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YOUTH SPORTS

Neck Strength Predicts Concussion Risk, Study Says

New research shows that stronger necks may lead to safer heads.

By Sean Gregory @seanimgregory · Feb. 21, 2013 · 61 Comments

For years, biomechanics researchers have suspected that girls had higher concussion rates than boys in sports like soccer and lacrosse because of gender differences in neck strength. The weaker your neck, the more likely your head will bob around on impact. And concussions are caused by the brain shaking inside the skull.

For the first time, new research backs up this conclusion. Before practices and games, athletes shouldn't just be stretching and strengthening their legs and backs. They should be working out their necks as well.



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A fourth annual Youth Sports Safety Summit in early February, Dawn Comstock, associate professor of epidemiology at the Colorado School of Public Health, presented the findings. During the 2010-2011 and 2011-2012 academic years, athletic trainers collected measurements of head circumference, neck circumference, neck length, and four measurements of neck strength — extension, flexion, right lateral and left lateral — on 6,704 athletes nationwide across three sports; boys' and girls' soccer, lacrosse and basketball. These measures were taken before the start of the season; during the season, athletic trainers reported injury data — including concussion incidence — for each athlete.

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And the results didn't favor those with tiny necks; concussed athletes had smaller mean neck circumference, a smaller mean neck-circumference-to-head-circumference ratio (in other words, a small neck paired with a large head), and smaller mean overall neck strength than athletes who did not suffer a concussion. After adjusting for gender and sport, overall neck strength remained a statistically significant predictor of concussion. For every one pound increase in neck strength, odds of concussion fell by 5%.

Comstock, and her colleagues, have submitted this research for peer review. "We focus so much on how to properly diagnose concussions," Comstock says. "That's obviously important, but preventing concussions is a much better outcome. We're not saying that you won't get a concussion if your neck is stronger. But the data shows that neck strengthening has strong potential as a key concussion prevention tool." This is a pilot study; this data is almost begging for a follow-up study in football, where repeated head trauma seems to have the most dangerous consequences. Do stronger necks correlate with less concussions in that sport?

Still, this new study is very promising. Neck strengthening exercises are easy. For example, you can use your own hands as a resistance tool — put your hands on the back of your head, and press them forward while you bend your neck backwards. They don't require any huge investment in additional equipment; that's important for today's cash-strapped schools.

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The takeaway is clear: don't neglect your neck. Your head may thank you later.

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Sean Gregory @seanmgregory

Sean Gregory is a senior writer at TIME, covering sports.