HandyEvidence: Who, what, when, where, why

Nico Magni, PhD

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Who

KIA ORA TĀTOU

GREETINGS ALL

KO RESEGONE TE MAUNGA

RESEGONE IS THE MOUNTAIN

KO PIOVERNA TE AWA

PIOVERNA IS THE RIVER

NŌ ITALIA AHAU

I AM FROM ITALIA

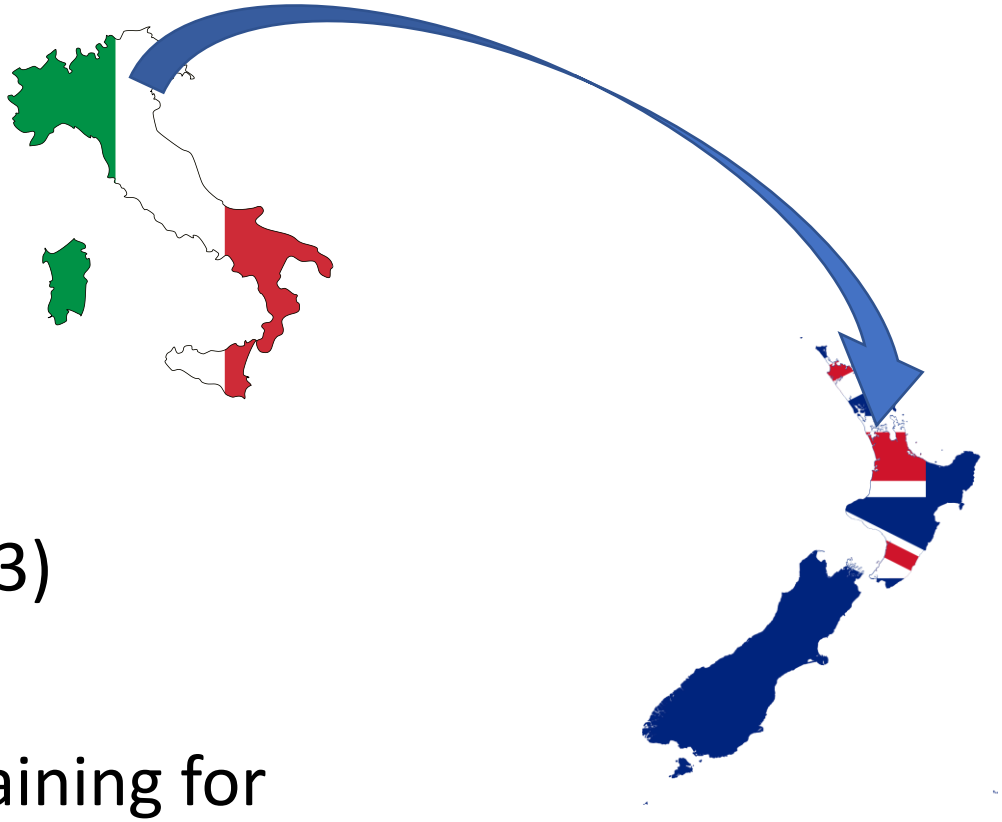
KO MAGNI TŌKU WHĀNAU

MAGNI IS MY FAMILY

KO NICO TŌKU INGOA

MY NAME IS NICO

Who



- PGDip in MSK (2013)
- MHSc (2015)
- PhD on strength training for hand osteoarthritis (2019)

What

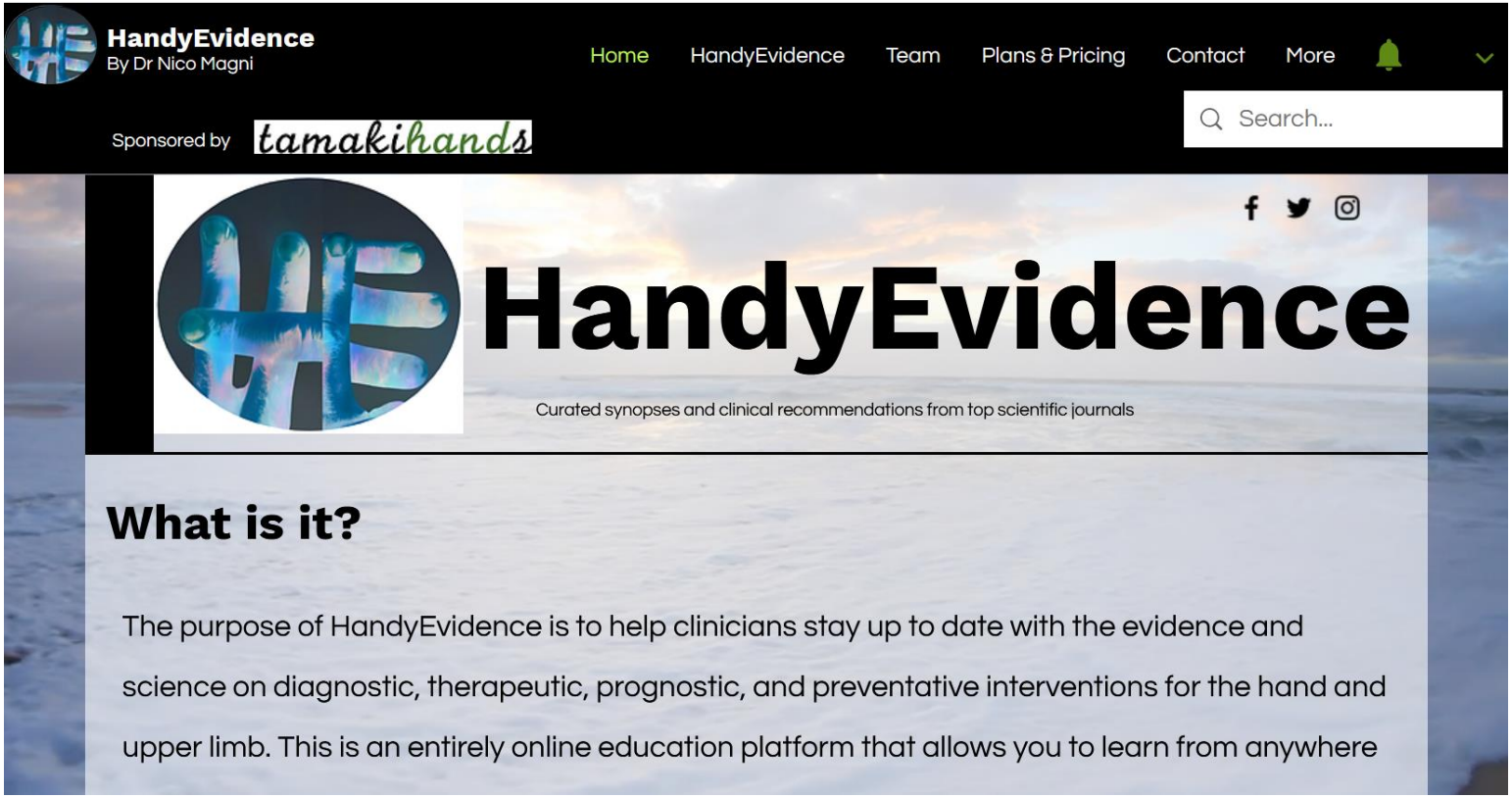
- Answer clinical questions
- Diagnostic, therapeutic, prognostic, preventative
- Hand and upper limb
- Synopses

When

- Started in March (2020)

- Just before Lock down

Where



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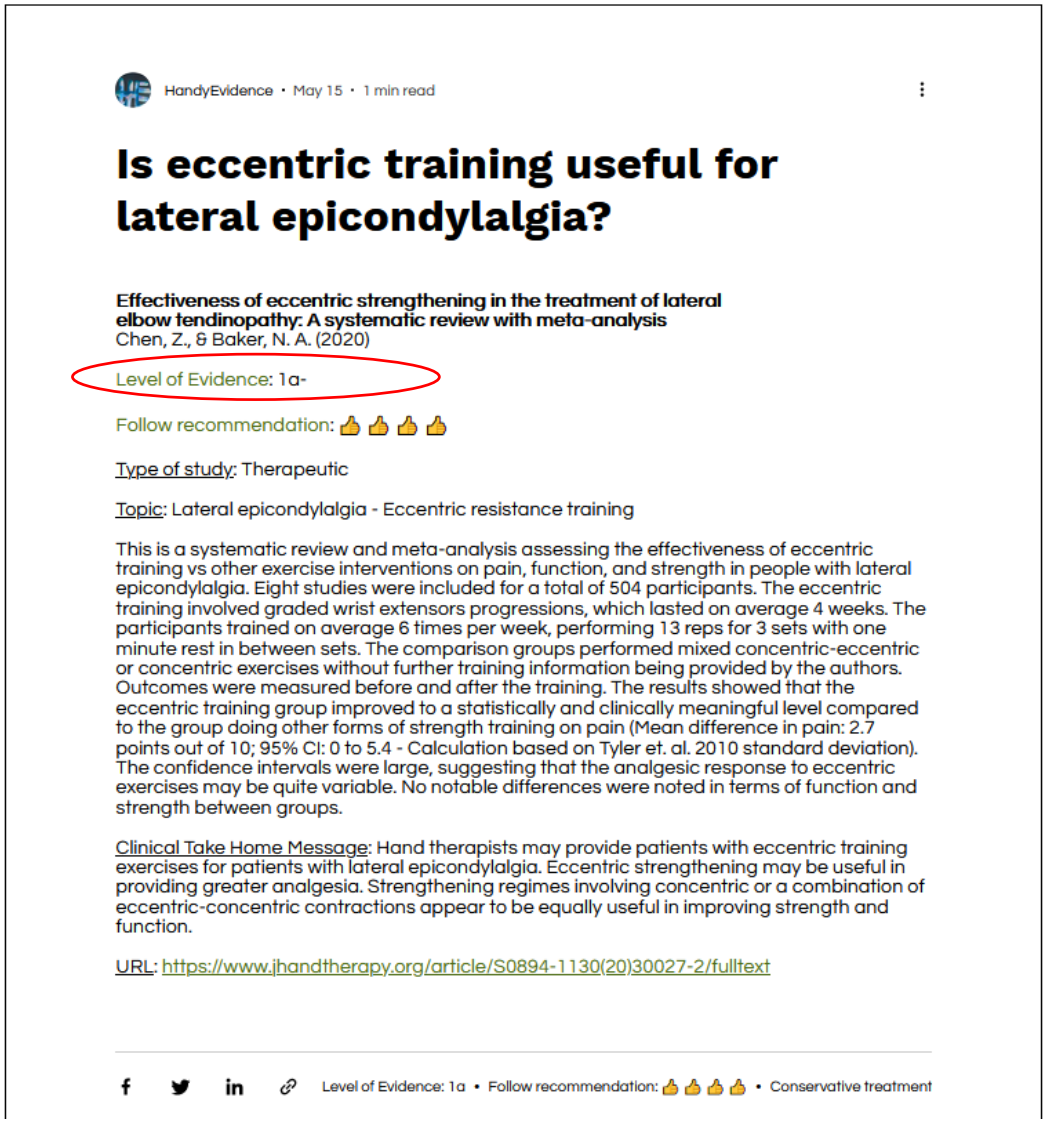
Why

- ≅ 74 articles within 3 weeks
- Save clinicians ≅ between 4 and 9 hrs/week to keep up to date with evidence
- 1-2hrs/week find and access articles, clinical relevance
- 1-3hrs/article to read, assess, interpret, clinical repercussions
- Quick reference

Synopsis' structure explained



HandyEvidence • May 15 • 1 min read

Is eccentric training useful for lateral epicondylalgia?

Effectiveness of eccentric strengthening in the treatment of lateral elbow tendinopathy: A systematic review with meta-analysis
Chen, Z., & Baker, N. A. (2020)

Level of Evidence: 1a-

Follow recommendation: 👍 👍 👍 👍

Type of study: Therapeutic

Topic: Lateral epicondylalgia - Eccentric resistance training

This is a systematic review and meta-analysis assessing the effectiveness of eccentric training vs other exercise interventions on pain, function, and strength in people with lateral epicondylalgia. Eight studies were included for a total of 504 participants. The eccentric training involved graded wrist extensors progressions, which lasted on average 4 weeks. The participants trained on average 6 times per week, performing 13 reps for 3 sets with one minute rest in between sets. The comparison groups performed mixed concentric-eccentric or concentric exercises without further training information being provided by the authors. Outcomes were measured before and after the training. The results showed that the eccentric training group improved to a statistically and clinically meaningful level compared to the group doing other forms of strength training on pain (Mean difference in pain: 2.7 points out of 10; 95% CI: 0 to 5.4 - Calculation based on Tyler et. al. 2010 standard deviation). The confidence intervals were large, suggesting that the analgesic response to eccentric exercises may be quite variable. No notable differences were noted in terms of function and strength between groups.

Clinical Take Home Message: Hand therapists may provide patients with eccentric training exercises for patients with lateral epicondylalgia. Eccentric strengthening may be useful in providing greater analgesia. Strengthening regimes involving concentric or a combination of eccentric-concentric contractions appear to be equally useful in improving strength and function.

URL: https://www.jhandtherapy.org/article/S0894-1130(20)30027-2/fulltext

Level of Evidence: 1a • Follow recommendation: 👍 👍 👍 👍 • Conservative treatment

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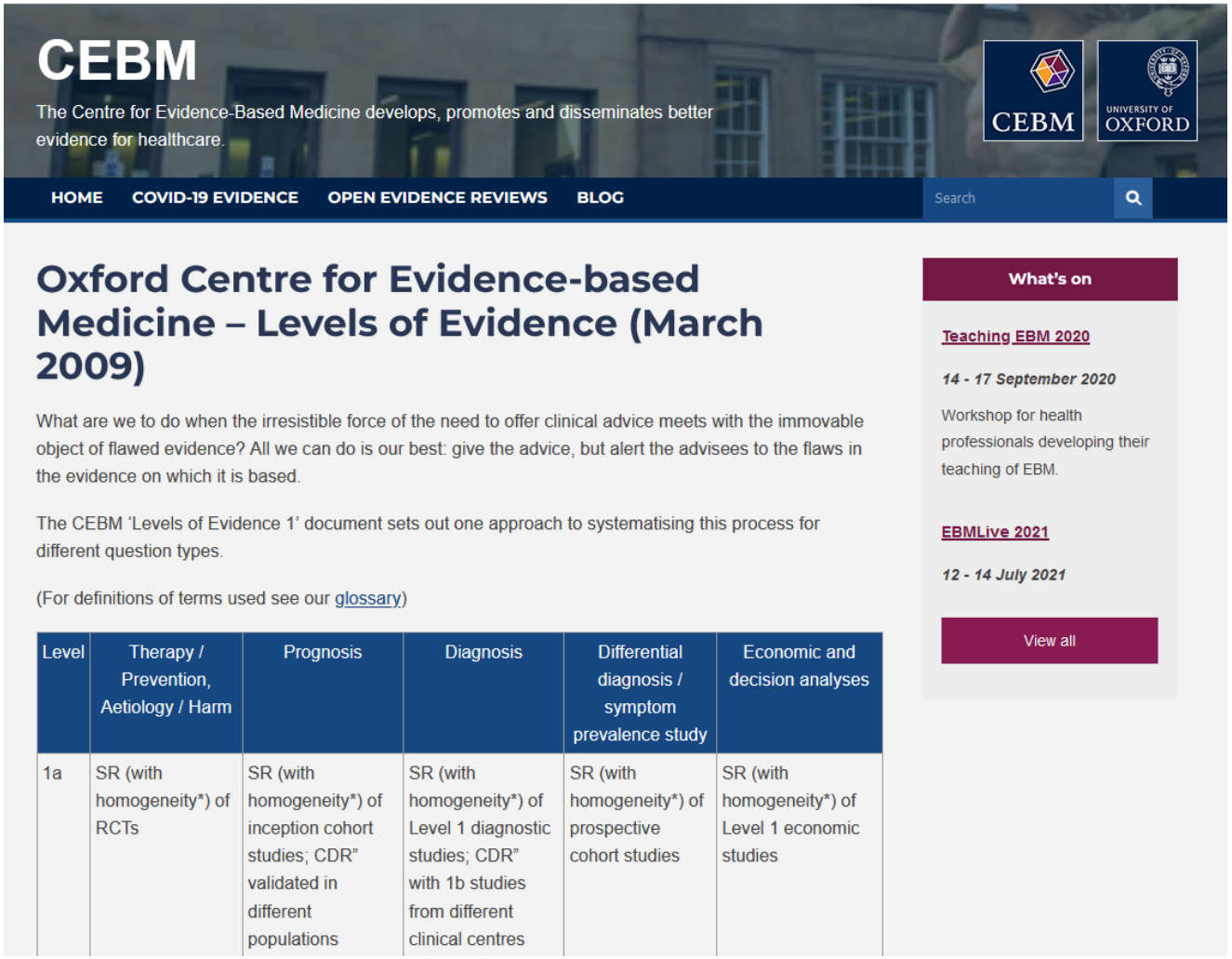
Levels of evidence



CEBM

The Centre for Evidence-Based Medicine develops, promotes and disseminates better evidence for healthcare.

CEBM | UNIVERSITY OF OXFORD

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Oxford Centre for Evidence-based Medicine – Levels of Evidence (March 2009)

What are we to do when the irresistible force of the need to offer clinical advice meets with the immovable object of flawed evidence? All we can do is our best: give the advice, but alert the advisees to the flaws in the evidence on which it is based.

The CEBM 'Levels of Evidence 1' document sets out one approach to systematising this process for different question types.

(For definitions of terms used see our glossary)

Level	Therapy / Prevention, Aetiology / Harm	Prognosis	Diagnosis	Differential diagnosis / symptom prevalence study	Economic and decision analyses
1a	SR (with homogeneity*) of RCTs	SR (with homogeneity*) of inception cohort studies; CDR" validated in different populations	SR (with homogeneity*) of Level 1 diagnostic studies; CDR" with 1b studies from different clinical centres	SR (with homogeneity*) of prospective cohort studies	SR (with homogeneity*) of Level 1 economic studies

What's on

Teaching EBM 2020

14 - 17 September 2020

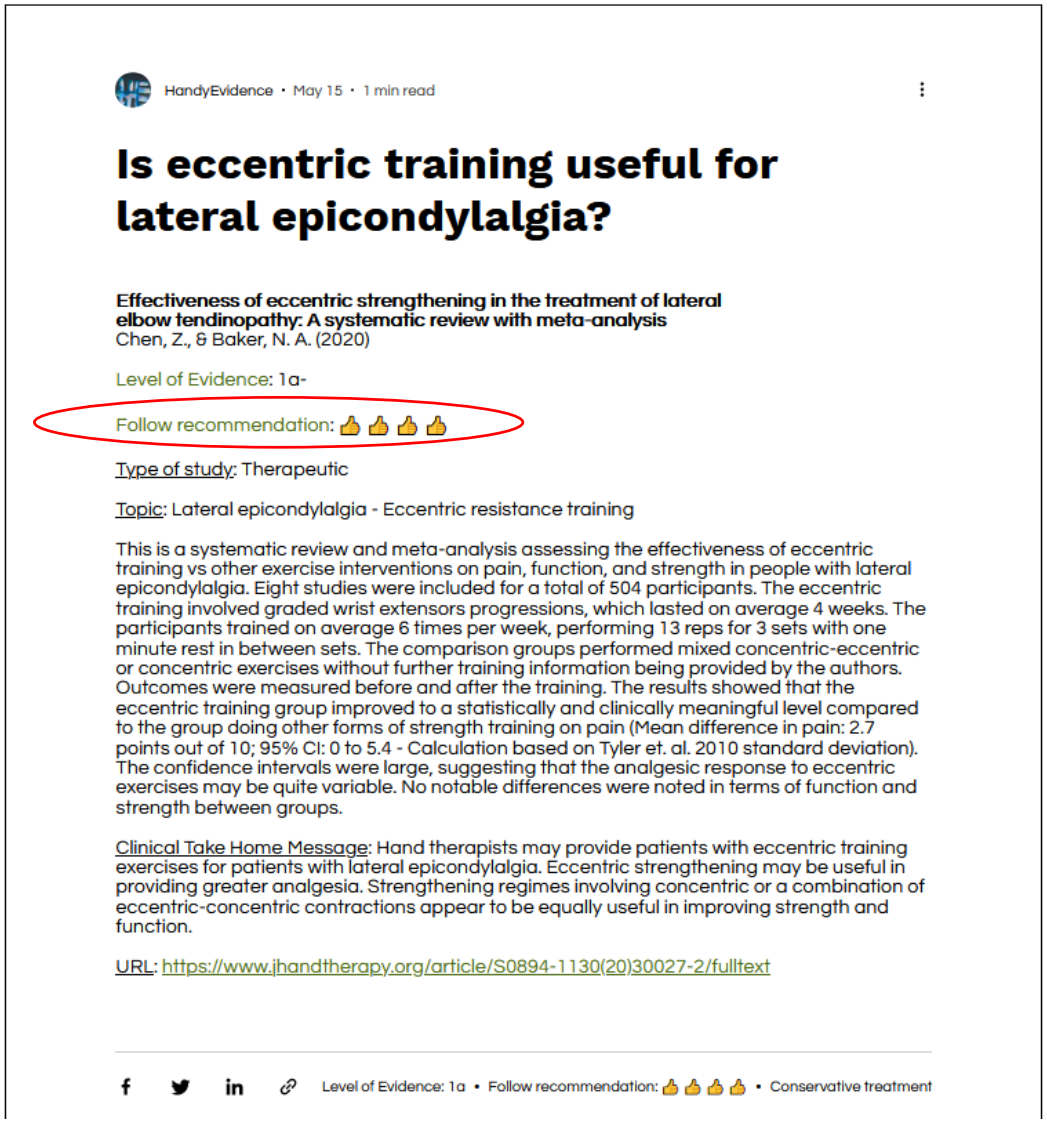
Workshop for health professionals developing their teaching of EBM.

EBMLive 2021

12 - 14 July 2021

View all

Synopsis' structure explained



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Level of Evidence: 1a • Follow recommendation: 👍 👍 👍 👍 • Conservative treatment

Follow recommendation

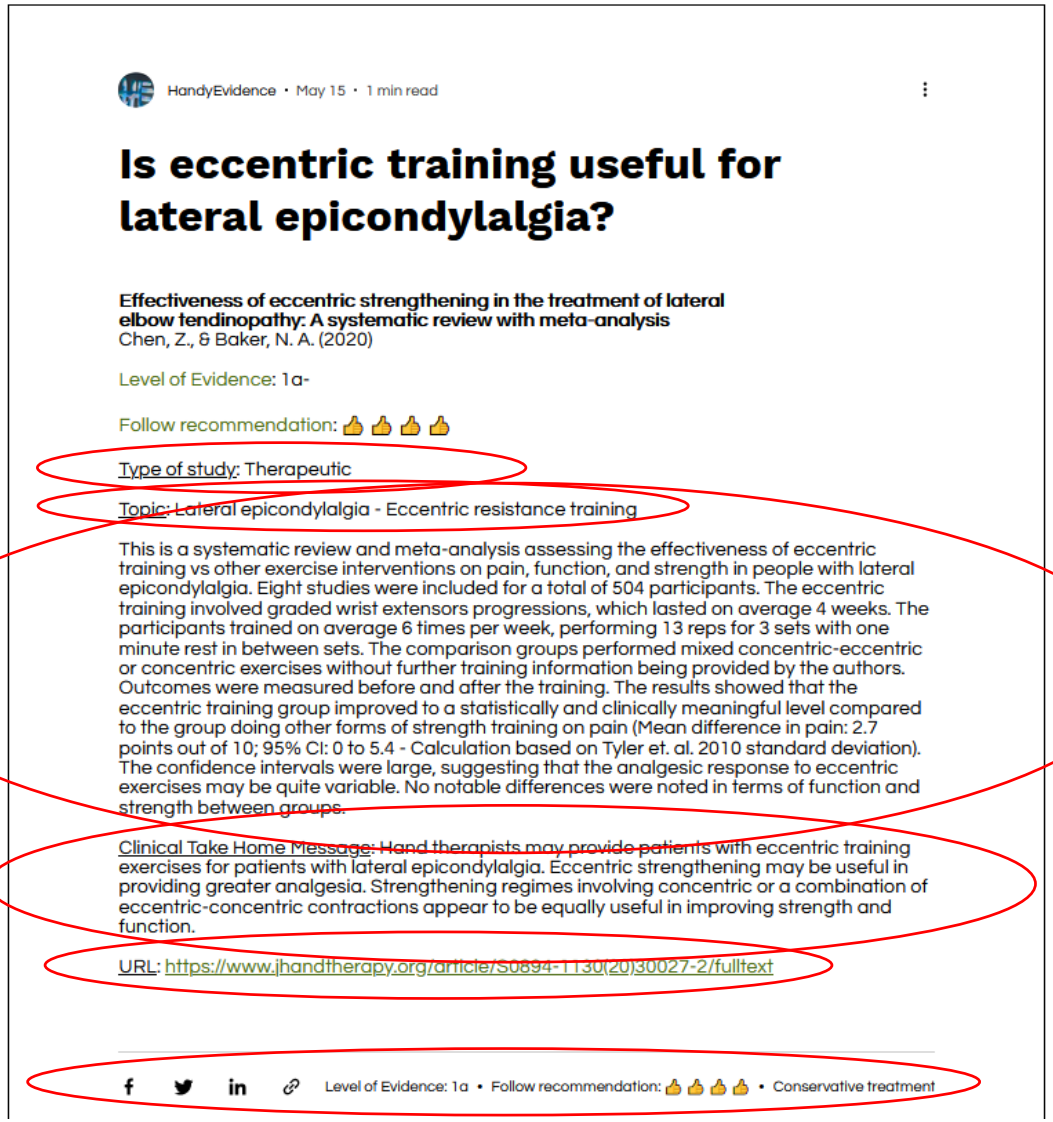
Table 5

Grade Practice Recommendations*

Grade	Descriptor	Qualifying Evidence	Implications for Practice
A	Strong recommendation	👍👍👍👍	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present
B	Recommendation	👍👍👍	Generally, clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences
C	Option	👍👍	Clinicians should be flexible in their decision-making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role
D	Option	👍	Clinicians should consider all options in their decision making and be alert to new published evidence that clarifies the balance of benefit versus harm; patient preference should have a substantial influencing role

* From the American Society of Plastic Surgeons. Evidence-based clinical practice guidelines. Available at: http://www.plasticsurgery.org/Medical_Professionals/Health_Policy_and_Advocacy/Health_Policy_Resources/Evidence-based_GuidelinesPractice_Parameters/Description_and_Development_of_Evidence-based_Practice_Guidelines/ASPS_Grade_Recommendation_Scale.html. Accessed March 3, 2011

Synopsis' structure explained



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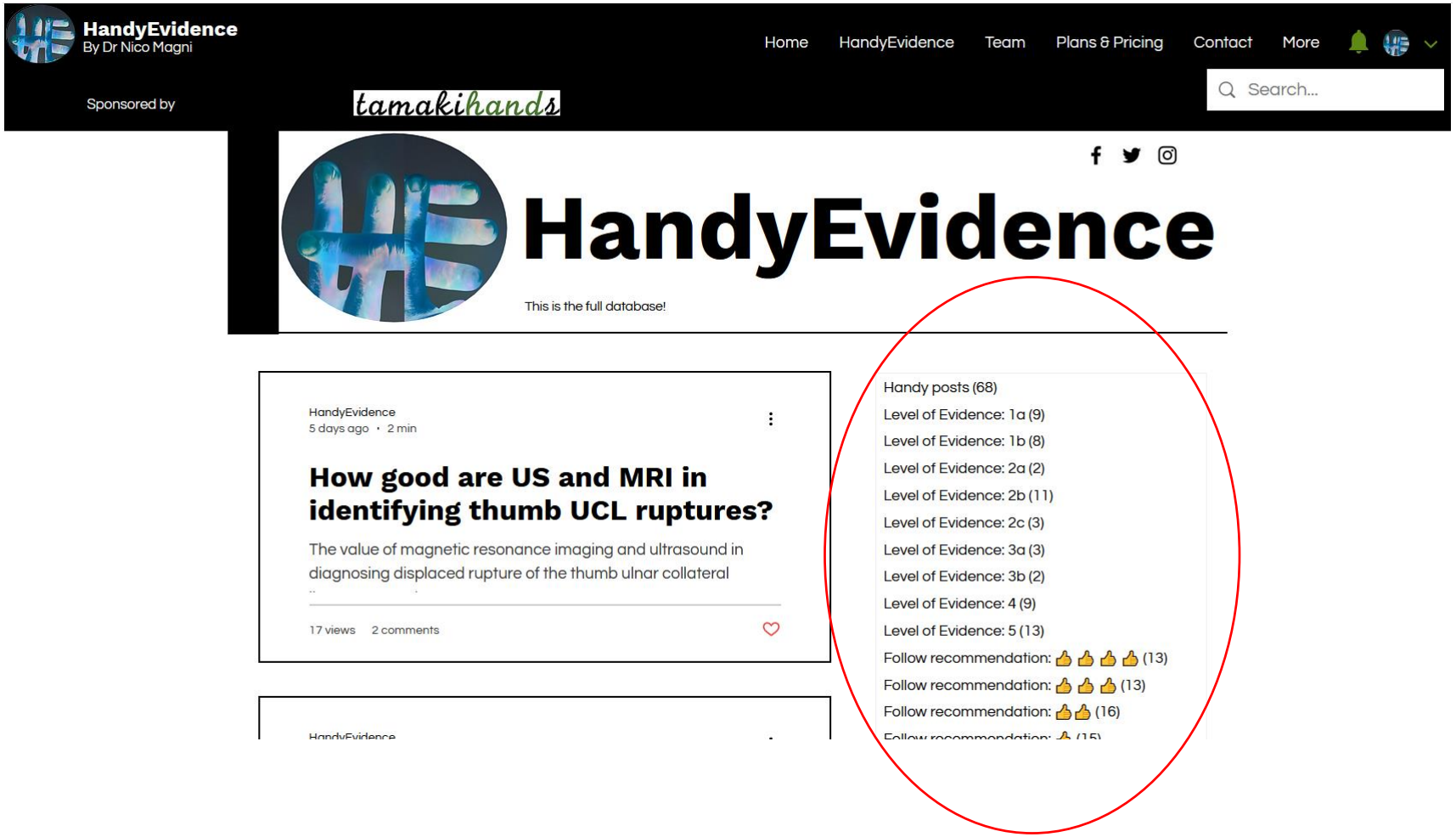
Categories



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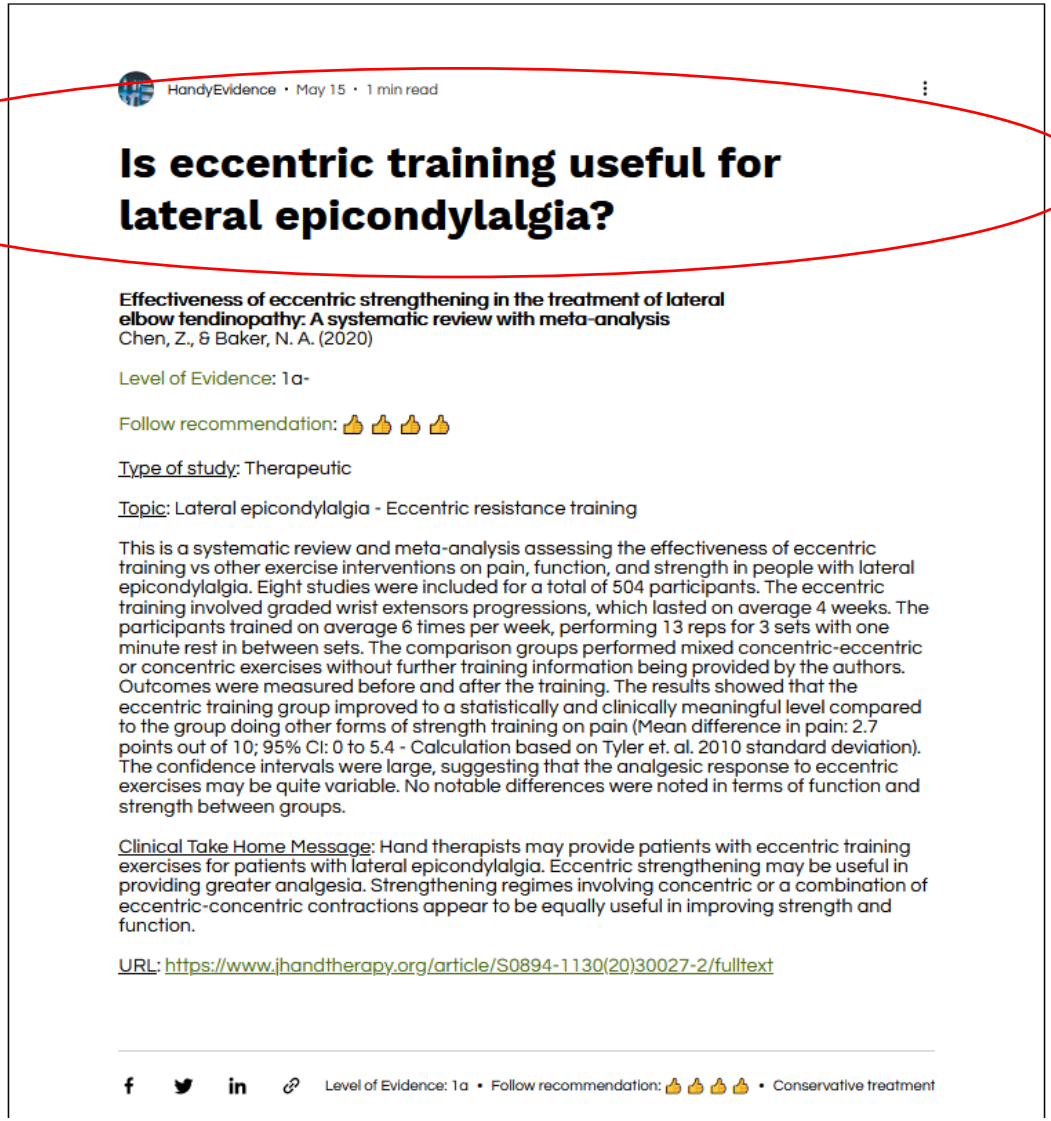
Example on Lateral Epicondylalgia



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Example on Lateral Epicondylalgia

Journal of Hand Therapy xxx (2020) 1–10

Contents lists available at ScienceDirect

Journal of Hand Therapy

journal homepage: www.jhandtherapy.org

Effectiveness of eccentric strengthening in the treatment of lateral elbow tendinopathy: A systematic review with meta-analysis

Zhiqing Chen MS(OT), CHT[a,b,*], Nancy A. Baker ScD, MPH, OTR/L, FAOTA[b]

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Available online xxx

Keywords:
Lateral elbow tendinopathy
Eccentric strengthening
Pain
Strength
Function

ABSTRACT

Study Design: Meta-analysis.
Introduction: Lateral elbow tendinopathy is a common condition with an annual incidence of up to 3% of the population. Eccentric strengthening has shown promise as a method to treat lateral elbow tendinopathy, but is unclear if it is superior to other forms of treatment.
Purpose of the Study: The purpose of this study was to investigate the effectiveness of eccentric strengthening compared with other forms of strengthening and pain-relieving modalities on pain, strength, and function in people with lateral elbow tendinopathy.
Methods: Five electronic databases were searched. Reference lists of selected articles were hand-searched. Outcomes were defined a priori. Meta-analyses were performed using a random effects model with standardized mean differences, test of heterogeneity, and sensitivity analyses.
Results: Eight articles were included in this review. When comparing eccentric strengthening to other forms of strengthening and pain-relieving modalities, there were significant large effect size of 1.12 (CI: 0.31-1.93) and 1.22 (CI: 0.25-2.18) in reducing pain and improving function in the short-term, respectively. In long-term, results were inconclusive on all outcomes.
Discussion: A treatment program using eccentric strengthening of adequate intensity and duration seemed to be most effective for treating lateral elbow tendinopathy.
Conclusions: The state of science of best care for lateral elbow tendinopathy is still in its infancy. Large, high-quality randomized controlled trials with clearly defined strengthening regime are needed to determine optimal dosage to maximize treatment effects. Recommendations were provided based on careful synthesis of findings from this review and current evidence in literature.

Example on Lateral Epicondylalgia

A B S T R A C T

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Example on Lateral Epicondylalgia

PAIN

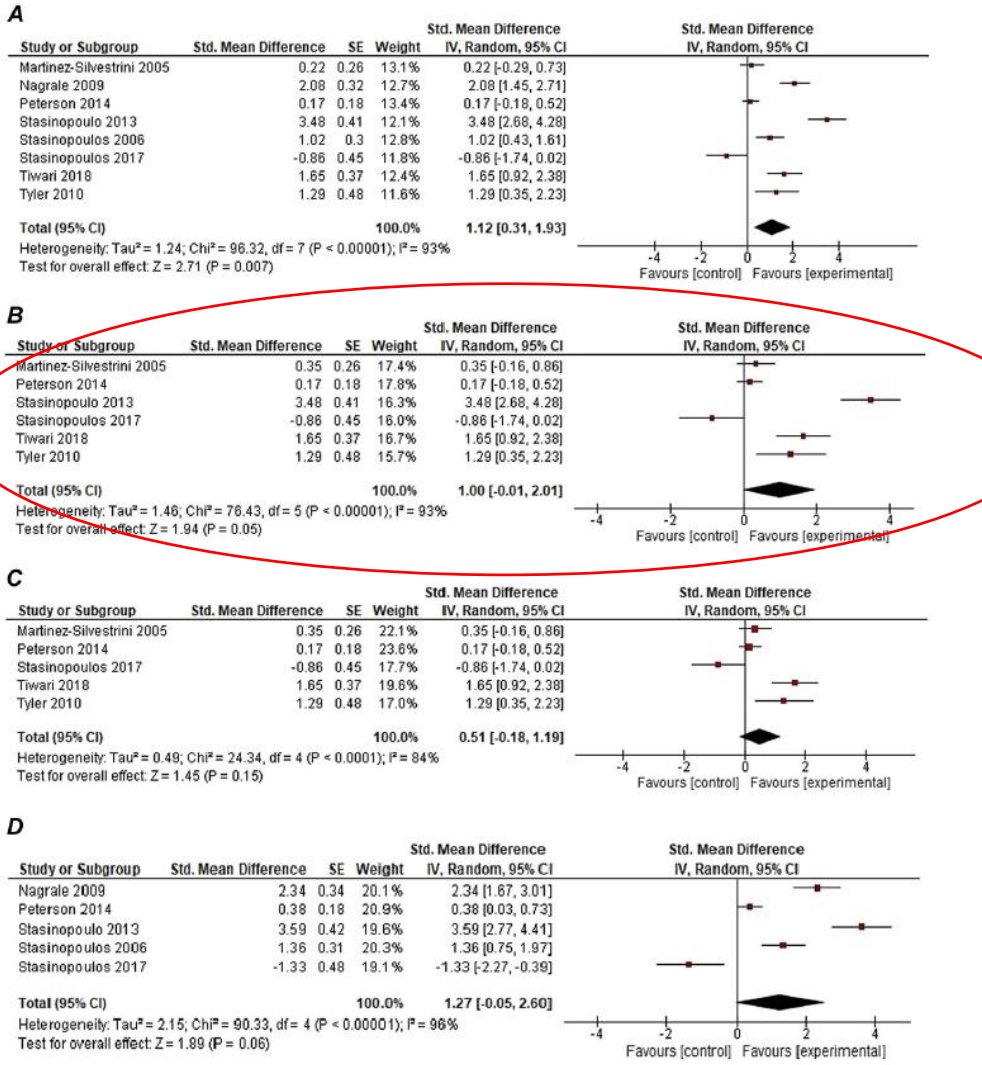

Fig. 2. Pooled SMD for pain between control and experimental groups. (**A**): Immediate results for all interventions; (**B**): Immediate results comparing eccentric strengthening to other forms of strengthening; (**C**): Sensitivity analysis of immediate results comparing eccentric strengthening to other forms of strengthening; (**D**): Intermediate results for all interventions. SMD = standardized mean difference.

Example on Lateral Epicondylalgia

FUNCTION

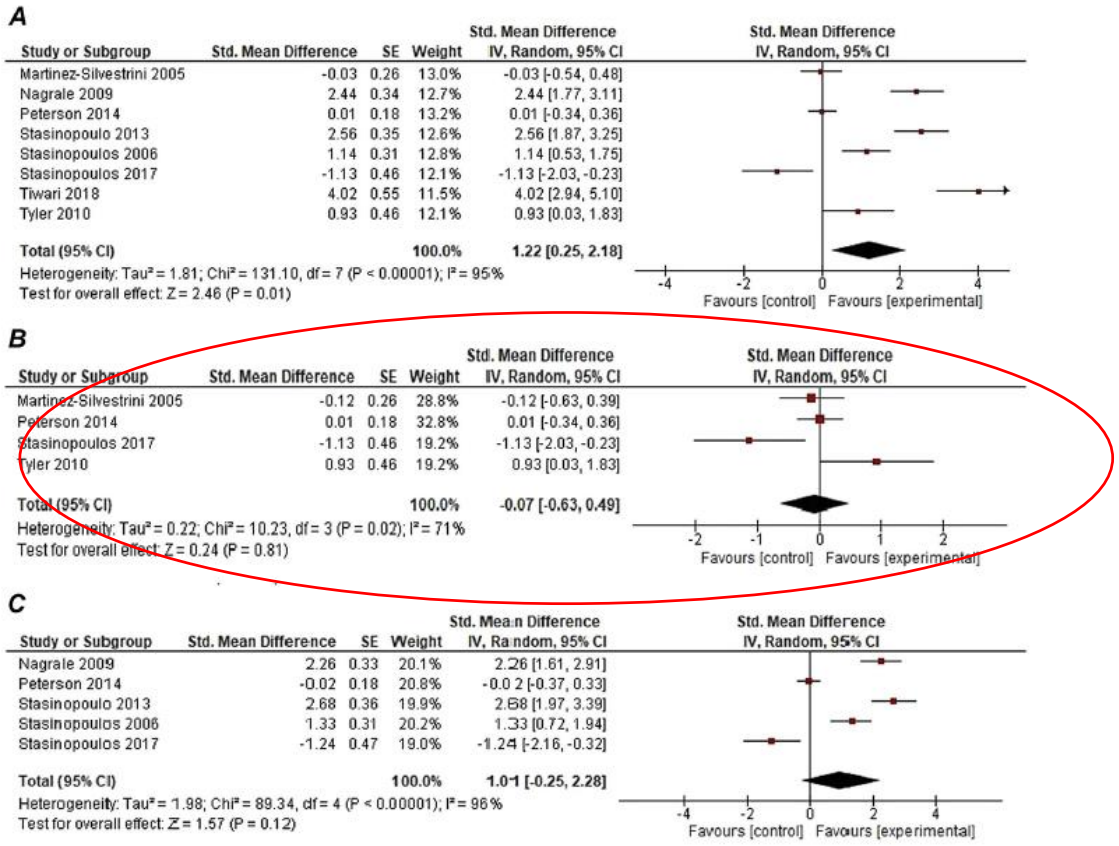

Fig. 4. Pooled SMD for function between control and experimental groups. (**A**): Immediate results for all interventions; (**B**): Sensitivity analysis of immediate results comparing eccentric strengthening to other forms of strengthening; (**C**): Intermediate results for all interventions. SMD = standardized mean difference.

Example on Lateral Epicondylalgia

Clinical Take Home Message: Hand therapists may provide patients with eccentric training exercises for patients with lateral epicondylalgia. Eccentric strengthening may be useful in providing greater analgesia. Strengthening regimes involving concentric or a combination of eccentric-concentric contractions appear to be equally useful in improving strength and function.

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Level of Evidence: 1a • Follow recommendation: 👍 👍 👍 👍 • Conservative treatment

Example on Distal Radius Fracture

HandyEvidence · a few seconds ago · 2 min read

Should you use graded motor imagery to improve function post distal radius fracture?

Effectiveness of the graded motor imagery to improve hand function in patients with distal radius fracture: A randomized controlled trial.

Dilek, B., Ayhan, C., Yagci, G., & Yakut, Y. (2018)

Level of Evidence: 2b

Follow recommendation: 👍👍👍

Type of study: Therapeutic

Topic: Radius fracture - graded motor imagery

This is a randomised single-blind controlled trial assessing the effectiveness of Graded Motor Imagery (GMI) and traditional rehabilitation in participants with distal radius fracture. Participants (N = 36) were included if they had undergone a closed fracture reduction or an open reduction internal fixation surgery. Participants were excluded if they had bilateral fracture or had any neurological/rheumatological condition. Effectiveness of each intervention was assessed through pain (VAS), range of movement (degrees of wrist movement), and function (DASH). The outcomes were measured at baseline and after 8 weeks of treatment. All participants attended two session (1 hour) with a physiotherapist each week for 8 weeks. Participants in every group received a home exercise program. Treatment allocation was randomised. The assessor was blind to treatment allocation. Participants were provided with either GMI (n = 17) or traditional rehabilitation (n = 19). Participants in the GMI completled 3 weeks of left/right hand discrimination (10 minutes each waking hour). This was followed by 3 weeks of explicit motor imagery in which participants had to look at a hand picture and imagining moving their own hand (10 minutes each waking hour). The last phase of the GMI (2 weeks) involved mirror therapy (10 minutes each waking hour). The traditional rehabilitation group included a gradual AROM home exercise program which was then progressed into resistance exercises towards the end of the intervention program. There were no differences between groups in the number of participant that underwent a conservative or surgical intervention for their fracture. All the participants reported high adherence to the physiotherapy intervention (100%) and home exercise program (90-100%), although the latter was self-reported. The results showed that GMI improved pain (GMI - Mean difference: 2.2, SD: 2.1; Control - Mean difference: 1,1, SD: 1.2) and function (GMI - Mean difference: 38, SD: 14.3; Control - Mean difference: 27, SD: 17) to a statistically and clinically significant level compared to the traditional rehabilitation group. Contrasting results were reported in text and in the tables for range of movement. It is therefore not possible to comment on these findings with certainty.

Example on Distal Radius Fracture

Journal of Hand Therapy 31 (2018) 2–9

Contents lists available at ScienceDirect

Journal of Hand Therapy

journal homepage: www.jhandtherapy.org

JHT Read for Credit Article #518.
Scientific/Clinical Article

Effectiveness of the graded motor imagery to improve hand function in patients with distal radius fracture: A randomized controlled trial

Burcu Dilek PhD, PT[a,*], Cigdem Ayhan PhD, PT[b], Gozde Yagci PhD, PT[b], Yavuz Yakut PhD, PT[c]

[a] Department of Physical Therapy and Rehabilitation, Istanbul Medipol University, Istanbul, Turkey
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[c] Department of Physical Therapy and Rehabilitation, Hasan Kalyoncu University, Gaziantep, Turkey

ARTICLE INFO

Article history:
Received 11 April 2017
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Keywords:
Radius fractures
Rehabilitation
Pain
Graded motor imagery

ABSTRACT

Study Design: Single-blinded randomized controlled trial.
Introduction: Pain management is essential in the early stages of the rehabilitation of distal radius fractures (DRFx). Pain intensity at the acute stage is considered important for determining the individual recovery process, given that higher pain intensity and persistent pain duration negatively affect the function and cortical activity of pain response. Graded motor imagery (GMI) and its components are recent pain management strategies, established on a neuroscience basis.
Purpose of the Study: To investigate the effectiveness of GMI in hand function in patients with DRFx.
Methods: Thirty-six participants were randomly allocated to either GMI ($n = 17$; 52.59 [9.8] years) or control ($n = 19$; 47.16 [10.5] years) groups. The GMI group received imagery treatment in addition to traditional rehabilitation, and the control group received traditional rehabilitation for 8 weeks. The assessments included pain at rest and during activity using the visual analog scale, wrist and forearm active range of motion (ROM) with universal goniometer, grip strength with the hydraulic dynamometer (Jamar; Bolingbrook, IL), and upper extremity functional status using the Disability of the Arm, Shoulder and Hand Questionnaire, and the Michigan Hand Questionnaire. Assessments were performed twice at baseline and at the end of the eighth week.
Results: The GMI group showed greater improvement in pain intensity (during rest, 2.24; activity, 6.18 points), wrist ROM (flexion, −40.59; extension, −45.59; radial deviation, −25.59; and ulnar deviation, −26.77 points) and forearm ROM (supination, −43.82 points), and functional status (Disability of the Arm, Shoulder and Hand Questionnaire, 38.00; Michigan Hand Questionnaire, −32.53 points) when compared with the control group (for all, $P < .05$).
Conclusion: The cortical model of pathological pain suggests new strategies established on a neuroscience basis. These strategies aim to normalize the cortical proprioceptive representation and reduce pain. One of these recent strategies, GMI appears to provide beneficial effects to control pain, improve grip strength, and increase upper extremity functions in patients with DRFx.

Example on Distal Radius Fracture

A B S T R A C T

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Example on Distal Radius Fracture

Table 3
Main outcome measures by group at the pre- and post-treatment assessments

Outcomes	Pretreatment			Post-treatment		Actual mean difference		
	GMI	Control	*P*	GMI	Control	GMI	Control	*P*
	Mean (SD)			Mean (SD)		Mean (SD)		
Pain (VAS)								
Rest	2.29 (2.08)	2.26 (2.56)	.817	**0.06 (0.24)**[a]	**1.16 (1.57)**[a]	**2.24 (2.08)**[b]	1.11 (1.24)	**.005**[b]
Activity	6.94 (1.34)	5.84 (2.17)	.065	**0.77 (1.09)**[a]	**3.74 (2.13)**[a]	**6.18 (1.43)**[b]	2.11 (0.81)	**.001**[b]
ROM (°)								
Flexion	27.94 (13.24)	32.90 (19.32)	.502	**68.53 (12.09)**[a]	**53.42 (13.44)**[a]	**−40.59 (13.22)**[b]	−20.53 (10.92)	**.001**[b]
Extension	12.65 (8.50)	18.16 (16.77)	.607	**18.16 (16.77)**[a]	**38.95 (17.53)**[a]	**−45.59 (16.19)**[b]	−20.79 (9.32)	**.003**[b]
Radial deviation	12.65 (7.31)	12.63 (8.72)	.779	**12.63 (8.72)**[a]	**26.32 (9.55)**[a]	**−25.59 (7.88)**[b]	−13.68 (6.20)	**.001**[b]
Ulnar deviation	11.76 (5.85)	14.21 (9.90)	.569	**14.21 (9.90)**[a]	**30.53 (8.80)**[a]	**−26.77 (8.83)**[b]	−16.32 (7.97)	**.004**[b]
Supination	19.12 (15.13)	23.16 (22.44)	.822	**23.16 (22.44)**[a]	**42.90 (23.11)**[a]	**−43.82 (14.63)**[b]	−19.74 (11.12)	**.008**[b]
Pronation	50.29 (30.34)	50.53 (28.03)	.974	50.53 (28.03)	72.90 (18.36)	−32.06 (24.69)	−22.37 (16.95)	.066
Grip strength (kg)	—	—	—	2.68 (1.86)	2.16 (1.17)	—	—	.341
DASH score	70.65 (16.76)	70.47 (16.15)	.835	**32.65 (12.96)**[a]	**43.90 (18.55)**[a]	**38.00 (14.33)**[b]	26.58 (16.82)	**.048**[b]
MHQ score	29.71 (7.25)	34.79 (8.70)	.073	**62.24 (9.28)**[a]	**54.47 (10.81)**[a]	**−32.53 (11.09)**[b]	−19.68 (10.40)	**.038**[b]

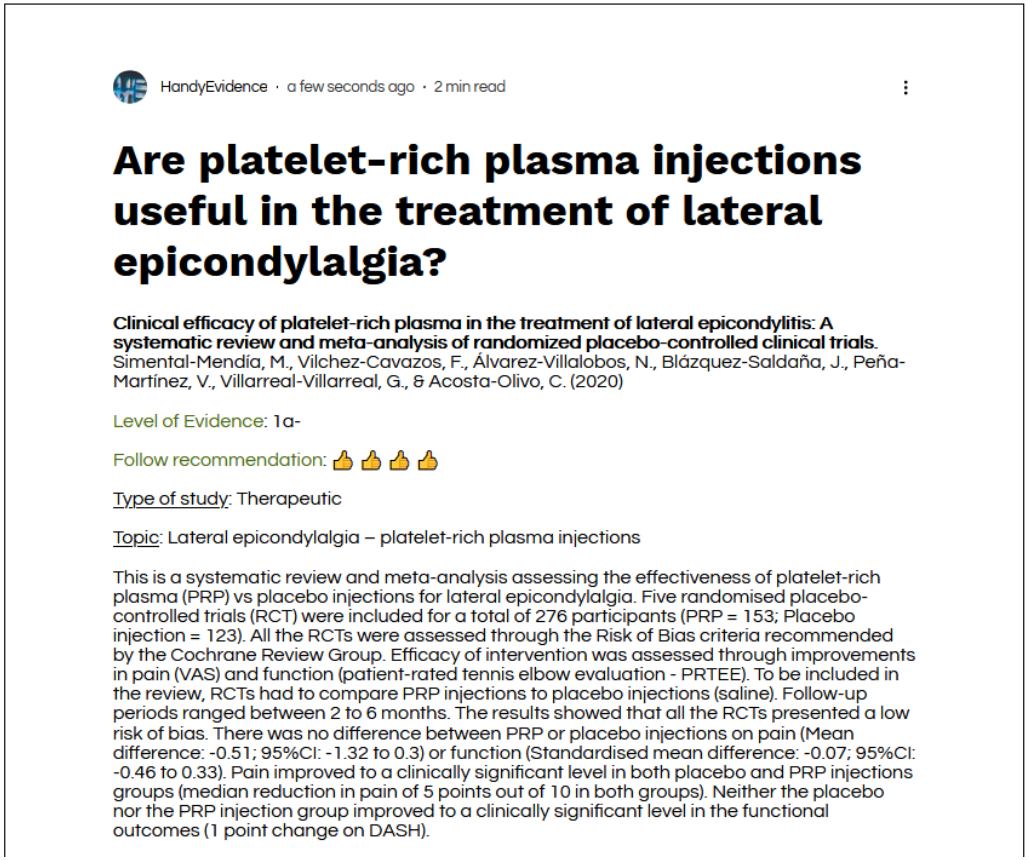
GMI = graded motor imagery; SD = standard deviation; VAS = visual analog scale; ROM = range of motion; DASH = Disability of the Arm, Shoulder and Hand Questionnaire; MHQ = Michigan Hand Questionnaire.
Change values are expressed for mean (SD).
Bold values indicate statistical significance $P < .05$.
[a] $P < .05$ within-group differences.
[b] $P < .05$ between-group differences.

Example on Distal Radius Fracture

Clinical Take Home Message: Hand therapists may choose GMI training if the main goal of rehabilitation is to reduce pain and improve function. This may be particularly appropriate in patients presenting with high levels of pain within the first week of injury (these patients are also more likely to develop CRPS). It is unclear whether GMI can lead to improvements in range of movement.

Open Access URL: https://www.jhandtherapy.org/article/S0894-1130(17)30101-1/fulltext

Example on platelet-rich plasma for lateral epicondylalgia



HandyEvidence · a few seconds ago · 2 min read

Are platelet-rich plasma injections useful in the treatment of lateral epicondylalgia?

Clinical efficacy of platelet-rich plasma in the treatment of lateral epicondylitis: A systematic review and meta-analysis of randomized placebo-controlled clinical trials.
Simental-Mendía, M., Vilchez-Cavazos, F., Álvarez-Villalobos, N., Blázquez-Saldaña, J., Peña-Martínez, V., Villarreal-Villarreal, G., & Acosta-Olivo, C. (2020)

Level of Evidence: 1a-

Follow recommendation: 👍 👍 👍 👍

Type of study: Therapeutic

Topic: Lateral epicondylalgia – platelet-rich plasma injections

This is a systematic review and meta-analysis assessing the effectiveness of platelet-rich plasma (PRP) vs placebo injections for lateral epicondylalgia. Five randomised placebo-controlled trials (RCT) were included for a total of 276 participants (PRP = 153; Placebo injection = 123). All the RCTs were assessed through the Risk of Bias criteria recommended by the Cochrane Review Group. Efficacy of intervention was assessed through improvements in pain (VAS) and function (patient-rated tennis elbow evaluation - PRTEE). To be included in the review, RCTs had to compare PRP injections to placebo injections (saline). Follow-up periods ranged between 2 to 6 months. The results showed that all the RCTs presented a low risk of bias. There was no difference between PRP or placebo injections on pain (Mean difference: -0.51; 95%CI: -1.32 to 0.3) or function (Standardised mean difference: -0.07; 95%CI: -0.46 to 0.33). Pain improved to a clinically significant level in both placebo and PRP injections groups (median reduction in pain of 5 points out of 10 in both groups). Neither the placebo nor the PRP injection group improved to a clinically significant level in the functional outcomes (1 point change on DASH).

Sponsored by tamakihands

Example on platelet-rich plasma for lateral epicondylalgia

Clinical Rheumatology
https://doi.org/10.1007/s10067-020-05000-y

REVIEW ARTICLE

Check for updates

Clinical efficacy of platelet-rich plasma in the treatment of lateral epicondylitis: a systematic review and meta-analysis of randomized placebo-controlled clinical trials

Mario Simental-Mendía[1] · Félix Vilchez-Cavazos[1] · Neri Álvarez-Villalobos[2,3,4] · Jaime Blázquez-Saldaña[2] · Víctor Peña-Martínez[1] · Gregorio Villarreal-Villarreal[1] · Carlos Acosta-Olivo[1]

Received: 26 November 2019 / Revised: 10 February 2020 / Accepted: 14 February 2020

Abstract

To compare the effects of platelet-rich plasma (PRP) injection versus placebo (saline injection) on pain and joint function in lateral epicondylitis in randomized placebo-controlled trials. Randomized controlled trials that evaluated pain (visual analog scale [VAS] and patient-rated tennis elbow evaluation [PRTEE]) and/or functional improvement (PRTEE; disability of the arm, shoulder, and hand [DASH]; and Roles–Maudsley score [RMS]) in patients diagnosed with lateral epicondylitis and compared PRP with placebo injections were considered. The MEDLINE, EMBASE, Web of Science, and Scopus databases were searched from inception to October 2019. The assessment of bias was performed using the Cochrane Risk of Bias Tool version 1. The meta-analysis was conducted with a random effects model and generic inverse variance method. Five trials involving a total of 276 individuals were included. They used a parallel study design and saline solution as placebo. The mean age of participants was 48.0 ± 9.3 years. Follow-up varied from 2 months to 1 year. No significant changes were noted for pain (standardized mean difference [SMD], − 0.51 [95% confidence interval (CI), − 1.32 to − 0.30]) nor functional scores (SMD, − 0.07 [95% CI, − 0.46 to 0.33]) between PRP and placebo injections. The most frequent adverse reaction reported in two of the five studies was transient post-injection pain for a few days (from 16 to 20% in the PRP group and from 8 to 16% in the placebo group). PRP injection was not superior to placebo for relieving pain and joint functionality in chronic lateral epicondylitis. However, patients reported improvement after both interventions in such clinical parameters. Further randomized trials are required to determine whether PRP injection is clinically more effective than placebo (saline injection).

Example on platelet-rich plasma for lateral epicondylalgia

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Example on platelet-rich plasma for lateral epicondylalgia

Clin Rheumatol

Study or Subgroup	PRP Mean	PRP SD	PRP Total	Placebo Mean	Placebo SD	Placebo Total	Weight	Std. Mean Difference IV, Random, 95% CI
Krogh 2013	-6	9.8	20	-3.3	9.8	20	24.3%	-0.27 [-0.89, 0.35]
Montalvan 2016	-5.1	1.3	25	-5.2	1.8	25	25.0%	0.06 [-0.49, 0.62]
Seetharamaiah 2017	-5.7	2.5	30	-1.1	2.5	30	24.4%	-1.82 [-2.42, -1.21]
Yerlikaya 2018	-3.65	2.85	60	-3.3	2.61	30	26.2%	-0.13 [-0.56, 0.31]
Total (95% CI)			**135**			**105**	**100.0%**	**-0.53 [-1.32, 0.27]**

Heterogeneity: Tau² = 0.58; Chi² = 25.13, df = 3 (P < 0.0001); I² = 88%
Test for overall effect: Z = 1.30 (P = 0.19)

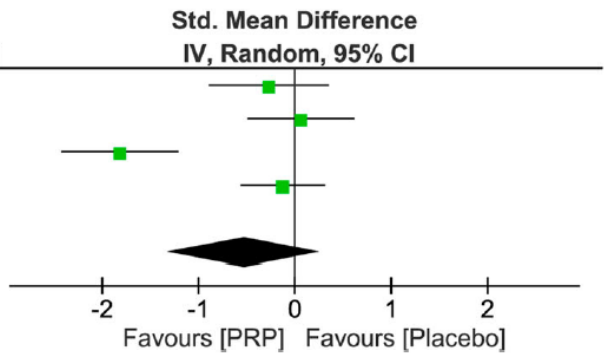

Fig. 3 Forest plot displaying the standardized mean difference and 95% confidence intervals for the impact of treatment with PRP injections on pain in patients with lateral epicondylitis. Values from Seetharamaiah et al. (2017) were obtained from a graph and their SD were imputed using the range rule of thumb method

Example on classical conditioning

HandyEvidence · Jun 5 · 2 min read

Can we learn to feel pain?

Pain can be conditioned to voluntary movements through associative learning: An experimental study in healthy participants
Alaiti, R., Zuccolo, P., Leite Hunziker, M., Caneiro, J., Vlaeyen, J., & Fernandes da Costa, M. (2020)

Level of Evidence: 5

Follow recommendation: 👍

Type of study: Aetiologic

Topic: Acute pain - Movement conditioning

This is an experimental study assessing the effect of shoulder movement associated with a painful stimuli on the likelihood of perceiving pain in the presence of a non painful stimuli after the conditioning. A total of 34 healthy participants were included in the study. Assessment took place immediately before and after the pain conditioning. During the assessment, a non painful stimuli was delivered through an electrocutenous current of low intensity at the acromion of the tested shoulder. During the assessment, participants were asked to report whether two shoulder movements (shoulder flexion/shoulder flexion with horizontal adduction) paired with the non painful stimuli were painful or not. During the conditioning, a painful stimuli (electrocutaneous current of high intensity) was delivered consistently to one of the shoulder movements described above (randomised among participants) for 50% of the trials. The conditioning phase lasted on average 2 minutes. The results showed that the painfully conditioned movement was reported as painful more often (85%; SD: 25%) compared to the non conditioned movement (73%; SD: 32%) when paired with the non painful stimuli after the conditioning.

Clinical Take Home Message: Hand therapists may be aware that patients can develop a learned association between a specific movement and the perception of pain. It is possible that this leads to the experience of pain in the absence of tissue damage. Therapeutic interventions aiming to dissociate movement from pain may be useful in reducing the pain experience.

Example on classical conditioning

PAIN
The Journal of the International Association for the Study of Pain

RESEARCH PAPER: PDF ONLY

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Pain can be conditioned to voluntary movements through associative learning

an experimental study in healthy participants

Alaiti, Rafael Krasic[1,2]; Zuccolo, Pedro Fonseca[3]; Leite Hunziker, Maria Helena[3]; Caneiro, JP.[4,5]; Vlaeyen, Johan W.S.[6,7]; Fernandes da Costa, Marcelo[1,3] Author Information

Abstract

Experimental data suggest that associative learning can influence defensive avoidance behavior and pain perception in humans. However, whether voluntary movements can become conditioned stimuli and influence pain responses has yet to be evaluated. Forty healthy volunteers participated in this study. Electrocutaneous stimuli applied to the shoulder at pain threshold level (US^{test}) and at pain tolerance level (US) were determined prior to a movement-conditioning paradigm. First, reaching movements to visual cues shown on one side of a computer screen were associated with the US (CS+ movements) on 80% of trials, whereas reaching movements to visual stimuli shown on the other side were never associated with the nociceptive-US (CS- movements). Next, participants underwent a test phase in which movements to visual cues on both sides were paired with the US^{test} on 50% of trials. During the test phase, participants were asked to evaluate if the movement was painful (yes/no) and to rate pain intensity after each trial. Movement onset and duration as well as skin conductance responses (SCR) were collected. The US^{test} stimuli were more likely to be perceived as painful and were also rated as more painful during CS+ movements. Movement onset latency and SCRs were significantly higher in anticipation of the CS+ movement as compared to the CS- movement. These findings suggest that pain can be conditioned to voluntary movements.

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Example on classical conditioning

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Example on protein

HandyEvidence · May 22 · 2 min read

Multi-ingredient protein vs protein only supplements: What's best for muscle gains?

Do multi-ingredient protein supplements augment resistance training-induced gains in skeletal muscle mass and strength? A systematic review and meta-analysis of 35 trials.
O'Bryan, K., Doering, T., Morton, R., Coffey, V., Phillips, S., & Cox, G. (2020)

Level of Evidence: 1a

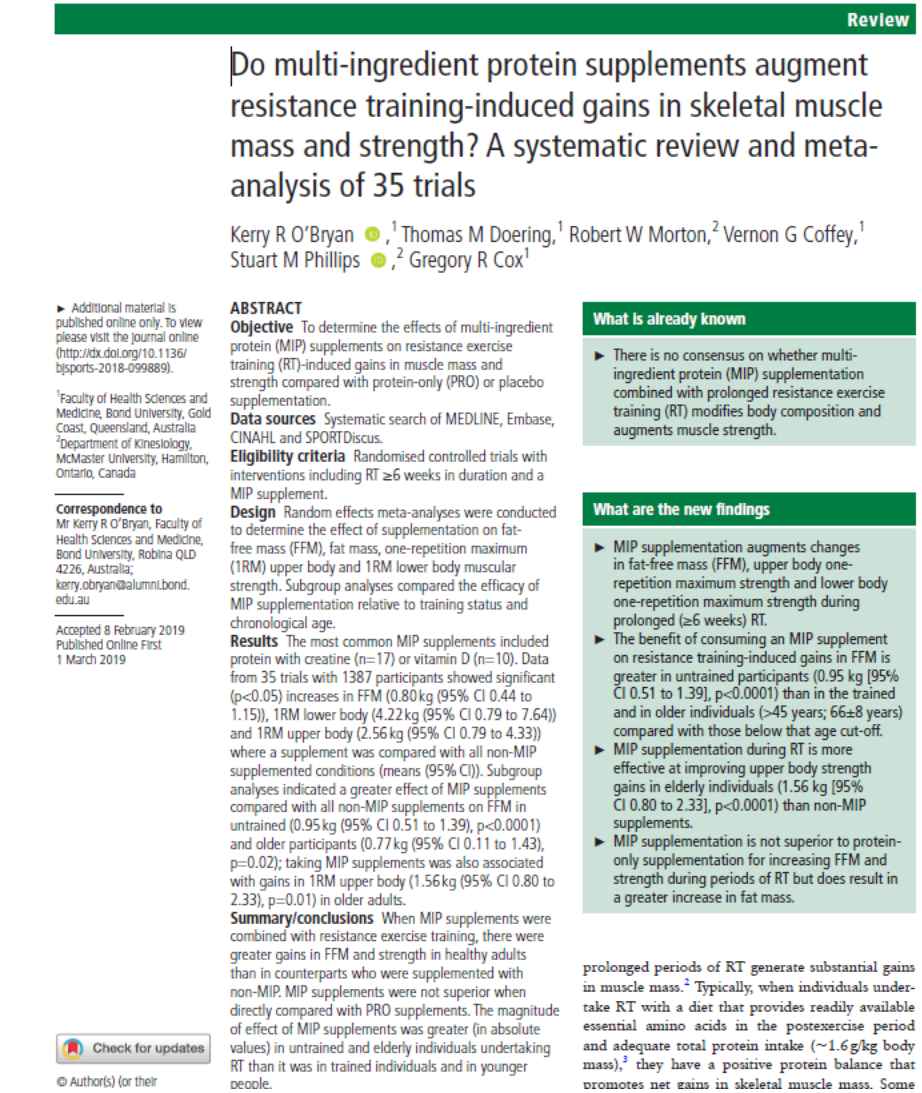
Follow recommendation: 👍 👍 👍 👍

Type of study: Therapeutic

Topic: Strength gains - Multi-ingredient protein (MIP) vs protein only supplements

This is a systematic review and meta-analysis assessing the effectiveness of multi-ingredient protein (MIP) vs protein only supplements on total body mass (kg), fat-free mass (kg), fat mass (kg), and maximum lifting ability (kg) after a strength straining period. Twelve studies were included for a total of 265 participants. The MIP included protein based supplements with the addition of creatine, creatine and carbohidrates, extra leucine or glutamine, β-Hydroxy β-methylbutyric acid (HMB), or polyunsaturated fatty acids (PUFAs). The protein only supplements included whey protein with or without caseine. Most studies provided participants with a dosage between 0.3 to 1.5g/kg/day of supplements in both groups. Assumption of the supplements was usually post-exercise. Strength training programs lasted on average 16(±14) weeks, with frequency of 3(±1)/week, 3(±1) sets, 9(±2) reps, with progressive overload during the training period. The results showed that there was no difference on total body mass (Mean difference-MD (kg): 0.65; 95%CI: -0.45 to 1.78), fat-free mass (MD (kg): 0.39; 95%CI: -0.28 to 1.05), and maximum lifting ability (MD (kg): 1.33; 95%CI: -3.81 to 6.48) between groups, although fat mass (MD (kg): 0.76; 95%CI: 0.13 to 1.40) was significantly greater in the MIP group.

Example on protein



Review

Do multi-ingredient protein supplements augment resistance training-induced gains in skeletal muscle mass and strength? A systematic review and meta-analysis of 35 trials

Kerry R O'Bryan ,[1] Thomas M Doering,[1] Robert W Morton,[2] Vernon G Coffey,[1] Stuart M Phillips ,[2] Gregory R Cox[1]

► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/bjsports-2018-099889).

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Accepted 8 February 2019
Published Online First 1 March 2019

Check for updates

ABSTRACT

Objective To determine the effects of multi-ingredient protein (MIP) supplements on resistance exercise training (RT)-induced gains in muscle mass and strength compared with protein-only (PRO) or placebo supplementation.

Data sources Systematic search of MEDLINE, Embase, CINAHL and SPORTDiscus.

Eligibility criteria Randomised controlled trials with interventions including RT ≥6 weeks in duration and a MIP supplement.

Design Random effects meta-analyses were conducted to determine the effect of supplementation on fat-free mass (FFM), fat mass, one-repetition maximum (1RM) upper body and 1RM lower body muscular strength. Subgroup analyses compared the efficacy of MIP supplementation relative to training status and chronological age.

Results The most common MIP supplements included protein with creatine (n=17) or vitamin D (n=10). Data from 35 trials with 1387 participants showed significant ($p<0.05$) increases in FFM (0.80 kg (95% CI 0.44 to 1.15)), 1RM lower body (4.22 kg (95% CI 0.79 to 7.64)) and 1RM upper body (2.56 kg (95% CI 0.79 to 4.33)) where a supplement was compared with all non-MIP supplemented conditions (means (95% CI)). Subgroup analyses indicated a greater effect of MIP supplements compared with all non-MIP supplements on FFM in untrained (0.95 kg (95% CI 0.51 to 1.39), $p<0.0001$) and older participants (0.77 kg (95% CI 0.11 to 1.43), $p=0.02$); taking MIP supplements was also associated with gains in 1RM upper body (1.56 kg (95% CI 0.80 to 2.33), $p=0.01$) in older adults.

Summary/conclusions When MIP supplements were combined with resistance exercise training, there were greater gains in FFM and strength in healthy adults than in counterparts who were supplemented with non-MIP. MIP supplements were not superior when directly compared with PRO supplements. The magnitude of effect of MIP supplements was greater (in absolute values) in untrained and elderly individuals undertaking RT than it was in trained individuals and in younger people.

What is already known

- There is no consensus on whether multi-ingredient protein (MIP) supplementation combined with prolonged resistance exercise training (RT) modifies body composition and augments muscle strength.

What are the new findings

- MIP supplementation augments changes in fat-free mass (FFM), upper body one-repetition maximum strength and lower body one-repetition maximum strength during prolonged (≥6 weeks) RT.
- The benefit of consuming an MIP supplement on resistance training-induced gains in FFM is greater in untrained participants (0.95 kg [95% CI 0.51 to 1.39], $p<0.0001$) than in the trained and in older individuals (>45 years; 66±8 years) compared with those below that age cut-off.
- MIP supplementation during RT is more effective at improving upper body strength gains in elderly individuals (1.56 kg [95% CI 0.80 to 2.33], $p<0.0001$) than non-MIP supplements.
- MIP supplementation is not superior to protein-only supplementation for increasing FFM and strength during periods of RT but does result in a greater increase in fat mass.

prolonged periods of RT generate substantial gains in muscle mass.[2] Typically, when individuals undertake RT with a diet that provides readily available essential amino acids in the postexercise period and adequate total protein intake (~1.6 g/kg body mass),[3] they have a positive protein balance that promotes net gains in skeletal muscle mass. Some

Example on protein

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Example on protein

Supplementary Table 3. Random effects analysis between Multi-ingredient protein (MIP) and protein (PRO) supplementation

		Cases, *n*					Heterogeneity test	
Outcome measure	**Trials, *n***	**MIP**	**PRO**	**MD**	**(95% CI)**	**p value**	**I^2 (%)**	**p value**
Total body mass (kg)	8	165	100	0.65	(-0.45, 1.78)	0.24	76	0.0001
Fat-free Mass (kg)	8	165	100	0.39	(-0.28, 1.05)	0.26	64	0.006
Fat mass (kg)	6	115	70	0.76	(0.13, 1.40)	0.02	51	0.07
1 RM Lower Body (kg)	5	109	69	1.33	(-3.81, 6.48)	0.61	0	0.59
1 RM Upper Body (kg)	4	84	76	0.01	(-4.16, 4.18)	1.00	51	0.11

Note: RM= repetition maximum

Example on dermatomal patterns

HandyEvidence · Mar 14 · 1 min read

Dermatomal presentation in cervical radiculopathy: Should the textbooks get updated?

Observed patterns of cervical radiculopathy: how often do they differ from a standard, "Netter diagram" distribution?
McAnany, S., Rhee, J., Baird, E., Shi, W., Konopka, J., Neustein, T., & Arceo, R.

Level of Evidence: 2b

Follow recommendation: 👍 👍 👍

Type of study: Symptoms prevalence study

Topic: Cervical radiculopathy – Dermatomal patterns

This is a retrospective study assessing the agreement between radiculopathy symptoms reported by patients and standard textbook patterns of radiculopathy. Patients were selected if they presented with a single level cervical radiculopathy (identified through MRI/CT scan), if they had been unresponsive to conservative treatment, and if they had a 75% improvement of symptoms at 6 months after anterior cervical discectomy and fusion (ACDF) surgery. The results showed that ipsilateral neck pain was present in 80% of patients before surgery. Shoulder pain on the side of the radiculopathy was present in 60% of the cases before surgery. Any spinal level from C3-C4 to C7-T1 could present with symptoms beyond the shoulder before surgery. The pain/numbness patterns described by the patients significantly deviated from the patterns described in textbooks and only 54% of patients presented with a standard pain/numbness pattern.

Clinical Take Home Message: Radiculopathies may present with a dermatomal pattern as described in textbooks in 54% of the cases. The presence or lack of symptoms beyond the neck/shoulder is not useful in identifying the level of cervical compression.

Example on tests for cervical radiculopathy

HandyEvidence · Mar 14 · 2 min read

Physical tests for cervical radiculopathy

Value of physical tests in diagnosing cervical radiculopathy: A systematic review
Thoomes, E., van Geest, S., van der Windt, D., Falla, D., Verhagen, A., Koes, B., Thoomes-de Graaf, M., Kuijper, B., Scholten-Peeters, W., & Vleggeert-Lankamp, C.

Level of Evidence: 1a

Follow recommendation: 👍👍👍👍

Type of study: Diagnostic

Topic: Cervical radiculopathy – Physical tests

This is a systematic review assessing the usefulness of physical tests in making a diagnosis of cervical radiculopathy in patients with a disk herniation or osteoarthritic changes. Five papers, which compared physical test results against MRI/CT scans or surgical findings were included. The variables of interest were the sensitivity and specificity of physical tests. If a test is very sensitive and its result is negative, you can be more certain that the patient does not have the condition. If the test is specific and its result is positive, you can be more certain that the patient has the condition. Spurling's test and cervical distraction test showed high specificity and low sensitivity. Upper limb neurodynamic tests showed high sensitivity and low specificity. The arm squeeze test showed high sensitivity and high specificity. The arm squeeze test is performed by compressing the anterior and posterior mid portion of the patient's arm. The test is considered positive if compression of the arm is 3/10 points more painful than squeezing the patient's shoulder joint. The cervical distraction test showed high specificity and low sensitivity. The cervical distraction test is considered positive when manual cervical traction relieves symptoms in the upper limb.

Clinical Take Home Message: Hand therapists may use a combination upper limb neurodynamic test, and arm squeeze test to rule out a radiculopathy. If neurodynamic tests do not elicit pain and the arm squeeze test is negative, the presence of a radiculopathy is less likely. A diagnosis of cervical radiculopathy can be made if the arm squeeze test and Spurling's test are positive, and if the cervical distraction test relieves pain.

URL: https://www.thespinejournalonline.com/article/S1529-9430(17)30918-X/fulltext

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