

# Impact of COVID19 on Maxillofacial Fractures in the Province of L'Aquila, Abruzzo, Italy. Review of 296 Patients Treated With Statistical Comparison of the Two-Year Pre-COVID19 and COVID19

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**Abstract:** The aim of this study was to understand the impact of the COVID-19 pandemic on the epidemiology of maxillofacial trauma in a regional trauma center in L'Aquila, Abruzzo, Italy, during the first wave of the pandemic and compared it to an equivalent period from 2015 to 2018. The authors have retrospectively analyzed personal data, site of trauma, etiology, and mechanism of injury. Statistical analysis has been carried out utilizing IBM SPSS Statistics software (IBM Corp., Armonk, NY) and significance was accepted for  $P$  values of  $<0.05$ . From January 2015 to December 2020, a total of 296 were analyzed. In Pre-COVID era, 195 patients were evaluated, 130 males (66.6%) and 65 females (33.4%). Zygomatic-malar complex fractures were the most common site of trauma in both genders (53%), followed by mandibular fractures (23%) and orbital ones (15%). The highest incidences of injuries were recorded between 15 and 34 years (21%) with the most common etiology attributed to road accidents traumas (49%). In COVID19 era, the authors recorded 101 traumas, 58 males (57.4%), 43 females (42.6%). Zygomatic-malar complex fractures were confirmed as the most common ones in both genders (41%). The most common etiology was related to casual domestic accident and assaults (37% and 30%, respectively). There was no statistically significant difference in terms of incidence in the comparison of Pre-COVID19 and COVID19 periods ( $P > 0.05$ ) as opposed to the etiology in which the road traffic accidents decreased in favor of domestic accidents and interpersonal assaults ( $P < 0.05$ ). Our scientific study represents the first epidemiologic study related to the impact of COVID-19 on maxillo-facial trauma in the Province of

L'Aquila, Abruzzo, Italy. A decrease in the number of Maxillofacial injuries related to road traffic accidents can be demonstrated as the benefit of lockdown, however, a significant increase in the number of physical assaults shows how isolation and restrictions have had a highly negative psychological impact on society.

**Key Words:** COVID-19, epidemiology, fractures, maxillofacial, surgery, trauma

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The outbreak of Covid-19 has changed our professional and social habits. Since December 2019, cases of SARS-COV-2 infection, subsequently called COVID-19, have dramatically increased. For the dramatic situation and the saturation of the health care system, on March 11, 2020, the Italian population was locked down, by government legislative decision, in order to slow down and stop the spread of the virus. The containment measures of COVID-19 included school and workplace closures, stay-at-home orders, travel and outdoor activities restrictions, with severe limitations on people movements. These last measures have not only affected Italy but most of the nations in the world. As a consequence of this management, an important decrease in maxillofacial trauma in terms of incidence has been widely reported and described in international literature.<sup>1–5</sup> Moreover, elective surgery, and with it also maxillofacial one, has been gradually reduced nationwide in order to keep services operational without putting both healthcare professionals and patients at risk despite the assistance activity relating to traumatology and oncology has been guaranteed.<sup>6–8</sup> The purpose of this retrospective study is to analyze the management of maxillofacial trauma during the COVID-19 pandemic period at “San Salvatore Hospital” of L'Aquila and compare results with two different two-year periods, respectively, 2015–2016; 2017–2018 focusing our attention on incidence, age, gender, and etiology. This is the first epidemiological study of maxillofacial trauma in the Province of L'Aquila which has 291.112 habitants.<sup>9</sup> It covers 5047.55 km<sup>2</sup> and it is an important regional trauma center also for the Province of Teramo which has 300.933 habitants.<sup>10</sup>

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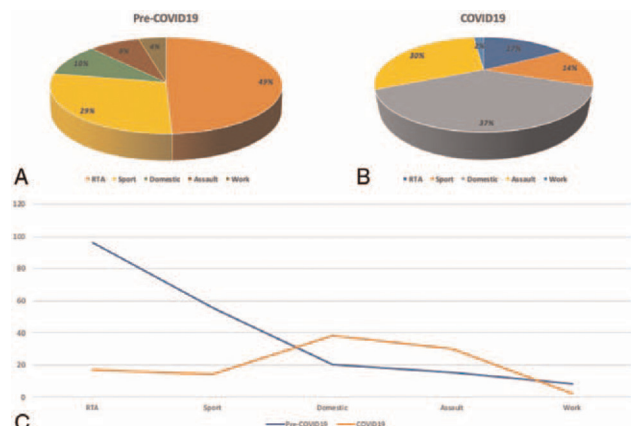
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## MATERIALS AND METHODS

All clinical records and departments database regarding patients with maxillofacial fractures who were managed at San Salvatore Hospital of L'Aquila were analyzed from 2015 to December 2020. Two groups were formed, pre-COVID19 era and COVID19 one. Pre-COVID19 era group was divided into two two-years period (2015–2016 and 2017–2018, respectively). Sex, age, etiology, and



**FIGURE 1.** Diagram showing the different etiologies and relative percentages in the Pre-COVID19 (A) and COVID19 (B) era. (C) Scatter diagram that better highlights the changes between the two periods.

site of trauma were evaluated. Fractures were classified in mandibular fractures, zygomatic-malar complex fractures (ZM), orbital fractures (OF), and panfacial ones. Causes were grouped into five main categories: road traffic accidents (RTA), assaults, casual domestic accidents, sport accidents, and work-related accidents. Patients were divided into eight age groups (0–14, 15–24, 25–34, 35–44, 45–54, 55–64, 65–74, and >75 years). Analysis was carried out using IBM SPSS Statistics software (IBM Corp., Armonk, NY). Statistical significance was accepted for *P* values <0.05 comparing.

**RESULTS**

From January 2015 to December 2020, 296 patients with a maxillofacial trauma were presented and were treated at San Salvatore Hospital of L’Aquila. Of them, 188 were male (63.5%) and 108 were female (36.5%) (Supplementary Digital Content, Table 1, <http://links.lww.com/SCS/D726>). Analyzing the Pre-COVID19 era, 195 patients were treated: 130 males (66.6%) and 65 females (33.4%). The fracture most frequently treated, regardless of genders, was the zygomatic-malar complex one (103; 53%) followed by mandibular fractures (45; 23%) and OFs (29; 14%). The age group in which the highest number of traumas was recorded was that of 15 to 34 years (45; 23%), RTAs were the most common cause of trauma (96; 49%) followed by sport injures (56; 29%) (Fig. 1A-C). Moving to COVID19 era, we recorded 101 traumas, 58 males (57.4%) and 43 females (42.6%) (Supplementary Digital Content, Table 1, <http://links.lww.com/SCS/D726>). Zygomatic-malar complex fractures were confirmed as most common ones in both genders (41; 41.5%) followed by mandibular ones (32; 32.3%) and OFs (18; 18.2%). COVID19 era was evidence of a change in the etiological frequencies, casual domestic accidents were the common one (38; 37.4%) followed by assaults (31; 30.4%), opposite to age groups where 15 to 34 age group were confirmed as the one with the highest incidence (25; 24.7%) (Fig. 1B-C). No statistically significant difference was highlighted comparing Pre-COVID19 and COVID19 eras in terms of incidence (*P* > 0.05). Otherwise, statistically significant difference was detected in etiology were in COVID19 era RTA highly decreased in favors of a steep rise of case related to casual domestic accidents and assaults (*P* < 0.05) (Fig. 2).

**DISCUSSION**

The epidemiological data of and craniofacial injuries can vary considerably by examining different injuries and their related

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
A	Fractures	3.062	.082	-.748	194	.455	-.06616	.11513	-.31323	.14091
	Equal variances assumed									
	Equal variances not assumed			-.742	180.401	.459	-.06616	.11619	-.31542	.14310
B	Fractures	.255	.614	.809	188	.420	.00333	.12774	-.14865	.15532
	Equal variances assumed									
	Equal variances not assumed			.812	187.619	.418	.00333	.12773	-.14785	.15451
C	Fractures	5.179	.024	-.148	204	.883	.01717	.11617	-.21189	.14623
	Equal variances assumed									
	Equal variances not assumed			.147	193.874	.883	.01717	.11676	-.21311	.14745

**FIGURE 2.** Independent samples *t* test for statistical analysis of the different incidence in the various two-year periods (2015–2020). (A) Comparison between the two two-year Pre-COVID19 years; (B) comparison between the first two years of Pre-COVID19 and the COVID19 period; (C) comparison of the second pre-COVID19 two-year period and the COVID19 period. No statistically significant difference was found in any of the three analyzes performed (*P* > 0.05; 95% CI including 0). IBM SPSS Statistics software (IBM Corp., Armonk, NY).

behaviors. The latter can occur in isolation, associated with locoregional injuries or other bodily traumas in what is defined as polytrauma.<sup>11</sup> This makes us understand how variable the treatment of a maxillofacial trauma can be, from a closed reduction of a fracture of the nasal bones up to the treatment of facial fracas with complex reconstruction interventions, or more complex eventual microsurgical facial paralysis reanimations.<sup>12–17</sup> Understanding the different causes that most frequently determine facial trauma is of fundamental importance if we consider that traumas, and among these also maxillofacial ones, represent a primary cause of health care costs and productive morbidity for the entire community. The latter is in direct proportionality between the severity of the trauma and the duration of inactivity.<sup>18</sup> The emergence of SARS-CoV-2 began to spread globally in late December 2019 causing a respiratory disease pandemic.<sup>19</sup> The World Health Organization announced, for the first time, an international emergency in January 2020 and then, on February 11, 2020, gave the official name to the new pandemic of “COVID-19.”<sup>20</sup> The latter has changed our habits and lifestyle. Many activities have been forced to close and many people have lost their jobs, while other people worked from home. Face-to-face teaching in schools was suspended, as all outdoor/indoor and physical activities. The national health care system has been saturated by the emergency. The entire national elective surgery was gradually suspended, leaving space only for treatments relating to oncological and trauma cases. The aim of this study was to understand the impact of the COVID-19 era on the epidemiology of maxillofacial trauma in a regional trauma center in L’Aquila, Abruzzo, Italy. The main limitation of this study was a retrospective, single-institution analysis. However, it represents the first study to evaluate the epidemiological effects of the COVID-19 in relation to maxillofacial trauma in the provincial territory of L’Aquila, Abruzzo, Italy. The authors hypothesized that the number of maxillofacial lesions decreases during the COVID19 era compared to the previous years, but this hypothesis was refuted by a nonstatistically significant difference probably related to the fact that San Salvatore Hospital represents the only trauma hub in the province of L’Aquila.<sup>21</sup> Zygomatic-malar complex fractures were the most anatomical site of injures in both Pre and COVID19 eras (Supplementary Digital Content Table 1, <http://links.lww.com/SCS/D726>). In accordance with what is already present in the international literature, where age range from 18 to 36 years is most often reported as having the highest rate of maxillofacial fractures,<sup>22,23</sup> also in our case series, the ages group 15 to 34 recorded the highest incidence. RTA and sports-related traumas,

which were the most common causes in the pre-COVID19 era, decreased and were responsible only for 17% and 14%, respectively, of facial fractures during the lockdown period because of a decline in mobility and activity (Fig. 1). As opposite to the latter, the percentage of traumas due to casual domestic accidents and assaults increased, resulting the major causes of accesses in our trauma center. This was probably the most interesting data recorded in our series and, not by chance, the percentage of women treated in our center has considerably increased. Indeed, according with ISTAT analysis about Covid-19 lockdown data, Italy was reported an increase of +79.5% of violence episodes, compared with the same period in the pre-COVID19 era.<sup>24</sup> In addition, economic stresses, loss of jobs for many people, and the uncertainty of the future are also potential contributing factors. The aim of this study was to understand the impact of the COVID-19 pandemic on the epidemiology of maxillofacial trauma in a regional trauma center in L'Aquila, Abruzzo, Italy. These studies are important for determining the needs of the population and improving their quality of life and health; the authors think they have highlighted important data that can help improve support and prevention measures within our provincial and nonprovincial territory.

## CONCLUSIONS

This is the first epidemiological study of the impact of COVID-19 on maxillofacial trauma in the province of L'Aquila. The data showed no significant changes in the incidence of maxillofacial trauma that occurs at the San Salvatore since the declaration of the COVID-19 emergency. Although elective surgery was suspended nationwide, traumatology care was guaranteed, any surgery was postponed, and the management of these injuries was no different from normal practice. The decrease in the number of maxillofacial injuries related to traffic accidents can be demonstrated as a benefit of the lockdown, however, the increase in the number of physical assaults also shows how isolation and restrictions have had a highly negative psychological impact on society. The authors hope that these data can help to expand support for people who are victims of domestic violence not only during the pandemic but also in everyday life.

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