

Fifty Miles for My Fiftieth Birthday: Instructor Guide

Title:

Fifty Miles for My Fiftieth Birthday

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Discipline:

Biological Sciences

Target Audience

Intermediate, majors

Keywords

Exercise, skeletal muscle, skeletal muscle pathology

Length of Time/Staging

Three in-class sessions of approximately fifteen minutes each; out of class research of approximately four to eight hours.



Abstract

Lincoln is a 50-year old runner who, over the past five years, has completed five one-half marathons and four marathons. He regularly runs six to seven days a week, totaling thirty to fifty miles per week. For his fiftieth birthday Lincoln decided to participate in the Silver Rush fifty mile run. This fifty mile out-and-back run started at an elevation of 10,000 feet in Leadville, Colorado, and ascended 7,400 feet over four peaks, with the highest pass at 12,200 feet. During the run and after the run, Lincoln encounters significant musculoskeletal problems, resulting in hospitalization and treatment. This PBL problem introduces students to exercise- induced skeletal muscle pathophysiology and the resulting disturbances in homeostasis.

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10/31/2012

Student Learning Objectives

This problem was written with the following objectives in mind:

Discipline-specific objectives:

1. Develop an understanding of the interaction of the various systems of the human body and how the pathology of one of the four basic tissues of the body can have a profound effect on total body homeostasis.
2. Develop an understanding of the anatomy and physiology of skeletal muscle.
3. Develop an understanding of the metabolism of skeletal muscle.
4. Develop an understanding of the anatomy and physiology of the urinary system.
5. Develop an understanding of the pathology of exertional rhabdomyolysis.

Overall objectives:

1. Increase overall problem-solving skills, including the ability to define problems, gather and evaluate information, and develop solutions.
2. Develop effective knowledge-acquisition skills.
3. Develop better team skills.
4. Increase communication skills.
5. Increase self-assessment skills.
6. Increase overall ability to identify, find and use appropriate resources.

Format of Delivery/Teaching Notes

This problem has been utilized in Human Anatomy classes with an enrollment ranging from forty to eighty students. The following documents accompany this problem:

1. "The Group Process." During the over twenty five years I have been teaching by PBL, I have come to find that students do not understand how to work in a group and, as a result, I have had to spend time in class teaching students how to work in a group. Over the past



five or so years, this process and accompanying document have been successfully developed and implemented.

2. The step-by-step PBL process that I utilize in my classes. This is provided for information only; each instructor needs to develop his/her own process for teaching by PBL. Over the years I have found that three-part problems work best with my students. In addition, I have found that a detailed grading rubric (see accompanying rubric) is essential for students to understand how they will be graded on any and all PBL reports.
3. Individual and team assessment. Again, these documents are provided for information only; each instructor needs to develop his/her own process for teaching by PBL and assessing student progress. I have found that students need to assess the quality of the work of their team members, as well as reflect on the quality of their own work as a team member. I do not utilize these forms in the assignment of grades for the PBL reports or for the overall course grades. I do use them, however, in the event that one or more members of a PBL group have a complaint regarding the quality (or lack thereof) of the work of one of their PBL group members.

Student Resources

Possible student resources would include their classroom physiology and/or pathophysiology texts.

Instructor Resources

In addition to any standard Physiology and Anatomy textbooks, the following clinical and research articles will be of benefit to the classroom instructor:

Clarkson, PM (2007) Exertional rhabdomyolysis and acute renal failure in marathon runners. *Sports Medicine* 37(4-5):361-363.

Huerta-Alardin, AL et al. (2005) Bench-to-bedside review: Rhabdomyolysis—an overview for clinicians. *Critical Care* 9(2):158-169.

Knochel, JP (1990) Catastrophic medical events with exhaustive exercise: “White collar rhabdomyolysis. *Kidney International* 38:709-719.

Luck, RP and Verbin, S (2008) Rhabdomyolysis. A review of clinical presentation, etiology, diagnosis and management. *Pediatric Emergency Care* (24(4):262-268.

Poels, PJE and Gabreëls, FJM (1993) Rhabdomyolysis: a review of the literature. *Clinical Neurology and Neurosurgery* 95:175-192

Springer BL and Clarkson, PM (2003) Two cases of exertional rhabdomyolysis precipitated by personal trainers. *Medicine and Science in Sports and Exercise* 35(9):1499-1502.

Vanholder, R et al. (2000) Rhabdomyolysis. Journal of the American Society of Nephrology 11:1553-1561.

Young, IM and Thomson, K (2004) Spinning-induced rhabdomyolysis: A case report. European Journal of Emergency Medicine. 11:358-359

Solution Notes

Solution removed.