



**STRENGTH & CONDITIONING  
INJURY REHABILITATION  
PHYSIOTHERAPY  
DIETITIAN**

A black and white photograph of a basketball player's leg and foot is visible on the left side of the page. The player is wearing a basketball shoe and a knee brace. The image is partially obscured by the diagonal design elements.

**BASKETBALL  
PERFORMANCE  
GUIDE: KNEE PAIN**



# WE SPECIALISE IN OPTIMISING HUMAN PERFORMANCE

The RAD Centre is a High Performance Company located in Ballarat. Our staff have years of experience in the field and have worked with the AFL, VFL, VNL, NBL1 and NAB League. Our core business includes the services of

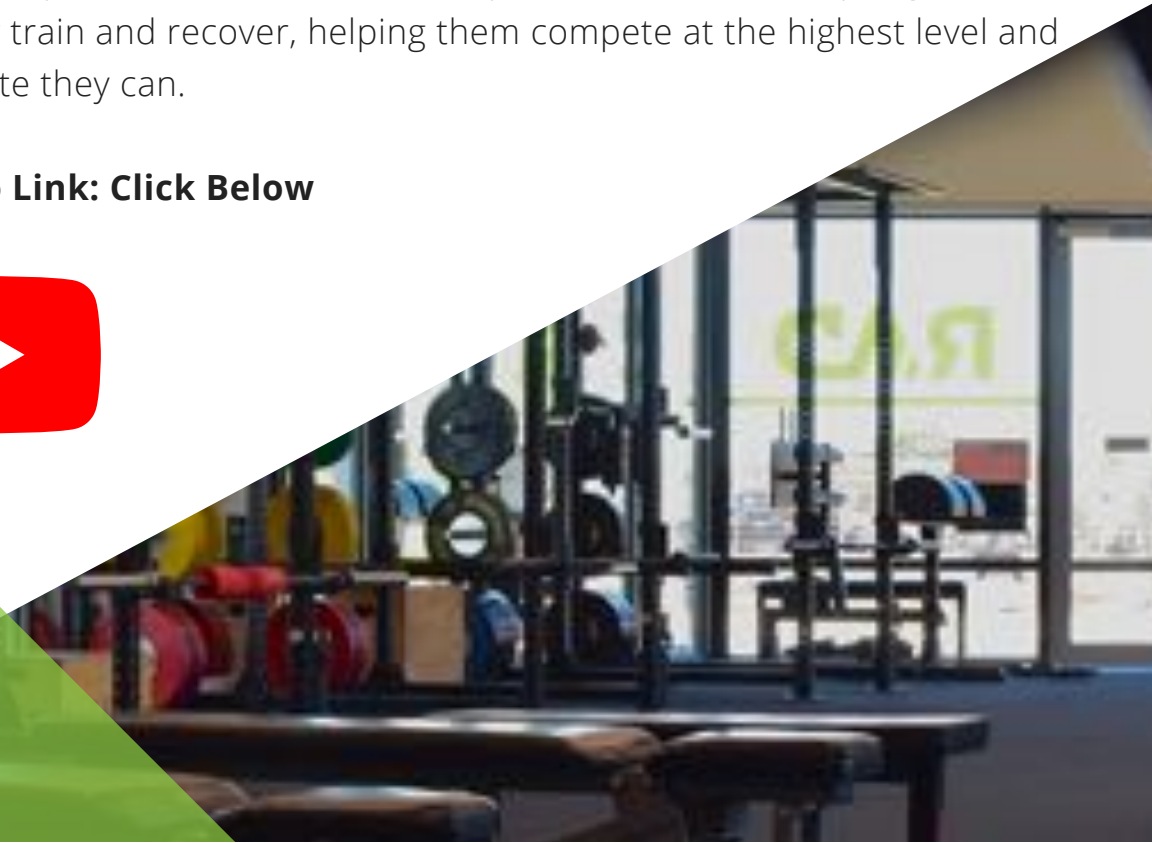
- Strength & Conditioning
- Injury Rehabilitation
- Physiotherapy
- Dietetics

Basically, we specialise in three main areas

1. **If you want to run faster, jump higher or be stronger, we can help!**
2. **If you have a sport / work / life related injury, we can help!**
3. **If you want to know more about athletic performance, we can help!**

Through our experience working with a range of professional, semi professional and local athletes- we have come to realise that having the right people in Regional Victoria to help develop athletes is crucial! It is a passion of ours to help regional athletes to properly train and recover, helping them compete at the highest level and to be the best athlete they can.

**What we do Video Link: Click Below**





# KNEE PAIN IN BASKETBALLERS



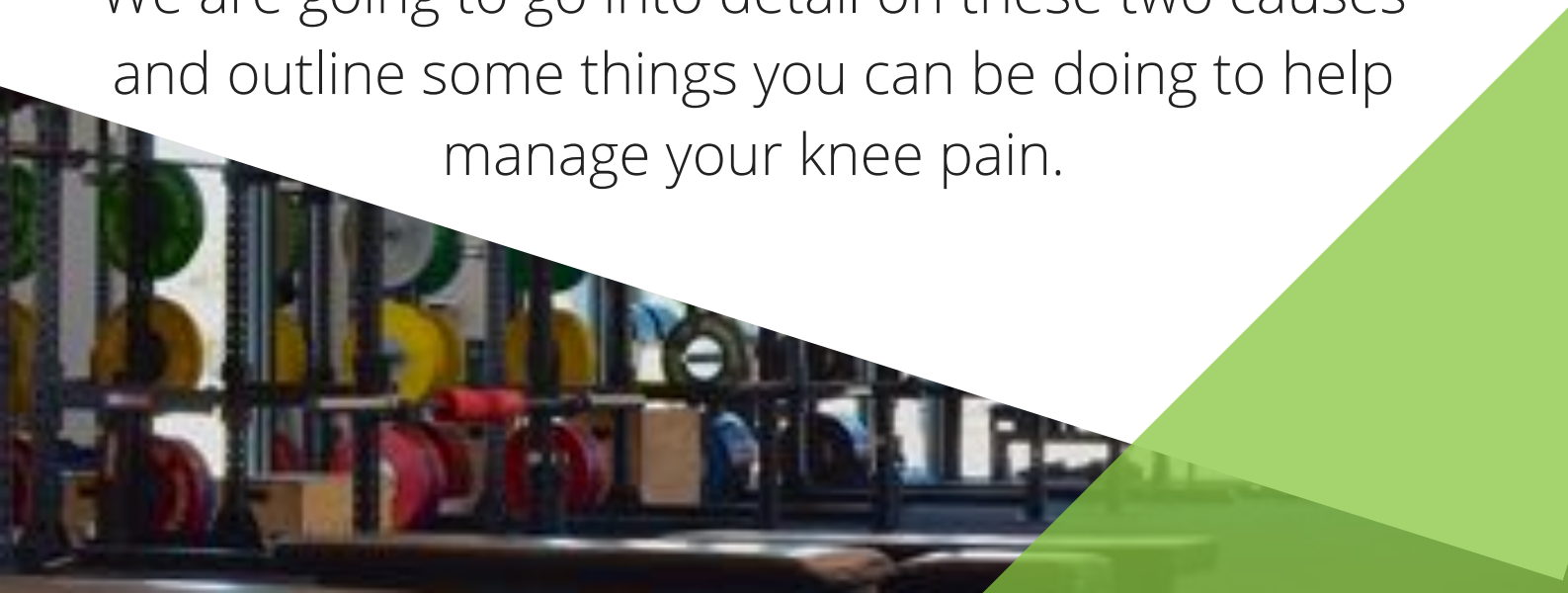
Basketballers are some of the most powerful and explosive athletes, with their speed and agility crucial to success on the court.

*But nearly 50% of all basketballers will experience knee pain while playing.*

The two most common causes of knee pain are:

1. Osgood Schlatters
2. Patellar Tendinopathy

We are going to go into detail on these two causes and outline some things you can be doing to help manage your knee pain.





# OSGOOD SCHLATTERS

## What is it?

Osgood Schlatters is a growth-related apophysitis of the knee. This simply means there is inflammation on or around the growth plates.

Osgood Schlatters generally presents with pain and/or swelling localised to the tibial tuberosity (which is where the patellar tendon inserts onto the shin). This is a common condition in adolescents (affecting 1 in 10).

Osgood Schlatters is often aggravated with knee loading activities (such as running and jumping). Early sports specialisation is also associated with a greater relative risk of developing the condition.

“There is a lack of evidence-based interventions, and passive approaches (eg, rest and avoidance of painful activities) are often prescribed.” (Rathleff, Winiarski et al. 2020) This is **NOT** the answer.





# PATELLAR TENDINOPATHY

## What is it?

Patellar Tendinopathy is a chronic load-related injury characterised by patellar tendon pain. Tendinopathy is a term used to highlight structural changes of the tendon tissue with minimal inflammation.

This is why anti-inflammatory treatment options are discouraged and largely ineffective for treating tendinopathy.

Patellar Tendinopathy can affect up to 45% of elite jumping sport athletes (eg, basketball/volleyball) often leading to:

- Absence from sport
- Reduced athletic performance
- Reduced physical activity
- Reduced participation in physically demanding work





# KNEE PAIN IN BASKETBALLERS

Rest, passive approaches, and anti-inflammatories are often used to treat the symptoms, **NOT** the cause of knee pain in Basketballers.





# KEY KNEE PAIN MANAGEMENT PRINCIPLES

1. Tendon capacity
2. Activity modification
3. Isometric loading
4. Progressive tendon loading
5. Prognosis - Long term





# TENDON CAPACITY

Normal tendons adapt to load over time. Acute overload leads to a reactive tendinopathy or a grumpy tendon. Think of a jumping athlete who suddenly increases the number of jumping/landing repetitions they are performing each week. This athlete may then develop patellar tendon pain.

Rest is not always the answer. Tendons exposed to low levels of load (start of pre-season or after injury) may also develop a reactive tendon when exposed to a moderate increase in load (Cook and Purdam 2009).

The term capacity is used to describe whether or not you can perform a task (ie jump/land) or play basketball without causing injury (Cook and Docking 2015). Tendinopathy occurs gradually over time when the load exceeds what the tendon is able to tolerate and recover from. This is often the case with basketball athletes that train and play multiple times per week with little variation in the type of loading they are performing.

Tendon pain usually increases with load (Cook and Purdam 2009). This can be identified in two ways:

- Provocative and functional loading which leads to an increase in pain
- Pain is then localised to the tendon being loaded





# ACTIVITY MODIFICATION

Activity modification does not always mean rest.

The key to activity modification is avoiding activities that aggravate your knee pain (i.e. jumping/landing/playing basketball). This does not always mean full rest. Depending on the severity of your symptoms - sometimes reducing your overall weekly load may be enough to help manage your knee pain.

Reducing your exposure to running/jumping/landing and playing basketball will help reduce your pain in the short-term. This is a great time to focus on training around your injury and building lower limb strength. The aim is simple - increase your overall capacity to tolerate running/jumping and landing when you return to sport.

**“Rehab is training in the presence of injury.” - Phil Glasgow**

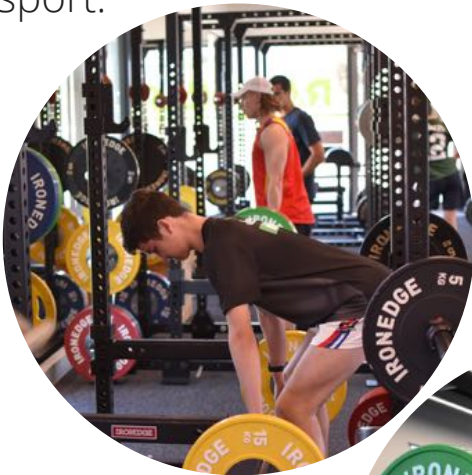




# ACTIVITY MODIFICATION

What else can you train without increasing your knee pain? Building strength throughout the kinetic chain (think calves/hamstrings/glutes) can help maintain strength/power and a return to performance. This is also a good time to work on upper body strength, core exercises, or energy system development via cross-training.

Building lower limb strength may sound provocative. Remember that tendons respond well to a combination of isometric exercises and heavy, slow resistance training. This process generally starts with isometric exercises (static holds) as they can help reduce pain in the short-term. Progressive loading then becomes important to ensure your symptoms are not flared when you return normal training and sport.





# ISOMETRIC LOADING

Isometric loading is a form of muscle strengthening that occurs without any movement.

Static holds can be used to introduce a new load as they are generally less provocative than other forms of exercise. Static holds may also help with pain relief in the short-term however this is not a blanket rule for all painful tendons.

The aim of isometric loading is to build strength in comfortable positions before progressing to more challenging and functional positions.

Isometric variations can be progressed and regressed in-season based on your symptoms.





# PROGRESSIVE TENDON LOADING

A progressive loading program with additional exercises targeting risk factors, load management and patient education is the best treatment for physically active patients with tendinopathy.

Progressive loading may start with isometric exercise with the aim of reducing pain. A combination of isometric and isotonic exercises are then used to build muscle strength. Isotonic exercises aim to build strength through your required range of motion. Explosive exercises are then used to bridge the gap between strength and sport specific movements before an eventual return to sport.

Exercise programmes should be first-line treatment for tendinopathy as this is an effective option to reduce pain and improve function.

Progressive loading makes sense.





# PROGNOSIS - LONG TERM

Rathleff, Winiarski et al. 2020 implemented a 12-week program that led to a reduction in pain and increase in performance. Pain scores dropped from an average of 7/10 to 2/10 in this cohort. This means that it is possible to reduce pain - but low levels of pain are likely to remain with participation in jumping sports like Basketball. Progressive strengthening and a graduated return to sport also allowed these athletes to increase their hip and knee muscle strength, and improve their jumping performance.

These results are similar to adult athletes with patellar tendinopathy. Return to sport rates were higher, and pain scores were lower when progressive tendon loading was used (Breda, Oei et al. 2021). Again - this takes time with outcomes measured after 24-weeks.

This highlights a couple of important things:

- Progress takes time
- Your pain levels may reduce - but most athletes with Osgood-Schlatters and Patellar Tendinopathy report ongoing pain (at a reduced level)
- Progressive loading and a graduated return to sport leads to an increase in athletic performance
- Rest is not the only option





# PROGNOSIS - LONG TERM

There is no quick fix when it comes to Osgood-Schlatters and Patellar Tendinopathy.

We know that a combination of activity modification, pain monitoring, progressive strengthening, and a graduated return to sport is an effective way to reduce pain in adolescent athletes with Osgood-Schlatters. This takes time.





# OSGOOD SCHLATTERS MANAGEMENT PLAN

## Week 1- 4

- Activity modification (avoid activity that aggravates knee pain)
- Isometric leg extension holds
- Double leg glute bridge

## Week 5 -12

- Progressive home-based knee strengthening

Level 1 = Wall Squats

Level 2 = Squats

Level 3 = Squats and Lunges

- Activity ladder and progression model for RTS
- Training diary

From week 5 and onwards

- Exercises with body weight 
- Gradual increase in knee loading activities using the activity ladder

- |   |   |  |
|---|---|--|
|  |  | 1. Light walking/cycling                   |
|  |  | 2. Faster walking/medium to hard cycling   |
|  |   | 3. Slow running                            |
|  |   | 4. Stairs                                  |
|  |   | 5. Running in medium pace                  |
|  |   | 6. Skipping                                |
|  |   | 7. Jumping                                 |
|  |   | 8. High speed running, turning and jumping |
|  |   | 9. Warm-up and 1/2 training                |
|  |   | 10. Warm-up and full training              |
|  |   | 11. Match/competition                      |

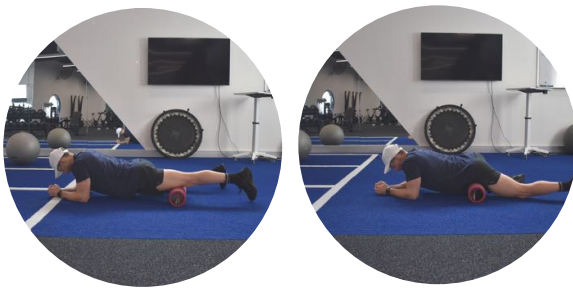




# KNEE PAIN MANAGEMENT PLAN

## Example pre warm up routine

- Activity modification (avoid activity that aggravates knee pain)
- Foam roll through quadriceps and hip flexors



- Stretch through quadriceps and hip flexors



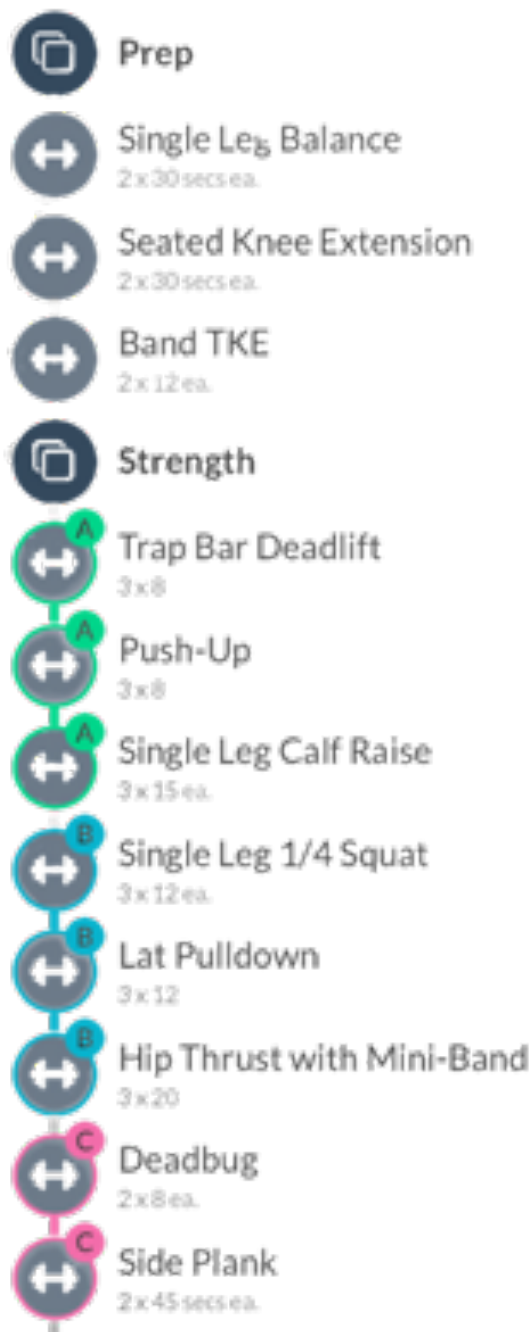
- Wall squat hold - 3 x 45seconds





# KNEE PAIN MANAGEMENT PLAN

Example gym session





# REFERENCES

- Rathleff, M. S., et al. (2020). Activity Modification and Knee Strengthening for Osgood-Schlatter Disease: A Prospective Cohort Study. *Orthopaedic Journal of Sports Medicine*. 8(4): 1-9.
- Breda, S. J., et al. (2021). Effectiveness of progressive tendon-loading exercise therapy in patients with patellar tendinopathy: A randomised clinical trial. *British Journal of Sports Medicine*. 55(9): 501-509.
- Cook, J. L. and C. R. Purdam (2009). Is tendon pathology a continuum? A pathology model to explain the clinical presentation of load-induced tendinopathy. *British Journal of Sports Medicine*. 43(6): 409-416.
- Cook, J. L. and S. I. Docking (2015). Rehabilitation will increase the 'capacity' of your... insert musculoskeletal tissue here... Defining 'tissue capacity': a core concept for clinicians. *British Journal of Sports Medicine*. 49(23): 1484-1485.
- Magnusson, S. P., et al. (2010). The pathogenesis of tendinopathy: balancing the response to loading. *Nature Reviews Rheumatology*. 6(5): 262-268.





# RECOVERY PLAN



## Rest

8 - 10 hours sleep per night



## Rehydrate

2+ litres daily PLUS 1.5 times BW lost during exercise



## Refuel

Consume a nutritious meal within 90mins of finishing, eat well regularly

Points Before Next Session

**Heavy Session = 100 Points**  
Heavy Session = 7RPE

**Moderate Session = 70 Points**  
Moderate Session = 6 - 7

**Easy Session = 50 Points**  
Easy Session = 6 or less RPE

Recovery Points	Physical	Mental	Physical & Mental
20 Points	<ul style="list-style-type: none"> <li>Foam roll/trigger point</li> <li>Massage gun</li> <li>Stretching session</li> <li>Pilates</li> <li>Easy bike ride/walk/very light jog</li> </ul>	<ul style="list-style-type: none"> <li>Connect with a team mate away from the club</li> <li>Read for 30mins</li> </ul>	<ul style="list-style-type: none"> <li>Fun activity (walking the dog, bike ride, etc)</li> </ul>
30 Points	<ul style="list-style-type: none"> <li>Movement &amp; Mobility Session (TeamBuildr)</li> <li>Healthy smoothie</li> <li>Warm bath - tech free</li> <li>Ice bath</li> <li>Sauna</li> <li>Wearing compression (skins)</li> </ul>	<ul style="list-style-type: none"> <li>Time with family/friends</li> <li>Learn something new</li> <li>Journalling (i.e. greatfullness)</li> <li>Act of kindness</li> </ul>	<ul style="list-style-type: none"> <li>Nature walk</li> <li>Wearing NormaTec Recovery Boots (tech free)</li> <li>Yoga</li> </ul>
40 Points	<ul style="list-style-type: none"> <li>Pool session</li> <li>Beach</li> </ul>	<ul style="list-style-type: none"> <li>2 hour tech free time</li> </ul>	<ul style="list-style-type: none"> <li>Power nap</li> </ul>
50 Points	<ul style="list-style-type: none"> <li>Massage</li> </ul>	<ul style="list-style-type: none"> <li>Check in with trusted friend</li> <li>Mindfulness activity (i.e. meditation, body scan, breathing session)</li> </ul>	<ul style="list-style-type: none"> <li>Float tank/Salt Rooms</li> <li>Hot springs</li> </ul>





# THE RAD CENTRE

Would you like to take your performance to the next level?

-Welcome to the RAD Process

Our initial assessment is to be completed in at the RAD Centre and is designed to evaluate your movement patterns and aspects of your on-field performance which we can utilise to create training programs around in order to improve your athletic capabilities.

## Initial Assessment

**Medical/  
Injury  
history**



We start your initial assessment with a detailed overview of your medical / injury history, discuss your current training schedule and the goals you're looking to achieve.

**Movement  
screen**



Next we move out on to the gym floor and go through a movement screen, to assess your current capabilities.

**Jump &  
power  
testing**



Then we assess how you produce force to jump, this is done through our force platforms. We also compare your 3 jump vectors vertical, horizontal and lateral.

**Speed  
testing**



Continuing with the power theme, next we roll through a 20m sprint and also a 505 change of direction test to assess your speed.

**Strength  
testing**



Finally finishing it all off identifying your current strength levels and any asymmetries.





# JUNIOR STRENGTH & CONDITIONING

Developing long term athletes - laying the foundations for future success.

Learning key movement patterns correctly from the beginning is a pivotal step in junior athlete success that carries through to their senior sporting career.

At RAD, our Junior Athlete Development program prioritise long term athlete development through nailing fundamental movement patterns prior to progressing along a competency continuum.

Our approach ensures that your child has the foundations to build upon throughout their entire career, rather than pushing immediate development which may prove detrimental down the track.



Our highly trained coaches provide your child with individualised programming to suit their needs and stage of development, alongside educational coaching which provides the 'why' behind the exercises. These sessions are aimed at athletes between the age of 13 and 18.





# SENIOR STRENGTH & CONDITIONING

Our Athletic Development Program (ADP) is designed for any senior level

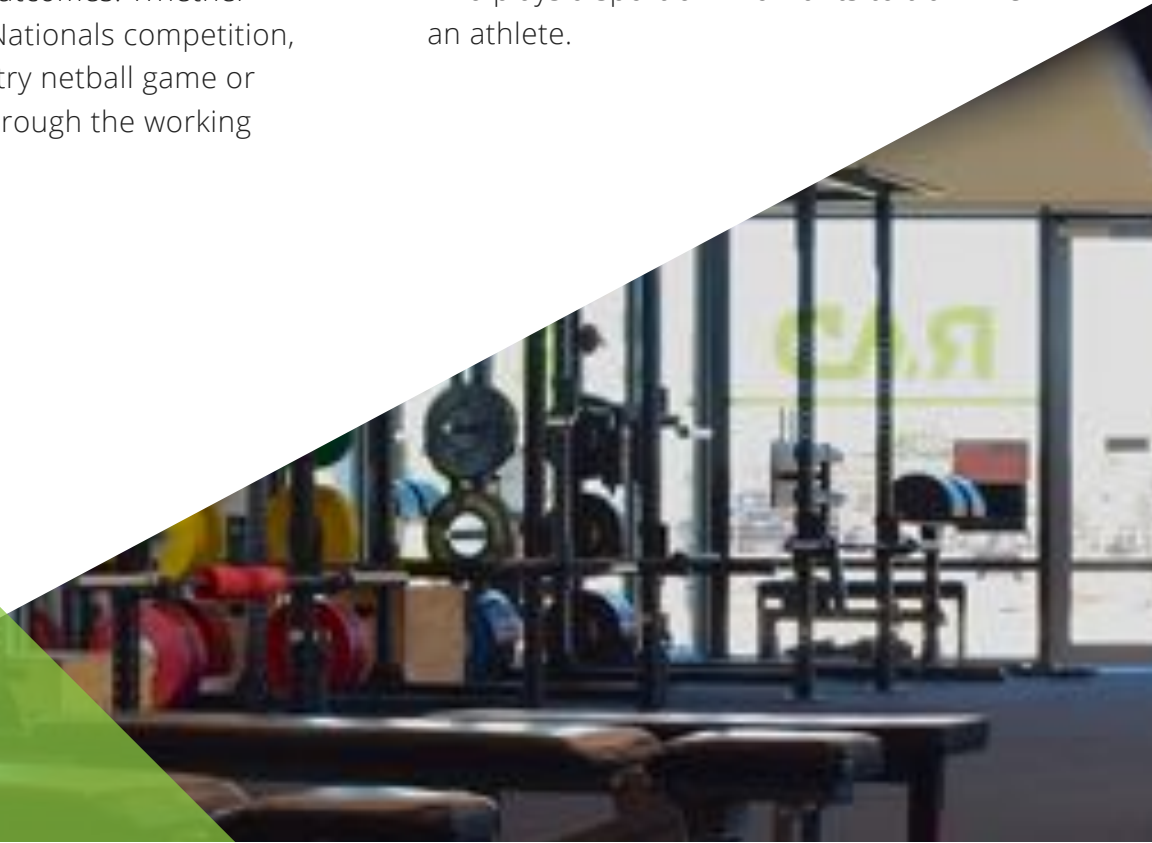
- professional athlete
- semi-professional athlete
- country sport level athlete
- or general health enthusiast

Strength and Conditioning plays an important role in not only sporting performance but also injury prevention as well. Developing all areas of athletic movement ensures that all our members are equipped with the physical resilience that they require to perform at their best.

Each training program is designed based on the individuals athletic profile and their desired performance outcomes. Whether that is competing at a Nationals competition, on court during a country netball game or just to be able to get through the working day without pain.



While a normal 24/7 gyms and group fitness gyms provide a way to exercise, we provide a way to train - an absolute must for anyone who plays a sport or who wants to train like an athlete.





# INJURY REHABILITATION

The complete package to ensure you return to your best quicker! Making sure we get the injured site back to full strength and performance but also ensuring that the whole body is ready to get back to your best – your program is built out to make sure you have got absolutely everything you need, not just some stick figures drawn on a piece of paper you take home to complete.

Following your initial assessment where we will assess and diagnose your injury – a plan will be put in place to begin working towards returning to your sport.

After any injury it is important that a 'team effort' approach is taken for the rehabilitation of an athlete! Not one person solves the rehab equation – and this is an important concept to understand. Within pro sporting teams, Physiotherapists and Strength & Conditioning coaches work along side each other, hence why we have got both in the one facility, to help you get back to doing what you love.



We pride ourselves in providing an inclusive and supportive community that replicates a team environment. This enables injured athletes to feel like they are still a part of their competitive community until they eventually return to their own competition/sport.





# DIETETICS

Nutrition is the gateway, unlocking the adaptations of your training

Often, one major forgotten component of someones complete preparation for their sport or general health is their Nutrition – Ensuring that you are putting in the correct fuels and the right amount for your body is essential to get the best out of yourself.

In addition to provision of sports nutrition services to athletes from recreational to elite, Michelle is also accepting eating disorder referrals (preference for under 25yrs), and general paediatric dietetic referrals.

Michelle can assist with Medical Nutrition Therapy for:

- Sporting performance at all levels
- Nutrient deficiencies and malnutrition
- Gut disorders, allergy and intolerance
- Optimising rehab from injury and surgery
- Paediatric feeding concerns
- Collaborative care for eating disorder recovery



Michelle Ryan is based at RAD in Ballarat and is an Accredited Practising Dietitian and Accredited Sports Dietitian – she loves working with individuals, teams and their support networks to help develop nutrition skills and strategies to assist in achieving performance, rehab, or wellbeing goals.

All Dietitian services are claimable with private health care.





# PHYSIOTHERAPY

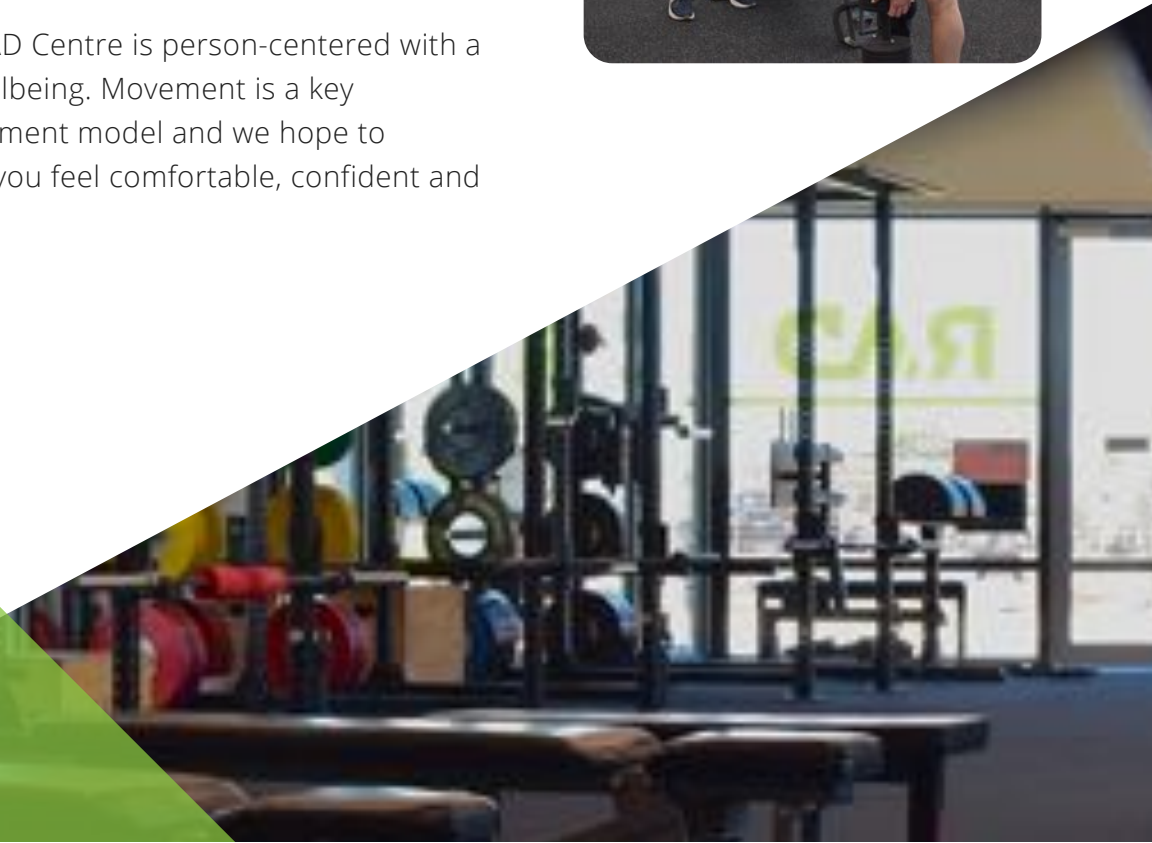
When you walk into our facility in Ballarat you will be blown away. Our welcoming team will make you feel like you have found the right place. We strive to provide an inclusive environment and a sense of community. Our high-performance facility allows you to take control of your injury.

Our consultations allow time for a thorough history, assessment, diagnosis, and a plan to be developed. This is the best approach to making sure your goals are met. One person does not solve the rehabilitation equation – and our team approach aims to get you back to doing what you love.

Once an injury occurs it is important to keep motivated and keep moving. A collaborative approach across Physiotherapy and Strength & Conditioning will ensure you return to your best quicker, and with confidence.

Our approach aims to break the negative cycle that often occurs after injury. We aim to meet you where you are, and bridge the gap between where you want to be. Our focus is to rehabilitate and recondition so you can do the things you love, and support those closest to you.

Physiotherapy at the RAD Centre is person-centered with a focus on health and wellbeing. Movement is a key component of our treatment model and we hope to provide a space where you feel comfortable, confident and in control of your body.





# CONTACT US

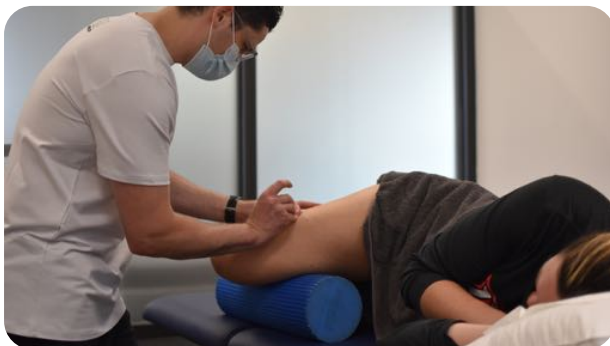
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