THE #1 MAGAZINE FOR ATHLETIC PROFESSIONALS

SEPTEMBER 1999 $4.00

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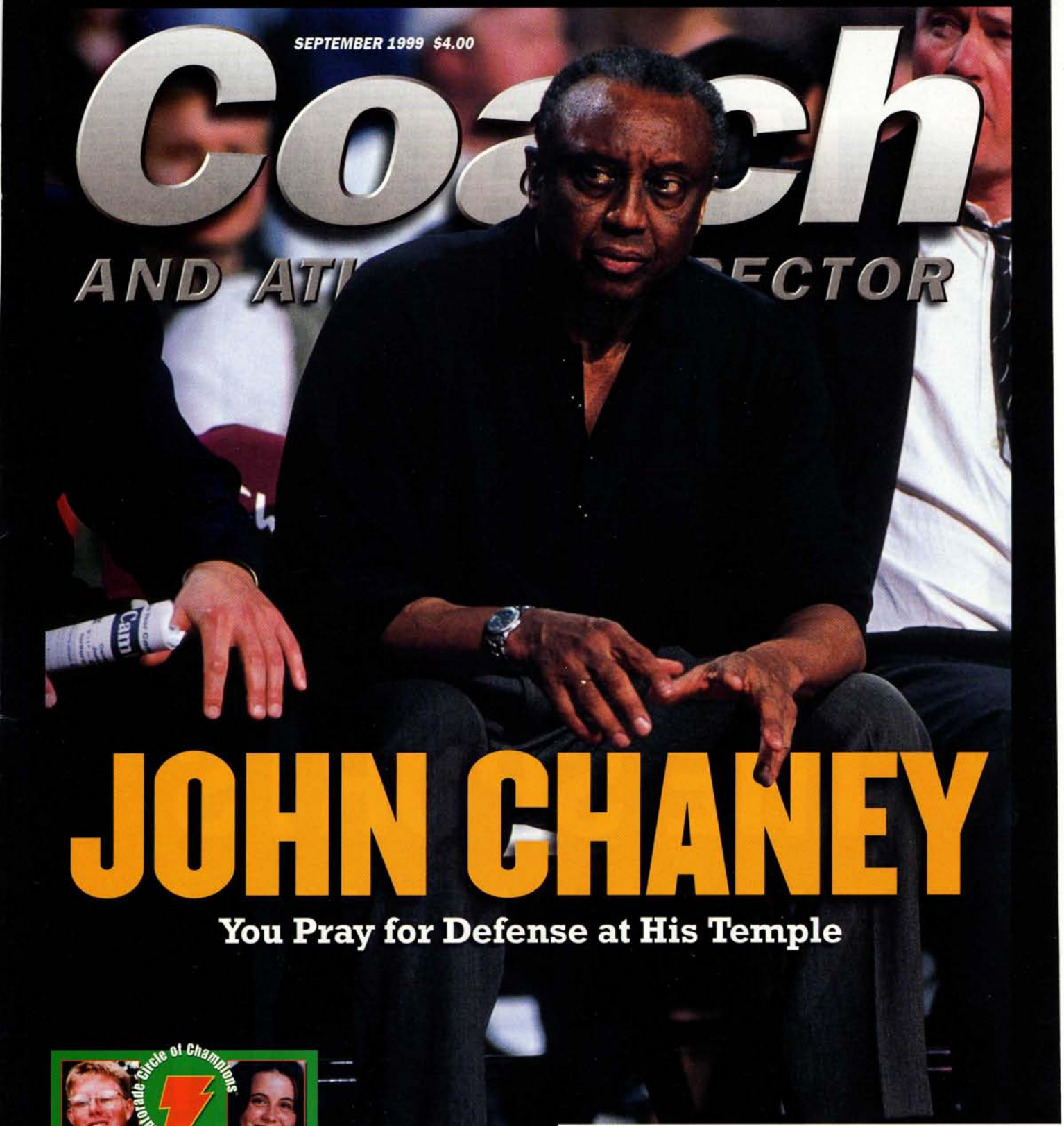

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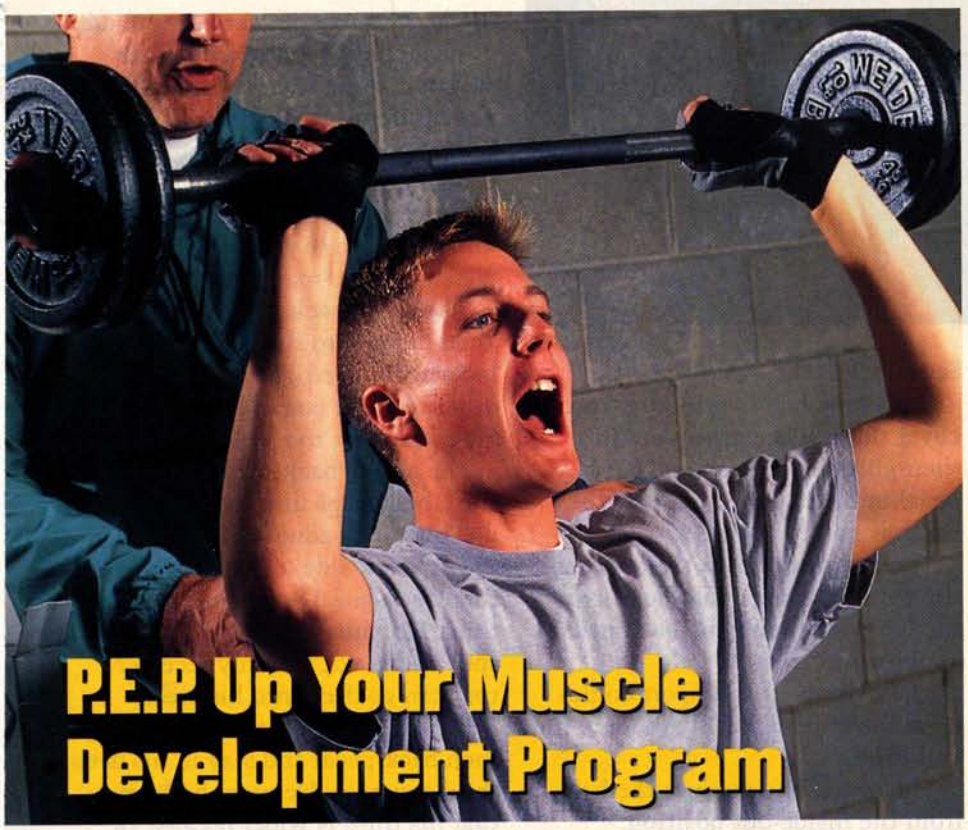

P.E.P. Up Your Muscle Development Program

PATTI McCONVILLE

The Pre-Exhaustion Principle (double sets) will maximize your effort simply and efficiently

ATHLETES AND COACHES interested in maximizing muscular development in a safe and efficient fashion must have a thorough understanding of the two types of exercise movements—single joint and multi-joint.

A single-joint (or primary) exercise involves the movement of only one joint, enabling the athlete to isolate a single muscle. For example, a leg extension will straighten a bent leg at the knee joint, thus isolating the quadriceps muscle on the front of the thigh.

by Matt Brzycki
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A multi-joint (or secondary) exercise involves two or more joints. A lat pulldown, for example, will involve both the shoulder and elbow joints. The movement of the upper back (or lats) will stretch the upper arm from the shoulder joint, while the biceps will bend the arm at the elbow joint.

Multi-joint exercises are advantageous in that they allow a relatively large amount of muscle mass to be used in one movement. However, just as a chain is only as strong as its weakest link, a multi-joint movement can create a problem in cases of muscular fatigue.

When an athlete experiences fatigue while exercising, it is generally because he has exhausted the smaller, weaker muscle involved in the multi-joint movement.

This will happen well before the larger and stronger muscle has taken on a sufficient workload.

In an exercise such as a lat pulldown, the biceps is the smaller muscle and will therefore fatigue long before the upper back. In fact, the athlete's grip strength may be the first to go.

In any multi-joint movement for the upper back, such as a lat pulldown or a seated row, the lifter will quickly notice that the biceps and forearms have worked much harder than the upper back. Ergo, the biceps and forearms will get a pretty good workout, but the upper back—the real target of the exercise—won't get much of a workload.

As a rule of thumb, the arms are the weak link in multi-joint movements for the upper body, while the legs are the weak link in the multi-joint movements for the gluteals (hips and buttocks).

These weak links limit the athlete's potential for developing larger, more powerful muscular structures.

P.E.P. It Up

Question: How can our athletes avoid this problem?

Answer: Try the Pre-Exhaustion Principle, a training technique that was popularized in the early 1970s. The P.E.P. employs a "double set"—a single-joint movement followed quickly by a multi-joint moment.

The idea is to pre-exhaust the target muscles by performing a single-joint exercise—bypassing the weak link—then quickly performing a second exercise to activate the surrounding muscles, thus helping work the pre-fatigued muscle to a point beyond its normal state of exhaustion.

Let us suppose you want to use the P.E.P. for your upper back. First, you perform a single-joint exercise,

such as a barbell or a dumbbell pullover, to pre-fatigue the upper back. Then, your immediately follow with a multi-joint movement, such as a lat pulldown or a seated row, to help work the pre-fatigue upper back to a degree of exhaustion that would normally be impossible.

Note: For maximum results, the second exercise should follow right on the heels of the first. Any noticeable time lapse between the two exercises will allow the pre-fatigued muscle to recover some of its original level of strength, putting the athlete right back to where he started, with the weak link still being the limiting factor.

Multi-joint exercises are advantageous in that they allow a relatively large amount of muscle mass to be used in one movement.

Practical Applications

Brief guidelines for devising double sets to pre-exhaust the major muscle groups:

Gluteals. A leg press may be a great exercise for the front thigh, but it is a relatively poor exercise for the gluteals. However, the athlete can pre-fatigue the "gluts" through a single-joint exercise, such as a hip extension or hip abduction (on a machine or with manual resistance), followed immediately by a leg press—thus using the fresh quadriceps and hamstring muscles to fatigue the "glutes" to a greater degree than would otherwise by possible.

Hamstrings. The leg curl is the main single-joint exercise used to isolate the "hams" on the back of the thigh. By instantly following up with a leg press, the athlete can use the "glutes" and the quadriceps toe further exhaust the hamstrings.

Quadriceps. A leg extension is the best single-joint movement with which to isolate the "quads," but the athlete can once again use the leg press as a secondary movement. In this case, the "glutes" and hamstrings are used to exercise the pre-fatigued quadriceps.

Chest. A bent-arm fly (using dumbbells or manual resistance) is an excellent single-joint movement with which to provide direct resistance to the pectoral muscles. This movement also works the anterior deltoid on the front part of the shoulders.

After pre-fatiguing the chest region with the bent-arm fly, the athlete can further exhaust the pecs through several multi-joint movements—bench press, decline press, incline press, push-ups, or dips, depending upon the available equipment. The performance of any of these multi-joint movements soon after completion of the bent-arm fly will use the triceps to further exhaust the pectoral area.

Note: For variety, the bent-arm fly can be performed in the decline, incline, or prone positions.

Upper Back. The lats can be effectively isolated with a barbell or dumbbell pullover, then followed up immediately with a multi-joint exercise such as a chin, pull-up, seated row, bent-over row, or lat pulldown. The combination will enable the athlete to exercise his upper back in a highly efficient manner.

Shoulders (the musculature includes the deltoids and the trapezius). The most popular single-joint movements for addressing the deltoid muscles are the lateral raise (middle deltoid), front raise (anterior deltoid), and bent-over raise (posterior deltoid), whereas the shoulder shrug is the best single-joint exercise for isolating the trapezius.

A "double set" for the deltoids would include one of the three single-joint exercises for the deltoids followed quickly by a shoulder press to help exercise the pre-fatigue deltoids (via the triceps).

A "double set" for the trapezius would be the shoulder shrug followed as soon as possible by an upright row, which will use the biceps to help pre-exhaust the trapezius.

Biceps. The biceps curl offers the best single-joint exercise for isolating this muscle. Located on the front part of the upper arm, the biceps is used to flex the lower arm at the elbow joint.

When followed quickly by a multi-joint movement such as a chin, pull-up, seated row, bent-over row, or lat pulldown, the biceps curl will allow the athlete to use his upper back to exhaust his biceps even further.

Triceps. The best single-joint exercise for this muscle (located on back of the upper arm) is a triceps extension. The bench press, decline press, incline press, dip, or shoulder press can be used as a multi-joint movement.

The chest and/or anterior deltoid are thus used to exercise the pre-fatigued triceps.

Bottom Line

Remember, the limiting factor in multi-joint movements is the smaller, weaker muscle structures. However, this disadvantage can be turned into an advantage by having the athlete pre-fatigue a muscle with a single-joint movement and then immediately follow up with a multi-joint exercise to recruit surrounding muscles for assistance.

The athlete can, in this fashion, maximize his muscular development in a safe and efficient manner. ■