

View From The Researcher - Part II

Last month we introduced a research project involving a case study using a single test subject who has committed to a bowling-specific exercise program in order to determine its effects on bowling performance. Complete confidentiality of the subject will be maintained throughout the project, though monthly releases of vital information will appear in this column. Each month you will see this section as your way to stay unobtrusively involved while enhancing your understanding of sport research. The project employs a **pretest-posttest experimental design** diagramed as:

O₁ X₁ O₂ X₂ O₃

Each O represents an evaluation and each X represents a treatment given to the subject. Use the following table as your guide.

- **O₁** - the pretest administered 9/26/97.
- **X₁** - the initiation of the bowling-specific exercise program beginning 9/27/97.
- **O₂** - an intermittent test to be administered 2/26/98 duplicating the first.
- **X₂** - the continuation of the bowling-specific exercise program.
- **O₃** - a post-test to be administered 9/26/98 duplicating the previous two.

In reality, the initial pretest is accompanied by six months of bowling-specific exercise performed three days a week, followed with an intermittent test exactly the same as the first revealing any progress six months after initiation. The program then continues with another six months of bowling specific exercise ending with an identical post-test.

The Evaluations (O₁, O₂, & O₃)

The pretest (**O₁**) derived baseline values for body weight, body fat percentage, lean body weight, blood pressure, resting heart rate, cholesterol level, HDL cholesterol, LDL cholesterol, triglyceride level, upper body strength, lower body strength, bowling-hand grip strength, girth measurements, lumbar-hamstring flexibility, bowling shoulder flexibility, bowling sliding leg/hip flexibility, resting heart rate, VO₂ MAX, heart rate training range, and perceived exertion. Each successive test (**O₂ & O₃**) will be identical to the first in order to compare the differences due to training and infer practical implications to bowling performance. These physiological tests were performed in at a major research institution by a clinical exercise physiologist. This same individual is scheduled to perform both successive tests on the subject to insure evaluator reliability.

The Treatment (X₁ & X₂)

The treatment, a bowling-specific exercise program, is the method used to enhance the subject's physical fitness. The program the subject performs 3 days a week is diagramed as follows:

A Bowling-Specific Exercise Routine

Aerobic Component

- ACSM (1995) suggests 20 or more minutes of aerobic exercise. We started at 20 minutes.
- We chose the recumbent bike that the subject enjoys and is readily accessible.
- Warm-up for three minutes performing the exercise slowly.
- Increase intensity, pedaling rate and resistance, elevating subject's heart rate into the range.
- Monitor the heart rate throughout the exercise maintaining it within the training range.
- Once the intense training is completed, cool-down for three minutes using minimal effort.

Anaerobic Component

- ACSM (1995) recommends strength training to improve the musculoskeletal structure.
- We determined, thru trial-and-error, each exercise's resistance for 8-12 repetitions.
- Strength-train the entire program completing one set of 8-12 repetitions to failure.
- Each specific exercise should be performed using a slow 4-second x 4-second count.
- Swiftly move from one exercise to another with minimal rest.

- Reconfigure the resistance paralleling the subject's increased strength over time.

Bowling-Specific Strength-Training Exercises

- **Seated Upright Front Shoulder Press**
- **Seated Upright Behind The Neck Pulldown**
- **Reclined Chest Press**
- **Standing Shoulder Width Grip Arm Curl**
- **Standing Close Grip Pushdown**
- **Seated Close Grip Over & Under Grip Wrist Curl**
- ****Abdominal Crunch (no resistance required, use body weight)**
- ****Reclined Back Extension (no resistance required, use body weight)**
- **Seated Leg Extension**
- **Seated or Reclined Leg Curl**
- **Seated or Standing Calf Raise (preferable seated)**

The dietary recommendations used in this project have very specific implications concerning results of the exercise program. In order to accurately evaluate specific changes in physical fitness and sport performance due to training, minimizing other factors including dietary manipulation is necessary. For this reasoning, it is important I de-emphasized the dietary guidelines to mere suggestions toward nutritional awareness.

Only two specific nutritional suggestions were given to the subject. First, increasing fluid consumption, water, was required to satisfy appropriate hydration demands. By increasing the subject's exercise patterns, we must increase that person's intake of water in order to prevent the early onset of fatigue or tiring. For those of you exercisers who experience premature tiring, you may want to examine your fluid intake before and after activity. Second, suggesting the subject leave some food remaining after each meal is an indirect way to assure the individual is not overeating or consuming too many calories offsetting gains from the exercise program.

The Connection

An athlete's health and more specifically, physical fitness, is a primary influence on sport performance. Understanding that precept has enabled sport researchers like myself to study and test various health-enhancing measures such as training protocols. The same principle which sport researchers use to study other sports is being applied to bowling. To date, there is little to no scientific research that has attempted to uncover or establish ground-base values in the sport of bowling. At present time, I currently have three specific research projects that are all aimed at establishing ground-base information while providing direction for future research in our sport.

It has yet to be shown that a bowler's level of fitness either promotes or prohibits skill mastery and execution, though these concepts have been theorized and reviewed on numerous occasions. Countless sport studies on basketball, baseball, track & field and swimming have provided a multitude of information for not only the researcher, but also the coach, teacher, administrator, and athlete. Our sport has fallen light years behind others in respect to research and development of the athlete. As we strive for legitimacy and aspire to curb societies' perception of the bowler, our efforts are futile without the support of basic and expanded research.

Next month I will diagram for you the subject's pretest results and where this person fell into the standards of our society for each category. You will be able to see just how much our bowling friend is out of shape and begin to review the progress he or she has made after 12 weeks of training.