Injury Prevention and Caring for Swimmers' Bodies: Changing through the Aging Process

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Overview

- Part 1 –Injury Prevention Principles
  - Injury and illness general principles
  - Mobility in swimmers
  - Injury and prevention in the mature athlete
- Part 2 -Practical
  - Practical Screening
  - Screening Reports
- Part 3 – Prevention Implementation

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Part 1 – Injury Prevention Principles

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Primary Injury & Illness Prevention

- **Primary** prevention involves eliminating or reducing causes or determinants of ill health, controlling exposure to risk, and promoting factors that are protective of health
- In healthcare, this includes
  - **Immunisation**
  - **Smoking education**
- **Swimming**
  - **Controlling key factors related to injury/illness risk**

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Primary Prevention – the "Big Rocks"

- **Physiological**
  - Fatigue
  - Sleep
  - Nutrition
- **Physical**
  - Mobility
  - Training load
- **Psychological**
  - Mood
  - Motivation
  - Stress and recovery

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In Other Words…

Swimmers require:

- Good sleep
- Good food and hydration
- Good recovery
- Address life stresses, particularly mood, anxiety, depression
- Optimise mobility

These are the absolute essentials/basics!

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Injuries in Swimming

- Point prevalence of shoulder pain is up to 95%
- Shoulders represent by far the most time lost in (elite) swimmers
- Often multi-factorial in nature
  - Tendon
  - Bursa
  - Labrum

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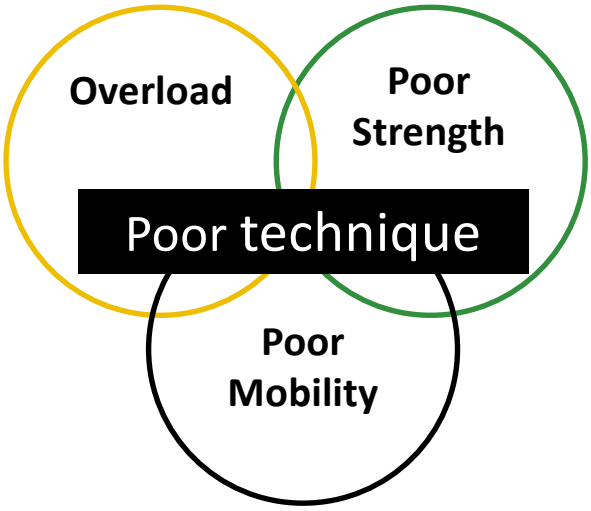
Why Do (Shoulder) Injuries Occur?



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Mobility in Swimmers – Why Bother?

- "Swimmers…generally have a catch position that requires shoulder internal rotation in elevation and a more streamlined posture"
- "If the body can't fulfil these requirements the compensatory changes either result in the swimmer swimming more slowly and/or predisposing the swimmer to overuse injuries"
- "Small biomechanical inefficiencies can rapidly accumulate"

Peter Blanch

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Key Areas of Mobility in Swimmers

- Thoracic rotation
- Shoulders
- Hips
- (Hip extension / Hip flexors)
- (Hamstring and sciatic nerve)

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Injury Risk in the Ageing Swimmer

- Increased muscle tightness common
- Decreased joint mobility
- Strength often lower
- Swimming training changes:
  - E.g. more intermittent
  - Event-focused, e.g. RCS, P2P
- Lifetime changes:
  - Hormonal changes, e.g. menopause
  - Changes in tendon structure >40y

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Part 2 – Practical and Screening

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Baseline Screening

Test	Ankle DF		Ankle PF		Tx Rotation		ABIR		Thomas Test		Tibial ER	
	L	R	L	R	L	R	L	R	L	R	L	R
Aim (Elite)	>12cm		165°		75°		150°		>10°		>45°	
Aim (sub-elite)	>10cm		160°		70°		140°		>0°		>35°	
07.07.24	-	-	°	°	°	°	°	°	°	°	°	°

Test	Sh ER		Sh IR		Shoulder Impingement				MN NTPT		SLR	
	L	R	L	R	L	Pain?	R	Pain?	L	R	L	R
Aim (Elite)	>95°		>45°		>25°	Nil	>25°	Nil	>160°		>80°	
Aim (sub-elite)	>90°		>40°		>25°	Nil	>25°	Nil	>160°		>80°	
07.07.24	°	°	°	°	°		°		°	°	°	°

Test	CET	Hip IR		Dynamometry (Neutral) in % BW				
		L	R	L ER	R ER	L IR	R IR	Ratio IR:ER
Aim (Elite)	5-15°	>40°		>20%		>30%		1.3-1.5:1
Aim (sub-elite)	>0°	>30°		>15%		>20%		1.3-1.5:1
07.07.24	°	°	°					

Test	Dynamometry (90' abd) in % BW								
	L IR	Pain?	R IR	Pain?	L ER	Pain?	R ER	Pain?	Ratio IR:ER
Aim (Elite)		Nil		Nil		Nil		Nil	1:1
Aim (sub-elite)		Nil		Nil		Nil		Nil	1:1
07.07.24	%	Nil	%	Nil	%	Nil	%	Nil	L=,R=

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Thoracic Spine

Rotation and Extension

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Thoracic Rotation


Potential sites of restriction:

- Thoracic Spine
- Lumbar spine (e.g. QL)
- Lats
- Pecs
- Abdominals

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Thoracic Rotation

	Elite	Others
Thoracic Rotation	>75º	>70º
	65-75º	60-70º
	<65º	<60º

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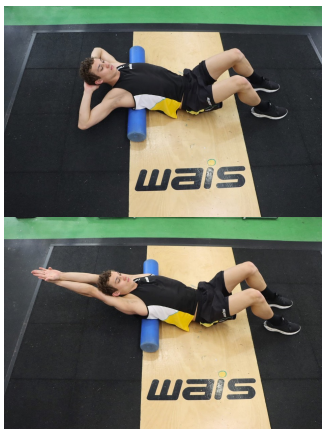
Thoracic Rotation/Extension



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The Shoulder

Rotation

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Shoulder Internal Rotation (IR)

- Internal rotation is required for an early catch and a high elbow throughout the stroke
- Also relies on the shoulder blade moving into upward rotation and elevation
- Poor result may indicate tightness in posterior rotator cuff or in the shoulder capsule
  - May decrease during periods of higher load
- Treatment could be release through posterior cuff, or through stretching of shoulder into IR (e.g. sleeper stretch)

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Shoulder Internal Rotation

	Elite	Others
Shoulder Internal Rotation	>45º	>40º
	30-44º	30-39º
	<30º	<30º

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Shoulder 'Impingement' Range

	Elite	Others
Shoulder Impingement Range	>25º	>15º
	10-24º	10-14º
	<10º	<10º

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Shoulder Restriction




Potential sites of restriction:

- Back of shoulder joint
- Medial shoulder blade
- Posterior rotator cuff
- Shoulder joint
- Pecs/lats

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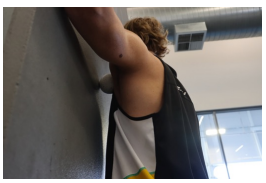
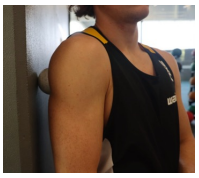
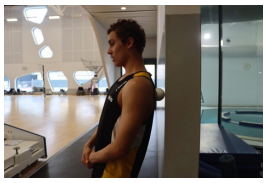
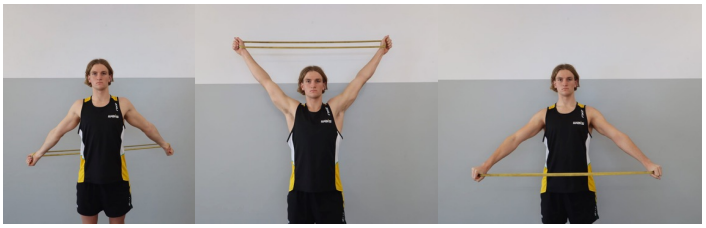
Shoulder

Massage Ball

- Pec
- Back of shoulder
  - Just above armpit
- Inside of shoulder blade





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Combined Elevation

- Combined elevation is required for:
  - High elbow at the start of the stroke
  - Recovery phase
  - Streamline position
  - Glide in breast-stroke
  - Kick sets on a board!
- It is a measure of thoracic spine extension (either joint-related, or muscular, e.g. abdominals), but also shoulder ROM (e.g. pecs, lats)
- Treatment could be release through pecs, lats, thoracic spine (rotations and/or extension)

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Combined Elevation Test (CET)

	Elite	Others
CET	>5-15º	>5º
	<5º	0-5º
	<0º	<0º

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Swimming Mobility – Combined Elevation

Combined Elevation Test


Forehead on ground, shoulders in line with zero, hands in streamline

Potential sites of tightness

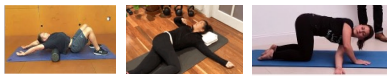
- Pecs
- Lats
- Thoracic Spine

Ways to Treat

- Pec stretch/trigger

- Lat Stretch

- Thoracic Spine



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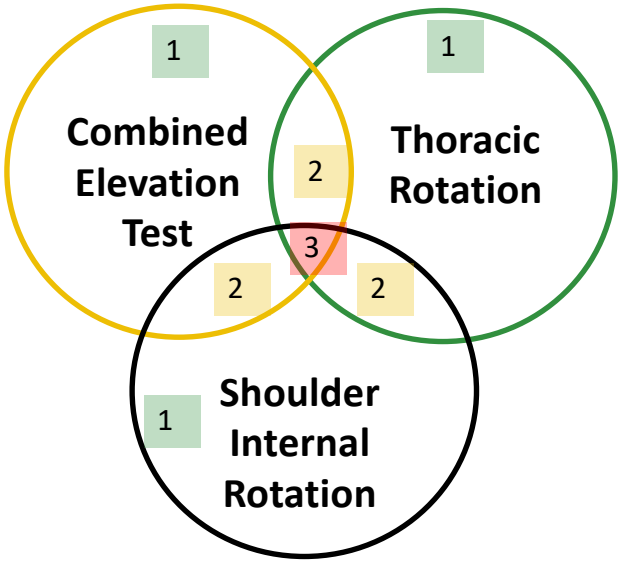
Mobility Screening – The Triad of Doom!



1 = Low Risk

2 = Medium Risk

3 = High Risk

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Part 3 - Implementation of Screening

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Baseline Screening - Reporting

Screening Summary
Mobility generally good
Shoulder strength and ratios down, likely due to not being in the gym since prior to Trials (note that test today was performed on a VALD Force Frame, which may affect results compared to last test)
Straight leg raise (SLR) is down, likely because of sciatic nerve rather than true hamstring length. This usually happens after a growth spurt
Abduction in internal rotation is much improved, and now within normal range
Ankle plantarflexion range down – possible Achilles tendon irritation
Rounded shoulder posture at rest slightly better

Recommendations
Most important is to get back into the gym. Trunk strength is fair, but needs to strength work, including shoulder blade
Continue any mobility work, add in some work on posterior shoulder with ball
Add in mid-range shoulder isometric (static) work 3x per week
Add in isometric (static) single leg calf raises to load Achilles

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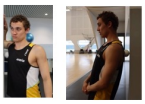
Baseline Screening - Recommendations

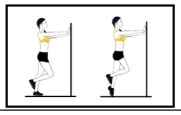
Recommendations

Shoulder Band-Work – 3x per week:
- 2x20sec holds each side – both positions – external and internal rotations

Shoulder Massage with Ball:
- ball in back of shoulder, just next to armpit



Achilles Rehab – at least 3x per week:
Single Leg Calf Raise Holds 3x30sec holds



Core Work:
- Planks and Side Planks as a minimum to build a basis of core strength:
- Planks 3x45sec holds, keeping hips low
- Side planks 3x20-30sec holds

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Example Plan

Every Session	2 min of Foam rolling on back
	Massage ball in front and back of shoulder
	Archer Stretch 1x20 e/s
	Spidermans 1x15 e/s
	Bird-Dogs 2x10
	Deadbugs 2x 10
	Dumb Waiters 4x10sec

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Specific Post-Screening - Plan

CIRCUIT 1		Reps
Trunk	Foam Roller Thoracic	10 slow
Trunk	Archer Stretch (banded)	10/side
Hip	Trigger ball / roll glutes	30sec
Hip	Trigger ball / roll TFL	30sec
Knee	Foam roll hamstrings	10 slow
Knee	Foam roll quads	10 slow
Knee	Hammy neural glides	10
Hip	Hip flexor stretch	10 pulses
Hip	Adductor rock back	10sec
Ankle	Banded knee to wall	5/side (3 directions
Ankle	Downward dog toe tap	5/side
Trunk	Childs pose with thread the needle	5/side
Shoulder	Trigger front & back of shoulder	30sec
Shoulder	Trigger release pec	30sec
Trunk	Half kneeling thoracic rotation on wall	5/side
Shoulder	Lat stretch	30sec

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‘Microdosing’

- The concept of small amounts of work done regularly and consistently, e.g.
  - Mobility
  - Strength
  - Tendon loading
- Timing important
  - Pre-pool or dry-land means that you can try to get a little bit of extra ROM, then use that extra range during your swim
  - Doing pre-pool also ‘anchors’ it to a specific time, place and activity
- However, can fit into the day anywhere!

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