PROSTHESSES

According to Period 5B
Lee Engineering Academy
Spring 2010
• Existed in Cairo Egypt 2600 years ago
• Belonged to an unknown woman
• Controversy over if it was a real functional prosthetic or for appeal in after life
An ancient prosthesis?

British researchers believe this artificial toe, found attached to an Egyptian mummy that is more than 2,600 years old, might have been an early functional prosthesis.

FLEXIBLE JOINTS
The three pieces of wood (two shown), carefully fastened with flexible leather, make researchers believe the prosthesis was functional as well as cosmetic.

TOENAIL
It has been carefully carved, suggesting the prosthesis also served a cosmetic purpose.

BIG TOE
Bearing 40 percent of the body's weight when standing, the big toe plays a big role.

FOOTWEAR
Modern shoes can compensate for the loss of a toe. Egyptian sandals would not, making a prosthesis necessary.

WEAR AND TEAR
Scuff marks suggest the toe bore the wearer's weight.

SOURCE: University of Manchester

“Cairo Toe”
"Capua (Capri) Leg"

The original was made of bronze and had been excavated from a grave in Capua, Italy. Dating from c.300BC, it was the oldest artificial limb to be discovered. Kept at the Royal College of Surgeons in London, it was destroyed in an air raid during World War II.
Copy of an artificial leg in brass and plaster from the original at the Royal College of Surgeons, London made around 1910.

1)www.sciencemuseum.org.uk/.../I022/10284932.aspx
Gotz von Berlichingen

By Brandon Allgeier
• Was a German Imperial Knight and mercenary.
• He lived the years 1480 – 23 July 1562
• In 1504 he lost his right arm when enemy cannon fire forced his sword against him; which was replaced with a mechanical prosthetic arm
• He lived most of his life fighting in the military, retiring in 1540
Berlichingen’s Prosthetic Arm
• Originator of the now popular quote, "kiss my arse" upon being demanded to surrender
• Also inspired the name for a military branch of grenadiers in Nazi Germany during WWII

Other References
• http://en.wikipedia.org/wiki/17th_SS_Panzergrenadier_Division_G%C3%B6tz_von_Berlichingen
• http://en.wikipedia.org/wiki/G%C3%B6tz_von_Berlichingen
• Dutch Surgeon
• 1696 created a non locking below knee prosthesis.
• Similar to modern joint and corset prosthetics.
• His invention was so innovating that we are still using prosthetics with similar systems.
• http://www.pelinks4u.org/articles/douglas1109.htm
• http://www.univie.ac.at/cga/history/prosthetics.html
• A Frenchman in the 1500s named Ambroise Pare. Also had been called the father of military medicine.
• He improved surgical techniques.
Treating the wounded

- Pare is seen here treating two wounded soldiers.
http://www.ebinrushed.com/history/images/history_5.jpg
http://www.chemheritage.org/EducationalServices/pharm/chemo/readings/timeline/pare.jpg
- Anglesey Leg
- Prosthetic leg
Civil war prosthesis

By: Clayton Rowan & Darius Williams
History

Wartime always pushes surgery beyond its limits, and it is not surprising that most of the advances in prosthetics have taken place during wars. The American Civil War (1861–65) was especially gruesome when it came to maiming healthy young men, and over 30,000 amputations were performed on the Union side alone. A manufacturer in New York priced its wooden socket limbs anywhere from $75 to $150. Most of these prostheses differed little from those of a century before, and it was not until the two twentieth-century world wars that any real progress was made in the design and manufacture of artificial limbs.
pictures
Bibliography

- http://www.scienceclarified.com/Ph-Py/Prosthetics.html
- http://www.tysjourney.org/Civil%20War%20Prosthetic1.JPG
- http://www.gatewaycoalition.org/files/patents/site/graphics/prosthetic_2.jpg
Anglesey knee cap

- This prosthetic leg was made for someone who had their leg amputated above the knee. The original owner made extensive home repairs. Artificial limbs are very personal items and the extensive home repairs show the lengths some people will go to keep a limb they feel comfortable with. Gaffer tape, rubber and textiles have all been used. The Anglesey leg was named after the Marquis of Anglesey, who took to wearing a leg made to this design after he lost one during the Battle of Waterloo in 1815. It was also known as a ‘Clapper’ after the sound the leg made when it was fully extended.
In 1858, Doctor Douglas Bly of Rochester, New York invented and patented a prosthetic leg with an articulated ankle made of an ivory ball in a vulcanized rubber socket. The articulated ankle allowed for inversion and eversion, the movement that brings the sole of the foot inward and outward.[16] Dr. Bly admitted that his prosthetic leg had its flaws when compared to an anatomical leg: “Though the perfection of my anatomical leg is truly wonderful, I do not want every awkward, big fatted or gamble-shanked person who always strided of shuffled along in a slouching manner with both his natural legs to think that one of these must necessarily transform him or his movements into specimens of symmetry or beauty as if by magic.”[17]
Lower Prosthetic Limbs

Describing the Artificial Leg
- Transfemoral prosthesis are designed for people that have had the leg amputated above the knee.

- Transtibial prosthesis are designed for people with an amputation below the knee.
Leg Prosthetics

Here are two examples of Transtibial Prosthesis. ...and one Transfermoral.
Upper prosthetic limb parts

Marvin Reese
A prosthesis is a device or an artificial substitute designed to replace, as much as possible, the function or appearance of a missing limb or body part.
• First used way of attaching limbs.
• Most basic and least complex form.
• greater freedom of movement
• increased use of the remaining muscles
• increased comfort due to elimination of belts and straps
- Direct bone attachment
- Better muscle control of the prosthetic
- Extended wear time
Jaipur Foot

THE JAIPUR BELOW KNEE PROSTHESIS HDPE
Fabrication Manual

By
Taran Kumar Kulkshetty
Prosthetist & Orthotist
Bhagwan Mahavir Viklang Sahayata Samiti
Bringing feet afoot

- Jaipur below-knee prosthesis is indigenously designed and fabricated from locally available and durable high density polyethylene sheets and pipes and is fitted with world famous Jaipur foot. It is most functional prosthesis with a total contact socket. It looks like a normal limb, has good range of movement required for normal human locomotion.

- BMVSS, being a social organization engaged in humanitarian work, provides all the artificial limbs, calipers, crutches, ambulatory aids like wheelchairs, hand paddled tricycles and other aids and appliances totally free of charge to the physically challenged.
All the feet and other prosthetics are made in house from local materials.

The people can come straight up to the housing area and they are fed are sheltered until their new legs are made.
• http://www.jaipurfoot.org/default.asp
Cheetah Flex-Foot

By: DARIUS WILLIAMS & CLAYTON ROWAN
• This is the optimal sprinting foot for both transtibial and transfemoral amputees. It attaches posterior to the socket, making it agile, strong and a proven performer for professional athletes around the world.
• Flex-Foot Cheetah User Information Amputation level: Transfemoral and Transtibial Impact level: Sport Max Patient Weight: 147kg (325lbs)
• Flex-Foot Cheetah Product Information Warranty: 12 month limited warranty. Categories: 2-9 Sizes: One Size Per Category Weight of foot: 512g (18.1oz) Build height: 411mm (16 3/8") Adapter Options: Lamination Connector
• http://www.ossur.com/?PageID=13462
• http://www.independent.co.uk/multimedia/archive/00028/Oscar_pistorius_28434t.jpg
Direct Skeletal Attachment (Osseointegration)

Joshua Dopson
Connects directly to bone
Figure 2.
Example of skin penetration area and abutment protruding from residual limb.
Figure 1.
DOI:10.1682/JRRD.2005.05.0160
Sources


http://www.amputee-coalition.org/communicator/vol2no3pg4.html

http://www.sinovision.net/attachments/2009/12/24/7635586564b342297f0641.jpg

Myoelectric Prostheses

By Keith Jan Yadao
Myoelectric Prostheses

- A prosthesis of this type utilizes the residual neuro-muscular system of the human body to control the functions of an electric powered prosthetic hand, wrist or elbow.

- Build to replace the whole hand, wrist and elbow.

- The first commercial myoelectric arm was developed in 1964 by the Central Prosthetic Research Institute of the USSR, and distributed by the Hangar Limb Factory of the UK.
Myoelectric Prostheses

- Pictures: