A Fitness Assessment and Exercise Prescription

For My Parents

An Honors Senior Project (HONRS 499)

By

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CHAPTER I: INTRODUCTION

As an Exercise Science student at Ball State University, I have taken many courses relating to health and the human body. Some of these courses include anatomy, exercise physiology, weight training, nutrition, fitness assessment, and exercise prescription. The curriculums of these classes involve assignments and projects that simulate situations occurring in health-related careers. These lessons have often included labs in which I have measured myself and my peers in the various components of physical fitness. These components, as well as the origination and purpose of this project, are outlined and defined in this section. Learning how to apply classroom lessons to the real-life scenario presented by this project shall be the capstone of the knowledge and experience I have gained as an Exercise Science major. One of the important lessons that I have learned in both theory and practice is the many positive benefits gained from living a physically active lifestyle.

In 2000, 30.9% of United States population was measured as clinically obese, a 7.6% increase from data gathered in the late 1980s and early 1990s. It is estimated that this number will have increased to 39% by next year\textsuperscript{1}. In direct relation to this epidemic, the prevalence of metabolic and cardiovascular diseases has also increased. Health problems associated with this widespread weight gain include increased risks for heart disease, osteoarthritis, some cancers, stroke, hypertension, and mood, sleep, and eating disorders. It is said that obese individuals carry more health-related problems than smokers or chronic drinkers\textsuperscript{2}. The benefits of engaging in regular physical activity and working towards or achieving physical fitness are countless. Numerous studies have shown that physical activity and exercise prevent the occurrence of the aforementioned
ailments. As one can see, achieving a sufficient level of fitness can improve the physiological, metabolic, and psychological health of an individual.

Physical fitness is defined as a set of attributes that people possess that relate to their ability to perform physical activity. This multidimensional concept is comprised of skill-related, physiologic, and health-related components. The skill-related components of agility, balance, coordination, speed, power, and reaction time are closely related to sport and motor skills performance. Physiologic fitness includes the status of metabolic systems, body compositional factors, and bone mineral density. Finally, the five components of health-related physical fitness are cardiorespiratory fitness, body composition, muscular strength, muscular endurance, and flexibility. Due to their association with the ability to perform daily activities and their influence on the risk of the premature development of diseases, these five factors are covered closely in this paper. Before exploring these components individually, I will take some time to summarize the conception, objectives, and process of this project.

During my junior year, I enrolled in EXSCI 301 – The Fundamentals of Exercise Prescription. My professor for the class who has also served as my advisor for this project, Paul Nagelkirk Ph.D., provided an anecdote concerning his mother’s hesitance in trusting his doctoral-level knowledge of health and fitness. He said that she was more comfortable believing what she read in various periodicals than in listening to him. I could relate to this because my parents are fairly uneducated in this area as well. My mother is a high school nurse and my father is a businessman. Both parents enjoy sports and are former athletes themselves. My mom competed in volleyball and tennis at the high school level, and my dad played football and baseball at the collegiate level. This
background has provided them some sort of foundation in health and physical activity; however, their ability to put together a structured exercise routine was limited. Since both of them had a desire to improve their health, I began to think of ways in which I could use my knowledge and experience to help them. After discussing the idea with my parents and Dr. Nagelkirk, the organization of this project began to take shape. We decided that a pre-program assessment of the five components of physical fitness, followed by an eight-week exercise prescription and post-test would provide my parents with a foundation on which to build their personal level of physical fitness. However, there were many items to take care of before we made our way to the fitness room.

One of the first tasks was to have my parents respond to a Health History Questionnaire (HHQ) (Appendix A). This pre-participation form allowed me to gain some insight into the background, risks, and habits of my parents. Also, several items gathered from the HHQ assessment revealed some potential limitations to the project. For example, my dad is on medication for high cholesterol and hypertension, and my mom takes medication for an esophageal disorder. In order to assign proper risk stratification, these elements and a few others were taken into account. For example, in a procedure outlined by the American College of Sports Medicine (ACSM), individuals are evaluated in eight different categories of risk. These categories include age, family history, smoking habits, hypertension, dyslipidemia, impaired fasting glucose, obesity, and sedentary lifestyle. Based on my father’s medication, body mass index (BMI), activity level, and as a male over the age of 45, he was classified as a client with moderate risk. Furthermore, my dad’s BMI classified him as Class I obese. Based on my mother’s singular positive risk factor of high cholesterol, she was classified as low risk. On her
HHQ, my mom listed symptoms of chest pain and heart palpitations which would have automatically placed her as a high risk client. However, upon further explanation, it was discovered that these symptoms were only present on days where she had consumed more caffeine than usual.

I would not consider either of my parents extremely out of shape as my mom takes regular walks and both parents are active working in the yard. However, the prescreening questions offered by the HHQ revealed that the main goal of both individuals was to lose weight and improve their health. Though I expected this to be the case, these goals solidified the basis of the actual exercise prescription. All the elements of health-related physical fitness are important, but the one most conducive to resulting in weight loss and improving overall health is cardiorespiratory fitness. This component is defined as the ability to perform large-muscle, dynamic, moderate to high intensity exercise for prolonged periods. Low levels of CR fitness are associated with an increased risk of premature death, especially by cardiovascular disease (CVD), and improved levels are associated with a reduction in death from all causes.4

Another one of the five health-related fitness components highly associated with disease risk, body composition, is expressed as the relative percentage of fat to fat free tissue in the body. By lowering the amount of fatty tissue in one's body, these disease risks greatly diminish. In order to lose weight, one must expend more energy than he or she consumes. This can easily be achieved on a short term basis, but a lasting improvement in body composition must usually be accompanied by a well-balanced diet and devout participation in an exercise program. An item worth noting at this point is the fact that muscle tissue, at rest, consumes more energy in calories than fatty tissue. By
improving the components of muscular fitness, strength and endurance, one can decrease the percentage of fat to fat free tissue in his or her body.

Muscular strength is defined as the maximal force that can be generated by a specific muscle or muscle group. Endurance is the ability for this muscle group to perform repeated contractions over a sufficient duration to cause muscular fatigue, or the ability to maintain a certain percentage of maximum voluntary contraction for a prolonged period of time. Though neither of my parents desired to “get bulky” or experience soreness caused by high volume workouts, I explained to them that these fitness components would be stressed in their exercise routine for a couple of reasons. The first reason, as listed above, was to decrease their percentage of fat to fat free tissue and to be able to expend more energy at rest. Secondly, an increase in muscular endurance would allow them to perform activities of daily living more easily and with more zest. Finally, as one ages, muscular strength decreases due to various physiological and structural factors. Therefore, it is important for my 49 year-old parents to build their strength while they still can, or at least maintain what exists.

The last health-related component of physical fitness is flexibility, which is the ability to move a joint through its complete range of motion. It is difficult to assess this component because it is specific to each joint, and there is no way to evaluate total body flexibility. Although some may not consider flexibility as an important factor concerning health, a lack of it may lead to functional limitations and is also considered as a risk factor for musculoskeletal injury. Benefits acquired by an increase in flexibility include reduced muscle tension, an increased range of motion, injury prevention, improved coordination, and a decreased level of soreness associated with other activities.
Before deciding which assessments I would use to evaluate my parents in these fitness components, I first described to them the risks that can be involved in starting an exercise program. In order to comply with the legal and ethical standards of fitness testing, I had my parents read and sign an informed consent form approved by the Ball State University Physical Fitness Program (Appendix B). This form described possible tests and their subsequent risks. It also allowed for questions, and explained to them their right to quit the tests at any time. It was beneficial for me to practice this because the process is required in all research projects involving subjects.
CHAPTER II: BASELINE TESTING

As stated in the introductory section, the five health-related components of physical fitness include cardiorespiratory (CR) fitness, body composition, muscular strength and endurance, and flexibility. I measured both of my parents in each of these components at the beginning of the semester using Ball State’s recreational and athletic facilities. By using a structured format of tests endorsed by the ACSM, I was able to compare my parents’ results with normative data for individuals of a similar age, gender, and risk stratification. It also allowed me to evaluate my parents’ strengths and weaknesses, which is an important aspect of exercise prescription. Finally, I chose which assessments to perform based on their relevance to the overall goals of the exercise program.

There are many reasons for having clients partake in baseline testing before writing their exercise prescription. For instance, if clients know that they will be tested at the end of a program and that their improvement can be measured quantitatively, the pre-testing can provide a sort of intrinsic motivation, and perhaps a sense of responsibility. Not only does a clinician assess strengths and weaknesses, but a pre-test also allows a client to gain confidence in individual strengths and realize his or her shortcomings. Lastly, the pre-testing day allowed me to practice the proper order in which to implement multiple tests in a single session. I started with non-fatiguing measurements such as the skin-fold test for body density as well as height, weight, and blood pressure measurements. From there I progressed to muscular strength, muscular endurance, and finally aerobic capacity assessments. Ideally, all measurements would be performed on
separate days to ensure maximal performance, but this order best provides the best opportunity for adequate rest and, therefore, the ability to achieve reliable results.

The first health-related component measured in the pre-testing period was body composition. The first of two assessments that I employed involved weighing and measuring my parents to calculate their Body Mass Index. This technique commonly used in health-related research and maintains a certain respect in clinical settings. I also performed a skin-fold test on my parents which involved measuring certain areas of subcutaneous tissue for fat content. To carry out the measurement, I pinched three specific areas of the body (Table 3) and measured the extent of the fold using a Lange caliper. I chose this test because I have had prior experience with it, and also because I wanted to be able to show my parents an estimation of their body fat percentage as compared to normal values for their age and gender. When I calculated the results of these tests and shared them with my parents, it became apparent that improving upon this component would become a high priority.

An item that was not of great importance in the creation of the prescription was muscular strength. In choosing specific tests, I had to keep in mind my parents' objectives for this project as well as my goals for them. Neither of my parents desired to gain large amounts of muscle mass, nor were they thrilled about the idea of the soreness caused by high intensity workouts. Since their prescription would not focus on improvement of muscular strength, I chose to test this component by using a hand-grip dynamometer. This test is not necessarily a poor strength assessment; however, it essentially only measures the maximal force generated by muscles of the forearm. These muscles contribute to activities of daily living and correlate to overall strength, but do not involve
large muscle groups and multi-joint movements that would probably be tested in the creation of an athletic or performance based prescription.

Due to the fact that there is no single test to evaluate total body muscular strength, endurance, or flexibility, these components of fitness proved difficult to measure. For muscular endurance, I attempted to direct my parents through an endurance battery. However, after neither my mom nor dad could complete a single repetition in the bench press at the recommended resistance, I decided to make a few adjustments in the procedure. I created a modified version of the muscular endurance battery which included estimated resistances for three upper body exercises, three for the lower body, and one core endurance activity (Table 5). By doing this, I sacrificed the ability to compare them to population norms. On the other hand, one of the main objectives of the program was to give my parents a foundation from which to work and improve on. In making these adjustments, I would still be able to see individual improvement at the completion of the program. After completing the battery, I found that my parents were able to perform a significant number of repetitions in the lower body exercises at the protocol's recommended levels of resistance. This item was noted and later considered while creating the exercise prescription.

The last component of muscular fitness, flexibility, is essential in both athletic performance and performing activities of daily living. It is believed that an individual with poor flexibility may have a greater risk of sustaining injuries as well as an increased chance of suffering from low back pain. Low back pain, caused by an inflexible lower back and hamstrings, affects 60-80% of Americans at some point in their life. It is the second most common cause for time lost from work aside from the common cold, and the
second most common ailment next to headaches. The two tests to assess my parent’s flexibility included the Sit and Reach test to measure lower body flexibility and the Shoulder Rotation Test to evaluate upper body flexibility. I found that testing for flexibility could be performed by using inexpensive equipment, and did not take much time or effort.

Maximal oxygen uptake (VO2max), which is the product of maximal cardiac output and arterial-venous oxygen difference, is accepted as the criterion measure of CR fitness. The best way to measure this variable is by using a procedure known as open-circuit spirometry during maximal intensity exercise. However, this process is extremely involved as it requires an experienced clinician and expensive equipment. I did not find this method necessary because there are several valid and reliable methods to indirectly estimate VO2max using a submaximal exercise test. The estimations provided by these measurements are based on assumptions gathered by previous research. Some of these assumptions include the existence of a linear relationship between heart rate and work rate, a uniform maximal heart rate for a given age, and a subject whose heart rate is not altered by medications.

In order to test CR fitness, I used the single-stage Ebbeling Treadmill Test. In a study performed in 1991, it was found that this single-stage submaximal test is effective in estimating an individual’s VO2max. The test involved a warm-up stage in which my parents walked on a treadmill for roughly three minutes at a comfortable, yet brisk pace that elicited a heart rate between 86 and 128 beats per minute, or 50-75% of their age-predicted maximal heart rate. Once this steady-state heart rate was achieved, the treadmill was elevated at a degree of 5%. As per Ebbeling’s protocol, my parents continued
walking for approximately five more minutes until their heart rate reached a steady state. Heart rate was assessed using a telemetric monitor (Polar Electro, Kempele, Finland).

Finally, VO2max was estimated using a regression equation\(^7\).

Though my father is currently on medication that may affect his heart rate, a pre- and post-test performed in a consistent fashion would still be able to establish a baseline and show progress in CR fitness. This submaximal measurement of VO2max also allowed me to compare my parents to other individuals of the same age and gender. Their specific values will be discussed in a later section, but it is important to note that values falling below the 20\(^{\text{th}}\) percentile in maximal aerobic power normative tables are associated with an increased risk of premature death from all causes\(^8\).

By testing my parents in the five components of health-related fitness, I was able to compare them with others and set a foundation for their exercise prescription by taking note of their strengths and weaknesses. In most cases, I was not able to use the "Gold Standard" measurements used by researchers. However, the tests that I did use allowed me to make recommendations conducive to the goals we set at the beginning of the semester. These tests could be repeated by most any individual with minimal instruction, and yet they still go a long way in gauging the fitness capacity of an individual.

Everything discussed so far will be elaborated upon as I explain the rationalization of the exercise prescription.
CHAPTER III: EXERCISE PRESCRIPTION

To create a well-rounded exercise prescription for my parents I had to consider many important factors. I wanted to make the experience fun and enjoyable, but also challenging enough so that they could see the benefits of exercise. Next, I realized that achieving compliance during the first eight weeks would be essential for them to continue their routines at the completion of the program. Therefore, we decided they would record their workouts on sheets that I provided, and that we would communicate on a weekly basis. The pre-testing allowed me to evaluate their individual strengths and weaknesses and make adjustments to the program. In this section, I will elaborate on what these pre-tests did and did not show. Finally, by considering their limitations and preferred activities, I hoped to be able to help my parents accomplish their fitness-related goals.

Due to the fact that both of my parents are employed full-time, travel frequently to see their children, and are active around the house, time was the first limiting factor I considered in creating their workout. Exercises without a specific purpose were immediately disregarded from their prescription, as I was forced to prioritize. After much thought, I decided that three weekly workouts lasting approximately one hour would provide a sufficient starting point. However, I encouraged them to participate in as much activity as possible, even on unscheduled days. A workout lasting longer than an hour would interfere with my parent's busy lifestyles and could possibly create issues with compliance. On the other hand, a workout shorter than an hour would probably not be challenging enough to show significant improvements in all five components of fitness. Fortunately, access to a workout facility was not an issue, as our family owns a membership to the community's YMCA. Regular access to a large fitness center within
our hometown eliminated some possible limitations concerning workout frequency and
duration. With the time and location factors decided, it was now time to decide which
activities should be performed.

In 2003, the United States Surgeon General recommended that individuals
participate in a moderate amount of physical activity on most, if not all days of the week.
(REFERENCE) Some examples of sufficient physical activity include 15 minutes of
running or 30 minutes of brisk walking. With this in mind, I came up with the CR fitness
recommendation for my parents’ prescriptions. Starting with the first week, I
recommended that my parents perform a cardiovascular exercise of their choice
(treadmill walk, elliptical machine, bike, etc...) for at least 23 consecutive minutes. This
duration would allow for a three minute warm-up and 20 minutes of exercise at a slightly
higher intensity. The degree of intensity was ordered to match or exceed that of the
Ebbeling pre-test, or 50-75% of their age-predicted maximal heart rate. Considering the
results of the test, I thought that this amount of cardiovascular exercise would not be
overly strenuous for my parents while at the same time begin a progression towards
increasing their CR fitness. Similarly, there are two ways to increase caloric expenditure
during a workout. One way is by increasing the intensity, or the speed and resistance of
the activity, while the other involves increasing the duration. I planned for them to
increase their duration by at least one minute on each of the following work-out days to
the point where they could comfortably complete thirty minutes of continuous moderate
exercise. By accomplishing this, they could increase their chances of improving their CR
fitness capacity, and body composition. I communicated all of this information orally,
and left the instruction on the first week’s workout short and to the point (Appendix C).
According to Thomas Baechle and Roger Earle (pg. 396), mode, intensity, and frequency are important to all aspects of an exercise prescription, including resistance training. In the first several weeks of a program, it is advised to prescribe both core, or multi-joint, and assistive, or single-joint, muscular exercises. The eight different lifts that I prescribed fulfill this recommendation (Appendix C). In order to improve the components of muscular fitness, I considered evidence-based information on the physiological response of muscle tissue to resistance training. It has been documented that most gains in muscular fitness for previously untrained individuals during the first six to eight weeks of training can be attributed to improvements in the neurological adaptations of muscle fibers and motor unit recruitment (pg 20). Therefore, an untrained individual would not show increased benefit from a workout geared towards hypertrophy, or increased muscle mass, during the first one to two months. This information allowed me to prescribe one set of twelve to fifteen repetitions for each lift. As stated in the BASELINE TESTING chapter, I had to make some adjustments in the amount of resistance for lifts in the endurance battery. However, after the battery was completed, I found that I had underestimated my parent’s ability in several of the lifts. In order to prescribe a challenging level of resistance, I simply recommended additional weight in the lifts where more than fifteen repetitions were achieved. For example, my mom achieved close to twenty repetitions in five of six exercises during the battery pre-test. I predicted that by increasing the resistance of each lift by one or two levels, she would still be able to complete the recommended twelve to fifteen repetitions.

There are several other items that should be noted within the prescription. By viewing the weekly workout sheets, one might notice the absence of free-weight
exercises. I chose machine exercises for my parents because they do not require a spotter, they are found in the same room as the cardiovascular exercise equipment at our YMCA, and because they are safer to use, especially for previously untrained individuals. Additionally, in following recommendations for beginning lifters, I recommended performing the resistance exercises two times per week (pg. 396). This frequency is conducive to improving muscular endurance, yet also allowed my parents adequate rest between lifting sessions. In addition to extra rest, the work-out day in the middle of the week was used to concentrate on the flexibility component of muscular fitness.

There are many methods in which a person can improve flexibility. The two that I chose to implement in my parents’ prescriptions included dynamic and static stretches. I used the day in the middle of the week to utilize dynamic movements. These stretches include specific movement patterns that are widely used among athletes. The reason that I decided to have my parents perform them is because of their capacity to raise the heart rate and increase core body temperature. These movements are effective way to limber up before a cardiovascular workout. Static stretches are easy to learn, and because of their slow, constant movement they have a low likelihood of injury. I instructed my parents to hold six different stretches emphasizing major muscle groups for thirty seconds upon the completion of their resistance workouts. Not only do these movements improve flexibility, but they also reduce the occurrence of muscle soreness caused by resistance training. All of the fitness components addressed in this section were completely subject to change. In the weeks ahead, several adjustments were made to improve the effectiveness of the program. These adjustments are explained in chronological order in the next section.
CHAPTER IV: PROGRAM MONITORING

Due to the fact that my parents were untrained and inexperienced in many of the activities that I prescribed for them, I knew that there might be a few bumps in the road along the way. By keeping our priorities in mind and by communicating frequently, I was able to make necessary adjustments concerning activities that they were uncomfortable with, and also avoid those that would adversely challenge their limitations. A few of these modifications were insignificant, but at the start of the fifth week I made some changes worth noting. I will address these issues in order within this section.

During the planning phase, my parents and I attempted to discuss any and all possible limitations for the project. One of my first concerns was the reoccurrence of my dad’s “old football injury,” which he sustained while playing in college. For as long as I can remember, my dad has mentioned pain in his left shoulder when he lifted his arms above his head. Since many upper body weight-training activities involve movement at the shoulder joint, I instructed my dad to use extreme caution while performing these types of lifts. Also, throughout the planning and pre-testing phases of this project my dad was busy searching for a new job. I informed him that participating in an exercise program might help to provide an outlet to reduce stress and increase his energy level (REFERENCE). Another person that would benefit from an energy boost is my mother. Not only does she work full-time as a high school nurse, she also takes care of all of the indoor housework. I really hoped that she would enjoy the workouts that I designed, and see some quick results.

During the first few weeks of the workout phase, I was extremely concerned with compliance. As stated before, my parents had never participated in a regimented workout
and their time was limited. Since I was still in Muncie completing a senior internship and competing on the baseball team, I would not be there to coach and motivate them. I could not answer any immediate questions about the workout, make adjustments to intensity levels, or correct lifting techniques. Finally, I was worried that my parents would feel self-conscious carrying around a pen and paper during their workout. However, when I talked to my parents after the first week, none of these items were labeled as problematic.

From reports received via email and telephone, I found that my parents were adjusting well to the first week of the program. I was happy to hear that the workouts were taking approximately 60 minutes, and that they were challenging without producing too much soreness or fatigue. Both parents commented that they thought the static stretching at the end of the resistance training helped to eliminate some aches and pains. Also, they both stated that they were uncomfortable with the dynamic stretching and the Physioball exercises. They reported that they were trying them, but they were not sure if they were performing them correctly because they felt awkward and uncoordinated. During the pre-testing period, I provided them with several pictures of the dynamic stretches to serve as a reminder for proper form. After the first week, I was able to send them several pictures and descriptions of the Physioball exercises (Appendix D). I hoped that these would provide both a visual aid and a written reminder for the proper way to execute these movements. My parents and I both discovered that this method of instruction, with pictures and descriptions, was much easier to follow and not too cumbersome to carry around.

Though I only provided workouts for three days of the week, my mom was walking for cardiovascular exercise an additional two to three times a week. As stated
before, she was already well on her way to meeting the Surgeon General’s recommendation of performing cardiovascular exercise on most, if not all days of the week. I realized that I should make some adjustments in all components of the workout in order to follow the training principle of progression. This principle states that over time a person adapts to training stimulus; therefore, the volume and intensity of a workout must be advanced so an individual can continue to make improvements (pg. 415). I knew that at the completion of the fourth week, I would have a chance to meet with my parents. We decided that during this time, the mid-point of the eight-week program, it would be appropriate to make a few substantial changes in the structure of the workout.

Due to the fact that the principle of progression applies to all the components of fitness, and because my parents were overachieving in the three-day per week routine, I decided to change to a four-day a week format (Appendix C). This was one way to increase the volume of their workouts without exceeding the one-hour time frame. Both parents agreed that the CR portion of the workout was becoming too easy, and an adjustment was necessary. They believed that the 30-35 minutes of training did not elicit enough fatigue to reap any serious benefits. I reiterated an important fact that I mentioned to them during the planning phase and acknowledged in the INTRODUCTION section. That is, there are two ways to increase one’s energy expenditure during a workout. One is by increasing the time, and the other, by increasing the intensity. Since they had already increased the duration of the CR activity up to at least 30 minutes, I instructed them to increase the intensity of their activity during the middle portion of the exercise. Some examples of this would be to increase the elevation during a walk on a treadmill, or add to the resistance on a bike, stair-climber, or elliptical machine.
For the resistance component of the exercise program, I decided to split their workout into two different routines with two days dedicated to lower-body exercises and two concentrating on the upper-body. Additionally, I provided pictures and descriptions of a shoulder routine, and free weight alternative exercises for the biceps, triceps, and back (Appendix E). I instructed my parents to try all of these free-weight exercises for at least a week. The equipment for these movements could still be found in the same room as the cardiovascular equipment at our YMCA, and after receiving instruction and picture reminders, my parents were confident they could perform them. Also, by splitting the workout into two distinct concentrations, I was able to add a few more movements and increase the volume of the workout, yet remain within the time frame. To amplify the volume of the resistance workout, I followed normal progressive resistance guidelines and prescribed that they complete two sets of each exercise (pg. 416). I noted that they might not reach twelve repetitions, but encouraged them to achieve as many repetitions as possible without sacrificing technique.

Finally, in regard to the muscular fitness component of flexibility, I eliminated the dynamic stretching from their routines. Both parents claimed that they were never really comfortable with the exercises, and felt that they were not gaining many benefits from the movements. My mom reported soreness in both her biceps and iliotibial bands (sides of thigh). I decided to augment the static stretches on the respective upper and lower body lifting days to include a stretch for each of these areas. I provided a demonstration, as well as a stick figure depiction and written instructions as a reminder of how to perform these stretches (Appendix E).
The chance to meet face-to-face with my parents and discuss all of these issues at the exact midpoint of the program was extremely beneficial. I felt that they were noticing results in both the improvement of their numbers and their ability to complete the workouts, and I could tell that they had gained more confidence and insight into the goals they were trying to accomplish. I was highly encouraged that the last four weeks would run just as smoothly, and that the post-testing phase would provide proof that they had improved in most or all of the fitness components.
CHAPTER V: CONCLUSION

As predicted at the midpoint meeting, the second half of the exercise prescription went relatively well. I was able to communicate frequently with my parents via telephone and email, and there were no major setbacks before my parents returned to Ball State for the post-testing phase of the program. This section discusses information gathered from a survey administered at the completion of the program as well as a few of my own observations. The results of the pre- and post-tests will also be compared. The data gathered from these tests can be found in table format in Appendix F.

Table 1 illustrates the results of the Ebbeling Treadmill Test for CR fitness. Both of my parents, especially my mother, achieved significant improvement in VO2max. This success can be attributed to the progressive increase of intensity, frequency, and duration of the workout routine. My mother showed more gain than my father in this area because she went above and beyond the expectation of the three and four day per week routine provided to her. Even if she did not go to the YMCA, she met the Surgeon General’s recommendation by performing some type of cardiovascular exercise, usually walking, on five to six days of the week. The difference in the amount of improvement between my parents illustrates the effect of the dose-response relationship. In other words, an individual who performs a greater amount of activity should expect to see more significant positive results. It was encouraging to see that in a matter of only eight weeks, both parents made gains in their functional heart capacity, thus reducing the risk of premature death from many diseases.

Tables 2 and 3 illustrate the change, or in the case of this program, the lack of change in my parent’s BMI and skin-fold tests. Though it was frustrating to see a lack of significant weight loss during the course of the eight week program, I assured both of my parents that the
foundation of a lasting change in BMI and an improved ratio of fat-free to fat mass is a habitual workout plan. Therefore, if they continue to perform a progressive exercise routine, they will increase their chances of attaining their weight loss goals. This is especially important for my dad whose BMI classification places him at a high health risk.

The results of the muscular fitness assessments are demonstrated in Tables 4, 5, and 6. In the hand grip dynamometer assessment (Table 4), both parents showed an improvement in their muscular strength score. Due to the fact that my parents did not perform workouts geared specifically towards increasing muscular strength or perform specific movements isolating the muscles of the forearm, it was interesting to see an increase in these numbers. The gain in this fitness component can probably be attributed to the fact that the subjects were previously untrained, and that they performed a balanced workout with various movements including pressing, pulling, and twisting of the arms.

Table 5 exhibits the outcome of the muscular endurance battery. As seen in the last two columns of the table, my father showed an increase in the amount of repetitions for each lift. He was also able to increase the amount of weight in two lifts, with a dramatic increase in the amount of resistance on the leg press. My mother improved either the number of repetitions or resistance in four of the six movements. Though she achieved fewer repetitions in the leg press, she increased her amount of weight by 120 pounds. For the amount of weight that she used in the arm curl, I would have expected to see an equal or larger number of repetitions than she actually achieved. However, prior to the test, she informed me of an occurrence of bilateral elbow soreness. In reviewing her technique, I noted that she used improper form during this lift that could have possibly been the source of this pain. After the post-test, I advised her to eliminate this lift from her routine until the soreness subsided and reinstructed her in the proper technique...
of the movement. Though this was only a minor injury, I believe this type of setback could have been prevented if I had been present during at least a couple of workout sessions to remind both my mother and father of the finer points of lifting. Finer points such as these allow one to limit the likelihood of injury and permit a greater degree of improvement.

The results of the last component of muscular fitness, flexibility, are displayed in Table 6. Both individuals improved their numbers and percentile rankings in the sit-and-reach test, an assessment which evaluates lower back and hamstring flexibility. Even though the dynamic stretching routine was eliminated at the midpoint of the program, these results show that the static stretches prescribed for the end of each workout were sufficient in improving the flexibility in at least the lower back and hamstrings. Through an unfortunate error in protocol on my part during the pre-test, I had to disregard the results of the shoulder rotation test for upper body flexibility. In the future, I will make sure to follow all protocols precisely, and practice them before using them as an assessment.

About two weeks after the completion of the post-test, I emailed a list of questions to my parents asking for their impressions of the program. Both parents stated that they felt much more educated about exercise. The demonstrations, images, and descriptions were said to be of great help. My father mentioned that he noticed others at the YMCA who made mistakes in technique and machine alignment. Both individuals recognized the structured format of the workout as a major asset. They enjoyed the fact that the workouts were constructed specifically for them, and that they had pre-testing numbers and goals to serve as motivation. My mother mentioned that she liked the balance of the workout, and how it encouraged her to do resistance and flexibility training that she would not have done on her own. Both parents agreed that they had a better understanding of how and when to push themselves, which is essential to improving, instead of
simply maintaining health. They also agreed that a booklet of pictures would be more efficient to
carry around during the workout instead of a bunch of loose sheets of paper. In regards to
complaints or suggestions, my father stated that his only disappointment in the program was the
lack of “magical weight loss.” Finally, both parents professed a desire to continue a structured
exercise format, but added that they would need additional assistance in order to expand or vary
the program. Overall, both stated that their impression was favorable and that they profited
greatly from the experience.

This entire process was a great success for me as well. I was able to help my parents
improve their health, as well as put knowledge gained in the classroom to practice. On top of
learning and applying basic principles to assessing needs and constructing a specific, well-
balanced workout, I gained experience in dealing with and working through intangible variables.
If I would change anything about this project, I would go back and encourage my parents to set
more goals. It is extremely difficult to make improvements in any arena of one’s life unless an
individual has determined the proper steps to accomplish something. There will always be
obstacles that obstruct the path to achievement, but setting goals can provide a drive and inner
sense of responsibility to work through them. It is difficult to find that motivation inside oneself,
which makes providing that motivation for someone else even more difficult. It will take many
more clients and years of experience before I will become successful at this process. This project
provided the first step towards gaining the knowledge and experience that my career requires to
be successful. It was encouraging to receive constructive feedback from my parents
complimenting me on my education and my ability to help them accomplish something they
could not have done on their own. I wish to pass that compliment on to those, including back to
my parents, who helped me accomplish things I could not have done on my own.
REFERENCES


BALL STATE UNIVERSITY
HEALTH HISTORY QUESTIONNAIRE

NAME ___________________ AGE ______ Social Security # __________ DATE OF BIRTH __________

ADDRESS ____________________________________________________________

Street City State Zip

TELEPHONE (HOME) ___________________ BUSINESS ___________________

E-MAIL ADDRESS ___________________ PLACE OF EMPLOYMENT __________

OCCUPATION __________________________________________________________

MARITAL STATUS: (circle one) SINGLE MARRIED DIVORCED WIDOWED SPOUSE: __________________________

EDUCATION: (check highest level) ELEMENTARY ___ HIGH SCHOOL ___ COLLEGE ___ GRADUATE ___

PERSONAL PHYSICIAN ___________________ ADDRESS ____________________________

City, State, Zip

PHYSICIAN PHONE __________________________

Reason for last doctor visit? ___________________ Date of last physical exam __________

(Circle Choices)
Have you previously been tested for the Ball State Program? YES ______ NO ______ YEAR ______

Have you ever had any other exercise stress test? YES NO DATE & LOCATION OF TEST ______ ______

Person to contact in case of an emergency ___________________ Phone __________________ (relationship) ______

PLEASE CHECK YES or NO

FAMILY HISTORY
(Have any immediate family or Grandparents had?)

(For Staff Use)

PAST HISTORY
(Have you ever had..)

(For Staff Use)

PRESENT SYMPTOMS
(Have you ever had..)

(For Staff Use)

Other family illness ______

Heart disease ______

High blood pressure ______

Any heart problems ______

Disease of the arteries ______

Varicose veins ______

Lung disease ______

Asthma ______

Kidney disease ______

Hepatitis ______

Diabetes ______

High Cholesterol ______

Arthritis ______

Chest pain/discomfort ______

Shortness of breath ______

Heart palpitations ______

Skipped heart beats ______

Cough on exertion ______

Coughing of blood ______

Dizzy spells ______

Frequent headaches ______

Frequent colds ______

Back pain ______

Orthopedic problems ______

HOSPITALIZATIONS: Please list recent hospitalizations (Women: do not list normal pregnancies)

Location Reason
Any other medical problems/concerns not already identified? Yes No (Please list below)

Have you ever had your cholesterol measured? Yes No (Value) Where?

Are you taking any Prescription or Non-Prescription medications? Yes No (include birth control pills)

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>DOSAGE</th>
<th>WHEN/HOW OFTEN TAKEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you currently smoke? Yes No If so, what? Cigarettes Cigars Pipe
How much per day: <.5 pack 0.5 to 1 pack 1.5 to 2 packs >2 packs
Have you ever quit smoking? Yes No When? How many years and how much did you smoke?

Do you drink any alcoholic beverages? Yes No If yes, how much in 1 week?
Beer _____ (cans) Wine _____ (glasses) Hard liquor ________ (drinks)

Do you drink any caffeinated beverages? Yes No If yes, how much in 1 week?
Coffee _____ (cups) Tea ________ (glasses) Soft drinks ________ (cans)

ACTIVITY LEVEL EVALUATION

What is your occupational activity level? Sedentary Light Moderate Heavy

Do you currently engage in vigorous physical activity on a regular basis? Yes No
If so, what type? _____________________________ How many days per week? _____
How much time per day? <15 min 15-30 min 30-45 min >60 min
Do you ever have an uncomfortable shortness of breath during exercise? Yes No
Do you ever have chest discomfort during exercise? Yes No If so, does it go away with rest? ______
Do you engage in any recreational or leisure-time physical activities on a regular basis? Yes No
If so, what activities? ______________________________ On average: How often? ______ Times/week; for how long? ______ Time/session

Are you currently following a weight reduction diet plan? Yes No
If so, how long have you been dieting? _____ Months Is the plan prescribed by your doctor? Yes No
Have you used weight reduction diets in the past? Yes No Of yes, how often and what type?

Please indicate the reasons why you want to join the exercise program, rank according to strongest reason=1 to least=7.
To lose weight ________ Doctor’s recommendation ________ For good health ________ Enjoyment ________
Release of tension ________ Improve physical appearance ________ Other ________

Please use the space provided below to outline your fitness goals and objectives.

FOR STAFF USE:
BALL STATE UNIVERSITY
INFORMED CONSENT

(For Exercise Testing of Low to Moderate Risk Subjects)

I, ___________________________, do hereby voluntarily consent to participate in a fitness assessment at the Human Performance Laboratory. This assessment may consist of, but is not limited to a PAR-Q/health history questionnaire, resting ECG, resting heart rate, resting blood pressure, blood lipid analysis, skinfold fat measurements, bioelectrical impedance analysis, various muscular strength and/or endurance assessments, and a submaximal or maximal graded exercise test. If am over the age of forty, or have any risk factors (i.e. high blood pressure, smoking, previous abnormal ECG, etc.) or symptoms of heart problems, it is strongly encouraged that I have a medical examination by my personal physician prior to engaging in the exercise test. I also understand that I will be interviewed by a physician and/or other person prior to my undergoing the exercise test. This/these person(s) will in the course of interviewing me consider any obvious reasons which could make it undesirable or unsafe for me to take the exercise test. Consequently, I understand that it is important that I provide complete and accurate responses on the health history questionnaire and to the interviewer, and recognize that my failure to do so could lead to possible unnecessary injury to myself during the exercise test.

The graded exercise test will be performed to evaluate the functional performance and capacity of the heart, lungs, blood vessels and skeletal muscles. The graded exercise test is a physical work test, usually performed on a treadmill or bicycle. The test begins with a low level of exertion, and then gradually increases until the limits of fatigue, breathlessness, or any symptoms of severity which the examining team considers significant to terminate the test, are reached. I recognize that I may stop the test at my discretion when I have reached a point where I no longer wish to continue. These test results will be used in developing a personalized physical fitness program. The test procedures may take place on two separate days and will take approximately one and one half-hours to complete.

There exists a possibility of adverse changes occurring during the exercise test. These changes could include, but are not limited to: muscle or joint injury, abnormal blood pressure, fainting, disorders of heart beat, stroke, rare instances of heart attack, as well as death. I understand that reasonable efforts will be made to minimize problems by preliminary examination and by observation during the testing. I also understand that trained personnel will be available to deal with foreseeable situations as they may arise.

The results of this test may or may not benefit me. Potential benefits relate mainly to my personal motives for taking the test, i.e., knowing my exercise capacity in relation to the general population, understanding my fitness for certain sport, recreational and occupational activities, planning my physical conditioning program or evaluating the effects of my current lifestyle and/or exercise habits. Although my fitness level might also be evaluated by alternative means, such as a step test, outdoor run or walk test, or other submaximal test, such tests do not provide as accurate a fitness assessment as the above mentioned treadmill or bike test nor do these options allow equally effective monitoring of my responses.

The information which is obtained during the fitness assessment will be treated as privileged and confidential, and will not be released or revealed to any person other than Program Staff, without my consent. The information obtained, however, may be used for a statistical or scientific purpose without reference to my identity.
I have read the above information and I have full understanding of the risks, benefits, and safeguards of the test procedures. I have been given an opportunity to ask questions as to the procedures. Any questions that I might have had have been answered to my satisfaction. I acknowledge that I have read this document in its entirety or that it has been read to me if I have been unable to read same. I consent to participate in all services and procedures as explained herein by all program personnel.

I agree that this Informed Consent shall be enforced in accordance with the laws of Indiana. I further agree to assume and take on myself all of the risks and responsibilities associated with my participation in these test procedures. In consideration of and in return for the services, facilities, and other assistance provided to me by Ball State University during my fitness assessment, I release Ball State University and its board of trustees, officers, employees, and agents (in their official and individual capacities) from any and all liability, claims, actions, damages, expenses, and costs that may arise from injury, harm, death, or damage due to my participation in this fitness assessment.

I agree to be bound by this Informed Consent, and I understand that it binds my heirs, executors, administrators, and assigns. I have knowingly and voluntarily signed this Informed Consent.

Participant ___________________________ Date ___________________________

Program Coordinator ___________________ Date ___________________________

Physician _____________________________ Date ___________________________

I hereby authorize the Ball State University Physical Fitness Program to release my test information obtained during the laboratory evaluation to my physician.

Participant ___________________________ Date ___________________________
Example Workout Routines
Week 1 and 5
<table>
<thead>
<tr>
<th>DAY ONE</th>
<th>DAY TWO</th>
<th>DAY THREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wt.</td>
<td>RP</td>
<td>Wt.</td>
</tr>
<tr>
<td>Chest Press</td>
<td>3</td>
<td>Dynamic Stretches</td>
</tr>
<tr>
<td>Leg Press</td>
<td>4</td>
<td>Forward Lunge</td>
</tr>
<tr>
<td>Back Lunge w/ Twist</td>
<td>5 x2</td>
<td>Leg Press</td>
</tr>
<tr>
<td>Side Lunge</td>
<td>5 x2</td>
<td></td>
</tr>
<tr>
<td>Slow Karaoke</td>
<td>5 x2</td>
<td></td>
</tr>
<tr>
<td>Walk-Outs</td>
<td>5 x2</td>
<td></td>
</tr>
<tr>
<td>Lat Pull</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Seated Leg Curl</td>
<td>6</td>
<td>Physioball Exercises</td>
</tr>
<tr>
<td>Bicep Machine</td>
<td>3</td>
<td>Crunches</td>
</tr>
<tr>
<td>Back Extensions</td>
<td>2 x12</td>
<td>Bicep Machine</td>
</tr>
<tr>
<td>Trunk Rotation</td>
<td>2 x12</td>
<td></td>
</tr>
<tr>
<td>Roll-Outs</td>
<td>2 x12</td>
<td></td>
</tr>
<tr>
<td>Opposite Arm/Leg</td>
<td>2 x12</td>
<td></td>
</tr>
<tr>
<td>Back Machine</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Seated Row</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Chest Press</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Leg Press</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Lat Pull</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Seated Leg Curl</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Bicep Machine</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Tricep Machine</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Back Machine</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Seated Row</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**CARDIO:**
- Your Choice >23 minutes
- Your Choice >24 minutes
- Your Choice >25 minutes

**CORE EXERCISE:**
- Bent-Knee Sit-Ups 2 x20
- Russian Twists 2 x20

**WEEK ONE NOTES:**
- Beginning the workout by performing a cardiovascular exercise of your choice (bike, walk, elliptical, etc...) Remember, you don't have to kill yourself, but your Heart Rate should be in the 90-130 range. Perform all of the lifts in a slow and controlled manner, exhaling on the lifting phase. Also, try keeping good posture especially on the shoulder and back exercises.
- your choice (bike, walk, elliptical, etc...) Record which machine you chose, and how much time you spent on the machine.

***PERFORM THESE SEATED STRETCHES AFTER EACH WORKOUT. STRETCH THE FOLLOWING MUSCLE GROUPS:
1. HAMSTRINGS: Hurdler Stretch
2. GROIN: Butterfly
3. LOW BACK: Crossover

4. PECTORAL: Lean against doorframe or corner wall
5. QUADS: Lay on your left/right side and stretch quad
6. CALF: Leg back, press against wall
"Motivation is what gets you started. Habit is what keeps you going."

<table>
<thead>
<tr>
<th>DAY ONE</th>
<th>DAY TWO</th>
<th>DAY THREE</th>
<th>DAY FOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lat Pull</td>
<td>6</td>
<td>6</td>
<td>Seated Leg Curl</td>
</tr>
<tr>
<td>Bicep Curl</td>
<td>3</td>
<td>3</td>
<td>Leg Extension</td>
</tr>
<tr>
<td>Tricep Ext.</td>
<td>3</td>
<td>3</td>
<td>PB Wall Squat</td>
</tr>
<tr>
<td>Bent Over Row</td>
<td>7</td>
<td>7</td>
<td>PB Leg Curl</td>
</tr>
<tr>
<td>Shoulder Trio</td>
<td>5,8</td>
<td>5,8</td>
<td>Dead Bugs</td>
</tr>
</tbody>
</table>

Cardio:
Your Choice | >30 minutes |

Core Exercise:
Russian Twists | 2 x 12 |
Supine Trunk Rot. | 2 x 12 |
Opposite Arm/Leg | 2 x 12 |
Table Trunk Rot. | 2 x 12 |
PB Back Ext. | 2 x 12 |

Core Exercise:
PB Crunches | 2 x 12 |
kneeling Roll-Out | 2 x 12 |
Squeeze Leg Raise | 2 x 12 |
Reverse Hypers | 2 x 12 |
kick-outs | 2 x 12 |

Core Exercise:
Core Exercise:
Core Exercise:
Core Exercise:

***See Note Sheet for tips on exercises***

***Perform these seated stretches after each workout. Stretch the following muscle groups:***

1. HAMSTRINGS: Hurdler Stretch
2. GROIN: Butterfly
3. LOW BACK: Crossover
4. PECTORAL: Lean against doorframe or corner wall
5. IT BAND: See Picture
6. QUADS: Lay on your left/right side and stretch quad
7. FOREARM/BICEP: See Picture
8. Calf: Leg back, press against wall
**DAD'S WEEKLY WORKOUT**

**WEEK ONE: Jan. 29 - Feb. 2**

"Nothing great was ever achieved without enthusiasm."

<table>
<thead>
<tr>
<th>DAY ONE</th>
<th>Wt.</th>
<th>RP</th>
<th>DAY TWO</th>
<th>RP</th>
<th>DAY THREE</th>
<th>Wt.</th>
<th>RP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest Press</td>
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<td></td>
<td>Dynamic Stretches</td>
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<td>Chest Press</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Leg Press</td>
<td>12</td>
<td></td>
<td>Forward Lunge</td>
<td>5 x2</td>
<td>Leg Press</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Lat Pull</td>
<td>10</td>
<td></td>
<td>Back Lunge w/ Twist</td>
<td>5 x2</td>
<td>Lat Pull</td>
<td>10</td>
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</tr>
<tr>
<td>Seated Leg Curl</td>
<td>10</td>
<td></td>
<td>Side Lunge</td>
<td>5 x2</td>
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<tr>
<td></td>
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<td></td>
<td>Slow Karaoke</td>
<td>5 x2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Walk-Outs</td>
<td>5 x2</td>
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<td></td>
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</tr>
<tr>
<td>Seated Leg Curl</td>
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<td></td>
<td>Physioball Exercises</td>
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<td>Seated Leg Curl</td>
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<td></td>
</tr>
<tr>
<td>Bicep Machine</td>
<td>4</td>
<td></td>
<td>Crunches</td>
<td>2 x12</td>
<td>Bicep Machine</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Tricep Machine</td>
<td>4</td>
<td></td>
<td>Back Extensions</td>
<td>2 x12</td>
<td>Tricep Machine</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Trunk Rotation</td>
<td>2 x12</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Roll-Outs</td>
<td>2 x12</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Opposite Arm/Leg</td>
<td>2 x12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back Machine</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td>Back Machine</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Seated Row</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Seated Row</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>CARDIO:</strong></td>
<td></td>
<td></td>
<td><strong>CARDIO:</strong></td>
<td></td>
<td><strong>CARDIO:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your Choice</td>
<td>&gt;23 minutes</td>
<td></td>
<td>Your Choice</td>
<td>&gt;24 minutes</td>
<td>Your Choice</td>
<td>&gt;25 minutes</td>
<td></td>
</tr>
<tr>
<td>Bent-Knee Sit-Ups</td>
<td>2 x20</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**WEEK ONE NOTES:**

Begin the workout by performing a cardiovascular exercise of your choice (bike, walk, elliptical, etc...) Record which machine you chose, and how much time you spent on the machine. Remember, you don't have to kill yourself, but your Heart Rate should be in the 90-130 range. Perform all of the lifts in a slow and controlled manner, exhaling on the lifting phase. Also, try your best to keep good posture, and flex your core muscles by bringing your belly button up and in. Good Luck!

**3. PERFORM THESE SEATED STRETCHES AFTER EACH WORKOUT. STRETCH THE FOLLOWING MUSCLE GROUPS:**

1. HAMSTRINGS: Hurdler Stretch
2. GROIN: Butterfly
3. LOW BACK: Crossover
4. PECTORAL: Lean against doorframe or corner wall
5. QUADS: Lay on your left/right side and stretch quad
6. CALF: Leg back, press against wall
"Motivation is what gets you started. Habit is what keeps you going."

<table>
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<th>DAY ONE</th>
<th>DAY TWO</th>
<th>DAY THREE</th>
<th>DAY FOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest Press</td>
<td>Leg Press</td>
<td>Chest Press</td>
<td>Leg Press</td>
</tr>
<tr>
<td>Lat Pull</td>
<td>Seated Leg Curl</td>
<td>Lat Pull</td>
<td>Seated Leg Curl</td>
</tr>
<tr>
<td>Bicep Curl</td>
<td>Leg Extension</td>
<td>Bicep Curl</td>
<td>Leg Extension</td>
</tr>
<tr>
<td>Tricep Ext.</td>
<td>PB Wall Squat</td>
<td>Tricep Ext.</td>
<td>PB Wall Squat</td>
</tr>
<tr>
<td>Bent Over Row</td>
<td>PB Leg Curl</td>
<td>Bent Over Row</td>
<td>PB Leg Curl</td>
</tr>
<tr>
<td>Shoulder Trio</td>
<td>Dead Bugs</td>
<td>Shoulder Trio</td>
<td>Dead Bugs</td>
</tr>
</tbody>
</table>

**Cardio:**
Your Choice >30 minutes

**Core Exercise:**

<table>
<thead>
<tr>
<th>Russian Twists</th>
<th>2 x 12</th>
<th>PB Crunches</th>
<th>2 x 12</th>
<th>(See Day One)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supine Trunk Rot.</td>
<td>^</td>
<td>kneeling Roll-Out</td>
<td>^</td>
<td></td>
</tr>
<tr>
<td>Opposite Arm/Leg</td>
<td>^</td>
<td>Squeeze Leg Raise</td>
<td>^</td>
<td></td>
</tr>
<tr>
<td>Table Trunk Rot.</td>
<td>^</td>
<td>Reverse Hypers</td>
<td>^</td>
<td></td>
</tr>
<tr>
<td>PB Back Ext.</td>
<td>^</td>
<td>kick-outs</td>
<td>^</td>
<td></td>
</tr>
</tbody>
</table>

***See Note Sheet for tips on exercises***

***Perform these seated stretches after each workout. Stretch the following muscle groups:***

1. HAMSTRINGS: Hurdler Stretch
2. GROIN: Butterfly
3. LOW BACK: Crossover
4. PECTORAL: Lean against doorframe or corner wall
5. IT BAND: See Picture
6. QUADS: Lay on your left/right side and stretch quad
7. FOREARM/BICEP: See Picture
8. CALF: Leg back, press against wall
Images and Descriptions of Physioball and Body Weight Exercises
Physioball Crunches

• Sit on the ball and roll forward until hips are on the front part of the ball. Put feet against the wall for extra support.

• As you crunch forward, do not pull on head. Keep abdominals contracted throughout the movement, and remember to breathe.

• To make the exercise more difficult, hold weight against chest.

• To strengthen the obliques, rotate the trunk as the crunch is performed.
Physioball Back Extensions

• Lay on ball as shown. Push hips into the ball to extend the back. Hold for a 2 count.

• If you don’t have a wall to put your feet against, spread feet and roll ball closer to thighs.

• Same as previous exercise except rotate the trunk.
Kneeling Roll Out

- Start in kneeling position with hands together on top of physioball. Lift your feet off of the ground so that your knees become a pivot point. Hold your abdominals tight, lean forward, and allow the ball to roll down your arms. Keep chest upright and do not hyperextend the back (note line). Continue until the chest falls forward, then return to the starting position.
Physioball Bridging

- Lie on floor or exercise mat with feet on physioball (ball under calves). Perform pelvic tilt so that back is flat against the floor. Raise hips off of floor so that your body is in a straight line. Hold for 3 seconds. Relax. Repeat for 10 repetitions total.
Physioball Bridging (cont’.)

- Hold bridge position and perform alternate leg raises holding each for a count of 2. Perform 5 with each leg.
Supine Trunk Rotation

- Lie on back with physioball held under legs or between knees. Hold abdominals tight and bring ball up above hips. Keeping shoulders flat bring knees towards the floor by rotating lower extremity. Then, return to starting position and over to opposite side.
Physioball Supine Abs

• Lie on back with physioball held between knees or under heels. Perform crunches.

• Same as above, but add rotational component.
Wall Squats

- Start with the ball at your low back leaning against a wall. Make sure your feet are well in front of you (you will want your lower leg to be perpendicular to the ground at the bottom of the movement). With a good upright posture, perform a squat making sure that your hips follow the contour of the ball by maintaining contact. When your thighs are parallel to the ground, hold for a one count before returning to the starting position. When squatting, make sure the knees do not buckle inwards. There should be no pain in the knees.

- Increase difficulty by performing with one leg at a time or by holding weights.
Lunges

• Start with one foot in front of the other with feet shoulder width apart and the knees at 90 degrees on the floor. Raise your self up and back down about 2 inches from the floor and repeat. Make sure knees don’t go over you toes.
Table Trunk Rotations

• Lay with ball between shoulder blades and knees at 90 degree angle to thighs.
• Rotate *slowly* from side to side while keeping arms extended.
• Put feel against wall for extra support.
• To make the exercise more difficult, hold medicine ball in hands.
Kick-Outs

- Start in position as shown, or with hands on hips. Physioball should be in middle of the back.
- While keeping trunk and thighs in a straight plank position, slowly kick left and right leg out.
Opposite Arm/Leg

• Perform as shown.

• Put feet and hands closer together to make more difficult.

• Can also be performed on floor.
Squeezed Leg Raises
Leg Curl
Dead Bugs
Parachutes

• Start in position shown.

• Lift hands, head and chest off of ground, as well as knees and thighs as much as possible.

• Hold for three seconds.

• Relax and repeat.
Reverse Hypers

• Perform as shown.

• Make sure to contract gluteus (butt) muscles before raising legs, and throughout entire movement.

• Lower, and repeat.
Russian Twists

• Perform as shown. When twisting, touch hands or weight to the ground at level or behind hips.

• Several ways to make exercise more difficult...

• Hold weight in hands.

• Lean back further during movement.

• Cross legs and lift feet off of ground.
Images and Descriptions of Supplementary Movements Following Week 4
**Shoulder Routine**

Perform these 3 exercises consecutively. Do 8 reps of each one, rest, then repeat.

**Lateral Raise**

Front Raise

(same as above, just forwards instead of out to side.)

Rear Raise

You should probably use 8-15 lbs. You may be able to do more on the rear raise.

Remember to keep flat back and contracted abs.

**Dumbbell Side Bend**

Repetitions: 10 on each side

2 sets

**Dumbbell Curl (Biceps)**

Can rotate arms instead of both at the same time. Keep elbows stable (don't rock backwards) 2 sets of 12 record weight

**Skull-Crusher Triceps Extension**

Use dumb-bells. Keep elbows in, do not flare out. Also, angle arms slightly as shown by arrows. 2 sets of 12

**Bent-Over Dumbbell Row**

Perform as shown, use a little more weight than used for curls. 2 sets of 12 each arm.
**Forearm/Bicep Stretch**

- Keeping one elbow extended, gently pull on fingers until a stretch is felt in forearm and bicep.
- Do one rep with each arm while fingers are pulled down, and one where they are pulled up.

**IT Band Stretch**

- Stand at arm's length against wall.
- Cross leg nearest wall over the top of other leg.
- Gently push hips away from wall.
## Table 1: Cardiorespiratory Fitness – Ebbeling Treadmill Test

**Formula and Calculations**

\[ \text{VO2max} = 15.1 + (21.8 \times \text{mph}) - (0.327 \times \text{SSHR}) - (0.263 \times \text{mph} \times \text{age}) + (0.00504 \times \text{SSHR} \times \text{age}) + (5.98 \times \text{gender}) \]

*** Female = 0, Male = 1

<table>
<thead>
<tr>
<th></th>
<th>Pre/Post</th>
<th>Walking Speed (mph)</th>
<th>Steady-State HR (bpm)</th>
<th>VO2max (ml/kg/min)</th>
<th>Percentile Ranking (GETP pg. 79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dad</td>
<td>Pre-</td>
<td>3.6</td>
<td>96</td>
<td>45.48</td>
<td>60th</td>
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<tr>
<td>Age: 49</td>
<td>Post-</td>
<td>4.0</td>
<td>105</td>
<td>48.33</td>
<td>70th</td>
</tr>
<tr>
<td>Mom</td>
<td>Pre-</td>
<td>3.6</td>
<td>125</td>
<td>37.18</td>
<td>70th</td>
</tr>
<tr>
<td>Age: 49</td>
<td>Post-</td>
<td>4.0</td>
<td>100</td>
<td>42.75</td>
<td>90th</td>
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</table>

## Table 2: Body Composition – Body Mass Index

Body Mass Index = kg/m^2

<table>
<thead>
<tr>
<th></th>
<th>Pre/Post</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>BMI</th>
<th>Classification</th>
<th>Health Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dad</td>
<td>Pre-</td>
<td>1.83</td>
<td>105.6</td>
<td>32.5</td>
<td>Obese – Class I</td>
<td>High</td>
</tr>
<tr>
<td>Post-</td>
<td></td>
<td></td>
<td>106.3</td>
<td>32.7</td>
<td>Obese – Class I</td>
<td>High</td>
</tr>
<tr>
<td>Mom</td>
<td>Pre-</td>
<td>1.778</td>
<td>73.3</td>
<td>23.2</td>
<td>Normal (upper end)</td>
<td>Average</td>
</tr>
<tr>
<td>Post-</td>
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<td></td>
<td>72.9</td>
<td>23.0</td>
<td>Normal (upper end)</td>
<td>Average</td>
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## Table 3: Body Composition – Three-Site Skinfold for Body Density

**Formula and Calculations**

Dad – Three-Site Formula (chest, triceps, subscapular)

Formula (GETP pg. 63-65)

<table>
<thead>
<tr>
<th></th>
<th>Chest</th>
<th>Triceps</th>
<th>Subscapular</th>
<th>Total</th>
<th>Body Density</th>
<th>% Body Fat</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>20</td>
<td>24</td>
<td>26.5</td>
<td>70.5</td>
<td>1.03535...</td>
<td>28.1</td>
<td>Lower 10th</td>
</tr>
<tr>
<td>Post-Test</td>
<td>23</td>
<td>20</td>
<td>26</td>
<td>69</td>
<td>1.03616...</td>
<td>27.7</td>
<td>Lower 10th</td>
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<tr>
<td>Difference</td>
<td>+3</td>
<td>-4</td>
<td>-0.5</td>
<td>-1.5</td>
<td>1.03616...</td>
<td></td>
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Appendix F

Mom – Three-Site Formula (triceps, suprailiac, abdominal)

Formula (GETP pg. 63-65)

<table>
<thead>
<tr>
<th></th>
<th>Triceps</th>
<th>S-iliac</th>
<th>Abdominal</th>
<th>Total</th>
<th>Body Density</th>
<th>% Body Fat</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>20</td>
<td>18.5</td>
<td>23</td>
<td>61.5</td>
<td>1.0375</td>
<td>25.9</td>
<td>50\textsuperscript{th}</td>
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<tr>
<td>Post-Test</td>
<td>19</td>
<td>19</td>
<td>23.5</td>
<td>61.5</td>
<td>1.0375</td>
<td>25.9</td>
<td>50\textsuperscript{th}</td>
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<tr>
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<td>+0.5</td>
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**TABLE 4: Muscular Strength – Hand Dynamometer Test**

Best of Three Trials

<table>
<thead>
<tr>
<th>Pre/Post</th>
<th>Left (kg)</th>
<th>Right (kg)</th>
<th>Total (kg)</th>
<th>Difference (kg)</th>
<th>Classification</th>
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</thead>
<tbody>
<tr>
<td>Dad Pre-</td>
<td>55</td>
<td>59</td>
<td>114</td>
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<td>Above Average</td>
</tr>
<tr>
<td>Post-</td>
<td>55.5</td>
<td>64</td>
<td>119.5</td>
<td>+5.5</td>
<td>Above Average</td>
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<tr>
<td>Mom Pre-</td>
<td>35</td>
<td>34</td>
<td>69</td>
<td></td>
<td>Above Average</td>
</tr>
<tr>
<td>Post-</td>
<td>36</td>
<td>39</td>
<td>75</td>
<td>+6</td>
<td>Above Average</td>
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</table>

**TABLE 5: Muscular Endurance – Muscular Endurance Battery**

<table>
<thead>
<tr>
<th>Dad</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Weight +/-</th>
<th>Rep +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight (lbs.)</td>
<td>Repetitions</td>
<td>Weight (lbs.)</td>
<td>Repetitions</td>
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<tr>
<td></td>
<td>Bench</td>
<td>95</td>
<td>20</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>Lat Pull</td>
<td>115</td>
<td>15</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>Arm Curl</td>
<td>65</td>
<td>15</td>
<td>65</td>
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<td>Leg Press</td>
<td>180</td>
<td>16</td>
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<td>Leg Ext.</td>
<td>120</td>
<td>17</td>
<td>120</td>
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<tr>
<td></td>
<td>Leg Curl</td>
<td>70</td>
<td>12</td>
<td>70</td>
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</table>

<table>
<thead>
<tr>
<th>Mom</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Weight +/-</th>
<th>Rep +/-</th>
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<tbody>
<tr>
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<td>Repetitions</td>
<td>Weight (lbs.)</td>
<td>Repetitions</td>
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<td>Lat Pull</td>
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<td></td>
<td>Arm Curl</td>
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<td>Leg Press</td>
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<tr>
<td></td>
<td>Leg Ext.</td>
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<tr>
<td></td>
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<td>50</td>
<td>17</td>
<td>50</td>
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</table>
### TABLE 6: Flexibility – Sit and Reach Test

For Hamstring and Lower Back Flexibility

Best of Three Trials

<table>
<thead>
<tr>
<th></th>
<th>Reach (cm)</th>
<th>Difference</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dad</td>
<td>Pre-</td>
<td>10.5</td>
<td>Difference</td>
</tr>
<tr>
<td></td>
<td>Post-</td>
<td>17</td>
<td>+6.5</td>
</tr>
<tr>
<td>Mom</td>
<td>Pre-</td>
<td>27</td>
<td>30th</td>
</tr>
<tr>
<td></td>
<td>Post-</td>
<td>31.5</td>
<td>+4.5</td>
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