

Giuliano Vanghetti: the naval surgeon who invented cineplastic prosthesis

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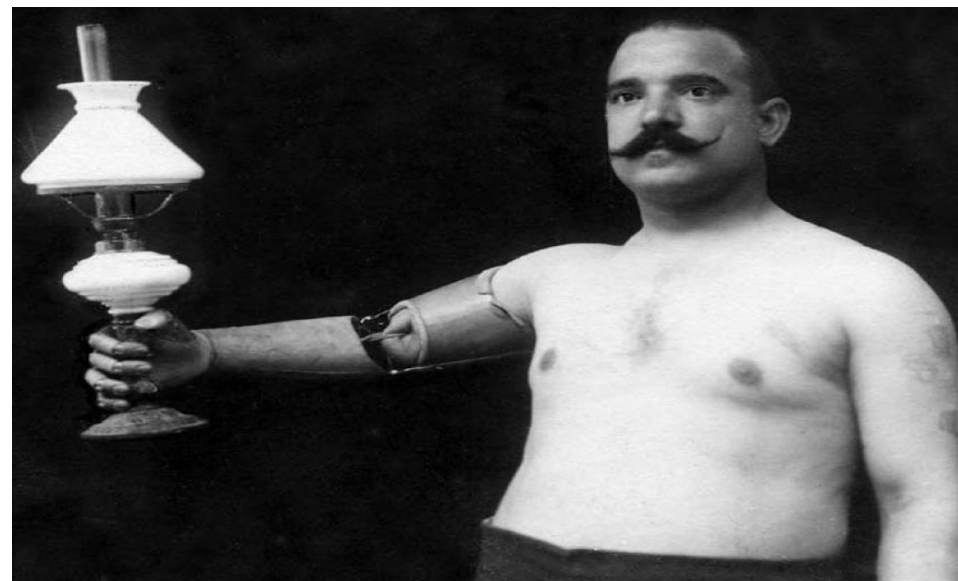


Who was Giuliano Vanghetti ?

Giuliano Vanghetti (1861 – 1940) was an Italian physician and orthopaedist. He received his medical degree on July 1890 from the University of Bologna. After graduating, he worked as a country doctor in Empoli, but dissatisfied with his profession he became a naval surgeon. After the battle of Adwa (1896), during the first Italo-Aethiopian War, he was deeply impressed by the condition of the eight hundred Askaris who had their right hand and left foot amputated in retaliation.

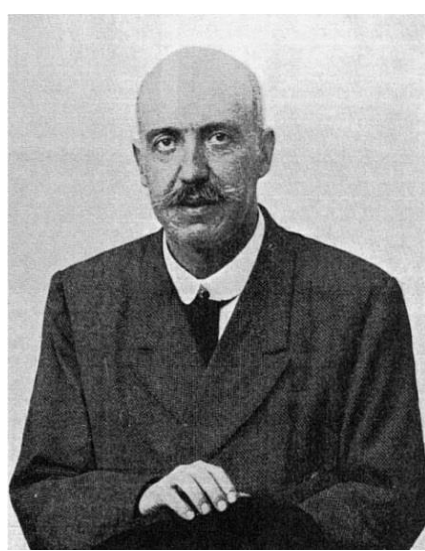
He was the first medical doctor who applied engineering to medicine to restore movements in the prostheses provided to the Askaris by the Italian government.

Cineplastic operations are revolutionary because their role is not limited to the patient's physical remission but to the social one, allowing the complete recover.



On 2 December 1900, the surgeon Antonio Ceci, from Pisa, had to perform a cineplastic operation on a worker who had suffered a serious injury to his right forearm. Since amputation was necessary at the level of the lower third of the arm, the surgeon thought it best to put Vanghetti's idea to the test, joining the biceps tendon with that of the triceps and thus forming a ring motor. The outcome of the operation was excellent. From theory to animal experiments, from hens to human practice: the goal had been achieved.

"The conscientious surgeon must not dream of living and enriching himself on the basis of prior surgical science, without running any scientific risk and without contributing in any way to its advancement."



Description of cineplastic operation

The idea underlying this innovative method lies in the possibility of utilizing the residual functional resources of the stump to convey movement to the artificial limb. The purpose was to construct one or more muscular (or tendinous) loops at the end of the patient's stump, so that the voluntary movements of these loops may be transmitted to the artificial hand. With a prosthesis constructed based on this principle, the patient is able, after practice, to perform motions.

Vanghetti's cineplastic operation should respect every residual natural function. In his writings, he stated that muscles should be selected based on their force and function. Preference falls on the muscle with the same function (agonist), otherwise on the semi-agonist muscle (synergic), and as a final choice, the antagonist.



From hens to humans

Giuliano Vanghetti used hens as cavy, which were inexpensive, easy to find and they had "the tarsal tendons easily accessible to the operator". These hens were held in a special box built by him, amputated of one or two legs, they returned to scurry after the placement of the prosthesis. Thus validated, in 1896, his hypothesis on the fact that "the tendon or muscle provided with the necessary physiological protection could be used for the prosthesis".

There was one last obstacle to overcome, the proof of efficacy on humans, and Vanghetti, who was not a surgeon, was in danger of running aground forever because he couldn't do a cineplastic operation by himself. Meanwhile, in April 1898, two years after the battle of Adua, he made public for the first time his innovative method with a lithographed memory that he had reproduced in a hundred copies at his own expense, sending them to all Italian clinics and scientific societies "Amputations, Disarticulations and Prostheses".

The First World War

Despite the positive outcome of the operation, for years the cineplastic prosthesis method invented by Vanghetti remained not completely exploited. At the outbreak of the First World War, given the exponential increase in war wounded, it became essential to be able to rehabilitate amputees. Vanghetti, with the rank of Major of the Red Cross, directed and organized a center for the mutilated in the Mellini hospital in Chiari, Brescia, Lombardy. Many surgeons, from all the warring countries, made Vanghetti's principles their own, developing and patenting orthopedic devices, without recognizing his paternity. The revolutionary method of the kinematic prosthesis and the related amputation technique gradually crossed all borders in the world: some even found the courage to call it "Italian cineplasty". This technique had the deserved success, certainly larger than the success of its inventor, whose name and figure always remained in the background. After all, Vanghetti had developed a doctrine, but beyond the hens he had never put it into practice, and it was therefore inevitable that the name of the actual surgeon on duty took all the credit. That's why the surgeon Ernst Ferdinand Sauerbruch, earned the greatest rewards because he applied Vanghetti's method on humans meanwhile, Vanghetti "just had the idea" of cineplastic operation but he never did this kind of operation.

The scientific acknowledgments that arrived directly to Giuliano Vanghetti were few, late and not at all sensational. Nonetheless, we remember Vanghetti as a humble person with sound principles; a genuine scientist, driven in his free thinking only by the will to do good to humanity, without any speculative purpose.

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