Agressive cooling by cold water immersion (CWI) is recommended by the National Athletic Trainers’ Association (NATA) as the most critical factor in the treatment of exertional heat stroke (EHS).1 Furthermore, CWI is has proven to be the most effective method to rapidly decrease elevated core body temperature.2-3 Similar to the trepidation associated with the use of rectal thermometry in the recognition of EHS that we reported in Part 3 of this series,4 some athletic trainers (ATs) and other emergency care personnel are still apprehensive about implementing CWI as part of an emergency care plan, even though it represents the standard of care. In fact, most sports medicine personnel are utilizing other cooling techniques that decrease core body temperature at a much slower rate than that produced by CWI,5-6 even when these modalities are not considered the most effective treatment for EHS.1,3 Correctly managing an EHS victim is imperative, as survival from EHS greatly depends on the amount of time an individual’s core body temperature remains above a critical threshold (≈ 105°F; Figure 1).7

Addressing the proper treatment for EHS is an essential aspect of an Athletic Training Education Program (ATEP), because the NATA Educational Competencies10 requires athletic training students to be taught management skills for environmental illnesses. Although there is no specific mention of CWI in the NATA Educational Competencies,10 the document states the following:

Program personnel should strive to include content and skills that reflect evidenced-based knowledge and practice in all aspects of students’ educational program, including students’ clinical experiences. Because the knowledge within a profession is dynamic, information of current practice, as represented by appropriate position statements of various professional associations/organizations, should be incorporated into the curriculum in a timely and accurate fashion. Current practice particularly applies to position statements issued by the National Athletic Trainers’ Association, Inc.10 (p. 4)

Figure 1 The cooling curves for early intervention (beginning at 10 minutes) and late intervention (50 minutes). Temperatures above the dashed line indicate potential for cell damage. The amount of time from the time of collapse to the time which the temperature dips under the critical level indicates a greater chance of survival with an early intervention. Reprinted with permission.
Because the NATA position statement on exertional heat illnesses advocates CWI as a primary option for rapidly cooling EHS victims, athletic training educators should cover this technique in an ATEP curriculum. The purpose of this report is to present athletic training educators with a sequence of teaching strategies for instruction relating to rapid cooling of an athlete suffering from EHS. The authors hope that proper education of athletic training students regarding CWI will make them feel comfortable and confident with the technique, so that they can appropriately care for the athlete with EHS and reduce the fatality rate associated with the condition.

### Discussion

In this last report addressing heat and hydration issues, we again draw from teaching principles that have been derived from brain-related learning research\(^\text{11-12}\) that are applicable to athletic training education.\(^\text{13}\) Craig\(^\text{13}\) recommends that AT educators create lessons that address the senses, make a personal connection with the material, encourage transfer, address multiple learning styles, and provide kinesthetic learning in a real-life context. Caine and Caine\(^\text{14}(p.50)\) also point to the importance of authentic decision making: “Such decision making can naturally lead to the development of new knowledge.” Furthermore, many of the topics within athletic training curricula warrant the use of authentic experiences in order to enhance student learning.\(^\text{15-16}\) The use of CWI in the treatment of EHS is one of those topics that may merit the use of genuine experiences. Furthermore, psychomotor skill acquisition would be best instructed utilizing a structured, controlled environment that allows for observation, focus, and continued feedback.\(^\text{17}\)

Table 1 outlines the key objectives and suggested teaching strategies for CWI. To make a connection to recommendations in the literature, we implement background connections, dialogic discussions, experiential learning, and directed instruction (see parts 1-3, 11-12 of this series for a more detailed description of these strategies). The specific recommendations for using directed instruction\(^\text{17}\) that can be applied to the instruction of CWI include the following:

1. Clear explanation and demonstration of the skill
2. Sequential presentation of the skill
3. Being specific and concrete
4. Frequent checking for understanding of the skill

To ensure that athletic training students are acquiring the new CWI skill, the athletic training educator needs to give a clear explanation and properly demon-

---

**Table 1. Key CWI Objectives and Recommended Teaching Strategies**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Teaching Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will recall the significance of CWI.</td>
<td><strong>Background connection.</strong> Have students summarize what they learned about rapid cooling of an EHS victim. As described in part 2 of this series, students should recall that CWI is the most rapid and effective cooling technique for athletes who have succumbed to an EHS. Students can read recent articles on CWI prior to class to gain a broader understanding of the topic. <strong>Dialogic discussion.</strong> Begin the discussion by having students identify potential hindrances to the implementation of CWI. Table 1 from Casa et al. previously read by students can be used as a starting point. This table lists misconceptions cited in the literature regarding CWI. Have students consider both perspectives as to why to support and not support CWI. Based on hindrances of the protocol, ultimately, the goal is for students to realize that survival trumps all these potential hindrances.</td>
</tr>
<tr>
<td>Students will decide which considerations need to be addressed to effectively implement CWI.</td>
<td><strong>Background connection.</strong> Have groups develop a plan that outlines the implementation of CWI. Each plan must include a diagram of an athletic setting. Note that this original plan will continue to be revised as students increase their understanding of CWI as a result of participating in subsequent activities.</td>
</tr>
</tbody>
</table>

(continued)