

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	- Successful operative outcome. - Adequate pain relief. - Understands post-op instructions.	<u>Weight-bear as op note allows.</u> - Mobility: aim for comfort and safety - Ice, POLICE (see appendices) ROM exercises: 10-15 x 3 - Supine: hip flexion - Hip abduction - Bent knee fall out Upper limb maintenance: 0.5 – 2kg 10 -15 x 3 - Bicep curls - Shoulder press - Upright row - Reverse fly's	- Manage Pain - Allow healing - Reduce inflammation. - Promote distal circulation. - Gradually regain ROM. - Increase confidence. - Promote early mobility. - Maintain health, fitness and wellbeing		BEFORE DISCHARGE check the op note for any specific post-op instructions and amend the guide accordingly.

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST	SPECIAL INSTRUCTION
PHASE 2 From Week 1	○ Adequate pain relief. ○ Mobilise independently +/- aids. ○ Increase Range of Motion	Standing: • Hip flexion • Hip abduction • Hip extension Low Load muscle activation exercises 5- 10 seconds 5 -10 x 3 • Glute squeeze • Core squeeze • Bridge • Supported mini squat Cardiovascular exercises: 3 minutes + gradual increase • Supported marching on the spot • Side stepping • Heel flicks Contralateral limb strength training 3x per week (continue for 10 weeks) Leg Press, Leg Curl & Leg Ext 3 x 5RM. • Other muscle groups not to be neglected. • Upper body active exercise→ resis/ reps/sets/speed.	1. Promote early function. 2. Increase ROM. 3. Increase confidence. 4. Promote early mobility. 5. Maintain health, fitness and wellbeing	AROM. PROM. SLR.	

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PHASE 3 From Week 4 – 5 Inpatient Stay	- Post Op X-rays ensure bony healing. - Wound Healed	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.	

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PHASE 4 From 6 weeks Muscle activation and early motor control <i>Isom – hold 5 – 10 seconds, 3 reps x 2 a day.</i>	○ Mobilise independently ○ Trendelenburg negative ○ Bridge 10 reps	Hydrotherapy (when wound allows) for ROM Manual therapy to increase ROM Initial muscle activation in varying vectors of range, using pain as a guide: (5 - 10 seconds 5 x 3) Hip abduction/adduction: supine, crook lying, sitting, standing Hip flexion in sitting, prone if tolerated Progression of Muscle activation exercises (keep pain low RPE high) 5 - 10 seconds 5 x 3 • Clam • Hip abduction • Fire hydrant - Hip adduction. Supine, crook lying • Wall press • ½ side plank • Wall slide • Hip flex – sitting 90 degrees, front plank (1/2 or full). Motor control. 10 – 15 x 3 +/- resistance. Sit to stand Bridging Low step up (if able) Heel raises Cardiovascular exercises: • Static bike • Alter G treadmill (gait re-education) Contralateral limb strength training 3x per week (continue for 10 weeks) Leg Press, Leg Curl & Leg Ext 3 x 5RM. • Other muscle groups not to be neglected. • Upper body active exercise → resis/reps/sets/speed.	1. Promote early function. 2. Increase ROM. 3. Normalise gait 4. Increase muscle activation 5. Increase confidence. 6. Maintain good pelvic control	Double leg bridge holds Active hip abduction against gravity Active hip flexion against gravity at 0 and 90 degrees Single leg stance (Trendelenburg -)	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.

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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>	○ Directional Planks 30 sec hold ideal control. ○ Bridge 10 reps with 10 sec hold ideal control. ○ Body Weight squat x 15, minimal discomfort.	DL Muscle control: 15 – 25 x 3 1. Crab/monster walk 2. Bridge/hip thrust 3. Squat 4. Romanian Deadlift (RDL) 5. DLHR overstep 6. Step up/lunge Single leg muscle control: 15 – 25 x 3 1. Side plank clam 2. Lunge/Bulgarian split squat 3. Supported SL squat (TRX) 4. SL RDL 5. SL hip thrust 6. SLHR overstep Cardiovascular exercises: Introduce zone 2 if able (60 – 70% max HR) 40 – 60 mins Upper limb maintenance: increase weight. Strength, Hypertrophy, Endurance as required (see Appendix) 1. Shoulder press 2. Upright row 3. Reverse flys 4. Bent over row Core: 20 second's work: 10 rest x 3 – 5. Pick 3 – 6 exercises of your choice e.g. 1. Dead bugs 2. Front plank 3. Side plank 4. Russian twist 5. Chop 6. Lift 7. Mountain climbers	7. Improved neuromuscular control 8. Progress functional activities 9. Ensure good lumbo-pelvic stability.	STS in 30 seconds 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 Dynamo as able.	Orthopaedic Hospital 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.

PHASE OF REHABILITATION	IDEAL CRITERIA	REHABILITATION GUIDE	GOALS	OBJECTIVE TEST
PHASE 6 From Month 6 Progressive Strength phase – plyometrics Return to non-contact Sport	- 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	Max strength: 3 – 8 x 4 -5 - Squat - Lunge - Dead lift - Leg press - Hip thrust - Heel raise - Train strength and endurance on separate days. - Have a minimum of 24 hours between strength days. Strength: [include through range OKC Q from Week 10] See appendix. - Adjust if necessary, based on symptoms. Hypertrophy: See appendix. - Adjust, if necessary, based on symptoms. Endurance: Gradually progress toward ≥45 min continuous CV exercise (exception of jogging/running). See appendix. Adjust if necessary based on symptoms 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> - Bike - Cross trainer - Swimming (if would healed) - Walking - Stepper Return to Run Assessment: Couch to 5km Get running with Couch to 5K - NHS (www.nhs.uk) Progress to Rowing and more dynamic cardiovascular exercises. Can begin gym classes e.g., Spinning, body pump	Improve strength - Ensure good biomechanical control - Improve dynamic stability and ability to accept force - Prepare neuromuscular and psychological ability to return to unrestricted function.	SL bridge in 30 seconds. Aim 90%+ R = L SL hamstring bridge in 30 seconds. Aim 90%+ R = L SL HR in 30 seconds. Aim 90%+ R = L Side plank. Aim 90%+ R = L SL dip x 15 (control R = L) SL stands from chair Dynamo as able Single hop test

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PHASE 8 From Month 9 – 12+ Return to Sport and Injury Prevention	- All Tests > 90% parity. - Consider parity with normative population data.	- 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. Progress to full restriction free sports and activities.	1. Improve strength 2. Ensure good biomechanical control 3. Improve dynamic stability and ability to accept force Unrestricted confident function. 4. Injury prevention.	Single hop test Triple hop test Triple hop cross over test	

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.

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 without 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).