REMOVAL OF
HAIRS, VESSELS
AND SKIN REJUVENATION

Studies Book
MeDioStar

Asclepion
Laser Technologies

EPILATION

Monitoring study of permanent hair removal with high power diode laser MeDioStar NeXT carried out

Dirk Landwehr, MD, Dermatological laser centers,
Medizinzentrum Rotenbühl, Saarbrücken, Germany

1 Summary

Over the period of May 2011 and June 2012, a total of 27 patients were treated with a new type of diode laser during 157 sessions on 1-3 areas of the body. A number of 17 patients had already undergone up to 11 treatments with other systems for permanent hair removal and were either dissatisfied with the result or the side effects – both of which led to the termination of the therapy. A total of 20 patients were very satisfied or satisfied with the results of the treatment series, among them were 13 patients with prior treatment. For most patients the new laser system provided a successful, reliable, fast and painless method of permanent hair removal with no side effects. The system meets its limits when treating dark skin types and light-coloured hair.

2 Introduction

The wide variety of systems and technologies for permanent hair removal available in the market poses a real challenge for consumers. Diode lasers with a wavelength of 810 nm however, have become established as the most effective system available. The system tested during this study is a diode laser with wavelengths of between 800 and 950 nm. Thanks to a maximum fluence of 44 J/cm2, a maximum pulse frequency of 12 Hz and a spot diameter of 14x10 mm, large areas of skin are treated as fast as can be expected of a state-of-the-art system. The MeDioStar NeXT is distinguished by its SmoothPulse, which emanates fluence rates of up to 12 J/cm2 at a frequency of up to 12 Hz. This so-called Multipass technology ensures that the same hairy section is treated several times over several sequences within only a few seconds. The resulting cumulative heating effect leads to the required thermal damage.

The treatments with the technology described above were intended to assess their therapeutic efficiency and to find out whether diode lasers would have an additional therapeutic effect on patients that had been treated and were not satisfied with other methods prior to this study. Moreover, the range of undesired side effects particularly on pre-treated patients was to be assessed in comparison to other technologies. Also, the therapeutic effect of the SmoothPulse function and potential side effects were to be analysed.

3 Material and method

Patients

Between May 2011 and June 2012, a total of 27 patients aged between 25 and 60 years of skin types II-IV (acc. to Fitzpatrick), 4 of which male, two transgender (male -> female) and 21 female were subjected to a total of 157 treatments on up to three body areas. The number of treatment sessions varied between 1 and 7, which was due to the limited duration of the study and the fact that the equipment was only available for a number of days. Body areas treated included the lower leg, thigh, bikini zone and female genital area, abdomen, mammary papillae, chest, back, arms, armpits and face.

A number of 17 patients, two of which male, 1 transgender and 14 females had already undergone prior treatments involving both IPL systems and diode lasers with or without bipolar radio frequency flow.

Technology

The MeDioStar NeXT diode laser manufactured by Asclepion Laser Technologies was operated either in professional mode or in SmoothPulse mode. Frequently both modi were used in combination, a minimum of two sessions was always applied. The fluence was set according to the local reaction up to 15 minutes after treatment of a test spot. The setting focused mainly on the perifollicular oedema and diffuse erythema with or without oedema, which were analysed in combination with the skin type according to Fitzpatrick, the hair colour and the hair shaft thickness.

Assessment

The patients were asked to assess the treatment efficiency after one, three and six sessions. The questionnaire provided four assessment options (very satisfied, satisfied, not fully satisfied, not satisfied). The same applied to the evaluation of unwanted side effects. The medical assistant or doctor carried out these assessments in parallel. A photo documentation was not possible for all cases, because some patients did not wish to be photographed or there were no follow-up photos made.

4 Results

A majority of the 17 patients with previous treatment experience described the new diode laser as either more efficient (n = 14/17 or 82%) as having less side effects (n = 12/17 or 71%) or both (n = 11/17 or 65%).

20 patients of a total of 27 (74%) were very satisfied or satisfied with the treatment.
Of those 10 patients with previous treatment experience, 7 (70%) were satisfied or very satisfied, 3 patients did not make any statement, as they only received one treatment after which they were unavailable. Of all patients treated, the medical staff rated the treatments of 21 (78%) patients as satisfied or very satisfied, 1 (4%) was not fully satisfied and 1 (4%) was not satisfied.

During the Multipass approach, the SmoothPulse passed over the same area up to ten times. A total of 9 patients underwent treatment with conventional single and double-pulse methods as well as with the SmoothPulse technique. As expected, all patients experienced the SmoothPulse as clearly more pleasant, as it is virtually painless. The therapeutic efficiency was rated as comparable by patients and users alike.

One salient aspect of the assessment of unwanted side effects was the virtual painlessness, particularly of the Multipass technique. Only one patient had persisting confluent urticaria in the treatment area of chest and back, which was observed for three days and did not have any residues. However, similar side effects also occurred for seven days during previous treatment with ELOS technology.

5 Discussion

This monitoring study was intended to assess the therapeutic efficiency and the treatment window of a new diode laser for permanent hair removal. It included patients with various previous treatment experiences as well as previously untreated patients. Special focus was on the application of the not yet established Multipass technique with low fluence to larger areas.

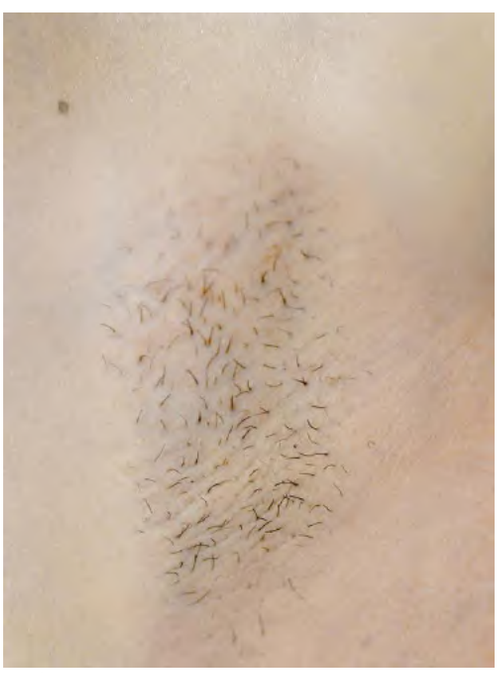
The reliable and permanent effect of a variety of epilation methods is undisputed.

For users and patients, benchmarking these technologies involves the therapeutic efficiency, as represented by the number of required sessions, the speed of the equipment and the duration of the individual sessions as well as the side effects. Moreover, the equipment is expected to be effective for a wide variety of skin types and epilation techniques.

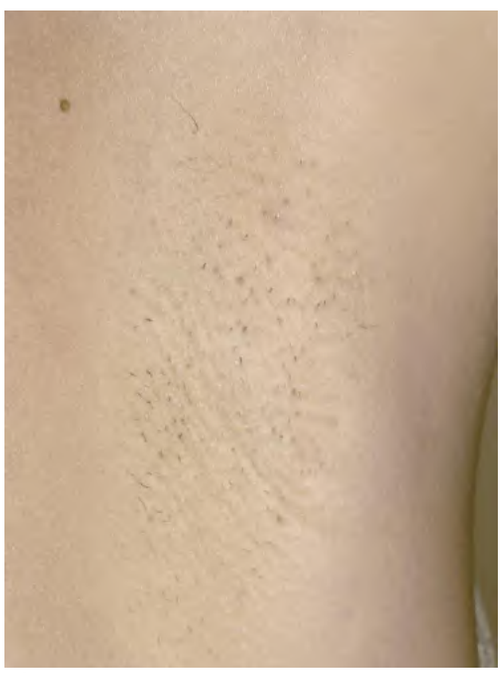
The medical experts themselves will also consider the investment and potential energy and material consumption costs as a critical factor for their decision.

In this study, the Multipass technique was proven as a very effective approach with a comparable response rate to conventional systems, high speed and virtually insignificant side effects, i.e. cursory erythema and short-term perifollicular oedema.

The MeDioStar NeXT diode laser has proven itself as a substantial enhancement of the range of epilation systems for permanent hair removal.



before treatment



after 4 treatments

Diode Laser Hair Removal: a Study with a new high power system

André Steps, Jena, Germany

The following paper reports a placebo controlled single blind prospective study, done to evaluate efficacy and safety of hair removal treatments performed by a dual wavelength high power diode laser of 800-950nm. The subjects treated were Fitzpatrick I-III of both genders in an age of 18 – 66 years.
Laser hair removal is based on the theory of selective Photothermolysis.[1] Firstly mentioned by Goldman in 1963, pulsed Ruby lasers were observed to remove hair in 1996. [2] After further trials have been made, longer wavelengths and pulse durations were found to be more efficient, such as Alexandrite (755nm), Diode (810nm) and Nd:YAG lasers (1064nm). Using an IPL represents the same method, but the wavelength is spread mainly into a broadband between 600 – 1200nm. Compared to Diode and Nd:YAG lasers, fluencies, IPLs are able to emit, are significantly reduced in most cases. Since the very beginning of hair removal some major problems had to be faced: How to distinguish the targeted chromophore Melanin in the hair and not to be treated epidermal Melanin? How saving the epidermis by applying a lethal dose to deeper localized hair reproducing tissues such as keratinocytes, stem cells and melanocytes inside the follicle? How to achieve an appropriate depth of penetration? Last but not least how to avoid any risk of paradoxical hair (re-)growth? Summarized, all influencing factors of the outcome of a hair removal treatment are wavelength (=depth of penetration, absorption), spot size, fluence, pulse duration, repetition, number of treatments and interval.[3] The authors of the study are convinced in using a high power diode of a wavelength λ=800-950nm is to be an appropriate tool for a save and efficient hair removal even in darker skin types.

Patients
This patients monitoring started with 33 subjects, dropout rate was 13.8% (n=4), 29 patients left, they were mostly female (n=18, 62%), 11 males (38%) underwent themselves the trial. Subjects were in an age of 22 - 68 (ø=39.4years), treated three times within 18 weeks. The final results were observed 4 weeks after the third and last treatment. All of them were treated in axilla in both of the sides. Axillae were divided in five treatment zones and randomly treated.

Parameters
As an established[4] benchmark we used MeDioStar miXT (λ=810 + 940 nm, 10 – 500ms), spotsize of ø= 12mm. We compared with MeDioStar NeXT (spotsize 1 x 1.4cm), both of them manufactured by Asclepion Laser Technologies GmbH, Jena, Germany. Generally two different modes were applied: conventional high power single impulse mode (Professional) and a low fluence and high repetition rate mode (Smooth Pulse Mode).
Some approved parameters of MeDioStar miXT in Fitzpatrick skin type I/II represented benchmarks: 35 J/cm^2, 111ms (shortest possible pulse duration) at 1,5 Hz.[5] The same fluence was applied with the new model (MeDioStar NeXT) at pulse duration as short as possible of 82ms at 1,5 Hz, too. Additionally to those two modes we compared the new sublethal mode[6] (SmoothPulse Mode) with the setting of fluence = 10 J/cm^2, with a pulse duration of 20ms at 9,3 Hz. One of two randomized control areas was treated with 635nm diode, 0.5 J/cm^2, (xxx), single pulses with a pulse duration of 100ms.

[1] Anderson RR, Parish JA. Selective photothermolysis: precise microsurgery by selective absorption of pulsed radiation. Science 1983; 220:524-7.
[2] Goldman L, Blaney DJ, Kindel DJ, Frinke EK. Effect of the laser beam on the skin. *J Invest Dermatol* 1963;40:121-123.
[3] Nachweis fehlt
[4] Nemeth/ MSM
[5] McCoy papers
[6] Xxx alma soprano SHR mode

In Fitzpatrick skin type III following preset parameters were applied: benchmarking MeDioStar miXT with 30 J/cm^2, 95ms, 1.5 Hz and compared MeDioStar NeXT 30 J/cm^2, 70ms, 1.5 Hz. All the parameters for Smooth Pulse Mode and placebo treated area were exactly the same like those mentioned above.
During preparation it's been found that in using SmoothPulse Mode most influencing is the speed of moving the hand piece across the skin. Due to the high frequency one increases the applied fluence rapidly in moving the hand piece slowly, which is distributing more impulses in a certain area. In order to apply a comparable fluence of 35 J/cm^2 the hand piece in SmoothPulse Mode was moved forward with an average speed of 2cm/sec, accordingly to 4 impulses per area or a fluence of 40 J/cm^2.

Methods
Patients randomly matched three different modes (miXT professional, NeXT professional, NeXT SmoothPulse) and two control areas (untreated, but shaved, placebo treated and shaved). Those five randomized areas were photographically observed. For quantifying the results we applied a Trychodensometer (Neidel), which is a standardized mask with a measuring area of A=2cm^2, in which all the visible terminal hairs were counted before each session and finally 4 weeks after the last one. In order to evaluate the safety of the systems, all the zones were photographed 24h post op.

Results

Fitzpatrick I/II, conservative mode
After evaluating the hair reduction rate of visible terminal hair on the epidermis in axillae, treated by conventional modes of both of the machines, we found significant differences: In MeDioStar NeXT we measured 4 weeks after three treatments an average hair reduction of 64.3% (Median = 61.2%, spread: 29.8% - 90.9% reduction in visible terminal hair) using the NeXT Professional Mode with 35 J/cm^2, 82ms in 20 patients ($n_{♂}$= 8, $n_{♀}$=12) with Fitzpatrick I and II, subjects of both of the genders did not show significant differences in efficacy: 63.9% of the hairs in females were reduced, 65.2% of hair in males.
Hair reduction rates in axilla zones treated with MeDioStar miXT (35 J/cm^2, 111 ms) in Fitzpatrick I and II showed following results: average hair reduction of 50.1% (Median = 51.1%, spread: 17.2% - 85.7%), this method did not show significant gender related differences in efficacy (♂= 49.5%, ♀=52.6%).

Fitzpatrick III, conservative mode
Lower fluencies were used on remaining 9 subjects (31%, $n_{♂}$= 3, $n_{♀}$=6) with darker skin type (Fitzpatrick III), in both of the cases 30 J/cm^2 within 92ms (miXT) and 70ms (NeXT).
Results for 70ms-setting four weeks after the third treatment: the average hair reduction of all subjects was 65.1%, males improved 70.2%, females 62.6%, Median 63.8%. The authors reading of the significant difference between both of the genders are possibly caused by a very small number of subjects in the male cohort. Further trials are to be conducted.
Using the High power Diode with a pulse duration of t = 92ms the results of 9 individuals with Fitzpatrick III did not significantly differ to those treated by the short pulsed Diode: Average percentage of hair loss was 61.6% (Median 60.4%), in males 66.9%, females improved by 59.0%.

Fitzpatrick I-III, high frequency mode
In smooth pulse mode, subjects of all kind of skin types were treated with the same parameters, which were 10 J/cm^2 at 9.3 Hz repetition rate. The treatments were performed with a motion forward of an average speed of 2cm/sec. The combined factors were added to a total fluence of ~ 40 J/cm^2. The results for all the individuals were an average hair reduction of 67.1% (Median: 67.9), in female skin the results were not significantly increased than in male: ♂= 68.6%, ♀=64.6%.

Discussion

Once more, the high power diode laser proved to be an effective tool in the treatment of unwanted hair. We could see its efficacy both in the classical treatment procedure – established as pulse per pulse treatment – as well as in a relative new method, the smooth pulse mode. Side effects were low, and never exceeded a level of short time erythema. The MeDioStar NeXT is a safe and effective system for hair removal.

810-nm Diode Laser Offers 'Impressive' Results

Damian McNamar, Miami Bureau
Skin & Allergy News, June 2002, Volume 33, Number 6

ATLANTA — Researchers found no differences in hair removal efficiency or patient comfort when patients were treated on one side for 6 milliseconds and on the other for 40 milliseconds with an 810-nm diode laser, according to a study presented at the annual meeting of the American Society for Laser Medicine and Surgery.

In a double-blind study, 75 participants with unwanted hair were treated with the Asclepion MeDioStar 810-nm power-pulsed diode laser. The laser featured a 12-mm, sapphire-cooled tip and fluences of 10-40 J/cm2. All participants received a minimum of three treatments (range three-eight), and 84% were Fitzpatrick skin types II and III.

The study was a "real-world situation" because it included both patients who had previously had laser hair removal and those who had not, said Dr. Albert J. Nemeth, medical director of the Advanced Specialized Laser Center in Clearwater, Fla.

"We found impressive hair removal on both sides," he said. "Both 6 milliseconds and 40 milliseconds were equally highly efficacious." Results were the same for 69 out of 70 participants; the other participant experienced 20% more hair removal on the side treated for 6 milliseconds.

Hair removal efficiency improved after one, two, and three treatments in naive participants—an average of 26%, 45%, and 63%, respectively.

"This laser is very effective, but there is slower clearing in axillae and extremities," said Dr. Nemeth, also of the University of South Florida, Tampa. The most notable hair removal to date in this ongoing study is on the lip, chin, neck, bikini area, pubic area, beard, abdomen, back, shoulders, buttocks, and upper arms. All these areas had effective and rapid clearing. There was a fair response in the glabella region and the toes and a poor response on the ears. There were no significant differences in patient comfort. "Only three patients (4%) consistently found the 6-millisecond laser more comfortable," Dr. Nemeth said.

Adverse effects were rare. For example, only 4 of 619 total treatment sessions resulted in occasional crusting. No participant experienced scarring or permanent sequelae.

In another study presented at the meeting, Dr. Neil S. Sadick removed unwanted hair in 24 women using the Zeiss-Meditech 810-nm diode laser. The mean age of participants was 33 years; all received three monthly treatments with follow-up at 6 months. Patients had Fitzpatrick skin types II-IV, with light to dark brown hair. Dr. Sadick used a 12-mm spot size, pulse duration of 50 milliseconds, and a fluence of 25-35 J/cm2 to treat the face, bikini region, and axillae.

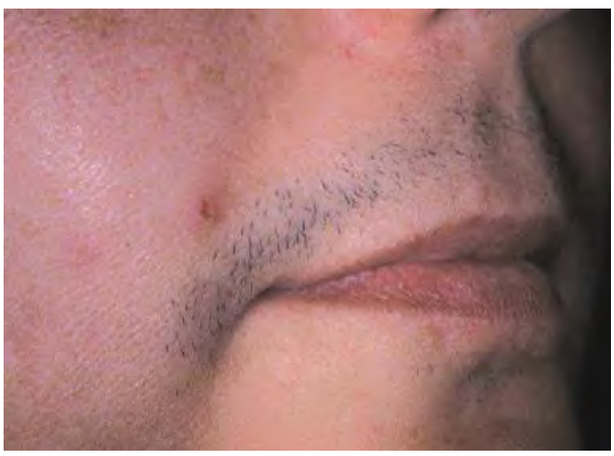
Handheld magnifiers were used to count hairs at baseline, after each treatment, and at follow-up. Two independent observers also performed hair counts using digital photography.

Adverse effects were rare: Two patients had transient hyperpigmentation, said Dr. Sadick of Cornell University, New York. At 3 months, there was a 74% mean hair removal efficiency, which was largely maintained at 6 months. Best results were attained in patients with type III skin who were treated for bikini-area hair.

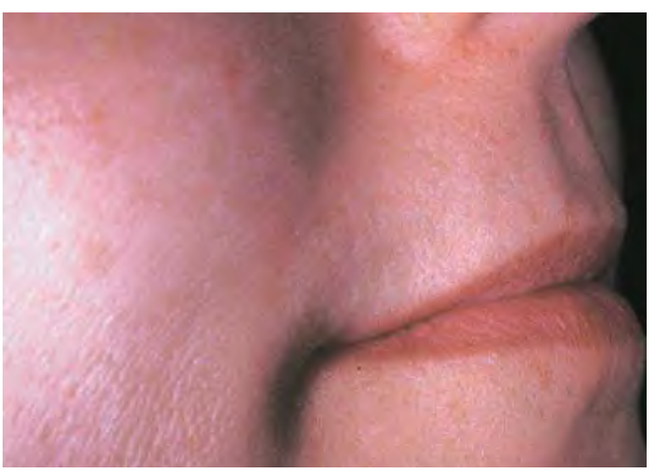
Five participants had biopsies at baseline, 1 month, and 3 months to assess histologic changes. There was vacuolar degeneration of the pilosebaceous outer root sheath, Dr. Sadick said. Biopsy results also showed multinucleated shaft cells.

Dr. Sadick disclosed that he received equipment and a research grant from Asclepion. Dr. Nemeth disclosed that he purchased one laser and a second was provided by the company for the comparative study.

This patient is shown before five treatments with the 810-nm laser with fluences of 29-32 J/cm2. Treatments were 6 weeks to 3 months apart.



Two months after treatment was completed, the patient's upper lip is still clear of unwanted hair.
Photos Courtesy Dr. Albert J. Nemeth



Study of Very Long-Pulsed (100 ms) High-Powered Diode Laser for Hair Reduction on All Skin Types

Eliot F. Battle, Jr., MD; R. Rox Anderson, MD
Wellman Laboratories of Photomedicine,Department of Dermatology,Harvard Medical School, Boston, MA -not published in a journal-Long-term, prospective study

Objective:
safety and effectiveness of long pulsed diode laser in permanent reduction of coarse pigmented hair in darker skinned subjects; Comparison of 30ms and 100ms in effectivity

Parameters:
Fluence: 15 – 100 J/cm²
Pulse duration: 30ms and 100ms
22 test sites, 6 for 100ms, 4 for 30ms, 1 control
11 for other fluence/pulse duration combinations

Patients: 40, 25 females, 15 males, All skin types

Evaluation of effectivity:
Hair counts by video camera an software
Before, 1, 2, 3 and 6 month after treatments

Side effects evaluated visually: pigment changes, erythema, edema, textural changes using a scale

Results:
Long pulsed diode laser provides effective, long-term reduction of medium to coarse pigmented hair, even in darker-skinned subjects.

Details:
- Long-term hair loss is strongly correlated with fluence level
- Hair regrowth after a single treatment is about 50-72% for high fluences
- the fluence levels for the 100ms pulse width can be increased to improve efficacy without compromising safety.

Safety:
Very long pulse widths allow for all skin types to tolerate substantially higher fluences, and thus darker skin types can be safely and effectively treated.

side effects
- transient pigment change was most common
- With 100ms a fluence of 30J/cm² could be safely used at all skin types besides type VI
- All patients with skin type VI had side effects, the test should be done with 10J/cm²
- Side effects increased with higher fluence, but at any given fluence they were significantly reduced with longer pulse durations.

Effects of the 810-nm diode laser on hair and on the biophys. properties of skin.

T. Ilknur et al.: Lasers Med Sci 2010, Oct.
Prospective, randomized, right – left comparison study

Objective: study was designed to investigate the effects of 810-nm diode laser treatment on hair and on the biophysical properties of the skin by using various non-invasive techniques on various parameters, including hair analysis, surface color changes, integrity of skin barrier, sebum production rate and pH level.

Parameter: MeDioStar HC, mode Basic and Professional, 810nm, 25 – 30J/cm², variable pulse up to 100ms, Spot size 12mm, Pre-cooling of skin by cold Aluminium probe

Patients: 31 women, 1 treatment of axilla, 4 patients with skin type II, 22 x III, 5 x IV

Evaluation of effectivity:
- before and 2, 4, 6 weeks after treatment treated area versus control area
- Hair analysis: hair density and thickness using photographs with digital microscope (zoom 30) and visual counting of the enlarged area
- Biophysical measurements:
  erythema index, melanin index (by Mexameter)
  transepidermal water loss (Texameter)
  capacity of stratum corneum hydration (Corneom.)
  Sebum secretion (Sebumeter)
  pH analysis (Skin-pH-meter)

Statistics (ANOVA, Bonferroni correction)

Results: Hair density and thicknesses statistically significantly decreased after the first post-treatment evaluation and remained during follow up.

Details: short-term changes of hair growth in our study was determined as:
49.68% in 2 weeks,
46.01% in 4 weeks,
and 48.15% in 6 weeks

Safety: The diode laser can perform a significant reduction in the hair amount without signifi cant epidermal damage, at least for a short period.

Details:
- erythema response with the diode laser can continue up to the second week.
- no difference in the Melanin index with the diode laser, although pigment changes are a common side effect of laser treatments in general
- no changes in the biophys. properties of skin, including transepidermal water loss, capacity of stratum corneum hydration, sebum and pH level

Epilation of 143 cases with diode laser

Yu Lin, Wang Min, Zhang Qiujie
Tianjin Changzheng Hospital , China, Dermatology Department

Prospective study

Objective:
To evaluate efficacy and adverse effect of diode laser assisted epilation

Parameter:
MeDioStar HC, 810nm, 20 - 29J/cm² dependent on skin type and area

Patients:
143 patients, 115 females, 28 males
treatment of lip, axilla, upper limb, lower limb, chest
3 – 5 treatments
4 patients with skin type II, 22 x III, 5 x IV

Evaluation of effectivity:
- photographs were taken before and 6 months after all treatments
- Hair counts in an area of 1 cm²
- clinical response was assessed according to the following criteria:
  cure (hair reduction≥80%),
  effective (hair reduction around 60%),
  poor (hair reduction<30%)
  side effects were documented

Results:
Diode laser assisted epilation is effective.

Details:
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.

Response is also different according to different skin type: Type III exhibiting the best effect and type V the poorest

Safety:
Diode laser assisted epilation is safe.

Details:
- Skill of operation and choice of treatment parameters are 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

The Effect of Different Spot Sizes on the Efficacy of Hair Removal Using a Long-Pulsed Diode Laser.

Bäumler W, Scherer K, Abels C, Neff S, Landthaler M, Szeimies RM. Dermatol Surg 2002;28:118-121

Study design:
20 patients, skin type I-III, MeDioStar, 3 treatments only Fluence: 44J/cm² with 8mm spot size, 40J/cm² with 12mm spot size, 33J/cm² with 14mm spot size

Results:
3 month after 3 treatments regrowth was: 67% with 8mm spot size,
54% resp. 55% with 12 resp. 14mm. 15 month after 3 treatments regrowth was (for 12mm spot size): sparse in 4 volunteers, moderate in 5 volunteers, full in 7 volunteers , when evaluating 16 of 20 volunteers

Hair Removal with Long Pulsed Diode Lasers: A Comparison Between Two Systems With Different Pulse Structures.

Fiskerstrand EJ, Svaasand LO, Nelson JS. Lasers Surg Med 2003;32:399-404

Study design:
29 patients, skin type II-IV, 3 treatments only, upper lip
MeDioStarHC: PRO1, 12mm, Fluence 35J/cm²
LightSheer: 9x9mm, fluence 35J/cm²

Results:
MeDioStar: 49% hair reduction
LightSheer/Lumenis: 48% hair reduction
Side effects: no scarring or pigmentary changes
Less erythema and burned hair with MeDioStar

The Use of a New Diode Laser for Hair Removal.

Sadick NS, Prieto VD. Dermatol Surg 2003;29:30-34

Study design:
24 patients, skin type II-IV, MeDioStar, 3 treatments only Spot size 12mm,
fluence 25-35J/cm²

Results:
74% resp. 70% clinical hair removal efficacy at 3 resp. 6 months after 3 treatments; no serious side effect, 1 patient with transient hyperpigmentation for 2 weeks

Impressive laser hair removal with an 810 nm powerpulsed diode laser: safety and efficacy.

Nemeth AJ. EADV 2004

Study design:
200 patients, 978 treatments, MeDioStar, skin type I – VI fluence 10 – 36 J/cm², spot size 12mm

Results:
Hair reduction after 1. treatment: 26%, after 2. treatment 47%, after 3. treatment 64%; -
only 0,5% (5 treatments) transient hyperpigmentation

VASCULAR TREATMENTS

Laser therapy as an eminence in superficial small vessel removal

Laura Lasinger, MD, specialist of dermatovenerology, poster for 11th AMWC 2013 - 11th Anti-Aging Medicine World Congress, Montecarlo, April, 4th to 6th, 2013

Clinical:
Superficial dilatation of blood vessels may develop anywhere on the body, at or near the surface of the skin. These red, purple or blue, linear and curvy effluorescences measuring less than 2 mm, occur predominantly on the cheek of middle aged , while the capillaries and tiny veins on the legs can be present in young patients as well. The treatment is desired because of cosmetic reasons, for these vessels have no haemodynamic importance and they are medically insignificant.

Description:
The procedure is ellegant, not complicated,without bleeding. The period of epithelisation is short and actually leaving no, or minimal scar beyond. The tingling sensation and the redness of the treated skin can be avoided thanks to the excellent cooling system of the laser handpiece.

The first step:
The patients got the diagnosis and appointed in our dermatology department for laser therapy. Detailed anamnesis is taken and the physical examination is accomplished before the treatment. The patient is to be well informed about the laser treatment.

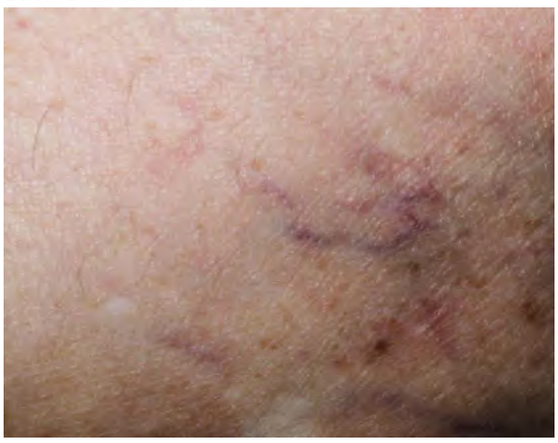
Minimal discomfort:
Laser therapy is performed with no anaesthesia. The pain is deminished due to the advanced cooling system of the vascular handpiece. Very sensitive persons can have local anaesthetic oinment on the skin before the treatment.

Methods:
In practice we operating the Asclepion MeDioStar NeXT diode LASER device. After the phototype of the patient is determined, the very individual setting of the medical device is necessary to optimize the procedure. We applicate emollients on the predicted area to provide gentle and perfect contact of the light source of the vascular handpiece and the skin surface. The spot size is 3x4 mm, the fluence is 120 J /cm^2.

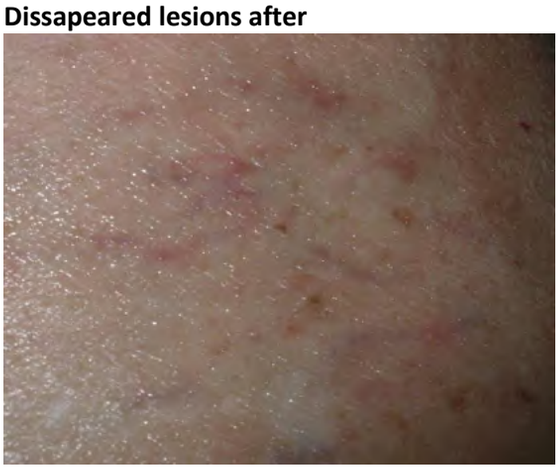
The effect on the tissue:
Laser means short skin contact and effective pin-point energy transmission on the relation of the generator and haemoglobin in the blood vessel. This fenomenon results in obliteration. Side effects are rare, and occur because of the energy absorption by the melanin of the treated skin. The small wounds or burns might appear, but they are transitory and do not need special care.

Case report 1

Blue vessels before

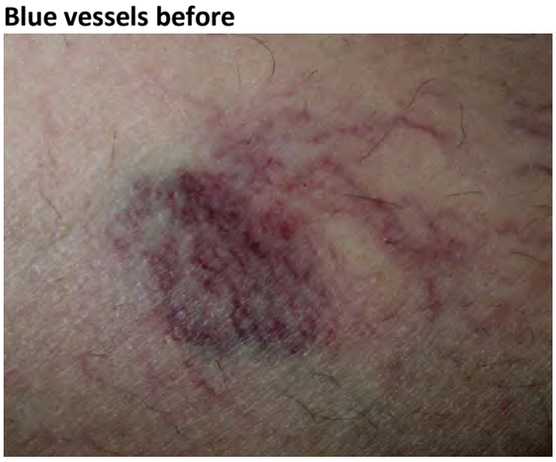


Dissapeared lesions after

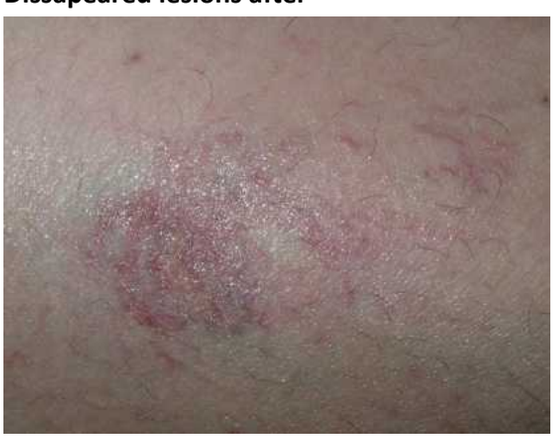


Case report 2

Blue vessels before

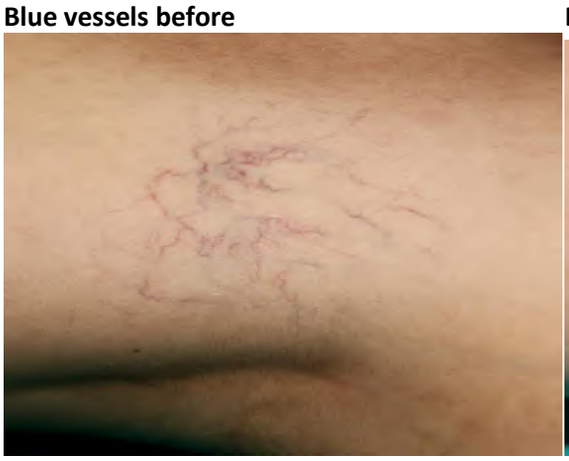


Dissapeared lesions after

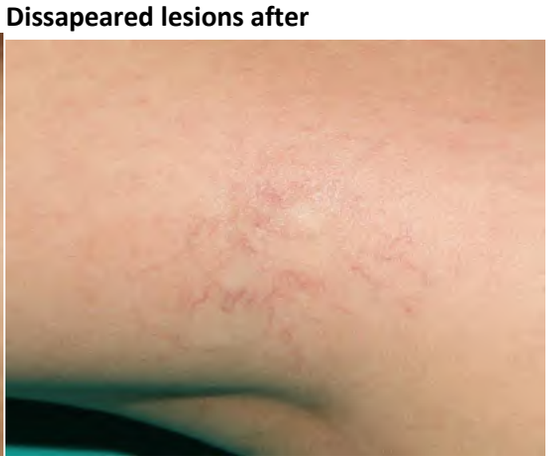


Case report 3

Blue vessels before

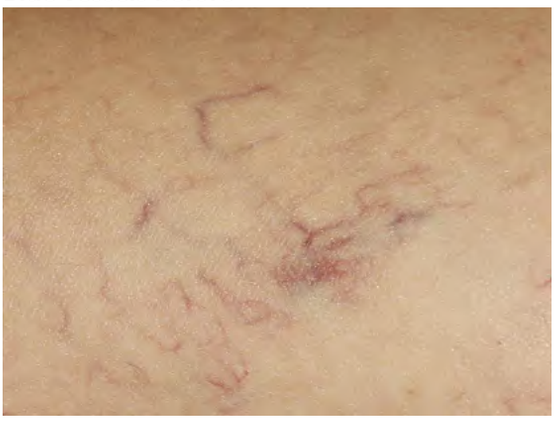


Dissapeared lesions after



Case report 4

Blue vessels before



Dissapeared lesions after

After the procedure:

The scar control in most of our cases is not needed, but for valid statistic score and photodocumentation, is desirable to see the patient in 4-6 weeks. Thus we can evaluate the esthetic benefit and not what is of essencial importance we communicate with our patients to find out wether they are satisfied with the present look of the skin of the discussed region.

Conclusion:

- this technique is simple, non-invasive and comfortable both for the doctor and the patient
- The Asclepion MeDioStar NeXT laser unit provides high technology and safety in our practice
- local anesthesia is usually not needed
- one small vessels requests only few seconds to be obliterated
- no surgery
- rapid healing period
- minimal or no scar, satisfies the doctor and the patient
- less sterile instruments and used materials

Vascular Treatment with MeDioStar High Power Diode Laser from Asclepion Laser Technologies

MU Dr. Karolina Kykalova, Institute of Aesthetic Medicine, Prague, Czech Republic

In September 2001 we were provided with the opportunity to use a MeDioStar (High Power Diode Laser) which is equipped with a special laser beam delivery system for leg vein treatment. We have been working with this equipment since September 2001.

Contraindications:

Tanning,
Fitzpatrick IV. - VI.,
Isotretinoin in past 6 months,
Spontaneus keloids,
Diabetes,
Pregnancy,
Ischemia of lower extreties,
Skin disease in place of treatment,
Neavus neavocellularis in the place of treatment

Clinical data:

(Group 1)
We had a small group of 9 patients consisting entirely of women with chronicle leg vein disease of maximum grade II: (Widmer,Fisher). They are aged between 33 and 65. We only treated blue leg veins on thighs or lower legs. These veins were situated mainly in the subcutis region.
We performed two sessions with this group and applied a one to two months follow up after initial treatment.

(Group 2)
A year later with more experience in the mean time we treated a second group of 24 women (age 27-60) having blue leg veins with diameter of the microvarices between 1 to 4mm at thighs and lower legs. The skin type of the patients according to Fitzpatrick was I – III. There was no combination with sclerotheraphy or small surgery (local flebectomy).

Therapeutic procedure

Preparation:
Patients should be prepared very carefully, receive full information about treatment, healing time, pain and the period following treatment and generally be placed in a position to have realistic expectations.
The area to be treated has to be clean (also free from hair). Once all preparations have been finished, local anesthesia (cooling, cream) should be chosen. Of major significance are proper skin cooling before the laser shots are applied. Some patients complained about pain during treatment and I can say that the level of pain is essentially depended on the individual patient condition. For sensitive patients, I recommend using anesthetic cream e.g. EMLA 2% lidocain for one hour together with intensive skin cooling.

Treatment:
Treatment should be performed nearly in skin contact, without removing (forcing inwardly) the hemoglobin (target) from the site of therapeutic treatment due to mechanical pressure.

(Group 1)
For the first group we used fluences between 130 and 150 J/cm².

(Group 2)
With more experience we found lower fluences of about 90 – 100 J/cm² to be as effective as the higher ones with less potential of side effects.

Immediately after irradiation the outcome can be seen – either the vein has disappeared or its colour has turned to a very dark blue (black-blue). Treatment lasted between ten and twenty minutes depending on the number of veins requiring treatment.

Aftercare:
Following treatment, the skin shows a certain redness or some kind of urticarial reaction.This will disappear within a few (max. 6) hours. The treated area has to be be cooled as long as it is convinient for the patient, e.g. with Cool Packs. Local corticosteroids, panthenol cream (foam) has to be applied.
No compression was applied after treatment. Recommended restrictions were:
- No fitness exercises, heavy work, sauna or others which might increase the blood stream in lower extremities for one week.
- Of course, no sun exposure including solar studios without sun-blocks for a minimum 5-week period.

Number of treatments: average 3 (2 – 5), interval at least 2 months

Results:

(Group 1)

After initial treatment, our small group showed a minimum 50% and a maximum 90% (approximately) success rate. We identified only one case, in which this rate was reduced to a level of 20% (from 50%) due to recanalization in the course of two months. With all other patients, the effect of initial treatment stayed at the same level.

About 50% of our patients had minor crusts that remained for 5 to 12 days after treatment (depending on the selected energy and photo type).
As a side effect one can expect hyperpigmentation (we have one lady with this problem in our small group).
Care should therefore be taken if persons referring to Fitzpatrick skin type IV or higher are to be treated! One should generally start with a low fluence - reduce fluence setting! Cooling time should be longer than 15s! This is necessary to prevent hypopigmentation effects. There is no case of hypopigmentation in our group 1.

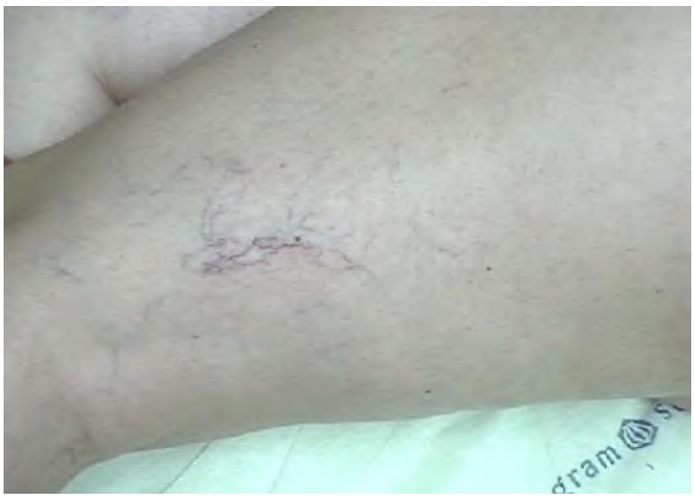
This procedure for leg vein treatment can be an opportunity and the results look very good this time, but should be subjected to a longer follow up after treatment. It appears that two or three sessions are enough if energy is properly dosed, contact mode and cooling devices used and patients have good indications and realistic expectations.

(Group 2)

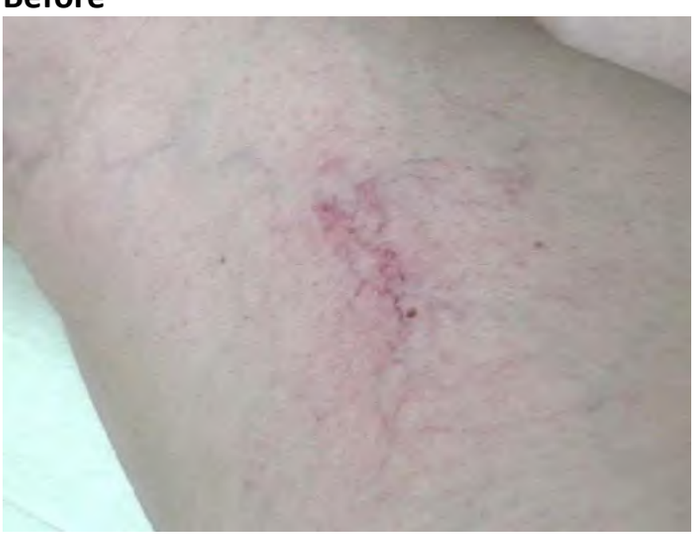
Small veins: 1 – 2 mm diameter after third treatment almost 70% completely healed without coming back (last control 7/2002 – 2months after last treatment)
Medium vessels: 2 – 3 mm diameter about after third 50% completely healed without coming back (last control 7/2002 – 2months after last treatment)
Big vessels: 4mm diameter – need more than 3 treatments and reccurency after third is about 70% so need more treatments and higher energy.

Side effects:
- Crusting reduced: with reducing fluence to 90-100 J/cm² only 30% of the patients
- Hyperpigmentation: 3 patients
- Turn to hemosiderin: 1 patient (copper color hyperpigmentation for 3 weeks)
- Hypopigmentation: 1 patient
- Scar (perimalleolar): 1 patient

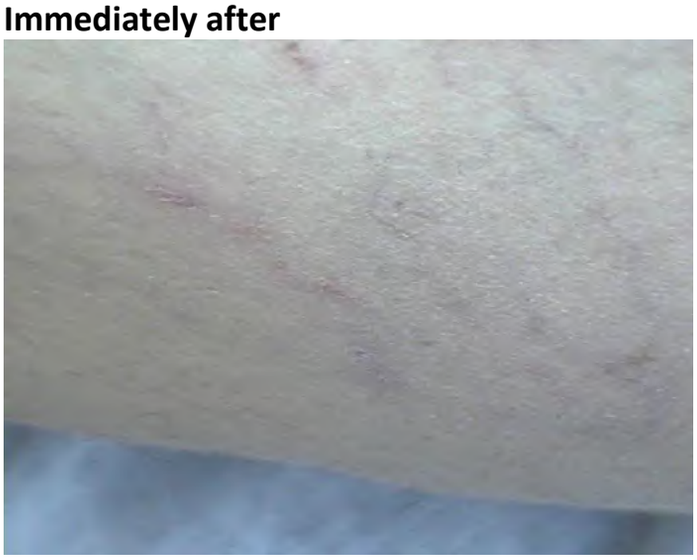
Summary:
Laser treatment of leg veins with the MeDioStar is an efficient procedure with good results even in monotheraphy without combination with other methods for microvarices. Now we are using lower fluence with more rapide healing and less pain during the treatment with same effects. Number of treatments is individual mainly in larger microvarices (4mm diameter).



Before



Immediately after



After 5 weeks

Response of spider leg veins to pulsed diode laser (810 nm): a clinical, histological and remission spectroscopy study.

Wollina U, Konrad H, Schmidt WD, Haroske G, Astafeva LG, Fassler D. J Cosmet Laser Ther 2003;5:154-62

Study design:
35 patients with spider leg veins, 2 treatments 2 weeks apart, 810 nm diode laser
12 mm spot size, 60 ms pulse length, 80-100 J/cm² fluence
Skin biopsies
Remittance spectroscopy

Results:
Complete clearance after 1st treatment with 15 of 35 patients, 20 of 35 remarkable improvement; stable situation after 6 month, 2 patients had mild scarring, otherwise no side effects.

SKIN REJUVENATION

Efficacy of diode laser (810 and 940 nm) for facial skin tightening.

Voravutinon N1, Seawthaweesin K1, Bureethan A1, Srivipatana A1, Vejanurug P1.
Institute of Dermatology, Ministry of Public Health, Bangkok, Thailand.
J Cosmet Dermatol. 2015 Dec;14(4):E7-14. doi: 10.1111/jocd.12165. Epub 2015 Jul 15.

BACKGROUND:
Laser treatment has been introduced for facial skin tightening. However, no prior study has used a diode laser to treat facial skin laxity.

AIMS:
To evaluate the efficacy and safety of a 810- and 940-nm diode laser (MeDioStarNeXT) for treating facial skin laxity.

METHODS:
Thirty patients, with facial skin laxity grading scale II-IV, were enrolled in this study. Each patient underwent four sessions with a 810- and 940-nm diode laser (MeDioStarNeXT) treatment over 3-week intervals. Improvement in the laxity of facial skin was evaluated using a Cutometer MPA 580, spectrophotometer, and a grading scale.

RESULTS:
Significant improvement was observed with the Cutometer F3 and R7 parameters at 1 and 3 months after complete treatment, respectively. Physician assessment showed significant improvement in the laxity scale at 1 and 6 months after treatment. Approximately 10% of the patients reported mild pain or minor adverse events. Ninety-eight percent of the patients were satisfied with the treatments.

CONCLUSION:
Treatment with a diode laser (810 and 940 nm) is safe and may be effective for facial skin tightening. Maintenance treatment is necessary to sustain the effect of treatment.

INTRODUCTION
Skin aging includes two main categories. Intrinsic skin aging is an inevitable change due to telomere shortening and age-related changes in the skin's appearance. Extrinsic skin aging is commonly called photoaging and is due to ultraviolet damage, which is clinically characterized by dyschromia, elastosis, fine rhytides, erythema, telangiectasia, textural changes, and keratoses.[1] Skin laxity is a common cosmetic condition for middle-age patients, which is linked with chronological aging and exposure to solar radiation.[2] Skin elasticity is a property of the skin that allows it to amend and regain shape when stretched or deformed.[3] Facial laxity results from a decrease in the skin elasticity, which is clinically characterized by cheek sagging and nasolabial fold formation. Nasolabial fold severity is related to diminished dermal elasticity and an increasing subcutaneous adipose tissue layer.[4] These changes might induce sagging formation in the upper cheek area and, subsequently, a line or groove is formed. Skin aging may cause psychological problems and prompt patients to seek treatment assistance.
The current treatment options for nonsurgical skin tightening may be classified into 3 main groups based on their targets: (1) infrared (IR) lasers, which target the dermis and induce neocollagenesis, minimizing rhytides; (2) intense pulse light (IPL) sources, which target the melanin pigment and blood

vessels, improving dyschromia and erythema–telangiectasia, and (3) radiofrequency (RF) devices, which stimulate the collagen contracture, targeting skin laxity.[5] Studies have been conducted on combination treatments with IR, RF, and/or IPL and diode laser to treat facial skin laxity and rejuvenation, resulting in improvement in the clinical outcomes with minor side effects, such as temporary erythema and edema without scarring or dyspigmentation. 5–7 A comprehensive grading scale of the severity of various aspects of skin aging, including rhytides, laxity, and multiple components of photoaging, has been used to assess the efficacy of treatment, providing a more quantitative analysis of each category as well as the overall improvement.[5]
The diode laser MeDioStar NeXT (Asclepion Laser Technologies GmbH, Jena, Germany) has a combination of two wavelengths, 810 and 940 nm, and the target chromophores are hemoglobin and water. In selective photothemolysis, water absorbs laser energy, causing a direct thermal effect on the deep dermis, stimulating fibroblasts to promote collagen remodeling. Hemoglobin absorbs the laser energy, which triggers the cutaneous vessels to generate cellular mediators and growth factors that are necessary to produce new collagen bundles.[7] To the best of our knowledge, no previous studies used diode laser (810 and 940 nm) alone to treat facial skin laxity. Hence, the objective of this study was to evaluate the efficacy and safety of a diode laser with wavelengths of 810 and 940 nm (MeDioStar NeXT) for treating facial skin laxity. The primary outcome is improvement in the facial skin laxity, and the secondary outcome is decrease in skin pigmentation.

MATERIALS AND METHODS

STUDY DESIGN

The Ethics Committee and Review Board of The Institute of Dermatology, Bangkok, Thailand, approved this study protocol. Thirty healthy 35- to 60-year-old male and female Thai patients with Fitzpatrick skin phototypes III to IV and moderate-to-severe facial skin laxity were enrolled in the study. Exclusion criteria consisted of patients with a history of keloids or hypertrophic scarring, skin malignancy, open wound on the face, facial herpes simplex infection, bleeding disorder, photosensitive disorder, heritable disorders of connective tissue, pregnancy and lactation, the use of oral and topical retinoids within the preceding 6 months, a history of facial laser treatment within 6 months of the treatment and a history of injection with filler, botulinum toxin, within the preceding 6 months. Only subjects consenting to longitudinal follow-up during the study were enrolled. Patients were allowed to continue their use of moisturizers and sunscreen during the study.

Treatment parameters

The patients were treated with four sessions, over 3-week intervals, using the 810- and 940-nm diode laser (MedioStaNeXT) device. Two treatment processes were used to treat patients in each session. The first process was the painting technique with a smooth pulse mode. During the first process, eight passes were performed at the malar, nose, and chin areas; the settings were 8–10 J/cm^2, 16–20 ms pulse duration, and 6 Hz. At the forehead area, four passes were performed, and the settings were 4–6 J/cm^2, 10–12 ms pulse duration, and 6 Hz. An infrared thermometer device was used to maintain the temperature at close to 40–42 °C during this painting technique for stimulate the collagen remodeling that can make skin tightening. The second process included two passes of a staged pulse technique, with a skin rejuvenation mode, contact cooling, and cooling gel; the settings were 200–250 ms, 1 Hz, and a single pulse. The energy setting was allowed to adjust according to the patient's skin

type and specific susceptible areas. Basically, in patients with Fitzpatrick skin phototype type III, on the malar, nose, and chin area, 25–30 J/cm^2 was used, which was reduced to 15–20 J/cm^2 at the forehead area. In patients with Fitzpatrick skin phototype type IV, this value was reduced to 20–25 J/cm^2 and 10–15 J/cm^2, respectively. A single physician (N.V.) performed all of the treatment sessions. Digital photographs were taken using the Canfield Visia CR System (Canfield, Fairfield, NJ, USA) in the standard manner prior to each treatment session and at 1, 3, and 6 months after the last treatment. Sunscreen (SPF 60) was prescribed to all patients after laser treatment, and the patients were advised to avoid the sun.

Assessments

Clinical outcomes were evaluated using a Cutometer® MPA 580 (Courage+Khazaka electronic GmbH, Cologne, Germany), spectrophotometer, and grading scale for assessing rhytides, laxity, and photodamage[2] before and after each treatment session. A patient satisfaction questionnaire and serial photography were evaluated at every visit. A five-point scale (0–4 points for no improvement, <25%, 25–50%, 51–75%, and >75% improvement) was assessed by patients and nontreating dermatologists using serial photography at baseline and every visit at 1, 3, and 6 months after last laser treatment. Adverse effects, such as erythema and postinflammatory hyperpigmentation, were evaluated. Pain during treatment was assessed with a pain score using a standard 0–10 visual analog scale. Follow-up was conducted at 1, 3, and 6 months after laser treatment.

Skin elasticity was determined using a noninvasive, in vivo suction skin elasticity meter, Cutometer MPA 580® (suction skin elasticity meter), with a 2-mm-diameter probe at a negative pressure of 400-m bar applied to the skin in the perpendicular direction for a period of 2 s of suction, which was followed by 2 s of release. Ten repetitions of the measurement cycle were performed. A strain–time curve was derived from the measurement of cheek skin.[4,5,8] The measurement point was 2 cm below the crossline between the midpupillary line and the angle of the alar nasi. We used the cutometer parameters F3 and R7 because they were previously reported as significant in evaluating the age-related changes in the skin elasticity of the cheek.[8]

Statistical analysis

The paired t-test was employed to statistically analyze clinical efficacies by comparing the clinical result at 1 and 3 months post-treatment with baseline. Measurements of the cutometer and spectrophotometer were analyzed using repeated-measures ANOVA. The Spearman rank correlation coefficient was used to analyze the correlation of the laxity scale of photography graded by two nontreating dermatologists. Patient selfassessment of the clinical outcome using a global improvement score was analyzed using Friedman twoway ANOVA. All computations were performed with SPSS software (IBM Corporation, Armonk, NY, USA). All the P-values were two-sided, and statistical significance was defined as $P < 0.05$. The percentage of adverse effects was recorded on the basis of a patient interview.

Results

Demographics

Thirty Thai subjects completed four treatment sessions and were included in the data. The mean age was 51.7 years with a range of 38–59 years. Ten of thirty patients (33%) were Fitzpatrick skin type III, and the remaining patients (67%) were type IV.

Efficacy evaluation

Cutometer

Significant improvement in facial laxity at 1 month after last treatment ($P = 0.008$) was observed with the F3 parameter (Fig. 1, Table 1). Significant improvement in facial laxity at 3 months ($P < 0.05$) after the last treatment was also observed with the R7 parameter. At 6 months after treatment, the tightening of the skin seemed to persist with no statistical significance ($P = 0.464$) (Fig. 2, Table 1).

Spectrophotometer

After complete treatment, skin pigmentation trended to reduce, and there was no statistical significance ($P = 0.21$) on the spectrophotometer at 1 month (Fig. 3).

Patient self-assessment

Patient self-assessment of the clinical outcome showed moderate-to-marked improvement at the 2nd, 3rd, and 4th treatment sessions with percentages of 56.7%, 66.7%, and 83%, respectively. During the follow-up periods, 90% of the patients had significantly moderate-to-marked facial skin tightening (Fig. 4). Almost all of the patients were satisfied, would like to continue the treatment and may advise others to undergo the treatment as well.

Physician assessment

Evaluation of the clinical efficacy by two nontreating dermatologists using photography evaluation of the laxity scale and global improvement scale (GIS). There was a positive moderate correlation coefficient ($r = 0.5–0.7$) for the laxity scale of photography graded by the two nontreating dermatologists (Table 2). The physician assessment of the clinical outcome showed significant improvement in the laxity scale at 1, 3, and 6 months after treatment ($P < 0.001$). Figures 5 and 6 showed the serial photographs of 48-year-old participant. The facial skin laxity in this case was improved particularly at 1-month follow-up and still noticeable at 6-month follow-up.

The result of the GIS assessment showed that 53.3% of the patients had mild improvement in their skin laxity (<25%) at 1 and 3 months and 66.7% at 6 months after treatment (Table 3).

Safety evaluation

Approximately 10% of the patients reported only mild pain (pain score 1–3) or minor adverse events, such as mild hyperpigmentation and transient erythema. During all treatment sessions, approximately 81% of the treatment sessions were reported as erythema free, 19% were reported as involving mostly mild erythema, and only one session was reported as involving moderate erythema, which diminish spontaneously within a few days. The majority of the patients reported no hyperpigmentation and few cases reported a mild degree of hyperpigmentation. During the 3rd and 4th laser treatments, erythema seems to be more tolerable than in the earlier sessions. There were also no reports of hypopigmentation, infection, dermatitis, or scarring up to 6 months after treatment. Details of the adverse events are shown in Table 4.

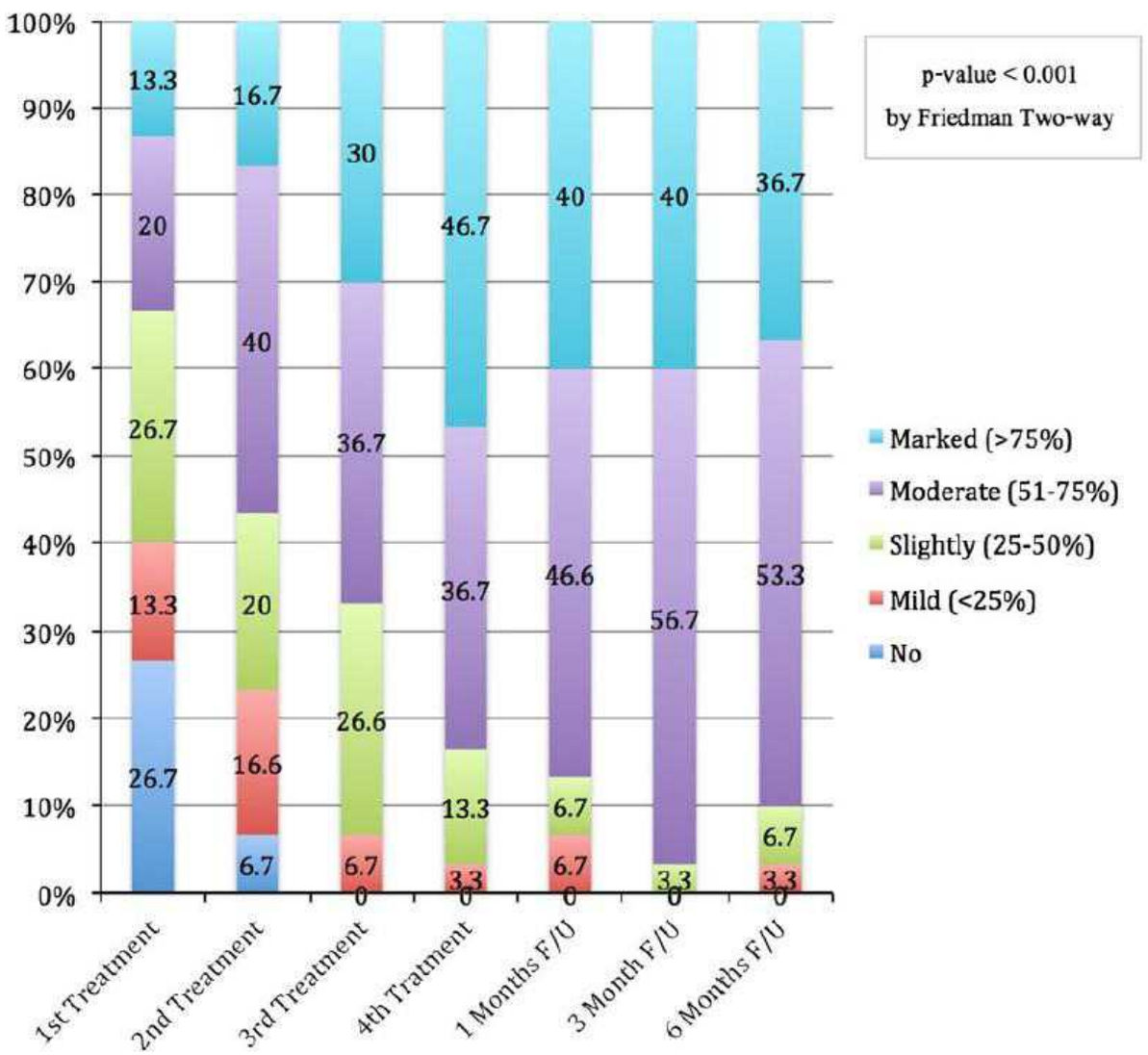


Figure 4 Patient self-assessment of the skin laxity improvement.

Table 2 Physician assessments of the laxity scale by two non-treating dermatologists

Visit	Mean	Correlation coefficient (*r*)	*P*-value	SD
1st Laser	2.067	0.663	<0.001	0.58
2nd Laser	1.767	0.490	0.006	0.50
3rd Laser	2.167	0.580	0.001	0.59
4th Laser	2.167	0.439	0.015	0.53
F/U-1 month	1.933	0.633	<0.001	0.52
F/U-3 month	2.200	0.492	0.006	0.48
F/U-6 month	1.900	0.623	<0.001	0.55

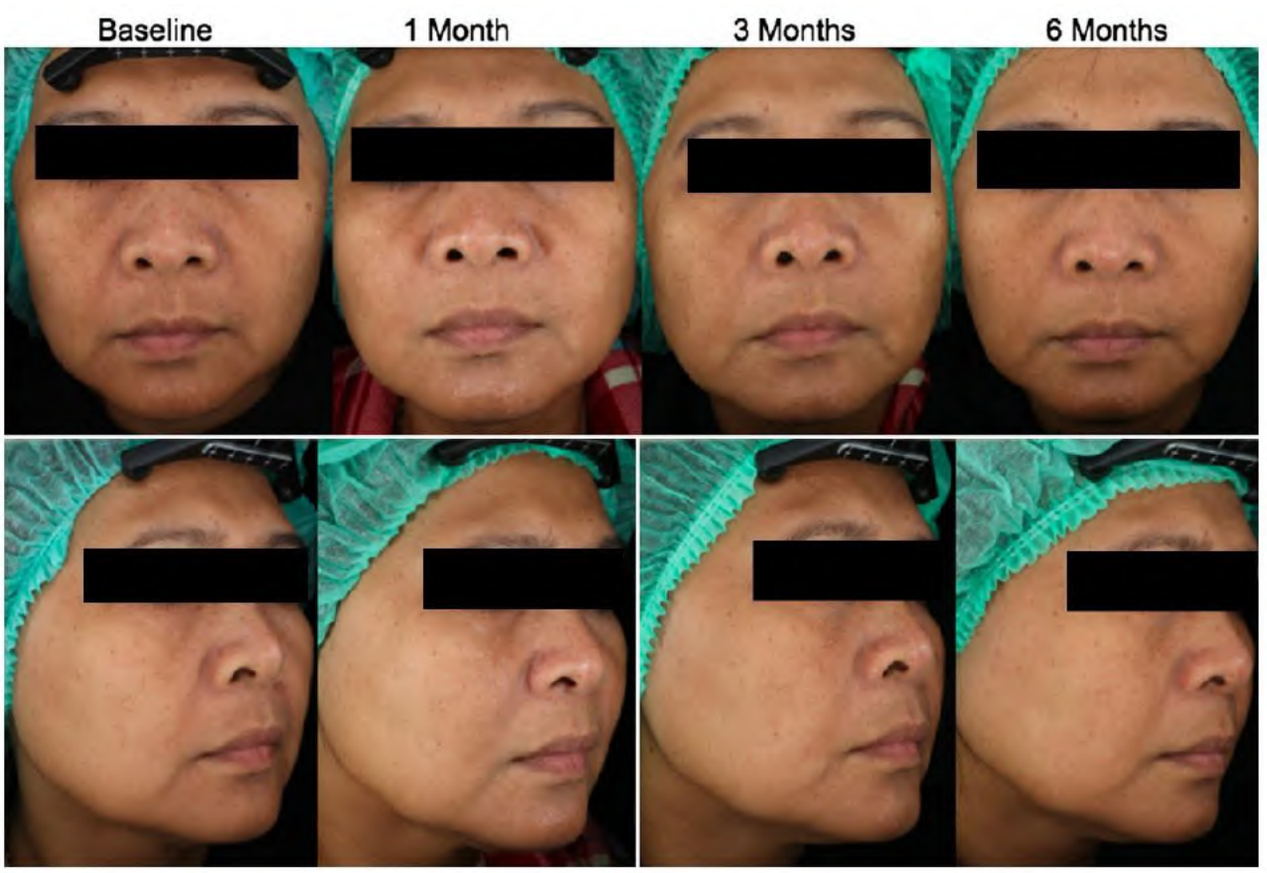
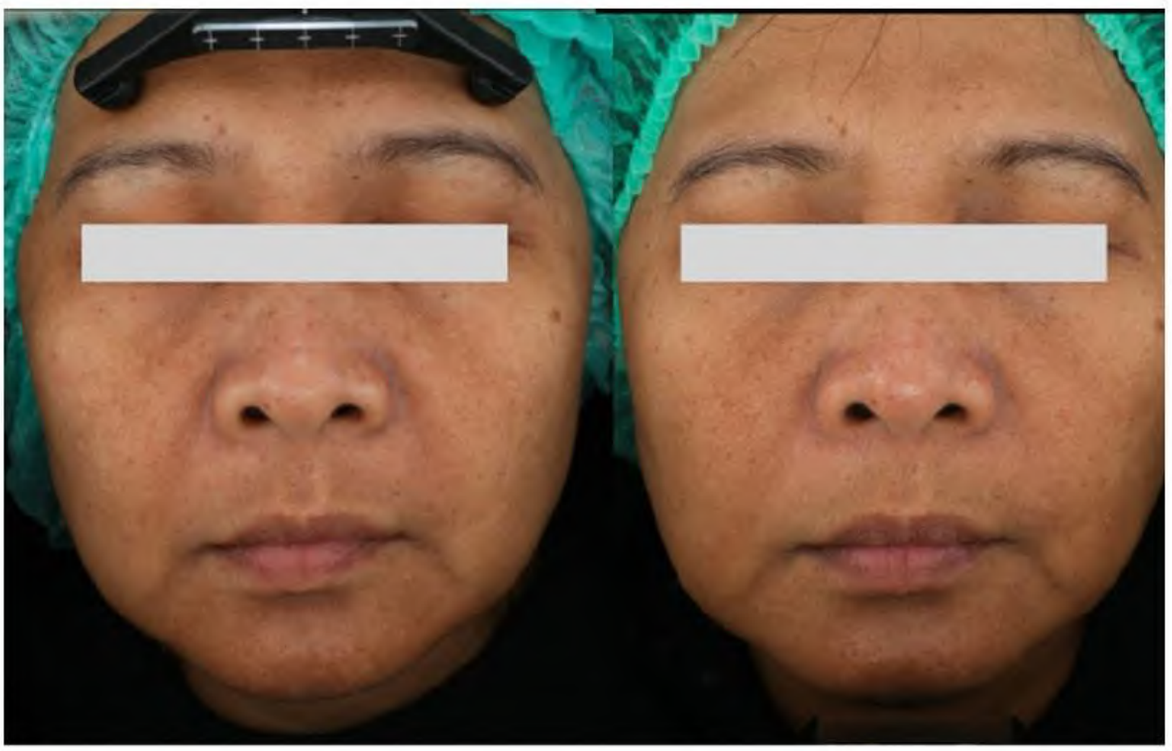


Figure 5 Photographs of 48-year-old patient. The serial photographs compared those of baseline and those of follow-up period after completed treatment sessions. The facial skin laxity was improved particularly at 1-month follow-up.



At Baseline

At 6th month follow-up after completed 4 treatment sessions

Figure 6 Photographs of the same patient as Figure 5. The compared photographs between pretreatment and the last follow-up. The facial skin laxity improvement was still noticeable.

Table 3 Global improvement scale assessment (GIS) according to two nontreating dermatologists

	Comparing GIS at baseline and at the follow-up after last laser treatment Number of patients (%)		
GIS	Follow-up 1 month	Follow-up 3 months	Follow-up 6 months
No improvement	14 (46.67)	14 (46.67)	10 (33.33)
Mild improvement	16 (53.33)	16 (53.33)	20 (66.67)

Table 4 Adverse events of laser treatment

Adverse event	Laser treatment Number of patients (%)				Friedman test
	1	2	3	4	
Adverse event					
None	24 (80)	24 (80)	27 (90)	24 (80)	$P < 0.001$
Mild	5 (16.7)	6 (20)	3 (10)	2 (6.7)	
Moderate	1 (3.3)	0	0	0	
Severe	0	0	0	0	
Pain (Pain score)					
None (0)	17 (56.7)	22 (73.3)	25 (83.3)	27 (90)	$P = 0.002$
Mild (1–3)	13 (43.3)	8 (26.7)	5 (16.7)	3 (10)	
Moderate (4–6)	0	0	0	0	
Severe (7–9)	0	0	0	0	
Severe intolerable (10)	0	0	0	0	
Erythema					
None	21 (70)	24 (80)	25 (83.3)	27 (90)	$P = 0.161$
Mild	9 (30)	5 (16.7)	5 (16.7)	3 (10)	
Moderate	0	1 (3.3)	0	0	
Severe	0	0	0	0	
Hyperpigmentation					
None	30 (100)	28 (93.3)	30 (100)	29 (96.7)	$P = 0.300$
Mild	0	2 (6.7)	0	1 (3.3)	
Moderate	0	0	0	0	
Severe	0	0	0	0	
Dry skin	0	2 (6.7)	1 (3.3)	1 (3.3)	

Discussion

We evaluated the efficacy and safety of a diode laser (810 and 940 nm) for treating facial skin laxity. The outcome of the study showed good results according to both objective and subjective assessments. Our objective assessment involved the use of cutometer R7 and F3 parameters, which are the best parameters for evaluating skin elasticity. To the best of our knowledge, few studies have used a cutometer to evaluate the skin-tightening effect, which is most likely due to the difficult measurement technique. A significant improvement in facial laxity at 1 month after the final treatment was observed with the F3 parameter ($P < 0.05$), and at 3 months, significant improvement was observed with the R7 parameter ($P < 0.05$). From the results of the cutometer, as an objective parameter, the best treatment responses were achieved at approximately 1–3 months after the completed treatment sessions. Therefore, in clinical practice, maintenance treatment may be necessary every 2–3 months to maintain the treatment result. Interestingly, the patient's self-assessment showed moderate–marked significant improvement in skin laxity over the course of laser treatment and in the follow-up periods up to 6 months.

Our study result was consistent with the efficacy of a study report on Polaris WR, which combines the radiofrequency and diode laser energies (Electrooptical synergy or ELOS).6 The improvement in the facial rhytides was observed in the majority of patients with clinical improvement scores of 25–50%, and patient satisfaction surveys reflected the clinical improvements observed at the 9-week, 3-month, and 6-month follow-up visits, which were rated as 93%, 86%, and 81%, respectively. However, some adverse events in the ELOS system, such as mild-to-moderate pain, post-treatment erythema, and transient edema, were reported for most of the patients. Another study reported on the effectiveness

of combination treatment using bipolar radio frequency-based intense pulsed light (470–980 nm), infrared light (700–2000 nm), and a diode laser (915 nm) in a split-face trial.7 All patients showed statistically significant reduction in the photoaging global score. Objective measurements showed significant improvements in the melanin index and elasticity (R5 and R7) as well as increases in the levels of procollagen types I and III and elastin. This study efficacy is consistent with our study. However, the treatment protocol of the other study required the application of topical anesthetic cream, and all of the patients still reported mild pain during the procedures.

Our treatment protocol was safe. There were no serious or permanent adverse effects. The most common adverse effects found in our study were only temporally pain and erythema, demonstrating this technique is well tolerated. Additionally, the patient population in our study included Asians with Fitzpatrick skin types III to IV, which are prone to having more side effects, especially postinflammatory hyperpigmentation. The protocol settings were adjusted to minimize complications in our study. Nevertheless, the majority of the patients reported a lack of hyperpigmentation and few cases reported only transient and mild hyperpigmentation, which did not need any treatment. Therefore, regarding the efficacy and safety, diode laser (810 and 940 nm) may be considered a suitable choice for facial skin tightening in higher Fitzpatrick skin types, such as in Asians. In a white population, the treatment settings may have to be adjusted to obtain optimal results without excessive risk of dyspigmentation. The limitation of our study is the relatively short follow-up period of 6 months after the final treatment session because optimal improvement may be evident after 6–12 months of follow-up. The histological studies showed increases in the collagen layer thickness that persisted for 1 year following 980 nm diode laser use to treat solar elastosis.9 The clinical benefit from the dermal remodeling process normally starts several months after treatment and continues for years after the initiation of the cutaneous wound-healing cascade.8 Our study was also limited by the small sample size and lack of a sham control group. We attempted to control for observer bias by using two nontreating dermatologists, who were blinded to the results, to evaluate the outcome of skin elasticity.

In conclusion, our study suggests that a diode laser (810 and 940 nm) is safe and may be an effective treatment for facial skin tightening. Maintenance treatment every 2–3 months may be the optimum interval for maintaining the results.

References

1 Yaar M, Gilchrest BA. Photoageing: mechanism, prevention and therapy. Br J Dermatol 2007; 157: 874–87.

2 Sadick N. Tissue tightening technologies: fact or fiction. Aesthet Surg J 2008; 28: 180–8.

3 Everett JS, Sommers MS. Skin viscoelasticity: physiologic mechanisms, measurement issues, and application to nursing science. Biol Res Nurs 2013; 15: 338–46.

4 Ezure T, Amano S. Involvement of upper cheek sagging in nasolabial fold formation. Skin Res Technol 2012; 18: 259–64.

5 Alexiades-Armenakas M. Rhytides, laxity, and photoaging treated with a combination of radiofrequency, diode laser, and pulsed light and assessed with a comprehensive grading scale. J Drugs Dermatol 2006; 5: 731–8.

6 Doshi SN, Alster TS. Combination radiofrequency and diode laser for treatment of facial rhytides and skin laxity. J Cosmet Laser Ther 2005; 7: 11–5.

7 Kim JE, Chang S, Won CH et al. Combination treatment using bipolar radiofrequency-based intense

pulsed light, infrared light and diode laser enhanced clinical effectiveness and histological dermal remodeling in Asian photoaged skin. Dermatol Surg 2012; 38: 68–76.
8 Muccini JA, O'Donnell FE, Fuller T et al. Laser treatment of solar elastosis with epithelial preservation. Lasers Surg Med 1998; 23: 121–7.
9 Fisher GH, Jacobson LG, Bernstein LJ et al. Nonablative radiofrequency treatment of facial laxity. Dermatol Surg 2005; 31: 1237–41.

Treatment of lentigines with a diode laser at 808 nm

S McCoy; Laser, Skin & Vein Clinic, North Adelaide, South Australia

Background:
Lentigines are common benign epidermal skin lesions which occur predominantly on sun-exposed areas of individuals with fair (Fitzpatrick Types I-III) skin, increasing in incidence with advancing age. Histologically, solar lentigines exhibit elongation of the epidermal rete ridges and an increase in the number of melanocytes and the amount of epidermal pigment. Many different lasers have been used with a high degree of efficacy and low incidence of adverse sequelae including Q-switched Nd:YAG, Erbium:YAG, ultra-short pulsed CO_2 and others. This study evaluated treatment of lentigines with a long-pulsed 808 nm diode laser which is common clinical use for the purpose of hair reduction.

Results:
All patients showed 50% or greater reduction in lentigines at one month except one patient treated with a 12 mm spot and 30 J who shows only 25-50%. There was poor correlation between clearance and fluence but strong correlation between clearance and the colour of the original lesions with darker lesions showing greater clearance. There was no scarring at one moth but some lesions showed residual erythema at this short post-treatment interval. Histology consistently showed streaking of the nuclear chromatin of the pigmented basal keratinocytes, clefting of the dermal-epidermal junction and variable homogenization of a thin upper rim of the papillary dermal collagen. The effects were more pronounced with the 6 mm than the 12 mm spot.

Summary:
A diode laser emitting 25 to 50 J/cm^2 at 808 nm is capable of inducing limited and focal necrosis of solar lentigines in the forearm skin of Caucasian females with satisfactory clinical results. Treatment is rapid and well tolerated. Results are more dependent on the colour of the lentigo than the fluence of the laser. Operator judgement and experience is therefore important in obtaining good results.

Non-ablative skin remodeling: an 8-month clinical and 3D in vivo profilometric study with an 810 nm diode laser.

Levy JL, Trelles M, Servant JJ, Agopian L. J Cosmet Laser Ther 2004;6:11-15

Study design:
10 patients, 3 treatments, 810 nm diode laser, 4 mm spot size, 182 ms pulse length, 29 J/cm² fluence, Skin cooling (contact), 3D in vivo profilometry

Results:
Global mild improvement around the third treatment, with progression 5 months after, reduction of roughness, No short- or long-term side effects.

ACNE

Hair Removal for treatment of hidradenitis suppurativa with the Asclepion MeDioStar Laser

Falk Bechara, M.D.
Head of Dermatologic Surgery Unit; Department of Dermatology,
Ruhr-University Bochum, Germany

Introduction
Hidradenitis suppurativa (HS) or acne inverse is a chronic, recurrent, inflammatory disorder localized in the intertriginous areas such as the axillary, inguinal, perianal or inframammary region causing painful, fistulating sinus tract formation with malodorous purulence and hypertrophic scarring. Its prevalence is estimated up to 4%, and the disease is three times more likely to occur in women than men.

The major challenge is the choice of the optimal treatment. Options proposed based on the patient's disease severity include local wound care, antibiotics, hormon therapies, incision and drainage, limited or radical local excision or laser therapy up to immunosuppressive medication and biologics.

Regarding to pathogenesis of HS recent histopathologic studies suggest that the primar event in HS is an infundibular hyperkeratosis, hyperplasia of the follicular epithelium and perifollicular inflammation leading to an occlusion and subsequent rupture of the follicle.

These findings provide a rationale for the use of laser therapy in the early stages of the disease before sinus tracts, fistula und scarring formation occur.

Case reports
Two patients with HS Hurley stage II (hurley stage II= one or more abscesses widely separated with tract formation and scarring) of the axilla and one of groin were included.

Both participants received seven treatments at month intervals with the Asclepion MeDioStar, a 810-nm diode laser. Settings were chosen based on Fitzpatrick skin-type (treatment parameters: spot size 12mm, fluence of 25 J/cm^2 for patient 1 and of 35 J/cm^2 for patient 2). Treatment response was scored using the hidradenitis suppurative score (HS-Score). This scoring system incorporates the anatomic regions involved, number and types of lesions involved, the distance between lesions and the presence of normal skin in between lesions.

Results
In general the treatment was well tolerated by the patients. Due to Asclepion´s contact-cooling hand piece pain and postoperative bruising was rare. No postoperative hyperpigmentation or scarring scars occurred as a result of treatment. Apart from the expected significant reduction in hair density the disease activity dramatically improved in the course of the treatment (see figures 1 and 2). During treatment and the follow-up period of 3 month up to now there was no need for antibiotics or operative treatment.

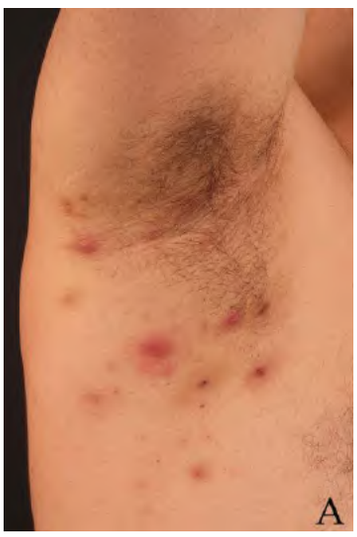
Doctor Bechara, in charge of a wide HS patient population at the Department of Dermatology at the Ruhr-University Bochum (Germany), states: "Hidradenitis suppurativa can significantly reduce the patients quality of life due to the pain and social embarrassment limiting daily and professional activities. Early diagnosis and specialist treatment may spare the patient years of struggling and radical operations. Laser epilation for example with the MeDioStar HC by Asclepion seems to be a promising treatment approach of mild to moderate cases of hidradenitis suppurativa with a low incidence of side effects. A prospective side-control study with

long-term follow up is currently conducted at our dermatologic surgery unit. This will be the first long-term-follow-up study including a large cohort of patients regarding laser epilation as a treatment approach of hidradenitis suppurativa. We are really excited about the long term results!"

References

1. Ralf Paus, L., Kurzen, H., Kurokawa, I., Jemec, G. B. E., Emtestam, L., Sellheyer, K., Giamarellos-Bourboulis, E. J., Nagy, I., Bechara, F. G., Sartorius, K., Lapins, J., Krahl, D., Altmeyer, P., Revuz, J. and Zouboulis, C. C. (2008), What causes hidradenitis suppurativa?. Experimental Dermatology; 17: 455–456.
2. Bechara FG, Hartschuh W. (2010), Acne inversa. Hautarzt; 61: 39-46.

Figures:



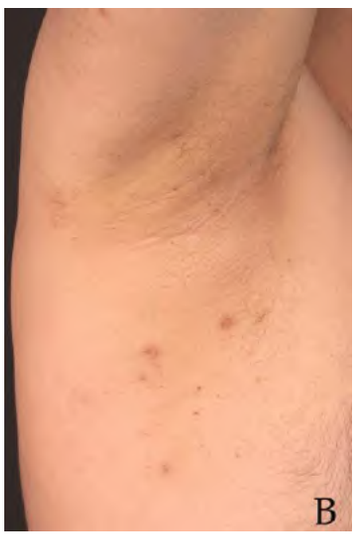
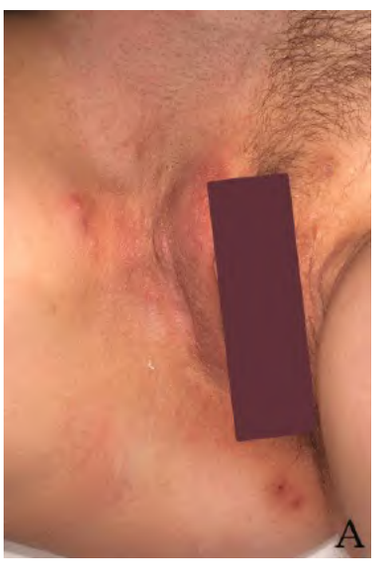


Fig. 1.

Axilla: visible reduction of inflamed papules and nodules after laser epilation.

A:
Before laser treatment
(HS-score 15)

B:
After 7 laser treatments
(HS-score 2)



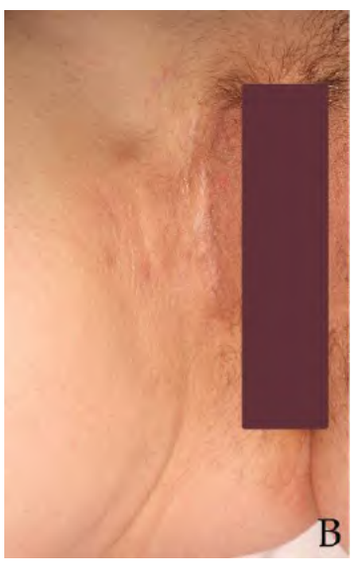


Fig. 2.

Groin: visible reduction of inflamed papules and nodules after laser epilation.

A:
Before laser treatment
(HS-score 14)

B:
After 7 laser treatments
(HS-score 3)

Efficacy of diode laser for treating acne keloidalis nuchae.

Shah GK. Indian J Dermatol Venereol Leprol 2005;71:31-4

Study design:
2 patients with acne keloidalis nuchae, 810 nm diode laser, 100 ms pulse length, 23-26 J/cm² fluence

Results:
Patients had about 90% clearance one month after 4th treatment. Papules decreased in number and reduced in size. No new lesions appeared after 6 months. No side effects.

Acne – Minimal surgery replaces radical operation

Passos Pereira C. Dermaforum 2003; Nr. 9, S. 22

Study design:
20 patients over 3 years, Treatment analog epilation, Minimum side effects

Results:
Regression of fresh inflammations within few days, of scary inflammation in 6 weeks

Studies Book

- MeDioStar -

Asclepion Laser Technologies GmbH
Brüsseler Str. 10 • 07747 Jena, Germany
www.asclepion.com