Blue Light and the Challenge of MRSA

By J. Stephen Guffey, PT, EdD, President of Physical Therapy Plus, Inc.

Methicillin-resistant strains of Staphylococcus aureus (MRSA) have become a serious clinical challenge. These community-acquired pathogens are certainly capable of causing quite serious disease (Moellering, 2006). Between 40 and 50 percent of Staphylococcus aureus isolates are resistant to methicillin (Kasper et al., 2006). Athletic trainers, along with all members of the health care community, are experiencing the challenges posed by MRSA. Like all health care professionals, athletic trainers are evaluating prevention and treatment options to most effectively care for those who make up their practice population. The challenge is serious.

We have long known that light, and particularly the ultraviolet (UV) spectrum of light, is capable of clearing skin ulcerations of microbial infestations. The use of UV light, however, can be clinically difficult. Improper dosing can lead to ineffectiveness and/or harm to the patient. Realizing the potential value of UV, but fully aware of the clinical problems associated with it, Guffey and Wilborn (2006) examined the bactericidal effect of 405, 470, and 880nm light on Staphylococcus aureus and other organisms. In a lab setting, the 405nm light was found to yield a kill rate as high as 90 percent. Since 405nm light is within the visible spectrum (yet outside the UV spectrum), the clinical risks are minimized. This work strongly suggests that 405nm light has a powerful bactericidal impact for common skin microbes and therefore has significant clinical potential.

At least two studies are currently being undertaken to evaluate 405nm light in terms of its bactericidal effect on MRSA specifically. This research is extremely important. Based on the Guffey and Wilborn (2006) results, there is reason to anticipate that light in the "blue" range will prove bactericidal against MRSA strains of Staphylococcus aureus. The instrumentation to easily administer this treatment option already exists in the commercial market. We must all carefully follow this research. Many who practice wound care have already begun to use light as a central part of their treatment protocols.

Therapeutic light is an emerging research area. We are beginning to match specific wavelengths of light to specific clinical applications. Instruments that safely and easily administer specific wavelengths are becoming available. The bactericidal potential of blue light is but one of the clinical applications that may soon be common. The future is bright.

Moellering, RC (2006). The growing menace of community-acquired methicillin-resistant Staphylococcus aureus. *Annals of Internal Medicine* 144: 368-370.

Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL, Isselbacher KJ [eds.] (2005). *Harrison's Principles of Internal Medicine* (16th edition), Chapter 120.

Guffey JS, Wilborn J (2006). Effects of combined 405nm and 880nm light on Staphylococcus aureus and Pseudomonas aeruginosa in vitro. *Photomedicine and Laser Surgery* 24: 680-683.

Guffey JS, Wilborn J (2006) In vitro bactericidal effects of 405nm and 470nm blue light. *Photomedicine and Laser Surgery* 24: 684-688.