

Ministry of Higher Education and Scientific Research  
University of Baghdad  
Institute of Laser for Postgraduate Studies



# **" Sutureless CO<sub>2</sub> Laser Labiaplasty of Labia Minora "**

A Dissertation Submitted to the Institute of Laser for  
Postgraduate Studies, University of Baghdad in Partial  
Fulfillment of the Requirements for the Degree of Higher  
Diploma in Laser in Medicine / GYNECOLOGY.

**By**

**Dr. Farah Sami Dawood**

**M.B.CH.B - D.O.G**

**Supervisor**

**Dr. Nadia Mohammed Saeed**

**M.B.CH.B - F.I.C.OG**

**D.L.G.S Gynecology**

**2022 AD**

**1443 AH**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ ﴿٧٦﴾﴾

صدق الله العظيم

يوسف: ٧٦

## **Certification**

I certify that this thesis was prepared under my supervision at the Institute of Laser for Postgraduate Studies, University of Baghdad, as a partial fulfillment of requirements for the degree of "Higher Diploma in Laser in Medicine / Gynaecology.

Signature:

Name: **Dr. Nadia Mohammed Saeed**

Title: **M.B.CH.B. F.I.C.O.G DLGS Gynecology**

Address: AL-Imamain AL-Kadhemain,  
Medical City / Baghdad.

Date: 2 /2 / 2022

(Supervisor)

In view of the available recommendation, I forward this thesis for debate by Examining Committee.

Signature:

Name: **Asst. Prof. Dr. Hanan Jaafar Taher**

Title: Head of the Scientific Committee.

Address: Institute of Laser for Postgraduate studies,  
University of Baghdad.

Date: 2/2 / 2022

## **Examination Committee Certification**

We certify that we have read this dissertation " Suture less CO<sub>2</sub> Laser Labiaplasty of Labia Minora " and as Examination Committee, we examined the student in its content and in our opinion, it is adequate with standards as a dissertation for a degree of Higher Diploma in Laser in Medicine / Gynaecology.

**Signature :**

**Name : Dr. Hanan Jaafar**

**Name : Dr. Manal Ibrahim Mzeail**

**Title : Asst. Prof.**

**Title : M.B.CH.B, CABOG , FICOG, DLGS**

**Address: Institute of laser  
for postgraduate studies  
university of Baghdad**

**Address: AL-Imamain AL-Kadhemain  
Medical City / Baghdad**

**Date : / / 2022**

**Date : / / 2022**

**(Member)**

**(Member)**

Approval by the Deanship of Institute of Laser for Postgraduate Studies, University of Baghdad.

**Signature :**

**Name : Dr. Hussein Ali Jawad**

**Title : Dean. professor**

**Address: Institute of Laser for Postgraduate Studies, university of  
Baghdad.**

**Date : / / 2022**

DEDICATED TO

MY

MOTHER

AND

MY FAMILY

## Acknowledgements

First of all I would like to thank ALLAH for inspiring me with patience and strength to do this work.

I wish to express my great thanks to professor **Dr. Hussein Ali Jawad** , Dean of the Institute of Laser for Postgraduate Studies for his encouragement.

I found words inadequate to express my deep respect to my supervisor **Dr. Nadia Mohammed Saeed**, who supports me with her unlimited experience , inspiration and continuous **valuable** scientific suggestions throughout the preparation of this thesis and being patient with me in accomplishing this work .

I wish to express my deep appreciation to **Dr. Layla M. H. Al. Amery**, the Institute of Laser for Postgraduate Studies, University of Baghdad for her encouragement and support.

I wish to express my great thanks to **Dr. Ahmed M. Hasan** , Institute of Laser for Postgraduate Studies /University of Baghdad for his great advices.

Great thanks to **Dr. Youssra Waheed**.

Great thanks to all the staff of the Institute of Laser for Post Graduate Studies for their Kind help and great efforts! To all: Thank you very much!

## **Abstract**

**Background:** The hypertrophy of labia minora is recently represented big concern for women for aesthetic purposes or due to local irritation and discomfort. The laser treatment of labia minora hypertrophy has many advantages.

**Aim of study:** To evaluate the effectiveness of sutureless CO<sub>2</sub> laser labiaplasty of labia minora.

**Patients and Methods:** This study is case series study conducted in private Gynecological Aesthetic Clinic at Baghdad city /Iraq during duration of five months throughout the period from 1<sup>st</sup> of September, 2021 till 31<sup>st</sup> of January, 2022 on sample of eight women with labia minora abnormality. Edge resection of excess tissue was performed in non-contact mode by CO<sub>2</sub> laser. Assessment of outcomes was done by measuring the Visual Analog Scale (VAS) and the Vulvovaginal Symptom Questionnaire (VSQ).

**Results:** The sutureless Co<sub>2</sub> laser labiaplasty was significantly effective in increasing VAS for satisfaction and for self confidence during intercourse. The sutureless laser labiaplasty was significantly effective in reducing intensity of itching, irritation, odour, discharge and discomfort symptoms. The complications of procedure were shown by two women (25%); one woman with bleeding complication and one woman with oedema.

**Conclusion:** The sutureless laser labiaplasty is effective method for reducing the size of labia minora.

# LIST OF CONTENTS

Title	Page No.
Dedication	
Acknowledgment	
Abstract	I
List of contents	II
List of tables	IV
List of figures	V
List of abbreviation	VII
<b>Chapter One: Introduction &amp; Basic Concepts</b>	
1.1. Background	1
1.1. Labia minora	1
1.1.1. Definition and anatomy	1
1.1.2. Embryology	2
1.1.3. Blood supply & nerve supply	2
1.1.4. Physiologic Variants	2
1.2. Hypertrophy of Labia minora	5
1.3. Cosmetic treatment of female genitalia	7
1.3.1. Benefits	8
1.3.2. Risks and adverse effects	8
1.4. Labiaplasty Minora	9
1.4.1. Indications	9
1.4.2. Contraindications	10
1.4.3. Complications	10
1.5. Sutureless Laser labiaplasty minora	10
1.5. Laser physics	13
1.5.1. Basic Components of Laser	13
1.5.2. Properties of Laser Light	14
1.5.3. Laser modes	15
1.5.4. Laser parameters	17
1.5.5. Laser hazards effects	18
1.5.6. Laser safety standards and hazard classification	18
1.5.7. Laser tissue interaction	19
1.5.8. Effect of tissue on laser light	20



1.5.9. Effect of laser light on tissue	21
1.5.10. Medical Laser types can be divided into:	22
1.5.11. CO2 laser	23
1.5.12. Surgical CO2 Laser	23
Aim of study	25
<b>Chapter Two : Patients &amp; Methods</b>	
2.1 Introduction	26
2.2 Patients	26
2.2.1 Study design & settings	26
2.2.2 Study population	26
2.2.3 Inclusion criteria	26
2.2.4 Exclusion criteria	26
2.3 Clinical assessment	27
2.4 Ethical considerations	27
2.5 Procedure	27
2.6 CO2 Laser specifications	28
2.7 Treatment parameters	29
2.8 Safety measures	32
2.9 Outcome assessment	32
2.10 Follow up	33
2.11 Statistical analysis	33
<b>Chapter Three Results, Discussion and Conclusions</b>	
3.1 Introduction	34
3.2 Results	34
3.3 Discussion	45
3.4 Conclusions	49
3.5 Recommendations	49
References	50
الخلاصة	58

## LIST OF TABLES

<b>No.</b>	<b>Table</b>	<b>Page No.</b>
1-1	Franco classification of labia minora hypertrophy	5
1-2	Ricci and Pardo classification of labia minora hypertrophy for surgical correction.	7
1-3	Laser hazard classification.	19
3-1	General characteristics of women managed with sutureless laser labiaplasty of labia minora	34
3-2	History and chief complaints of women managed with sutureless laser labiaplasty of labia minora	35
3-3	Visual analogue scale of women managed with sutureless laser labiaplasty of labia minora	37
3-4A	Vulvovaginal symptom questionnaire of women managed with sutureless laser labiaplasty of labia minora	38
3-4B	Vulvovaginal symptom questionnaire of women managed with sutureless laser labiaplasty of labia minora	39
3-5	Treatment complications of women managed with sutureless laser labiaplasty of labia minora	40
3-6	Immediate complication during surgery.	41
3-7	Distribution of woman's VAS before and after surgery	41
3-8	Distribution of woman's VSQ before and after surgery	43

## LIST OF FIGURES

<b>No.</b>	<b>Figure</b>	<b>Page No.</b>
1-1	Female reproductive system.	1
1-2	A 32-year-old woman with prominent bilateral lateral clitoral hood folds.	3
1-3	A 28-year-old woman with thick, hyperpigmented labia minora and redundant labia minora tissue extending between the introitus and anus	4
1-4	Photograph of a 29-year-old woman with extended labia minora	4
1-5	Labial hypertrophy	6
1-6	Young lady in her 20s felt uncomfortable with her labia and redundant and loose perineal tissues. She requested an aggressive labiaplasty for both comfort and personal confidence a) before surgery, b) two months after surgery (labia minoraplasty, clitoral hood reduction, and perineoplasty)	13
1-7	Basic components of laser.	14
1-8	Laser light properties vs. ordinary light	15
1-9	Energy vs. time emitted from a laser. a) typical continuous wave (CW) laser; constant energy over time. b) CW laser 'chopped' with a shutter mechanism; average power is reduced but no gain in peak power. c) Ultrashort pulse laser; average power remains the same but peak power is greatly enhanced.	17
1-10	Laser tissue surface interaction.	20

1-11	Interaction of light with biological tissue (Wavelength dependent mechanism)-30	21
1-12	Interaction of light with biological tissue (Wavelength independent mechanism).	21
1-13	Skin penetration of Ablative, Non ablative and fractional laser types.	22
2-1	CO2 Laser Machine.	29
2-2	CO2 Laser Specifications.	30
2-3	CO2 Laser parameters.	30
2-4	CO2 Laser hand piece.	31
2-5	Incised part of labia minora by CO2 Laser	31
3-1	Chief complaints.	36
3-2	Sutureless laser labiaplasty complications	40
3-3	VAS for satisfaction before and after sutureless laser labiaplasty of labia minora.	42
3-4	Itching intensity before and after sutureless laser labiaplasty of labia minora	44
3-5	Discomfort intensity before and after sutureless laser labiaplasty of labia minora	44

## List Of Abbreviations

Abbreviation	Item
ACOG	American college of obstriation and Gyneacologists
ANSI	American National Standard Institute
CO <sub>2</sub>	Carbon dioxide
Cm	Centimeter
CW	Continuous Wane
Er- YAG	Erbium - YAG
1 <sup>st</sup>	First
He – Ne	helium – Neon
HZ	Hertz
HPV	Human papilloma virus
IR	infrared
J	Joule
mm	millimeter
nm	nanometer
Nd – YAG	Neodymium – yttrium Aluminum Granet
NSAIDS	nonsteroidal antiinflammatory drugs
QOL	quality of life
Sec	Second
SOGC	Society of obsteteriation and Gynecologists of Canada
SD	Standard deviation
SPSS	Statistical package for social sciences
Uk	United Kindom
VAS	Visual Analogue Scale
VSQ	Vuluvaginl symptom Questionnaine
W	Watt
Wtlo	World health organization

# **Chapter One**

**Introduction**

**& Basic Concepts**

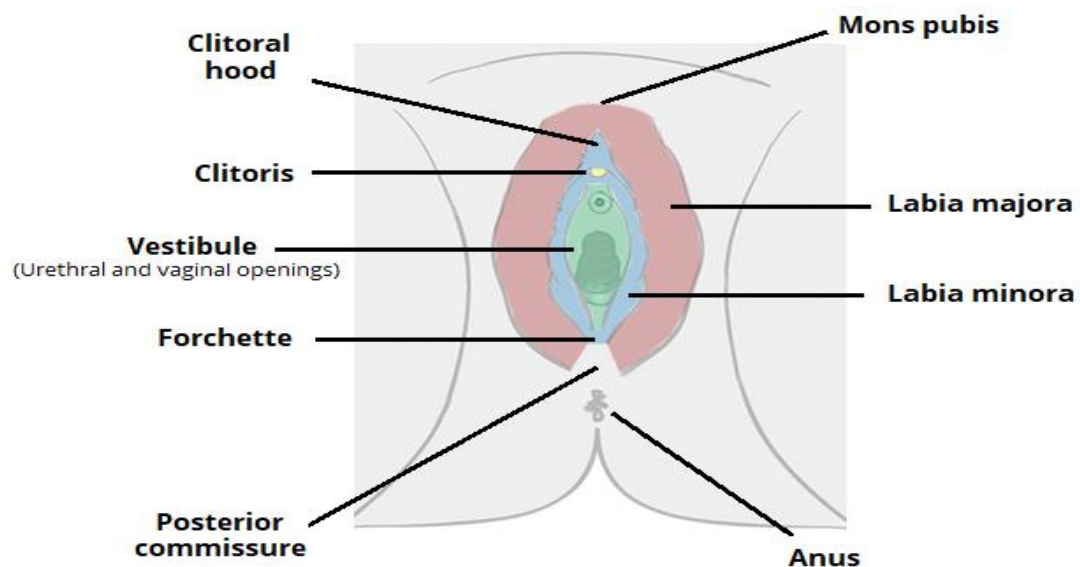
## Introduction

### 1.1. Background

#### 1.1. Labia minora

##### 1.1.1. Definition and anatomy

The labia minor are a pair of small cutaneous folds that begins at the clitoris and extends downward. The anterior folds of the labia minora encircle the clitoris forming the clitoral hood and the frenulum of the clitoris. Then the labia minor descends obliquely and downward forming the borders of the vulva vestibule. Eventually, posterior ends of the labia minora terminate as they become linked together by a skin fold called the frenulum of the labia minora. The labia minora will encircle the vulva vestibule and terminating between the labia majora and the vulva vestibule. With sexual arousal, the labia minora will become engorged with blood and appear edematous (**As shown in Figure 1-1**) [1].



*Figure 1-1: Female reproductive system. [1]*

### **1.1.2. Embryology**

The female external genitalia develops from many default structures such as the genital tubercle, urogenital sinus, urogenital folds, and the labioscrotal folds specifically urogenital folds form the labia minora in females and it forms the ventral shaft of the penis in males [2]. The reason that these default structures differentiate into female external genitalia instead of males' is due to the influence of estrogen [3].

### **1.1.3. Blood supply & nerve supply**

The internal pudendal artery perfuses the majority of the external female genitalia. The labia majora also received blood from the superficial external pudendal artery. The superficial external pudendal artery is a tributary of the femoral artery [4]. The venous drainage of the external female genitalia is via the external and internal pudendal veins. The lymphatic drainage of the external female genitalia drains toward the superficial inguinal lymph nodes except for the clitoris. The lymph from the superficial and deep inguinal lymph nodes will ascend toward the common iliac lymph nodes[4]. The motor, sensory, and sympathetic nerve innervation of the external female genitalia originate from the pudendal nerve. The pudendal nerve will branch into three main branches: the dorsal nerve for the clitoris, the perineal nerve for the external genitalia, and the inferior rectal nerve. As for the perineal nerve branch, it will provide sensory to the external genitalia via the posterior labial nerves. The labia majora also received addition innervation from the anterior labial nerves [5].

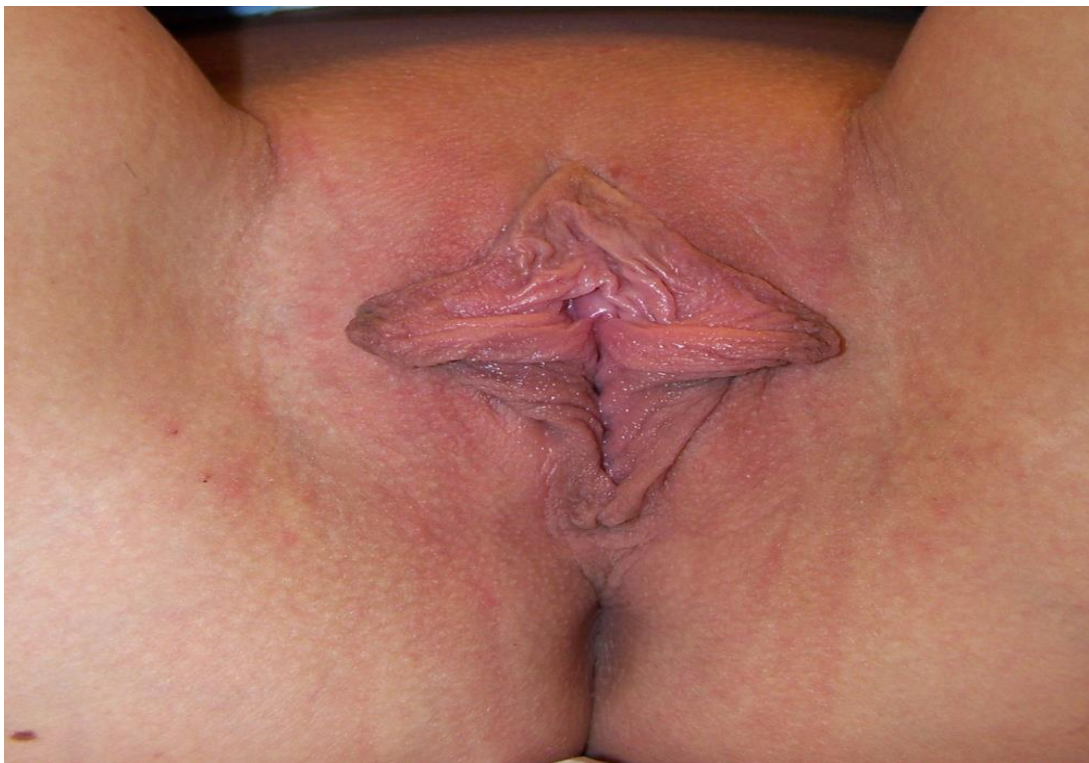
### **1.1.4. Physiologic Variants**

The female external genitalia varies greatly. The shape, size, and color of the mons pubis, clitoris, labia majora, labia minora, and the vagina orifice are different from female to female (**Figures (1-2) – Figures**



(1-4)). The reason for the variations is due to the amount of estrogen influence during development. If there is more estrogen, these structures tend to be larger and thicker. While the lack of estrogen can lead to the external genitalia being thinner and smaller. The labia majora and labia minora tend to be the structures that vary greatly in size, color, and length when comparing females. Some females have more prominent labial folds visually. In some females, the clitoris and the clitoris hood may be larger and more prominent visually. While many of these structures can vary greatly. In general, the functionality of these structures is unchanged [6].

These variations in the female external genitalia can be due to aging and the lack of estrogen also. During menopause, women start to have a decrease in the production of estrogen. This decrease in estrogen causes the female external genitalia to atrophy [7].



*Figure 1-2: A 32-year-old woman with prominent bilateral lateral clitoral hood folds[6].*



***Figure 1-3: A 28-year-old woman with thick, hyperpigmented labia minora and redundant labia minora tissue extending between the introitus and anus. [6]***



***Figure 1-4: Photograph of a 29-year-old woman with extended labia minora. [6]***

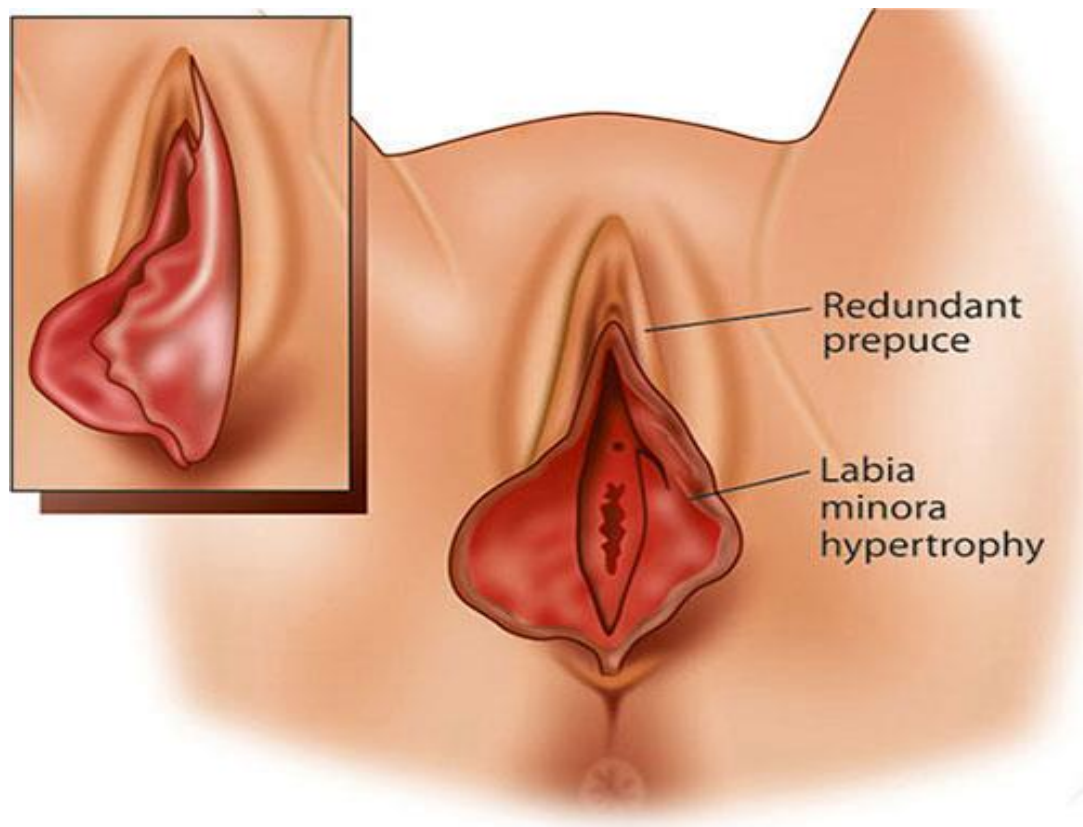
## 1.2. Hypertrophy of Labia minora

Hypertrophy of labia minora is an anatomical variant of labia minora affecting a woman's daily activities as well as her self-esteem due to concern about vulvar appearance (**As shown in Figure 1-5**). Mechanical irritation is thought to contribute to hypertrophic labia minora, etiology of which is likely multifactorial [8]. Clinical labia minora hypertrophy remains poorly defined, and consensus regarding criteria for surgical intervention has yet to be formally established. Interest in surgical correction of vulvar appearance may be associated with trends in pubic hair removal, exposure to idealized images of genital anatomy through digital applications or websites, social media, and growing awareness of cosmetic vaginal surgery [8].

The most widely used classification system, first described by Franco in 1993, divides labial hypertrophy into four stages: stage I, less than 2 cm; stage II, 2 to 4 cm; stage III, 4 to 6 cm; and stage IV, greater than 6 cm. The distance is measured in centimeters from the base of the labia minora (the vaginal introitus) to the distalmost tip. The labia minora vary in length, thickness, symmetry, and protuberance. The mean width of the labia minora is 2.5 cm, with a range of 7 mm to 5 cm [9].

**Table 1-1: Franco classification of labia minora hypertrophy.**

Type	Labial width (cm)
1	< 2
2	2-4
3	4-6
4	>6



*Figure 1-5: Labial hypertrophy. [8]*

Although no standard consensus has been established yet to classify labia minora hypertrophy; many do exist depending on the size and severity of the hypertrophy [Tables 1 and 2]. Arbitrary landmarks taken in these measurements make it difficult to diagnose hypertrophy on a standard scale. Some have measured size from midline horizontally, and some have measured from free edge. It is indeed of great importance to include patient's own symptoms in the diagnosis [10, 11]. Ricci and Pardo classified the labia minora in regard to surgical objectives and they also reported hemostatic advantages of using laser devices when performing this procedure, with high rates of patient satisfaction and few rate of complications [12].

**Table 1-2: Ricci and Pardo classification of labia minora hypertrophy for surgical correction.**

Type	Labial width (cm) and character
Lacking true hypertrophy	Up to 2 cm and no zone of greater growth but with morphological defect such as asymmetry
Moderate true	2-3 cm with zones of greater growth
Severe true hypertrophy	>4 cm with or without zone of greater growth/ hypertrophy

### **1.3. Cosmetic treatment of female genitalia**

In 1946, the World Health Organization (WHO) defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Esthetic surgeons similarly recognize that self-perception of body image, beauty, and physique may strongly influence a woman’s mental and social well-being. Cosmetic surgery, therefore, is generally considered ethical and beneficial when the intervention is able to improve the quality of life (QoL) and well-being of the patient. In recent decade, however, a new esthetic concept has been introduced into urogynecological practice: correction and/or modifying the genital anatomy in the absence of a specific organic problem or disease with the objective of improving a woman’s self-perception. This scenario has resulted in a growing demand for cosmetic genital procedures and is based on the same premises as that of plastic surgery performed on other bodily structures, such as breast, face, and abdomen, without evidence of organic disease [13].

Surgical decision should largely be dependant on labia size as well as symptoms addressed by the patient. A number of studies have been published in context to labia minora hypertrophy and their management, but



only a few have addressed the occurrence of hypertrophy in adolescent age and most of their patients fall in 20–40 age group [10, 11].

### **1.3.1. Benefits**

In gynecological settings, it is estimated that >90% of performed cosmetic genital procedures involved the labia minora. The National Health Service in the UK has reported a fivefold increase in labiaplasty operations over a 10-year period, although this procedure is being more restricted when performed primarily for cosmetic indications. Most labiaplasty studies reported that different techniques appear to offer excellent and equally similar esthetic results with high patient satisfaction and very low complication rates [14]. In addition, using validated symptom questionnaires in some studies, significant improvements in sexual satisfaction, pain during intercourse, and psychological state were found in patients after genital cosmetic surgery [15].

### **1.3.2. Risks and adverse effects**

Several questions have been raised regarding the safety and effectiveness of female aesthetic genital surgery by several professional bodies, including the American College of Obstetricians and Gynecologists (ACOG). Due to the lack of published clinical data, the ACOG has recommended that all women seeking aesthetic genital surgery should be aware of the potential complications, such as altered sensation, dyspareunia, scarring, and adhesions. Recently, the Society of Obstetricians and Gynaecologists of Canada (SOGC) released clinical practice guidelines to attempt to provide evidenced-based direction for cosmetic vaginal and vulvar surgeries. The concerns of these organizations continue to revolve around the belief that studies showing the safety and efficacy of female aesthetic genital surgery are lacking. Several studies have reported minor complications

associated with labia minora reduction, such as wound dehiscence, skin necrosis, infection, and hematoma [16].

#### **1.4. Labiaplasty Minora**

Labiaplasty refers to surgical reduction of the labia minora. Additional goals of this procedure include minimal invasiveness, preservation of the introitus, optimal color/texture match, and maintenance of the neurovascular supply. It is a technique used to alleviate labia minora hypertrophy with common popularity. Due to greater public awareness regarding problems associated with hyperplastic labia minora, increasing numbers of women are seeking labiaplasty procedures for aesthetic, functional, and/or psychological reasons. Identity and self-esteem can be intimately related to the self-perceived appearance of one's genitalia. Female genital aesthetics is a product of cultural norms and a woman's perceived concept of beauty. Patient awareness has led to significant demand for genital aesthetic surgery, and according to the American Society of Aesthetic Plastic Surgeons 2017 Statistics, request for labiaplasty has increased by 217.2% from 2012 to 2017. Female aesthetic genital surgery can greatly enhance the confidence of a perceived or real genital deformity and labial reduction and clitoral hood surgery can give a natural appearance with an extremely high satisfaction rate exceeding 90% [17].

**The basic guidelines for genital aesthetics** include (1) symmetrical labia minora that do not protrude past the labia majora, especially when standing; (2) a clitoral hood that is reasonably short and non-protuberant without extra folds; (3) full labia majora without redundant skin but not overly fatty which can cause an unsightly bulge in clothes, and (4) a mons pubis that has mild fullness but does not protrude in clothes [17, 18].

### **1.4.1. Indications**

The majority of labia minora enlargements are congenital, although women do claim to have enlargement after childbirth, hormone therapy, and increasing age [19]. Labia minora reduction is indicated in women as young as 12 years old if extremely symptomatic, where enlargement can affect self-esteem, cause discomfort, or social stigmata. The vast majority of labial reduction is performed for aesthetic reasons in sexually mature women. Women often perceive an ideal labia minora as light in color, thin, straight, and symmetrical [19]. Technique selection should be based on anatomy, patient goals, and patient preferences [22-22].

### **1.4.2. Contraindications**

Contraindications include patients with body dysmorphic disorder and those expecting this procedure to enhance their sexual lives and improve the ability to achieve orgasm [19].

### **1.4.3. Complications**

Although the majority of patients heal extremely well, the most common complications are a slight separation of the labial edge closure or a small fistula, occurring in less than 2% of cases. These can typically be repaired under local anesthesia in 4-6 months from surgery. Major dehiscence is rare if performed as stated. Chronic scar discomfort or interference with intercourse are very rare and can be corrected. Occasionally, the labia or scars may stretch back over time, but this can be easily revised [22].



### **1.5. Sutureless Laser labiaplasty minora**

Increasing number of patients are seeking medical attention, due to concerns about labia minora hypertrophy related to cosmetic, functional, and sexual concerns [23]. Gynecologists from around the world are nowadays confronted with an increasing demand for labia reduction surgery [24].

Clinical labia minora hypertrophy remains poorly defined, with no established cut-off values and only few attempt at classification since data on measurements of the labia minora are sparse [25]. An indication for surgery can also be asymmetry. All things considered, the criteria of the “ideal vulva” are very subjective so a decision to perform the procedure should be based on the patients perception and surgeons discretion. In order to obtain the best possible results many different techniques have been used by surgeons around the world. All of the techniques can be categorized into 3 groups: Edge resection, wedge resection, and central resection. According to published data best-fit techniques are not proposed since all studies report of good outcomes and high satisfaction rates no matter the technique used as long as the operator had enough experience with labiaplasty [10].

Hodgkinson was one of the firsts to publish a description of a labiaplasty procedure in 1983. Rouzier and colleagues presented their experience with a large series of patients. Labiaplasty technique has also been described by many other authors, such as Munhoz [26], Maas, Giraldo, and Rauso [27]. These techniques were performed with common surgical techniques, without the aid of energy source or laser devices. Pardo and colleagues reported hemostatic advantages of using laser devices when performing this procedure, with high rates of patient satisfaction and few rate of complications [12].

Laser energy sources have been used in gynaecology for more than three decades. There are many described advantages, such as bactericidal,

bio-regenerative and bio-stimulating effects on tissues, which allow better healing, faster recovery, less pain and better aesthetic results [28].

Ablative lasers like Er:YAG and CO<sub>2</sub> are also used in labiaplasty procedures [29]. Three articles report on using laser instead of scalpel for cutting, Pardo used Nd:YAG,[12] Smarrito and GonzalezIsaza instead used CO<sub>2</sub> [30, 31]. However Er:YAG laser has also been used for surgical procedures in gynecology for at least 2 decades [32].

Many techniques have been described for labiaplasty: deepithelialized reduction, linear incision, composite reduction, wedge reduction, W-plasty excision or Z-plasty [9]. The linear excision technique is the most preferred among gynecologists because of its simple and minimally invasive approach. In Laguna Beach, California, terms that are used for the labial reductions according to the level of labia majora below or at the same level with labium minora: rim look, Barbie look or hybrid look [33]. With this technique, smoother contours can be achieved. According to Miklos and Moore's [34] study, 97% of 550 women wanted to remove dark edges. If the patient wants to retain the dark edges of the labium minora, a wedge technique can be performed. This technique is mostly performed by plastic surgeons. There are modifications of this technique; central V-plasty, and 90-degree Z-plasty [35]. If any of these wedge techniques are performed, perfect hemostasis is very important to prevent wound dehiscence and fistula formation. Although the wedge resection technique preserves a more natural edge look, most women want removal of this irregular labial edge for a smoother and more petite appearance (Figure 1-6). If a minimal amount of labium needs to be excised deepithelialized reduction technique may be preferred. If the deepithelialized area is large, it can result in increased labial thickness and a visible suture line. Labia majora reduction, or labia majoraplasty, is intended to reduce the size of labia majora that appear saggy and hyperplastic. Here, the excess skin, and, if necessary, fat pad is removed.

In over 90% of cases, only segments of the labia majora skin is removed. Longitudinal resection with scar placement between the thigh-vulva crease or resection with scar placement between the labium majora and minora can be performed. The first technique has high risk for wound dehiscence because of scar formation in a high tension area [36].



***Figure 1-6: Young lady in her 20s felt uncomfortable with her labia and redundant and loose perineal tissues. She requested an aggressive labiaplasty for both comfort and personal confidence a) before surgery, b) two months after surgery (labia minoraplasty, clitoral hood reduction, and perineoplasty) [36]***

## **1.5. Laser physics**

The name LASER is an acronym for Light Amplification by Stimulated Emission of Radiation.

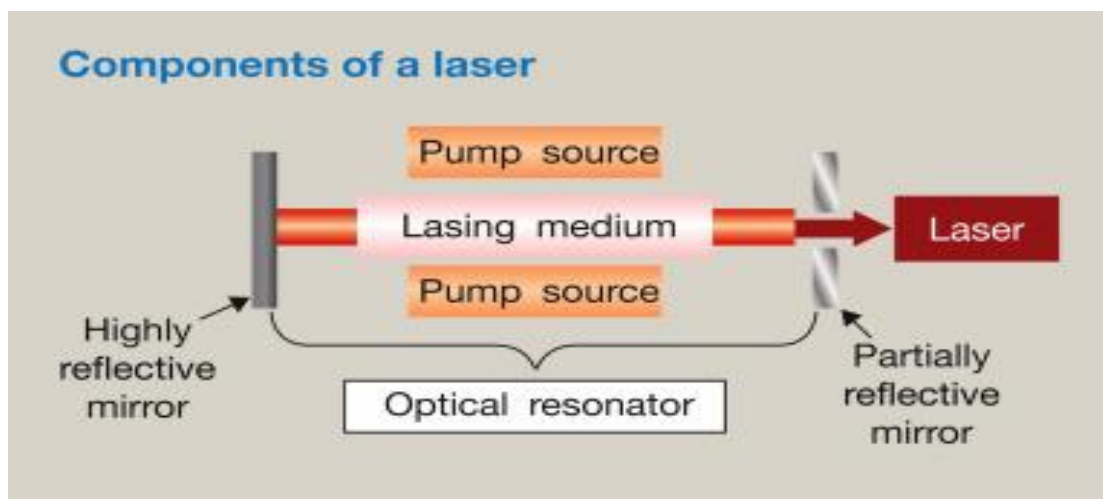
### **1.5.1. Basic Components of Laser**

In order to operate most laser devices, three basic conditions must be satisfied:

1-Active medium: This is a collection of atoms, molecules, or ions that can be solid, liquid, gas, or plasma states. The composition of the lasing medium determines the wavelength output and name of a particular laser[37].

2-Pumping source: The source of energy to pump the laser medium. When the laser medium in the optical cavity is pumped, a laser beam is generated that leaves the cavity through the partially transmissive mirror by which the population inversion is created inside the active medium.

3-Optical resonator: This consists of two mirrors. The laser medium is placed in the optical cavity and its axis is made to coincide with the common axis of the mirrors. One mirror is generally fully reflective for the wavelength of operation of the laser and the other is partially transmissive, by which the selection of some photon states and the suppression of other states can be realized [38]. As shown in Figure 1-7.



*Figure 1-7: Basic components of laser. [38]*

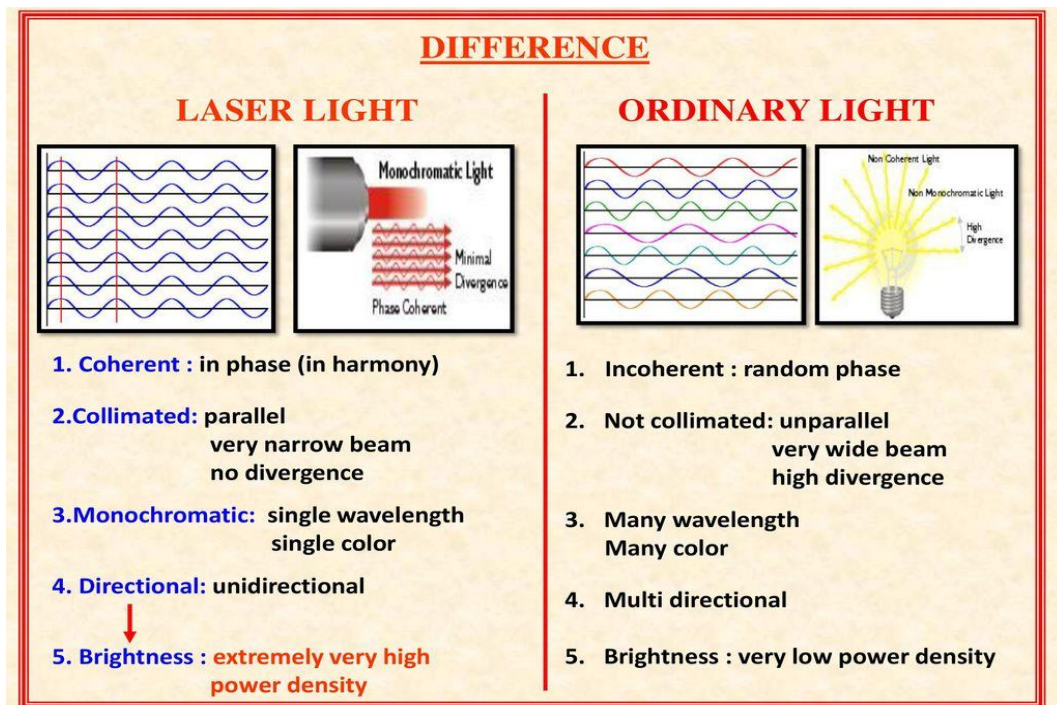
### 1.5.2. Properties of Laser Light

**Monochromaticity:** Monochrome means that all the photons have the same wavelength.

**Coherence:** Coherence means that the electromagnetic waves of light rays are in phase with each other in both space and time.

**Directionality:** There is little divergence of the laser beam as it exits the laser device and the beam can travel a considerable distance with very little movement away from parallelism.

**Brightness or intensity:** This property arises from the parallelism or collimation of the laser light as it moves through space maintaining its concentration and thus, the characteristic brightness. Laser light versus ordinary light [39]. As shown in figure 1-8.

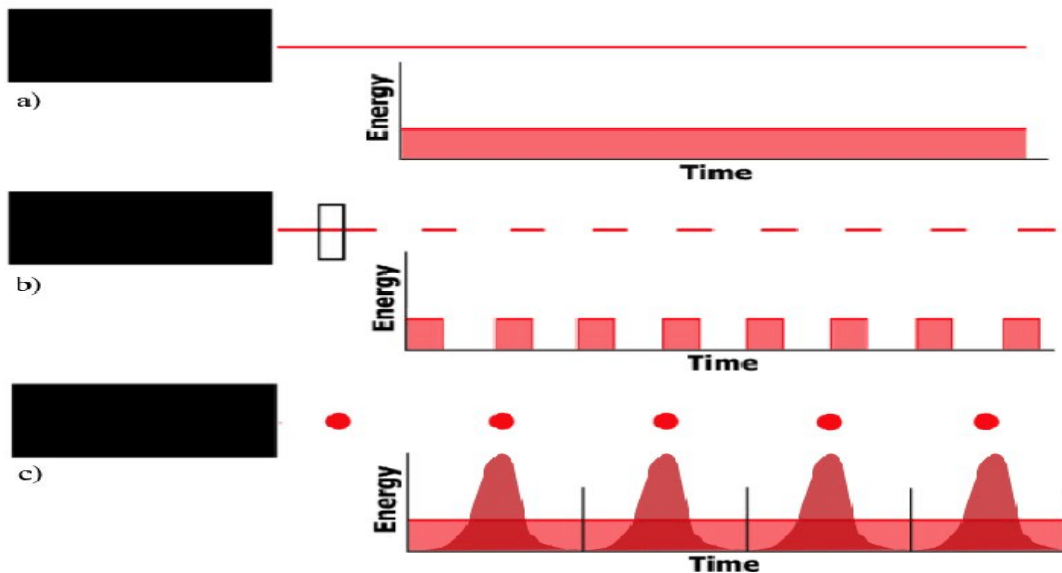


*Figure 1-8: Laser light properties vs. ordinary light. [39]*

### 1.5.3. Laser modes

Types of laser operation: Lasers can operate in the following modes:

- CW or continuous mode: is generated by continuously pumping energy into active medium to achieve equilibrium between the number of atoms raised to the excited state and the number of photons emitted .At such equilibrium continuous laser output results. The duration of which ranges from fractions of a second to hours. (Figure 1-9)
- Chopped mode: A shutter interrupt; the output of a CW laser that chops the beam into trains of short pulses. The maximum power level of each pulse is the same as that obtained in the CW mode. (Figure 1-9)
- Pulsed: Gas lasers such as the CO<sub>2</sub> laser can be gated or pulsed. Electronically the gating permits the duration of the pulses to be compressed; producing a corresponding increase in peak power that is much higher than it is commonly available in the CW mode. (Figure 1-9)
- Q-Switched: Short and more intense pulse can be obtained with the technique of Q-switching. By introducing a shutter into the resonant cavity of the laser, the energy in the active medium is raised to a level far above that is obtainable without the shutter or obstruction in the system. If the shutter is then rapidly opened or the obstruction is removed to permit light to traverse the resonant cavity, all of the stored energy is discharged in an extremely short period [39].



*Figure 1-9: Energy vs. time emitted from a laser. a) typical continuous wave (CW) laser; constant energy over time. b) CW laser 'chopped' with a shutter mechanism; average power is reduced but no gain in peak power. c) Ultrashort pulse laser; average power remains the same but peak power is greatly enhanced. [39]*

#### 1.5.4. Laser parameters

- **Wavelength:** Wavelength is the most important determinant in how light affects tissue.
- **Energy:** Energy is measured in joules (J) and is proportional to the number of photons.
- **Energy density:** Fluence is the energy delivered per unit area. It is measured in  $\text{J}/\text{cm}^2$
- **Pulse duration:** This term is used in pulsed lasers. It refers to the full width at half maximum of the peak of the pulse. Pulse duration is measured in units of time (milliseconds, microseconds, nanoseconds, picoseconds or femtoseconds).

- **Repetition rate:** It is the number of pulses per one second. It is measured in Hertz (Hz).
- **Duty cycle:** It is the useful proportion of the laser beam during which the light is transmitted by the chopped laser. It is a unit less quantity.
- **Power:** Power is the rate of delivery of the energy. It is measured in watts (W) where  $1\text{ W} = 1\text{ J/sec}$ .
- **Power density:** Irradiance: Irradiance is the power per unit area. It is measured in  $\text{W/cm}^2$ .
- **Spot diameter:** It is the diameter of the irradiated area on the target. The spot diameter is considered to be equal to the beam diameter when the lenses are not be used. The units of the spot diameter are usually centimeters [39].

#### **1.5.5. Laser hazards effects**

As a consequence of increasing popularity, laser systems are now highly widespread in medical environment, where they are used also by personnel not highly specialized in optics and laser source management and in the presence of patients. This has greatly boosted the attention towards laser safety issues related to exposure to laser beams and to strictly assess the values of well-defined laser radiation standard parameters characterizing the level of hazard of laser sources [40].

#### **1.5.6. Laser safety standards and hazard classification**

This standard was developed by the American National Standard Institute (ANSI) in year 1993. The classification is based upon the beam output power or energy from the laser. Basically, the classification is used to describe the capability of the laser to produce injury to personnel. The higher



the classification number, the greater is the potential hazard [41]. As shown in table 1-3:

**Table 1-3: Laser hazard classification.**

<b>Class I</b>	Lasers or laser systems that do not, under normal operating conditions, pose a hazard.
<b>Class IIa</b>	Low power visible lasers or laser systems that are not intended for prolonged viewing, and under normal operating conditions will not produce a hazard if the beam is viewed directly for periods not exceeding 1000 seconds.
<b>Class II</b>	Low power visible lasers or laser systems which, because of the normal human aversion response, do not normally present a hazard, but may present some potential for hazard if viewed directly for extended periods of time (like many conventional light sources).
<b>Class IIIa</b>	Lasers or laser systems having a CAUTION label that normally would not injure the eye if viewed for only momentary periods (within the aversion response period) with the unaided eye, but may present a greater hazard if viewed using collecting optics. Another group of Class 3a lasers have DANGER labels and are capable of exceeding permissible exposure levels for the eye in 0.25 seconds and still pose a low risk of injury.
<b>Class IIIb</b>	Lasers or laser systems that can produce a hazard if viewed directly. This includes intrabeam viewing of specular reflections. Normally, Class 3B lasers will not produce a hazardous diffuse reflection.
<b>Class IV</b>	Lasers or laser systems that produce a hazard not only from direct or specular reflections, but may also produce hazardous diffuse reflections. Such lasers may produce significant skin hazards as well as fire hazards.

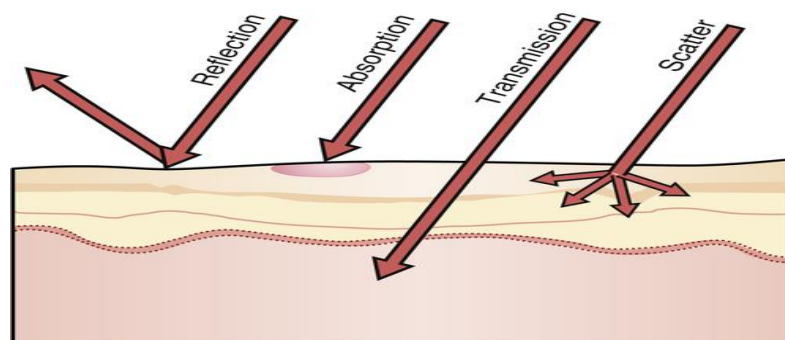
### 1.5.7. Laser tissue interaction

Today, lasers are widely used in biology and medicine, and the majority of health centers and hospitals utilize modern laser systems for diagnosis and therapy applications. Researchers have introduced different medical applications for different lasers used in surgeries and other medical treatments. Medical lasers can be categorized in both diagnosis and therapy branches. Main difference between diagnosis and therapy applications is the type of laser-tissue interactions. In diagnosis, one tries to arrange a noninvasive method to study the normal behavior of tissue without any damage or clear effect on tissue. But in therapy, such as surgery, surgeon uses laser as a knife or for affecting a specific region. So, the medical laser applications are defined by the interaction type between laser light and tissues. The knowledge of laser-tissue interaction can help doctors or

surgeons to select the optimal laser systems and modify the type of their therapy [42].

#### **1.5.8. Effect of tissue on laser light**

When laser light strikes a tissue surface, it can be reflected and refracted, scattered, absorbed or transmitted. The fractional intensity that goes into these different processes depends on the optical properties of the tissue like its reflectivity, scattering and absorption coefficients, particle size, as well as the laser parameters like wavelength, energy, pulse duration, operation mode and output spectral profile. In medical laser applications, refraction plays a significant role when irradiating transparent media like corneal tissue. In opaque media, usually, the effect of refraction is difficult to measure due to the absorption and scattering [43]. All the effects of light begin with the absorption of electromagnetic radiation. During absorption, the intensity of an incident light is attenuated by passing through a medium due to a partial conversion of light energy into heat motion or certain vibrations of molecules of the absorbing material. The ability of a medium to absorb electromagnetic radiation depends on a number of factors, mainly the electronic constitution of its atoms and molecules, the wavelength of radiation, the thickness of the absorbing layer and internal parameters such as temperature or concentration [44]; Figure 1-10 shows these processes.

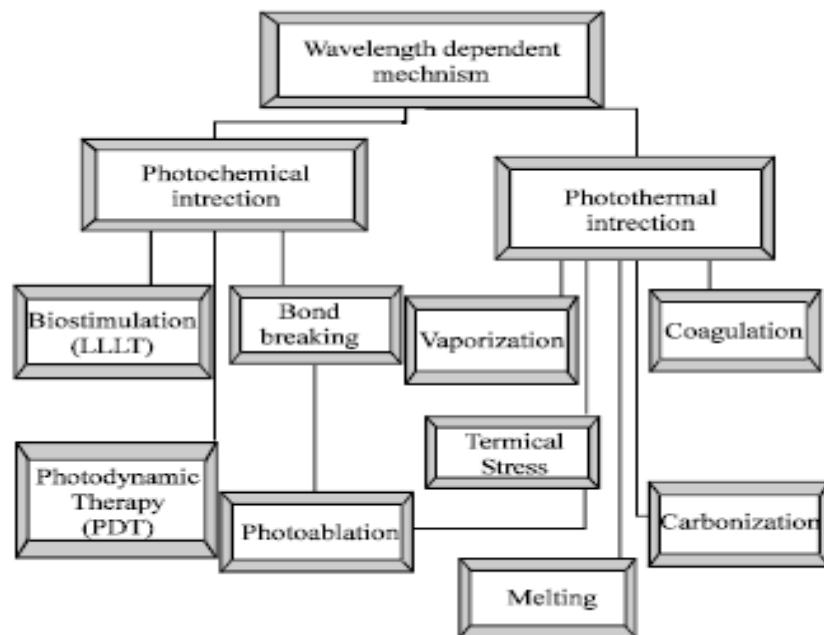


*Figure 1-10: Laser tissue surface interaction . [44]*

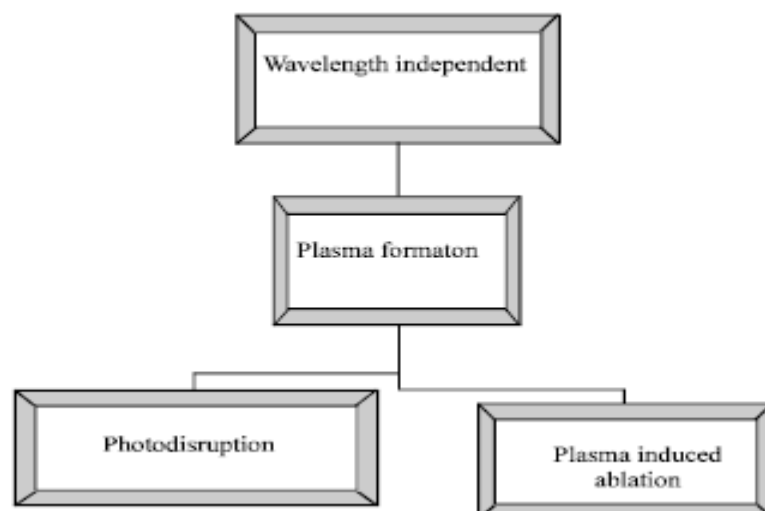
### 1.5.9. Effect of laser light on tissue

The variety of interaction mechanisms may occur when applying laser light to biological tissue due to specific tissue characteristics as well as laser parameters.

- Wavelength dependent mechanisms: As shown in Figures 1/11, 12:



*Figure 1-11: Interaction of light with biological tissue (Wavelength dependent mechanism) [45]*



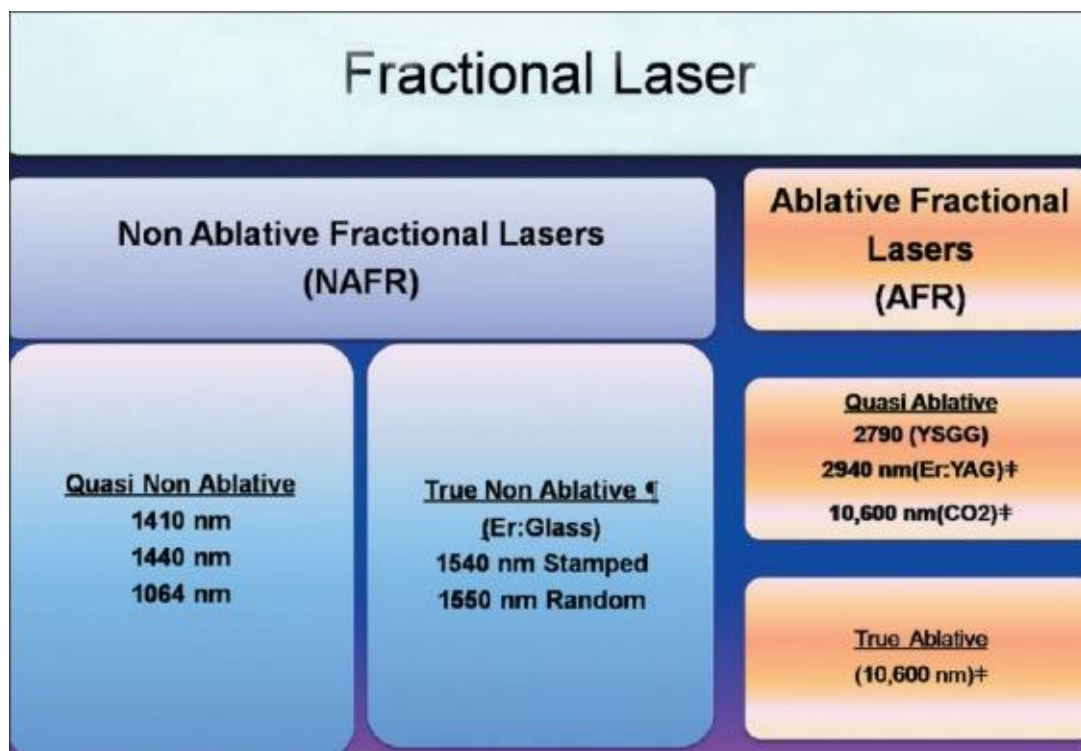
*Figure 1-12: Interaction of light with biological tissue (Wavelength independent mechanism). [45]*

### 1.5.10. Medical Laser types can be divided into:

**Ablative laser.** This is a wounding laser that removes the thin outer layer of skin (epidermis) and heats the underlying skin (dermis), which stimulates the growth of new collagen fibers.

**Nonablative laser.** This is a non-wounding laser that stimulates collagen growth.

**Fractional Lasers.** Break up the laser energy into thousands of tiny beams to treat only a fraction of the skin in the area. The depth of optical penetration for co2 laser is only about 20 microns, but Fractional co2 laser can vaporize nearly full thickness microchannels through the dermis. Difference between Ablative, Non-ablative and Fractional lasers depth penetration [45]. shown in figure 1-13.



*Figure 1-13: Skin penetration of Ablative, Non ablative and fractional laser types.[45]*

### **1.5.11. CO2 laser**

The carbon dioxide (CO<sub>2</sub>) laser emits light at a wavelength of 10 600 nm. Its photo thermal effect on tissue consists of the transformation of water into vapor, which leads to complete cell vaporization. However, as the CO<sub>2</sub> light only penetrates 0.3– 1mm into the target and, the thermal damage to the tissue beyond the vaporization area is minimal. In practical terms, the CO<sub>2</sub> laser is applied in a non- contact technique in CW and about 15W. As the laser light is in the far-infrared band, visual control can be achieved by the addition of visible guiding beam, such as a He-Ne or diode laser to mark the aimed focal spot [46].

Because of its very long and Far-IR wavelength, the CO<sub>2</sub> beam has a very shallow absorption depth and a great affinity for water and almost everything including glass and fiber optics. Though the beam must be delivered via mirrors mounted in an articulated arm, the CO<sub>2</sub> makes a great surgical “light” scalpel and ablator. When used with a scanner or pattern generator, cosmetic skin resurfacing is easily achieved. The treatment can be fractional or totally ablative [47]. Developments in fiber optics made it possible to transmit far-infrared laser beams, increasing the flexibility of CO<sub>2</sub> lasers for endoscopic surgery [48].

### **1.5.12. Surgical CO2 Laser**

The carbon dioxide laser has been considered an effective modality for multiple tasks related to the treatment of intraepithelial neoplasia of the lower genital tract, most commonly for large lesions and for multifocal manifestations of human papilloma virus (HPV). The use of this technology is limited in some areas because of healthcare provider training and experience and because of a lack of availability of equipment. Many hospitals require that specific credentials be obtained before using this

modality, including documentation of didactic instruction and clinical supervision of initial procedures [49].

Since the earliest use of the CO<sub>2</sub> laser for managing squamous abnormalities of the lower genital tract and intra-abdominal treatment of endometriosis and adhesions, it has been employed for other medical therapies including : treatment of condylomata in women who are pregnant, treatment of Bartholin gland cysts and abscesses, ablation of pigmented follicular cysts of the vulva, treatment of chronic anal fissures, excision of an imperforate hymen, excision of a vaginal septum, excision of hypertrophied labia minora or vaginal polyps, management of Nabothian cysts and even to assist the treatment and care of girls who have had Type III female genital mutilation [50].

The CO<sub>2</sub> laser has also been utilized as an option for management of anal dysplasia or treatment of refractory ano-genital lichen sclerosis. Intra-abdominal use of the CO<sub>2</sub> laser is now being compared to other instruments such as the Ultrasonic scalpel and employed via robotic management of endometriosis. It is of value in not only resection of endometriotic implants and treatment of endometriomas, but of value in deep endometriotic implants and in combination with bowel resections for endometriosis. Case reports also address the use of the CO<sub>2</sub> laser in the laparoscopic resection of myomas and adenomyomas. Other traditional uses of the CO<sub>2</sub> laser laparoscopically included ovarian “drilling” or even wedge resection for adjuvant therapy of women with polycystic ovaries to assist ovulation [51].

The most recent focus of attention on gynecologic use of the carbon dioxide laser has been as a treatment option for vulvovaginal rejuvenation and vaginal atrophy. Most studies fail to cite the absence of FDA approval of this device for this purpose and report observational case studies or case series with success defined as patient reports of satisfaction. Little mention is made of postoperative adhesions or pain or need for

retreatments (duration of therapy). Although the FDA did clear a fractional CO<sub>2</sub> laser for indications of “incision, ablation, vaporization and coagulation of body soft tissues in medical specialties including genitourinary surgery”, the indication for treatment of genital atrophy was not listed. The American College of Obstetricians and Gynecologists (ACOG) published a position statement about fractional laser treatment of vulvovaginal atrophy in 2016 and reaffirmed this position statement July 2018 [52]. ACOG has also published a Committee Opinion on vaginal “rejuvenation” and cosmetic vaginal procedures [53].

Observational studies utilizing the CO<sub>2</sub> laser for vaginal atrophy generally lacked comparison to other treatment modalities and have no long term follow-up [54]. A single study from Menopause 2018 was a randomized, double-blind, placebo-controlled clinical trial comparing the CO<sub>2</sub> laser with topical estriol alone, and with use of laser and topical estriol together. It enrolled 45 women and assessed symptoms, vaginal appearance and vaginal maturation at 8 and 20 weeks and noted increased pain in the laser alone group at 8 weeks but at 20 weeks female sexual function scores were comparable for all groups (estriol alone, estriol and CO<sub>2</sub> laser and CO<sub>2</sub> laser alone). Another study assessed epidermal thickness in an effort to more quantify results of CO<sub>2</sub> laser use in women with vaginal atrophy [55].

### **Aim of study**

To evaluate the effectiveness of sutureless laser Co<sub>2</sub> labiaplasty of labia minora.

# **Chapter Two**

## **Patients & Methods**



## **2.1 Introduction :**

This chapter includes the criteria of choosing the patients before laser treatment and parameters in the treatment of the patient.

## **2.2 Patients**

### **2.2.1 Study design & settings**

A case series study conducted in private Gynecological Aesthetic Clinic at Baghdad city /Iraq during duration of five months throughout the period from 1<sup>st</sup> of September, 2021 till 31<sup>st</sup> of January, 2022.

### **2.2.2 Study population**

Eight women with labia minora abnormality presented to private Gynecological Aesthetic Clinic for functional and cosmetic indications were the study population.

### **2.2.3 Inclusion criteria**

1. Adult women (age  $\geq 18$  years).
2. Labia minora undesirable appearance.
3. Recurrent infections (odour, discharge, irritation).
4. Discomfort during wearing clothes.

### **2.2.4 Exclusion criteria**

1. Younger age.
2. Active sores due to malignancy.
3. Labia minora hypertrophy due to malignancy.
4. Recent surgical intervention to labia minora.
5. Lost to follow up.
6. Refused to participate.

### **2.3 Clinical assessment**

The data was collected by researcher from direct interview with selected women and filled in a prepared questionnaire. The questionnaire was designed by the researcher and supervisor according to previous literatures. The following information was checked in every woman:

1. General characteristics of women: Age, marital status and parity.
2. Mode of previous delivery of women.
3. Previous vaginal or vulvular surgery of women.
4. Chief complaints of women: Undesirable appearance, discomfort during wearing clothes and recurrent infections.
5. Visual analogue score (VAS) of women: VAS for satisfaction and VAS for self confidence during intercourse.
6. Vulvovaginal symptom questionnaire (VSQ) of women: Itching, burning, irritation, dryness, odour, discharge, discomfort during wearing clothes and pain during intercourse.

### **2.4 Ethical considerations**

1. Written informed consent of selected women.
2. Confidentiality of data was taken in consideration.
3. Discussing with patients the complications and the management procedure.

### **2.5 Procedure**

Each women included in this study was examined and the amount of the tissue planned to be removed was discussed with the patient and marked before the procedure. sterilization done and All patients received local anesthesia with 2% Xylocaine and adrenaline. After lying of the patients in lithotomy position, the clamp was placed on

the previously marked lines on labia minora. Edge resection of excess tissue was performed in non-contact mode by CO<sub>2</sub> laser.

The duration of procedure was about 30 minutes; the clamps were left on labia minora for longer duration (about 15 minutes) . The patients were discharged after one hour. The patients received topical Gentamycin and Betamethasone cream to be applied by patients in next five days postoperatively and oral antibiotics . The patients were instructed to take NSAIDs if needed them.

## **2.6 CO<sub>2</sub> Laser specifications**

The laser system used in this study is KES MED-870+ CO<sub>2</sub> Laser Therapy System manufactured in China by Beijing KES Biology Technology Co.Ltd. Electronic electrician. (Figures 2/1-2/5). Its clinical data is the following, as shown in the catalogue:

Wavelength	10600nm Laser
Power	U.S. 40W RF Metal Tube
Spot Size	0.12mm and 1.25mm (adjustable)
Spot Density	Up to 102400 dot
Scan Size	Up to 20×20mm
Scan Shapes	Square; Rectangle; Circle.
Scan Modes	Standard; Random; Scatter
Aiming Beam	5mW red diode laser, 635nm, adjustable intensity
Beam Delivery	360° Rotation Articulated 7 Joint Arm
Operating System	Fractional ; Ultrapulse ; CW; Gynaecology Vaginal Head
Cooling System	Air Cooling, self-contained; closed cycle
Display	10.4 Inch True Color LCD Touch Screen
Voltage	220V±10% 50/60Hz, 110V±10% 50/60Hz .
Dimension	52×38×117cm (W*D*H) Net
Weight	52KG

## 2.7 Treatment parameters :

- power = 4W
- mode = CW



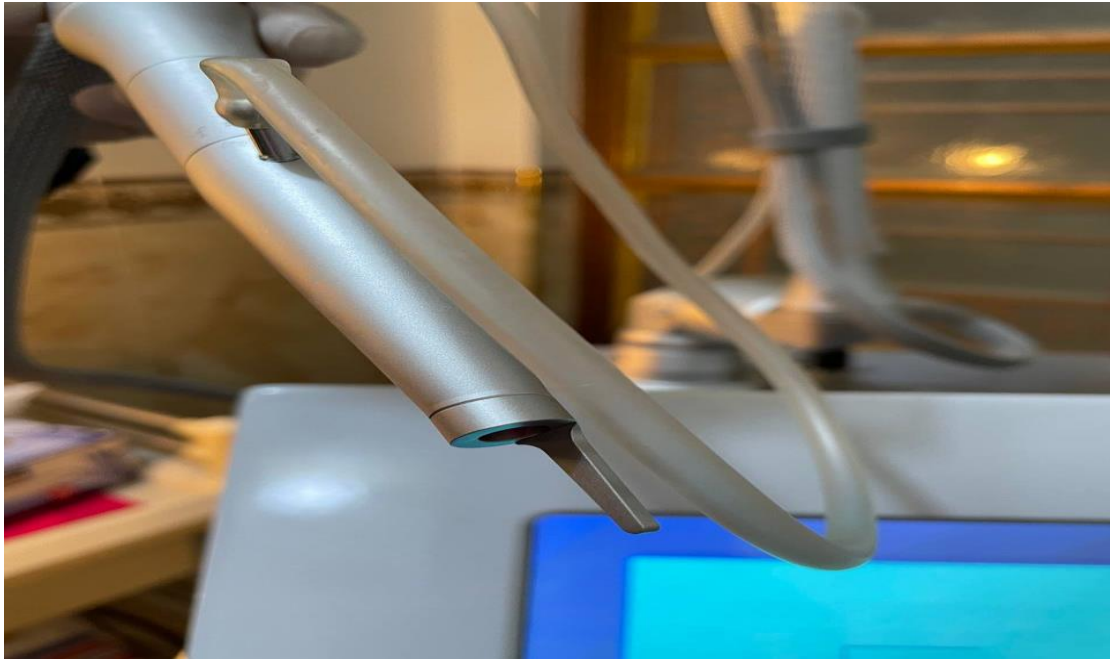
*Figure 2-1: CO<sub>2</sub> Laser system.*



*Figure 2-2: CO<sub>2</sub> Laser Specifications.*



*Figure 2-3: CO<sub>2</sub> Laser parameters.*



*Figure 2-4: CO<sub>2</sub> Laser hand piece.*



*Figure 2-5: Incised part of labia minora by CO<sub>2</sub> Laser.*

## **2.8 Safety measures**

In this study the laser employed was class IV laser. These types of laser can cause damage with direct intrabeam exposure and from specular or diffuse reflections. So safety measures must be taken to provide protection from energy emissions of these lasers. All persons wear protective glasses appropriate to the procedure to eliminate the risk of eye damage. These glasses are designed with special wavelength and optical density for CO<sub>2</sub> laser. The doctor goggles. (Figure 2-6) In this research the eyes of the patient were covered with mops of cotton or gauze, or to tell the patient to close eyes and to tilt the head away from the field.

## **2.9 Outcome assessment**

The patients were discouraged from having sexual intercourse for next two weeks. Assessment of outcomes was done by the Visual Analog Scale (VAS) was used to compare the degree of satisfaction and comfort with sexual partners during intercourse. The Vulvovaginal Symptom Questionnaire (VSQ) was used to measure symptoms, emotions, life-impact, and sexual-impact before and after surgery. The first seven questions of the VSQ comprise symptoms subscale (itching, burning, irritation, dryness, odour, discharge, discomfort during wearing clothes and pain during intercourse). Women who answered “Yes” to any of the first seven symptoms questions were considered to have vulvovaginal symptoms, and sexual impact (none, mild, moderate, severe and extreme).

## **2.10 Follow up**

The duration of follow up was one month postoperatively by phone calling for any complication and with first direct interview after one month to evaluate the outcomes and assess the complications.

## **2.11 Statistical analysis**

All women's data entered using computerized statistical software; Statistical Package for Social Sciences (SPSS) version 22 was used. Descriptive statistics presented as (mean  $\pm$  standard deviation) and frequencies as percentages. Multiple contingency tables conducted and appropriate statistical tests performed, Fishers exact test was used for categorical variables. In all statistical analysis, level of significance (p value) set at  $\leq 0.05$  and the result presented as tables and/or graphs.



# **Chapter Three**

**Results ,**

**Discussion**

**and Conclusions**

### 3.1 Introduction :

This chapter presents the results , the discussion to explain these results , conclusion and suggestion about this study.

### 3.2 Results

A total of eight women managed with sutureless laser labiaplasty of labia minora were included in this study with mean age of  $27.6 \pm 6.7$  years and range of 19-39 years; one woman less than 20 years age, 50% of them were in age group 20-29 years and 37.5% of them were in age group 30-39 years. Most of studied women were married and only one woman was single. Mean parity for women managed with sutureless laser labiaplasty of labia minora was  $2.1 \pm 1.6$  para with range of 0-4 para; 25% of women were nullipara, while 25% of them had para of 1-2 and 50% of them had para of 3-4. All these findings were shown in table 3-1.

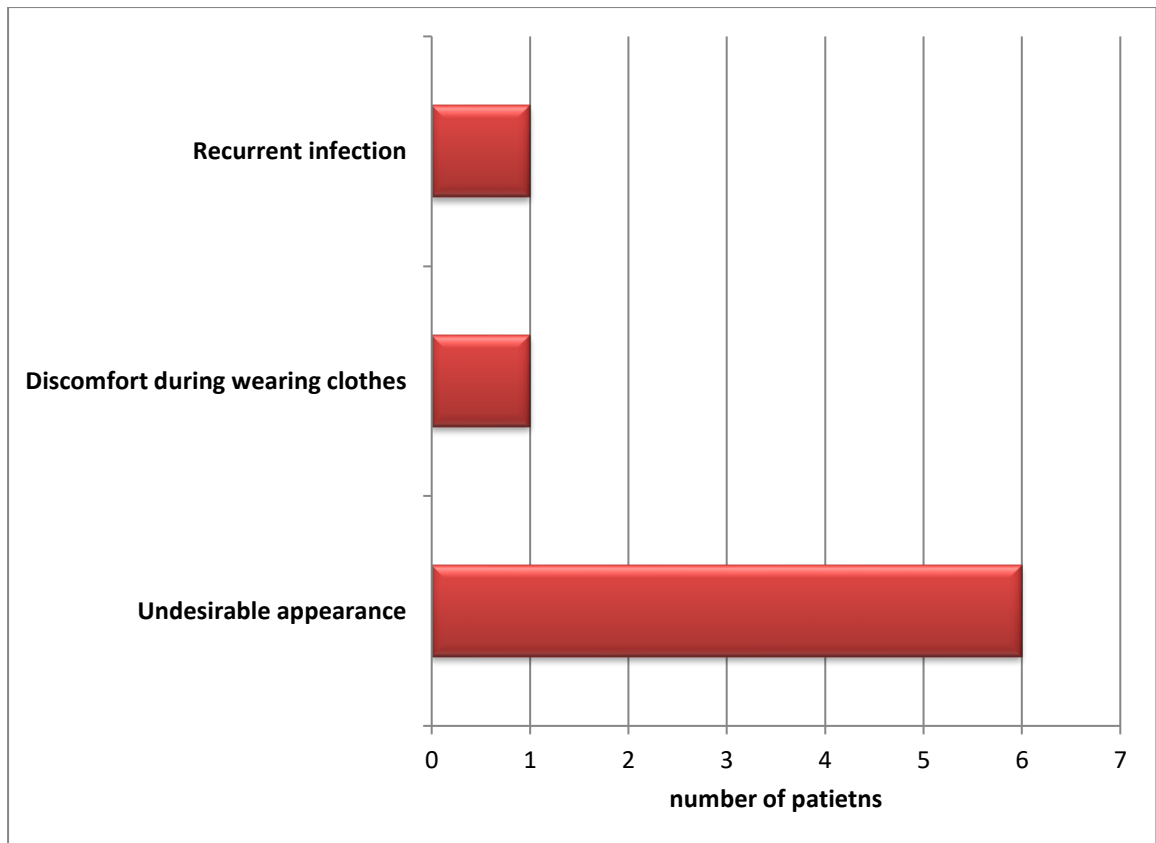
**Table 3-1: General characteristics of women managed with sutureless laser labiaplasty of labia minora.**

Variable	No.	%
<b>Age</b> mean $\pm$ SD ( $27.6 \pm 6.7$ years) range (19-39 years)		
<20 years	1	12.5
20-29 years	4	50.0
30-39 years	3	37.5
Total	8	100.0
<b>Marital status</b>		
Single	1	12.5
Married	7	87.5
Total	8	100.0
<b>Parity</b> mean $\pm$ SD ( $2.1 \pm 1.6$ para) range (0-4 paras)		
Nulliparous	2	25.0
1-2 para	2	25.0
3-4 para	4	50.0
Total	8	100.0

Half of studied women were delivered by normal vaginal delivery and other half was delivered by cesarean section. Previous vaginal or vulvular surgery was positive in 37.5% of women. The common chief complaint of women managed with sutureless laser labiaplasty of labia minora was undesirable appearance (75%), followed by; discomfort during wearing clothes (12.5%) and recurrent infection (12.5%). All these findings were shown in table 3-2 and figure 3-1.

**Table 3-2: History and chief complaints of women managed with sutureless laser labiaplasty of labia minora.**

Variable	No.	%
<b>Mode of delivery</b>		
Normal vaginal delivery	3	50.0
Cesarean section	3	50.0
Total	6	100.0
<b>Previous vaginal or vulvular surgery</b>		
Yes	3	37.5
No	5	62.5
Total	8	100.0
<b>Chief complaint</b>		
Undesirable appearance	6	75.0
Discomfort during wearing clothes	1	12.5
Recurrent infection	1	12.5
Total	8	100.0



**Figure 3-1: Chief complaints.**

The VAS for satisfaction before treatment in studied women was mainly dissatisfied in 75% of women, while VAS for satisfaction after treatment was mainly very satisfied in 62.5% of them. The VAS for self confidence during intercourse before treatment was moderate in half of studied women, while VAS for self confidence during intercourse after treatment was mild in 66.7% of women. All these findings were shown in table 3-3.

**Table 3-3: Visual analogue scale of women managed with sutureless laser labiaplasty of labia minora.**

Symptoms	No.	%
<b>VAS for satisfaction before treatment</b>		
Very dissatisfied	2	25.0
Dissatisfied	6	75.0
Total	8	100.0
<b>VAS for satisfaction after treatment</b>		
Satisfied	3	37.5
Very satisfied	5	62.5
Total	8	100.0
<b>VAS for self confidence during intercourse before treatment</b>		
Mild	1	16.7
Moderate	3	50.0
Severe	2	33.3
Total	6	100.0
<b>VAS for self confidence during intercourse after treatment</b>		
None	2	33.3
Mild	4	66.7
Total	6	100.0

The itching was mainly moderate before surgery (75%), while mainly mild after surgery (62.5%). The burning was mild in half of women before surgery, while mild in 62.5% of them after surgery. Irritation was mainly moderate before surgery (75%), while none in 62.5% of women after surgery. Dryness was mainly mild (62.5%) before

surgery, while none in 75% of women after surgery. Odour and discharge were mainly mild (62.5%) before surgery, while none in 62.5% of women after surgery. Discomfort during wearing clothes before surgery was mild in half of women before surgery, while commonly none (87.5%) after surgery. Pain during intercourse before surgery was mild in 57.1% of women before surgery and mild in 71.4% of women after surgery. All these findings were shown in table 3-4A-B.

**Table 3-4A: Vulvovaginal symptom questionnaire of women managed with sutureless laser labiaplasty of labia minora.**

<b>Variable</b>	<b>No.</b>	<b>%</b>
<b>Itching before surgery</b>		
None	1	12.5
Mild	1	12.5
Moderate	6	75.0
Total	8	100.0
<b>Itching after surgery</b>		
None	2	25.0
Mild	5	62.5
Moderate	1	12.5
Total	8	100.0
<b>Burning before surgery</b>		
None	3	37.5
Mild	4	50.0
Moderate	1	12.5
Total	8	100.0
<b>Burning after surgery</b>		
None	3	37.5
Mild	5	62.5
Total	8	100.0
<b>Irritation before surgery</b>		
None	1	12.5
Mild	1	12.5
Moderate	6	75.0
Total	8	100.0
<b>Irritation after surgery</b>		
None	5	62.5
Mild	3	37.5
Total	8	100.0

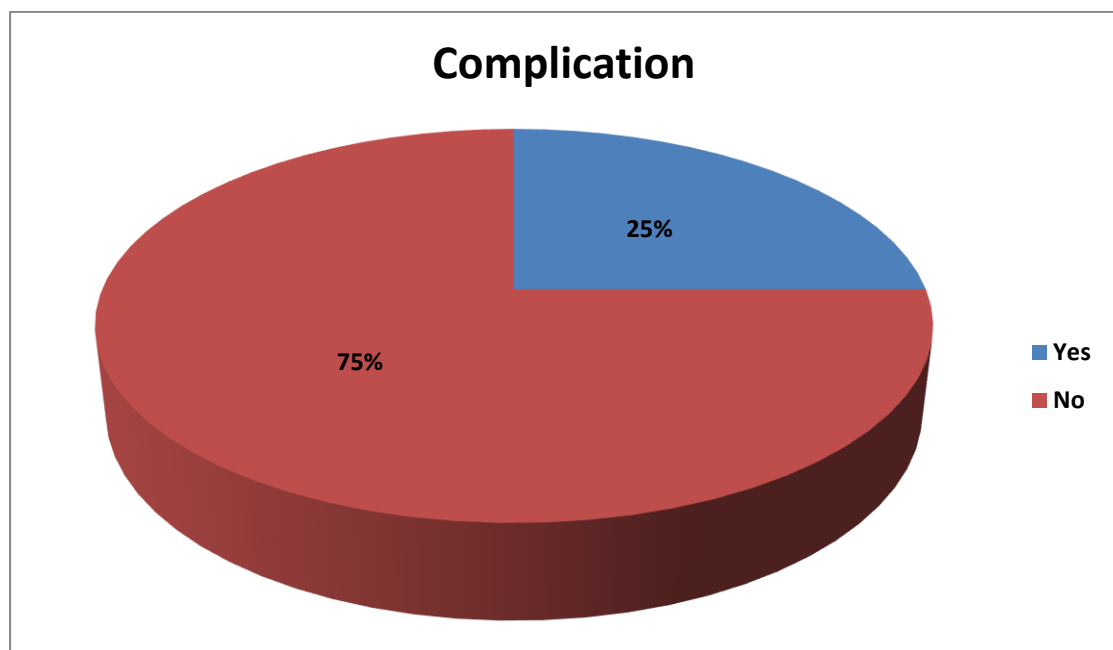
**Table 3-4B: Vulvovaginal symptom questionnaire of women managed with sutureless laser labiaplasty of labia minora.**

<b>Variable</b>	<b>No.</b>	<b>%</b>
<b>Dryness before surgery</b>		
None	3	37.5
Mild	5	62.5
<b>Dryness after surgery</b>		
None	6	75.0
Mild	2	25.0
<b>Odour, discharge before surgery</b>		
Mild	5	62.5
Moderate	3	37.5
<b>Odour, discharge after surgery</b>		
None	5	62.5
Mild	3	37.5
<b>Discomfort during wearing clothes before surgery</b>		
None	1	12.5
Mild	4	50.0
Moderate	2	25.0
Extreme	1	12.5
Total	8	100.0
<b>Discomfort during wearing clothes after surgery</b>		
None	7	87.5
Mild	1	12.5
Total	8	100.0
<b>Pain during intercourse before surgery</b>		
Mild	4	57.1
Moderate	2	28.6
Severe	1	14.3
Total	7	100.0
<b>Pain during intercourse after surgery</b>		
None	2	28.6
Mild	5	71.4
Total	7	100.0

The complications of sutureless laser labiaplasty were shown by two women (25%); one woman with bleeding complication and one woman with oedema. All these findings were shown in table 3-5 and figure 3-2.

**Table 3-5: Treatment complications of women managed with sutureless laser labiaplasty of labia minora.**

Variable	No.	%
<b>Complications</b>		
Yes	2	25.0
No	6	75.0
Total	8	100.0
<b>Types of complications</b>		
Bleeding	1	50.0
Oedema	1	50.0
Total	2	100.0



**Figure 3-2: Sutureless laser labiaplasty complications.**



**Table 3-6: Immediate complication during surgery.**

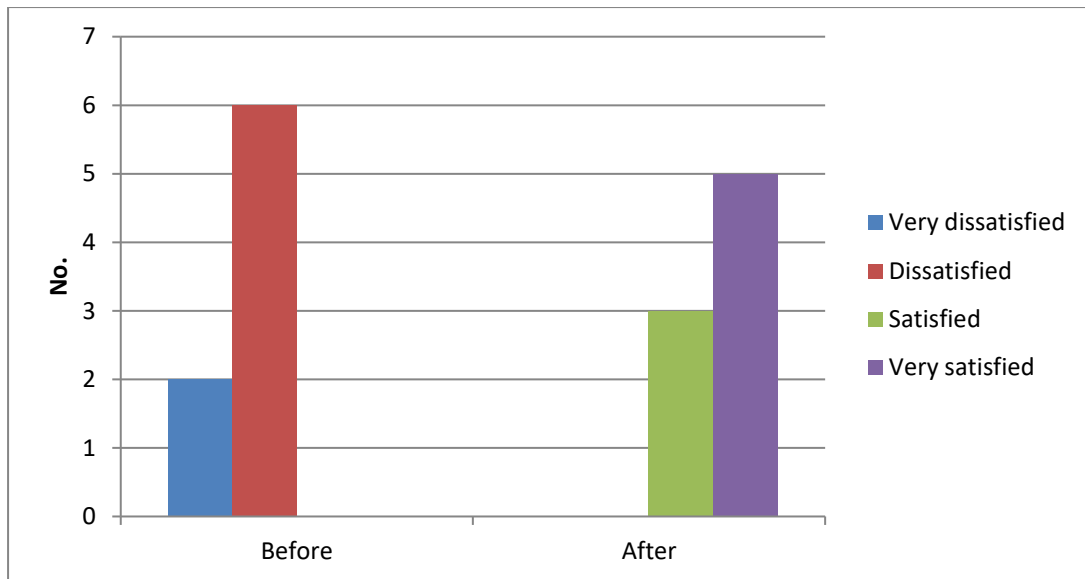
Complication	Number of patients
Pain	no
bleeding	one patient
suturing	one patient
infection	no
no healing	no
separation of edge	no

A significant association was observed between very satisfaction VAS for satisfaction of women after sutureless laser labiaplasty of labia minora ( $p=0.001$ ). There was a significant association between mild VAS for self-confidence during intercourse after sutureless laser labiaplasty of labia minora ( $p=0.03$ ). All these findings were shown in table 3-7 and figure 3-3.

**Table 3-7 Distribution of woman's VAS before and after surgery.**

Variable	Before		After		P
	No.	%	No.	%	
<b>VAS for satisfaction</b>					<b>0.001</b> * <sup>S</sup>
Very dissatisfied	2	25.0	0	-	
Dissatisfied	6	75.0	0	.0	
Satisfied	0	-	3	37.5	
Very satisfied	0	-	5	62.5	
<b>VAS for self-confidence during intercourse</b>					<b>0.03</b> * <sup>S</sup>
None	0	-	2	33.3	
Mild	1	16.7	4	66.7	
Moderate	3	50.0	0	-	
Severe	2	33.3	0	-	

\*Fishers exact test, S=Significant.



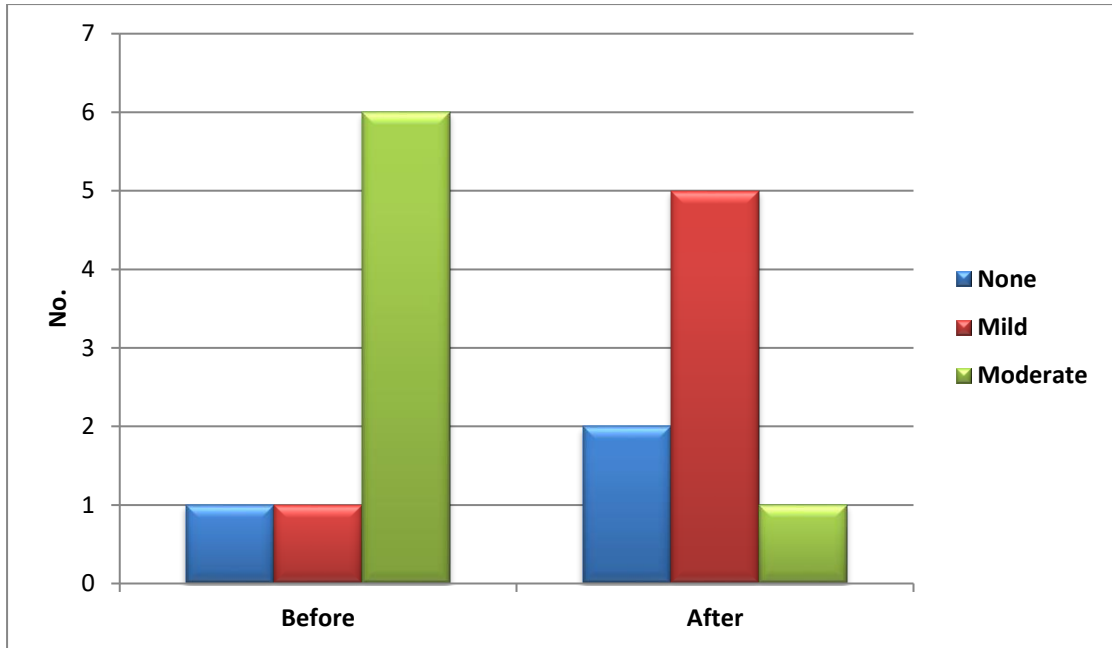
**Figure 3-3: VAS for satisfaction before and after sutureless laser labiaplasty of labia minora.**

A significant decline in itching intensity of women was observed after sutureless laser labiaplasty of labia minora ( $p=0.03$ ). No significant differences were observed in intensity of burning, dryness and pain during intercourse of women before and after surgery ( $p>0.05$ ). There was a significant decline in irritation intensity of women after sutureless laser labiaplasty of labia minora ( $p=0.008$ ). A significant decline in odour, discharge intensity of women was observed after sutureless laser labiaplasty of labia minora ( $p=0.01$ ). Intensity of discomfort during wearing clothes was significantly none after sutureless laser labiaplasty of labia minora ( $p=0.02$ ). All these findings were shown in table 3-8 and figures 3-4, 5.

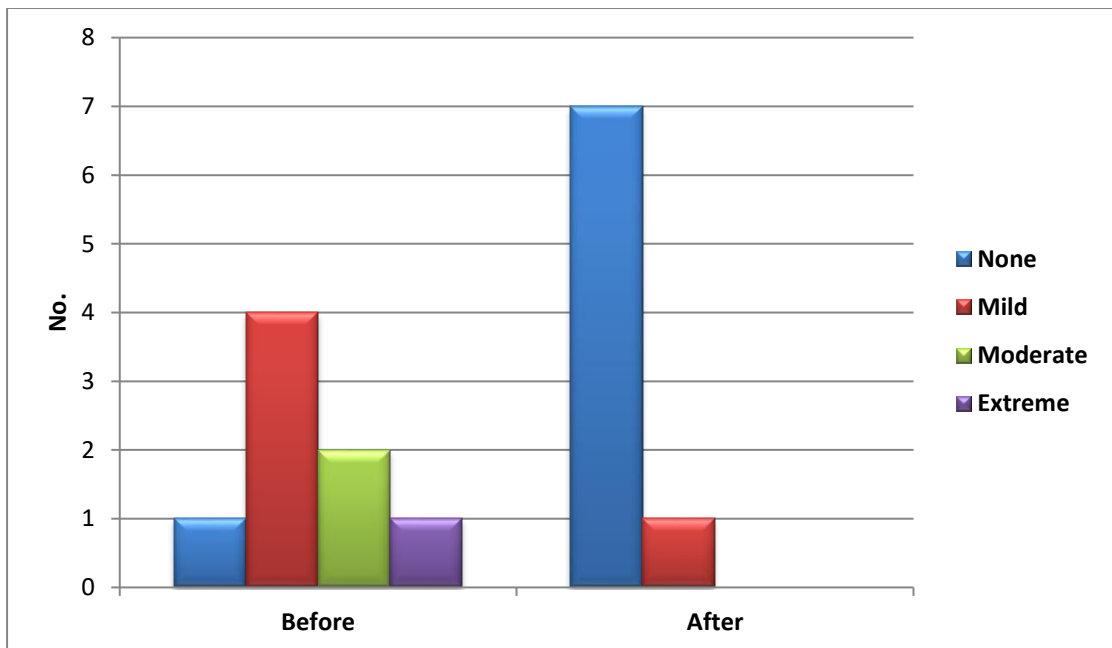
**Table 3-8: Distribution of woman's VSQ before and after surgery.**

Variable	Before		After		P
	No.	%	No.	%	
<b>Itching</b>					<b>0.03*</b> <sup>S</sup>
None	1	12.5	2	25.0	
Mild	1	12.5	5	62.5	
Moderate	6	75.0	1	12.5	
<b>Burning</b>					0.57* <sup>NS</sup>
None	3	37.5	3	37.5	
Mild	4	50.0	5	62.5	
Moderate	1	12.5	0	-	
<b>Irritation</b>					<b>0.008*</b> <sup>S</sup>
None	1	12.5	5	62.5	
Mild	1	12.5	3	37.5	
Moderate	6	75.0	0	-	
<b>Dryness</b>					0.13* <sup>NS</sup>
None	3	37.5	6	75.0	
Mild	5	62.5	2	25.0	
<b>Odour, discharge</b>					<b>0.01*</b> <sup>S</sup>
None	0	-	5	62.5	
Mild	5	62.5	3	37.5	
Moderate	3	37.5	0	-	
<b>Discomfort during wearing clothes</b>					<b>0.02*</b> <sup>S</sup>
None	1	12.5	7	87.5	
Mild	4	50.0	1	12.5	
Moderate	2	25.0	0	-	
Extreme	1	12.5	0	-	
<b>Pain during intercourse</b>					0.16* <sup>NS</sup>
None	0	-	2	28.6	
Mild	4	57.1	5	71.4	
Moderate	2	28.6	0	-	
Severe	1	14.3	0	-	

\* Fishers exact test, NS=Not significant, S=Significant.



**Figure 3-4: Itching intensity before and after sutureless laser labiaplasty of labia minora.**



**Figure 3-5: Discomfort intensity before and after sutureless laser labiaplasty of labia minora.**

### 3.3 Discussion

Labia minora hypertrophy could be bothersome for functional, aesthetic and social purposes. In aesthetic medicine, the labia minora reduction is implemented by different methods like surgical labiaplasty or by sutureless laser labiaplasty [56].

The current study showed that mean age of women presented with labia minora hypertrophy was (27.6 years), most of them were married and half of them had multiparity history. These findings indicated increase in desire of middle age married women for aesthetic medicine especially sutureless laser labiaplasty to reduce the size of labia minora specifically women with high parity history. These findings are in agreement with reports of Güneş and Alinsod [57] study in Turkey which stated that the labioplast was increased in last two decades commonly required by young women for cosmetic purposes. In UK, there is a high desire for labiaplasty among adolescent women that is not accepted ethically as the labia has a continuous growth until age of 18 years [58]. Our study revealed that half of studied women were delivered by normal vaginal delivery and 37.5% of them had previous vaginal or vulvular surgery. These findings are close to results of Dayan et al [59] study in USA which reported that mean number of vaginal deliveries was (2) for women with labia minora hypertrophy and half of them had history of trauma. Vaginal delivery and its associated trauma is related to labia minora hypertrophy [60]. In our study, common chief complaint of women managed with sutureless laser labiaplasty of labia minora was undesirable appearance (75%), followed by; discomfort during wearing clothes (12.5%) and recurrent infection (12.5%). These findings are in agreement with results of Widschwendter et al [61] cross sectional study in Austria on 200 premenopausal women which reported that a variability

of women perception regarding labia minora size, but revealed that undesirable appearance was the common complaint among women tend to labiaplasty option, while the functional complaints were less common.

The present study found that VAS for satisfaction before treatment in studied women was mainly dissatisfied in 75% of women, while VAS for satisfaction after treatment was mainly very satisfied in 62.5% of them, a significant association was observed between very satisfaction VAS for satisfaction of women after sutureless laser labiaplasty of labia minora ( $p=0.001$ ). Our study also found that VAS for self confidence during intercourse before treatment was moderate in half of studied women, while VAS for self confidence during intercourse after treatment was mild in 66.7% of women, there was a significant association between mild VAS for self-confidence during intercourse after sutureless laser labiaplasty of labia minora ( $p=0.03$ ). All these findings regarding satisfaction are consistent with results of Pardo et al [12] study in Chile which revealed a dramatic increase in visual analogue scale for satisfaction and self confidence during intercourse after sutureless laser labiaplasty of labia minora.

This study showed a significant decline in itching intensity of women was observed after sutureless laser labiaplasty of labia minora ( $p=0.03$ ). This finding coincides with results of González-Isaza et al [62] prospective case series study in Colombia on 112 women with labia minora hypertrophy managed by laser labiaplasty which found a significant decline in mean Vulvo Vaginal Symptom Questionnaire (VSQ) score for women after laser labioplasty of labia minora. Our study found a significant decline in irritation intensity of women after sutureless laser labiaplasty of labia minora ( $p=0.008$ ). This finding is parallel to reports of Qureshi et al [63] study in USA which stated that sutureless

laser labiaplasty of labia minora is effective in declining VAQ score and improving irritation intensity. Current study showed significant decline in odour, discharge intensity of women after sutureless laser labiaplasty of labia minora ( $p=0.01$ ). This finding is similar to results of Regenyi study [64] in Italy which reported that sutureless laser labiaplasty is effective in reducing the VSQ score especially regarding odour, discharge intensity of women. The present study found that intensity of discomfort during wearing clothes was significantly none after sutureless laser labiaplasty of labia minora ( $p=0.02$ ). This finding is consistent with results of González-Isaza et al [62] prospective case series study in Colombia.

Present study showed that complications of sutureless laser labiaplasty were shown by two women (25%); one woman with bleeding complication and one woman with oedema. These findings are inconsistent with results of Bizjak-Ogrinc and Senčar retrospective chart review analysis study [65] on 80 women underwent laser labioplasty which found that sutureless laser labiaplasty is safe method accompanied with only wound infection in 5% of women. This inconsistency might be due to differences in techniques and equipments used in addition to risk factors related to women and sample size of the study. The scientific rationale underlying cosmetic genital surgery lacks sufficient theoretical support mainly because of the methodological limitations in the available literature. Most authors have described cure and complication rates of different genital cosmetic techniques without controlling for patient factors or surgical indications, and it is therefore not possible to conclude the reliability or reproducibility of postoperative outcomes. In fact, women who had labiaplasty for hypertrophy of the labia minora causing pain at penetration or injuries during intercourse are not expected to be comparable with women who had the procedure to treat complications of

female genital mutilations or to reduce labial size primarily for cosmetic reasons. Moreover, most studies included small patient populations with short follow-up periods [66].

Previous study using Er:YAG laser to cut of excessive labia minora tissue while curved serrated forceps are used on both labia to prevent bleeding and achieve hemostasis by compression for many years. Due to its simplicity, good results and low risk this technique is becoming popular among Er:YAG users [64].



### **3.4 Conclusions**

- The sutureless laser labioplasty is effective method for reducing the size of labia minora.
- The procedure is accompanied with high satisfaction and self confidence during intercourse.
- The procedure lead to decreasing the intensity of itching, irritation, odour, discharge and discomfort symptoms.
- The side effects of procedure are low and preventable.

### **3.5 Recommendations**

- ❖ Increasing public awareness of effectiveness and safety of sutureless laser labioplasty in management of labia minora hypertrophy.
- ❖ Encouraging physicians to select the sutureless laser labioplasty in aesthetic gynecology.
- ❖ Further comparative studies analyzing the sutureless laser labioplasty with other labioplasty techniques must be supported.
- ❖ Increasing the number of studied patients in future studies.

## References

1. Hunter JG. Commentary on: Labia Minora Reduction Techniques: A Comprehensive Literature Review. *Aesthetic Surgery Journal* 2015; 35 (4): 432–433.
2. Clerico C, Lari A, Mojallal A, Boucher F. Anatomy and aesthetics of the Labia Minora: The Ideal Vulva? *Aesthetic Plast Surg* 2017; 41:714–719.
3. Schober JM, Alguacil NM, Cooper RS, Pfaff DW, Meyer-Bahlburg HFL. Selfassessment of anatomy, sexual sensitivity, and function of the labia and vagina. *Clin Anat* 2015; 28:355–362.
4. Andrikopoulou M, Michala L, Creighton SM, Liao LM. The normal vulva in medical textbooks. *J Obstet Gynaecol* 2013; 33:648–650.
5. Howarth C, Hayes J, Simonis M, Temple-Smith M. ‘Everything’s neatly tucked away’: young women’s views on desirable vulval anatomy. *Cult Health Sex* 2016; 18:1363–1378.
6. McQuillan SK, Jayasinghe Y, Grover SR. Audit of referrals for concern regarding labial appearance at the Royal Children's Hospital: 2000-2012. *J Paediatr Child Health* 2018; 54(4):439-442.
7. Patni R. Genitourinary Syndrome of Menopause. *J Midlife Health* 2019; 10(3):111-113.
8. Agrawal K, Patel PK, Sahu SA. Premenarchal labia minora hypertrophy. *Indian J Plast Surg* 2016; 49:245-248.
9. Motakef S, Rodriguez-Feliz J, Chung MT, Ingargiola MJ, Wong VW, Patel A. Vaginal labiaplasty: current practices and a simplified classification system for labial protrusion. *Plast Reconstr Surg* 2015; 135:774–788.

10. Oranges CM, Sisti A, Sisti G. Labia minora reduction techniques: A comprehensive literature review. *Aesthet Surg J* 2015; 35:419-431.
11. Lynch A, Marulaiah M, Samarakkody U. Reduction labioplasty in adolescents. *J Pediatr Adolesc Gynecol* 2008; 21:147-149.
12. Pardo J, Sola V, Ricci P, Guilloff E. Laser labioplasty of labia minora. *Int J Gynecol Obstet* 2006; 93:38-43.
13. Serati M, Salvatore S, Rizk D. Female genital cosmetic surgery: the good, the bad, and the ugly. *Int Urogynecol J* 2018; 29: 1411–1412.
14. Crouch NS, Deans R, Michala L. Clinical characteristics of well women seeking labial reduction: a prospective study. *BJOG* 2011; 118:1507–1510.
15. Goodman MP, Placik OJ, Matlock DL. Evaluation of body image and sexual satisfaction in women undergoing female genital plastic/cosmetic surgery. *Aesthet Surg* 2016; 36:1048–1057.
16. Lista F, Mistry BD, Singh Y, Ahmad J. The Safety of Aesthetic Labioplasty: A Plastic Surgery Experience. *Aesthetic Surgery Journal* 2015, Vol 35(6) 689–695.
17. Alter GJ. Management of the mons pubis and labia majora in the massive weight loss patient. *Aesthet Surg J* 2009; 29(5):432-442.
18. Rouzier R, Louis-Sylvestre C, Paniel BJ, Haddad B. Hypertrophy of labia minora: experience with 163 reductions. *Am J Obstet Gynecol* 2000; 182(1 Pt 1):35-40.
19. Clerico C, Lari A, Mojallal A, Boucher F. Anatomy and Aesthetics of the Labia Minora: The Ideal Vulva? *Aesthetic Plast Surg* 2017; 41(3):714-719.

- 20.Triana L. Commentary on Anatomy and Aesthetics of the Labia Minora: The Ideal Vulva? *Aesthetic Plast Surg* 2017; 41(4):993-994.
- 21.Ouar N, Guillier D, Moris V, Revol M, Francois C, Cristofari S. Postoperative complications of labia minora reduction. Comparative study between wedge and edge resection. *Ann Chir Plast Esthet* 2017; 62(3):219-223.
- 22.Turini T, Weck Roxo AC, Serra-Guimarães F. The impact of labiaplasty on sexuality. *Plast Reconstr Surg* 2018; 141:87–92.
- 23.Miklos JR, Moore RD. Labiaplasty of the labia minora: patients' indications for pursuing surgery. *J Sex Med* 2008; 5:1492-1495.
- 24.Liao LM, Creighton SM. Requests for cosmetic genitoplasty: how should healthcare providers respond? *BMJ* 2007; 334(7603):1090-1092.
- 25.Felicio Yde A. Labial surgery. *Aesthet Surg J* 2007; 27:322–328.
- 26.Munhoz AM, Filassi JR, Ricci MD, Aldrighi C, Correia LD, Aldrighi JM, et al. Aesthetic labia minora reduction with inferior wedge resection and superior pedicle flap reconstruction. *Plast Reconstr Surg* 2006; 118(5):1237-1247; discussion 1248-1250.
- 27.Rauso R, Tartaro G, Salti G, Zerbinati N, Colella G. Utilization of Needles in the Surgical Reduction of Labia Minora: A Simple and Cost-Effective Way to Reduce Operating Time. *Aesthet Surg J* 2016; 36(10):NP310-312.
- 28.González-Isaza P, Lotti T, França K, SanchezBorrego R, Tórtola JE, Lotti J, et al. Carbon Dioxide with a New Pulse Profile and Shape: A Perfect Tool to Perform Labiaplasty for Functional and Cosmetic Purpose. *Open Access Maced J Med Sci* 2018; 6(1):25-27. Available from: <https://doi.org/10.3889/oamjms.2018.043>

- 29.Ozer M, Mortimore I, Jansma EP. Labiaplasty: motivation, techniques, and ethics. *Nat Rev Urol* 2018; 15:175–189.
- 30.Smarrito S. Lambda laser nymphoplasty: retrospective study of 231 cases. *Plast Reconstr Surg* 2014; 133:231e–232e.
- 31.Gonzalez-Isaza P, Lotti T, Franca K. Carbon dioxide with , a new pulse profile and shape: a perfect tool to perform labiaplasty for functional and cosmetic purpose. *Open Access Maced J Med Sci* 2018; 6:25–27.
- 32.Vizintin Z, Lukac M, Kazic M. Erbium laser in gynecology. *Climacteric* 2015; 18:4–8.
- 33.Banwell PE. Anatomy and Classification of the Female Genitalia: Implications for surgical management. In: Hamori CA, Banwell PE, Alinsod R (eds). *Female Cosmetic Genital Surgery Concepts, Classification and Techniques*. New York: Thieme Publishers 2017; p.:14–17.
- 34.Miklos JR, Moore RD. Postoperative cosmetic expectations for patients considering labioplasty surgery: our experience with 550 patients. *Surg Technol Int* 2011; 21:170–174.
- 35.Gungor M, Sir E, Celik D, Seyhan A, Yoleri L. Reconstruction of labium minus hypertrophy taking into account anatomical differences. *Turk J Plast Surg* 2011; 19:70–73.
- 36.Triana L, Robledo AM. Aesthetic surgery of female external genitalia. *Aesthet Surg J* 2015; 35:165–177.
- 37.Keye WR. *Laser surgery in gynecology and obstetrics*. 2<sup>nd</sup> Edn., G.K. Hall and Co., Mosby, Montana 1990.
- 38.Oshea DC, Callen WR, Rhodes WT. *Introduction to Lasers and their Applications*. 2<sup>nd</sup> Edn., Addison-Wesley Publishing Company, USA 1978.

39. Jawad MM, Abdul Qader ST, Zaidan AA, Zaidan BB, Naji AW, Abdul Qader IT. An Overview of Laser Principle, Laser-Tissue Interaction Mechanisms and Laser Safety Precautions for Medical Laser Users. *International Journal of Pharmacology* 2011; 7: 149-160.
40. Daniele De Luca, Ines Delfino, Maria Lepore. Laser Safety Standards and Measurements of Hazard Parameters for Medical Lasers. *International Journal of Optics and Applications* 2012; 2 (6): 80-86.
41. Niemz MH. *Laser-Tissue Interactions: Fundamentals and Applications*. 3<sup>rd</sup> Ed., Springer, Germany 2004.
42. Ansari MA, Mohajerani E. Mechanisms of laser-tissue interaction: I. optical properties of tissue. *J Lasers Med Sci* 2011; 2(3):119-125.
43. Niemz MH. *Laser Tissue Interaction*. Springer, Heidelberg, Germany 1996.
44. Elliott DJ. *Ultraviolet Laser Technology and Applications*. Academic Press, USA 1995.
45. Keyvan Nouri (ed.) *Lasers in Dermatology and Medicine* 10.1007/978-0-85729-281-0\_1 © Springer-Verlag London Limited 2011.
46. Niemz MH. *Biological and medical physics, biomedical engineering Laser Tissue Inter actions Fundamentals and applications* 3<sup>rd</sup>, Enlarged Edition 2007, P.1-6, 201-203, 248-254.
47. Dan Little, Technical Director, Laser Training Institute, Professional Medical Education Association, Inc. *Laser Measurement in Medical Laser Service* 2010.
48. Michael L. Geiges *History of Lasers in Dermatology* Bogdan Allemann I, Goldberg DJ (eds): *Basics in Dermatological Laser Applications*. *Curr Probl Dermatol*. Basel, Karger, 2011, vol 42, pp 1–6.

- 49.Frega A, Verrone A, Schimberni M, Manzara F, Ralli E, Catalano A, et al. Feasibility of office CO2 laser surgery in patients affected by benign pathologies and congenital malformations of female lower genital tract. *Eur Rev Med Pharmacol Sci* 2015; 19 (14):2528-2536.
- 50.Penna C, Fallani MG, Fambrini M, Zipoli E, Marchionni M. Type III female genital mutilation: clinical implications and treatment by carbon dioxide laser surgery. *Am J Obstet Gynecol* 2002; 187 (6):1550-1554.
- 51.Choussein S, Srouji SS, Farland LV, Gargiulo AR. Flexible Carbon Dioxide Laser Fiber Versus Ultrasonic Scalpel in Robot-Assisted Laparoscopic Myomectomy. *J Minim Invasive Gynecol* 2015; 22 (7):1183-1190.
- 52.Fractional Laser Treatment of Vulvovaginal Atrophy and U.S. Food and Drug Administration Clearance: Position Statement. ACOG.
- 53.Committee on Gynecologic Practice, American College of Obstetricians and Gynecologists. ACOG Committee Opinion No. 378: Vaginal "rejuvenation" and cosmetic vaginal procedures. *Obstet Gynecol* 2007; 110 (3):737-738.
- 54.Arunkalaivanan A, Kaur H, Onuma O. Laser therapy as a treatment modality for genitourinary syndrome of menopause: a critical appraisal of evidence. *Int Urogynecol J* 2017; 28 (5):681-685.
- 55.Cruz VL, Steiner ML, Pompei LM, Strufaldi R, Fonseca FLA, Santiago LHS, et al. Randomized, double-blind, placebo-controlled clinical trial for evaluating the efficacy of fractional CO2 laser compared with topical estriol in the treatment of vaginal atrophy in postmenopausal women. *Menopause* 2018; 25 (1):21-28.

56. Ellsworth WA, Rizvi M, Lypka M. Techniques for labia minora reduction: an algorithmic approach. *Aesthetic Plast Surg* 2010; 34: 105-110.
57. Güneş A, Alinsod RM. A mini-review of aesthetic gynecology and leading gynecology associations' approaches to this issue. *Turk J Obstet Gynecol* 2018; 15:105-111.
58. Runacres SA, Wood PL. Cosmetic Labiaplasty in an Adolescent Population. *J Pediatr Adolesc Gynecol* 2016; 29(3):218-222.
59. Dayan E, Ramirez H, Theodorou S. Radiofrequency Treatment of Labia Minora and Majora: A Minimally Invasive Approach to Vulva Restoration. *Plast Reconstr Surg Glob Open* 2020; 8(4):e2418.
60. Zahran KM, Saad Eldin W. Pinhole Vagina Following Mismanaged Vaginal Delivery. *Journal of Gynecologic Surgery* 2010; 26 (4): 1-16.
61. Widschwendter A, Riedl D, Freidhager K, Azim SA, Jerabek-Klestil S, D'Costa E, et al. Perception of Labial Size and Objective Measurements-Is There a Correlation? A Cross-Sectional Study in a Cohort Not Seeking Labiaplasty. *J Sex Med* 2020; 17(3):461-469.
62. González-Isaza P, Lotti T, França K, Sanchez-Borrego R, Tórtola JE, Lotti J, et al. Carbon Dioxide with a New Pulse Profile and Shape: A Perfect Tool to Perform Labiaplasty for Functional and Cosmetic Purpose. *Open Access Maced J Med Sci* 2018; 6(1):25-27.
63. Qureshi AA, Tenenbaum MM, Myckatyn TM. Nonsurgical Vulvovaginal Rejuvenation With Radiofrequency and Laser Devices: A Literature Review and Comprehensive Update for Aesthetic Surgeons. *Aesthet Surg J* 2018; 38(3):302-311.



64. Regenyi P. Abstract: experience with two years of laser labioplasty. *J Laser Heal Acad.* 2019; 2019:S22.
65. Bizjak-Ogrinc U, Senčar S. Sutureless Laser Labioplasty of Labia Minora. *Sex Med* 2021; 9(5):100406.
66. Sharp G, Tiggemann M, Mattiske J. Psychological outcomes of labioplasty: a prospective study. *Plast Reconstr Surg* 2016; 138:1202–1209.

## الخلاصة

**نبذة:** يمثل تضخم الشفرين الصغيرين في الآونة الأخيرة مصدر قلق كبير للنساء لأغراض جمالية أو بسبب التهيج الموضعي وعدم الراحة. العلاج بالليزر لتضخم الشفرين الصغيرين له مزايا عديدة.

**هدف الدراسة:** لتقييم فعالية عملية تجميل الشفرين الصغيرين بالليزر بدون خياطة.

**المرضى وطرق البحث:** هذه الدراسة عبارة عن دراسة حالة متسلسلة أجريت في عيادة التجميل الخاصة بأمراض النساء في مدينة بغداد / العراق خلال فترة خمسة أشهر طوال الفترة من 1 سبتمبر 2021 حتى 31 يناير 2022 على عينة ملائمة من ثماني نساء مصابات بتضخم الشفرين الصغيرين. تم إجراء استئصال حافة الأنسجة الزائدة في وضع عدم الاتصال بواسطة ليزر ثاني أكسيد الكربون. تم تقييم النتائج عن طريق قياس مقياس النظير البصري واستبيان أعراض المهبل.

**النتائج:** كانت عملية تجميل الشفرتين بالليزر بدون خياطة فعالة بشكل كبير في زيادة الرضا والثقة بالنفس أثناء الجماع. كانت عملية تجميل الشفرات بالليزر بدون خياطة فعالة بشكل كبير في تقليل حدة الحكّة والتهيج والرائحة والتفريغ وأعراض الديسك. تم عرض مضاعفات العملية من قبل امرأتين (25٪) ؛ امرأة تعاني من مضاعفات النزيف وامرأة مصابة بالوذمة.

**الخلاصة:** إن عملية تجميل الشفرات بالليزر بدون خياطة طريقة فعالة لتقليل حجم الشفرين



وزارة التعليم العالي والبحث العلمي

جامعة بغداد

معهد الليزر للدراسات العليا

# تجميل الشفرتين الصغيرتين بالليزر ثنائي أوكسيد الكربون بدون خياطة

دراسة مقدمة إلى معهد الليزر للدراسات العليا/ جامعة بغداد كجزء من متطلبات نيل  
درجة الدبلوم العالي في تطبيقات الليزر في الطب/ النسائية والتوليد

من قبل

د. فرح سامي داود

بكالوريوس طب وجراحة عامة

دبلوم عالي نسائية وتوليد

بإشراف

الدكتورة نادية محمد سعيد

زميلة المجلس العراقي للاختصاص النسائية والتوليد

دبلوم عالي ليزر

2022م

1443هـ