Epilation of 143 cases with diode laser

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[Abstract]

Objective: To evaluate efficacy and adverse effect of diode laser assisted epilation. **Method:** 810nm Diode laser was used for epilation of 143 cases. **Result:** Total effective rate was 98% and cure rate 93%. Different areas exhibited different treatment outcome. The clinical response of axillary hair was the best, that of lips, upper limbs, chest and lower limbs ranked behind. Response of hirsutism was the poorest. Different skin types also responded differently, type III responding best and type IV ranking behind. **Conclusion:** Diode laser assisted hair removal is both safe and effective.

Key words: Diode laser epilation

Diode laser assisted hair removal has been conducted in the period between July 2003 and July 2004, and satisfactory result has been obtained.

1.Materials and Methods

1.1Clinical data:

143 patients (male 28, female 115; age 14-40, average 25), who had not undergone any epilation within 1 month, were included in the study. 53 patients belonged to skin type III, 69 skin type IV and 21 type V. The area undergoing hair removal was as follows: lip 36 cases, axilla 42, chest 5, upper limbs 25 and lower limbs 35.

1.2 Treatment:

Laser system: 810nm Diode laser (MeDioStar, Asclepion Laser Technologies GmbH, Germany) was used for hair removal, the spot size being 12mm in diameter.

Procedure: Before laser therapy, the area to be treated was shaved and sterilized with 1/1000 neogeramine solution, and parameters were chosen according to skin type and treated site. For areas of high hair density, adjust the fluence 4J/cm^2 lower than regular level. Cooling gel, the temperature of which was 3±2^{o}C, was applied to the area to be treated with thickness of

0.5cm. During epilation, the handpiece was placed onto the skin surface. Laser pulses were not overlapped, and 3-5 treatments were performed at 1 month interval.

Table 1: Parameters according to different skin type

Skin type	lip	axilla	upper limbs	lower limbs	chest
III	22	25	24	29	27
IV	21	23	23	26	25
V	20	21	22	23	25

1.3 Criteria for evaluation of clinical effect:

Hair reduction was evaluated by means of close photography 6 months after epilation. The same area was photographed at the ratio of 1:1 before and after epilation, and 1 cm^2 area was chosen for comparison of pre and post-therapeutic hair count. The clinical response was assessed according to the following criteria: cure (hair reduction$\geqslant$80%), effective (hair reduction around 60%), poor (hair reduction<30%).

2.Results

2.1 Clinical response:

see table 2 and 3.
Generally, the total effective rate was 100%, and cure rate 94%.

Table2: Clinical response of different anatomic site

Site	cure	effective	poor	total effective rate
Axilla	42	0	0	100%
Lip	36	0	0	100%
Chest	3	2	0	100%
upper limb	23	2	0	100%
lower limb	26	9	0	100%

Table 3: Clinical response of different skin type

skin type	cure	effective	poor	total effective rate
III	51	2	0	100%
IV	63	6	0	100%
V	16	5	0	100%

2**.2 Side effect:**

Blisters occurred in 4 of 143 treated patients. Hyperpigmentation occurred in 7 cases 2 weeks after treatment, resolving 2 months later.

3. Discussion

Hair growth is closely related to pluripotential located in the bulge area and hair follicle bulb. Permanent hair removal can be achieved only if pluripotential cells in the forementioned areas are damaged simultaneously. Effect of traditional therapeutic methods for epilation, such as shaving, plucking, wax epilation and chemical epilation is often transient, and there are many side effects. Although permanent hair removal can be achieved with electric needle, this process is time consuming. Moreover, epilation of large area is difficult and scar is likely to be formed.

Diode laser works at 810nm, which is not only readily absorbed by melanin but also penetrates to deeply located hair follicles. Based upon the principle of selective photothermolysis, this laser selectively acts upon hair follicle and hair shaft, injuring target cells (pluripotential cells), thereby removing hair. The advantage of this laser system is as follows:

1. The wavelength of 810nm is poorly absorbed by hemoglobin and water, and therefore causes minimal injury to the normal tissue other than the target.
2. The parallel beam emitted by this laser will not cause focal damage to the tissue, since the energy is evenly distributed in the tissue.
3. The maximum pulse width (100ms) of this laser decreases fluence within unit time, and thereby decreases damage to epidermis.
4. The cooling system of this laser can provide better protection of epidermis.

All the data above indicate that diode laser assisted epilation is both safe and effective.

Treatment outcome has indicated that different anatomic sites exhibited different clinical response:
Effect of hair removal for axilla is the best, that of upper lip, upper limbs, lower limbs and chest ranks behind in sequence.
Clinical effect is also different according to different skin type:
Type III exhibiting the best effect, and type V the poorest.
Skill of operation and choice of treatment parameters are also important factors, otherwise adverse effect such as blisters and hyperpigmentation is likely to occur. The adverse effect seen in 7 patients is not only caused by the above 2 factors, but is also due to too high fluence used in areas with dense hair and failure to remove hair adhering to handpiece during treatment.

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