

Filippo Pacini and the method of wax injection for the preservation of anatomical specimens

Fabio Zampieri and Alberto Zanatta

Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy

Filippo Pacini is famous for his histological researches and in particular for the discovery of the small sensory organs known as Pacinian corpuscles in 1831, and the identification of the cholera bacillus in 1854. His researches touched a wide range of different medical and technical topics, from normal anatomy and physiology to pathology, from the methodology of preservation of anatomical specimens to the invention of new types of microscope. Despite this apparent heterogeneity of interests, we think there is a common denominator behind all his scientific production: his capacity to observe anatomical structures, to understand their significance and functions, and – last but not least – to preserve them. Pacini was an extraordinary anatomical and histological preparer, this ability was one of the basic conditions for his discoveries. Pacini was Director of the Florence Museum of Anatomy and a great part of the collection was created under his direction. We can appreciate that Pacini explored all the methodologies of preservation of anatomical parts being interested in microscopic as well as macroscopic anatomical structures.

Pacini left the recipes of preservative fluids to prepare dried anatomical specimens. Very interesting is a recipe of 1851 about a fluid composed by 10 ounces of yellow wax, 0,5 ounce of cinnabar and 1 drachma of turpentine. Pacini showed to have developed the old and important technique of wax injection. This method was established during the early XVII century, but some authors supposed it was already known by Greeks and Romans, and lost during the Middle Age. Jan Swammerdam (1637-1680), Frederik Ruysch (1638-1731) and Regnerus de Graaf (1641-1673) were the early most famous producers of injected preparations. Cinnabar and turpentine, as in Pacini's recipe, were the most frequent ingredients mixed with wax. The fluid was injected in the vascular system and the method comprehended also complex techniques of washing and drying the organ before and after the injection. In XVIII and XIX century the method was further developed and made possible the creation of spectacular preparations showing complex structures of normal and pathological anatomy. Angelo Dubini (1813-1902) in his famous *Antropotomia* (1837) described different injection methodologies. Lodovico Brunetti (1813-1899) ideated an alternative method, awarded at the Paris Universal Exposition in 1863, with the injection of tannic acid instead of wax. Comparing the descriptions of these researchers and their results with the specimens leaved by Pacini we can elucidate the technique used by Pacini himself and fully appreciate the skills necessary to obtain this "wonderful" objects.

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