

RJAH Periacetabular Osteotomy (PAO) Guide

Patient Details:

Co-morbidity:

Note to Therapist:

**This is a guide to progression, not an exhaustive list of rehabilitation and does not replace clinical reasoning.*

**Treat any soft tissue symptoms on their merit.*

**Objective Tests (not exhaustive) can be used as an indication for progression. The choice can be individualised for the patient.*

****Special Instruction(s) includes specific post-operative advice for the individual patient based on the Consultant's recommendation(s). This will be completed on discharge or follow-up clinic appointments.***

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 1 From Day 1 <i>Post-operative recovery phase</i> Range of movement	<ul style="list-style-type: none"> Successful operative outcome. Adequate pain relief. Understands post-op instructions. 	<ul style="list-style-type: none"> <u>Weight-bear as op note allows.</u> Mobility: aim for comfort and safety Ice, POLICE (see appendices) ROM exercises: 10-15 x 3 <ul style="list-style-type: none"> Supine: hip flexion Hip abduction Bent knee fall out Upper limb maintenance: 0.5 – 2kg 10 -15 x 3 <ul style="list-style-type: none"> Bicep curls Shoulder press Upright row Reverse fly's 	<ol style="list-style-type: none"> Manage Pain Allow healing Reduce inflammation. Promote distal circulation. Gradually regain ROM. Increase confidence. Promote early mobility. 		BEFORE DISCHARGE check the op note for any specific post-op instructions and amend the guide accordingly.

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Applicable for Geraint Thomas, Nigel Kiely, J.P. Whittaker, Nithin Unnikrishnan unless states otherwise.

Page | 1

8. Maintain health, fitness and wellbeing

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 2 From Week 1	<ul style="list-style-type: none"> ○ Adequate pain relief. ○ Mobilise independently +/- aids. ○ Increase Range of Motion 	<p>Standing:</p> <ul style="list-style-type: none"> • Hip flexion • Hip abduction • Hip extension <p>Low Load muscle activation exercises 5- 10 seconds 5 -10 x 3</p> <ul style="list-style-type: none"> • Glute squeeze • Core squeeze • Bridge • Supported mini squat <p>Cardiovascular exercises: 3 minutes + gradual increase</p> <ul style="list-style-type: none"> • Supported marching on the spot • Side stepping • Heel flicks <p>Contralateral limb strength training 3x per week (continue for 10 weeks) Leg Press, Leg Curl & Leg Ext 3 x 5RM.</p> <ul style="list-style-type: none"> • Other muscle groups not to be neglected. • Upper body active exercise→ resis/reps/sets/speed. 	<ol style="list-style-type: none"> 1. Promote early function. 2. Increase ROM. 3. Increase confidence. 4. Promote early mobility. 5. Maintain health, fitness and wellbeing 	<p>AROM.</p> <p>PROM.</p> <p>SLR.</p>	

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PHASE 3 From Week 4 – 5 Inpatient Stay	<ul style="list-style-type: none"> Post Op X-rays ensure bony healing. Wound Healed 	<ul style="list-style-type: none"> At week 4 -5 patients will attend inpatient physiotherapy, which will provide specific rehabilitation using our state of the art gymnasium and hydrotherapy pool. Upon arrival patients will be fully assessed on their progress with x-rays to ensure bone healing is occurring 		Single Leg Stance. Clam. Planks. Bridge. Hurdle Step.	

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 5 From Month 3 Motor/muscle Control – progressing to strength <i>Muscle control</i> <i>Double – single</i> <i>15 – 25 repetitions</i> <i>3 sets</i>	<ul style="list-style-type: none"> Directional Planks 30 sec hold ideal control. Bridge 10 reps with 10 sec hold ideal control. Body Weight squat x 15, minimal discomfort. 	<p>DL Muscle control: 15 – 25 x 3</p> <ol style="list-style-type: none"> Clam/hip abduction medley with band Crab/monster walk Bridge/hip thrust Squat Romanian Deadlift (RDL) DLHR overstep Step up/lunge <p>Single leg muscle control: 15 – 25 x 3</p> <ol style="list-style-type: none"> Side plank clam Lunge/Bulgarian split squat Supported SL squat (TRX) SL RDL SL hip thrust SLHR overstep <p>Cardiovascular exercises: Introduce High Intensity Interval training (HIIT). <i>Work hard 10 seconds 50 seconds active recovery x 5 – progress to 30:30 x 5 then increase.</i></p> <ol style="list-style-type: none"> Bike Cross trainer Swimming (if would healed) Walking Stepper <p>Upper limb maintenance: increase weight. Strength, Hypertrophy, Endurance as required (see Appendix)</p> <ol style="list-style-type: none"> Shoulder press Upright row Reverse flys Bent over row <p>Core: 20 second's work: 10 rest x 3 – 5. Pick 3 – 6 exercises of your choice e.g.</p> <ol style="list-style-type: none"> Dead bugs Front plank Side plank 	<ol style="list-style-type: none"> Improved neuromuscular control Progress functional activities Ensure good lumbo-pelvic stability. 	<p>STS in 30 seconds</p> <p>SL bridge in 30 seconds. Aim 80%+ R = L</p> <p>SL hamstring bridge in 30 seconds. Aim 80%+ R = L</p> <p>SL HR in 30 seconds. Aim 80%+ R = L</p> <p>Side plank. Aim 80%+ R = L</p> <p>SL dip x 15 (control R = L)</p> <p>SL stand from chair</p> <p>Dynamo as able.</p>	<p>Do Not force movement. Use pain and discomfort as a guide – do not exceed 2-3/10 pain on the NRS. Work muscles to 7-8/10 on rate of perceived exertion.</p>

- 4. Russian twist
- 5. Chop
- 6. Lift
- 7. Mountain climbers

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 6 From Month 6 Progressive Strength phase – plyometrics Return to non-contact Sport	<ul style="list-style-type: none"> SL bridge in 30 seconds. Aim 80%+ R = L SL hamstring bridge in 30 seconds. Aim 80%+ R = L SL HR in 30 seconds. Aim 80%+ R = L Side plank. Aim 80%+ R = L SL dip x 15 (control R = L) SL stand from chair 	<p>Max strength: 3 – 8 x 4 -5</p> <ol style="list-style-type: none"> Squat Lunge Dead lift Leg press Hip thrust Heel raise <ul style="list-style-type: none"> Train strength and endurance on separate days. Have a minimum of 24 hours between strength days. <p>Strength: [include through range OKC Q from Week 10]</p> <ul style="list-style-type: none"> See appendix. Adjust if necessary, based on symptoms. <p>Hypertrophy:</p> <ul style="list-style-type: none"> See appendix. Adjust, if necessary, based on symptoms. <ul style="list-style-type: none"> Endurance: Gradually progress toward ≥45 min continuous CV exercise (exception of jogging/running). See appendix. Adjust if necessary based on symptoms <p>Return to Run Assessment: Couch to 5km Get running with Couch to 5K - NHS (www.nhs.uk)</p> <p>Progress to Rowing and more dynamic cardiovascular exercises.</p> <p>Can begin gym classes e.g., Spinning, body pump</p>	<ol style="list-style-type: none"> Improve strength Ensure good biomechanical control Improve dynamic stability and ability to accept force Prepare neuromuscular and psychological ability to return to unrestricted function. 	<p>SL bridge in 30 seconds. Aim 90%+ R = L</p> <p>SL hamstring bridge in 30 seconds. Aim 90%+ R = L</p> <p>SL HR in 30 seconds. Aim 90%+ R = L</p> <p>Side plank. Aim 90%+ R = L</p> <p>SL dip x 15 (control R = L)</p> <p>SL stands from chair</p> <p>Dynamo as able</p> <p>Single hop test</p>	

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 8 From Month 9 – 12+ Return to Sport and Injury Prevention	<ul style="list-style-type: none"> All Tests > 90% parity. Consider parity with normative population data. 	<ul style="list-style-type: none"> Check and discuss with patient's Consultant prior to RTS. 1 Day a week maintenance strength 3 – 8 reps x 4 -5 sets Push/Pull exercises, can super set (see appendices) Begin non – contact sport specific drills, progressing intensity. Add predictable agility drills when sufficient control and confidence is achieved e.g., twist/turn/pivot/cut/accelerate/decelerate/direction Perturbation training e.g., therapist randomly nudges patient off balance during a single leg throw-catch drill. Can begin gym classes e.g., Spinning, body pump Contact sport specific training. Earliest return to contact sport training. <p>Progress to full restriction free sports and activities.</p>	<ol style="list-style-type: none"> 1. Improve strength 2. Ensure good biomechanical control 3. Improve dynamic stability and ability to accept force Unrestricted confident function. 4. Injury prevention. 	<p>Single hop test</p> <p>Triple hop test</p> <p>Triple hop cross over test</p>	

PWB	Partial Weight Bear	FWB	Full Weight Bear
EOR	End of Range	MDT	Multidisciplinary Team
E	Extension	ROM	Range of Movement
RTS	Return to Sport	AROM	Active Range of Movement
SLR	Straight Leg Raise	PROM	Passive Range of Movement
DL	Double Leg	RM	Repetition Maximum
SL	Single Leg	resis	Resistance
CV	Cardiovascular	reps	Repetitions
[L]	Left	[R]	Right

Summary of Post-Operative Restrictions (unless stated otherwise):

Activity	Dictated by sufficient neuromuscular control and time from surgery.
Post-operative recovery phase (including inpatient stay) Range of movement	From 1 - 6 weeks.
Early Muscle activation	From 6 – 12 weeks.
Motor/muscle Control – progressing to strength	From 3+ months.
Progressive Strength phase – plyometrics (non – contact sport)	From 6+ months.

Return to Sport and Injury Prevention	From 9 – 12+ months, dependent on specific RTS criteria and MDT opinion.
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Appendix:

POLICE:

Protection

Optimal Load

Ice

Compression

Elevation

Patient S&C Education.

A **repetition maximum** (RM) is the most weight you **can** lift, push, press or curl for a defined number of exercise movements. For example, a 5RM would be the heaviest weight you could lift for 5 consecutive repetitions. What will dictate your RM is muscle fatigue/ weakness, or you are experiencing pain more than 3-4/10 above your normal baseline (10 = worst pain imaginable, 0 = no pain at all), or you are losing technique/ form.

1 – 5 RM will improve Muscle Strength

6 – 10 RM will improve Muscle Hypertrophy

11 – 15+ will improve Muscle Endurance

Sets are a series of reps of an exercise done in sequence (usually with a rest between). For example, 3 x 5 RM would be an exercise you can perform a maximum of 5 consecutive times (see **repetition maximum**), rest and then repeat twice more.

Perform **a minimum of two sets** for each exercise.

Progress:

As you progress and the loads you are lifting are getting easier, but not easy enough to increase the weight, increase the volume. For example if you are lifting 5RM for 3 Sets, increase the number of sets. When this starts to feel easier reduce the number of sets and try increasing the weight to ensure you remain in the specific training zone for you.

Recommended Rest times between sets:

1 – 5 RM, 2 min. rest between sets.

6 – 10 RM, 1 min. rest between sets.

11 – 15 RM, 40 sec. rest between sets.

Particularly when you have 2 mins between sets, you might choose to save time and increase your workout intensity by performing a

Superset. This can be a combination of two or three different exercises that work opposing muscle groups, or upper and lower body, or left and right limbs, and the exercises are done back-to-back with no rest in between. For example, you may choose to switch between the leg press and the chest press. Working on the chest press during the 2 min. rest on the leg press and vice versa.

Single Leg and or Arm exercises will give you an indication of the strength differences between your limbs. It also means the weaker limb cannot be assisted by the stronger limb. If you are performing single limb exercises, make sure the RM is specific for each limb. Remember strengthening your non-injured side will limit the deconditioning of your injured side.

Circuits are a collection of exercise sets you repeat without a rest. A rest will be recommended between circuits rounds.

CV Endurance and Strength training don't mix. If you want to progress your CV work to more than a 20 min moderate session, don't do this in the same session that you strength train. The benefits of the two exercises counteract with each other, meaning you will not strengthen as quickly. If you want to progress your CV do so on a separate day.

Treadmill Progression:

Add or progress one factor at a time, duration (length of session) or volume (how many sessions per week) or pace (speed) or terrain (incline, decline, surface). Start easy and find benchmark that does not produce symptoms during or after. You may choose to follow **Example 1**, below. Ensure this can be repeated once a week for few weeks, to ensure consistency of symptom control, prior to progressing.

Example 1:

Treadmill to ensure even consistent surface and control.

Start: 2 min walk e.g. 4 mph/ 6.5 kmph

1 min jog e.g. 6 mph/ 9.5 kmph

1min walk

1 min jog

Continue in this manner until 10 min achieved

Progress by

1. Maintaining the 2 min walk start, but then decrease the amount of walking and increase the amount of jogging within the 10 min.

Or

2. Performing **Example 1**, increased to twice per week.

Or

3. Performing **Example 1**, increasing the duration to 15 mins.

The choice of progression can be based on your preference and goals. Once the progression has been maintained for a few weeks with no exacerbation of symptoms a further progression can be introduced in the same manner.

When you can jog for 20 min add fartlek training if this meets with your return to sport/ activity goals.

Example 2:

- 2 min walk
- 3 min jog
- 30 sec sprint
- 1 min jog
- 30 sec sprint

Continue in this manner until 10-15 min mark and finish with a 10-5 min jog until 20 min total has been achieved.

- You may also vary the treadmill work by gradually adding inclines or declines (if available).