

# Comparison of opinions on invasive and noninvasive esthetic procedures between Croatian and French population

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**UNIVERSITY OF ZAGREB**  
**SCHOOL OF MEDICINE**

**Caroline Vaslon**

**Comparison of opinions on invasive and  
noninvasive esthetic procedures between  
Croatian and French population**

**GRADUATE THESIS**



**Zagreb, 2018.**

This graduate thesis was made at the Department of Plastic Surgery at the University Hospital Center Zagreb, KBC Rebro, under the supervision of Prof. D. Mijatović M.D Ph.D. It was submitted for evaluation the academic year of 2017/18.

# List of Abbreviations

ASPS : American Society of Plastic Surgeons.

M : Male

Ž or F : Female

Srednja škola ili manje / Lycée ou moins : High school or less

VŠS / Quelques(s) années(s) d'université : Some college

VŠS ili više / Diplôme universitaire et plus : College graduate and beyond

Da / Oui : Yes

Ne / Non : No

Manje od / Moins de : Less than

Više od / Plus de : more than

Kirurški / Chirurgical : Surgical

Ne kirurški / Non-chirurgical : Non-surgical

Oboje / les 2 : Both

Zaposlen(a) / Employé(e) : Employed

Samo-zaposlen(a) / Profession libérale : Self-employed

U mirovini / A la retraite : Retired

Student (ica) / Etudiant(e) : Student

Domaćica / Femme ou homme au foyer : House-wife or house husband

Oženjen(a) / Marié(e) : Married

Udovac(ica) / Veuf/veuve : Widowed

Samac / Seul(e) : Single

Rastavljen/rastavljena / Divorcé(e) : Divorced

U vezi / En couple : In a Relationship

Liposukcija : Liposuction

Abdominoplastika : Abdominoplasty

Transplantacija kose : Hair transplant

Korekcija nosa : Rhinoplasty

Blefaroplastika : Blepharoplasty

Korekcija ušiju : Ear correction

Operacija grudi : Breast surgery

Pomlađivanje kože : Skin rejuvenation

Hijaluronski fileri : Hyaluronic acid filler

Ostalo : Others

Filling à l'acide hyaluronique : Hyaluronic acid filling

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# 1. Summary

**Title: Comparison of opinions on invasive and noninvasive esthetic procedures between Croatian and French population.**

**Author: Caroline Vaslon**

In modern society, the obsession with a young and beautiful appearance has become ordinary and has resulted in an upswing in cosmetic procedures trying to reverse the aging process[1].

During these last few years, the evolution on this topic has expanded and the requirement of the patient for interventions increased exponentially. Different techniques were developed in order to meet the growing demand.

The purpose of this cross-sectional study was to explore, in the general population, the opinions on invasive and non-invasive esthetic procedures, how many people already had an esthetic procedure done, how many wanted to have one and which procedure was the most popular. We compared these results between a sample of Croatian and French population. The data of 360 Croatians and 360 French, over the age of 18 years, without any pre-selection were included in the study. The study was done over a 4 month period during the year 2018.

Results show a significant trend in invasive surgical procedures in the French and Croatian population with preponderance for rhinoplasty. It was found that in the Croatian population, the most common esthetic procedures in the population included rhinoplasty (33,3%), breast surgery (17,8%) and hyaluronic acid injections (17,8%). In the French population, the majority had rhinoplasty (45,6%) and Botox injections (24,4%). However, we can conclude that most of the procedures desired by both populations are non-invasive. Croatians mostly want hyaluronic acid injections (30,6%) and French population mostly will prefer Hyaluronic acid injections (46,2%) and Botox injections (35,6%). Nevertheless, the rhinoplasty (26,4%) stay a preponderant invasive surgery wanted by the Croatian population.

We can conclude that the French population is more prone to use non-invasive esthetic procedures compared to the Croatian population even if the Croatian population start going the same way, they still have a strong desire for rhinoplasty.

This study is still conducted to be able to recruit a bigger sample to be more significant.

**Keywords:** ■ Aging ■ cosmetic procedures ■ Cross-sectional study ■ Croatian population  
■ French population ■ Invasive procedures ■ Non-invasive procedures ■ Rhinoplasty  
■ Hyaluronic acid injections ■ Botox injections

## 2. Sažetak

**Naslov: Usporedba stavova o invazivnim i neinvazivnim estetskim postupcima između hrvatske i francuske populacije.**

**Author: Caroline Vaslon**

U suvremenom društvu, opsesija mladim i lijepim izgledom postala je uobičajena i rezultirala je povećanjem kozmetičkih postupaka koji pokušavaju preokrenuti proces starenja.

Tijekom proteklih nekoliko godina evolucija na ovoj domeni je povećana i potreba pacijenta za intervencijama povećala se eksponencijalno. Da bi se to postiglo razvijene su različite invazivne i neinvazivne tehnike.

Svrha ove prospektivne studije bila je istražiti koliko je ljudi u općoj populaciji već napravilo estetski postupak, koliko ih je željelo imati, a koji je najpopularniji i usporediti te rezultate između hrvatske i francuske populacije. U istraživanje su uključeni podaci od 360 Hrvata i 360 Francuza, starijih od 18 godina bez prethodnog odabira. Studija je provedena tijekom 4 mjeseca tijekom 2018. godine.

Invazivni postupci su prevladavali u hrvatskom i francuskom stanovništvu, a na prvom mjestu je bila rinoplastika. U hrvatskoj populaciji najčešće se radilo o rinoplastici (33,3%), operaciji dojki (17,8 %), aplikaciji hijaluronskih punila (17,8 %). U francuskoj populaciji dominirali su rinoplastika (45,6 %) i injekcije Botoxa (24,4 %). Međutim, možemo procijeniti da je većina postupaka koje žele obje populacije neinvazivna. Hrvati uglavnom žele injekcije hijaluronske kiseline (30,6%) i rinoplastiku (26,4%), dok će francuska populacija uglavnom preferirati injekcije hijaluronske kiseline (46,2%) i Botox injekcije (35,6%).

Možemo zaključiti da će u budućnosti francusko stanovništvo biti sklonije koristiti neinvazivne metode plastične kirurgije u odnosu na hrvatsko stanovništvo. U hrvatskoj populaciji najčešće planirani i željeni zahvat je rinoplastika. Ovo je rezultat pilot projekta, a studija se nastavlja provoditi.

**Ključne riječi: ■ Starenje ■ Kozmetički postupci ■ Istraživanje poprečnog presjeka ■ hrvatsko stanovništvo ■ francusko stanovništvo ■ Invazivne procedure ■ Neinvazivne procedure ■ Rinoplastika ■ Injekcije hijaluronske kiseline ■ Botox injekcije**



### 3. Preface

This graduate thesis is based on the collection of data for a cross-sectional study on the Croatian and the French population over the course of 4 months. The random sample of people chosen consists of 360 Croatians and 360 French individuals. The goal of this study was to determine if a difference of opinion exists between French and Croatian population about invasive and non-invasive esthetic procedures. The goal was to better understand patients' needs and desires in relation to esthetic procedures.

In this study an invasive procedure is referred as any surgical procedure that requires an invasive surgical environment and equipment and non-invasive procedure as non-surgical/ non-invasive which leaves the skin intact and unbroken, except for needle points. It was desired that the questionnaire distribution be easy, fast to fill-in and understandable for the general population. Two versions of the questionnaire were made, one in the Croatian language and the other in French language; allowing people to feel more comfortable when answering in order to obtain the most accurate answers as possible. The questionnaire was designed by Prof. Mijatović, Dr. Dujmović, Dr Mance and the author of the thesis Caroline Vaslon. The data was collected by the author herself Caroline Vaslon online, in Croatia and in France. The sample size was taken as large as possible during a defined period of 4 months and the patients were selected at random.

This questionnaire is completely anonymous. This questionnaire is made in view of a publication in a medical journal and will be part of a medical study.

The questionnaire was made informatically and printed on paper. This study grouped the answers of the people who answered online and the people who answered on paper. All the data was collected by the author Caroline Vaslon.

This thesis was a prerequisite for the completion of the Medical Studies in English Program at the University of Zagreb, School of Medicine. The author of the thesis is Caroline Vaslon, who wrote it with the assistance of her mentor, Prof. Mijatović, the Dr. Dujmović and Dr. Mance.

## **4. Hypothesis**

The French population is more likely to prefer non-invasive cosmetic procedures than Croatian population.

## **5. Objectives**

The aim of the present study was to evaluate whether there is a significant difference between the Croatian and the French population's opinion on the subject of esthetic procedures. There is a common notion that France is a more advanced, developed, stable country with a strong medical history and a good social status with educated population moreover seeing Croatia as a new country that just entered the European union, opening up to the western world and in full bloom. The esthetic procedures seemed to be more accepted and more used in daily activities in France than in Croatia because of Croatia's conservative past and lower social-economic status.

## 6. Introduction

During the last decade, with the progress of science and the advance in technology the fear of aging is of real importance. The plastic surgery is seen with a different approach since no one wants to get old and trying to keep our body young has become a priority.

The concerns with appearance extends throughout life with each stage making a psychological response in the body. Widely known is the mid-life crisis occurring around 40 years of age that includes stereotypes, myths and psychological realities associated with aging. For women, the psychological idea of aging has been enhanced in a way that they perceived the symptoms in a symptomatic way as losing their femininity, their sexuality, their social power and the way they are seen in society. These factors increase the dissatisfaction of looking old and increase the need to look younger. A study was conducted by Goodman (1994) interviewed 24 women, from 29 to 75 years, 12 had previous cosmetic surgery and 12 had not. He found out that younger women were mostly concerned about the shape and appearance of their bodies while older women were mostly more preoccupied about their facial appearance[2]. Facial aging result of a combination of changes that involve the skin (the wrinkling, the dyspigmentation and the vascular changes) and the underlying tissues. A progressive loss of tissue volume due to the atrophy and displacement of subcutaneous fat, as well as a reduction in structural support due to bone atrophy, contribute significantly to facial aging[3][4]. The aging of the face includes intrinsic factors such as the loss of skin elasticity, collagen and fat atrophy along with extrinsic factors such as solar radiation that affect the dermis and the elastic fibers, smoking, unhealthy diet and alcohol all contribute to an increase in aging lines of the face. Demas and Braun (2001) outline the signs of the aging face: a lined forehead; drooping brows, with a hooded appearance to the lateral upper lid; loss of cheek roundedness and deep nasolabial folds secondary to loss of subcutaneous fat; sagging neck lines consequent upon loss of tone of the platysma muscle; loss of chin definition, from submental fat deposition; drooping of the nasal tissues; and wrinkling of the skin around the mouth, with thinning of the lips[5].

On other hand, the understanding and perturbation of the “body image” is the main concern of the younger population. The body image is not a static psychological issue, but it changes in response to lifestyle events and situational factors including puberty, pregnancy, disability, illness, surgery, menopause, and aging[6].

According to the American Society of Plastic Surgeons (ASPS), 17.504.950 cosmetic procedures were done in 2017 an increase of 137% from the year 2000[7].

Esthetic surgery in the past had a stigma of being “fake”, nevertheless this stigma is fading, and plastic surgery has undergone a perception transformation. Getting some ‘work done’ is no longer something to hide especially within the celebrity community as sharing on social media their esthetic procedure has become the norm. Haiken (1997) has suggested that North American society became increasingly visual with heightened values attached to women’s looks over the period since the Second World War[8].

An invasive procedure is essentially surgery. It is a medical procedure where the skin is broken by an incision. Non-invasive or non-surgical are procedures which leave the skin intact and unbroken, except for a needle prick[9]. The report of The American Society of Plastic Surgeons (ASPS) in 2017 includes the cosmetic surgical procedures and cosmetic minimally invasive procedures. The analysis of this report shows a decrease of 6% from the year 2000 of the surgical invasive procedures going from 1.901.049 procedures in 2000 to 1.790.832 in 2017. Nevertheless, the increase of minimally invasive procedure is tremendous with 5.500.446 procedures done in 2000 and 15.714.118 procedures done in 2017 making it an increase of 186%[7].

Moreover, cosmetic procedures do not involve the vital prognosis of the patient, that being the reason why a perioperative or post-operative complication is of major importance. The knowledge of the surgeon is really important, in fact for additional procedures it is imperative to be able to choose the appropriate technique for the appropriate problem at a certain time. To do so, the surgeons need to attend conferences all over the world and learn new techniques continuously. It is by knowing the various techniques available that the surgeon will be able to choose the best adequate procedure for his patients. In fact, the modern plastic surgeon has an obligation not only to develop his skills in the technical methods of reconstruction, but also his knowledge of the impact of deformity on the patient to minister to his total need[10].

It is important to know who, how and when the patient is the right candidate for surgery. One of the most important roles in being a plastic surgeon will often be to explain and take the time to understand the patient’s need for the procedure and maybe to consider the need of psychiatric evaluation in order to develop confidence and self-acceptance of the patient before any procedure. This includes the preoperative discussion about expectations. It is of colossal importance to understand the motivational pattern of the patients and guide them to understand the possible outcome instead of the unmanageable image they often have in their mind. In a study made in 2012, regarding the factors that motivate people to undergo cosmetic surgery, involving 204 British

participants, showed that self-esteem was negatively associated with the likelihood of undergoing cosmetic surgery.

Individuals with low self-esteem may be more willing to have cosmetic alteration to improve their own self-perceptions, thus boosting their self-esteem, although it is unclear whether that will indeed occur[11].

The popularity of plastic surgery is rising along with new techniques and this study observed if the French and Croatian general population were matching the current international/western trends and if a difference could be found between these two countries. In fact, France since 1789 with the revolution, placed the rights of the people and the creation of a constitution in the first place. France is known throughout the world as a liberal, fashion and beauty capital. It is also a free country with a strong democracy created in 1848[12]. France in 1957 was one of the six core state cofounders of the European union[13]. In 1993, France was one of the country that agreed and created the Copenhagen criteria, which require that any membership of the European Union is open to any European country that is a stable, free market liberal democracy that respects the rule of law and human rights. Following these criteria, Croatia entered the European Union the 1<sup>st</sup> of July 2013. In fact, after the II world war, communist Yugoslavia was a centralized state, based on the Soviet model[14] and it's only on the 22<sup>nd</sup> of December 1990 that the Croatian parliament adopted the current Constitution of Croatia and decided to declare independence from Yugoslavia on May 25th 1991. The historic, technologic and social evolution of these two countries is distinctive although, nowadays the difference is of less importance. Croatia aligns with the requirement of the European Union and today, the health care and the social needs tend to be similar as the other European countries. Plastic surgery seems to be a necessity in the western society.

To the best of our knowledge, no previous study has been done in Croatia to study which kind of procedures patients prefer nowadays.

The new techniques available allow the surgeons to operate in a way that the scarring will be minimal and situated in areas that are almost invisible. Nevertheless, why go through surgery if you can have almost the same result with injections? The answer is more than logical but the real question wouldn't be which procedure is the most adapted to my patient to fit their desire the best?

It is often ignored or disregarded among patients that non-invasive procedures tend to be temporary, only lasting between 4 to 24 months while invasive surgeries tend to leave a more permanent of long term effect.

# 7. Material and method

To identify and analyze the differences in the population on their opinion between invasive and non-invasive surgery, we performed a cross-sectional study. The data was collected by distributing a questionnaire in the language that the patient will understand (Table 1,2,3).

Table 1. Questionnaire in Croatian language

## Upitnik za estetsku kirurgiju:

Odaberite odgovor koji vam najviše odgovara. Ovaj upitnik je potpuno anonimn.

Ovaj upitnik je napravljen u cilju publikacije u medicinskom časopisu i biti će dio medicinske studije.

1. Spol: M Ž
2. Dob: \_\_\_\_\_
3. Nacionalnost: \_\_\_\_\_
4. Visina: \_\_\_\_\_ 5. Težina: \_\_\_\_\_
6. Edukacija:
- A) Srednja škola ili manje B) VŠS C) VSS ili više
7. Zanimanje:
- A) Nezaposlen/a B) Domaćica C) Zaposlen/a D) Samo-zaposlen/a  
E) U mirovini F) Student/ica
8. Bračno stanje:
- A) Oženjen/a B) Udovac/ica C) Samac D) Rastavljen/rastavljena  
E) U vezi
9. Imate li djece?
- A) **DA** B) **NE**
- Ako DA, navedite koliko \_\_\_\_\_
10. Koliko iznose Vaši mjesečni bruto prihodi?
- A) Manje od 500 € B) 500 – 1000 € C) 1000 – 2000 € D) 2000 – 3000 €  
E) 3000 – 4000 € F) Više od 5000 €

11. Da li je netko od Vaših poznanika imao neki estetski zahvat? **DA** **NE**
12. Da li ste Vi ikada imali neki estetski zahvat? **DA** **NE**

### Ako je odgovor DA:

Koji tip zahvata ste imali?

- A) **Kirurški** B) **Ne kirurški (Botox, Hijaluronski fileri, Laser)**
- C) **Oboje**

O kojoj vrsti zahvata se radilo?

- A) Liposukcija  
Ako je Vaš odgovor DA, navedite koji dio tijela? \_\_\_\_\_
- B) Abdominoplastika  
C) Transplantacija kose  
D) Korekcija nosa  
E) Face- lifting  
F) Blefaroplastika  
G) Korekcija ušiju  
H) Operacija grudi  
Ako je Vaš odgovor DA, navedite koji zahvat? \_\_\_\_\_
- I) Pomlađivanje kože  
J) Botox  
K) Hijaluronski fileri  
L) Laser

Ostalo \_\_\_\_\_

13. Da li ste ikada razmišljali o nekom estetskom zahvatu? **DA** **NE**

### Ako je Vaš odgovor NE:

Molimo navedite razlog:

- a. Bojim se bilo kojeg zahvata  
b. Ne mislim da je potrebno  
c. Financijski razlozi  
d. Zabrinut sam što bi moje kolege/ obitelji o tome mislili  
e. ostalo \_\_\_\_\_

### Ako je Vaš odgovor DA:

Koji tip zahvata razmatrate?

- A) **Kirurški** B) **Ne kirurški (Botox, Hijaluronski fileri, Laser)** C) **Oboje**

Koji biste zahvat razmotrili?

- A) Liposukcija  
Ako je Vaš odgovor DA, navedite koji dio tijela? \_\_\_\_\_
- B) Abdominoplastika  
C) Transplantacija kose  
D) Korekcija nosa  
E) Face- lifting  
F) Blefaroplastika  
G) Korekcija ušiju  
H) Operacija grudi  
Ako je Vaš odgovor DA, navedite koji zahvat? \_\_\_\_\_
- I) Pomlađivanje kože  
J) Botox  
K) Hijaluronski fileri  
L) Laser

Ostalo \_\_\_\_\_

Table 2. The questionnaire in French

### Questionnaire de chirurgie esthétique :

Sélectionner les réponses qui vous correspond le plus. Ce questionnaire est complètement anonyme. Ce questionnaire a été créé pour faire part d'une recherche médicale en vue d'une publication dans un journal médical.

1. Sexe: M F

2. Age: \_\_\_\_\_

3. Taille: \_\_\_\_\_ 4. Poids: \_\_\_\_\_

5. Niveau d'éducation:

A) Lycée ou moins B) Quelques années(s) d'Université C) Diplôme universitaire et plus

6. Occupation

A) Sans emploi B) Femme/ Homme au foyer C) Employé(e)  
D) Profession Libéral E) A la retraite F) Etudiant

7. Etat civil

A) Marié(e) B) Veuf /veuve C) Seul D) Divorcé(e) E) En couple

8. Avez-vous des enfants ?

A) NON B) OUI

Si OUI, combien \_\_\_\_\_

9. Quel est votre revenu net mensuel ?

A) Moins de 500 € B) 500 – 1000 € C) 1000 – 2000 € D) 2000 – 3000 €

E) 3000 – 4000 € F) Plus de 5000 €

3. Est-ce que quelqu'un de votre entourage a déjà eu recours à la chirurgie esthétique ?

OUI NON

4. Est-ce que vous avez déjà eu recours à la chirurgie esthétique?

OUI NON

Si OUI :

Quel type de chirurgie avez-vous eu ?

A) Chirurgical B) Non-chirurgical (Botox, Hyluronic acid filler, Laser)  
C) Les 2

Quel type de procédure(s) avez-vous eu ?

A) Liposuccion  
Si OUI quelle partie du corps ? \_\_\_\_\_  
B) Abdominoplastie  
C) Chirurgie de transplantation capillaire  
D) Remodelage du nez  
E) Face lift  
F) Blépharoplastie (lift des paupières)  
G) Chirurgie des oreilles  
H) Chirurgie mammaire  
Si OUI quel type? \_\_\_\_\_  
I) Rajeunissement de la peau  
J) Botox  
K) Injections d'Acide Hyaluronique  
L) Laser

Autre \_\_\_\_\_

Si NON

Donner une raison:

A. J'ai peur de l'intervention  
B. Je ne pense pas que cela soit nécessaire  
C. Raison financière  
D. J'ai peur de ce que mes amis, mes collègues ma famille pourraient penser  
E. Autre \_\_\_\_\_

5. Avez-vous déjà considéré une procédure esthétique ? OUI NON

Si OUI:

7. Quelle type de procédure considérez-vous?

A) Chirurgicale B) Non-chirurgicale (Botox, injections d'acide hyaluronique, Laser)  
C) les 2

8. Quelle procédure envisagez-vous?

A) Liposuccion  
Si OUI quelle partie du corps ? \_\_\_\_\_  
B) Abdominoplastie  
C) Chirurgie de transplantation capillaire  
D) Remodelage du nez  
E) Face lift  
F) Blépharoplastie (lift des paupières)  
G) Chirurgie des oreilles  
H) Chirurgie mammaire  
Si OUI quel type? \_\_\_\_\_  
I) Rajeunissement de la peau  
J) Botox  
K) Injections d'acide hyaluronique  
L) Laser

Autre \_\_\_\_\_



Table 3. The questionnaire in English:

## Cosmetic surgery questionnaire:

Select the answers that fit you the most. This questionnaire is completely anonymous.  
This questionnaire is made in view of a publication in a medical journal and will be part of a medical study "

1. Sex: M F
2. Age: \_\_\_\_\_
3. Nationality: \_\_\_\_\_
4. Hight: \_\_\_\_\_ 5. Weight: \_\_\_\_\_
6. Education level:  
A) High school or less B) Some college C) College graduates or beyond
7. Occupation:  
A) Unemployed B) Housekeeper C) Employee D) Self-employed  
E) Retired F) Student
8. Marital status:  
A) Married B) Widowed C) Single D) Divorced  
E) In relationship
9. Do You have children?  
A) **NO** B) **YES**  
If YES, how many \_\_\_\_\_
10. What is Your monthly income after taxes  
A) Less than 500 € B) 500 – 1000 € C) 1000 – 2000 € D) 2000 – 3000 €  
E) 3000 – 4000 € F) More than 5000 €
11. Has anyone you know ever had an aesthetic procedure? YES NO
12. Have you ever had a cosmetic procedure? YES NO
- If YES :**  
Which type of procedured have you had?  
A) **Surgical** B) **Non-surgical (Botox, Hyluronic acid filler, Laser)** C) **both**

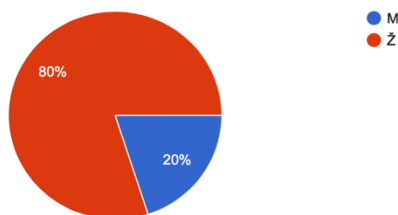


## 8. Results

### Croatian population:

The study showed that 80% (288) of the questionnaire was answered by females and 20% (72) by males (Chart 1).

Chart 1: Percentage of female to male of Croatian people



The average age, height and weight of the Croatian population was calculated by the following:

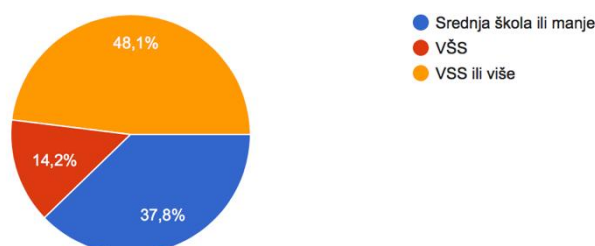
$$\text{Average Age} = \frac{\Sigma \text{of all ages}}{\text{number of persons}} = 32,72 \text{ years.}$$

$$\text{Average Height} = \frac{\Sigma \text{of all heights}}{\text{number of persons}} = 171,26 \text{ cm}$$

$$\text{Average Weight} = \frac{\Sigma \text{of all weights}}{\text{number of persons}} = 69 \text{ kg}$$

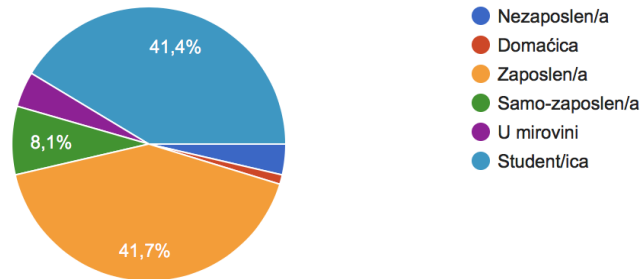
Out of all Croatians, 48,1% had at least a university degree, 37,8% had attended university for some years and 14,2% had a high school diploma or less (Chart 2).

Chart 2: Percentage of the education level of Croatian people



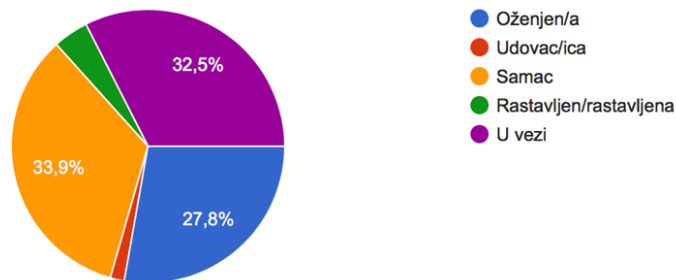
In the data collected 41,7% of individuals were employed, 41,4% students, 8,1% self-employed, 4,2% retired, 3,6% unemployed and 1,1% were housewives (Chart 3).

Chart 3: Partition by profession in Croatia



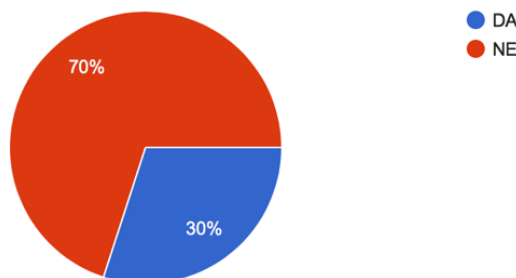
In regard to their social status, 33,9% were single, 32,5% were in a relationship, 27,8% were married, 4,2% were separated or divorced and 1,7% were widowed (Chart 4).

Chart 4: Division of marital status of Croatian people



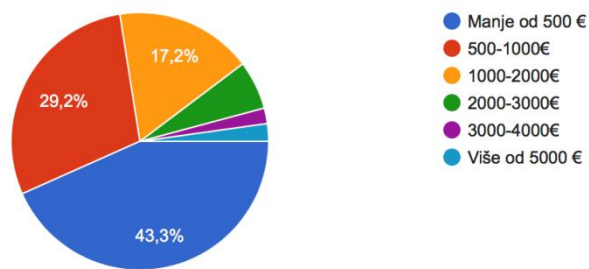
In this population, 30% had children and 70% did not (Chart 5). Out of the people who had children, 53,2% had 2.

Chart 5: Percentage of people with children in Croatia



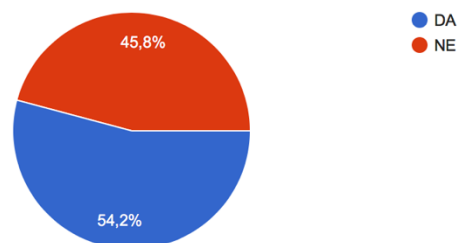
One of the questions that was asked was “how much is your monthly income after taxes”, this question allowed to identify if the “money factor” which has a big impact on plastic surgery. In the Croatian population, 43,3% made less than 500€ but 41,4% were students which is not relevant. 29,2% made between 500-1000€, 17,2% between 1000-2000€, 6,1% between 2000-3000€, 1,9% between 3000-4000€ and 2,2% made more than 5000€ (Chart 6).

Chart 6: Percentage of income of Croatians



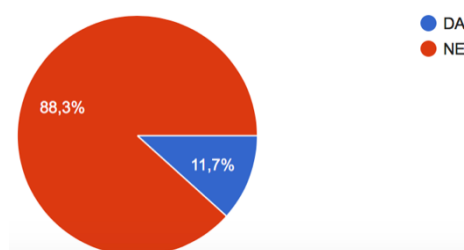
Interestingly, we found out that 54,2% knew someone that already had plastic surgery (Chart 7).

Chart 7: Percentage of knowledge about the surrounding having cosmetic procedures in Croatia



However, only 11,7% already had a previous esthetic surgery. Which represent 42 persons out of 360 including 37 females and 5 males (Chart 8).

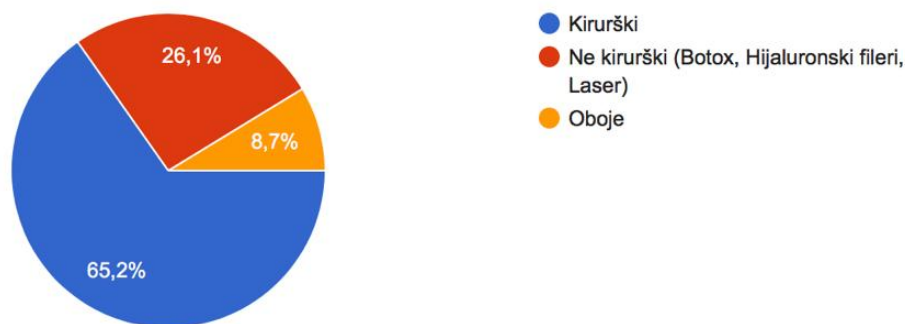
Chart 8: Percentage of previous surgery done by Croatian people



In this group of people that already had plastic surgery we were interested to know which type and kind of procedure they had.

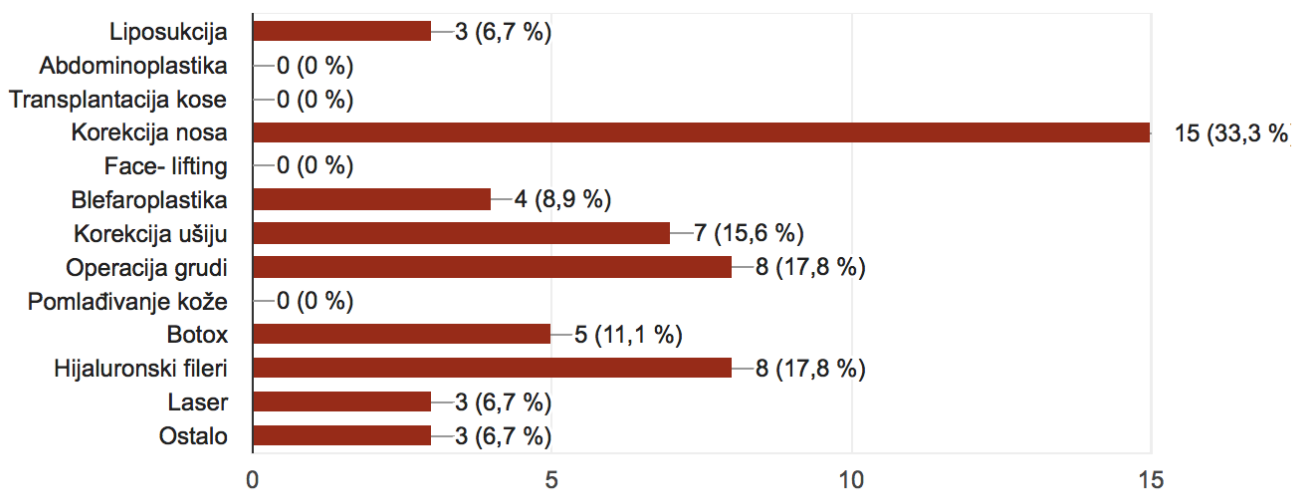
We found that, 65,2% had a surgical procedure whereas 26,1% had a non-surgical one and 8,7% had both (Chart 9).

Chart 9: Repartition of the different type of procedures done by Croatian people



Furthermore, on the graph below, it is remarkable to see that the rhinoplasty is the most popular surgery at 33% of the questioned population, followed by breast surgery, and hyaluronic acid fillers equally in second place with 17,8%.

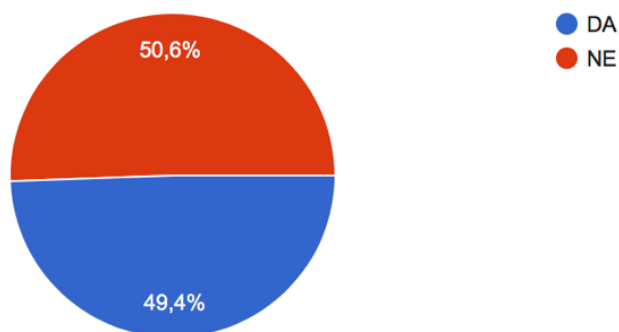
Chart 10: Repartition in percentages of different procedures done by Croatian people



The next section, individuals were asked if they will be interested in any kind of plastic surgery.

The results show that 49,4%, 178 people, 162 women and 16 men are interested and 50,6%, 182 people, including 126 women and 56 men are not (Chart 11).

Chart 11: Percentage of people interested by a cosmetic procedure in Croatia

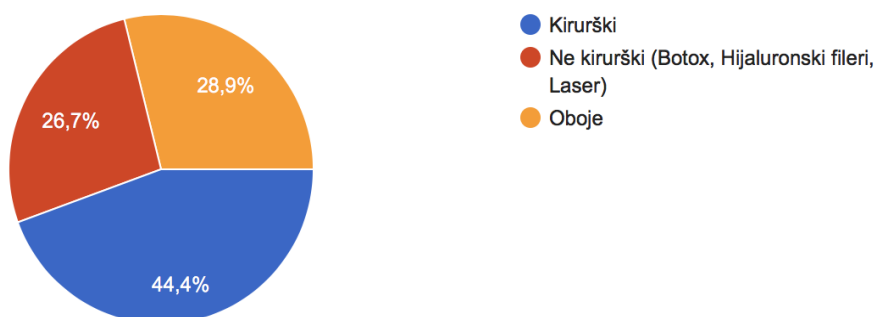


Out of the 182 people that were not interested in having plastic surgery, the main reason why was that they didn't think they needed it for 154 (85,4%). This was the case for 53 out of the 56 males that thought they didn't need surgery. 9,4% of people were afraid of surgery, 5,7% didn't want to have surgery for financial reasons.

The main interest of this study, was to know, out of the general Croatian population who wanted to have plastic surgery, and what kind of surgery they would prefer.

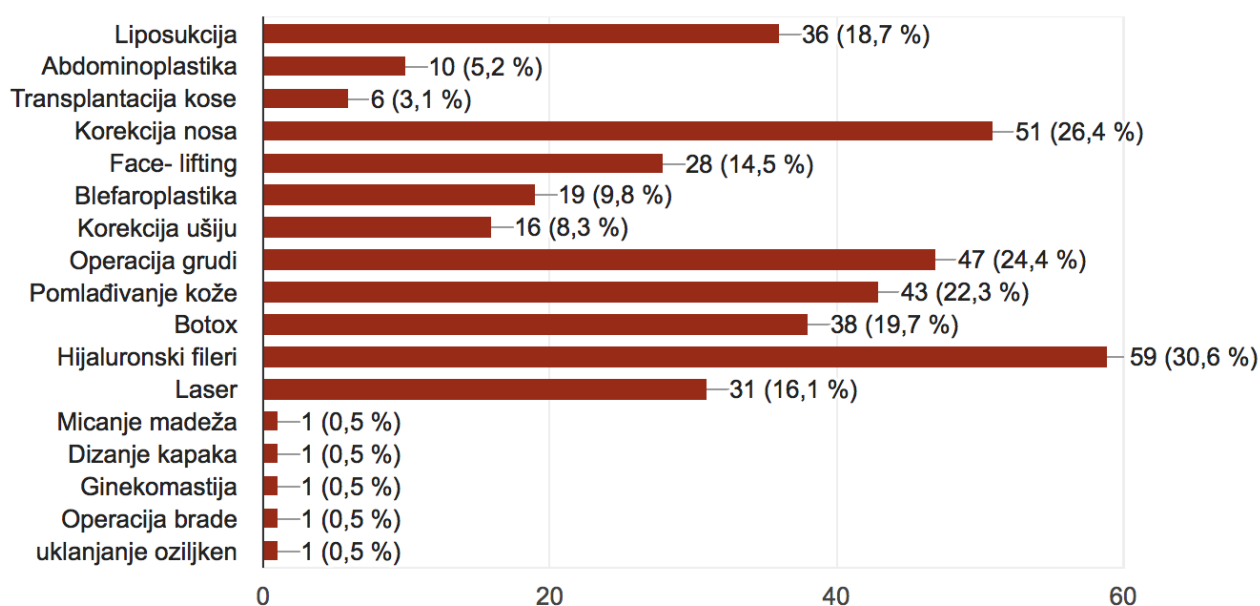
This study showed that 44,4% of Croatians would prefer to have a surgical procedure, which mean 80 people including 71 females and 9 males. 26,7%, 48 persons will prefer to have a non-surgical procedure including 45 females and 3 males. And 28,9%, 52 persons would choose both including 49 females and 3 males (Chart 12).

Chart 12: Repartition of the different type of procedures wanted by Croatians



These are the results that we obtain from the questionnaires regarding the list of esthetic procedures offered (Chart 13).

Chart 13: Repartition in percentages of different procedures wanted by Croatians



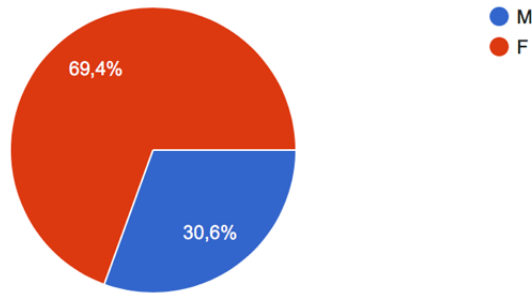
It was concluded that, out of 178 people, 30,6% (59) would like to have some hyaluronic acid injections, 26,4% (51) will like to have a rhinoplasty, 24,4% (47) will have a breast surgery, 22,3% (43) will be interested by a skin rejuvenation and 19,7% (38) will like to have Botox. Secondly, 18,7% (36) would undergo liposuction, mostly in the abdomen region, 16,1% (31) will be interested in a laser treatment, 14,5% (28) will do a face-lift.



**French population:**

The study showed that 69,4% (250) of the questionnaire was answered by females and 30,6% (110) by males (Chart 14).

Chart 14: Percentage of female to male of French people



The average age, height and weight of the French population was calculated by the following:

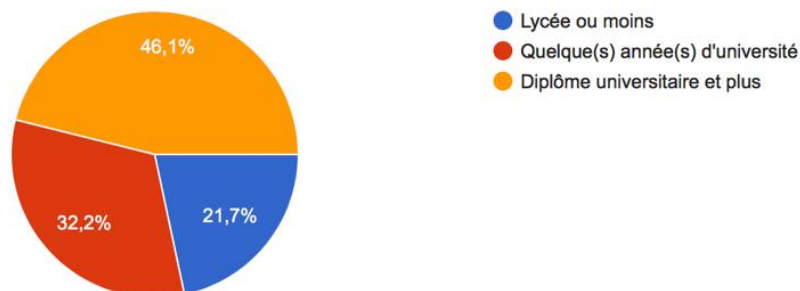
$$\text{Average Age} = \frac{\Sigma \text{of all ages}}{\text{number of persons}} = 38,30 \text{ years.}$$

$$\text{Average Height} = \frac{\Sigma \text{of all heights}}{\text{number of persons}} = 169,32 \text{ cm}$$

$$\text{Average Weight} = \frac{\Sigma \text{of all weights}}{\text{number of persons}} = 65,96 \text{ kg}$$

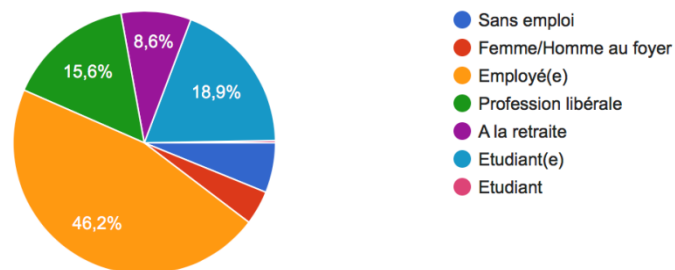
Out of all French, 46,1% had at least a university degree, 32,2% had attended university for some years and 21,7% had a high school diploma or less (Chart 15).

Chart 15: Percentage of the education level of French people



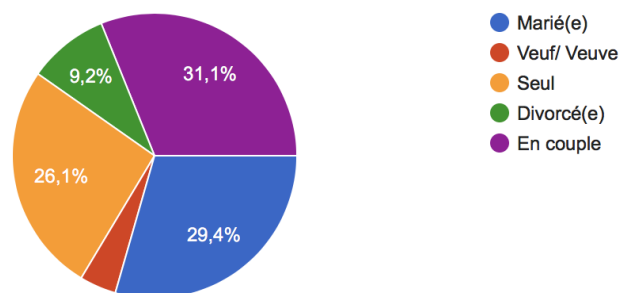
This data collected included 46,2% employed, 18,9% students, 15,6% self-employed, 8,6% retired, 6,1% unemployed and 4,2% were housewives (Chart 16).

Chart 16: Partition by profession in France



Concerning their social status, 31,1% were in a relationship, 29,4% were married, 26,1% were single, 9,2% were separated or divorced and 4,2% were widowed (Chart 17).

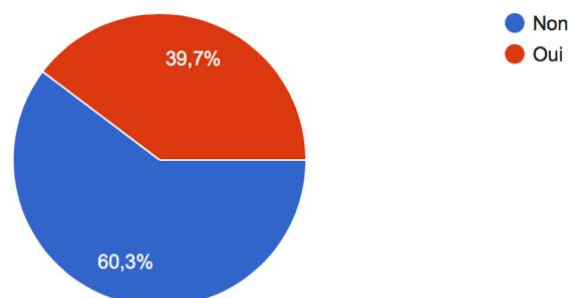
Chart 17: Division of marital status of French people



On this population, 60,3% didn't have children and 39,7% did.

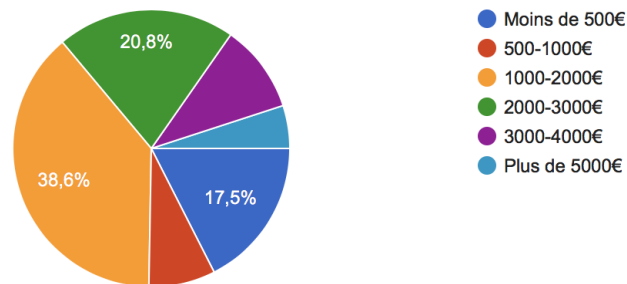
Out of the people who had children, 36,8% had 2, 29,2% had 1 and 19,4% had 3 (Chart 18).

Chart 18: Percentage of people with children in France



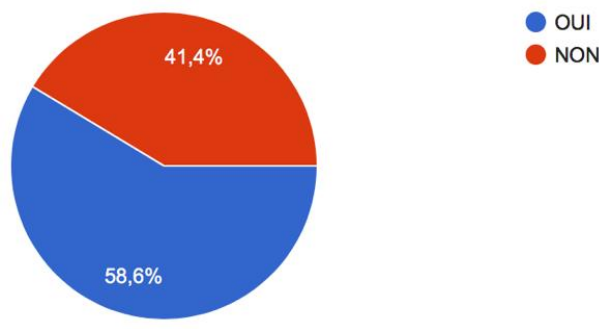
For the question that was asked “how much is your monthly income after taxes”, this question allowed to identify if the “money factor” had a big impact on plastic surgery. In the French population, 17,5% made less than 500€, 7,8% made between 500-1000€, 38,6% between 1000-2000€, 20,8% between 2000-3000€, 10,3% between 3000-4000€ and 5% made more than 5000€ (Chart 19).

Chart 19: Percentage of income of French



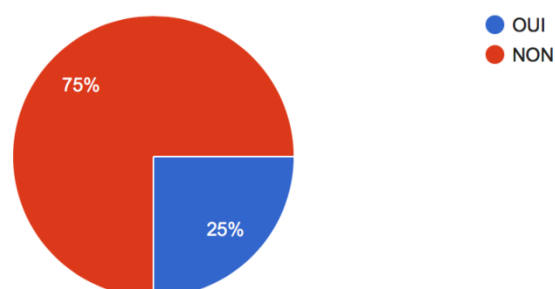
Interestingly, we found out that 58,6% knew someone in their surrounding that already had plastic surgery (Chart 20).

Chart 20: Percentage of knowledge about the surrounding having cosmetic procedures in France



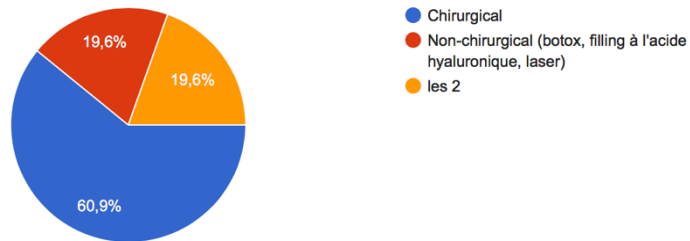
However, 25% already had a previous esthetic surgery. Which represents 90 persons out of 360 including 67 females and 23 males (Chart 21).

Chart 21: Percentage of previous surgery done by French people



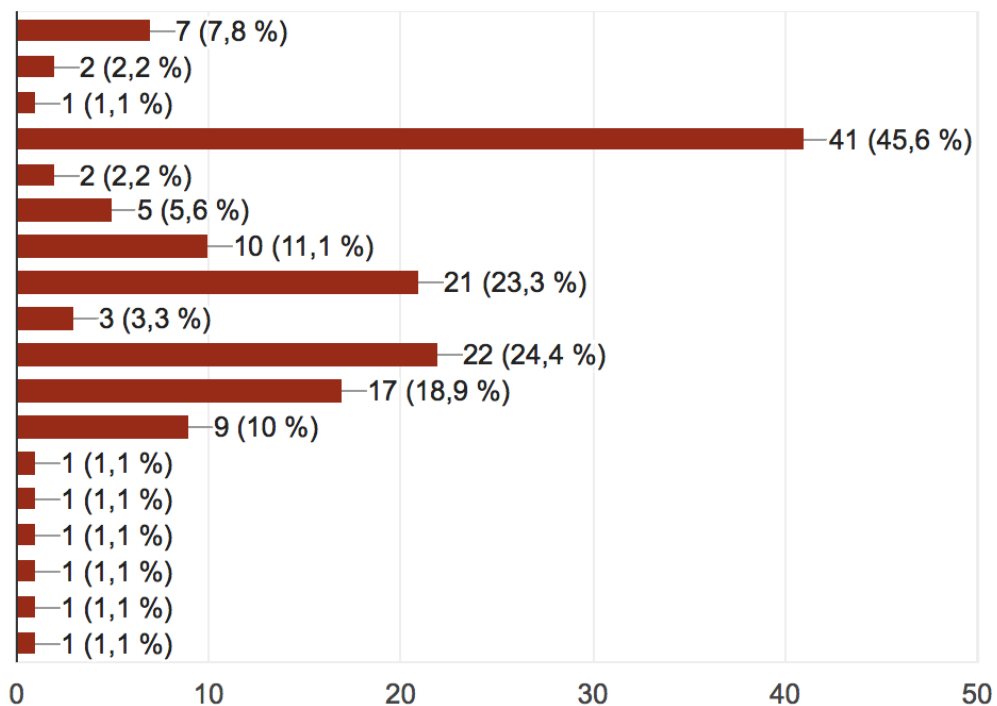
In this group of people that already had plastic surgery we were interested to know which type and kind of procedure they had. We found that, 60,9% had a surgical procedure whereas 19,6% had a non-surgical one and 19,6% had both (Chart 22).

Chart 22: Repartition of the different type of procedures done by French people



Furthermore, on the graph below, it is remarkable to see that the rhinoplasty was the first surgery that was completed by 45,6% of the population, followed by Botox (24,4%), breast surgery (23,3%) and hyaluronic acid fillers 18,9 % (Chart 23).

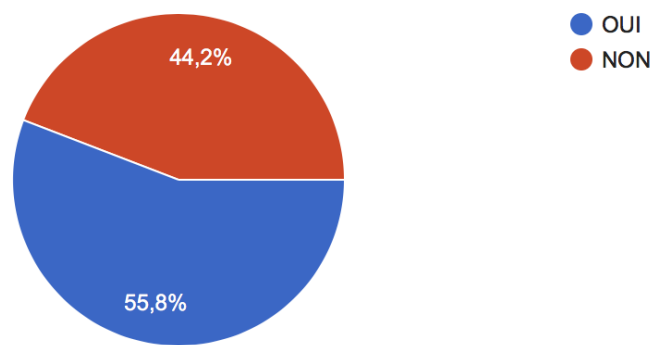
Chart 23: Repartition in percentages of different procedures done by French people



The next section, examined if people will be interested in getting any kind of plastic procedure.

The results show that 55,8%, 201 people, 157 women and 44 men are interested and 44,2%, 159 people, including 93 women and 66 men are not (Chart 24).

Chart 24: Percentage of people interested by a cosmetic procedure in France

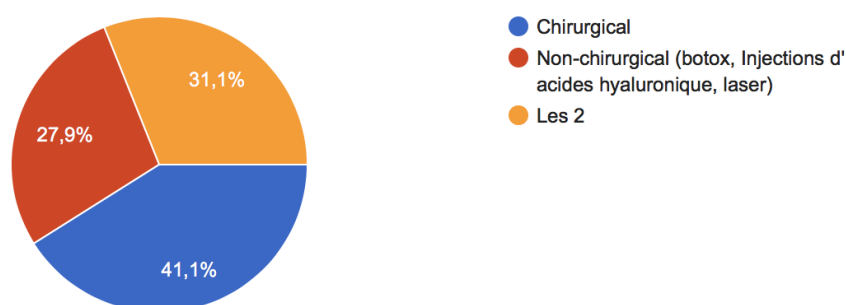


Out of the 159 people that were not interested in having plastic surgery, the main reason why was that they didn't think they needed it for 124 of them (71,3%). This was the case for 53 out of the 56 males that thought they didn't need surgery., 21,8% didn't want to have surgery for financial reasons and 14,4% of people were afraid of surgery

The main interest of this study, was to determine, out of the general French population who wanted to have plastic surgery, and what kind of surgery they would prefer.

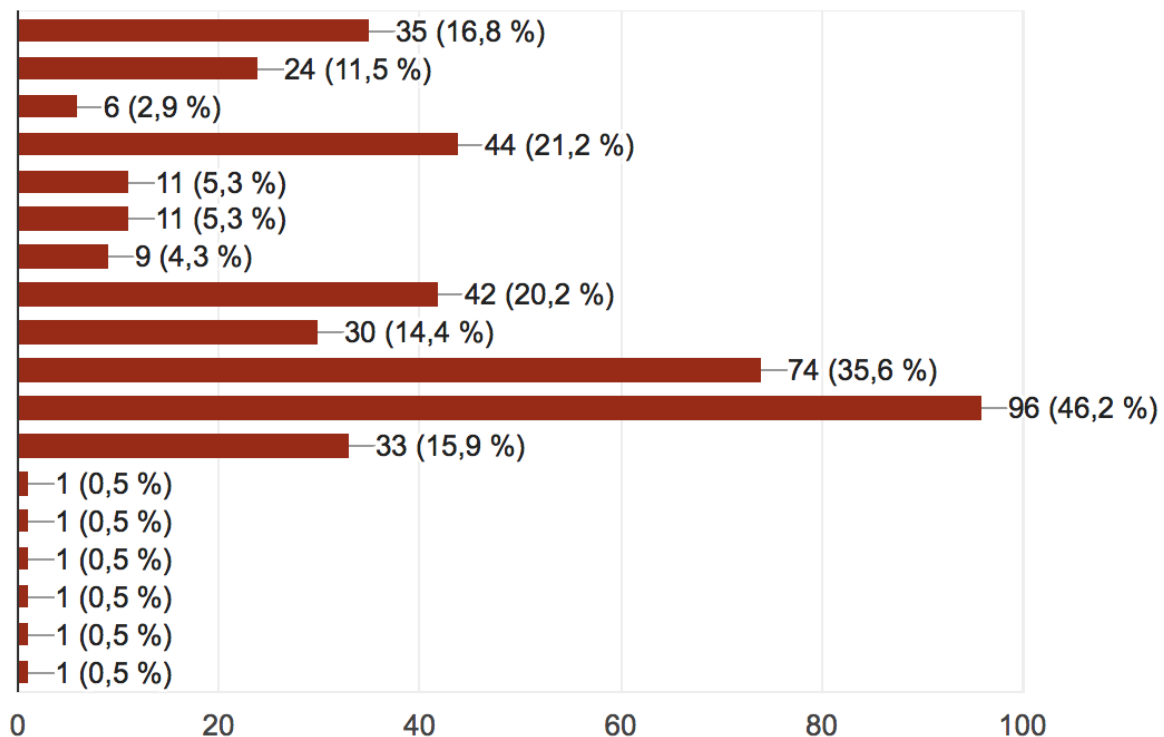
This study showed that 41,4% of French would prefer to have a surgical procedure, which means 78 people including 58 females and 20 males. 27,9%, 53 persons will prefer to have a non-surgical procedure including 41 females and 12 males. 31,1%, 59 persons including 48 females and 11 males would choose both (Chart 25).

Chart 25: Repartition of the different type of procedures wanted by French



These are the results that we obtain from the questionnaires regarding the list of esthetic procedures offered (Chart 26).

Chart 26: Repartition in percentages of different procedures wanted by French



The outcome was that, out of 201 people, 46,2% (96) will like to have some hyaluronic acid injections, 35,6% (74) will like to have Botox injections, 21,2% (44) will have a rhinoplasty, 20,2% (42) will be interested by a breast surgery and 16,8% (35) will like to have a liposuction mainly in the abdomen region and thighs. Secondly, 15,9% (33) will do laser, 16,1% (31) will be interested in a skin rejuvenation, 11,5% (24) will do an abdominoplasty and in equal number, 5,3% (11) will like to have a blepharoplasty or a face lift.

## 9. Discussion

In this study, we analyzed the differences in opinion on esthetic procedures between the Croatian and the French population. In Croatia, 80% (288) females answered the questionnaire whereas 69,4%, (250) females answered the French questionnaire. This data is important to consider because women and men generally have different expectations on esthetic procedures. The age is another important factor, in fact, the average age in the Croatian population was 32,72 years and 38,3 years in the French population. At different ages and different stages of life the opinion on plastic surgery is different.

We can see a similar background on the level of education between France and Croatia. Moreover, we can see a higher unemployment rate at 6,1% in France compared to 3,6 in Croatia and a higher percentage of self-employment of 18,9% in France compared to 8,1% in Croatia.

The marital status shows similarity between the two countries; both population have a low amount of people with children while in both groups the population is older than 30 years of age.

One of the main difference besides the fact that the Croatian sample contains more students is the average income between the two countries, France having higher salaries than Croatia.

In both countries, more than 50% of the population knew someone in their surrounding that already had plastic surgery (54,2% for the Croatian population and 58,6% for the French population).

One disparity, is the number of individuals that already had an esthetic procedure performed. Only 11,7% of Croatians already had some sort of plastic surgery including 37 women and 5 men compared to 25% for the French population which included 67 women and 23 males. The difference in the procedures done by men between these two populations is remarkable. Although more men answered the French questionnaire, it seems as French men are more likely to have an esthetic procedure performed on themselves compared to Croatian males.

Nevertheless, when people were asked if they will be interested in cosmetic procedures, 178 Croatians (49,4%) and 201 French (55,8%) were interested. This data confirms that in general the French population is more open to esthetic procedures compared to Croatian population.

## Invasive Procedures:

In this questionnaire the procedures that were considered as invasive included: Liposuction, abdominoplasty, rhinoplasty, face lift, blepharoplasty, otoplasty, hair transplant and breast surgery.

This study shows that Croatians had independently more surgical (65,2% compared to 60,9% for the French population) procedures performed. We can also observe that the French population had more of a mix of invasive and non-invasive procedures done compared to Croatians (19,6% and 8,7%)(Table 1).

Table 1: Total of surgical procedures done in Croatian and French population

	Only surgical procedures done	Both surgical and non-surgical procedures done	Total of surgical procedures done
Croatian population	65,20%	8,70%	36,95%
French population	60,90%	19,60%	40,25%

Nevertheless, the French population had more surgical procedure performed than the Croatian population in general.

We can perceive that the invasive procedure that was most often conducted in Croatia and in France was rhinoplasty (33,3% in Croatia and 45,6% in France). This was followed by breast surgery with 17,8% in Croatia and 23,3% in France.

55,8% of the French population wish to have some kind of surgery done compared to 49,5% for the Croatian population.

If we compare the surgeries that are desired by the sample group, 44,4% of Croatians want only a surgical procedure and 28,9% want to have both a surgical and non-surgical procedure. For the French population, 41,1% want only a surgical procedure and 31,1% want both a surgical and non-surgical procedure (Table 2).

Table 2: Total of surgical procedures wanted in Croatian and French population

	Only surgical procedures wanted	Both surgical and non-surgical procedures wanted	Total of surgical procedures wanted
Croatian population	44,40%	28,90%	36,65%
French population	41,10%	31,10%	35,45%



Based on this data, we can conclude that the Croatian population wants to have more surgical procedures performed than the French population.

As a result of this study, the surgical procedure that was mostly wanted by the Croatian population was rhinoplasty (26,4%), followed by breast reconstruction (24,4%), liposuction (18,7%), face lift (14,5%), blepharoplasty (9,8%), otoplasty (8,3%) and hair transplant (3,1%).

For the French population, the most desired surgical procedures were, rhinoplasty (21,2%), followed by breast surgery (20,2%), liposuction (16,8%), face lift (5,3%), blepharoplasty (5,3%), otoplasty (4,3%) and hair transplant (2,9%).

We can conclude that the surgical procedures desired by both population are in the same order of wishes.

### Non-invasive Procedures:

In this questionnaire the non-invasive procedures listed were: skin rejuvenation, Botox, hyaluronic acid injections and laser. This study shows that Croatians had independently more non-surgical (26,1% compared to 19,6% for the French population) done. We can observe that the French population had a larger population that had both, invasive and non-invasive procedures done compared to Croatians (19,6% compared to 8,7%) (Table 3).

Table 3: Total of non-surgical procedures done in Croatian and French population

	Only non-surgical procedures done	Both surgical and non-surgical procedures done	Total of non-surgical procedures done
Croatian population	26,10%	8,70%	17,40%
French population	19,60%	19,60%	19,60%

Nevertheless, the French population had more surgical procedures done compared to the Croatian population.

We can appreciate that the non-invasive procedures that mostly done in Croatia are the injection of hyaluronic acid (17,8%) whereas, in France, Botox injection was more predominant (24,4%). In Croatia, the hyaluronic injections are predominant followed by Botox injections (11,1%), laser procedures (6,7%) and no skin rejuvenation treatments. In France, the predominant non-invasive procedure is the injections of Botox, followed by the Hyaluronic acid injections (17,8%), the laser (10%) and skin rejuvenation (3,3%).

55,8% of the French population wish to have some kind of surgery done compared to 49,5% for the Croatian population.

If we compare the procedures that are desired, 26,7% of Croatians wish to have only a non-surgical procedure and 28,9% want to have both a surgical and non-surgical procedure. For the French population, 27,9% want only a non-surgical procedure and 31,1% want both a surgical and non-surgical procedure (Table 4).

Table 4: Total of non-surgical procedures wanted in Croatian and French population

	Only non-surgical procedures wanted	Both surgical and non-surgical procedures wanted	Total of non-surgical procedures wanted
Croatian population	26,7%	28,90%	27,80%
French population	27,9%	31,10%	29,50%

We can evaluate that most of the procedures already done were surgical. Most popular in the French and Croatian population be the rhinoplasty (33,30% in the Croatian population and 45,60% in the French population) followed by breast surgery for the Croatian population (17,80%) and the Botox injections (24,40%) for the French population (Table 5).

Table 5: Percentage of all surgical procedures done by the Croatian and French population

	Croatian population	French population
Invasive procedures already done	36,95%	40,25%
Rhinoplasty	33,30%	45,60%
Breast surgery	17,80%	23,30%
Liposuction	6,70%	7,80%
Abdominoplasty	0%	2,20%
Face lift	0%	2,20%
Ear surgery	15,60%	11,1%
Blepharoplasty	8,90%	5,60%
Hair transplant	0%	1,10%
Non-invasive procedures already done	17,40%	19,60%
Botox	11,10%	24,40%
Hyaluronic acid	17,80%	18,90%
Skin rejuvenation	0%	3,30%
Laser	6,70%	10,00%

As a result of our study we can see that the non-surgical procedure that was mostly desired by the French population are injections of hyaluronic acid (35,6%), followed by Botox injections (35,6%), laser (15,9%), and skin rejuvenation (14,4%).

For the Croatian population, the most desired non-surgical procedures included hyaluronic acid injections (30,6%), followed by skin rejuvenation (22,3%), Botox (19,7%), and laser (16,1%).

We can conclude that the non-surgical procedures are more desired by the French population than the Croatian population (Table 6).

Table 6: Percentage of all surgical procedures wanted by the Croatian and French population

	Croatian population	French population
Invasive procedures wanted	36,65%	35,45%
Rhinoplasty	26,40%	21,20%
Breast surgery	24,40%	20,20%
Liposuction	18,70%	16,80%
Abdominoplasty	5,20%	11,50%
Face lift	14,50%	5,30%
Ear surgery	8,30%	4,30%
Blepharoplasty	9,80%	5,30%
Hair transplant	3,10%	2,90%
Non-invasive procedures wanted	27,80%	29,50%
Botox	19,70%	35,60%
Hyaluronic acid	30,60%	46,20%
Skin rejuvenation	22,30%	14,40%
Laser	16,10%	15,90%

Recently, cosmetic surgical procedures are performed in outpatient settings and are in general low-risk procedures. Perioperative and postoperative complications for these surgeries are infrequent, with an overall rate of 2 to 6% [15]; the incisions are minimal, the recovery is fast and the techniques more advanced.

Nevertheless, in general, the patients are still skeptical of surgery. The risks include general anesthesia complications, postoperative pain, risk of wound infection and pain and discomfort. Invasive procedures such as the face-lift are of lesser popularity than facial injections of hyaluronic acid or Botox.

## 10. Conclusion

This cross-sectional study observed the opinion of 720 randomly chosen people of French and Croatian descent regarding invasive and non-invasive esthetic procedures. Most of the procedures already done were surgical in the French and Croatian population. However, we can assess that most of the procedures desired by both population are non-invasive. Nevertheless, we can see that the Croatian population still has a prominent desire for rhinoplasty, whereas the French population is more prone to choose non-invasive cosmetic procedure like Hyaluronic acid or Botox injections.

Therefore, it can be concluded that the French population is more prone to use non-invasive esthetic procedures compared to Croatian population.

## 11. Acknowledgements

I would like to express my sincere gratitude to the Prof. Davor Mijatović, from the plastic surgery department at Rebro University Hospital in Zagreb who accepted to be my mentor on this thesis and show great interest to my subject. Thank you for your teaching skills and presence, I hope I can learn more by your side in the future.

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To the Dr. Saban ENT and plastic surgeon in Nice: Thank you for your support your help and your trust. You are one of my models. Working by your side was one of the best experience in my life and I hope we can continue our team-work and always stay in touch.

To my family,

Dad, unfortunately you left this January, too early to be able to see me graduate, read this paper and this paragraph... Thank you pouny for transmitting me this love for medicine and for teaching me life. Thank you for being here for me in my good and hard times, forcing me and helping me to realize my dreams. You were and still are everything to me my model, my rock and my shoulder. I miss you so much and every single day I wish you were by my side. I love you so much and forever.

Mom, so much I have to say in such a little paragraph... I admire your strength and the person you are. I think if more people were like you the world will be a better place. Thank you for your love, your generosity, your support and everything you gave me. I love you to the moon and back.

Virgine, my little sister, my confident, my dentist. I am so proud of you and what you accomplished, you're an amazing person and I don't know what I will do without you thank you for your advices, your support and for always being here for me. I love you CVTS.

Tiffany, my little little sister, my casse bon-bon, my future lawyer. I am really proud of you and with what you went through shows me just how strong you are. I am so happy to have you in my life. Thank you for your opinions and your support. I love you CVTS.

Sébastien, my brother, my baby. I am so proud of you and the person you've become. The year we shared together was one of the best in my life. You're a man now and your actions will define you. I trust you with my life. Thank you for being you and helping me without you even knowing. I love you more than you will ever know. CVTS

To my grand-parents. Thank you for your love and support. I know you are here and you are watching me, and I know how proud you are of me. Mamie I am thinking about you.

To my partner,

To my Love, Shahab. We met almost seven years ago and as soon as we entered the class we knew that it will be us. We went through the whole medical school and this new life in Croatia that we built together. Thank you for teaching me English, thank you for helping me through medical school to be with me and by my side even with the stress and the exams. Thank you for your support and comfort when I needed it. Thank you for being such an amazing person and being so handsome, generous and caring, you are going to become an amazing doctor. Thank you for your love so strong that I can barely handle, thank you for sharing my life and my passion. Being by your side is the best thing that happen to me. I can't wait for this new chapter in our life my partner in crimes. I love you.

To my extended family, Shahin, Hossein, Sean, Arash. Thank you for being here and helping us. Your support and your big heart was really important during these tough years. I am so happy to be part of your family. I love you all.

To my friends, thank you for your support especially this last year. You showed me how much I meant to you and I am holding you close to my heart. Thank you for being here by my side these years spend in Zagreb away from my family I just feel that I created a new one with you. You are all going to become amazing doctors and I will miss you I am proud of all of you! I love you all!!

I would also like to acknowledge Zagreb University, School of Medicine, who gave me the opportunity to pursue medical studies in the beautiful country of Croatia. I am forever grateful.

## 12. Biography

Caroline Vaslon was born on October 28<sup>th</sup> 1989 in Nice, France. After finishing a scientific baccalaureate, she studied at the Medical, Science and Law University of Nice Sophia Antipolis for 4 years before enrolling at the University of Zagreb School of Medicine, Medical Studies in English.

During her studies Caroline participated in several extracurricular activities such as CROSS, Forum of cardio surgery, and was an active member of the woman's football team of the university for six years. Furthermore, in order to increase her clinical skills, Caroline did several clinical rotations in different hospital and different countries (Gastroenterology department at the Hospital l'Archet II in Nice, France; Oncology department at the Princesse Gr<sup>ac</sup>e Hospital in Monaco with Dr. Garnier; ENT and plastic surgery with Dr. Yves Saban in Nice, France; General Surgery with Dr. Venegas and Dr. Sandoval at the General Hospital of Guadalajara in Mexico).

This January, she experienced one of the most difficult moment in her life by losing her father. He was a family doctor and the smartest person she knew. Her father was her model in as much in medicine than in everyday life.

She still lives in Croatia with her life partner and she is going to finish her medical stage in Zagreb in order to receive her medical license.

Caroline's interest lies in the field of Surgery especially plastic and reconstructive surgery and she hopes she can achieve her dream in the future by becoming one of the best surgeons in the world.



## 13. References

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