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Research Article

CLINICAL THERMOMETER LET'S DIG INTO THE PAST

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A B S T R A C T

Of the many tools and instruments regarded as essential to the clinical examination, none has had such widespread application as the clinical thermometer. Over the years many changes and developments are made in the functioning of the clinical thermometer since the times of Hippocrates till today. All these inventions have played their part into finally transforming this great invention of science into what in today's world is called as the clinical thermometer. Recent advances in thermometer design include digital, electronic direct and predictive, infra-red ear thermometers, and dot-matrix or phase-change thermometers. This is a review regarding the development of the clinical thermometer through its various stages.

INTRODUCTION

Of the many tools and instruments regarded as essential to the clinical examination, none has had such widespread application as the clinical thermometer. In the time of Hippocrates, only the hand was used to detect the heat or cold of the human body, although fever and chills were known as signs of morbid processes. In Alexandrine medicine, the pulse was observed as an index of disease, superseding the crude assessment of temperature. Hero of Alexandria (10-70 AD) knew of the principle that certain substances, notably air, expand and contract and described a demonstration in which a closed tube partially filled with air had its end in a container of water.[1] the expansion and contraction of the air caused the position of the water/air interface to move along the tube.

Such a mechanism was later used to show the hotness and coldness of the air with a tube in which the water level is controlled by the expansion and contraction of the gas. These devices were developed by several European scientists in the 16th and 17th centuries, notably Galileo Galilei.[2] As a result, devices were shown to produce this effect reliably, and the term *thermoscope* was adopted because it reflected the changes in sensible heat (the concept of temperature was yet to arise). The difference between thermoscope and a thermometer is that the latter has a scale. Though Galileo is often said to be the inventor of the thermometer, what he produced were thermoscopes.

A large step forward was achieved by Santorio (Sanctorio Sanctorius) who invented a mouth thermometer. Santorio (1561–1636) was an Italian physiologist, professor at Padua. He made quantitative experiments in temperature, respiration, and weight, and measured 'insensible perspiration' that laid the foundation for the study of metabolism. Sanctorio Sanctorius produced several designs, but all were cumbersome and required a long time to measure the oral temperature. To this day, the time to get an accurate, stable reading remains difficult. Glass thermometers must remain in contact with sublingual tissue for 8 min. rectal temperature takes 5 min, axillary temperatures up to11 min.[3]

History and Contributions

In 1665, Christiaan Huygens added a scale extending from the freezing point to the boiling point of water, the original centigrade system. Gabriel Daniel Fahrenheit based his new scale on a mixture of ice and ammonium chloride as the lower point. He found mercury more useful than water, as it expanded and contracted more rapidly.

In 1714 Dutch scientist and inventor Daniel Gabbiel Fahrenheit invented the first reliable thermometer, using mercury instead of alcohol and water mixtures. In 1724 he proposed a temperature scale which now (slightly adjusted) bears his name. He could do this because he manufactured thermometers, using mercury (which has a high coefficient of expansion) for the first time and the quality of his production could provide a finer scale and greater reproducibility, leading to its general adoption. In 1742, Anders Celsius (1701-1744) proposed a scale with zero at the boiling point and 100 degrees at the freezing point of water,[4] though the scale which now

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bears his name has them the other way around. French entomologist Rene Antoine Ferchault de Reaumur invented an alcohol thermometer and temperature scale in 1730 that ultimately proved to be less reliable than Fahrenheit's mercury thermometer.

The first physician that put thermometer measurements to clinical practice was Herman Boerhaave (1668-1738). In 1866, Sir Thomas Clifford Allbutt (1836-1925) invented a clinical thermometer that produced a body temperature reading in five minutes as opposed to twenty.

In 1868, Carl Wunderlich published temperature recordings from over 1 million readings in over 25000 patients made with a foot-long thermometer used in the axilla. He established a range of normal temperature from 36.3 to 37.5 °C. Temperatures outside this range suggested disease. The size of thermometers remained a major disadvantage. Aitkin in 1852 made a mercury instrument with a narrower tube sited above a bulb reservoir; this ensured that the mercury did not drop back after the reading had been taken. It was left to Thomas Clifford Allbutt (1836–1925) to design in 1866 a conveniently portable 6-inch clinical thermometer, able to record a temperature in 5 min. It replaced a foot-long model, which required 20 minutes to determine a patient's temperature. The measurement of temperature soon became an inescapable routine.[5]

In 1999, Dr. Francesso Pompei of the Exergen Corporation introduced the world's first temporal artery thermometer, a non-invasive temperature sensor which scans the forehead in about two seconds and provides a medically accurate body temperature.[6]

Recent advances in thermometer design include digital, electronic direct and predictive, infra-red ear thermometers, and dot-matrix or phase-change thermometers.

References

1. T.D. McGee (1988) Principles and Methods of Temperature Measurement ISBN 0-471-62767-4.
2. R.S. Doak (2005) Galileo; astronomer and physicist ISBN 0-7565-0813-4 p36.
3. Santorio S. In: *Commentaria in Primam Fen Primam Libri Canonis Avicenna*. 1625. Cited and illustrated by Lyons AS, Petrucelli RJ. *Medicine: An Illustrated History*. New York, Abrams, 1987:437
4. R.P. Benedict (1984) Fundamentals of Temperature, Pressure and Flow Measurements, 3rd ed, ISBN: 0-471-89383-8 page 6.
5. Sir Thomas Clifford All butt (http://www.britannica.com/EBchched/topic/16002/Sir-Thomas-Clifford-Allbutt), Encyclopaedia Britannica.
6. Exergen Corporation (http://www.exrgen.com/about.htm). Exergen.com. Retrieved on 2011-03-30.

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