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## Journal Pre-proof

“The Impact of COVID-19 on Plastic and Reconstructive Surgery in China: A Single-Center Retrospective Study”

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**“The Impact of COVID-19 on Plastic and Reconstructive Surgery in China: A Single-Center Retrospective Study”**

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Journal Pre-proof

## **The Impact of COVID-19 on Plastic and Reconstructive Surgery in China: A Single-Center Retrospective Study**

### **ABSTRACT**

**Background:** This study aimed to investigate the volume of plastic surgery operations in a large public hospital and figure out the changes of the related factors associated with COVID-19 and identify the potential problems.

**Methods:** We created a survey and collected clinical data from 1 January 2018 to 31 December 2020. Information on procedure time, patient gender, patient age, and procedure type were collected from the database. The data were analyzed using IBM SPSS Statistics for Windows, version 25.0.

**Results:** A total of 10827 patients were admitted to our department. The total number of patients decreased by 21.53% in 2020 (3057 cases) compared to the same period in 2019 (3896 cases). The total number of aesthetic procedures was 34.17% lower in 2020 than in 2019. However, restorative procedures in 2020 (2013 cases) only dropped by 12.86% compared to 2019 (2310 cases). The percentages of women among patients who underwent aesthetic procedures were 91.75%, 92.18%, and 90.71% in 2018, 2019, and 2020, respectively. Most of the patients in these three years were aged 20–29 years.

**Conclusions:** The plastic surgery industry is experiencing the effects of the unprecedented COVID-19 pandemic worldwide. COVID-19 was quickly brought under control and the plastic surgery industry developed rapidly in China due to the active, timely, and accurate implementation of epidemic prevention strategies.

**KEY WORDS:** Coronavirus disease 2019; Plastic; Reconstructive; Surgery

## INTRODUCTION

The pandemic of coronavirus 2019 (COVID-19), a severe contagious disease<sup>1</sup> that has rapidly spread worldwide and infected more than 246 million people and led to more than 5 million deaths, is likely to continue to impose enormous burdens. Among these are severe disruptions of societies and economies. Large-scale clinical data suggest that social and economic pressure<sup>2</sup>, public health system<sup>3</sup>, physical and psychological complications<sup>4</sup> have been explicitly described. Plastic and reconstructive surgery is a separate branch on the tree of general surgery<sup>5</sup>. As Staige described, plastic surgery focuses on the repair of defects and malformations, improvement of appearance, and restoration of function<sup>6</sup>. Based on the particularity of this subject, public demand for plastic surgery, especially cosmetic surgery, has been in serious decline during the pandemic<sup>7</sup>.

Most studies have focused on prevention strategies for plastic surgery during the pandemic<sup>8</sup>. Clinical studies on the impact of the COVID-19 pandemic on plastic surgery are urgently required. However, few studies have combined online surveys to indirectly assess the impact of COVID-19 on plastic surgery<sup>9</sup>. Thus, the severity and characteristics of the impact of the pandemic on plastic surgery in public hospitals in China remain unknown.

Furthermore, no studies have yet reported the impact of COVID-19 on plastic surgery in China using quantitative indicators to reveal trends in disciplines amid the pandemic. We investigated the volume of plastic surgery operations in a large public hospital and determined the changes in factors associated with COVID-19 during the last three years to identify potential problems.

#### **PATIENTS & METHODS:**

To better assess the impact of the COVID-19 pandemic on plastic surgery and propose ways to address existing challenges, we created a survey based on the medical record system of the Department of Plastic and Aesthetic (Burn) Surgery. Data analysis was performed from 1 January 2018 to 31 December 2020. The study protocol was approved by the institutional review board of the Second Xiangya Hospital of Central South University.

The collected clinical data included four base items: procedure time, patient gender, patient age, and procedure type. The types of procedures included burns, acute wound repair, chronic wound repair, benign surface masses, malignant surface tumor, congenital malformations, scar excision, rhinoplasty, blepharoplasty, mammoplasty, botulinum toxin injection, vaginal rejuvenation, and axillary osmidrosis surgery (Table 1). Patient names, detailed addresses, record numbers, and any other individually identifying information were not collected or entered into the database.

The data were analyzed using IBM SPSS Statistics for Windows, version 25.0. Measurement data with a normal distribution and homogeneity of variance were

expressed as means  $\pm$  standard deviation and compared using one-way analysis of variance (ANOVA). Measurement data that were not normally distributed or without uniform variance were expressed as M(QR) and compared using Kruskal–Wallis H tests. For enumeration data, Pearson chi-square tests were performed when all theoretical numbers (T) were  $\geq 5$  and the total sample size n were  $\geq 40$ . Statistical significance was set at  $p < 0.05$ .

## **RESULTS:**

### **The total volume of procedures performed in the plastic surgery was significantly lower than that before the pandemic**

A total of 10827 patients were admitted to the Department of Plastic and Aesthetic (Burn) Surgery for treatment between 1 January 2018 and 31 December 2020, including 3874 patients in 2018, 3896 in 2019, and 3057 cases in 2020, showing a decrease of 21.53% compared to the same period in 2019. Because the monthly average number of patients in this study did not show a normal distribution, Kruskal–Wallis H tests were performed to identify differences between the monthly average numbers of patients for the three years. The results showed no significant differences between the monthly average number of patients in 2018 and 2019, but a significantly different number of patients in 2020 compared to both 2018 ( $p=0.046$ ) and 2019 ( $p=0.016$ ). The lowest number of patients



was admitted to the clinic in February 2020 (Fig. 1). The volume of patients admitted to our department decreased significantly from an average of 325 new admissions per month in 2019 to 19 admissions in February 2020, corresponding to the COVID-19 outbreak in China. Of the 19 admissions, 16 (84.21%) patients were admitted from the emergency department for head and facial trauma. As shown in Fig. 1, July 2018, January 2019, and July 2019 showed small peak numbers of patients admitted to the Department of Plastic and Aesthetic (Burn) Surgery.

**The total volume of aesthetic procedures performed in the plastic surgery was significantly lower than that before the pandemic**

The items were divided into restorative and aesthetic procedures. Restorative procedures included burns, acute wound repair, chronic wound repair, benign surface masses, malignant surface tumor, congenital malformations, and scar excision, while aesthetic procedures include rhinoplasty, blepharoplasty, mammoplasty, botulinum toxin injections, vaginal rejuvenation, and axillary osmidrosis surgery (Fig. 2). Chronic wound repair included chronic diabetic ulcers, pressure ulcers, surgical wound infections, etc. Benign surface masses included melanocytic nevus, lipoma, sebaceous cyst, etc. Malignant surface tumors included skin squamous cell carcinoma, carcinoma basocellulare, malignant melanoma, etc. Congenital malformations included cleft lip, facial cleft, microtia, polydactyly, etc. As shown in Table 2, the numbers of total aesthetic procedures performed before and after the outbreak differed significantly ( $p < 0.001$ ), while

the numbers of total restorative procedures did not. The reconstruction categories of chronic wound repair, malignant tumors, and congenital abnormalities showed no significant differences before and after the epidemic, but the great majority of cosmetic procedures, with the exception of rhinoplasty, demonstrated considerable declines. The Pearson chi-square test results revealed statistically significant differences between the constituent ratios in 2018, 2019, and 2020 ( $\chi^2=28.722$ ,  $df=2$ ,  $p < 0.001$ ). Post hoc analysis was performed using the z-test to compare column proportions, and p-values were adjusted using the Bonferroni method. The results indicated no statistically significant difference between the constituent ratios of the procedures in 2018 and 2019, but a significantly different constituent ratio in 2020 compared to those in 2018 and 2019. A total of 1527 and 1586 aesthetic procedures were performed in 2018 and 2019, respectively, compared to only 1044 procedures in 2020. The total number of aesthetic procedures in the pandemic period was 34.17% lower in 2020 than in 2019. However, restorative procedures in 2020 (2013 cases) only dropped by 12.86% compared to the same period in 2019 (2310 cases).

#### **Female patients were the predominant patients in our department before and during the epidemic**

In 2020, after the outbreak of COVID-19, 1799 women were admitted to the Department of Plastic and Aesthetic (Burn) Surgery, representing 58.84% of all patients. However, the percentages of female patients were 70.34% and 70.69% in 2018 and 2019, respectively (Fig. 3). The Pearson chi-square test results

revealed statistically significant differences among the gender constituent ratios in 2018, 2019, and 2020 (chi-squared=135.616, df=2,  $p < 0.001$ ). Post hoc analysis was then performed using z-tests to compare column proportions and adjustment of p-values using the Bonferroni method. The results showed no statistically significant difference between the gender constituent ratios in 2018 and 2019, while the gender constituent ratio in 2020 differed significantly from those in 2018 and 2019. As shown in Table 3, female patients mainly underwent aesthetic and restorative procedures before and during the epidemic, respectively. In contrast, male patients underwent mainly restorative procedures during the entire period. Further analysis showed that 91.75%, 92.18%, and 90.71% of patients who underwent aesthetic procedures at our department in 2018, 2019, and 2020, respectively, were female. In contrast, men comprised 10% of patients who underwent aesthetic procedures for all three years. The female: male gender ratio for aesthetic procedures was as high as 9 to 1. However, the percentages of women who underwent restorative procedures in 2018, 2019, and 2020 were 56.41%, 55.93%, and 42.32%, respectively.

#### **Young patients aged 20–29 years were the predominant patients in our department before and during the epidemic**

The average age of the patients in 2018, 2019, and 2020 were 31.10, 32.36, and 34.55 years, respectively. For further analysis, patients with restorative or aesthetic needs were divided into six age groups: <20, 20–29, 30–39, 40–49, 50–59, and  $\geq 60$  years of age (Fig. 4). Kruskal–Wallis H tests were performed

because the numbers of patients in each age group were not normally distributed. We observed differences in the distributions of age groups between any two of the three years. As shown in Table 4, patients of all age groups predominantly underwent restorative procedures before and after the epidemic. The survey data in 2018 showed that the largest group of patients admitted to the Department of Plastic and Aesthetic (Burn) Surgery (32.99% of patients) were young adults aged 20–29 years old age group. In 2019, patients aged 20–29 years also comprised the largest group (36.68%), followed by those aged 30–39 years (22.02%). Similarly, in 2020, the largest age group was those aged 20–29 years (31.79%). The percentage for those aged 20–39 years were 56.63%, 58.70%, and 55.94% in 2018, 2019, and 2020, respectively.

#### **DISCUSSION:**

This direct study analyzed clinical data to assess the consequences of the COVID-19 pandemic on plastic surgery. We analyzed the severity and evolution across multiple dimensions in 10827 patients in the three years before and after the outbreak. As several studies have described<sup>10,11</sup>, the pandemic has restricted the development of the plastic surgery industry due to factors such as changes in the allocation of health resources and industry policy<sup>12</sup>, as well as financial and psychosocial factors<sup>7,13</sup>. One of the psychological factors that stands out is that the acceptance of operations during the pandemic period can be influenced by the fear of people concerning the risk of getting infected. The total volume of procedures performed in the plastic surgery industry was significantly lower than

that before the pandemic. Figure 1 shows that the number of novel coronavirus infections per month was inversely proportional to the number of restorative and aesthetic procedures per month, which peaked in February. This was helped by the Chinese government's swift action to develop the Chinese health emergency system to contain the outbreak, such as strictly controlling the epidemic area, stepping up publicity, and dispatching medical teams from all over the country to support Hubei Province.

We found that young patients aged 20–29 years were the predominant patients in our department before the pandemic, a finding consistent with those of previous studies<sup>14</sup>. Patients aged 20–29 years were also the main group during the pandemic in our study. The underlying causes of this phenomenon during COVID-19 are likely to be multifactorial<sup>15</sup>. Restorative procedures accounted for 65.8% of patients during the pandemic, most of whom were aged 20–29 years. While young people have a comprehensive understanding of basic medical care<sup>16</sup> and epidemic prevention and control<sup>17</sup> and can seek medical treatment<sup>18</sup> in the case of physical problems, they also have high requirements regarding their aesthetic appearance<sup>19</sup>. In February 2020, only 19 patients were admitted to our department, most of whom underwent restorative procedures, including burns, acute wound repair, malignant surface tumor. However, assessment of the monthly changes in surgery volume showed a steady increase in the number of patients in our department since April 2020, even reaching pre-epidemic levels in some months. Compared to other countries, China drastically decreased its rate of new cases in the early stages of the COVID-19 outbreak as government-mandated quarantines took effect<sup>20</sup>. Table 1 shows higher proportions of male patients, patients undergoing wound repair, and patients >50 years of age during

the pandemic. These data showed the significant negative impact of COVID-19 on cosmetic surgery. However, because restorative procedures are considered basic medicine, public hospitals assume greater responsibility to solve these problems, which may explain why the epidemic has had a less negative impact on public hospitals compared to private hospitals.

The centers for Disease Control and Prevention (CDC) and American College of Surgeons (ACS) published an updated classification of patients in the Department of Plastic and Reconstructive Surgery during this period, which mainly included low acuity healthy patients, low acuity unhealthy patients, intermediate acuity healthy patients, intermediate acuity unhealthy patients, high acuity healthy patients, and high acuity unhealthy patients<sup>21</sup>. We observed significant declines in aesthetic procedures since the start of the COVID-19 pandemic ( $p<0.001$ ), especially in blepharoplasty ( $p<0.001$ ), vaginal rejuvenation ( $p<0.001$ ), axillary osmidrosis surgery ( $p<0.001$ ), and mammoplasty ( $p=0.043$ ) (Table 2). This is consistent with data from other countries<sup>22</sup>. The patients' cognitive level was improved and they were concerned about infection in medical facilities<sup>7</sup>. The epidemic has led to a decline in the national economy and a marked increase in bankruptcy and unemployment rates<sup>23</sup>. Public hospitals tended to cut back on aesthetic procedures and focus resources on fighting the epidemic<sup>24</sup>. However, restorative procedures were stable during the COVID-19 pandemic, especially cosmetic sutures. In addition, many patients in our department showed acuity. As advocated by the American Society of Plastic Surgeons, postponing all elective operations and minimizing operating room and hospital times were important<sup>25</sup>.

Most patients in the present study were female. However, compared to the gender ratios in 2018 and 2019, the number of female patients decreased significantly in 2020. The top three procedures for female patients before COVID-19 were generally aesthetic procedures, including blepharoplasty (505), botulinum toxin injection (413), excision of benign surface masses (395), while restorative procedures accounted for the largest part during COVID-19, including excision of benign/malignant body surface masses (335), acute/chronic wound repair (304), and botulinum toxin injection (297) (Table 3). Women constitute the major proportion of aesthetic procedures, creating a gender imbalance in private clinics<sup>25</sup>. Patients hospitalized with malformation reconstruction problems undergoing reconstructive surgery in public hospitals show no significant difference in the numbers of male and female patients. The decline in females among plastic surgery patients was associated with the severe impact of the pandemic on cosmetic surgery. The reconstructive procedure, as a category of non-elective surgery, has supported the departments of plastic reconstructive surgery in public hospitals during COVID-19. There are several interesting points that we can see in our data. Firstly, there was no significant difference in the number of chronic wound repairs before and after the epidemic, especially in flaps after cancer ablation. A large proportion of patients with chronic wounds are referred from other medical specialties. The female group showed a downward trend, and the male patients increased slightly compared with those before the epidemic. Secondly, the congenital malformation patients who came to the hospital were more common in females. And the number of patients with congenital anomalies decreased slightly during the epidemic period, but the sample size is relatively insufficient, which may need to be supported by large sample data.

The Chinese government and its people have made tremendous efforts to overcome the challenges posed by the COVID-19 pandemic. With the emergence of COVID-19 in December 2019, the Chinese government took decisive measures to establish a rapid response mechanism for disease prevention and control, as well as a national, provincial, and regional emergency response mechanism for public health emergencies<sup>26</sup> to slow the viral spread by shutting down cities on 23 January 2020. At the same time, all patients with COVID-19 were offered free medical care. Subsequently, the government has developed different epidemic prevention policies<sup>27</sup> for different industries and regions to better prevent outbreaks. Furthermore, national education on infectious diseases was implemented in China, which targeted the real-time dissemination of epidemic-related news through social networks such as WeChat and Weibo<sup>28</sup>. In our hospital, all health care workers are required to perform daily self-health monitoring and all people entering and leaving the hospital must undergo temperature monitoring and health passport checks. Meanwhile, fast and accurate self-testing tools are evolving and can be used for the rapid and comprehensive inspection of people around epidemic areas<sup>29</sup>. The principle of building a universal, comprehensive health system has been implemented in China<sup>3</sup>. Sufficient, equitable access and safe vaccines have been made widely available to the population and the acceptance rates of the COVID-19 vaccine among Chinese people are as high as 90%<sup>17,30</sup>. China has also implemented a strong strategy for comprehensive health prevention, such as maintaining regular physical activity and strengthening mental and psychological treatments. In other words, only a concerted scientific response can bring the epidemic to a quicker end.

This study has several limitations. First, the sample size may have been insufficient for more significant results, although the study hospital is typical and



representative of public hospitals in China. Second, a larger test power yielded impractical sample sizes for a single-center study. Thus, a multicenter study with larger sample sizes is needed. Third, while private hospitals account for a large proportion of the cosmetics industry, this study did not enroll patients in private hospitals whose main purpose for treatment was improving their appearance. Although there are many private plastic surgery hospitals in China, their scale is not large; thus, it is not possible to find representative institutions. Finally, the study was limited to the first three years of the outbreak however, the global epidemic is still not fully understood. Further efforts are needed to study the future trends in the plastic surgery industry to better address problems due to the epidemic.

#### **CONCLUSIONS:**

The COVID-19 pandemic poses an enormous threat to the plastic surgery industry. Compared to restorative procedures, COVID-19 has had a greater impact on aesthetic procedures in China. Women constitute the majority of people undergoing aesthetic procedures. However, while equal numbers of men and women underwent restorative procedures during the COVID-19 pandemic. Patients aged 20–29 years comprised the primary group in undergoing plastic surgery, even during the pandemic. Thanks to the active, timely, and accurate implementation of epidemic prevention strategies, COVID-19 was quickly brought under control and the plastic surgery industry developed rapidly in China. Our findings provide a reference for the evaluation of the severity of the effects of COVID-19 on

the plastic surgery industry.

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Ethical Approval: Not Required

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Table 1. Demographic and clinical features before and during the COVID-19 outbreak.

	2018 No. (%)	2019 No. (%)	2020 No. (%)	Percent Change 2019vs2018 (%)	Percent Change 2020vs2018 (%)
<b>total number</b>	3874 (100)	3896 (100)	3057 (100)	0.56	-21.08
<b>month</b>					
January	323 (8.3)	374 (9.6)	287 (9.4)	15.79	-11.15
February	266 (6.9)	294 (7.5)	19 (0.6)	10.53	-92.86
March	309 (8.0)	323 (8.3)	150 (4.9)	4.53	-51.46
April	284 (7.3)	345 (8.9)	252 (8.2)	21.48	-11.27
May	306 (7.9)	331 (8.5)	247 (8.1)	8.17	-19.28
June	313 (8.1)	341 (8.8)	277 (9.1)	8.95	-11.50
July	433 (11.2)	396 (10.2)	330 (10.8)	-8.55	-23.79
August	369 (9.5)	316 (8.1)	326 (10.7)	-14.36	-11.65
September	321 (8.3)	286 (7.3)	279 (9.1)	-10.90	-13.08

October	326 (8.4)	287 (7.4)	297 (9.7)	-11.96	-8.90
November	311 (8.0)	300 (7.7)	311 (10.2)	-3.54	0.00
December	313 (8.1)	303 (7.8)	282 (9.2)	-3.19	-9.90
<b>procedure type</b>					
blepharoplasty	476 (12.3)	574 (14.7)	345 (11.3)	20.59	-27.52
botulinum toxin injection	450 (11.6)	432 (11.1)	328 (10.7)	-4.00	-27.11
rhinoplasty	279 (7.2)	275 (7.1)	225 (7.4)	-1.43	-19.35
mammoplasty	125 (3.2)	102 (2.6)	66 (2.2)	-18.40	-47.20
axillary osmidrosis surgery	145 (3.7)	125 (3.2)	45 (1.5)	-13.79	-68.97
vaginal rejuvenation	52 (1.3)	78 (2.0)	35 (1.1)	50.00	-32.69
<b>total aesthetic procedure</b>	1527 (39.3)	1586 (40.7)	1044 (34.2)	3.86	-31.63
acute wound repair	590 (15.2)	683 (17.6)	612 (20.0)	15.76	3.73
chronic wound repair	217 (5.6)	211 (5.4)	208 (6.8)	-2.76	-4.15
benign surface masses	745 (19.3)	752 (19.3)	698 (22.9)	0.94	-6.31
malignant surface tumor	90 (2.3)	92 (2.4)	99 (3.2)	2.22	10.00
scar excision	347 (9.0)	291 (7.5)	215 (7.0)	-16.14	-38.04
burns	251 (6.5)	165 (4.2)	78 (2.6)	-34.26	-68.92
congenital malformations	107 (2.8)	116 (2.9)	103 (3.3)	8.41	-3.74
<b>total restorative procedure</b>	2347 (60.7)	2310 (59.3)	2013 (65.8)	-1.58	-14.23

<b>gender</b>					
female	2725 (70.3)	2754 (70.7)	1799 (58.8)	1.06	-33.98
male	1149 (29.7)	1142 (29.3)	1258 (41.2)	-0.61	9.49
<b>age group (years)</b>					
<20	719 (18.6)	569 (14.6)	381 (12.5)	-20.86	-47.01
20-29	1278 (33.0)	1429 (36.7)	972 (31.8)	11.82	-23.94
30-39	916 (23.6)	858 (22.0)	738 (24.1)	-6.33	-19.43
40-49	470 (12.1)	493 (12.7)	416 (13.6)	4.89	-11.49
50-59	259 (6.7)	285 (7.3)	291 (9.5)	10.04	12.36
≥60	232 (6.0)	262 (6.7)	259 (8.5)	12.93	11.64

Data are shown as n (%). P value were calculated by Kruskal-Wallis H test, or Pearson chi-test, as appropriate.



Table 2. Comparison of the monthly average volume of different procedures in 2020 (pandemic) and 2019 (pre-pandemic)

Procedure type	Pre-pandemic Mean±SD	Pandemic Mean±SD	P-value
blepharoplasty	47.83±8.07	28.75±12.82	<0.001
botulinum toxin injection	36.00±4.81	27.33±14.32	0.067
rhinoplasty	22.92±5.90	18.75±10.13	0.231
mammoplasty	8.50±3.39	5.50±3.45	0.043
axillary osmidrosis surgery	10.42±2.11	3.75±2.45	<0.001
vaginal rejuvenation	6.50±1.83	2.92±2.23	<0.001
<b>total aesthetic procedures</b>	<b>132.17±11.95</b>	<b>87.00±31.25</b>	<b>&lt;0.001</b>
acute wound repair	56.92±8.14	51.00±22.12	0.399
chronic wound repair	17.58±9.58	17.33±9.10	0.948
benign surface masses	62.67±13.30	58.17±23.85	0.574
malignant surface tumor	7.67±2.71	8.25±4.02	0.681
scar excision	24.25±7.42	17.92±9.55	0.084
burns	13.75±7.76	6.50±3.06	0.009
congenital malformations	9.67±6.49	8.58±6.24	0.681
<b>total restorative procedures</b>	<b>192.50±27.58</b>	<b>167.75±63.7</b>	<b>0.231</b>

Table 3. Procedure options for different genders in 2020 (pandemic) and 2019 (pre-pandemic)

Gender	Pre-pandemic		Pandemic	
	Sorting of the procedure	Number	Sorting of the procedure	Number
<b>male</b>	<b>acute wound repair</b>	<b>453</b>	<b>acute wound repair</b>	<b>421</b>
	<b>benign surface masses</b>	<b>357</b>	<b>benign surface masses</b>	<b>420</b>
	<b>scar excision</b>	<b>81</b>	<b>scar excision</b>	<b>107</b>
	blepharoplasty	69	chronic wound repair	95
	burns	61	blepharoplasty	58
	chronic wound repair	35	malignant surface tumor	42
	rhinoplasty	28	botulinum toxin injection	31
	axillary osmidrosis surgery	23	burns	29
	botulinum toxin injection	19	rhinoplasty	28
	congenital malformations	11	congenital malformations	15
	malignant surface tumor	4	axillary osmidrosis surgery	6
	mammoplasty	1	mammoplasty	6
	vaginal rejuvenation	0	vaginal rejuvenation	0
	<b>blepharoplasty</b>	<b>505</b>	<b>botulinum toxin injection</b>	<b>297</b>
	<b>botulinum toxin injection</b>	<b>413</b>	<b>blepharoplasty</b>	<b>287</b>
<b>benign surface masses</b>	<b>395</b>	<b>benign surface masses</b>	<b>278</b>	
rhinoplasty	247	rhinoplasty	197	
acute wound repair	230	acute wound repair	191	
scar excision	210	chronic wound repair	113	
<b>female</b> chronic wound repair	176	scar excision	108	
congenital malformations	105	congenital malformations	88	
burns	104	mammoplasty	60	
axillary osmidrosis surgery	102	malignant surface tumor	57	
mammoplasty	101	burns	49	
malignant surface tumor	88	axillary osmidrosis surgery	39	
vaginal rejuvenation	78	vaginal rejuvenation	35	

Table 4. Procedure options for different age groups in 2020 (pandemic) and 2019 (pre-pandemic)

Age group (years)	Pre-pandemic Sorting of procedure	Number	Pandemic Sorting of procedure	Number
<20	benign surface masses	133	benign surface masses	90
	scar excision	120	scar excision	80
	burns	94	congenital malformations	52
20-29	acute wound repair	291	acute wound repair	182
	blepharoplasty	300	botulinum toxin injection	180
	benign surface masses	208	benign surface masses	168
30-39	acute wound repair	167	acute wound repair	181
	blepharoplasty	148	benign surface masses	158
	botulinum toxin injection	146	botulinum toxin injection	99
40-49	acute wound repair	116	acute wound repair	124
	benign surface masses	107	benign surface masses	119
	botulinum toxin injection	71	botulinum toxin injection	37
50-59	benign surface masses	100	benign surface masses	88
	acute wound repair	43	acute wound repair	63
	chronic wound repair	36	chronic wound repair	43
≥60	benign surface masses	83	benign surface masses	75
	malignant surface tumor	55	malignant surface tumor	59
	chronic wound repair	42	acute wound repair	39

**Figure Legends:**

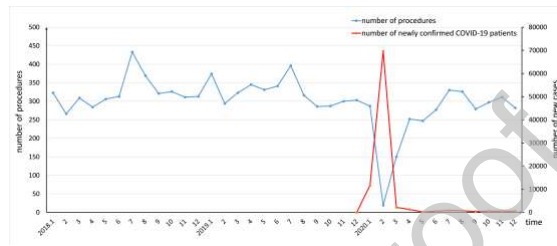
Fig.1. The number of procedures and newly confirmed COVID-19 patients per month during the three years.

Fig.2. The number of patients in different procedures during the three years.

Fig.3. The number of patients in different gender during the three years.

Fig.4. The number of patients in different age group during the three years.

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