

# Taking care of healthcare workers during COVID-19 pandemic: does plastic surgery have a role?

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**Summary.** *Background:* The massive use of personal protective equipment is required by the medical and paramedical staff of the COVID-19 dedicated departments. This often causes painful pressure injuries. The aim of this study is to value the use of anesthetic cream and collagen veil masks for the treatment of pain. We also evaluated the possible psychological impact on healthcare workers involved in the emergency, which is currently a hot topic in the worldwide literature. *Materials and Methods:* We applied lidocaine hydrochloride 5% cream and a collagen veil mask respectively before and after each work shift. We evaluated the improvement of pain symptoms through VAS assessments. We used a modified Maslach burnout inventory as well to evaluate the psychological impact of our treatments on healthcare workers. *Results:* A significant reduction of pain was detected within the first 3 days, but this was not significant over the long period (10 days). Otherwise, we saw a significant improvement of the psychological assessment ( $p < 0,05$ ). *Conclusions:* Parameters such as pain or psychological stress are not objective, but, anyway, our data show a reduction of pain due to continuative PPE wearing and a significant improvement of psychological wellness of healthcare workers from two different countries, a finding which should not be undervalued by all the health caregivers not directly involved in COVID-19 pandemic. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Keywords:** PPE; COVID19; Maslach; Pressure injuries

## Background

In December 2019, a novel zoonotic infection was detected in hospitalized patients with pneumonia in Whuan, China. The infection was found to be caused by an enveloped RNA virus of the Coronaviridae family, named “Severe Acute Respiratory Syndrome Coronavirus 2” (SARS-CoV-2), or, more frequently, CORONA VIRUS Disease-2019 (COVID-19)

Due to its rapid spreading all over the world, the WHO declared it pandemic in early March 2020.<sup>1</sup>

The best evidences suggest the COVID-19 is transmitted by Flugge's droplets. The infection results in ARDS (Acute Respiratory Distress Syndrome), although the exact pathophysiology is still unclear.

Recently, the role of vasculitis, vessel thrombosis, hypercoagulability, immune dysregulation, and an increased risk of pulmonary embolism, were remarked by different studies<sup>2,3</sup>.

Up to 8<sup>th</sup> July 2020, there have been 11,669,259 confirmed case of CoVid-19 infections in the world, including 539.906 deaths<sup>4</sup>.

Due to its easy spread and difficult treatment, it is mandatory for healthcare workers, and CoVid-19 centers caregivers in particular, to wear PPE (Personal Protective Equipment): gowns, gloves, shoes, goggles, visors, helmets and filtering masks for many hours.

As plastic surgeons, we were directly involved in this healthcare emergency because of the skin lesions which include SARS-CoV-2 cutaneous

manifestations<sup>5</sup>, and indirectly as well. In fact, we saw an upsurge in skin lesions in both patients and healthcare workers (pressure injuries, contact dermatitis and itch as well) related to personal hygiene measures and, above all, to the continuative use of visors and filter masks.

N95/FFP2 and FFP3 masks, which are among the most used PPE, contains a metal strip in the upper portion to ensure the best adhesion possible to skin. Goggles and face shields, very used as well, can squeeze and damage the skin of cheek, forehead and nasal bridge, resulting in maceration, erosion, ulcers and pain. In particular, even grade 1 pressure injuries due to PPE resulted in a tremendous discomfort for CoVid-19 center workers due to pain and cutaneous hypersensitivity in skin areas, mostly because of the re-use of PPE during the weeks. Besides, the psychological aspect of healthcare workers during the pandemic should not be underestimated, as worldwide literature provides evidences of an increasing in psychological distress and even familiar impairment in nurses and advanced practice provider working in CoVid-19 units.<sup>6,7,8</sup>

The aim of this manuscript is to provide an approach in the management of pain in this kind of pressure injuries, describing our experience in the treatment of these lesions and, eventually, the psychological impact on healthcare workers.

## Materials and Methods

From April 23<sup>rd</sup> 2020 we have visited 39 healthcare workers from CoVid-19 units of two different countries for skin lesions due to prolonged use of facial PPE.

We retrospectively include in our work those patients who met the following criteria.

**Inclusion criteria:** grade 1 pressure lesions; Physicians, Nurses or healthcare assistant; wearing facial PPE continuatively more than 3 hours a day.

**Exclusion criteria:** skin ulceration; vasculitis; chronic systemic corticosteroids therapy; diabetes; reported psychological disorders

At first visit, which was in every case after a work shift, (time 0 – T<sub>0</sub>), a single operator performed a VAS

scale assessment. We applied small amount of Lidocaine Hydrochloride 5% cream before each work shift. Immediately after the end of each work shift we applied collagen veil mask. VAS assessment was performed at time 0 (T<sub>0</sub> – first visit), time 1 (T<sub>1</sub> – 3<sup>rd</sup> day), and time 2 (T<sub>2</sub> – 7<sup>th</sup> day), time 3 (T<sub>3</sub> – 10<sup>th</sup> day), before each work shift.

The Maslach Burnout inventory was performed at the first visit and after 2 weeks of or after the resolution of the lesions, in order to establish whether our intervention could have an impact on psychological assets of healthcare workers involved in the pandemic emergency.

A modified version of Maslach Burnout inventory (MBI)<sup>9,10</sup> was used, so that each question (Table 2) was asked as “YES” or “NO”. We added three further questions to the above mentioned modified MBI, which were specific for the emergency.

Finally, we compared the average values of VAS scores between T<sub>0</sub> and T<sub>1</sub> and between T<sub>0</sub> and T<sub>3</sub>. We compared as well the number of “YES” answers to each *item* of our modified MBI, which, were performed, for each patient, before the beginning and after the end of the treatment.

In order to follow up the lesions we also collected some photos. (figure 1)

The statistical analysis for was performed basing on Student-T test, using the IBM SPSS Statistics ver. 25.

Only p-values <0.05 were considered significant.

## Results

A total amount of 23 patients among physicians, nurses and healthcare assistants met these criteria.

Two patients developed skin ulcerations and were excluded from the study, as they began to be medicated with proper dressings and they were temporary suspended from working in CoVid units.

At ten days, that is between t<sub>0</sub> and t<sub>3</sub>, the decrease in VAS was not statistically significant, although it is possible to notice some improvement in perceived pain (table 1). Otherwise, t<sub>0</sub>-t<sub>1</sub> VAS assessment resulted to be significant. This could mean that the Lidocaine cream is effective to reduce pain within the first three



**Figure 1.** An example of grade 1 pressure injury on the nasal bridge related to a prolonged use of PPE; application of collagen veil mask; a minimum improvement of the lesion is detectable even through photograph examination.

days but, as the working days go by, the use of PPE progressively worsen the pain. On the other hand, the improvement in MBI answers was significant, with a  $p$ -value  $<0.05$  (Table 2).

## Discussion

The pandemic emergency has put health systems around the world under stress. All health professionals involved in the front line in the management of covid patients suffer both physical and psychological consequences during work shifts.

In particular, the use of PPE generates discomfort to health workers. The application of modest quantities of Lidocaine cream on the areas of greatest contact has proved useful in controlling pain during the work shift. Furthermore, taking care of healthcare workers has had a great psychological impact on them.

The data and results are not sufficient to assert the efficacy of anesthetic cream or collagen-based products on the reduction of PPE pain, and there are already studies in the literature that focus on the treatment and prevention of PPE-related lesions<sup>11</sup>. However, we believe that the major contribution of this study concerns the psychological impact of a targeted assistance to healthcare personnel in an exceptional stress phase of their careers. This improvement, measured through MBI, resulted statistically significant. The psychological stress and the feeling of insecurity of health workers involved in the fight against the pandemic is a fact underlined by the mass media, the worldwide literature<sup>6,7,8</sup> and also emerges from our data. Where there is insufficient data to demonstrate the effectiveness of local anaesthetics or collagen products in reducing PPE-related pain, there is, however, a significant increase in the psychological wellbeing of the healthcare workers from different countries.

**Table 1.** Visual analogue scale, performed at time 0 (first visit); time 1 (3 days); time 2 (7 days); time 3 (10 days)

Patient	VAS – time 0	Vas - time 1	VAS – time 2	Vas 3 - time 3
1	5	6	5	5
2	7	7	5	6
3	8	5	3	7
4	5	5	4	5
5	8	6	6	7
6	8	6	5	7
7	8	7	7	5
8	8	5	6	7
9	7	6	5	6
10	8	6	6	7
11	6	5	4	5
12	6	4	5	5
13	5	2	3	4
14	6	5	4	5
15	8	6	6	7
16	6	5	4	7
17	7	5	6	6
18	5	4	5	6
19	7	6	5	6
20	4	5	5	5
21	8	6	6	7

**Table 2.** Modified MBI. “YES” answers before and at the end of the treatment. *p* value < 0.05

Emotional fatigue	“YES” answers before	“YES” answers after
Do you feel emotionally drained at work?	6	4
Do you feel used up at the end of the workday?	11	9
Do you feel fatigued when you wake up in the morning to face yet another day at work?	9	5
Do you feel that you are frustrated by your job?	9	8
Do you think that you have difficulty creating a relaxed working environment at work?	9	10
Do you feel a lack of energy at work?	10	6
Do you feel that you are unable to accomplish worthwhile things from your work?	7	6
Do you think that this job is hardening you emotionally?	12	9
<b>Personal fulfilment</b>		
Do you feel like you are at the end of the rope?	10	7
Do you feel like you are too hard on your job?	4	5
Do you feel like you do not care what is happening to some of your patients?	2	3

Emotional fatigue	“YES” answers before	“YES” answers after
Do you think that you are unable to bring a positive change in other people’s life through your work?	9	7
Do you think that you have difficulty dealing with emotional problems calmly?	7	6
Do you feel that working with people all day long is a strain for you?	7	6
Do you feel that you treat some patients as if they are impersonal objects?	4	3
Do you feel that you have become callous towards people since you have taken this job?	8	8
Depersonalization		
Do you feel burned out from work?	10	7
Do you feel that the patient will blame you for anything that goes wrong in their treatment?	4	4
Do you think that you have difficulty understanding how your patients feel about things?	3	4
Do you think that you have difficulty dealing with the patients’ problems?	11	7
Do you feel a lack of enjoyment while working with your colleagues?	5	7
<i>Do you feel that you are in danger doing your job?</i>	14	11
<i>Do you feel afraid or anxious while doing your job?</i>	12	7
<i>Do you feel uncomfortable with the idea of beginning your workshift in the CoVid unit?</i>	9	4

## Conclusion

Parameters such as pain or psychological stress are not objective. Nevertheless, our work shows that even specialists not directly involved in the CoVid-19 emergency, such as plastic surgeons, can have an indirect impact in the fight against the virus. In fact, this study is intended as a focus on the improvement of both physical and psychological benefits perceived by every healthcare workers. Psychological benefits were statistically significant and relevant as well, given the upsurge of reports in worldwide literature of psychological distress and familiar impairment in nurses and advanced practice provider working in CoVid-19 units.

## Disclosure

Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest with the submitted article.

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