

Elite Training Seminar

Sports Recovery

Sports Medicine Division

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Outline



- What is Sports Recovery?



- The importance of Sports Recovery



- How we could use Sports Recovery to enhance athlete's performance?

Practical Rest and Recovery Strategies for Athletes



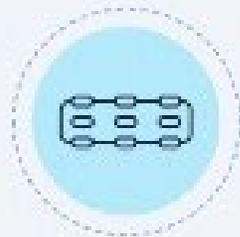
Sleep



Listen to the Body



Ice & Contrast Baths



Recovery Tools



Periodization



Hydration



Sports Massage



Mental Rest

類別	恢復干預措施
Compressive Techniques	按摩 (Massage)
	壓縮服裝 (Compressive Garments)
	水療法 (Water Immersion)
Electro-stimulation	電刺激 (Electro-stimulation)
Stretching	拉伸 (Stretching)
Anti-Inflammatory Interventions	冷療法 (Cryotherapy)
	冷水浸泡 (Cold Water Immersion)
Active Recovery	主動恢復 (Active Recovery)

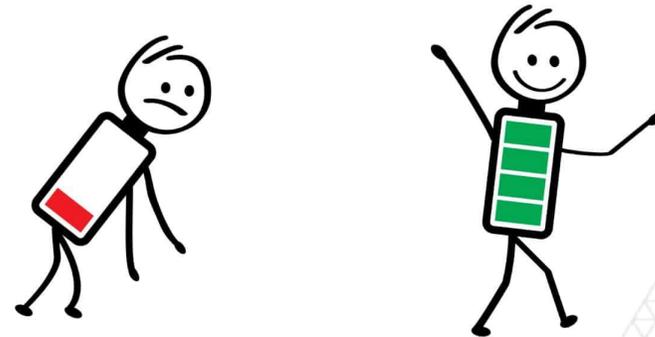
定義 Definition

The process of becoming **well again** after an illness or injury.

The **process** of allowing your body to recovery (=return to normal) after doing strong exercise.

Cambridge Dictionary

恢復是一個**多層面**的過程（生理、心理、社會），旨在**重建**個人的**資源儲備**並恢復其**完全的功能能力**。



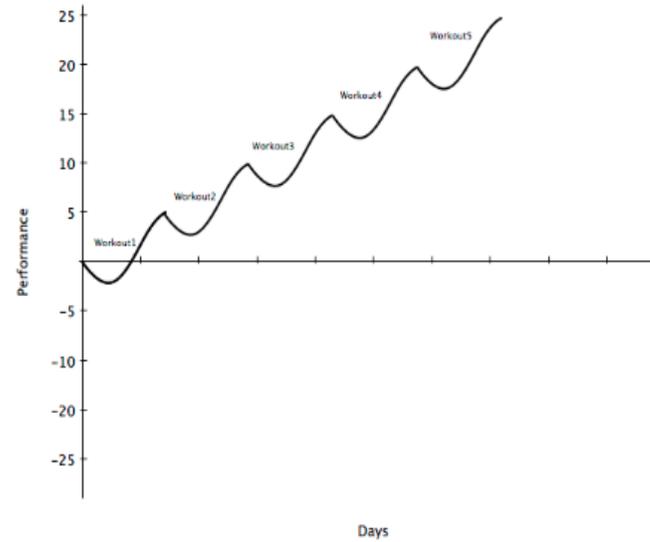
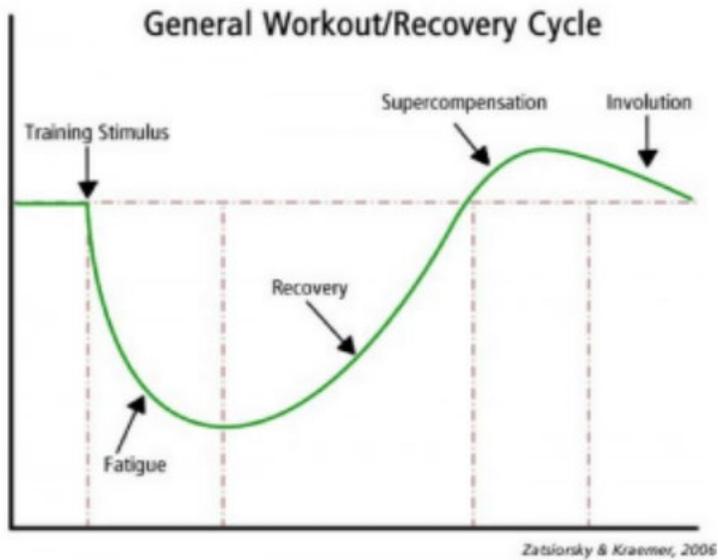
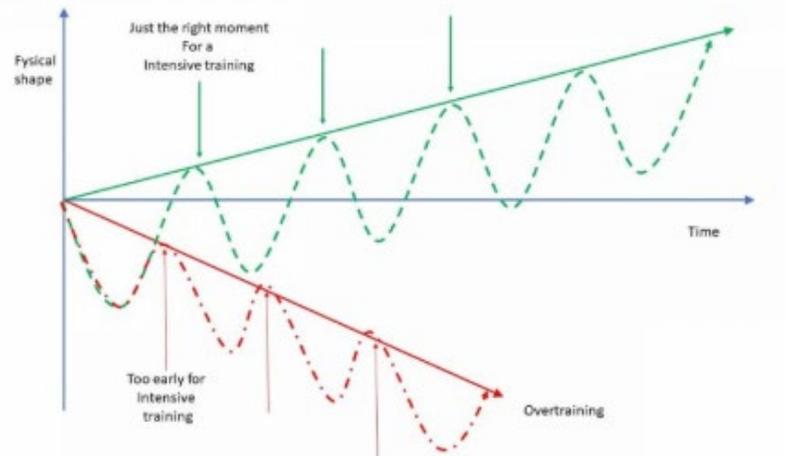


Figure 2: 'Re-exposure at the peak of the supercompensation curve'



Consistent Training Stimulus

Figure 3: 'Improving performance vs overtraining' compares the improving performance through correct programming (green), and overtraining (red).



Compression Methods



手法 Manual Technique



Review

The Effects of Massage Therapy on Sport and Exercise Performance: A Systematic Review

Miloš Dakić¹, Lazar Toskić^{2,3,*}, Vladimir Ilić¹, Saša Đurić⁴, Milivoj Dopsaj¹ and Jožef Šimenko^{5,*}

4.1. The Effect of Massage Therapy on Motor Abilities

In most studies, massages did not affect muscle force [15–31], but a few studies showed that massages led to a significant improvement in muscle force [32–38]. They also revealed that performing a massage before doing muscle strength or speed tests in most conditions did not alter the results in the post-tests [18,24,25,27,30,36,41–51,61–64]. However, the results of several studies showed improvements in muscle force and strength, especially 48 h after the fatigue protocols [21,35,36,47,53,59].

Most analyzed studies found that a massage neither accomplished a positive nor a negative effect on sprint performance [48,61–64], and it did not alter the dynamic reaction time [50]. Arabaci (2008) also examined the effects of a massage on sprint performance. The results revealed that a massage did not change the 20 m flying sprint completion time or the leg reaction time. On the other hand, the massage protocol induced significantly shorter completion times of 10 m and 30 m runs [60].

Concerning endurance, a twenty-minute massage did not improve the cycle ergometer endurance times (total or lap times) during a 161 km race. The race was finished in 4 days, and the same distance had to be completed daily [65]. In a similar endurance study, the subjects did not obtain better results in a 5 km bicycle race when they were given a massage rather than active or passive rest. However, combining massage and active recovery led to better results at the same distance [66]. Junker and Stöggel (2019) also demonstrated that

The most obvious effects of the massage were the effects on flexibility, as most studies indicated a positive correlation between massage and flexibility, significantly increasing the range of motion. Therefore, it is concluded that a massage can be used as an alternative

4.2. The Effects of Massage Therapy on Neurophysiological Mechanisms

Bale and James (1991) confirmed that a massage has a **positive effect** on **lactate removal** (LR) [88]. There was just one more study in which a massage was **more effective** than **passive recovery** was in removing blood lactate (10 min massage after 200 m of front crawl swimming with maximal effort) [69]. Nevertheless, one study showed that a massage **negatively** affected LR [99]. In this study, subjects performed 2 min of strenuous isometric handgrip exercise at 40% MVC to elevate the level of forearm muscle lactic acid after they received a manual massage for 10 min. This was the first study that examined venous lactate acid, allowing researchers to investigate a massage's influence on its removal from exercised muscle. In a series of future studies, other authors did not obtain similar results [11,12,19,66,87,89–95].

Researchers tried to explain eventual lactate removal with increased **blood flow** (BF) and **temperature** changes during that period. Several methods were used to analyze the relationship between massage and BF; the results differed depending on the method used. Two studies found that massage therapy **increased BF**. They used a Laser blood flow meter [96], Spectral Doppler, and Power Doppler ultrasound [97]. In the other three studies, the researchers used the Pulsed Doppler method and **did not find any effect** on BF [15,98] or even impeding factors [99].

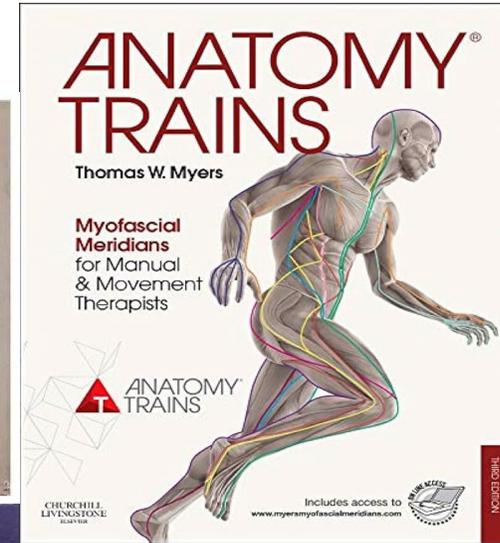
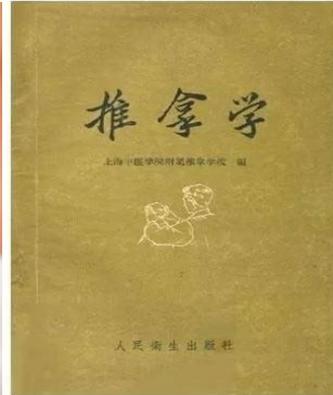


4.3. *The Effects of Massage Therapy on Psychological Mechanisms*

Studies that link massage and psychological mechanisms are scarce. In the athletic and recreational sport population, most of the studies confirmed a **positive correlation** between a massage and the **improvement** of different **psychological states**. Massages **reduce stress** [122,124], **anxiety** [120–123], **depression** [122], and **fatigue perception** [92,93,96,112,125–127] and **increase mood** [56,120,121], **relaxation** [120] and **recovery from fatigue** [91,124,125]. However, only **one study** found **no influence** of massages on **mood state** [128]. In that study, 16 subjects completed a questionnaire to establish their baseline mood, and then performed a 30 s Wingate anaerobic cycling test. After the test, they received a 30 min massage or had 30 min of passive rest, and then repeated the same procedure.

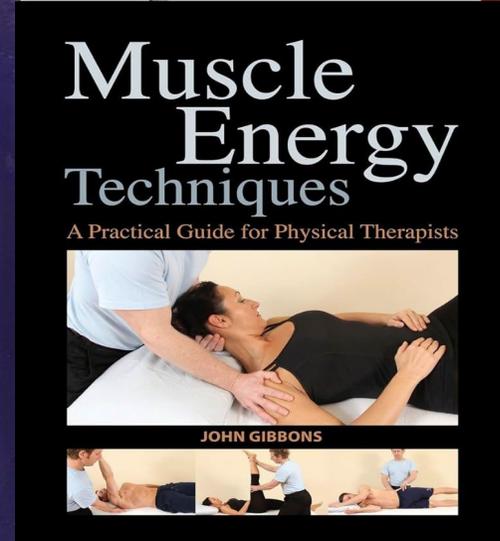
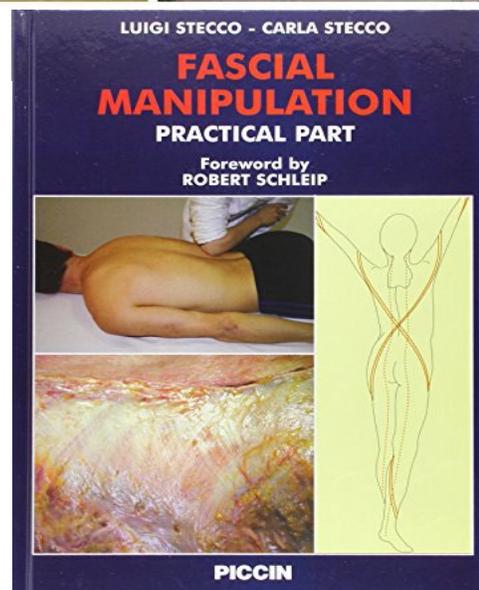


手法 Manual Technique



SPORTS MASSAGE

Sports massage therapy is typically geared toward athletes. The sports massage technique is specific to the athlete's sport of choice and focuses on areas of the body that are overused and stressed from repetitive and often aggressive movements.

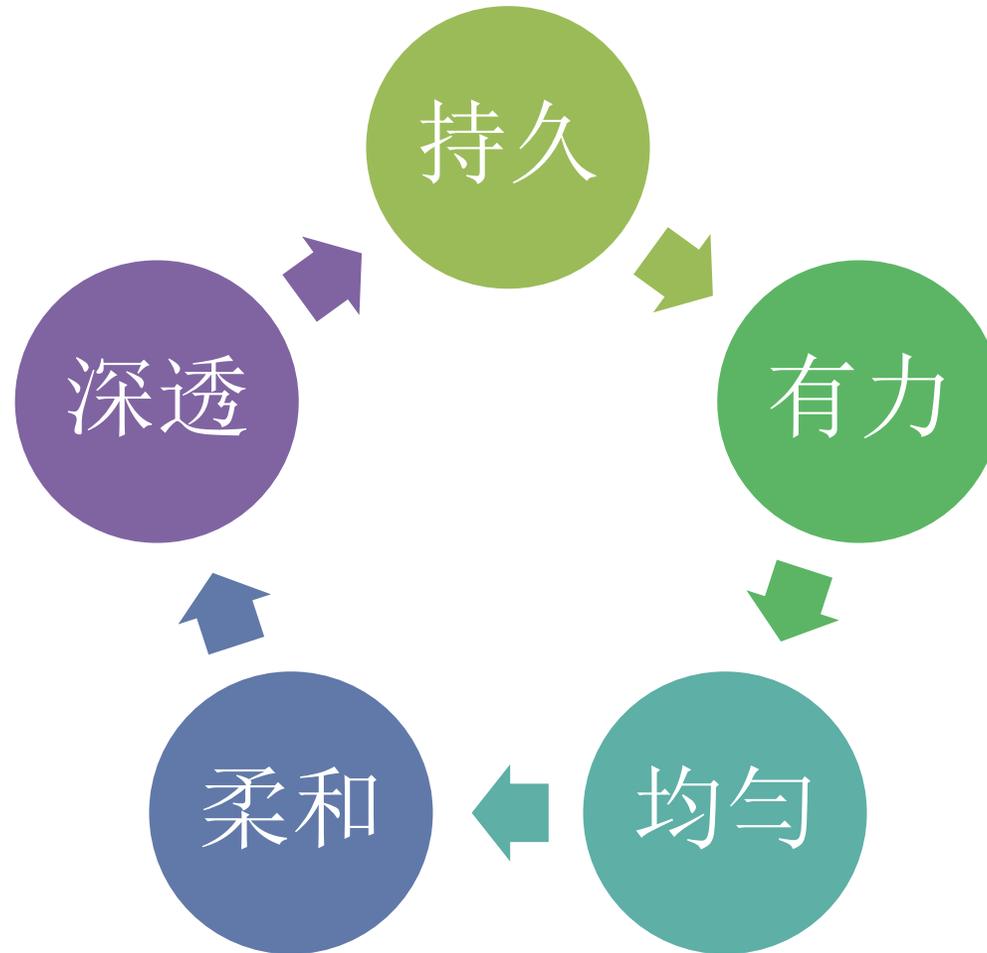


中醫推拿與運動醫學相結合

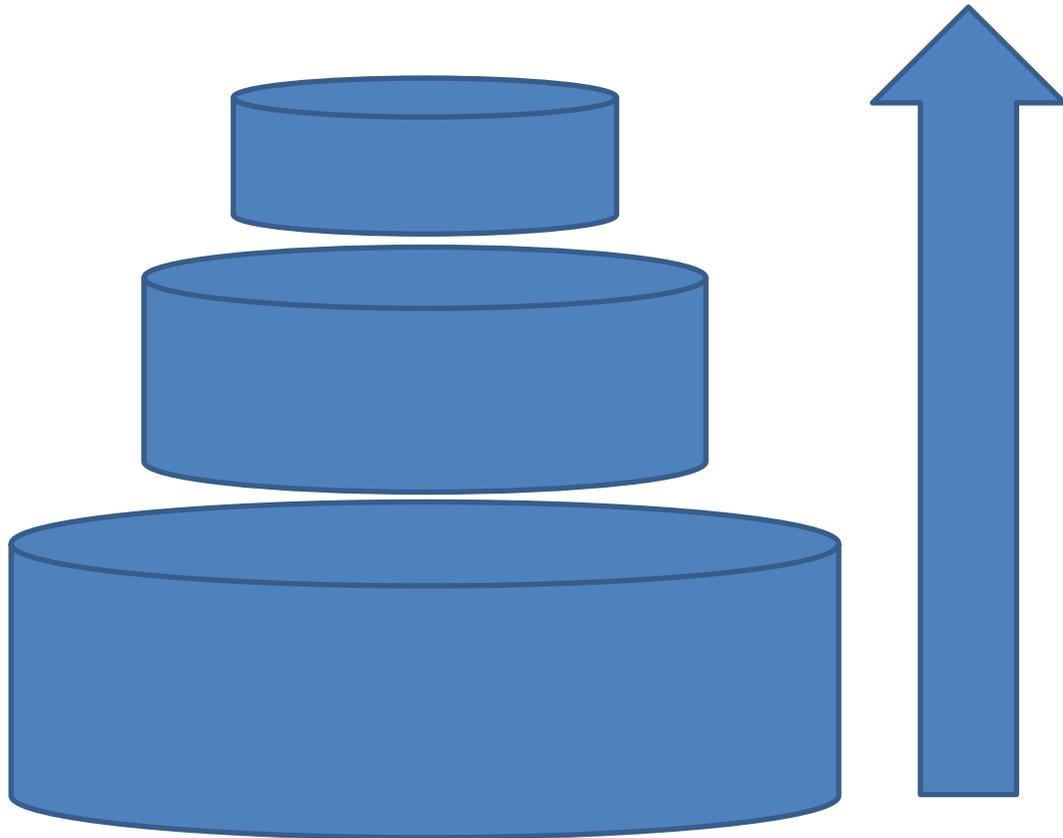
手法治療在傳統中醫推拿的基礎上，結合西方按摩手法，取長補短，在發揚傳統推拿理論的同時，加強對**人體解剖、生理病理**的研究，診斷參考西醫病名，推拿操作採取**經絡腧穴與解剖部位相結合**，最終達到治療運動相關的急慢性損傷疾病的目的。

Builds on classical Tui Na (Chinese therapeutic massage) and integrates Western massage techniques, combining the strengths of both. While carrying forward traditional Tui Na theory, it places greater emphasis on the study of **human anatomy, physiology, and pathology**. Diagnostic references from Western medicine are used, and manual techniques combine **meridian and acupoint principles with anatomical locations**. The ultimate goal is to treat acute and chronic sports-related injuries and disorders.

手法的技術要求 Technical Requirements for Manual Therapy



手法學習的三個階段



- 人體操作訓練
- 手法滲透力的學習和訓練，即手法之“神”或功力
- 手法基本動作的學習和訓練，模擬手法之“形”

Active Recovery

Long term development

Load – Recovery – Regeneration

Strength – Flexibility – Mobility

Overloading – Overtraining



TOP 5 LEARNINGS

1. The 'good stuff' happens during recovery, we need the training but we need the recovery to drive adaptation
 2. If you can work out when to include it (recovery) & when to take it away, you have yourself some real advantages
 3. You need to be fatigued to drive the adaptation (fatigue is not the enemy)
 4. For shorter term goals maximise recovery, for longer term goals you can experiment a bit; with a bit more fatigue, a good taper & building up adaptation
- The most consistent predictor of underperformance has been shown to be how an athlete 'feels'



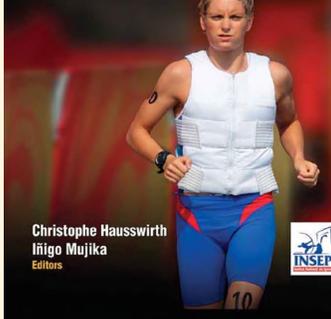
THE EXPERT EDITION
PHYSICAL PERFORMANCE SHOW #238

Shona Halson
Associate Professor, 'Periodising Recovery for the Athlete'

POWERED BY:
Shona Halson Livestream



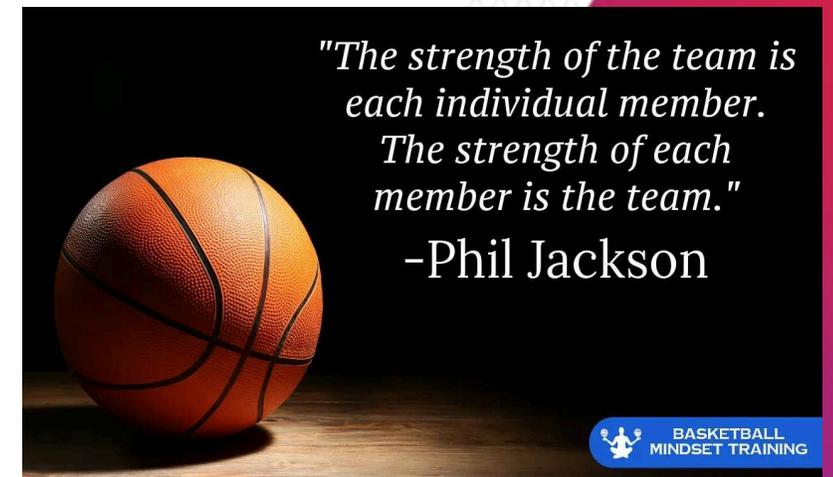
RECOVERY FOR PERFORMANCE IN SPORT



Take Home Message

Your training has provided the stimulus to make you a better athlete. But all those gains are going to be realized during your recovery.

Try different methods, combine them together, become your own routine.



感謝大家



Lori Lee 李婷婷
Sports Recovery
Officer
運動恢復主任

- 前空手道運動員
- 運動創傷預防及處理
高等文憑
- 運動按摩證書
- 伸展按摩證書

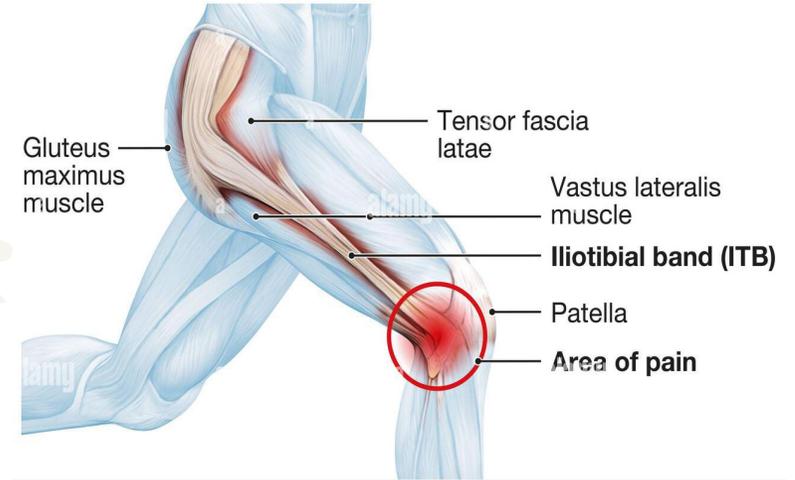


運動員期間因恢復不夠的傷勢

髂脛束過緊
半月板撕裂
內側韌帶撕裂

脛骨前肌過緊
踝關節扭傷

Iliotibial Band Syndrome



alamy

Image ID: 2X71EWC
www.alamy.com

Tibialis Anterior



Bodyworks Prime

www.bodyworksprime.com

水療療法與運動恢復

熱水浴 (Hot water immersion) 、
冷水浴 (Cold Water Immersion) 及
對比水療法 (Contrast Water Therapy)
完全指南

冷/熱水浴



- Hot 30-40
- Cold 10-12

冷水浸泡

- 攝氏約7-8度
- 時間約10秒
- 適合前肘部炎症
- 如投球手/網球肘/
哥爾夫球手



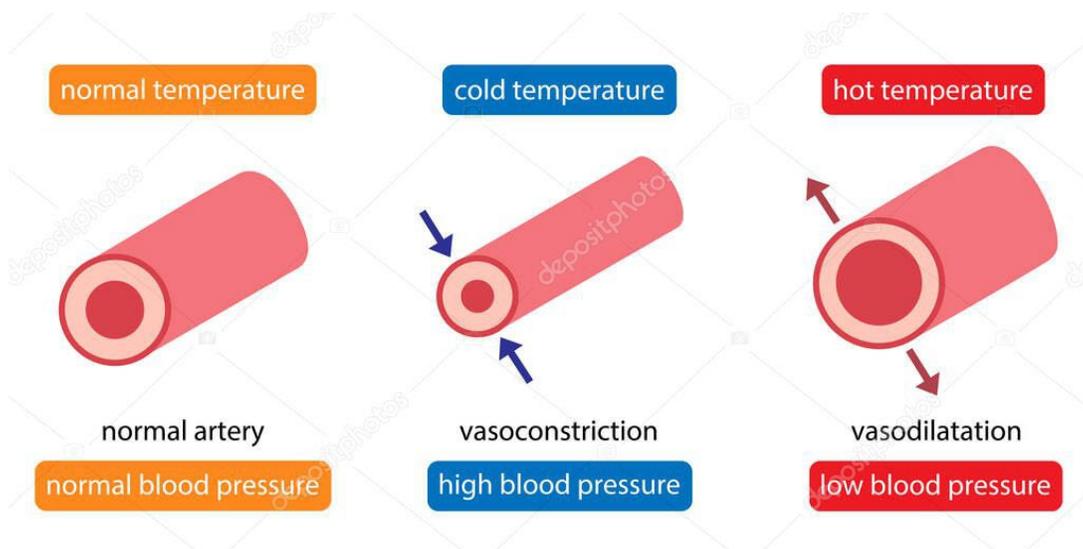
GAME READY

- 可選擇冷/熱度數
- 外加壓力
- 局部位置
- 可隨隊攜帶



溫度療法的科學原理

利用溫度調節血液流動和組織癒合



冷水浸泡
(冷凍療法)
Cold water
immersion

熱水浸泡
(熱療)
Hot water
immersion

對比水療法
(冷熱交替)
Contrast water
therapy

原理	血管收縮 Vasoconstriction	血管擴張 Vasodilation	泵送效應 Pump Effect
目標	寒冷減少血流量，以減輕發炎，麻痺疼痛及肌肉腫脹 加速中樞神經系統疲勞恢復 降低氧化反應 提高募集肌肉的能力	熱能增加血流量，以放鬆肌肉和沖走代謝廢物	交替溫度產生「泵送」作用，幫助清除乳酸

冷水浸泡（冷凍療法）

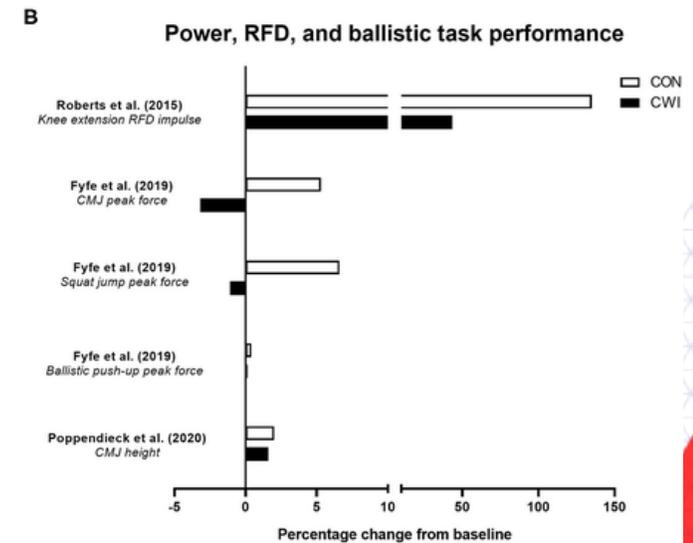
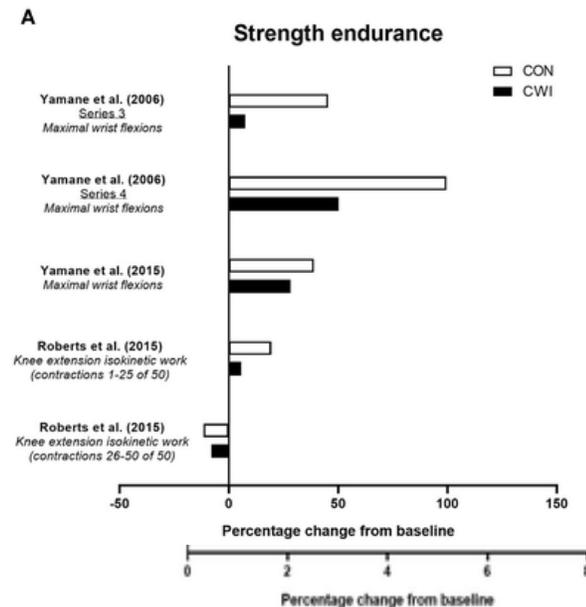
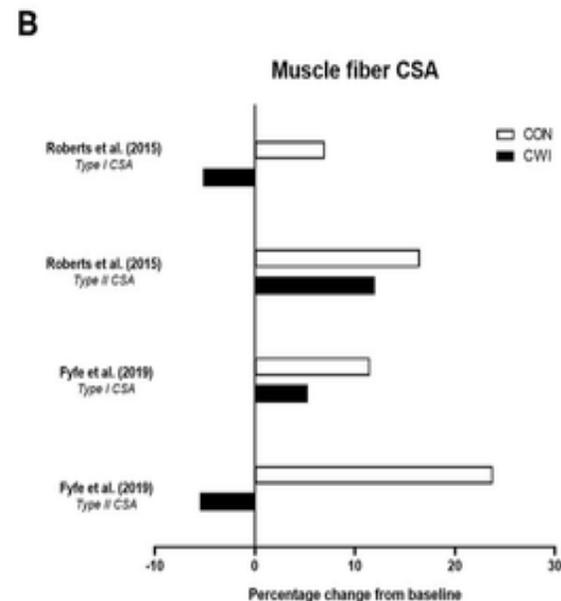
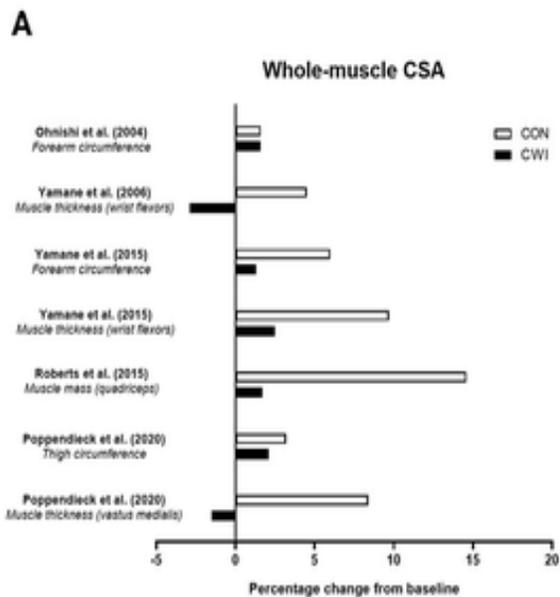
Cold Water Immersion (CWI)

- 主要機制：降低組織溫度、減緩神經傳導速度、收縮血管
- 何時使用：
 - 急性損傷：受傷後立即使用（如扭傷、拉傷），以限制腫脹（受傷後**24-48**小時內）
 - 高強度訓練後：劇烈運動後（如衝刺、接觸性運動、增強式訓練），以緩解延遲性肌肉痠痛
 - 體溫過高：快速降低核心體溫

冷水浸泡 (冷凍療法)

Cold Water Immersion (CWI)

- 冷水浸泡對增肌的方面的影響
- 文獻指出冷水浸泡(CWI)過程中減少因肌肉破壞而產生的炎症，
- 體溫降低打破肌肉蛋白質平衡，蛋白質合成↓分解↑，降低肌肉增長成效
- 如訓練目的是：
 - 透過高強度→破壞肌肉→增肌 ☒
 - 提升爆發力(RFD) ☒



冷水浴的禁忌症

何時不應使用：

- 周邊神經病變：如糖尿病 (Diabetes) 患者（有神經損傷風險）
- 心血管疾病：寒冷壓力會增加心臟負荷
- 開放性傷口或皮膚感染
- 對寒冷過敏
- 懷孕期間

冷水浴的時機與應用方案

- 溫度： 10 - 15 度
- 持續時間： 5 - 15 分鐘（水溫越低，時間越短）
- 最佳實踐：
 - 浸泡受影響的肢體或全身
 - 專注於控制呼吸以應對最初的冷休克
 - 不要在訓練前使用（可能會抑制神經肌肉反應，增加受傷風險）

熱水浸泡（熱療）

Hot Water Immersion

- 主要機制：提高組織溫度、擴張血管、放鬆肌肉纖維
- 何時使用：
 - 肌肉僵硬：在進行伸展或活動度訓練之前
 - 慢性疼痛：緩解關節僵硬或肌肉緊張
 - 訓練前（熱身）：增加組織延展性，預防受傷（短時間）
 - 精神放鬆：減壓和促進睡眠

熱水浴的禁忌症

何時不應使用：

- 急性損傷：切勿對新傷（48小時內）加熱 □ 加劇出血和腫脹
- 多發性硬化症 (Multiple Sclerosis)：熱能會暫時加劇症狀
- 懷孕期間：有體溫過高的風險
- 心臟疾病：會顯著增加心率及心臟負荷
- 開放性傷口或皮膚感染

熱水浴的時機與應用方案

- 溫度： 36 – 40 度
- 持續時間： 10 - 20 分鐘
- 最佳實踐：
 - 最好在急性發炎期過後使用（運動後24-48小時）
 - 理想時間是晚上，以促進睡眠
 - 補充充足水分，以替代出汗流失的液體

對比水療法

Contrast Water Therapy (CWT)

- 何時使用：
 - 延遲性肌肉痠痛 (DOMS)：最適合中等強度訓練後的全身性痠痛
 - 減輕水腫：幫助促進四肢的液體流動
 - 傷後康復：常用於損傷恢復的亞急性期 Sub-Acute Phase（腫脹停止後）
 - 一般性疲勞：在密集訓練後，讓身體感覺「煥然一新」
- 主要機制：製造血管泵送效果。寒冷使血管收縮，熱能使血管擴張。這種轉變迫使血液流出組織（冷），並讓含氧血液迅速回流（熱）

對比水療法的禁忌症

何時不應使用：

- 急性發炎：如果患處仍然發熱、紅腫，請勿使用（應僅使用冷水）
- 開放性傷口
- 心血管或血壓問題：血管管徑的快速變化會對心臟造成壓力。
- 血液循環不良

對比水療法的時機與應用方案

- 標準方案：
 1. 從熱水開始：3-4 分鐘
 2. 切換到冷水：1 分鐘
 3. 重複循環：3-5 次
 4. 總是以冷水結束（以減輕發炎並喚醒神經系統）
（如果目標是放鬆，可以熱水結束—運動員較少採用）

水療療法使用貼士

- 留意身體的反應：如果感覺疼痛或不適，請立即停止
- 補充水分：所有方法都會對身體造成某種程度的生理壓力或導致水分流失
- 結合主動恢復：水療與輕度活動和營養補充搭配使用，效果最佳
- 諮詢專業人士：如果您有任何潛在健康問題，請先諮詢醫生或物理治療師

水療療法總結表

特點	冷水浸泡（冷凍療法） Cold water immersion	熱水浸泡（熱療） Hot water immersion	對比水療法（冷熱交替） Contrast water therapy
主要目標	減輕發炎、麻痺	疼痛 放鬆肌肉、增加活動度	沖走廢物、緩解肌肉痠痛
最佳使用時機	運動後 / 受傷後立即使用	慢性僵硬 / 晚間	一般恢復 / 傷後亞急性期康復
何時避免	出現急性損傷	患處腫脹時	急性腫脹 / 心臟問題
應用時間	5-15 分鐘	10-20 分鐘	15-25 分鐘（循環）



An Evidence-Based Approach for Choosing Post-exercise Recovery Techniques to Reduce Markers of Muscle Damage, Soreness, Fatigue, and Inflammation: A Systematic Review With Meta-Analysis

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Introduction: The aim of the present work was to perform a meta-analysis evaluating the impact of recovery techniques on delayed onset muscle soreness (DOMS), perceived fatigue, muscle damage, and inflammatory markers after physical exercise.

Method: Three databases including PubMed, Embase, and Web-of-Science were searched using the following terms: (“recovery” or “active recovery” or “cooling” or “massage” or “compression garment” or “electrostimulation” or “stretching” or “immersion” or “cryotherapy”) and (“DOMS” or “perceived fatigue” or “CK” or “CRP” or “IL-6”) and (“after exercise” or “post-exercise”) for randomized controlled trials, crossover trials, and repeated-measure studies. Overall, 99 studies were included.

Results: Active recovery, massage, compression garments, immersion, contrast water therapy, and cryotherapy induced a small to large decrease ($-2.26 < p < -0.40$) in the magnitude of DOMS, while there was no change for the other methods. Massage was found to be the most powerful technique for recovering from DOMS and fatigue. In terms of muscle damage and inflammatory markers, we observed an overall moderate decrease in creatine kinase [MD (95% CI) = -0.37 (-0.58 to -0.16), $P = 40.15\%$] and overall small decreases in interleukin-6 [MD (95% CI) = -0.26 (-0.60 to -0.12), $P = 0\%$] and C-reactive protein [MD (95% CI) = -0.38 (-0.59 to -0.14), $P = 39\%$]. The most powerful techniques for reducing inflammation were massage and cold exposure.

Conclusion: Massage seems to be the most effective method for reducing DOMS and perceived fatigue. Perceived fatigue can be effectively managed using compression techniques, such as compression garments, massage, or water immersion.

Keywords: meta-analysis, recovery, DOMS, fatigue, inflammation, muscle damage, immersion efficiency

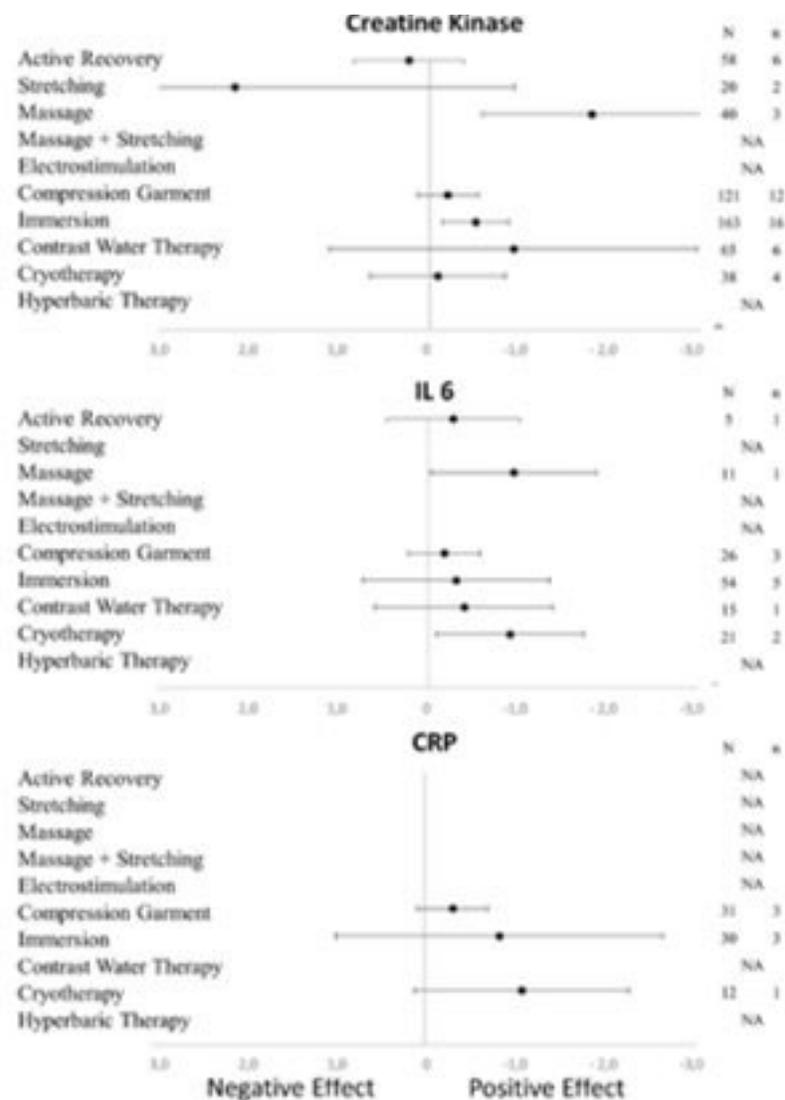


FIGURE 2 | Effects of recovery techniques on the kinetics of muscle damage (CK) and inflammatory markers (CRP and IL-6). NA, not available; N, number of subjects; n, number of experimental groups.

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