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Leg Injuries Following Concussion: How Big a Problem is It?

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The study examined Division I athletes at the University of North Carolina, focusing on the time period January 1, 2010, to October 8, 2013. Of 83 athletes suffering concussion and meeting some fairly stringent study entry criteria, they selected 44 for analysis and selected 58 control athletes who had not suffered a concussion during the time period. (They were hoping for 2 controls per concussed participant, but couldn't quite get that number of matched controls.) They counted lower extremity injuries associated with any sports activity, including...

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This is an interesting case-control study confirming findings of others that the sequelae of concussive sports injury comprise more than just direct effects on the brain. It's a little more difficult, however, to determine the magnitude of these additional injuries.

Source: Lynall RC, Mauntel TC, Padua DA, et al. Acute lower extremity injury rates increase following concussion in college athletes [published online ahead of print June 8, 2015]. Med Sci Sports Exerc. 2015;47:2487-92. doi:10.1249/MSS.0000000000000716. See AAP Grand Rounds commentary by Dr. Cynthia LaBella (subscription required).

PICO Question: Among college athletes, is there an increased risk of acute lower extremity musculoskeletal injury following concussion compared to athletes without history of concussion?

Question type: Prognosis

Study design: Case-control

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accidents. I was pleased that the study included both male and female athletes, the latter comprising about a third of the study population, and multiple sports.

Not too surprisingly, given what is already known about this subject, the concussed athletes had higher rates of lower extremity injuries (sprains, strains, contusions, and fractures) following concussions than did the control athletes. They speculate that this results from impaired balance, postural, and other neuromuscular control deficits due to the concussive injury; these effects have been noted previously in concussed athletes, and it seems biologically plausible.

Clearly, more work is needed in this area, but I found myself wondering about the magnitude of the increase in injury rates. If this is a very small number of individuals, then efforts at correction, such as validation of neuromuscular control measurements to incorporate into return to play rules, may not really prevent that many injuries, at the expense of limiting sports participation unnecessarily for many.

So, what is the magnitude of the problem? It turns out that was a little tough for me to tease out. The results are expressed as injuries per 1000 "athlete exposures," the exposure unit defined as any day the athlete was capable of completing physical activity and was an active member of their school team. The incidence for concussed athletes over a 365-day exposure period was 1.78 per 1000 exposure days prior to the concussion, and 3.51 per 1000 post concussion, an absolute increase of 1.73 per 1000. For the control group, the respective numbers were 2.56 and 2.14, or an absolute decrease of 0.42. So, the overall rates are quite small, meaning the number of individuals who might benefit from an intervention is very low (remember, almost no intervention is 100% effective).

Another minor detail of this study caught my eye. I mention the study dates above specifically because it is such an odd time period, suggesting a convenient cutoff for the data analysis. The potential problem with this is that injuries may not be uniform throughout the year - in fact, I doubt that they are given that most of these sports are seasonal. I would have preferred that the investigators dealt with just full calendar years.

These issues will take a while to sort out: looking at larger populations, across multiple institutions and sports participation levels, and validating risk scoring tools. Maybe in a decade we'll have a better idea.

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