**ECG AS AN INDISPENSABLE TOOL FROM EINTHOVEN TO TODAY**

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Diagnostic Medicine has gradually metamorphosed from the use of ancient/orthodox instruments/machines to the use of modern and digital instruments and machines (eg computers, MRI equipment, ELISA machines, ECG –electrodes, Robots in surgery).The history of ECG is dated back to the early 20th century. The need for modern diagnostic equipments in Medicine cannot be overemphasized.

Willem Einthoven invented the first practical Electrocardiagram in 1903 and received a Nobel prize in Medicine in 1924 for it. Although the capillary electrometer helped to initiate the study of the heart's electrical activity, Einthoven was unable to boost the device's capabilities to acceptable diagnostic levels. He therefore began work with another instrument—the string galvanometer. An early article that Einthoven wrote about the string galvanometer's registration of the human electrocardiogram was published in a Festschrift book in 1902. When Einthoven began to devise his electrocardiograph, he was unaware that a similar instrument had been constructed in 1897 by the French engineer Clément Ader, for the purpose of communications. Ader's apparatus had an extremely low sensitivity that was inadequate for clinical electrocardiography. Nonetheless, after Einthoven learned of this instrument, he cited Ader's work in a 1901 paper, “Un nouveau galvanometer,” in order to credit all persons known to have contributed any idea associated with Einthoven's invention.

The string galvanometer comprised a thin, silver-coated quartz filament that passed between 2 electromagnets. An electric current passed through the filament and produced a movement that projected a shadow, which was magnified and registered. The string galvanometer provided readings of higher quality than its precursor, the capillary electrometer. This was due to the thinness and minimal mass of the string and to the ability of the operator to adjust tension to regulate sensitivity and response time. According to Barold,

Einthoven achieved such amazing technical perfection that many modern electrocardiographs do not produce recordings of such high quality. Today, the modern ECG monitors are computerized data acquisition and display systems that typically provide continuous monitoring of multiple patient parameters. Most can display (1) the ECG, (2) respirations/impedance pneumography (via the ECG leads), (3) blood pressure (continuous invasive or intermittent noninvasive) and (4) oxyhemoglobin saturation (SpO2). Bedside units are usually modular in design. In these systems, additional modules can be added to provide monitoring of other parameters, such as end-tidal CO2.

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