

## **“Mask Wrinkles” Facial distortion caused by N95 masks**

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### **Abstract:**

Appearance of facial wrinkles is considered as a sign of aging. Inability to reverse facial skin aging can have deleterious effects on the mental health of a person oriented towards maintaining ones aesthetic appearance. Health-care workers have been using N95 masks when they are inside the hospital premises treating patients for hours. Owing to these long shifts and inability to remove the mask during the working hours, a serious amount of damage is being caused to the facial skin due to the continual use of masks. It may not be wrong to consider the possibility that facial distortion due to the continuous and repetitive use of N95 masks only results in mask wrinkles, but it may also contribute to overall facial aging. Compression of the skin inside the N95 mask as a result of the tight seal, and facial movements can increase the appearance of new fine lines and their subsequent deepening. The following article discusses the potential facial distortion that can be caused by the continual use of N95 masks during the Covid-19 pandemic.

**Key Words:** Facial wrinkles, N95 surgicalrespirator, Covid19 pandemic, Facialdistortion

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### **I. Introduction**

Face is an important channel of identity of any person. A pleasing face with a youthful appearance is a symbol of confidence. Recognition due to one's confident face and being accepted socially many a times go hand in hand.

Appearance of wrinkles on the face is considered as a sign of aging, and wear and tear. Skin aging is particularly important because of the impact it would have on social aspects of a person's life. For many people, especially females, a considerable amount of daily expense is occupied by cosmetics and pharmaceuticals with the attempt to prevent or reverse skin aging. <sup>1</sup>Inability to reverse facial skin aging can have deleterious effects on the mental health of a person oriented towards maintaining ones aesthetic appearance.

While there are many modalities which help in the reduction of facial wrinkles, it might be a matter of concern for some people to face the early signs of aging by the premature appearance of the 'face mask-induced' facial wrinkles and deepening of the expression wrinkles observed during the Covid-19 pandemic. With the ever increasing risk of the present pandemic, people prefer the use of N95 masks while venturing out of their houses, more than ever. For visiting a hospital, an N95 mask can be considered as one of the best precautionary measures to prevent Covid19 infection. Doctors and the other hospital staff have been using N95 masks all the time round when they are inside the hospital premises treating patients.

Owing to the long shifts and inability to remove the mask during the long working hours, a serious amount of damage is being caused to the facial skin due to the continual wearing of these masks. Though a menial issue in front of the deadly Covid19 virus infection, skin issues, especially the appearance and deepening of wrinkles, will surface in the near future after resolution of the pandemic. It may not be wrong to consider the possibility that facial distortion due to the continuous and repetitive use of N95 masks only results in mask wrinkles, but it may also contribute to overall facial aging.

### **II. Causes of wrinkling of facial skin**

The factors which play a role in the aging process are intrinsic, extrinsic, and stochastic damage. Extrinsic aging develops due to several factors: ionizing radiation, severe physical and psychological stress, alcohol intake, poor nutrition, overeating, environmental pollution, and exposure to UV radiation.<sup>2</sup> Intrinsic aging is dependent on genetics, age, hormonal status, and environmental exposure. While extrinsic aging is largely preventable, intrinsic aging reflects the genetic background and depends on time.

Since N95 masks can accelerate the appearance and incidence of facial wrinkles, it can be considered as a cause for pathological ageing. Dermatologists and cosmetic physicians have a great role to play in restoring the condition of the skin back to the accepted normal after the resolution of the Covid19 outbreak.

### **III. N95 surgical respirators and facial distortion**

The N95 surgical respirators currently being used expand into a convex-shaped mask with elastic head-loops to secure the mask to the user's face, and a malleable aluminum strip is positioned above the nose to help obtain a tighter seal around the nose and face. N95 masks should be worn in such a fashion that there is a tight seal on and around the nose and mouth to prevent the Covid19 virus from entering the mask.

The tight seal often causes bruising of the facial skin if used for long periods of time. Quality and volume of speech decreases after wearing the masks forcing the wearer to speak louder with more facial movements causing entrapment of surrounding facial skin into the area bound by the face mask. The fault lines which appear on the skin may be due to skin distortion and muscle contraction as a result of facial expressions, or they can be as a result of the mechanical compression of skin due to the tight seal of a N95 mask. Though the expression lines are due to the repetitive action of the facial muscles to carry out facial expressions, the mask wrinkles have a completely different etiology. Mask wrinkles develop in response to the distortion of skin created with the continuous and long term use of face masks.

Although a wrinkle may initially be caused by muscle contraction, the wrinkle appears to worsen due to compression. This can reinforce deepening of the nasolabial fold. Centripetal entrapment of the skin as a result of the tight seal and facial movements during talking can increase the appearance of new fine lines and their subsequent deepening around the corners of the mouth, mostly appearing as marionette lines or extensions of marionette lines.



**Figure 1: An illustration of the compression of facial tissue caused by use of N95 mask leading to the appearance of mask wrinkles and deepening of existing facial wrinkles and folds.**

These masks can also cause a compression around the skin surrounding the eyes and may cause the appearance or deepening of the under-eye wrinkles and malar smile lines. The forces produced by these mask may become significant when we consider the amount of time the masks are being used and can lead to progression of temporary lines to permanent lines if left unattended. The rate and severity of wrinkling varies as skin ages in response to intrinsic and extrinsic influences combined with repetition of force patterns.<sup>3</sup>

### **IV. Factor accentuating the appearance of mask wrinkles**

Several other causes can accentuate the formation of mask wrinkles. The protective gears donned during treatment of Covid patients have to be discarded after one use. With staff shortage and short supply of personal protective equipments, many doctors and nurses resort to continuous work for 6-7 hours, without any breaks. Dehydration, undernourishment, and physical and psychological stress as a result of the gruelling schedule, is affecting the overall health of health-care workers across the globe.

Results of a study by Choi JW et al , revealed that a negative correlation was seen between hydration level and wrinkle parameters. It concluded that within the physiologic range, skin hydration actually diminishes wrinkles.<sup>4</sup>

Nutritional factors also play a key role in normal dermatologic functioning and appearance. Health-care workers tend to skip healthy options in meals and prefer carbohydrate-rich food in order to keep pace with their schedules. This too may have deleterious effects on their facial skin in the long run. According to a study by Cosgrove MC et al, healthy dietary behaviors may have additional benefit for skin appearance.<sup>5</sup> The study

associated a better skin appearance with higher intakes of vitamin C and linoleic acid and lower intakes of fats and carbohydrates. This is suggestive of the negative role that a higher dietary intake of fats and carbohydrates has in skin-aging appearance.

Physical and psychological stress is a component of chronological skin aging, however, evidence directly connecting psychological stress to skin aging is limited. Certain human studies have shown that stressful situations result in rising levels of catecholamines, angiotensin, cortisol, and acetylcholine which are known to cause premature skin aging.<sup>6</sup> The mechanisms through which stress-induced catecholamine release causes DNA damage and immunosuppression are the most well defined molecular pathways which link stress to aging.<sup>7</sup>

## V. Conclusion

Facial expressions and compression caused by N95 mask cause reinforcement of the previously present expression lines may accelerate the aging process. To date, mask wrinkles have not been recognized in any classification system. The consequence of repetitive compression of N95 surgical respirator on the facial tissue over time is intriguing and warrants further study.

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