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Rehabilitation and treatment of a recreational golfer with hip osteoarthritis: a case report

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Objective: *This case study reviews the conservative chiropractic treatment of hip osteoarthritis (OA) and the prescription of a rehabilitation program for a recreational golfer.*

Clinical features: *A 49-year-old registered nurse/college instructor presented with a five year history of left hip OA and pain, recent right hip pain and occasional low back stiffness. Once her symptoms improved, a golf-specific functional rehabilitation program was prescribed in preparation for the upcoming golf season.*

Intervention and Outcome: *The initial treatment included ultrasound, soft tissue and myofascial therapy, mobilizations, acupuncture and home advice. Rehabilitative exercises included core and scapular stability exercises, general conditioning, golf specific stretches, functional swinging, proprioceptive and strengthening exercises, and referral to a swing coach. The positive outcomes included increased ranges of motion, decreased pain, as well as improvements in golf driving distance and endurance.*

Summary: *Conservative management and golf-specific*

Objectif : *La présente étude de cas porte sur le traitement chiropratique conservateur de l'arthrose de la hanche et la prescription d'un programme de réadaptation pour une golfeuse récréative.*

Caractéristiques cliniques : *Une infirmière et enseignante au collège de 49 ans présente depuis cinq ans de l'arthrose et de la douleur à la hanche gauche, et, depuis récemment, de la douleur à la hanche droite et des raideurs lombaires occasionnelles. Une fois ses symptômes atténués, un programme de réadaptation adapté aux golfeurs lui a été prescrit en prévision de la saison de golf qui approchait.*

Intervention et résultat : *Le traitement initial comprenait des ultrasons, de la thérapie myofasciale et pour tissus mous, des mobilisations, de l'acupuncture et des conseils sur le domicile. Les exercices de réadaptation suivants ont été, entre autres, prescrits : exercices de stabilisation du tronc et du scapulaire, conditionnement général, étirements adaptés au golf, élans de golf fonctionnels, exercices de proprioception et de renforcement, et orientation vers un entraîneur d'élan de golf. Parmi les résultats favorables se trouvent l'amélioration de l'amplitude des mouvements, une atténuation de la douleur ainsi que l'amélioration de l'endurance et de la distance parcourue par la balle de golf au coup de départ.*

Résumé : *La gestion conservatrice et la prescription d'une réadaptation adaptée au golf semblent avoir été bénéfiques, dans le présent cas, pour l'arthrose*

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rehabilitation prescription appears to be beneficial for hip OA and recreational golf performance in this case.
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KEY WORDS: low back pain, hip osteoarthritis, golf, rehabilitation, chiropractic, exercise

de la hanche et le rendement au golf dans un contexte récréatif.
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MOTS CLÉS : lombalgie, arthrose de la hanche, golf, réadaptation, chiropratique, exercice

Introduction

The sport of golf has been increasing in popularity in recent years and has been shown to increase in frequency of play with age.[1] Since golf offers a lower intensity sport and lacks the risk of physical contact, it is an ideal physical activity for older adults.[2] It has been shown that walking 18 holes of golf has been shown to help golfers achieve the recommended 10,000 steps per day, which can lead to associated health benefits.[3] Also, golf is a versatile sport that participants can return to after total hip arthroplasty with less pain and high satisfaction, but postoperative rehabilitation is a major contributor to positive postsurgical golf performance.[4,5]

Common areas of injury in golfers are in the low back (27-30%), the wrist (18%) and the elbow (25%) and are often due to overuse.[2,6,7] It has been demonstrated in previous studies that the lumbar spine sustains compressive loads of up to eight times one's body weight during a golf swing.[8,9] Inactivity prior to playing, poor posture, combined with poor physical conditioning and poor swing mechanics (such as over-rotating to surpassing their neutral pain-free backswing axial rotation position; increased trunk flexion at ball strike and excessive side flexion during backswing) have all been shown to predispose golfers to getting low back pain.[2,5,8] Golfers who have low back pain demonstrate earlier activation (before backswing commences) and less activity of the erector spinae muscles, as well as well as a delay to the onset time in the external obliques with the start of the back swing and a delay and decreased endurance capacity in transverses abdominus activation.[2,5,6,8,10] A large difference in lateral endurance testing of golfers (more than a 12.5 second difference between sides), a BMI lower that 25.7 kg/m^2, and shortened hip flexors have also been shown to lead to low back injury in professional golfers in a longitudinal study.[8] Types of low back pain reported in golfers include mechanical lower back pain, sacroiliac joint dysfunction, disc herniation, spondylolysis and vertebral compression fractures.[2,5,9] Hip osteoarthritis or dysfunction has been theorized to play a contributing role in mechanical low back, since it can lead to decreased internal lead hip rotation during the swing phase, leading more forces to overstress the lumbar spine.[2,8] Restriction of the lead side hip internal rotation and lumbar extension (which may lead to increased force being transmitted to the lumbar spine) have been shown in golfers with a history of low back pain.[5]

Chiropractors reported in 2010 that 25.6% of their patients present with the low back/pelvis as their chief complaint and 9.4% with the lower extremity as their chief complaint.[11] Therefore, this case report deals with conditions that are relevant to most chiropractic practices. The purpose of this case report is to describe the successful management of a patient with hip osteoarthritis and to present a rehabilitative program for golfers.

Case report

A 49 year-old registered nurse/college instructor presented complaining of ongoing left hip pain which she reported starting to notice five to six years prior after she started a nightly power walking routine. An MRI was performed of the left hip 2 ½ years prior revealed no evidence of avascular necrosis, mild degenerative irregularity of the acetabulum with mild thinning of articular cartilage in the left hip and mild bilateral insertional tendinosis of the gluteus minimus tendons. Previous therapy included acupuncture and ultrasound years prior. The patient also noted that she had right hip pain in the groin area and occasionally lateral to the hip, which she felt was due to compensations for the left hip. She reported that the left hip

pain started deep in the groin region and referred laterally into the gluteal region and was worse at night, with some short term stiffness in the morning. She rated the pain as a 4-7/10 (10 being the worst pain she had ever experienced), depending on the activities she was performing. She described it as constantly stiff and "throbbing" in certain positions. Aggravating factors included getting out of a car, sitting with her knees up, stepping off a curb, stair climbing and after long walks (which resolved after 2-3 days). She reported that rest and ibuprofen relieved the hip pain. She explained that the pain "came and went" depending on her activities. She documented that she took Advair and Ventolin for her asthma, Venlafaxine for her menopause related night sweats and hot flashes, as well as calcium, vitamin D, Omega 3 fatty acid, and a high fiber supplement (PGX) for weight loss. She stated that she was normally active by using an elliptical machine at the gym, as well as playing golf frequently. She reported that her diet was "average", that she was a non-smoker and that she drank alcohol occasionally in moderation. She stated she slept "well" with 6 to 8 hours per night, but that it was interrupted because of her left hip pain. Previous accidents included a bike accident which led to a cervical spine injury and contusions, as well as a motor vehicle collision as a pedestrian which led to knee contusions. Previous surgery included the removal of her left ovary. She had been previously diagnosed with asthma and her relevant family history included breast cancer, thyroid conditions, hypertension and osteoporosis. Her systems review revealed that she wore reading glasses and that she had a history of migraine headaches. The review of red flags was unremarkable. The review of her psychosocial history revealed that she was married and had no children. Other complaints included bilateral foot pain (on the ball of the foot and first metatarsal), occasional low back stiffness and that she was attempting to lose weight.

The physical examination revealed a mild limp and favoring of the right leg. The lumbar ranges of motion were full and pain free. Hip ranges of motion revealed decreased internal rotation bilaterally (more on the left) and decreased external rotation on the left. Active hip extension testing revealed weak deep abdominals bilaterally. Active hip abduction testing revealed weak bilateral gluteal muscles (as well as tight iliotibial bands and tensor fascia lattae). Ranges of motion and joint play in the first metatarsals were reduced bilaterally and the patient reported tenderness at the base and lateral aspect of the first and the base of the second metatarsals bilaterally. Soft tissue palpation revealed tight and tender bilateral gluteal, tensor fascia latta, iliopsoas, piriformis (more left than right sided), hamstrings, gastrocnemius, first metatarsal plantar flexors, lumbar erector spinae and quadratus lumborum muscles. Compression of the left hip aggravated the patient's symptoms and traction relieved it. Positive orthopedic tests include: bilateral Thomas (supine, knee to chest which reproduced the hip pain), Obers (side lying, top leg is abducted and then released to adduct passively with gravity, tight bilateral iliotibial bands cause the thigh not to adduct) and bilateral Hibbs (prone, internally rotate hip; this was reduced bilaterally and reproduced hip pain).[12,13] The neurological examination lower limbs was unremarkable.

The differential diagnoses included left hip osteoarthritis; right hip bursitis or osteoarthritis; bilateral myofascial strain; bilateral metatarsalgia (secondary to myofascial strain) and myofascial strain of the musculature of the lower back (secondary to muscular imbalance and weakness). The prognosis was rated as moderate, since osteoarthritis is degenerative in nature. The plan of management included ultrasound, soft tissue and myofascial release therapy, mobilizations (of the lumbar spine, and the first and second metatarsals) and hip traction mobilizations (using a Mulligan belt), and acupuncture. Home care recommendations included stretching (see figures 1-3 & table 1), deep abdominal bracing, home heat and icing, topical anti-inflammatory cream (Muscle Care cream®), ibuprofen (recommended by her MD), good supportive shoes (avoiding high heeled shoes and wearing newer running shoes to increase shock absorption), getting up regularly from sitting and increasing her cardiovascular exercise gradually (low weight bearing, such as cycling or swimming). Treatment was rendered on the first visit according to the plan of management.

On the second visit, the patient reported that she was somewhat tender from the soft tissue therapy, but had experienced the same sensation after previous physiotherapy treatments in the past. She also reported taking ibuprofen twice at night and that she had experienced less left hip pain generally even with common aggravating activities. Acupuncture was added on this second visit, since there was not sufficient time to include it on the first visit. On subsequent visits, the patient reported pain relief which

Figure 1 *Seated piriformis stretch (front and side views)*

Figure 2 *Seated gluteal stretch*

Figure 3 *Standing iliospoas stretch (side and front views)*[14]

Table 1 *Rehabilitative exercises prescribed*

Visit #	Prescribed Exercises
1	Stretches: priformis, gluteals and iliopsoas muscles (see figures 1-3)[14] Deep abdominal bracing [14] General cardiovascular exercises/conditioning: 3-4 days per week, working up to 30 minutes.
8	Modified curl up, side bridge and modified bird dogs: to be performed daily with a neutral spine, deep abdominal activation and 8-10 second endurance-aimed holds (with adding more repetitions within her tolerance; see figures 4-6).[14]
10	Proprioceptive exercises: progressing from eyes open to eyes closed, two legged to one legged and two-directional rocker to multidirectional wobble board.
12	Scapular stability exercises: external rotation/rotator cuff, push up plus (on the wall since kneeling aggravated her knees) and scapular retractions (standing with a theraband) , twice per week, with 10-12 repetitions working up to 2-3 sets (see figures 7-9).[15] Golf specific stretches: seated torso rotation (to later add a club behind her head) and standing side bends (see figures 10 & 11).[16]
13	Functional swinging and strengthening exercises: bicep curls, wall squats, resisted backswings, downswings and through swings (increasing resistance band tension slowly) with 10-15 repetitions, working up to 3 sets and 2 seconds in each direction.[6,16]

Table 2 *Core exercise testing results*

Exercise tested	Initial testing (visit 8)	Subsequent testing (visit 15)
Modified curl up	1 minute 37 seconds	2 minutes 47 seconds
Right side bridge	1 minute 2 seconds	1 minute 5 seconds
Left side bridge	51 seconds	1 minute 35 seconds
Modified bird dog: Left arm/right leg	1 minute 54 seconds	2 minutes 27 seconds
Modified bird dog: Right arm/left leg	2 minutes 30 seconds	2 minutes 1 second

Figure 4 *Modified curl up*

Figure 5A *Side bridge (beginner on knees)*

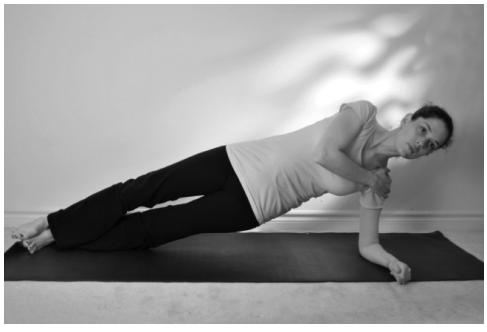

Figure 5B *Side bridge (advanced on feet)*

Figure 6 *Modified bird dog (prone on abdomen)*

was only aggravated with long distance walking and prolonged sitting and for one night at a time, and that is was quickly relieved with ibuprofen. The left hip pain eventually dissipated and she was left with occasional right hip pain which she described as "achy". By the sixth visit she reported the left hip was "great" and that she only had very mild morning stiffness in the right hip (related to sleeping on her right side all night). The next visit she reported both hips were "great" and mild lower back tightness. She stated that the recommendation of abdominal bracing really helped her lower back discomfort. At this point she requested a rehabilitation program to strengthen her core for the upcoming golf season. On the eighth visit, she reported that her hips were "good", except for one day after a 9 hour car trip. After demonstration and instruction, initial baseline measurements were taken on this visit for "back safe" core stability exercises (see tables 1 & 2).[14] The bird dog was modified to a prone position because the patient had difficultly kneeling due to previous knee injuries. The patient was then instructed to do these exercises at home.[14]

The treatments were extended to once every 1.5-2.0 weeks. The patient reported that core exercises were helping her lower back and that her hips continued to maintain the improvement. She reported that she had increased the number of exercise repetitions and that she felt she was getting "stronger". On her tenth visit, she was able to walk longer distances without pain. Proprioceptive rocker board exercises were added. She reported enjoying the balance and "core" exercises since she felt they seemed to decrease her lower back stiffness. On the twelfth visit, she reported her left hip was pain free and the right hip had only lateral muscle pain. She reported progressing to one-legged balance exercises and a multidirectional balance board from a two-directional rocker board. She continued the core exercises daily. At this point, scapular stability exercises and golf specific stretches were also added (see figures 7-11 and table 1).[15,16]

Visits were staggered to once every two weeks and the patient reported only occasional pain that was relieved by ibuprofen. The patient reported performing the one-legged balance exercises more frequently. Functional swinging and strengthening exercises were added on this visit (see table 1).[6,16] On the fourteenth visit, she reported that both hips were virtually pain free and that she had also lost five pounds in two weeks after joining Weight Watchers® pro-

Figure 7 *Shoulder external rotation/rotator cuff exercise*

Figure 8 *Wall push-up plus*

Figure 9 *Scapular retraction*

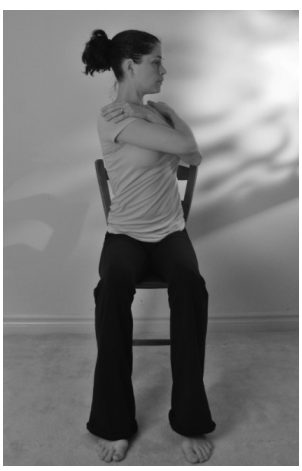

Figure 10 *Seated torso rotation*

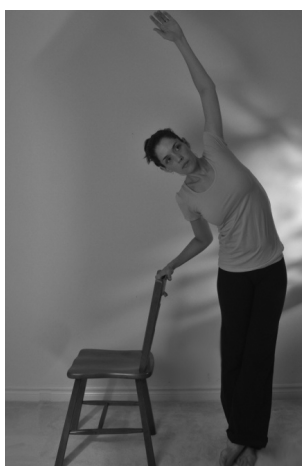

Figure 11 *Standing side bend*

gram online. She reported using the balance board daily on one leg, as well as preforming the upper body and core exercises on alternate days. She stated that the wall squats aggravated her knee pain, but that she had started "cardio boxing" at home 20 minutes daily which she felt was strengthening her upper body. She also reported that she had taken a lesson with a golfing professional. The golfing professional also noted how "balanced" she was and gave her a few corrections for her swing performance (i.e. not shortening at the end range) and a golf "drill" to work on.

Her next visit, 2 ½ weeks later, she reported no hip pain on the left side and only very low grade "ache" on the right side. She also stated that her low back felt "good". On this visit, the core exercises tests were repeated (see table 2). Due to the outcome, she was given directions to increase her focus on the right sided side bridge and right arm/left leg bird dogs. Overall she reported doing her exercises regularly. She stated that she would be travelling for a golf trip for the following month for 10 days and was then advised to do a 5-10 minute warm up before each game and to stretch afterwards.

On follow-up 6 months later, the patient reported golfing for a week, during which her left hip was pain free and she had improvements in her endurance and driving distance. She later golfed 15 times in the first half of the summer season and reported improvements of 10-14 yards driving distance overall. A referral to her family doctor was suggested to investigate the symptoms in her right hip, since her left hip was now pain free. The patient chose to return for monthly care to maintain her current positive results and get assistance with her exercise progressions.

Discussion

Research has demonstrated that highly proficient golfers have greater hip and torso strength (which provide a solid base of support), increased shoulder, hip and torso flexibility (to help improve driving distance) and balance (allowing the body to adapt to different terrains and maintain good position over the body's base of support) than golfers who do not perform as well on the golf course.[17,18] Static and dynamic balance (including one leg stance, one leg perturbed stance and lunging) has been shown to be better in older golfers when compared with nongolfing healthy adults, which researchers have associated with

walking on uneven golfing surfaces and the transfer from two to one-legged stances that is often required in golf.[19] It has also been documented that better golfers have higher club head velocity, higher ball launch angle, lower standard deviation of ball velocity and faster body-twist angular velocity.[16] Golf specific training programs have been given to athletes and have been shown to improve performance and prevent injuries.[17]

It has been shown that strength increases up to one's early 20's, plateaus until their 50's and then starts to decline by 10% per decade (mostly due to a decrease in muscle mass).[5] Golf performance also has a similar pattern, since recreational golfers tend to peak in their 30's and start to decrease in their performance in their 40's.[5] This is why a conditioning program is so important for older participants to follow, since previous studies have demonstrated gains in strength and club head speed with relatively short training periods.[5]

Golf-specific functional rehabilitation and proper swing mechanics instruction have been recommended as part of a treatment and prevention plan for golfers with low back pain.[2,6,16] These recommendations include spinal stabilization exercises to activate the transversus abdominus and multifidus muscles, transitioning to a more classic swing (by shortening their backswing to decrease low back strain without affecting performance or moving to a two-plane swing to minimize hip and trunk separation), aerobic endurance training to reduce fatigue, balance training, resistance exercises, as well as a good warm-up of at least 10 minutes, and flexibility/stretching of affected musculature (which has been shown to decrease injury by up to 60%).[2,6,7,8,16,20] Slight activation of the erector spinae, biceps femoris and gluteus maximus muscles has been shown to assist the transfer of load from spine to legs, which in turn prevents spinal shear.[21] McGill has researched many lumbar spine sparing stabilization exercises using correct techniques and optimal progression.[14] When combined with abdominal bracing the modified curl-up, side bridge and bird dog help to create a "muscular corset" to protect the spine against daily challenges.[14] Functional training has been shown to improve club head speed, ball velocity and driving distance (by increasing upper torso axial rotation velocity), as well as improving functional fitness in the older golfing population.[7,16] Referral to a professional golf instructor has also been recommended to aid with swing pattern correction.[5,8,18]

There are many golf-specific training programs that recommend various exercises, such as transversus abdominus conditioning, seated thoracic and lumbar rotation exercises, hip flexor and lumbar extensor stretching, oblique and core stability.[6] Other programs include a warm up followed by static stretches, spinal stabilization such as: pelvic tilts, floor bridging, floor quadriped, prone abdominals, dynamic abdominal crunches and scapular stability exercises; balance exercises, and strengthening exercises.[7] One study recommended bird dog, side planks, crunches/curl-ups, front planks and later hang twist, lunge twist, prone twist, Roman twist, Russian twist, latissimus dorsi pull downs, Kettle bell squats and standing and seated horizontal throws, as well as pylometrics much later on.[8] Other authors have also recommended focusing on groups of conditioning exercises, such as stretching, strengthening with elastic tubing (hip abductions and adductions, scapular retractions, resisted backswings and downswings, resisted through-swings) abdominal crunches and balancing.[16] A three phase resistance training program discusses preventing "musculoskeletal injuries, improve strength and power of the golf swing and increase general fitness".[15] It included trunk stability exercises, shoulder exercises, strength and power training, resistance training and flexibility training.[14,15] Switching from a "modern"golf swing (large shoulder turn with a restricted hip turn, leading to increased lateral bending and exaggerated hyperextension) to a "classic" golf swing (front heel raised during backswing to increase hip turn, shorten the backswing or a combination of both, decreasing the lumbar spine torque), along with increasing trunk flexibility has also been shown to assist golfers with low back pain.[9]

Summary

This case report demonstrates positive results for the conservative chiropractic management of hip osteoarthritis related pain and the prescription of golf-specific rehabilitation. As it is only a single patient, it is difficult to extrapolate results to other cases and further investigation is always recommended. Case reports are limited due to many factors, including non-controlled environment and a small sample size, while results could be due to natural history or placebo effect. Future studies should include the use of outcome measures, randomization and larger sample sizes. The results of this case help to support that

conservative care and rehabilitation management of hip osteoarthritis and low back pain may help golfers improve their performance and prevent further injuries.

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