In Reply to Dr Cooper and Mr Frost

To the Editor:

We would like to thank Dr Cooper and Mr Frost for their comments¹ regarding our recent article “Wilderness Search Strategy and Tactics.”² Their experience and points provide an excellent complementary perspective. We would like to point out that the intent of our article was to summarize current search strategies in a manner that would illustrate the basics of search strategy to medical providers and readers with no background in search management. It was not intended to be a treatise on land search techniques. Thus, we purposefully limited content and focused on the topics that would be most valuable to the *Wilderness & Environmental Medicine* readership.

Although the 2011 *Land Search and Rescue Addendum to the National Search and Rescue Supplement to the International Aeronautical and Maritime Search and Rescue Manual* (LSA)³ is a wonderful reference for search strategy and tactics, to suggest that it is the “standard of care” or the accepted “best practice” is misleading as there is still considerable incongruity by experts regarding some of the strategies suggested. The LSA attempts to reconcile maritime and military search tactics to land search and rescue (SAR) operations. There are several problems with this approach. The most prominent issue is that maritime search is considered a closed system (a vessel will remain in a body of water), whereas land search is an open system (the subject may not be within the search area or could travel outside the original search area, or criminal intent could be involved). These variables introduce uncertainty and complexity into the management of land search.

The authors of the *WEM* article referenced are all considered subject matter experts in their field, each with countless hours of practical application of the techniques described in the article. Despite some differences in opinion, we would suggest that *WEM* readers interested in this topic and engaged in its application pursue further education in search management topics.

Finally, we would like to end this discussion with an excerpt from the Introduction to the LSA:

The guidance within this Addendum is intended to assist SAR personnel without preempting their experience and sound judgment. SAR planning in particular is both an art and a science, relying greatly on the creativity and experience of the personnel involved. Because of the many variables encountered during SAR operations and the uniqueness of each individual SAR case, any guidance must be tempered with sound judgment, having regard for the individual situation. Nothing in this Addendum should be construed as relieving SAR

personnel of the need for initiative and sound judgment. Therefore, few actions or procedures discussed in this Addendum are mandatory.

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Ritualistic Envenomation by Bullet Ants Among the Sateré-Mawé Indians in the Brazilian Amazon

To the Editor:

The Sateré-Mawé Indians, who reside along the border between the Pará and Amazonas states in Brazil,¹ are known for conducting a ritual in which young males subject themselves to the venomous stings of the ant species *Paraponera clavata*, or the bullet ant (Figure 1), which is commonly found throughout Brazil. This ritual

Figure 1. *Paraponera clavata* (Fabricius, 1775), the true tocandira.

serves to initiate young male members of the Sateré-Mawé community into adulthood. *P clavata* is infamous for its sting, which is purported to be the most painful insect sting in the world.^{2,3} *P clavata* is also known as the *vinte-e-cuatro-horas* ant, because the pain from just one sting can last for 24 hours.¹

Sateré-Mawé elders smoke the ants out of their colonies⁴ and immerse the ants in a herbal brew that anesthetizes them.⁵ The anesthetized ants are woven into

Figure 2. Ceremonial glove made of arumã palm strings and macaw feathers.

gloves made from leaves of palm fronds, and their stingers are pointed inward.⁵ These gloves are then placed in more ornate ceremonial gloves also made from leaves of palm fronds (Figure 2). Young males participating in the ritual don these ceremonial gloves on both hands. To become eligible for marriage and leadership roles within their community, they must show no emotion while enduring the stings of the ants.⁴ The pain from one sting alone is excruciating, yet participants are exposed to the stings of dozens of ants woven into each glove.^{2,5} Dossey⁵ reports that participants must wear the gloves for at least 10 minutes and repeat the ritual 20 times.⁵ Haddad et al¹ report that participants must wear the gloves for nearly 30 minutes and repeat the ritual 25 times.

A person may need 2 weeks to recover from a single sting,³ and participants of the ritual may shake uncontrollably for days.² Systemic manifestations, which include fever and chills,¹ can occur with just a single sting, given the high potency of the bullet ant's venom. Stung persons may also experience tachycardia, cardiac arrhythmias, lymphadenopathy, local edema, hemochezia, diaphoresis, nausea, vomiting, and paresthesia and paralysis of the limbs.⁴

In conclusion, this ritual among the Sateré-Mawé Indians is an intriguing example of envenomation functioning as a culturally sanctioned method of intentional self-injury. Nonnative healthcare professionals working in the vicinity of this indigenous community, such as through global health initiatives, may encounter Sateré-Mawé males who intentionally subject themselves to numerous stings from bullet ants and subsequently seek formal medical care. These healthcare providers must appreciate the cultural context in which this injury can occur, for these patients likely will expose themselves again to the bullet ant's stings.

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Ultraendurance Athletes With Type 1 Diabetes: Leadville 100 Experience

To the Editor:

In 2011, the Centers for Disease Control and Prevention reported approximately 25.8 million children and adults in the United States were affected by diabetes mellitus, making diabetes one of the most prevalent chronic diseases in our population.¹ Although people with type 1 diabetes mellitus (DM1) constitute a small percentage of this population, the majority of them are involved in various levels of athletic activities, including endurance sports.² The American Diabetes Association published a position statement in 2004 reinforcing the fact that persons with DM1 can participate in all levels of activity granted that they have no complications of their diabetes and are in good glycemic control.³ Subsequent to this position statement, there have been a few articles discussing the recommended management of glycemic control in diabetic patients participating in endurance sports.^{2–4} However, only a few papers have reported case series of athletes with DM1 in endurance and ultraendurance sports.^{4–6} The purpose of the present study was to report the number and performance of athletes with DM1 who participated in the Leadville 100 races.

The Leadville 100 consists of a 161-km mountain bike race and a 161-km ultramarathon in Leadville, Colorado, in August of each year. The courses range in altitude from 2800 m to 3840 m, and the majority are on forest trails with some mountain roads.⁷ The Leadville 100 mountain bike race starts at 6:30 AM on the second Saturday of each August. Participants should finish the race within 12 hours to be able to successfully complete the race. The Leadville 100 ultramarathon starts at 4:00 AM of the third Saturday of each August. Runners should finish the race within 30 hours to be able to successfully complete the race. All Leadville 100 race participants have to report their medical history and medication use through an electronic medical check-in before the race. A medical team reviews the responses for any potential risks for participation before the race. At-risk athletes are counseled during the medical check-in before the race. After reviewing our database, we included all self-described athletes with DM1 who reported being on insulin from 2011 to 2013 in the study. We excluded athletes with type 2 diabetes who reported being on insulin. We performed a descriptive analysis of demographics and unpaired *t* test to compare our study population to all other athletes of these two races. The Colorado Multiple Institutional Review Board and the Leadville 100 race approved this study.

From 2011 to 2013, a total of 7215 athletes competed in the Leadville 100 races. Of these, 5194 athletes (4851 mountain bikers and 2364 runners) were able to successfully complete the races (72%). Nineteen athletes reported having DM1. Only 2 runners with DM1 started the race more than once (2011 and 2012, and 2012 and 2013). Both runners who were not able to finish the race on their first attempt were able to successfully complete the race the next year. The other 15 athletes with DM1 only participated once during the 2011–2013 period. The Figure illustrates the comparison of athletes with DM1 to all other athletes. The majority of the participants with DM1 were male, with average age of 39 years (range 22 to 61 years). The majority (68.4%) of athletes with DM1 were able to successfully complete the race. The average finish time for mountain bike and run for DM1 athletes, respectively, was 10 hours, 36 minutes (range 8 hours, 44 minutes, to 11 hours, 45 minutes), and 27 hours, 54 minutes (range 24 hours, 45 minutes, to 29 hours, 52 minutes). Because of the small number of athletes with DM1, including or excluding them from the entire population did not change any statistics (eg, completion rate). There was no statistically significant difference for successfully completing the races between athletes with DM1 and all other athletes (odds ratio 0.84; 95% confidence interval, 0.32 to 2.22).