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Employing Cribbed Wire to Increase Compliance of Face Mask Wear during COVID-19 Pandemic

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ABSTRACT

To begin with, face masks were not designed to be worn round the clock, but in the aftermath of Coronavirus Disease-2019 (COVID-19) pandemic, duration of masks use has increased. However, conventional way of wearing of masks for such long period is giving rise to myriad of issues ranging from constant irritation to erythematous and painful changes at back of ear, thereby decreasing compliance and increasing risk of acquiring and spreading viruses. To enhance compliance with the Standard Operating Protocol (SOP), a simple technique of securing mask at back of the head with steel wire is being proposed to make it trouble-free, snug fit with less leakage of air. Enhanced comfort ensured by present technique discourages one from touching face, mask or ears inadvertently; thus offering better health protection.

Keywords: Coronavirus disease-2019, Patient adherence, Stainless steel wire, Vertical crib

INTRODUCTION

In December 2019, an off beat pneumonia with a high potential of transmissibility between humans was first reported. The virus Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) that causes the disease (COVID-19) has steadily evolved into a pandemic, and as of May 2021, more than 170 million people globally in 220 countries have been infected and 3.5 million people have died of COVID-19 [1].

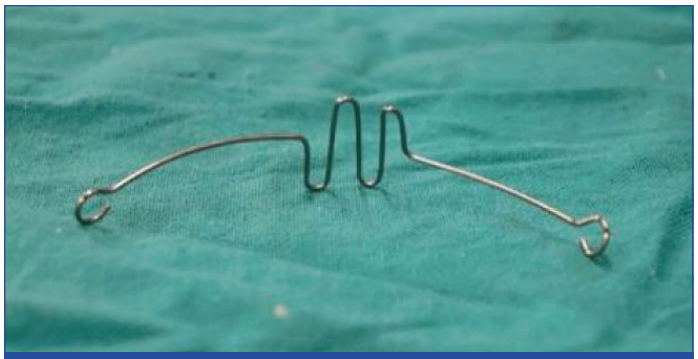
Specific guidelines have been issued by World Health Organisation (WHO) regarding usage of mask in this pandemic [2]. At present many countries across the world have made wearing of mask compulsory in public places [3], and thus the necessity of masks is not confined to healthcare workers only but also relevant for general population. However, wearing of mask for long duration may cause irritation, redness and pain at the back of the ear due to pressure from elastic cord or ribbon ties that are used to keep the mask secured over the face [Table/Fig-1]. Lowering of preventive measures take place, when one impulsively touches the mask, face and ears to get rid off the soreness and irritation. To overcome these drawbacks, few innovations are being introduced to secure mask such as novel cardboard technique [4], polythene or three dimensional (3D) printed materials [5].

[Table/Fig-1]: Masks with elastic cord and ribbon ties.

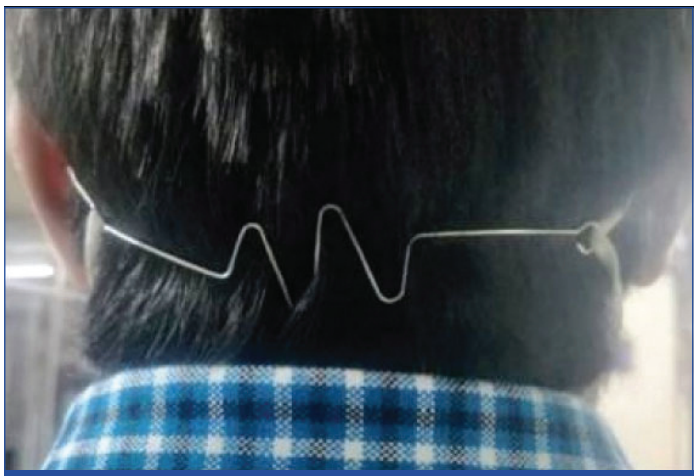
In this article, an innovative way of securing mask by using stainless steel wire was proposed and thereby overcoming the short comings of long duration of mask wear along with safeguarding the very purpose of it.

TECHNIQUE

A segment of 19 gauze stainless steel wire (Leowire, Leone) approximately the width of one's head from temple to temple across back of the head was taken. Four cribs of 4 cm height and 1 cm width were then made with universal orthodontic plier. The wire-crib configuration was passively adapted around back of the head and hooks were made at both the ends [Table/Fig-2] to fasten elastic strings of the face mask [Table/Fig-3]. To accommodate big or



[Table/Fig-2]: Wire-crib configuration.



[Table/Fig-3]: Technique of wearing.

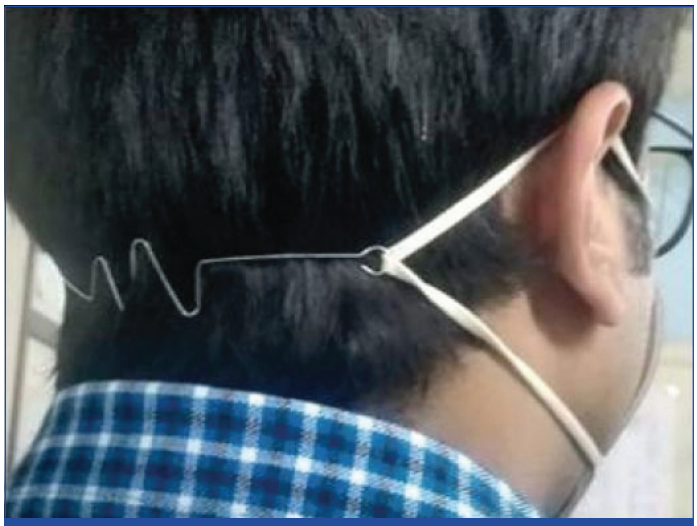
small head size, adjustment can be made at vertical cribs by either expanding or compressing it, thereby modifying the length of the wire around the head.

DISCUSSION

Perhaps one of the noteworthy lifestyle changes resulting from the COVID-19 pandemic is mandatory use of face masks in grocery stores, restaurants and other public places. Precautionary measures as well as legal considerations dictate wearing of mask for longer durations [3]. Amongst those available in the market, surgical masks with elastic loops are the ones commonly chosen. Compression from these elastics may bring about erythematous and painful lesions of the retroauricular skin when the masks are used for long hours [Table/Fig-4] [6].

[Table/Fig-4]: Erythematous retroauricular area.

Innovations such as novel cardboard technique, polythene or 3D printed materials effectively address these issues and helpful in improving compliance with mask wearing to a great extent. However, the cardboard is bulky and not aesthetically pleasing, whereas 3D printed materials are very expensive and not easily available to the user [4]. The steel crib as described, distributes pressure over larger occipital region and can be worn at a stretch upto six hours without causing irritation or friction over the ears [Table/Fig-5] as noted from user's feedback. It is cost-effective, avoids needless ear pull and size and placement of wire makes the configuration inconspicuous. Passive adaptation of the design on the back of head is of utmost importance to prevent it from exerting any undue pressure. Any distortion of the wire-crib configuration resulting from repeated use could easily be reversed by simple adjustment of the crib.



[Table/Fig-5]: Optimal pressure distribution with properly fitted mask.

Limitation(s)

An important limitation of the present technique is that, its fabrication demands some training in wire bending exercises, so ideally suited for dental or orthodontic offices to act as provider.

CONCLUSION(S)

This wire-crib design ensures close-fitting masks; it is easy to make, aesthetic, ready to use, economical and pliable depending on user and mask size. Patient compliance is enhanced and so one is better equipped to fight against this pandemic without a lag.

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