

Ed Case Study Answers

Ed is a 54-year-old former professional baseball player who is currently managing a law firm and spends most of his day behind a desk. He is 6'2" tall and weighs 200 lbs. His waist circumference is 38 inches. Ed underwent a physical examination and received the following results: resting blood pressure 131/89 mmHg, total cholesterol 225 mg/dL, LDL 180 mg/dL, HDL 37 mg/dL, fasting blood glucose 104 mg/dL, triglycerides 163 mg/dL. His resting heart rate was 81 beats/min and regular. He doesn't smoke cigarettes or use any other tobacco products. He has no symptoms or personal history of cardiovascular disease. Ed was a right-handed pitcher and has discomfort with shoulder internal and external rotation and overhead pressing movements.



Ed's doctor has recommended resistance training and stretching to resolve his rotator cuff pain. Ed's brother had an angioplasty procedure at the age of 57. Ed used to participate in recreational doubles tennis matches once a week for about 45 minutes, and played 9 holes of golf once a week using a cart before he began having rotator cuff pain. Ed has been going to the gym and lifting weights a couple of times a week for 30 minutes each session for the past 3 months, but his progress has plateaued. Ed is currently performing 2 sets of 12-15 repetitions to failure for the major muscle groups using machines but wants to participate in more cardio activities and begin a more structured resistance training program at the suggestion of his doctor. He has hired a trainer to help him with a resistance program 2 days/week as well as cardio activities. Ed is available 3-5 days a week for 1 hour each day.

Coronary Risk Factors

1. What is Ed's body mass index (BMI) and what is his body weight category?

$BMI = (200 \times 703) / 74 / 74 = 25.7 \text{ kg/m}^2$ Overweight category

2. List Ed's major coronary risk factors (if any):

Abnormal blood cholesterol, prediabetes, sedentary lifestyle, age

3. What other factors that contribute to coronary artery disease does Ed current have (if any)?

Elevated blood triglyceride level

Physical Fitness Assessment

After ensuring that Ed was fully cleared for exercise, he underwent a fitness assessment. His skinfold and 1 mile walk test measurements are listed below.



Skinfold measurements: Chest: 17 mm, Abdomen: 26 mm, Thigh: 20 mm. 1 Mile Walk Test: Heart rate = 140 beats/minute, Time = 14 minutes and 30 seconds.

4. Using the Body Composition and Waist Circumference section of your PHF textbook, determine Ed’s percent body fat. Determine his estimated VO₂ max for the 1 mile walk test by using the formula in the Physical Fitness Assessment section of your textbook. Using the table below, as well as the Normative Data and Fitness Categories section of your textbook, indicate his current fitness category for each test, and create a short-term goal for each test by using the percentage increases listed in the Goal Setting section of your textbook. Ed is still a novice exerciser, but is highly motivated. Therefore, use the higher end of the percentage increase for each test score.

	Current Raw Score	Current Fitness Category	Goal Raw Score*	Goal Fitness Category**
Percent Body Fat	21.5%	Mid Good	18.5%	High Good
Sit-and-Reach (inches)	17.5	Low Excellent	19.25	High Excellent
1 Min Sit-up	20	Mid Poor	25	Mid Fair
1 Min Push Up	Test not taken			
1 RM Bench Press	Test not taken			
1 Mile Walk (ml/kg/min)	33.6	Mid Poor	37.0	Mid Fair

*Calculations for improving Goal Raw Score were done using percentages as indicated below:

Body Fat: $21.5\% - 3\% = 18.5\%$
 Sit-Up: $20 \times 1.25 = 25$

Sit-and-Reach: $17.5 \times 1.1 = 19.25$ inches
 VO₂ max: $33.6 \times 1.1 = 37.0$ ml/kg/min

**Goal fitness category was determined by looking the goal raw score up in the Normative Data and Fitness Categories section of your PHF textbook.

Cardiovascular Training and Prescription

5. Based on the above information and using the Heart Rate Reserve formula in the Cardiovascular Training and Prescription section of your PHF textbook, calculate Ed’s target HR. Remember that the intensity should be based on his current cardiovascular fitness level.

- a. Estimate Max Heart Rate: $207 - (0.7 \times 54) = 169.2$ (round down to 169)
- b. Calculate Heart Rate Reserve (HRR): $169 - 81 = 88$



- c. Multiply HRR by lower range of intensity: $88 \times 40\% = 35$
Multiply HRR by higher range of intensity: $88 \times 59\% = 52$
- d. Add resting heart rate back in.
Determine low end of target HR: $35 + 81 = 116$ beats per minute
Determine high end of target HR: $52 + 81 = 133$ beats per minute
- e. Target HR Range = between 116 and 133 beats per minute
- f. Target HR Range (10 second count): $116/6 = 19$ and $133/6 = 22$ 19-22 beats/10 second count
- g. Design a progressive 8 week cardiovascular program for Ed based on his current level of cardiorespiratory fitness to help him improve his VO_2 max score on his next fitness assessment.

	Type	Frequency	Intensity	Time	Weekly Volume
Week 1	Walk	3	116-133 bpm	20 min	60 min
Week 2	Walk	3	116-133 bpm	25 min	75 min
Week 3	Walk/Elliptical	3	116-133 bpm	30 min	90 min
Week 4	Walk &/or Elliptical	4	116-133 bpm	25 min	100 min
Week 5	Walk &/or Elliptical	4	116-133 bpm	30 min	120 min
Week 6	Walk &/or Elliptical	5	116-133 bpm	25 min	125 min
Week 7	Walk &/or Elliptical	5	116-133 bpm	30 min	150 min
Week 8	Walk &/or Elliptical	5	116-133 bpm	35 min	175 min

6. At which week does Ed meet the minimum number of minutes per week of moderate intensity aerobic activity recommended for health benefits?

At week 7, Ed meets the recommended minimum of 150 minutes of moderate intensity aerobic activity per week required to achieve the health benefits.

This is just an example of a cardiovascular program. There are many ways to write a progressive cardiovascular training program.

Resistance Training



7. Ed would like to perform resistance training workouts with his trainer 2 days/week. What is one area that the trainer should target for resistance training?

Because of Ed's history of rotator cuff muscle pain, safe and effective exercises to strengthen these muscles should be part of his overall resistance training program.

(Note that on the 2 days per week that Ed does 30 minutes of resistance training, he could perform only 30 minutes of cardio since he has one hour available for his workout.)

8. Select a strength goal for Ed from the Resistance Training and Prescription section of the PHF textbook. He would like to utilize a traditional resistance training program for most of his exercises, but will utilize dynamic resistance training for his rotator cuff muscles. The Table in your textbook will assist you.

Since Ed has been lifting for 3 months, it would be appropriate to start with a traditional goal, avoiding exercises that may aggravate his rotator cuff injury. To be safe, he will utilize a dynamic resistance training program for the rotator cuff musculature. This would provide improvements in both muscular strength and endurance. It is appropriate for Ed to perform only 2 sets given that he will be increasing his resistance as he performs fewer repetitions. As he progresses, he may increase to 3 sets if it matches his long-term goals and allows enough time for aerobic activities necessary to improve his health and facilitate weight loss.

Intensity
65-85% for most exercises
30-65% for rotator cuff

9. List 7 resistance training exercises (3 upper body, 2 core, and 2 lower body) that you would include in his program along with the muscles worked, number of reps, and number of sets.

Name of Exercise	Muscles Worked	Days/Week	Sets	Reps
Standing Cable Internal Rotation*	Rotator Cuff (Subscapularis)	2	1-2	12-17
Standing Cable External Rotation*	Rotator Cuff (Teres Minor and Infraspinatus)	2	1-2	12-17
Seated Cable Low Row	Latissimus Dorsi, Posterior Deltoid, Rhomboids, Middle Trapezius, Biceps Brachii and Brachialis	2	2-3	6-12
Plank	Rectus Abdominis (this exercise uses a static contraction)	2	N/A	~3, hold with proper form until fatigued
Back Extension Machine	Erector Spinae	2	2-3	6-12

Dumbbell Squats	Gluteus Maximus, Quadriceps	2	2-3	6-12
Hamstring Curl Machine	Hamstrings	2	2-3	6-12

*Note it is recommended that Ed use lower resistance with higher repetitions (1-2 sets of 12-17 repetitions) for his rotator cuff exercises (shoulder internal and external rotation).

Resistance Training continued

Since Ed spends much of his day at a desk, and has played tennis and golf for years, his pectoralis major and anterior torso muscles are likely stronger and tighter than his upper back muscles which are likely weaker. This can aggravate his rotator cuff injury. Note that for now, the bench press and overhead movements have been excluded from Ed's program until his rotator cuff injury is healed and he can perform these types of movements pain-free.

10. How would you determine the amount of resistance Ed should use for the seated cable low row and dumbbell squats? The Table in your textbook will assist you.

You could have him perform a 1 RM test for each of those exercises, then use 65-85% of the 1 RM to determine the amount of resistance.

Alternatively, for the seated cable low row you could estimate his 1 RM using the Table in the Resistance Training and Prescription section of the PHF textbook. Let's assume he was able to do 8 repetitions to failure with 60 lbs. Using Table 6, 8 repetitions to failure correlates to approximately 78.5 % of his 1 RM. We would estimate his 1 RM by performing the following calculation: $60 \text{ lbs} / .785 = 76.4 \text{ lbs}$. As noted earlier, Ed needs to start somewhere in the range of 65-85% of his 1 RM. Selecting 65% to start with would correspond to $76 \text{ lbs} \times .65 = 49.4 \text{ lbs}$. This amount of resistance should allow him to perform approximately 12 repetitions to failure.



With regard to dumbbell squats, it is best to use the Trial and Error Estimation approach to ensure that he can maintain proper form before doing any heavy lifting. Knowing that his goal is to perform 6-12 repetitions, you want to select a dumbbell weight where he can squat 10-12 times (high end of the range to start) with good form. So, you would start with a moderate weight (25-30 lbs. dumbbells) and determine how many repetitions he can perform with proper technique. If he can perform more than 12 repetitions, then select a heavier weight for the next set until you determine the amount of resistance that allows him to perform 10-12 repetitions to failure. This weight should correspond to approximately 65% of his 1 RM.



Flexibility Training

11. Ed spends much of his day sitting, has a rotator cuff problem, and would like to play tennis and golf again. Given these factors, list four static stretches that Ed should be doing, as well as the muscle(s) stretched, joint action to stretch each muscle, and provide suggestions for the duration and number of repetitions for each stretch. Use the Flexibility Training and Prescription section in your PHF textbook

Sitting at a desk for significant periods of time often leads to tight hip flexors, as well as tight low back, and hamstrings. In addition, both tennis and golf emphasize the anterior chest and rotator cuff muscles.

Name of Stretch	Muscles Stretched	Joint Action to Stretch	Duration	Repetitions
Standing Hip Flexor Stretch	Iliopsoas	Hip Extension	30 sec	2 each side
Shoulder Rotation Stretch	Supraspinatus, Infraspinatus, Teres Minor (Rotator Cuff)	Shoulder Internal Rotation	30 sec	2
Supine Knees to Chest Stretch	Erector Spinae	Spine Flexion	30 sec	2
Seated Modified Hurdler Stretch	Hamstrings	Knee Extension with Hip Flexion	30 sec	2 each side



Nutrition

When at the doctor getting cleared for exercise, Ed met with a registered dietitian and was prescribed a diet of 2,000 calories per day. Counting calories will be a change for Ed, who tends to eat fast foods. The dietitian instructed him to consume 30% of his calories from healthy fats. In addition, he was instructed to cut back on simple sugars.

12. With a recommendation of 30% of total calories from fat, how many grams of fat should Ed take in each day?

$$2000 \times .30 = 600 \text{ calories}$$

$$600 \text{ calories divided by } 9 = 66.6 \text{ (round up to 67 grams per day)}$$



Is there any particular type of fat that Ed should limit in his diet?

Yes. The American Heart Association currently recommends limiting saturated fat to <7% of total daily calories and keeping trans fat intake as low as possible.

13. To help Ed achieve this goal, what type of general recommendations would you make for him, especially since he mentioned earlier that he finds himself eating meals at fast food restaurants?

- Limit saturated fats such as whole-milk dairy products, butter and fatty cuts of beef and pork.
- Select healthy fats such as mono and polyunsaturated. Cook with olive or canola oil. Choose baked or grilled fish (salmon, tuna, swordfish, etc.) and other foods (avocados, nuts and seeds)
- Avoid drinks with large amounts of added sugars, such as flavored coffee drinks, non-diet soft drinks, sports drinks, energy drinks, and imitation fruit drinks.
- Look for options to include vegetables and fruits with meals.
- Pack healthy snacks at home and bring to work so he isn't tempted to visit fast food restaurants when hunger strikes.
- Consider preparing meals at home and bringing his lunch to work 3 days/week.
- Consume at least 50% of his grains as whole grains.
- Reduce sodium, as it may assist in lowering blood pressure.
- Visit ChooseMyPlate.gov for dietary recommendations and guidelines.



Behavior Change



14. Consider all of the information provided about Ed. What stage of change would you classify him with regard to cardio and resistance training activity and healthy eating?

Ed is most likely in the preparation stage for both increasing cardio activity and healthy eating. He has enlisted the help of a personal trainer to improve his cardio activities and has seen the dietitian, so he is preparing to change his behavior.

Ed is in the action stage for resistance training since he has been lifting weights regularly but for less than 6 months.

It is important to recognize that clients may be in different stages of change among various behaviors and fitness activities. Be sure to plan and set goals accordingly.

16. How might you incorporate some of the concepts in the behavior change action steps to help keep him motivated?

- Set small written, short-term goals.
- Select a method to track progress for both diet and exercise using pen and paper or an App.
- Develop a back-up plan when he is tempted to snack on unhealthy foods at work.
- Develop a back-up plan for when Ed misses a cardio workout due to work-related responsibilities.

