

## View From The Researcher - Part III

I have some great news to share with everyone. This month we will be revealing the first bit of progress from our case study. Recall both January and February laid the groundwork for the project, identified the bowling-specific exercise routine, and defined the rationale for conducting it. I am happy to say the subject has faithfully stuck with the program for more than three months and has shown much improvement. Do you want to know where the subject started, how out of shape he was, and his current improvements, follow along and see for yourself?

As a researcher, it is my responsibility to remain completely unbiased throughout the project, yet I have aspirations for the subject and the project's implications. Sharing with you the real need for qualified bowling research is important to me. Though some may say they have researched this or studied that, there are very few who have been trained and certified to conduct validated work at the highest level. Anyway, I am happy to say so far I have maintained my position as the person who will merely conduct the study and report the information.

In September 1997, the subject initially underwent a physical fitness and health oriented evaluation to determine his baseline values. I contacted a research institution near his home and scheduled the evaluation with a clinical exercise physiologist. I flew to the destination and we prepared for testing. The following sections reveal the series of evaluations, the subject's results, normative comparisons (if available), and why you should consider these same evaluations.

Normative standards for the fitness tests are provided by the Institute for Aerobics Research in Dallas, Texas (1994). These standards help us in the fitness and medical community evaluate test results and provide a basis for risk factors and goal setting. All standards are specific to both the subject's age and gender.

### **Blood Profile**

A blood profile was the initial evaluation. The subject was required to fast for at least 12 hours before the test. A small amount of blood was drawn for analysis, and only after a few minutes it was revealed the subject had:

- **A total cholesterol of 253 mg/dL** - a major heart disease risk factor. Anything more than 200 is considered dangerous according to the National Cholesterol Education Program (**NCEP**).
- **HDL cholesterol of 47 mg/dL** - known as the good cholesterol. 47 is slightly above the heart disease risk minimum of 35, though NCEP suggests something around 60 is beneficial.
- **LDL cholesterol of 178 mg/dL** - known as the bad cholesterol. NCEP recommends less than 130.
- **A total cholesterol to HDL ratio of 5.4** - a good way to assess the risk for heart disease comparing the body's good vs. bad cholesterol. A ration of 4.5 or less is desirable.
- **A triglyceride level of 142 mg/dL** - clinical consensus is anything below 250 is good. The subject had a good triglyceride level.
- **Blood pressure at 132/82** - the danger zone is 140/90. The subject had a good blood pressure reading.

At any given time multiple variables can affect your cholesterol. Though your body makes a majority of it, diet, body weight, smoking, alcohol consumption, exercise, and medication have been shown to alter cholesterol in one way or another. If you are unsure of your cholesterol count or risk for heart disease, contact your physician and request a blood profile. See how you compare with the subject.

### **Body Composition**

The subject had several body composition and girth measurements taken to assess his physical structure. Body composition is one of the five elements of physical fitness and will help me evaluate his structural changes. The subject was approximately 6' tall, weighed 256 pounds, and had a body fat percentage of 31%. The 31% body fat placed him into the very poor 4<sup>th</sup> percentile. Our subject definitely needs to drop some body fat to function more efficiently and represent our sport as one of its athletes. If you want to have your body fat checked, contact the human science or physical education department at your local college or university.

Girth measurements were taken at the following sites: arms - 13", chest - 44", waist - 45.5", and thigh - 24.5". It is my belief that a reduction in body fat and change in body composition will enhance the movements of the bowling approach with greater ease due to less friction and restriction by fatty tissue. Does your body fat prevent the smooth fluid pendulum swing? Do your legs rub together while walking? Is your waistline hindering your approach or balance? A reduction in body fat may be what our sport needs to present its athletes as athletes.

## **Strength Analysis**

Muscular strength is of prime importance to all athletes no matter what sport. I theorize that improvements in bowling-specific muscular strength will improve bowling performance; therefore, our subject completed several strength tests to elicit his specific strength levels. Using the effective 1-repetition maximum test, the subject's upper body and lower body strength were determined.

A flat bench press was used to evaluate upper body strength and the seated leg press for lower body strength. The subject was given ample time to stretch and acclimate to the testing device and warm up repetitions with minimal resistance was done to reduce the risk of injury. Upon completion, the subject tested at 170 pounds upper body strength and 260 pounds lower body strength.

Standards for upper and lower body strength are based on a strength to body weight ratio. The subject's upper body strength to weight ratio (170/256) was .63 and fell into the lowest 1 percentile. The subject's lower body strength to body weight ratio (260/256) was 1.02 and fell into the lowest 1 percentile. Needless to say, our subject had extremely poor musculoskeletal strength. Not good for a competitive athlete.

Grip strength was also tested using a hand dynamometer. For some odd reason I only tested the subject's bowling hand and inadvertently neglected the non-bowling hand. I must have been caught up in the moment. Anyway the subject's bowling hand total grip strength measured 63 pounds of pressure. No current normative standards are in place, but I hope to some day developed my own standards for bowlers at all skill levels. How strong is your bowling hand?

## **Flexibility**

Flexibility of many body parts is vital to sport performance. Our subject did the standard sit-and-reach test used for decades by the physical education community. The sit-and-reach test measures flexibility of the hamstrings, hip extensors, lumbar muscles and those in the spine. The subject reached 13" placing him into the 20<sup>th</sup> percentile. Adding some lower body, hip, leg, and back flexibility should enhance the subject's bowling. How flexible are you?

Additional shoulder and hip range of motion angles were recorded for notation purposes and will not be mentioned since they are numerous. They will be compared and correlated at the end of the project so I thought you should know.

## **Cardiorespiratory Fitness (VO2 Max)**

This is the one you all been waiting for. The treadmill test. The all-out, give-it-all-you-got, go-till-you-drop, cardiovascular test. Actually, it is not as bad as one imagines. In fact, most competitive athletes should have a grasp on their cardiorespiratory fitness, often termed VO2 Max. VO2 Max is a measurement of oxygen supplied to the body to keep it functioning at high levels of intensity. It is a measurement of gas exchange, oxygen in and carbon dioxide out, and is extracted from a treadmill test using clinical equipment. In the past, VO2 Max has primarily been determined and used with endurance athletes, but more recently has been applied to all sports and facets of life.

It is true our sport does not apply high intensity cardiorespiratory demands on the average person, but VO2 Max is also a measurement of our endurance. A higher VO2, 65 for example, reveals a person can handle greater amounts of stress for generally greater lengths of time. How does it apply to bowling? Do you ever get tired after bowling 6, 8, 10, or even 20 games a day? A conditioned cardiorespiratory system will not tire as quickly allowing us to bowl longer, stronger, and recover much quicker. For those who bowl many games and quite frequently, increasing VO2 will improve your bowling endurance. Having mentioned that, our subject's VO2 Max was measured at 34 ml/kg/min. This figure placed him in the 15<sup>th</sup> percentile and is designated as poor condition. I bet he tires quickly bowling. Do you know your VO2 Max?

## **Current Status**

The subject has trained for three months at the time of this writing. He has maintained the program with extreme sincerity exercising an average of three days per week performing only the specific program. No extra physical activity beyond the scope of this training program has been recorded. The following table outlines the subject's program, initial strength levels, current strength levels as of December 1997, and the percentage of increase.

## **Training Program**

<b>Exercise</b>	<b>09/97</b>	<b>12/97</b>	<b>Increase</b>
<b>Recumbent Bike</b>	<b>26 minutes</b>	<b>38 minutes</b>	<b>46%</b>
<b>Training Range 129-156bpm</b>	<b>20 minutes</b>	<b>32 minutes</b>	<b>60%</b>
<b>Shoulder Press</b>	<b>50 pounds</b>	<b>95 pounds</b>	<b>90%</b>
<b>Behind the Neck Pull-down</b>	<b>70 pounds</b>	<b>100 pounds</b>	<b>43%</b>
<b>Chest Press</b>	<b>70 pounds</b>	<b>110 pounds</b>	<b>57%</b>
<b>Bicep Curl</b>	<b>50 pounds</b>	<b>70 pounds</b>	<b>40%</b>
<b>Triceps Extension</b>	<b>33 pounds</b>	<b>70 pounds</b>	<b>112%</b>
<b>Wrist Curl - over</b>	<b>20 pounds</b>	<b>40 pounds</b>	<b>100%</b>
<b>Wrist Curl - under</b>	<b>40 pounds</b>	<b>70 pounds</b>	<b>75%</b>
<b>Back Extension</b>	<b>body weight</b>	<b>body weight</b>	<b>not factored</b>
<b>Abdominal Curl</b>	<b>body weight</b>	<b>body weight</b>	<b>not factored</b>
<b>Leg Extension</b>	<b>73 pounds</b>	<b>95 pounds</b>	<b>30%</b>
<b>Leg Curl</b>	<b>60 pounds</b>	<b>110 pounds</b>	<b>83%</b>
<b>Calf Press</b>	<b>150 pounds</b>	<b>150 pounds</b>	<b>no increase sought at this time due to a leg strength imbalance.</b>

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