

The impact of war and technology on surgery and health

Throughout history, one of the key times when the latest medical techniques and the most up-to-date medical technology are needed is during wartime. If medical services are good, then more soldiers have a chance of survival; and the more soldiers there are available, the greater the country's chances of victory. Medicine usually develops at a greater rate during wartime than in peacetime. Governments pour a lot of money into developing ways of getting their injured soldiers back 'fighting fit' as soon as possible. Doctors and surgeons work very hard in wartime, often in battlefield situations, to develop their ideas in order to treat the injured. The huge numbers of wounded soldiers give doctors and surgeons more opportunities than are available in peacetime to test their ideas out.

Objectives

- ▶ **Examine** the links between the two world wars and medical progress.
- ▶ **Assess** the impact war and technology has had on surgery and health.
- ▶ **Explore** the latest technological breakthroughs since the Second World War, including radiation therapy and keyhole surgery.

The two world wars that took place during the twentieth century were huge conflicts that killed and wounded millions more people than in any wars before them. New and deadly weapons – high explosive shells, gas bombs, hand grenades and machine guns – were used on a massive scale for the first time, and inflicted terrible – often fatal – injuries. Over 10 million people were killed in the First World War (1914–18) and over 20 million in the Second World War (1939–45). These figures overlook the huge amount of people who were injured. Despite the great suffering caused by these two horrific wars, a number of improvements in surgery were made as a direct result.

Impact of the First World War on surgery

The diagram on these pages outlines the impact of the First World War on surgery and health. Advances made during and as a result of the Second World War are shown on pages 74 and 75.

Positives and negatives

As you can see from some of the examples on these pages, war can often bring about a great many medical developments and advances. But some historians argue that war can have a negative effect on medical progress too. For example, it could be argued that the First World War actually hindered the development of medicine because thousands of doctors were taken away from their normal work to treat casualties. Furthermore, lots of medical research was stopped during wartime so countries could concentrate everything on the war effort. Also, throughout history, warfare has disrupted towns and cities, sometimes destroying libraries and places of learning. Medical advances may have been delayed because these places were destroyed and manuscripts and research lost.

Work

- 1 In what ways can war have both a positive and a negative effect on the development of medicine?
- 2 Imagine you are an army surgeon in the First World War. Write a short letter home to your friends and family explaining how the latest scientific and technological developments have helped you in your work.

Shell shock

The mental strain of war could cause psychological damage known as shell shock. Some shell shocked soldiers had panic attacks; others shook all the time or were unable to speak or move. To begin with, the British army refused to believe that shell shock existed and many of the men were treated as cowards. However, by the end of the war, there were so many cases that shell shock was officially recognised. Today the condition is known as PTSD, or post-traumatic stress disorder.

Blood transfusions

Although blood transfusions had been tried for centuries, it wasn't until 1900 that scientists worked out how to do them successfully. Karl Landsteiner discovered blood groups, which helped doctors to work out that a transfusion only worked if the donor's blood type matched the receiver's. Even then it wasn't possible to store blood for long because it clotted so quickly. As a result, many people still died from loss of blood, so a solution to the problem of storing blood was needed. In 1914, Albert Hustin discovered that glucose and sodium citrate stopped blood from clotting on contact with air. Other advances meant that blood could be bottled, packed in ice, and taken to where it was needed by surgeons operating on soldiers.

X-rays

X-rays were discovered in 1895, and soon hospitals were using them to look for broken bones and disease. However, it was during the First World War that X-rays became really important. Mobile X-ray machines were used near battlefields to find out exactly where in the wounded soldier's body the bullets or pieces of shrapnel had lodged – without having to cut him wide open!

Plastic surgery

During the First World War, the hard work and dedication of Harold Gillies, a London-based army doctor, led to the development of what we now call plastic surgery. He set up a special unit to graft (transplant) skin and treat men suffering from severe facial wounds. He is commonly recognised as one of the first surgeons to consider a patient's appearance when treating wounds. Queen's Hospital in Kent opened in 1917 and by 1921 provided over 1000 beds for soldiers with severe facial wounds. Gillies and his colleagues treated over 5000 servicemen by 1921.

Infection

Battlefields are very dirty places and lethal wound infections such as gangrene were common. Through trial and error, surgeons worked out that the best way to prevent this was to cut away any infected flesh and soak the wound in salty (saline) solution. This wasn't ideal, but as a short-term answer in a battle situation, it saved many lives.

Broken bones

New techniques were developed during the First World War to repair broken bones. For example, the Army Leg Splint (or Keller-Blake Splint) was developed, which elevated and extended the broken leg 'in traction'. This helped the bones to knit together more securely. The splint is still in use today.

11.1B

The impact of war and technology on surgery and health

The First World War sped up developments in surgery, health and medicine that probably would have happened anyway. For example, scientists had been working on blood transfusions for many years, but the amount of blood needed by soldiers in the war meant that scientists worked even harder to make blood transfusions a success. X-rays had been discovered in 1895, but it was during the First World War that X-ray technology became really important.

Blood transfusions

Advances in storing blood in the years after the First World War meant it could be kept fresh and useable for longer. This led to the British National Blood Transfusion Service opening in 1938. Large blood banks were developed in both the USA and Britain during the Second World War.

Heart surgery

Heart surgery progressed during the Second World War. American army surgeon Dwight Harken, stationed in London, cut into beating hearts and used his bare hands to remove bullets and bits of shrapnel. His findings helped heart surgery develop greatly after the war.

Impact of the Second World War on surgery and health in Britain

The National Health Service

When the Second World War broke out, the British government increased its involvement in medical care. After the war people started to think about how best to organise health care on a national basis. In 1942, a civil servant named William Beveridge proposed a free National Health Service for all – and just after the war finished, the NHS was born.

Plastic surgery

A doctor from New Zealand who trained and worked in Britain, Archibald McIndoe (a cousin of Harold Gillies), used new drugs such as penicillin to prevent infection when treating pilots with horrific facial injuries. His work on reconstructing damaged faces and hands was respected all over the world.



▲ **SOURCE A** A soldier, wounded in the Second World War, after treatment by Archibald McIndoe

Diet

Shortages of some foods during the war meant that the government encouraged people to grow their own food. This improved people's diets because the food they encouraged civilians to grow – fresh vegetables for example – was very healthy.



if you

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▲ **SOURCE B** A government poster issued during the Second World War

Hygiene and disease

In order to keep Britain 'fighting fit', posters were produced to encourage people to keep healthy. They warned against the dangers of poor hygiene, for example. A national immunisation programme against diphtheria (a bacterial infection which killed many children) was launched too.

Drug development

Penicillin, the first antibiotic, was developed in the years leading up to the war. The British and American governments realised how important this new 'wonder drug' could be in curing infections in deep wounds. By 1944, enough penicillin was produced to treat all the Allied forces in Europe.

Poverty

During the war, over one million children were evacuated from Britain's towns and cities into the countryside. Many of the children were very poor and the cleaner, healthier, lifestyle they enjoyed in the countryside improved their health. The whole experience highlighted the levels of poverty endured by some children in Britain, and increased the government's commitment to improve things after the war.

Practice Question

Has war been the main factor leading to improvements in surgery?

16 marks

SPaG: 4 marks

Study Tip

You can refer to periods outside the twentieth century in your answer, for example, the Medieval period or the nineteenth century.

Impact of technology on surgery

Major technological breakthroughs continued in the field of surgery after the world wars. Improved anaesthetics allowed patients to be unconscious for longer, so more complicated operations could be attempted; while better antiseptics increased the success rate of difficult operations because they cut down the chances of deadly infection. When transplant surgery became more common, new drugs helped to prevent a patient's body from 'rejecting' their new organs. Keyhole surgery, using small fibre-optic cameras linked to computers, meant surgeons could perform operations through very small cuts. Microsurgery allowed them to magnify the areas they were working on so they could re-join nerves and blood vessels – allowing feeling to be returned to damaged limbs.

Radiation therapy (also known as radiotherapy) has been used for the treatment of cancer and other diseases for over 100 years. However, the methods of treatment are developing all the time and it is estimated that about half of all cancer patients will receive some type of radiation therapy during the course of their treatment. Broadly speaking, radiation therapy involves the use of high-energy radiation to shrink tumors and kill cancer cells. The radiation may be delivered by a machine outside the body – or it may come from radioactive material placed inside the body near cancer cells. Sometimes a radioactive substance such as radioactive iodine is used, which travels in the blood to kill cancer cells.

Surgery using lasers (rather than a scalpel) has become increasingly popular since a laser was first used in an eye operation in 1987. Lasers are still commonly used in eye surgery, but are increasingly used to treat a variety of skin conditions, help clear blocked arteries, remove tumors and ulcers and control bleeding.

Extension



The Second World War had a major impact on healthcare – and not just in Britain. For example, the World Health Organisation (WHO) was set up in 1946 to help people worldwide attain the highest possible level of health. Research WHO to see the work it has done over the years. What is their current opinion of the state of public health in Britain?

Work

- Study the diagram of the impact of the Second World War. Explain how each of the advances, ideas and developments improved surgery and health.
 - Which of these developments would not have happened if it wasn't for the Second World War?
- In your own words, explain how technological developments since the Second World War have made an impact on surgery and health.