

# A Scientific Approach To Skill Development, Part I

For years now I have studied this game watching its players and coaches meticulously find ways to develop bowling skill. And that's what we're really after is it not . . . the knowledge and methodology to develop skill. Without skill, all we really have is know-how and equipment, not the wherewithal to complete the formula. So in essence, skill could be considered the central focus of our sport. As coaches, developing and molding a bowler's skill should be one of our primary objectives. With that in mind, over the next two issues I want to share some of my innovative teaching techniques that I found to be effective skill builders.

Physical education and sport science researchers have delved deeply for years into the study of proprioception, neural muscular facilitation, fine motor development, reciprocal innervation, and one's coordination; all of which comprise our athletic skill. A result of this work has provided both direction and revolutionary means to train athletes. We now have the capability to accurately test the strength, flexibility, and endurance of an athlete as well as train them using sport science and the physiological knowledge from such research. Working as a former physiologist in several clinical settings, I can attest to the scientific and technological advances in athlete development. Thus, having created some bowling-specific drills using my sport science background let me share them with you.

## Relaxing the Downswing and Back swing

By far one of the most difficult bowling skills to develop and truly "feel" is the free flowing pendulum arm swing. I'm sure everyone has their own view of how the arm swing should move or flow from start to finish, but understand the shoulder joint clearly dictates what is appropriate and what is not. The shoulder joint moves in several directions, but when fully relaxed will only move in a straight curvilinear path around its preferred axis of rotation. When unrestricted by muscular intervention, the shoulder and arm will drop straight down and back due to a direct line of pull from gravity. Therefore, if we want to teach bowlers to have a purely straight free flowing pendulum arm swing (downswing and back swing), complete relaxation of muscular resistance is essential - and yes extremely difficult.

The following drill is devised to teach bowlers the feeling and motion of relaxing the upper body muscles to reduce muscular restriction of the downswing. This drill can be performed both on and off the lanes.

1. Have a bowler place their hand in the ball and extend the bowling arm holding the ball in front of the body between waist and chest high. Only 90% extension is needed, locking out the elbow joint increases the risk of injury.
  - o \*The coach should stand in front of the bowler verbally queuing\*
2. Have the bowler hold the ball in this extended position for 10 seconds to fatigue the upper body muscle's energy, then instruct the bowler to completely relax the muscles allowing the arm to drop down and back simulating a downswing.

This drill fatigues the upper body muscles promoting relaxation while performing a simulated free falling motion. Sport science tells us that fatiguing a muscle's readily energy supply will enable it to function devoid of muscular resistance. The short-term energy supply of the upper body muscles are quickly replenished, therefore this drill can be performed multiple times.

## The Balanced Finish Position

This is one of my favorites. Every athlete strives for balance and precision while executing a movement or skill. Bowlers too should also look to develop balance for successful performance. Balance is created through the many muscles in our body synergistically working together for stabilization during movement or resistance of movement. Balance at the foul line while releasing the ball is a key to shot making. If you're looking to develop greater balance with your students try this simple home remedy.

This drill can be done at home, the office, or while at the gym.

1. Position yourself in front of a mirror in your finish position.
2. While posing the finish position, slowly lift the drag leg off the ground while attempting to maintain balance on just the front or slide leg.
3. Slowly lower the drag leg while again maintaining balance.
4. Slowly raise and lower the drag leg trying not to wobble or move, staying perfectly still.

This simple drill can be done daily and will strengthen the muscles in the lower legs as well as develop some added coordination and balance. Keeping the motion very slow will force the bowler to work hard to maintain balance. If you're having trouble relaxing the downswing or maintaining balance at the foul line, begin using these two drills in an attempt to improve your performance.