

Bowling's final frontier: modern sports science weighs in on a burning issue

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This article, by Lynda Rypcinski, appeared in an August 2002 issue of Bowling Digest. I pulled it off of the web and want to post it here for all of you in the global bowling community. I hope this will help us begin the discussion of bowling as a sport.

Bowling's final frontier: modern sports science weighs in on a burning issue: topnotch bowlers are topnotch athletes - Cover Story - Statistical Data Included Lydia Rypcinski , Bowling Digest, August 2002

IT'S AN ETERNAL QUESTIONS, KIND of like. "Which came first--the chicken or the egg?"

Is bowling a sport? That question begets another: Are bowlers athletes?

Too often, bowling and bowlers' claims to legitimacy have been pooh-poohed with a dismissive, "You can't be a sport because ... (choose any or all):

"You don't sweat."

"You drink and smoke while performing."

"You sit more than you move."

"You can be out of shape and still get high scores."

It's been hard to refute those arguments. People with serious spare tires around their middle do win bowling tournaments. Not many scientific studies deal specifically with bowling and fitness. What's more, people in bowling--like people everywhere--assume that "real" sports require huffing and puffing, which bowling admittedly does not.

However, a small but growing core of sports science professionals inside and outside of the sport has become convinced that bowling and bowlers do indeed fall within the realm of sport and athletics.

"Sport is academically defined as a well-organized physical activity, with sub-factions and sub-disciplines, that is regulated through rules. Bowling fits that definition, given all its membership groups rules and levels of involvement," points out Dr. Jeff Briggs, a lifelong bowler with a Ph.D. in administration and science and the founder of Briggs Consulting, which offers consultative services to the bowling industry.

"Of course bowling is a sport, and it takes an athlete to perform it well," says David Grisaffi a corrective exercise kinesiologist in Washington State who trains boxers. Grisaffi worked with Hall-of-Famer Jeanne Naccarato when she was touring regularly. "An athlete combines a God-given genetic talent with sport-specific skills that tire developed to ti high level. Bowling simply differs in the bio-motor abilities it requires."

"Competitive bowlers who take a holistic approach to their sport--that is, have a coach, train and practice--tire certainly athletes," states Dr. Rob Wood, a sports scientist at the Northern Territory Institute of Sport (NTIS) in Darwin, NT, Australia. Wood specialized in long--jumping and sprinting in his younger days, and now works with elite-level Australian bowlers at the NTIS.

Bowling's bad rap, it seems, comes partly from the fact that it's an anaerobic sport. "'Anaerobic' means you're relying on adenosine triphosphate, which is stored in the muscle's fibers, for immediate energy," Grisaffi says, explaining that performance in bowling comes in short bursts of energy that stress the musculo-skeletal system [muscles, joints, and bones] rather than the cardiovascular [heart and lungs]. That's why the sweating and "windedness" seen in a continuous-activity sport such as soccer or long-distance running aren't present.

Bowling, Grisaffi says, is more akin to weightlifting, golf, and even platform diving. "You get up, perform the activity, and then go back and wait for your next turn."

"Cardiovascular endurance plays a minor role in bowling performance," adds Wood. "Some cardiovascular fitness is important because it helps the bowler stay fresh for longer periods of play, maintain fine motor control and execute properly. However, there seems to be a threshold aerobic level for howlers, beyond which further increases have limited contribution to improving performance."

Grisaffi suggests comparing a bowler to a sprinter on a scale of one to 10 in various bio-motor abilities. "Bowlers would

rank very low on speed, compared to sprinters. However, a bowler's power needs would be up there with the sprinter, if you look at the full spectrum of bio-motor abilities. You'll find that bowlers actually score high on several of them--power, balance, coordination, and flexibility."

These needs blend into what Briggs calls "functional fitness."

"Physical fitness concerns itself more with aesthetics and appearance," he says. "Functional fitness refers to how someone performs. A basketball player trains to jump higher. A bowler works to acquire and then sustain a low finishing position."

As bowling legend Carmen Salvino cautions, "Developing the wrong muscles--or the right muscles the wrong way--could even hurt your performance. Too many pushups, for instance, can overdevelop the chest muscles and force your swing off-line. You want muscles that are strong but lean." Salvino, a fitness buff who still uses a 16-pound ball at age 68, is competing again in selected PBA national stops.

"Let's face it: You've got only so many hours in a day to eat, sleep, work, and train," Grisaffi says. "You have to allocate your training time to where it will do the most good."

The principles of kinesiology (the study of the body in motion) will determine the most effective exercise program for a bowler. "Bowling is really a combination of a lunge, a twist, and flexion and extension of the shoulder, or extending the arm straight out in front of the face after extending it behind the body," Grisaffi says.

Briggs notes that today's power game generates so much torque, or twisting force, on the body that bowlers who generate a lot of revolutions "create a 'whiplash' effect on the shoulder, elbow, and wrist joints. Enormous stress is placed on the body when the ball is thrown. This is one of the biggest reasons bowlers develop 'bowler's tendinitis' and many other cumulative-trauma disorders."

In addition, the lunging motion of the final step stresses not only the torso and upper body as the ball comes down from the peak of the backswing, but also the supporting leg and knee. "You're asking your supporting leg to bear 90% of the body weight, plus the ball, plus the centrifugal forces in motion around the body as the ball swings forward. These forces are multiplied severalfold when we throw the ball," Briggs says.

Bowler-specific training, then, should enhance flexibility, strength, power, stability, balance, endurance, and general conditioning. As might be expected, programs will vary according to the trainer and athlete's priorities and philosophies.

"Very high levels of fitness are probably not beneficial to bowling," Wood offers. "For example, you need adequate strength to hold a 16-pound ball and carry it for many games. Improving your strength beyond this level may have limited benefit. However, if a bowler's fitness level is below threshold level in key areas, bowling performance may be adversely affected, especially in the later stages of tournaments."

Wood emphasizes aerobic endurance, balance, core stability (abdominal strength), and flexibility in his training programs, which incorporate principles of exercise physiology, experience gained from coaching athletes in other sports, and an understanding of the physiological demands of bowling.

"I'll assess flexibility first, because if, say, the hip flexors are tight, the full range of motion for the shoulder and/or the pelvis can be affected," Grisaffi says. "To compensate for that rigidity, another part of the body--say, the back--is asked to take more of the workload, over time, that adversely affects the lower spine. My feeling is that if you stretch the short and tight muscles before you begin and make them more flexible at the beginning, you can avoid bigger problems down the road."

Grisaffi says to think of the back as the body core. If the muscle "girdle" supporting the lower back is weak--or if a "pot belly" hangs off that girdle--the core is more likely to crack under the strains caused by bowling's twisting action. Doing some simple exercises that focus on the transverse abdominus--the innermost muscle in the body's core--will help reduce the likelihood of back pain.

"Lunging is a huge exercise to strengthen this area as well as the legs," Grisaffi says. "Strengthening the core helps build endurance; your body becomes less likely to break down over the long haul."

Other areas to strengthen and support are the shoulder joint, upper arm, forearm, and wrist. Grisaffi's training also addresses what he calls "unbalance. The side a bowler uses to throw the ball will always be stronger and thicker than the other side, so it's important to work the underused side, too." Grisaffi's preferred training apparatus includes Swiss balls, body blades, free weights and cable machines with weight stacks.

Briggs' training guidelines, detailed in "The Bowler-Specific Training Manual," incorporate the use of free weights and exercise machines to improve flexibility and body core strength. "Briggs Consulting conducted several different studies

assessing many of the factors that impact and are impacted by prolonged bowling. We placed electrodes on people and had them bowl for hours, measuring torque and pounds-per-square-inch of pressure on the body. We determined what joints, muscles, and bones are stressed the most, and this program incorporates those findings."

The manual emphasizes strength training to develop the forearm, shoulder, lower back, hip, and knee. "Strength training is the most specific and proficient form of anaerobic exercise recommended 10 bowlers." Briggs writes in the introduction. "Strength training, by using resistance greater than normal daily activity, overloads muscles and surrounding tissues, promoting increased strength, joint stability, and flexibility."

He also gives high points to lunging exercises. "Even the U.S. Olympic Committee promotes walking lunges for competitive bowlers to strengthen their legs and core."

Salvino, who plans to produce a video based on his exercise program, suggests that dynamic exercise--"exercise in motion"--should be part of a bowler's conditioning. "I like to use a treadmill and bicycle. You need to learn how to stretch properly, too: yoga is a good alternative. My philosophy is that sport is a dynamic thing, so your conditioning should be dynamic, rather than a series of static exercises."

Everyone agrees that in today's competitive arena, bowlers need more than just practice games to improve their sport-specific fitness levels. As Briggs points out, the fallacy of the "practice makes perfect" theory was revealed back in the 1950s and '60s, when Eastern Bloc athletes who underwent exacting fitness training regimes began rewriting the Olympic and world record books.

"The attitude of, 'Well, I'll just practice more' doesn't work in the 21st century," Briggs says. "You can't play yourself into shape at the elite level. Look at Tiger Woods in golf. His coach, Butch Harmon, has him on a rigid strength-training program; because of Wood's amazing success, all you hear about now is golf-fitness, golf training, and so on.

"Look at what Martina Navratilova achieved in women's tennis once she adopted a fitness program. Now all those pros do extensive fitness training, just to stay even with everyone else."

"Why do sports like football and baseball have preseason training camps if fitness contributes nothing to performance?" Salvino asks, "Unfortunately, bowling is still in the Dark Ages when it comes to that topic. While physically unfit people can bowl high scores, they're not the ones who master the game and last. We need to do a better job in promoting this to bowlers."

Part of the problem might be that few studies exist showing a bowler can raise his or her average by X pins as a direct result of: conditioning. However, Briggs cites a study he did several years ago. "We put a skilled bowler, whose average was pretty much the same for 15 years, on a training program and kept all other variables the same: There was no new equipment, no increased practice time, etc. That bowler's score improved by about eight pins after one year, so we assumed that the increase could be attributed to just one thing--the introduction of the training program."

"While I believe there can be great improvements in bowling scores with physical training, it is difficult to measure and prove," says Dr. Wood. "There are studies that show a relationship between some fitness parameters and bowling scores, but we lack studies to show that by improving certain aspects of fitness, a bowler's scores will improve."

Still, successful pro bowlers who follow rigorous training programs (think Amleto Monacelli, Jeff Lizzi, Kim Adler and Carolyn Dorin-Ballard, among others) have inspired youth and collegiate bowlers seeking a competitive edge. "They've been exposed to the concept more; they see the value fitness can have, and they've really snapped onto it," Briggs says. "They'll be leading the charge to a higher fitness standard for all bowlers in the years to come."

Are bowlers athletes? At the elite level, the answer is becoming apparent as science takes a closer look at the sport: Yes, bowlers are athletes.

And soon, they will be faced with the choice that athletes in all sports face: Get with the program--or get out of the way of those who do.

For additional information on bowling-specific training, contact Dr. Jeff Briggs at Briggs Consulting, 415 Roper Mountain Road, Greenville SC 29615. You can phone him at (864) 281-0080, e-mail bowlfit@charter.net, or log on to his Web page, www.BriggsConsulting.com. David Grisaffi, C.H.E.K.II and certified fitness trainer; can be reached at The Fit Zone, 625 North G Street, Tacoma WA 98403, or by phoning (253) 383-5370. e-mailing FitDavid@aol.com, or accessing the Web page www.fit-zone.com. Dr. Rob Wood's e-mail address in Australia is robjwood@hotmail.com; his Web page is www.topendsports.com/bowling-science.

RELATED ARTICLE: Jeanne Naccarato's workout regimen.

BOWLING CAN LEAD TO UNBALANCED MUSCULAR development of the forearm, back and gluteus. To maintain

muscular balance, keep in mind the amount of work by the dominant hand/side vs. the non-dominant hand/side. These unbalances can lead to overcompensation of the lumbar, thoracic and cervical spines, leading to altered gait moment. With the change in the movement pattern, consistency may be affected and lower back pain can result.

With that in mind, corrective exercise kinesiologist David Grisaffi designed this exercise regimen for bowler Jeanne Naccarato, and it could be a good guideline for your bowling workout. PHASE I (four to six weeks, Monday/Wednesday/Friday)

Exercise	Rest	Tempo	Reps	Sets
1. Multi Directional Lunge	1:00	202 *	1.3/each position L/R	3
2. DB bent rows	1:00	202	10-15	1
3. DB bench-press on SB Alternating	1:00	202	10-15	3
4. DB front lateral raise/DB rear lateral raise	1:00	202	10-15 L/R	3
5. Woodchopper	1:00	202	10-15 L/R	3
6. Single Arm High Cable Row and Reach (with split stance)	202	8-15 L/R	3	7. SB crunches
7. SB crunches	202	8-15	3	Additional exercise
8. Wrist extension on Swiss Ball (with six-pound medicine ball)	1:00	202	10-12	1-3
9. Wrist flexion on Swiss Ball (with six-pound medicine ball)	202	10-12	1-3	3. Wrist Deviation on Swiss Ball (with six-pound medicine ball)
10. DB biceps curls	202	8-12	1-3	Equipment needed: Swiss ball, Dumbbells. * 2X2 and such terminology refers to holding for two counts and releasing for two counts.

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