

EBM Journal Club

網球肘與雷射治療

指導醫師: 顏宏融醫師

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報告醫師: R2 陳兆暉

2011/11/21

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雷射針灸治療網球肘是否有效？

實證醫學五步驟: 5A / 問查讀用審

- Asking: 提出可回答的臨床問題
- Assessing: 搜尋最佳實證文獻資料
- Appraisal: 謹慎的文獻評讀
- Apply: 臨床應用
- Auditing: 評估改善

STEP 1 – Asking 提出問題

雷射針灸治療網球肘是否有效？

PICO

P	Patient Problem Population	Lateral epicondylitis Lateral elbow tendinopathy Tennis elbow
I	Intervention	Laser acupuncture
C	Comparison	Placebo Non-laser intervention
O	Outcome	Pain relief Function improvement

肱骨外上髁炎(網球肘)

- 名稱
 - Tennis elbow
 - Lateral epicondylitis
 - Lateral elbow tendinopathy (tendinosis慢性肌腱損傷)
- 流行病學:
 - 好發年齡在35歲以上，通常發生在慣用手
 - 盛行率:
 - 一般族群: 1-3%
 - 網球運動員: 10.6% (業餘者較多)
 - 好發族群:
 - 手臂高舉過頭部的職業運動員
 - 工作或生活上需要前臂經常用力旋轉、反覆敲打或提舉重物



黃雅萍, 漫談肱骨外上髁炎的診療, 台北市醫師公會會刊, vol.51, no.1, 2008, p28-31

Neeru, Jaianthi, Epicondylitis (tennis and golf elbow), Uptodate, 2011, oct

2011/11/2

肱骨外上髁炎(網球肘)

- **病因:** 腕部伸展肌群及旋後肌群的過度使用
- **病生理學:**
 - 纖維母細胞退化
 - 血管新生
 - 僅有少量發炎細胞
- **症狀:**
 - 伸肌群肌腱附著於肱骨外上髁處疼痛
 - 檉側伸腕短肌(extensor carpi radialis brevis muscle)
 - 伸指肌(extensor digitorum communis muscle)
 - 影響肘腕部伸展及功能性的活動



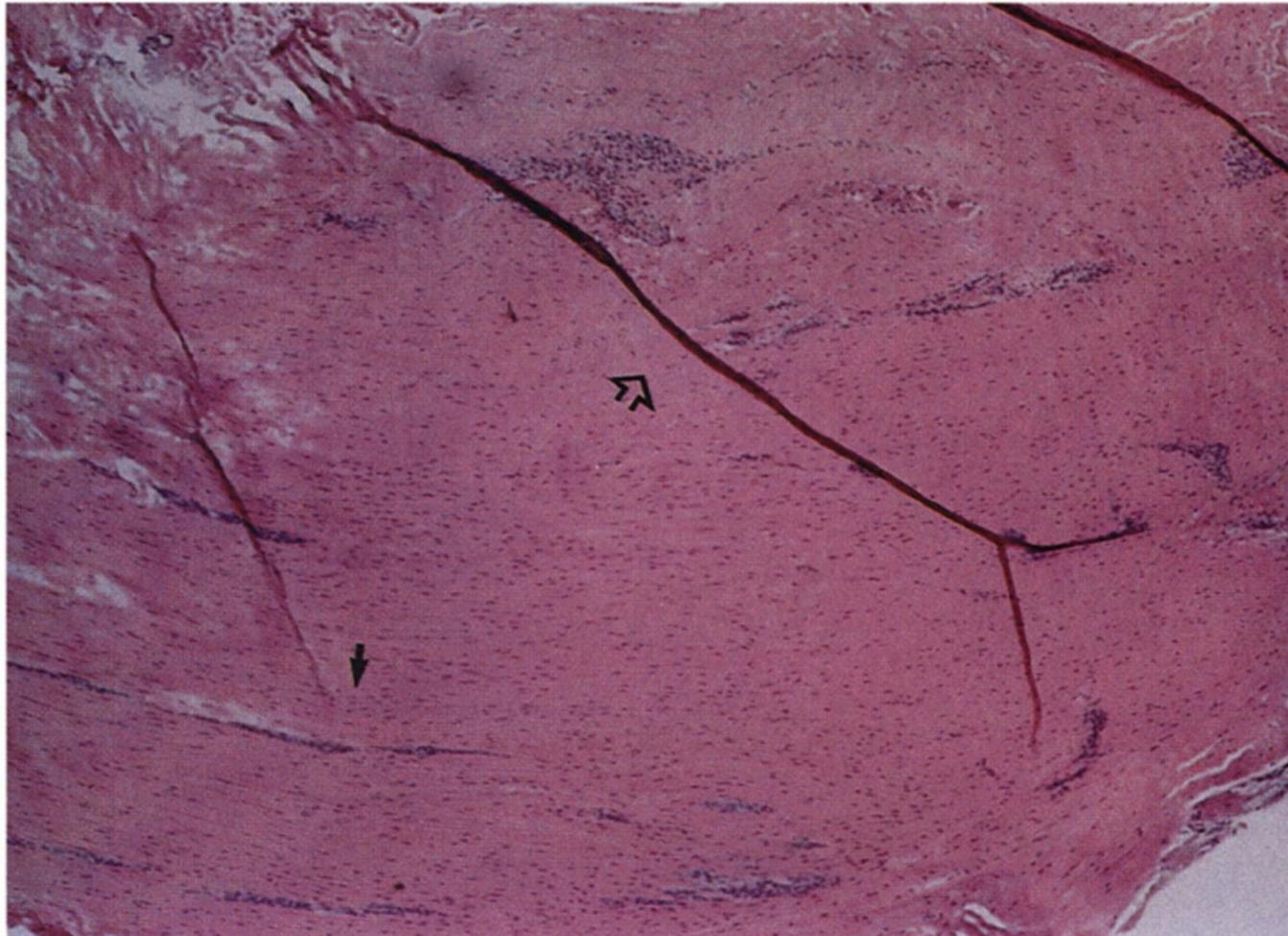
Nirschl RP. Elbow tendinosis/tennis elbow. Clin Sports Med 1992; 11:851.

黃雅萍, 漫談肱骨外上髁炎的診療, 台北市醫師公會會刊, vol.51, no.1, 2008, p28-31

2011/11/2

From: Current Concepts Review - Tendinosis of the Elbow (Tennis Elbow). Clinical Features and Findings of Histological, Immunohistochemical, and Electron Microscopy Studies*

The Journal of Bone and Joint Surgery (American) 1999; 81:259-278



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肱骨外上髁炎(網球肘)

● 檢查

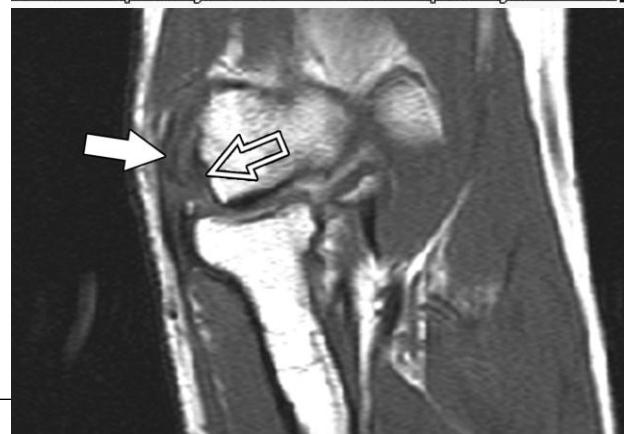
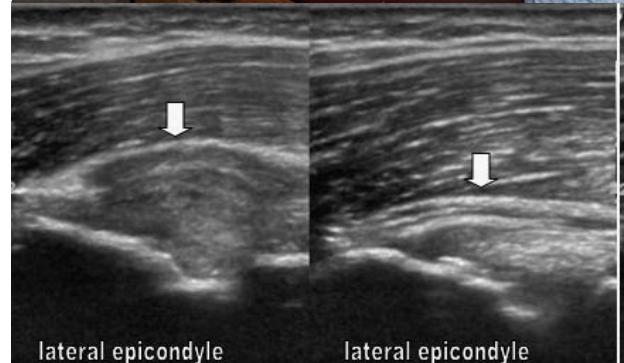
● 理學檢查

- 手腕做伸展或前臂做旋後的等長阻力測試(resisted isometric test/Cozen's test)會誘發疼痛，力量會因疼痛而減弱。
- 手肘外上髁處會有局部壓痛點

● 影像學檢查：

- 軟組織超音波檢查: sensitivity 64-82%
- 核磁共振造影: sensitivity 90-100%
多用以評估是否需要手術治療

● 診斷: 病史+PE (+image)



肱骨外上髁炎治療現況

● 局部類固醇注射

- 短期(6週): *
 - 快速顯著緩解疼痛
 - 增加肘部活動量及負重，造成高復發率
- 中長期:
 - 減少膠原蛋白的合成，進而減少肌腱張力及糖胺多醣基質的形成，增加肌腱退化及斷裂的機率
 - 預後不佳**



● 非類固醇抗發炎藥物

- 短期療效不如類固醇*
- 多以局部外用劑型給藥(降低GI副作用)



● 體外震波治療

- 證據不足，正反觀點均有

* Green S, Buchbinder R, Barnsley L, et al. Non-steroidal anti-inflammatory drugs (NSAIDs) for treating lateral elbow pain in adults. Cochrane Database Syst Rev 2002; :CD003686.

** Bisset L, Smidt N, Windt DA Van der, Bouter LM, Jull G, Brooks P, et al.: Conservative treatments for tennis elbow do subgroups of patients respond differently? *Rheumatology (Oxford)* 2007, 46(10):1601-5.

肱骨外上髁炎治療現況

● 運動與物理治療

- 運動治療: 離心運動、牽拉、護具及貼紮
- 物理治療: 筋膜與軟組織鬆解術、按摩、高電壓直流電刺激、及肌力訓練

● 手術治療

- 保守療法6個月以上無效者可考慮
- 橈側伸腕短肌肌腱清創術
- 關節鏡治療與開放性手術無顯著差異*

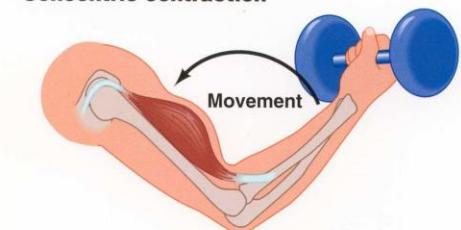


Isometric contraction
Muscle contracts
but does not shorten



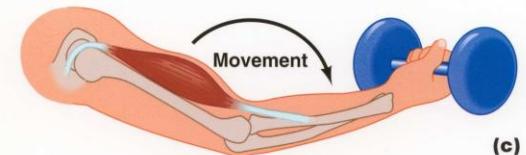
(a)

Concentric contraction



(b)

Eccentric contraction



(c)



STEP 2 – Assessing 搜尋資料

A systematic review with procedural assessments
and metaanalysis of low level laser therapy in lateral
elbow tendinopathy

2011/11/2
1

12	EBMR--Database of Abstracts of Reviews of Effects	Database OVID	使用者人數:林口4人,基隆2人;嘉義2人;高雄4人。
13	EBMR--Health Technology Assessment	Database OVID	使用者人數:林口4人,基隆2人;嘉義2人;高雄4人。
14	EBMR--NHS Economic Evaluation Database	Database OVID	使用者人數:林口4人,基隆2人;嘉義2人;高雄4人。
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16	First Consult	Database Elsevier	
17	HDCN	Database Medtext, Inc.	
18	Journal Citation Report(JCR) : Science Edition	Database Thomson	使用者人數:林口4人。
19	Journals@Ovid Full Text	Database OVID	系統使用人數17人,單本電子期刊使用人數2人。
20	Mdconsult	Database Elsevier	
21	Medline+Journals @ ovid	Database OVID	使用者人數:林口25人,基隆5人,嘉義4人,高雄6人。
22	Micromedex(CCIS) 2.0版	Database Thomson	使用者人數:林口15人,基隆10人,嘉義10人,高雄15人。
23	Nursing Consult	Database Mosby	
24	Nursing Index (Mosby's Index)	Database Mosby	
25	NursingConnect(試用至11/30)	Database Elsevier	
26	Oxford Scholarship Online Collection牛津線上學術電子書	Database Oxford University Press	
27	Pharmaceutical News Index	Database Proquest	
28	ProQuest Health and Medical Complete	Database Proquest	
29	PubMed	Database National Library of Medicine, NLM	1948-
30	PubMed (Intranet)	Database National Library of Medicine, NLM	1948-
31	Reference Manager	Database Thomson	
32	Regional Business News	Database EBSCO	
33	Science Direct	Database Elsevier	1995-
34	Scopus	Database Elsevier	
35	SDOS	Database Elsevier	
36	UpToDate Online	Database Uptodate	 不提供院外連線
37	Web of Science(SCIE)	Database Thomson	1991- 線上使用人數5人。
38	中文電子期刊服務(CEPS)	Database 華藝數位	1991-
39	中國博士學位論文全文數據庫	Database CNKI中國知網	2000-
40	中國期刊全文數據庫	Database CNKI中國知網	1915-
41	中國優秀碩士學位論文全文數據庫	Database CNKI中國知網	2000-
42	中醫藥知識庫(試用至11/30)	Database 萬芳數據庫	

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Laser acupuncture, tennis elbow

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 Include All Subheadings

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Select	Subject Heading	Explode	Focus	Scope
<input checked="" type="checkbox"/>	Tennis Elbow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Acupuncture Therapy	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Clinical Trials as Topic	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Combined Modality Therapy	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Diagnosis, Differential	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	High-Energy Shock Waves	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Evidence-Based Medicine	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	Laser Therapy	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Orthopedic Procedures	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Randomized Controlled Trials as Topic	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<i>laser acupuncture, tennis elbow.mp. search as Keyword</i>			

Hints:

- Click on a Subject Heading to view its tree - related terms that are more general and more specific.
- Select the Explode box if you wish to retrieve results using the selected term and all of its more specific terms.
- Select the Focus box if you wish to limit your search to those documents in which your subject heading is considered the major point of the article.
- If your search did not map to a desirable subject heading, select the box Search as Keyword.
- If you select more than one term, you can combine them using a boolean operator (**AND** or **OR**).
- If you wish to see the scope note for any term or heading, click on the information  icon, when available.

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laser therapy
tennis elbow

Search Returned:

13 results

Sort By:



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1. [Evidence for laser acupuncture in cases of orthopedic diseases : a systematic review]. [Review] [57 refs] [German]

Schuller BK, Neugebauer EA.

Der Schmerz. 22(1):9-15, 2008 Feb.

[English Abstract. Journal Article. Review]

UI: 17530300

-

Authors Full Name

Schuller, B K, Neugebauer, E A M.

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2. Treatment of lateral epicondylitis. [Review] [31 refs][Summary for patients in Am Fam Physician. 2007 Sep 15;76(6):849-50; PMID: 17910299].[Summary for patients in Am Fam Physician. 2007 Sep 15;76(6):853; PMID: 17910300]

Johnson GW, Cadwallader K, Scheffel SB, Epperly TD.

American Family Physician. 76(6):843-8, 2007 Sep 15.

[Journal Article. Review]

UI: 17910298

-

Authors Full Name

Johnson, Greg W, Cadwallader, Kara, Scheffel, Scot B, Epperly, Ted D.

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3. Low intensity Nd:YAG laser irradiation for lateral epicondylitis.

Hoens AM.

Clinical Journal of Sport Medicine. 12(1):55, 2002 Jan.

[Journal Article]

UI: 11871356

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搜尋技巧(1)

OR	尋找包含某些特殊字眼或片語的研究。如，「child OR adolescent」會找到包含「child」和「adolescent」的所有文章。
AND	尋找同時包含兩個特殊字眼或片語的研究。如，「child AND adolescent」會找到包含「child」和「adolescent」的所有文章。
NEAR	類似 AND 的功能，必須同時包含兩個字，而且這兩個字中間的距離間隔，不能超過五個字。
NOT	排除包含否些特殊字眼或片語的研究。如，「child NOT adolescent」表示要找包含「child」一詞、但不包括「adolescent」一詞的所有文章。較少使用。
Limits	可以經由在某些方面加以限制，而找到想要找到的文章。如，日期、語言、及是否提供摘要等。

搜尋技巧(2)

()	利用括號組合文字。如，"(child OR adolescent) AND (hearing OR auditory)"，會找到包括"child"或"adolescent"以及"hearing"或"auditory"的文章。
*	截斷字："**"為萬用字元，代表任何字母。如，child* 為 child 加任何字母，相當於(child OR child's OR children OR childhood)。
[ti] or :ti	尋找標題中有該字眼的研究。如，hearing[ti] (in PubMed)及 hearing:ti (in Cochrane)會找到標題中有 hearing 這個字的研究。
[so] or :so	尋找特定來源的研究，如，hearing AND BMJ [so] 會找到 BMJ 中與 hearing 有關的研究。
MeSH	MeSH 為 Medical Subject Headings 的縮寫，是關鍵字的特殊語彙，通常用在 PubMed 或 Cochrane。同時使用 MeSH 及內文(text words)，經常會很有用。

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- laser acupuncture
- tennis
- tennis elbow

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2. Acupuncture for lateral elbow pain. [Review] [30 refs]

Green S, Buchbinder R, Barnsley L, Hall S, White M, Smidt N, Assendelft W.

*Cochrane Database of Systematic Reviews. (1):CD003527, 2002.
[Journal Article. Review]*

UI: 11869671

-

Authors Full Name

Green, S, Buchbinder, R, Barnsley, L, Hall, S, White, M, Smidt, N, Assendelft, W,

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laser acupuncture AND tennis elbow



Clinical Study Categories

Category: ▾
Scope: ▾

Results: 5 of 13

[Treatment of epicondylitis - a current review].

[Sportverletz Sportschaden. 2010]

Therapeutic effects of low-level laser on lateral epicondylitis from differential interventions of Chinese-Western medicine: systematic review. [Photomed Laser Surg. 2010]

Steroid injection for lateral epicondylitis.

[J Hand Surg Am. 2009]

A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow) [BMC Musculoskelet Disord. 2008]

A critical review of the current conservative therapies for tennis elbow (lateral epicondylitis).

[Australas Chiropr Osteopath. 1998]

See all (13)

Systematic Reviews

Results: 5 of 10

Tennis elbow.

[Clin Evid (Online). 2011]

[Treatment of epicondylitis - a current review].

[Sportverletz Sportschaden. 2010]

Therapeutic effects of low-level laser on lateral epicondylitis from differential interventions of Chinese-Western medicine: systematic review. [Photomed Laser Surg. 2010]

Steroid injection for lateral epicondylitis.

[J Hand Surg Am. 2009]

A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow) [BMC Musculoskelet Disord. 2008]

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Medical Genetics

Topic: ▾

Results: 0 of 0

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雷射

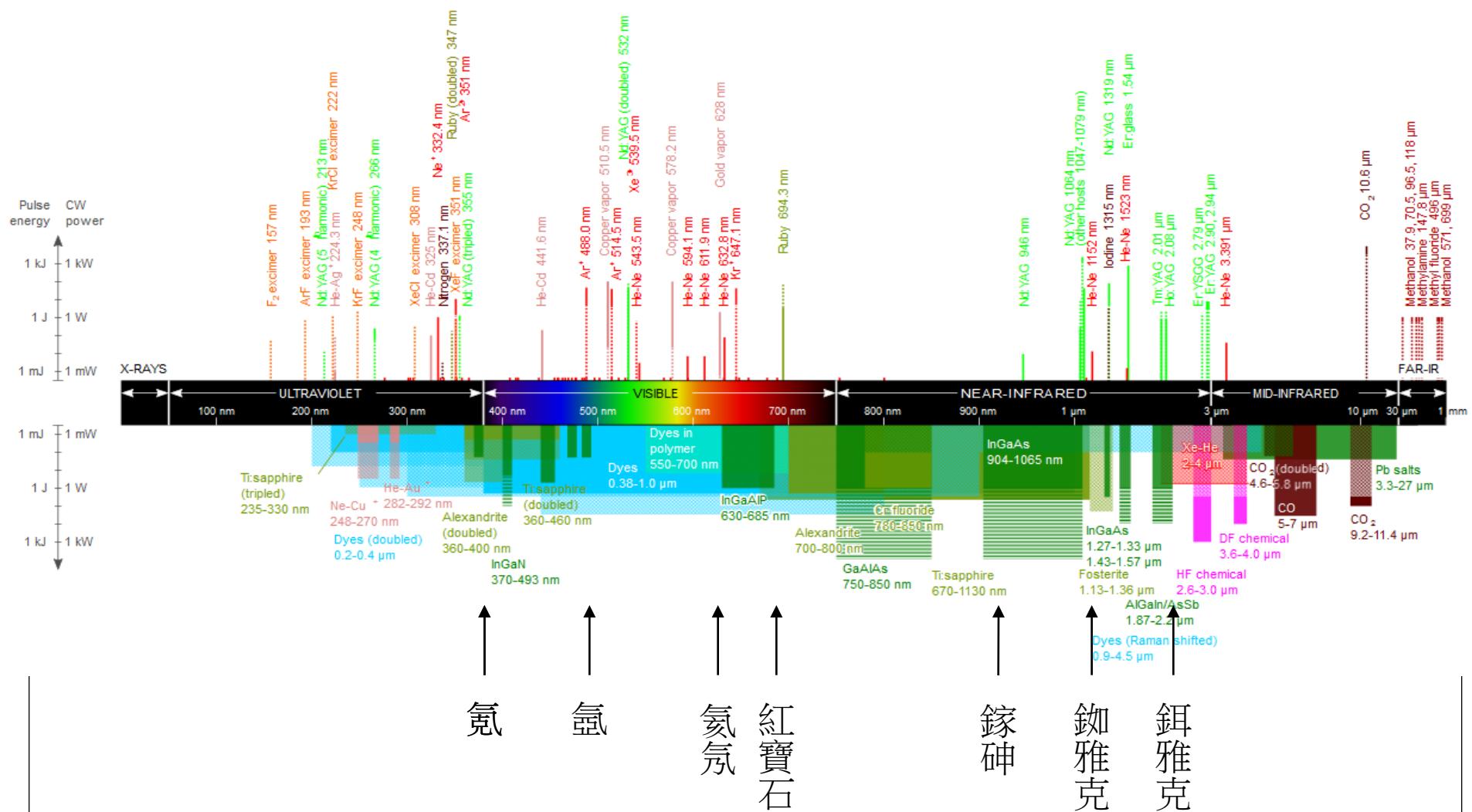
- Laser = Light Amplification by Stimulated Emission of Radiation
- 定義：將激發放射產生的光能，不斷放大而產生單一波長的平行光束
- 光反應：因功率密度 (Power Density) 和照射時間 (Exposure time) 而不同
 - 光熱反應 (Photothermal interaction)
 - 光剝離反應 (Photoablation interaction)
 - 光崩解反應 (Photobreakdown interaction)
 - 光化學反應 (Photochemical interaction)

溫度	效應
37-50°C	Hyperthermia 加熱
>60°C	Coagulation 凝固
70-90°C	Welding 熔合
100-150°C	Vaporization 蒸發
>200°C	Carbonization 碳化

雷射

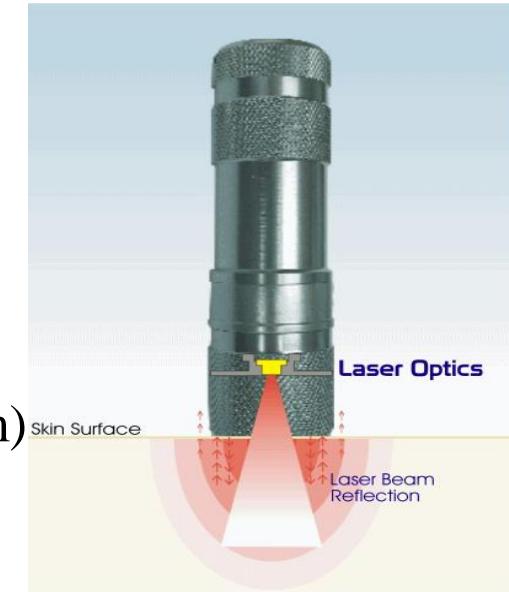
- **波長:** 不同組織對不同波長的光能吸收有所差異
 - 人體內的黑色素及血紅素對波長 810-980nm 的光能吸收顯著
 - 水分和硬組織則對Er:YAG, ErCr:YSGG雷射波長有不錯的反應。
 - 一般而言，波長越長，穿透能力越強
- **能量:**
 - Fluence 能量密度 (J/cm^2) = [Watts 瓦 (J/sec) \times 時間 (sec)] / cm^2
- **雷射針灸:** 低能量雷射(Low Level Laser)
 - 氦氖HeNe雷射(波長632.8nm)
 - 砷化鎵GaAs雷射 (波長904nm)
 - 雅克Nd:YAG雷射 (波長1064nm)

光譜



Low Level Laser Therapy (LLLT) 低能量雷射

- LLLT別名
 - Cold laser 冷雷射
 - Soft laser 軟性雷射
- 波長: 600-1000nm
 - 氦氖雷射(Helium-Neon laser、波長632.8nm)
 - 納磧近紅外線雷射(Infra-red laser、波長904nm)
- 能量:
 - 5-500mw(milliwatts)
 - 手術用雷射能量約為300w(用於止血凝固、燒灼及切除組織)
- 劑量: <35J/cm²



Low-level laser therapy, Current Procedural Terminology(CPT), 2010, p1-9
A systematic review with procedural assessments
and metaanalysis of low level laser therapy in lateral
elbow tendinopathy

2011/11/2
1

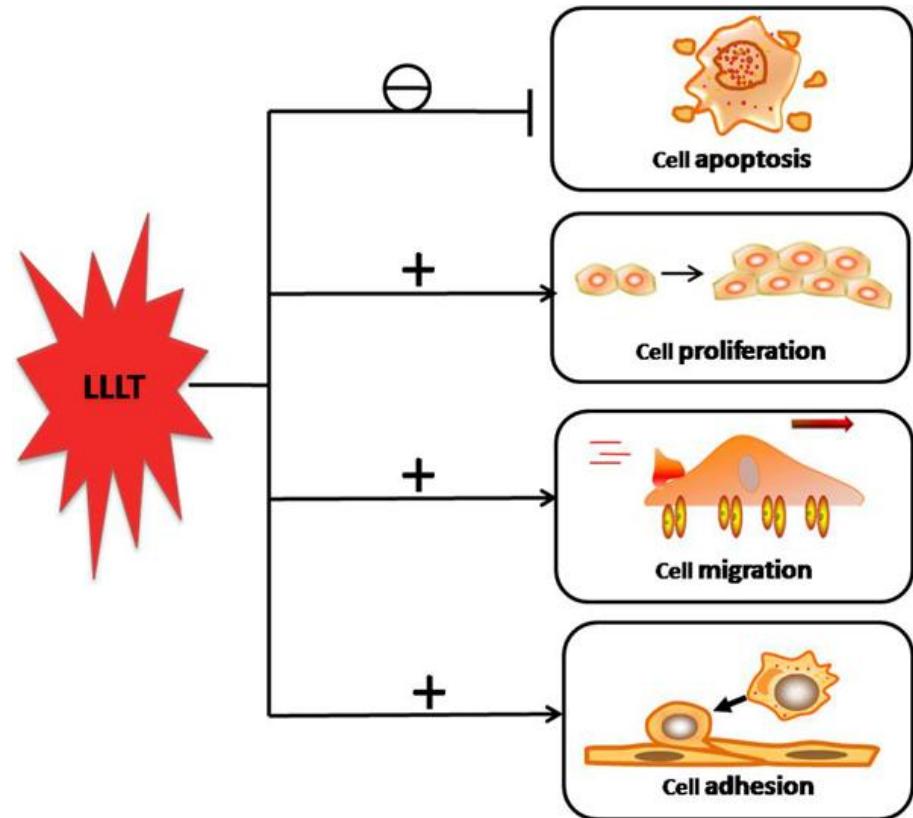
Low level laser therapy(LLLT)低能量雷射

- 功效: 生物刺激作用(Biostimulation)

- 促進傷口癒合
- 止痛

- 臨床應用

- 口腔黏膜炎
- 烤髮症
- 皮膚分節性白斑
- 肥胖
- 腕隧道症候群



Low-level laser therapy, Current Procedural Terminology(CPT), 2010, p1-9
A systematic review with procedural assessments
and metaanalysis of low level laser therapy in lateral
elbow tendinopathy

2011/11/2
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PubMed Clinical Queries

Results of searches on this page are limited to specific clinical research areas. For comprehensive searches, use [PubMed](#) directly.

Low level laser AND lateral epicondylitis



[Search](#)

Clinical Study Categories

Category: ▾
 Scope: ▾

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Topic: ▾

Results: 5 of 12

Investigation of the effect of GaAs laser therapy on lateral epicondylitis.

[Photomed Laser Surg. 2010]

Therapeutic effects of low-level laser on lateral epicondylitis from differential interventions of Chinese-Western medicine: systematic review.
[Photomed Laser Surg. 2010]

Low level laser treatment of tendinopathy: a systematic review with meta-analysis.
[Photomed Laser Surg. 2010]

Comparing the effects of exercise program and low-level laser therapy with exercise program and polarized polychromatic non-coherent light (bioptron light) on the treatment of lateral [Photomed Laser Surg. 2009]

A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow).
[BMC Musculoskelet Disord. 2008]

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Tennis elbow.

[Clin Evid (Online). 2011]

Therapeutic effects of low-level laser on lateral epicondylitis from differential interventions of Chinese-Western medicine: systematic review.
[Photomed Laser Surg. 2010]

Low level laser treatment of tendinopathy: a systematic review with meta-analysis.
[Photomed Laser Surg. 2010]

A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow).
[BMC Musculoskelet Disord. 2008]

A critical review of the current conservative therapies for tennis elbow (lateral epicondylitis).
[Australas Chiropr Osteopath. 1998]

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Display citations pertaining to topics in medical genetics. See [filter information](#).



Keyword Author Title Journal

Lateral AND (epicondylitis OR elbow tendinopathy) AND low level laser

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You searched:

(lateral and (epicondylitis or elbow tendinopathy) and low level laser).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier]

- Search terms used:

- elbow
- elbow tendinopathy
- epicondylitis
- laser
- lateral
- level
- low
- low level laser
- tendinopathy

Search Returned:

12 results

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1

1. Therapeutic effects of low-level laser on lateral epicondylitis from differential interventions of Chinese-Western medicine: systematic review.

2. Low level laser treatment of tendinopathy: a systematic review with meta-analysis.

3. Comparing the effects of exercise program and low-level laser therapy with exercise program and polarized polychromatic non-coherent light (bioptron light) on the treatment of lateral elbow tendinopathy.

4. A systematic review with procedural assessments and meta-analysis of low level laser therapy in lateral elbow tendinopathy (tennis elbow).

5. The short-term efficacy of laser, brace, and ultrasound treatment in lateral epicondylitis: a prospective, randomized, controlled trial.

6. Effects of low-level laser and plyometric exercises in the treatment of lateral epicondylitis.

7. Effects of 904-nm low-level laser therapy in the management of lateral epicondylitis: a randomized controlled trial.

邏輯 檢索項 檢索詞 詞頻 擴展

主題 在結果中檢索
 檢索

網球肘+低能量激光

從 1994 到 2011 更新 全部數據 范圍 全部期刊 匹配 精確 排序 時間 每頁 20 中英擴展

已訂購 未訂購 未登錄 不提供全文

友情提示：部分全文需經由海外中心網站調閱，下載時間會依使用單位網路速度快慢而不同，下載時請您耐心等待，謝謝！

共有記錄3條

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序號	篇名	作者	刊名	年/期
1	激光穴位照射治療網球肘30例	馮芳軍	實用中醫內科雜志	2003/02
2	低能量激光無助于網球肘的治療	趙冬林	國外醫學·物理醫學與康復學分冊	1997/02
3	低能量激光與傳統理療治療網球肘的比較	張德富	國外醫學·物理醫學與康復學分冊	1994/01

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詳目

延伸查詢 PDF全文

網球肘+低能量雷射

針刺與雷射針刺治療肘外側肌腱炎的文獻綜述=Review of Acupuncture Versus Laser Acupuncture Treatment for Lateral Epicondylitis
張文典；吳季樺；江昭暉 中西整合醫學雜誌 11:1 2009.06[民98.06] 頁35-44

摘要

語文 | 中文

關鍵詞 | 肘外側肌腱炎；雷射針刺；針刺；穴位；Lateral epicondylitis；Laser acupuncture；Acupuncture；Acupuncture point

分類號 | 413.26

本刊其他篇目查詢 | 中西整合醫學雜誌

系統識別號 | A09055253

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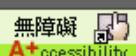
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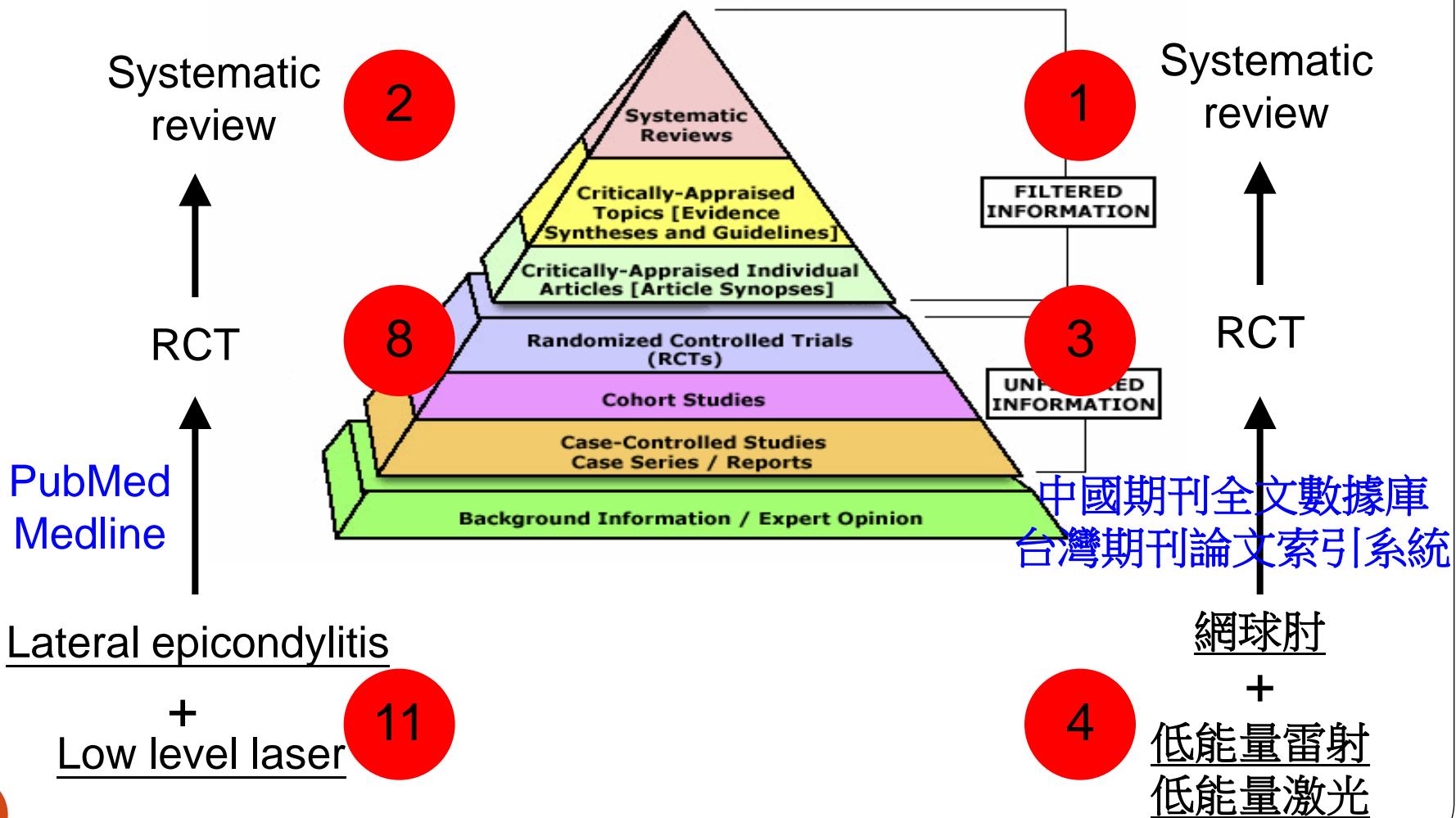
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解答不同類型臨床問題之最佳研究設計*

Question type (問題類型)	Study design (研究設計)
Diagnostic test 診斷性檢驗或檢查	Prospective, blinded cross-sectional study comparing with gold standard 前瞻性、盲法、與黃金標準進行比較之斷面研究
Prognosis 預後	Cohort study > Case control study > Case series study 世代研究 > 病例對照研究 > 病例系列研究
Etiology 病因	Cohort study > Case control study > Case series study 世代研究 > 病例對照研究 > 病例系列研究
Therapy 治療	Randomised control trial (RCT) 隨機對照試驗
Prevention 預防	Randomised control trial (RCT) 隨機對照試驗
Cost effectiveness 成本效益	Economic analysis 經濟分析

The Evidence Pyramid



Research article

A systematic review with procedural assessments and meta-analysis of Low Level Laser Therapy in lateral elbow tendinopathy (tennis elbow)

Jan M Bjordal^{*1,2}, Rodrigo AB Lopes-Martins³, Jon Joensen^{1,2}, Christian Couppe⁴, Anne E Ljunggren², Apostolos Stergioulas⁵ and Mark I Johnson⁶

Published: 29 May 2008

BMC Musculoskeletal Disorders 2008, 9:75 doi:10.1186/1471-2474-9-75

This article is available from: <http://www.biomedcentral.com/1471-2474/9/75>

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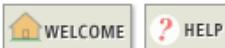
Mark	Journal Title	ISSN	Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Citable Items	Cited Half-life	Citing Half-life
<input type="checkbox"/>	BMC MUSCULOSKEL DIS	1471-2474	1838	1.941	2.375	0.134	284	3.6	7.6
	Cited Journal  Citing Journal  Source Data Journal Self Cites								

Levels of Evidence and Grades of Recommendations

Grade of recommendation	Level of evidence	Interventions
A	1a	Systematic review of randomized controlled trials
	1b	Individual randomized controlled trial
B	2a	Systematic review of cohort studies
	2b	Individual cohort study
	3a	Systematic review of case-control studies
	3b	Individual case-control study
C	4	Case series
D	5	Expert opinion without explicit critical appraisal or based on physiology or bench research

SCI點數: impact factor

6	DynaMed	Database	EBSCO		
7	EBM Reviews (ALL)	Database	OVID		使用人數：林口4人,高雄4人。
8	EBMR--ACP Journal Club	Database	OVID	1991-	使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
9	EBMR--Cochrane Central Register of Controlled Trials	Database	OVID		使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
10	EBMR--Cochrane Database of Systematic Reviews	Database	OVID		使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
11	EBMR--Cochrane Methodology Register	Database	OVID		使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
12	EBMR--Database of Abstracts of Reviews of Effects	Database	OVID		使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
13	EBMR--Health Technology Assessment	Database	OVID		使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
14	EBMR--NHS Economic Evaluation Database	Database	OVID		使用人數:林口4人;基隆2人;嘉義2人;高雄4人。
15	EndNote	Database	Thomson		
16	First Consult	Database	Elsevier		
17	HDCN	Database	Medtext, Inc.		
18	Journal Citation Report(JCR) : Science Edition	Database	Thomson		使用人數：林口4人。
19	Journals@Ovid Full Text	Database	OVID	1993-	系統使用人數17人，單本電子期刊使用人數2人。
20	Mdconsult	Database	Elsevier		
21	Medline+Journals @ ovid	Database	OVID	1948-	使用人數：林口25人;基隆5人;嘉義4人;高雄6人。
22	Micromedex(CCIS) 2.0版	Database	Thomson		使用人數：林口15人;基隆10人;嘉義10人;高雄15人。
23	Nursing Consult	Database	Mosby		
24	National Clinical Guideline	Database	Medline		



Subject Category Selection

選擇適合的分類

1) Select one or more categories from the list.

[\(How to select more than one\)](#)

OPHTHALMOLOGY
OPTICS
ORNITHOLOGY
ORTHOPEDICS
OTORHINOLARYNGOLOGY
PALEONTOLOGY
PARASITOLOGY
PATHOLOGY
PEDIATRICS

2) Select to view Journal data or aggregate Category data.

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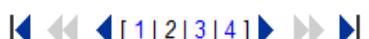
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Impact Factor

▼ SORT AGAIN

s 21 - 40 (of 61)



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L UPDATE MARKED LIST

Ranking is based on your journal and sort selections.

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data <small>i</small>					Eigenfactor™ Metrics <small>i</small>		
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half-life	Eigenfactor™ Score	Article Influence™ Score
<input type="checkbox"/>	21	BMC MUSCULOSKEL DIS	1471-2474	1838	1.941	2.375	0.134	284	3.6	0.00982	0.801
<input type="checkbox"/>	22	ACTA ORTHOP	1745-3674	6287	1.897	2.206	0.250	120	>10.0	0.01018	0.755
<input type="checkbox"/>	23	KNEE SURG SPORT TR A	0942-2056	3693	1.857	2.129	0.394	282	4.9	0.01490	0.793
<input type="checkbox"/>	24	J ORTHOP TRAUMA	0890-5339	4316	1.792	2.358	0.309	162	8.4	0.00959	0.801
<input type="checkbox"/>	25	INT ORTHOP	0341-2695	2782	1.561	1.726	0.381	194	6.2	0.00763	0.528
<input type="checkbox"/>	26	J HAND SURG-AM	0363-5023	6928	1.439	1.743	0.172	302	>10.0	0.01083	0.482
<input type="checkbox"/>	27	KNEE	0968-0160	1275	1.403	1.627	0.202	89	4.9	0.00536	0.583
<input type="checkbox"/>	28	ORTHOP CLIN N AM	0030-5898	2525	1.398	1.892	0.561	41	>10.0	0.00338	0.672
<input type="checkbox"/>	29	J SPINAL DISORD TECH	1536-0652	2939	1.333	1.939	0.130	100	7.8	0.00819	0.762
<input type="checkbox"/>	30	ARCH ORTHOP TRAUM SU	0936-8051	2995	1.196	1.290	0.202	228	7.5	0.00797	0.451
<input type="checkbox"/>	31	J HAND THER	0894-1130	664	1.164		0.276	29	7.8	0.00127	
<input type="checkbox"/>	32	J PEDIATR ORTHOPED	0271-6798	4216	1.153	1.474	0.051	177	>10.0	0.00730	0.474
<input type="checkbox"/>	33	ORTHOPEDICS	0147-7447	2351	1.098	0.843	0.212	33	10.0	0.00548	0.335
<input type="checkbox"/>	34	FOOT ANKLE INT	1071-1007	4522	1.092	1.364	0.053	171	9.6	0.00664	0.343
<input type="checkbox"/>	35	J HAND SURG-EUR VOL	1753-1934	3288	0.868	1.141	0.113	97	>10.0	0.00443	0.366
<input type="checkbox"/>	36	J ORTHOP SCI	0949-2658	1303	0.839	1.113	0.066	122	6.5	0.00399	0.395
<input type="checkbox"/>	37	HAND CLIN	0749-0712	1232	0.802	1.214	0.038	53	>10.0	0.00202	0.438
<input type="checkbox"/>	38	HIP INT	1120-7000	237	0.792	0.574	0.013	79	4.0	0.00089	0.162
<input type="checkbox"/>	39	J FOOT ANKLE SURG	1067-2516	1118	0.760		0.126	135	6.9	0.00264	
<input type="checkbox"/>	40	PROSTHET ORTHOT INT	0309-3646	506	0.634	0.818	0.395	38	8.9	0.00063	0.190

STEP 3 – Appraisal 評讀

低能量雷射治療網球肘的系統性回顧及統合分析

低能量雷射治療肱骨外上髁炎

- 過去數個研究*認為LLLT治療網球肘無顯著意義。
- 未曾比較LLLT不同治療步驟、雷射波長或劑量的影響
- 最近統計LLLT文獻
 - 21/24 controlled laboratory trials有抗發炎效果(87.5%)
 - 31/36 trials有生物刺激效應，加速膠原蛋白合成(86.1%)

* Smidt N, Assendelft WJ, Arola H, Malmivaara A, Greens S, BuchbinderR, *et al.*: Effectiveness of physiotherapy for lateral epicondylitis: a systematic review. *Ann Med* 2003, 35(1):51-62.

* Bisset L, Paungmali A, Vicenzino B, Beller E: A systematic review and meta-analysis of clinical trials on physical interventions for lateral epicondylalgia. *Br J Sports Med* 2005, 39(7):411-22. discussion 411-22.

* Stasinopoulos DI, Johnson MI: Effectiveness of low-level lasertherapy for lateral elbow tendinopathy. *Photomed Laser Surg* 2005, 23(4):425-30.

A systematic review with procedural assessments
and metaanalysis of low level laser therapy in lateral
elbow tendinopathy

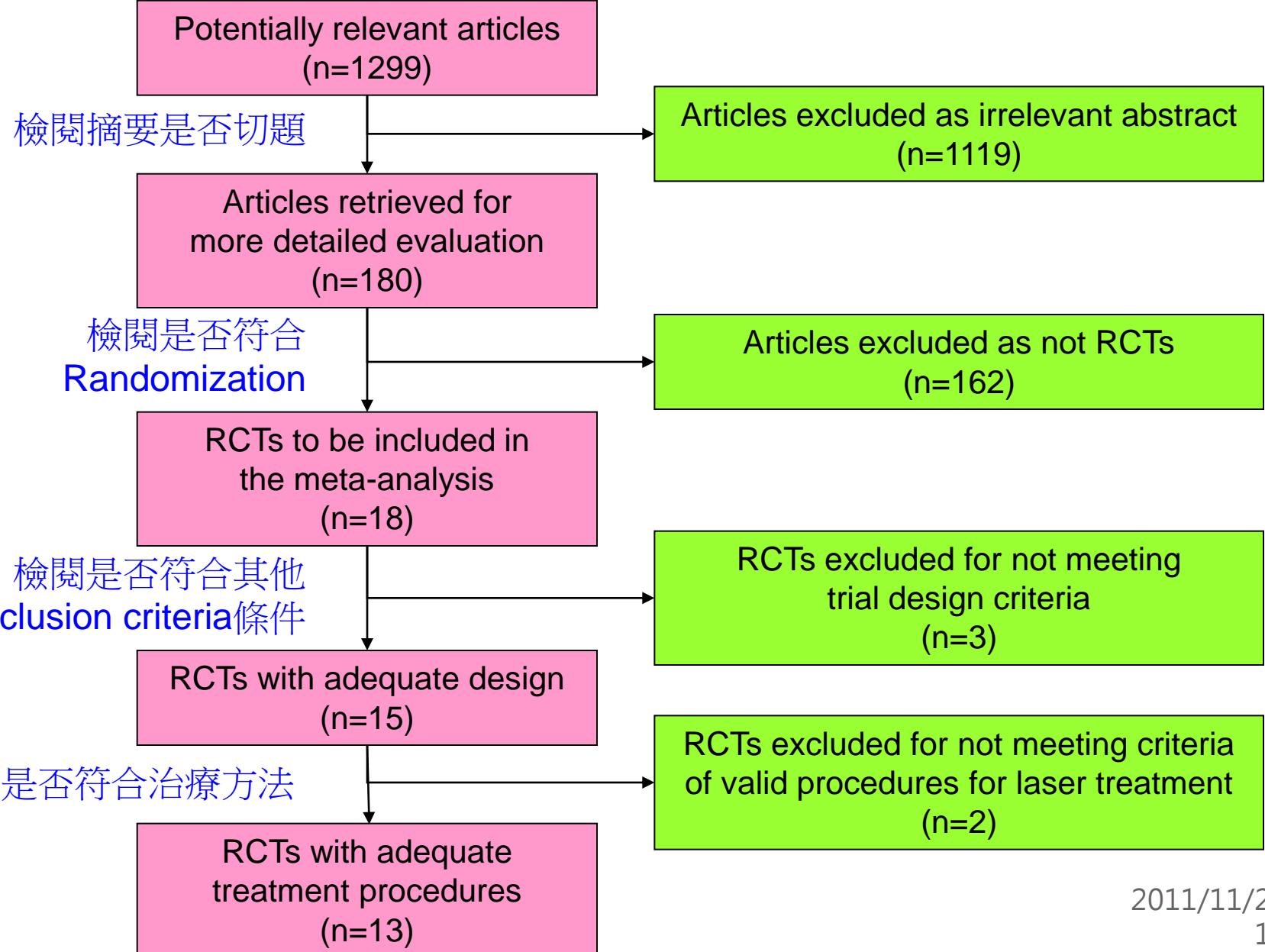
文獻搜尋

- Randomised controlled clinical trials
- 關鍵字: [LLLT(∪)] ∩ [Tennis elbow(∪)]
- 資料庫:
 - Medline
 - Embase
 - Cinahl
 - PedRo
 - the Cochrane Controlled Trial Register as advised by Dickersin

納入標準 Inclusion criteria

- Diagnosis: lateral elbow tendinopathy
- Treatment: LLLT 波長介於632-1064nm之間，刺激
 - 韌帶病變處
 - 針灸穴位
 - 激痛點trigger point
- Design: RCTs 或 crossover
- Blinding: outcome assessor
- Control group
 - Placebo control group
 - Other non-laser intervention with >10 person per group
- Specific endpoint: 納入後1-52週需評估疼痛或健康狀態

Quorom flow chart of reviewing process



未符合 Trial Design Inclusion Criteria

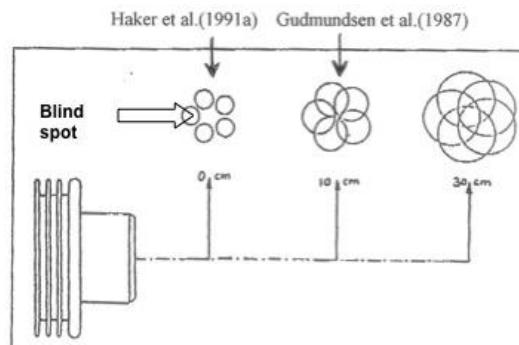
Table 1: Randomised LLLT-trials excluded for not meeting trial design criteria for diagnosis, blinding or specific endpoints.

Study by first author	Year	Method score	Laser wavelength	Application technique	Result	Reason for exclusion
Mulcahy [40]	1995	5	904	Not stated	No significant differences between active and placebo LLLT	Does not satisfy control group criterion: Lacks sufficient patient numbers in placebo control group as only 3 patients had tendinopathy
對照組僅有3個患者罹患網球肘						
Simunovic [41]	1998	3	830	Tendon + Trigger Points	LLLT significantly better than placebo	Does not satisfy criterion for specific endpoint and standard number of treatments: Only bilateral conditions were given placebo treatment, but data for this group were not presented
對照組只有bilateral condition有給placebo treatment 且資料不完整						
Vasseljen [42]	1992	5	904	Tendon	Traditional physiotherapy significantly better than LLLT	Does not satisfy blinding criterion: Neither therapist, patients or observers were blinded in the traditional physiotherapy group
未符合blinding						

Trial characteristics by first author, method score, laser wavelength in nanometer, laser application technique, trial results and reason for exclusion.

未符合Treatment Procedure

Table 2: Randomised LLLT-trials excluded for not meeting criteria of valid procedures for active laser and placebo laser treatment.

Study by first author	Method score	Wave-length	Application technique	Result	Reason for exclusion
Haker [43]	6	904	Tendon	No significant differences	<p>Photograph in trial report shows that the laser probe was kept in skin contact and thereby violated the manufacturers' recommendation of a keeping the laser head at a distance of 10 cm. This violation caused a central blind spot of ca 3 cm^2 which left the tendon pathology unexposed to LLLT (See Figure 2)</p> 
Siebert [44]	6	904 + 632	Tendon	No significant differences	<p>Active laser treatment to the placebo group received red 632 nm LLLT, which we calculated to be (2.25J), which again is an adequate LLLT dose. Consequently this trials lacks a placebo or non-laser control group</p>

Trial characteristics given by first author, method score, laser wavelength, laser application technique, trial results and reason for exclusion.

13 eligible RCT after exclusion

Table 3: Included randomised LLLT-trials.

Study by first author	Method score	Patient numbers	Application technique	Control	Trial results
Basford [53]	8	47	Tendon	Placebo	0
Gudmundsen [51]	6	92	Tendon	Placebo	++
Haker [46]	7	49	Acupoints	Placebo	0
Haker [50]	6	58	Tendon	Placebo	+
Krashenninikoff [54]	6	36	Tendon	Placebo	0
Lam [55]	7	37	Tendon	Placebo	++
Løgdborg-Anderson [49]	7	142	Tendon	Placebo	++
Lundeberg [47]	6	57	Acupoints	Placebo	0
Oken [56]	7	59	Tendon	UL, Brace	++
Palmieri [57]	6	30	Tendon	Placebo	++
Papadopoulos [52]	4	31	Tendon	Placebo	-
Stergioulas [48]	7	62	Tendon	Placebo	++
Vasseljen [58]	8	30	Tendon	Placebo	+
Total	6.5(Mean)	730			

Trial characteristics by first author, method score, laser application technique, control group type, trial results. The abbreviations used are determined by the following categories: (-) means a result in favour of the control group, (0) means a non-significant result, (+) means a positive result for LLLT in at least one outcome measure, and (++) means a consistent positive results for more than one outcome measure.

n=13

N=730

Tendon=11

Acupoint=2

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elbow tendinopathy

2011/11/2
1

Bias analysis

- Positive bias detection
 - Methodological score (以PEDro scale評分，滿分為10分)
 - Profit funding source 資金來源
- Negative bias detection
 - Patient selection
 - Long symptom duration 症狀持續21週以上
 - Recent steroid injection 大於20%患者收案前曾使用類固醇注射
 - Effective co-interventions 同時接受運動治療
- Publication bias
 - 具有顯著意義的文章較有可能被發表
 - 於文獻搜尋過程中，只使用電腦搜尋並且著重在發表的文章，可能會造成發表偏差

Bias analysis

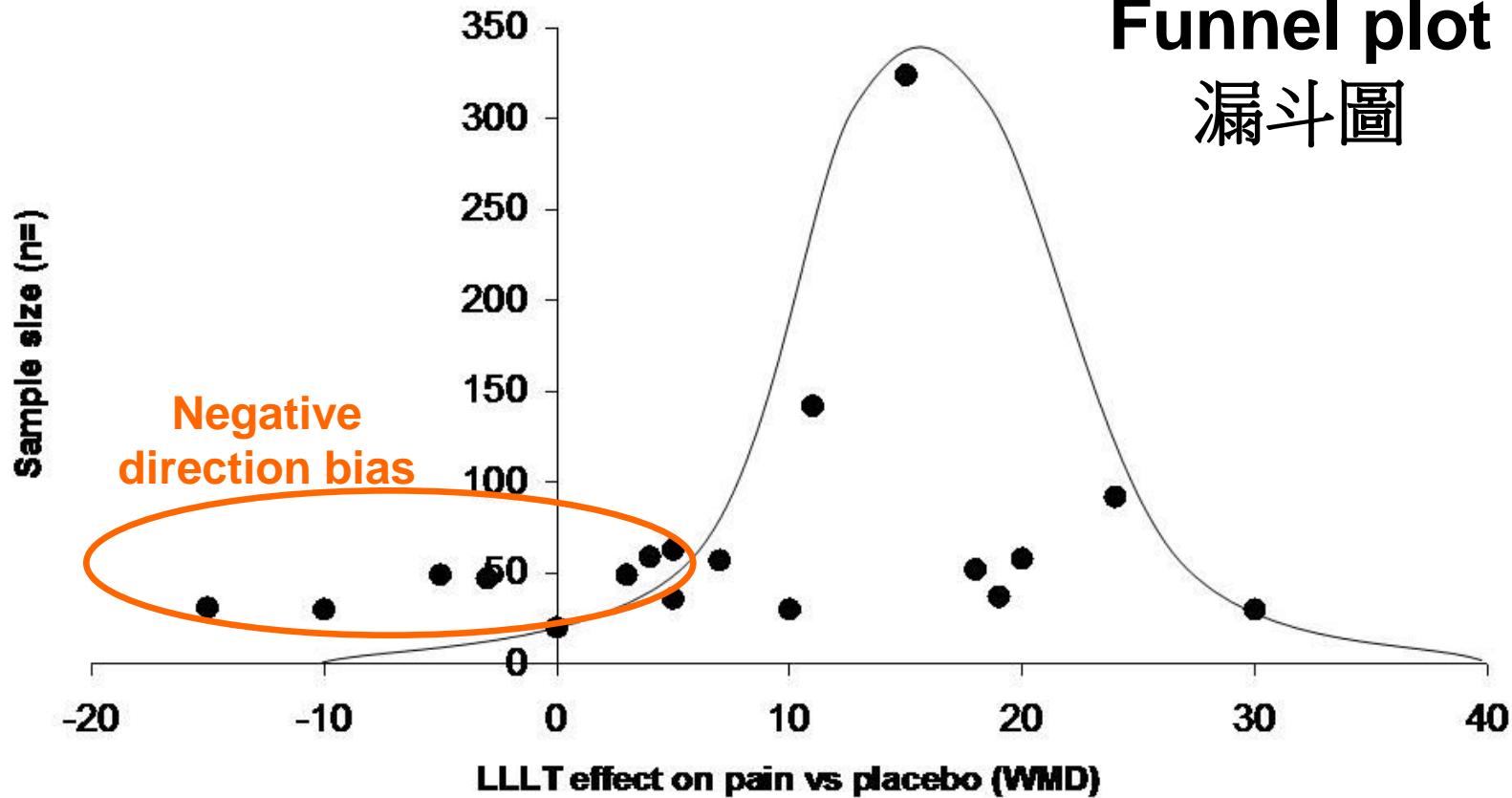
誤差偵測	種類	結果
Positive bias detection	Method score (Pedro criteria list)	平均6.5分 (僅有一篇低於5分)
	Profit funding source	未提及雷射製造公司 未有作者為雷射製造商會員
Negative bias detection	Long symptom duration	6篇症狀平均大於21週
	Recent steroid injection	5篇患者收案前曾使用類固醇注射
	Effective co-interventions	4篇同時併用運動治療

Study by first author	A) Steroid injections (> 20%)	B) Mean symptom duration	C) Mean baseline pain	D) Prior treatment failures	E) Concurrent exercise therapy	Deflated effect size due to patient selection bias
Basford [53]	6/23	25	48	?	No	Yes (A, B)
Gudmundsen[51]	?	19	?	134/92*	No	Possible (A,C,D)**
Haker [50]	17/25	52	?	20/25	No	Yes (A,B,D)
Haker [46]	18/49*	26	?	38/49*	No	Yes (A,B,D)
Krashennikoff [54]	?	9	55	?	No	Possible (A, D)
Lam [55]	0	13	51	0	Eccentric + stretching	Possible (E)
Lundeberg [47]	0	> 12	?	?	No	Possible (B,C,D)
Løgdberg-Andersson [49]	8/73	26	36	54/73	No	Yes (B)* *
Oken [56]	0 (not < 6 weeks before)	24	71	?	Strengthen-ing and stretching	Yes (B,C,E)
Palmieri [57]	0	5	65	0	No	No
Papadopoulos [52]	11/14	28	45	21/14	Yes (no details)	Yes (A,B,C,D)
Stergioulas [48]	0	6	53	0	Eccentric + stretching	No
Vasseljen [58]	5/15	17	43	8/15	No	Yes (A, E)

Publication bias 發表誤差

Publication bias plot

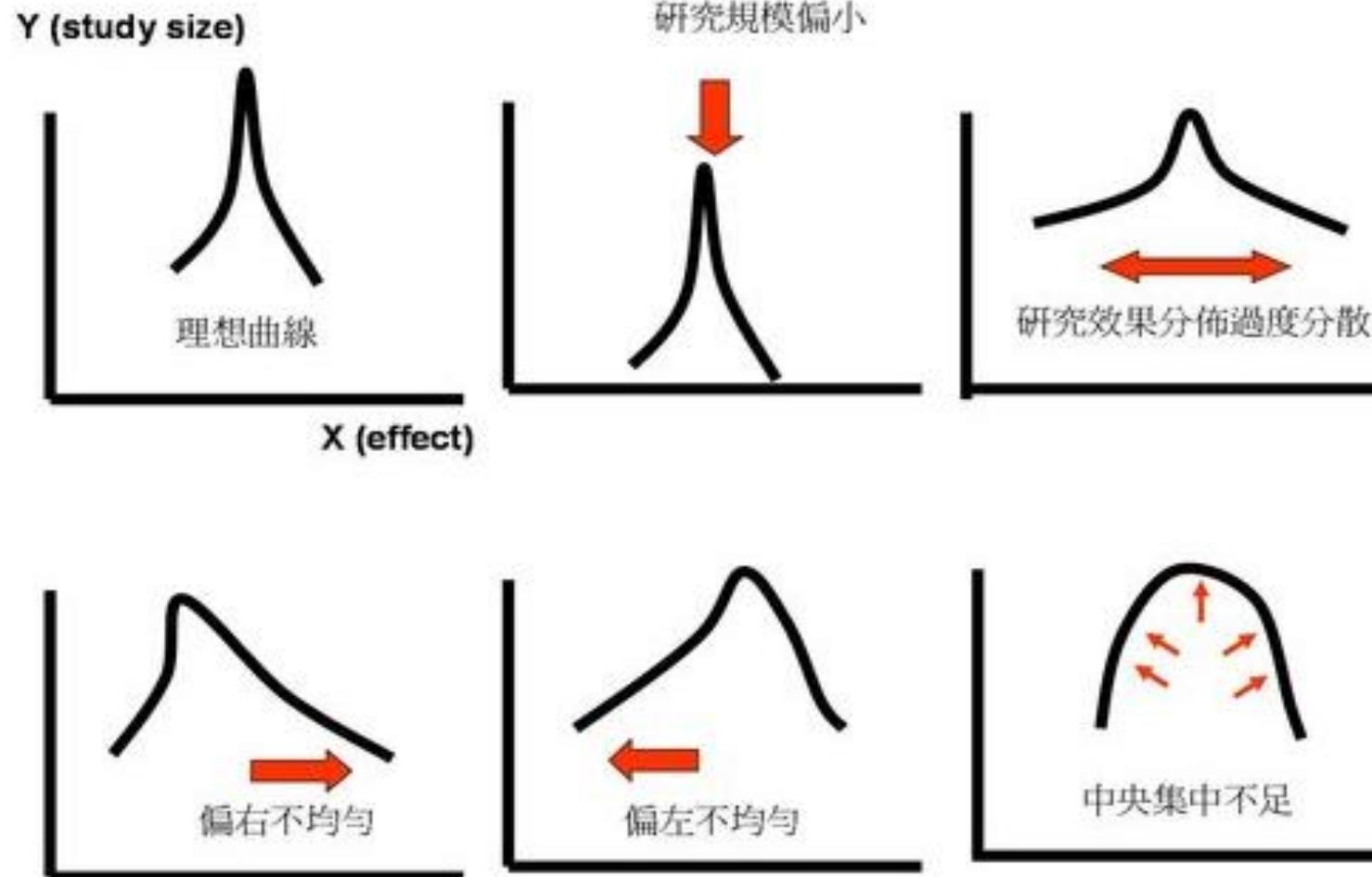
Funnel plot
漏斗圖



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Publication bias



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Assessment of procedures and treatment variables

Study by first author	Laser wavelength (nm)	Laser mean output (mW)	Energy dose per point (J)	Total energy dose per session (J)	Power density (mW/cm ²)	Points irradiated	Total irradiation time (s)	No. therapy sessions
Basford [53]	1064	4080	12.2	12.2	204	7	60	12
Gudmundsen[51]	904	12	1.2	1.2	3	4.6 cm ² area	480	8
Haker [50]	904	12	0.36	2.16	24	6	180	10
Krashenninikoff [54]	830	30	3.6	7.2*	110	?	120	8 (max.)
Lam [55]	904	25	0.28	0.66	208	2.4	22	9
Løgdberg-Andersson [49]	904	8	0.25*	0.5	24	2*	62	6
Oken [56]	632	10	6	6	?	1	600	10
Palmieri [57]	904	3	0.6	1.8	50	3	600	20
Papadopoulos [52]	820	50	3	3	714	1	60	6
Stergioulas [48]	904	40	1.2	7.2	80	6	180	12
Vasseljen [58]	904	1.5	0.9	3.6	6	4	600	8

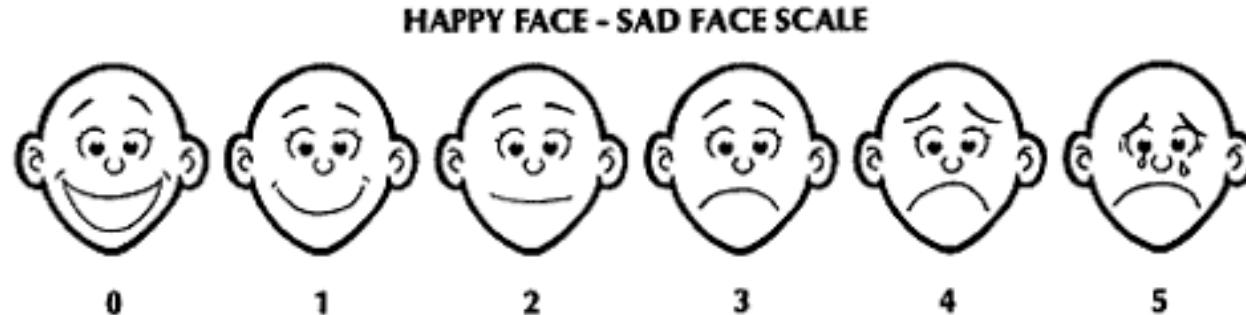
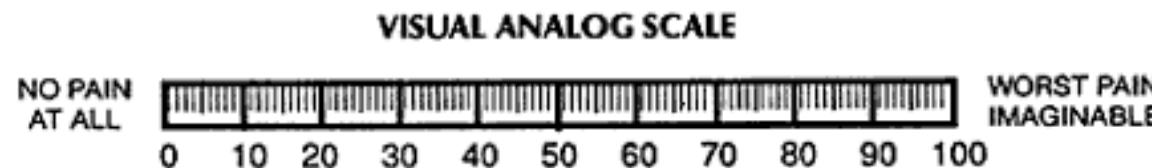
Assessment of procedures and treatment variables

Study by first author	Laser wavelength (nm)	Laser mean output (mW)	Energy dose per session (J)	Power density (mW/ cm ²)	Points irradiated	Total irradiation time (s)	No. therapy sessions
Haker [46]	904	8	1.20	16	5	150	10
Lundeberg [47]	632/904	1.56/ 0.07	0.09 / 0.004	10	11	60	10

評估方法 outcome measure

- Primary

- Visual analogue scale 視覺類比量表(VAS)
- Improved global health status
 - Improved
 - Good
 - Better
 - Much improved
 - Pain-free
 - Excellent



評估方法 outcome measure

- Secondary

- painfree grip strength 無痛握力 (dynamometer, vigorimeter)
- pain pressure threshold 壓痛閾值 (algometer)
- sick leave 因不適症狀而無法工作 (days)
- Follow-up results



dynamometer



vigorimeter

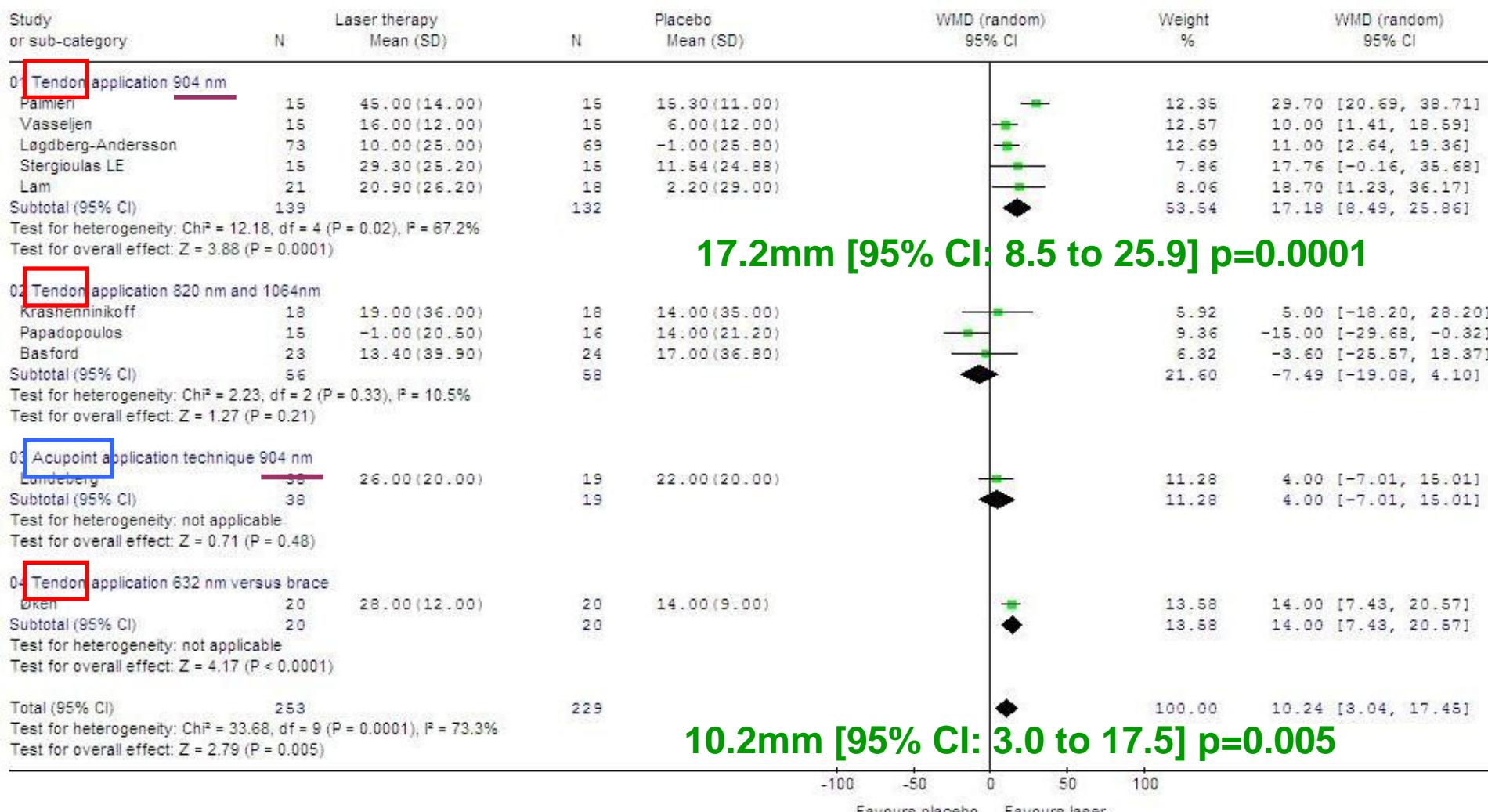


algometer

Meta-analysis of effects – Primary Outcome

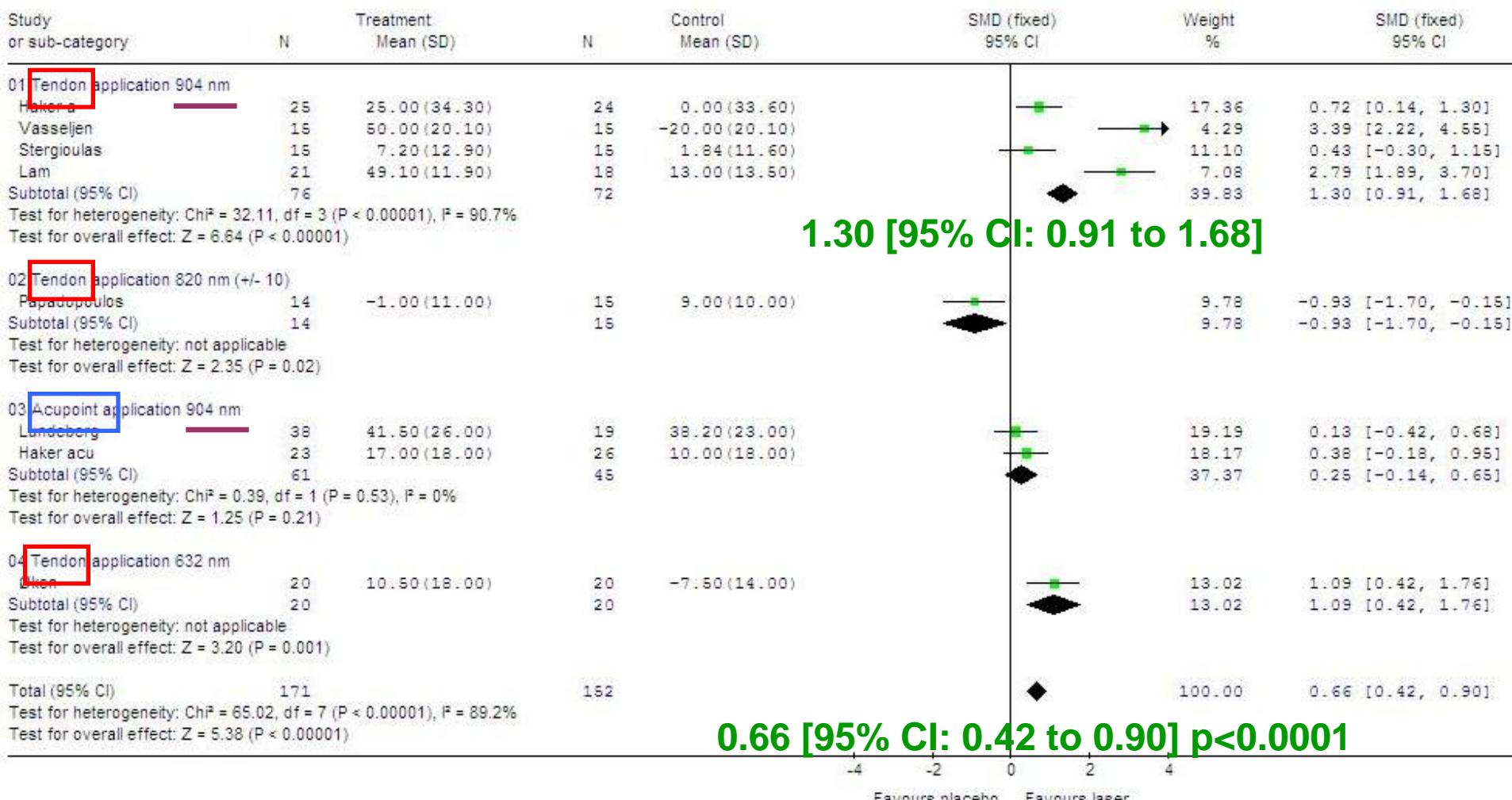
the WMD pain reduction on 100mm VAS

Review: Laser tendinopathy
 Comparison: 05 Lateral elbow tendinopathy pain
 Outcome: 01 Pain reduction on 100 mm VAS at end of study



Meta-analysis of effects – Secondary Outcome the SMD for pain-free grip strength

Review: Laser tendinopathy
 Comparison: 05 Lateral elbow tendinopathy pain
 Outcome: 03 Pain free grip strength improvement



Disscussion (1)

- 系統性回顧
 - 搜尋關鍵字更廣
 - 無語言限制
 - 排除品質不佳的RCTs (不符合inclusion criteria)
 - 排除治療方法有問題的RCTs
 - 排除利益團體資金贊助的文章 (v.s 使用藥物治療疼痛的文獻有83%有企業資金贊助*)
- 統合分析
 - 依低能量雷射的波長及治療部位分組討論
 - 分析可能產生的誤差(bias)

* Bjordal JM, Ljunggren AE, Klovning A, Slordal L: Non-steroidal antiinflammatory drugs, including cyclo-oxygenase-2 inhibitors, in osteoarthritic knee pain: meta-analysis of randomised placebo controlled trials. *BMJ* 2004, 329(7478):1317-21.

Discussion (2)

- 使用904nm針對韌帶治療的組別(7 trials)，各項結果均有顯著意義
- 使用632nm針對韌帶治療的組別(1 trial)，也有正向結果
 - 穿透深度較淺*
 - 治療劑量較高(6焦耳)
- 使用830nm或1064nm的組別(3 trials)，無顯著意義
 - 治療劑量過高(平均約7.5焦耳)
 - 患者病程較長(2試驗大於21週)
 - 治療前曾注射類固醇的比例較高(2試驗大於20%)
- 對中醫穴道治療的組別(2 trials)，無顯著意義
- 此13篇文獻未有副作用相關報導

* Enwemeka CS: Attenuation and penetration depth of red 632.8 nm and invisible infrared 904 nm light in soft tissues. *Laser Therapy* 2001, 13:95-101.

STEP 4 – Applying 臨床應用

Q1: 我的病人是否與研究族群差異很大?

- 不會
- 選擇病程較短(<21wks)，未接受類固醇注射的網球肘病患效果較好

Q2: 研究中的治療是否實際可行?

- 可以
- 操作正確波長(904nm)的雷射針灸器械
- 確認網球肘病患韌帶病變部位
- 使用低劑量(5-50mW/cm²)治療以達到生物刺激效應

Q3: 治療對於病人的益處和風險?

- 可減輕疼痛，改善功能等各項指標
- 無明顯副作用

Q4: 病人會如何看待這樣的治療?

- 正向，且大多數病人都能夠接受

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STEP 5 – Auditing 評估成果

目前證據顯示，正確使用雷射針灸對於網球肘患者的疼痛、整體健康程度，以及無痛握力、局部壓痛、工作能力影響、長期預後都有幫助



無菌、無痛、安全、劑量可調整

別擔心！不會有明顯副作用～

未來研究方向

- 904nm是否為最合適治療網球肘的波長？
- [雷射針灸 v.s. 針灸、注射類固醇]的療效比較
- 雷射針灸是否有更多適應症？

How do I
right-click?



小結

Summary

- 實證醫學可從龐大的醫學資料庫中找出值得信賴的部分：5A問查
讀用審
- 利用方法學及誤差偵測可篩選出符合需求的文獻。
- 將所能獲得的最佳文獻證據應用於臨床工作中，使病人得到最佳的照顧：實證、專業、病患三位
一體



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Thanks for Your Attention!