

# EXERCISE FOR *Persisting Pain*

An eBook by

**ESSA:**

EXERCISE & SPORTS SCIENCE AUSTRALIA

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# FOREWORDS

## ANITA HOBSON-POWELL

*Chief Executive Officer of Exercise & Sports Science Australia (ESSA)*

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**Pain impacts so many aspects of a person's life. Their ability to do everyday activities, socialise, and engage in important healthy behaviours, like exercise. We want to help you change this.**

As the CEO of Exercise & Sports Science Australia (ESSA) I am committed to ensuring all Australians have access to safe exercise. This includes those experiencing chronic musculoskeletal pain, otherwise referred to as persisting pain in this eBook, who feel that they are unable to exercise at all. I hope that you will find the eBook to be a useful resource to help get you moving in a way that brings meaning back to your life.

This eBook aims to provide education on how the body processes pain, specifically persisting pain, as well as offering some practical approaches to help get you moving so that you can stay as healthy as possible despite your pain, and hopefully even improve your pain experience.

*While this eBook is for people who are experiencing persisting pain, family members, carers and friends may also benefit from reading this, as it can offer methods to help support loved ones who are experiencing persisting pain.*

At ESSA, we want to ensure every Australian that is experiencing persisting pain is supported in their exercise journey. It's important to seek out the right resources and experts who can provide you with assistance – you are not alone.

# ASSOCIATE PROFESSOR JOHN BOOTH

Faculty of Medicine, UNSW.

Assoc. Professor Booth is an Exercise Physiologist practicing in musculoskeletal rehabilitation. He has a special interest in persistent pain and his research investigates ways to improve exercise treatment and delivery for people living with pain.

## Chronic or persistent pain is pain that lasts beyond the expected healing time following injury or illness.

Persistent pain can significantly impact on an individual's quality of life through limitations to daily activities, work, recreation, and social interaction. Coping with persistent pain can be stressful and emotionally draining. The greatest proportion of persistent pain is accounted for by musculoskeletal pain, with more than 150 conditions including, but not limited to, back pain, osteoarthritis, rheumatoid arthritis, fibromyalgia, gout, and osteoporosis.

Based on decades of research, exercise is universally accepted as an important treatment for most persistent pain conditions. Exercise has been shown to improve symptoms, function and quality of life across a wide range of musculoskeletal conditions. Any physical activity and movement is better than none! Even a single bout of exercise such as 20 minutes walking or stretching can improve symptoms.

Engaging in regular exercise benefits people with musculoskeletal pain through a broad range of adaptations including: decreased inflammation, improved cardiovascular function, an increase in pain-relieving endorphins, improved mood and psychological well-being, and less sensitive pain pathways. Most people with musculoskeletal conditions have at least one other chronic condition, often including depression and psychological distress. These coexisting chronic conditions can also benefit from the adaptations afforded by regular exercise.

In my role as an exercise physiologist treating persistent musculoskeletal pain over the last 22 years, I have been fortunate to witness the physical and psychological benefits of exercise for people with musculoskeletal pain.

*Regular exercise and physical activity are vital to recovery, developing confidence and empowering people to re-engage and get back to the activities they want and need to do.*

This eBook captures key themes about exercise and persistent pain. The reader is introduced to the complex nature of persistent pain and the benefits and role of exercise in pain rehabilitation and recovery. This is followed by practical advice about commencing an exercise program and becoming more active. Lastly, questions frequently asked by people with persistent musculoskeletal pain commencing an exercise program are answered. I hope this eBook inspires you to embed exercise, or better utilise exercise, in your recovery plan. Appropriately qualified health professionals, such as an Accredited Exercise Physiologist, can be helpful in coaching and supporting you on your journey.

# WHO IS ESSA

## ESSA

Founded in 1991, Exercise & Sports Science Australia (ESSA) is the peak professional body and accrediting authority for over 8,000 university qualified Accredited Exercise Physiologists, Accredited Exercise Scientists, Accredited Sports Scientists and Accredited High Performance Managers.

Find your local accredited exercise professional [www.essa.org.au/find-aep](http://www.essa.org.au/find-aep)

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## EXERCISE RIGHT

Exercise Right is a public awareness campaign powered by ESSA. Our goal is to help Aussies to live more active lives and to understand where to get the “right” advice for their individual needs (regardless of age or health status).

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*We thank all ESSA accredited professionals who contributed their time and expert knowledge to this publication, through chapter contributions and testimonials.*

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If you find it useful, please do share this resource with anyone who might be interested in the topic.  
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Always consult your doctor about matters that affect your health. This eBook is intended as a general introduction to the topic and should not be seen as a substitute for medical, legal or financial advice. Please refer to the advice within this eBook at your own risk.

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# PAIN IN AUSTRALIA

**3.37 million Australians** were living with chronic pain in 2020. The prevalence of chronic pain is estimated to increase to **5.23 million** people by 2050. **68.3%** (**2.30 million**) are of working age.



The total financial cost of chronic pain in Australia in 2020 was estimated to be \$144.10 billion, comprising:

- » **\$12.64 billion** in health system costs;
- » **\$49.74 billion** in productivity losses;
- » **\$68.63 billion** in reduction of quality-of-life costs and
- » **\$13.09 billion** in other financial costs, such as *informal care, aids and modifications and deadweight losses*.



Of the expenditure on health system costs in 2020 (total \$12.64 billion), governments paid for 66.7% of total health expenditure, while individuals paid 22.1% and other funding sources paid 11.2% to the total.

The national financial burden of pain is estimated to increase to \$215.6 billion by 2050.

A multidisciplinary approach to pain management is essential for better health outcomes, however, nearly 70% of all GP consultations relating to pain result in a medicine prescription.

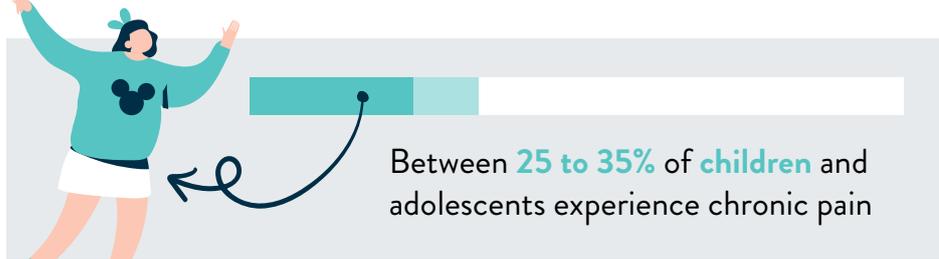
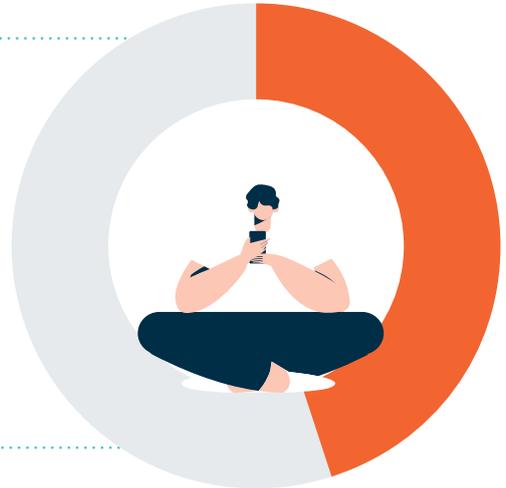


56%

of Australians living with chronic pain which **restricts what activities** they can undertake

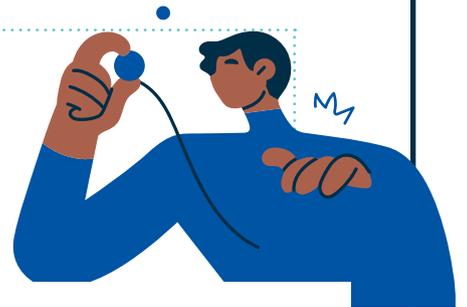
45%

of people living with chronic pain also experience depression or anxiety.



Between **25 to 35%** of **children** and adolescents experience chronic pain

53.8% of people living with chronic pain are **women** (1.81 million) and **46.2%** are **men** (1.56 million)



**53.8% FEMALE**

**46.2% MALE**

**1 in 3** Australians **aged 65+** are living with chronic pain



## EXERCISE DEFINITIONS THAT MAY HELP

### Accredited Exercise Physiologist (AEP)

A health professional that utilises exercise education and other strategies to help people improve their health, including people chronic and complex conditions such as persisting pain.

### Repetition (rep)

One complete movement of an exercise, such as performing one push-up from the starting position, executing the motion, and returning to the start position.

### Set

A group of consecutive repetitions of an exercise, often a pre-determined amount, such as completing 5 push ups.

### Muscle Strengthening Exercise

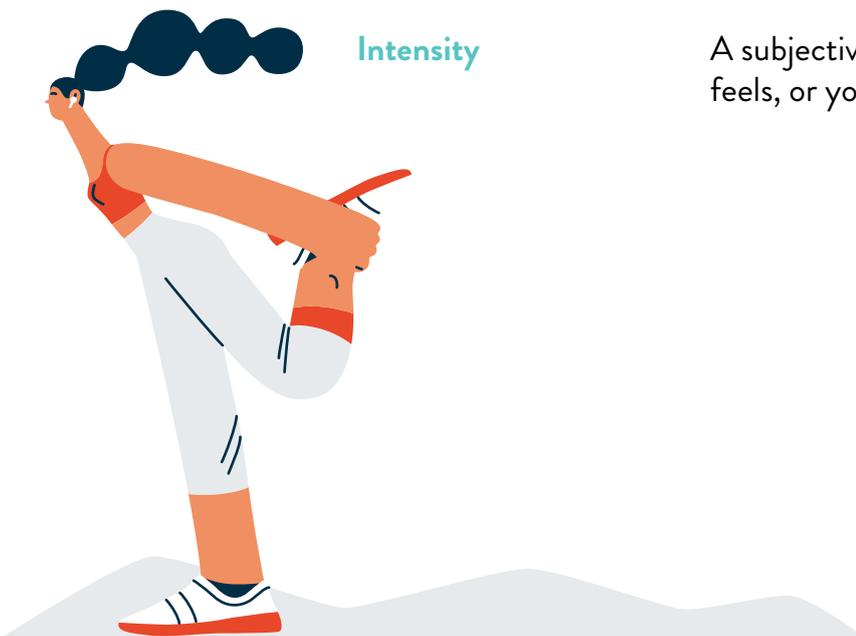
Often referred to as resistance training, is an activity or movement utilising resistance, such as weight machines, free-weights, resistance bands, or bodyweight.

### Aerobic exercise

Rhythmic, continuous exercise, usually involving the whole body, which increases heart rate and level of exertion, such as walking, swimming, or cycling.

### Intensity

A subjective measure of how hard an exercise feels, or your perceived exertion.





# INTRODUCTION TO PAIN

## PAIN IS PROTECTIVE

Pain is one of the body's most important protective responses, an output of the brain alerting us to the need to take action to avoid harm or injury. For example, when you sprain your ankle, the pain experienced initially limits us from bearing weight resulting in less load being placed on the ankle to promote healing, recovery and reduce the risk of further injury.

There are multiple terms used to describe the duration of pain someone has experienced. The term “acute pain” refers to the time of onset being recent (often less than three months) and is often related to things like a recent injury or headache caused by a viral infection. When the body's tissues are injured or at risk of injury, nerves send messages via the spinal cord to alert the brain to potential danger. The brain weighs this up and draws on additional information, including previous pain experiences, to decide whether a pain response is necessary to action protective behaviours aimed at avoiding tissue damage and injury.

*When pain persists beyond the normal healing times of a tissue injury, we call this ‘chronic’ or ‘persisting’ pain.*

For ease, we will use the word persisting pain throughout this e-book. Persisting pain can negatively impact a person's ability to complete normal everyday activities and can become mentally and emotionally exhausting.



## PAIN IS UNIQUE

The experience of pain is unique to an individual and can depend on multiple factors including mood; past pain experiences; thoughts and beliefs; what other people say, including therapists; what you know about your pain and injury; and the environment and context.

For example, the pain response to a heavy knock sustained playing competitive sport in front of a large crowd might be very different to the pain experienced through the same knock unexpectedly in the street from a stranger.

## TISSUE HEALING

Humans have an amazing ability to adapt, heal and recover. As injuries are treated and heal, there is less need to protect and pain reduces. Acute pain is typically worse when the initial injury occurs.

There may be a period of redness, swelling, throbbing sensations, panic or shock, and increased breathing and heart rate. Sometimes treatments such as pain medication and ice will help reduce pain and other related symptoms – even some gentle activity in some cases have been shown to provide some relief. However, it's important to remember that having some pain, although unpleasant, means your body is doing what it needs to do to keep you safe and heal. And as for the swelling and redness, that's some great evidence of the self-healing powers of your body being hard at work already!

Gradually, and sometimes without any treatment at all, pain and other symptoms like swelling, bruising or redness subside over time, and as they become more tolerable, you'll find that it is safe to gradually go back to our usual activities.

## WHEN THE HURT OUTWEIGHS THE HARM

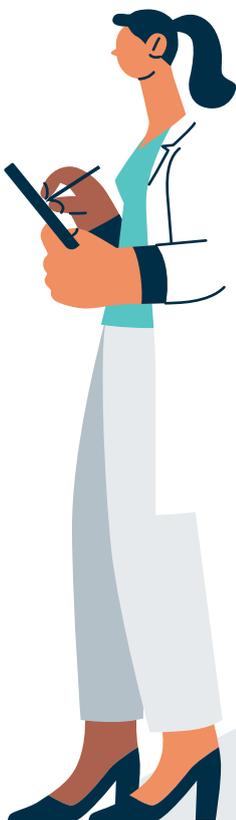
Sometimes pain doesn't subside despite tissue healing, with pain persisting long after the body's tissues heal. Pain which lasts longer than the expected healing time is called 'persistent pain'. Persistent pain can start to cause havoc with a person's ability to complete normal everyday activities and can become mentally and emotionally exhausting.

All pain is real no matter what the cause. However, pain becomes a less reliable indicator of tissue damage the longer it persists. Once someone is experiencing persistent pain, they may have a larger than normal pain response, even though there is less danger present.

For example, experiencing pain during previously non-painful activities or movement can be a sign of persistent pain. Much research has been done to understand changes in the nervous system that contribute to persistent pain.

Pain scientists are still unravelling the mystery of pain, but we do know that the more a person learns about pain and the better they understand their pain experience, the greater the likelihood of recovery and getting back to normal daily activities. Exercise and physical activity have been shown to be very effective treatments for reducing pain and improving the lives of nearly all persisting pain conditions. We hope you find this e-book helpful in learning more about how science and physical activity can help you recover.

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# PAIN SCIENCE

## PAIN PATHWAYS THROUGH THE NERVOUS SYSTEM

To better understand pain, it may be helpful to first learn about your nervous system.

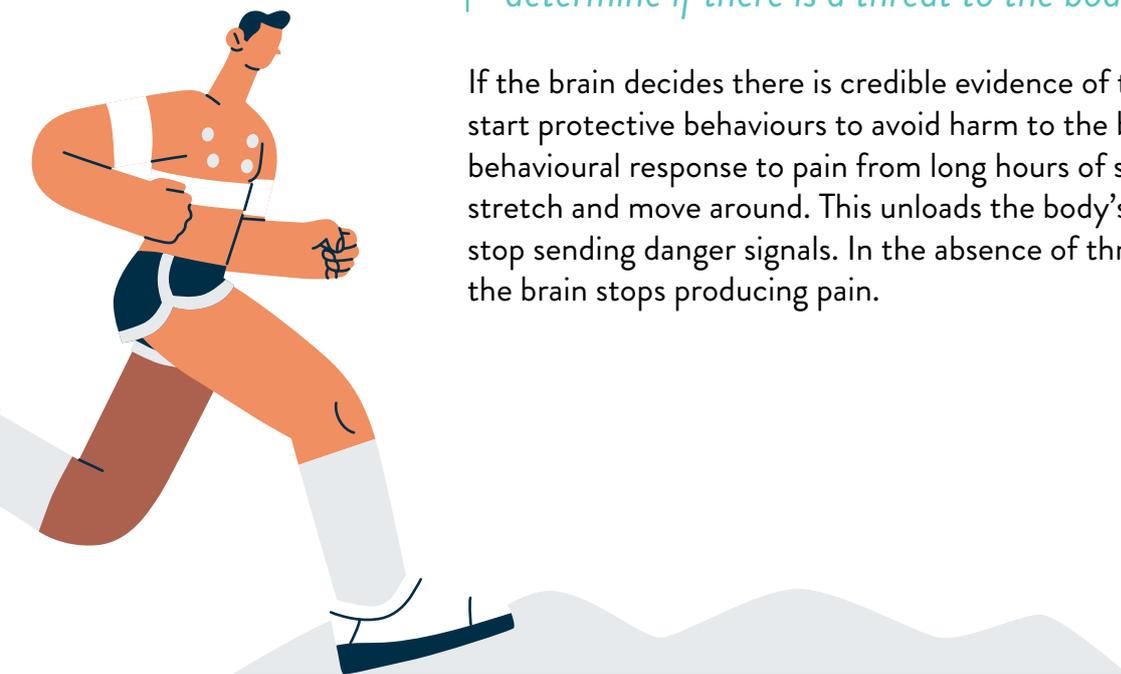
Specialised nerves - called *nociceptors* - are widely distributed throughout the body including in the skin, muscles, joints, bones, and internal organs.

Nociceptors are 'danger detectors' and help protect the body from harm by transmitting information to the nervous system about potentially harmful changes that occur throughout the body. This includes changes to pressure in the joints; stretch in muscles and tendons; skin temperature; and inflammatory chemicals released from injured tissues.

Once these changes are detected, nociceptors send 'danger signals' to the brain via the spinal cord.

*It is important to understand that nociceptors transmit danger signals, not pain, to the brain. These danger signals are weighed up by the brain, along with stored information from previous experiences and what has been learned, to determine if there is a threat to the body's tissues.*

If the brain decides there is credible evidence of threat, pain is produced to start protective behaviours to avoid harm to the body. A familiar, protective behavioural response to pain from long hours of sitting is to stand up, stretch and move around. This unloads the body's tissues and nociceptors stop sending danger signals. In the absence of threat and a need to protect, the brain stops producing pain.



## NERVOUS SYSTEM SENSITISATION

### What is it and why does it matter for those in pain?

If you are one of many people who experience persistent pain each day, right now you might find yourself asking questions like: How has my pain gotten worse over time? Why is my pain lasting longer than expected? Why does my pain flare up unpredictably? Why has my pain spread to other parts of my body?

As pain persists, the body adapts by becoming more protective. This involves many changes to the brain and nervous system, including a heightened sensitivity to danger signals and threat. This results in the brain and body systems becoming overprotective, like a car alarm that goes off every time a leaf lands on the bonnet.

An overprotective nervous system that produces persisting pain may negatively affect how you engage in everyday activities and interact with colleagues, friends, and family members.

The good news is that an overprotective nervous system can be retrained to be less sensitive and protective, decreasing pain sensations. Changes in the brain, include reshaping existing pain neural networks and shaping new neurons and connections that inhibit pain processing, also contribute to pain desensitisation.

*Exercise and physical activity play a key role in reducing pain sensitivity and reengaging in activities you might have had to give up.*

We will discuss this more later in this eBook.

## THOUGHTS, BELIEFS, EMOTIONS, AND PAIN

The way we think, experience, and sense the world influences how the arriving danger signal is processed in the brain and in turn, influences the pain we experience. Distraction techniques have been shown to decrease peoples' pain in the short-term.

Some examples of distraction techniques include:

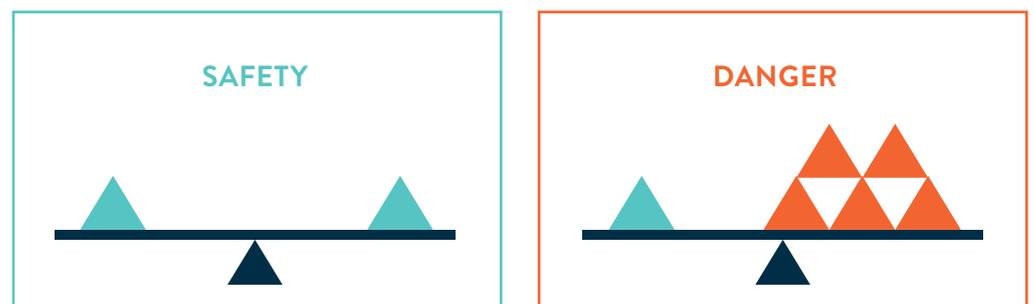
- » The use of virtual reality
- » Mindfulness techniques
- » Playing an instrument or a game
- » Focusing on controlled breathing

Even short meditation practice can increase the circulating levels of chemicals in the brain that turn down danger signals and decrease pain. This isn't to say that you can distract your way out of pain but shows that learning ways to change unhelpful thoughts, beliefs and emotions can help reduce the impact of persistent pain.

The 'fight or flight' response is another one of the body's responses to threat which begins in times of stress. Research shows that pain and stress are linked, with higher levels of stress associated with higher levels of pain. Treatments that reduce stress and promote relaxation, including exercise and physical activities, are key components of pain rehabilitation programs.

## THE PAIN SYSTEM IN ACTION: DANGER / SAFETY BALANCE SCALE

When danger signals arrive in the brain, the brain balances danger and safety to decide on the level of threat. A good way to think about how the brain weighs up danger signals is much like balancing stones on a scale.



As you could imagine, the size and weight of each stone varies depending on the significance of the danger or safety. It's a dynamic system that changes moment to moment. Larger and heavier danger stones increase threat, with the need to protect against potential harm increasing your pain.

*To reduce pain, it can be useful to think of your own personal safety and danger stones and how to increase the weight and size of your safety stones.*

This can include identifying and learning strategies to reduce key stressors in your life. Safety stones might also include participating in exercise and physical activities that you enjoy and are good for your health.

Big, weighty safety stones also include learning about pain and better understanding your pain experience. If nothing else, having more 'safety' in your life can help when it comes to building the confidence to take on challenges when you have pain, including returning to exercise and other meaningful daily activities, recreation, and work.

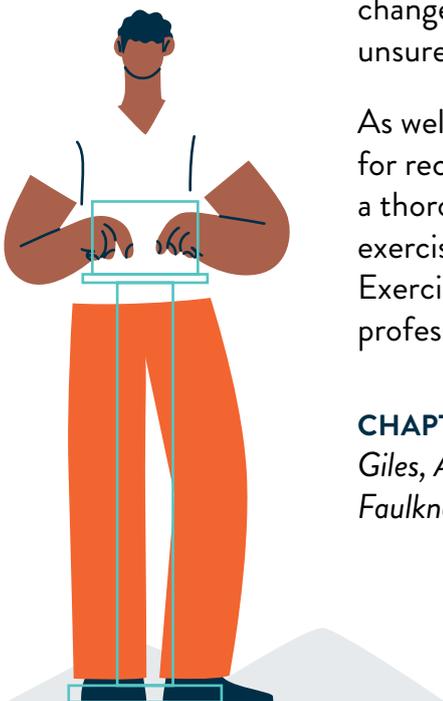
It is common for people with persisting pain to undertake X-rays or MRIs to try and identify the cause of their pain. The report findings from these investigations often include complicated and threatening language such as degeneration, sequestered, signal loss, protrusion, and fissure.

The anxiety and worry caused by MRI findings can be weighty, danger stones for people with persistent pain that stop them choosing to engage in effective pain treatments, including exercise and physical activity.

In most cases, MRI findings often describe normal, age-related structural changes also seen with people who do not experience pain. If you are unsure, discuss with your health or medical professional.

As well as being safe, getting moving and becoming more active is crucial for recovery from pain. An Accredited Exercise Physiologist will undertake a thorough initial assessment and prescribe an individualised and safe exercise program best suited to your condition and needs. Accredited Exercise Physiologists also liaise with your treating doctor and other health professionals involved in your care.

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# THE BENEFITS OF EXERCISE FOR PAIN

Exercise and movement are essential ingredients in the management of persistent pain.

Many pain researchers and health professionals recognise that increasing physical activity levels can improve pain, function, and wellbeing across a range of persistent pain conditions including osteoarthritis, back and neck pain, shoulder pain, fibromyalgia, and post-surgery pain.

Although exercise is recommended for most patients with persistent pain, the longer someone has experienced pain the harder it can be to get started. This means physical activity and everyday movements can become more painful, and flare-ups can become more frequent, severe, and longer lasting when someone has had pain for a long time. This can reduce confidence, promote anxiety or fear concerning exercise and activity, and lead to avoiding exercise which ultimately worsens pain.

*The good news is that learning to exercise in a way that is right for you as an individual has a positive effect on the pain system.*

With increased exercise tolerance, pain sensitisation reduces, meaning fewer, less severe flare-ups as your system becomes less sensitive.



## EXERCISE CHANGES YOUR BODY'S PHYSIOLOGY

Most people believe that the benefits of exercise for persistent pain are through improved muscle strength and endurance and mobility, better lubricated joints, and increased flexibility. While these adaptations are important, regular exercise and physical activity have multiple, positive changes in all the body's systems, such as the cardiovascular system, brain and nervous system, hormonal, and immune systems.

Exercise can undo some of the negative effects of persistent pain which include a weaker immune system, reduced fitness, strength and resilience, and negative effects on our mood. The combined effect of these system changes can be of great benefit to people with persistent pain.

Exercise related health benefits for people with persistent pain include:

- » **Improved sleep.** For people experiencing persistent pain, poor sleep has been linked to higher levels of pain. Exercise contributes to changing the fight or flight response, winding the nervous system down and promoting relaxation.
- » **Improved mood and reduced stress and anxiety.** Improved release and responsiveness to naturally produced 'feel good' hormones and neurotransmitters (for example dopamine) can reduce your perception of pain. These work similarly to some frequently prescribed pain medications and can help reduce pain medication dependency.
- » **Increased pain tolerance and pain desensitisation.** Even a single short bout of exercise, like a brisk 20 min walk, can decrease pain for 20-30 minutes post-exercise. Regular daily exercise can increase pain tolerance and assist with reengaging in activities ceased or limited by pain.
- » **Improved immune function.** Exercise reduces systemic inflammation through improved circulation and changes in immune system function. Increased inflammation promotes pain and low mood and is common in many chronic conditions.

Exercise is an effective and beneficial treatment for persistent pain through the combined effects of multiple positive changes in the body, brain and nervous system that improve physical and psychological well-being. Most importantly, exercise and physical activity can be safe and reduce the potential harm and side effects associated with some medications and medical procedures commonly used to treat persistent pain.

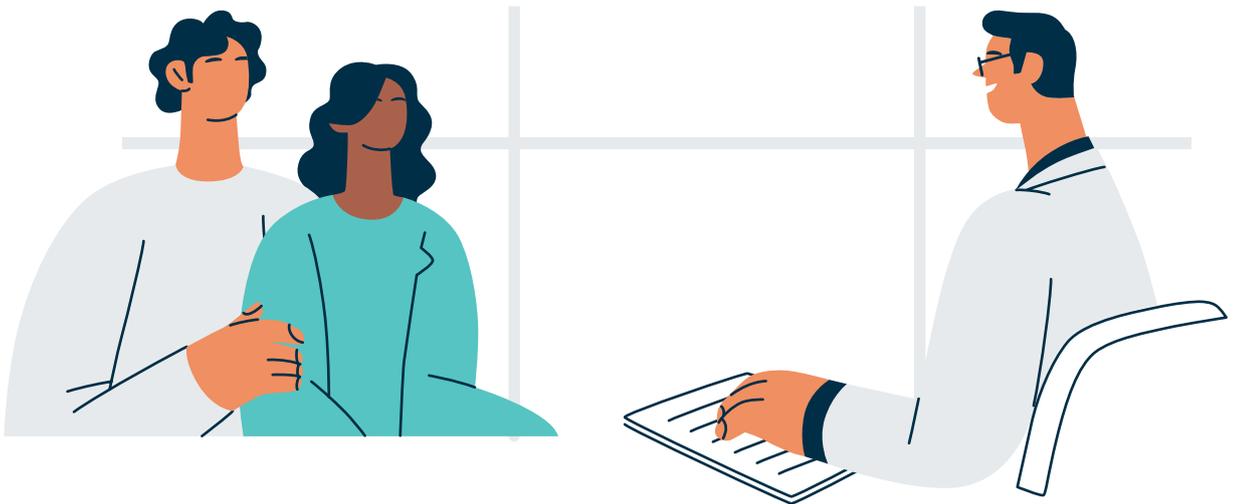
**CHAPTER AUTHORS:** *David Dall'Alba AES, AEP, and John Booth PhD, AEP.*



# PRACTICAL ADVICE FOR EXERCISE AND PAIN

Although exercise is considered a safe and effective treatment for people living with persistent pain, it is important that you are assessed by a suitably qualified exercise professional, such as an Accredited Exercise Physiologist, to make sure that there will be no serious risks prior to commencing exercise.

These may be contraindications specific to pain (although these are rare), or to other health conditions more generally that may impact on your ability to safely perform exercise.



## PHYSICAL ACTIVITY AND PAIN

The relationship between physical activity and pain is complex. For example, people with persistent pain can experience an increase in their symptoms during and following a single exercise session, which leads them to believe they should avoid exercise in the future.

However, we know regular exercise over weeks to months helps reduce pain and improve function and quality of life for a range of different persistent pain conditions. Therefore, it is important for people with persistent pain to engage in regular physical activity to experience the many health benefits. But how can people with persistent pain keep active? Especially considering the complex interaction between physical activity and pain.

An important first step can be to understand your current activity levels. When it comes to physical activity in people with pain, we commonly see two distinct activity patterns – ‘persisters’ and ‘avoiders’.

- » **Persisters** are those who continue to push on with their daily activities despite pain. While this might be manageable for a time, eventually this overactivity can catch up and pain increases beyond tolerable levels, forcing someone to rest for extended periods until the pain subsides. If you feel like this describes you, try dividing your daily activities into smaller, more manageable portions and spreading out activities across the day or week. This activity pacing can be a useful starting point to stabilise symptoms before engaging in more structured graded activity.
- » **Avoiders**, on the other hand, are those who avoid activity for fear of worsened symptoms or that they are causing ‘damage’ to themselves when their pain increases with activity. Over time, this activity avoidance leads to deconditioning and subsequently a lower tolerance for activity. When avoiders do try and exercise again, their lower tolerance for activity means they may experience even greater increases in pain, so they again avoid activity, and the cycle continues. If you identify with this ‘avoider’ pattern of activity, graded exposure and graded activity are useful behavioural strategies to improve your tolerance for activities.

These concepts will be discussed in more detail in this chapter.



## GOAL SETTING

Becoming more physically active can be difficult for many people. This can be particularly true for people with pain because of the effect physical activity can have on their symptoms. Goal setting is one of several strategies that can be useful to become more active and stay engaged in the activities.

It is very common for many with pain to want to be pain-free. Unfortunately, the complex nature of persistent pain means this is rarely a realistic goal. Instead, it is important for people with pain to aim to stay engaged in activities that matter to them.



This could be in the form of structured exercise like walking or going to the gym, or hobbies such as surfing or gardening, or even social activities like going out to dinner with friends. Research has shown that when we focus more on staying engaged in meaningful activities and on keeping active, rather than focusing on resolving our pain, we can experience some pain relief!

To help identify activities that matter to you, you could ask yourself “If I didn’t have pain, what would I be doing?” Once you have identified some goals you want to achieve, you can use the strategies outlined here, and the practical actions described below, to help you put them into action.

## PRACTICAL ACTIONS FOR RETURNING TO ACTIVITIES WITH PAIN

*Once you have worked out the activities that you currently struggle with due to your pain, you can use these to set up a graded exposure exercise program.*

One way to do this is to take the activity, for example, walking. Start with a short amount and gradually do more and more until you have achieved your desired goal. This sounds simple but can be quite challenging and scary when you have pain.

Pain experienced during this activity can be a barrier to successfully engaging exercise. It is normal and expected that you will experience pain when returning to exercise and activities when recovering from persistent pain.

*In fact, painful exercises can have a significant benefit over pain-free exercises when it comes to reducing pain.*

Although it is generally safe to exercise despite pain, you may find it useful to follow these guidelines regarding acceptable amount of pain:

1. If you are coping with the level of pain, then continue with the exercise.
2. If the pain is more than you find acceptable or tolerable, or flares up longer than 24 hours after exercise, then decrease the amount of exercise until you're coping with it again. Some ways to tell if your level of exercise is too intense may be that you begin experiencing interruptive mood or sleep, or you are finding it harder than normal to do everyday tasks.
3. It is important to adjust the exercises depending on your symptoms. This may mean increasing the number of repetitions you do or the amount of resistance that you use as it becomes easier; or decreasing if it gets too painful. Try to avoid not doing the exercises altogether, as complete rest is unlikely to help.

When starting exercises, it can be a good idea to start with an amount that you are confident you can achieve and is unlikely to lead to prolonged exacerbation of symptoms. This may mean starting at a level of exercise that seems too easy to be beneficial, though this isn't the case.

Starting with a small amount of exercise is a great way to increase your confidence and is a major part of the therapeutic process. We suggest that for the first few weeks, you choose exercises and activities that you are at least 80% confident that you can achieve without pain exacerbation that would cause you distress or reduce your ability to live your normal life.

When engaging in a graded exposure exercise program, it is important to remember that the goal is to increase your ability to perform challenging or painful tasks and that this might not necessarily lead to reductions in pain. Because of this, it is important to choose exercises and activities that are meaningful to you and that are currently challenging due to your pain problem.

*Using a 'time contingent' strategy can be useful once you have become used to the exercises or activities that you have chosen.*

This means setting a goal ahead of time as to how much you will increase the activity despite your symptoms.

This is not to say that you should exercise into any pain that you do not consider acceptable, or that you should continue if you are having flares after exercise lasting greater than 24 hours, but this can help you increase your activity when you may think you aren't able to. You might be surprised with just how much activity you can achieve in this way!

If you are unable to perform even a very small amount of the activity that you have chosen for your graded exposure, it may sometimes be necessary to reduce the task to start with.

For example, if your chosen activity is gardening, but you cannot currently do even a small amount, you may have to break it down into its basic parts and start with one of these. This may be as simple as doing some forward bending towards the floor, inside your house to replicate the action of pulling weeds.

From here, you might make it more difficult by doing the same movement with a small weight in your hands, gradually making the activity harder as your capacity increases, and ultimately transitioning to gardening at some point along this journey.

If you need advice or support setting up your graded exposure program, an Accredited Exercise Physiologist can help at any point along the journey.

**CHAPTER AUTHORS:** *Sam Rollison AEP, Aidan Cashin PhD, AEP, and Matthew Jones PhD, AEP.*





# FREQUENTLY ASKED QUESTIONS

## WHAT TYPE OF EXERCISE AND HOW MUCH SHOULD I DO?

The key message is that even small amounts of exercise can benefit people with persistent pain. The most enjoyable exercise will be the most effective, and a wide range of exercises are suitable including walking, swimming, weight training, Pilates, yoga, and Tai Chi. Choose exercise that you enjoy and feel confident and safe undertaking.

Remember to start gradually and “pace” yourself. For example, start with 10-15 minutes of gardening or a short walk rather than drive next time you head out to the post office. Another effective way to improve your strength, fitness, and function is to break down activities into tolerable and achievable chunks, with several repeats throughout the day.

You can increase the duration of each chunk as your fitness and activity tolerance increases. Set a goal of exercising at least 2-3 days a week and being physically active on most days of the week (gardening, shopping, house duties).

## HOW HARD SHOULD I EXERCISE?

While exercise at any intensity is helpful for people with persistent pain, a good goal is to perform some exercise at moderate intensity. During moderate intensity exercise, you should be breathing harder to the point at which you are not able to sing or shout, yet still be able to speak.

As your confidence grows and your fitness improves you can gradually increase the intensity to a level in which you cannot comfortably talk, sing, or shout due to difficulty breathing. While

most people with persistent pain will undertake moderate intensity exercise, higher intensity exercise is also beneficial but guidance from a health professional is recommended.

For aerobic exercise such as walking, dancing, cycling, and swimming, aim for between 20 and 60 minutes at a low to moderate intensity. Resistance exercise such as weight training, resistance bands, floor, and body exercises performed 2-3 days per week at a moderate intensity has also shown to be beneficial for people with persistent pain. As a guide, start with higher repetitions, 1-2 sets of 15-20 repetitions.

As you get fitter and stronger you can reduce the repetitions and increase the load. Performing 1-2 sets of 8-12 repetitions at about 70-80% of maximal effort is best for developing strength. Include a variety of exercises and/or movements that engage all major muscle groups, including the painful body part.

If resistance exercise is not of interest, try to incorporate strengthening daily activities 2-3 times per week such as gardening, carrying the shopping or stair climbing. Regardless of whether you are completing aerobic, resistance, or a combination of the two, a minimum of 4-6 weeks training is usually required for pain and function to improve. An Accredited Exercise Physiologist can assist people with chronic pain commencing exercise or requiring help with tailoring exercise to best suit their needs and goals.

## HOW MUCH PAIN IS OK TO EXPERIENCE WITH EXERCISE?

An important part of getting back into physical activity and exercise while you're experiencing pain is feeling and believing you are safe. This might mean choosing an activity you are confident you can complete, or you know will not cause you physical harm despite the level of pain you can acceptably tolerate.

If you feel unsafe or threatened during exercise, for example believing it will cause or worsen an injury, you're less likely to persist and it may increase your pain. One of the biggest barriers to individuals exercising in the short or long term seems to be fear of exercise and aggravation of pain.

While we know pain is designed to protect us, in persistent pain it is important to remember the alarm system does not necessarily reflect the reality or level of threat. Exercising with a tolerable level of discomfort has been shown to be beneficial compared to pain free exercise. With the right approach you will gradually be able to do more exercise with less interference from pain.

If you aren't sure, start by exercising non-painful areas of your body that you are comfortable with, as aerobic and resistance exercises can still improve pain in other areas of your body that are not directly involved in the exercise. For example, if you have pain in your knee due to osteoarthritis, doing strength training with the upper body has been shown to reduce pain in the lower body. Accredited Exercise Physiologists can assist you to identify ways to progress your exercise to better manage your pain via coaching, support, and education to develop your confidence to self-manage your pain through exercise.

## I'VE BEEN EXPERIENCING SORE MUSCLES AND FLARE-UPS AFTER EXERCISE. IS THIS NORMAL?

It is quite normal after exercise for your muscles to feel weak and stiff, so it sometimes feels painful and restricted when you try to use them after exercise. This normally peaks in intensity between 48 and 72 hours after you have exercised. Although if it is holding you back from daily life or the pain is intolerable, it is best to speak to an Accredited Exercise Physiologist or reduce the intensity of your exercise.

Some pain can be a normal response to exercise, and it will generally settle down after a few days and won't have any longer-term implications. The body also adapts quickly to exercise, so if you were to do the same exercise session again it's unlikely to result in the same amount of muscle soreness as it did the first time.

As you increase the load and/or intensity of exercise, the risk of exercising in pain involves experiencing a flare-up of your symptoms, particularly if the increase is too soon. Therefore, it can be a good idea to note details of your exercise daily in a journal or diary. This allows you to step back to the amount of exercise you tolerated before a flare-up, which you know is safe. You can keep exercising at the pre-flare-up load and gradually pace it back up as your symptoms reduce. A diary is also helpful to keep you on track to reach your goals and reduce your risk of increasing your intensity too quickly or drastically.

It's important to remember that flare-ups are not a sign of further injury but reflect an overactive and sensitised pain system. This is important to keep in mind on days your pain is worse than others and you don't feel comfortable or safe doing your normal exercise program.

## HOW CAN I STAY MOTIVATED?

It is very normal to experience days in which you don't feel like doing any exercise or just feel "off", so it can be a good idea to pick something you do feel safe and motivated to do and do as much as you can tolerate.

Another great way to commit to exercising is by joining up with a friend or family member, or even a pet, as it can reduce your attention towards your painful body part, make the activity more enjoyable, and increase the likelihood that you will engage in the activity. Setting realistic exercise goals and monitoring your progress with an activity diary can also help you stay motivated and keep moving!

## DO I NEED HELP BECOMING MORE ACTIVE AND STARTING EXERCISE?

If you don't have any medical conditions or reasons exercise would be unsafe, you can start exercising on your own, although support from a health professional such as an Accredited Exercise Physiologist can support your recovery and arm you with tools to better manage.

An Accredited Exercise Physiologist will assess what you can do safely, to establish and guide you through an exercise or activity program that is individualised for your circumstances and goals. Finding the appropriate level of supervision can assist you to stay motivated, provide encouragement, reassurance, real-time monitoring of your technique, and opportunities for feedback and progression of your exercise program.

If you're confident and have an individualised exercise program, you can even complete your exercises independently at home, or within a group environment with less supervision.

## I ALREADY SEE MANY OTHER HEALTH PROFESSIONALS FOR MY PAIN. DO I NEED TO SEE AN AEP AS WELL?

AEPs work with other allied health and medical professionals to make sure you can achieve the best possible health outcomes. Speak to your healthcare team to see if they think referring you to an AEP would help improve your pain outcomes.

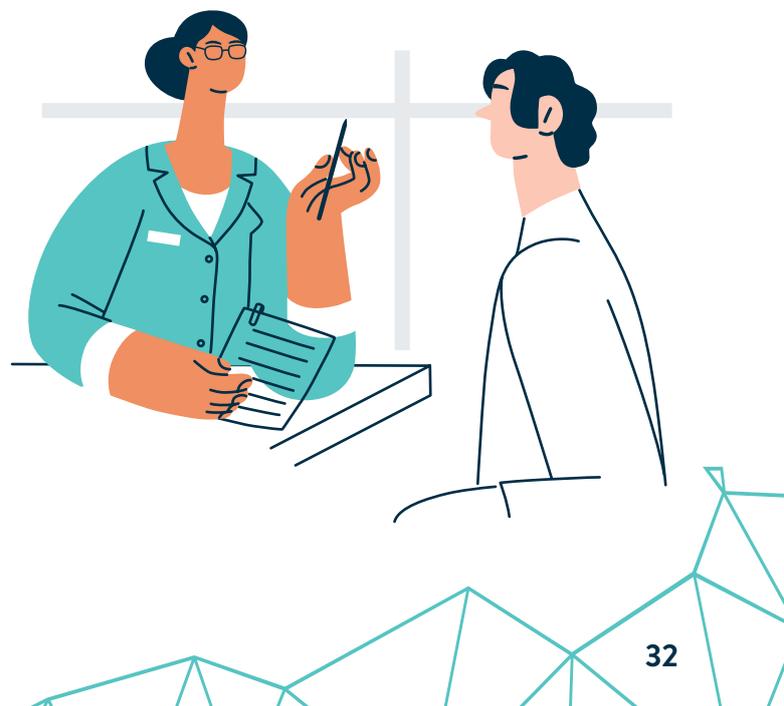
## HOW CAN I ACCESS AN AEP?

You can find an AEP by going to this [webpage](#) and searching for an AEP in your area.

You may be eligible to access exercise physiology sessions through Medicare. Your GP will be able to tell you if you are eligible for up to five allied health sessions under a chronic disease management plan.

If you have used all your allied health sessions under your Medicare chronic disease management plan before the end of the calendar year, you may be able to access further support through your local Primary Health Network. See this [factsheet](#) for further details.

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# PAINAUSTRALIA

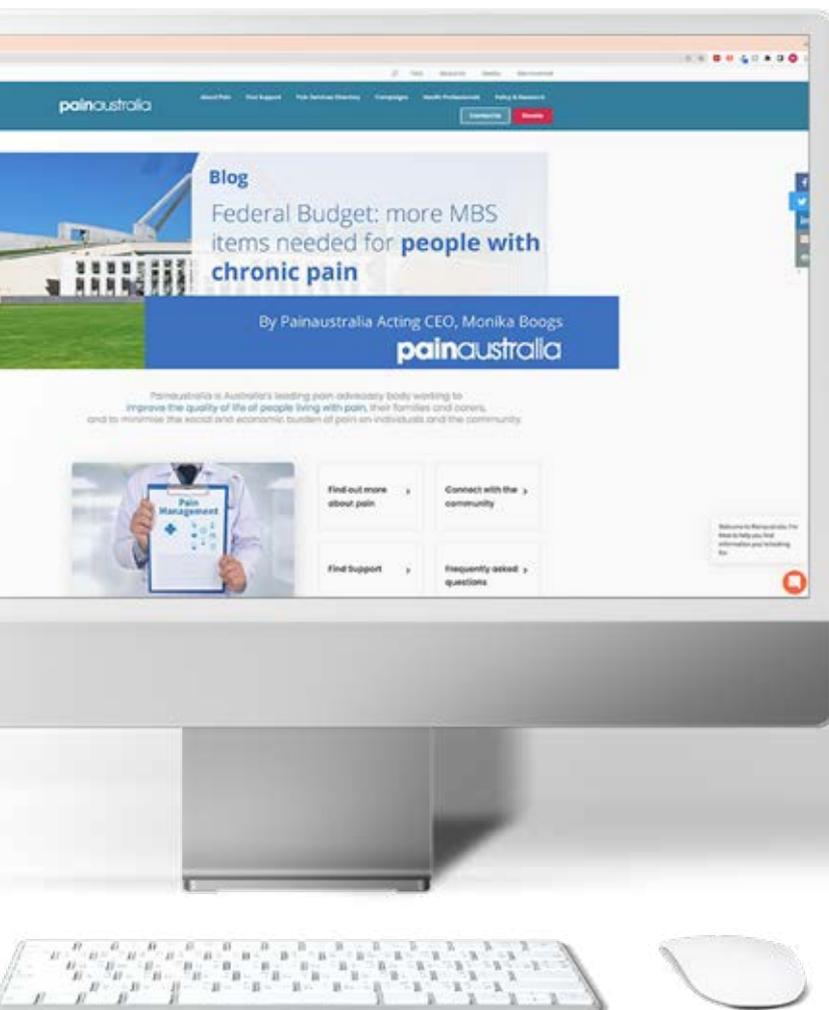
Painaustralia is Australia's leading pain advocacy body improving the quality of life of people living with pain, and to minimise the social and economic burden of pain on individuals and the community.

Its vision is for pain to be recognised as a national health priority and that all Australians living with pain or at risk of pain-related disability, their families and carers can access credible information and a world-class system of care.

Painaustralia offers a variety of support to people living with pain, including:

- » Connecting you to peer support groups in your community.
- » Helping you find pain management services via their Pain Services Directory.
- » Resources and tools to help you understand your pain management options and different pathways to access care.
- » Advocacy to improve public policy so that your pain management needs are met.
- » Training and resources for health professionals, so that they can better support you.
- » Public and education campaigns, so that the community is aware of the impact that pain can have on your life and reduce the stigma around living with pain.

You can visit Painaustralia's website for more details, at [painaustralia.org.au](http://painaustralia.org.au).



# REFERENCES

- Blyth, F. M., March, L. M., Brnabic, A. J., Jorm, L. R., Williamson, M., & Cousins, M. J. (2001). *Chronic pain in Australia: a prevalence study*. *Pain*, 89(2-3), 127-134. doi:10.1016/s0304-3959(00)00355-9
- Bonezzi, C., Fornasari, D., Cricelli, C., Magni, A., & Ventriglia, G. (2020). *Not All Pain is Created Equal: Basic Definitions and Diagnostic Work-Up*. *Pain Ther*, 9(Suppl 1), 1-15. doi:10.1007/s40122-020-00217-w
- Booth, J., Moseley, G. L., Schiltewolf, M., Cashin, A., Davies, M., & Hübscher, M. (2017). *Exercise for chronic musculoskeletal pain: A biopsychosocial approach*. *Musculoskeletal Care*, 15(4), 413-421. doi:10.1002/msc.1191
- Cashin, A. G., Booth, J., McAuley, J. H., Jones, M. D., Hübscher, M., Traeger, A. C., . . . Moseley, G. L. (2021). *Making exercise count: Considerations for the role of exercise in back pain treatment*. *Musculoskeletal Care*. doi:10.1002/msc.1597
- deCharms, R. C., Maeda, F., Glover, G. H., Ludlow, D., Pauly, J. M., Soneji, D., . . . Mackey, S. C. (2005). *Control over brain activation and pain learned by using real-time functional MRI*. *Proc Natl Acad Sci U S A*, 102(51), 18626-18631. doi:10.1073/pnas.0505210102
- Economics, D. A. (2019). *The Cost of Pain in Australia*. Faculty of Pain Medicine (Australian and New Zealand College of Anaesthetists). (2017). *Children with chronic pain miss out on services* [Press release]. Retrieved from <http://www.anzca.edu.au/documents/children-with-chronic-pain-miss-out-on-services-me.pdf>
- Garcia-Larrea, L., & Bastuji, H. (2018). *Pain and consciousness*. *Prog Neuropsychopharmacol Biol Psychiatry*, 87(Pt B), 193-199. doi:10.1016/j.pnpbp.2017.10.007
- Hotfiel, T., Freiwald, J., Hoppe, M. W., Lutter, C., Forst, R., Grim, C., . . . Heiss, R. (2018). *Advances in Delayed-Onset Muscle Soreness (DOMS): Part I: Pathogenesis and Diagnostics*. *Sportverletz Sportschaden*, 32(4), 243-250. doi:10.1055/a-0753-1884
- Johnson, R. A., & Meadows, R. L. (2010). *Dog-walking: motivation for adherence to a walking program*. *Clin Nurs Res*, 19(4), 387-402. doi:10.1177/1054773810373122
- Khera, T., & Rangasamy, V. (2021). *Cognition and Pain: A Review*. *Frontiers in psychology*, 12, 673962-673962. doi:10.3389/fpsyg.2021.673962
- Latremoliere, A., & Woolf, C. J. (2009). *Central sensitization: a generator of pain hypersensitivity by central neural plasticity*. *The journal of pain*, 10(9), 895-926. doi:10.1016/j.jpain.2009.06.012
- Mikkelsen, K., Stojanovska, L., Polenakovic, M., Bosevski, M., & Apostolopoulos, V. (2017). *Exercise and mental health*. *Maturitas*, 106, 48-56. doi:https://doi.org/10.1016/j.maturitas.2017.09.003
- Mittinty, M. M., Vanlint, S., Stocks, N., Mittinty, M. N., & Moseley, G. L. (2018). *Exploring effect of pain education on chronic pain patients' expectation of recovery and pain intensity*. *Scand J Pain*, 18(2), 211-219. doi:10.1515/sjpain-2018-0023
- Moseley, G. L., & Butler, D. S. (2017). *Explain pain supercharged : the clinician's manual*: Noigroup Publications.
- Mosley & Butler. (2013). *Explain Pain*. Retrieved from
- Nijs, J., Paul van Wilgen, C., Van Oosterwijck, J., van Ittersum, M., & Meeus, M. (2011). *How to explain central sensitization to patients with 'unexplained' chronic musculoskeletal pain: practice guidelines*. *Man Ther*, 16(5), 413-418. doi:10.1016/j.math.2011.04.005
- Nugraha, B., Gutenbrunner, C., Barke, A., Karst, M., Schiller, J., Schäfer, P., . . . Treede, R. D. (2019). *The IASP classification of chronic pain for ICD-11: functioning properties of chronic pain*. *Pain*, 160(1), 88-94. doi:10.1097/j.pain.0000000000001433
- Raja, S. N., Carr, D. B., Cohen, M., Finnerup, N. B., Flor, H., Gibson, S., . . . Vader, K. (2020). *The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises*. *Pain*, 161(9), 1976-1982. doi:10.1097/j.pain.0000000000001939
- Rice, D., Nijs, J., Kosek, E., Wideman, T., Hasenbring, M. I., Koltyn, K., . . . Polli, A. (2019). *Exercise-Induced Hypoalgesia in Pain-Free and Chronic Pain Populations: State of the Art and Future Directions*. *The journal of pain*, 20(11), 1249-1266. doi:10.1016/j.jpain.2019.03.005
- Smith, B. E., Hendrick, P., Smith, T. O., Bateman, M., Moffatt, F., Rathleff, M. S., . . . Logan, P. (2017). *Should exercises be painful in the management of chronic musculoskeletal pain? A systematic review and meta-analysis*. *Br J Sports Med*, 51(23), 1679-1687. doi:10.1136/bjsports-2016-097383
- Woo, K. Y. (2012). *Exploring the Effects of Pain and Stress on Wound Healing*. *Advances in Skin & Wound Care*, 25(1). Retrieved from [https://journals.lww.com/aswcjournal/Fulltext/2012/01000/Exploring\\_the\\_Effects\\_of\\_Pain\\_and\\_Stress\\_on\\_Wound.10.aspx](https://journals.lww.com/aswcjournal/Fulltext/2012/01000/Exploring_the_Effects_of_Pain_and_Stress_on_Wound.10.aspx)
- Woolf, C. J. (2011). *Central sensitization: implications for the diagnosis and treatment of pain*. *Pain*, 152(3 Suppl), S2-S15. doi:10.1016/j.jpain.2010.09.030



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