Antonius Mathijsen and Plaster Casts

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In ancient times, bonesetters immobilized fractured limbs by splinting to alleviate pain, reduce deformities, and expedite healing. Ancient splints generally were made of wooden sticks and bandages stiffened with wax, lard, pitch, or resin.

Rhazes (854-925 C.E.) and Avicenna (980-1035 C.E.) were among the first to use casts consisting of lime (calcium oxide) and egg whites to immobilize fractured limbs. In that period, bonesetters first made a wooden frame and placed it around the fractured limb. Next, the space between the limb and frame was filled with the mixture of lime and egg whites. The wooden frame was removed after the cast hardened.

During the 18th century, Paris became a center of gypsum (calcium sulfate) production; the term “Plaster of Paris” was coined to describe a sticky substance created by heating gypsum. Although there were many uses for gypsum in the construction and art world, gypsum was not used in medicine in Europe until the early 19th century.

In 1798, William Eton, a British diplomat who wrote a survey of the Ottoman Empire, observed the broken leg of a solider set with liquid gypsum during a trip to Basra (present-day Iraq). He noted that gypsum was less irritating than lime, and his description appeared in some European medical journals.

Pieter (Petrus) Hendriksz (1779-1843), a professor at the University of Groningen in the Netherlands, is credited as the first Westerner to use this technique in 1814. However, joint contractures, heavy weight of the cast, and problems with skin care and secretions from open fractures limited the use of this casting technique.

Nikolai Ivanovitch Pirogov (1810-1881) in Saint Petersburg, Russia, developed his own casting technique by applying strips of coarse cloth soaked in a liquid mixture of plaster of Paris on limbs protected by stockings and cotton pads. He got the idea from a sculptor who used strips of linen immersed in a liquid mixture of plaster of Paris for making and repairing sculptures.

In 1851, while working in a military hospital in Haarlem, Antonius Mathijsen (1805-1878), a Dutch military surgeon who was the son of a village physician in the town of Budel (southern Netherlands), innovated a technique for application of plaster casts. He used gypsum powder between layers of unbleached cotton and linen bandages to produce a thick plaster bandage that, when soaked in water, could be easily applied at once. The plaster would stiffen in a few minutes, while allowing the surgeon access to the wound and the ability to mold the plaster cast to the circumference of the limb in its aligned position. Casts created in this way were relatively light and were not damaged by humidity or suppuration, and could be removed by wetting and unwinding the bandages. Mathijsen wrote a monograph on his new technique and published it in a Dutch medical journal.

This new technique of plaster of Paris application was first extensively used for fractured limbs during the Crimean War (1853-1856) with good results. In 1856, both the Society of Surgery and Obstetrics in Amsterdam and the Society of Physicians in Vienna recommended Mathijsen’s plaster bandage technique for fractures. In 1876, Mathijsen presented his development of plaster bandage at the Centennial Exhibition in Philadelphia and it subsequently became popular in America. He died in 1878 in Harmont, in present-day Belgium.

Antonius Mathijsen was honored philatelically by the Netherlands (Scott number B134) on May 29, 1941.

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