Strength and Conditioning in MSK Physiotherapy

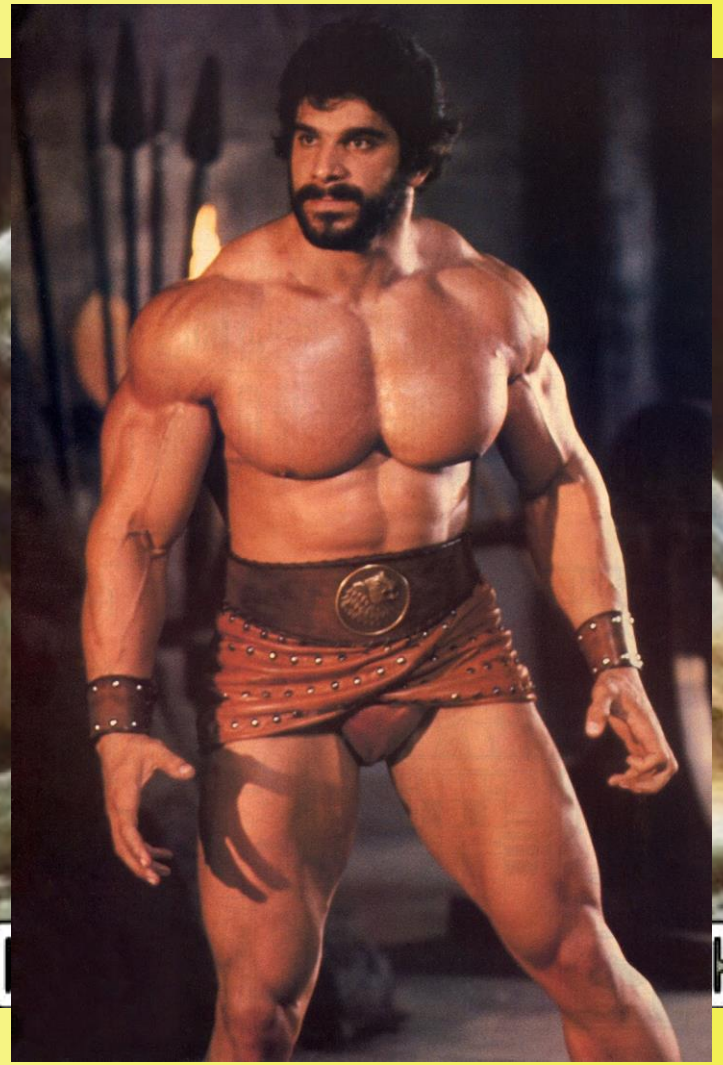
Rob Tyer, BSc (Hons), MSc, MSc, MMACP, MCSP

Advanced Practice Physiotherapist


Disclaimer

What is “Strength”

Connect



What is “conditioning”

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Time + Effort=

Where are you on the continuum?

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Variable	Phase 1: Hypertrophy	Phase 2: Strength/Power	Ph Pe
Reps			
Sets	High	Moderate	Lo
Rest	Short	Moderate	Lo
Load	Low	Moderate	Ve
Volume	High Moderate	Moderate	Lo
Training sessions per week			3-6

Purist S+C approach

Loose advice and guidance approach

Response to the word “Exercise”

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Expectation

Reality

Is this actually more representative of how we think the session will go down?
Is this the problem?

Needs analysis

- Who's needs?
- How do you gather this information?
- When do you gather it?
- Can YOU meet those needs?

#WhatsYourPatter

"If you didn't have this problem, what would be the 1st thing you'd do?"

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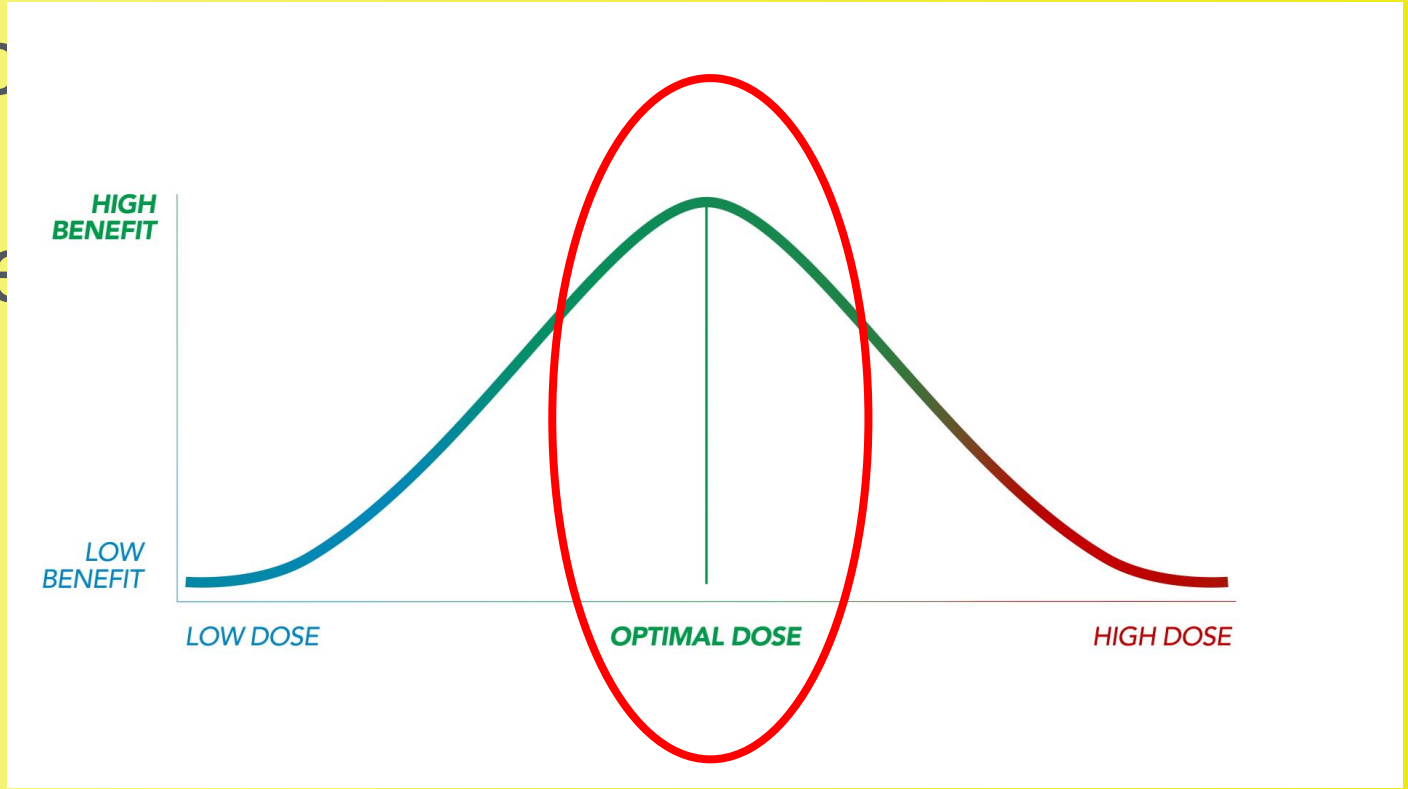
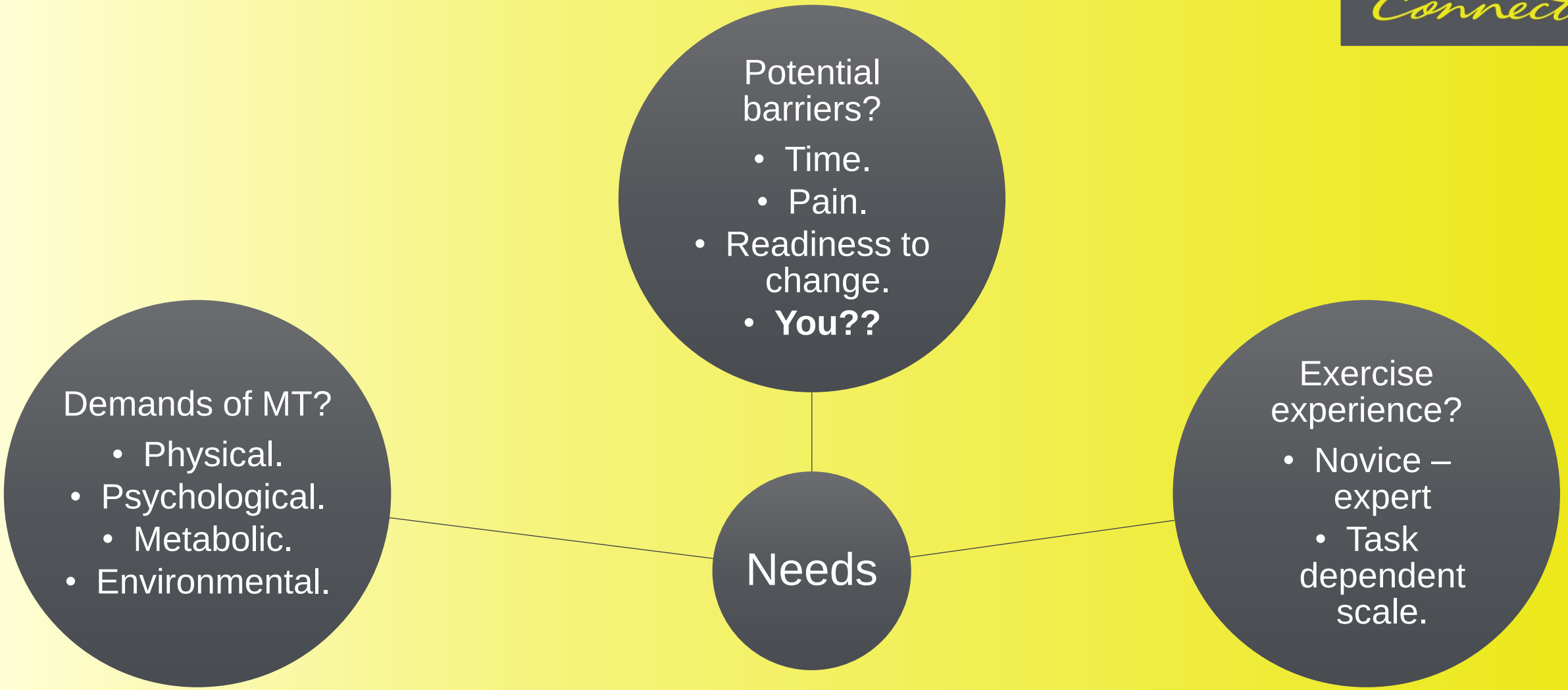
Exercise prescriptio
is not about the
appropriate dosage



Needs analysis



Principals of S+C

- Overload.
- Specificity – Needs analysis.
- Progression, regression and Periodisation.
- Reversibility – Anything gained by prolonged loading, can be lost by prolonged de-loading.

Variable Manipulation

- How….
  - Many – Volume = Reps x sets x load.
  - Often – Frequency.
  - Hard – Perceived exertion / load.
  - Fast - Time under tension / Power / RFD
  - Long – Endurance / recovery.

Resistance training – Fashion or Function?

Muscle Thickness and training type

J Strength Cond Res. 2014 Oct;28(10):2909-18. doi: 10.1519/JSC.0000000000000480.

Effects of different volume-equated resistance training loading strategies on muscular adaptations in well-trained men.

Schoenfeld BJ[1], Ratamess NA, Peterson MD, Contreras B, Sonmez GT, Alvar BA.

Strength training (7 sets x 3RM w 3 mins rest) vs Hypertrophy training (3 sets x 10RM w 90 seconds rest).

Equal muscle thickness changes after 8 weeks, but greater strength gains with strength training.

N=17

Muscle thickness and load volume

J Strength Cond Res. 2014 Oct;28(10):2909-18. doi: 10.1519/JSC.0000000000000480.

Effects of different volume-equated resistance training loading strategies on muscular adaptations in well-trained men.

Schoenfeld BJ[1], Ratamess NA, Peterson MD, Contreras B, Sonmez GT, Alvar BA.

Low Load training (25-35 reps to failure) vs High load training (8-12 reps to failure).
3 sets of 7 types of exercise across all major muscle groups.3 times per week for 8 weeks.
Similar muscle thickness in UL and LL, with no significant differences.
Strength gains significantly greater in heavy load training vs low load (19.6% vs 8.8%) in squat 1RM and 6.5% vs 2% in bench 1RM.
N= 18

Strength and Hypertrophy

J Strength Cond Res. 2017 Dec;31(12):3508-3523. doi: 10.1519/JSC.0000000000002200.

Strength and Hypertrophy Adaptations Between Low- vs. High-Load Resistance Training: A Systematic Review and Meta-analysis.

Schoenfeld BJ[1], Grgic J[2], Ogborn D[3], Krieger JW[4].

- 21 studies included.
- 1RM gains were significantly greater in HL training vs LL training.
- Hypertrophy measurements were similar across all load spectrums.

Hypertrophy and frequency of training

Sports Med. 2016 Nov;46(11):1689-1697. doi: 10.1007/s40279-016-0543-8.

Effects of Resistance Training Frequency on Measures of Muscle Hypertrophy: A Systematic Review and Meta-Analysis.

Schoenfeld BJ[1], Ogborn D[2], Krieger JW[3].

- 2 times per week training of a major muscle group is superior to once per week.
- There is no clear evidence to suggest 3 times is better than 2 times.

Does S+C influence…

Pain:

Injury risk reduction:

Lauersen (2014) SR in BJSM - demonstrates the greatest risk reduction is with Strength training (~33%).

Can you exercise into pain?

Review

Should exercises be painful in the management of chronic musculoskeletal pain? A systematic review and meta-analysis

Benjamin E Smith[1, 2], Paul Hendrick[3], Toby O Smith[4], Marcus Bateman[1], Fiona Moffatt[3], Michael S Rathleff[5, 6], James Selfe[7], Pip Logan[2]

Painful exercise offers a small, but significant benefit to people with MSK conditions in the short term, but no superiority in the moderate to long term.

Effects of exercise on pain

PAIN® 153 (2012) 915–923

IASP

PAIN®

www.elsevier.com/locate/pain

Effects of strength vs aerobic exercise on pain severity in adults with fibromyalgia: A randomized equivalence trial

W. Michael Hooten [a,b,*], Wenchun Qu [c], Cynthia O. Townsend [b], Jeffrey W. Judd [c]

ppl Physiol 98: 1154–1162, 2005;
:10.1152/japplphysiol.00164.2004.

as a

improve and also have no impact on measures of pain sensitivity (PPT, QST).

fashion with each additional hour.

- 3/52 of either Aerobic or resistance training.
- Aerobic training (12/52) = improved UL pain tolerance, not LL.
- Both groups improved pain levels.
- Resistance training (12/52) = no sig dif in pain tolerance in UL or LL.
- ** Aerobic arm better constructed compared to the resistance training arm. Don't take into account for new physiological adaptation to new stim.
- Combined training (12/52) = Suggested the aerobic arm caused similar UL effects on pain.

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So should we engage in S&C in physio??

Efficacy

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Effective treatment options for musculoskeletal pain in primary care: A systematic overview of current evidence

Opeyemi O. Babatunde*, Joanne L. Jordan[☯], Danielle A. Van der Windt[☯], Jonathan C. Hill[‡], Nadine E. Foster[‡], Joanne Protheroe[‡]

4 guidelines, 3 policy documents, 32 reviews, 1 RCT.	Back, neck, shoulder, knee & multi-site pain.	Pain Function Quality of life Work-related outcomes.	Medium to large summary effects sizes (e.g. SMD 0.65, 95% CI: -0.09 to 1.39 for multi-site pain, Busch et al 2007, & RR 7.74, 95% CI: 1.97 to 30.32 for shoulder pain, Green et al 2003) Beneficial effects in the short & long-term for all five pain presentations.	****Strong evidence

What are the mechanisms?

Is it Truly “Strength gains” or distraction?

Is it modification of lifestyle factors?

Is it Self Efficacy?

Is it Graded Exposure?

Is it Expectancy Violation?

Is it all/non of the above?

Take home messages

Exercise is a HUGE part of physio, and we should ensure we're "good" at ExRx.

Validate the person's pain experience and offer guidance through a SDM model.

Construct a program which addresses a meaningful task, in a graduated method, with avenues for progression/regression – considering individual factors.

Try to be a decent human being – engage in conversation about their rehabilitation and use your skills based on the person in front of you.

Recommended reading

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CLINICAL COMMENTARY

INTEGRATION OF STRENGTH AND CONDITIONING PRINCIPLES INTO A REHABILITATION PROGRAM

Michael P. Reiman, PT, DPT, OCS, SCS, ATC, FAAOMPT, CSCS[1]
Daniel S. Lorenz, DPT, PT, ATC/L, CSCS[2]

REVIEW ARTICLE

The Importance of Muscular Strength: Training Considerations

Timothy J. Suchomel[1] · Sophia Nimphius[2] · Christopher R. Bellon[3] · Michael H. Stone[4]

Evidence-Based Guidelines for Strength and Conditioning in Mixed Martial Arts

Tack, Chris BSc (Hons)

Strength & Conditioning Journal: October 2013 - Volume 35 - Issue 5 - p 79–92

Thank You

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