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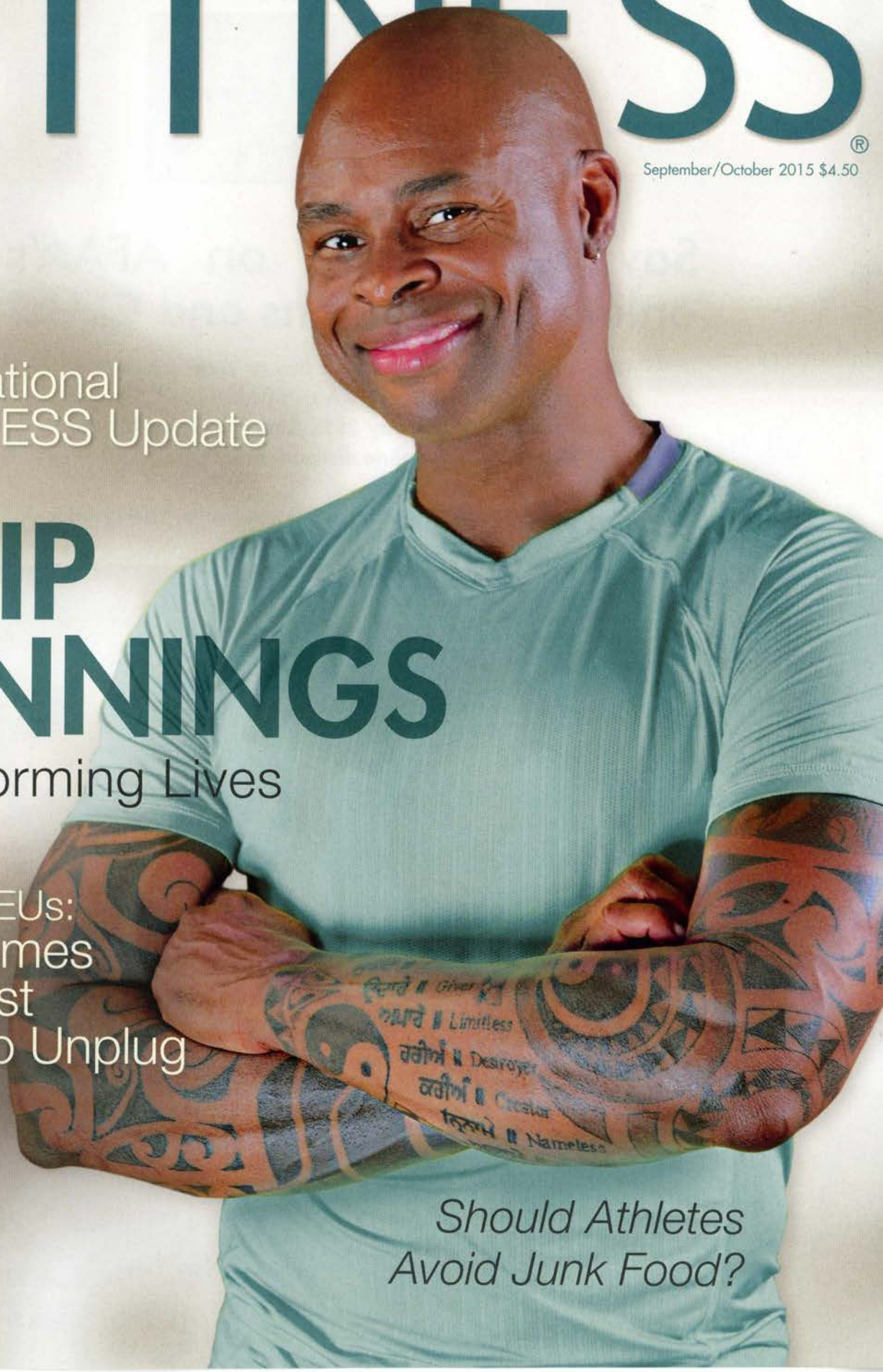

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BY MATT BRZYCKI

WHEN USING SELECTORIZED MACHINES, IS VARIABLE RESISTANCE BETTER THAN CONSTANT RESISTANCE?

Selectorized machines for strength training can provide resistance that's either variable or constant. As the name implies, constant resistance is when the load remains the same throughout the range of motion; variable resistance is when the load changes throughout the range of motion.

When you perform an exercise, your biomechanical leverage changes; you're stronger in some areas and weaker in others. In theory, then, variable resistance would be more advantageous since variations in load compensate for variations in leverage.

In one study, 37 male subjects (average age 65) were quasi-randomly assigned to three groups: One group used machines that provided constant resistance for the lower body, another used machines that provided variable resistance for the lower body, and the third acted as a control group and didn't train. The subjects in the two experimental groups also used machines that offered constant resistance for the upper body and performed the identical protocol (sets and reps) two times per week for 20 weeks.

It was found that both types of machines produced significant increases in lower body strength and the cross-sectional area of the quadriceps. However, only the variable training group significantly improved the work that they could do—here, load times reps—with 75% of their one rep maximum.

IS DOING PUSH-UPS WITH RESISTANCE BANDS AS GOOD AS DOING THE BENCH PRESS WITH WEIGHTS?

The bench press and push-up are multiple-joint exercises for the upper body that engage the chest, shoulders and triceps. These two exercises appear quite similar or "biomechanically comparable": A push-up is somewhat like a bench press turned upside down. The advantage of the bench press is that it allows more options for systematic adjustments in resistance. But when the amount of resistance is equitable, is the bench press superior to the push-up?

In one study, 30 subjects (average age 21.9) were randomly assigned to three groups: One group did the bench press with a Smith machine, another did push-ups with resistance (elastic) bands and the third acted as, a control group, and didn't train. The subjects in both experimental groups did five sets with their six repetition maximum (6RM: the most resistance that they could lift six times). This protocol was followed two times per week for five weeks.

The researchers found that there was no significant difference in muscle activity of the pectoralis major and anterior deltoid between the 6RM bench press and 6RM push-up. Moreover, both groups had similar improvements in their 1RM and 6RM tests.

DOES STRENGTH TRAINING HAVE ANY EFFECT ON ENDURANCE?

Individuals who are looking to increase their capacity to perform physical work for long periods of time do some type of endurance training. It only makes sense that in order to improve endurance you need to do endurance training, right? But an area that's often overlooked in this regard is strength training.

Researchers examined 26 studies of well-trained runners, cyclists, cross-country skiers and triathletes. The majority of the studies—employing a wide range of protocols—showed that strength training improved their performance, force production and economy (using less energy than others for the same level of effort).

Bottom line: Strength training can augment endurance training.

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