

## Aula Passada: Abordagem Interdisciplinar da Dor

O SUS oferece atenção multiprofissional para alívio da dor e cuidados paliativos

Cuidado Interdisciplinar inclui:

Equipe multiprofissional em comunicação para tomada de decisão clínica

Reconhecimento do papel de cada uma dos profissionais da equipe

A formação e consolidação das equipes multiprofissionais dependem da: *“formação de graduação, educação continuada, “credenciamento” de centros de referência e clínicas especializadas, ambiente de trabalho, formação especializada, cursos de reciclagem e atualização, discussões de casos, estabelecimento de guidelines, pesquisa e divulgação”*

Pesquisas recentes apontam melhores resultados de intervenções interdisciplinares em atenção a pacientes com condições crônicas e agudas e maior satisfação do paciente com o atendimento

Floter T. An interdisciplinary approach to pain therapy. WHO Reg Publ Eur Ser. 1992;44:403-4.

1

## RCG1080 - Dor e Cuidados Paliativos Medidas Conservadoras Não-Farmacológicas

### Recursos Conservadores Não- Farmacológicos para o Controle da Dor

2

## Tópicos Abordados

**Objetivo:** Apresentar um panorama sobre a contribuição da ciência na compressão dos mecanismos de analgesia em tratamentos não-farmacológicos

Background

Exercícios

Modalidades Térmicas

Estimulação Elétrica Nervosa Transcutânea (TENS)

Manipulação Articular

Outros recursos

3

## Trabalho em Pequenos Grupos

Você recebeu um *handout* e um resumo de revisão sistemática. Seu grupo recebeu também o artigo completo. Numerem seus *handouts* consecutivamente de 1 ao número de participantes do grupo



Leia individualmente o resumo (6 min)

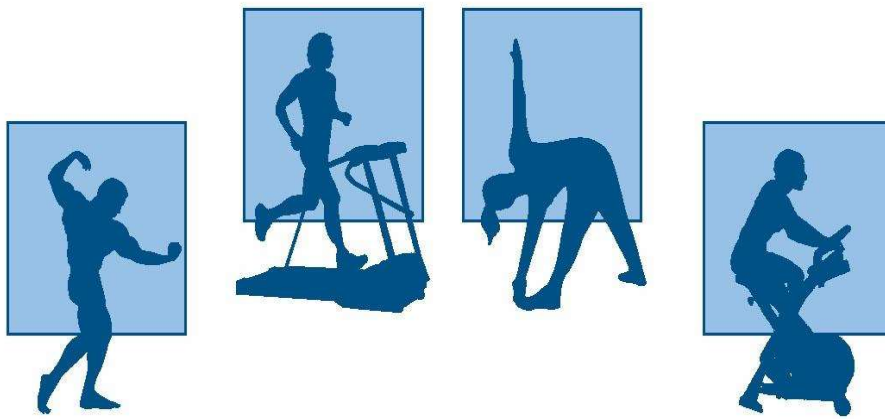
Estabeçam um consenso no grupo para as questões e tomem notas individuais em seus *handouts* (24 min)

Em seguida todos os grupos irão partilhar seus consensos Um número de cada grupo vai ser chamado pela professora para relatar o consenso (5 min)

**TEMPO TOTAL PARA CONCLUIR: 30 min para o grupo + 5 relator**

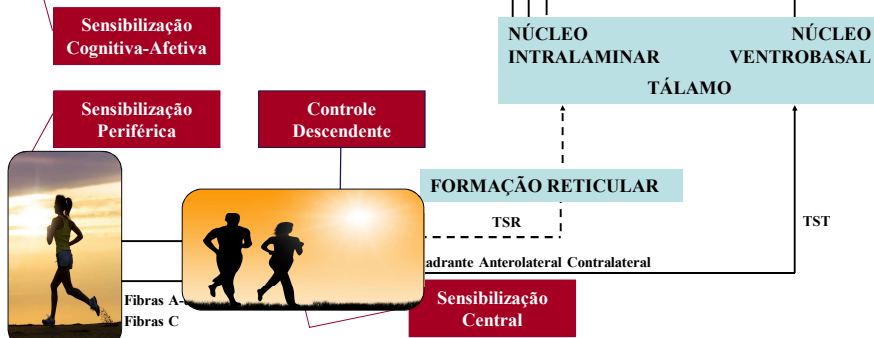
4

Como exercícios aliviam a dor?



5

Modulação da nocicepção e dor



6

Exercícios – Hipótese Opióide e resultante aumento do limiar de dor

Liberação de  $\beta$ -endorfina  
(glândula pituitária)

Mais de 60% do máximo consumo  
de oxigênio ( $VO_{2máx}$ )

(Goldfarb et al 1997)



70% da máxima capacidade  
aeróbica

(Koltyn 2000)

Aumento do Limiar de Dor  
em sujeitos sem dor

7

Exercícios – Hipótese Opióide

Liberação de  $\beta$ -endorfina

Administração de Antagonista Opióide [naloxone]



(Haier et al 1981, Olausson et al 1986)

Os resultados de Janal et al (1984) mostraram que corridas de longa distância produzem hipoalgesia e melhora do humor em homem. O efeito inibitório do naloxone implica em um mecanismo opióide endógeno envolvido

As pesquisas com animais apontam para a possibilidade do sistema analgésico acionado endogenamente ser dependente do tipo de exercícios estressante aplicado

8

Exercícios – Hipótese Opióide



Pharmacology Biochemistry and Behavior, Vol. 41, No. 1, pp. 19-27, 1998  
 © 1998 Elsevier Science Inc.  
 Printed in the USA. All rights reserved.  
 0091-3057/98/\$10.00 + .00

Chronic Running-Wheel Activity Decreases  
 Sensitivity to Morphine-Induced Analgesia in  
 Male and Female Rats

ROBIN B. KANAREK, AMY V. GERSTEIN, RACHEL P. WILDMAN,  
 WENDY FOULDS MATHEIS AND KRISTEN E. D'ANCI



Pharmacology Biochemistry and Behavior, Vol. 66, No. 2, pp. 343-346, 2000  
 © 2000 Elsevier Science Inc.  
 Printed in the USA. All rights reserved.  
 0091-3057/00/\$-see front matter

Long-Term Voluntary Access to Running  
 Wheels Decreases Kappa-Opioid  
 Antinociception

KRISTEN E. D'ANCI, AMY V. GERSTEIN AND ROBIN B. KANAREK

Os resultados indicam que a atividade física crônica pode diminuir a analgesia por morfina. Esta redução de efetividade foi observada após a administração de um antagonista de kappa opioide e deve-se a uma tolerância cruzada entre os opióides endógenos liberados no exercício e o exógeno

9

Exercícios – Hipóteses Não-Opióide

Droster et al (1991)

10 homens esportistas realizaram corridas extenuantes após receberem doses de naloxone

Medidas de beta-endorfinas, cortisol e catecolaminas (noradrenalina)

Limiars de dor eletroestimulados permaneceram elevados de 10-15 minutos após os exercícios e retornaram 60 minutos após ao níveis iniciais

A percepção de fadiga reduziu de 5-10 minutos após o final do exercício



Alteração da Percepção de Esforço Pós Exercício

(Haier et al 1981, Janal et al 1984, Olausson et al 1986, Droster et al 1991)

10

Em pacientes...

---

## 🤔 Níveis de atividade física em pacientes com condições dolorosas

- fibromialgia: fadiga exacerbada e sugestão de trabalho em níveis abaixo do condicionamento cardiovascular

(Loeser et al 2001)

11

Exercícios – Hipótese Opióide

---

## Low-Intensity Exercise Reverses Chronic Muscle Pain in the Rat in a Naloxone-Dependent Manner

Marie K. Hoeger Bement, PT, PhD, Kathleen A. Sluka, PT, PhD

Arch Phys Med Rehabil Vol 86, September 2005 1736-1740



- 🤔 Modelo de dor crônica muscular não-inflamatória
- 🤔 Ratos 1 dia de adaptação (40 minutos) e 3 dias por 5 minutos em baixa velocidade
- 🤔 Teste com monofilamentos

Os exercícios de baixa intensidade reverteram a hiperalgesia mecânica no modelo de dor crônica através da ativação do sistema opióide endógeno

- Estresse -

12

Exercícios – Hipóteses Não-Opióide

Marek et al. Brain Res. 1992 Apr 24;578(1-2):197-203  
 Nado forçado, antagonistas e teste de chapa quente



Água Aquecida - 32 °



Antagonista Opióide  
 [naloxone]



Água 20 °

Analgesia revertida por uma  
 mistura dos antagonistas



Água Fria – 15°



Antagonista Glutaminérgico  
 [dizocilpine]

13

Influencia sobre o sistema osteo-neuro-muscular



Estudos randomizados controlados de baixo risco de viés metodológico e revisões sistemáticas com e sem metanálise têm mostrado que terapia baseada em exercício diminui a dor e melhora a função dos pacientes, mas seus achados não são consistentes nas mudanças de performance muscular, cardiovascular e outras variáveis biomecânicas

Steiger et al. Eur Spine J. 2012 Apr;21(4):575-98

14

## Influencia sobre o sistema osteo-neuro-muscular

## Então porque os exercícios funcionam?

*Se as mudanças em força e resistência não são necessárias para criar mudança funcional, os exercícios provavelmente influenciam em outras partes do processamento de dor*

- mudanças no sistema nervoso central (medula e cérebro) que permitem as pessoas realizarem mais atividades antes de experimentar dor
- aumento da sensação de confiança e autocontrole (autoeficácia)
- melhora nas expectativas de mudança
- melhora no senso de participação em seus papéis habituais
- melhora no senso geral de saúde

... e outras possibilidades

Steiger et al. Eur Spine J. 2012 Apr;21(4):575-98

15

## Relato de Grupo

## ORIGINAL RESEARCH ARTICLE

## Network Meta-Analysis of Various Nonpharmacological Interventions on Pain Relief in Older Adults With Osteoarthritis

*Qi Zhang, MD, Lufei Young, PhD, and Feng Li, PhD*

**Abstract:** To compare the effectiveness of different nonpharmacological interventions on pain relief in older adults with osteoarthritis, literature databases, bibliographies, and other relevant sources were searched. No language limitations were applied. Thirty-two trials published from 1997 to 2017 were included in the systematic review and network meta-analyses. We included only randomized controlled trials and studies that evaluated the effects of nonpharmacological interventions on alleviating pain in elderly adults (age  $\geq 60$  yrs or mean age  $> 65$  yrs) who experience osteoarthritis, irrespective of sex. In the network meta-analysis, resistance training was ranked as the most effective among all nonpharmacological interventions (surface under the cumulative ranking = 82.9%, standardized mean difference = 1.96, confidence interval = -1.39 to 5.31). In subgroup analyses, resistance training still ranked the most effective pain reduction intervention, followed by strengthening exercise and yoga. Among female subjects with intervention adherence rate more than 90%, the most effective intervention was yoga. Strengthening exercise was superior to all other forms of interventions when comparing long-term effect of selected interventions. Among older adults with osteoarthritis, resistance training can be considered a treatment option for pain relief. Yoga is an effective intervention strategy for female elderly, and strengthening exercise has a better long-term beneficial effect.

**Key Words:** Osteoarthritis, Physiotherapy, Physical Activity, Network Meta-Analysis

(*Am J Phys Med Rehabil* 2019;98:469-478)

16



## Relato de Grupo

### Effects of water therapy on disease activity, functional capacity, spinal mobility and severity of pain in patients with ankylosing spondylitis: a systematic review and meta-analysis

Zejun Liang<sup>a,b,\*</sup>, Chenying Fu<sup>a,c,\*</sup>, Qing Zhang<sup>a,b</sup>, Feng Xiong<sup>a,b</sup>, Lihong Peng<sup>a,b</sup>, Li Chen<sup>a,b</sup>, Chengqi He<sup>a,b</sup> and Quan Wei<sup>a,b</sup>

<sup>a</sup>Department of Rehabilitation Medicine Center, West China Hospital, Sichuan University, Chengdu, Sichuan, PR China; <sup>b</sup>Key Laboratory of Rehabilitation Medicine in Sichuan Province, Chengdu, Sichuan, PR China; <sup>c</sup>State Key Laboratory of Biotherapy, West China Hospital, Sichuan University, Chengdu, Sichuan, China

**ABSTRACT**

**Purpose:** To evaluate the efficacy of water therapy for disease activity, functional capacity, spinal mobility, and pain in patients with ankylosing spondylitis.

**Methods:** PubMed, Ovid, web of science, Cochrane library, Physiotherapy Evidence Database, CNKI, VIP, Wan Fang, and Open Grey were searched for randomized controlled trials that investigated the effects of water therapy on patients with ankylosing spondylitis. Two researchers independently screened the literature databases and then assessed methodological qualities using the Physiotherapy Evidence Database scale and extracted data. Outcomes included were disease activity, functional capacity, spinal mobility, and pain.

**Results:** A total of eight studies ( $n=383$ ) met the inclusion criteria. Analysis demonstrated that water therapy had a significant effect on disease activity and pain, but not on spinal mobility, or functional capacity in patients with ankylosing spondylitis.

**Conclusion:** Water therapy can benefit patients with ankylosing spondylitis by reducing disease activity and alleviating pain. More well-designed randomized controlled trials are needed to confirm the results.

**► IMPLICATIONS FOR REHABILITATION**

- Water therapy can reduce disease activity and pain in patients with ankylosing spondylitis, but cannot improve functional capacity or spinal mobility.
- Due to its analgesic effect both during and after treatment, water therapy remains an alternative for patients with ankylosing spondylitis when land-based therapy is not well tolerated.

**ARTICLE HISTORY**

Received 15 November 2018

Revised 14 July 2019

Accepted 15 July 2019

**KEYWORDS**

Water therapy; hydrotherapy; balneotherapy; aquatic exercise; ankylosing spondylitis; meta-analysis

17

## Relato de Grupo

### Whole Body Vibration Exercise for Chronic Musculoskeletal Pain: a Systematic Review and Meta-analysis of Randomized Controlled Trials

Yulin Dong, MS,<sup>a</sup> Wu Wang, BS,<sup>a</sup> Jiejiao Zheng, BS,<sup>b</sup> Su Chen, BS,<sup>a</sup> Jun Qiao, MS,<sup>b,\*</sup> Xueqiang Wang, PhD<sup>c,\*</sup>

From the <sup>a</sup>Department of Treatment, The Second Rehabilitation Hospital of Shanghai, Shanghai; <sup>b</sup>Rehabilitation Medical Department, Hua Dong Hospital, Shanghai; and the <sup>c</sup>Department of Sport Rehabilitation, Shanghai University of Sport, Shanghai, China. <sup>\*</sup>Qiao and Wang contributed equally to this work.

**Abstract**

**Objective:** This study systematically reviews previous work on the effects of whole body vibration exercise (WBVE) on pain associated with chronic musculoskeletal disorders.

**Data Sources:** Seven electronic databases (PubMed, Embase, CINAHL, Web of Science, Cochrane, Physiotherapy Evidence Database [PEDro], and the China National Knowledge Infrastructure) were searched for articles published between January 1980 and September 2018.

**Study Selection:** Randomized controlled trials involving adults with chronic low back pain (CLBP), osteoarthritis (OA), or fibromyalgia were included. Participants in the WBVE intervention group were compared with those in the non-treatment and non-WBVE control groups.

**Data Extraction:** Data were independently extracted using a standardized form. Methodological quality was assessed using PEDro.

**Data Synthesis:** Suitable data from 16 studies were pooled for meta-analysis. A random effects model was used to calculate between-groups mean differences at 95% confidence interval (CI). The data were analyzed depending on the duration of the follow-up, common disorders, and different control interventions.

**Results:** Alleviation of pain was observed at medium term (standardized mean difference [SMD], -0.67; 95% CI, -1.14 to -0.21;  $I^2$ , 80%) and long term (SMD, -0.31; 95% CI, -0.59 to -0.02;  $I^2$ , 0%). Pain was alleviated in osteoarthritis (OA) (SMD, -0.37; 95% CI, -0.64 to -0.10;  $P < .05$ ;  $I^2$ , 22%) and CLBP (SMD, -0.44; 95% CI, -0.75 to -0.13;  $P < .05$ ;  $I^2$ , 12%). Long-term WBVE could relieve chronic musculoskeletal pain conditions of OA (SMD, -0.46; 95% CI, -0.80 to -0.13;  $P < .05$ ;  $I^2$ , 0%). WBVE improved chronic musculoskeletal pain compared with the treatment "X" control (SMD, -0.37; 95% CI, -0.61 to -0.12;  $P < .05$ ;  $I^2$ , 26%), traditional treatment control (SMD, -1.02; 95% CI, -2.44 to 0.4;  $P > .05$ ;  $I^2$ , 94%) and no treatment control (SMD, -1; 95% CI, -1.76 to -0.24;  $P < .05$ ;  $I^2$ , 75%).

**Conclusions:** Evidence suggests positive effects of WBVE on chronic musculoskeletal pain, and long durations of WBVE could be especially beneficial. However, WBVE does not significantly relieve chronic musculoskeletal pain compared with the traditional treatment. Further work is required to identify which parameters of WBVE are ideal for patients with chronic musculoskeletal pain.

Archives of Physical Medicine and Rehabilitation 2019; ■■■■■■■■■■

18

## Relato de Grupo

## Are Mindful Exercises Safe and Beneficial for Treating Chronic Lower Back Pain? A Systematic Review and Meta-Analysis of Randomized Controlled Trials

Liye Zou <sup>1,†</sup>, Yanjie Zhang <sup>2,†</sup>, Lin Yang <sup>3,4</sup>, Paul D. Loprinzi <sup>5</sup>, Albert S. Yeung <sup>6</sup>, Jian Kong <sup>6</sup>, Kevin W Chen <sup>1</sup>, Wook Song <sup>2,7</sup>, Tao Xiao <sup>8,\*</sup> and Hong Li <sup>9,10,\*</sup>

**Abstract:** Background: Chronic low back pain (CLBP) is a common health issue worldwide. Tai Chi, Qigong, and Yoga, as the most widely practiced mindful exercises, have promising effects for CLBP-specific symptoms. Objective: We therefore conducted a comprehensive review investigating the effects of mindful exercises versus active and/or non-active controls while evaluating the safety and pain-related effects of mindful exercises in adults with CLBP. Methods: We searched five databases (MEDLINE, EMBASE, SCOPUS, Web of Science, and Cochrane Library) from inception to February 2019. Two investigators independently selected 17 eligible randomized controlled trials (RCT) against inclusion and exclusion criteria, followed by data extraction and study quality assessment. Standardized mean difference (SMD) was used to determine the magnitude of mindful exercises versus controls on pain- and disease-specific outcome measures. Results: As compared to control groups, we observed significantly favorable effects of mindful exercises on reducing pain intensity (SMD = -0.37, 95% CI -0.5 to -0.23,  $p < 0.001$ ,  $I^2 = 45.9\%$ ) and disability (SMD = -0.39, 95% CI -0.49 to -0.28,  $p < 0.001$ ,  $I^2 = 0\%$ ). When compared with active control alone, mindful exercises showed significantly reduced pain intensity (SMD = -0.40,  $p < 0.001$ ). Furthermore, of the three mindful exercises, Tai Chi has a significantly superior effect on pain management (SMD = -0.75, 95% CI -1.05 to -0.46,  $p < 0.001$ ), whereas Yoga-related adverse events were reported in five studies. Conclusion: Findings of our systematic review suggest that mindful exercises (Tai Chi and Qigong) may be beneficial for CLBP symptomatic management. In particular, Tai Chi appears to have a superior effect in reducing pain intensity irrespective of non-control comparison or active control comparison (conventional exercises, core training, and physical therapy programs). Importantly,

19

## Modalidades Térmicas



20

Efeitos do Aquecimento Terapêutico

Efeitos vasodinâmicos

Vasodilatação com hiperemia

Efeitos metabólicos

Aumento do metabolismo

😊 Efeitos neuromusculares

- Mudança da velocidade de condução nervosa
- Aumento do limiar de dor
- Mudança na força muscular

21

Aquecimento Terapêutico - Hipóteses

Espasmo muscular protetor pode ser reduzido com temperaturas acima de 42° C devido a diminuição da taxa de disparo das fibras II do fuso muscular (fibras Ia do fuso aumenta atividade com o calor) e aumentam a taxa de disparo das fibras Ib aferentes dos OTGs.

(Mense 1978)



22

Efeitos do Aquecimento Terapêutico

- 😊 Efeitos vasodinâmicos
  - Vasodilatação com hiperemia

Efeitos metabólicos

Aumento do metabolismo

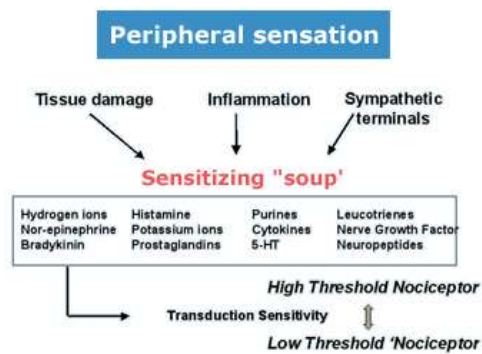
Efeitos neuromusculares

- Mudança da velocidade de condução nervosa
- Aumento do limiar de dor
- Mudança na força muscular

23

Efeitos do Aquecimento Terapêutico

Efeitos vasculares no processo inflamatório



😊 Nossos recursos térmicos são capazes de aquecer os tecidos dolorosos?

24

## Profundidade das modalidades térmicas superficiais

Agente Térmico	Profundidade	Músculo
Calor úmido	10 mm	+ 1° C
Parafina – luva	20 mm	+ 4° C
Parafina – imersão	20-30 mm	+ 4 a 5° C
Infravermelho	5-10 mm	+ 0,5 a 1° C
Forno de Bier	20 a 30 mm	+ 4 a 5° C

Os valores estimados dependem da intensidade da energia liberada pela fonte, o tecido tratado e a técnica de aplicação usada.

25

## Relato de Grupo

## Heat therapy for primary dysmenorrhea: A systematic review and meta-analysis of its effects on pain relief and quality of life

Junyoung Jo<sup>1,2</sup> & Sun Haeng Lee<sup>3</sup>

Primary dysmenorrhea, which is menstrual pain without pelvic pathology, is the most common gynecologic condition in women. Heat therapy has been used as a treatment. We assessed the evidence on heat therapy as a treatment for primary dysmenorrhea. We searched 11 databases for studies published through July 2018. All randomized controlled trials (RCTs) that addressed heat therapy for patients with primary dysmenorrhea were included. Data extraction and risk-of-bias assessments were performed by two independent reviewers. Risk of bias was assessed using the Cochrane risk-of-bias tool. Six RCTs met our inclusion criteria. Two RCTs found favorable effects of heat therapy on menstrual pain compared with unheated placebo therapy. Three RCTs found favorable effects of heating pads on menstrual pain compared with analgesic medication (n = 274; SMD -0.72; 95% confidence interval -0.97 to -0.48; P < 0.001; two studies). One RCT showed beneficial effects of heat therapy on menstrual pain compared with no treatment (n = 132; MD -4.04 VAS; 95% CI -4.88 to -3.20; P < 0.001). However, these results are based on relatively few trials with small sample sizes. Our review provided suggestive evidence of the effectiveness of heat therapy for primary dysmenorrhea, but rigorous high-quality trials are still needed to provide robust evidence.

26

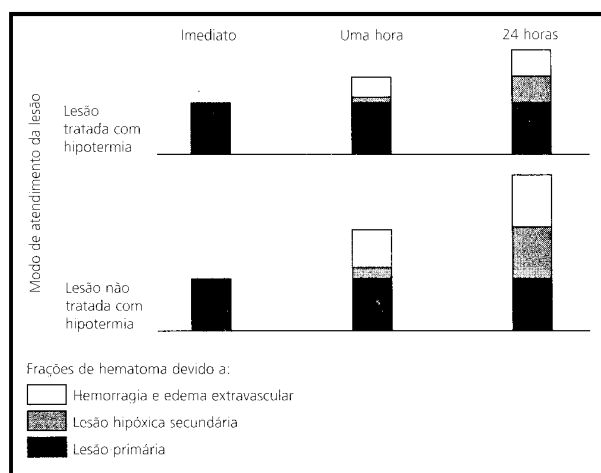
Efeitos do Resfriamento Terapêutico

- 😊 Efeitos vasodinâmicos
  - Vasoconstrição
  
- 😊 Efeitos metabólicos
  - Diminuição do metabolismo
  
- 😊 Efeitos neuromusculares
  - Mudança da velocidade de condução nervosa
  - Aumento do limiar de dor

27

Crioterapia

😊 Efeitos anti-inflamatórios conhecidos



28

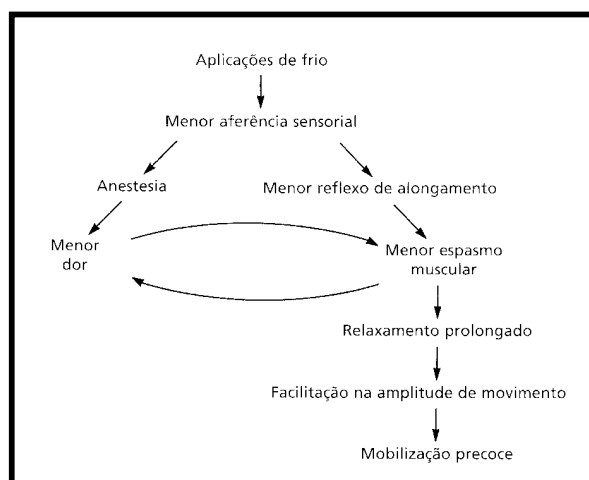
Efeitos do Resfriamento Terapêutico

- 😊 Efeitos vasodinâmicos
  - Vasoconstrição
  
- 😊 Efeitos metabólicos
  - Diminuição do metabolismo
  
- 😊 Efeitos neuromusculares
  - Mudança da velocidade de condução nervosa
  - Aumento do limiar de dor

29

Crioterapia

😊 Efeitos neuromusculares



30

## Resfriamento Terapêutico - Hipóteses

Diminuição da condução nervosa das fibras aferentes e eferentes.

Diminuição da transmissão sináptica

Aumento da duração dos potenciais de ação muscular

O órgão tendinoso de Golgi parece não sofrer alteração em relação a aplicação de frio

O fuso muscular tem resposta similar às fibras sensitivas

Diminuição da aferência para o corno dorsal deverá reduzir os efeitos de ativação do segundo neurônio e de expansão dos campos receptivos

(Abranson et al, 1966; Lee et al, 1978, Sluka et al, 1998)

31

## Resfriamento Terapêutico - Hipóteses

Mecanismo contra-irritante – ativando a via descendente inibitória da dor

Trataram articulações do ombro artríticas com aplicações de gelo moído aplicadas por 20 minutos, 3 vezes por semana por 3 semanas e observaram, diminuição da dor, melhora da ADM e melhora da função do ombro

(Williams et al, 1998)

Descobriram o mecanismo contra-irritante como o causador da analgesia induzida por spray de gelo

(Parsons & Goetzl, 1945)

32



## Relato de Grupo

## Drug-Free Interventions to Reduce Pain or Opioid Consumption After Total Knee Arthroplasty A Systematic Review and Meta-analysis

Dario Tedesco, MD; Davide Cori, MD; Karishma R. Desai, PhD; Steven Asch, MD, MPH; Ian R. Carroll, MD; Catherine Curtin, MD; Kathryn M. McDonald, MM; Maria P. Fantini, MD; Tina Hernandez-Boussard, PhD

**RESULTS** Of 5509 studies, 39 randomized clinical trials were included in the meta-analysis (2391 patients). The most commonly performed interventions included continuous passive motion, preoperative exercise, cryotherapy, electrotherapy, and acupuncture. Moderate-certainty evidence showed that electrotherapy reduced the use of opioids (mean difference,  $-3.50$ ; 95% CI,  $-5.90$  to  $-1.10$  morphine equivalents in milligrams per kilogram per 48 hours;  $P = .004$ ;  $I^2 = 17\%$ ) and that acupuncture delayed opioid use (mean difference, 46.17; 95% CI, 20.84 to 71.50 minutes to the first patient-controlled analgesia;  $P < .001$ ;  $I^2 = 19\%$ ). There was low-certainty evidence that acupuncture improved pain (mean difference,  $-1.14$ ; 95% CI,  $-1.90$  to  $-0.38$  on a visual analog scale at 2 days;  $P = .003$ ;  $I^2 = 0\%$ ). Very low-certainty evidence showed that cryotherapy was associated with a reduction in opioid consumption (mean difference,  $-0.13$ ; 95% CI,  $-0.26$  to  $-0.01$  morphine equivalents in milligrams per kilogram per 48 hours;  $P = .03$ ;  $I^2 = 86\%$ ) and in pain improvement (mean difference,  $-0.51$ ; 95% CI,  $-1.00$  to  $-0.02$  on the visual analog scale;  $P < .05$ ;  $I^2 = 62\%$ ). Low-certainty or very low-certainty evidence showed that continuous passive motion and preoperative exercise had no pain improvement and reduction in opioid consumption: for continuous passive motion, the mean differences were  $-0.05$  (95% CI,  $-0.35$  to  $0.25$ ) on the visual analog scale ( $P = .74$ ;  $I^2 = 52\%$ ) and  $6.58$  (95% CI,  $-6.33$  to  $19.49$ ) opioid consumption at 1 and 2 weeks ( $P = .32$ ,  $I^2 = 87\%$ ), and for preoperative exercise, the mean difference was  $-0.14$  (95% CI,  $-1.11$  to  $0.84$ ) on the Western Ontario and McMaster Universities Arthritis Index Scale ( $P = .78$ ,  $I^2 = 65\%$ ).

**CONCLUSIONS AND RELEVANCE** In this meta-analysis, electrotherapy and acupuncture after total knee arthroplasty were associated with reduced and delayed opioid consumption.

33

## Resfriamento Terapêutico - Hipóteses

### Calor ou frio em artrite aguda?

- Induziram inflamação em articulações do joelho de ratos e realizaram calor a  $40^{\circ}\text{C}$  e resfriamento a  $4^{\circ}\text{C}$ . Medidas de latência de retirada da pata (hiperalgesia) comportamento doloroso espontâneo (posição antálgica e descarga de peso) e medida de edema articular. O frio reduz de retirada da pata apenas. O calor produziu pequena, significativa redução dos comportamentos dolorosos sem afetar o edema articular e o reflexo de retirada da pata.
- O calor reduz o espasmo protetor e o frio reduz a hiperalgesia

(Sluka et al, 1999)

🤔 Aplicável na prática clínica?



34

## Resfriamento Terapêutico - Hipóteses

**Efeito do aquecimento e resfriamento terapêutico na temperatura intrarticular e temperatura da pele?**

Pacote de gelo moído, diatermia por ondas curtas, spray de gelo, parafina, compressa quente

44 sujeitos saudáveis, aplicações no joelho

O calor reduz o espasmo protetor e o frio reduz a hiperalgesia

(Sluka et al, 1999)

O uso de diatermia por ondas curtas e compressas quentes podem aquecer prejudicialmente os tecidos intra-articulares

Oosterveld & Rasker (1994) – altas temperaturas articulares

aumentaram a quebra da cartilagem articular e tecidos colágenos.

O foco da terapia deve ser reduzir a temperatura articular

35

## Estimulação Elétrica Nervosa Transcutânea



36

## Estimulação Elétrica Nervosa Transcutânea

- *Transcutaneous Electrical Nerve Stimulation*
- Qualquer estimulação aplicada transcutaneamente para estimular a inervação
- 1965 - *Gate Control Theory* aumentou a popularidade e a justificativa para TENS
- Taxa de efetividade de 50 a 80%

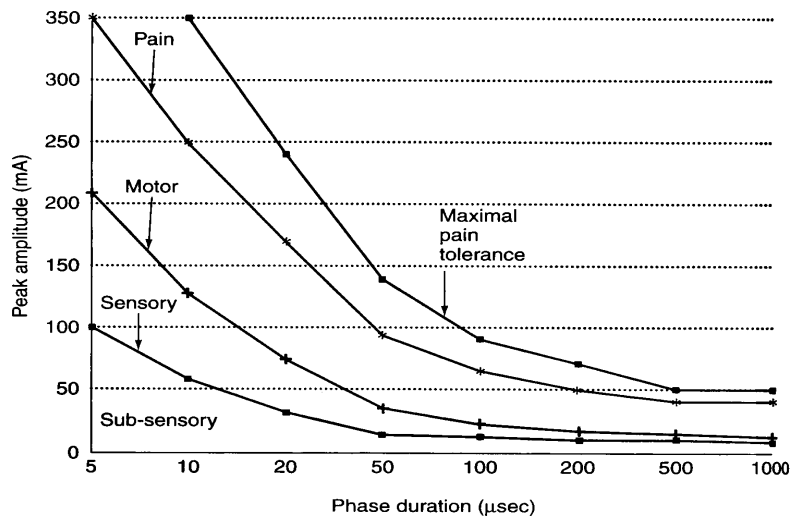
37

## TENS - Modos de Estimulação

	<b>Amplitude ( i mA )</b>	<b>Duração ( T <math>\mu</math> s )</b>	<b>Frequência ( Hz )</b>
<b>Convencional</b>	Forte, mas Sensorial	Baixa 45-150	Alta 70-150 pps
<b>Burst ou Trens de Pulso</b>	Alta Motor	Alta 150-250	Trens de HF modulados a 2 Hz
<b>Tens- Acupuntura</b>	Alta Motor	Alta 200-300	Baixa de 1 a 4 Hz
<b>Breve-Intensa</b>	Alta Doloroso	Alta > 150 < 15 min	Alta > 150 pps

38

Limiares de Excitabilidade



39

Parâmetros da TENS e Curso Temporal da Dor - Orientação Clássica

Dores Agudas

Dores Crônicas

Alta Frequência e

Baixa Frequência e

Baixa Intensidade  
(AF - BI)

Alta Intensidade  
(BF - AI)

TENS Convencional

TENS-Acupuntura

Comportas Medulares  
Ascendentes

Liberação de Opióides  
Endógenos

40

## Há diferença na modulação com TENS AF/BI e BF/AI ?

Dados de estudos recentes sugerem que ambos tem efeitos na modulação segmentar e na modulação suprassgmentar. No entanto, na integridade das vias descendentes o TENS de AF/BI ativa receptores  $\mu$ -opioides e a TENS de BF/AI ativa receptores  $\delta$ -opioides...

... Qual a implicação clínica?

41

## PREFERÊNCIA DOS PACIENTES - Johnson e col. Pain (1991) 44(3): 221-234

Questão	n	Média (Faixa)
Idade (em anos)	(a) Mulheres - 82	(a) 55.7 ( 24 - 82 )
	(b) Homens - 97	(b) 54.8 ( 30 - 85 )
	(c) Total - 179	(c) 55.2 ( 24 - 85 )
Tempo de Uso (em anos)	179	4.0 ( 0.25 - 9 )
Grau de Alívio da Dor (0 = nenhum 10 = total)	168	5.1 ( 0 - 10 )
Duração do Tto (Horas / Semana)	152	39.7 ( 0.75 - 63 )
Tempo para Início da Analgesia (min.)	150	30 ( 0 - > 2 h )
Duração do Pós Efeito (min.)	150	51 ( 0 - > 2 h )

42

PREFERÊNCIA DOS PACIENTES - Johnson e col. Pain (1991) 44(3): 221-234

		n	N ° de Ptes ( % )
Preferência por padrão de pulso	contínuo		72 (56)
	burst	128	29 (23)
	ambos		27 (21)
Preferência por Frequência	rápida		28 (58)
	lenta	48	15 (31)
	nenhuma		05 (11)
Escolhe F regularmente		48	35 (73)
Mudanças na Efetividade com o Tempo	aumento		13 (10)
	sem alteração	129	75 (58)
	diminuição		41 (32)
Uso da TENS fora de casa	regularmente		85 (53)
	ocasionalmente	162	31 (19)
	nunca		46 (28)
Usa droga analgésica		147	110 (75)
Reações Cutâneas		143	45 (31)

43

Relato de Grupo

**Effects of Physical-Agent Pain Relief Modalities for Fibromyalgia Patients: A Systematic Review and Meta-Analysis of Randomized Controlled Trials**

Yuichiro Honda,<sup>1,2</sup> Junya Sakamoto,<sup>3,1</sup> Yohei Hamaue,<sup>3,4</sup> Hideki Kataoka,<sup>1,5</sup> Yasutaka Kondo,<sup>6</sup> Ryo Sasabe,<sup>1,2</sup> Kyo Goto,<sup>1,3</sup> Takuya Fukushima,<sup>1,2</sup> Satoshi Oga,<sup>1,7</sup> Ryo Sasaki,<sup>1,8</sup> Natsumi Tanaka,<sup>1,3</sup> Jiro Nakano,<sup>1</sup> and Minoru Okita<sup>1</sup>

<sup>1</sup>Department of Physical Therapy Science, Nagasaki University Graduate School of Biomedical Sciences, Sakamoto 1-7-1, Nagasaki 852-8520, Japan

<sup>2</sup>Department of Rehabilitation, Nagasaki University Hospital, Sakamoto 1-7-1, Nagasaki 852-8520, Japan

<sup>3</sup>Department of Physical Therapy, Niigata University of Health and Welfare, Shimami-cho 1398, Kitaku, Niigata 950-3198, Japan

<sup>4</sup>Institute for Human Movement and Medical Sciences, Niigata University of Health and Welfare, Shimami-cho 1398, Kitaku, Niigata 950-3198, Japan

<sup>5</sup>Department of Rehabilitation, Nagasaki Memorial Hospital, Fukahori 1-11-5, Nagasaki 851-0301, Japan

<sup>6</sup>Department of Rehabilitation, Japanese Red Cross Nagasaki Atomic Bomb Hospital, Mori 3-15, Nagasaki 852-8104, Japan

<sup>7</sup>Department of Rehabilitation, Saiseikai Nagasaki Hospital, Kitajuchi 2-5-1, Nagasaki 850-0003, Japan

<sup>8</sup>Department of Rehabilitation, Juzenkai Hospital, Kago 7-18, Nagasaki 850-0905, Japan

Correspondence should be addressed to Junya Sakamoto; jun-saka@nagasaki-u.ac.jp

Received 16 March 2018; Accepted 27 June 2018; Published 1 October 2018

Academic Editor: Shinya Kasai

Copyright © 2018 Yuichiro Honda et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Purpose.** We conducted a systematic review and meta-analysis to investigate the effects of the following physical-agent modalities for pain relief in fibromyalgia (FM) patients. **Methods.** We identified randomized controlled studies of adults with FM in the MEDLINE, CINAHL, and PEDro databases. The primary outcome measure was pain relief measured by a visual analogue scale (VAS), and the secondary outcome measures of interest were subjective improvements in the number of tender points, Fibromyalgia Impact Questionnaire (FIQ), and quality of life (QOL) scores. **Results.** Eleven studies were included in our review. The studies' physical-agent modalities were low-level laser therapy (LLLT), thermal therapy, electromagnetic field therapy, and transcutaneous electrical nerve stimulation (TENS). LLLT did not reduce VAS scores, but it significantly reduced both the number of tender points and FIQ score. Thermal therapy was associated with significantly reduced VAS scores, tender points, and FIQ scores. Electromagnetic field therapy was associated with significantly reduced VAS score and FIQ score. TENS significantly reduced VAS scores. **Conclusion.** Our analyses revealed that thermal therapy and LLLT had a partial effect on pain relief in FM patients, and this beneficial effect may have a positive influence on FM patients' health status.

44

Terapia Manual

---



45

Terapia Manual

---

A moderna terapia manual consiste de vários métodos que variam de deslizamentos oscilatórios lentos a manipulações de curta amplitude com rápida velocidade

Benefícios principais: **alívio da dor**, relaxamento muscular e restauração da amplitude de movimento articular

46

Sluka KA, Wright A. Knee joint mobilization reduces secondary mechanical hyperalgesia induced by capsaicin injection into the ankle joint. Eur J Pain. 2001;5(1):81-7.



- 1) Estimular o processo de reparo de articulações periféricas
- 2) Modificar o ambiente químico que cerca os nociceptores
- 3) Ativar os mecanismos segmentares de inibição da dor
- 4) Ativar os mecanismos descendentes de inibição da dor
- 5) Influência psicológica positiva criada pelo toque terapêutico

47

### Terapia Manual

Analgesia induzida por terapia manual deve ser de origem multifatorial:

Ambiente químico

Facilitação do reparo dos tecidos

Mecanismos inibitórios segmentares

(Wright, 1995)

Teoria das comportas – manipulação articular

Ativação de mecanoreceptores de baixo limiar

(Wyke, 1981)

Movimentos passivos e manipulação articular

Ativação de das fibras Ia do fuso e IIb do OTG

(Pickar & Wheeler, 2001)

Ativação dos mecanoreceptores articulares III

(Schaible & Grubb, 1993)

48



## Intensidade de Dor

- Mecanorreceptores tipo I inibem a atividade aferente dos receptores articulares **nociceptivos** tipo IV

- Efeito inibitório da dor pelos mecanorreceptores tipo I ao nível do cordão espinal.

(ALTER, 1999; STERLING & JULL, 2001)

(STERLING & JULL, 2001)

- Envolvimento do SNC

Mobilização indireta = efeitos antinociceptivos não revertidos por administração de bloqueador gabaminérgico

(GABA inibe célula de transmissão e o segundo neurônio)

SLUKA & WRIGHT (2001)

SLUKA et al. (2002)

49

Sluka KA, Wright A. Knee joint mobilization reduces secondary mechanical hyperalgesia induced by capsaicin injection into the ankle joint. Eur J Pain. 2001;5(1):81-7.

Mobilização para produzir antinocicepção mecânica



Aplicação da técnica 2 horas após a injeção de capsaína no tornozelo com durações variáveis (3; 9 e 15 min)

Avaliações do limiar de dor à estímulo mecânico seqüências imediatamente após, 30 min, 1 h e 2h após a sensibilização

50

Sluka KA, Wright A. Knee joint mobilization reduces secondary mechanical hyperalgesia induced by capsaicin injection into the ankle joint. *Eur J Pain*. 2001;5(1):81-7.

O efeito da técnica foi efetivo para aplicações de 9 e 15 min e durou por 30 minutos;

Este efeito não foi revertido pela administração de naloxona (antagonista de morfina), sugerindo uma forma de analgesia, de origem central, não-opióide.

Isso também foi observado no efeito hipoanalgésico produzido por manipulação cervical em humanos

(Vicenzino et al 2001)

Skyba et al 2002 – envolvimento serotoninérgico



51

### Relato de Grupo

## The Impact of Spinal Manipulation on Migraine Pain and Disability: A Systematic Review and Meta-Analysis

Pamela M. Rist, ScD; Audrey Hernandez, MS; Carolyn Bernstein, MD; Matthew Kowalski, DC; Kamila Osypiuk, MS; Robert Vining, DC; Cynthia R. Long, PhD; Christine Goertz, DC, PhD; Rhayun Song, RN, PhD; Peter M. Wayne, PhD

**Background.**—Several small studies have suggested that spinal manipulation may be an effective treatment for reducing migraine pain and disability. We performed a systematic review and meta-analysis of published randomized clinical trials (RCTs) to evaluate the evidence regarding spinal manipulation as an alternative or integrative therapy in reducing migraine pain and disability.

**Methods.**—PubMed and the Cochrane Library databases were searched for clinical trials that evaluated spinal manipulation and migraine-related outcomes through April 2017. Search terms included: migraine, spinal manipulation, manual therapy, chiropractic, and osteopathic. Meta-analytic methods were employed to estimate the effect sizes (Hedges'  $g$ ) and heterogeneity ( $I^2$ ) for migraine days, pain, and disability. The methodological quality of retrieved studies was examined following the Cochrane Risk of Bias Tool.

**Results.**—Our search identified 6 RCTs (pooled  $n = 677$ ; range of  $n = 42-218$ ) eligible for meta-analysis. Intervention duration ranged from 2 to 6 months; outcomes included measures of migraine days (primary outcome), migraine pain/intensity, and migraine disability. Methodological quality varied across the studies. For example, some studies received high or unclear bias scores for methodological features such as compliance, blinding, and completeness of outcome data. Due to high levels of heterogeneity when all 6 studies were included in the meta-analysis, the 1 RCT performed only among chronic migraineurs was excluded. Heterogeneity across the remaining studies was low. We observed that spinal manipulation reduced migraine days with an overall small effect size (Hedges'  $g = -0.35$ , 95% CI:  $-0.53, -0.16, P < .001$ ) as well as migraine pain/intensity.

**Conclusions.**—Spinal manipulation may be an effective therapeutic technique to reduce migraine days and pain/intensity. However, given the limitations to studies included in this meta-analysis, we consider these results to be preliminary. Methodologically rigorous, large-scale RCTs are warranted to better inform the evidence base for spinal manipulation as a treatment for migraine.

52

Relato de Grupo

The effectiveness of non-surgical interventions for common plantar digital compressive neuropathy (Morton's neuroma): a systematic review and meta-analysis

Barry G. Matthews<sup>1</sup>, Sheree E. Hurn<sup>1,2</sup>, Michael P. Harding<sup>3</sup>, Rachel A. Henry<sup>4</sup> and Robert S. Ware<sup>5</sup>

**Background:** Morton's neuroma (MN) is a compressive neuropathy of the common plantar digital nerve. It is a common compressive neuropathy often causing significant pain which limits footwear choices and weight bearing activities. This paper aims to review non-surgical interventions for MN, to evaluate the evidence base for the clinical management of MN.

**Methods:** Electronic biomedical databases (CINAHL, EMBASE, MEDLINE and Cochrane) were searched to January 2018 for studies evaluating the effectiveness of non-surgical interventions for Morton's neuroma. Outcome measures of interest were treatment success rate (SR) (binary) and pain as measured using 100-point visual analogue scale (VAS) (continuous). Studies with and without control groups were included and were evaluated for methodological quality using the Downs and Black Quality Index. Results from randomised controlled trials (RCT) were compared between-groups, and case series were compared pre- versus post-treatment. Effect estimates are presented as odds ratios (OR) for binary data or mean differences (MD) for continuous data. Random effects models were used to pool effect estimates across studies where similar treatments were used. Heterogeneity was assessed using the  $I^2$  statistic.

**Results:** A total of 25 studies met the inclusion criteria, seven RCTs and 18 pre/post case series. Eight different interventions were identified, with corticosteroid or sclerosing injections being the most often reported (seven studies each). Results from a meta-analysis of two RCTs found corticosteroid injection decreased pain more than control on VAS (WMD: -5.3, 95%CI: -7.5 to -3.2). Other RCTs reported efficacy of: manipulation/mobilisation versus control (MD: -15.3, 95%CI: -29.6 to -1.0); extracorporeal shockwave therapy versus control (MD: -5.9, 95%CI: -21.9 to 10.1). Treatment success was assessed for extracorporeal shockwave therapy versus control (OR: 0.3, 95%CI: 0.0 to 7.1); and corticosteroid injection vs footwear/padding (OR: 6.0, 95%CI: 1.9 to 19.2). Sclerosing and Botox injections, radiofrequency ablation and cryoneurolysis have been investigated by case series studies, however these were of limited methodological quality.

**Conclusions:** Corticosteroid injections and manipulation/mobilisation are the two interventions with the strongest evidence for pain reduction, however high-quality evidence for a gold standard intervention was not found. Although the evidence base is expanding, further high quality RCTs are needed.

53

O que mais de recurso temos disponíveis???



54

## Relato de Grupo

## Low-Level Laser Therapy for Temporomandibular Disorders: A Systematic Review with Meta-Analysis

Gang-Zhu Xu,<sup>1,2</sup> Jie Jia,<sup>3</sup> Lin Jin,<sup>2</sup> Jia-Heng Li,<sup>1</sup> Zhan-Yue Wang,<sup>1</sup> and Dong-Yuan Cao<sup>1</sup>

<sup>1</sup>Key Laboratory of Shaanxi Province for Craniofacial Precision Medicine Research, Research Center of Stomatology, College of Stomatology, Xi'an Jiaotong University, Xi'an, Shaanxi, China

<sup>2</sup>Department of Neurosurgery, First Affiliated Hospital of Xi'an Medical University, Xi'an, Shaanxi, China

<sup>3</sup>Department of Psychiatry, Xi'an Mental Health Center, Xi'an, Shaanxi, China

Correspondence should be addressed to Dong-Yuan Cao; dongyuan\_cao@hotmail.com

Received 14 January 2018; Accepted 3 April 2018; Published 10 May 2018

Academic Editor: Klaus Boening

Copyright © 2018 Gang-Zhu Xu et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Objectives.** We systematically reviewed randomized controlled trials (RCTs) of the effect of low-level laser therapy (LLLT) versus placebo in patients with temporomandibular disorder (TMD). **Methods.** A systematic search of multiple online sources electronic databases was undertaken. The methodological quality of each included study was assessed using the modified Jadad scale, and the quality of evidence was evaluated using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system. **Results.** A total of 31 RCTs were included. Total modified Jadad scale scores showed that the methodological quality was high in 30 studies and low in 1 study. Combining data from all clinically heterogeneous studies revealed positive effects of LLLT on pain relief, regardless of the visual analogue scale (VAS) score or the change of VAS score between the baseline and the final follow-up time point, while dosage analyses showed discrepant results about the effects of high or low doses for patients with TMD. Follow-up analyses showed that LLLT significantly reduced pain at the short-term follow-up. Temporomandibular joint function outcomes indicated that the overall effect favored LLLT over placebo. **Conclusion.** This systematic review suggests that LLLT effectively relieves pain and improves functional outcomes in patients with TMD.

55

## Relato de Grupo

## Is acupuncture an effective postherpetic neuralgia treatment? A systematic review and meta-analysis

This article was published in the following Dove Press journal:  
Journal of Pain Research

Wenya Pei<sup>1</sup>  
Jingchun Zeng<sup>2</sup>  
Liming Lu<sup>3</sup>  
Guohua Lin<sup>2</sup>  
Jingwen Ruan<sup>1</sup>

<sup>1</sup>Department of Acupuncture, the First Affiliated Hospital of Sun Yat-sen University, Guangzhou, Guangdong, People's Republic of China; <sup>2</sup>Department of Acupuncture, The First Affiliated Hospital of Guangzhou University of Chinese Medicine, Guangzhou, Guangdong, China; <sup>3</sup>Clinical Medical Center, South China Research Center for Acupuncture and Moxibustion, Medical College of Acu-Moxi and Rehabilitation, Guangzhou University of Chinese Medicine, Guangzhou, Guangdong, China

**Background:** Postherpetic neuralgia (PHN) refers to pain which remains after the healing of rashes from herpes zoster. Previous literatures have shown that acupuncture has potential benefits for PHN, but evidence remains lacking. Thus, we have performed a systematic review and meta-analysis to identify the effectiveness of acupuncture in the treatment of PHN.

**Methods:** Six databases were searched for randomized controlled trials (RCTs) to assess the effects of acupuncture on PHN. After selecting the studies, extracting the data, and assessing study quality, meta-analysis was performed on several of the studies with RevMan 5.3. The GRADE (Grading of Recommendations Assessment Development and Evaluation) system was used to assess the overall quality of the evidence.

**Results:** Acupuncture helps relieve pain intensity (standardized mean difference [SMD]: -1.78, 95% confidence interval [CI]: -2.36 to -1.21). For other intervention types, electroacupuncture (SMD: -1.28, 95% CI: -2.51 to -0.05), fire needle (SMD: -2.23, 95% CI: -2.62 to -1.84), bloodletting and cupping (SMD: -2.46, 95% CI: -2.95 to -1.97) have better effects on pain intensity relief. To date, no study has reported on the onset of pain relief time. The Hamilton Anxiety Scale score (SMD: -18.94, 95% CI: -37.37 to -0.52) was lower for the acupuncture group than for the control group. It was also found that acupuncture can improve quality of life (QOL) (SMD: 3.78, 95% CI: 2.50 to 5.06). The quality of evidence for acupuncture for PHN pain intensity was moderate according to the GRADE system.

**Conclusion:** Acupuncture may reduce pain intensity, relieve anxiety and improve quality of life in patients with PHN. Further randomized trials with larger sample sizes and of higher methodological quality are needed to confirm these results.

56

## Relato de Grupo

## Mindfulness Meditation for Chronic Pain: Systematic Review and Meta-analysis

Lara Hilton, MPH<sup>1</sup> · Susanne Hempel, PhD<sup>1</sup> · Brett A. Ewing, MS<sup>1</sup> ·  
Lea Xenakis, MPA<sup>1</sup> · Sydne Newberry, PhD<sup>1</sup> ·  
Jlicia Ruelaz Maher, MD<sup>1</sup> · Roberta M. Shanman, MS<sup>1</sup> ·  
D<sup>1</sup> · Margaret A. Maglione, MPP<sup>1</sup>

**Abstract**

**Background** Chronic pain patients increasingly seek treatment through mindfulness meditation.

**Purpose** This study aims to synthesize evidence on efficacy and safety of mindfulness meditation interventions for the treatment of chronic pain in adults.


**Method** We conducted a systematic review on randomized controlled trials (RCTs) with meta-analyses using the Hartung-Knapp-Sidik-Jonkman method for random-effects models. Quality of evidence was assessed using the GRADE approach. Outcomes included pain, depression, quality of life, and analgesic use.

**Results** Thirty-eight RCTs met inclusion criteria; seven reported on safety. We found low-quality evidence that mindfulness meditation is associated with a small decrease in pain compared with all types of controls in 30 RCTs. Statistically significant effects were also found for depression symptoms and quality of life.

**Conclusions** While mindfulness meditation improves pain and depression symptoms and quality of life, additional well-designed, rigorous, and large-scale RCTs are needed to decisively provide estimates of the efficacy of mindfulness meditation for chronic pain.

57

## Conclusões gerais

 Existe ciência básica que explica os efeitos analgésicos de recursos não-farmacológicos mas os estudos clínicos realizados com pacientes em ambientes clínicos, com alto controle de viés são a melhor forma de selecionar opções de tratamento para seus pacientes com dor.

58