

# Interaction of dermal filler and COVID-19's mRNA vaccine

## Abstract

Coronavirus 2019 has changed the life of the people and leads to death of more than 5.9 million people worldwide. In December 2020, two vaccines against COVID-19 were approved by Food and Drug Administration that are mRNA vaccines. While there are some concepts to produce special proteins against viral infections like mRNA, but for the first-time technology of using mRNA as a vaccine for producing certain proteins to cure patients. Some studies reported that there are some interactions between mRNA vaccines and dermal fillers and the main question is that mRNA vaccines are safe or not.

**Keywords:** mRNA, COVID-19, filler, mRNA vaccines, Inflammation, coronavirus

Volume 9 Issue 1 - 2022

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**Received:** June 28, 2022 | **Published:** July 4, 2022

**Abbreviations:** FDA, Food and Drug Administration; HIV, Human immunodeficiency virus; AIDS, Acquired immunodeficiency syndrome; mRNA, Messenger RNA; DHR, Delayed hypersensitivity reaction; HA, Hyaluronic acid; SARS-CoV-2, Severe acute respiratory syndrome coronavirus 2

## Case report

The COVID-19 is the most terrible challenge worldwide and it is caused by Sars-CoV-2.<sup>1</sup> In December 2019, the first case observed in Wuhan (China) and by fast-growing mutations, new variants of original coronavirus have emerged. The coronavirus 2019 had devastating effects and caused to more than 5.9 million deaths.<sup>2</sup> A significant aspect to highlight during this crisis is the speed of studies that have been developed to a better understanding of clinical manifestations, risk factors, transmission factors, and ways to deal with the diseases, as well as to the identification of the etiological agent, structure of the virus, its genome, its intracellular replication, and the immune response of the infected individuals.<sup>3</sup> All the studies have been done aim at finding the best strategy for diagnostic tests, clinical management, effective antiviral agents, and producing the vaccine.<sup>4</sup> During the pandemic, finding an effective vaccine against the COVID-19 was the main aim of the all the scientists around the world, hence different pharmaceutical companies tried to find the best strategy for the making a vaccine. For many years, scientists have worked to produce particular proteins against viral infections by using mRNA, but the technology of using mRNA as a vaccine for making certain proteins to cure patients who have a viral disease was not trustable until the current pandemic.<sup>5-7</sup>

There are three main type of COVID-19 vaccines in use around the world: mRNA vaccine (Pfizer BioNTech & Moderna) Adenovirus-based (AstraZeneca, Johnson & Johnson and Russian's Sputnik) and Inactivated SARS-CO2 virus like Sinovac Biotech.<sup>5,8</sup> Between them, the most important in terms of many scientists is mRNA vaccines,

because this type of vaccines have changed the Vaccine industry it was a revolution in the medical science.<sup>4,6</sup> The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) mRNA vaccine is made based on mRNA molecule, has had high success, and is a good document for persons who have no trust in mRNA vaccines.<sup>5,9-11</sup> The two efficient COVID-19 vaccines (Pfizer BioNTech and Moderna) were confirmed by the U.S. Food and Drug Administration (FDA) in December 2020 that was a turning point in action against the pandemic situation.<sup>12,13</sup> Pfizer vaccine with 95% efficiency against COVID-19 infection, prescribed on days 0 and 21 that have been effective for all age and racial groups. While the Moderna vaccine had 94% effectiveness against coronavirus, it was less efficient for aged 65 and over but the same in all racial groups and administrated on days 0 and 28. The effectiveness of vaccines was measured 7 days after and 14 days after the second dose, respectively in Pfizer and Moderna.<sup>14</sup> Some side effects were observed in most of the persons who were vaccinated by the Moderna vaccine, for instance, the pain at the injection site, tiredness, and temporary facial inflammation.<sup>15</sup>

The immunological reaction can be created in persons who possess dermal filler, during infection to viral diseases such as COVID-19. According to the FDA report, the interaction between dermal filler and immune response after and before vaccination can cause a swelling response in persons with dermal filler.<sup>16</sup> Around the cutaneous adverse events accrued to the immunization by COVID-19 vaccines, mRNA vaccines indicated a rare reaction to dermal filler.<sup>17</sup> In Table 1, you can see the information of the patients who had dermal filler and experienced immunological reaction due to vaccination with mRNA vaccines. Waves of new variants are currently being discovered; the omicron variant contains roughly 50 mutations that have never been seen together before. Extra protection against the virus will almost certainly necessitate new vaccine formulations, raising questions about whether booster doses may need to be given continuously, perhaps increasing the risk of delayed hypersensitivity reaction

(DHR) in hyaluronic acid (HA) patients.<sup>18</sup> Based on the assessment of the different reports, scientists believe that by using mRNA and its applications a new period for controlling infectious disease and

preventing its outbreak start. Nowadays, different pharmaceutical companies are trying to make mRNA vaccines against different diseases such as HIV/AIDS.

**Table 1** Information of the patients who had dermal filler and experienced immunological reaction with mRNA vaccines

Number	Type of vaccine	Filler injection	Age & Sex	Time of injection	Symptoms
1	COVID-19 POSITIVE	HA filler not specified region	50, F	Aug-20	Lips, cheeks burning, and tear troughs.
2	COVID-19 POSITIVE	Various parts of the face	32, F	Six years ago	Unexpected swelling
3	COVID-19 POSITIVE	non- surgical rhinoplasty with HA	22, F	Jul-20	Swelling, edema, induration, erythema, moderate, tenderness, around the radix
4	First dose Pfizer-BioNTech	Into the tear trough	39, F	Oct-20	Swelling, headache, myalgias, anorexia, and headache
5	First dose Pfizer-BioNTech	At the zygomatic arch, chin, jawline, and tear trough	61, F	Jun-20	Swelling
6	Second dose Pfizer-BioNTech	Aesthetic facial rejuvenation and contour enhancement of superficial wrinkles	43, F	2019	Swelling and tenderness
7	First dose Pfizer-BioNTech	The cheeks	76, F	2019	Periorbital edema and Inflammatory pan facial
8	First dose Pfizer-BioNTech	into her temples and cheeks	43, F	2019	Swelling in the periorbital area
9	second dose of the Moderna vaccine	On the lips, earlobes, nasolabial folds, and cheeks	31, F	Fall 2018	Swelling and Inflammation
10	The first dose of the Moderna vaccine	Bilateral tear troughs, Upper and lower portion of the lips	36, F	Nov-19	Swelling, perioral edema, inflammation, Fewer, malaise, lethargy, myalgias, Developing bilateral infraorbital
11		HA fillers	51, F		
12	First and second dose Pfizer-BioNTech	Into the lips.	32, F	2020	Swelling, edema, painful erythematous, mild pain
13	second dose of the Moderna vaccine	To the chin	26, F	2018	Chin enlargement, difficulties in speech, headache, and paresthesia
14	the second dose of the Sinopharm vaccine	In both hands	62, F	2019	Swelling, Nodules with stone-loke firmness in the back of both hands, adding pain
15	The first dose of AstraZeneca COVID-19 vaccine	In the lips, chin, malar, nasojugal furrow	35, F	2016, 2020	Edema and induration in her chin and lips
16	second dose Pfizer-BioNTech	Around the eye	47, F	Feb-21	Swelling and Edema
17	First dose Pfizer-BioNTech	In the superior and inferior lips	34, F	Dec-20	Edema and Pain in the area of HA administration
18	First dose Pfizer-BioNTech	In the chin and mandibular (jaw angle)	56, F	Sep-20	Pain and induration in the area of HA administration
19	second shot of AstraZeneca COVID-19 vaccine	In the nasolabial folds and lips	43, F	May-20	Edema, erythema, fever, the sensation of fatigue, redness on her lips

## Conclusion

In conclusion, the immune response of the body could be stimulated by viral diseases such as COVID-19 and flu especially in persons with dermal filler in the face that have experienced Inflammation in the same place that filler has been injected. Besides, this reaction of the body was specified as a natural infection that can be eliminated by the administration of antihistamines or steroids and did not have signs of dangerous diseases.

## Acknowledgments

None.

## Funding

None.

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