

SCIENTIFIC

PHYSICAL THERAPY

Patient with sharp pain in right buttock when sitting for longer than 5 minutes.

CASE STUDY

By Matt Hatscher P.T.

HISTORY:

The patient is a 25 y.o. female who is currently working as a consultant and spends all of her work hours (40/week sometimes more) sitting in a chair in front of a computer. She began noticing a sharp pain in her R buttock after driving cross country last summer. She figured the pain would go away but it persisted until November 2003 when she finally went to the doctor. The pain goes away with movement or walking and is most noticeable when sitting. L.T. does not recall any trauma and states the symptoms were a gradual onset. Outside of work she is an extremely active individual spending most of her time whitewater kayaking, snowboarding, and hiking. Currently, she is not taking any medications (ibuprofen as needed). No imaging performed.

SYSTEMS REVIEW

Structural inspection: Slight recurvatum in B knees

No significant findings pertaining to cardiopulmonary, integumentary, or mental status.

TESTS AND MEASURES

AROM on 11/6/03: Lumbar

Flexion: Mild limitation with pain (No limitation but pain on 2/11/04)

All other planes WNL

Sacrum: Mild limitation and pain with flexion

Hip WNL

In this issue:

Patient with sharp pain in right buttock when sitting for longer than 5 minutes and Patient with pulsating pain in the lower back with burning pain going down the back of the left leg.

By Matt Hatscher P.T.

Systemic Inflammation measured with highly sensitive C-reactive protein in response to lumbar disk herniation

By Didrik Soplér, Ph.D., L.Ac.

TESTS AND MEASURES

PROM: Lumbar and sacrum WNL in all planes

Resisted tests: Lumbar planes all WNL

On 11/6/03 B hamstrings 4/5 and on 2/11/04 3+/5

Palpation: Tenderness and guarding in R piriformis and gluteals

Neurology: Myotomes: WNL (except hamstring weakness noted above)

Dermatomes: WNL

DTR's: WNL

(-) skin rolling test B along spine

Special tests: All compression tests (-)

SLR (-) hamstring tightness

Slump test (+) for dural tension

Supine to sit test (+) for posterior rotation of R ilium (shorter in supine)

Shearing (-) on 11/6/03

Shearing (+) on 2/11/04 at L4-5 and L5-S1

Gaenslen's (-)

SI ligamentous tests (-)

Forward bending test (-)

Leg measurements 97 cm B

Reduced recruitment of TrA

Joint mobility: 4/6 at L4-L5 and L5-S1 in B rotation, 2/6 at L3-L4 in B rotation and FB

2/6 posterior rotation of L ilium

EVALUATION AND DIAGNOSIS

Medical diagnosis:

SI joint pain and mechanical dysfunction PT diagnosis: L4-L5 and L5-S1 disc protrusion resulting in impaired nerve function (motor) and guarding of piriformis and gluteals.

LITERATURE REVIEW

Levangie, "Physical Therapy", 1999

Purpose was to assess the association between innominate torsion and Gillet, standing forward flexion, sitting forward flexion, and supine to sit tests in 150 subjects. The data did not support the value of the tests in identifying innominate torsion, but are useful for identifying SI hypomobility.

Levangie, "Spine," 1999.

Evaluated the premise that asymmetrical positioning of the innominates of the pelvis is a source of low back pain. Pelvic landmark data was obtained in 144 cases of low back pain and 138 controls. Pelvic asymmetry was not associated with low back pain in any way that seemed clinically meaningful.

Richardson, et al 2002

Two abdominal muscle patterns were tested in 13 healthy individuals: contraction of the TrA and contraction of the lateral abdominal muscles. Their effects were compared in relation to SI joint laxity. They found contraction of the TrA decreased SI joint laxity to a much greater degree than bracing of the lateral abdominal muscles.

LITERATURE REVIEW

Sasso, et al 2001

69 patients with SI dysfunction were prospectively evaluated and treated with a structured physical therapy program. Follow up 2 years later showed 95% rated their results as good or excellent while 5% were fair or poor.

RECOMMENDATIONS

(as of 2/11/04)

Initial treatment has begun with STM to the R piriformis and gluteal to reduce guarding using passive and active pump. Additional manual treatment includes L3-L4 rotation joint mobs for plastic deformity and pain inhibition. Clinical exercise was initiated with side lying cranial lumbar rotation at 3x25 at 4 kg to promote coordination and endurance of the multifidi. Hips are flexed to lock lower lumbar hypermobilities. Prone hip extension (3x10) and A37 (3x10) for improved recruitment, coordination, and stability using TrA. Quadruped lumbar rotation (3x10) for improved coordination of multifidi. Prone R hip ER at 2 x40 at 1 kg for improved vascularity to piriformis. Home exercise program includes 1) lower trunk rotations for optimal stimuli to the disc, coordination, and vascularity 2) nerve flossing to improve neural tension. Expect to have reduction in guarding with improved recruitment and coordination in 2 weeks.

T R E A T M E N T INTERVENTIONS AND PROGRESSIONS

Stage 1 (Weeks 1-3): STM and joint mobilizations with exercises as stated above. Initiate sit ups for abdominal strengthening. Primary goal is to improve endurance and coordination in pertinent muscles (multifidi, TrA, erector spinae, gluts). Also providing compression/decompression with modified tension in the line of stress to the disc.

Stage 2 (Weeks 3-5): Continue manual treatment as necessary. Progress to standing rotational exercises at 3x25 at 60% then to 3x15 at 85% for strength training. Continue to progress hip strengthening with lunges and steps. Progress abdominal strengthening as tolerated with 3x15 on slant board. Also begin to initiate diagonal patterns with pulleys at 3x25 at 60% for coordination.

Stage 3 (Weeks 5-7): Progress pulley diagonals to 3x15 at 85% for strength training. Also, may add quick reversal for eccentric training. Continue closed chain activity for LE strengthening. Progress abdominal training.

DISCUSSION/CONCLUSION

Pt has responded well to recent adjustment in treatment approach. While treating the SI for the previous 2 months (anterior rotation mobs for R ilium, squats, lunges on R, etc.) the pt did improve but was unable to return to her previous level of function.

About 3 weeks ago she began working 60+ hrs/week and symptoms were exacerbated. After rechecking the lumbar spine, possible disc pathology was noted leading to the change in treatment.

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Systemic inflammation measured with highly sensitive C-reactive protein in response to lumbar disk herniation.

By

Didrik J. Sople, Ph.D., L.Ac.

Two interesting studies investigated the systemic inflammatory response to lumbar disk injuries. In one of the studies, highly sensitive C-reactive protein (hs-CRP) was measured in 35 patients 23-64 years of age, suffering from sciatica shown by computed tomography to be due to a disk herniation.¹ When hs-CRP levels were compared in age and sex-matched controls, the patients had significantly higher levels than the subjects in the control group. There was also a trend toward higher hs-CRP levels in patient with more severe nerve root symptoms.

The second study also measured hs-CRP in patients with disk herniation.² The 48 patients were young and also showed elevated hs-CRP levels significantly higher than what was found in the control group. No correlation between the hs-CRP concentration and the level and type of herniation, or the pre-operative clinical data, was found. These researchers made another interesting observation however. The patients who had a higher concentration of hs-CRP before surgery showed a poorer recovery after the surgery. The researchers even concluded hs-CRP levels might be a predictor of recovery after surgery. This is useful information because it

means that patients with higher systemic inflammation, verified by higher levels of hs-CRP, do not heal as well. In addition to regular post surgical therapy, one way to ensure that the patients heal better and recover faster is to help them reduce systemic inflammation.

Nonsteroidal anti-inflammatory drugs (NSAID's) are not the solution because they have been shown to interfere with the healing process. A significant reduction in the role of spinal fusion has been found in patients taking NSAID's.³

Nutritional intervention has however shown to be very effective in reducing systemic inflammation and fiber consumption is inversely related to CRP concentration and omega 3 fatty acids have shown to inhibit a variety of inflammatory chemicals.^{4,5,6}

It would be very interesting to know if the patients with higher hs-CRP levels prior to surgery also had elevated hs-CRP levels before the disk herniation took place. Since neither the level or the type of herniation, or the pre-operative clinical data showed any correlation with the hs-CRP levels, a conclusion could be drawn that the reason was that the hs-CRP was already somewhat higher in these patients prior to the injury as

compared to the other patients.

This would of course only be speculative because no studies have specifically looked at that issue yet. If this was the case however, it would mean that systemic inflammation could be a risk factor for back injury.

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Case Report

by
Matt Hatscher, P.T.

Patient's Initials: I.R.

Date of presentation: 5/12/04

Chief Complaint: Pulsating pain in the lower back with burning pain going down the back of the L leg.

HISTORY

I.R. is a 26 y.o. male from Honduras. He began having back problems on 2/20/02 after slipping at work. Originally, he felt pain in his low back and going down his L leg. One year later (2/4/03) he underwent a laminectomy (L5-S1?) after which sx improved a little bit. Since the surgery, he has gone through work conditioning, the pain clinic, and has received 5 cortisone injections. The pain increases with sitting and extended walking (>1 mile) and decreases with icing and lying on his back. He has not worked since 10/31/02 but states one of his goals is to return to work – he is taking English classes and is looking to enter barber school. He is currently taking neurontin and a pain medication.

SYSTEMS REVIEW

Performed by physician. Intake assessment reviewed with patient.

TESTS AND MEASURES

AROM on 10/30/03: Lumbar

Flexion: 30% with pain in lumbar and L leg

Extension: WNL

R SB: 75% with pain down to L ankle

L SB: 80%

R rotation: 75% with pain down L leg

Sacrum and hip WNL

L rotation: 75%

Flex/R rotation: Painful

Flex/L rotation: Painful

Ext/R rotation: WNL

Ext/L rotation: WNL

PROM on 10/30/03: Lumbar

Flexion: 40% with pain in lumbar and L leg

Extension: WNL with end range pain

R SB: 80% with pain at incision

L SB: WNL

R rotation: 80% with pain

L rotation: 80%

Sacrum and hip WNL

Resisted tests: Lumbar planes all WNL but painful in L SB (mid and lengthened) and R rotation (all positions).

Palpation: Significant tenderness and guarding in L lumbar multifidi, Q.L., and piriformis. Sciatic nerve painful to palpation at sciatic notch.

Neurology: Myotomes: R WNL

L: L3 4+/5, L4 5-/5, S2 5-/5

Dermatomes: R WNL

L: L4 and S2 increased to sharp and dull

DTR's: WNL

TESTS AND MEASURES

Special tests: Compression test in flexion (+)

SLR (+)

Slump test (+)

Cram's (+)

SI ligamentous tests (-)

Joint mobility: Unknown

Segmental play: Shearing (+) at L3/4, L4/5, L5/S1

EVALUATION AND DIAGNOSIS

Medical diagnosis: L L5-S1 disc protrusion/ s/p surgery with L leg radicular sx

PT diagnosis: L3-S1 discogenic pain with increased dural tension

LITERATURE REVIEW

Lew, et al., 1997

Purpose was to determine whether changing the cervical position during slump altered posterior thigh pain and/or the tension in the hamstring muscle. Average over the group was 40% decrease in posterior thigh pain with cervical extension. There were no significant differences in hamstring EMG readings during cervical movements indicating 1) cervical movement did not change hamstring tension and 2) the change in experimentally induced pain during cervical flexion was not due to changes in the hamstring muscle.

George SZ, 2002

Purpose was to describe the criteria used to determine if patients were to receive slump stretch treatment within a treatment based classification system and to describe selected symptom characteristics associated with these patients. Out of 88 patients with low back diagnoses, 6 met the inclusion criteria for treatment with slump stretching. At discharge, 5 of the 6 had symptoms that were more proximally located and all patients reported a decrease in intensity.

Turl, et al., 1998

The authors investigated the correlation between repetitive hamstring strain and neural tension. 14 males with a history of grade 1 repetitive hamstring strain were compared to an injury-free group. Neural tension was assessed using the slump test. Results showed 57% of the test group had a positive slump, indicating adverse neural tension. None of the control group had a positive slump test. There were no differences in flexibility. Results suggest that adverse neural tension may result from or be a contribution factor in the etiology of repetitive hamstring strain.

RECOMMENDATIONS

Initial treatment has begun with STM to the L lumbar multifidi, Q.L., and piriformis to reduce guarding using passive and active pump. Additional manual treatment includes L3/4, L4/5, and L5/S1 distraction oscillations for pain inhibition. R rotation in R SB with flexion was attempted to open the L foramen at L3/4 but I.R. was unable to tolerate secondary to pain in leg. Clinical exercise was initiated with 1) NWB lumbar rotation to provide the optimal stimulus to the disc and with 2) neural glides to mobilize the nerve.

TREATMENT INTERVENTIONS AND PROGRESSIONS

Stage 1: STM and joint mobilizations as stated above. Exercises including LTR with hips at 90 degrees to the R 3x25 at 60% to provide optimal stimulus to the disc in a NWB position progressing to both directions. Vigor Gym squats 3x25 for LE endurance and to improve neural mobility. Caudal SB to the L on the wall then progressing to both directions for abdominal endurance and again to improve neural mobility. Bike x 8 min for neural mobility and endurance.

TREATMENT INTERVENTIONS AND PROGRESSIONS

Stage 2: Continue manual treatment as necessary. Progress to sitting/standing rotational exercises at 3x25 at 60% to the R then B. Caudal SB on slant board to the L then progress to both directions. Continue Vigor Gym squats and begin fall out lunges as tolerated. Progress abdominal strengthening with sit ups 3x15 on slant board in pain free ROM.

Stage 3: Progress pulley rotations to 3x15 at 85% for strength training. Also, may add quick reversal for eccentric training. Progress abdominal training and continue neural mobilizations.

Stage 4: Continue neural mobilization and simulate work/recreational activities.

DISCUSSION/CONCLUSION

I.R. has made slow but steady progress since beginning P.T. last November. Subjectively, he continues to experience the same symptoms but with less frequency and intensity. Objectively, his Oswestry score has decreased from 62% disability to 38% disability, ROM has improved, and neurological signs have improved. Given the chronic nature of the symptoms, the ease of provoking symptoms, and the tissue involved, it is unlikely these symptoms will completely resolve.

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