



# **Physical Therapy Interventions Directed at the Hips for Individuals with a Primary Complaint of Low Back Pain**

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A thesis submitted in fulfilment of the requirements for the degree of

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The University of Newcastle

This is to certify that the thesis entitled *Physical Therapy Interventions Directed at the Hips for Individuals with a Primary Complaint of Low Back Pain*, submitted in fulfilment of the requirements for the degree Doctor of Philosophy (Physiotherapy), is in a form ready for examination.

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I hereby certify that the work embodied in the thesis is my own work, conducted under normal supervision. The thesis contains no material which has been accepted, or is being examined, for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made. I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968 and any approved embargo.

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Date: February 24, 2022

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I hereby certify that the work embodied in this thesis contains published papers/scholarly work of which I am a joint author. I have included as part of the thesis a written declaration endorsed in writing by my supervisor, attesting to my contribution to the joint publication/scholarly work.

By signing below, I confirm that Scott A. Burns contributed to the concept and research design, acquisition of data, analysis, and interpretation of data, as well as writing, reviewing, and editing of the paper/publication entitled:

- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Effectiveness of physical therapy interventions for low back pain targeting the low back only or low back plus hips: A randomized clinical trial protocol. *Brazilian Journal of Physical Therapy*. 2018; 22(5): 424-430. <https://doi.org/10.1016/j.bjpt.2018.08.014>
- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Examination procedures and interventions for the hip in the management of low back pain: A survey of physical therapists. *Brazilian Journal of Physical Therapy*. 2019; 23(5): 419-427. <https://doi.org/10.1016/j.bjpt.2018.09.007>
- **Burns SA**, Cleland JA, Cook CE, Bade M, Rivett D, Snodgrass S. Variables describing individuals with improved pain and function with a primary complaint of low back pain: A secondary analysis. *Journal of Manual and Physiological Therapeutics*. 2018; 41(6): 467-474. <https://doi.org/10.1016/j.jmpt.2017.11.006>

- **Burns SA**, Cleland JA, Rivett DA, O'Hara MC, Egan W, Pandya J, Snodgrass S. When Treating Co-Existing Low Back Pain and Hip Impairments, Focus on the Back: Adding Specific Hip Treatment Does Not Yield Additional Benefits: A Randomized Clinical Trial. *Journal of Orthopaedic & Sports Physical Therapy*. 2021; 51(12): 581-601.

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Associate Professor Suzanne Snodgrass

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Date: February 24, 2022

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## Publications and Presentations

The following publications and presentations were a direct result of the work completed in this thesis:

### Papers Published

- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Effectiveness of physical therapy interventions for low back pain targeting the low back only or low back plus hips: A randomized clinical trial protocol. *Brazilian Journal of Physical Therapy*. 2018; 22(5): 424-430. <https://doi.org/10.1016/j.bjpt.2018.08.014>
- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Examination procedures and interventions for the hip in the management of low back pain: A survey of physical therapists. *Brazilian Journal of Physical Therapy*. 2019; 23(5): 419-427. <https://doi.org/10.1016/j.bjpt.2018.09.007>
- **Burns SA**, Cleland JA, Cook CE, Bade M, Rivett D, Snodgrass S. Variables describing individuals with improved pain and function with a primary complaint of low back pain: A secondary analysis. *Journal of Manual and Physiological Therapeutics*. 2018; 41(6): 467-474. <https://doi.org/10.1016/j.jmpt.2017.11.006>
- **Burns SA**, Cleland JA, Rivett DA, O'Hara MC, Egan W, Pandya J, Snodgrass S. When Treating Co-Existing Low Back Pain and Hip Impairments, Focus on the Back: Adding Specific Hip Treatment Does Not Yield Additional Benefits:



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### **Poster Presentations**

- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Examination and interventions for the hips in the management of low back pain: A survey of physical therapists. Poster Presentation at Combined Sections Meeting, February 2018. New Orleans, LA.
- **Burns SA**, Cleland JA, Rivett D, O'Hara M, Egan W, Pandya J, Snodgrass S. Outcomes for treatment directed at the hips for individuals with LBP: A randomized controlled trial. Poster Presentation at Combined Sections Meeting of the American Physical Therapy Association, February 2022.

### **Conferences and Other Invited Presentations**

- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Short-term outcomes for individuals with LBP and concurrent hip impairments: A randomized controlled trial. Platform Presentation at Combined Sections Meeting of the American Physical Therapy Association, February 2021.
- **Burns SA**, Cleland JA, Rivett D, Snodgrass S. Physical therapists' use of manual therapy directed at the hip(s) for individuals with a primary complaint of low back pain. Platform Presentation at American Academy of Orthopaedic

Manual Physical Therapists National Conference, October 2017. Salt Lake City, UT.

- **Burns SA**, Cleland JA, Cook CE, Bade M, Rivett D, Snodgrass S. Predictors of response to manual therapy and exercise for individuals with a primary complaint of low back pain: A secondary analysis. Platform Presentation at American Academy of Orthopaedic Manual Physical Therapists National Conference, October 2016. St. Louis, MO.

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## List of Abbreviations

ANOVA	One-way analysis of variance
BMI	Body-mass index
CI	Confidence interval
FABER	Special test of the hip that combines Flexion, Abduction, and External Rotation
FADDR	Special test of the hip that combines Flexion, Adduction, and Internal Rotation
GROC	Global Rating of Change
ICF	International Classification of Functioning, Disability and Health
LBP	Low back pain
LBP+Hip	Lumbar spine and hip intervention group
LBP only	Lumbar spine only intervention group
NPRS	Numeric Pain Rating Scale
ODI	Modified Oswestry Disability Index
OR	Odds ratio
RCT	Randomized controlled trial



ROM	Range of motion
SDI	Socio-demographic Index
WHO	World Health Organization
YLD	Years Lived with Disability

## **Preamble**

Scott Burns is a PhD candidate at the University of Newcastle (Australia) but based in the United States. All studies were completed in the United States which has nomenclature that is different than the country of the degree-granting institution. In the United States, physiotherapy is referred to physical therapy and physiotherapists are referred to as physical therapists. It has been recommended by journal editors in our field that the nomenclature used for practitioners be consistent with the naming conventions of the location where they work, and/or where the data were collected. Therefore, 'physical therapy' and 'physical therapists' will be used throughout the thesis to refer to 'physiotherapy' and 'physiotherapists'. The supervisory committee was comprised of an international group of collaborators from both Australia and the United States which agreed with the naming convention.

## **Abstract**

### **Background**

Low back pain (LBP) is one of the primary conditions seen in outpatient musculoskeletal physical therapy clinics. The optimal intervention strategy continues to be elusive. One emerging area is the role of hip region impairments in the manifestation and persistence of LBP symptoms; however, the practice patterns of physical therapists related to the role of the hip region in individuals with LBP has never been studied. Additionally, there is a need for studies that examine long-term outcomes following treatment of the hip region in individuals with LBP.

### **Purpose**

The aims of this thesis were to investigate (1) clinical practice patterns related to physical therapy tests/measures/interventions directed at the hip region for individuals with LBP, (2) baseline patient characteristics that predict recovery from LBP following physical therapy directed at the lumbar spine and hip region, and (3) the short- and long-term effects of physical therapy interventions directed at the lumbar spine with or without hip interventions for individuals with LBP and a concurrent hip region impairment.

## **Methods**

This thesis comprises three studies to address the three aims of the thesis. (1) An anonymous electronic survey of physical therapists was conducted to investigate therapists' perceived importance of hip region impairments in individuals with LBP, as well as their examination and intervention strategies aimed at the hip region when an individual presents with LBP. (2) A secondary analysis of a data set from a prior randomized controlled trial (RCT) to examine prognostic baseline patient characteristics that predict recovery from LBP symptoms in individuals with LBP (with or without hip region impairments) receiving physical therapy interventions targeting the lumbar spine and/or hip. (3) An RCT of individuals with LBP plus an identified hip region impairment to investigate the short- and long-term effectiveness of tailored physical therapy interventions directed at the lumbar spine with or without interventions directed at the hip region. Outcomes included pain, disability, and patient perception of recovery.

## **Results**

The survey received 1163 responses and 91% of respondents reported they 'always or most of the time' performed examination tests/measures directed at the hip region for individuals with LBP. The most common examination tests/measures were hip muscle strength testing (performed by 94% of respondents), hip joint passive range of motion assessment (91%), and hip muscle flexibility testing (90%). The most

common interventions directed at the hip region were muscle strengthening exercises (utilized by 94% of respondents), muscle flexibility exercises (90%), and various hip joint manual therapy techniques (e.g., joint mobilization, 66%).

The secondary analysis found that the four variables of body mass index (BMI)  $\leq$  25.4, an irritable condition as assessed by the therapist, baseline numeric pain rating scale (NPRS) score  $\leq$  4 points, and the presence of a concurrent hip problem best predicted recovery from LBP following physical therapy targeting the lumbar spine with or without treating the hips. These variables at baseline examination may assist the therapist determining a prognosis for the patient.

In the RCT, 76 participants enrolled with 80% retained to discharge. There were no group x time interactions at discharge, 6 months or 12 months for pain or disability ( $p > 0.05$ ) indicating that the addition of hip interventions did not improve the outcomes. However, both groups experienced significant improvements in pain and disability ( $p < 0.05$ ) from baseline to discharge that were maintained at 6 and 12 months.

## **Conclusions**

Physical therapists treating individuals with LBP examine and provide interventions targeting the hip region the majority of the time. Interventions often utilized include hip muscle strengthening and stretching exercises with hip joint manual therapy

being used less frequently. Since clinicians are providing interventions to the hip region for individuals with LBP, it may be helpful to determine what factors may predict a positive outcome with this approach. The presence of the four variables of an irritable condition, mild pain ratings, lower BMI and a concurrent hip problem improved the chances of recovery following physical therapy for LBP. The presence of a concurrent hip region impairment had the strongest odds ratio of achieving recovery following physical therapy. Therefore, the final study included individuals with LBP and a concurrent hip region impairment to determine if this treatment approach had superior outcomes for disability and pain. The addition of hip region interventions to low back interventions did not result in improved outcomes in the short- or long-term follow-ups. However, physical therapy interventions targeting the lumbar spine with or without interventions targeting the hips, are effective at reducing pain and disability in individuals with LBP and a concurrent hip problem.

In conclusion, many physical therapists reported that hip region impairments play an important role in individuals with LBP, but interventions directed at the hips may not provide additional benefits. In the future, additional research needs to look whether there is a specific type of individual with LBP (e.g., mechanical, non-specific) with or without hip region impairments (e.g., decreased ROM or strength) or hip conditions (e.g., osteoarthritis, femoroacetabular impingement, tendinopathy) that respond better to this intervention strategy.