

# ORIGINAL ARTICLE

## Efficacy of intense pulsed light in hirsutism treatment: A clinical trial study

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### Abstract

**Introduction:** Unwanted hair growth is a common cosmetic problem. The need for a rapid method with long-term relief has led to the discovery of various light source techniques. Regarding this, the present study was conducted to evaluate the effect of intense pulsed light (IPL) source on unwanted facial hair growth in the Iranian women suffering from hirsutism.

**Methods:** This clinical trial was conducted on 39 women with hirsutism. Data collection was performed by recording the demographic characteristics and skin type of the participants. The patients were subjected to five sessions of IPL treatment. The number of the remaining hair was counted at the end of each session; in addition, the effectiveness and side effects of the treatment were evaluated. The data were analyzed in SPSS software (version 13) using paired sample t-test. P-value less than 0.05 was considered statistically significant.

**Results:** The results revealed an 85.6% reduction in hair follicles after the treatment. Furthermore, the mean number of hair follicles was reduced from 25.4 to 3.4 at the post-intervention stage ( $P < 0.001$ ). Additionally, eight patients experienced side effects, the most common of which was hyperpigmentation that was observed in 12.9% of the cases.

**Conclusions:** Based on the findings, IPL is a safe and effective method for removing unwanted facial hair among the Iranian women with skin type II. Given the high efficacy of IPL (85.6%) and its lack of significant side effects, IPLS can be recommended as a safe and reliable method for the treatment of hirsutism.

**Key Words:** Hair removal, Hirsutism, Intense pulsed light, Laser therapy

### Introduction

Hirsutism is a common cosmetic problem, which may result in social or psychological disorders (1). This condition is defined as excessive hairiness on women's body parts, such as the upper lip, cheeks, and chin, in which terminal hair does not normally grow (2, 3). Hirsutism can be caused either due to the enhancement of androgen

levels or the oversensitivity of hair follicles to androgens.

This condition is the result of an increase in the average Anagen phase and abnormal enlargement of hair follicles (2). Around 0-10% of women suffer from this problem worldwide (4). In addition, some diseases, such as polycystic ovary syndrome, or certain medications may account for this condition (5, 6).

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Traditional methods for the treatment of hirsutism include shaving, waxing, chemical medications, and electrolysis, all of which are painful, time-consuming, and temporarily effective (7). The need for a faster and more long-lasting therapeutic strategy has resulted in the innovation of various light sources. During the recent years, the use of laser technology for hair removal has undergone a rapid improvement. Some of these new therapeutic modalities include ruby laser, alexandrite, diode, Nd: YAG laser and, intense pulsed light source (IPLS). These techniques work based on selective photothermolysis, which induces damage to hair follicles (8).

Many studies have been conducted on alexandrite laser and diode; however, there are insufficient data regarding other methods, like IPL. The IPL is a high-power polychromatic light source, which produces intense pulses of non-coherent light distributed over a wave length range of 500-1200 nm. This technology is used in the treatment of cosmetic skin disorders and has created a revolution in this field (9, 10).

Given the novelty of this technology, there are limited studies investigating the efficacy of this approach in the treatment of hirsutism in Iran (7-12). With this background in mind, the present study was conducted to examine the efficacy of IPL in hirsutism therapy among the Iranian women.

## Methods

This clinical trial was conducted on 39 women suffering from confirmed hirsutism and referring to the Dermatology Clinic of Imam Reza Teaching Hospital, Birjand, Iran, in 2010. They were all looking for facial hair removal treatment. The patients with a history of laser therapy for hair removal or active skin infection in the face, hypertrophic scar or keloid, and Accutane use in recent years were excluded from the study. The studied patients had not received any type of intervention in the four weeks prior to IPL, except for shaving or use of depilatory creams.

After the collection of the patients' demographic data, their skin type was determined based on the Fitzpatrick scale. For the purpose of the study, a 1×1 cm square with high hair density in the target area was selected, and the number of hair follicles in the specified region was counted prior to the onset of the therapy. All patients were then treated with IPLS by a single well-experienced dermatologist, using the Lumenis IPL machine (IPL, Lumenis Inc, Santa Clara, CA, USA).

The IPL probe was used at a fluency range of 21-31 J/cm<sup>2</sup>. Treatment parameters, such as the

number of pulses per use of machine, activated time, pulse width, and pulse delay (repetition rate), varied based on hair color, skin type, and treatment duration. The IPL was applied in five sessions for all patients with a 4-to-6-week interval between each session. The patients received no other treatment between the therapeutic sessions.

Side effects, such as erythema, pigmentation disorders, blister, or folliculitis, were continuously monitored. One month after the final therapeutic session, the number of hair in the specified area was counted again. Hair removal was considered as the ratio of post-treatment hair loss to the initial number of hair prior to the treatment.

The study protocol was approved by the Ethics Committee of Birjand University of Medical Sciences, Birjand, Iran (IRCT Code138904024 244N1). In with line research ethics principles, informed consent was obtained from all participants prior to the study. All reported research involving "human beings" was conducted in accordance with the principles set forth in the Helsinki Declaration (2008). The data were analyzed in the SPSS software (version 13) using paired sample t-test. P-value less than 0.05 was considered statistically significant.

## Results

According to the results, the mean age of the participants was 28.9±3.8 years (age range: 22-40 years). Furthermore, 43.6%, 38.5%, and 17.9% of the patients had skin types III, II, and I, respectively. The number of hair follicles declined from 25.4 before the treatment to 3.9 after treatment (P<0.001; Table 1).

There was a significant reduction in the mean number of hair follicles (85.6±10.9%) after the treatment. The minimum and maximum reductions were 53% and 100%, respectively. In terms of side effects, just 8 (20.5%) patients had complications, 12.9% and 7.6% of which were mild hyperpigmentation and blister, respectively. Additionally, mild and transient erythema as a reaction to the intervention was observed in 16 cases (41.03%; Table 2).

**Table 1: Comparison of the mean number of hair follicles before and after treatment**

	No. of cases	Mean±SD (1×1 cm <sup>2</sup> )	t-test results
<b>Before treatment</b>	39	25.4±5.5	t=30.4 dF=38 P<0.001*
<b>After treatment</b>	39	3.9±3.4	

\*: α=0.05 was considered as significant.

**Table 2: Prevalence of different side effects following intense pulsed light treatment**

Side effect type	No. of cases	Percentage
Mild and transient erythema	16	66.7
Mild hyperpigmentation	5	20.8
Blister	3	12.5
Total	24	100.0

## Discussion

Hair removal by light sources is a useful method for the treatment of hirsutism, which is also well-tolerated. Various controlled clinical trials have examined the efficacy of light sources in the removal of excessive hair. The latest and most effective technique in this respect is IPL, which is a secure and safe method (4, 13).

In a study performed by El-Bedewin, IPL was performed on 210 patients with Fitzpatrick scale skin types III and VI for 3-5 sessions with 6-week intervals. They reported a significant reduction in hair follicles with no complications. In another study, the efficacy of four different systems, including IPL with red filter, yellow filter, Diode laser, and Alexandrite laser, were compared with one another. The evaluations made after 1, 4, and 6 months showed a significant reduction in the amount of hair with all investigated systems; however, IPL was more effective and less painful in comparison with other laser systems (14).

The IPL is also considered as a safe and reliable method in individuals with skin grafts because of its minimum complication rate. Huo et al. used IPL in 10 patients with skin grafts for 3-5 sessions with 2-month intervals (15). In comparison to other methods, IPL is a less invasive technique and more adaptable with all types of skin and hair; moreover, it has higher safety and is easy to apply (16).

In a study carried out by Khodiyani, the efficacy of IPL was compared in 60 patients with idiopathic hirsutism and skin types III and IIII (based on Fitzpatrick scale). After six therapeutic sessions in different areas of the face, IPL effectiveness reached to 86.42% and no side effects were reported (10). In another study performed in Lahor, Pakistan, which included 50 patients with idiopathic hirsutism having skin types III and IIII, the results were similar to those of our study; however, their patients had darker skin compared to our cases (3).

In the present study, the mean age of the patients was  $28.9 \pm 3.8$  years. Based on the Fitzpatrick scale, 17.9%, 38.5%, and 43.6% of the patients had skin types I, II, and III, respectively. There was no significant difference among these groups in terms of the IPL outcomes. Generally,

patients with lighter skin (i.e., skin types I-IV) and darker hair respond better to photothermolysis and are the best candidates for this therapy. Successful hair removal has been reported with laser and IPL in skin types V and VI with blond hair. Nevertheless, the rate of complications, such as burn, scar, and pigmentation changes, increases along with the enhancement of skin pigmentation degree and skin type number (1, 17).

The success rate of IPL in skin types I, II, and III is indicative of the high effectiveness of this method in Iran due to the high number of dark-haired women in this country. The main side effects usually occurring after photoepilation with IPL include epidermal burning with blister, erosion, and folliculitis in 13% of the cases and transient hyperpigmentation in 10% of the patients (13).

In our study, 41.03%, 12.9%, and 7.7% of the patients had transient erythema, transient hyperpigmentation, and blister, respectively. No serious side effects were observed in our patients, which may due to the prevalent skin types in our region where types IV or higher are rarely seen and most of the women have white skin with dark hair regarded as the best candidates for IPL.

The IPL is a safe and highly effective method for hirsutism treatment among the dark-haired Iranian women. Favorable outcomes were observed after five therapeutic sessions. The majority of the patients did not show any serious side effects, except for mild transient erythema and transient pigmented lesions. Given the effectiveness and safety of this technique, IPL is recommended as a reliable therapeutic method for hirsutism.

## Conclusions

The mean age of the patients was  $28.9 \pm 3.8$  years, and 17.9%, 38.5%, and 43.6% of them had skin types I, II, and III, respectively. There was no significant difference among these groups in terms of the IPL outcomes. Nevertheless, the rate of complications, such as burn, scar, and pigmentation changes, rises along with the increase of skin pigmentation degree and skin type number. The success rate of IPL in skin types I, II, and III demonstrates that this method is highly effective in Iran due to the high number of dark-haired women in this country.

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### Author's contribution

Dr. Reza Ghaderi, DR. Masood Asghari, and DT. Mahdi Bakhshaei conducted the study. Dr. Reza Ghaderi designed and monitored the study. Dr. Masood Asghari collected the data and edited the article. Dr. Mahdi Bakhshaei monitored the research plan, edited the article, and made the article amendments.

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### Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

### References

1. Michael H. Lasers and light sources for the removal of unwanted hair. *Clin Dermatol*. 2009; 25(5):443-53. [PMID: 17870522](#) [DOI: 10.1016/j.clindermatol.2007.05.017](#)
2. Akbari D, Hosseinpour N. Etiological diagnosis of hirsutism in premenopausal Iranian women. *J Dermatol Cosmetic*. 2010; 1(3):119-24. [Persian]
3. Asad F, Hameed S, Khurshid K, Bashir B, Rani Z, Pal SS. Efficacy and safety of intense pulse light in idiopathic hirsutism. *Ann King Edward Med Univ*. 2010; 16(1):24-6. [DOI: 10.21649/akemu.v16i1%20SI.150](#)
4. Asilian A, Kashani HH, Momeni A. Comparison the first and second generation intense pulsed light devices (IPL) effect on hirsutism. *J Isfahan Med Sch*. 2011; 28(124):69-73. [Persian]
5. Habif TH. *Clinical dermatology*. 5<sup>th</sup> ed. China: Mosby Publishing Ltd; 2010. P. 926-31.
6. Grippaudo FR, Angelini M, Chiossi MR, Toscano V. Intense pulsed light photo epilation in hirsute woman: the role of obesity. *Laser Med Sci*. 2009; 24(3):415-8. [PMID: 18626571](#) [DOI: 10.1007/s10103-008-0583-x](#)
7. Nabaie L, Shirzadian KA, Gachkar L. Efficacy of the intense pulsed light source on unwanted hairs. *Iran J Dermatol*. 2004; 7(28):247-57. [Persian]
8. Anderson RR, Parish JA. Selective photothermolysis: precise microsurgery by selective absorption of pulsed radiation. *Science*. 2012; 220(4596):524-7. [PMID: 6836297](#)
9. Babilas P, Schreml S, Szeimies RM, Landthaler M. Intense pulsed light (IPL): a review. *Lasers Surg Med*. 2010; 42(2):93-104. [PMID: 20166155](#) [DOI: 10.1002/lsm.20877](#)
10. Khodaeyani E, Amirnia M, Babaye-Nazhad S, Alikhah H, Brufeh B. Efficacy of intense pulsed light in hirsutism. *Pak J Biol Sci*. 2010; 13(13):635-41. [PMID: 21717866](#)
11. Azizi JM, Mamizadeh M, Tabaie S, Esmaeili JG. ND: YAG laser hair removal: treatment session and total energy effects on hair reduction. *Laser Med*. 2008; 5(3):29-30. [Persian]
12. Haedersdal M, Gotzsche PC. Laser and photoepilation for unwanted hair growth. *Cochrance Database Syst Rev*. 2009; 18(4):CD004684. [PMID: 17054211](#) [DOI: 10.1002/14651858.CD004684.pub2](#)
13. El-Bedewi AF. Hair removal with intense pulsed light. *Lasers Med Sci*. 2014; 19(1):48-51. [PMID: 15278721](#) [DOI: 10.1007/s10103-004-0298-6](#)
14. Amin SP, Goldberg DJ. Clinical comparison of four hair removal lasers and light sources. *J Cosmet Laser Ther*. 2015; 8(2):65-8. [PMID: 16766483](#) [DOI: 10.1080/14764170600717902](#)
15. Huo MH, Yao LY, Chen GZ. Hair removal with intense pulsed light (IPL) for hairy skin grafts. *Zhonghua Zheng Xing Wai Ke Za Zhi*. 2008; 24(1):32-3. [PMID: 18437980](#)
16. Fodor L, Menachem M, Ramon Y, Shoshani O, Rissin Y, Eldor L, et al. Hair removal using intense pulsed light (EpiLight): patient satisfaction, our experience and literature review. *Ann Plast Surg*. 2015; 54(1):8-14. [PMID: 15613875](#)
17. Yaghmai D, Garden JM, Bakus AD, Spencer EA, Hruza GJ, Kilmer SL. Hair removal using a combination radiofrequency and intense pulsed light source. *J Cosmet Laser Ther*. 2004; 6(4):201-7. [DOI: 10.1080/14764170410008133](#)