ChatGPT

L4–L5 Disc Herniation Rehabilitation Plan (Week 0–16)

Overview: An L4–L5 disc protrusion with a central annular fissure and left-sided sciatica requires a progressive 16-week rehabilitation plan. Healing a herniated lumbar disc usually takes about 3–4 months with proper care [1] [2]. In the first 3–4 weeks, the outer disc tear begins to scar over and stop further nucleus pulposus leakage [3]. By ~8–12 weeks, the disc's inner layer heals and the extruded material is reabsorbed, allowing increased activity with less pain [4] [1]. This plan outlines **week-by-week goals, exercises, and modalities** (including TENS use) to maximize recovery and achieve 100% rehabilitation.

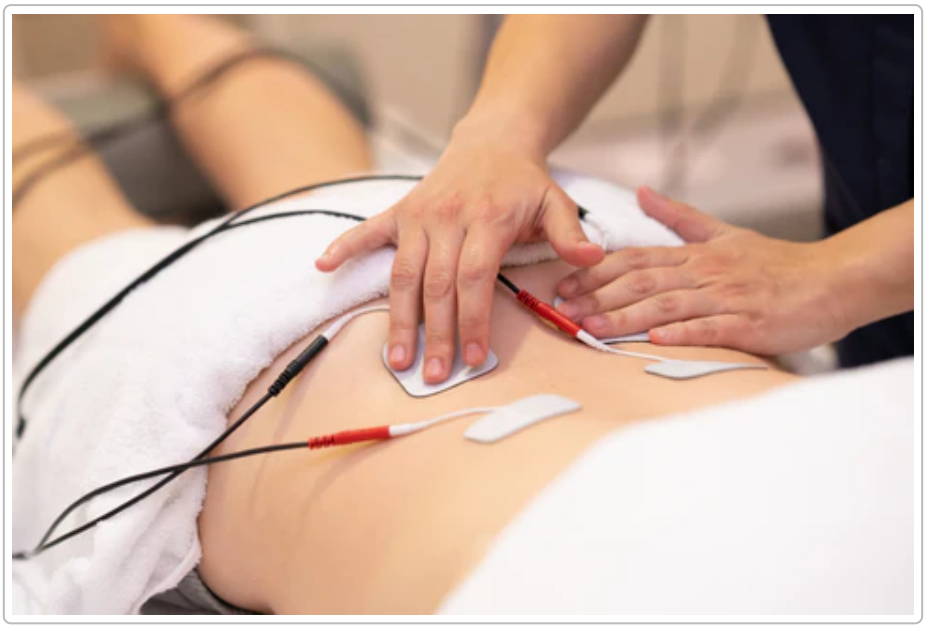
> **Note:** Always listen to your body and avoid movements that sharply increase pain. Progress to the next phase only if criteria are met (pain under control, improving leg symptoms, and ability to perform current exercises with good form). Consult a healthcare provider if symptoms worsen (e.g. new weakness, loss of bladder/bowel control, or severe pain) [5] [6].

Week 0–1: Acute Phase – Pain Relief and Gentle Movement

Goals: Control pain and inflammation, protect the injured disc, and find positions of comfort [7]. Avoid stressing the disc further while keeping **gentle mobility** to prevent stiffness [8] [9].

- **Activity Modification: Avoid heavy bending, lifting, twisting, or prolonged sitting** which increase disc pressure [10] [11]. If sitting is necessary, do so briefly and with a neutral spine posture (use a lumbar roll or cushion) [12]. Emphasize "good" positions like **standing and walking**, which shift load to the back of the disc and encourage the nucleus to recede inward [10] [13]. Short **frequent walks** (e.g. 5–10 minutes, several times a day) are encouraged as tolerated to maintain circulation – ensure an upright, symmetric gait [14].

- **Pain Relief Modalities:** Apply **ice** to the low back in the first few days to reduce acute inflammation (15–20 minutes, a few times daily) [15]. After the initial acute period, you may alternate with heat if muscle spasm is present. Utilize your **TENS unit** for drug-free pain relief – it can block pain signals and stimulate endorphin release [16] [17]. For acute pain, use a **high-frequency (80–120 Hz)** continuous mode to stimulate the pain-gating mechanism for short-term relief [18] [19]. If pain is more chronic or lingering, a **low-frequency (2–10 Hz)** or burst mode can help release endorphins for longer-lasting relief [18] [19]. Start with a **comfortable intensity** (a strong tingling without muscle contraction) for ~20–30 minutes, up to 3–4 times daily [20] [21]. Place the electrodes to "surround" the pain: for example, one pair on either side of the spine at L4–L5, and another pair over the left buttock or upper thigh where the sciatic pain refers [22] [23]. (See image below for pad placement.)



Example of TENS electrode pad placement for lower back sciatica pain. Pads are placed on either side of the lumbar spine and over the affected gluteal area, targeting the L4–L5 level and sciatic nerve pathway.

- **Supported Rest Positions:** In the acute flare-up stage (one week post-injury), you may need "active rest" [24]. Rather than total bed rest (which is discouraged), find **pain-free positions** that relieve nerve pressure. Many people find relief lying on their back with knees bent (e.g. with a pillow under knees) or **lying face-down (prone)** which can reduce disc pressure on the nerves [25] [26]. Experiment with a **prone prop**: lie on your stomach propped up on pillows or on your elbows (**prone on elbows** position) if tolerated. This gentle extension posture can help "centralize" pain – i.e. reduce leg tingling by encouraging the disc bulge to move away from nerve roots [27] [25]. If this position eases your leg symptoms, aim to lie prone propped on elbows for **30–60 seconds at a time, 5–10x per day**, breathing deeply [28]. If prone is too painful, try lying on your back with a pillow under your low back for slight extension, or side-lying with a pillow between knees. Avoid curled-up, forward-bending postures that exacerbate disc pressure (no fetal-position sleeping if possible) [12].

- **Gentle Nerve Movement:** With left leg tingling down to the toes (sciatic nerve distribution), introduce very gentle **nerve gliding ("flossing") exercises** to help relieve neural tension once acute pain starts to settle. In week 1, keep the range small and **pain-free** [29] [30]. For example, a basic **lying sciatic nerve glide** can be done on your back: Bend both knees with feet flat. Slowly straighten the left leg up toward the ceiling, **flexing the ankle** (toes toward head) until a mild tension is felt in the buttock or hamstrings, then lower the leg back down [31] [32]. You can hold the stretch just 1–2 seconds at the top, then release. Perform **5–10 gentle repetitions per side, 1–2 times daily** [33]. This "flossing" motion (tensioning then releasing the nerve) can improve sciatic nerve mobility and reduce tingling [30] [34]. **Important:** This should *not* reproduce sharp pain – only a mild pulling or tingling that eases each time. Stop if symptoms worsen. (As flexibility improves in later weeks, you'll progress this with longer holds or using a towel to assist – described in later phases.)

- **Core Engagement (Pain-Free)**: Even in Week 1, begin very **gentle core muscle activation** to support your spine in neutral positions [35]. This is often done in a supine (on your back) supported position to avoid strain. Try the **abdominal brace**: lying on your back with knees bent, gently draw in your lower abdomen (as if zipping up tight pants) and activate your deep

transverse abdominis (TA) muscle without moving your spine. You should be able to breathe while holding a mild tension in the abs. Hold ~5–10 seconds, repeat 5–10 times. This is subtle but helps start re-engaging the core. If it doesn't increase pain, you can incorporate small movements while bracing: e.g. **TA marches/heel slides** – with abs drawn in, slowly slide one heel along the floor to straighten the leg partway, then slide it back, alternating legs [35] [36]. Or lift one foot a few inches (march in place) while keeping your low back flat. Do ~10 reps per side, focusing on form rather than range. These low-load exercises activate the deep core and multifidus muscles in a protected, pain-free range [35]. Stop if any leg pain increases.

Educational Points (Week 0–1): Understand that some pain and tingling are expected initially, but steady improvements should start over the next couple of weeks [37]. Use **positive posture habits** – when standing or walking, imagine a string lifting your chest to avoid slouching. When changing positions (getting out of bed or a chair), **brace your core** to protect your spine. Avoid any sudden twisting. The disc and nerves are inflamed now (acute stage, ~1–2 weeks post-injury) [2], so be patient and focus on reducing irritation.

Week 2: Early Subacute Phase – Introduce Gentle Stretching and Mobility

By week 2, acute inflammation is starting to subside for most people [37]. You should notice a slight decrease in baseline pain and possibly less severe radiating leg pain. **Goals for week 2**: maintain pain control, gently improve flexibility in tight areas (without aggravating the disc), and continue nerve mobility work.

- **Continued Pain Management:** Keep using **TENS** as needed (e.g. before activity or in the evening) to manage pain levels – many patients find 20–30 minutes of TENS before exercise warms them up by reducing pain spasm [19] [21]. You can also use it **after exercises** if you experience a flare-up, to calm things down. In week 2, you may experiment with **modulating modes** (some TENS units have modes like burst (B) or modulation (M)) – for example, a *burst mode* delivers low-frequency pulses (e.g. 2 Hz bursts) that can help with the aching pain [20] [18]. Always end your TENS session by turning the unit off *before* removing electrodes [38].

- **Gentle Stretching:** Start **light stretches** for muscle groups that can contribute to pressure on the spine and nerve. Key areas are the **hamstrings, glutes (piriformis), and hip flexors**, which often tighten up with low back pain [39] [40]. **Hamstring stretch (seated):** Sit on a chair and straighten your left leg with heel on the floor, toes up. Keeping your back straight, slowly lean forward at the hips until you feel a gentle stretch in the back of the thigh – hold *15–20 seconds* [41] [42]. Repeat 3 times per leg, a few sessions per day. **Piriformis stretch (supine):** Lie on your back and cross the left ankle over the right knee. Gently pull the right thigh toward your chest (use hands behind the right thigh) until a stretch is felt deep in the left buttock. Hold 20 seconds, 3–5 reps each side. This targets the piriformis muscle, which can compress the sciatic nerve when tight [43] [44]. Perform these stretches in a **pain-free range** – you should feel *mild tension*, not sharp pain. Stretching these areas can reduce pressure on the nerve and relieve some leg symptoms [43] [45].

- **McKenzie Extension Exercises:** If extension postures were helpful in week 1, continue to utilize them more frequently. In addition to prone on elbows, you can try **prone press-ups** this week if tolerated. This is a dynamic extension: lie face-down and place your hands under your shoulders. Gently press your upper body up **as far as comfortable**, allowing your lower back to sag while keeping hips on the floor (like a half "cobra" pose) [46] [47]. **Perform 10 repetitions** of press-ups,

holding at the top for 1–2 seconds, about **every 2 hours** if you can [48] [49]. The goal is to **centralize** the pain (leg tingling should reduce as you do them) – stop if leg pain worsens or peripheralizes. Many people find that repeated gentle extensions reduce leg symptoms over time [27] [25]. If doing press-ups is too intense, stick with the prone-on-elbows for longer holds (up to 5 minutes if tolerable, a few times a day) [50] [51]. **Tip:** Perform an extension set **first thing in the morning** to counter the typical flexed posture during sleep – this can alleviate morning stiffness [52] [15]. Also do a set after any prolonged sitting.

Gentle lumbar extension exercise ("prone on elbows"). This McKenzie exercise encourages the disc bulge to move anteriorly, away from nerve roots, potentially reducing leg pain [53] [25]. Keep hips down and relax your low back; hold ~30 seconds if it feels good, and repeat several times.

- **Nerve Floss Progression:** Continue **sciatic nerve glides** from week 1. If last week's lying leg glide was tolerable, increase the range slightly. You can add an **ankle pump** to the movement: as you straighten your leg up, **flex the foot back** (toes toward head) to tension the nerve, then **point the toes** as you bend the knee to release. This adds an extra glide of the tibial nerve component. Do 10 reps in a slow, rhythmic fashion. Additionally, try a **seated sciatic nerve floss**: Sit on a chair, slump your mid-back slightly and extend your left leg until you feel tingling, simultaneously flex your neck (chin to chest), then release by bending the knee and lifting your head [33] [54]. Repeat 5–10 each side. This seated version lets you control the tension via neck movement as well. Remember, nerve flossing should *not* be held static – it's a gentle oscillation of tension to improve nerve mobility [55] [54].

- **Light Aerobic Activity:** By end of week 2, if pain is manageable, introduce **low-impact cardio** to boost blood flow and healing. **Walking** is still ideal (you may lengthen your walks to 10-15 minutes as tolerated). If walking is limited by leg pain, consider trying a **recumbent stationary bike** or short **swimming sessions** (if accessible and pain-free) – these are low-impact and keep your spine neutral. Even **aquatic walking** in a pool can unload the spine while allowing movement. Aim for ~15–20 minutes of gentle cardio most days, but **stop if it exacerbates leg symptoms**. According to guidelines, **frequent short bouts** are better than one long session in this phase [14] [56].

Progress Check: By the end of Week 2, you ideally have **less leg tingling** than at week 0 (for example, tingling might not go all the way to the toes anymore, or is present only after certain activities) [57] [58]. You should be able to sit a bit more comfortably (perhaps 10–15 minutes) before needing to change

position. Your low back pain may still be present but generally improved from the initial flare. These are signs of healing [59] [60]. Continue to avoid heavy lifting or deep bending.

Week 3: Subacute Phase – Core Activation and Improved Mobility

In week 3, you're transitioning into the **subacute stage**. The disc's outer annulus should have begun to scar over by about week 3–4, helping contain the nucleus and reducing severe nerve irritation [3] [4]. This means you can start **more active rehabilitation**, focusing on restoring range of motion, strengthening core and hip muscles, and further reducing nerve tension.

- **Flexibility & Range of Motion:** Now is a good time to gently restore lumbar mobility **if** it can be done without sharp pain. Continue the McKenzie extension exercises (prone press-ups) from prior weeks; you might notice you can press up higher now as leg pain centralizes. You can also introduce a **knees-to-chest flexion stretch** *if and only if* it does not aggravate your leg symptoms. Many disc herniation patients benefit from extension, but a flexion stretch can relieve tight low-back muscles. To do a **double knee-to-chest stretch**, lie on your back and slowly hug both knees toward your chest (you may feel a stretch in the low back) [61] [62]. Hold ~10 seconds and release. **Caution:** If you feel increased sciatic pain with this, stop – you may not be ready for flexion yet (disc still sensitive to bending). Instead, stick with hamstring and piriformis stretches (which you should continue daily). Also add a **hip flexor stretch** (since prolonged sitting tightens the front of the hips): kneel on your right knee (pad under it) and left foot forward; gently lunge forward until a stretch is felt in the right front hip. Hold 20 sec, 3x/side [63] [64]. Keeping hip flexors loose can reduce anterior pelvic tilt and pressure on the lumbar discs.

- **Core Strengthening:** Begin more dedicated **core stabilization exercises** this week, moving beyond just abdominal bracing. A cornerstone exercise is the **Dead Bug**. This trains your deep core (transverse abdominis) and teaches you to stabilize your spine while moving your limbs. To perform the dead bug: lie on your back with arms extended to the ceiling and hips and knees at 90° (like a tabletop) [65] [66]. Tighten your core (press your lower back towards the floor) [67] [68]. Slowly **lower one arm overhead** toward the floor while simultaneously **straightening the opposite leg** toward the floor, in a controlled manner [67] [69]. **Do not let your lower back arch up** – only lower the arm/leg as far as you can while keeping back flat. Then return to start and repeat on the other side. Perform **8–10 reps per side**, 2–3 sets, resting as needed. Dead bugs are excellent for rebuilding core stability **without stressing the spine** (since your back is supported on the floor) [70] [71]. If you struggle to keep your back flat, start with just leg movements (keep arms up) or just arm movements, then progress to both together. Over the next weeks, your goal will be to increase reps or hold times (e.g. pausing 2 seconds with limb extended).

The dead bug exercise engages the deep core muscles while keeping the spine neutral. Alternate opposite arm and leg lowering, ensuring the low back stays in contact with the floor. This builds abdominal strength and spinal stability important for protecting the lumbar disc [65] [67] .

- **Gluteal and Hip Strength:** Weak glutes can contribute to back strain, so start isolating these muscles now. **Glute Bridges** are perfect this week (if not started earlier). Lie on your back, knees bent, feet hip-width apart. Engage your core, squeeze your buttocks, and lift your hips off the floor until your body makes a straight line from shoulders to knees [72] [73] . Hold the bridge for ~5 seconds at the top, then slowly lower. Do **10–15 repetitions** for 2–3 sets [74] [75] . Focus on *using the glute muscles* (imagine pushing through your heels) rather than hamstrings. If you feel it too much in hamstrings, reposition feet or don't lift as high. As you get stronger, you can hold each bridge longer (up to 10 seconds) [76] [77] . Bridging not only strengthens glutes and hamstrings, but also gently engages the lumbar extensors, which helps support the spine [78] [79] .

Performing a glute bridge to strengthen the hips and lower back. Lie on your back with knees bent and feet flat, then lift your hips by squeezing the glutes [72]. This exercise builds core and glute strength, easing load on the lumbar disc.

- **Clamshells (Hip Abduction):** Introduce a clamshell exercise to target the gluteus medius (side hip) which stabilizes the pelvis. Lie on your **right side** with hips and knees bent (~90°). Keeping feet together, lift your left knee up (opening the "clamshell") without rotating your trunk. Do 10–15 reps, then switch sides. You can add a light resistance band around your knees to increase difficulty [35] [36]. Strong lateral hips will help improve your posture and take pressure off the spine during activities.

- **Controlled Dynamic Movement:** By week 3, you can start **dynamic lumbar stabilization** drills in a very controlled manner. One great exercise is a modified **Bird-Dog** (but we will do an easier version first). Instead of the full quadruped bird-dog, begin in a **modified plantigrade position**: stand facing a countertop or table and bend forward to place your hands on it, so you're at a 45° angle (almost like a push-up position against a wall or high surface). From this stance, practice lifting one arm forward and/or extending one leg back, keeping your spine neutral and abs engaged (this mimics bird-dog but with less load) [80] [81]. For example, with hands on a table, tighten core, then slowly slide your left leg straight backward while keeping your body stable (no hip dropping). Hold 3 seconds, return, then right leg. You can also lift an arm (like a mini forward reach) to challenge balance. Do ~10 reps each side. This exercise starts training your spinal **stabilizers (multifidi)** in a functional position without the full weight of quadruped, and improves neuromuscular control [80] [82].

- **Aerobic Activity:** Increase **walking duration** if you can – aim for up to 20–30 minutes total per day (accumulated). It could be two 10–15 minute walks. If weather or tolerance is an issue, **stationary cycling** (upright or recumbent bike) for 15 minutes is a good alternative. Some patients start using the **elliptical trainer** by week 3–4 if back pain is improved, as it's low impact (ensure you maintain an upright posture on it) [83] [84]. The goal is to gradually build endurance without triggering leg pain. Monitor that walking distance or speed increases week by week with *decreasing* discomfort – by now you should be able to walk a bit farther or faster than in week 1.

Assessment at Week 3's end: You should feel your **core and hips getting active** (mild muscle soreness in abs or glutes is normal as they wake up). Low back pain should be less intense and more localized (perhaps an ache in the center of low back, with less frequent sharp pain). The leg tingling may now be intermittent – e.g. only when sitting too long or at end of day, rather than constant. Nerve symptoms often "lag" behind pain improvement but should be gradually reducing [85] [86]. You likely can sit ~15–20 minutes with a neutral spine before needing a break [87] [88]. If you meet these milestones, you're progressing well. Continue all previous exercises daily or every other day, as consistency is key.

Week 4: Building Strength and Stability (Late Subacute)

At one month, the disc's acute injury has started to heal internally, and most patients see **notable symptom improvements by 4–6 weeks** [37] [2]. In week 4, focus shifts to **strengthening the support muscles of the spine and hips more aggressively**, while still being cautious with the healing disc. This is the transition toward **Phase II (early strengthening)** of rehab [89] [90].

- **Lumbar Stability & Balance:** Begin more challenging versions of earlier exercises. If you've mastered dead bugs on the floor, you can increase difficulty by using a **foam roller** or unstable

surface. For example, **supine on a half foam roller** (lengthwise along your spine) doing gentle marches or arm movements forces your core to work harder to stabilize [70] [71]. Another tool: try holding a light **medicine ball** or weight (2–5 kg) during bridges or dead bugs to increase the load (only if form is perfect). Additionally, practice simple **balance exercises** like standing on one foot for 20–30 seconds (hold onto support as needed). Better balance reduces falls and engages core reflexes.

- **Advance Bird-Dog to Quadruped:** If modified bird-dogs were easy, now progress to the standard **quadruped bird-dog** on hands and knees. From all-fours position (hands under shoulders, knees under hips), brace your abs. Slowly **extend your left leg straight back** while keeping hips level, and at the same time **extend your right arm forward** [91] [92]. Hold 5 seconds, then return and switch (right leg + left arm) [93] [94]. Do 10 reps per side. Focus on not arching your back; the only movement is at the hip and shoulder. If balancing is hard, just move one limb at a time (leg only or arm only) until you build control. Bird-dog strengthens the multifidus and gluteal muscles and improves coordination [91] [92]. It's a **proven rehab exercise for lumbar stability**. Aim to do this **daily**, as endurance is key – you might do 2 sets of 10 each morning. As you progress, increase the hold time toward 10 seconds per rep for more endurance.

The bird-dog exercise (shown in full quadruped position) strengthens the low back and hips. Keep your spine neutral as you lift the opposite arm and leg, improving core stability and hip strength [91] [93].

- **Partial Squats and Leg Work:** It's important to re-train functional movements like squatting **with proper form** (neutral spine). In week 4, start with **wall-supported partial squats**: Stand with your back against a wall, feet shoulder-width forward. Gently slide down a few inches as if sitting (only to about 45° knee bend) then stand back up. Keep your low back lightly touching the wall (neutral). Do 2 sets of 10. This builds quad and glute strength while keeping spine supported. If wall squats are easy and pain-free, you can try **free-standing squats**: use a chair behind you as a target, squat as if sitting down (don't let knees pass toes), and keep your back flat by hinging at hips. In this initial week, go down only to a comfortable depth (maybe halfway to chair) and stand up, 10–15 reps. Over time you'll go deeper as tolerated. Squats will strengthen your legs and unload your spine during daily activities [95]. Always **brace your core** during squats to protect the disc. Avoid any tendency to bend forward excessively – the movement should come from hip and knee bending (the mantra is "hip hinge" to spare the spine) [96] [97].

- **Hip Extension Strength:** Add exercises that specifically target hip extensors (glute max and hamstrings) aside from bridging. A good one is **"Good Mornings" with light resistance** (essentially a hip hinge movement). Stand with feet hip-width. Place a resistance band under your feet and hold the ends at shoulder level, or hold a light dumbbell at your chest (5–10 lbs). With a slight bend in knees and a very straight back, hinge forward at the hips (like a bow), pushing your buttocks back, until you feel a stretch in hamstrings, then contract glutes to stand tall. Only hinge to about 30° forward initially. Do 2 sets of 10. This exercise trains the **hip-hinge pattern** critical for safe lifting and engages glutes/hamstrings without heavy load [96] [97]. Keep weight light and focus on form—imagine your spine is a plank moving as one unit. Stop if it causes any nerve pain; it should actually feel like a gentle stretch and strengthening in the posterior chain.

- **Stretching & Nerve Glides:** Maintain your daily **stretching routine** (hamstrings, piriformis, hip flexors). You may deepen the stretches slightly now (hold 30 seconds if it feels good, and do 3–4 rounds) as flexibility improves. For nerve flossing, you can progress the **lying sciatic floss** by using a strap: Lie on back, loop a towel or strap around your foot. Straighten the knee to raise the leg until you feel tension, then **gently pump your ankle** back and forth (toes toward head, then away) for 10–15 pumps [98] [99]. This combines hamstring stretch with nerve gliding. Do 2 sets per side. By now, you might notice significantly **less tingling** during these glides compared to week 1, a sign the nerve compression is easing.

- **Cardio:** At week 4, **increase aerobic exercise intensity slightly** if pain allows. You can walk longer or at a quicker pace. If you have access, **swimming or water therapy** is excellent now – you could swim gentle laps or do pool exercises (water's buoyancy reduces spine load). Aim for 30 minutes of light cardio most days. Listen to your leg: a bit of soreness after is okay, but **persistent increase in leg tingling or pain means back off**.

Milestones by end of Week 4: Most individuals have **marked reduction in leg pain** by 4–6 weeks [37] [2]. Ideally, your left leg tingling is greatly diminished (maybe only occasional numbness in toes) and glute soreness is minimal now. Your **core strength** is improving – you can do daily activities (getting out of bed, dressing, light housework) with much less pain than during the flare-up. You should be able to sit for **20+ minutes** with little or no leg symptoms if you maintain good posture [87] [100]. Flexion (bending) range may still be limited (don't worry – full forward bending isn't urgent to regain yet, and many protocols intentionally limit flexion in the first 6 weeks [12]). The key point: **pain is more localized and manageable**, and function is returning. If that's the case, you're ready to progress to more intensive strengthening in the coming weeks.

(If your progress is slower and you still have significant leg pain at week 4, don't be discouraged – some herniations take longer. Continue the current phase until symptoms abate. It's more important to not rush the healing disc. Consider consulting your physician about an epidural steroid injection around 6 weeks if severe sciatica persists [101] [102].)

Week 5–6: Transition to Early Strengthening Phase

Weeks 5–6 mark the shift into **early strengthening** (Phase II of rehab typically begins ~6 weeks post-injury) [89]. The disc's outer tear is usually healed enough that you can **tolerate more load** without re-injury [4] [1], and the focus turns to rebuilding endurance and strength in the back and leg muscles.

Goals for weeks 5–6: further increase core and hip strength, introduce more dynamic exercises (with caution), and prepare for a return to fuller daily activities (like light lifting, longer sitting).

- **Core Endurance:** Continue to progress core exercises like **planks**. Around week 5, you can try a modified **forearm plank**: support on your forearms and knees (instead of toes) initially. Keep your body in a straight line from head to knees, abs braced. Hold this for **20–30 seconds**, rest, repeat 3 times. If that's easy and no back pain, attempt a full plank on toes by week 6. The target by end of Phase II (week 12) is to hold a front plank ~40 seconds [100] [103], so build up gradually (add a few seconds each session). Also practice **side planks** (on your side forearm and knees) to strengthen lateral core muscles; hold 15–20 seconds per side. Planks are excellent for **spinal stability** but be mindful of form – a sagging lower back means stop and reset.

- **Hip and Leg Strength:** Now that basic squats and bridges are comfortable, increase their challenge. For **bridges**, try **single-leg bridging**: at the top of a regular bridge, extend one knee so one foot is off the floor, hold 2 seconds, place it back, then lower. Alternate legs for 5 each side. This greatly increases glute demand. For **squats**, if bodyweight is easy, start adding light weights. For example, hold a pair of dumbbells (5–10 lbs each) or a single kettlebell at your chest while squatting. Ensure absolutely perfect form with neutral spine and **no butt wink** (tucking under at bottom). You might also incorporate **lunges** now: static lunges or split squats (one foot forward, one back, dip down) for 8–10 reps each side. Lunges strengthen quads, glutes, and improve balance – keep your torso upright and do shallow depth at first. All these will help you resume functional tasks like climbing stairs and picking objects up (with proper bending at knees/hips).

- **Posterior Chain & Lifting Mechanics:** By week 6, **Romanian deadlifts (RDLs)** with light weight can be introduced to specifically train safe bending/lifting mechanics. Using a light barbell or two dumbbells held in front of thighs (maybe ~10–20 lbs to start), perform the hip-hinge motion: slight knee bend, slide weights down your thighs by hinging hips back, keep back straight, then engage glutes to stand up. Only go to mid-shin. Do 2 sets of 10. This strengthens hamstrings, glutes, and back **in unison** and is directly relevant to lifting objects safely [104] [105]. Use a mirror to ensure your low back stays neutral (neither rounding nor over-arching). **Tip:** imagine you have a slight arch (lordosis) in your low back throughout – if you can maintain that, your disc is protected.

- **Upper Body Strength (Supported):** Don't neglect upper body. Around week 5, you can begin **gentle upper body resistance training** as long as your low back is supported. Good choices: **seated or supported rows** (with a band or cable) to strengthen mid-back muscles – keep your spine neutral against the back of a chair while pulling. Also **wall push-ups** or light bench press (keep feet on floor, lumbar neutral on bench). Avoid any heavy overhead lifting just yet unless guided (overhead work compresses the spine). However, **scapular strengthening** (rows, face pulls) will improve posture and help the overall rehab.

- **Stretching & Mobility:** At this point, you might achieve about **75% of full lumbar motion** without pain [88] [100]. Continue daily stretches. You can add a **thoracic rotation stretch** to keep upper spine mobile (e.g. on hands/knees, thread one arm under the other to rotate trunk, gently). Maintaining flexibility above and below (thoracic spine, hips) will reduce strain on L4–L5.

- **Neural Desensitization:** If any residual tingling in the foot remains, continue nerve glides. By week 6, many find the tingling is minimal or only after strenuous activity [60]. You can do a quick flossing routine daily (5 reps of seated or lying floss each) just to keep the nerve moving freely. Additionally, use **massage or foam rolling** on the gluteal region if you have piriformis tightness

pressing on the nerve – gentle self-massage with a tennis ball on the buttock can release tension (stop if it triggers nerve pain).

- **Aerobic exercise:** You should be increasing stamina. By week 6, aim for **30 minutes of continuous low-impact cardio** (fast walk, cycling, elliptical) at least 3 times a week in addition to lighter daily activity. If you plan to eventually return to running or impact sports, this cardiovascular base will help. Some patients start **aqua-jogging or light water aerobics** now – a great way to introduce impact-like movement without gravity's full force.

Clinical Checkpoint (Week 6): By the 6-week mark, we expect that you can **sit ~20 minutes with little leg symptom** [87] [106], **walk longer distances** (a mile or more) with at most mild discomfort, and perform basic home exercises (bridges, bird-dogs, dead bugs, etc.) with controlled pain. **Neurologic status** should be improved – any initial weakness or numbness in the leg is better (e.g. your toe or ankle strength feels normal). If a formal test is done, you'd likely be able to raise your leg ~75% of normal range before any sciatic tightness (straight leg raise test) [107] [108]. All these indicate the nerve root compression is resolving. Now you are entering the **strengthening and conditioning phase** more fully.

Week 7–8: Strengthening Phase – Increasing Load and Complexity

Weeks 7–8 continue the **early strengthening phase**, with an emphasis on gradually returning to more normal activities and building resilience. At this point, the herniation is often in a **stable phase** – pain is much less, and you're unlikely to re-herniate as long as you use good form (the disc's inner layer is scarring over around 8 weeks) [4] [109]. **Goals for week 7–8:** improve muscular endurance, start functional training (lift, carry, push/pull), and prepare for moderate-impact activities.

- **Core & Trunk Strength:** You should now work on **functional core strength** – not just isolated exercises, but combined movements. One excellent exercise is the **farmers carry**: hold a moderately heavy weight (e.g. 15–20 lbs to start) in one hand at your side (like a suitcase) and walk 30–50 feet while keeping your torso upright (don't lean sideways) [110] [111]. This works your **quadratus lumborum and obliques** (side core muscles) and simulates carrying groceries. Do it on each side for 2–3 rounds. Another is the **anti-rotation press (Pallof press)** using a resistance band: stand perpendicular to a band attachment, hold band in both hands at your chest, and press straight forward, resisting the band's pull to rotate you. Hold 2 seconds and return, 10 reps each side. These "anti-rotation" drills build a stable core that can withstand asymmetrical loads [104] [112] – important for daily life and sports. Continue planks and side planks, aiming for longer holds (try to reach that 40-second front plank by end of week 8) [100].

- **Advanced Glute Work:** In addition to bridging and squats, add targeted **hip extensor and abductor strengthening**. **Hip Thrusts:** similar to bridges but with upper back on a bench and adding weight on your pelvis (if available). If not, continue single-leg bridges which are plenty challenging. **Lateral walks with band:** Place a loop band around your thighs or ankles, get into a half-squat, and step sideways 10 steps, then back. This burns the glute medius and improves hip stability. Strong hips protect your back when you pivot or step on uneven surfaces.

- **Introduce Mild Impact (Optional):** By the end of week 8, if you have **no more radicular pain** (no leg pain) and minimal back pain, you might try a **few seconds of light impact** to test tolerance – *only if cleared by your therapist/doctor*. For instance, gentle **skipping in place** or a few hops. Alternatively, try a **very light jog** for 100–200 meters on a soft surface. The disc has healed

substantially by 8–12 weeks such that mild impact shouldn't re-injure it [1] [113], but you must see how your body reacts. Start extremely small (literally 10 seconds of jogging). If that causes no increase in symptoms over 24 hours, you can gradually incorporate more in coming weeks. If you're not comfortable with this yet, it's fine to postpone until week 12; there's no rush for impact if your goals don't require it immediately.

- **Daily Activity Simulation:** Practice **functional movements** you need in daily life. Example: **lifting** – simulate picking up a box from the floor with perfect form (squat down, neutral spine, engage core, lift with legs). Use an empty box first, then load a bit of weight (~10–20 lbs) and practice. Do 5 reps, focusing on technique. Also practice **getting into low positions**: kneel on one knee and stand up (half-kneel to stand, which uses glutes). These will build confidence that you can move without hurting your back. You might also do a **gentle stair-climbing exercise** (if you have stairs, go up and down a flight slowly, which is good eccentric work for quads and engages back stabilizers).

- **Upper Body Work:** Increase upper body training now, being mindful of spine. You could add **seated lat pulldowns** (light weight) to strengthen lats (helps with lifting form) [112] [114], and **standing dumbbell overhead press** with very light weights (5–8 lbs) to begin shoulder strengthening – when doing overhead press, maintain a tight core and do not lean back; if it hurts, do it seated with back support and wait a bit longer for standing version. The MGH protocol suggests integrating standing overhead press and pull-downs by 12+ weeks, but you can start lightly in week 8 if stable [104]. The key is **no back pain during these** – if any discomfort, reduce weight or wait a couple weeks.

- **Aerobic & Conditioning:** By week 8, you ideally are pretty active. If not jogging, you might extend walks to 30–45 minutes. Try incorporating **incline walking** (hills or treadmill incline) for more strength, or a bit faster pace. If using an elliptical, increase the resistance or incline to build leg strength. Variety is good – bike one day, walk the next, swim another. The goal is to have **improved cardiovascular endurance** without back pain, as this correlates with better disc nutrition and healing [115] [116].

Symptoms Check: At 8 weeks, **most herniated disc sufferers have major relief** – often little to no leg pain [37] [117]. Your left leg tingling might only occur after very strenuous activity, if at all. Any residual numbness in toes might linger (nerve sensation can take longer to fully normalize, sometimes several months [57]), but it should be improving. Low back might still get achy after a long day or new exercise, which is normal – use occasional ice or TENS if needed for those post-exercise aches (e.g. after a heavier workout, a 15-min TENS high-frequency session can ease reactive soreness). You should feel **stronger and more confident** in movements that used to hurt. Importantly, your spine's support muscles are much more conditioned now. If everything looks good, you are ready for **Phase III – advanced strengthening** in the final two months of this plan [118] [119].

Weeks 9–12: Advanced Strengthening and Functional Restoration

Phase III (12–16 weeks) typically is the advanced strengthening phase [120] [121], but we'll begin elements of it in weeks 9–12. By this period, you are largely pain-free in daily life, and the focus is on **regaining full strength, preventing re-injury, and returning to higher-level activities or sports**. The

disc is mostly healed by 12 weeks (the nucleus has been reabsorbed and the annular fissure has scarred) [122] [1], so you can carefully resume impact and heavier loads with proper form.

- **Heavy Resistance Training:** If you have access to a gym or equipment, weeks 9–12 is when you introduce more **significant resistance**. Key lifts like **squats, deadlifts, lunges, overhead press, rows** can be progressed to moderate weights, always prioritizing form over load. For instance, by week 12 you might perform a barbell back squat or front squat at a weight that is challenging for 10 reps (maybe just the barbell at first ~20 kg, adding weight gradually) [104] [123]. Keep the squat depth to where you can maintain a neutral lumbar curve. Similarly, for **deadlifts**, you might progress from Romanian (stiff leg) to conventional style (bending knees more, picking bar from floor) if comfortable – but start with light loads (even just 20–30 kg) until technique is solid. **Tip:** use mirrors or have a trainer/PT check your form on these complex lifts. The objective is to **rebuild strength in the posterior chain** so you can lift objects safely outside the gym. Perform strength training **3 times per week** (non-consecutive days), with 48 hours rest for muscle recovery as you increase intensity.

- **Plyometrics and Agility (Week 12+):** Toward the end of this phase (around week 12 or later), incorporate some **light plyometric or agility drills** if you intend to return to sports or running. This could include exercises like gentle **jump squats** (quarter squat then a small hop, land softly) or **skater hops** side to side to engage lateral hip power. Start with very small jumps and focus on soft, balanced landings – your knees and hips should absorb impact, not your spine. Only do a few reps (5–10) initially to gauge tolerance. **Proprioceptive training** can also be added: e.g. **standing on unstable surfaces** (balance board or cushion) to challenge your balance and reflexes [124] [125]. This trains your body to react to perturbations, reducing injury risk. By practicing controlled dynamic moves now, you prepare your spine for unexpected real-life forces.

- **Return to Running:** If you are a runner or your goal is to jog, and you haven't already started, week 12 is a common time to begin a **return-to-run program** [126]. Start with a walk/jog interval: for example, 1 minute jog, 3 minutes walk, repeat 5 times. Do this on a flat, forgiving surface (track or treadmill). Every other day is plenty at first. Over weeks 12–16 you can gradually increase the jogging time if no setbacks. Watch for any recurrence of leg pain – a little muscle soreness is fine, but nerve pain means scale back.

- **Sports or Recreational Activities:** By week 12, you can often resume **lighter sports practices** (e.g. swinging a golf club or tennis racket gently, easy cycling tours, etc.), with your therapist's okay. Continue to avoid extreme spinal twisting or heavy contact sports until cleared (often after 16+ weeks for those). But you can certainly do things like **yoga** or **Pilates** with modifications – many yoga poses will actually complement your strengthening (just be mindful of forward folds; emphasize planks, bridges, cobra pose, etc., which you're already doing). Pilates can be great for core if you have guidance. The key is to integrate your improved strength into real movements.

- **Maintain Stretching Routine:** Even as strength is main focus, keep up flexibility work to prevent any tightness. By now you might be able to do more **advanced stretches** – e.g. a proper **pigeon pose** for piriformis (if comfortable, since it's a deeper stretch of the glute) or full **standing hamstring stretches**. Ensuring your hamstrings and hip flexors remain flexible will help maintain a healthy posture as you ramp up activity.

- **Ergonomics & Body Mechanics:** At this stage, make sure you've incorporated all the **good habits** into daily life: e.g., you always **hip-hinge when bending** (no stooping), you lift things with bent knees and braced core, you avoid sitting on a soft couch for hours (choose supportive chairs or use a lumbar cushion), and you frequently stretch/move during prolonged tasks. These

habits will **prevent re-injury**. The fact that you have no pain now doesn't mean you should return to old bad habits – keep using proper mechanics conscientiously, especially under load [96] [97].

Psychological Readiness: By 3 months, many patients feel **confident and normal** again, though some have a lingering fear of re-injury. It's important to trust the process – your disc has healed significantly (often the herniation has shrunk on its own as shown in studies) [127] [128]. As long as you apply what you've learned (strong core, good posture, gradual progression), you can safely get back to **100% of your activities**. If anxiety remains, discuss with your PT – sometimes doing a supervised session of heavy lifting or agility drills can prove to you that you're ready and resilient.

Weeks 13–16: Return to Full Activity (Phase III/IV – Optimization)

The final month (weeks 13–16) is about **returning to full function and even exceeding your pre-injury fitness**, if that's your goal. By week 16, you should be **functionally 100%** in terms of daily life and well on your way in sports/work capacities. The rehab now transitions to **maintenance and optimization**.

- **Maximize Strength & Endurance:** Continue progressive overload in your strength training. By week 16, ideally you can do challenging core exercises like: hold a **side plank 40+ seconds** each side [100] [103], do a **front plank for 60+ seconds**, perform 15+ bird-dog alternations with perfect control, and perhaps even do more advanced moves (e.g. **exercise ball rollouts, plank with arm/leg lift**, etc. for dynamic stability). In weightlifting terms, by week 16 you might be squatting and deadlifting loads that are near your body weight (if you were trained before – if not, just focus on solid form and moderate weight). The idea is your **trunk and hips are strong enough to protect your spine during high loads**.

- **Sport-Specific Drills:** If you have a specific sport or work demand, incorporate tailored exercises now. For example, if you play basketball, add drills like defensive shuffles, gentle jumps, and increase sprinting. If you do manual labor, practice lifting odd objects, carrying them over distance, and simulate motions like shoveling (again, using legs and core). The body adapts specifically to stresses you put on it (specificity principle), so mimic your goals in controlled practice. Wear any protective bracing if advised (though by now lumbar bracing is usually discontinued to allow your muscles to do the work) [129] [130].

- **Conditioning:** Achieve full cardiovascular fitness by varying intensity. You could incorporate some **interval training** (e.g. short bursts of higher intensity if running or cycling) to build resilience. Ensure at least **150 minutes of moderate aerobic exercise per week** (standard health guideline), which you likely exceed if you're active daily. This not only helps recovery but also disc health long-term (discs get nutrition through movement).

- **TENS & Modalities:** By week 16, you shouldn't need TENS regularly for pain, but it can still be useful for any minor aches after heavy workouts. Also, at this point, consider transitioning from rehab mode to **prehab/maintenance mode** – that is, keep a habit of doing core exercises and stretches a few times a week even when fully recovered. Many patients integrate their favorite rehab moves (like planks, bird-dogs, bridges) into their ongoing fitness routine to maintain a healthy back and prevent recurrence [131] [132].

- **Monitor for any Red Flags:** Although rare at this stage, be mindful of any **red flag symptoms**: e.g. a sudden return of severe leg pain, new numbness, or any bowel/bladder changes – seek

medical attention if those occur [5]. With disc healing, a mild flare-up occasionally can happen if you overdo it, but it should be temporary and respond to rest or dialed-back activity. If you ever feel a similar intense pain as the initial injury, back off and consult your provider to ensure there's no re-herniation. However, given your adherence to this plan, the odds are in your favor – **most patients are symptom-free by 3–4 months** and by maintaining strength, they avoid future episodes [8] [133].

- **Lifestyle Factors:** Now that you're essentially recovered, remember general health factors influence your back. Keep an eye on body weight (extra weight adds strain to the spine) [134] [135], practice good nutrition (for tissue healing and to minimize inflammation), and avoid smoking (smoking impairs disc health). These will all help ensure your 100% recovery is lasting.

Final Outcomes (Week 16): At four months, you should confidently say you have **your life back**. You can sit, stand, bend, lift, exercise, and participate in hobbies *without limitations*. Any residual issues should be very minor (perhaps occasional stiffness after a tough workout, etc.). Neurologically, the tingling in your left leg and toe should be gone or only very rarely noticeable [60] [86]. Muscle strength in the left leg should be equal to the right. You likely feel even **stronger in your core and glutes than before the injury**, because of all the targeted training. This strength is your best defense against re-injury – research shows a strong core and good endurance in spinal muscles correlate with lower back pain recurrence rates [136] [137].

Continue to **stay active and listen to your body**. If you ever feel the twinges of back pain returning, revisit the basics (core engagement, flexibility, use your TENS on a flare-up day, etc.). But if you follow best practices and maintain what you've built these 16 weeks, you will enjoy a full, pain-free return to all your activities with a healthier spine than ever. **Congratulations** on your dedication to rehabbing your L4–L5 disc – with this comprehensive, week-by-week approach grounded in best practices, you've given yourself the best chance at a complete 100% recovery [131] [138]!

Sources:

1. Massachusetts General Brigham Sports Medicine – *Lumbar Disc Herniation Rehab Guidelines* [139] [35].
2. Buffalo Rehab Group – *Lumbar Disc Herniation Recovery Time and Healing* [3] [122].
3. Performance Pain (Dr. M. Saeed) – *Herniated Disc Healing Signs and Timeline* [37] [57].
4. Spine-health – *McKenzie Back Exercises for Disc Herniation (extension/flexion)* [46] [49].
5. MoreGoodDays Rehab – *Best Exercises for L4–L5 Disc Bulge Relief* [28] [74].
6. BodSupport – *TENS Unit for Sciatica (Pad Placement & Settings)* [20] [22].
7. Kent NHS Foundation Trust – *TENS Guidelines (Pain Gate vs Endorphin Settings)* [18].
8. Goodman Campbell Spine – *Sciatic Nerve Flossing Techniques* [33] [98].
9. Spine-health – *SI Joint Exercise Examples (Bridge, Bird-dog, etc.)* [72] [91].
10. Spine MD (Dr. Lanman) – *Herniated Disc Recovery FAQ* [2] [117].

---

[1] [3] [4] [10] [11] [13] [113] [122] [131] [132] The Recovery Time for a Lumbar Disc Herniation - Buffalo Rehab Group
https://buffalorehab.com/blog/the-recovery-time-for-a-lumbar-disc-herniation/

[2] [6] [86] [117] [127] [128] Signs a Herniated Disc is Healing: Timeline & Recovery - Spine MD
https://www.spine.md/insights/signs-herniated-disc-is-healing

5 37 57 58 59 60 85 109 Herniated Disc Healing Stages and Timeline - Performance Pain and Sports Medicine
https://www.performancepain.com/blog/herniated-disc-healing-stages-and-timeline/

7 12 14 15 24 35 36 39 40 52 56 63 64 70 71 80 81 82 83 84 87 88 89 90 96 97 100 101 102 103 104 105 106 107 108 110 111 112 114 115 116 118 119 120 121 123 124 125 126 129 130 139 massgeneral.org
https://www.massgeneral.org/assets/MGH/pdf/orthopaedics/sports-medicine/physical-therapy/rehabilitation-protocol-conservative-management-of-lumbar-spine-disc-displacement.pdf

8 9 25 26 133 4 Exercises For Herniated Discs (and 8 Exercises Not to Do)
https://axionspine.com/4-exercises-for-herniated-discs-and-8-exercises-not-to-do/

16 17 19 20 22 23 The Best TENS Unit Placement for Sciatica Pain Relief – BodSupport
https://bodsupport.com/blogs/news/the-best-tens-unit-placement-for-sciatica-pain-relief?srsltid=AfmBOoqqgVRZZse21rL9mEMdl2RobT2idme25w2tCHuOYOGXgpegkyVm

18 21 38 TENS in chronic pain | Kent Community Health NHS Foundation Trust
https://www.kentcht.nhs.uk/leaflet/transcutaneous-electrical-nerve-stimulation-tens-2/

27 53 Prone Press-Up to Help with Lumbar Disc Herniations
https://regenerativespineandjoint.com/2024/10/24/why-the-prone-press-up-exercise-is-helpful-for-lumbar-disc-herniations/

28 61 74 134 135 138 5 Best Exercises for Herniated Disc Back Pain Relief
https://www.moregooddays.com/post/exercises-for-herniated-disc

29 Sciatic Nerve Flossing — Rehab Hero
https://www.rehabhero.ca/exercise/sciatic-nerve-flossing

30 31 32 33 34 54 98 99 Sciatic Nerve Flossing - Goodman Campbell
https://www.goodmancampbell.com/2025/12/sciatic-nerve-flossing/

41 42 Herniated disk: 6 safe exercises and what to avoid
https://www.medicalnewstoday.com/articles/324311

43 44 45 136 137 Piriformis Muscle Stretch and Physical Therapy
https://www.spine-health.com/conditions/sciatica/piriformis-muscle-stretch-and-physical-therapy

46 47 48 49 50 51 62 7 McKenzie Method Exercises for Back Pain and Sciatica
https://www.spine-health.com/wellness/exercise/7-mckenzie-method-exercises-back-pain-and-sciatica

55 6 Best Nerve Flossing Exercises for Pain Relief
https://www.hingehealth.com/resources/articles/nerve-flossing/

65 66 67 68 69 How to Do the Dead Bug Exercise: Tips and Variations
https://www.hingehealth.com/resources/articles/deadbug/

72 73 75 91 92 93 94 95 Strengthening Exercises for Sacroiliac Joint Pain Relief
https://www.spine-health.com/wellness/exercise/strengthening-exercises-sacroiliac-joint-pain-relief

76 77 78 79 Bridge Exercise | Low Back Pain | Muscle | Florida - BioSpine
https://www.biospine.com/bridge-exercise/