

# The Nelson's inhaler

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The Nelson's inhaler is an earthenware vessel that enables inhalation of the vapour of water and medicinal substances (Fig 1). It was introduced on 28 May 1861 when Dr Nelson presented his recent invention to the fellows of the Royal Medical and Chirurgical Society of London at the conclusion of a meeting. He drew their attention particularly to its 'great ease and simplicity of action, perfect cleanliness, and an arrangement of the mouth-piece by which is secured economy in the use of any medicated ingredient that may be required for inhalation'.<sup>1</sup>

Respiratory ailments were rampant in Britain at that time due to industrialisation and rapid urban development that had occurred before the sanitary revolution. Physicians who treated these conditions were aware of the advantages that inhaling medications directly into the lungs would bring, but there was no suitable apparatus available.

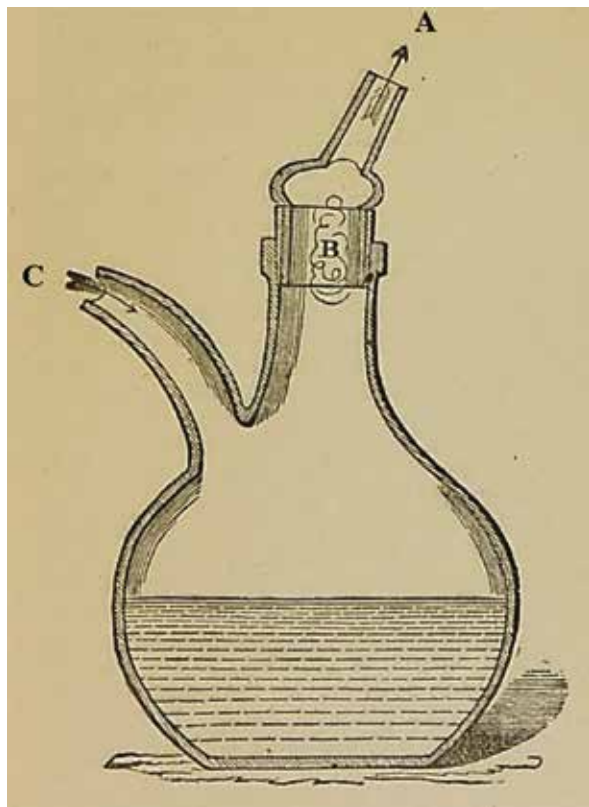


FIG 1. Sectional illustration of Dr Nelson's improved earthenware inhaler.<sup>7</sup> The Nelson's inhaler consists of a mouthpiece (A) for inhalation, a sponge (B) for soaking medication, and a spout (C) from which exhaled breath escapes

The demonstration of ether as an inhalational anaesthetic in 1846 and, later, the successful use of antiseptic heightened interest in the inhalational administration of medication. Dr Nelson was one of those who had spent time inventing and experimenting with inhalation devices.

Dr John Mudge invented the first inhaler in 1778 and even coined the term. The purpose of his invention was to provide a 'radical and expeditious cure for a recent catarrhus cough' using hot water and added herbs or medicinal products (such as opium).<sup>2</sup> The inhaler became popular and was used both in hospitals and by patients at home, but those with respiratory ailments struggled to inhale against the pressure of the water.<sup>3</sup> In 1865, S Maw & Son, a prominent medical equipment manufacturer, launched the Dr Nelson's improved earthenware inhaler with a notice in *The Lancet*. It was promoted as a 'very handy, cheap, simple and effective apparatus'.<sup>4</sup> The promotional notice included the following instructions for use: "Remove the corked stopper, and fill the vessel half full of hot water; then pour the remedy to be employed upon the sponge contained in the hollow tube at B; and, having replaced the latter, inhale the vapour through the mouth-piece at A, the exhaled breath passing freely through the tube at C. For the inhalation of the vapour of hot water only, or the infusion of stramonium, hops, or other medicinal plants, the sponge in the tube need not be displaced."<sup>4</sup>

The new inhaler was well received by the medical profession. In 1867, five vapour medications (eg, *vapor creasoti* and *vapor iodi*) were incorporated into the British Pharmacopoeia for the first time.<sup>5</sup> In 1870, the inhaler was advertised in the *British Medical Journal* as 'a most efficient apparatus for the inhalation of the vapour of hot water, either alone or impregnated with ether, chloroform, henbane, creosote, vinegar, etc., in affections of the throat and bronchial tubes, asthma, consumption, etc.'<sup>6</sup>

The new inhaler was also well received by patients and self-medicators. Its 'great ease and simplicity of action' minimised errors when using the device. Being earthenware, it was not liable to corrosion and could be easily cleaned; it was also readily available and affordable. From among the numerous inhalers available at that time, Nelson's was selected to illustrate the use of an inhaler in Spencer Thomson's *A Dictionary of Domestic Medicine and Household Surgery*.<sup>7</sup> Over time, many different designs of Nelson-type earthenware inhalers were



FIG 2. Dr Nelson's improved inhaler from the Hong Kong Museum of Medical Sciences collection. This version is 16 cm in height without cork stopper and mouthpiece

produced, as witnessed by the variety collected in many museums. The item in the collection of the Hong Kong Museum of Medical Sciences bears the logo of 'Boots the Chemists' and could have been produced before the logo changed in the 1960s (Fig 2).

From the mid-1900s, steam inhalers were gradually replaced by safer and more effective drugs (such as antibiotics, bronchodilators, steroids, and mucolytics) and delivery systems (such as metered-dose inhalers, dry-powder inhalers, soft mist inhalers, and nebulisers). In Hong Kong, the Nelson's inhaler was used in hospitals until the 1980s (J Lui, Senior Nursing Officer at Queen Mary Hospital

from 1995 to 2007, oral communication, November 2021). Before then, tincture benzoin compound was usually prescribed for inhalation as an expectorant. The prepared pot would be wrapped in towels and patients would sit in bed and inhale the vapours for 10 to 15 minutes (J Lui, oral communication, November 2021). The Nelson's inhaler is still produced today and is mainly used by singers to soothe their vocal cords.

When the various inhalers were first invented, their performance was not evaluated. While the Nelson's inhaler was popular, it was not specifically referred to in case reports. Although many advocated the use of inhaled vapours, the practice also had its detractors.<sup>8</sup> Williams<sup>9</sup> concluded in 1888 that medicinal inhalations were more useful for conditions of the pharynx, larynx and larger bronchi but that their effects on lung parenchyma were doubtful. He questioned whether the methods available at the time could deliver medications to the lungs as effectively as the oral route of administration.<sup>9</sup>

More recently, in 2017, Murnane et al<sup>10</sup> conducted modern inhalation performance testing of the Nelson's inhaler using simulated adult breathing and a preparation of benzoic acid. They demonstrated that about 45% of the benzoic acid emitted from the inhaler had an aerosol size of <math>6.4 \mu\text{m}</math> and therefore could reach the lungs.<sup>10</sup> This finding could partly explain the inhaler's enduring popularity.

Invented 160 years ago, the Nelson's inhaler will be remembered as a 'simple and effective' apparatus that helped to establish inhalation as a popular treatment for respiratory ailments.

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