# Limb prostheses: historical development and psychosocial impact in 19th and 20th centuries

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#### Historical context

The history of limb prostheses goes back to the beginning of history itself. The first findings date back to 950-710 a.C. and to 600 a.C.

They were two big toes, one made of wood and the other made of cartonnage, named "the Cairo toe" (Fig. 1) and "the Greville Chester Toe" (Fig. 2). They were both found in Egypt.

The thirty-year period that includes the two World Wars (1915-1945) marks a watershed in the history of limb prosthetics as a consequence of the enormous number of injured and mutilated people. Such military conflicts were characterized by the use of new weapons: including "rifled weapons", more precise in hitting enemies and expanding bullets, in the Crimean War; hand grenades, flamethrowers, chemical bombs, tanks and bombers during the World Wars. The use of this new weapons enormously enlarged the number of injured people.

The other factor that contributed to the significant increase in mutilations was, in the civil field, the construction of railways and building sites, following the Second Industrial Revolution.





#### **Prostheses innovations**

Since the demand and the need of customers had increased, Marks began to design and experiment new types of prosthetics, more functional and more comfortable. Since 1863, the elastic properties of rubber have been preferred to the wood and the metal. They invented the rubber hand which was equipped with a passive wrist joint that allowed rotation. Instead of the hand, several tools could be connected directly to the forearm, such as a razor, a hook, a brush, a fork or a hammer, as needed.

Wearing one of the common prosthetic feet and walking slowly, it is difficult to notice its presence. However, as the speed increases, the flaw is increasingly apparent. To prevent this, A.A.Marks created the "spring-mattress rubber foot" which was a foot without the ankle joint.

### Reflection on the psycho-social condition

Since ancient times, the prosthesis was not used simply to restore body integrity, but above all to allow the mutilated to lead a life as normal as possible and similar to that lived before the accident. And it is precisely this aspect that Marks proposed to pursue since its foundation: the social reintegration of the mutilated in daily life and work.



The manual was indeed an extremely marketing gimmick thanks to the illustrations and to the users testimonies.

The customers were amazed and fascinated that, unlike the other prosthetics of the time, those of Marks were both aesthetically discreet, little evident and functionally useful. The injured people could come



Figura 1



Figura 2

# A.A.Marks, Manual of Artificial Limbs

This study was able to look at what stage was the art of prosthetic, on the eve of the First World War, through the analysis of the *Manual of* 

*Artificial Limbs.* It was published in various editions in the second half of the 19th century by the A.A. Marks Company of New York, which was, at that time, one of the leading companies in the sector worldwide.



#### back to a normal life doing all sort of activities, working in every sector, doing all type of sports such as skiing, skating, dancing or riding a bike. Mutilated people no longer felt impaired but enriched. The A.A.Marks' goal was reached and the injured could come back to live a normal life, both socially and work-wise.



# Bibliography

ANGRISANI MARIA VITTORIA, CARACÒ MARIA SOFIA, LUCA BORGHI, *Qualità tecnica e valore sociale delle protesi d'arto alla vigilia della Prima Guerra Mondiale,* Rivista degli infortuni e delle malattie professionali, fascicolo n. 1/2019, pp. 131-153. FINCH JACQUELINE, "The art of medicine: the ancient origins of prosthetic medicine", The Lancet, vol. 377 12 February 2011, pp. 548-549. MARKS AMASA ABRAHAM, *Marks' Patent Artificial Limbs, with India rubber hands and feet*, Turner, New York 1876, pp. 85. MARKS GEORGE EDWIN, *Manual of artificial limbs*, A.A. MARKS, New York 1914, pp. 399.

