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CASE REPORT

COMPREHENSIVE STRENGTH TRAINING PROGRAM FOR A RECREATIONAL SENIOR GOLFER 11-MONTHS AFTER A ROTATOR CUFF REPAIR

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ABSTRACT

Background and Purpose: Golf is a popular sport played by hundreds of thousands of individuals of all ages and of varying skill levels. An orthopedic or sports-related injury and/or surgery may limit an individual's sport participation, require him/her to complete a course of rehabilitation, and initiate (or resume) a sport-specific training program. Unlike the availability of evidence to guide postsurgical rehabilitation and sport-specific training of athletes from sports other than golf, there have only been two reports describing outcomes after surgery and for golfers. The purpose of this case report is to present a post-rehabilitation return to sport-training program for a recreational golfer 11-months after a rotator cuff repair.

Case Description: The subject, a 67-year old female, injured her right shoulder requiring a rotator cuff repair 11-months prior to her participation in a golf fitness training program. The subject participated in six training sessions over seven week period consisting of general strengthening exercises (including exercises for the rotator cuff), exercises for the core, plyometrics, and power exercises.

Outcomes: The subject made improvements in power and muscular endurance of the core. She was able to resume golf at the completion of the training program.

Discussion: The subject was able to make functional improvements and return to golf after participation in a comprehensive strength program. Additional studies are necessary to improve program design for golfers who wish to return to sport after shoulder surgery.

Key Words: golf, return-to-sport, senior, kettlebells, plyometrics

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BACKGROUND AND PURPOSE

Golf is a popular sport played by hundreds of thousands of individuals of all ages and of varying skill levels.[1] Despite the low-impact nature of the sport, golfers are at risk for injury. Sport-related golf injuries have been reported in the lower back, elbow, shoulder, and knee.[2-7] Potential risk-factors for a golf-related injury include a lack of warm-up, poor trunk flexibility and strength, faulty swing technique, and overuse.[2,8-10]

A musculoskeletal injury may impair an individual's ability to play golf. The golfer who is sidelined by an injury may experience decrements in performance due to lost practice time and a decrease in fitness. Case reports and clinical commentaries have provided treatment suggestions to guide the rehabilitation management for the injured golfer.[3,11,12] These clinical recommendations include the prescription of endurance and strength training exercises, flexibility exercises, and plyometrics.[12] In addition, many golfers may benefit from swing analysis and instruction from a golf professional.[11,12] Improving swing mechanics may reduce risk for a sport-related injury; however, there is no prospective evidence to support this claim.[7,8,11,12]

An orthopedic injury and/or surgery may also limit sport participation and require the golfer to complete a lengthy course of rehabilitation. However, unlike the availability of evidence to guide postsurgical management and return to sport strength training programs for athletes who perform sports other than golf, there are only a few reports describing outcomes after surgery for golfers. Jackson et al[13] reported that a total knee arthroplasty may relieve pain in golfers with degenerative joint disease and the majority of their subjects reported playing golf as much or more post-operatively than pre-operatively, and with less pain (81% and 83% respectively). A majority of patients returned to golf 4 to 6 months after surgery (13% returned after 0-3 months, 44% after 4-6 months, 43% 7 months or later).[13] Jensen et al[14] reported that a majority of patients (23 out of 24) were able to return to golf after either a shoulder arthroplasty or hemiarthoplasty. Physician members of the American Shoulder and Elbow Society suggest that the mean time for one to return to sport after a shoulder arthroplasty is 4.3 months (range 2–12 months).[13]

Despite the published clinical rehabilitation recommendations and a few reports that demonstrate successful return to sport after surgery, there is a paucity of literature regarding golf specific rehabilitation or post-rehabilitation return to sport training programs. The purpose of this case report is to describe a post-rehabilitation return to sport training program for a recreational golfer with a recent rotator cuff repair.

CASE DESCRIPTION: PATIENT HISTORY AND SYSTEMS REVIEW

The subject, a 67-year old female (right hand dominant, height 1.59 m, 87.54 kg, BMI = 34.7), injured her right shoulder 11-months prior to her participation in a golf fitness training program. Her injury was the result of a trip and fall. Symptom onset including pain, loss of function, and swelling, was immediate. A computerized tomography (CT) scan revealed a comminuted fracture of the right scapula involving the both the superior and inferior aspects of the glenoid with the inferior fracture extending into the anterior body of the scapula. The fracture was considered stable by her orthopedic physician; she was immobilized with a sling, and referred to the orthopedic physician group's physical therapy practice for passive and active-assisted range of motion exercises. At her next physician appointment she reported an inability to actively elevate her arm despite good healing of the fracture site. A subsequent MRI arthrogram revealed a full-thickness rotator cuff tear with a supraspinatus defect and degeneration of the long head of the biceps tendon. Two months after her injury a mini-open rotator cuff repair and biceps tenodesis was performed. It should be noted that the immediate postoperative physical therapy for this patient was not provided by the authors of this case report. She began physical therapy 5 weeks after surgery. At the 3 month follow up with her orthopedic physician she demonstrated full flexion and abduction, 60° degrees of shoulder external rotation, 5/5 strength (traditional manual muscle testing positions) of the supraspinatus and shoulder internal rotators, and 4/5 strength of shoulder external rotators as reported in the physician's chart notes. She was formally discharged 7-months post-operatively with no activity restrictions, the length and details of supervised physical therapy were not reported by the treating therapists.

Clinical Impression #1

The subject, 11-months post-surgery, self-referred to a golf-fitness research study (responding to an advertisement in a local newspaper). The research study was approved by the Pacific University Institutional Review Board. The subject was informed and she approved that the data collected and presented in this case would be submitted for publication.

Prior to participating in the golf-fitness training program, each subject had to read and sign the informed consent form and complete the Physical Activity Readiness Questionnaire (PAR-Q).[15,16] The PAR-Q is a 7-question form for individuals aged 15 to 69 years, to be completed prior to increasing physical activity.[15,16] The PAR-Q is designed to identify individuals who require assessment by their primary provider prior to initiating or increasing a training program.[16] The PAR-Q screens for the following conditions/situations: heart conditions requiring physician supervision, chest pain during activity, chest pain unrelated to activity level during the previous 30 days, orthopedic conditions that may worsen after activity, medications for hypertension or heart conditions, and any other condition that should prevent one from exercise. The subject answered "no" to each of the 7 questions allowing her to begin the program without physician approval.

The subject was appropriate to initiate a golf fitness exercise program based on her physician's discharge recommendations and her score on the PAR-Q. To meet her goal of returning to golf, a progressive, functional exercise program might prepare her for the biomechanical stresses applied to the body during the golf swing and could potentially impact her golf performance variables (*e.g.* club head speed, driving distance). Addressing any muscular imbalances, general muscular weakness, or deficits in flexibility may help to reduce the risk of reinjury or subsequent injury to another region of the body. Although the subject was cleared to return to all activities by her physician, assessment of her shoulder function was warranted. It is not uncommon for some subjects to experience some muscular weakness or limitations in range of motion, even after a successful rotator cuff repair.[17-22]

Examination

Baseline tests and measures were recorded before the start of the 1st training session. Muscular endurance, strength, and power tests were performed to assess functional abilities related to readiness for sport and the strength of the postoperative shoulder. These tests were administered as part of a larger study assessing the effect of a golf specific training program on sport performance and fitness. Range of motion testing of the shoulders was performed to identify any asymmetries that might exist on the postoperative side. These tests were performed specific to this subject due to her history of rotator cuff repair.

Figure 1. *Prone bridge test.*

The selection of exercises for the golf training program was twofold: to train functional aspects of the golf swing and to minimize risk of injury.[12] As previously mentioned, golfers are at risk for injury to multiple regions of the body.[2-7,23] The functional tests that were administered were chosen for their ability to identify upper extremity power and core muscular endurance. The number one injury region for both amateur and professional golfers is the spine.[4,7] During the swing the lumbar spine experiences compression, shearing, rotation, and lateral bending forces.[4,24] Muscular endurance tests for the core were performed, including the prone bridge (Figure 1), the back extensor test (Figure 2), and flexor endurance test (Figure 3). Details regarding the performance of each assessment can be found in Table 2. Results of these functional tests (Table 1) revealed both asymmetry and limited endurance capacity. Ratios between muscular endurance tests (back extensor, flexor endurance, and the lateral musculature tests) are reported to assess muscular endurance capacity and their potential risk for a musculoskeletal injury in the core region.[25,26] Risk of low back injury is increased in

Figure 2. *Back extensor test.*

Figure 3. *Flexor endurance test.*

Table 1. *Functional Tests and Measures.*

Tests	Pre	Post
Core Muscular Endurance Tests (seconds)		
Prone Bridge	**15**	**10**
Back Extensor Test	**3**	**20**
Flexor Endurance Test	**9**	**16**
Lateral Musculature Test*		
Right	**20**	**41**
Left	**16**	**10**
Ratios Between Core Endurance Tests		
Lateral Musculature/ Back Extensor Ratio (either side)	**6.7**	**L 0.5, R 2.1**
Flexion/ Back Extensor Ratio	**3**	**0.8**
Lateral Musculature/ Lateral Musculature	**0.8**	**0.25**
Seated Chest Pass (m)		
1.8 kg ball (mean distance)	**2.77**	**3.28**
3.2 kg ball (mean distance)	**2.23**	**2.47**

*Modified lateral musculature test position (subject weightbearing on knee closest to mat instead of on the feet).

individuals with limited muscular endurance of the core.[25,26] The following ratios between tests are suggested to demonstrate muscular endurance of the core and balance between the muscle groups: flexion/back extensor < 1; left/right lateral musculature ratio < 0.05 difference; and lateral musculature (either side)/back extensor ratio < 0.75.[25,26] As can be observed in Table 1, the patient's ratios for each comparison failed to meet the standards.

Upper extremity strength was assessed by traditional manual muscle tests. Her bilateral shoulder strength was graded as 4+/5 or greater (bilateral external rotation weakest group at 4+/5). Upper extremity power was assessed by performing the seated chest pass (Figure 4). Refer to Table 2 for description of the performance of this functional test. The seated chest pass was selected as a general upper extremity power test because most active individuals can assume the testing position and the test does not require a large testing area. Mean passive range of motion (goniometry) measures were 110° of external rotation and 61° of internal rotation on the left (left total arc of rotation motion = 171°) and 92° of external rotation and 65° of internal rotation on the right (right total arc of rotation motion = 157°). The purpose of assessing

Table 2. *Descriptions of Functional Tests.*

Functional Test	Description	
Prone Bridge	Subject assumes a prone bridge (also described as a prone plank) position. Record how long individual is able to maintain this position.	Figure 1
Back Extensor Test	Subject assumes a prone position with torso positioned off the end of the table. Therapist supports the lower extremities by either manually stabilizing the legs with one's body weight or, if available, use a strap to stabilize the client's lower body. Record how long the individual is able to maintain her torso in a neutral position. Stop the test if the patient fatigues or if one starts to compensate by hyperextending at the low back.	Figure 2
Flexor Endurance Test	Subject is positioned with back resting against a jig or a bolster (angled approximately 60°). Hips and knees are flexed to 90°. The back support is slid 10 cm away from the subject. Therapist provides stabilization force at ankles. Record how long the position can be held. Test is stopped with loss of posture (back coming in contact with bolster).	Figure 3
Lateral Musculature Test	Subject assumes a side bridge position (also described as a side plank). Record how long one can maintain this posture. For this case the subject was allowed to weight-bear through her knees instead of her feet (modified test position).	
Seated Chest Pass	Subject assumes a long sitting position with back, head, and shoulders against a wall. Ball is held in front of the body at the chest. Subject performs a two-armed chest pass with the goal of throwing the ball as far as possible.	Figure 4

passive range of motion was to identify if any residual deficits existed. Because of the client's post-surgical status, the Constant-Murley Shoulder Outcome Assessment was administered. Diercks et al report that a score of at least 80 is a clinically significant measure that would identify an individual as having a functional, healthy shoulder.[27] The patient scored 78, indicating mild shoulder dysfunction, which would be appropriate for ongoing intervention. The primary purpose of administering the Constant-Murley Shoulder Outcome Score at that start of the training program was to assess if there was a particular domain of shoulder health (range of motion, activity level, pain, strength) that was limited. The outcome tool was not

Figure 4. *Seated chest pass (test for UE power).*

repeated at the end of the training program; only post-tests relevant to the larger study were administered at the end of the training period.

Clinical Impression #2

The subject presented with bilateral shoulder weakness and muscular weakness of the core. We hypothesized at the end of the 8-week training program (60-minute supervised training session performed once a week) the subject would demonstrate improvements in muscular core endurance, upper extremity power, and would be able to return to sport participation.

INTERVENTION

The training program consisted of exercises to increase strength of the shoulder and legs, exercises to improve muscular endurance of the core, and exercises to enhance power (Table 3). All exercises used with this subject are described in the Appendix. The subject was instructed to walk briskly daily for aerobic exercise as time available in the clinic did not allow for aerobic exercise. Exercise performance was evaluated after each training session by reviewing of the number of reps and sets that was performed. Recommendations to increase or decrease training load (weight) was made based the ability to complete training volume.

Core Training

The "core" is the region of the body consisting of the joints and muscles of the lumbar spine, the pelvis, and the hips.[11,28] As previously mentioned, the lumbar spine is susceptible to golf-related injuries.[4,23] During baseline testing the client demonstrated both limited muscular endurance capacity of the core and muscular imbalance (as indicated by ratio scores between tests presented in Table 1). Initial core exercise prescription consisted of mat/table exercises such as the prone and side plank, with the goal of increasing muscular endurance. The vertical swing described in the Appendix (Figure 5) was also initiated during the first training session. The vertical swing is a functional core training exercise mimicking the diagonal movement patterns associated with the golf swing.[11,28] As her core muscular endurance capacity improved the client was progressed from basic (e.g. bridging) and intermediate intensity (e.g. Russian Twist) (Figure 6) core exercises to functional strengthening and power exercises that incorporated activation of the trunk.[28]

Legs and Shoulders

Squats were performed to increase lower extremity functional strength. Dumbbells were held in each hand to increase the challenge once the client was able to perform the initial desired number of sets and reps. The static single leg balance exercise (with eyes open) was performed during each training session. A golfer must be able to weight shift between bilateral stance and single leg stance during the golf swing. Improving one's ability to balance on one extremity may help to improve control during the swing.[29]

The muscles of the shoulder girdle are active throughout the golf swing.[30,31] Strengthening the muscles of the rotator cuff and the scapular stabilizers may help improve performance and may reduce risk of shoulder injury.[2,6,30,31] In this case, training the shoulders was potentially beneficial to address postoperative weakness. To improve muscular

Table 3. *Golf Fitness Training Program.*

Region or Category and Exercises	Training Goal Sets/Reps	Training Sessions	Training Modifications
Core			
Bridging	2 x 10	1-2	
Crunches	2 x 10	1-2	
Prone Bridge (aka prone plank)	1 x 2 x 10 → 30 s holds	1-4	Modified√
Side Bridge (aka side plank)	1 x 2 x 10 → 30 s holds*	1-4	Modified√
Vertical Swing‡	2 x 10*	1-4	
Russian Twist	2 x 10*	3-4	Physioball√
Legs			
Squat†	2 x 10	1-6	
Standing Heel Raises†	2 x 25	1-6	
Single Leg Balance	1 x 2 x 30* s	1-6	
Shoulders			
Shoulder Extension†	2 x 15*	1-2	
Shoulder Row†	2 x 15*	1-3	
Sidelying Shoulder† External Rotation	2 x 15*	1-6	
Scaptions†	2 x 15*	1-6	
Plyometric and Power Exercises			
Overhead Throw to Rebounder	2 x 20 s	1-6	
Side Throw to Rebounder	2 x 20* s	1-6	
Medicine Ball Side to Side Rotation	1 x 15*	3-6	
Medicine Ball High to Low Rotation	1 x 15	3-6	
Sit-Up with a Toss	1 x 10	4-6	
Kettlebell 2-Arm Swing‡	2 x 10	4-6	
Kettlebell 1-Arm Swing‡	2 x 10*	4-6	

*Performed bilaterally

†Exercises performed with dumbbells

‡Exercises performed with kettlebells

√ See table 4 for descriptions

endurance of the scapular stabilizers and the rotator cuff, 15 repetitions were performed in each set of each exercise. (Figures 7,8,9)

Power and Plyometric Exercises

The golf swing is considered a power movement.[12] Meira and Brumitt suggest that golfers may benefit from golf-specific plyometric exercises (exercises designed to improve power utilizing the stretch-shortening cycle) for the trunk and the use of Olympic lifts.[12] Performing Olympic lifts (e.g. clean, push jerk) may help to develop the explosiveness necessary to maximize clubhead speed. Because of the age and fitness status of this client, careful consideration went into the prescription of power and plyometric exercises. Plyoball throws to a rebounder were the first plyometric exercise chosen to increase power. (Figures 10 and 11) These low intensity exercises were progressed as tolerated to exercises of greater intensity such as medicine ball (Figures 12, 13, and 14) and kettlebell swing exercises (Figures 15 and 16). The medicine ball exercises were performed to improve functional power (utilizing rotation and diagonal patterns) and to strengthen muscles of the core and the upper extremities. The use of Olympic lifts was considered inappropriate for this subject because performing a traditional Olympic lift using only the barbell would have been too heavy; however, the use of kettlebell exercises was included to enhance power development.[32] The shape of the kettlebell and its handle allow an individual to swing the weight through a curvilinear arc of motion (Described in Appendix).[32] This swinging motion is similar in nature to that of some traditional power lifts.

Outcomes

At the completion of the training program tests for muscular endurance capacity and power were

Figure 5. *Vertical swing.*

Figure 6. *Russian twist.*

repeated (Refer to Table 1). Her muscular endurance capacity improved in some of the test positions (back extensor test, flexor endurance, and (R) lateral musculature endurance) as did some of the ratios

Figure 7. *Shoulder extension (with ER).*

Figure 8. *Shoulder row exercise.*

Figure 9. *Scapular plane abduction ("scaption").*

between tests. The mean distance of each seated chest pass (1.8 kg & 3.2 kg) also increased.

In addition to the aforementioned tests, a computerized analysis of the subject's golf swing was performed

Figure 10. *Overhead throw to rebounder.*

Figure 11. *Position for side throw to rebounder.*

at the end of the training program. Up to this point, the client had yet to practice swinging her clubs. The P3ProSwing Virtual Golf Simulator and Golf Swing Analyzer (Sports Vision Technologies, Bethlel, ME) provides data related to (but not limited to) driving distance, club speed, ball speed, and swing tempo. The client performed 5 swings each with her favorite wood and iron. Data related to those swings is presented in Table 4. Means ($\pm$SD) were calculated for golf performance scores. SPSS 17.0 (Chicago, IL) was used for the statistical analysis. The subject reported to the lead author that she had returned to golf for the first time since injuring her shoulder a week after the last golf fitness training session.

DISCUSSION

The purpose of this case report is to describe a post-rehabilitation return-to-golf fitness program for a 67-year old female who was 11-months post rotator cuff repair. The aforementioned training program addressed both the client's fitness limitations and functional aspects of the sport previously described by other authors.[12,24] At the end of the training program the client was able to demonstrate some improvements in muscular endurance and power and was able to return to sport.

Despite the positive outcomes described for the subject in this case, there are limitations to this case report and generalizations or blanket recommendations cannot be made. Other training components and varied exercise prescription should be considered in the future. Meira and Brumitt suggest that a comprehensive training program should include flexibility exercises, strength training, core training, and power exercises.[12] The program described in this case report contained 3 of the 4; however, specific flexibility exercises were not addressed. Prior to the start of each training session, the subject performed a dynamic warm-up; however, it was probably not a sufficient strategy to address all regions of muscular inflexibility. Due to the limited time frame of the training program in the larger research study (conducted over an 8-week period) and the subject's ability to only meet once a week, flexibility exercises were not prescribed.

Figure 12. *Medicine ball side-side rotations, performed with a partner.*

Figure 13. *Medicine ball side-side rotation with diagonal component, performed with a partner.*

Figure 14. *Sit-up with ball toss.*

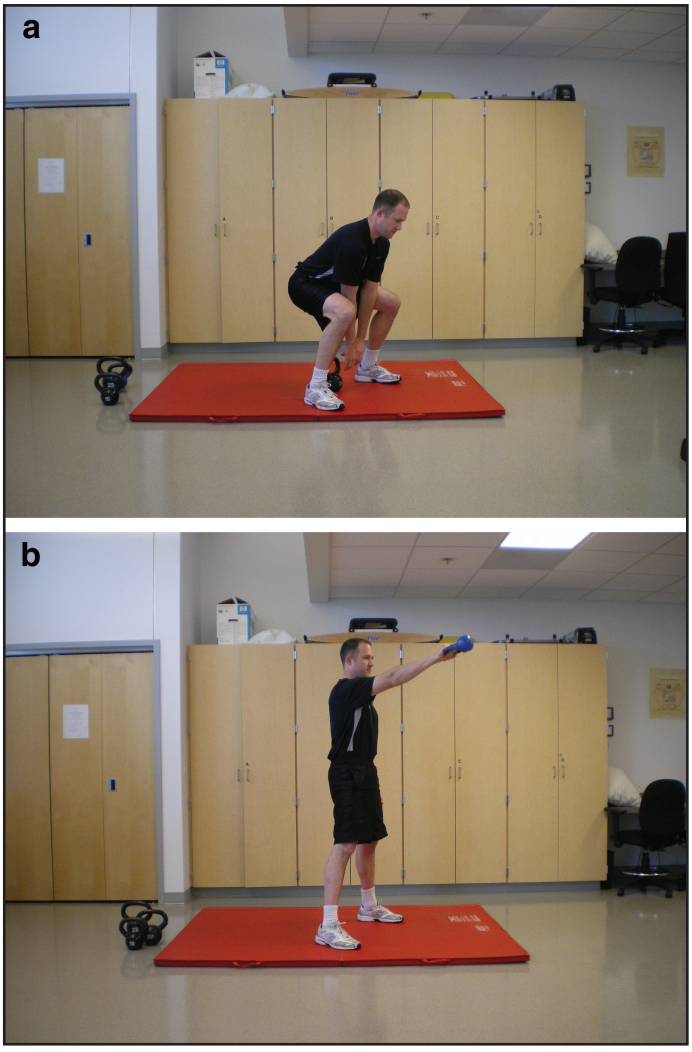

Figure 15. *1 Arm kettlebell swing, a) beginning position, b) end position.*

Another aspect of conditioning that the authors did not test or control for was aerobic fitness training. Again, due to the limited time spent with the subject

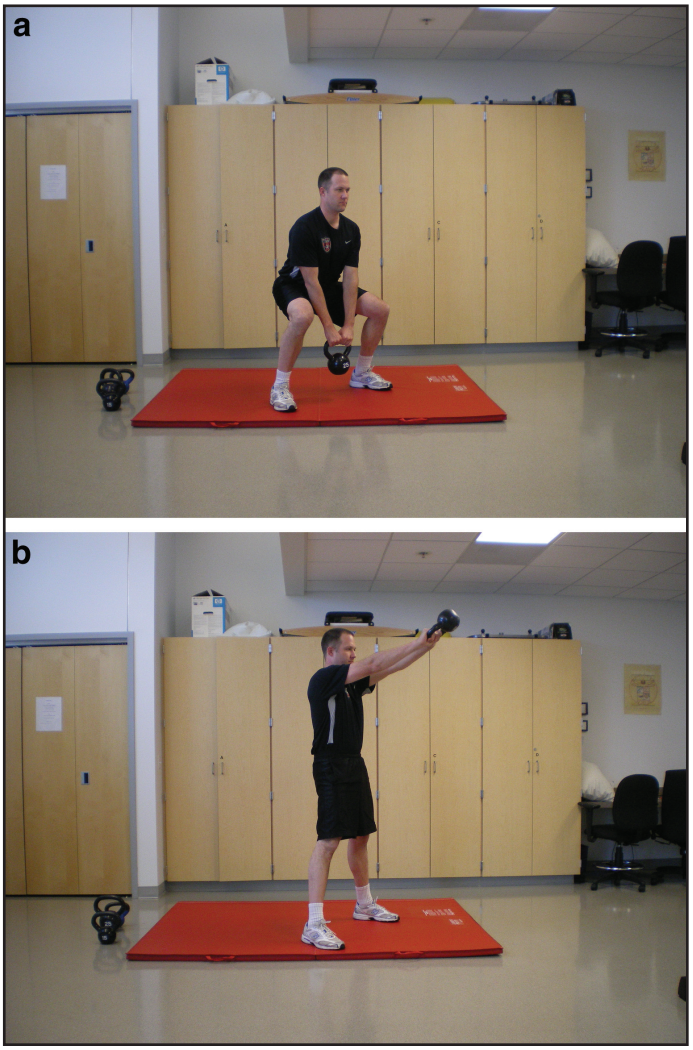

Figure 16. *2 Arm kettlebell swing, a) beginning position, b) end position.*

in the clinic, appropriate time could not be devoted in order to meet the minimum aerobic fitness exercise guidelines recommended by the Centers for Disease Control (a minimum of 150 minutes of moderate aerobic exercise per week).[33] The subject was instructed to independently perform aerobic exercises (*e.g.* walking briskly) as previously mentioned.[33]

Finally, if time had permitted, the authors would have performed additional functional tests and/or used dynamometry to objectively assess strength and power. Due to the individual's age and fitness level there are limited types of lower extremity strength and power tests that could be performed (due to safety considerations and complexity of the movements). The utilization of a hand-held dynamometer would have improved the quantification of the client's shoulder girdle strength both at baseline at the end of training period.

To the authors' knowledge, this is the first case report to describe a return to golf fitness training program in a senior-aged, recreational golfer who was post-rotator cuff repair. The training program performed addressed her functional weaknesses and demonstrated positive outcomes for aspects of muscular endurance and strength. The client was able to return to golf and was provided with a home training program that included many of the program's exercises. Aspects of this program may be useful to other rehabilitation professionals when prescribing a functional golf-specific program for a similar client.

Table 4. *Golf Performance Measures with Subject's Favorite Wood and Iron.*

Club	Hit Distance (m)	Club Speed Entry (mph)	Club Speed Exit (mph)	Ball Speed (mph)	Swing Tempo (s)
1-Wood					
Swing #1	148.6	63.6	58.9	94.1	1.3
Swing #2	132.8	57.2	49.3	84.7	1.2
Swing #3	122.7	53.1	50.7	78.6	1.4
Swing #4	121.2	52.4	49.2	77.6	1.4
Swing #5	129.4	56.0	52.6	82.9	1.4
Means ± SD	130.9 ± 11	56.5 ± 4.5	52.1 ± 4.0	83.6 ± 6.6	1.3 ± .1
6-Iron					
Swing #1	93.5	48.6	48.0	72.0	1.2
Swing #2	39.2	34.1	22.9	50.5	1.2
Swing #3	70.4	37.3	38.0	55.2	1.2
Swing #4	91.9	50.2	55.1	74.4	1.2
Swing #5	81.3	42.8	37.5	63.4	1.2
Means ± SD	75.3 ± 22	42.6 ± 7.0	40.3 ± 12.2	63.1 ± 10.3	1.2

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APPENDIX: DESCRIPTION OF SELECTED EXERCISES

Selected Exercises	Technique Description	Figure
Core		
Prone Bridge (aka prone plank)	Subject assumes a plank position supporting the body with the forearms and on the toes. The body should be maintained in neutral alignment (straight). Hold the position as instructed and repeat. Modification: performed with knees supporting body instead of toes.	Refer to Figure 1
Side Bridge (aka side plank)	Subject begins side-lying with the elbow and forearm positioned under the shoulder. Subject's feet are either positioned one on top of the other or with one positioned to the front of the other. The plank positioned is held with the head, torso, and legs in alignment. Hold the position as instructed and repeat. Modification: performed with knees flexed, and the closest to mat weight-bearing instead of feet.	No Figure
Vertical Swing	From a deep squat position, the subject grasps the kettlebell that is placed laterally to one foot. The movement is performed by lifting the kettlebell diagonally from a low to high position. The kettlebell is returned to the start position and repeated. The exercise is performed from each side.	Figure 5
Russian Twist Note: The subject performed all core exercises with an abdominal bracing contraction. An abdominal bracing isometric contraction is performed without outward or inward movement of the abdominal wall, with co-contraction of the lumbar musculature.	The subject positions her back on a physioball with the lower extremities positioned in neutral hip extension, 90° of knee flexion, and the feet positioned flat on the ground. The arms are extended in front of the body with the fingers interlocked (or holding a medicine ball). The individual rotates from one side to the other maintaining torso in neutral alignment.	Figure 6
Shoulders		
Shoulder Extension	Subject lies prone with arm hanging off the side of a table and the shoulder externally rotated. The arm is lifted (shoulder extended) in line with the torso.	Figure 7
Shoulder Row	Subject lies prone with arm handing off the side of a table and the shoulder positioned in a neutral position. The shoulder is extended and the elbow flexed (sawing motion).	Figure 8
Scaptions	Subject is standing with shoulders externally rotated and arms positioned along one's sides. The arms are elevated in the plane of the scapula, flexing the shoulders to 90°.	Figure 9

Plyometric and Power Exercises		
Overhead Throw to Rebounder	The subject stands facing a rebounder with arms holding a plyoball overhead. The ball is thrown to rebounder as many times as possible during a specific period of time.	Figure 10
Side Throw to Rebounder	The subject stands perpendicular to a rebounder throwing the ball across their body as many times as possible during a specific period of time. Side throws are performed to each side of the body.	Figure 11
Medicine Ball Side to Side Rotation	Subject stands back to back with another golfer. Holding a medicine ball, the subject rotates to her left handing the ball to the other person then rotates to her right to receive the ball. This is pattern is performed both directions.	Figure 12
Medicine Ball High to Low Rotation	This exercise is performed similar to medicine ball side to side rotation except that the subject rotates the medicine ball across her body handing the ball to her partner at her shoulder and receiving the ball at her hip. This pattern is performed both directions.	Figure 13
Sit-Up with a Toss	Subject is sitting with hips and knees bent and her partner stands approximately 2 to 3 feet away. The partner throws the ball to the sitting subject who catches the ball while lowering her torso to the mat. The subject reverses the position, sitting up and tossing the ball back to the partner.	Figure 14
Kettlebell 1-Arm Swing	Subject starts in a squat position with one arm holding a kettlebell that is situated between the legs with an overhand grip (17a). To initiate the swinging motion, the individual grabs the kettlebell swinging it forcefully to the height of their head (17b). During the descent from the position, the kettlebell is lowered between the legs, slightly posterior to the body. From this position, the swinging motion is repeated; power should be generated by the hips and knees.	Figure 15 a,b
Kettlebell 2-Arm Swing	Performed the same as the 1-arm swing except that both hands are grasping the kettlebell handle. Start position 18a, finish position, 18b.	Figure 16 a,b