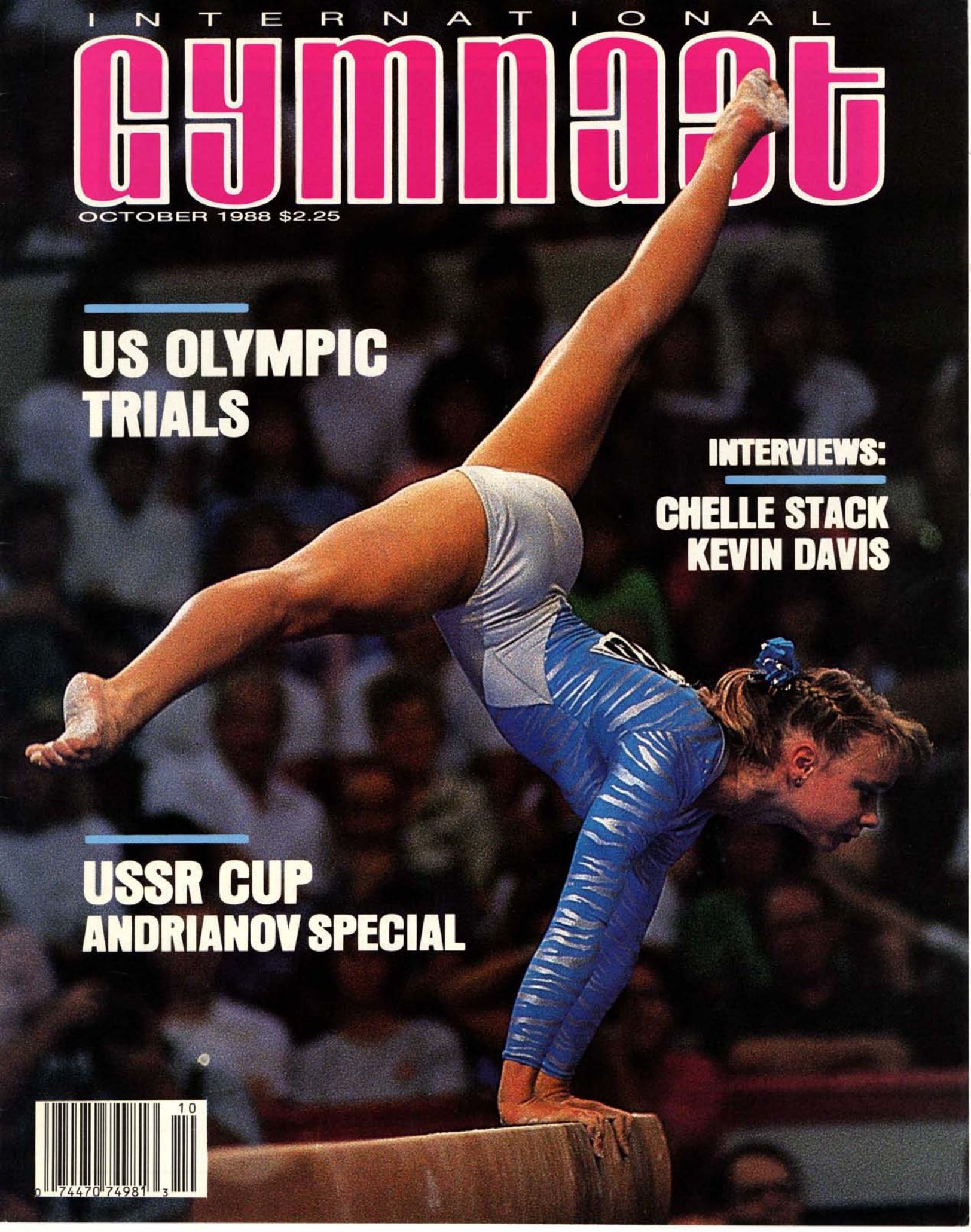
INTERNATIONAL

# Gymnast

OCTOBER 1988 $2.25



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# THE PLYOMETRIC CONTROVERSY

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THE latest buzzword in the area of strength and conditioning is "plyometrics," another "secret" training technique brought back from the Eastern European countries.

Plyometrics were used originally as a training method by U.S. track and field athletes in the 1970s, and more than a decade later the popularity of plyometrics is literally growing by leaps and bounds as a possible means of increasing explosive strength in such sports as basketball, football, gymnastics, volleyball and weightlifting.

**What are plyometrics?**

Plyometrics apply to any exercise or jumping drill that uses the myotatic, or stretch reflex of a muscle. This reflex is elicited when a muscle is pre-stretched prior to a contraction. Pre-stretching causes a more powerful movement than would be possible otherwise. In-depth jumping, for example, uses an individual's bodyweight coupled with the force of gravity to evoke this response. In this exercise, you are required to step off a box from a specified height (usually 2½-3½ feet). The elastic nature of muscles (in this case the gluteals, quadriceps, hamstrings and calves) allows you to store potential energy during the lowering (or eccentric) phase of this movement. Upon contact with the ground, your lower body musculature is pre-stretched forcefully which causes the stretch reflex. Then the stored energy is released as kinetic energy, resulting in a rapid, explosive movement. It is similar to the act of stretching a rubber band (giving it potential energy) before shooting it across a room.

***... popular plyometric exercises include bounding, hopping and various box drills.***

Other popular plyometric exercises include bounding, hopping and various box drills. More recently, upper body plyometrics have been introduced, such as ballistic or "drop" pushups. Medicine balls also are used frequently during upper body plyometrics.

**Are plyometrics productive?**

At first glance, plyometric training appears to be a rather innovative idea based on scientifically documented principles. Unfortunately, it is not without its share of controversy. It seems as if a great deal of misleading information, half-truths and confusing rhetoric surround plyometrics. For example, "experts" on the subject are eager to point out that plyometrics "bridge the gap between strength and speed." However, no one ever explains exactly what this nebulous description means.

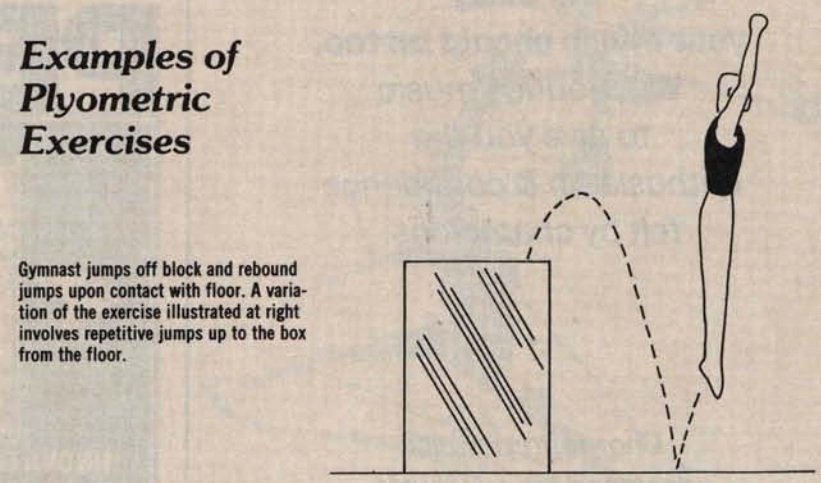
Further, most of the accolades showered upon plyometrics are centered on the erroneous protocol of biased research or personal anecdotes. One well-known advocate of plyometrics even admits that studies are difficult to conduct because of the many uncontrollable variables. Additionally, personal success stories offer little proof as to the effectiveness of plyometric drills. For example, although the 1987 Super Bowl champion New York Giants use plyometrics, the 1988 Super Bowl champion Washington Redskins do not.

Therefore, the belief that you can train the elastic properties of tendons and muscle tissue to become more efficient at storing energy is completely unfounded. There's no definitive proof.

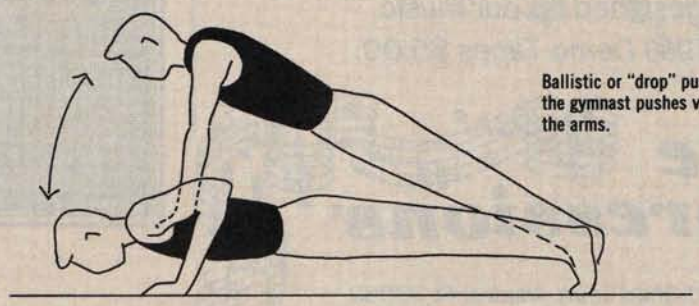
**Are plyometrics safe?**

With plyometrics, the potential for traumatic injury is extremely high due to the repetitive, ballistic nature of the activity. In fact, many prominent sportsmedicine doc-

## *Examples of Plyometric Exercises*



Gymnast jumps off block and rebound jumps upon contact with floor. A variation of the exercise illustrated at right involves repetitive jumps up to the box from the floor.



Ballistic or "drop" pushups in which the gymnast pushes vigorously with the arms.

tors, physical therapists and athletic trainers view plyometrics as "an injury waiting to happen." When performing plyometrics, the musculoskeletal system is exposed to extreme biomechanical loading. The muscles, bones and connective tissue act as natural shock absorbers to dissipate the imposed stress. An injury occurs when these stresses exceed the structural integrity of a joint. Going back to a previous analogy, if you stretch a rubber band with too much force it will snap. The same is true of your muscles.

Potential injuries include heel bruises, shin splints, meniscal damage, patellar tendinitis and vertebral compression, as well as various sprains, strains and stress-related fractures.

Remember when aerobic dancing was introduced? Most fitness enthusiasts eagerly accepted this form of conditioning with little or no reservation. Within the past few years, however, it's become almost commonplace to hear about overuse injuries directly related to the pounding absorbed by the body while jumping up and down. Today, the concerns for these inherent dangers are reflected by the advent of the so-called "low impact" aerobics. If people suffered traumatic injuries from jumping up and down a distance of several inches, imagine how dangerous it is when jumping up and down several feet!

Experts generally caution that you should be "in shape" or "in condition" before beginning plyometrics, and that they're safe "as long as you don't overdo it." Precautions like these are merely more examples of the vague, confusing rhetoric characterizing plyometrics and represent a feeble attempt to ease one's fears.

***. . . a great deal of misleading information . . . surrounds plyometrics.***

**Final concerns**

The adage "a little bit of knowledge is dangerous" certainly seems appropriate concerning plyometrics. In their haste to gain the "competitive edge," people are easily influenced by the claims of successful coaches and athletes as well as the latest "research" from the Soviet Union. Unfortunately, most people do not look at this information critically to determine whether it is practical, efficient, productive and safe.

Again, it has never been proven that the stretch reflex responds to training. However, even if plyometric training was a productive method of stimulating gains in explosive strength, it exposes athletes to an unreasonably high risk of injury. ***IG***

*Matt Brzycki has a bachelor's degree in health and physical education from Penn State and has been the Assistant Strength Coach at Rutgers University since 1984. He is accredited by the National Strength and Conditioning Association as a Certified Strength and Conditioning Specialist and has authored nearly 30 articles on strength and conditioning for 11 different publications.*