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Managing Headache in the Musculoskeletal Practice: The Cross-Light Approach

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Dr. Tzvika Greenbaum
BPT, MaPT, PhD
Ben Gurion University
Israel

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EDITED BY
Mieszko Wieckiewicz,
Wroclaw Medical University, Poland

REVIEWED BY
Helena Martynowicz,
Wroclaw Medical University, Poland
Marta Waliszewska-Prosół,
Wroclaw Medical University, Poland

*CORRESPONDENCE
Tzvika Greenbaum
✉ tzvikagg@gmail.com

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Headache and orofacial pain: A traffic-light prognosis-based management approach for the musculoskeletal practice

Tzvika Greenbaum[1]* and Alona Emodi-Perlman[2]

[1]Department of Physical Therapy, Faculty of Health Sciences, Recanati School for Community Health Professions, Ben-Gurion University of the Negev, Beer Sheva, Israel, [2]Department of Oral Rehabilitation, The Maurice and Gabriela Goldschleger School of Dental Medicine, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

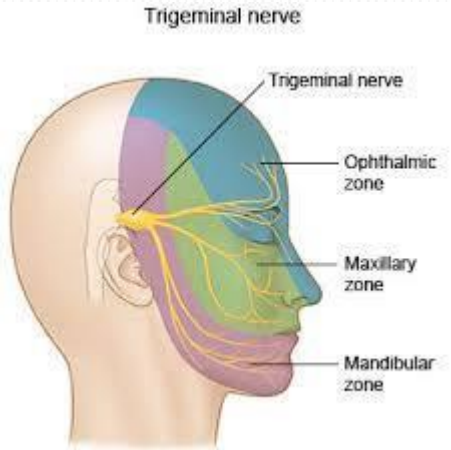
Introduction: Headache (HA) is one of the most prevalent disabling conditions worldwide and is classified as either primary or secondary. Orofacial pain (OFP) is a frequent pain perceived in the face and/or the oral cavity and is generally distinct from a headache, according to anatomical definitions. Based on the up-to-date classification of the International Headache Society, out of more than 300 specific types of HA only two are directly attributed to the musculoskeletal system: The cervicogenic HA and HA attributed to temporomandibular disorders. Because patients with HA and/or OFP frequently seek help in the musculoskeletal practice, a clear and tailored prognosis-based classification system is required to achieve better clinical outcomes.

Purpose: The aim of perspective article is to suggest a practical traffic-light prognosis-based classification system to improve the management of patients with HA and/or OFP in the musculoskeletal practice. This classification system is based on the best available scientific knowledge based on the unique set-up and clinical reasoning process of musculoskeletal practitioners.

Implications: Implementation of this traffic-light classification system will improve clinical outcomes by helping practitioners invest their time in treating patients with significant involvement of the musculoskeletal system in their clinical presentation and avoid treating patients that are not likely to respond to a musculoskeletal based intervention. Furthermore, this framework incorporates medical screening for dangerous medical conditions, and profiling the psychosocial aspects of each patient; thus follows the biopsychosocial rehabilitation paradigm.

Headache or Orofacial Pain?

?



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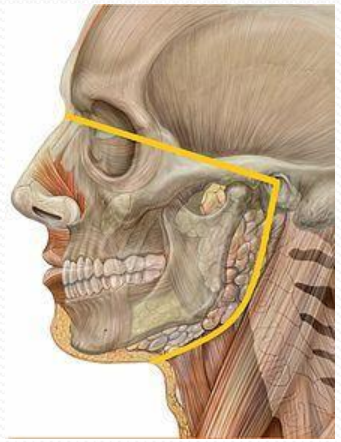


- ***Headache 1:*** Pain located in the head, above the orbitomeatal line and/or nuchal ridge (IHS, 2020)
- **Headache 2**: A pain in the head with the pain being above the eyes or the ears, behind the head (occipital), or in the back of the upper neck (medicine, 2020)

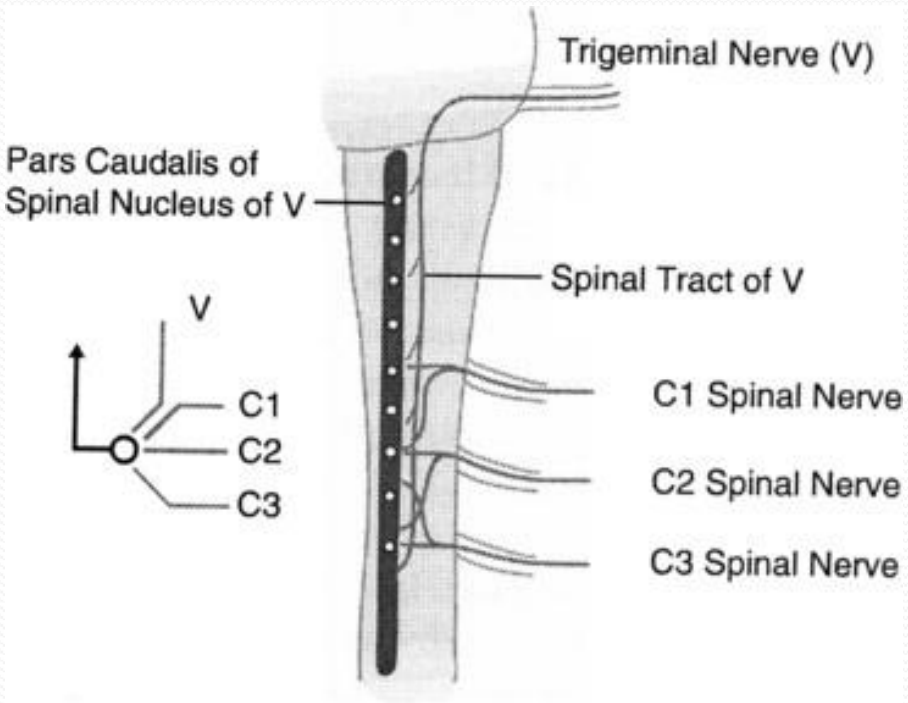
- ***Orofacial pain 1:*** a frequent form of pain perceived in the face and/or oral cavity (IASP, 2020)
- **Orofacial pain 2**: pain associated within the head and neck regions, soft and hard tissues, both extra orally and intraorally (Halpern & Porchia, 2015)

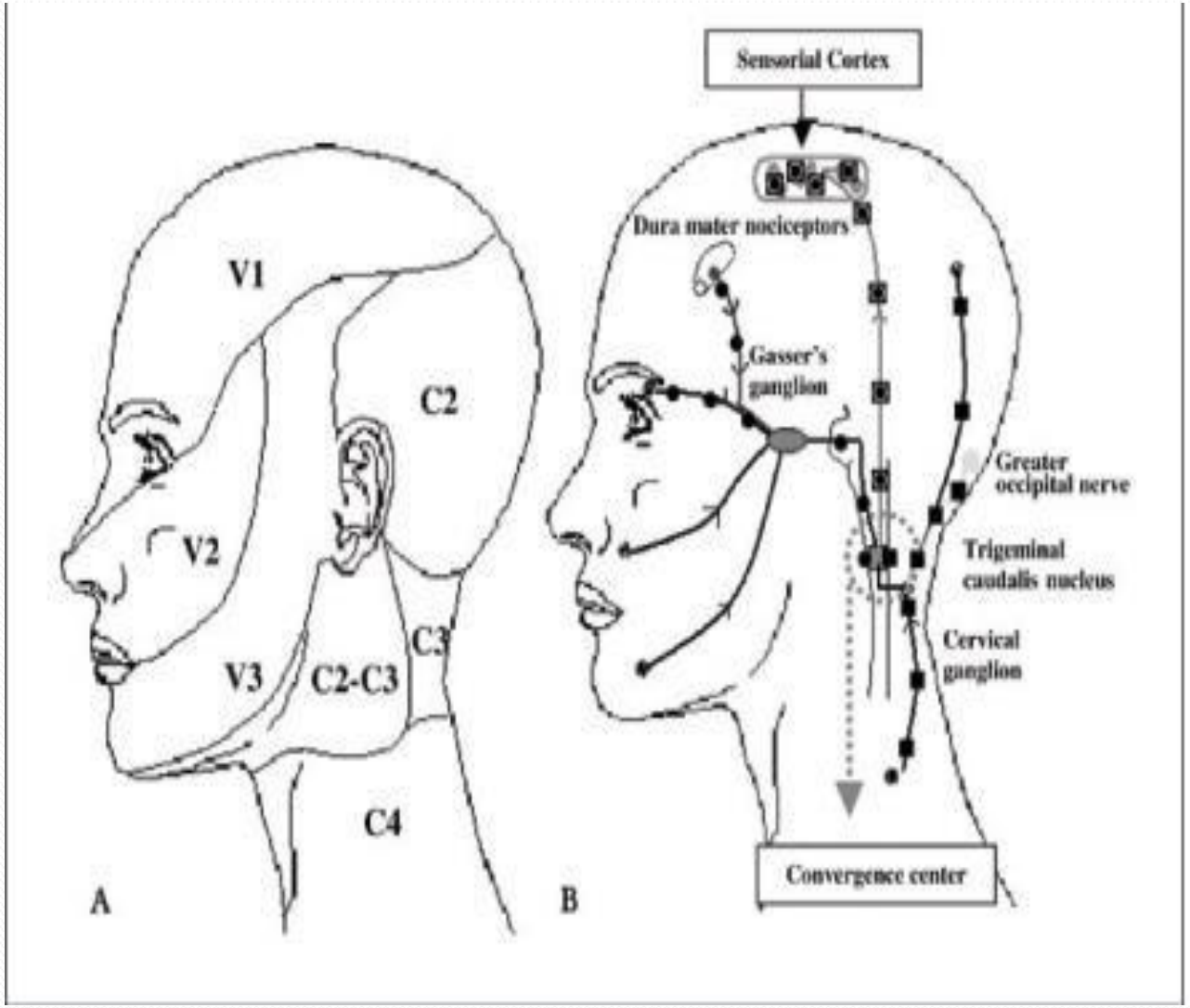
Epidemiology of OFP & HA

Feature	Headache (any type)	Orofacial Pain
Yearly prevalence (general population)	Up to 80%	22-25%
Age	Picked in 20-40	Picked in 20-40
Gender	Tension Type 1.5:1 (Female : Male) Migraine 3:1 (Female: Male) Cervicogenic 4:1 (Female : Male)	TMD 3:1 to 4:1 (Female : Male)
Other	Tension Type is the most common HA (80% of general population) followed by Migraine (10%) and Cervicogenic (4%)	TMD is the most common OFP (12-15% of general population) followed by Cervicogenic HA (2-4%)

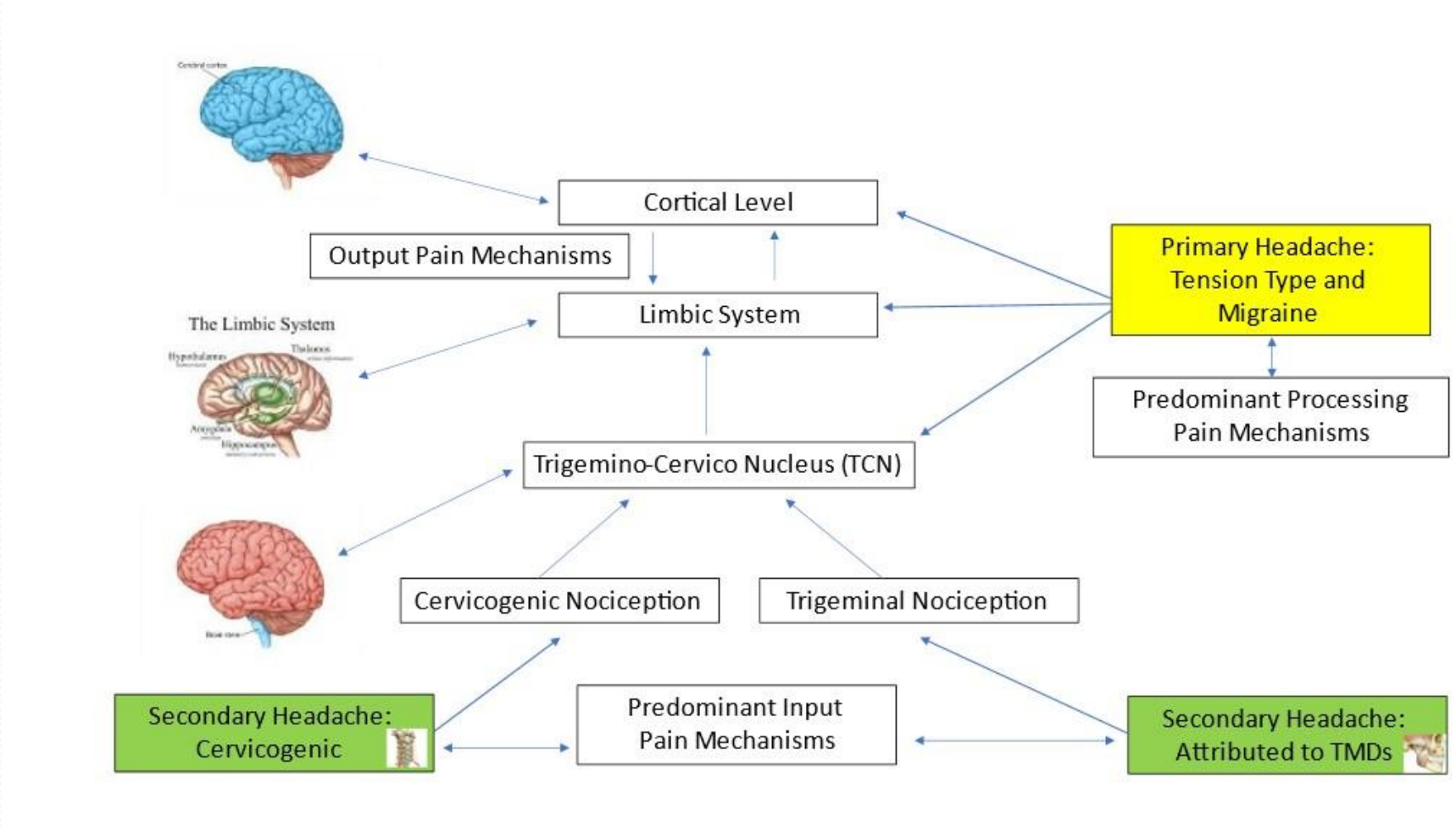
Fernández-de-las-Peñas et al, 2018

Pathophysiology of OFP & HA





Pathophysiology of OFP & HA



Medical classification of OFP & HA

Headache

<u>Primary</u>

refers to a lack of clear underlying causative pathology, trauma, or systemic disease

<u>Secondary</u>

that are due to an underlying medical condition, such as a neck injury or a sinus infection

OFP

1. TMD's (and Cx)
2. Dental
3. ENT's
4. Primary HA
5. Red flags
6. Other

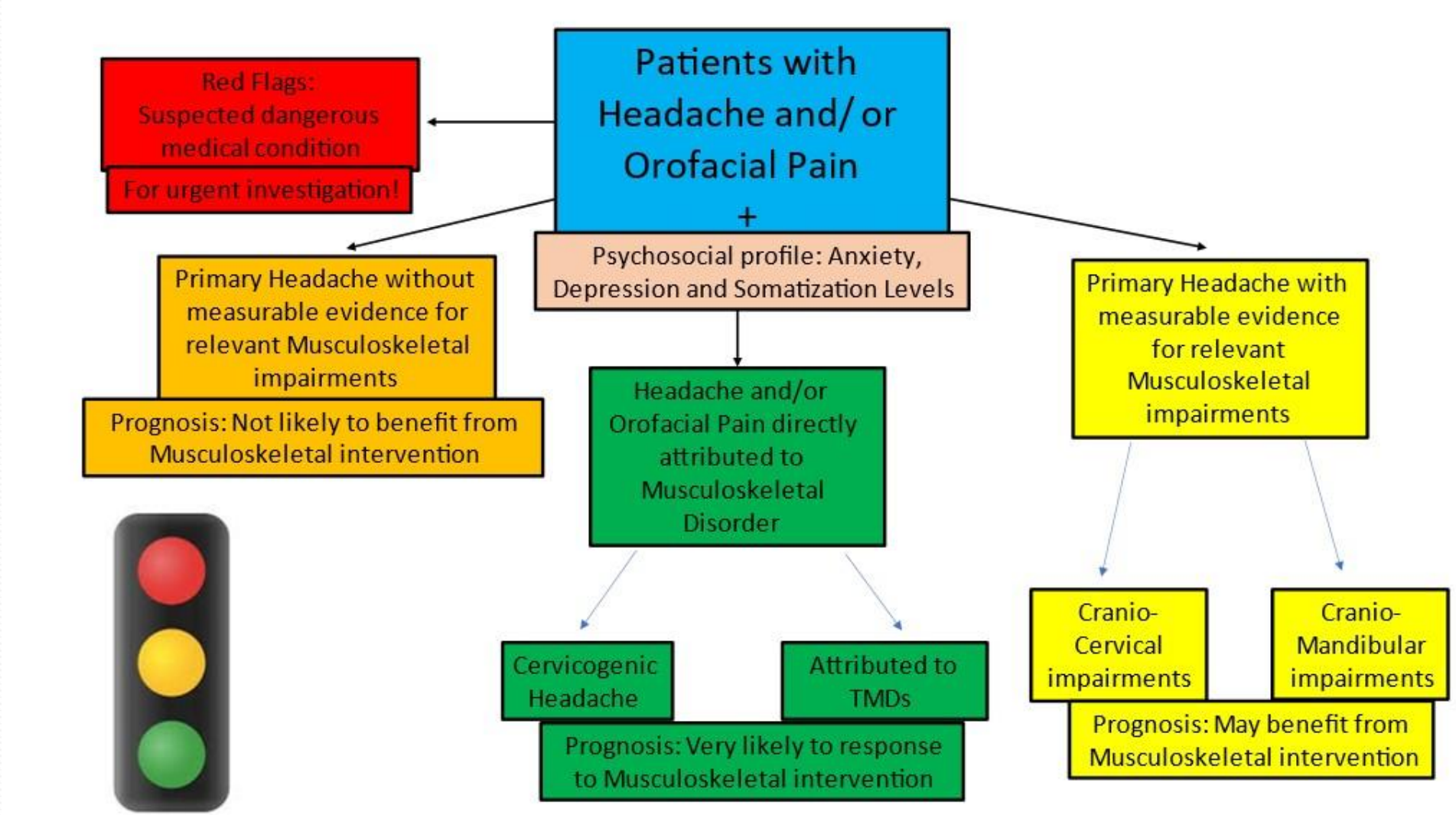
Dual Axis

(Physical and Psychosocial)

HA/OFP in the Physiotherapy practice: 4 key qustions

1. Is the presented HA/OFP be secondary to a dangerous medical condition?
2. Is the presented HA/OFP secondary to a specific MSK disorders (CGH/TMDs)?
3. If primary HA is presented, what is the expected response to MSK rehabilitation?
4. How severe is the mental distress associated with HA/OFP?

Physio practical classification for OFP & HA



The red light!

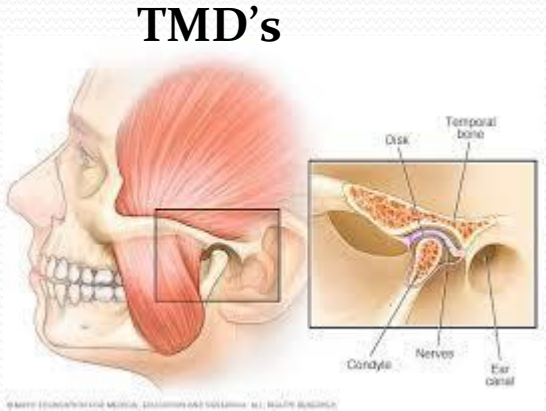
Danger sign or symptom	Possible diagnoses
First or worst headache of the patient's life	Acute infection, Arteriovenous pathologies
Focal neurological signs (not typical aura)	Arteriovenous pathologies, Oncological pathologies
Headache triggered by cough or exertion, or while engage in sexual intercourse	Arteriovenous pathologies, Oncological pathologies
Headache with change in mental status or personality	Acute infection, Arteriovenous pathologies, Oncological pathologies
Neck stiffness of meningismus	Acute infection (Meningitis)
New onset of severe headache in pregnancy or postpartum	Arteriovenous pathologies
Older than 50 years	Temporal arteritis, Oncological pathologies
Papilledema	Acute infection, Oncological pathologies
Rapid onset during exercise	Arteriovenous pathologies
Sudden onset (maximal intensity occurs within seconds)	Arteriovenous pathologies, Oncological pathologies
Systemic illness with headache	Acute infection, Arteritis
Tenderness over temporal artery	Temporal arteritis
Worsening pattern	Medication overuse, Oncological pathologies, Arteriovenous pathologies
New headache type in patient with cancer	Oncological pathologies

Hainer and Matheson, 2013

Green Light:

The Musculoskeletal HA/OFP

+



Diagnosis of Cervicogenic HA

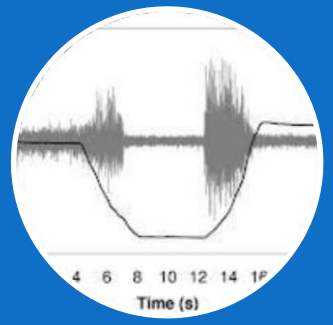
according to the CGH international study group

1. Symptoms and signs of neck involvement (ROM, aggravation by sustained neck positions, palpation and/or ipsilateral shoulder/arm pain)
2. Positive response to diagnostic anesthetic block
3. Unilaterality of head pain, without side shift
4. Head pain is: moderate to severe, starting at the neck, non-throbbing, fluctuating & continuous
5. Optional associated symptoms: Nausea, Phonophobia, Photophobia, Dizziness, blurred vision, difficulties swallowing.

Sjaastad et al, 1998

Cervical spine impairments in CGH

Range Of Motion (ROM)



Motor Control alternation

Muscular strength & endurance

Flexion-Rotation Test

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Cranio-Cervical Flexion Test

Upper Neck Flexors Endurance Test

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PT for Cervicogenic HA

Systematic Review

Conservative physical therapy management for the treatment of cervicogenic headache: a systematic review

Stephanie Racicki, Sarah Gerwin, Stacy DiClaudio, Samuel Reinmann, Megan Donaldson

Department of Physical Therapy, Walsh University, North Canton, OH, USA

Purpose: The purpose of this systematic review was to assess the effectiveness of conservative physical therapy management of cervicogenic headache (CGH).
Introduction: CGH affects 2.2–2.5% of the adult population with females being four times more affected than men. CGHs are thought to arise from musculoskeletal impairments in the neck with symptoms most commonly consisting of suboccipital neck pain, dizziness, and lightheadedness. Currently, both invasive and non-invasive techniques are available to address these symptoms; however, the efficacy of non-invasive treatment techniques has yet to be established.
Methods: Computerized searches of CINAHL, ProQuest, PubMed, MEDLINE, and SportDiscus, were performed to obtain a qualitative analysis of the literature. Inclusion criteria were: randomized controlled trial design, population diagnosed with CGH using the International Headache Society classification, at least one baseline measurement and one outcomes measure, and assessment of a conservative technique. Physiotherapy evidence-based database scale was utilized for quality assessment.
Results: One computerized database search and two hand searches yielded six articles. Of the six included randomized controlled trials, all were considered to be of 'good quality' utilizing the physiotherapy evidence-based database scale. The interventions utilized were: therapist-driven cervical manipulation and mobilization, self-applied cervical mobilization, cervico-scapular strengthening, and therapist-driven cervical and thoracic manipulation. With the exception of one study, all reported reduction in pain and disability, as well as improvement in function.
Conclusion: Calculated effect sizes allowed comparison of intervention groups between studies. A combination of therapist-driven cervical manipulation and mobilization with cervico-scapular strengthening was most effective for decreasing pain outcomes in those with CGH.

Keywords: Cervicogenic headaches, Systematic review, Physical therapy management, Conservative management

SPINE Volume 27, Number 17, pp 1835–1843

A Randomized Controlled Trial of Exercise and Manipulative Therapy for Cervicogenic Headache

Gwendolen Jull, PT, PhD,* Patricia Trott, PT, MSc,† Helen Potter, PT, MSc,‡
Guy Zito, PT, Grad Dip Manip Ther,§ Ken Niere, PT, Mph,‖ Debra Shirley, PT, BSc,¶
Jonathan Emberson, MSc,# Ian Marschner, PhD,# and Carolyn Richardson, PT, PhD*

Study Design. A multicenter, randomized controlled trial with unblinded treatment and blinded outcome assessment was conducted. The treatment period was 6 weeks with follow-up assessment after treatment, then at 3, 6, and 12 months.

Objectives. To determine the effectiveness of manipulative therapy and a low-load exercise program for cervicogenic headache when used alone and in combination, as compared with a control group.

Summary of Background Data. Headaches arising from cervical musculoskeletal disorders are common. Conservative therapies are recommended as the first treatment of choice. Evidence for the effectiveness of manipulative therapy is inconclusive and available only for the short term. There is no evidence for exercise, and no study has investigated the effect of combined therapies for cervicogenic headache.

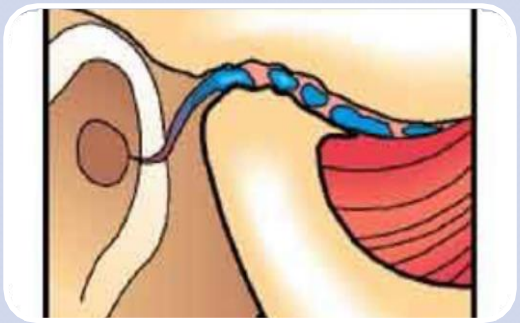
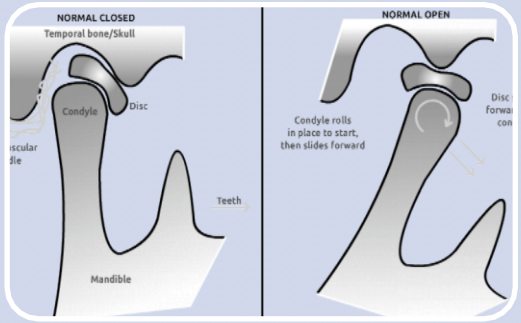
Methods. In this study, 200 participants who met the diagnostic criteria for cervicogenic headache were randomized into four groups: manipulative therapy group, exercise therapy group, combined therapy group, and a control group. The primary outcome was a change in headache frequency. Other outcomes included changes in headache intensity and duration, the Northwick Park Neck Pain Index, medication intake, and patient satisfaction. Physical outcomes included pain on neck movement, upper cervical joint tenderness, a craniocervical flexion muscle test, and a photographic measure of posture.

Results. There were no differences in headache-related and demographic characteristics between the groups at baseline. The loss to follow-up evaluation was 3.5%. At the 12-month follow-up assessment, both manipulative therapy and specific exercise had significantly reduced headache frequency and intensity, and the neck pain and effects were maintained ($P < 0.05$ for all). The combined therapies was not significantly superior to either therapy alone, but 10% more patients gained relief with the combination. Effect sizes were at least moderate and clinically relevant.

Conclusion. Manipulative therapy and exercise can reduce the symptoms of cervicogenic headache, and the effects are maintained. [Key words: cervical spine, clinical trial, exercise, headache, manipulative therapy] **Spine 2002;27:1835–1843**

Headaches arising from musculoskeletal disorders of the cervical spine, termed cervicogenic headaches,[30,38] are a common form of chronic and recurrent headache.[33,35]

TMD: 3 subgroups (according to DC/TMD)

20%-15%	40%-35%	50%-45%
		
Degenerative – Mainly OA	**Intra-articular (Disc) Not necessarily with pain**	**Pain related: (Mainly muscular)**

9 TMD working diagnoses

Degenerative	Intra-articular	Pain related
• Degenerative joint disease	• Disc displacement with reduction • Disc displacement with reduction with intermittent locking • Disc displacement without reduction with limited opening • Disc displacement without reduction without limited opening	• Myalgia • Myofascial pain with referral • Arthralgia • Headache attributed to TMD

Diagnostic Criteria for Temporomandibular Disorders (DC/TMD): Diagnostic Decision Tree

Pain-Related TMD and Headache

HISTORY
Start at each blue-outline box

Regional pain [SQ3]
AND
Pain modified by jaw movement, function, or parafunction [SQ4]

No

Yes

Examiner confirmation pain location [E1a]

No

[Yes = Mast muscles] [Yes = TMJ]

EXAMINATION

(1) Familiar pain from: jaw opening [muscle, E4] **OR** 2-secs masticatory muscle palpation [muscle,E9];
AND
(2) Confirm location [E1a]

No

[To rule out false negative]

Yes

[To subtype myalgia]

Investigate other Pain diagnoses

Familiar pain, MM palpation (5 secs) [muscle, E9]

No

Yes

No

Extension of pain beyond muscle boundary [muscle, E9]

Yes

No

Pain extend beyond area of stimulation [muscle, E9]

Yes

DIAGNOSIS

Myalgia

Local Myalgia

Myofascial pain with spreading

Myofascial pain with referral

Diagnosis of Myalgia or Arthralgia

Yes

No

Headache of any type in temporal region [SQ5]
AND
Headache modified by jaw movement, function, or parafunction [SQ7]

Yes

Investigate other pain diagnoses

(1) Familiar pain from: jaw opening [joint, E4] **OR** jaw horizontal movement [joint, E5] **OR** TMJ palpation [joint, E9];
AND
(2) Confirm location [E1a]

No

Yes

Arthralgia

Examiner confirmation of headache in temporalis area [E1b]

No

Yes

Familiar headache from: jaw opening **OR** excursive movement, **OR** temporalis muscle palpation [temporalis, from E4, E5, OR E9]

No

Yes

Headache not better accounted for by another headache diagnosis [Symptom review]

No

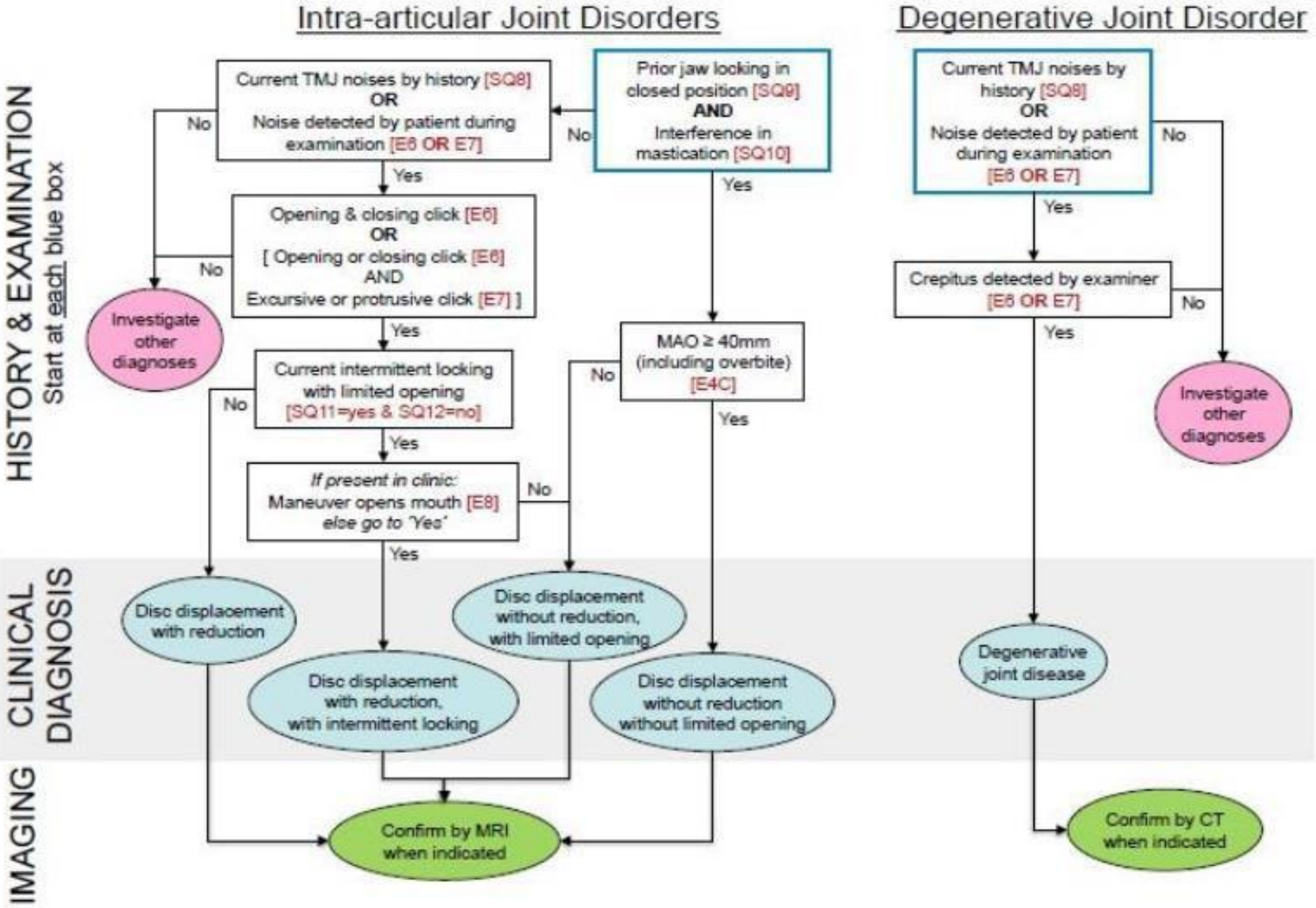
Yes

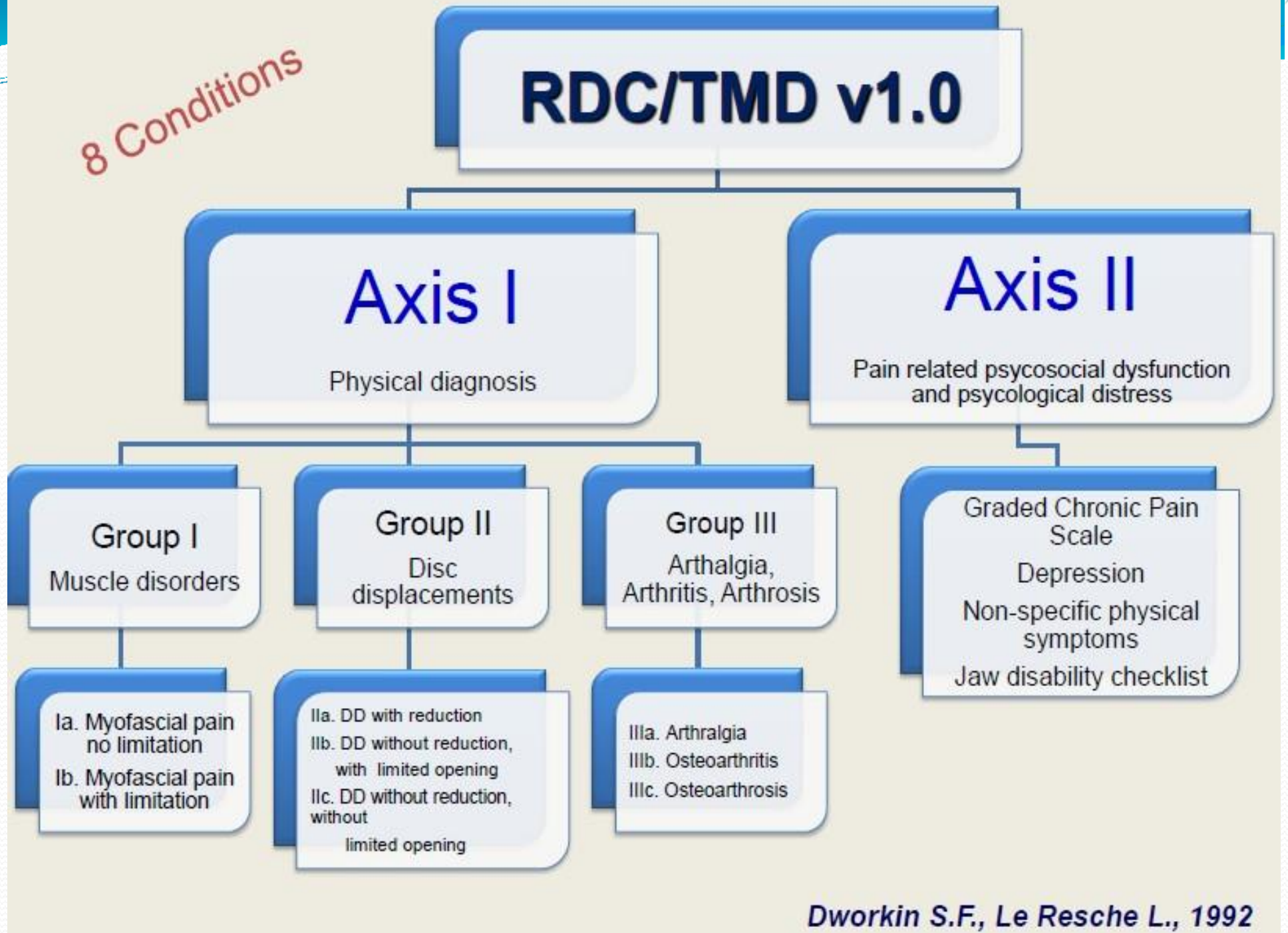
Headache attributed to TMD

Version 1/24/2014

	History		Ex
Disorder	*Criteria*	*SQ*	*Criteria*
Pain Disorders			
Myalgia (ICD-9 729.1) • Sens 0.90 • Spec 0.95	Pain in a masticatory structure	SQ3	Confirmation of pain in masticatory muscle(s)
	Pain modified by jaw movement, function, or parafunction	SQ4	Familiar pain in masticatory muscle(s) with either muscle palpation or maximum opening
Myalgia Subtypes			
Local Myalgia (ICD-9 729.1) Sens and Spec not established	[same as for Myalgia]	[SQ3 & SQ4]	Confirmation of pain in masticatory muscle(s)
			Familiar pain with muscle palpation
			Pain remains local to the area of stimulation
Myofascial Pain (ICD-9 729.1) Sens and Spec not established	[same as for Myalgia]	[SQ3 & SQ4]	Confirmation of pain in masticatory muscle(s)
			Familiar pain with muscle palpation
			Spreading (but not referred) pain with muscle palpation

Diagnostic Criteria for Temporomandibular Disorders (DC/TMD): Diagnostic Decision Tree




8 Conditions
RDC/TMD v1.0
Axis I
Physical diagnosis
Axis II
Pain related psycosocial dysfunction and psycological distress
Group I
Muscle disorders
Group II
Disc displacements
Group III
Arthalgia, Arthritis, Arthrosis
Graded Chronic Pain Scale
Depression
Non-specific physical symptoms
Jaw disability checklist
Ia. Myofascial pain no limitation
Ib. Myofascial pain with limitation
IIa. DD with reduction
IIb. DD without reduction, with limited opening
IIc. DD without reduction, without limited opening
IIIa. Arthralgia
IIIb. Osteoarthritis
IIIc. Osteoarthrosis
Dworkin S.F., Le Resche L., 1992

PT for TMD's – Evidence Based Practice

Journal of *Clinical Medicine*

MDPI

Review

Efficacy of Manual Therapy in Temporomandibular Joint Disorders and Its Medium-and Long-Term Effects on Pain and Maximum Mouth Opening: A Systematic Review and Meta-Analysis

Andres Herrera-Valencia [1], Maria Ruiz-Muñoz [2,3,*], Jaime Martin-Martin [3,4], Antonio Cuesta-Vargas [1,3,5] and Manuel González-Sánchez [1,3]

1 Department of Physiotherapy, Faculty of Health Sciences, University of Málaga, 29071 Málaga, Spain; andresherrval@gmail.com (A.H.-V.); acuesta@uma.es (A.C.-V.); mgsa23@uma.es (M.G.-S.)
2 Department of Nursing and Podiatry, Faculty of Health Sciences, University of Málaga, 29071 Málaga, Spain
3 Institute of Biomedicine of Málaga (IBIMA), 29010 Málaga, Spain; jaimemartinmartin@uma.es
4 Department of Human Anatomy, Legal Medicine and History of Science, Faculty of Medicine, University of Málaga, 29010 Málaga, Spain
5 School of Clinical Sciences of the Faculty of Health, Queensland University of Technology, Brisbane QLD 4000, Australia
* Correspondence: marumu@uma.es; Tel.: +0034 951-95-32-15

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check for updates

Abstract: The aim of this study was to conduct a systematic review of the medium- and long-term efficacy of manual therapy for temporomandibular joint disorders, alone or in combination with therapeutic exercise. Information was compiled from the PubMed, SCOPUS, Cochrane, SciELO and PEDro databases. The inclusion criteria were established: randomized controlled trials only; participants must present any kind of temporomandibular disorder; the treatments must include manual therapy in at least one of the experimental groups; a minimum of 3 months of follow-up; pain must be one of the primary or secondary outcomes; and the article must be available in English, Spanish, Italian, Portuguese or French. Six documents that fulfilled all the criteria were obtained for analysis, two of them considered low quality and four considered high quality. A significant improvement in pain and mouth opening compared to baseline was observed after manual therapy treatment. Manual therapy seems to be an effective treatment for temporomandibular disorders in the medium term, although the effect appears to decrease over time. However, when complemented with therapeutic exercise, these effects can be maintained in the long term. This review underlines the importance of manual therapy and therapeutic exercise for the medium- and long-term treatment of temporomandibular joint disorders in daily practice.

Keywords: manual therapy; temporomandibular; joint; pain; review

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https://doi.org/10.1080/08869634.2020.1776529

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PHYSICAL THERAPY

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Manual therapy and exercise in temporomandibular joint disc displacement without reduction. A systematic review

Roy La Touche PT, PhD [a,b,c], Tania Boo-Mallo PT, MSc [a], Joseba Zarzosa-Rodríguez PT, MSc [a], Alba Paris-Alemany MD, PT, PhD [a,b,c], Ferran Cuenca-Martínez PT, MSc [a,b] and Luis Suso-Martí PT, MSc [b,d]

[a]Department of Physiotherapy, Centro Superior de Estudios Universitarios La Salle, Autonomous University of Madrid, Madrid, Spain; [b]Motion in Brains Research Group, Institute of Neuroscience and Sciences of the Movement (INCIMOV), Centro Superior de Estudios Universitarios La Salle, Autonomous University of Madrid, Madrid, Spain; [c]Neuroscience and Craniofacial Pain Institute, (INDCRAN), Madrid, Spain; [d]Department of Physiotherapy, Universidad Cardenal Herrera-CEU, CEU Universities, Valencia, Spain

ABSTRACT

Objective: The aim of this systematic review was to analyze the effectiveness of exercise and manual therapy interventions in patients with disc displacement without reduction.
Method: The authors performed a systematic review of Medline, EMBASE, PEDro, CINAHL, and Google Scholar databases. Two independent reviewers conducted the eligibility and quality assessment of studies. Interventions based on exercise and manual therapy regarding pain intensity and maximum mouth opening as primary outcomes were examined.
Results: Ten articles were included, according to the inclusion criteria. Most of the interventions showed statistically significant improvements in the primary outcomes.
Conclusion: Results show that interventions based on therapeutic exercise or manual therapy may be beneficial and play a role in the treatment of disc displacement without reduction. Limited evidence suggests that exercise significantly improves mouth opening in comparison to splints. Due to the heterogeneity of the included studies, these results should be interpreted with caution.

KEYWORDS
Disc displacement; exercise therapy; temporomandibular disorders; manual therapy

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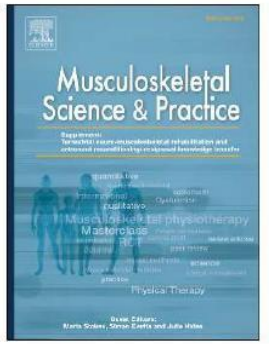
Comorbidity of CGH among TMD's

Journal Pre-proof

The association between specific temporomandibular disorders and cervicogenic headache

Tzvika Greenbaum, Zeevi Dvir, Alona Emodi-Perlman, Shoshana Reiter, Pessia Rubin, Ephraim Winocur

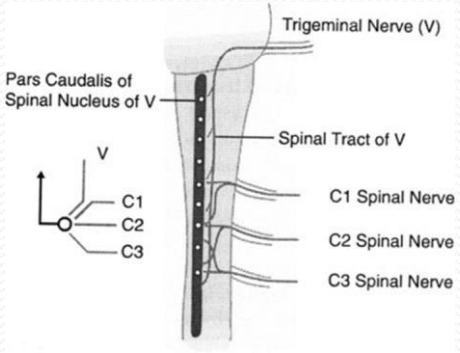


GROUP	N	Cervicogenic Headache		CGH %	Odds ratio (compared to controls)	95% Confidence Interval	P value versus controls
		Yes	No				
Healthy	42	2	40	5%	NA	NA	NA
Pain related TMD	37	14	23	38%	12.17	2.53-58.39	0.0018
Intra-Articular TMD	17	0	17	0	0.46	0.02-10.14	0.6249
Combined TMD	20	7	13	35%	10.76	1.98-58.45	0.0059
TMD total	74	21	53	28%	7.92	1.75-35.77	0.0071

- Red represents statistical significance (P<0.05)

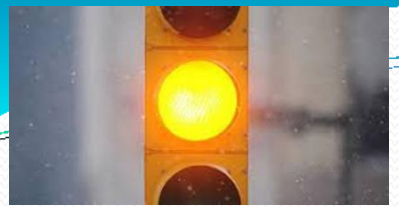
The Primary HA in the PT clinic:

Yellow and Orange lights

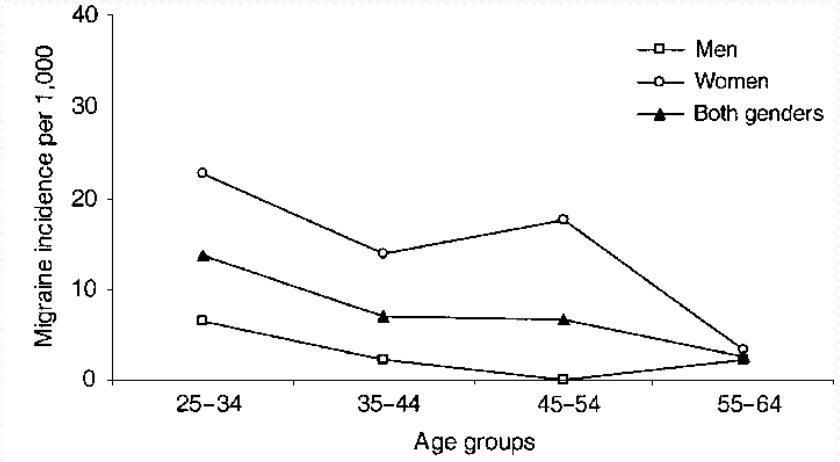


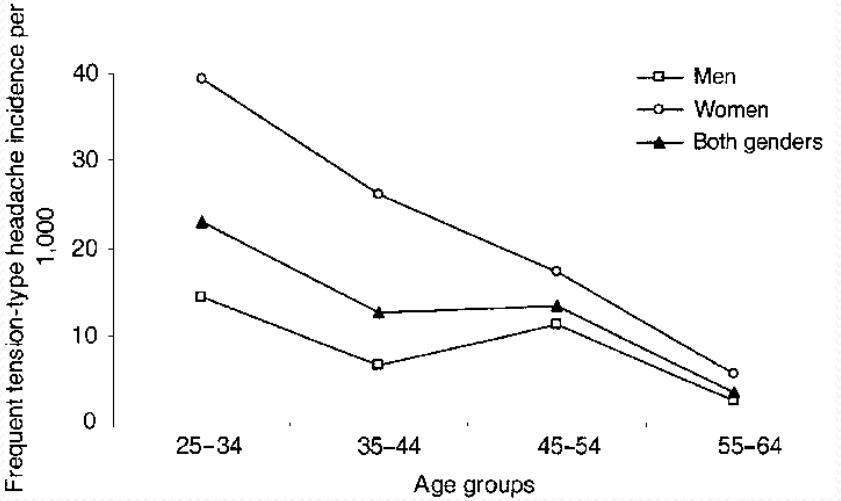
Headache Classification

- **Headaches**
  - **Primary**
    - **Tension** → Most common HA type. May transform from episodic to chronic.
    - **Migraine** → Less common but more debilitating with days lost from work and reduced quality of life. May transform from episodic to chronic.
    - **Cluster** → Less common but more debilitating with days lost from work and reduced quality of life. May transform from episodic to chronic.
  - **Secondary**
    - **Medication Overuse Headache (MOH)** → Occurs when pain medications are used on a frequent basis to treat acute headaches.
    - **Traumatic Brain Injury (TBI) Related** → Usually acute but can become chronic (> months) and lead to significant disability.
    - **Other: Infection, tumor, vascular, metabolic disorders.** → Diagnostic w/u needed to clarify diagnosis & establish tx plan

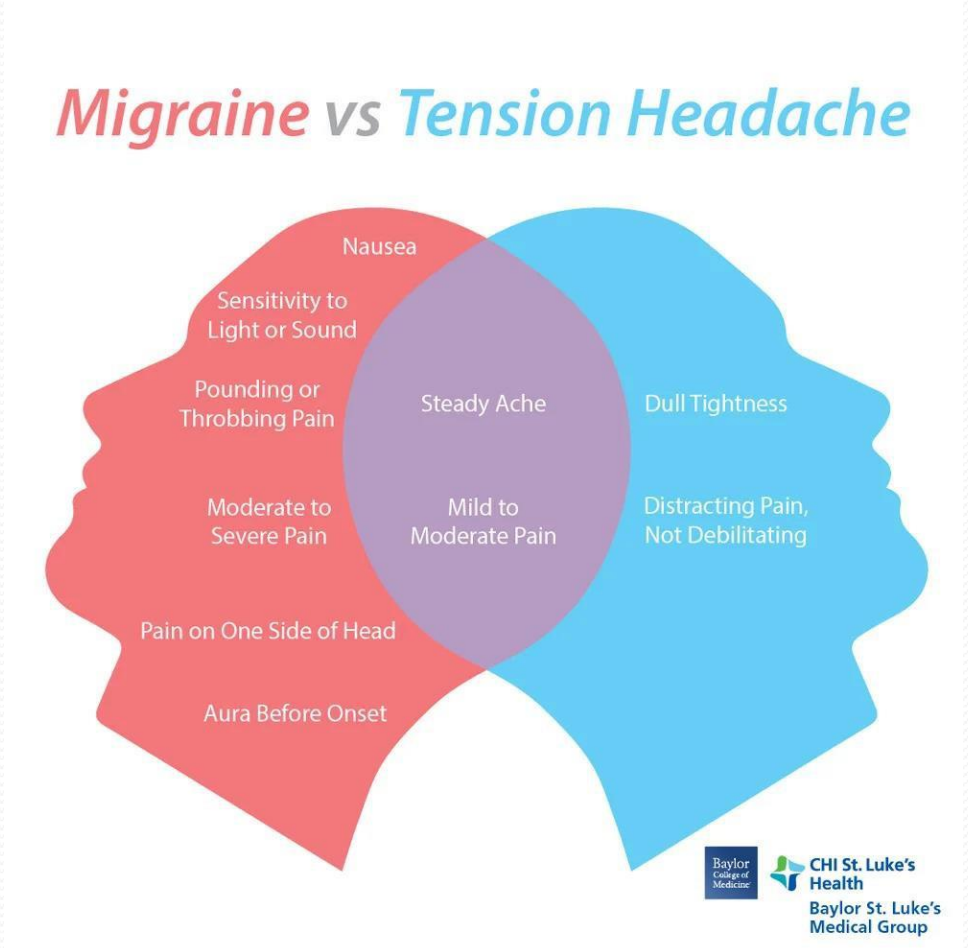


Tension Type and Migraine HA: the most common on earth





Lyngberg et al, 2005



CCMA
Cervico-Cranio-Mandibular Academy

PT Yellow light

Tension Type or Migraine **with**:

- Comorbidity of CGH/TMD
- MSK Aggravating/easing factors
- Cervical Spine objective findings (ROM/muscular performance/TP)
- Masticatory system objective findings (ROM/TP)
- Positive response for PT (TTH>Migraine)

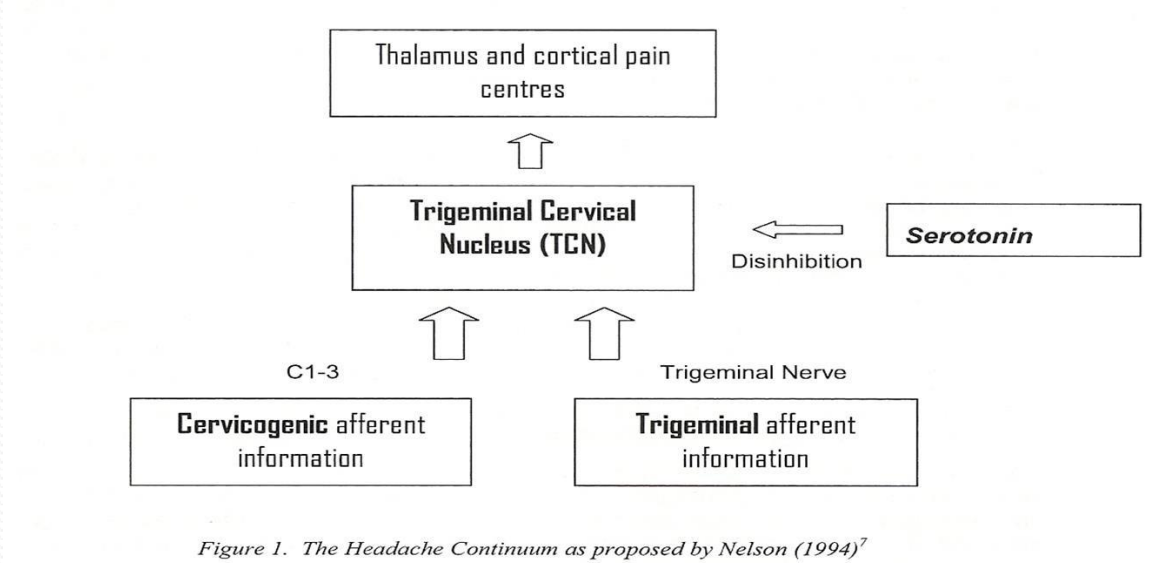


Figure 1. The Headache Continuum as proposed by Nelson (1994)[7]

PT Orange light

Tension Type or Migraine **without**:

- Comorbidity of CGH/TMD
- MSK Aggravating/easing factors
- Cervical Spine objective findings (ROM/muscular performance/active TP)
- Masticatory system objective findings (ROM/active TP)
- Positive response for PT

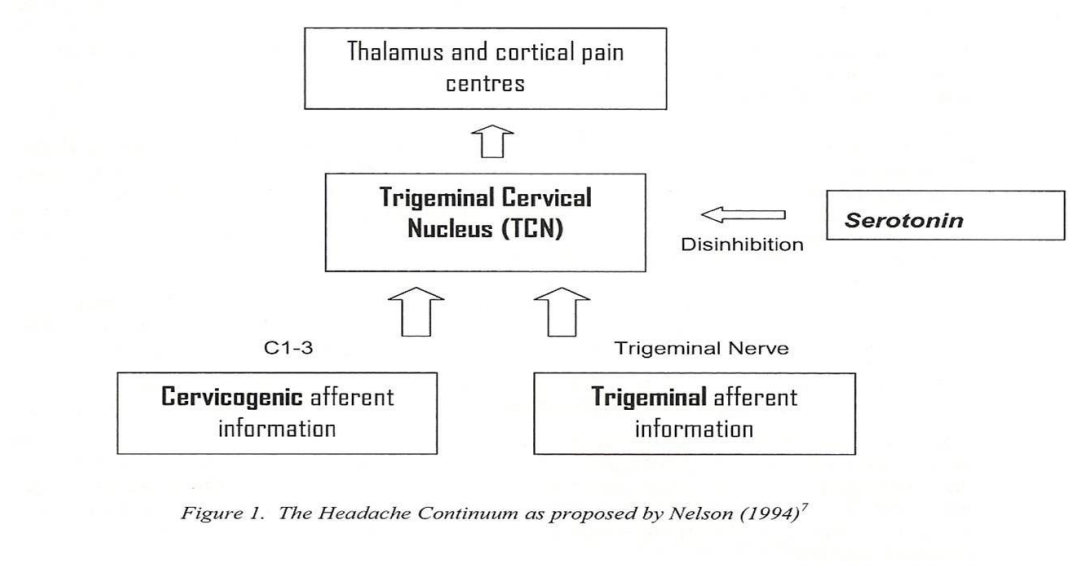


Figure 1. The Headache Continuum as proposed by Nelson (1994)[7]

PT for Primary HA: Evidence Based Practice

Review

Evaluation & the Health Professions
1-21

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Effectiveness of Hands-Off Therapy in the Management of Primary Headache: A Systematic Review and Meta-Analysis

Naziru Bashir Mukhtar[1,2], Mira Meeus[1,3,4], Ceren Gursen[5], Jibril Mohammed[2], Robby De Pauw[1], and Barbara Cagnie[1]

Abstract

A number of hands-off therapies have been widely reported and are used in the management of headache. This systematic review and meta-analysis aimed to assess evidence supporting these therapies on selected headache outcomes. A systematic literature search for randomized clinical trials reporting on the effects of hands-off therapies for headache was performed in two electronic databases; PubMed and Web of Science (PROSPERO: CRD42018093559). Risk of bias was assessed using the Cochrane risk of bias tool. Meta-analysis was performed using Review Manager v5.4. Thirty-five studies, including 3,403 patients with migraine, tension-type or chronic headaches were included in the review. Methodological quality of the studies ranged from poor to good. Result-synthesis revealed moderate evidence for aerobic exercises, relaxation training and pain education for reducing pain intensity and disability. Other hands-off interventions were either weak or limited in evidence. Meta-analysis of 22 studies indicated that the effect of hands-off therapies significantly differed from one another for pain intensity, disability and quality of life ($p < 0.05$). Relaxation training, aerobic and active/stretching exercises had significant effect on pain intensity and disability ($p < 0.05$). To conclude, few hands-off therapies were effective on selected headache outcomes. Evidence to support other hands-off therapies is limited by paucity of studies.

Keywords

effectiveness, hands-off, therapy, headache, trials

DISABILITY AND REHABILITATION
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REVIEW ARTICLE

Effectiveness of manual therapy in patients with tension-type headache. A systematic review and meta-analysis

Danilo Harudy Kamonseki[a], Erika Plonczynski Lopes[b], Hedwig Aleida van der Meer[c] and Letícia Bojikian Calixtre[b,d]

[a]Laboratory of Analysis and Intervention of the Shoulder Complex, Universidade Federal de São Carlos (UFSCar), São Carlos, SP, Brazil; [b]Physiotherapy Department, Universidade Federal de São Carlos (UFSCar), São Carlos, SP, Brazil; [c]Department of Orofacial Pain and Dysfunction, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Amsterdam, The Netherlands; [d]Department of Dental Materials and Prosthodontics, Araraquara Dental School, Universidade Estadual Paulista (UNESP), Araraquara, SP, Brazil

ABSTRACT

Purpose: To systematically review the evidence about the effectiveness of manual therapy (MT) on pain intensity, frequency and impact of headache in individuals with tension-type headache (TTH).
Methods: Medline, Embase, Scopus, Web of Science, CENTRAL, and PEDro were searched in June 2020. Randomized controlled trials that applied MT not associated with other interventions for TTH were selected. The level of evidence was synthesized using GRADE, and Standardized Mean Differences (SMD) were calculated for meta-analysis.
Results: Fifteen studies were included with a total sample of 1131 individuals. High velocity and low amplitude techniques were not superior to no treatment on reducing pain intensity (SMD = 0.01, low evidence) and frequency (SMD = −0.27, moderate evidence). Soft tissue interventions were superior to no treatment on reducing pain intensity (SMD = −0.86, low evidence) and frequency of pain (SMD = −1.45, low evidence). Dry needling was superior to no treatment on reducing pain intensity (SMD = −5.16, moderate evidence) and frequency (SMD = −2.14, moderate evidence). Soft tissue interventions were not superior to no treatment and other treatments on the impact of headache.
Conclusion: Manual therapy may have positive effects on pain intensity and frequency, but more studies are necessary to strengthen the evidence of the effects of manual therapy on subjects with tension-type headache.

➤ IMPLICATIONS FOR REHABILITATION

- Soft tissue interventions and dry needling can be used to improve pain intensity and frequency in patients with tension type headache.
- High velocity and low amplitude thrust manipulations were not effective for improving pain intensity and frequency in patients with tension type headache.
- Manual therapy was not effective for improving the impact of headache in patients with tension type headache.

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KEYWORDS
Primary headache; soft tissue; thrust manipulation; physical therapy; rehabilitation; dry needling

Axis 2 assessment tool

PHQ-4: Validated Screening Tool for Anxiety and Depression

Over the last two weeks, how often have you been bothered by any of the following problems?	
1. Feeling nervous, anxious or on edge	☐ Not at all - 0 ☐ Several days - 1 ☐ More than half the days - 2 ☐ Nearly every day - 3
2. Not being able to stop or control worrying	☐ Not at all - 0 ☐ Several days - 1 ☐ More than half the days - 2 ☐ Nearly every day - 3
3. Little interest or pleasure in doing things	☐ Not at all - 0 ☐ Several days - 1 ☐ More than half the days - 2 ☐ Nearly every day - 3
4. Feeling down, depressed, or hopeless	☐ Not at all - 0 ☐ Several days - 1 ☐ More than half the days - 2 ☐ Nearly every day - 3

- None: 0-2
- Mild: 3-5
- Mod
- S