

The evolution of face masks

In times of a pandemic, common sense dictates that each person must protect themselves by all available means, especially when those pandemics are generated by infectious agents that are transmitted by air such as the current COVID-19 pandemic and the Spanish Flu of 1918. The common method generally approved and tested to bring some kind of protection to our lives is the use of face masks.

There is an ongoing debate both in scientific community and on a personal level about the effectiveness of wearing face masks to avoid the exposure to infectious agents like Coronavirus or influenza virus just to mention some examples. The truth is that face masks with medical and health purposes have been used for a long time, mostly to prevent infections transmitted by air.

While most people debate about the effectiveness or not of wearing a face mask in these pandemic times, history has shown us that face masks have undergone an important evolution trying to provide a better degree of protection to our lives.

The earliest recorded face mask-like objects in history date to the 6th Century BC. Some images of people wearing cloth over their mouths were found on the doors of Persian tombs.

In China, a kind of scarf woven with silk and gold threads from the Yuan Dynasty (1279-1368) is believed to be the earliest item in China that is similar to today's face mask.

According to the record of The Travels of Marco Polo, the 13th-Century travelogue of the famous Italian who once travelled in China in Yuan Dynasty (1279-1368), servants who served the emperor during meals needed to wear silk scarves to cover their mouths and noses. It was believed that the silk scarves would keep the servants' breath from impacting the smell and taste of the food.



16th Century plague doctor masks, worn during a Black Death outbreak

In the 14th Century, the Black Death spread to Europe. This also greatly promoted the emergence of functional face mask-like objects.

In the 16th Century, French doctor Charles de Lorme invented the beak mask. He installed glass in the eye sockets to ensure visibility and perfume, scented spices or medicines including mint leaves, camphor could be placed in the beak section to filter out disease. In addition to the mask, a top hat, shawl, robe, trousers, gloves, shoes and walking sticks made up a complete 'beak suit'. It eventually evolved into a terrifying symbol of death due to the rampant extent of the plague.

That same century, famous painter Leonardo da Vinci proposed soaking cloth in water and placing it on his face in order to filter out toxic chemicals coming from people's respiratory systems. This effective method is still widely used in fire escape guides today.

Modern exploration

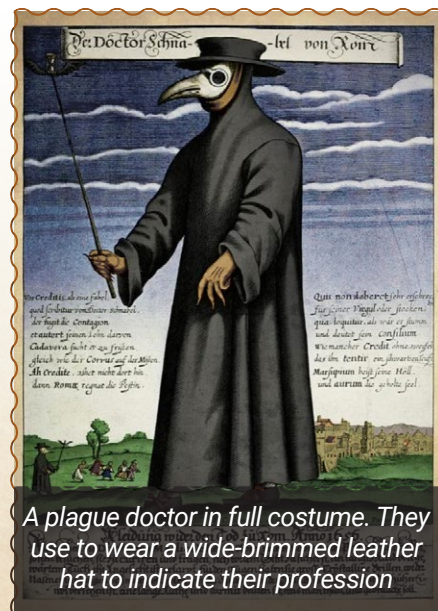
The design of the mask took a big step forward in the 19th Century. In 1827, Scottish scientist Robert Brown discovered "Brownian motion," which theoretically proved the protective effect of masks on dust.

In 1848, the mask made by American Lewis Hassley for miners obtained the first patent for a protective mask,

which was a milestone in the history of face masks. Masks at this stage were closer to gas masks. Hassley applied for the patent in 1849 with the patent number 6529, which is still available in the archives in the US.

In 1861, French biologist, microbiologist and chemist Louis Pasteur proved the presence of bacteria in the air, which made more people pay attention to the design of modern masks.

For example, a French doctor created a mask made of six layers of gauze and sewed it on the collar of a surgical gown in 1899. The doctor



A plague doctor in full costume. They use to wear a wide-brimmed leather hat to indicate their profession



Gauze face mask following Berkeley George Andrew Moynihan (1865–1936)



Mask-wearing during the 1918 Spanish Flu Pandemic

- ▶ only needed to flip the collar up when using it. It gradually evolved into a form that could be freely tied and hung on the ears with a looped strap, thus giving birth to the modern mask.

In 1890 William Stewart Halsted pioneered the use of rubber gloves and surgical face masks, although some European surgeons such as Paul Berger and Jan Mikulicz-Radecki had worn cotton gloves and masks earlier. These masks became commonplace after World War I and the Spanish Flu Epidemic of 1918.

During the late Qing Dynasty (1644-1911), Chinese-Malaysian epidemiologist Dr Wu Lien-teh invented the surgical face mask, considered the precursor to the N95 mask in response to the Manchurian Plague, which spread in northwestern China in 1910. The Chinese government appointed Wu to investigate the disease, which he identified as the highly contagious pneumonic plague that spread from human to human through respiratory transmission. Wu designed and produced a special surgical mask with cotton and gauze, adding several layers of cloth to filter inhalations. The mask was called “Wu’s mask” and was highly complimented by experts in different countries as it is simple to manufacture, has a low production cost and the materials are easy to obtain. Wu also worked with Government officials to establish quarantine stations and hospitals and apply progressive sterilisation techniques.

The influenza pandemic of 1918 and 1919 was the most deadly flu outbreak in history, killing up to 50 million people worldwide. In 1918, advanced masks like the N95s that healthcare workers use today were a long way off. Surgical masks were made of gauze and many people’s flu masks were made of gauze too. Red Cross volunteers made and distributed many of these and newspapers carried instructions for those who may want to make a mask for themselves or donate some to the troops. Still, not everyone used the standard surgical design or material.

New design

With several outbreaks of infectious diseases and flu and the rise of smog from modern industry, the materials in masks have continued to evolve to better filter viruses and pollution.

In addition to the SARS epidemic in 2003, the last large-scale use of masks in China was due to smog in 2012. That year, the term “PM2.5” began to enter public awareness and mask models such as N95 and KN90,

which can filter out this fine particulate matter, became highly popular.

The 3M mask is short for Minnesota Mining and Manufacturing Co, the company that has produced these masks since 1967. Interestingly, the idea of 3M came from women’s disposable bras. An employee proposed the inspiration that a disposable mask could protect workers’ noses and lungs in harsh operating environments such as mining and smelting.

The evolution of face masks has been exponential since its first days back in ancient times. While there is an open and heated debate about their effectiveness in preventing some kind of diseases, common sense dictates that, in the worst case scenario, wearing a face mask can’t do any harm, and some people think it is even ‘cool’ to wear it, while at best they can help you stay alive and healthy in times of pandemic.

Sources: Global Times, Deyner’s Notes, US Today, European Journal of Medical Research, History.com ▲



Chinese-Malaysian epidemiologist Dr Wu Lien-teh invented the surgical face mask