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STETHOSCOPE AND IT'S OVER 200 YEARS LONG JOURNEY

Neurology

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ABSTRACT

The stethoscope is a medical device for auscultation of internal sounds of human body. It is placed against the skin with two tubes connected to two earpieces. It was invented in France in 1816 by French Physician R.T.H. Laennec at the Necker-Enfants Malades Hospital in Paris. Through the stethoscopes 200 year history there has been a significant development from the use simple monaural earpiece to the binaural stethoscope followed by the electronic stethoscope which in today's world is used by all doctors and in all specialties. This is a review highlighting all the changes that were made to this wonderful instrument along with the relevant history.

KEYWORDS

Stethoscope, bicentenary, auscultation, binaural

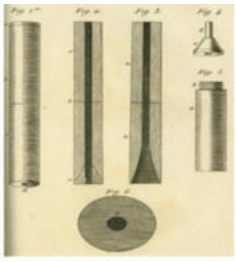
INTRODUCTION

Invented in France in 1816 by French Physician R.T.H. Laennec at the Necker-Enfants Malades Hospital in Paris, the unmatched golden tool of medical fraternity "The Stethoscope" has just completed its bicentenary journey.

Laennec invented the stethoscope because he was uncomfortable placing his ear on women's chests to hear heart sounds. He observed that a rolled notebook, placed between the patient's chest and his ear, could amplify heart sounds without requiring physical contact. Laennec's device was consisted of a wooden tube and was monoaural but was very much similar to the common ear trumpet, a historical form of hearing aid; indeed, his invention was almost indistinguishable in structure and function from the trumpet, which was commonly called a "microphone". Laennec called his device the "stethoscope" (stetho- + -scope, "chest scope"), and he called its use "mediate auscultation", because it was auscultation with a tool intermediate between the patient's body and the physician's ear.[1-2]

Laénnec with his Monaural Wooden Tube Stethoscope

Early stethoscope of Laénnec (Science Museum, London)



The Stethoscopes of Laénnec

A succession of different designs followed his, including, eventually, a "binaural" type with two earpieces. In the early 1850s, there was a rush of designs for a new Stethoscope that used both the ears. This new "binaural" ('bi-aural') instrument was felt to be the future of auscultation. Actually, the idea for a Binaural Stethoscope was first introduced in 1829.

Binaural Stethoscope

An Irish Physician Arthur Leared presented a model of a "double" Stethoscope (Binaural) made of gutta-percha at the Great Exhibition in London in 1851. The first commercially marketed model was that of Nathan Marsh of Cincinnati in 1851. His model was made of Indian rubber and contained the first recorded diaphragm chest piece. However, it proved bulky and cumbersome and quickly faded. The diaphragm would not re-surface for 50 years.

In 1852, Dr. George Philip Cammann of New York produced the first recognized usable Binaural Stethoscope. Cammann did not claim to have the original idea for a Binaural Stethoscope. He claimed only to have designed a practical instrument that uses both ears and could be used in clinical practice which has become the standard ever since. The manufacturer of the original instrument, George Tiemann, named the Stethoscope Cammann's Stethoscope.

In 1940, Rappaport and Sprague designed a new stethoscope, which became the standard by which other stethoscopes are measured, consisting of two sides, one of which is used for the respiratory system (the diaphragm), the other for the cardiovascular system (the bell). The bell transmits low frequency sounds while the diaphragm transmits higher frequency sounds. The Rappaport-Sprague model stethoscope was heavy and short (18–24 in (46–61 cm)) with an antiquated appearance recognizable by their two large independent latex rubber tubes connecting an exposed-leaf-spring-joined-pair of opposing "f"-shaped chrome-plated brass binaural ear tubes with a dual-head chest piece.

Several other minor refinements were made to stethoscopes, until in the early 1960s David Littmann, a Harvard Medical School professor, created a new stethoscope that was lighter than previous models and had improved acoustics (3M-Littmann).[3]

In 1999, Richard Deslauriers patented the first external noise reducing stethoscope, the DRG Puretone. It featured two parallel lumens containing two steel coils which dissipated infiltrating noise as inaudible heat energy. In 2015, Dr. Tarek Loubani announced an open-source 3D-printed stethoscope based on the 1960s-era Littmann Cardiology 3 stethoscope, which is out of patent. The 3D-printed

equivalent is nearly an order of magnitude more affordable than the aforementioned non-3D-printed stethoscope and is intended to make the medical device more accessible to obtain, particularly in developing countries.[4]

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