

Knowledge organiser: the British sector of the Western Front, 1914-18: injuries, treatment and the trenches

Using sources - key words

Source—a source of information about the history we are studying; we usually use 'source' when we are talking about information that was produced around the time of the events we are studying—this information was produced for all sorts of reasons, it was not produced to teach us about what happened.

Provenance— where a source comes from; its nature, origin and purpose.

Nature—the kind of source, e.g. photograph, diary, speech.

Origin— who made the source, when and where.

Purpose—why the source was made

Evidence - information that can be used to back up an opinion

Enquiry - an investigation into a particular aspect of History

Typical - usual, common

Atypical - unusual, uncommon

Accurate - correct, precise, true and fits with our contextual knowledge

Supports - gives information that backs up a point of view

Suggests - what the source tells us, without saying it out-right

Contextual knowledge - knowledge about events that has already been gathered by other historians and that is not included in the source

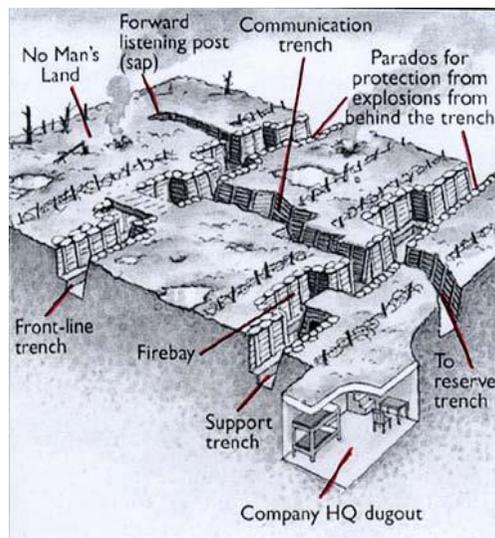
Useful - a source can be useful because of what it tells us about a particular enquiry: it can be useful because it gives an accurate or typical account, or because it gives an atypical account that gives us an insight into a true but unusual experience. A source can be useful because of its provenance: the author might be an expert or in a position to know lots about a subject; the source might give an insight into a particular point of view, event, time or place.

Major battles of the Western Front

Oct-Nov 1914	-	First Battle of Ypres
April 1915	-	Hill 60
Apr-May 1915	-	Second Battle of Ypres
July - Nov 1916	-	Battle of the Somme
Apr - May 1917	-	Battle of Arras
July - Nov 1917	-	Third Battle of Ypres
Oct - Dec 1917	-	Battle of Cambrai

Make sure that you know the defining features of each of these battles.

The trench system on the Western Front



Possible sources of evidence about medicine on the Western Front

- Photographs
- Diaries
- Autobiographies/memoirs/ interviews of soldiers or different medical staff
- Newspaper reports
- Doctors'/surgeons' medical journals
- Military records showing...
- RAMC records of...

Why might each of these sources be useful as evidence?

Key features of the trench system:

- Front-line trenches
- Dugouts
- Communication trenches
- Support trenches
- Reserve trenches
- Artillery emplacements

Make sure that what each of these features was for.



Field Ambulance

The unit of the RAMC (Royal Army Medical Corps) that ran the Dressing Stations.

Each Field Ambulance unit could, in theory, deal with 150 wounded men, but during major battles dealt with lots more.

The Arras underground network:
Chalky ground, easy to tunnel
1916, British linked existing tunnels, caves and quarries to create an underground network with electric lights, running water, railway and hospital
2.5 miles of tunnels in five months
25 000 men could be stationed in the tunnels
The underground hospital at Arras AKA Thompson's Cave:
800 m of tunnels
Fully functioning hospital, but as close to the front as a Dressing Station
Waiting rooms for the wounded
700 spaces for stretchers to be placed as beds
Operating theatre
Rest stations for stretcher bearers
Mortuary
Electricity and piped water

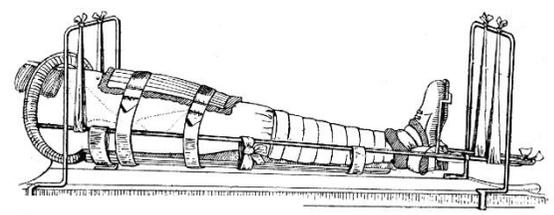
Triage
 At the CCS, injured soldiers were divided into three groups to help medical staff make decisions about treatment:

- the walking wounded
- Hospital cases
- the severely wounded

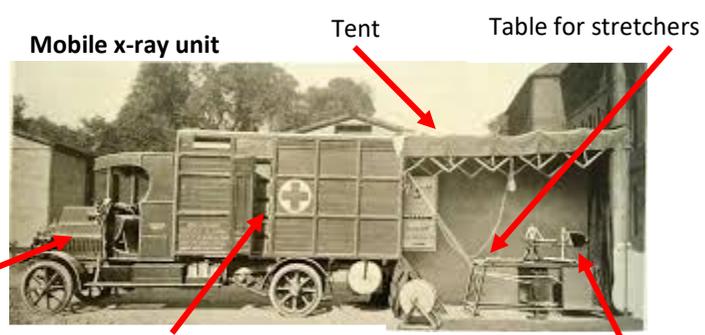
Pre-war developments in medicine
 Understanding of infection and aseptic surgery: washing hands, faces and arms; rubber gloves and gowns; sterilised air; autoclave to steam sterilise surgical tools.
 X-rays: discovered accidentally in 1895; radiology departments in British hospitals from 1896; x-ray machines were very fragile and very slow e.g. 90 minutes to x-ray a hand; dangerous levels of radiation.
 Blood transfusion: direct donor to patient transfusions were in use; universal blood group O had been identified; blood could not be stored; clotting was a problem.

The chain of evacuation
Regimental Aid Posts (RAP) Immediate first aid to get men back to the fighting; 200m from frontline; in communication trenches or abandoned buildings; staffed by Regimental Medical Officer and stretcher bearers with first-aid knowledge; men walked in or carried by other soldiers.
Dressing Stations (ADS and MDS) More serious injuries than the RAP; maximum stay of one week; if both available, ADS would be 400m back from the RAP and the MDS a further half mile back; in abandoned buildings, dug-outs, or tents; staffed by 10 medical officers, orderlies, stretcher bearers and nurses; men walked or were stretchered in. <i>For genuine video footage of a dressing station during the Battle of the Somme:</i> https://www.youtube.com/watch?v=xszo-8-qAi8&list=PLm84TkhSFu3pO28NUNG9TLVOJOPpgZa62&index=17
Casualty Clearing Stations Wounded were triaged; increasingly carried out surgery for life-threatening injuries; patching up of walking wounded; safely back from frontline, but accessible by ambulance wagons; in buildings such as factories or schools; often near railway lines; 24 CCS in the Ypres Salient.
Base Hospitals Men treated until well enough to return to Britain for more treatment or well enough to return to the fighting; original role of dealing with critical wounds, especially head and chest, taken over by CCS → Base Hospitals increasingly responsible for continuing treatment; experimented with new techniques that could then be used at CCS such as specialist wards and doctors; near the coast; during the German Spring Offensive, March 1918, many CCS had to move back → Base Hospitals took over surgery again.

Weapons and wounds
 Shells and shrapnel caused 58% of wounds.
 Bullets caused 39% of wounds.
 Shrapnel and bullets dragged dirt into wounds, including the bacteria that caused gas gangrene and tetanus infections. In 1915, the Brodie helmet was introduced; reduced fatal head wounds by 80%.
 Chlorine, phosgene and mustard gas were all used as weapons. Around 6000 British soldiers were killed by gas. British soldiers were given gas masks in July 1915.



Thomas splint



Engine of the van, used to power the x-ray machine

Equipment for processing the x-ray film is inside the van

X-ray machine

Mobile x-ray unit

Tent

Table for stretchers

Medical problems caused by the conditions in the trenches			
Condition	Cause	Symptoms	Attempted solutions
Trench foot	Standing in cold mud and water	Stage one: painful swelling of the feet Stage two: gangrene (flesh rotting due to a loss of blood supply)	Rubbing whale oil into feet; regular sock changes; amputation if gangrene developed.
Trench fever	Lice	Flu-like symptoms: high temperature, headache, aching muscles Affected half a million men on the Western Front	After cause discovered in 1918, delousing stations set up.
Shellshock	Trauma of war	Tiredness, headaches, nightmares, loss of speech, uncontrollable shaking, complete mental breakdown. Affected around 80 000 British troops	2000 men treated at the Craiglockhart Hospital in Edinburgh. Some accused of cowardice and punished, even shot.

New treatment techniques in WW1

- Wounds and infection:** aseptic surgery was impossible and carbolic acid did not work on gas gangrene so other solutions were found:
 - The Carrel-Dakin method:** tubes carrying an antiseptic sterilised salt solution were inserted into wounds to kill the infection-causing bacteria; the method was effective but the solution could only be kept fresh for six hours, which meant that making enough solution was difficult when large numbers of men all needed treatment at the same time because it could not be made in advance; in use by 1917.
 - Debridement:** cutting away dead, damaged and infected tissue from around the wound; needed to be done quickly before infection spread; after debridement the wound was stitched up but if all the infected tissue was not removed the infection would spread again
 - Amputation:** cutting off wounded limbs (arms and legs) to prevent the spread of infection; by 1918, 240, 000 men had lost limbs.
- The Thomas Splint:** In 1914 and 1915, men with a gunshot or shrapnel wound to the leg only had a **20% chance of survival**. These wounds to the leg often caused compound fractures (where the bone sticks out of the skin), which led to severe blood loss and gas gangrene infection by the time the wounded men reached the CCS. Many of those who did survive only did so because their legs were amputated. In 1916, the Thomas Splint was introduced to improve the survival rate for men with this type of injury. This splint stopped the joints from moving, keeping the leg still (especially when the wounded man was being moved), and so reducing injury and blood loss. Thanks to the Thomas splint, the **survival rate for this type of wound increased to 82%**.
- Mobile x-ray units:** x-rays were essential in locating bullets and shrapnel before surgery and static machines were used in base hospitals and some CCS from 1914. A system of using three machines in rotation to prevent over-heating was developed. Six mobile x-ray units operated from vans on the British sector of the Western Front (see diagram below) and could be called to CCS or base hospitals that did not have static units. The images they produced were not as clear as those from static machines, but they worked closer to the front and did help to save many lives.
- Blood transfusions:** blood loss could lead to shock which caused death, even from relatively minor wounds. Blood transfusions were used to stop this:
 - Blood transfusions were used from 1915 by Dr Lawrence Bruce Robertson at the Base Hospital at Boulogne; he used the indirect method where a syringe and tube was used to transfer donor blood to the patient; **however** there were still limitations as blood **could not be stored**.
 - 1915, Richard Lewisohn added sodium citrate to blood stopped it from clotting so that it could be **stored for a short time**.
 - 1915, Richard Weil refrigerated blood with added sodium citrate, allowing it to be **stored for up to two days**.
 - 1916, Francis Rous and James Turner added citrate glucose to blood, which meant that it could be **stored for up to four weeks**
 - 1917, Oswald Hope Robertson created a 'blood depot': glass bottles of universal donor blood (some collected up to 26 days before use), in a carrying case packed with ice and sawdust; during the Battle of Cambrai, he used this blood to treat severely wounded soldiers who were badly affected by shock and not expected to survive; 11 of the 20 did survive. Blood depots meant that blood could be taken from healthy men in advance and stored at CCS where the most severely injured men were taken for treatment.
 - By 1917, blood transfusions were a routine procedure in CCS.
- Brain surgery:** 20% of all wounds were to the head, face and neck. At the start of the war, brain injuries were often fatal because of infection, difficulties in moving men down the chain of evacuation and lack of experienced brain surgeons. Solutions included operating on brain injuries at CCS rather than Base Hospitals soldiers remaining at the CCS for three weeks to recover. Harvey Cushing, an American neurosurgeon, developed new more effective techniques: using magnets to remove fragments of metal from the brain; using local rather than general anaesthetic to avoid the brain swelling.
- Plastic surgery:** new techniques for treating horrific facial injuries developed by Harold Gillies. *Watch this clip for more details* <https://www.bbc.co.uk/teach/class-clips-video/history-ks4-gcse-how-did-reconstructive-surgery-develop-in-world-war-one/zmfvd6f>