Exercise Technique:

The push press: an alternative to the bench press

Pat O'Shea, Ed.D.
Human Performance Laboratory
Oregon State University

For as long as one can remember, the "Big Three" of athletic strength training have always been the bench press, squat, and power clean. Why is this so? Primarily because the authors of strength training textbooks and articles have repeatedly said so. Well, this may come as a shock to some, but the bench press was a poor choice for membership in the Big Three. In no way does it meet the criteria set for athletic-type lifts. The intent of this author is to offer an objective evaluation of the push press from a biomechanical and specificity standpoint, and recommend that it receive serious consideration as a replacement for the bench press as one of the Big Three lifts. The following article describes the benefits of the push press for field event throwers and other athletes involved in sports requiring explosive-reactive-ballistic movements through a full range of motion.

The discus, hammer, and shot put are highly explosive events and require the utmost in ballistic strength and speed. A comparative biomechanical analysis of the throws shows that they have many commonalities as far as muscle groups used, range of motion, torso rotational energy demands, and speed of movement.

Producing an outstanding throwing performance is dependent to a great degree on the athlete's ability to properly direct and utilize the large muscular forces the body's "power zone" is capable of generating. Muscle groups comprising this zone are the hip flexors and extensors, spinal erectors, quadriceps and hamstrings. Consequently, the power zone provides the greatest potential to favor both strength and speed production, and contributes most to throwing performance.

The main role of the upper torso muscle groups in throwing is transferring the kinetic energy generated by the power zone to the throwing movement. Upper body muscles most important to throwing include the upper back, trapezius, upper pectoralis major, deltoids, triceps, forearms and wrist.

Further analysis of the throws shows that speed, quickness, and mobility are critical factors for good throwing performance. Unfortunately, these are the factors most neglected in the training of developing young throwers. A good thrower must be trained to quickly exert forces in multiple directions utilizing several body joints simultaneously. Thus, throwers need to concentrate on developing explosive-reactive-ballistic movements through a full range of movement and less on absolute strength and muscle mass.

The greatest transfer of muscular power developed through weight training to the throws will result from the execution of explosive torso-rotational lifting movements, such as full-range "total body" lifts that require the thrower to concentrate and think in terms of both strength and speed. Athletic-type lifts meeting this criteria are power snatches, power cleans, high pulls, squats and the push press.

Noticeably absent from this list is the so-called "king" of the upper body lifts, the bench press. This is pure heresy, for we have been led to believe that every strength athlete must do lots of bench pressing to maximize upper torso strength. While this is partially true, the other side of the coin is that the bench press has some serious flaws as far as throwers are concerned. It is not a full range total body lift and does little if anything for development of the power zone. Too, bench pressing can lead to excessive upper body muscular bulk--especially the chest. Throwing speed depends on functional range of motion, where overly-developed muscles interfere with the thrower's range of motion and decrease flexibility and speed.
On the other hand, from a technical standpoint the push press is in many respects superior to the bench press in its ability to develop functional athletic-type strength. It is a free standing full-body lift requiring the generation of high torso kinetic energy when lifting maximum to near maximum loads. The ballistic nature of the lift provides for excellent transfer of power to the throws and all other sports requiring high power output. Directly stated, the inclusion of the push press in a thrower’s training will contribute directly to optimal throwing performance.

**Mechanics of the Push Press**

To execute the push press the bar may be either power cleaned to the chest or taken from a rack. Most throwers will prefer using the rack as less energy is expended permitting the use of heavier loads. Periodically, though, the thrower needs to execute the complete clean and push press to challenge the mind and to train the body through a full-range of multiple joint movement.

The bar is positioned on the top of the chest with the load distributed over the mass of the shoulder girdle. Hands are positioned slightly wider than shoulder-width.

Head is up, chest is out.

Feet are parallel and spread hip-width or slightly wider, toes turned at about 15 degrees.

Immediately prior to the execution of the lift make a strong isometric contraction of all muscles of the thighs and torso. This action facilitates the stretch reflex mechanism which assists in producing a strong eccentric contraction in the extensor dominate muscles used in the initial phase of the push press.

**Execution**

Taking a deep breath and making a slight knee dip (approximately 1/5 of a squat - *Figure 2*), which is then followed immediately by a vigorous straightening of the knees together with a forceful upward thrust of the hips, the bar is driven to eye level or a little higher and then pressed out to arm’s length overhead - (*Figure 3*). At this point, though, the lifter can assume a slight layback position. Up to this point, though, the lifter can maintain a strong leverage position by keeping the bar close in to the face. Throughout the lift the feet remain stationary and on line.

Once the bar is fixed overhead it is then lowered back to the chest. In doing so, the knees are unlocked, thus serving as shock absorbers and reducing the stress on the lower back as the bar lands back on the chest.

**Discussion**

In push pressing the thrower is duplicating many of the biomechanical demands of throwing. One prime example is the application of the stored kinetic energy concept which is a vital key to instantaneous power output as required in throwing and push pressing. The initial dip of the knees in push pressing involves a strong eccentric contraction of the hip and quadricep flexors resulting in the generation of stored kinetic energy in the large extensor muscles of the power zone. Stored kinetic energy plays a major role in the transition from the knee dip to the upward ballistic thrust of the bar from the chest. The bar thrust is facilitated by the utilization of the stored kinetic energy which assists in producing a powerful upward drive (concentrated contraction) of the hip and quadricep extensors.

Since this same rotational hip action is required in throwing, it makes good sense to train with lifts like the push press that closely duplicate the throwing movement. (This is application of the specificity principle.)
Push pressing also greatly assists in maximizing upper body power. For once the bar reaches eye level its continuous upward movement requires strong action from the spinal erectors, deltoids, triceps and forearms. These are virtually all the same muscles used in throwing.

From a biomechanical standpoint, a summation of forces occurs during the execution of a push press. The powerful muscular force generated by the hip and knee joints is transmitted through the musculoskeletal system to the upper torso muscles. They, in turn, transmit this force to the bar to maintain its upward acceleration. Effective throwing technique is also dependent upon this same summation of forces.

By now it should be quite evident why every thrower, as well as other athletes who require a powerful and mobile upper body, should utilize the push press more and the bench press less in their training. Granted, the bench press is both technically and physically an easier lift to perform than the push press. If that is what you are looking for, fine. Remember, though, the easy way is not the road to athletic success.

**Supporting dumbbell pressing exercises**

Presented here is a group of selective dumbbell pressing exercises that lend support to the push press and contribute greatly to the overall development of upper body strength and flexibility. Dumbbell presses should be the first choice of assistant exercises for throwers. Dumbbells work the shoulder girdle through a wider range of joint movement and require greater neuromuscular coordination in their execution than do barbell exercises. Virtually any lifting movement you can do with a barbell can in many instances be done more effectively with dumbbells.
To determine the level of effectiveness the bench press and push press can have on maximizing power oriented sports performance they were each rated on the following athletic characteristics.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>H</td>
<td>O</td>
<td>M</td>
</tr>
<tr>
<td>L</td>
<td>H</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>L</td>
<td>M</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>M</td>
<td>H</td>
<td>L</td>
<td>H</td>
</tr>
</tbody>
</table>

Develops muscular power in multiple directions in multiple body joint movement - eg. full range athletic-type strength.

Potential to shift the force-velocity curve to the right.

Develops the neuromuscular and sensory systems.

Challenges the mind and body to function in synchronization.

Provides for positive transfer of training to power-oriented sports.

**Key**

O - None
L - Low
M - Medium
H - High

Table 1. Athletic Characteristics Rating of the Bench Press and Push Press

---

**HOW TO BUILD A BETTER ATHLETE**

You need to build strength and endurance. Train hard. Eat nutritiously. And make Nutrament part of that nutrition.

Nutrament provides vitamins, minerals, protein and carbohydrates necessary for muscle growth and development. It’s also high in calcium. And because it’s a liquid, it digests easily. For more information, call 1-800-632-1684.

**Nutrament®**

The athletes' fitness and energy food.