



## **Exertional Heat Illness Fatalities: Causation and Prevention**

Barry Boden, M.D.

For the past 20 years there have been close to 10 non-traumatic fatalities in high school and college football each year.<sup>1</sup> While these fatalities may appear as isolated events, when assessed together over time, they demonstrate a recurrent problem. At first glance the problem may appear to be an inherent problem with the sport of football or a preexisting problem with the athlete. However, on closer inspection, these fatalities demonstrate several common themes.<sup>2</sup> First the majority of fatalities do not occur during games, but rather during out of season conditioning sessions, especially in August. The exercise regimens at the time of the fatalities usually involve excessive high intensity aerobic training, especially sprinting, may be associated with ad lib punishment drills, and do not take into account baseline fitness levels.<sup>2</sup> In football, training is often based on the tradition of teaching mental toughness with the errant belief that there is no physiologic limit to exercise. A common scenario is a coach, angry at perceived lack of effort, subjecting players to excessive sprints and other conditioning drills.

One of the most common causes of non-traumatic fatalities is exertional heat illness.<sup>1</sup> Unfortunately the 2003 NCAA out-of-season model, promoted to reduce heat fatalities, has been ineffective at reducing deaths.<sup>1</sup> The mandated 5-day acclimatization rules focus on limiting the number and duration of practices and equipment worn. Rather the primary focus should be on the intensity of the conditioning drills and developing appropriate exercise regimens dependent on baseline fitness. The majority of non-traumatic fatalities, especially heat fatalities, occur in obese linemen with poor aerobic fitness.<sup>2</sup> In a recent fatality a 360 pound lineman was required to perform 36 fifty yard sprints with short rest periods.<sup>2</sup> During intense exertion obese athletes have diminished capacity to shed metabolic heat and should not be trained with skill players. It is a common myth amongst coaches that hydration can prevent heat illness. While hydration can help reduce the risk of heat illness, overexertion produces more heat than the circulatory system can dissipate and is the highest risk factor for heat stroke. This was demonstrated in a study on preseason professional football players, where linemen had higher core temperatures than non-linemen despite the linemen being more hydrated.<sup>3</sup> Therefore, coaches should be more vigilant of the level of exertion and discontinue the belief that the water bottle can prevent heat illness. Exertion-related fatalities are potentially preventable via organizational structure: applying exercise science in workout design based on position played and body habitus, holding coaches accountable, ensuring compliance with current



athlete health and welfare policies, and establishing independent medical care to allow health care providers authority over athlete medical care.

### References

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