Table S2. Descriptions of LEAP study interventions

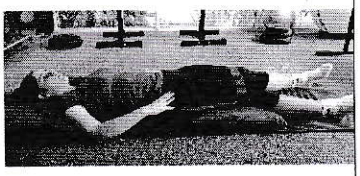
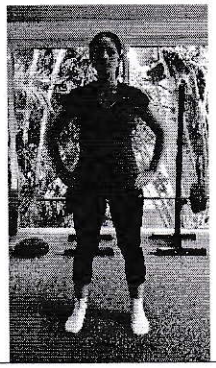
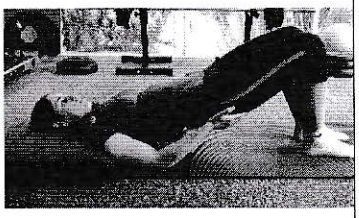
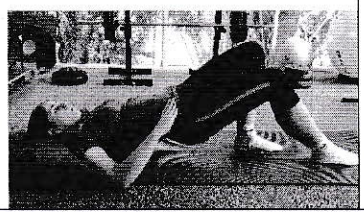
1. **Education, Load management and Exercise program (EDX)**

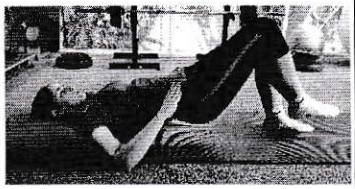
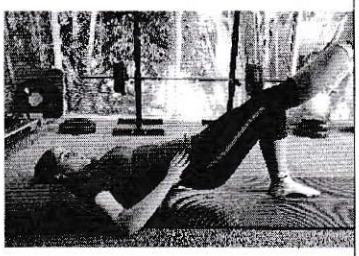
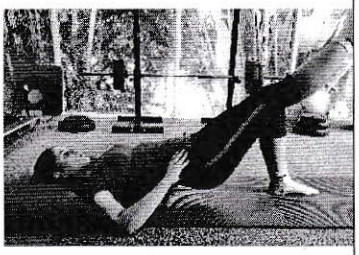
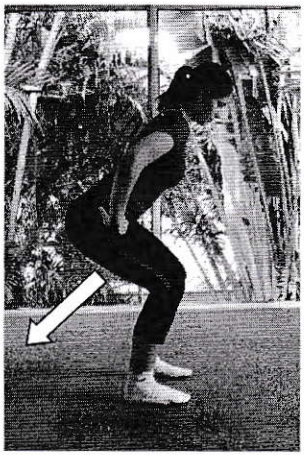
- 14 individualised Physiotherapy sessions over 8 weeks plus daily home exercise program (4-6 exercises). Physio sessions once/week for first two weeks, then twice/week for remaining six weeks. A weekly diary was completed recording exercises performed, any issues/problems
- Detailed advice and education on tendon care – handouts, verbal explanation, DVD
- Exercises included functional retraining, targeted strengthening for hip (particularly abductor) and thigh muscles, and dynamic control of adduction during function.
- Exercise difficulty gradually increased, to optimise improvements in muscle strength and function without significant aggravation of pain. Difficulty level monitored with the Borg Scale [11] where warm up is performed at a light level (Borg 11-12), functional retraining at a somewhat hard to hard level (Borg 13-15), and the slow heavy targeted strengthening moving from somewhat hard towards the hard to very hard level (14-17), depending on response to loading.
- No change in trochanteric pain was acceptable during functional retraining, as this may indicate inadequate alignment control, and excessive compressive tendon loading. A maximum of NRS 5/10 pain was tolerated as long as this eased afterwards and did not result in increased pain levels that night or the next morning.
- Responses to the exercises closely monitored, and loading levels adjusted as required to prevent any increases in pain from week to week.

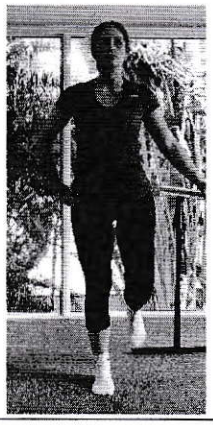
Stage	Exercise	Effort	Speed	Reps	Sets	Freq
Week 1- Familiarisation	*Low load activations* **Static Abduction:** Supine lying Standing	 Light Light	 Slow onset Hold 5-10 sec Slow onset Hold 5-15 sec	 10 3-5	 1-2 1	 BD BD
	Pelvic Control during Functional Loading: **Bridging** Double Leg Bridging **Functional Strengthening:** Double leg squats	 Light Light-SWH	 Moderate Slow	 10 10	 1 1	 daily daily
	Abductor Loading via Frontal Plane Movement: **Sidestepping**	Light	Moderate	10 each	1	daily
Week 2 – Early Loading & Movement Optimisation	*Low load activations* **Static Abduction:**	Maintain as per week 1				
	Pelvic Control during Functional Loading: **Bridging:** Double leg bridging	 Light SWH	 Slow Slow	 10 5	 1 1	 daily

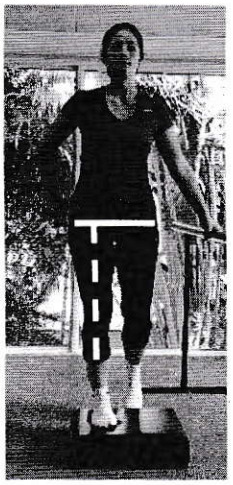
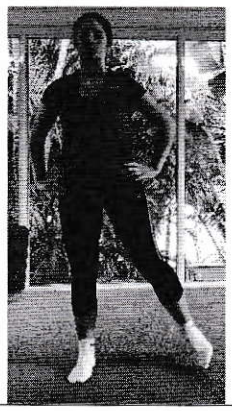
Stage	Exercise	Effort	Speed	Reps	Sets	Freq
	Single leg biased exercise: Offset bridging **Functional Strengthening:** Double leg squats Single leg biased exercise: Offset squat	Light SWH	Slow Slow	10 5	1 1	daily
	Abductor Loading via Frontal Plane Movement: **Sidestepping**	Light	Moderate	15 each	1	daily
Week 3-8 – Graduated Loading	*Low load activations* **Static Abduction:**	Maintain as per week 1				
	Pelvic Control during Functional Loading: **Bridging:** Double leg bridging Single leg biased exercise **Functional Strengthening:** Double leg squats Single leg biased exercise	Light SWH – Hard Light SWH - Hard	Slow Slow	5 5 – 10 5 5 - 10	1 2 1 2	daily daily
	Abductor Loading via Frontal Plane Movement: **Sidestepping** **Band Sideslides**	Light SWH-Hard	Moderate	10 each 5-10 each	1 1-2	daily
Week 3-8 – Graduated Loading; Sliding platform with spring resistance	All supervised by Physiotherapist in Clinic					
Warm up	*Abductor Loading via Frontal Plane Movement:* **Bilateral Abduction:** Upright Minisquat	Light Light	Moderate Moderate	5 each way 5 each way	1 1	Twice weekly
Higher level loading	*Abductor Loading via Frontal Plane Movement:* **Bilateral Abduction:** Upright Minisquat	SWH-VH SWH-VH	Slow Slow	5-10 each way 5-10 each way	1 1	Twice weekly
	Pelvic Control during Functional Loading: **Scooter**	Light - SWH	Moderate	5 - 10	1-2	Twice weekly

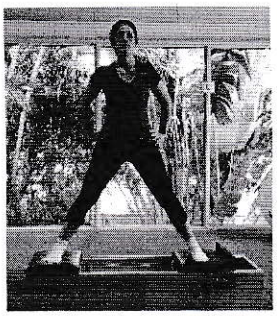
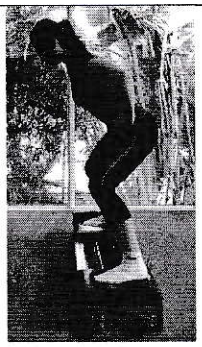
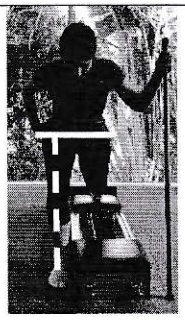
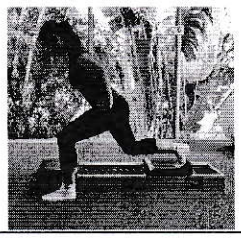
Reps= Repetitions; Freq=Frequency; BD=Bi-Daily; SWH= Somewhat Hard; VH=Very Hard

Exercise	Position	Exercise Description
Static Abduction 1. In Lying		**Aim: To gently activate the deep gluteal muscles at the side of your hips** 1. Lying on your back, knees just slightly wider than hip width. Pillow under the knees, belt/scarf around lower thighs. Now very slowly & gently start to move your knees apart, but only enough to just take up the slack in the belt. This may only be 1-2mm of movement. All the big superficial muscles you can feel around your hips and thighs should remain soft and relaxed. You should just be aware of a deep gentle tension at the side of your hips/buttocks.
2. In Standing		2.Standing feet slightly wider than your hips *Slowly and gently* imagine you are going to slide your legs apart – 'Imaginary splits'. Think of a slow 'ramp' of activation, rather than a fast movement. You should only be aware of a deep gentle tension at the side of your hips/buttocks. All the big superficial muscles you can feel around your hips and thighs should remain soft and relaxed. If you are unable to relax your superficial muscles, you can start this exercise leaning your back against a wall.
Bridging 1. Double Leg Bridge		**Aim: To strengthen the gluteals** 1. Draw in your lower abdomen gently. Contract your lower gluteals/buttocks without tucking or tilting your pelvis. Press your heels into the bed (ankles/toes stay relaxed), and lift your pelvis/bottom from the bed. Do not fully straighten the hips – no need to lift that high. Only lift in a comfortable range – this may be only just taking the pressure off your buttocks initially. There must be no discomfort in the lower back. Use no or one flat pillow to avoid strain of the neck. 2. Ensure you focus on your gluteals and don't let your hamstrings take over. If you are getting cramps in your hamstrings, your buttocks are not doing enough work. Try positioning your feet closer to your buttocks. Lift slowly – 3-4 seconds up & 3-4 secs down, gluteals working ***all*** the way.
2. Offset Bridging		2. Bring one foot in closer to the buttock, and place the other foot further away. The bridge should now be performed primarily with the 'close' side, with the weight of the other leg just resting, supported by the ground. Preset your muscles as above and complete the lift slowly – 3-4 seconds up and 3-4 seconds down. Your pelvis should remain level.

3. Single Foot Hover		Start as per double leg bridge, lifting your pelvis/bottom through 2 legs. Then *slowly peel* one foot off the ground, keeping the pelvis level. *Do not* rapidly pull the foot off the ground. Keep the pelvis 'tucked under' from the weightbearing side to keep the pelvis level. Do not let the pelvis sag. Return your foot to the ground slowly, then return your bottom to the bed.
4. Single Leg Extension		Perform this exercise as per the single foot hover, except once you have lifted your foot, slowly extend the knee of the non-weightbearing leg. Keep the pelvis level and knees about the same height. Slowly bend the leg again, return the foot to the floor, then return the bottom to the bed slowly.
5. Single Leg Dips		Draw in your lower abdomen slowly, tighten your lower gluteals and push through both feet as for double leg bridging. Now slowly peel one foot from the floor and extend your knee. Keeping your pelvis level, slowly lower the pelvis to just touch the ground/bed (but do not relax), and then slowly lift back up to the start position. DO NOT over extend, by lifting up your pelvis too high. Initially you may need to return your foot to the ground, and even bring your pelvis back to the ground to rest in between repetitions. As your strength and endurance improves you may be able to do a number of dips in a row before returning to the ground.
Functional Retraining 1. Double Leg Squats		**Aim: To strengthen the gluteals and thighs & practice good movement patterns** 1.Double leg squats Start with your weight equally on both feet, weight 2/3rds on the heels, and thighs and buttocks relaxed, as for good posture. Now bend at the hips and knees, translating the hips backwards, and the body forward, like when you sit down. Keep your knees facing straight ahead – light 'headlights'. Keep your back long and relaxed. Do not arch your back. Your physiotherapist will tell you how deep to go – usually start at 1/3 or ½ of the distance to a chair. Move slowly down over around 3 seconds, then return slowly to standing over 3 seconds, focusing on pushing through your heels and feeling the tension in your buttocks. As you reach the top again, grow tall into that good posture.

2. Offset Squats		2. Place the ball of one foot directly under that hip – in line with the other ankle. The squat should now be performed primarily with the side with the full foot on the ground, with the other leg assisting as required to achieve good alignment, and balance. Keep your knees facing straight ahead and your pelvis level. Do not let your pelvis sway or sag out to the side. Think of keeping a straight line down the side of your body. You may hold on at first with the hand opposite the main weightbearing side. Move slowly – 3-4 seconds down and 3-4 seconds up.
3. Single Leg Standing		Wake up the deep gluteal muscles at the side of your hips by doing a couple of static abductions in standing ('imaginary splits') 2 x 15 seconds. Now, hold on to a bench or a chair back on the side you will be lifting. Then, 'think tall' and transfer your weight onto one leg side, while keeping pelvis level and trunk upright. Lift the foot off the ground. Hold for as many seconds as your physiotherapist has directed – usually starting at 5 seconds and building to 15. You must only hold as long as you can keep your pelvis level and a straight line down the side of your body. Keep tall & your weight 2/3rds on your heel. There should be NO pain over the bone at the side of your hip. Some fatigue ache in the buttock is normal.
4. Single Leg Squats	 	Wake up the deep gluteal muscles at the side of your hips by doing a couple of static abductions in standing ('imaginary splits') as above - 2 x 15 seconds. Then, holding onto a chairback initially, transfer your weight onto one leg as above. Keeping your pelvis level, perform a slow, small range squat as you did on 2 legs. Bend at the hips and knees, moving your pelvis backwards, and bringing your body a little forward. Keep your back long and relaxed Your pelvis must stay level and your knee facing straight ahead. Keep that straight line down the side of your body too – no sagging! To come back up, think of using your buttock muscle, and push through your heel bringing yourself back to your 'tall' starting position. There must be no pain over the bone at the side of the hip. The speed of the squat should be performed as per the double leg squat – 3-4 seconds down and 3-4 seconds up.

5. Step ups		Wake up the deep gluteal muscles at the side of your hips by doing a couple of static abductions in standing ('imaginary splits') as above - 2 x 15 seconds. Think 'tall' then place one foot up on a step directly in front of the hip, not in the midline. Start with hand support opposite the foot on the step. Slowly lunge forward over the foot, keeping the kneecap straight ahead, directed over 2nd-3rd toe. Push up onto the step by squeezing the buttock. Don't let the hips sway out to the side. Ensure the hips are level and you think about keeping a straight line down the side of your body. Keep the knee facing straight ahead. You can initially use as much hand pressure as required to keep the correct alignment. As you get stronger you will be able to reduce hand support. Step back down again with the trail leg first – ie last foot up, first foot down, so the leg placed on the step first is doing all the work. There must be NO pain over the bone at the side of the hip, but some fatigue ache in the buttock muscles is normal. The movement should be slow, like the squats – 3-4 seconds up and 3-4 seconds down.
Weightbearing abductor loading 1. Sidestepping		**Aim: To activate & strengthen the gluteal muscles and tendons at the side of your hip** Start with good posture. Now practice some controlled sidestepping side to side. The focus should be on a controlled push from one side and landing softly and with control on the other. The trunk should remain upright, and the kneecaps facing straight ahead. When stepping together, only step back to hip width apart. Do NOT bring ankles together. Start with 5 repetitions side to side, then gradually increase as instructed by your physiotherapist.
2. Doorway side slides		Place an elastic band around your ankles. Stand in a doorway with one foot on a non-slip surface, & the other foot, with a sock on, on a slippery surface. Sometimes a folded handtowel can also help the sliding. Bend your hips and knees about 45° so you are in a shallow squat. Now slide the 'slip side' foot out to the side, pushing against the resistance of the band to take the knees apart, and take your knee almost to a straight position, or as far as is comfortable for your hip. Keep your body and non-slip side completely still. The movement should be slow and controlled – 2-3 seconds out and 2-3 seconds back in.

Abductor Loading via Frontal Plane Movement 1. Bilateral Abduction Upright		Stand with one foot in the centre of each plate, knees straight but not locked backwards and 2/3rds of your bodyweight resting through the heels. With the ankles, hips and shoulders aligned on top of each other and equal weight through both feet, press through both feet to separate the legs and slide the plates slowly out to the side against the spring resistance. Keep the knees soft and the body central. Weight should remain even on both feet and the trunk upright. Control the plate slowly back to the start position.
2. Bilateral Abduction Mini Squat		Stand with one foot in the centre of each plate and equal weight through both feet. Bend the hips and knees, leaning forward from the hips, ensuring that the spine and the pelvis remain in a neutral position. From this semi-squat position, press out equally with both feet, pushing against the spring resistance. Your knees face towards your middle toes and should remain bent throughout the movement. Keep your body leaning forward, maintaining a gentle inward curve of your lower back. The movement is a separation of the thighs, not a straightening of the knees. Control the plate slowly back to the start position.
<u>Pelvic Control during Functional Loading</u>: Scooter	 	Stand to the side of the base plate with one foot on the ground and the ball of the other foot against the lip of the slide plate. Initially you may require a stick, bench or back of a chair on the side of the back leg, for balance. Lean forward and bend at the hips and knees, keeping a gentle inward curve in the lower back and ensuring that your body weight is falling through your front heel. Keep the front knee directed over the middle toes. Press back against the spring resistance with the foot on the slide plate by extending the leg. Keep a level pelvis and the knee facing forward, minimising movement of the back, pelvis and front leg. Avoid shifting the hip/pelvis out to the side of the front leg. Control the plate back to the start position.