

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

## Return to sport criteria for low back pain

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### Is LBP a problem in athletes?





### Is LBP a problem in athletes?



38% Lifetime prevalence – non-athletes

(Wilson et al, 2021a)



### Is LBP a problem in athletes?



63% Lifetime prevalence – athletes

(Wilson et al, 2021a)



**6.01**/1000 AE

Incidence – NCAA athletes (Hasselbrock et al, 2019) 0.05/1000 AE – ACL (Chia et al, 2022)

20-59%

**Recurrence (Hasselbrock et al, 2019; van Hilst et al, 2015)** 66% - general population (da Silva et al, 2017)

41 days

**Time loss – Gaelic football (Roe et al, 2018)** 25.2 days – hamstring (Roe et al, 2018)

81.5%

**Return to play – non-operative (Sedrak et al, 2021)** 81% ACL reconstruction (Arden et al, 2014)



### **RETURN TO SPORT CRITERIA LITERATURE**



Rehabilitation	Return to Participation	→ Return to Sport	→ Return to Performance
Lumbar strain (Eck & Riley, 2004)			
	Full ROM	Return to sport	
Lumbar spondylolysis (Eck & Riley, 2004)			
	4-6 weeks non-contact sport Contact sport •Full ROM •Pain-free extension	Return to sport	



Reha	bilitation	→ Return to Participatio	n	Performance
Lumbar disc heri	niation (Adapted from: Va	n Gelder et al, 2013 )		
Acute phase	Repair phase	Remodelling phase	Full return to sport	
Days 0-6	Days 3-20	Days 9-full resolution		
No rotation No flexion	Counter rotation Flexion	Rotation Power development		

(Arden et al, 2016)





**Return to Participation** 

**Return to Sport** 

Performance

Low back pain in rowing (Adapted from: Wilson et al, 2021b)

#### **Examine:**

Pain response to active ROM
Rowing specific motion (hip flexion & hamstring flexibility)

#### **Progression criteria:**

- · +ve response activity
- ↓ symptoms in ADL eg sitting
- +ve response training modifications
- · Rower expressing confidence

(Arden et al, 2016)



Rehabilitation	→ Return to Participation	Return to Sport	Performance
Low back pain in rowing (Adapted from:	Wilson et al, 2021b)		
<ul> <li>Examine: <ul> <li>Pain response to active ROM</li> <li>Rowing specific motion (hip flexion &amp; hamstring flexibility)</li> </ul> </li> <li>Progression criteria: <ul> <li>+ve response - activity</li> <li>+ symptoms in ADL og sitting</li> </ul> </li> </ul>	<b>Examine:</b> • Rowing specific ROM • Spinal load tolerance • Erg row response • Short duration on-water row • Biomechanical/technical assessment		
<ul> <li>• +ve response - training modifications</li> <li>• Rower expressing confidence</li> </ul>	<ul> <li>Progression criteria:</li> <li>↓ medication use</li> <li>↓ reduction in symptoms</li> <li>↓ morning stiffness</li> <li>↓ pain response to rowing</li> <li>No ↑ pain during/after rowing</li> <li>Improved rowing movement</li> </ul>		
	· Rower's confidence		

(Arden et al, 2016)



Rehabilitation	Return to Participation		→ Performance
Low back pain in rowing (Adapted from: Wilso	on et al, 2021b)		
<ul> <li>Examine:</li> <li>Pain response to active ROM</li> <li>Rowing specific motion (hip flexion &amp; hamstring flexibility)</li> <li>Progression criteria:</li> <li>+ve response - activity</li> <li>+ symptoms in ADL eg sitting</li> <li>+ve response - training modifications</li> <li>Rower expressing confidence</li> </ul>	<ul> <li>Examine:</li> <li>Rowing specific ROM</li> <li>Spinal load tolerance</li> <li>Erg row response</li> <li>Short duration on-water row</li> <li>Biomechanical/technical assessment</li> </ul> Progression criteria: <ul> <li> <ul> <li>medication use</li> <li> <ul> <li>reduction in symptoms</li> <li> <ul> <li>morning stiffness</li> </ul> </li> <li> <ul> <li>pain response to rowing</li> <li>No  <ul> <li>pain during/after rowing</li> <li>Improved rowing movement</li> </ul> </li> </ul></li></ul></li></ul></li></ul>	<ul> <li>Examine: <ul> <li>Initial triage factors</li> <li>Reassess signs of resolution</li> </ul> </li> <li>Progression to competition: <ul> <li>Row with usual power</li> <li>Tolerate conditions</li> <li>Tolerate rowing rate</li> <li>Tolerate boat position</li> </ul> </li> <li>Red flags not progressed</li> <li>Yellow flags - referral</li> </ul>	
	· Rower's confidence		(Arden et al, 2010



Rehabilitation	Return to Participation	Return to Sport	Performance
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Rehabilitation	<ul> <li>Return to Participation</li> </ul>	→ Return to Sport	Performance
Low back pain in rowing (Adapted from: Wi	lson et al, 2021b)		
Examine: · Pain response to active ROM · Rowing specific motion (hip flexion & hamstring flexibility)	Examine: • Rowing specific ROM • Spinal load tolerance • Erg row response Short duration on water row	<b>Examine:</b> • Initial triage factors • Reassess signs of resolution	
<ul> <li>Progression criteria:</li> <li>+ve response - activity</li> <li>↓ symptoms in ADL eg sitting</li> </ul>	<ul> <li>Short duration on-water row</li> <li>Biomechanical/technical assessment</li> </ul>	<ul> <li>• Row with usual power</li> <li>• Tolerate conditions</li> <li>• Tolerate rowing rate</li> </ul>	
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	· Rower's confidence		(Arden et al, 2016





### Strategic Assessment of Risk and Risk Tolerance **StARRT FRAMEWORK** Step 1: Assessment of Health Risk Risk assessment process Step 2: Assessment of Activity Risk **RETURN TO PLAY DECISION**





















(Shrier, 2015; Taberner et al, 2022)





(Shrier, 2015; Taberner et al, 2022)



### Variables: 1. Reinjury risk and prognostic factors

History of LBP - OR = 3.5 (95%CI: 1.9-6.4) (Wilson et al 2021a)

Risk factors (Adapted from Moradi et al, 2015)			
Body weight			
BMI			
↓ Lumbar flexion			
↓ Lumbar extension			
Hip flexor length			
Hamstring length			
Trunk flexor endurance			
Trunk extensor endurance & strength			



### Variables: 1. Reinjury risk and prognostic factors

No consistent associations between imaging and LBP (Wilson et al, 2021a)

Quadratus lumborum asymmetry in LBP (24.9%; asymptomatic 3.0%) (Hides et al, 2008)

Larger asymmetry in asymptomatic (Kruskal–Wallis P = 0.050) (Kountouris et al, 2013)



### Variables: 1. Reinjury risk and prognostic factors

Fatty infiltrate of multifidus at left L4/5 level

Predictor for return to sport at 2.5 months



(Winslow et al, 2019)



### Variables: 2. Training load

Higher training volume – OR = 1.1-1.2 (Wilson et al, 2021a) Increased training periods – IRR = 1.85 (Hassebrock et al, 2019)

Considerations (Wilson et al, 2021b; Wilkie et al, 2021)

- Change to training intensity steep increase ± prior load reduction (eg holiday, illness)
- Inadequate recovery
- High training volume over a longer period (3 months protective)



### Variables: 3. Other

Psychological considerations

- Fear of pain or movement
- Worry about LBP
- Selection pressure
- Imminent competition

Other considerations

- ↓ Energy intake
- Poor sleep
- Poor S&C techniques

(Wilkie et al, 2021)



### **Proposed return to sport**

Rehabilitation	Return to Participation	Return to Sport	Performance
Low back pain in rowing (Adapted from: Will	son et al, 2021b)		
<ul> <li>Examine: <ul> <li>Pain response to active ROM</li> <li>Rowing specific motion (hip flexion &amp; hamstring flexibility)</li> </ul> </li> <li>Progression criteria: <ul> <li>+ve response - activity</li> <li>* symptoms in ADL eg sitting</li> <li>+ve response - training modifications</li> </ul> </li> <li>Rower expressing confidence</li> </ul>	<ul> <li>Examine:</li> <li>Rowing specific ROM</li> <li>Spinal load tolerance</li> <li>Erg row response</li> <li>Short duration on-water row</li> <li>Biomechanical/technical assessment</li> <li>Progression criteria:</li> <li>+ medication use</li> <li>+ reduction in symptoms</li> <li>+ morning stiffness</li> <li>+ pain response to rowing</li> <li>No + pain during/after rowing</li> <li>Improved rowing movement</li> <li>Rower's confidence</li> </ul>	<ul> <li>Examine:</li> <li>Initial triage factors</li> <li>Reassess signs of resolution</li> <li>Progression to competition:</li> <li>Row with usual power</li> <li>Tolerate conditions</li> <li>Tolerate rowing rate</li> <li>Tolerate boat position</li> <li>Red flags not progressed</li> <li>Yellow flags - referral</li> </ul>	
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### **Proposed return to sport**

Rehabilitation	Return to Participation	Return to Sport	> Performance
Low back pain in sports (Adapted from: Wilso	on et al, 2021b)		
<ul> <li>Examine:</li> <li>Pain response to active ROM</li> <li>Sport specific ROM</li> <li>Progression criteria:</li> <li>+ve response - activity</li> <li>+ symptoms in ADL eg sitting</li> <li>+ve response - training modifications</li> <li>Athlete expressing confidence</li> </ul>	<ul> <li>Examine:</li> <li>Sport specific ROM</li> <li>Spinal load tolerance</li> <li>Response to components of sport</li> </ul> Progression criteria: <ul> <li> <ul> <li>medication use</li> <li>reduction in symptoms</li> <li>morning stiffness</li> </ul> No ↑ pain during/after sport components <ul> <li>Improved sport movement</li> <li>Athlete confidence</li> </ul></li></ul>	<ul> <li>Examine: <ul> <li>Initial triage factors</li> <li>Reassess signs of resolution</li> </ul> </li> <li>Progression to competition: <ul> <li>Sports specific activity with usual power</li> </ul> </li> <li>Red flags not progressed <ul> <li>Yellow flags - referral</li> </ul> </li> </ul>	
			Arden et al, 2016



### **Proposed return to sport**

Rehabilitation	Return to Participation	→ Return to Sport	→ Performance
Low back pain in sports (Adapted from: Wils	son et al, 2021b)		
Examine:	Examine:	Examine:	]
· Pain response to active ROM	· Sport specific ROM	<ul> <li>Initial triage factors</li> </ul>	
Sport specific ROM	· Spinal load tolerance	· Reassess signs of resolution	
	· Response to components of sport		
Progression criteria:		Progression to competition:	
<ul> <li>+ve response - activity</li> </ul>	Progression criteria:	· Sports specific activity with usual	
• ↓ symptoms in ADL eg sitting	· ↓ medication use	power	
$\cdot$ +ve response - training modifications	· $\star$ reduction in symptoms		
	· ↓ morning stiffness		
	No ↑ pain during/after sport		
· Athlete expressing confidence	components	<ul> <li>Red flags not progressed</li> </ul>	
	<ul> <li>Improved sport movement</li> </ul>	<ul> <li>Yellow flags - referral</li> </ul>	
Considerations:	· Athlete confidence		
·Sleep		Considerations:	
· Nutrition	Considerations:	· Muscular performance measures	
·Weight	· S&C technique		
· Active ROM	· Training load		
· Muscle length	· Trunk endurance & strength		(Ardon at al 2016
			J (Aluen et al, 2016



#### Summary

Limited research in Return to Sport Criteria in LBP

StARRT Framework & Return to Sport Continuum

Return to sport considerations & proposal



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# Thank you



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### Image acknowledgments

Slide 1: Valley Rugby Football Club (Date accessed: 2018)

Slide 23: Hello I'm Nik (Date accessed: 2022/10/28). Unsplash. https://unsplash.com/photos/MrqlyH6J8Yw

Slide 26: Alessandro Bogliari (Date accessed: 2022/10/28). Unsplash. https://unsplash.com/photos/oDs\_AxeR5g4

Slide 30: Valley Rugby Football Club (Date accessed: 2018)





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