Advances in surgery

The Middle Ages

Surgery in the Middle ages was not a highly skilled trade. Barber surgeons, who had little skill or knowledge, carried out most surgery. Anaesthetics to put patients to sleep, were unknown to them. Surgical knowledge from Greek and Roman times had been lost or ignored and most operations, though simple, resulted in a high number of deaths due to shock, loss of blood and infection.

The Renaissance

By the beginning of the 16th century knowledge of anatomy had improved significantly but in the practice of surgery and medical treatments, progress was slow and techniques were often similar to the ones used in the Middle Ages.

For example, the main method of stopping a wound bleeding was to **cauterise** or seal it with a hot iron. Muslim doctors had developed this technique 500 years earlier. As surgery developed, surgeons were expected to have more formal qualifications. Now they were frequently educated gentlemen rather than enthusiastic barbers. Also working at this time was **Andreas Vesalius** his work was important as it showed that the traditional ideas about the body, and especially the teachings of Galen, were not always accurate; his work was backed up by the drawings of Leonardo da Vinci.

The effects of war

New developments in warfare, such as the use of gunpowder, caused many new challenges for the surgeon since there were new types of wounds which now went deep into the body.

Often, army surgeons showed the highest level of surgical expertise because the large number of injuries suffered by soldiers meant that they gained in depth knowledge about anatomy.

Three main challenges facing the surgeon when he was at work were:

- Pain
- Infection
- Bleeding

Each of these limited the time an operation could take and the sort of surgery which could be undertaken.

Amboise Paré

Paré worked during the Renaissance, when the discovery of **old** knowledge together with many **new** developments changed people’s ideas and attitudes. He was a French army surgeon who spent twenty years on war campaigns. Paré made several significant developments in the treatment of his patients. Read through these points and think about how different factors combined to make progress in medical practice.
Working with injured soldiers, their war injuries were often deep wounds. He followed the usual methods of treating such wounds, cauterising them as quickly as possible by pouring boiling oil onto them or sealing them with a hot iron.

By chance one day, he ran out of oil and made up a dressing from a mixture of egg yolks, oil of roses and turpentine. He was afraid that the wounds would get worse because he had not cauterised them but it had successfully sealed the wound and provided relief from pain. The next morning, he found the wounds were healing and the men had suffered less pain than usual. Those treated by the usual methods were all feverish. Paré suggested that bleeding arteries should be tied up with silken thread which was far less painful than cauterisation. Although this idea was an important development, the practice actually introduced germs from the surgeon's hands into the wound and thereby increased the chances of infection.

He published his ideas in a book, The Collected Works of Surgery, in 1575. It was widely translated. He made detailed drawings of surgical tools and produced artificial limbs.

The Paris College of Physicians tried to stop the publication of his texts and never accepted Paré because he was only a barber-surgeon. He did however have the support of the king, to whom he was personal physician. Royal approval enabled Paré to overcome the medical community's opposition to his ideas.

Exam tips

Exam questions will often begin by saying 'Describe the work of Paré' but many more marks are given for the next part of the question, which is usually something like, 'How important was the work of Paré?'

If you choose to write about Paré you would need to say that war was an important factor in his medical discoveries. The use of gunpowder in war created large numbers of wounds to be treated. You can use the example of when Paré ran out of oil and how he was desperate enough to improvise. Civilian doctors or surgeons wouldn't have been in this situation and probably would not have tried a strange mixture. Paré might not have suggested tying ligatures if he had not seen so many wounded men in pain from having their wounds cauterised.

His work is therefore a good example of the effect of war on medicine. Think about examples from Paré's work that you could use to illustrate these themes:

- Chance
- Importance of individuals
- Speed of change
- Resistance to new ideas.
The importance of Paré

Have a look at this sample exam question.

*Explain how important Paré was in the development of surgery.*

Make a list of the points you would include to answer this question. We have given you some ideas for the answers below. Alternatively, you might want to use Paré as an example when you are writing about the role of war or chance in the development of medicine.

Which of these examples is closest to the way you would have answered the question? Which do you think is the best answer?

*Sabeen* - Paré was a French army surgeon for over 20 years. One day he had run out of the oil that was used to cauterise wounds and, in desperation, he used a mixture of turpentine, egg yolk and rose oil. He expected the men to be in great pain, but to his surprise their wounds were healing better than if he had used the usual treatment. He also did detailed drawings of surgical tools and designed artificial limbs besides writing a book called 'The Collected Works of Surgery' which was published in 1575. For these reasons, Paré was very important in the history of surgery.

*Rajeev* - Paré was important because he developed new ways to treat wounds. Instead of cauterising the wounds to stop the bleeding he used a mixture of egg yolk, oil of roses and turpentine which helped to heal the wound but was also far less painful. This was important because many wounded soldiers died from shock and pain rather than the actual wound. Another thing Paré did was to tie the ligaments to stop the bleeding. This was a good idea but they didn't know about germs and infection, so because the surgeon had dirty hands, the soldier often died.

Paré spread his ideas about his new methods in a book that he wrote, 'The Collected Works of Surgery' which was published in 1575. In fact, the College of Physicians in Paris did not accept these ideas very quickly even though Paré had the king's support. The fact that tying ligaments often resulted in a higher death rate because of infection is another reason why Paré's ideas were not immediately copied although his ideas were important after doctors understood about germs. At the time, his work in designing artificial limbs and drawing surgical tools was probably seen as more important than his work on wounds, so he is more important in the long term, rather than being a turning point in the history of surgery.

**Examiner's view** - Sabeen had all the right details in her answer but she just described what Paré did. Rajeev used those details to explain why Paré was important. She explained both the good and bad results of Paré's work on wounds and showed that his work was not recognised in the short term but that he was seen as important once medical knowledge could explain the things he had found out by experience.