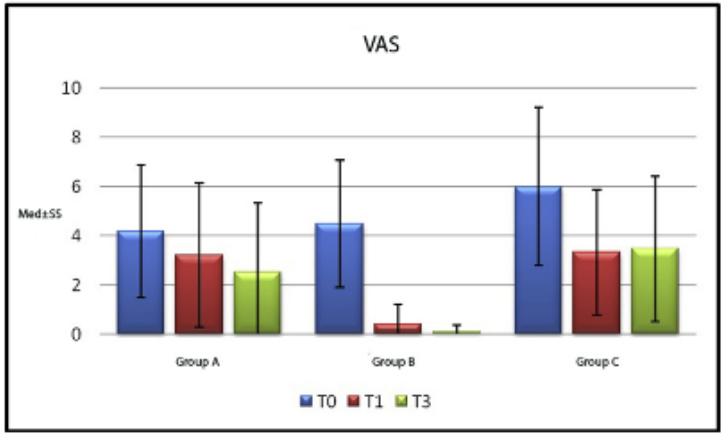


Fig. 6. Visual analog scale (VAS) evaluation.

ARTICLE 2 SELECTION

- Reason for selection:
  - This article shows how combination therapy is more effective that single treatments alone.
  - It also continues to demonstrate that these treatment options are only temporary fixes to a larger problem that must be addressed.
- Applicability to patient:
  - Our patient did not respond to the single treatment method. This article demonstrates how our patient may benefit from a combination therapeutic approach.
- Implications:
  - This method of treatment could prove effective for our patient in maintaining pain until a definitive treatment is established.

ARTICLE 3 CITATION AND INTRODUCTION

- Citation: Kietrys DM, Palombaro KM, Azzaretto E, Hubler R, Schaller B, Schlussel JM, Tucker M. Effectiveness of dry needling for upper-quarter myofascial pain: a systematic review and meta-analysis. J Orthop Sports Phys Ther. 2013 Sep;43(9):620-34. doi: 10.2519/jospt.2013.4668. PMID: 23756457.

- Study Design: Meta-analysis

- Study purpose: "To explore the evidence regarding the effectiveness of dry needling to reduce pain in patients with MPS of the upper quarter."

ARTICLE 3 SYNOPSIS

- Methods: This meta-analysis screened articles for the following criteria: (Dry needling, Performed on human subjects with, MPS)
  - These articles were analyzed and validated using the "MacDermid Quality Checklist) – 246 Articles qualified (12 picked at random)
  - "Four separate meta-analyses were performed: (1) dry needling compared to sham or control immediately after treatment, (2) dry needling compared to sham or control at 4 weeks, (3) dry needling compared to other treatments immediately after treatment, and (4) dry needling compared to other treatments at 4 weeks."
- Limitations: Some trials used had "group effect sizes were of questionable clinical meaningfulness" (due to number of participants)

ARTICLE 3 SYNOPSIS

- Results
  - Meta-analysis of Dry needling vs control (immediate results)
    - Dry needling showed drastic reduction in pain compared to control
  - Meta-analysis of Dry needling vs control (4 week recall results)
    - Dry needling was favored (results were less significant than immediate results, close to being considered “no difference”)
  - Meta-analysis of Dry needling vs Lidocaine (immediate results)
    - Lidocaine was favored over dry-needling
  - Meta-analysis of Dry needling vs Lidocaine (4 week recall results)
    - Lidocaine was favored over dry-needling “effect size was of questionable clinical meaningfulness”
- Conclusion: “Findings of studies that compared dry needling to other treatments were highly heterogeneous, most likely due to variance in the comparison treatments. There was evidence from 2 studies that lidocaine injection may be more effective in reducing pain than dry needling at 4 weeks.”

ARTICLE 3 SELECTION

- Reason for selection:
  - High level of evidence
  - Meta-analysis
  - Compared our treatment method to others for both immediate relief and 4 week recall results
- Relevance to patient:
  - Article analyzed the effectiveness of lidocaine trigger point injections which we used on our patient (only did comparisons, did not give overall effectiveness)
- Implications: When choosing between lidocaine and dry needling, lidocaine appears to be the better option in terms of effectiveness

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

The evidence discussed previously directly applies to this patient since patient is going to receive trigger point injections with Lidocaine and if that treatment doesn't resolve the problem, combination therapy will be recommended. If patient still experiences problems after combination therapy, Botox can potentially be used only if patient agrees to use it and financially can afford it.

DISCUSSION QUESTIONS

- **How often would the patient need to receive trigger point injections using lidocaine compared to botulinum toxin?**
- TPIs using Lidocaine produce immediate relief and last 2-3 weeks vs Botox can take up to a few weeks to get relief but it lasts 3-4 months.
- **Are there any contraindications associated with trigger point injections for treating TMD?**
- Presence of systemic or local infections, patients with bleeding disorders or on anticoagulants, pregnant.

DISCUSSION QUESTIONS

- **What is the theory behind using Lidocaine, versus a different local anesthetic, for trigger point injections?**
- Lidocaine eliminates pain immediately and, also, acts as diagnostic by eliminating referred pain. For example, Marcaine is not recommended due to increased risk of myotoxicity.
- **Is there any hypersensitivity or other immune reactions that are associated with Botox being used?**
- Most significant adverse effect is muscle paralysis but Botox can also be immunogenic when patient has an antibody-mediated resistance.

THANK YOU!!!