NORTH EAST HIP CLINIC
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Physiotherapy after Periacetabular Osteotomy

2024

North East Hip Clinic, Nuffield Health, Clayton Road, Newcastle upon Tyne, NE2 1JP https://nehipclinic.com

GUIDELINES FOR PHYSIOTHERAPY FOLLOWING

PERIACETABULAR OSTEOTOMY

Name of Protocol / Regime	Consultant	Updated On	Updated By	Review Date
PERIACETABULAR OSTEOTOMY (PAO)	**Malviya**	**Nov 2022**	**BD**	**Nov 2023**

Mr Malviya is the only Consultant currently carrying out Periacetabular Osteotomies at Northumbria Healthcare NHS Foundation Trust. He uses a minimally invasive technique the modified Smith-Peterson approach.

Inpatients

Post-op - Phase 1

- The patient will routinely stay on the orthopaedic ward for around 0-2 days post op, aim is to discharge day after surgery.
- Patients get up with the physiotherapist on the operation if medically fit.
- The patient will require a leg lifter to get in and out of bed, avoid active SLR.
- Routine foot pump circulation exercises, deep breathing and sub maximal isometric gluteal, quad and calf exercises should be given.
- AAROM exercise in supine and leg hang / circles in standing should be issued on the ward. It is important to regain controlled hip ROM as pain allows. Circumduction = leg dangle to promote relaxing the leg and dissociation. Can be progressed to foot brushing floor gentle small circles working in an (outward rotation) extension through abduction movement.
- **NO active SLR, long lever flexion or side lying hip abduction should be carried out for the first eight to ten weeks post-operatively. Protection and graded loading of the hip flexor complex is required.**

- Weight bearing is limited to **30kg flat foot PWB** for the first 6 weeks post-surgery. (Progression of weight bearing will occur after the 6/52 consultant review with x-ray confirmation of progressive healing).

- Flat foot PWB should be taught initially with a Zimmer frame then elbow crutches as pain and confidence allows. Be very clear **not** to allow a TTWB pattern – this increases hip flexor overuse activity.

On-Discharge

- The patient should be discharged with the PAO leaflet and elbow crutches. They will also need to be able to transfer independently with their crutches and have completed a stairs assessment.

Outpatient Follow Up

- The initial outpatient's appointment has been organised for two weeks post op, the ward physiotherapist should check this is in place prior to discharge.

Outpatients

PHASE 2 (weeks 2-6)

- **All patients should complete the IHOT33 or HAGOS on their first and last physiotherapy appointment.**

Goals

Protect healing tissues and labral / osteotomy sites

Reduce post-operative pain and inflammation

Normalise gait pattern with appropriate assistive device

Precautions

Protected weight bearing

Flat foot vs toe touch pattern

Protected ROM - > 90 degrees flexion, rotation >20 degrees, neutral extension.

Rehab key points

Initiate short lever AAROM exercises pain free (Better tolerated then PROM)

Avoid Clams and long lever exercises.

Improve dissociation, proprioception and correction of compensatory patterns, these are key requirements in the early to intermediate stages.

Emphasize submaximal isometrics and circumduction exercises, progress to mid range concentric.

Initiate low grade deep hip 'cuff' and core / abdominal strengthening in supine / prone. exercise

PATIENT EDUCATION

- Patient education to establish aims, discuss the rehabilitation process, reduce anxiety and offer advice on sleep health (Gambling,T.S and Long, A,. 2019)
- **Issue this booklet - https://www.nahr.co.uk/wp-content/uploads/2022/03/Hip-Dysplasia-in-teenagers-young-adults.pdf**

WEIGHT-BEARING

- Weight-bearing continues to be limited to **30kg flat foot PWB** for the first 6/52 until x-ray confirmation of callus formation has been confirmed at the consultant review appointment. **Check Siris for details.**

- Patients should be encouraged to walk with a normal heel-toe gait checking the amount of pressure through the leg by pressing down on some weighing scales. Dysplastic patients having an increased abductor and external rotator torque. Patients need to be

encouraged to walk slowly and shorten their stride length to decrease the load on the anterior hip joint and demand on the abductors/external rotators balancing the demand through the hip.

ROM

- All ROM exercises should be performed within pain limits to avoid exacerbating symptoms.
- There are no major ROM restrictions, but flexion beyond 90 degrees may be difficult in the initial recovery phase limit and progress as pain allows. ROM exercises should be encouraged in all planes. Limit external rotation to 20 degrees (due to reduced control level).
- A sliding board may be required initially to help initiate hip flexion and hip abduction.
- Progression to standing and toe tap ROM exercises to commence into extension and abduction as comfortable. Progress range as able.

STRENGTHENING

Hip flexor and adductor inhibition are common in the early stages due to the location of the pubic osteotomy, strength deficits and protective tension of the hip flexor / adductors for hip stability. (Jacobsen, et al 2017). Protect these tendons and gradually develop loading.

- Isometric glutes (Prone setting or supine/sitting squeezes)
- Isometric quads, IRQ and TRQ can be commenced.
- Prone glute/quad setting can commence
- Prone ER isometrics should be started and gradually progressed
- Initiate lower limb dissociation, core and anti-rotation trunk activation exercises (Pelvic tilts, leg slides, BKFO, OH raises, palloff press and banded pull downs in crook)
- Crook adductor ball squeezes sub max initially from week 4-6
- From 2 weeks, providing scars have healed, hydrotherapy based hip mobility, gait and basic proprioception work can be commenced.

ADDITIONAL ADVICE

- Avoid lifting heavy objects
- Avoid sitting on low chairs.
- Teach transfers to avoid excessive abdominal contraction
- Hydrotherapy can start as soon as wounds healed – (AROM, gait and early proprioception) programme example in physitrack in education – “hip hydrotherapy” and “hip hydro part 2” NTGH staff – Maurice has a copy.

PHASE 3 (weeks 6-12)

➢ **Phase begins once adequate healing of osteotomy / labral repair occurs.**

Goals
Progress weight bearing and continue to normalise gait pattern.
Restore near full, symmetrical range of motion
Progress strengthening and neuromuscular control

Precautions
Monitor for increased discomfort / pain with exercise, weight bearing progression and general activity.
Avoid premature weaning from walking aids
Avoid long lever hip flexion / abduction until after 8/52 or when deemed ready to do so.

Gait
Progress weight bearing status and wean walking aid support when,

- Able to demonstrate adequate gluteal muscle control / strength (SL Stance test)
- Demonstrate normalised gait pattern.

- **Week 6-8** ~25% - 50% PWB with 2 elbow crutches
- **Week 8-10** ~50%-75% PWB with 1 elbow crutches
- **Week 10-12** progress to FWB aiming to be FWB crutch free around 12 weeks post op.

Patients can ensure the correct weight by working out what this percentage is via bathroom scales at home.

Rehab key points
Gradual progress range of motion when avoiding painful end ranges
Emphasize pain free AROM, AAROM and passive stretches which can begin now.
Quadruped mobility and strengthening exercises can start, progress as able, Kneeling can start
Stationary bike 6/52 +
Progression of proprioception, gluteal, deep rotator and core strengthening.
Prioritise closed chain strengthening and dynamic control exercises. Bridging can start once WB status is increased to 50% at 6/52.
Progress hip flexor strengthening in a graded fashion, favour short lever work.

Siris should be checked for instruction at 6/52 prior to progression of weight bearing status. If in doubt contact Orthopaedic team to discuss. (Increased loading too early can lead to incidence of stress fracture).

- **NO Clams – these place increased activity through the TFL and hip flexors which may lead to tendon pathology and not a beneficial exercise to strengthen gluteal musculature.** (Moore, et al., 2020)

SOFT TISSUE MOBILISATION AND STRETCHES

- General management of increased hip rotator and adductor protective hypertonicity should be managed (Adler, et al., 2015).
- Therapist led stretches and soft tissue release as able.
- Exercise will aid this also by correction of muscle firing pattern (Adler, et al., 2015).

CV

- At week 6 resistance free exercise bike can start. (A recumbent bike may be more comfortable. **Therapist should ensure minimal awareness of hip flexor symptoms**). Aim aerobic initially then progress to anaerobic sessions post week 10.

- **Hydrotherapy:** If patients have access to a swimming pool, they should be encouraged to start some swimming at 8-10 weeks. A rehabilitation plan for the pool should be provided by the therapist to work on the hip both in and out of the water.

DRIVING

- Can commence once adequate control of the leg is gained and WB status has been progressed. Normally around 10 weeks.

PHASE 4 (week 12 to 24)

Phase begins once able to demonstrate:

Good tolerance to exercises of previous phase

Normalised gait pattern – fully weight bearing and > 1 mile distance.

ROM > 80% of the contralateral leg.

Goals

Begin to re-establish advanced neuromuscular control
Continue to increase muscular and cardiovascular endurance
Restore full range of movement
Improve lower limb muscle strength
Improve core strength
No running until > 24/52 post op.

Precautions

Avoid provocation of symptoms by over aggressive exercise progression

Avoid repetitive end range exercise until full range and control established

No Running, jumping, hopping, cutting or pivoting.

Rehab key points

Introduce long lever strengthening

Commence and progress through plyometric exercise pathway / return to run drills – excursion / clock balance, step up/down drills, decelerations, wall drills.

Progress multi directional hip and lower limb mobility and strengthening

Progress toward end range strengthening with continued emphasis on dynamic control and dissociation of hips, pelvis and trunk.

Functional strength training – weights room.

CV

- Aerobic and Anaerobic work can continue to progress on the stationary bike, cross trainer and in swimming pool
- Resistance can gradually be added to the static bike but the time should initially be reduced in order not to overload the joint with the aim of gradually building the time back up.

STRENGTHENING

- Continued core strengthening is important. Progression of the previous phase is completed here with initial focus remaining anti rotation drills, before progression to control through motion and kinetic chain work.

- Anti-rotation work – OH stick marching, McGill curl ups, 4pt bird dogs and UL activity drills, Side bridges, Progressed Palloff press - Sit > stand > split stance > Lunge position > Unstable surface, rope drills.

- Control through motion – Add arm drills to Side Bridge, lawnmowers https://www.youtube.com/watch?v=CAyMO4AnmBg, Hulk drills = Cable cross overs, Russian twists and Reverse hypers with no resistance and over table/plinth etc then progress - https://www.youtube.com/watch?v=FpvpwndtSVY.

- Banded walks can commence following a work on form and technique in side stepping of the walks with no band.

- Compound movements can begin in this phase – Bench squats > Goblets > Wall Sumo > Standing Sumo, Deadlift from step > floor > increase weight, RDL, Farmers walks, Progression to split squats and loaded step drills later in this phase is also beneficial.

- Progress compound exercises by increasing depth of movement and/or applying an external load. However monitor carefully for any reaction.

BALANCE

- Tandem stance exercises can be commenced initially Static +/- head movement, progressing to involve UL movements +/- object > Trunk movement +/- object > External loading drill

- Overhead stick marches / high knees progressing to include a single heel raise as able

- Single leg stance (SLS) can be commenced once the patient is FWB. Can be progressed with reduced support > external task > uneven surface > perturbations

- Single leg activities challenging proprioception and strengthening of the hip muscles in functional positions should be performed once confidence with SLS has been gained. Examples of this are single leg RDL, Step ups – laterally and Step hip hitches.

- More functional and dynamic balance exercises can be integrated to the patient's rehabilitation if deemed appropriate and they have sufficient control. Examples include Y balance or clock drills, Dynamic ball rolls, Bosu squats / SLS, Horizontal foot exercise and external loaded split squats > lunges.

PHASE 5 (24 weeks)

Goals

Tolerance of running and straight-line agility drills with appropriate lumbopelvic and lower limb control.

Progression to jumping, hopping, cutting/pivoting activity with appropriate lumbopelvic and lower limb control.

Develop 5/5 full level strength and performance

Optimise functional strength, endurance and power

Optimal SL squat and step down

Precautions

Avoid provocation of symptoms by over aggressive exercise progression

Rehab key points

Initiate running and agility progressions

Continue resistance training – S&C principles

Initiate jumping, hopping, cutting and pivoting drills

Initiate progressive sport / high level activity specific tasks.

AGILITY / PLYOMETRICS

- Bilateral: in place-sagittal-frontal-transverse–hurdle– box drop
- Unilateral: in place sagittal-frontal–transverse–hurdle – box drop
- Load acceptance (with load) -load acceptance (stability challenge) - load acceptance (with load & stability challenge) – Perturbations
- Maximum 80-100 foot contacts per plyometric / deceleration training session (Chu, 1998)
- Load /capacity training advice for long tern prevention of recurrence

The foundation of the plyometric and agility work is teaching deceleration first, (Don't speed things up if we can't slow it down efficiently). A large requirement of this phase is to teach a fundamental landing technique maintaining lower limb alignment with the aim of increasing lower limb force absorption which in turn decreases joint reaction force. Consequently it is a vital component of return to a good functional level.

RETURN TO RUNNING CRITERIA

- No pain or swelling.
- Full, pain free ROM; hip, knee and ankle. Look at passive prone true extension*
- Normal gait and unaided
- Total hip strength 80% or more of the contra-lateral limb.
- Single leg sit to stand (1sec pause only) 25 reps maintaining optimal alignment.
- Single leg calf raise 25 reps with good control.
- Single leg bridge 35-40 reps.
- Trunk side flexors; McGill's side bridge 2 mins hold bilaterally.
- Completion of 4-6 weeks deceleration training.

Suggested rehab running programme

1. **5 x 50m jog with walk return between (50m = half an adult football pitch)**
2. **50m jog, 100m jog, 150m jog with walk 50m between x 3 rest 2 mins between.**
3. **50m jog, 100m jog, 150m jog with walk 50m between x 2-3 reps x 2 sets 2 mins between.**
4. **50m jog, 100m jog, 150m jog with walk 50m between x 3 reps x 3 sets, rest 2 mins between**
5. **Couch to 5k**

Rest 2 days between runs in the first 3-4 weeks, this is to prevent overloading and allowing for recovery.

RETURN TO SPORT

- No pain or swelling.
- Full pain free ROM; hip, knee and ankle.
- Normal gait.
- Total hip strength 90% +
- Adductor strength 90-95% Also aim for an Adductor to Abductor strength ratio of 1.6:1.4.
- Single leg sit to stand (1sec pause only) 25 reps maintaining optimal alignment.
- Single leg calf raise 25 reps with good control.
- Single leg bridge 35-40 reps.
- Trunk side flexors; McGill's side bridge 2 mins hold bilaterally.
- Completion of 6 weeks + deceleration training.

Return to sport/activity must be based on the individual presentation of each patient and their ability to fulfil set criteria (listed above). It will also depend heavily on the nature of the sport and can therefore vary from 9-12+ months (Heyworth, et al., 2016).

Phase 6 - Psychological Management – Utilised throughout the rehabilitation journey.

- Manage worries, fears, beliefs and stressors.
- Educate on likelihood of setbacks
- Sleep management
- Discuss and educate on ‘Live well with pain’ website / resources.

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