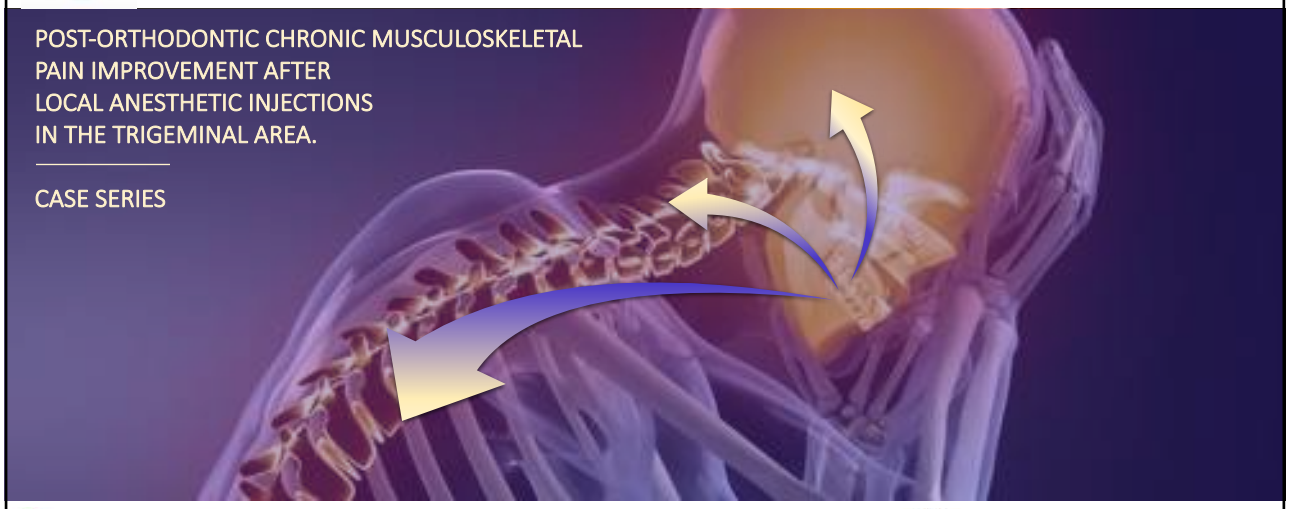


David Vinyes, MD
Director of Institut de Terapia Neural, Barcelona (CAT)
Director of Master's Degree in Neural Therapy, Univ Barcelona
@david.vinyes

THERAPY WITH LOCAL ANTESTHETICS CONGRESS
Heidelberg, July 7, 2023

POST-ORTHODONTIC CHRONIC MUSCULOSKELETAL PAIN IMPROVEMENT AFTER LOCAL ANESTHETIC INJECTIONS IN THE TRIGEMINAL AREA.

CASE SERIES



Institut de Teràpia Neural Medicina Reguladora · Neural Therapy Research Foundation · UNIVERSITÄTS KLINIKUM HEIDELBERG

1



@david.vinyes

Clinical Case Report

PENDING APROVAL

OPEN

Post-orthodontic chronic musculoskeletal pain improvement after local anesthetic injections in the trigeminal area. A case series

David Vinyes MD, Paula Hermosilla DDS, Julia Hartley DDS, Montserrat Muñoz-Sellart MD,
Institute of Neural Therapy and Regulatory Medicine, Sabadell, Barcelona, Spain;
Director of Master in Neural Therapy, University of Barcelona, Spain; Neural Therapy Research Foundation, Barcelona, Spain

Abstract

Introduction: Orthodontic treatment has been linked to chronic extraoral pain, including cervical spine and gonalgia pain, which are often refractory to traditional treatments such as pharmaceutical drugs or physiotherapy and have an impact on quality of life and functional capacity. Our clinical experience includes cases of cervical or knee pain whose onset coincided with the implementation of orthodontics.

Patient concerns and diagnoses: Six orthodontic patients (five women, one man) aged 15-48 years, suffering from chronic cervical spine or gonalgia pain. These individuals had a considerable reduction in their mental and physical well-being because of the chronic pain and experienced limitations in mobility due to high levels of discomfort, anxiety or depression associated with their pain.

Interventions and outcomes: Local anesthetic injections were administered at individual lesions and palpable points of tissue tension points of the oral mucosa and at the extraoral myofascial level, in accordance with the patient's clinical symptoms and medical history.

Conclusion: Favorable results were observed after injection of procaine 0.5% in all patients within the case report. Our aim was to motivate future studies to evaluate the effectiveness of local anesthetic injections for post-orthodontic musculoskeletal pain.

Key words: Chronic pain; local anesthetics; musculoskeletal pain, neural therapy, orthodontic.

Institut de Teràpia Neural Medicina Reguladora

2

Aim

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- This article shows favorable results observed after
  - LA injection in six orthodontic patients
  - With chronic cervical or knee pain
  - *Refractory to different treatments*
  - Completely pain-free at 6m control
  - Improvement of other ANS related symptoms
- With the aim of:
  - seeking the source of the pain
  - Warning of OTD a stressor
  - Warning of Fascial Tension as a stress keeper
  - Motivate future studies

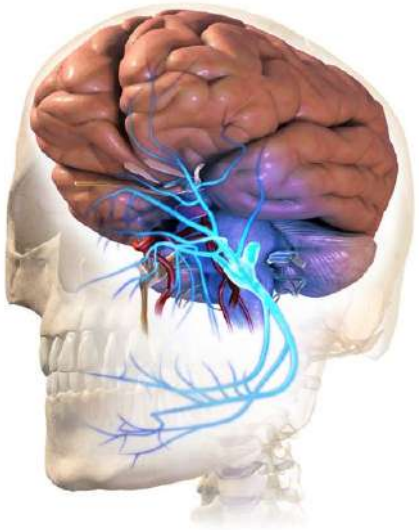


3

Introduction. Orthodontic pain

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- More than 90% of orthodontic patients suffer from "orthodontic pain" generated by brace activation.
- OTD mobilization is achieved with prolonged force on the teeth through bone remodelling.
- The trigeminal plays a central role in the transmission of this pain.





4

Introduction

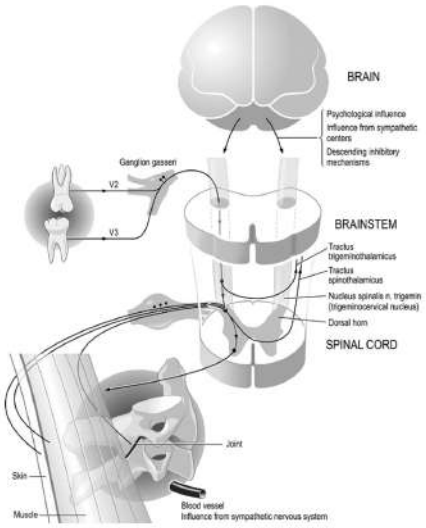
THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

Trigeminal-cervical complex

Network of nerves and associated structures that involve the spinal nucleus of the trigeminal and the afferents of upper cervical nerves (C1-C3).

Integrates sensory information and motor responses between the head, face, and neck regions.

Stimulation of the infraorbital evoked a response of the splenius and SCM muscles, innervated by the upper cervical nerves.



Shiratori Tusita LN, Fischer L. Chronic therapy-resistant neck pain in a fifty-year-old man. The role of partially impacted third molars. Case report and new pathophysiological insights. Complement Med Res. 2023 Jan 23


@david.vinyes

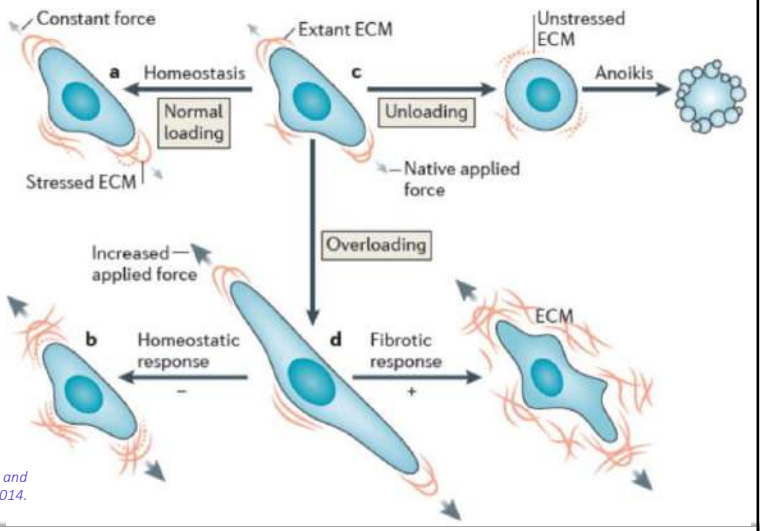
5

Introduction

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

Mechanotransduction

Is a complex dynamic process that converts biomechanical stimuli into intracellular biochemical signals that induce tissue responses.



Humphrey JD, Dufresne ER, Schwartz MA. Mechanotransduction and extracellular matrix homeostasis. Nat Rev Mol Cell Biol. 2014.


@david.vinyes

6

Introduction

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- OTD and Matrix

The compression, traction, and deformation forces exerted by OTD can generate large mechanical load patterns that translate into biological responses in the Cytoskeleton and ECM of the tissues surrounding the teeth.

Review > ScientificWorldJournal. 2015;2015:894123. doi: 10.1155/2015/894123. Epub 2015 Aug 13.

Periodontal Biological Events Associated with Orthodontic Tooth Movement: The Biomechanics of the Cytoskeleton and the Extracellular Matrix

L Feller [1], R A G Khammissa [1], I Schechter [2], A Moodley [1], G Thomadakis [3], J Lemmer [1]

Increased cytokines and various metalloproteinases have been evidenced at sites of orthodontic compression and tension.

> Eur J Orthod. 2013 Oct;35(5):644-51. doi: 10.1093/ejo/cjs057. Epub 2012 Sep 17.

Induction of cytokines, MMP9, TIMPs, RANKL and OPG during orthodontic tooth movement

Melissa Grant [1], Jay Wilson, Peter Rock, Iain Chapple



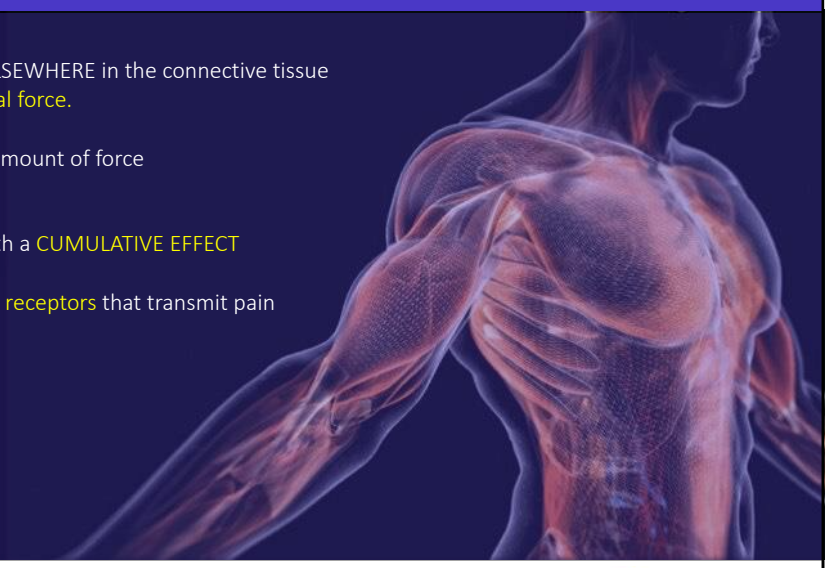
@david.vinyes

7

Fascial System. Myofobroblast

IX. INTERNATIONAL NEURAL THERAPY CONGRESS. Istanbul 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- Myofibroblast contraction can occur ELSEWHERE in the connective tissue in reaction to the application of minimal force.
- Myofibroblasts do not require a large amount of force to temporarily deform the ECM.
- The changes occur in a few µm/day with a CUMULATIVE EFFECT
- The connective tissue contains sensory receptors that transmit pain when the tissue is stretched.





@david.vinyes

8

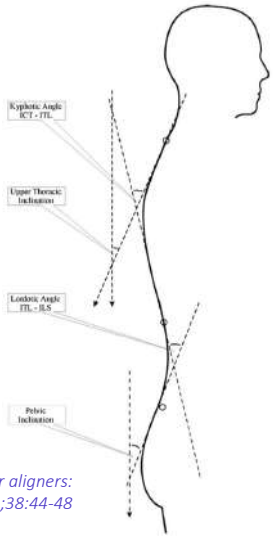
Introduction. Mechanism

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- *Fascial tension transmission*







Parrini S et al. Postural changes in orthodontic patients treated with clear aligners: A rasterstereographic study. J Electromyogr Kinesiol. 2018 Feb;38:44-48



9

Fascial System and Adhesions

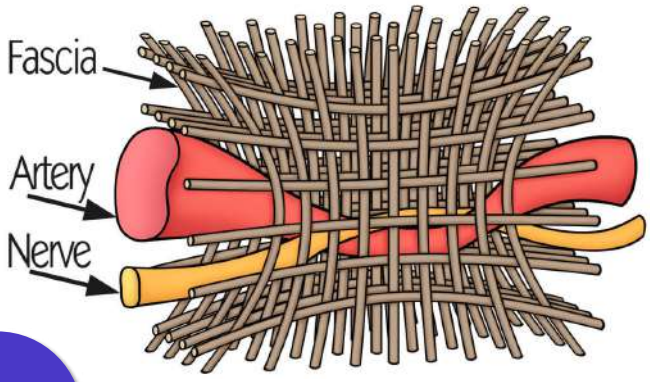
THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

The fascial continuum is innervated by the sympathetic

Persistent tension of the fascia can lead to adhesions or scar tissue that impacts surrounding tissues:
muscles, joints, vessels, nerves, etc.

These adhesions do not show up on radiological or other tests.

We have to palpate it



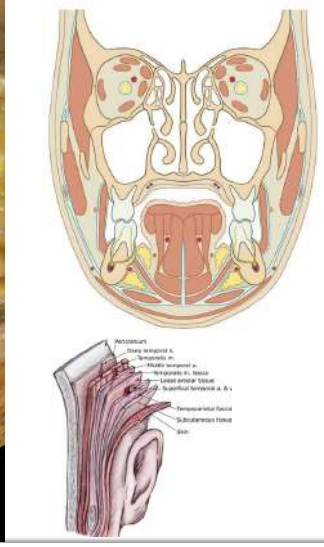


10

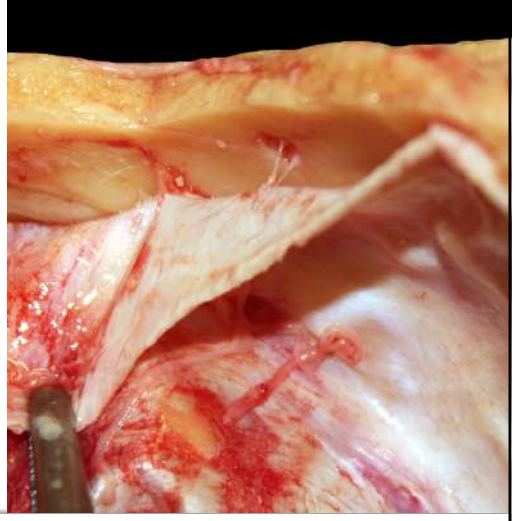
Fascial System. Tensegrity

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

Temporal. Fascia Tutusaus, 2015.



Fibrous tracts of dura mater crossing the skull. Tutusaus, 2015

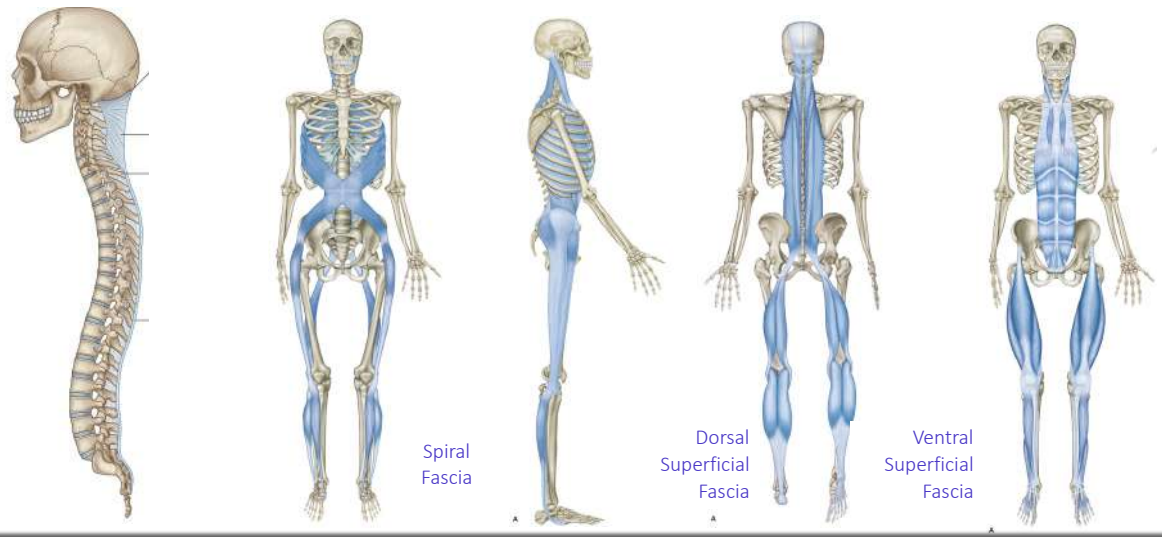


@david.vinyes

11

Fascial System and Transmission

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area



@david.vinyes

12

Method

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- Detailed anamnesis
- Palpation of the tension in the patient's body,
- including the intraoral cavity.
- Often coincides with a painful sensation.



@david.vinyes

13

Intervention and Monitoring

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

Procaine 0.5%

- Oral (submucosal) tension points: 0.5 mL
- Extraoral (myofascial) tension points : 1 mL
- Infraorbital and mental nerves intraorally injected.
- Num. of sessions for long-term remission: 3.2 (1-7)
- Patients returned if pain persisted or reappeared.
- Telephone monitoring at 3 and 6 months.



@david.vinyes

14

Intervention

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

Woman, 47 years old
Cervical pain for the last 10 years.
Worsening since OTD 5y ago VAS 7-10 /10
Anxiety coinciding with the brace's onset.

Medical: Caesarean; hysterectomy 2y ago.
Dental: Fixed retainers for 5y
Physical exam: Limitation of cervical range of motion.
Tension and dysesthesia in Pfannenstiel scar.

Treatment and evolution:
Immediate cervical pain relief VAS 3 and increased range of motion in the neck after injecting the oral TP.
2 more interventions by injecting into the myofascial TP of TMJ, subocc., trapezius, and Pfannenstiel scar.

Case 2



Instituto de Terapia Neural Medicina Regulatoria



@david.vinyes

15

Intervention

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

Woman 15y.
4 years knee pain VAS 7-8 coinciding with menarche and fixed OTD.
Abandoned figure skating because of pain at 13, she had done since she was 6. Worsening with physical activity and menstruation.

Medical: Headache, otitis, constipation
Anxiety with palpitations and painful tension in abdomen
Dental: Fixed OTD (11-13y); 18/28 in tilted orientation.
Physical exam: tension in oral, temporal, subocc., and abd areas.

Treatment and evolution:
Immediate release of knee pain and abd. tension after injecting into oral vestibules and temporal TP.
Also, abdominal TP were injected.
After 3 sessions, absence of pain and headache, and improved anxiety went back to figure skating.

Case 6



Instituto de Terapia Neural Medicina Regulatoria

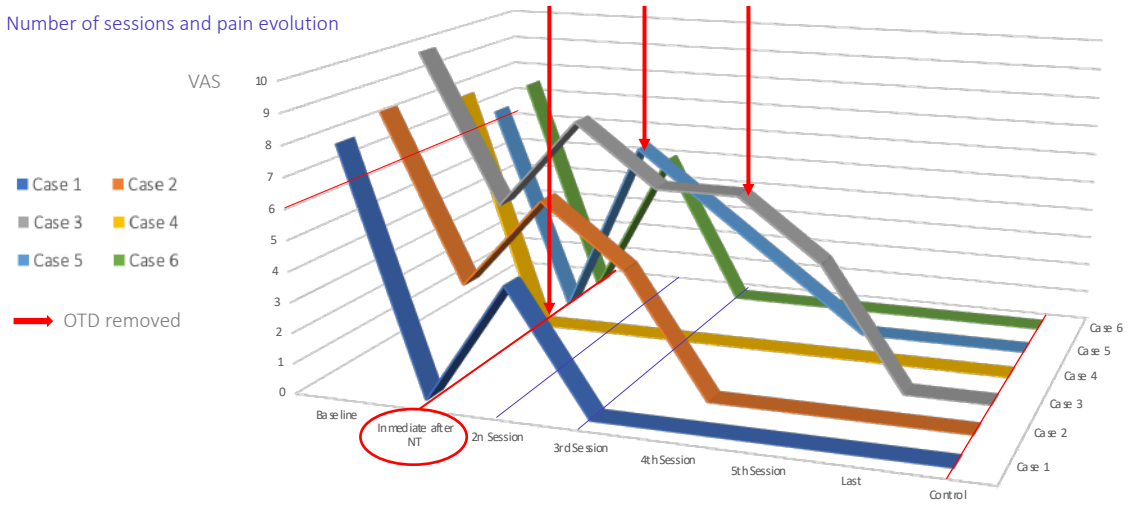


@david.vinyes

16

Results

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area




@david.vinyes

17

Conclusions

THERAPY WITH LOCAL ANESTHETICS CONGRESS. Heidelberg 2023
Post-orthodontic chronic musculoskeletal pain improvement after LA injections in the trigeminal area

- Based on our experience,
- Injection of low doses of LA into oral and myofascial stress points can release or eliminate chronic musculoskeletal pain that has worsened or started after OTD treatment.
- Other symptoms related to decreasing the sympathetic, such as anxiety, may also improve
- We are acting on a causal factor, with a short-term stimulus but long-lasting by activating the self-organizing circuits.
- This is a low cost and safe and fast treatment.


@david.vinyes

18

Where are we now

PENDING APROVAL

RANDOMIZED CLINICAL TRIAL OF LOW INTERVENTION WITH MYOFASCIAL INJECTIONS OF LOCAL ANESTHETIC FOR THE TREATMENT OF MUSCULOSKELETAL PAIN IN ORTHODONTIC PATIENTS

Simple blind (patient)
Multicentric
N = 90
3 groups (procaine, saline and sham injection)

Ajuntament de Barcelona
Àrea de Cultura, Educació, Ciència i Comunitat
Departament de Ciència i Universitats

DOCUMENT BÀSIC 2: MEMÒRIA CIENTÍFICA-TÈCNICA DEL PROJECTE

A. TÍTOL DEL PROJECTE

ASSAIG CLÍNIC ALEATORITZAT DE BAIXA INTERVENCIÓ AMB INJECCIONS MIOFASCIALS D'ANESTÈSIC LOCAL PEL TRACTAMENT DEL DOLOR MÚSCUL-ESQUELÈTIC EN PACIENTS AMB ORTODÒNCIA (ACATN).

B. ENTITAT LÍDER I ENTITATS NO LÍDERS

Núm	Entitat líder	Nom de la Investigadora Principal (IP)	Àrea o departament de recerca on està integrada
1.	Neural Therapy Research Foundation	Dr. David Vinyes Casajoana	Àrea de recerca en salut



@david.vinyes

19

Bibliography

1. Adstrum S, Hedley G, Schleip R, Stecco C, Yucesoy CA. Defining the fascial system. J Bodyw Mov Ther. 2017 Jan;21(1):173-177.
2. Álvaro Naranjo T, Noguera-Salvá R, F Fariñas. La matriz extracelular: morfología, función y biotensegridad (parte I). Rev Esp Patol 2009; Vol 42, n.º 4: 249-261.
3. Araya EI, Baggio DF, Koren LO, Andreatini R, Schwarting RKW, Zamponi GW, et al. Acute orofacial pain leads to prolonged changes in behavioral and affective pain components. Pain. 2020;161:2830–2840.
4. Ayoub LJ, McAndrews MP, Barnett AJ, Jeremy Ho KC, Cioffi I, Moayedi M. Baseline resting-state functional connectivity determines subsequent pain ratings to a tonic ecologically valid experimental model of orofacial pain. Pain. 2021;162:2397–2404.
5. Basedau H, Nielsen T, Asmussen K, Gloss K, Mehnert J, Jensen RH, May A. Experimental evidence of a functional relationship within the brainstem trigeminocervical complex in humans. Pain. 2022 Apr 1;163(4):729-734.
6. Bonnans C, Chou J, Werb Z. Remodelling the extracellular matrix in development and disease. Nat Rev Mol Cell Biol. 2014 Dec;15(12):786-801.
7. Bordoni B, Zanier E. Clinical and symptomatological reflections: the fascial system. J Multidiscip Healthc. 2014; 7: 401–411.
8. Campos LA, Santos-Pinto A, Marôco J, Campos JADB. Pain perception in orthodontic patients: A model considering psychosocial and behavioural aspects. Orthod Craniofacial Res. 2019;22:213–221.
9. Delmas P, Coste B. Mechano-gated ion channels in sensory systems. Cell. 2013;155:278-284.
10. Engel R, Barop H, Giebel J, Ludin SM, Fischer L. The Influence of Modern Neurophysiology on the Previous Definitions of "Segment" and "Interference Field" in Neural Therapy. Complement Med Res. 2022;29:257-267.
11. Fede C, Albertin G, Petrelli L, Sfriso MM, Biz C, De Caro R, Stecco C. Expression of the endocannabinoid receptors in human fascial tissue. Eur J Histochem. 2016 Jun 28;60(2):2643.
12. Feller L, Khammissa RAG, Schechter I, Moodley A, Thomadakis G, Lemmer J. Periodontal Biological Events Associated with Orthodontic Tooth Movement: The Biomechanics of the Cytoskeleton and the Extracellular Matrix. Sci World J. 2015;2015: 1-7.
13. Flynn DM. Chronic Musculoskeletal Pain: Nonpharmacologic, Noninvasive Treatments. Am Fam Physician. 2020;102:465–477.
14. Gilligan C, Volschenk W, Russo M, Green M, Gilmore C, Mehta V, et al. An implantable restorative-neurostimulator for refractory mechanical chronic low back pain: a randomized sham-controlled clinical trial. Pain. 2021;162:2486-2498.
15. Grant M, Wilson J, Rock P, Chapple I. Induction of cytokines, MMP9, TIMPs, RANKL and OPG during orthodontic tooth movement. Eur J Orthod. 2013 Oct;35(5):644-51.



@david.vinyes

20

Bibliography

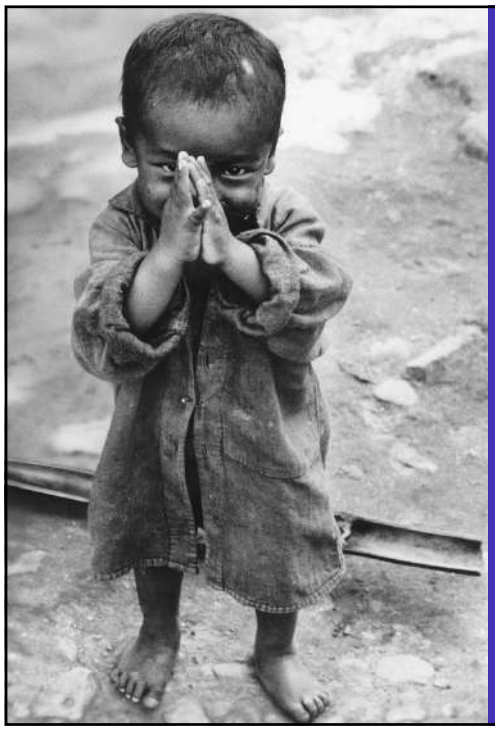
15. Humphrey JD, Dufresne ER, Schwartz MA. Mechanotransduction and extracellular matrix homeostasis. Nat Rev Mol Cell Biol. 2014 Dec;15(12):802-12.
16. Mark Dutton: Dutton's Orthopaedic Examination. Evaluation and Intervention. 4th EditionScarr G. A model of the cranial vault as a tensegrity structure, and its significance to normal and abnormal cranial development. International Journal of Osteopathic Medicine 11 (2008) 80-89.
17. Miller VE, Chen DG, Barrett D, Poole C, Golightly YM, Sanders AE, et al. Understanding the relationship between features associated with pain-related disability in people with painful temporomandibular disorder: an exploratory structural equation modeling approach. Pain. 2020;161:2710–2719.
18. Owens AP et al. Reference Module in Neuroscience and Biobehavioral Psychology. Elsevier. 2017
19. Parrini S, Comba B, Rossini G, Ravera S, Cugliari G, De Giorgi I, Deregibus A, Castroflorio T. Postural changes in orthodontic patients treated with clear aligners: A rasterstereographic study. J Electromyogr Kinesiol. 2018 Feb;38:44-48
20. Sarah Lipp, Capturing the Extracellular Matrix in 3D Color. Purdue University, and Sarah Calve, University of Colorado, Boulder . 2021 Dec.
21. Scarr G. A model of the cranial vault as a tensegrity structure, and its significance to normal and abnormal cranial development. International Journal of Osteopathic Medicine 11 (2008) 80-89.
22. Shiratori Tusita LN, Fischer L. Chronic therapy-resistant neck pain in a fifty-year-old man. The role of partially impacted third molars. Case report and new pathophysiological insights. Complement Med Res. 2023 Jan 23.
23. Tadeo I, Berbegall AP, Escudero LM, Alvaro T, Noguera R. Biotensegrity of the extracellular matrix: physiology, dynamic mechanical balance, and implications in oncology and mechanotherapy. Front Oncol. 2014 Mar 4;4:39.
24. Torisu T, Tanaka M, Murata H, Wang K, Arendt-Nielsen L, De Laat A, et al. Modulation of neck muscle activity induced by intraoral stimulation in humans. Clin Neurophysiol. 2014 May;125(5):1006–11.
25. Tutusaus R, Potau JM. Sistema Fascial. Ed. Panamericana, 2015.
26. Weinschenk S, Göllner R, Hollmann MW, Hotz L, Picardi S, Hubbert K, et al. Inter-Rater Reliability of Neck Reflex Points in Women with Chronic Neck Pain. Forsch Komplementmed. 2016;23:223-229.
27. Woo SH, Lukacs V, de Nooij JC, Zaytseva D, Criddle CR, Francisco A, Jessell TM, Wilkinson KA, Patapoutian A. Piezo2 is the principal mechanotransduction channel for proprioception. Nat Neurosci. 2015 Dec;18(12):1756-62.
28. Zhang F, Li F, Yang H, Jin Y, Lai W, Roberts N, et al. Effect of experimental orthodontic pain on gray and white matter functional connectivity. CNS Neurosci Ther. 2021;27:439–448.





@david.vinyes

21



Neural Therapy
RESEARCH FOUNDATION

Institut de campus Teràpia Neural Medicina Reguladora

Gràcies
Danke
Thank you

David Vinyes, MD
david@institutdeterapianeural.cat
@david.vinyes



22