

Sphygmomanometer

Blood pressure, if too high or too low, brings damage to the human body. The main contributor of human sickness is the abnormality in blood pressure. That is also why medical staff would measure our blood pressure to understand our body condition every time we seek medical attention.



Many types of medical research started with experiments on animals and so was the invention of the sphygmomanometer. In the early 18th century, an English doctor Stephen Hales began his study on a device which was able to measure blood pressure. He completed his experiment by using his own horse. He first inserted a brass pipe into the crural artery near to the belly of the tied horse. He then fixed a glass tube to the brass pipe. As he untied the ligature on the artery, the blood rose in the glass tube. He later concluded that the blood pressure of the horse was 83 inches in height.

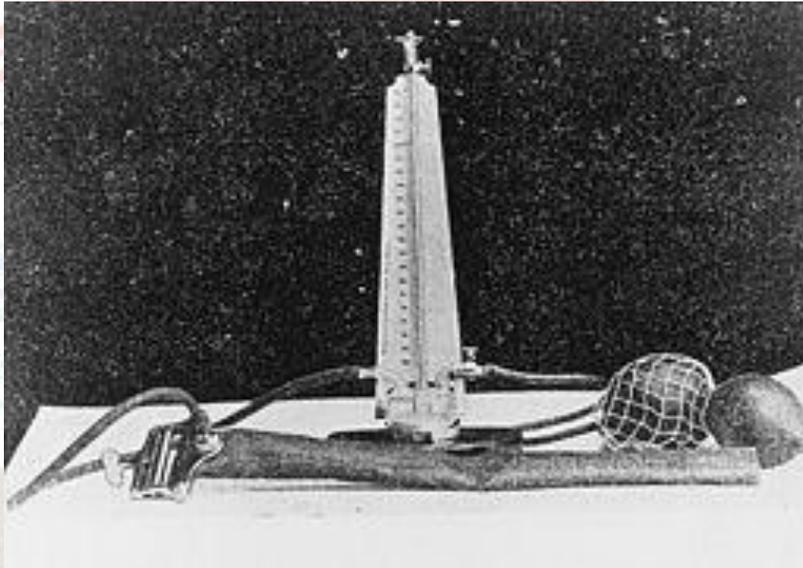
Such a test was not just unsafe and inaccurate; it also led to the destruction of blood vessels. Life will be greatly threatened if a similar test was to be carried out on a human. As such, no one dared to conduct the experiment on a human.

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In 1896, Italian physician Scipione Riva-Rocci (1863 - 1937) continued the research work of Hales. Upon studying and analyzing Hales' work in detail, Riva-Rocci managed to invent a mercury sphygmomanometer which would bring no damage to blood vessels. His version of the sphygmomanometer consisted of three parts, which were the cuff, pressure gauge, and rubber bulb.

The steps of measuring blood pressure were not complicated as well. The rubber cuff would first be wrapped around the patient's arm. With one hand feeling for the patient's pulse in the wrist, the other hand would be inflating the cuff with a rubber bulb. The pressure in the cuff was measured by the height of the mercury in the sphygmomanometer's vertical glass tube.

Although Riva-Rocci's invention was much safer than Hales', the mercury-based sphygmomanometer was not entirely perfect. The instrument was merely measuring the systolic blood pressure in the arteries, which made the measurement results speculative and non-precise.



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About ten years later, to ensure accuracy in the blood pressure reading, Russian surgeon Nikolai Sergeyevich Korotkov did some modifications to Riva-Rocci's sphygmomanometer without altering the original structural design. The medial arterial pulse near the elbow pit, where the cuff should be wrapped, was the key area. In addition, during the process of measuring blood pressure, a stethoscope was used.

When measuring blood pressure, the tone produced by the first arterial beating, could be heard in the stethoscope, corresponded to the maximal (systolic) blood pressure. This was indicated by the height reached by the mercury in the manometer. When the tone ceased, the mercury would drop to a certain height and this corresponded to the minimal (diastolic) blood pressure. Due to the safety and accuracy of this improved sphygmomanometer, it is used to this day.

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With the development of technology in this new era which emphasizes on electronic technology, plenty of electronic sphygmomanometers, with high accuracy, have been produced. These electronic instruments have slowly replaced the original sphygmomanometer.

Food for Thought:

- Ideas for innovation or invention were often produced in the problem solving process.
- Innovation or invention must be based on the accumulation of previous experiences by predecessors. With in-depth exploration and continuous research, greater success could be attained.