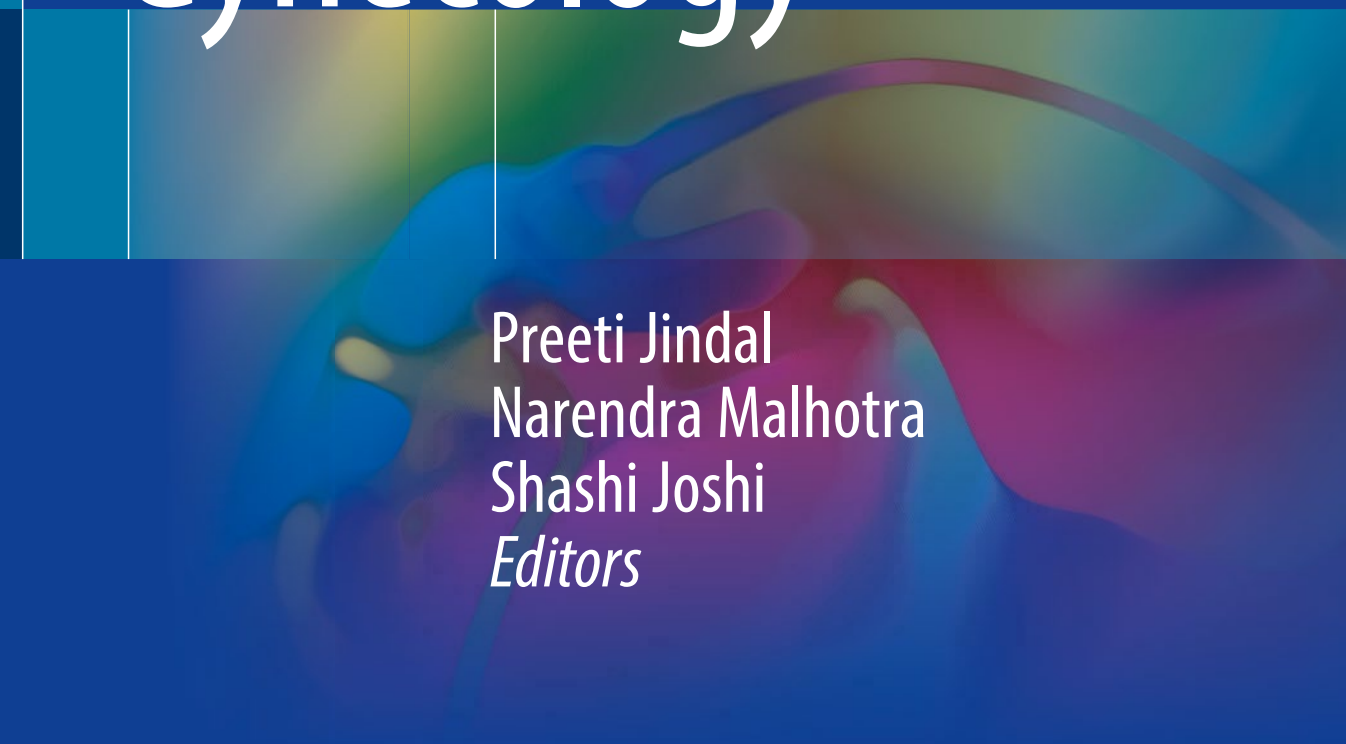
Aesthetic and Regenerative Gynecology



Preeti Jindal
Narendra Malhotra
Shashi Joshi
Editors

Springer

Aesthetic and Regenerative Gynecology

Preeti Jindal • Narendra Malhotra
Shashi Joshi
Editors

Aesthetic and Regenerative Gynecology

Springer

Editors
Preeti Jindal
The Touch, Advanced Obstetrics
IVF & Cosmetic Gynae Centre
Mohali, India

Shashi Joshi
City Clinic - International
Mahboula, Kuwait

Narendra Malhotra
Global Rainbow Healthcare
Agra, Uttar Pradesh, India

ISBN 978-981-16-1742-3 ISBN 978-981-16-1743-0 (eBook)
https://doi.org/10.1007/978-981-16-1743-0

Dedicated to all my teachers, patients and well-wishers

Acknowledgement

Any endeavour big or small is not complete without the help of numerous behind the scene well-wishers. I will like to convey special thanks to my solid support system—my husband Dr Ravul Jindal who not only ushered me into a new and intriguing field of aesthetic and regenerative Gynecology—a new path I was afraid of to tread; but also supports me in all my endeavours.

Special thanks to my parents for imbibing me with virtue and knowledge. No words are enough to thank my loving children—Adit and Kush for bearing with my long hours of work and absentee from their special moments.

Thanks to all authors for sparing valuable time and sharing their knowledge, experience and penning down the chapters which helped in creating this beautiful book. Thanks to Dr Isha without whose contribution this book could not have been completed.

Hope it inspires and guides all those who want to follow this wonderful field.

Enjoy gaining knowledge and shine

Fond love

Preeti Jindal

Contents

1 Introduction to the Rising field of Aesthetic and Regenerative Gynecology 1
Preeti Jindal and Isha Kundal

2 Epidemiological Perspective in Aesthetic and Regenerative Gynecology 7
Madhu Gupta, Neena Singla, and Kiranjit Kaur

3 Anatomy and Physiology in Relation to Invasive and Non-invasive Procedures in Aesthetic and Regenerative Gynecology 15
Jaideep Malhotra, Narendra Malhotra, Neharika Malhotra, Manpreet Sharma, and Shemi Bansal

4 Counselling Before Cosmetic Gynecology 23
Shashi Joshi

5 Medico-legal Aspects in Aesthetic and Regenerative Gynecology 29
Geetendra Sharma and Hitesh Bhatt

6 Energy-Based Devices: Comparisons and Indications 37
Ohad Toledano

7 Laser in Aesthetic and Regenerative Gynecology: Physics, Types, Applications, Safety Profiles 53
Avitus John Raakesh Prasad, Ganesh S. Pai, and Anusha H. Pai

8 Laser in Vaginal Rejuvenation 67
Alex Bader

9 Other Lasers in Aesthetic and Regenerative Gynecology 79
Vidya Pancholia, Krishna Hari, and Ksenija Selih Martinec

10 Radiofrequency in Aesthetic and Regenerative Gynecology 91
Francesco Merelli and Bruno Boccioli

11 Carboxytherapy in Aesthetic and Regenerative Dermatology 103
Karin Staab

12 Micro-focused Ultrasound in Aesthetic and Regenerative Gynecology 117
Ting Song Lim

13 Minimal Invasive Treatment of Varicose Veins 121
Ravul Jindal, Luv Luthra, Piyush Chaudhary, Taranvir Kaur, and Shabjot Dhillon

14 Chapter on Testosterone Therapy 139
Carolyn DeLucia

15 Laser Hair Removal 147
A. B. Prabhu

16 Thread Lift in Aesthetic and Regenerative Gynecology 153
Biplav Agarwal and Poonam Mishra

17 Chemical Peels and Vulval Whitening in Aesthetic and Regenerative Gynecology 165
Vivek Malhotra and Purva Pande

18 Scars in Aesthetic and Regenerative Gynecology 175
Rashmi Sarkar and Preethi B. Nayak

19 Hypo and Hyperpigmentary Disorders of Vulva 181
Surajit Gorai and Koushik Lahiri

20 Breast Lifting and Reduction in Aesthetic and Regenerative Gynecology 191
James Dsilva and Mohan Thomas

21 Butt Reshaping/Gluteal Recontouring Surgeries in Aesthetic and Regenerative Gynecology 209
A. Jayanthi Mala

22 Hymenoplasty, Vaginoplasty, and Perineoplasty in Aesthetic and Regenerative Gynecology 221
Ragini Agrawal

23 Labiaplasty and Cliteroplasty 233
Shashi Joshi

24 Vulvodynia 249
Rashmi Bagga and Rimpi Singla

25 Non Energy Based Modalities in Cosmetic Gynaecology 259
Madhuri Agarwal and Sejal K. Shah

26 Genitourinary Syndrome of Menopause 265
Preeti Jindal, Isha Kundal, Ridhi Kalra, and Sumitu Sahdev

27 Management of Urinary Incontinence in Aesthetic & Regenerative Gynecology 273
Ronen Gold

28 Non-cosmetic Uses of Laser in Aesthetic and Regenerative Gynecology: Vulvodynia, Urinary Incontinence, Infections, Warts 301
Preeti Jindal, Isha Kundal, and Sonam Goyal

29 Gender Reassignment Surgery in Aesthetic and Regenerative Gynecology 311
Rakesh Kain

30 Anaesthesia in Procedures of Aesthetic and Regenerative Gynecology 319
Amit Kumar, Neerja Bharti, and Adarsh Chandra Swami

31 Stem Cells and Recent Advances in Aesthetic and Regenerative Gynecology 327
Asawari Bapat

32 PRP and Exosomes in Regenerative Gynecology 359
Carolyn DeLucia

33 Setting Your Practice and Future of Aesthetic and Regenerative Gynecology 367
Preeti Jindal and Muskan Mittal

Index 371

Editors and Contributors

Chief Editor

Preeti Jindal, MD, MRCOG, DNB, FICOG
The Touch, Advanced Obstetrics, IVF & Cosmetic Gynae Centre, Mohali, India

Co-Editors

Narendra Malhotra, MD, FICOG, FICMCH, FRCOG, FICS Global Rainbow Healthcare, Agra, India

Shashi Joshi City Clinic, Mahboula, Kuwait

Contributors

Biplav Agarwal, MBBS Gurgaon, India

Madhuri Agarwal, MD, DDV Mumbai, India

Ragini Agrawal, MS, FICOG, FICMCH Pratiksha Hospital, Dr Ragini's Urogynae, Laser & Cosmetic Gynecology Centre, Gurgaon, India

Alex Bader, MD, FAAOCG, FAAC Bader Medical Institute of London, London, UK

Rashmi Bagga Department of Obstetrics and Gynecology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Shemi Bansal, MBBS, DIPGO Global Rainbow Healthcare, Agra, India

Asawari Bapat, DPB (DCP), PGDHHM Nashville, TN, USA

Neerja Bharti Department of Anaesthesia, PGIMER, Chandigarh, India

Hitesh Bhatt, MD, LLB Mumbai, India

Bruno Boccioli, PhD Perugia, Italy

Piyush Chaudhary Mohali, India

Carolyn DeLucia, MD Hillsborough, NJ, USA

Shabjot Dhillon, MBBS Mohali, India

Ronen Gold, MD Department of Uroygnecology and Pelvic Floor Rehabilitation, Aya Medical Advanced Gynecology, Tel Aviv-Yafo, Israel

Service for Obstetric Anal Sphincter Injury at Birth, Lis Women's Hospital, Tel Aviv Medical Center, Tel Aviv Medical School, Tel Aviv-Yafo, Israel

Surajit Gorai, MBBS, MD, DNB, MNAMS Department of Dermatology, Apollo Hospitals, Kolkata, India

Sonam Goyal, MBBS The Touch, Advanced Obstetrics, IVF & Cosmetic Gynae Centre, Mohali, India

Madhu Gupta, MD, PhD Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Krishna Hari Indore, India

A. Jayanthi Mala, MS Department of Plastic Surgery, CMC, Ludhiana, India

Ravul Jindal, MS (PGI), DNB, FRCS (UK), FAMS Fortis Hospital, Venous Association of India (VAI), Mohali, India

Rakesh Kain, BSc, MBBS, MA (Psychology), MS AIIMS, Rishikesh, India

Ridhi Kalra The Touch, Advanced Obstetrics, IVF & Cosmetic Gynae Centre, Mohali, India

Kiranjit Kaur, MPH Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Taranvir Kaur Mohali, India

Amit Kumar Department of Anaesthesia and Critical Care, Fortis Hospital, Mohali, India

Isha Kundal, MBBS The Touch, Advanced Obstetrics, IVF & Cosmetic Gynae Centre, Mohali, India

Koushik Lahiri, MBBS, DVD (CAL), FIAD, FFAADV Department of Dermatology, Apollo Hospitals, Kolkata, India

Ting Song Lim, MD (Dermatology) Department of Aesthetic Medicine, Clique Clinic, Kuala Lumpur, Malaysia

Luv Luthra Mohali, India

Jaideep Malhotra, MD, FICMCH, FICOG, FICS, FMAS Global Rainbow Healthcare, Agra, India

Neharika Malhotra, MD, FICMCH, FMAS Global Rainbow Healthcare, Agra, India

Vivek Malhotra, MD Beau Visage Skin Clinic, Chandigarh, India

Ksenija Selih Martinec Kallista Medical Center, Domžale, Slovenia

Francesco Merelli, MD Arezzo, Italy

Poonam Mishra, MBBS, DGO, DNB, FAM, FCG Lucknow, India

Preethi B. Nayak Cutis Academy of Cutaneous Sciences, Bengaluru, Karnataka, India

Anusha H. Pai, MD Derma-Care, Mangalore, India

Ganesh S. Pai, MD, DVD, FAAD Derma-Care, Mangalore, India

Vidya Pancholia, MD Indore, India

Purva Pande, MBBS, MD Dr. Purva's Skin Clinic, Panchkula, Haryana, India

A. B. Prabhu, MS (General Surgery), MCh Plastic, Cosmetic & Reconstructive Surgery, Fortis Hospital, Mohali, India

Avitus John Raakesh Prasad, DDVL S. P. Derma Center, Madurai, India

Sumitu Sahdev, MBBS The Touch, Advanced Obstetrics, IVF & Cosmetic Gynae Centre, Mohali, India

Rashmi Sarkar, MD Lady Hardinge Medical College, New Delhi, India

Sejal K. Shah, MD, DVD, DDV Mumbai, India

Geetendra Sharma, MD, LLB Ahmedabad, India

Manpreet Sharma, MBBS, MS (OBS & GYN) Global Rainbow Healthcare, Agra, India

Neena Singla, DGO, DHM Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Rimpi Singla Department of Obstetrics and Gynecology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Karin Staab, MD Universidad de Chile, Santiago, Chile

Adarsh Chandra Swami Department of Anaesthesia and Critical Care, Fortis Hospital, Mohali, India

James Dsilva The Cosmetic Surgery Institute, Mumbai, India

Mohan Thomas, MD, FACS The Cosmetic Surgery Institute, Mumbai, India

Ohad Toledano, MSc Tel Aviv, Israel

1 Introduction to the Rising field of Aesthetic and Regenerative Gynecology

Preeti Jindal and Isha Kundal

1.1 Introduction

Cosmetic Gynecology is becoming one of the fastest-growing branches in women's healthcare. It is very interesting, intriguing and futuristic branch that spans over fields of gynecology, dermatology, urogynecology, urology, vascular and plastic surgery. In fact, dentist fraternity is also showing lots of interest in this field. It was called cosmetic gynecology as it originally included **cosmetic procedures** to enhance the aesthetic appearance of the female genital region. Presently along with cosmesis; it includes **functional vulvo-vaginal repairs** to restore anatomy and physiology following recurrent trauma of childbirth, menopause and ageing. It covers not only women genitalia but complete female aesthetics from head to toe. In fact, it is time for all concerned specialities to join hands and take this field to newer heights to obtain optimal results.

1.2 Why is There a Sudden Interest in this Field?

Studies have shown that with rising awareness and increasing accessibility to Internet; women are becoming more aware of the beauty of their intimate parts. According to a 1997 survey, it is evident that 30% of all visitors to porn sites are women and more women watch porn on mobile phones than men as shown in Fig. 1.1 [1]. Hence it is but natural for women to desire for perfect body and mimic the appearances of their favourite models.

Another reason for increased interest in this field is due to increase in longevity of life. Everyone wants to reverse ageing and maintain youth. The world is moving rapidly towards rejuvenation. Nowadays, an average woman is expected to spend one-third of her life in postmenopausal phase. The usefulness for vaginal rejuvenation, non-invasive management of urinary incontinence, treatment of genitourinary syndrome of menopause and aesthetic upliftment cannot be understated. All these needs have lead to the sudden growth in field of cosmetic and rejuvenative gynecology and all efforts should be made by young aspiring clinicians to learn about it so that they can do justice to their patients.

1.3 History

Cosmetic is a Greek adjective "kosmetikos" which means—to adorn [2]. According to Merriam Webster thesaurus's first known use of this word was in1638. It may be used as a noun to refer to cosmetic preparation for external use.

P. Jindal (✉) · I. Kundal
The Touch, Advanced Obstetrics, IVF & Cosmetic Gynae Centre, Mohali, India

P. Jindal et al. (eds.), *Aesthetic and Regenerative Gynecology*,
https://doi.org/10.1007/978-981-16-1743-0_1

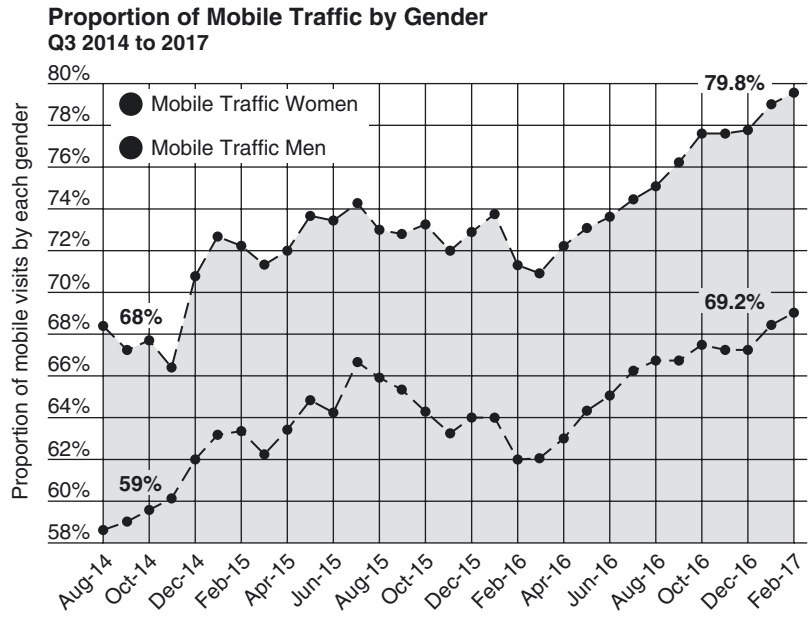


Fig. 1.1 Graph showing more women watching porn than men

Since time immemorial people have tried to improve beauty or aesthetics. **Sushruta** (Fig. 1.2), an Indian physician is considered as the world's first plastic surgeon who described the surgical treatment of a wide variety of ailments, including reconstructive procedures as early as 600 BC [3]. He was born 150 years before Hippocrates. His book "Sushruta Samhita" mentions labiaplasty.

In olden times smoke was used in newly wed women to enhance vaginal sexuality and tightness and also to kill abnormal flora leading to infection. Even today an old Javanese tradition of preparing the vagina by smoke and steam to tighten and rejuvenate is practised (RatusV tradition [4]. Indian mythology also describes similar practises. Interestingly, warming or heating actually is the basis of all **energy-based devices (EBD)** used nowadays for rejuvenation where energy is used to raise temperature of the tissue to an optimal level, which leads to remodelling of elastin and collagen causing rejuvenation of that part.

Vaginal rejuvenation is over 1000-year old. The work of female physician, **Trotula de Ruggiero** (1050 AD), a teacher whose main interest was to alleviate the suffering of women is believed to have first described Vaginoplasty [5]. Greek literature in the early first and second century AD by physician **Soranus** of Ephesus mentions female cosmetic procedures. In the sixth century AD, **Musico** did Latin translation of his 4 volume treatise entitled "gynecology" and describes clitoral surgeries to enhance or diminish sexual pleasures. In third century AD, **Philumenos** of Alexandria described the excision of hypertrophied clitoris because it was considered not appealing, in fact ugly and disgraceful. His work was abstracted by the physician **Aetios** of Amida in his fourth century work *Sixteen Books on Medicine*. Labiaplasty was performed by Greek physician **Paulos** of Aegina as early as in seventh century AD.

These procedures always were not done for aesthetics. The practice of excising the *nonhypertrophied* clitoris originated in Egypt in an effort to prevent any desire for coitus in premarital girls and not out of any cosmetic motivation [6]. Unfortunately such varied practises of female genital mutilation are still currently practised in some parts of the world and its correction also comes under the domain of cosmetic gynecology and plastic surgery.

Rati Rahasya (translated in English as Secrets of Love) an ancient Indian book written by **Kokkoka**, an Indian poet in eleventh–twelfth century on female sexuality mentions vaginal rejuve-

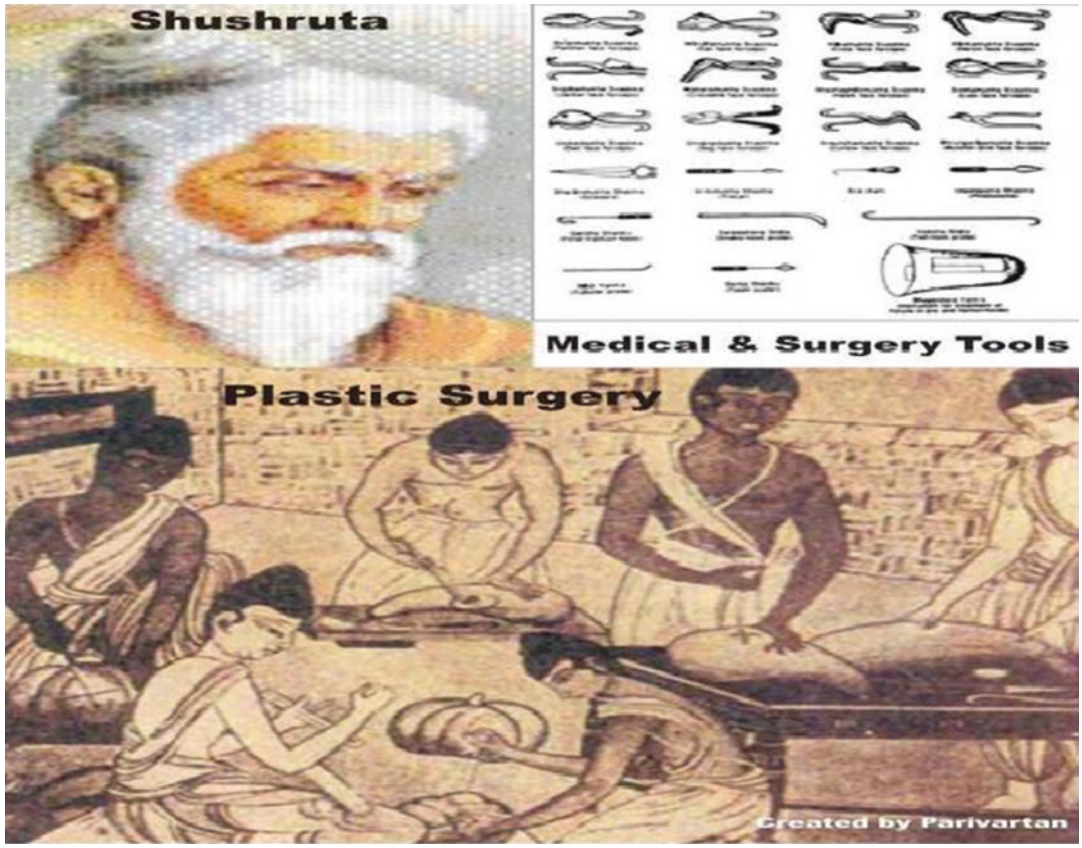


Fig. 1.2 Sushruta; Father of surgery

nation and Yoni shastra to contract or enlarge the vagina (nari kunjara Chapter 11 verse 3) [7].

In Renaissance period**—Pierre dionis** (1643–1718), a parisian described nymphaeplasty, i.e. labiaplasty in his Coursd'operations de chirurgie (1707) based on his late 1600 work (iscgmedia.com; history of cosmetic gyne). In 1905, **Barton Hirst** described vulval reconstructive surgeries and **Jeffcoate** published these in detail in 1957. Many textbooks of gynecology in the last century have given in detail vaginoplasty, labial reconstruction, and vulvodynia under different headings.

Recently in 2008 **Jamie McCartney**, a professional artist living in Brighton, England made a ten-panelled wall sculpture of plaster cast taken from 400 volunteers' genitalia—"The Great Wall of Vagina", to demonstrate diversity in appearances of the vulva; reviving new interest in female genital cosmesis (Fig. 1.3).

1.4 Present Scenario

Energy-based devices like lasers, radiofrequency, highly focused USG (HIFU), carboxytherapy, and many more advancements have made it possible to treat conditions previously considered untreatable or difficult to treat. Patients benefit from improved results, painless therapies, walk-in procedures and less cost as compared to conventional surgery. In the last few years, the main focus of research and development of medical lasers has been on laser hair removal, the treatment of vascular lesions including leg veins, and vision correction. But now there has been a revolution in the last two decades and the focus has shifted to cosmetic gynecology.

In fact, non-invasive management of non-neurological causes of urinary incontinence as highlighted in this chapter by the editor with help

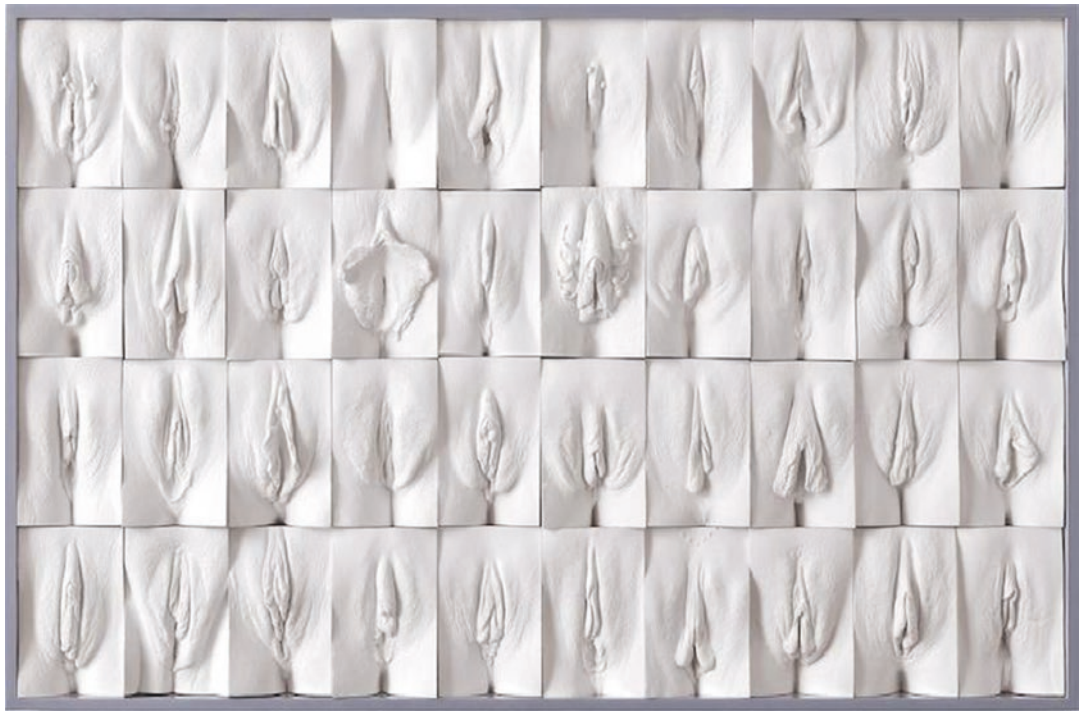


Fig. 1.3 The Great wall of vagina; McCartney (2008)

of laser, HIFEM (Emsella chair of BTL), carboxy, radiofrequency, PRP therapy, fillers etc. has revolutionised the management of this distressing problem [8].

North America holds the major share of this growing market due to factors such as high prevalence of the aged population, high disposable income, increased awareness of aesthetics, and presence of sophisticated infrastructure [9]. The American Society for Aesthetic Plastic Surgery reported an increase of 446% in cosmetic procedures since 1997 and an overall increase of 8% in 2007, with a 17% increase in men undertaking cosmetic surgery [10].

Asia-Pacific is expected to be the second fastest-growing market because of prominent growth factors such as rising disposable income, increasing awareness among the women population base, improving healthcare infrastructure and larger opportunities for physicians (Fig. 1.4). Europe is the third-largest market of cosmetic gynecology, propelling growth owing to increasing number of vaginal rejuvenation procedures providing centres and trained specialists.

The desire to look beautiful is something which all women have right from time immemorial. Although it is not possible to define the ideal aesthetic genitalia, patient-specific techniques chosen based on the patient's anatomy and applied with a realistic approach can increase patient satisfaction and reduce complication rates. Not only aesthetics but due to aging vaginal dryness, urinary leakage and genitourinary syndrome of menopause make it necessary that we offer these new technologies to women. Laser though not FDA (July 30, 2018, FDA statement) approved for vaginal rejuvenation (till date of writing of this chapter) has been found useful in these conditions by many users [11]. It is questionable that if FDA approves laser to be used on face and in vagina for surgical purposes (destruction of abnormal or pre-cancerous cervical, vaginal tissues and condylomas, warts; then why it is not approved for vaginal rejuvenation). The thickness of vaginal mucosa is around 4 mm and penetration of CO_2 laser is only 50–125 micrometres. Other lasers also penetrate much lesser. Hence, it is considered to be very safe modality

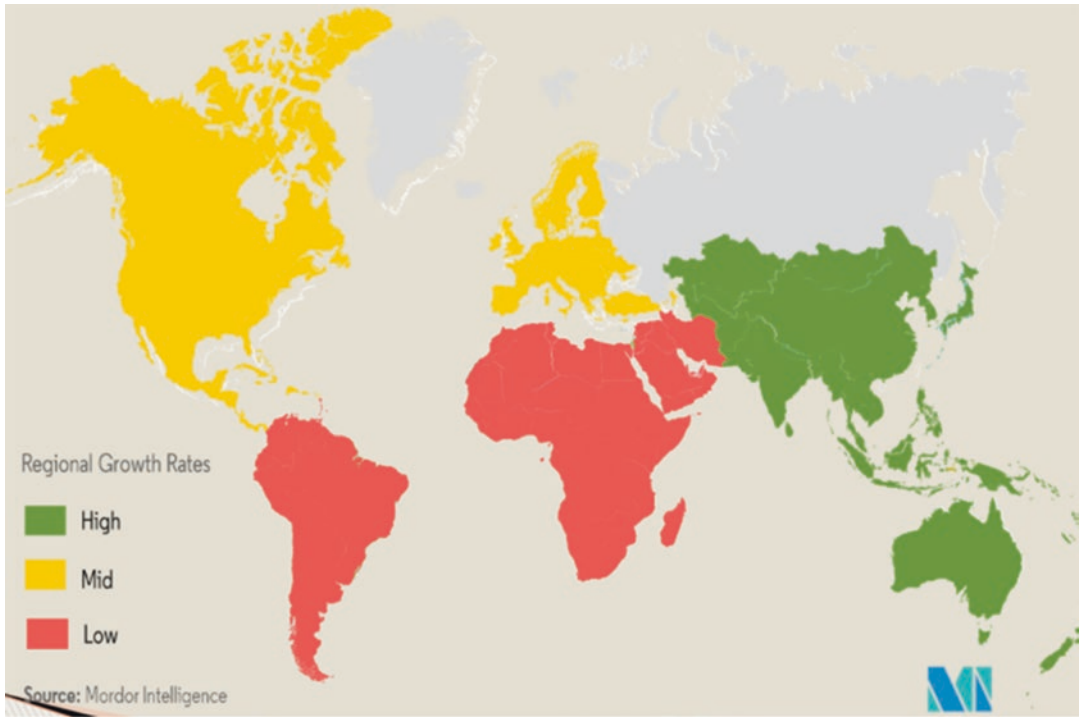


Fig. 1.4 Medical laser market—Growth rate by region (2018)

provided used with adequate knowledge and training. In fact with more and more studies citing the benefits of vaginal lasing with very few side effects it is speculated that it is a matter of time that EBDs will get the required approvals. HIFEM technology is FDA approved for male and female non-invasive urinary incontinence treatment. Other energy-based devices are also being regularly used for the treatment of these conditions with good patient satisfaction rates (as you will read further in the following chapters by various experts) and minimal observed complications.

As this field is relatively new and we are at that point in history that major advancements are occurring in this branch; it therefore becomes the responsibility of teachers as well as students alike to learn more about this field and offer evidence-based treatment to women to improve their quality of life. At the same time as it is a new field, we also have to be very careful and adhere to strict guidelines so that no harm is done to patients. Medicolegally also clinicians have to safeguard themselves with appropriate informed consents.

Bibliography

1. Dailymail.com, Erica Tempesta for. Women reveal the biggest mistakes that men make in the bedroom. Daily Mail Online, Associated Newspapers. 13 November 2020. www.dailymail.co.uk/femail/article-8947809/Women-reveal-biggest-mistakes-men-make-bedroom.html.
2. Lerner C. History of feminine beautification. Arch Dermatol Syphilol. 1932;26(6):1022–31. https://doi.org/10.1001/archderm.1932.01450031024008.
3. Bhagyashri S, Lalitkumar V. Concept of cosmetology in ancient India with special reference to Sushruta Samhita. Int A Med J. 2018;6(4):893–4.
4. Benefits of V-Spa Ratus. n.d. http://ratusv.blogspot.com/2013/04/benefits-of-v-spa-ratus.html.
5. Cavallo P, Proto MC, Patruno C, Del Sorbo A, Bifulco M. The first cosmetic treatise of history. A female point of view. Int J Cosmet Sci 2008 Apr;30(2):79–86. https://doi.org/10.1111/j.1468-2494.2007.00414.x. PMID: 18377616.

6. Pelosi M. The history of cosmetic vaginal surgery: part I [Web log post]. 2 October 2013. https://www.iscgmedia.com/iscg-blog/the-history-of-cosmetic-vaginal-surgery-part-i.
7. Somasundaram O, Raghavan V. The Ratirahasya—Kukkoka: secrets of love. J Psychosexual Health. 2019;1(3–4):283–5. https://doi.org/10.1177/2631831819890774.
8. Jindal P, et al. Non surgical management of stress urinary incontinence (SUI). ASWH. 2020;2(11):51–4.
9. Axiommrc.com. Cosmetic gynecology market | Global share, Trend analysis Report. [online]. 2019. https://axiommrc.com/product/hc2102-cosmetic-gynecology-market-report.
10. Furnham A, Levitas J. Factors that motivate people to undergo cosmetic surgery. Can J Plast Surg. 2012;20(4):e47–50.
11. Lanzafame RJ, de la Torre S, Leibaschoff GH. Photobiomodulation, photomedicine, and laser surgery. July 2019:395–407. https://doi.org/10.1089/photob.2019.4618.

2 Epidemiological Perspective in Aesthetic and Regenerative Gynecology

Madhu Gupta, Neena Singla, and Kiranjit Kaur

2.1 Introduction

Aesthetic and regenerative gynecology is a relatively new and fast-emerging sub-speciality of gynecology. The aim is to enhance the appearance and restore the function of vulvo-vaginal region which may have got damaged during pregnancy, childbirth or tissue changes brought about by ageing [1]. These procedures are no longer the sole domain of dermatologists and plastic surgeons. With increasing empowerment and financial independence of women; many women are demanding these procedures today leading to an increasing number of Gynecologists and Urogynecologists stepping into this field. The use of minimally invasive energy-based treatments along with a range of other medical and surgical options are used to achieve the twin goals of satisfactory function and appearance. It is important to have insight into the prevalence and incidence of the problems for which aesthetic and regenerative gynecology has a big role in the management.

M. Gupta (✉) · N. Singla · K. Kaur
Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India

2.2 Complaints for Which Aesthetic and Regenerative Treatment Is Sought

Mostly women seeking aesthetic and regenerative treatments may present with decreased sexual satisfaction on the part of self or partner, feeling of looseness in vagina or vaginal laxity, pain during coitus, decreased lubrication, dribbling of urine or urinary incontinence on coughing, laughing, sneezing, vaginal discharge which may be foul smelling or blood stained, dryness in vagina with irritation and itching. Some women may complain of hypertrophied or dark labia which may be congenital or just a normal variation leading to low self-confidence and dissatisfaction with appearance.

Events like pregnancy, childbirth, ageing, menopause or therapy for malignancy result in significant functional and physical changes in the woman's body. A loose vagina post childbirth is the most subjective and commonly self-reported complaint for which treatment may be sought. But substantial data is lacking [2]. Still in a large majority, women may seek help only because the spouse complains of decreased sexual satisfaction due to her lax vagina. In a UK study, women who attended gynecology and urogynecology clinics were evaluated through a questionnaire. More than one-third had sex-related symptoms which were told only when specifically asked, but very few complained of

P. Jindal et al. (eds.), *Aesthetic and Regenerative Gynecology*,
https://doi.org/10.1007/978-981-16-1743-0_2

vaginal laxity as a symptom [3]. Another survey by Millheiser L et al. (2010) of parous women in 25–55 years of age revealed that almost half of them felt decreased interest in sexual activity and were concerned about vaginal laxity following childbirth [4]. Endocrine changes at menopause lead to vaginal dryness, dyspareunia, low sexual desire and consequently sexual dysfunction [5]. Urinary incontinence as a result of tissue damage during childbirth or at menopause along with other symptoms of vaginal atrophy and the resultant sexual dysfunction are a cause of considerable disability and despair in many cases, leading to low self-esteem, strained relations with spouse and a poor quality of life.

In an OPD-based retrospective study done by Jindal P et al. in 2019–2020, prevalence of urinary incontinence among one thousand and eighteen women studied in North India was found to be 25.8% [6].

Satisfactory sexual function is associated with physical and mental well-being at all ages, even in the later years [7]. Decreased sexual function adversely affects relationship status with a partner and is associated with negative emotional and psychological state [8]. Similarly in a study by Kingsberg SA et al. (2013), it was observed that although the prevalence of symptoms of vulvovaginal atrophy is quite high in middle-aged and post-menopausal women, approximately, 50% of the women did not consult a healthcare professional, or complain about symptoms affecting their quality of life. Even healthcare providers did not bring up or discuss the subject in more than 90% of cases [9].

2.3 Problem Statement

The incidence and prevalence of female sexual dysfunction and other related disorders including vaginal laxity, dyspareunia and vaginal dryness, and their risk factors are summarised in Table 2.1.

2.3.1 Globally

A study among 29 countries across the globe was conducted to assess sexual behaviours and sexual dysfunction after 40 years among men and women. It was observed that 21% of women had lack of sexual interest, 16% had inability to reach orgasm and 16% had lubrication difficulties. Lack of sexual interest was found in more women in South East Asia and the Middle East. Dyspareunia was reported by 10% of women, with higher prevalence in South East Asia (22%) and lower in Northern Europe (5%) [10].

2.3.2 High-Income Countries

Incidence of female sexual dysfunction in one of the older studies in Finland was found to vary from 20% in females 25 years or younger to 70–80% among women in 55–74 years age group, while low sexual desire in women greater than 65 years was found to be prevalent in a range of 40–50%, in a review of literature by Kontula O, et al. (2015) [11]. In Sweden, the prevalence of sexual disabilities and problems were reported to be low sexual desire (65%), low achievement of orgasm (48%) and dyspareunia (30%) [12]. Self-reported sexual problems like lack of sexual desire, arousal and orgasm, which were accompanied by personal distress, varied from 8.9% among women greater than 64 years to 14.8% in women from 45–64 years in studies done in the USA by Shifren JL et al. (2002) [13]. Another study in the USA by Luber KM et al. (2004) found that ageing; obesity and smoking are major risk factors for stress urinary incontinence and its prevalence ranges from 4 to 35% [14]. Impact of vulvo-vaginal atrophy in post-menopausal women is seen in 45% of women aged 45 years and above [8], while in another study 63% had symptoms interfering with the enjoyment of sex [15]. Vaginal laxity is seen among younger women (35.9%) in Saudi Arabia. Though not associated with higher parity, Caesarean section was found to be protective [16].

Table 2.1 Incidence and prevalence of female sexual dysfunction (FSD) and related disorders globally

Country	Year	Author reference	Study design	Age group (year)	Prevalence[a]/Incidence[b] (%)	Risk factors
Global study	2004	Nicolosi A, et al. [9]	Cross-sectional study	40–80 (men and women)	Dyspareunia: 10 Decreased lubrication: 16 Orgasmic dysfunction: 16 At least 1 FSD: 39	–
Finland	2015	Kontula O, et al. [10]	Cross-sectional National Sex Survey (2007)	18–74	Low sexual desire: 41 Orgasm difficulty: 9 Lubrication issues 40	–
Sweden	2002	K Sjogren Fugl-Meyer et al. [11]	Cross-sectional National Survey	18–74	Lubrication: 12 Low sexual interest: 65 Low orgasmicity: 48 Vaginismus: 5 Dyspareunia: 30	–
United States of America	2014	Wysocki et al. [14]	Cross-sectional survey	45 and above	Vulvovaginal atrophy: 63	–
	2013	Kinsberg SA, et al. [8]	Cross-sectional survey	45–74	Vulvo vaginal atrophy: 38 Relationship with a partner was affected in 47	–
	2009	Santoro N, et al. [29]	Cross-sectional study	45 and above	Vulvo-vaginal atrophy: 45	–
	2008	Shifren JL, et al. [12]	Cross-sectional study	18 and above	FSD <45 years.: 10.8 45–64 years.: 14.8 >64 years.: 8.9 Low sexual desire: 38.7 Orgasmic difficulty: 20.5% Age adjusted: 43.1 for any sexual problem	Poor self-assessed health Low education level Depression Anxiety Thyroid conditions Urinary incontinence
	2004	Luber KM [13]	Review of literature	18–60	Stress urinary incontinence: Young women: 4–14 Elder women:12–35	Ageing Obesity and smoking Data regarding pregnancy and childbirth is inconsistent
Saudi Arabia	2019	Taleb S, et al. [15]	Retrospective hospital-based study	23–99	Vaginal laxity: 35.9 Stress urine incontinency: 64.4	Parity Menopause Diabetes was not associated with vaginal laxity More in vaginal delivery
Iran	2013	Jaafarpour M, et al. [16]	Cross-sectional study	18–50	FSD prevalence: 46.2 <20 years: 22 40–50 years: 75.7 Problems related to sexual desire: 45.3 Arousal: 37.5 Lubrication: 41.2 Orgasm: 42.0 Satisfaction: 44.5 Dyspareunia: 42.5	Age > 40 years Parity > = 3 Married for > = 10 years husband age > =40 years Unemployed Less educated

(continued)

Table 2.1 (continued)

Country	Year	Author reference	Study design	Age group (year)	Prevalence[a]/Incidence[b] (%)	Risk factors
India	2019	Jindal P, et al. [6]	Retrospective OPD-based study	18 and above	Stress urinary incontinence: 25.8% 76–85 years: 46.7% 66–75 years: 33.6% 15–55 years: 14.6%	Age 18 years and above Urban and rural areas Multiparous Menopause
	2016	Mishra V, et al. [18]	Cross-sectional study	20–47	FSD: 55.5 Sexual desire: 85.8 Arousal dysfunction: 91.7 Lubrication: 83.5 Orgasm: 82.3 Satisfaction: 71.7 Dyspareunia: 85.8	Age 26–30 years Middle level education Upper middle-class psychological stress Married for >16 years
	2016	Santpure A, et al. [5]	Cross-sectional study	46–65 and above	Dyspareunia & vaginal dryness 10.7 Decreased libido 55.3 Sexual activity decreased with increasing sexual dysfunction and age: 54.4 to 5.6 Willing for treatment: 2.1	Ageing Duration of menopause
	2015	Rao TS, et al. [17]	Cross sectional study: Door to door survey	18–50	More than 1 sexual problem: 44.5 FSD: 14 Dyspareunia: 2.34 Arousal dysfunction: 6.65	Age 31–50 yrs. Literacy Daily wage earners Home-makers
	2013	Singh U, et al. [20]	Cross-sectional study: Hospital-based survey	18 and above	Stress urinary incontinence 73.8 In Indian population 16.13	Age > 40 years Multi-parity Obesity Asthma Tea intake Menopause Vaginal delivery Post-hysterectomy
	2009	Singh JC, et al. [19]	Cross-sectional study: Hospital-based survey	>18	FSD: 73.2 <40 year: 60 >40 year: 90 Sexual desire: 77.2 Arousal dysfunction: 91.3 Lubrication: 96.6 Orgasm: 86.6 Dyspareunia: 64.4	Ageing Low literacy
Ghana	2010	Amidu, et al. [21]	Cross-sectional study: Prospective survey	18–58	Overall FSD prevalence: 72.8 Anorgasmia: 72.4 Dissatisfaction: 77.7	Alcohol

[a]Prevalence characterizes the proportion of a given population that at a given time has a particular condition; FSD: Female sexual dysfunction

[b]Incidence is defined as the number of new cases of a certain condition during a specific period in relation to the size of the population studied

2.3.3 Low- and Middle-Income Countries

Prevalence of FSD was reported to be the highest among Iranian women of age 40–50 years (75.7%) [17]. Problems related to sexual desire were 45.3%, arousal 37.5%, lubrication 41.2% and orgasm 42.0% among these women.

In a rural population in India, Rao et al. (2015), reported the prevalence of FSDs to be 14%, which was greater in age group 31 to 50 years. 44.5% women out of these had more than one sexual problem. Socio-economic status affects the prevalence of FSD which was found to be 17.7% in high school educated women; 14.5% in daily wage earners and 14.8% in homemakers. Arousal dysfunction was found in 6.65% which was less as compared to Western studies [18]. Among Indian women aged 20–47 years, the prevalence of FSD is found to be 55.5%, which was more in 26–30 years age group and increased with associated socio-cultural risk factors like education to middle level; upper middle class; psychological stress, and in those married for >16 years [19]. In another study by Singh JC et al. considering increasing age as a risk factor, FSD was found to be prevalent in more than 95% of women greater than 40 years [20]. Singh et al. (2013) reported 16.3% prevalence of urinary incontinence among Indian adults (18 years and above). This prevalence was observed to be higher among older population of age > 40 years, women with increased parity, history of vaginal delivery, hysterectomy; and individuals with obesity, history of tea intake and smoking [21]. Among Indian women aged 46–65 years, in spite of a decrease in sexual activity from 54.4% to 5.6% due to increasing sexual dysfunction with age, only 2.1% were willing for treatment [5]. In a study done in Ghana by Amidu et al. (2010), it was found that overall sexual dysfunction was prevalent among 72.8% of women, out of which most prevalent was dissatisfaction (77.4%) and anorgasmia (72.4%), with alcohol intake being reported as the main risk factor [22].

In most of these studies, women presented to the clinic primarily for some other problems and came out with these complaints only on being specifically asked. From these studies, it is seen that the prevalence of sexual dysfunction globally varies in the range 10%–70%, even going up to 90% in an Indian study in older women.

It is dependent on various factors like age, parity, years since marriage, educational and social status and cultural perceptions. Age was found to be the most important factor and sexual dysfunction increased with age in most studies. It was associated with distress in 10–15% of cases. Association of menopause with decreased sexuality was very high and this affected relationships with partner as well. Many women suffered from multiple disorders. Studies show that age greater than 40 years, parity of 3 or more children is a risk factor for female sexual dysfunction among women aged 18–50 years [17]. Female sexual dysfunction is one of the most under-recognised and undertreated conditions. It is not surprising that most women continue to suffer silently with their unspoken problems and hesitate to express their concerns even when specifically asked. The percentage that seeks advice is very low which may be because of embarrassment, shyness or socio-cultural taboos.

2.4 Aesthetic and Regenerative Procedures: History and Current Status

History is full of examples of Aesthetic Medicine practised from the time of ancient Egyptians, who used milk, honey, alabaster and animal oils to improve the skin texture. Indian surgeons about 2000 years ago had invented the forehead flap for reconstruction of the nose. The humans' need to improve looks and enhance beauty has not changed over the ages. With the advent of new surgical and non-surgical minimally invasive techniques, like energy based devices using fractional carbon dioxide (CO_2) lasers, fractional

erbium lasers and radio-frequency devices, the field of aesthetic and regenerative female genital surgery has evolved into a highly specialised one with increasing popularity among patients and physicians. Certification and preceptorship programmes in the USA and the UK offer training to surgeons in this field. In the past few years, a number of certification training programmes for Aesthetic procedures have come up worldwide, especially in Turkey, the Middle East, Spain and South America [1]. The aesthetic and regenerative society of India (InSARG) offers such courses at very economical rates with hands-on experience.

These days a large number of younger women are seeking cosmetic procedures. Most operations are performed upon the patient's request due to a feeling of enlargement and looseness in the vagina, a desire to improve sexual function, discomfort when wearing clothes or doing fitness activities, or with an aim to increase sexual satisfaction for both herself and her partner. This field is gaining popularity steadily in the developing countries also, but is still in its infancy in these countries. In an Indian study, the number of younger females (21 to 40 years) who approached for aesthetic surgery was much more as they are sexually most active and also more aware of their appearance [23]. In another cross-sectional study done in the USA, it was found that the likelihood of undergoing aesthetic procedures in women in the age group of 45 years or more is greater (15%) as compared to those in the younger age groups (8%) due to social pressures to look younger [24]. Vaginal laxity, dryness, atrophy, pain during coitus all affect sexual function, and when repaired, sexual function improves including relationship status and mental well-being. Women with stress incontinence are low on confidence, avoid social interaction, are generally miserable with a poor quality of life. Relief in stress incontinence gives them a new lease on life. Many a time women suffering from these issues present in the psychiatry clinic for the first time with symptoms of anxiety, depression due to poor self-image and relationship problems.

Various procedures that can be performed under Aesthetic and Regenerative Gynecology may be surgical or minimally non-invasive, non-surgical techniques called energy-based devices (EBD). These apply thermal or non-thermal energy to the tissues to enhance collagen regeneration and neo-vascularisation, increased epithelial proliferation and tissue regeneration to help restore physical appearance and function.

The minimally invasive techniques are:

1. Energy-Based Devices (EBD) using CO_2 lasers, Erbium YAG laser, low-level laser therapy, radio frequency, high intensity focused ultrasound, high-intensity focused electromagnetic waves (HIFEM).
2. Chemical treatment.
3. Labial fillers like hyaluronic acid.
4. PRP or platelet-rich plasma.
5. Carboxy therapy and LED therapy.
6. Stem cell therapy.

These may be performed for cosmetic or functional indications or both as described below:

2.5 Cosmetic Indications

- ***Labiaplasty*** of Labia minora/majora which may be reduction to eliminate unwanted tissue or augmentation to create fuller and symmetrical looking labia depending upon personal or cultural preferences. This may be achieved surgically or by use of EBD. Filling is more popular in Europe as compared to the USA [1]. Labiaplasty procedures showed an increase of 23% from 2015 to 2016 as per data of The American Society for Aesthetic Plastic Surgery and is one of the most commonly performed procedures along with clitoral hood reduction [25]. Not only the USA other countries like Australia, the UK and the Middle East have all shown an increase in these procedures over the last decade. Genital Cosmetic surgery is generally not recommended for females below 18 years as full genital maturity is not normally achieved before age of 18 years [26].
- Hymenoplasty, to recreate the virginal state. Labiaplasty and hymenoplasty have ethical

issues and are considered non-medically indicated surgical procedures by many experts [26].
- ***Reduction of*** Lipodystrophy in the Mons region.
- Vaginoplasty is both cosmetic and functional and may be done surgically or non-surgically by use of fractional CO_2 lasers, fractional erbium lasers and radio frequency for tightening or rejuvenation of vagina to improve sexual function. Vaginal tightening, or vaginoplasty, refers to surgery of the vaginal entrance, deeper canal, and epithelium. This procedure is not the same as pelvic floor repair.
- ***Lightening of Vulva***: Chemical agents or CO_2 fractional laser techniques are used to achieve whitening of a hyperpigmented vulva. It is quite popular in the Middle-East and Europe and is catching up in the UK and USA. However, this technique is also not without risk. Therefore, risk and benefits to be weighed before recommendation.
- ***To remove scars*** (cosmetic/functional) in cases of Lichen sclerosus.

2.6 Functional Indications

Functionally cases with symptoms of orgasmic dysfunction, stress incontinence and vulvovaginal atrophy are relieved by laser treatment and laser radio frequency.

- Vaginal rejuvenation using radio frequency by improving vaginal blood flow which causes stimulation of collagen regeneration, connective tissue restoration and tissue tightening. Statistically significant relief in vaginal laxity [4], symptoms of atrophy, stress incontinence and improvement in sexual pleasure were reported [27].
- ***G-spot amplification*** consists of injecting hyaluronic acid or collagen filler in a special spot in the female vagina, the "G-spot", to augment and heighten sexual satisfaction. It is a matter of debate if it is really effective, as sexual pleasure depends on many other factors.

2.7 Caution

American College of Obstetrics and Gynecology (ACOG) recommends that patients should be made aware that procedures to change sexual function or appearance (except done for clinical indications such as female sexual dysfunction, pain with intercourse, vaginal prolapse and incontinence) are not medically indicated, pose a substantial risk and their safety and effectiveness have not been established [28]. Further, the US Food and Drug Administration (FDA) warns against the use of energy-based devices to perform vaginal rejuvenation of vaginal cosmetic procedures as the safety and effectiveness of these devices have not been established [29].

2.8 Conclusion

There is a substantial burden of female sexual dysfunction and related disorders among middle-aged women globally including in India. To address these aesthetic, functional and sexual concerns of women, aesthetic and regenerative cosmetology is emerging as an upcoming field. These procedures are potentially beneficial among women suffering from chronic debilitating conditions like lichen sclerosus, stress-incontinence, sexual dysfunction, scars, vulvodynia and side effects of chemotherapy. But as with any new technology, caution in use is to be advocated. ACOG recommends proper counselling of patients including risks and limitations of procedures, and informed consent should be taken before undertaking any cosmetic procedure. In experienced hands, these procedures are quite safe with a high degree of patient satisfaction and life-changing benefits. However, should preferably be advised for management of clinical conditions rather than purely cosmetic reasons.

References

1. Güneş A, Alinsod RM. A mini-review of aesthetic gynecology and leading gynecology associations' approaches to this issue. Turk Jinekoloji ve Obstet Dern Derg. 2018;15(2):105–11.
2. Vaginal Laxity. The Frequent Problem That's Infrequently Addressed. MedResults Network [Internet]. [cited 2020 Aug 24]. Available from https://www.medresultsnetwork.com/vaginal-laxity-the-frequent-problem/
3. Roos AM, Sultan AH, Thakar R. Sexual problems in the gynecology clinic: are we making a mountain out of a molehill? Int Urogynecol J. 2012;23(2):145–52.
4. Millheiser L, Kingsberg S, Pauls R. A cross-sectional survey to assess the prevalence and symptoms associated with laxity of the vaginal Introitus. Neurourol Urodyn; 2010.
5. Santpure A, Nagapurkar S, Giri P, Bhanap P. Female sexual dysfunction amongst rural postmenopausal woman. Int J Reprod Contraception, Obstet Gynecol. 2016;5(12):4385–9.
6. Jindal P, Gupta M, Isha K, Mittal M, Gulati R, Cherry M, et al. Female urinary incontinence - A revisit on prevalence of this problem in today's society, which is increasing due to increase in average life span. Acta Scientific Women's Health 3.9. 2021;3(9):27–33.
7. Lindau ST, Gavrilova N. Sex, health, and years of sexually active life gained due to good health: evidence from two US population based cross sectional surveys of ageing. BMJ. 2010;340(7746):580.
8. Leiblum SR, Koochaki PE, Rodenberg CA, Barton IP, Rosen RC. Hypoactive sexual desire disorder in postmenopausal women: US results from the Women's international study of health and sexuality (WISHeS). Menopause. 2006;13(1):46–56.
9. Kingsberg SA, Wysocki S, Magnus L, Krychman ML. Vulvar and vaginal atrophy in postmenopausal women: findings from the REVIVE (REal women's views of treatment options for menopausal vaginal changes) survey. J Sex Med. 2013;10(7):1790–9.
10. Nicolosi A, Laumann EO, Glasser DB, Moreira ED, Paik A, Gingell C. Sexual behavior and sexual dysfunctions after age 40: the global study of sexual attitudes and behaviors. Urology. 2004;64(5):991–7.
11. Kontula O. Sex life challenges: the Finnish case. Int Encycl Soc Behav Sci Second Ed. 2015 Mar;26:665–71.
12. Sjögren Fugl-Meyer K, Fugl-Meyer AR. Sexual disabilities are not singularities. Int J Impot Res. 2002;14(6):487–93.
13. Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: prevalence and correlates. Obstet Gynecol. 2008;112(5):970–8.
14. Luber KM. Risk factors for stress urinary incontinence. Rev Urol. 2004;6(3):3–9.
15. Wysocki S, Kingsberg S, Krychman M. Clinical medicine insights: reproductive health Management of Vaginal Atrophy. Implications from the REVIVE Survey. 2014:23–30.
16. Talab S, Al-Badr A, AlKusayer GM, Dawood A, Bazi T. Correlates of vaginal laxity symptoms in women attending a urogynecology clinic in Saudi Arabia. Int J Gynecol Obstet [Internet]. 2019 Jun 8 [cited 2020 Aug 1];145(3):278–82. Available from https://onlinelibrary.wiley.com/doi/abs/10.1002/ijgo.12810
17. Jaafarpour M, Khani A, Khajavikhan J, Suhrabi Z. Female sexual dysfunction: prevalence and risk factors. J Clin Diagnostic Res. 2013;7(12):2877–80.
18. Rao TS, Darshan MS, Tandon A. An epidemiological study of sexual disorders in south Indian rural population. Indian J Psychiatry. 2015;57(2):150–7.
19. Mishra V, Nanda S, Vyas B, Aggarwal R, Choudhary S, Saini S. Prevalence of female sexual dysfunction among Indian fertile females. J Midlife Health. 2016;7(4):154–8.
20. Singh JC, Tharyan P, Kekre NS, Singh G, Gopalakrishnan G. Prevalence and risk factors for female sexual dysfunction in women attending a medical clinic in South India. J Postgrad Med. 2009;55(2):113–20.
21. Singh U, Agarwal P, Verma ML, Dalela D, Singh N, Shankhwar P. Prevalence and risk factors of urinary incontinence in Indian women: a hospital-based survey. Indian J Urol. 2013;29(1):31–6.
22. Amidu N, Owiredu WKBA, Woode E, Addai-Mensah O, Quaye L, Alhassan A, et al. Incidence of sexual dysfunction: a prospective survey in Ghanaian females. Reprod Biol Endocrinol. 2010;8:2–7.
23. Desai SA, Dixit VV. Audit of female genital aesthetic surgery: changing trends in India. J Obstet Gynecol India. 2018;68(3):214–20.
24. Yurteri-Kaplan LA, Antosh DD, Sokol AI, Park AJ, Gutman RE, Kingsberg SA, et al. Interest in cosmetic vulvar surgery and perception of vulvar appearance. Am J Obstet Gynecol [Internet]. 2012;207(5):428.e1–7. Available from https://doi.org/10.1016/j.ajog.2012.06.056
25. Data M. Cosmetic surgery National Data Bank Statistics. Aesthet Surg J. 2018;38:1–24.
26. Committee RE. Ethical opinion paper [Internet]. 2013. Available from https://www.rcog.org.uk/globalassets/documents/guidelines/ethics-issues-and-resources/rcog-fgcs-ethical-opinion-paper.pdf
27. Alinsod RM. Transcutaneous temperature controlled radiofrequency for orgasmic dysfunction. Lasers Surg Med. 2016;48(7):641–5.
28. Committee on Gynecologic Practice. ACOG COMMITTEE OPINION no 795:Elective Female Genital Cosmetic Surgery. Vol. 107, ACOG. 2006. p. 213.
29. FDA warns against use of energy based devices to perform 'rejuvenation' or vaginal cosmetic procedures: FDA Safety Communication. 2018. Available at https://www.fda.gov/medical-devices/safety-communications/fda-warns-against-use-energy-based-devices-perform-vaginal-rejuvenation-or-vaginal-cosmetic. Accessed on September 18, 2020.

3 Anatomy and Physiology in Relation to Invasive and Non-invasive Procedures in Aesthetic and Regenerative Gynecology

Jaideep Malhotra, Narendra Malhotra, Neharika Malhotra, Manpreet Sharma, and Shemi Bansal

3.1 Introduction

Aesthetic or cosmetic gynecology is an upcoming field with increasing demands to improve women's reproductive health and well being and enhance or restore sexual function.

The common procedures done are labioplasty, clitoral hood reduction, hymenoplasty, vaginoplasty, perineoplasty and G-Spot augmentation [1–5]. The various energy sources being used for non-invasive vaginal tightening include RF and different types of lasers [6] and other sources as described in the book (Table 3.1).

The procedures above are used both for functional and anatomical restoration of pelvic support defects and also as cosmetic (on-demand procedures) [7]. The cosmetic gynecological procedures have been shown to enhance and improve self-esteem and sexual function [8].

Table 3.1 Common procedures

Hymenoplasty	Creating an intact hymen
Vaginoplasty	Tightening of vagina/vaginal rejuvenation
Labiaplasty	Improves appearance of labia
Hoodectomy	Removes tissue covering clitoris
Monsplasty	Shaping the pubis

J. Malhotra · N. Malhotra (✉) · N. Malhotra
M. Sharma · S. Bansal
Global Rainbow Healthcare, Agra, India

All the above procedures are now being classified as FCGS (Female Cosmetic Gynecological Surgery). A comprehensive review by the brain explores all aspects of FGCS [9].

Concerns have been raised against FGCS and these are viewed as female genital mutilation. Various societies of ObGyn including ACOG, RCOG, Australian and New Zealand College and Malaysian Society are now putting forwards recommendations [1–4] and policy for its members.

The InSARG (Indian Society of Aesthetic & Regenerative Gynecology) is also in process of forming policy and guidelines for Indian Obstetricians & Gynecologists and Indian patients.

3.2 Anatomy And Physiology

The external genital organs include mons pubis, labia majora, labia minora, bartholin and clitoris. The internal organs include vagina, cervix, hymen, uterus, tubes, skene glands and G spot.

Female genitalia shows a very diverse spectrum of normal anatomic variation (Table 3.1 and Fig. 3.1).

Vulva: Both urinary tract and reproductive structures form the female external genitalia, collectively called as VULVA.

It acts as sensory tissue during sexual intercourse, assists in micturition by directing the flow of urine and protects the internal female reproductive tract from infection.

P. Jindal et al. (eds.), *Aesthetic and Regenerative Gynecology*,
https://doi.org/10.1007/978-981-16-1743-0_3

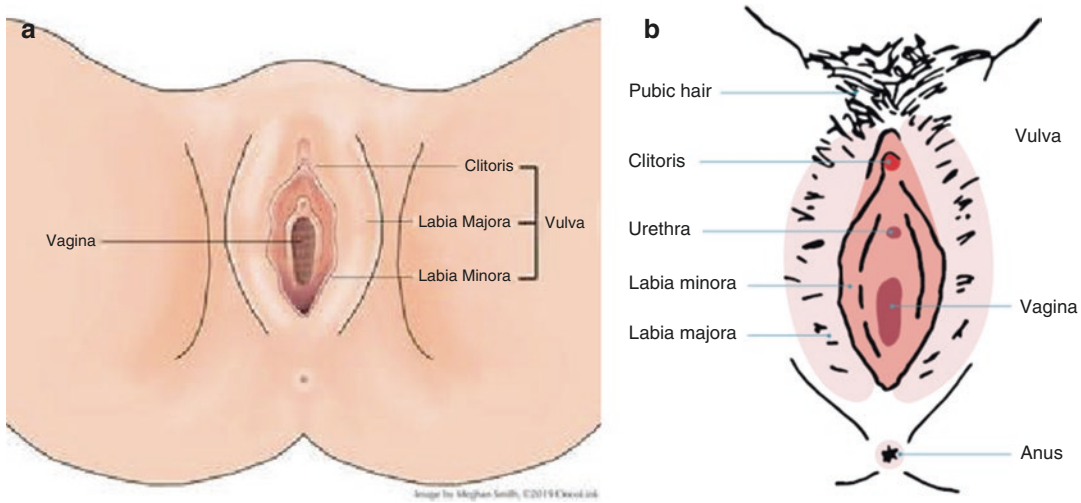


Fig. 3.1 (**a** and **b**) Anatomy of female genitalia

The vulva is made up of:

a. Mons pubis
b. Labia majora
c. Labia minora
d. Clitoris
e. Urethra
f. Vestibule
g. Bartholin's gland
h. Skene's glands
i. Vaginal opening
j. Hymen

- **Mons pubis**: The mons pubis has cushioning effect during sexual intercourse. The mons pubis also contains sebaceous glands that secrete pheromones to induce sexual attraction. The smell of secretions is highly individualized as these variations are the result of menstrual cycle, hygiene habits and body secretions. Excess skin can be addressed by removing and contouring the region to a natural-looking form with mons reduction surgery (monsplasty).
- **Labia majora**: Their function is to cover and protect the inner, more delicate and sensitive structures of the vulva, such as the labia minora, clitoris, urinary orifice and vaginal orifice. In women with enlarged labia majora its reduction known as majoraplasty can be done. With age fat of labia majora atrophies, here labial augmentation with nano fat, PRP, fillers may be offered.
- **Labia minora**: The middle region of the labia minora covers and protects the urethral orifice and vaginal orifice from the exterior environment. Appearance and shape of the labia minora has many anatomic variations, asymmetries being the commonest. Labia minora reduction surgery, or labiaplasty, is a popular surgery in the cosmetic field. Excessive hypertrophied labia minora may cause physical obstruction and here reduction surgeries can be offered.
- **Clitoris**: It is the principal female erogenous organ. Superiorly is located under a clitoral hood (prepuce) which is part of labia minora anatomically that splits into a frenulum on either side of the introitus. Clitoral hood reduction is a very important surgery in this branch.
- **Vestibule**: It is almond-shaped area enclosed by Hart line laterally, external surface of the hymen medially, clitoral frenulum anteriorly and fourchette posteriorly. Fractional CO_2 laser treatment has shown significant results in treating vulval vestibulitis vulvodynia due to rigid fourchette.
- **Bartholin's glands**: They are pea-sized compound alveolar glands located slightly posterior and on either side of the vaginal orifice.

They secrete lubricating mucus from small ducts during sexual arousal. Bartholin gland cysts are common in sexually active women. It can be treated with CO_2 laser in which a skin incision is performed with focused laser beam, the capsule is opened to drain mucoid content, followed by internal vaporization of the impaired capsule.

- **Hymen**: It is a thin membrane that surrounds the opening to the vagina. Hymens can come in different shapes. Hymenoplasty is usually a simple outpatient procedure that can be done in outpatient clinic under local anaesthesia. Also called 'revirgination', it is designed to restore the hymen. It is often advertised as a 'gift' to one's partner [10]. This procedure is occasionally requested by women of certain cultural backgrounds in which premarital sex is forbidden and an intact hymen is considered evidence of virginity. Rarely imperforate hymen is also encountered leading to hematocolpos. It can be divided for free drainage of menstrual blood, secretions and sexual intercourse.

Perineoplasty—Undertaken to strengthen the pelvic floor and, in the FGCS setting, aimed at establishing penile pressure with coital thrust. This procedure is technically similar to perineal reconstruction, in which the perineal length is restored following childbirth trauma or previous surgery. It is commonly performed as part of vaginal prolapse surgery. However, even in this setting, there is no evidence that this procedure improves sexual function and, in fact, it may cause dyspareunia.

Vaginoplasty—The purpose of this procedure is vaginal creation in gender reassignment but, in the FGCS setting, it refers to tightening the vagina, which can be surgical or non-surgical—as in 'laser vaginal rejuvenation' or 'designer laser vaginoplasty'.

G-spot augmentation—G spot, also called Grafenberg spot after German scientist Ernst Grafenberg who described it; is believed to be a point 2 to 3 inches on the anterior vaginal wall, inside from the introitus. It is believed to be a confluence of several nerve endings and its stimulation is believed to lead to orgasm. Involves autologous fat or collagen transfer via injection into the pre-determined G-spot location. There is no existing scientific literature describing this procedure. Similar procedures include G-spot amplification and G-shot collagen injection into the region. Often described as a sexual and cosmetic rejuvenation procedure for the vagina using the preparation and injection of blood-derived growth factors into the G-spot, clitoris and labia.

O spot—O-spot is the space between the urethra and the vaginal wall, most distally, in the area of the periurethral glands. Injection of 4 ml of PRP at the O-spot. Fluid fills the tissue between the urethra and the vagina thus improves orgasm.

The female external genitalia varies in almost all females in shape, size and colour but despite the oestrogen-dependent anatomical variations, the functions of these structures remain the same in all women [11]. With female ageing and fall in oestrogen levels, these structures undergo atrophy and their functions also decrease (Fig. 3.2) [12, 13].

As these organs are endocrine dependent, a defect in the hormonal secretions can lead to altered anatomy and physiology which may need medical treatment (ERT, Androgens cortisol etc.), EBD treatments or even need surgical correction (FCGS) like labian fusion, clitoral hood reduction and others [10, 14] (Figs. 3.3 and 3.4).

Table 3.2 shows cosmetic genital procedures [10, 15]

Terms such as 'vaginal rejuvenation', 'designer laser vaginoplasty', 'revirgination' and 'G-shot' are commercial in nature. The consumers at whom they are targeted can then mistakenly believe such official-sounding terms refer to medically recognised procedures.

3.3 Indication and Contraindications

FCGS is non-medically indicated cosmetic surgical procedures on healthy genitalia. As these are done on normal healthy organs there is a debate that these procedures come under female genital