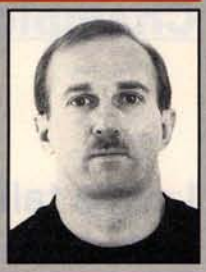
WrestlingUSA

www.wrestlingusa.com
March 15, 2006
VOL. XLI, NO. 9
$5.00

Is There a Need for NECK TRAINING?



By Matt Brzycki

A study that was published in the *Journal of Athletic Training* gained national attention when a very brief abstract of it appeared in a column in *The New York Times*. The headline of the column read, "Tough Neck Won't Save a Fragile Head." This, unfortunately, sent the message to the athletic community that there is no need for neck training. But before you throw out your neck machine or eliminate neck exercises from your program, let us take a closer look at the research upon which the column was based.

THE RESEARCH

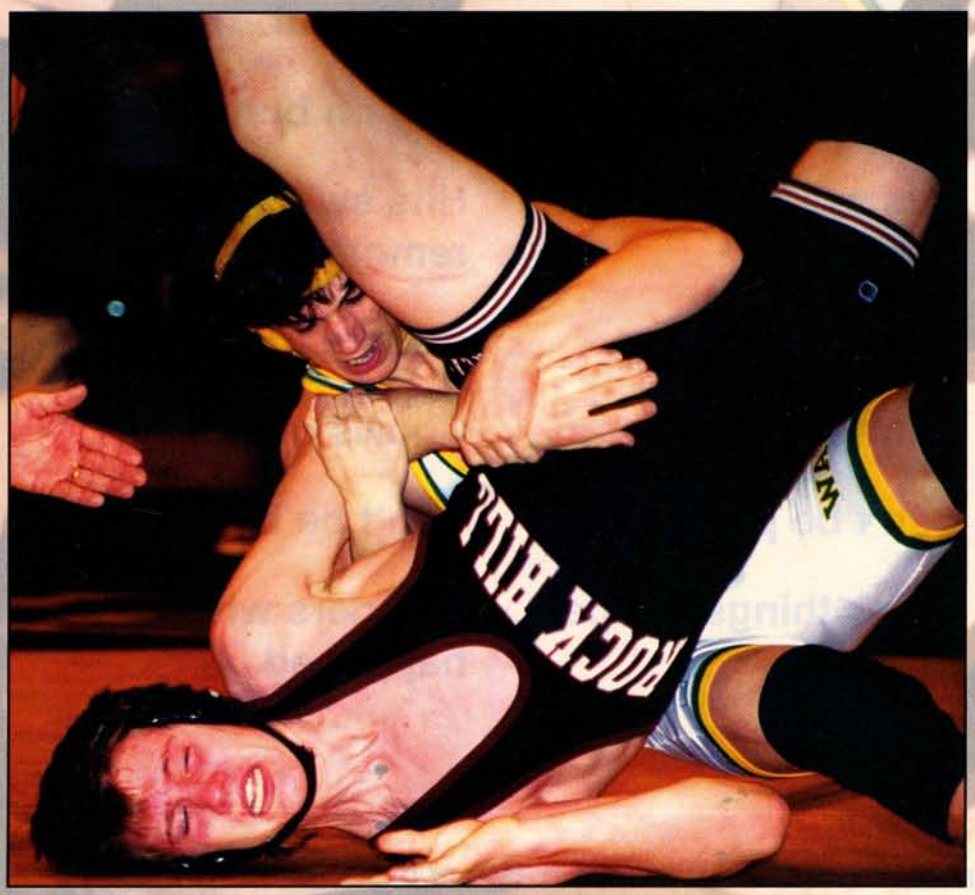
The study involved 36 male and female soccer players from Temple University (PA). The athletes were pre-tested in a number of areas including neck girth (circumference) and the isometric strength of the neck flexors (on the front part of the neck) and neck extensors (on the back part of the neck).

The athletes were also pre-tested in how their head-neck segment responded to the application of an outside force. Each of the athletes was given six trials. In the first three trials, the athletes (who were seated in a chair) knew exactly when the outside force was going to be applied to their heads. In the second three trials, the athletes did not know when the outside force was going to be applied to their heads. The trials were recorded with a video camera and the video data were analyzed using computer software. The researchers calculated the peak angular acceleration and total angular displacement of the head-neck segment. In other words, they calculated how much the outside force caused the head-neck segment to accelerate and how much the outside force caused the head-neck segment to move until motion stopped.

After pre-testing, the athletes were randomly assigned to two groups: one group (9 men and 10 women) did neck training twice a week for eight weeks and the other group (8 men and 9 women) did no neck training. In addition, both groups did the same off-season strength and conditioning program. The groups were told not to perform any additional exercise other than the team lifting and practices. So the only apparent difference was that one group did supplemental training for their necks and the other did not.

The group that was assigned neck training did neck flexion and neck extension on a selectorized machine. For each of the two exercises, the athletes did 3 sets of 10 repetitions with 90 seconds of rest between sets. During the first two weeks of training, the athletes used 55% of their 10-repetition maximum (10-RM). The resistance was increased by 5% every two weeks so that in the last two weeks of training, the athletes were using 70% of their 10-RM. Within one week of completing the training program, the athletes were post-tested in the same manner in which they were pre-tested.

South Carolina - Greg Matricciano (Summerville) works his tilt against Rock Hill. Greg holds the #1 ranking in 4A at 130 lbs. for the top ranked Summerville Green Wave. Photo by Mark Buford.



THE DATA

The nine men who did eight weeks of neck training increased their isometric strength in neck flexion by about 10.49%. While this is a significant improvement, it is perplexing that the nine women who did no neck training increased their isometric strength in neck flexion by about 10.34%! Equally perplexing is the fact that the nine men who did neck training decreased their isometric strength in neck extension by about 10.11%. Let me repeat: The women who did no neck training whatsoever increased their isometric strength in neck flexion by nearly the same percentage as the men who did neck training. And the men who did neck training somehow decreased their isometric strength in neck extension by 10.11%.

The nine men who did eight weeks of neck training increased their neck girth by about 0.27% or an average of 0.1 centimeters. For those of you who rarely use the Metric System, this is about 0.03937 inches! So if the increases that were made by all nine men were added together, it would amount to a little more than one third of an inch! If that does not raise your eyebrow, consider the fact that the nine women who

did no neck training increased their neck girth by about 2.27% or an average of 0.7 centimeters! Not to be redundant but just so there is no misunderstanding, the nine men who did neck training increased their neck girth by an average of 0.1 centimeters while the nine women who did no neck training whatsoever increased their neck girth by an average of 0.7 centimeters.

As stated earlier, testing also included the application of an outside force to the athletes' heads. The athletes performed three trials in which they knew exactly when the outside force was going to be applied and three trials in which they did not know when the outside force was going to be applied. The researchers calculated how much the head-neck segment accelerated and how much it moved until motion stopped. The kinematic data are difficult to interpret but one thing stood out like a proverbial sore thumb: In pre-testing one group of athletes, the peak acceleration of their head-neck segment was 1364.4 degrees per second when they knew that the outside force was going to be applied and 731.8 degrees per second when they did not know that the outside force was going to be applied. In other words, knowing when the outside force was going to be applied produced 86.44% more acceleration – or less restraint – than not knowing when the outside force was going to be applied. This simply makes no sense.

So the data on neck strength, neck girth and head-neck kinematics are questionable. And questionable data produce questionable research.

STUDY DESIGN

It is important to understand the meaning of the resistance that was used in the design of the study. Most people can do 10 repetitions to fatigue – a 10-RM – with about 75% of their one-repetition maximum (or 1-RM). So, essentially, the athletes who did neck training started with a resistance that was 55% of 75% of their 1-RM which is 41.25% of their 1-RM. This level of resistance is far too low to stimulate improvements in muscular strength. Most research suggests that a minimum of about 70% of a 1-RM is needed. Even in the last two weeks of training, the athletes were using 70% of their 10-RM – or 70% of 75% of their 1-RM – which is still only about 52.5% of their 1-RM.

This is a very important point so just to be clear, suppose that your 10-RM is 100 pounds in a given exercise. In other words, the most weight that you can lift 10 times is 100 pounds. If you used 70% of your 10-RM in your training, this means that you would do 10 repetitions with 70 pounds – even though you could do 10 repetitions with 100 pounds.

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ENTRIES DUE BEFORE APRIL 1ST

Given that the levels of resistance in this study were so low, is it any wonder why the results of the athletes who did neck training were so dismal? Since the neck training was the key element of the research, the design of the study is questionable. And questionable design produces questionable research.

CONCLUSIONS OF THE RESEARCH

The researchers concluded that, "Despite increases in isometric strength and girth, the 8-week isotonic cervical resistance training did not enhance head-neck segment dynamic restraint during force application to the head in male and female collegiate soccer players." In plain English, the authors concluded that, "The athletes increased their isometric strength and girth after eight weeks of neck training but it did not help them to counter a force that was applied to the head." Really?

The 10 women who did neck training increased their isometric strength in neck flexion and neck extension by 30.13% and 28.72%, respectively. And, as noted earlier, the nine men who did neck training increased their isometric strength in neck flexion by 10.49%. But remember, the nine women who did no neck training whatsoever increased their isometric strength in neck flexion by 10.34% – almost the same amount. Plus, the nine men who did neck training decreased their isometric strength in neck extension by 10.11%. So based upon the data, the women who did neck training had significant increases in isometric strength in both flexion as well as extension but the same cannot be said about the men.

The 10 women who did neck training increased their neck girth by 4.56% and the nine men who did neck training increased their neck girth by 0.27%. So, yes, the male athletes increased their neck girth but 0.27% is hardly a significant increase – especially for athletes who did not do any neck training for at least six months prior to the study. And let us not forget the fact that the women who did no neck training whatsoever increased their neck girth by 2.27%.

In short, the researcher's data do not support their conclusions. And questionable conclusions produce questionable research.

So as it turns out, the research has questionable data, design and conclusions. Given that, let us discuss neck training in greater detail.

GUIDELINES FOR NECK TRAINING

Like any other muscle, the neck must be trained in a manner that is safe, effective and efficient. Here are a few brief guidelines for neck training:

Repetitions

Reach muscular fatigue between 8 - 12 repetitions (or about 40 - 70 seconds). Muscular fatigue is when you have exhausted your muscles to the point where you literally cannot perform another repetition. Performing sets of less than 8 repetitions increases your risk of injury; performing sets of more than 12 repetitions stimulates more improvement in aerobic endurance than muscular strength. (Note: For most people, 8 - 12 repetitions represent about 70 - 80% of their 1-RM.)

Progression

Increase the demands on your neck muscles with a workload that is increased steadily and systematically throughout the course of your strength-training program. In order to accomplish this, you must attempt to increase either the resistance that you use or the repetitions that you do in relation to a previous workout. If you achieve the maximum number of repetitions, increase the resistance during your next workout (by 5% or less); if you do not achieve the maximum number of repetitions, use the same resistance during your next workout but try to increase the number of repetitions.

Technique

Perform all exercises with good technique. In general, good technique is raising the resistance without using an excessive amount of momentum, pausing distinctly in the mid-range (or contracted) position and lowering the weight in a deliberate

manner. Each repetition should take about six seconds to perform. This will ensure that the targeted muscles are raising the weight (rather than momentum) and that your chances of incurring an injury while strength training are minimized. In addition, good technique is doing each repetition throughout a full range of motion.

Sequence

Train your neck at the beginning of your workout or just after you complete your lower-body exercises (that is, prior to beginning your upper-body exercises). It is important to focus your full attention on performing exercises for your neck. Far too often, the neck is exercised at the end of a workout almost as an afterthought. At the end of your workout, you will be – and should be – physically and mentally drained. If you wait until this point to train your neck, it is not likely that you will address this all-important area with a desirable level of effort or enthusiasm. Training your neck earlier in your workout when you are less fatigued will yield a more favorable response.

Volume

Do 2 - 4 neck exercises in each workout. If you choose to do two exercises, the combinations would be (1) neck flexion and neck extension; (2) neck lateral flexion to the left and right; or (3) neck rotation to the left and right. (Note: All of these exercises can be done with manual resistance.)

Frequency

Train the neck 2 - 3 times per week on nonconsecutive days. The neck muscles should be trained three times per week when not in season and twice per week when in season (but not within 48 hours of a match). You should never do neck exercises immediately before practice or a match.

THE LAST REP

Injuries primarily occur when an outside force acting upon a joint momentarily exceeds the structural integrity of that joint such that the muscle and/or tendon has been forcefully stretched or extended beyond its existing range of motion. In order to reduce the potential for injury, then, it only stands to reason that wrestlers – and others who are involved in combative sports such as football and judo, for that matter – should strengthen the muscles of their neck. Remember, it is one thing to injure your shoulder, elbow, knee or ankle; it is an entirely different thing to injure your neck.

Is there a need for neck training? Let me answer that with another question: Is there a need to protect your neck from catastrophic injury?

Editor's Note: *Matt Brzycki has authored, co-authored or edited 13 books on strength and fitness including: Wrestling Strength: The Competitive Edge, Wrestling Strength: Prepare to Win and Wrestling Strength: Dare to Excel. The three wrestling books are available at all major bookstores or through Cardinal Publishers Group (800-296-0481).*