

## Civil War Weaponry and Medicine: A Disastrous Mismatch

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**Grade Level:** Middle

**Duration of lesson:** 1 period

**Overview:**

Like many modern wars, a good deal of the carnage during the American Civil War came from the fact that weapon technology outpaced the opposing side's ability to cope with and defend against it. This lesson focuses on what happened when the deadly "minie" ball replaced round bullets in American soldiers' rifles. The new ball tore through flesh and shattered bones at a much greater distance than older ammunition, and because of the unsanitary and sometimes crude field hospital practices, hundreds of thousands of soldiers died off of the battlefield. Students will engage with the dilemmas of Civil War doctors and nurses, and learn about new medical technologies of the period that did help soldiers survive the long struggle.

**Related National History Standards:**

**Content Standards:**

**Era 5: Civil War and Reconstruction (1850 – 1877)**

**Standard 2:** The course and character of the Civil War and its effects on the American people.

**Historical Thinking Standards:**

**Standard 2: Historical Comprehension**

**G.** Draw upon visual, literary, and musical sources.

**Standard 5: Historical Issues-Analysis and Decision-Making**

**A.** Identify issues and problems in the past.

**B.** Marshal evidence of antecedent circumstances and contemporary factors contributing to problems and alternative courses of action.

**F.** Formulate a position or course of action on an issue.

**Lesson Objectives:**

- Students will be able to identify the problems with battlefield surgery and factors in successful operations.
- Students will be able to evaluate the methods of field surgery concerning communicable diseases and infections that have changed over the past 200 years.
- Students will analyze period photographs to reach independent conclusions concerning appropriate battlefield medical practices.

## **Topic Background:**

The American Civil War was an era of technological advancement in many industries. While new industries emerged, established industries developed after the outbreak of the war, specifically in northern states. (Paludan 144). Arms and other “offensive” technology were no different as the demand for such items swiftly escalated. Unfortunately, sometimes the new arms technology wounded soldiers in ways that the current state of medical technology was unprepared to treat.

Specifically in the case of the American Civil War, a new rifled projectile with much improved accuracy and range called the “lead minie ball” preceded the professional medical understanding of communicable and transmittable infection and the practice of sterilizing instruments and prevention of wound contamination. This “technological mismatch” resulted in incredibly high mortality rates. Servicemen who were wounded, often died some time later due to complications and infections related to well meaning but ineffective surgical procedures such as amputation. Once wounded, a Civil War soldier died at a rate eight times greater than his later World War I counterpart. Of the 620,000 casualties in the American Civil War, two thirds of these deaths were from disease or infection, not battle. (Wagner et al. 623) While many different types of military technology developed during the American Civil War, this discussion targets the specific technological mismatch of the lead minie ball and corresponding treatment of associated bodily damage.

The lead minie ball is not a “ball” at all but rather a bullet shaped projectile made of lead with two or three grooves or rings etched at the base of the bullet. It was invented in 1848 by French Army Captain Claude F. Minie and by 1855 was adapted for military use in the United States by Harpers Ferry armory worker James H. Burton who was able to demonstrate that the ball would be cost effective. This combination of cost effective manufacturing plus unbeatable accuracy and range made the lead minie ball an “industry favorite” for the U.S. Army. (Freeman 12) When fired, this cone shaped ball would expand inside the rifled barrel of the gun to barrel and produce a projectile with a greater range and accuracy than the previous “round” shaped musket ball. The term “rifle” itself refers to the “rifling” or cut grooves inside the weapon barrel that creates the accurate and destructive spinning projectile. The musket balls, while still creating dangerous and often deadly wounds, were rarely very accurate. When they did find their marks, they often bounced off of bone or exited out of muscle and flesh. Since the lead minie ball had significantly more power and velocity than other ammunition, it shattered and broke bones as it fragmented inside the body, leaving a ragged, complex, and difficult to treat wound. Wounds caused by the lead minie ball may have even been more prone to infection than any other type of puncture wound as the action of a lead minie ball tearing through skin would introduce dirt and clothing into the wound. A young soldier wrote:

*“Shepard extracts from my wound several pieces of my pantaloons that have been carried into my leg by the bullet and which worked*

*themselves back the surface today, taking twenty-two days to go a distance of about 2 inches.” (Murphy 89)*

Unfortunately, as the lead minie ball proliferated on both sides of the conflict, the corresponding medical technology did not. As 21<sup>st</sup> century people, we take some concepts of medical technology for granted. The idea that infections can be limited or even avoided by properly sterilizing surgical equipment and maintaining a scrupulously clean surgical environment is not new to 21<sup>st</sup> century minds. In cases where our 21<sup>st</sup> century medical technology fails and wounds become infected or otherwise compromised, a battery of antibiotics may quickly and easily resolve the problem. Additionally, our modern 21<sup>st</sup> century medical technology is instrumental in identifying the wound, including systems as complex as CAT scans and as simple as x-ray-imaging.

Now, imagine the situation as it was in the last quarter of the 19<sup>th</sup> century, a mere 150 or so years ago. Infections were common and hard to treat. The concept of blood based or other fluid based pathogens was not fully accepted, but limited to the idea that a clean surgical space resulted in fewer complications. A bullet wound in the 21<sup>st</sup> century might be first be “imaged” using any manner of modern imaging tools so that extraction of shattered projectile or bone would be most efficient and least traumatic. In 1860, “good” medical care might involve digging the bullet out with dirty fingers and soiled instruments. Medical school education for Civil War doctors might have consisted of a basic apprenticeship with an existing (and likewise poorly trained) physician or two six month terms of lectures at any one of nearly 40 American medical schools where a philosophy of bringing a balance to the humors of the body prevailed. Regardless of where or how a period medical education was earned, medical practitioners had no knowledge of germ theory or antiseptic practices. (Museum)

Rampant infection or not, it was fortunate that wide spread use of anesthesia predated the American Civil War by several years and was probably generally available to battle field wounded, despite the dramatic portrayal of non-anesthesia amputations by popular media such as the movie and book *Gone With the Wind*. Unfortunately, most of the pain killer drugs of the time were straight morphine or chloroform and doubtlessly lead to a significant number of addicted veterans. While morphine and chloroform were used to deal with pain, when those ran short, whiskey and bourbon had to do. (Murphy 86)

The same hampering lack of knowledge about the spread of infection and disease in Civil War surgical environments also hampered the reduction of communicable diseases such as diarrhea, dysentery, Typhoid fever, Malaria, smallpox, tuberculosis, and pneumonia that ripped through war time camps of soldiers and prisoners alike and left thousands dead in their wake. (Bollet 213) Ironically, the American Civil War was over just a few short years before Louis Pasteur discovered the role of germs in infection. With no knowledge of how infection was transmitted, control was impossible except by accident.

Surgeons, limited by available light, often performed operations outside during the day. The need for bright light is understandable, and since the availability of artificial light was expensive, it had to be created using candles or

oil lamps, which were usually dim, fluctuating and hot. Most of the photographs of this time are exterior photographs for the same simple reason that making artificial light was hard, and the sun did a much better job. Additionally, the mess and considerable gore of a 19<sup>th</sup> century surgery and the sheer volume of battle related amputations would strongly encourage an outside operating theater.

The surgical operations themselves were limited by medical technology. Amputations were extremely common and medically necessary but they were rather gruesome and simple in their execution. A surgeon would build a makeshift operating table and administer available painkiller to the patient. The surgeon would employ tourniquets to stop the flow of blood in the extremity above the damage, and then, perhaps with the help of a strong armed friend, use a stiff serrated saw to separate flesh, muscle and bone from the lucky patient. By the time the patient (or victim) regained his senses, the surgeon had not only added the removed limb to an ever growing heap, but probably the recently severed limbs of a dozen others. One soldier tells the tale as follows:

*“We moved on to the East side of town where they were fetching the wounded...they had tents for those that were the worst off, and where they were amputating arms and legs...the legs had the shoes and stockings still on them”* (Murphy 86)

While this may seem a bit barbaric, the soldier was lucky that he had been hit in an extremity. Soldiers wounded in the chest, head or abdomen were often times left to die on the battlefield. (Bollet 99). The chances of death after amputation increased with the proximity of the amputation to the trunk of the body. Amputations of the hand or the fingers resulted in only 2.9% percent of deaths. A wound in the thigh had a death rate of 54.2% and a hip joint wound nearly insured death at a rate of 83.3%. (Wagner et al. 634)

While the state of 19<sup>th</sup> century medical technology seems barbaric, some innovations refined during this time period are still used today with positive results. For example, the hypodermic syringe was first used in the American Civil War (Freemon 69) and the idea of an ambulance was developed and refined during this time period as well. (Bollett 103). A more complex system of field hospitals and mobile surgical units was developed during this time as was the professional advancement and role development of nurses and the founding of organizations like city sanitary commissions and participation of Catholic Sisters in care giving roles. (Maher 82)

The U.S. Sanitary Commission was first approved by the federal government in 1861 in order to provide medical care to Union soldiers when the U.S. government could not. The Commission sent food and clothing to soldiers in the field as well as assisting the wounded in some of the battles. While the Sanitary Commission was a national organization with male head figures, the city branches of the Commission were mostly run and staffed by women who cared for the wounded, sent care packages to troops in service, and raised huge amounts of money to support their efforts. (PBS Livermore) When viewing disturbing pictures of period battle field hospitals, it is important to remember,

that although gruesome, the point of medical treatment in general and amputations in particular were honest attempts to heal wounded people. Even the doctors themselves believed in the necessity of amputation in prevention of infection as can be seen in the words of an imprisoned southern soldier upon meeting a Union doctor:

*He is a very fine looking man an has his hand in sling...when operating on upon a gangrened wound, the knife with which he was operating cut his finger slightly; and fearing infection he sensibly had his own finger immediately amputated. (Murphy 86)*

### **Bibliography:**

Bollet, Alfred Jay, M.D. *Civil War Medicine; Challenges and Triumphs*. Tucson: Galen Pres, Ltd., 2002.

Freemon, Frank R. *Microbes and Lead Minie Balls: An Annotated Bibliography of Civil War Medicine*. London: Associated University Presses, 1993.

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Murphy, Jim. *The Boys' War: Confederate and Union Soldiers Talk About the Civil War*. New York: Clarion Books, 1991.

"Museum Exhibits" From the web page of the National Museum of Civil War Medicine. <http://www.civilwarmed.org/exhibits.cfm>, Accessed August 14<sup>th</sup> 2004.

Paludan, Phillip Shaw. *A Peoples Contest: the Union & the Civil War 1861-1865*. Lawrence: University Press of Kansas, 1998.

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Wagner, Margaret E., Garry W Gallagher. and Paul Finkelman. *The Library of Congress Civil War Desk Reference*. New York: Simon and Schuster Press, 2002.

### **Vocabulary:**

**Amputation:** The surgical removal of a limb or portion of a limb. Amputation may be done above the knee, below the knee, or

part of the foot. This process was frequently used during the Revolutionary and Civil Wars.

**Anesthesia:** A chemical or drug used to numb the feeling of pain or to alter consciousness of a patient while they undergo a medical procedure.

**Antiseptic:** A medical device or function designed to prevent communicable diseases from spreading by killing the communicable agents. Hydrogen peroxide or tincture of iodine were used as antiseptics because they could be applied directly to wounds and killed many communicable agents.

**Communicable:** Capable of being transmitted by infection. Some communicable diseases are transmitted through saliva or blood, while others are transmitted in the air.

**Minie Ball:** A specific type of bullet fired from a rifle that was used during and after the American Civil War. It was particularly destructive and caused difficulties in treating wounds. It was named for its inventor, Claude Minie and was roughly about the size of a U.S. quarter.

**Surgeon:** A medical specialist who deals with issues of cutting into a patient's flesh in order to repair a wound.

### **Teaching Procedures:**

1. Place images of the following Resource Sheets on the overhead projector:

Resource Sheet #1: "1863 Civil War Era Operating Theater"

Resource Sheet #2: "1940's Era Operating Theater"

Resource Sheet #3: "1970's Era Operating Theater"

Ask:

**How is Resource Sheet #1 different from the other two photographs?**

2. Once students have finished reviewing the pictures, distribute Resource Sheet #4, "Photograph Analysis."

Model the analysis of one of the three pictures. Direct the discussion to highlight how infection and communicable agents are controlled through cleanable surfaces, antiseptic environment, masks and gloves.

Use instructor discretion to the amount of talking and “task talk” pertaining to these pictures

3. After students have completed the analysis, direct their attention back to the instructor. Inform them that you are going to conduct a “Read Aloud” from “The Boy’s War” and that they should jot down any interesting facts as they listen to you read.

Use Resource Sheet #5, “The Boy’s War” to conduct the “Read Aloud.”

Once the “Read Aloud” ends, tell them to use their notes to assist them during the discussion. Help them start their discussion with the following leading questions:

**How do we control infection in school?**

**How is infection controlled at the barber shop?**

**What sort of modern products control infection?**

**Where do you need to be specifically aware about infection?**

**Is everybody who is sick communicable?**

**What do you do if you get an infection?**

4. After 10-15 minutes of open class discussion, direct their attention to Resource Sheet #6, “General’s Orders.” Assign the work in groups of 2-3.
5. As a closing activity have the groups share their results.
6. To assess student understanding use the results of Resource Sheet #6 and identify why groups choose what they did to prevent infection. Look specifically for worksheets where the students 1) chose to bunk the infected men away from the uninfected men, 2) moved the bathrooms far from camps, 3) placed the cooking tents upstream from the medical tents and 4) ordered to have some sort of water boiling or other “Antiseptic” water treatment.
7. Extension activities include but are not limited to:
  - Students can read “The Boy’s War” in its entirety.
  - Students can graphically design a camp or a city with the idea of “Public Hygiene” in mind.

- Students can observe the medical equipment used at blood drives, paramedics or emergency rooms.
- Students can go to a store and report on the different types of products available to prevent infection and how they are used.

### **Primary Source Annotations:**

#### **Photograph of an 1863 Civil War Era Operating Theater**

Photograph of an 1863 outdoor amputation showing with an all male surgical group: to be used to compare operating theaters from a pre-germ theory and post germ theory world.

"Amputation scene at a general hospital" Attributed to Charles J. and Isaac C. Tyson. Tipton Collection., 1863

Item from Record Group 79: Records of the National Park Service, 1785 - 1990

Location: Still Picture Records LICON, Special Media Archives Services Division (NWCS-S), National Archives at College Park, 8601 Adelphi Road, College Park, MD 20740-6001 PHONE: 301-837-3530, FAX: 301-837-3621, EMAIL: stillpix@nara.gov

#### **Photograph of 1940s Era Operating Theater**

Photograph of a 1940s era operating room with a large light, clean dressings, nurse and stainless steel operating fixtures: to be used to compare operating theaters from a pre-germ theory and post germ theory world.

"Operating room in a company owned hospital" U.S. Coal & Coke Company, U.S. #30 & 31 Mines, Lynch, Harlan County, Kentucky, 09/19/1946

Location: Still Picture Records LICON, Special Media Archives Services Division (NWCS-S), National Archives at College Park, 8601 Adelphi Road, College Park, MD 20740-6001 PHONE: 301-837-3530, FAX: 301-837-3621, EMAIL: stillpix@nara.gov

#### **Photograph of 1970s Era Operating Theater**

Photograph of a 1970s era hospital room showing masked attendants and surgical drapes: to be used to compare operating theaters from a pre-germ theory and post germ theory world.



Educational materials were developed through the Teaching American History in Baltimore City Program, a partnership between the Baltimore City Public School System and the Center for History Education at the University of Maryland, Baltimore County.

Item from Record Group 412: Records of the Environmental Protection Agency, 1944 - 1989

Location: Still Picture Records LICON, Special Media Archives Services Division (NWCS-S), National Archives at College Park, 8601 Adelphi Road, College Park, MD 20740-6001 PHONE: 301-837-3530, FAX: 301-837-3621, EMAIL: stillpix@nara.gov

### **The Boy's War**

First-hand accounts that include diary entries and personal letters describe the experiences of boys, sixteen years old or younger, who fought in the Civil War: to be used to highlight medical technology and prisoner of war camp conditions.

Murphy, Jim. *The Boys' War; Confederate and Union Soldiers Talk About the Civil War*. New York: Clarion Books, 1990.