

Before cardiac MRI: Rene Laennec (1781–1826) and the invention of the stethoscope

“Immediately, ...I rolled a quire of paper into a kind of cylinder and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of my ear.”

[Rene Laennec, “De l’Auscultation Médiatè”]

In 1816, with the swift roll of Laennec’s hand, the era of indirect auscultation was born. In the time preceding this simple yet revolutionary idea it was standard medical practice to directly place your ear on the patient’s chest in an effort to hear heart and lung sounds. Physicians kept handkerchiefs on them at all times just for this purpose; however, Laennec had a different approach. As the above quote alludes to, Rene Laennec had just encountered a young, obese woman in distress from what appeared to be heart failure. Spurred by the awkwardness and frustration of placing his ear directly on an obese woman’s chest, Laennec drew from his acoustic background, and created the world’s first stethoscope: rolled paper [1]. Laennec had observed schoolchildren playing with long, hollow sticks in the days leading up to his epiphany. The children held their ear to one end of the stick while the opposite end was scratched with a pin with resultant amplification of the transmitted scratch [2]. This phenomenon, unbeknownst to the curious children, ignited the thought process behind one of the greatest medical inventions of the modern era, the stethoscope (Fig. 1).

Rene Theophile-Hyacinthe Laennec was born in Quimper of Brittany, France, on February 17, 1781. All his life, Laennec was fascinated by disease of the chest. Most likely, this was due to the passing of his mother from tuberculosis when he was only six years of age. After his mother’s death, he resided with his uncle, a physician, and in these early years, Laennec fostered his love of medicine under his uncle’s tutelage [1]. He also became an avid flutist, a skill that no doubt aided his discovery. At the age of 19, Laennec began his formal medical education at Ecole de Medicin in Paris.



Here, Laennec studied under several famous physicians, including Baron Guillaume Dupuytren as well as Nicolas Corvisart des Marest, Napoleon’s physician. It was Corvisart who taught Laennec the lost art of chest percussion. This method was originally described in 1761 by Leopold Auenbrugger, an Austrian physician, but had fallen out of favor before Corvisart’s efforts to reintroduce the technique [3].

Laennec took the education on the physical exam he received from Corvisart one step further. Following his impromptu paper construction in the office, Laennec applied his carpentry skills to build a more sustainable version. He built a hollow wooden cylinder, 25 cm in length and 2.5 cm in diameter;



Figure 1. Laennec examining a patient with probable tuberculosis (painting by Theobald Chartran).



Figure 2. Laennec's original stethoscope.

which he later modified to comprise of three detachable parts (Fig. 2). Laennec thus named the device in reference to the Greek roots “stethos,” which translates to chest, and “skopos,” which translates to observer. Not only did Laennec invent the stethoscope, he went on to describe the various chest sounds he heard at the bedside and correlated these inner body transmissions with autopsy findings. Three years after he discovered the utility of his invention and compiled observational data, he presented his findings at the Academie de Medecin in February of 1818. Not long after, in August of 1819, he published the first edition of his landmark work, *De l'Auscultation Médiante ou Traité du Diagnostic des Maladies des Poumons et du Cur* (“On Mediate Auscultation or Treatise on the Diagnosis of the Diseases of the Lungs and Heart”). Within this ground-breaking work, Laennec coined the phrase “mediate auscultation”, or indirect auscultation, a term describing the use of an instrument, such as a cylinder, as a mediator to transmit sounds from within the human body [4]. He went on to not only describe the physics and acoustics behind the stethoscope in this work but also used his clinical knowledge of chest pathology from bedside to autopsy to classify chest disease. It was in this publication that terms such as rales, rhonchi, crepitation, and egophony were first described. However, as most medical progress requires refinement, interpretation of Laennec's newfound device was no exception. While describing the heart sounds S1 and S2, Laennec mistakenly ascribed S1 to ventricular systole and S2 to atrial systole rather than the closing of the atrioventricular valves and ventricular outflow valves, respectively [1]. Nevertheless, this is easily forgivable when taking all of Laennec's wonderful contributions to medicine into account.

As with any major innovation and burgeoning change to standard practice, the stethoscope was initially met with a high degree of skepticism. Even though the “New England Journal of Medicine”

reported the invention of the stethoscope in 1821, two years after Laennec initially described it, a few esteemed physicians several decades later still abhorred the device. In fact, a famous quote in 1885 from a professor of medicine stated, “he that hath ears to hear, let him use his ears and not a stethoscope.” Further, even the founder of the American Heart Association, L.A. Connor, still carried a handkerchief to place on the chest wall for direct auscultation. Despite this initial criticism, the stethoscope was for the most part welcomed and Laennec achieved a position of prominence fairly quickly following publication of his treatise, becoming chair of the College of France in 1822 and a professor of medicine in 1823. Unfortunately, Laennec did not have sufficient time to enjoy his good fortune. Ironically, his nephew, using Laennec's stethoscope is said to have diagnosed tuberculosis in Laennec in 1826 [1]. Laennec died at Kerlouanec on August 13, 1826, from tuberculosis at the young age of 45. Laennec passed just a few years after he created what he referred to as his “great legacy.” Laennec's stethoscope has undergone a myriad of revisions and improvements over the years while maintaining the same principles as Laennec originally designed. The stethoscope is by far one of the finest bedside physical exam tools physicians have at their disposal today.

“the most important part of an art is to be able to observe properly”

[Rene Laennec, “De l'Auscultation Médiante”]

References

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