



A Preliminary Analysis of Innovative Design Approaches for New Protective Masks

Yu Tian, Zhaojing Chen*

School of Public Health, North China University of Science and Technology, Tangshan 063200, China

*Author to whom correspondence should be addressed.

Abstract: *Once the COVID-19 broke out, it quickly (spread to the whole world. People's lives are always threatened by viruses, and epidemic prevention has become the most important work. For epidemic prevention, in addition to preparing food, medicine and other necessities, masks have also become an essential part of going out. Because masks (especially medical surgical masks) can effectively prevent viruses from entering our bodies through the nose, mouth and respiratory tract. In the current situation of normalization of the COVID-19 epidemic, the use of masks is also normalized. As long as we go out, we cannot avoid contact with outsiders. Wearing a mask at this time not only provides good protection for ourselves, but also shows responsibility towards others around us. However, in terms of the current situation of masks in China, there are still some problems, which are not ideal in terms of vision, material, and comfort. Especially for medical staff who have been fighting against the virus face to face for a long time, they need to wear masks for a long time. We need to design masks carefully and put effort into mask design and production, in order to make everyone feel the warmth from masks in the cold winter of the epidemic. This article analyzes the innovative design of new protective masks in order to contribute to epidemic prevention work.*

Keywords: COVID-19; Mask design; Pathway; Protection work.

1. Introduction

At the end of 2019, a sudden epidemic storm broke out, disrupting people's normal pace of life and making people's lives across the country press the pause button. For a time, masks and protective clothing, which are usually not needed, became the most scarce items. On the street, apart from the people rushing to buy masks and supplies, no one else's figure can be seen. Supermarkets, pharmacies, and shopping malls have all sold out masks, but they still cannot meet everyone's needs, and masks are even in high demand. In this context, many enterprises have responded to the national call and transformed, joining the mask production work. Entrepreneurs also want to contribute their own strength to the country and the people in times of national crisis. Innovating the design of masks and developing new types of protective masks is not only a current need, but also a cause that benefits the people and the country.

2. Existing Problems in Mask Design

Generally, masks nowadays are mainly divided into air filtration masks and gas supply masks. From

the outbreak of this epidemic, we can observe that during the severe period of the epidemic, medical surgical masks N95 and KN95 were commonly chosen by people. With the control of the epidemic and the requirements of daily travel regulations, people have gradually begun to use disposable medical masks. Masks had become an essential daily item for people before the epidemic was completely cured. Nowadays, daily activities such as taking public transportation and entering and exiting public places require a mask as a pass to complete. At the same time as people began to use masks in large quantities, some problems with masks have also emerged. Let's analyze them in detail below:

2.1 Mask Compression Issue

Mask compression, also known as medical device related pressure injury, is mainly caused by people wearing masks for a long time accompanied by compressive physical stimuli such as friction and pulling. These stimuli can cause local pain and related damage to the contact areas such as the ears and nose, and the harm is more obvious for medical staff and people who wear masks for a long time. The fixation of masks on the human face mainly relies on mask straps and nose clips. From a physical perspective, both of them have the characteristics of small force area and high pressure. During the epidemic, we often see sunken patterns on the faces of medical staff in news reports, which is a manifestation of the pressure problem of masks. Analyze from some intuitive perspectives. The wearing design of masks is also one of the factors that lead to this problem.

2.2 Breathability Issue of Masks

The breathability of masks is very important. Previous masks generally had poor breathability, which often made runners feel a bit suffocated. Especially last summer, there was a case of suffocation and death while wearing a mask during long-distance running. In daily use masks, there are generally three layers of material, with a spunbond layer on the inner and outer surfaces and a meltblown fabric layer in the middle. This layer by layer stacking provides better protection, but it also greatly reduces the breathability of the mask, resulting in a low occupancy rate. Many people are even unwilling to wear masks when going out. Also, for people who wear glasses, wearing a mask in winter is very painful. Wearing a mask to breathe and the temperature difference between indoors and outdoors often causes layers of fog to form on the lenses of the glasses, which causes great inconvenience for travel. In addition, women generally love beauty, and in some workplaces, makeup is a necessary requirement. The lack of breathability of masks may cause discomfort between cosmetics and the skin, which is very distressing for female friends.

2.3 Masks have Monotonous Colors and Single Sizes, Lacking Personalization

Most of the mask colors on the market are dominated by monotonous blue and white, making it difficult for people to distinguish the quality of the mask by its surface, and they may also wear it incorrectly due to the inability to distinguish between the front and back. This has caused certain difficulties in the process of choosing masks. Also, the size of masks on the market is single and cannot meet the needs of people with different facial shapes. Some people with small faces wearing masks may experience frequent drops. For people with relatively large faces, wearing masks can cause creases on their faces, and the mask design lacks personalization.

3. Innovative Design Approaches for New Protective Masks

The design approach of new masks mainly relies on the existing problems of masks. In the previous text, we have analyzed the problems of strong pressure, poor breathability, and lack of personalized

color and size in current masks. Below, we propose specific innovative protective design approaches to address these issues.

3.1 Emphasize the Sense of Pressure in the Design to Provide Better Comfort for the New Type of Mask

This is raised in response to problem one. The design of the new type of mask should have a certain degree of comfort, which avoids skin damage caused by friction and other reasons, and helps frontline medical staff to focus more on their work. When designing masks, consideration should be given to the pressure on the load-bearing area, and lightweight materials should be selected as much as possible to reduce friction on the mask. This can ensure as much pain as possible for medical staff and all those who need to wear masks for a long time, allowing them to continue working in a more comfortable state.

3.2 Personalized Considerations Should be Taken into Account in the Design, Striving to Help All Personnel Find Masks That Fit Their Face Shape

The design of the new protective mask is based on personalization. When designing the mask ear strap, adjustable and retractable ear straps are selected according to the face shape and head size. This way, even for the same type of mask, it can meet the needs of different people.

3.3 In Design, Attention Should be Paid to the Breathability and Water Absorption of Masks

Now that the epidemic is normalized, masks need to be worn anytime and anywhere. The previous mask design made it difficult to breathe and the face felt stuffy when worn for a long time, especially in summer. After going out for a while, the mask became completely wet and could not meet the daily needs of epidemic prevention. So, the design of new protective masks requires us to change the material and choose materials that are breathable and have better protective effects, in order to enhance the breathability and water absorption of the masks.

3.4 Incorporating Natural Life Elements into the Design, Making Masks a Form of Decoration

Masks are the most practical epidemic prevention supplies for each of us, and practicality is definitely the top priority. However, for more and more young people, wearing masks all day is already burying their personality. If everyone wears masks of the same color without their favorite style, they are unwilling to wear masks anytime and anywhere unless necessary. So in the design of masks, innovation is necessary, incorporating colors and patterns such as cartoons, comics, landscapes, etc., to make everyone popular and have their own style beauty. This also invisibly makes masks a decoration, making more people willing to choose to wear masks and show a different self.

4. The Importance of Innovative Design of New Masks

The outbreak of the epidemic has taught us the importance of taking good protective measures. Masks, as an important part of protection, have become an essential component of people's travel. Because the virus spreads the fastest through droplets anytime and anywhere, wearing a mask can effectively block the rapid invasion of the virus and provide us with effective protection. Now, with the normalization trend of the epidemic, our masks should also strive to maximize their effectiveness. Therefore, designing new types of protective masks to better serve the people and protect their health is of great significance. Design of a new type of protective mask. It can provide frontline epidemic prevention

personnel with a better wearing experience and effectively prevent skin and other injuries caused by mask issues; Can provide better safety protection for epidemic prevention and control personnel who are frequently exposed to epidemic environments; It can make the people of the whole country feel the warmth brought by masks. The innovative design of the new type of mask has practicality, warmth, and safety, which can meet the needs of different groups while making the mask an effective shield against people and viruses. So, the design of new masks is beneficial to the people, society, and the country, and is currently the top priority in epidemic prevention work.

5. Summary

Under the normalization trend of the epidemic, masks have become a daily necessity. It is necessary to innovate the design of masks, as it can give them vitality and allow people to use them as decorations while taking good care of their own protection. This has contributed to the national epidemic prevention cause and opened up a new blue sky for the development of masks.

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