

FINAL HISTORY PROJECT – SEAN CARLO ALEJANDRO & BRITNEY DINH-VU

War sped up the advancement of prosthetics which led to the improvement of amputee soldiers' physical capabilities, provide advancements in medical technology for future amputees, and created social changes for amputees.

VIDEO - <https://www.youtube.com/watch?v=RXhL73ZKUzs>

Research Notes

Improvement of physical capabilities

- A German knight received a prosthetic arm after he lost his biological real arm in battle.
 - An Artisan created a prosthetic arm for him to continue to fight
 - “Iron hand”
 - It wasn't really a replacement for his missing arm but more of an extension of his armor.
 - Iron hand helped him get back into battle (he could hold his weapons, shields, and reins of his horse again)
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4128433/> (pics of prosthetics here)
- After WW1, there was an influx of amputees (This is kinda also in the medical technological advancements)
 - In Britain alone, there were around 41,000 amputees and an increased demand in prosthetics, but they were inadequate to deal with the volume
 - Many soldiers did not use their prosthetics because of how uncomfortable and heavy they were. There was an abundance of people preferring to live with a single full arm or use crutches instead of their prosthetics
 - A ‘split-hook’ attachment was created for arm prosthetics and used as a way to help amputees complete daily tasks in 1920
 - The high demand of prosthetics from WW1 veterans prevented manufacturers from innovating their prosthetics
 - The technological development of prosthetic devices could not significantly change until after the second world war.

Social Change for Amputees

- Great War led to more Amputees, which forced governments to change their thoughts about amputees and shifted to forcing them to invest in more research in making prosthetics to help the amputee veterans
- In 1917, the top US army surgeon general invited limb makers to meet in Washington DC. This event created the Association of Limb Manufacturers of America, which today is called the American Orthotic & Prosthetic Association
- In Canada, a national charter in 1920 recognized the need to support amputees and they created the Amputation Association of the Great War, which is known today as the War Amps
- Pensions were created for amputees

Medical Technological Advancements

- In 1916, a German surgeon created a hand prosthetic design that allows the user to control their finger movements using their upper body muscles (**Video shows the arm in action** <https://vlp.mpiwg-berlin.mpg.de/library/data/lit38416>)
 - This design was too expensive for many people because of its high production cost, so it was not commonly used for amputees
- In 1948, a German physics student created a myoelectric prosthetic that amplifies the electric potential energy from the nerves and powers motorized joints into the fingers.
 - He published his research and it was not widely appreciated or used commercially.
 - Later, Russian scientist created a prosthetic using the same technology and brought it to the USA & Canada but it was slow and heavy and mostly got in the way

A German knight (Götz von Berlichingen) had a prosthetic created in the 1500 after he lost his arm in battle, Siege of Landshut(1504). Created by an artisan, an iron arm with fingers that were able to grip was created. It was seen as an extension to his armor instead of a replacement to his hand due to the fact that the hand itself was extremely heavy and was attached to his armor using leather straps. However, it allowed the knight to continue his duties as a knight by allowing him to grip onto his sword, shield, and reins of his horse. This first design for an arm prosthetic was a base model for other prosthetic arms as the years went on,

After WW1, there was an influx in amputees and a need for more prosthetics to be created due to soldiers's limbs being lost to the new deadlier weapons innovated from the war. In Great Britain, amputees were entitled to

First prosthetic to be discovered was a big toe of an Egyptian woman in 950-710 BCE. And the idea of modern prosthetics was invented around the 1500s with basic functions for prosthetic legs. After WW1, a top US army surgeon general, Dr. Kirk, or whatever, pushed for dedicated camps around the US to help amputee soldiers who lost their limbs during the war. However,

after WW2 there was a protest from amputee soldiers demanding better prosthetics. Post WW1, prosthetics consisted of a piece of log and some leather straps to keep the log attached to the nubs of a soldier's leg or arm and there were not many technological advancements to prosthetics until after WW2 . The American Orthotic and Prosthetics Association was created in response to the protests.

The earliest model of a hand prosthetic was around 1500 BC and was worn by a German knight who had lost his arm. The prosthetic was made of iron and had the capacity to flex its fingers using a leather strap and was used for the knight to continue to hold his shield. It's not considered a proper prosthetics due to the fact that it required a second working arm to control it, and it was considered an extension to his armor. However, the first body powered prosthetic was created in 1948 using the ability to control the movement of one's shoulder and body. The first arm prosthetic using electric potential energy from the body's neurons was developed in the 1960s.

Summary; The development of prosthetics advanced very quickly post-WW2 . By the 1960s they had the capability to be controlled using the electric potential energy from the existing neurons, also known as a myoelectric prosthetic, using the discoveries found in 1948 by a German physics university student (Reinhold Reiter).

SCRIPT-WRITTEN

Hook:

-BOOM- *distant screams and gunshots in background*

Ahh my arm is gone!!!!!!!!!!!!!!

Gordon Ramsay: Hey, you bloody donkey, do you need an arm? I can get you an arm..

BUT YOU BETTER GET WORKING YOU LAZY COW (ok maybe dont put that in).

Uhhhhhhhhhhh

cut

Introduction:

Hello hello hello, welcome to our one and only final project. Today we're going to be talking about how war innovated the advancement of prosthetics which led to the improvement of

One. The amputee soldiers' physical capabilities.

Two. Provide advancements in medical technology for future amputees

Three. Created social changes for amputees.

Basically, we're going to be talking about why prosthetics are such a great use of advanced technology and how its history has been made.

These can all be explained in a list file, so what we're going to do is separate these into subunits.

The first topic we're going to be talking about will be how it improved the physical capabilities of soldiers that have lost their limbs. One of these examples would be when a German soldier, Gotz Von Berlichigen, had lost his arm in the middle of the Siege of Landshut back in 1504. Fortunately for him, an Artisan (A craftsmen) was able to create a prosthetic arm for him that was called, "the *iron arm*" (take that Iron-Man)

Though to be honest, it was less of an arm replacement and more of an extension of the armor itself. It was able to grip but not by the use of nerves, but by the use of leather straps and tension. The arm itself may have been heavy, but it allowed amputee soldiers to continue into battle holding their sword & shield.

And with today's sponsor, Nintendo's Sword & Shi-

No.. You wish.



This design would be at its introductory level and would continue to advance slowly as the years went on.

As time went by, and World War I passed, there was an influx of amputated soldiers due to the new deadlier weapons that had been introduced in that time period, and thus soldiers needed more replacement for their lost limbs. In fact in Britain alone, 41,000 soldiers had become amputees and so the demand for prosthetics have vastly increased. Unfortunately for them though they were inadequate to deal with the entire problem and thus technology of prosthetics didn't improve so much. Many soldiers around this time period didn't want to use prosthetics because of how uncomfortable and heavy they were, and in fact many would have rather lived with a single arm or use crutches. As time continued to pass by, around 1920, the split-hook attachment was created to help amputees deal with their daily tasks easier. But that's about as advanced the prosthetics would get for a while as the high demand of prosthetics during and after World War I had prevented the manufacturers from innovating their technology. By this time period the prosthetics would include a piece of log and leather straps that would be attached to the nubs' of a soldier's leg or arm (**idk if it was actually a log attached to a lost limb using leather straps, but it was essentially that, (it was a split log LOL)**). It wasn't until World War II that prosthetic technology would advance exponentially. (Note that these could also fit in the category of medical advancements.)

Our second topic will be about the social change that has occurred revolving around amputees. The events of the Great War and many other wars led to more amputated soldiers, which forced governments to invest in more research in making prosthetics to help their country's veterans. So now we know that the governments were more involved in the technology around the era of the Great War, and in 1917 the top US army surgeon general, Dr. Kirk invited the "limb makers (**manufacturers**)" to meet in Washington DC as a response to a protest, and in this meeting they created the Association of Limb Manufacturers of America. (I'm not kidding, that's what it's called.) Over time, their title changed to the American Orthotic & Prosthetic Association.

In 1917, the Red Cross created a rehabilitation center dedicated to training amputees called "The Institute of Crippled and Disabled Men" in New York City. It wasn't initially dedicated to WW1 veterans, but with the abundance of amputee veterans after the war, they shifted their focus towards helping the soldiers.

More social changes occurred for Amputees because of war and some of them are involved in Canada, and in Canada a national charter in 1920 recognized the need to support amputees. So they created the "Amputation Association of the Great War", which today is known as "the War Amps".

MEDICAL TECHNOLOGICAL ADVANCEMENTS

In 1916, a German surgeon created a hand prosthetic design that allowed the user to control their finger movements using their upper body muscles. The only problem with this was that the design was too expensive for people due to its high production cost, so it wasn't commonly used by amputees. The price of manufacturing prosthetics was also the reason behind why the innovation slowed.

(I don't know if that's even a word, but, but you guys get what I mean.)

In 1948, ANOTHER German man (Reinhold Reiter) who was a physics student at Munich university, created a myoelectric prosthetic that amplified the electric potential energy from the nerves to motorize joints into the fingers. This to me seems like such a big improvement simply because it allowed the ability to control the movement of one's arm without having to use movement of the arm. It was the path towards creating an artificial arm that would feel exactly like a natural arm. He was able to publish his research, but surprisingly it wasn't as widely appreciated or used commercially. **It was sadly ignored for the most part.** But it was there!

And in 1960 the first arm prosthetic using electric potential energy from the body's neurons was developed, however, it was very heavy and slow. **While not many people used them, it set the stepping stones to more innovative models of arm prosthetics and set the pace for modern prosthetic limbs.**

In summary, the development of prosthetics advanced very quickly after World War II and by the 1960s, they would have the capability to be controlled using electrical potential energy from existing neurons, these would be called myoelectric prosthetics, and their foundations would be discovered in 1948, and again they would be manufactured around after the second World War.

Little "fun" fact about prosthetics is that, in 950 - 710 BCE, an Egyptian woman was considered to have the first prosthetic, and in which it was just her big giant toe. Of course we did not know about the idea of modern prosthetics until the first model was invented in the 1500s.

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