Research on a kinetic and electromyographic comparison of the standing single-arm cable press and bench press showed that performance is limited by the activation and neuromuscular coordination of torso muscles, not maximal muscle activation of the chest and shoulder muscles (4). In other words, like the bench press, standing single-arm cable press performance also relies on the strength of shoulder and chest musculature; however, what presents the major limitation in force generation is whole-body stability and equilibrium together with joint stability. The results of this study highlight the fact that although both are upper-body pushing exercises, the standing pushing action is more of a whole-body exercise, whereas the bench press is more of just an upper-body exercise. Therefore, the two pushing actions involve very different force production and neuromuscular coordination patterns. This has potentially important implications for exercise classification and program design for enhancing human performance, which is what this article highlights.

**STRENGTH TRAINING FOR ENHANCED PERFORMANCE IS ALL ABOUT TRANSFER**

The goal of exercise programming for enhancing human performance is to maximize training transfer. What the research results discussed above demonstrate is that some exercises have an obvious and direct transfer into the improved performance of sporting actions and overall functional capacity, while other exercises offer a less obvious transfer, known as indirect transfer. Functional capacity can be summarized as how broad one’s range of ability is; in other words, a person capable of performing a broader range of specific tasks can be considered to possess a high functional capacity.

This article proposes that all resistance training exercises—not just pushing movements—can be classified as either “specific” or “general.” How to classify each exercise type and the unique benefits they offer is expanded upon below.

**WHAT ARE SPECIFIC EXERCISES?**

Specific exercises have an obvious and direct transfer into improved performance and functional capacity because they are based on the principle of specificity. According to Dr. Everett Harman in the *NSCA’s Essentials of Strength Training and Conditioning* (3rd Edition):

“The concept of specificity, widely recognized in the field of resistance training, holds that training is most effective when resistance exercises are similar to the sport activity in which improvement is sought (the target activity). Although all athletes should use well-rounded, whole-body exercise routines, supplementary exercises specific to the sport can provide a training advantage. The simplest and most straightforward way to implement the principle of specificity is to select exercise similar to the target activity with regard to the joints about which movement occur and the direction of the movements. In addition, joint ranges of motion in the training should be at least as great as those in the target activity,” (1).
It is important to note that most of the “assistance” exercises powerlifters use to help maximize their strength in the bench press, squat, and deadlift all replicate the specific force generation patterns of these lifts. Specific exercise applications for other sports also utilize the same wisdom. In short, specific exercise movements are essentially assistance exercises for the specific movement patterns that form the foundation of athletics. In the case of upper-body pushing exercises, the standing single-arm cable press would be classified as a specific exercise for an athlete that utilizes this movement pattern.

WHAT ARE GENERAL EXERCISES?
General exercises are essentially conventional strength training exercises and may consist of compound or isolation movements using free weights, cables, or machines. In the case of pushing exercise applications, the bench press, incline press, and shoulder press could be classified as general exercises. Since these exercises do not necessarily reflect the specific force generation patterns of many common movements in athletics, the ability of these applications to positively transfer into improved performance potential is less obvious, which has led some personal trainers and coaches into mistakenly labeling them as “non-functional” and therefore not valuable. This is a false belief. Just because the exercise application is less specific to replicating the specific force generation patterns of a given target movement does not make the exercise less functional; it simply makes it more general. Both specific and general exercises offer a unique set of benefits that transfer into improvements in performance and overall functional capacity.

BENEFITS OF SPECIFIC EXERCISES
The principle of specific adaptation to imposed demands (SAID) comes into play when stressors are applied such as biomechanical, neurological, and physiological stress (2). In other words, the adaptations to the training stimulus will be specific to the demands the training puts on the body. Specific exercise applications create a more ideal environment than general exercises for enhancing the specific force generation and neuromuscular coordination patterns of target movements in athletics such as the standing horizontal pushing environment.

The universal principle of specificity dictates that to maximize improvements in standing pushing performance, one must utilize standing pushing exercises such as the standing single-arm cable press (Figures 1 and 2) and the angled barbell press (Figures 3 and 4), or use pushing exercises like the one-arm push-up (Figures 5 and 6), that create whole-body stability and integrate the hips and core along with the upper body.

BENEFITS OF GENERAL EXERCISES
In most cases, general exercises create a more ideal environment than specific exercises for stimulating increases in overall muscle strength and size. Therefore, these applications offer a general transfer into improvements in human performance by increasing muscle hypertrophy, motor unit recruitment, bone density, and connective tissue strength, which can reduce injury risk. It is widely recognized that improving overall strength (i.e., the ability to produce, reduce, and control force) through strength training methods can improve performance and functional capacity, but the performance benefits offered by increasing muscle size (i.e., hypertrophy) via bodybuilding-style methods often go unrecognized.

Research has shown the performance benefits of increasing muscle hypertrophy and that horizontal pushing forces from a standing position under ideal mechanical conditions (i.e., the subject was able to maintain a stiff and stable body position to push from) are limited to 40.8% of the subject’s bodyweight, rather than the subject’s bench press (4).

This aspect of the study demonstrates the functional benefits of gaining muscle mass. The use of general exercise applications, like the bench press and dumbbell press along with isolation exercises, may improve one’s ability to produce more horizontal (and diagonal) pushing force from the standing position because one has more mass (into the ground) to push from (4). In other words, the more muscle mass an individual has, potentially the more ability they will have to produce pushing force (strength) when standing. Not only does this provide an athlete an advantage from a strength standpoint, but it also applies to avoiding getting knocked over or off-balance.

Additionally, a study of baseball pitchers found that increased bodyweight is highly associated with increased pitching velocity (6). This means that pitchers with larger body masses tended to throw the ball faster than those who weighed less. It is important to note that the sequencing of rotation required when throwing a baseball is a very similar total-body action to throwing a punch and to swinging an implement like a racquet, club, or bat. When the arms, which are responsible for the accuracy component of the individual sport skill of striking the target, are taken out of the equation, each of these athletic actions involve a force generation pattern that comes from the ground up (including the hips, trunk, and arms).

It is important to note that since sporting actions such as throwing and punching involve a coordinated effort of the entire body to summate force (a sum of the total individual muscles added together), increasing general muscle strength may increase the force producing capability of each muscle group. Therefore, allowing them to each make greater contribution to the summation force and increasing power production.

COMMON CONFUSION ASSOCIATED WITH SPECIFIC EXERCISE APPLICATIONS
It is important to not confuse working on sporting skills with the specific exercise applications and working on improving specific force generation patterns, which transfer into target movements. Some strength and conditioning professionals have athletes and clients load to their specific sports skill (such as attaching a resistance band to the end of a golf club or hockey stick and swinging it, or having a box, shadow box while working against bands that are strapped around their back) and call these “sport-specific exercises” or “functional exercises.” Put simply, loading specific sports skills is a misapplication of the principle of specificity, and therefore a misunderstanding of how to properly use specific exercise applications.
The reality is that improving one’s ability to perform certain sporting skills is not about replicating what that specific movement looks like, but rather it is about replicating the specific force generation patterns involved within that movement pattern. In other words, when the focus is only on what the exercise looks like, one can easily make the mistake of loading sport-specific skills instead of working on improving the specific force generation patterns used to perform sporting movements.

The problem with this is that the movement skills required in sports have accuracy components that are exact—not similar. For instance, research examining the validity of baseball players swinging a weighted bat before taking their turn to hit found that although a weighted bat does not influence actual swing speed, it may alter the batters’ perceptions of bat heaviness and swing speed (3). Another study found the normal swing pattern of experienced batters was altered and their swing speed slowed down for up to five swings following a warm-up with a weighted bat (5).

One can test this by shooting 10 free throws with a regular basketball. Then, taking 10 more free throws with a 4 – 5 lb medicine ball. One will quickly find that the motor pattern used to throw the heavier ball is completely different, as the first few throws will likely come up short until adaptation to the new weight occurs. Then, if one goes back to a normal basketball and shoots 10 more shots, the first few shots are likely to go over the backboard because shooting the much lighter basketball involves a much different motor sequence than shooting the medicine ball.

**CONCLUSION**

Both methods of training offer effective training options for improving important, interdependent fitness and performance components that the other type may miss. Therefore, a training program that combines both specific and general exercises will be more comprehensive and more likely to provide superior results than exclusively using only one type of training method. For example, performing the bench press can certainly provide benefits as a general strengthening exercise along with many other conventional pressing exercises. And exercises like one-arm push-ups, one-arm cable presses, and the angled barbell press make for effective specific exercises. These specific exercises complement the general exercises and may help in gaining benefits in the areas where the general exercise applications fall short.

**REFERENCES**


**ABOUT THE AUTHOR**

Nick Tumminello is the owner of Performance University, which provides practical fitness education for fitness professionals worldwide, and is the author of the book “Strength Training for Fat Loss.” Tumminello has worked with a variety of clients from National Football League (NFL) athletes to professional bodybuilders and figure models to exercise enthusiasts. He also served as the conditioning coach for the Ground Control Mixed Martial Arts (MMA) Fight Team and is a fitness expert for Reebok. Tumminello has produced 15 DVDs, is a regular contributor to several major fitness magazines and websites, and writes a very popular blog at PerformanceU.net.
FIGURE 1. STANDING SINGLE-ARM CABLE PRESS – START

FIGURE 2. STANDING SINGLE-ARM CABLE PRESS – FINISH

FIGURE 3. ANGLED BARBELL PRESS – START

FIGURE 4. ANGLED BARBELL PRESS – FINISH

FIGURE 5. SINGLE-ARM PUSH-UP – DOWN POSITION

FIGURE 6. SINGLE-ARM PUSH-UP – UP POSITION