

# Effectiveness of Exercise Physiology in Workers' Compensation

Jonathan Christie, *Agility Rehabilitation*

## Introduction:

Exercise therapy, particularly that guided by an Exercise Physiologist, is well known to assist with the management of a variety of musculoskeletal injuries, neurological disorders, chronic pain and inflammatory disorders in the general population<sup>1</sup>. There has however been little research into the effectiveness of exercise intervention on workers' compensation claimants who typically have lower rates of recovery than those outside of this scheme<sup>2</sup>.

## Aim:

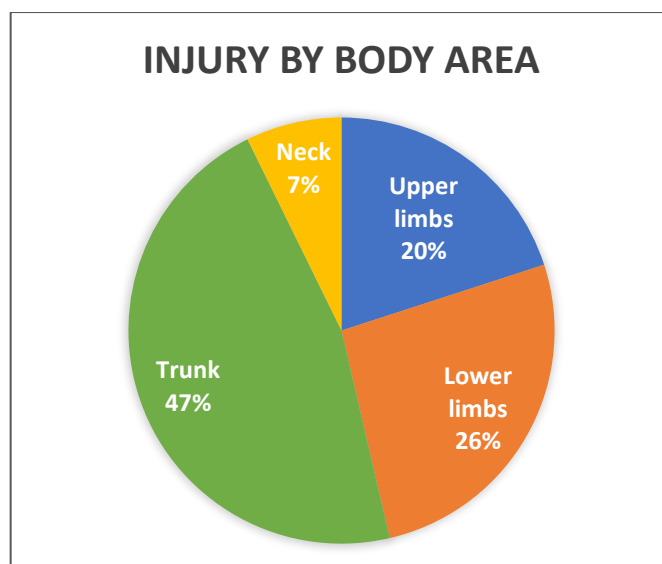
To determine the effectiveness of an exercise physiology intervention within the WA workers' compensation system, and trends of treatment including referral patterns, injury types and intervention characteristics.

## Method:

Data was collected from all patients referred for exercise rehabilitation programs to Agility Rehabilitation for the 2015/16 financial year. Our referrals were analysed in relation to general demographic characteristics such as WA workers' compensation scheme involvement, age, injury by body area and date of injury; and also exercise program characteristics including date of referral and program commencement, program type, date of program completion, and cost per program. Where possible, outcome-related measures pre and post exercise program were extracted from our case records. These included pain scores from the Visual Analogue Scale (VAS)<sup>3</sup>, and subjective functional questionnaire scores based on injury location including the Shoulder Pain and Disability Index (SPADI)<sup>4</sup>, the Oswestry Lower Back Pain and Disability Questionnaire<sup>5</sup>, the Knee Outcome Survey (KOS)<sup>6</sup>, and the Neck Disability Index (NDI)<sup>7</sup>. Patient work hours, lifting restrictions and capacity for unrestricted work duties were also reviewed at program commencement and completion.

## Results:

Agility Rehabilitation assessed 118 patients with WA worker's compensation claims, of which 112 commenced an exercise program. The injury spread was 47% trunk injury, 26% lower limbs, 20% upper limbs and 7% neck (fig. 1). The duration between date of injury and referral date ("referral delay") to Agility Rehabilitation was an average of 6 months, and a median of 3.53 months. The median program duration from initial assessment to discharge was 3.84 months, and median program cost was \$2,730.



**FIGURE 1. Distribution of injuries based on body area.**

Pain, function, and work-related measures were analysed for the group as a whole, and again in various groups based on referral delay.

Pain scores overall had an average 20% reduction (2-points on VAS) from program start to completion, with 57% of patients having clinically meaningful reductions in pain. When stratified into referral delay categories, referrals within 2 weeks of injury had a 4.2-point reduction in pain score from program start to completion; 2-6 weeks had a 2.4-point reduction, 6-12 weeks had a 2.3-point reduction, and over 3 months' delay had an average of 1.6-point reduction in pain scores (fig. 2, fig. 3).

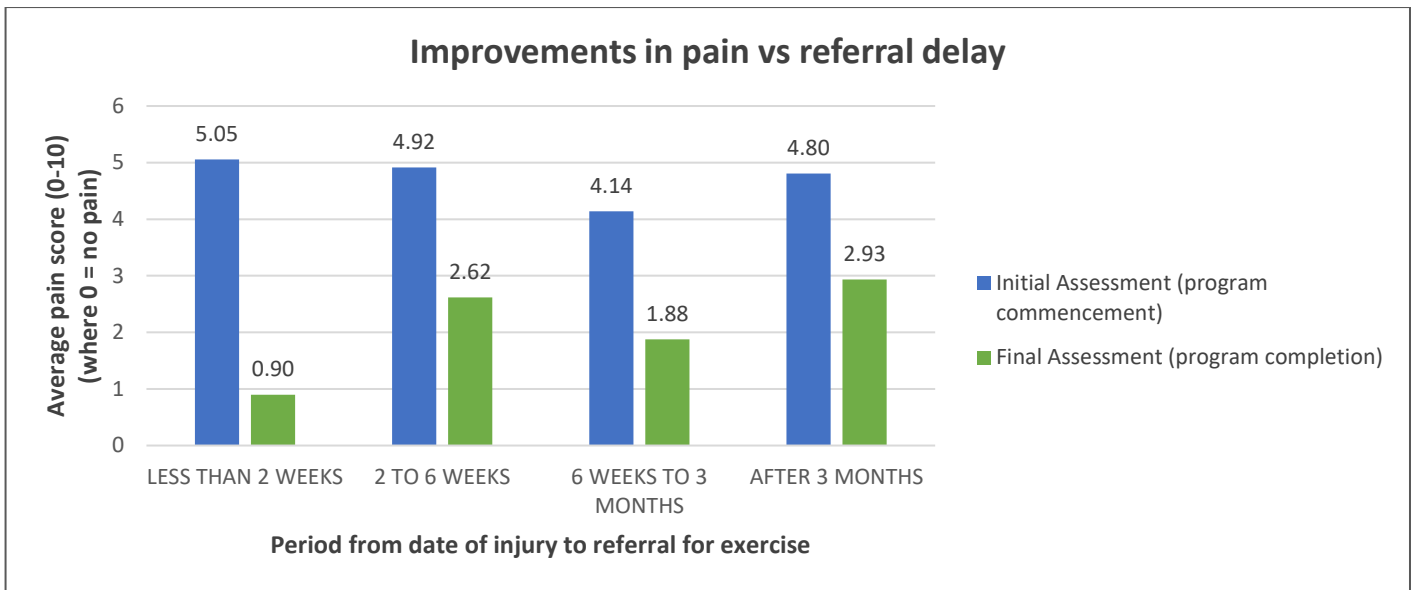


FIGURE 2: Average pain scores using 11-point visual analogue scale pre and post exercise program

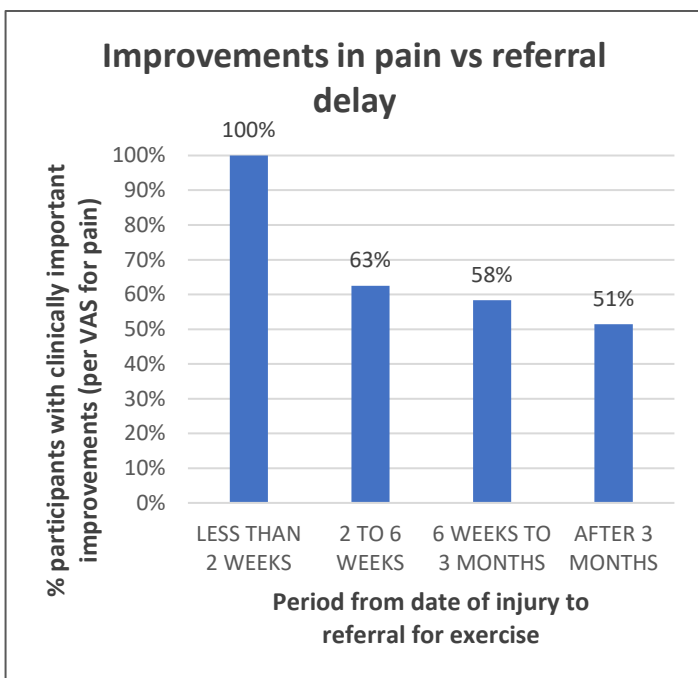


FIGURE 3: Percentage of participants with clinically meaningful improvements in pain score after completion of their exercise program

Subjective function-based outcome questionnaires were completed for shoulder, neck, lower back and knee injuries. Shoulder injuries averaged 23% improvement in function per SPADI, knee injuries averaged 60% improvement per KOS, and lower back injuries improved by 12% per Oswestry (fig. 5). Neck injuries had 26% improvement in function per NDI when referred before 6 weeks' post injury, but did not improve when referred later than 6 weeks post-injury.

Overall 60% of all patients had clinically meaningful improvements in function.

Functional improvements were also more frequent and significant with earlier-referred patients. 85% of referrals within 6 weeks of injury had clinically meaningful improvements in function by program completion. This reduced to 64% when referred between 6 weeks and 3 months, and further reduced to 38% for those referred after 3 months of injury (fig. 4).

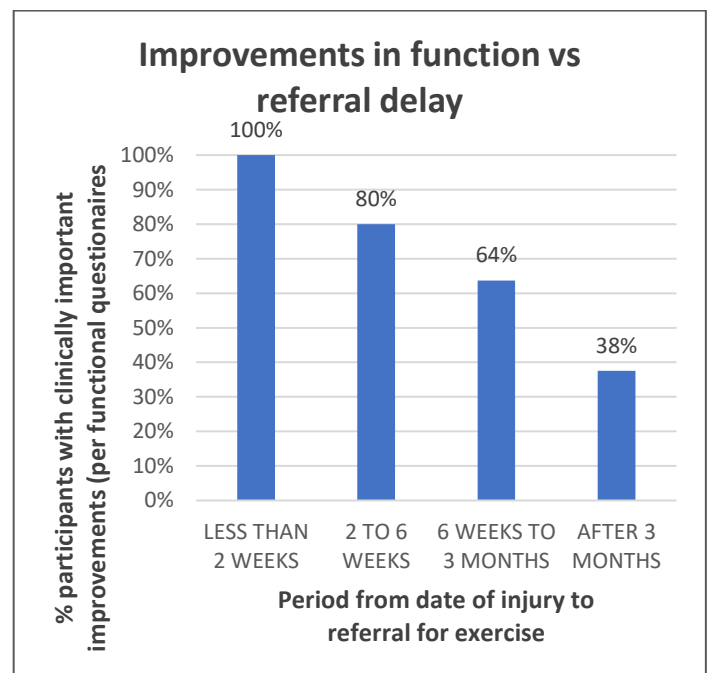
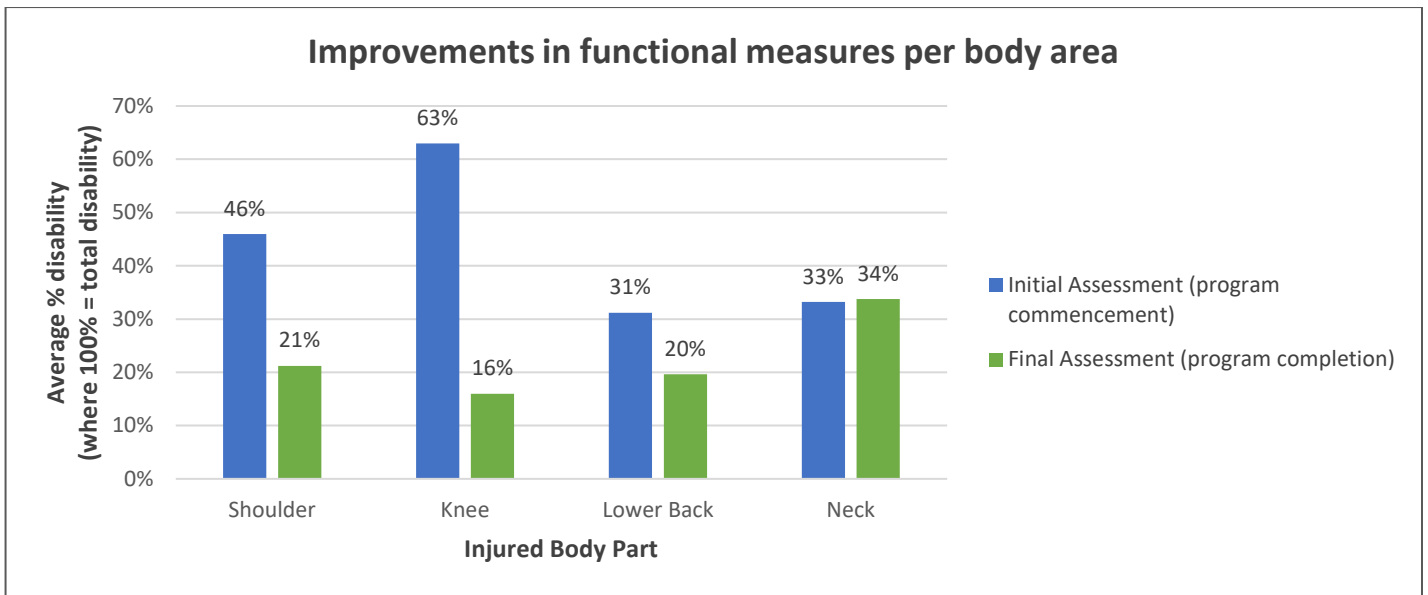
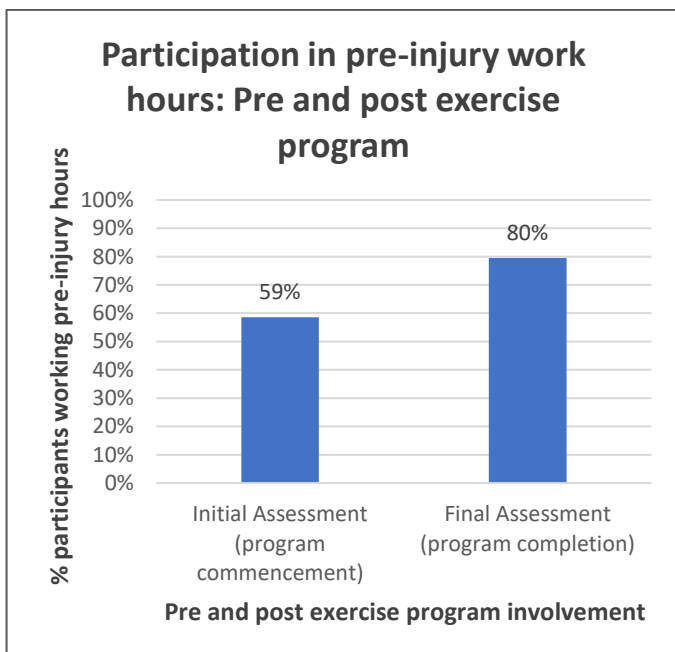


FIGURE 4: Percentage of participants with clinically meaningful improvements in function after completion of their exercise program



**FIGURE 5: Average percentage disability based on respective subjective questionnaires (SPADI, KOS, Oswestry & NDI) pre and post exercise program**

Prior to commencing exercise intervention, 59% of all participants were working pre-injury hours. This increased to 80% of all participants working normal hours at program completion (fig. 6). There were no significant differences in probability for return to pre-injury hours based on referral delay period, though earlier referred participants were more likely to return to full hours and duties (60% return to full duties rate when referred within 3 months' post injury, compared to 48% return rate for those referred after 3 months).



**FIGURE 6: Percentage of participants completing normal (pre-injury) work hours pre and post exercise program**

**Discussion:**

Whilst exercise physiology is increasingly utilised within the workers' compensation system<sup>8</sup>, referral for exercise rehabilitation programs is often late in the injury management process once injuries become chronic (average 6 months' referral delay from date of injury)<sup>9</sup>.

This retrospective audit demonstrates that exercise physiology intervention improves pain and function-based outcomes, as well as return to work status, at any stage of participation following injury, though this is more pronounced in the earlier stages of recovery. Patients who commenced exercise physiology programs within three months of injury were 15% more likely to have improvements in pain, and 37% more likely to have improvements in function, compared to those who start later than 3 months after injury. Similarly, there is a 12% increased likelihood for return to full hours and duties for those undertaking exercise rehabilitation programs within 3 months' post injury compared to those commencing after 3 months of injury. Those referred for exercise physiology within 6 weeks of injury had the most successful outcomes with 71% having a reduction in pain score and 85% demonstrating meaningful improvements in function.

The degree of effectiveness of exercise physiology programs within the workers' compensation cohort is difficult to analyse without the use of a control group or

collective and consistent workers' compensation data. Pain and function-based questionnaires are not consistently used or recorded for workers' compensation claimants, let alone available for public analysis. Return to work measures, particularly relating to lost time payments, are more broadly measured and available through WorkCover WA. In 2014/15, of the 33,995 total claims, 6670 (19%) were receiving weekly payments at 1 month post-injury<sup>10</sup>. This reduced to 4509 (13%) at 3 months' post injury, 3261 (9.6%) at 6 months, and 2001 (5.8%) at 12 months<sup>10</sup>. For those claims where weekly payments are made (i.e. not working full hours) at 6 months' post-injury, 64% of these still require weekly payments at 12 months<sup>10</sup>. In comparison with Agility Rehabilitation exercise program participants, for those claims where weekly payments are made at 6 months, only 49% of these require weekly payments at discharge (average 9½ months post injury). Weekly payments are by far the largest expense for workers' compensations insurers<sup>11</sup>, and treatment that can accelerate return to productive work for claimants and reduce these costs not only benefits the individual but minimises insurer wage, treatment and vocational expenses.

This audit's purpose was to provide a snapshot of the trends and effectiveness of an exercise physiology program in the WA workers' compensation system. We acknowledge there are many variables that may affect these findings including previous and concurrent treatment, the nature of injuries referred, and exercise intervention provided, and suggest more research using comparable data with a control group be undertaken. Most compensable injuries will recover within several months<sup>10</sup>, often with minimal treatment. Nevertheless, the evidence for exercise physiology in reducing pain, improving function, and accelerating return to work within this scheme is promising. Early referrals for exercise physiology yield more successful outcomes, but even those referred in the chronic stage (6+ months) appear to have more significant improvements than their non-exercising counterparts.

## References:

1. Exercise & Sport Science Australia (ESSA). How can an Accredited Exercise Physiologist (AEP) help? [Internet]. Albion, Queensland. [cited 2017 March 28].
2. Grant, G., O'Donnell, M., Spittal, M., Creamer, M., & Studdert, D. Relationship Between Stressfulness of Claiming for Injury Compensation and Long-term Recovery. *Jama Psychiatry*. 2014;71(4).
3. Visual Analog Scale. Merriam-Webster's Medical Dictionary [Internet]. Merriam-Webster; 2005 [cited 2017 March 23].
4. Breckenridge, J., & Mcauley, J. Shoulder Pain and Disability Index (SPADI). *Journal of Physiotherapy*. 2011;57(3).
5. Fairbank, J., & Pynsent, P. The Oswestry Disability Index. *Spine*. 2000;25(22).
6. Irrgang, J. J., Snyder-Mackler, L., Wainner, R. S., Fu, F. H., & Harner, C. D. Development of a patient-reported measure of function of the knee. *Journal of Bone & Joint Surgery - American Volume* 1998; 80-A(8):1132-1145.
7. D. A., Marcus. *Chronic Pain An Atlas of Investigation and Management* [Internet]. Oxford: Atlas Medical Publishing Ltd; 2009 [cited 2017 March 23].
8. Medical, Allied Health and Vocational Rehabilitation Service Status Report (2012/13 - 2015/16) WorkCover WA; Perth; The Government of Western Australia [cited 2017 April 3].
9. Apkarian, A., Baliki, M., & Geha, P. Towards a theory of chronic pain. *Progress in Neurobiology*. 2009;87(2).
10. Claim Longevity Characteristics. WorkCover WA; Perth; The Government of Western Australia [cited 2016 Nov 29].
11. Annual Report 2015/2016. WorkCover WA; Perth; The Government of Western Australia; 2016 Sept 21 [cited 2017 Apr 5].