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Session 209: Performance, Injury Prevention, & Rehabilitation Considerations for the Senior Golfer

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Leading the Way in Continuing Education and Professional Development.
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OBJECTIVES

- Understand the physical limitations common to the senior golfer as a master athlete.
- Know the typical injuries related to golf and related treatment interventions.
- Describe golf-specific postures and exercises to improve physical movement capabilities.
- Demonstrate a senior golf warmup to be performed at the gym and on the course.
"Grow old with me! The best is yet to come."
— Robert Browning, 1864

55 MILLION GOLFERS WORLDWIDE

Golf Pros
• Drive really nice cars
• Big bank accounts
• It’s their JOB
• Can really putt
• At risk for injury
• Swing efficient
• Swing fast

Golf Joes
• Pay to play
• Socialize
• Act like golfers
• Grip and rip
• Limited mobility
• Slower ball speed
THE SENIOR GOLFER

- Baby Boomers born 1946-1964 (50 y.o.+)
- Make up approximately 20% of the American Public
- 75 million on US soil
- Living longer than previous generation
- Not necessarily healthier
- Obesity, diabetes, HTN, high cholesterol on the rise
- Cancer and heart disease leading cause of death

THE SENIOR GOLFER

- Special -> Bloomberg Report 2015
- Forecast Baby Boomers to spend a vast amount of their retirement money on golf

- Top 5 Cities
  - Myrtle Beach, South Carolina
  - Daytona Beach, Florida
  - Portland, Maine
  - Sarasota, Florida
  - Palm Bay – Melbourne, Florida (554,000)

THE MASTER ATHLETE

- Active individual no longer middle aged (Roopenboom 2018)
- Aging athlete, veteran athlete, master athlete, senior athlete
- Defined 35 and older in literature (Trappe 2001)
- 50 year old typical terminology
- National Senior Games Association
  - 54 Hole Scratch Play
  - 18 holes for 90+ y.o.
  - Must use golf cart
SPECIAL CONSIDERATIONS

- Nutrition
- Physiology
- Risks of exercise

NUTRITION

- Goal -> Nutritional excellence and balance
- Essential to be active and competitive
- Intake must match intensity and volume of training
- Older athletes have no significantly different nutrition needs than younger counterparts
  - Plan to eat quality calories from nutrient-dense food
  - Reduce risk of heart disease, cancer, osteoporosis and debilitating diseases
  - Impacts rehabilitation and performance

(Hoogenboom 2016)

HYDRATION FOR THE MASTER ATHLETE

- Most important “nutrient”
- Water is best
- Low calorie, carbohydrate fluid with long duration exercise
  - (2 hours)
HYDRATION FOR THE MASTER ATHLETE

- Prepare for the event
  - 24 h prior -> generous amount of fluid
  - 14-22 oz of fluid with in 3-5 h before training
- During
  - Drink 6-12 oz fluid every 15-20 min
- Post exercise
  - Eat foods with high water content
  - Use sport drink to restore and keep the drive to drink alive
  - Replenish lost fluid 16-24 oz for every lb body weight

(Roosruddoom 2016)

PHYSIOLOGY

- Fatigue
  - Muscles reach same level, take longer to recover
- Physical activity
  - Maintain muscle fiber composition (regardless of age)
  - Lifespan resistance training, please!
  - Decrease in performance, loss of type II muscle fiber units
    - Loss of power
      - Begin in late 50s
  - Flexibility

RISKS OF EXERCISE

- Everything is risky!
- Sports related injuries – acute trauma | chronic overuse
- Master athlete
  - Achilles tendinopathies
  - Rotator cuff injuries
  - Meniscal tear in knee

- Loss of time
  - 1 week to 1 month recovery time
  - 70 years and older – 20% persistent pain or symptoms for >1 yr
(Tayrose 2015)
CHALLENGES TO OVERCOME

- Aging process
- Myths of training
- Intrinsically "Frail" mindset

FITNESS REQUIREMENTS

- Walk or Ride
- Not high intensity – no breathlessness
  - Sufficient cardiorespiratory endurance
- Rotational mobility helps – required?

BENEFITS OF GOLFMING

- Fun, Friends, Food
  - Increased aerobic performance and body comp
  - Golfing 2-3x/week over 20 week season
  - 55 year olds
  - Versus sedentary population
- Calorie burn / Weight loss
  - 900 calories per round male
  - 700 calories per round female
  - Carry clubs +10-15% burn

(Versteegh 2008)
**BENEFITS OF GOLFING**

- Steps to 19th hole
  - 11,000-12,000 steps per round – Goal accomplished no matter the score
- Knee joint proprioception
- Decrease falls
- Outdoors | Moving | Social

(Versteegh 2008)

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**GOLF SWING MECHANICS**

- What swing is right?
- Efficiency is key
- Equipment helps!

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**GOLF SWING MECHANICS**

- Setup
- Take Away
- Return to Impact
- Follow Through
- Address
- Backswing
- Top of backswing
- Downswing
- Impact
- Follow-through

(Versteegh 2008)

(Versteegh 2008)

(Finn 2013)
CLASSIC & MODERN SWING (FINN 2013)

<table>
<thead>
<tr>
<th>Swing Phase</th>
<th>Classic</th>
<th>Modern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Similar</td>
<td>Similar</td>
</tr>
<tr>
<td>Backswing</td>
<td>Body moves in unison (one)</td>
<td>Separate hips &amp; shoulders</td>
</tr>
<tr>
<td>Takeaway/Top</td>
<td>Shoulder/hip rotation (one)</td>
<td>X-Factor (trail leg pivot)</td>
</tr>
<tr>
<td>Downswing</td>
<td>Entire body moves as one</td>
<td>Hips start downswing &gt; shoulder &gt; arms</td>
</tr>
<tr>
<td>Impact</td>
<td>Shoulder/hip equal</td>
<td>Lateral trunk flexion trail</td>
</tr>
<tr>
<td>Follow-through</td>
<td>Minimal trunk flexion trail</td>
<td>Lumbar spine neutral Reverse C</td>
</tr>
</tbody>
</table>

THE SENIOR’S SWING CHARACTERISTICS

- C-Posture
- Loss of Posture
- Flat Shoulder Plane
- Early Extension
- Over the Top
- Sway
- Slide
- Chicken Wing

(Source MyTPI.com)
C-POSTURE

- Shoulders slumped
- Roundness of back
  - Janda’s Upper cross syndrome
  - Lacks upper thoracic extension
  - Reduces rotation range
**LOSS OF POSTURE**

- During the swing
  - Loss of angles
  - Standing up
  - Kills timing, balance and rhythm
  - Pelvis culprit
  - Can’t deep squat well

**FLAT SHOULDER PLANE**

- Describes angle of the shoulders at the top of backswing
  - Similar to Loss of Posture
  - Limited shoulder mobility

**EARLY EXTENSION**

- Feel they get stuck
  - Move toward the ball on downswing
  - Poor glide activation/control
  - Back pain producer
OVER THE TOP

- Very common with high handicappers
- Overdominance of the upper body in downswing
- Robs power and consistent ball flight
- Club thrown outside swing plane (out to in)
- Poor separation of upper and lower body
- Poor lead leg balance

SWAY

- Backswing transition
- Poor weight shift transition and downswing
- Lack of hind leg hip IR
- Lateral movement vs rotational

SLIDE

- Downswing
- Lack of lead hip IR
- Lateral movement vs rotational
- Lateral stability issue (glute medius weakness)
CHICKEN WING

- Loss of extension of lead elbow on downswing
- Develop tennis elbow
- Poor shoulder flexibility and shoulder strength issues

Injury and Golf
**INJURY AND GOLF**

- "The swing itself is thus the common cause of injury for golfers" (Fradkin 2007)
- Overuse and repetitive type injuries
- Versteegh 2008 - Environmental stresses – heat illness/lightning
- Struck by a club or ball
- Collisions
- Falls
- Golf Cart - 17,000 in 2007 (Brandon 2008)

- Injury rate (Brandon 2009)
  - Highest 10-19 y.o and 80+ yr

**UNINJURED VS INJURED**

Unremarkable
- Age
- Body mass index
- Years of experience
- Hours played each week

Significantly different
- Lessons
- Self perception of fatigue

Take home message – Reduce risk by improving technical skill and level of physical fitness.

**SWING INJURY**

- Volume of swings
- Poor technique
- Poor conditioning
- One side | one abuser
- No warmup
- Poor equipment
  - Clubs
  - Bag
COMMON GOLF INJURIES

- Palmer 2003 – Senior golfer – survey of musculoskeletal conditions
  - Over three year history of pain/injury
  - Shoulder or upper extremity-46%
  - Spine – 34%
- Theriault 1996-Golf injury characteristics – survey of 528 golfers
  - Injury rates | female 32% > male 25%
  - Upper limb - 42%
  - Spine – 45%
  - Lower limb – 18%
  - Recovery time (12 y.o – 70 y.o)
    - 1 month – 28%
    - < 6 months 20%

SHOULDER MOTIONS | GOLF SWING

- Golf is not considered an overhead sport
  - 20% of the swing is spent vertically elevated above 90 degrees
- Combination of horizontal and vertical extremes
  - Mechanism for shoulder injury with high reps
- Seniors vs college players amateur
  - 31 degrees less external rotation left (lead)
  - 38 degrees less external rotation right (trail)
  - Reduction in vertical planes as well | 18-21 degrees
  (Mitchell 2003)

UPPER EXTREMITY

- Rotator Cuff
  - Lead shoulder – higher incidence of injury
  - Eccentric stress – downswing
  - Repetitive impact loading and decelerating each swing
  - Fatigue | injury follows
  - No warmup/conditioning
  - Poor biomechanics
  - Excessive practice
- Total Shoulder Arthroplasty
- AC joint arthritis
  (Brandon 2000)
UPPER EXTREMITY

- Elbow
  - Stress higher in women – 51% to 8% male
  - Ground contact eccentric load large
  - Lead arm – lateral epicondylitis
  - Trail arm – medial epicondylitis
  - Technique with divot matters – women more consistent?

- Wrist
  - Stress higher in men – 32% vs 12% female

(Brandon 2009)

SPINE

- #1 Injury site in golf
- 34% of all golf injuries
- Most feel pain increase overtime vs one trauma incident
- Most aggravating swing impact and follow-through phase
- Modern swing – X-factor (lumbar hyperextension – reverse C)
  - Disc pressure
  - Eccentric contraction of abdominals

(Finn 2013) (Dale and Brumitt 2016)

SPINE

- Muscular strain – paraspinals
  - Increase in angular displacement of spine
  - Lateral bend, shear, compression, torsional force
- Facet irritation/arthropathy
  - Reverse C position (at end)
  - Spinal degenerative changes
- Disc herniation
- Vertebral and rib stress fracture due to osteoporosis
  (Menzer 2016)
- Spondylolysis – stress fracture of pars interarticularis
  (Fin 2013) (Cole 2016)
- Surgical intervention
  - Lower rate of return to previous athletic activity (Bradley 2008)
- Stenosis
  - Set up as tolerated
- SI Joint
  - Critical link in the kinetic chain
  - Power generated above it and stability provided below
  - 40% of injuries in low back due to SI dysfunction and pelvic instability (Brandon 2009)

### LOWER EXTREMITY

- Hip
  - OA
  - Short stem arthroplasty
  - Total hip arthroplasty
- Knee
  - Meniscus injury
  - Partial joint resurfacing
  - TKA
    - 30% of patients consider golf important/18% played golf (Hamai 2008)
    - Impairment remains occurring to follow-through (Hamai 2008)
    - Lead leg – 15 degrees external rotation
    - Trail leg – 20 degrees internal rotation

### BALANCE IMPAIRMENT

- Loss of proprioception with age = erratic performance
- Decreased strength – lower body
- Neuromuscular pathologies
- Arthritis (knee & ankle)
  - Decreased coordination and position awareness
- Metabolic conditions
  - Hypothyroidism, hypoglycemia, diabetes
- Polypharmacy – use of 4 or more meds
  - Example – cancer (e.g., SSRI)
**Rehab Considerations**

**Physiology**
- Muscular atrophy | sarcopenia
- Decrease Type 2 muscle fibers | loss of power
- Physical activity regardless of age
  - Increases work capacity
  - Maintains muscle fiber composition
- Why not improve athletic performance during rehab?
  - Utilize resistance training

**Guidelines**
- Longer recovery periods to be expected between exercises
- Longer warm-up and cool-down sessions
- Inactivity after an injury should be avoided
  - Rapid deconditioning
- Start thinking sports medicine | mindset
- Understand golf and the game
- Basic knowledge of practice drills helpful
- Golf specific activities ASAP in clinic
- Team approach when possible
SHOULDER — CHRONIC PAIN WITH GOLF

- Shorten back swing
- Keep elbows in close to the trunk during back swing
- Finish with hands low and club shaft horizontal
- Decrease mechanical impairment (flat swing plane)
- Rotator cuff strengthening
- Scapular stabilization program

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ROTATOR CUFF PATHOLOGY

- Making golf drills and skills part of the rehab process
- 3-6 weeks s/p rotator cuff repair
  - One handed putting with non-involved arm
  - Pen handed putting
  - Pelvic Tilt standing exercises
  - Trunk rotation
  - Visualization

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ROTATOR CUFF PATHOLOGY

- Making golf drills and skills part of the rehab process
- 8-12 weeks s/p rotator cuff repair
  - Short game strokes
  - Normal GH joint mechanics
  - 2 lb weight to 160 degrees (no shrug sign)
  - Putting continued
  - Chipping with wedges (controlled)
  - Progress shoulder flexibility — attempt
**ROTATOR CUFF PATHOLOGY**

- Full return to golf criteria
  - Normal, pain free ROM
  - RC strength 80% of uninvolved side

- 12-16 weeks
  - Tendon not fully biologically healed – improving in strength
  - Restart full swing
  - Swing mechanics/body swing efficiency
  - Core stabilization with scapula activation
  - Plant variations

- Return to teaching pro
- Give insight into rehab process
- Discuss limitations in physical capacity
- Most will be limited from previous form
- Exercises at home/gym 3x/week - 10 mins
  - Movement practice incorporated
  - Provide warmup exercises for course/home prior
  - Update equipment – graphite flexible shaft | forgiving irons

**LOW BACK PAIN**

- Pre-existence of back pain – Not contraindicated
  - 80% did not have increased pain with golf (Gosheger et al 2003)

- Pull carts – Push please!
- Forward bend – learn to hinges
- Don’t carry clubs
- Fix or compensate for lead hip internal rotation deficit
- 10 minute warmup minimum
- Golf pro evaluation and lessons
  - Proper hip hinge setup
  - (Versteegh et al 2008)

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  - (Versteegh et al 2008)
LOW BACK PAIN (LBP)

- Big 3
  - Core stabilization
  - Trunk/hip mobility
  - Neuromuscular control

EARLY REHABILITATION - LBP

- Following acute pain phase
- Core stabilization/control
  - Diaphragmatic breathing
  - Pelvic tilting – neutral
  - Pelvic floor exercises
  - Neurodevelopmental rolling
- Core stability is a fluid, continuous motion
  (Finn 2013)

LATE REHABILITATION - LBP

- Swing characteristics – address
- Stability/mobility model – address problem areas
- Hip stability – glute medius activation in functional positions
- Balanced exercises | combat unilateral golf swing
- Golf-ish exercises – needed?
OA

- Left Thumb
  - Strong grip better lower hand decrease pressure
  - Lighter clubs – get fit!
  - Thicker/safer grips

- Hip & knee OA
  - Toe out instead of neutral | cheat the movement
  - Work with teaching pro

RETURNING TO PLAY AFTER TOTAL JOINT SURGERY

- The answer is most definitely YES!
- ALWAYS follow specific guidelines set-up by the surgeon
- Start slow and build up
- Suggest using a golf cart
- Spikeless shoes

TOTAL HIP ARTHROPLASTY

- Return to golf 4-5 months with no specific restrictions
- Reports of increased
  - Driving distance (3-5 yds)
  - Handicap

- Must practice post-surgical hip precautions during the round
  - Anterior – No full swings 3 mo
  - Posterior
    (Papapiodis et al. 2017)
TOTAL HIP ARTHROPLASTY

- Keys to returning
- Each golfer to maximize strength and range of motion throughout the lower body
- Improve trunk rotation and reduce stress on the hip
- May require slight change in foot placement technique
  - Rotate surgical side foot slightly outward at address
  - Reduce stress at hip maximizing ability to turn during swing
- Return to golf 20.3 weeks (Papaliodis 2017)
- Must minimize and control amount of torsion at the knee following surgery
  - Prevent from locking the knee during backswing on trail side
- Keys to Returning
  - Restore normal motion in knee
  - Strengthen musculature of lower leg
  - Learn golf specific stretches that target the key muscles to reduce stress on joint
  (Choi et al 2015)

TOTAL KNEE ARTHROPLASTY

- Return to golf 20.3 weeks (Papaliodis 2017)
- Must minimize and control amount of torsion at the knee following surgery
- Prevent from locking the knee during backswing on trail side
- Keys to Returning
  - Restore normal motion in knee
  - Strengthen musculature of lower leg
  - Learn golf specific stretches that target the key muscles to reduce stress on joint
  (Choi et al 2015)

TOTAL SHOULDER ARTHROPLASTY

- Most challenging replacement to return
- Must follow guidelines of your physician
- 8-8 month return
- Return takes minimal 12 weeks long irons
- Will require full shoulder range of motion
TOTAL SHOULDER ARTHROPLASTY

• Keys to Success:
  • Progression of chipping and putting early, then advancement to longer shots as directed by physician
  • May want to tee up shots (fairway) early to avoid increased impact into shoulder
  • May change equipment to Graphite shafts to reduce shock at ball strike

RETURN TO PLAY GUIDELINES AFTER JOINT REPLACEMENT (PAPALOPOU ET AL 2017)

<table>
<thead>
<tr>
<th>Replaced Joint</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip</td>
<td>6-8 wk</td>
<td>putting</td>
<td>12 wk</td>
</tr>
<tr>
<td>Knee</td>
<td>6-8 wk</td>
<td>putting</td>
<td>10-12 wk</td>
</tr>
<tr>
<td>Shoulder</td>
<td>6-8 wk</td>
<td>putting</td>
<td>10 wk</td>
</tr>
</tbody>
</table>

BALANCE

• Sensorimotor training
• Lack of dose and progression of balance exercises
• Goal is to perform with appropriate postural stabilization
• Increase muscle reaction and tissue endurance
• Restore automatic reflexive stabilization for dynamic restraint
• Watch out for compensations
• Tai Chi
**Balance**

- Static Phase
  - Stable pelvis and core – Kinetic chain linkage
  - Firm to foam surface (Base of support)
  - Weight shifts and perturbations – elicit reflexive and automatic postural reactions

- Dynamic Phase
  - Progress challenge to Center of Gravity (COG)
  - Movements of UE and LE (OH reach | Steamboat)
  - Functional Phase
  - Progression of posture with extremity movements on various BOS.

**Dynamic Phase**

- Movements of UE and LE (OH reach | Steamboat)

**Functional Phase**

- Progression of posture with extremity movements on various BOS.
- Ex: lunge onto wobble board with anterior weight shift with band

**Screening Considerations**

- Evaluate functional and golf specific movement patterns
- If dysfunctional – compare mobility vs stability problem
- Postural standing upright and address position
- Special tests based on specific symptoms

"Identifying the Player’s Limitations" – MyTPI.com
POSTURE

- Neutral
  - Hips from hips | 10-15 degrees knee flexion
- S posture
  - Anterior pelvic tilt | lumbar lordosis
  - Reduced space at femoroacetabular joint
  - Stress on lumbar facet
- C posture
  - Increased thoracic kyphosis
  - Decreased spinal rotation
  - Difficult to maintain posture during the swing
  - Lacks hip hinge

MOVEMENT SCREENING TOOLS

- Functional Movement Screen™
  - General
- Titleist Performance Institute – Level 1
  - No gold standard
- Functional outcome measures
  - 30 second sit to stand
  - Timed up and go
  - 10 meter walk
( Cicileo et al 2016)

RANGE OF MOTION

- Cervical
  - Bilateral 80 degrees cervical rotation – full swing
- Thoracic
  - Bilateral 50 degrees rotation – full swing
  - Seated trunk rotation test
- Hip
  - Internal rotation | Greater than 40 degrees bilaterally
  - External rotation | Greater than 45 degrees bilaterally
**RANGE OF MOTION**

- Shoulder 90/90 test
- Golf putter position
- Lat length > 120 degrees
- Wrist mobility
  - Forearm rotation
  - Hips
  - Flexion/extension
- Ankle – Dorsiflexion

(mytpi.com)

**BALANCE**

- Single leg isolated with eyes closed
- Hip parallel to surface
- 25 seconds
- 38% of amateur golfers 0-5 seconds
- 15% of amateur golfers >25 seconds

(mytpi.com)

**DEEP SQUAT**

- Assess Bilateral Symmetrical Mobility
  - Ankles
  - Knees
  - Hips
  - Shoulders
  - Thoracic spine (OH position)
- If unable to keep heels on ground –
  - Impossible to maintain posture during downswing
  - Early extension
  - Loss of posture / Flat shoulder (mytpi.com)
DEEP SQUAT

- Seven possible outcomes – very informative
  1. Full or complete squat
  2. Arms down full deep squat – limited thoracic extension/shoulder mobility issues
  3. Arms down limited deep squat – core instability/ankle mobility issues
  4. Right or left calf limited (half-kneeling dorsiflexion test)
  5. Bilateral calf limitation
  6. Good DF Bil w/ arms crossed limited deep squat – core | hip flexion | knee flexion limitations
  7. Unilateral loading – avoiding one side during swing

REHAB SUMMIT 2017 – Performance, Injury Prevention & Rehabilitation Considerations for the Senior Golfer

- Addresses ROM limitations in hip hinge
- Can be unilateral limited
- Hip joint restriction vs poor motor control
- If limited – leads to poor address and dynamic posture

(mytpi.com)

TOE TOUCH

- Addresses ROM limitations in hip hinge
- Can be unilateral limited
- Hip joint restriction vs poor motor control
- If limited – leads to poor address and dynamic posture

(mytpi.com)

PELVIC TESTING – POWER TRANSFER

- Pelvic tilt in golf posture
- Can you separate pelvis and torso?
- Do you have appropriate mobility of hips and spine.

(mytpi.com)
**PELVIC TESTING — POWER TRANSFER**

- Pelvic Rotation Test
- Requires good mobility of spine, hips and pelvis
- Skill to properly sequence downswing
- Creates x-factor in modern swing

**PELVIC TESTING — X FACTOR**

- Mobility or stability problem? Determine first!

(mytpi.com)
TORSO TESTING

- Ability to rotate upper body independently from lower body
- Mobility restrictions – thoracic spine | myofascial restrictions
- Stability limitation – pelvis unstable | circuit machine trainer
- Skill in torso rotation vs extension of spine
- Creates reverse spine angle with extension and low back pain!

(REHAB SUMMIT 2017 – Performance, Injury Prevention & Rehabilitation Considerations for the Senior Golfer)

GLUTE ACTIVATION

- Single leg bridge test – 10 sec hold with leg extended
- Really a hip extension test
- Check for hypomobility of hamstrings and rectus femoris
- Lack of glute maximus activation
  - Early extension
  - Slide or sway

(REHAB SUMMIT 2017 – Performance, Injury Prevention & Rehabilitation Considerations for the Senior Golfer)
Performance Considerations

INJURY PREVENTION EDUCATION

- Return to play – knowing the facts about your body
- Benefits of physical correction exercises
- Strength and conditioning plan
- 10 minute movement practices
- Decrease weight – refer to dietician
- Compression clothing – aid muscle recovery
- Get clubs fitted by an expert
- Golf teaching lessons from a professional
- Have resources for patient – call their pro!
GOLF FITNESS

- Seek out fitness/health expert that also understand golf
- Develop physical body coordination, balance, stability, flexibility and strength
- Enhance hitting power and accuracy
- Enhance the lesson experience with swing coach
- Prevent injury, lose weight, enjoy golf more!

FITNESS TRAINING FOR GOLF

- General Adaptation Syndrome
- Training is simple – Not easy
  - Stressing the system
  - Allowing rest*
  - Recover
  - Adapt to higher level of function

GOLFER'S NEED TO BE HUMAN

- Need general training
- Training age high or low – customize
  - Golf movement
    - Hips at hips
    - Rotate spine
    - Move the body in sync/tempo
  - Golf specific –
    - Does it need to look like a golf swing to be golf performance?
    - Example – baseball training
Golf Fitness

- Consider you need the joint mobilization and skeleton movement to progress
- Non-painful exercises
- Bodyweight first
- Exercises in balance
  - UE push vertical and horizontal
  - UE pull vertical and horizontal
  - Squat
  - Hinge
  - Turn/rotate
- Progress single leg/power/speed/etc.

Periodization

- It always depends...
  - Part of the country
  - Golf rounds planned
  - Fitness goals
  - Travel
- Macrocycle - seasons
  - Microcycle - hard and easy days/weeks
- Return to golf
  - Preseason - movement based, get strong, develop power, flexibility
  - Golf season - progression, stay strong, stay flexible
  - Off season - 4-6 weeks of no golf, flexibility, recovery period

Physiology

- Muscular atrophy | sarcopenia
- Decrease Type 1 & 2 muscle fibers | loss of power bigger
- Physical activity regardless of age
  - Increases work capacity
  - Maintains muscle fiber composition
- Resistance training okay + plyometrics
  - Improve athletic performance
  - Power development
  - Fatigue factor
  - Higher injury risk – contraction induced injury
  - Alternates between high and low intensity UE and LE exercises
  - 6 days recovery
**EXERCISE RECOMMENDATIONS (ACSM)**

<table>
<thead>
<tr>
<th>Type of Training</th>
<th>Frequency</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobic</td>
<td>3-5 days per week for 20-30 mins</td>
<td>50%-95% max HR, light for deconditioned/chronic diseases</td>
</tr>
<tr>
<td>Resistance</td>
<td>2-3 days per week</td>
<td>3-4 sets, 8-20 reps</td>
</tr>
<tr>
<td>Flexibility</td>
<td>2-3 days per week</td>
<td>Incorporate, 2-4 reps, 60&quot;</td>
</tr>
<tr>
<td>Balance</td>
<td>2-3 days per week</td>
<td>20-30 mins</td>
</tr>
</tbody>
</table>

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**CASE STUDY**

- 60 year old male
- Executive at local business
- Plays 9-18 holes per week | April – September
- Clubs off the rack
- 23 handicap
- One or two lessons in the past
- Chief complaint is episodes of low back pain with golf
- Currently no pain in back
- Stopped running 4 years ago

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**CASE STUDY**

- Physical assessment
  - C-sagittal view (rounded shoulders)
  - Limited torso rotation
  - Limited hip rotation
  - Unable to perform pelvic rotation test
  - Deep squat limited depth with arms crossed
REVIEW OF FINDINGS

- Correct physical limitations found during screening
  - Mobility deficits first
  - Stability deficits second
- Teach core stabilization and flexibility exercises for homework
  - Begin glute activation program
- Refer to local teaching pro for swing mechanics evaluation/equipment fitting

WORKOUT – MOBILITY WARMUP

- Mobility warmup 7'
  - Golf ball arch rollouts x 50 ea
  - Foam roll IT band, Lats x 15 ea
  - Ankle mobility – banded dorsiflexion x30
  - Hip mobility – windshield wipers x15
  - Trunk mobility – reachbacks 2 x 15
WORKOUT — ACTIVATION WARMUP

- Activation Prep 7"
  - Glute bridge w/ band at knees – 10 reps hold 5"
  - Squat w/ band at knees (assisted) – 10 reps
  - Lateral banded monster walks – slow 2 x 8 yds
  - Retro banded monster walks – slow 2 x 8 yds
  - Knee hug x 6 ea
  - Three plane lunge w/ arm extended x 3 ea
  - Leg swings on wall (side and forward/backward) x 10 ea
  - Shoulders nerve glide circles x 5 ea
  - Ball rotations on wall x10

- Seated balance on stability ball – 4 reps 15 sec hold
- Seated rotations on stability ball
- Single leg balance – 4 reps 10 sec hold
- 2 leg hops sagittal and frontal plane 1x12
- Single leg balance – dynamic leg reach
- Single leg hops sagittal plane 2x12
- Single leg, opposite arm touchdown 2x12
- Single leg frontal plane hops 2x12

(Thompson et al 2007)
**REHAB SUMMIT 2017 – Performance, Injury Prevention & Rehabilitation Considerations for the Senior Golfer**

- Stability Core Exercises
  - Bird dog progression
  - Chop/1h
  - Planks

**OR**

- Medicine ball plyometrics
  - Kneeling or standing
  - Chest pass
  - Overhead chest pass
  - Perpendicular rotational throw
  - Parallel rotational throw
  - Slam

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**WORKOUT POWER/CORE DEVELOPMENT**

- Stability Core Exercises
  - Bird dog progression
  - Chop/1h
  - Planks

**OR**

- Medicine ball plyometrics
  - Kneeling or standing
  - Chest pass
  - Overhead chest pass
  - Perpendicular rotational throw
  - Parallel rotational throw
  - Slam

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WORKOUT – STRENGTH 20-30 MINS

- 2 supersets typical
- Pair UE and LE exercises
- Upper extremity
  - DB bench-press
  - One arm row
  - Overhead curl to press
  - Assisted pull-up
- Lower extremity
  - Lunges DB
  - Deadlift
  - Step-up
- Core stabilization focus

WORKOUT – REGENERATION 5-10 MINS

- Foam rolling
- Active isolated stretching: 10 x 2” hold
  - UE
    - Shoulder IR/ER
  - LE
    - Hamstring
    - Kneeling hip flexor
- Static stretching preference 30-60” hold
  - Sleeper shoulder
  - Wrist flexion/extension
  - Trunk flexion/extension/rotation
GOLF SPECIFIC WARM-UP

- Most amateur golfers lack knowledge of effective warm-up
- Most warm-up activity at driving range – air swings
- Warm-up essential to reduce risk of injury and improve performance
- 7-10 minutes long
- Increase club-head speed 3-6 m/s. (Versteegh et al 2008)

GOLF SPECIFIC WARM-UP

- Dynamic Rotation-specific Warm-up:

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossed-arm torso twist</td>
<td>Crossed-arm torso twist with neck rotation</td>
</tr>
<tr>
<td>Thoracic combined motions</td>
<td>Backswing with focus on internal rotation of loaded hip</td>
</tr>
<tr>
<td>Neck only rotations/rotator cuffs with hands wrung</td>
<td>Pelvic lead into downswing</td>
</tr>
<tr>
<td>GRF of the legs in opposition to rotation</td>
<td>Swing for remaining time</td>
</tr>
</tbody>
</table>

KEEP IT FUN!
QUESTIONS

PERFORMANCE ENHANCEMENT

- Competitive greatness – focus on the process
- Mature competitor (Tracey & Elcombe 2015)
- Attention to thoughts – mindset
- Technology
  - Virtual reality viewer
  - Video
  - 3D biomechanical data tracking

THANK YOU

- “Golf is a good walk spoiled” Mark Twain