Are you translating research into clinical practice? What to think about when it does not seem to be working

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This other contribution to a refereed journal was originally published as:

Original other contribution to a refereed journal available here:
[10.1136/bjsports-2020-102369](https://doi.org/10.1136/bjsports-2020-102369)

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This is the accepted manuscript version of an article published as:

Murphy, M.C., Gibson, W., Moseley, G.L., & Rio, E.K. (2021) Are you translating research into clinical practice? What to think about when it does not seem to be working. British Journal of Sports Medicine, 55(12) https://doi.org/10.1136/bjsports-2020-102369

This article has been published in final form at

https://doi.org/10.1136/bjsports-2020-102369
Research translation? What to think about when it’s not working

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The word count for the text is 841 words (excluding tables and figures), there are 8 references, there are 0 tables, 0 figures and 1 appendix.
Introduction

The value of clinical research can be lost in translation and implementation. One often overlooked issue concerns how easily clinicians can determine whether their patient is similar to research participants and, *ipso facto*, whether their treatment will have the same effects as those reported in a research study. This editorial presents five questions and clinical tips for clinicians facing these issues.

Who are the research participants?

The characteristics of a research study’s participants can be considered their ‘clinical phenotype’. The field dedicated to more precisely matching treatments to clinical phenotypes is ‘precision medicine’.$^1$ Defining clinical phenotypes remains a great challenge in musculoskeletal research because a gold standard diagnostic test is commonly absent. For example, the single leg decline squat is provocative for anterior knee pain but is not diagnostic for patellar tendinopathy.$^2$ Even where agreement exists as to a patient group having the same condition (e.g. rotator cuff tendinopathy), different clinical phenotypes (e.g. positive versus negative empty can test) within that group represent heterogenous populations, with potentially variable responses to interventions.

*Clinical tip: Don’t rely on the title or abstract of a paper. Review the methods section for details on more precise clinical phenotypes (or not), including how the condition was diagnosed and other features such as physical activity, education, cognitive or socioeconomic characteristics.$^3$ Does your patient match the clinical phenotype(s) in the study?*

Are those with comorbidities excluded?

Research studies usually involve stricter inclusion criteria than clinical practice does. This may mean your patient will not nicely match the research cohort. For example, the presence of comorbidi
conditions such as depression or other areas of pain (Appendix A), often means exclusion from research studies because these conditions can confound results (via known - e.g. impaired descending inhibition - and unknown mechanisms), necessitating bigger samples and more resources, but such comorbidities are common in clinical presentations.

Clinical tip: Clarify whether your patient would satisfy the inclusion and exclusion criteria of the study. Consider comorbidities when planning and interpreting your intervention.

What non-specific treatment effects could be at play?

Non-specific treatment effects are those that occur in response to an intervention but are not mediated by the intended active, or unique, component of the intervention. Non-specific effects become more likely as the outcome of interest moves towards clinically relevant metrics such as pain, quality of life and return to sport or work. For example, although pain modulation with exercise is often attributed to injury healing or aggravation, which reflects a biomedical tissue-focused interpretation, there are other aspects of exercise that are also likely to change pain. Relevant here are contemporary understandings of pain as providing a protective buffer for tissues (rather than a ‘read out of tissue state’), the size of which depends on complex and multifactorial processes across bio-, psycho- and social domains.

Clinical tip: Consider all possible mechanisms by which a study’s treatment could cause a change in outcome, not just the mechanism mentioned in the title.

Does the authors’ interpretation match their study design?

We recently conducted a case-series investigating the effect of an isometric squat in-season training program for jumping and landing athletes with patellar tendinopathy. We observed a decrease in pain over the 4-week intervention period. Our design allowed us to conclude that pain decreased during the course of the intervention, but not that pain decreased because of the intervention or any
part thereof. In addition to the passing of time, many non-specific effects may have been at play (e.g. expectations of effect, different training structure and timing, increased care). The important clinical consideration of such studies is that the specificity with which results can be explained by mechanisms is limited by the extent to which the design isolates those mechanisms from others. That is, to gain the study’s effect with your patient may require replication of the intended active component (isometric squats in the above example) and everything else not controlled for in the study.

*Clinical tip: Look for potential non-specific treatment mechanisms that can be replicated or estimated, for example by providing positive, accurate messaging and referring the patient to the published research.*

**Are too many assessments spoiling your result?**

The sensitivity of pain processing can be rapidly and substantially modified by a wide range of factors from across the biopsychosocial spectrum. It is important to remember the potential effect of multiple assessments, especially pain provocation tests and the order in which they are conducted. For example: imagine one performs a pain provocation test, then assesses pain; then assesses mechanical sensitivity via palpation; then implements an intervention; then reperforms the provocation test, palpation and finally reassess pain. Any or all the assessments could modify sensitivity, clouding the value of the final pain reassessment. Multiple assessments can both increase or decrease an apparent treatment effect, just as repeated pain provocation tests can *increase or decrease* pain, dependent on myriad of intra- and inter-individual factors.

*Clinical tip: Understand how assessments (e.g. palpation of the painful structure) can influence peripheral and central sensitivity. Select a single assessment most likely to detect the effect you intend to induce.*
COMPETING INTERESTS

GLM has received support from: ConnectHealth UK, Seqirus, Kaiser Permanente, Workers’ Compensation Boards in Australia, Europe and North America, AIA Australia, the International Olympic Committee, Port Adelaide Football Club, Arsenal Football Club. Professional and scientific bodies have reimbursed him for travel costs related to presentation of research on pain at scientific conferences/symposia. He has received speaker fees for lectures on pain and rehabilitation. He receives book royalties from NOIgroup publications, Dancing Giraffe Press & OPTP.

The other authors declare they have no conflicts of interest.

CONTRIBUTORSHIP

All authors have contributed substantially to the manuscript and approved the manuscript for this submission. MM and ER conceptualised the review. MM, WG, GLM and ER have written the manuscript.

ACKNOWLEDGMENTS

MM is supported by an Australian Government Research Training Program (RTP) Fee Offset Scholarship through the NHMRC of Australia. ER is supported by an Early Career Fellowship from the NHMRC of Australia. GLM is supported by a Leadership Investigator Grant from the NHMRC of Australia ID 1178444.

FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ETHICAL APPROVAL INFORMATION
Not applicable

DATA SHARING STATEMENT

Not applicable
REFERENCES


