

# PicoWay®

The complete  
picosecond platform.

Science | Results | Trust



 **CANDELA®**  
Science. Results. Trust.



Dear reader,

On behalf of Candela, we would like to say thank you for your interest in the PicoWay® system, our picosecond laser intentionally designed to work from the inside out to treat wrinkles, acne scars, benign pigmented lesions and tattoos\*. In this eBook, we provide you with the most important information regarding this device, from technology overview to the results clinical experts worldwide have achieved with their patients.

Know that when you decide to work with one or more of our devices, we'll do everything we can to provide you with the highest level of customer service possible.

**That's our promise to you.**

**The Candela Marketing Team**

\*PicoWay, CE mark.

### PicoWay Zoom

- Full beam 532 nm and 1064 nm<sup>1</sup>
- Tattoo removal
- Benign pigmented lesions<sup>1</sup>

### PicoWay 785 nm & 730 nm

- Ti:sapphire crystal handpieces
- Full Beam 785 nm and 730 nm
- Tattoo removal (blue and green)<sup>1</sup>
- Benign pigmented lesions<sup>1</sup>

### PicoWay Resolve™

- Two handpieces: 532 nm and 1064 nm
- Acne scars (1064 nm), wrinkles and benign pigmented lesions<sup>1</sup>

### PicoWay Resolve Fusion™ 532 nm

- Fusion beam structure for more coverage
- Benign pigmented lesions<sup>1</sup>

Spot sizes range up to 10 mm

6x6 mm with 100 identical beams for uniform treatment<sup>2</sup>

The system architecture is designed for treatment customization and performance<sup>1-5</sup>

### Multiple Wavelengths

- Versatile picosecond platform for many treatment needs
- 4 picosecond wavelengths for tattoo removal, benign pigmented lesions<sup>1</sup> of different depth

### Accuracy and Stability

- Accurate energy and pulse duration for stable performance<sup>2</sup>
- Stable optical synchronization for a reliable laser<sup>2</sup>

### Power and Pulse Duration

- 4 picosecond wavelengths with high peak power and shortest pulse durations<sup>a</sup> for a photoacoustic effect<sup>2</sup>
- Multiple energies per spot size
- No compromise of spot size for fluence<sup>2</sup>
- Flexible treatment parameters for physician control of wavelength, fluence, repetition rate, and spot size for highly customizable treatments

### Efficiency

- Fast warm up time<sup>2</sup>
- No frequent costly flashlamp replacement<sup>2</sup>
- Uses only 10% of available pump energy<sup>2</sup>
- No consumables

## Mechanism of action: The Picoway System

### The Science of PicoWay Technology - Experience Picosecond Laser Leadership

#### Ultra-Short Pulses & High Peak Power for Optimal Results

The PicoWay device's ultra-short pulses enable the strong photoacoustic impact needed to fracture pigment particles using lower fluences, for clearance in fewer treatments.



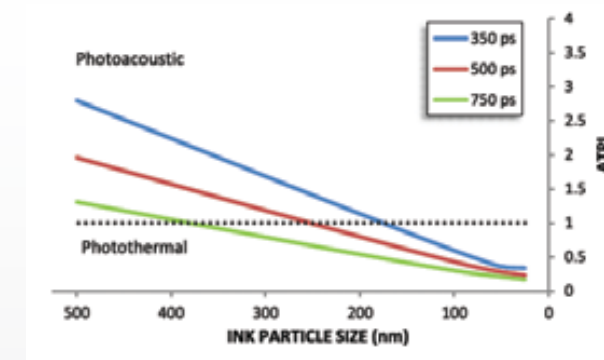
#### Photoacoustic

Laser energy is delivered so rapidly that even the smallest pigment fragments will shatter.



#### Photothermal

Laser energy is delivered more slowly so that only larger pigment fragments will shatter.



#### Acoustic to Thermal Pressure Index

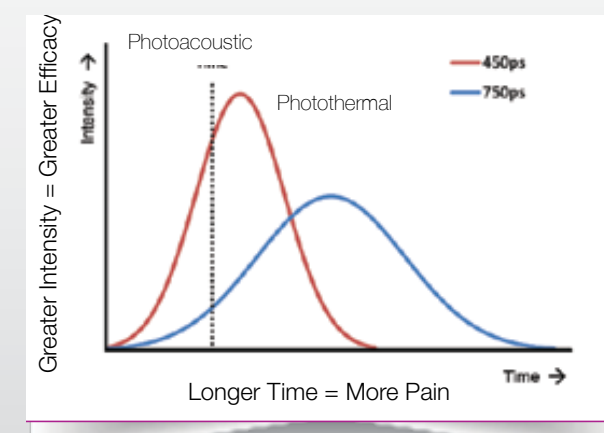
An ATPI index greater than 1 indicates a photoacoustic fracturing mechanism while an index less than 1 indicates a photothermal fracturing mechanism. The PicoWay system, with pulses from 300-450ps, has an ATPI index greater than 1 for particle sizes exceeding 350 nm.

#### Photoacoustic Fracturing is Advantageous

1. Less heat is generated resulting in fewer side effects and minimal discomfort.
2. Improved ability to treat smaller particles resulting in more complete clearance.

#### High Peak Power Means Greater Efficacy

The high peak power of the 450ps pulse of the PicoWay system delivers 4.5 times more photoacoustic effect than the 750ps pulse of other picosecond devices. The 750ps pulse delivers a more photothermal effect, since it does not have high peak power and must deliver the energy over a longer period of time. This excess photothermal effect can lead to potential side effects.\*



1. PicoWay CE mark.  
2. Candela, Data on File.



## Practitioner advantages

**The PicoWay system is a sound investment for your aesthetic practice. It may help you:**

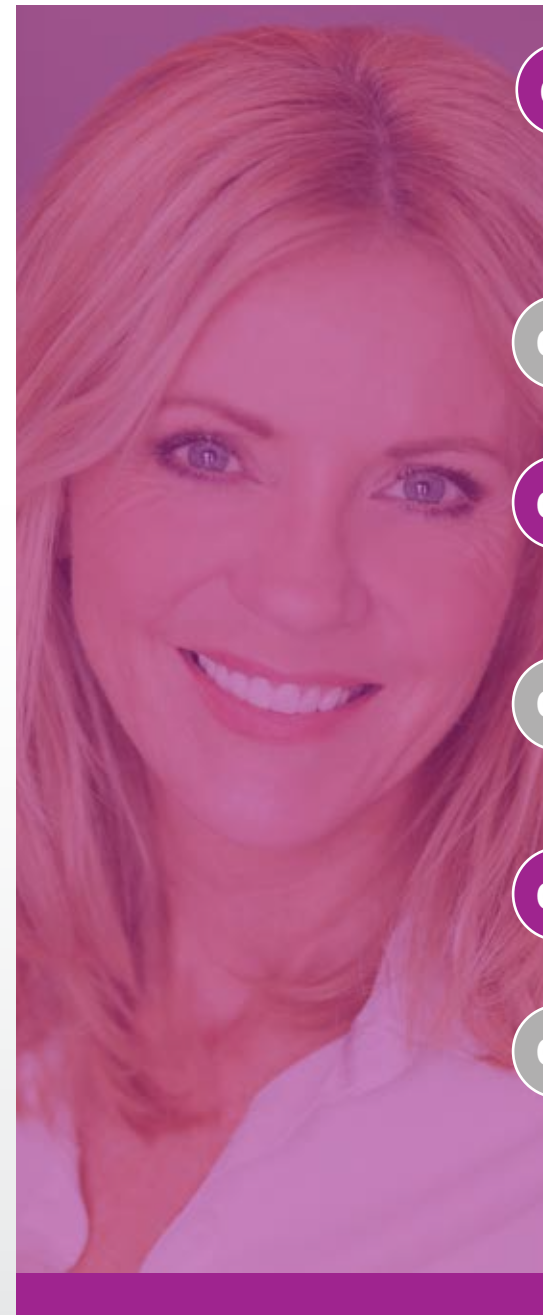


- 01 Build patient volume.** The PicoWay® Laser is a native picosecond laser intentionally designed to work from the inside out to treat benign pigmented lesions, acne scars, wrinkles and to provide removal of professional and cosmetic tattoos across the spectrum of colors, attracting a wide range of patients.
- 02 Differentiate your practice.** With consumers seeking effective aesthetic treatments with minimal downtime<sup>1</sup>, PicoWay lasers can help set your practice apart.
- 03 Gain versatility.** The PicoWay system features four wavelengths (1064nm, 785 nm, 730 nm and 532 nm) and multiple handpieces to maximise your treatment options - and your ROI.
- 04 Minimise risk in skin of colour patients.** The PicoWay system's ultra-short picosecond pulses are 10 to 100 times shorter than Q-switch lasers, in the trillionths of a second. Picosecond pulses minimise risk of side effects such as hypopigmentation and scarring that can often occur with slower, nanosecond pulse lasers<sup>2,3</sup>.

1. American Academy of Aesthetic Medicine website. Available at: [https://www.aaamed.org/aesthetic\\_med.php](https://www.aaamed.org/aesthetic_med.php).  
 2. Adatto MA, et al. Curr Probl Dermatol. 2017;52:113-123.  
 3. Wang CC, et al. J Am Acad Dermatol. 2006;54(5):804-810.

## Patient advantages

**The PicoWay system removes boldly with a gentle approach**



- 01** The PicoWay system treats benign pigmented lesions, acne scars, wrinkles and also provides removal of professional and cosmetic tattoos across the spectrum of colors
- 02** The PicoWay system delivers visible results from the first treatment
- 03** PicoWay Resolve and Resolve Fusion treatments help build new collagen and elastin, reducing acne scars and wrinkles
- 04** PicoWay Resolve handpiece treatment uses a gentle approach to skin transformation – it leaves the outermost layer of skin intact
- 05** Low-to-no downtime with high patient satisfaction
- 06** Brief 15 to 20-minute treatment sessions

1. PicoWay, CE mark.



Tattoo removal, 1064 nm



Post 1 treatment



Post 2 treatments

Photos courtesy of Frank Lista, M.D.



Baseline



Post 2 treatments

Photos courtesy of Delete - Tattoo Removal & Laser Salon

Photos unretouched. Individual results may vary.

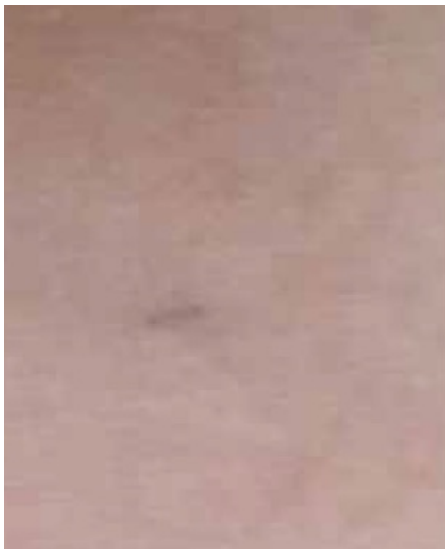
Tattoo removal, 1064 nm



Baseline



1 day post 1 treatment



3 weeks post 1 treatment

Photos courtesy of J.Jennings, M.D.



Baseline



Immediately after treatment



1 week after treatment

Photos courtesy of Lee, M.D.

Photos unretouched. Individual results may vary.

## Tattoo removal, 1064 nm



Baseline



1 monh post 1 treatment

Photos courtesy of R.Darwood, M.D.



Baseline



Post 1 treatment



Post 3 treatments



8 weeks post treatment 7

Photos courtesy of Eric Bernstein, M.D.

Photos unretouched. Individual results may vary.

## Multicolored tattoo removal, 1064 nm



Baseline



Post 2 treatments

Photos courtesy of David Friedman, M.D.

## Multicolored tattoo removal, 1064 nm &amp; 532 nm



Baseline



Post 3 treatments

Photos courtesy of Tina S.Alster, M.D.

Photos unretouched. Individual results may vary.



Café au lait, 532 nm

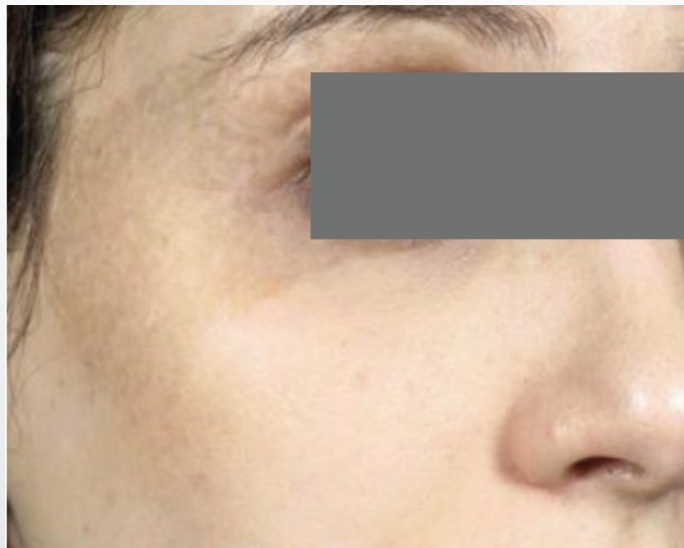


Baseline



2 months post 1 treatment

Photos courtesy of David Friedman, M.D.



Baseline



2 weeks post 1 treatments

Photos courtesy of David Friedman, M.D.

Photos unretouched. Individual results may vary.

Benign pigmented lesion, 532 nm & 1064 nm



Baseline



6 months post 3 treatments

Photos courtesy of Cheng Kuo-Liang, M.D.

Benign pigmented lesion, 532 nm



Baseline



Post 1 treatment

Photos courtesy of David Friedman, M.D.

Photos unretouched. Individual results may vary.



## Nevus of Zygomaticus, 532 nm &amp; 1064 nm



Baseline



3 months post 4 treatments

Photos courtesy of Cheng Kuo-Liang, M.D.

## Benign pigmented lesions, Resolve Fusion 532 nm



Baseline



Post 4 treatments

Photos courtesy of Candela Institute of Excellence

## Solar Lentigines, 532 nm



Baseline



1.5 months post 1 treatment

Photos courtesy of David Friedman, M.D.



Baseline



3 months post 4 treatments

Photos courtesy of Candela Institute of Excellence

Photos unretouched. Individual results may vary.

Photos unretouched. Individual results may vary.



Benign pigmented lesions, Resolve Fusion 532 nm



Baseline



Post 4 treatments

Photos courtesy of Candela Institute of Excellence



Baseline



Post 4 treatments

Photos courtesy of Candela Institute of Excellence

Photos unretouched. Individual results may vary.

Benign pigmented lesions, Resolve Fusion 532 nm



Baseline



3 months post 4 treatments

Photos courtesy of Candela Institute of Excellence



Baseline



8 weeks follow up post 3 treatments

Photos courtesy of Candela Institute of Excellence

Photos unretouched. Individual results may vary.



Benign pigmented lesions, 730 nm



Baseline



8 weeks follow up post 3 treatments

Photos courtesy of Candela Institute of Excellence



Baseline



8 weeks follow up

Photos courtesy of Candela Institute of Excellence

Photos unretouched. Individual results may vary.

Multicolored tattoo removal, 730 nm



Baseline



Post 4 treatments

Photos courtesy of Candela Institute of Excellence



Baseline



Post 4 treatments

Photos courtesy of Candela Institute of Excellence

Photos unretouched. Individual results may vary.



## Multicolored tattoo removal, 730 nm



Baseline



Post 4 treatments

Photos courtesy of Candela Institute of Excellence

## Multicolored tattoo removal, 785 nm



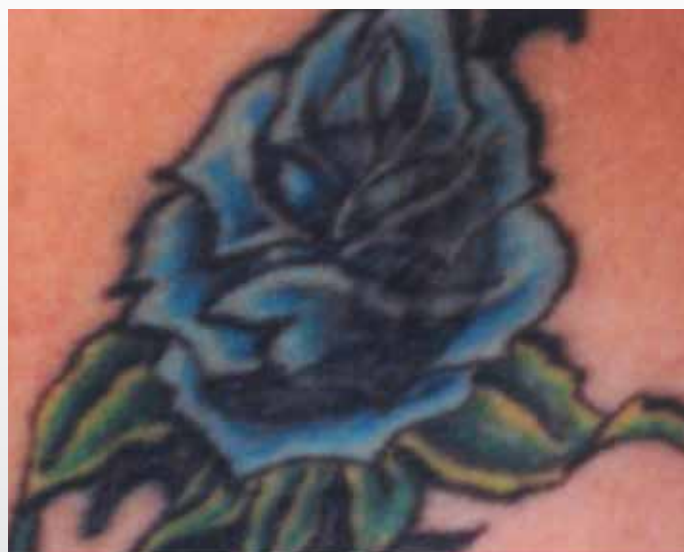
Baseline



8 weeks post 2 treatments

Photos courtesy of Eric Bernstein, M.D.

## Multicolored tattoo removal, 785 nm



Baseline



1 month post 1 treatment

Photos courtesy of Eric Bernstein, M.D.



Baseline



8 weeks post 2 treatments

Photos courtesy of Eric Bernstein, M.D.

Photos unretouched. Individual results may vary.

Photos unretouched. Individual results may vary.

## Multicolored tattoo removal, 758 nm



Baseline



8 weeks post 2 treatments

Photos courtesy of Eric Bernstein, M.D.

Don't take our word.  
Take it from our customers.

“With the shortest pulse on the market, PicoWay requires lower fluences and yields faster clinical results than traditional Q-switched lasers. The Nd:YAG wavelength can safely treat a wider variety of skin types and, along with the reduced fluence, minimizes thermal injury to the skin. I believe that the PicoWay will further revolutionize tattoo removal.”

**Dr. Tina Alster, Clinical Professor of Dermatology at Georgetown University Hospital**

“The system is very effective when dealing with discreet pigmentary alterations, such as lentigines. It succeeds in addressing these and other pigmentary issues with little downtime or post-inflammatory hyperpigmentation (PIH).”

“I think the PicoWay system has some advantages for tattoo removal including higher power which translates into fewer treatment sessions and fewer recalcitrant tattoos, as well as increased ergonomics and ease of use.”

**Douglas Wu, MD, PhD Dermatologist, Cosmetic Laser Dermatology, La Jolla, CA PicoWay**

## PicoWay

“As the first person to use the PicoWay, I have had a great deal of experience treating tattoos with this device. I was extremely impressed with the results on all tattoo colors, and have found that I could even remove yellow pigment, something I have not been able to do in the past. In performing the clinical trial leading to the FDA clearance of the 785 nm wavelength, I was also very impressed by the way the PicoWay attacks blue, green, and purple pigments, a major improvement over the Alexandrite laser I was previously using to treat these colors. The PicoWay really changed my practice and it gives me new possibilities to remove resistant tattoo pigments that I had trouble removing in the past.”

## PicoWay Resolve handpiece treatment

“The PicoWay Resolve handpiece treatment is already a mainstay in my practice for improving pigmentation as a component of photo damage and skin aging.”

Eric Bernstein, MD Director, Main Line Center for Laser Surgery, Ardmore, PA

## PicoWay

“The PicoWay laser has the ability to comprehensively treat a wider variety of tattoo colors and also a broader spectrum of pigmented lesions...”

Comparing Cynosure's PicoSure and the PicoWay: “The blistering response also appears to be greater after PicoSure than with PicoWay for reasons that are not yet completely understood.”

## PicoWay Resolve handpiece treatment

“I use the 532/1064 nm (PicoWay Resolve diffractive handpiece) for rejuvenation, especially for the male face. It is very effective for nevus of Ota and nevus of Ito, post inflammatory hyperpigmentation and postsclerotherapy hyperpigmentation.”

Mitchel Goldman, MD Founder and Medical Director, Cosmetic Laser Dermatology;  
 Volunteer Clinical Professor of Dermatology, University of California, San Diego



(On PicoWay laser treatment outcomes on recalcitrant tattoos);

“This is where the PicoWay has been most impressive. Some of the first treatments I did were on patients that had multiple tattoo removal procedures using conventional nanosecond lasers, as well as some people that I had treated with picosecond lasers that used an Alexandrite wavelength. These people had very resistant tattoos. We found that a single PicoWay application, which was very fast, was able to clear ink that the other approaches could not.”

“The PicoWay laser capitalizes on the predominant impact of photoacoustic over photothermal effects. It has the shortest picosecond pulse duration, thereby allowing for the maximizing of the photoacoustic effect.... and with reduction of the photothermal effects, the side effects, such as hypertrophic scarring, unwanted hypo- and hyper- pigmentation, are minimized.”

#### PicoWay Resolve handpiece treatment

“I've tried the new PicoWay Resolve diffractive handpiece and was impressed with its treatment of scars, including acne scars. The major advantage of a 1064 nm laser is that you can treat the most diverse skin types with the deepest penetration. When you fractionate that, you make the treatment even safer because now PicoWay LIOBs (relative effect). It takes safety even further without compromising efficacy and allows treatment with minimal to no downtime.”

**Vic A. Narurkar, MD, FAAD Founder of the Bay Area Laser Institute, San Francisco, CA PicoWay (Though Dr. Narurkar is deceased, the content of his comments may be valuable and were therefore retained in this document.)**

“With a Q-Switched laser, you would get to the point where the ink is almost gone but you still see some faint pigmentation and other effects that make it obvious that a tattoo had been there. With the PicoWay, you get complete clearance”

**Terrence Keaney, MD Assistant Clinical Faculty, George Washington Hospital, Washington, DC**

#### PicoWay Resolve Handpiece

“I think The PicoWay Resolve handpieces extend the ability for the practitioner to be able to treat different types of lesions that we've had difficulty treating in the past. I think this is definitely an advancement that's going to be important for our specialty.”

**Christopher Zachary, MD Professor and Chair, Department of Dermatology, University of California, Irvine**

“I have used and valued the quality of many Candela devices, especially the Picoway, for many years now. This picosecond laser is one of my favourite devices for many applications at my clinic. The Candela devices are very well known for their reliability.”

**Maurice Adatto, MD Founder & Medical Director of Skinpulse Dermatology & Laser Center in Geneva, Switzerland**

### PicoWay Laser System

“In my practice, we treat a variety of skin types and sun exposed skin. With the use of larger spot sizes, we can safely treat darker skin. I start doing test spots with the 10 mm spot at the highest fluence and decrease the spot size if I see whitening of the tattoo.”

“The PicoWay laser system is also my choice of treatment for pigmented lesions, especially for lentigos and café au laits. It's been wonderful for café au laits, which are an indication that we were always concerned about. I haven't had one worsen to date. They've improved and the results have been dramatic.”

David Friedman, MD Director, Friedman Skin & Laser Center, Jerusalem and Tel Aviv, Israel

“PicoWay presents the ultimate laser advancement in pigment, tattoo and skin remodelling with a high degree of efficiency and safety. It has 4 wavelengths and the shortest pulse duration making it a leading device in its field.”

Firas Al-Niaimi, MD. Dermatologist, Honorary consultant at St. John's Institute of Dermatology at Guy's and St. Thomas' Hospital, London, UK

“I am a plastic surgeon with over 15 years of experience in aesthetic medicine, having a special interest in lasers and energy-based devices. My target is to implement suitable personalised solutions for each patient while delivering excellent results. I believe that clear laser safety guidelines and clinical studies background are vital for my practice. Candela's PicoWay® perfectly fit my needs as it is the best device for pigmented lesions.” “I am a plastic surgeon with over 15 years of experience in aesthetic medicine, having a special interest in lasers and energy-based devices. My target is to implement suitable personalised solutions for each patient while delivering excellent results. I believe that clear laser safety guidelines and clinical studies background are vital for my practice. Candela's PicoWay® perfectly fit my needs as it is the best device for pigmented lesions.”

Martin Andrei M., MD Plastic surgeon, owner and medical director of Clinica Medispa from Cluj Napoca, Romania

## Summary of peer-reviewed articles

### **Comparison of 1064-nm and Dual-Wavelength (532/1064-nm) Picosecond-Domain Nd:YAG Lasers in the Treatment of Facial Photoaging: A Randomized Controlled Split-Face Study.**

Zhang M, Huang Y, Wu Q, Lin T, Gong X, Chen H, Wang Y. Lasers Surg Med. 2021 Nov;53(9):1158-1165.

#### **Study Details:**

- 21 Chinese females (mean age 53±7 years) with Fitzpatrick skin type III (n=7) and IV (n=13) and moderate to severe facial photoaging underwent PicoWay Resolve treatments and completed the follow-up visits
- 5 monthly treatments to a random half of the face with the Resolve 1064nm handpiece (2 passes, 2.1 J/cm<sup>2</sup> and 2 Hz), while the contralateral half of the face was treated with 2 passes with the Resolve 532nm handpiece (0.2 J/cm<sup>2</sup> and 2 Hz) followed by 2 passes with the Resolve 1064nm handpiece (2.1 J/cm<sup>2</sup> and 2 Hz)
- 2 blinded physicians evaluated the digital clinical images, based on the 5-point global score for photoaging, at 1 and 3 months after the final treatment
- Subjects assessed improvement, using a 5-point Global Aesthetic Improvement Scale (GAIS) of 0 = worsening to 4 = 4 = significant improvement
- 4 women had cheek skin biopsies of the treated areas before and within 24 hours of treatment or at 1 month after

#### **Results at 1- and 3-month follow-up after treatment series:**

- Compared with baseline, the global photoaging scores decreased significantly with either laser treatment, at the 1-month and 3-month follow-up visits (P < 0.001)
- The global photoaging scores, GAIS scores, and satisfaction scores did not differ significantly between the Resolve 1064 nm and combined Resolve 532/1064 nm treatments
- Neocollagenesis was observed in the upper dermis of both treatment groups, and elastic fibers were more elongated and orderly

## Summary of peer-reviewed articles

### **Treatment of imipramine-induced hyperpigmentation with quality-switched ruby and picosecond lasers.**

Hamid RN, Yang RG, Munavalli GS. JAAD Case Reports, 2021 Nov;17:12-17.

#### **Study Details:**

- A 72-year-old woman presented to the clinic for evaluation of progressive brown and slate-gray hyperpigmentation that had spread over the face and neck after taking imipramine for >20 years
- The patient underwent a series of 3 treatments, over a period of 17 months, with the PicoWay 532 nm picosecond laser (1.2 – 1.5 J/cm<sup>2</sup> and 4 mm spot size) to the forehead, cheeks, and temples
- Moderate improvement in brown hyperpigmentation following the treatments series
- After a 2-month imipramine taper, the patient underwent 3 treatments with a Q-switched ruby laser (694 nm, 5 mm, 3-4 J/cm<sup>2</sup>) and exhibited a significant reduction in slate-gray hyperpigmentation on the cheeks
- After 1 final treatment with the PicoWay 532 nm picosecond laser (1.8 J/cm<sup>2</sup> and 3 mm spot size), there was nearly complete resolution of hyperpigmentation to the forehead, cheeks, and temples
- Purpura developed after 1 PicoWay treatment with high fluence that resolved after a single session of pulsed dye laser (Vbeam ® Perfecta, Candela Corporation)
- The patient experienced resolution of pigmentation over a 3-year treatment period without recurrence despite the resumption of low-dose imipramine therapy



## Summary of peer-reviewed articles

### **Fractional 1064 nm Picosecond Laser in Treatment of Melasma and Skin Rejuvenation in Asians, A Prospective Study.**

Wong CSM, Chan MWM, Shek SYN, Yeung CK, Chan HHL. Lasers Surg Med. 2021 Oct;53(8):1032-1042.

#### **Study Details:**

- 20 Chinese females with Fitzpatrick skin type III (n=3) and IV (n=17) and average age of 52.7 years were treated for melasma (n=10) and signs of photoaging (n=10)
- 9 treatments with the PicoWay Resolve 1064 nm laser (4 passes, 1.3 – 1.9 J/cm<sup>2</sup>, 5-10 Hz)
- 2 blinded investigators calculated scores for the Modified Melasma Area and Severity Index (mMASI) and an Investigator Global Aesthetic Improvement Scale (IGAIS) for overall reduction in fine lines, rhytids, wrinkles, dyspigmentation, and pore size

#### **Results at 6 and 12 weeks after treatment series:**

- Statistically significant improvement in mMASI (10.8 at baseline to 2.7 and 3.6), at 6- and 12-weeks posttreatment,
- respectively (both  $P < 0.01$ )
- 90% of subjects treated for wrinkles and dyspigmentation (photoaging) showed some degree of improvement on IGAIS at follow-ups, while 40% showed at least moderate improvement at the 12-week follow-up
- No hypo or hyperpigmentation after treatment

## Summary of peer-reviewed articles

### **Histological Characteristics of Skin Treated With a Fractionated 1064-nm Nd: YAG Picosecond Laser With Holographic Optics.**

Zhang M, Guan Y, Huang Y, Zhang E, Lin T, Wu Q. Lasers Surg Med. 2021 Oct;53(8):1073-1079.

#### **Study Details:**

- *In vivo* back skin specimens of 3 volunteers, aged 60, 62, and 65 years, were treated, using the Resolve 1064 nm HP at low (1.3 J/cm<sup>2</sup>) medium (2.1 J/cm<sup>2</sup>), and high (2.9 J/cm<sup>2</sup>) fluence for 2 passes and at 2.9 J/cm<sup>2</sup> with 10 passes
- Fresh ex vivo human foreskin specimens were obtained following circumcisions in Chinese men with Fitzpatrick Skin Types III-IV and treated with the Resolve 1064 nm HP at low (1.3 J/cm<sup>2</sup>) medium (2.1 J/cm<sup>2</sup>), and high (2.9 J/cm<sup>2</sup>) fluence for 2 passes and at 2.9 J/cm<sup>2</sup> with 10 passes

#### **Results at 24 hours post treatment:**

- *In vivo*: Intraepidermal vacuoles (20 to 200 µm in diameter) were observed, along with pigment accumulation and inflammatory cell infiltration in the vacuoles. The vacuoles expanded as the fluence increased.
- Numerous intraepidermal vacuoles were observed, with dermal hemorrhage and inflammatory cell infiltration upon high fluence, multi-pass treatment. Vascular damage and red blood cell extravasation were consistent with the skin erythema and petechiae observed clinically
- The surrounding tissue around the vacuoles retained its structural integrity during this process
- *Ex vivo*: Both epidermal and dermal vacuoles (20 to 250 µm in diameter) were observed, with Melan-A-positive cells in the cystic wall of vacuoles in the epidermal basal layer, and CD31-positive cells in the cystic wall of some dermal vacuoles

## Summary of peer-reviewed articles

### **Safety and Efficacy of Tattoo Removal Using a Dual-Wavelength 1064/532-nm Picosecond Laser in Patients With Fitzpatrick Skin Type III and I.**

Nguyen HT, Doan EVL, Tran TNA, Vu TTP, Phan HN, Sobanko JF. Lasers Surg Med. 2021 Sep;53(7):939-945.

#### **Study Details:**

- 30 males and females (mean age 28 years), with 52 decorative tattoos primarily on the shoulders, back, arms, and thighs, were enrolled
- Up to 6 treatments, at 6 to 8-week intervals, with Resolve 1064 nm HP (black, blue, and green dyes) and Resolve 532 nm HP (red and yellow tattoos), using spot sizes of 3–6 mm, 1–5 Hz and average fluence of 2.7 – 2.9 J/cm<sup>2</sup> (1064 nm HP) and 1.05 – 1.12 J/cm<sup>2</sup> (532 nm HP)
- Blinded evaluation by 3 physicians of photographic improvement of pre- and 1-month post final treatment, categorized as complete response (100% clearance), very good response (>90% clearance), good response (≥75% clearance), or partial response (<75% clearance)

#### **Results at 1-month follow-up after final treatment:**

- Blinded assessment showed a significant reduction of tattoo appearance for all subjects
- 88.5% (n=46) of tattoos exhibited a “good” response to treatment, with >36% (n=23) of tattoos exhibiting a very good or complete response
- Short term adverse events were common but resolved without intervention. Higher energy PicoWay 532 nm treatment had increased incidence of immediate side effects (bulla formation, petechiae, edema)
- No hyperpigmentation, scarring, or keloids. 1 case of prolonged hypopigmentation after 3 months of treatment

## Summary of peer-reviewed articles

### **Treatment of facial and non-facial lentigines with a 730 nm picosecond titanium: sapphire laser is safe and effective.**

Kauvar ANB, Sun R, Bhawan J, Singh G, Ugonabo N, Feng H, Schomacker K. Lasers Surg Med. 2021 Aug 17.

#### **Study Details:**

- 16 subjects (4 males, 12 females, mean age 63 years, Fitzpatrick Skin Types II-III) underwent 4 monthly treatments to 30 body sites with 118 treated areas and were evaluated at a 12-week follow-up
- The 1st PicoWay treatment with the 730 nm handpiece was administered with an average beam diameter of 2.9 mm and fluence of 2.2 J/cm<sup>2</sup>. Laser fluences were successively increased to 3.9 J/cm<sup>2</sup> and spot size reduced to 2.0 mm for the 4th treatment
- Blinded evaluation by 3 physicians of photographic improvement of pre- and 1- and 3-month post-treatment digital images, using a 5-point scale (0 = 0% clearance, 4=75%–100% clearance (excellent response))
- Investigator Global Improvement Score (IGIS), using an 11 point clearance scale (0 = no improvement, up to a score of 10 = 100% improvement (complete clearance))
- 9 biopsies taken after treatment with 730 and 532 nm picosecond pulses and 755 and 532 nm nanosecond pulses

#### **Results at 12 weeks after treatment series:**

- 100% of posttreatment images were correctly identified from their respective baseline images
- On average, 73% of treatment areas achieved ≥50% clearance at the 12 week post treatment follow-up
- Mean IGIS score of 7.0
- Mild to moderate erythema and edema were common after treatment
- Histology showed better confinement of thermal energy with picosecond lasers compared to nanosecond lasers

## Summary of peer-reviewed articles

### **The efficacy and safety of fractional 1064 nm Nd:YAG picosecond laser combined with intense pulsed light in the treatment of atrophic acne scar: a split-face study.**

Feng H, Wu Y, Jiang M, Luo X, Yan S, Lu Z. Lasers Surg Med. 2021 Jun 3.

#### **Study Details:**

- 215 patients (10 females, 5 males; mean age 22.5 years; Fitzpatrick Skin Types III and IV), with atrophic acne scars accompanied by post-inflammatory erythema (PIE), underwent 5 monthly treatments and were evaluated at 3 months after treatment
- Both sides of the face were treated first with an IPL device (M22™, Lumenis®) followed by treatment to a random side of the face with the Resolve 1064 nm handpiece (3-4 passes with 6 Hz, 1.5-2.5 mJ)
- 2 blinded dermatologists calculated the ECCA Scale (échelle D'évaluation Clinique des Cicatrices D'acné) by assessing standard photography
- Pore counts and erythema scores at baseline and follow-up were collected by VISIA® software's automatic analysis

#### **Results at 3 months after treatment:**

- Combined Resolve + IPL-treated side showed significant ECCA score improvement ( $P < 0.01$ ), while IPL alone side did not ( $P = 0.1250$ )
- Significantly more pore count reduction and scar improvement were seen on the combined treatment side compared to IPL only treated side ( $P < 0.05$ )
- Statistically significant improvement in erythema ( $P < 0.05$ ) on both sides of the face
- No blistering, pigmentation alternation, scarring, or infection were observed for either side

## Summary of peer-reviewed articles

### **Comparison of fractionated frequency-doubled 1,064/532 nm picosecond Nd:YAG lasers and non-ablative fractional 1,540 nm Er: glass in the treatment of facial atrophic scars: a randomized, split-face, double-blind trial.**

Shi Y, Jiang W, Li W, Zhang W, Zou Y. Ann Transl Med. 2021 May;9(10):862.

#### **Study Details:**

- 22 Fitzpatrick skin type IV patients (4 males, 18 females) were included in this study, with an average age of 29.7 years and an average duration of acne scars of 8.8 years
- 4 monthly treatments to a random half of the face with the PicoWay Resolve 1064 nm (1.7 – 1.9 J/cm<sup>2</sup>) or Resolve 532 nm (0.2 – 0.22 J/cm<sup>2</sup>) laser with 10 Hz repetition rate and to the contralateral side with a non-ablative fractional 1540 nm Er: glass laser (StarLux™, Palomar) and energy of 65 – 70 J/cm<sup>2</sup>, each spot overlapped 10%, and treatment area scanned 4 times (NAFL treatment)
- 2 blinded physicians calculated the ECCA Scale (échelle D'évaluation Clinique des Cicatrices D'acné) by assessing standard photography
- Skin flatness (acne scar height) was measured with a 3-D imaging system (PRIMOS)

#### **Results at 1 month after treatment series:**

- PicoWay treatment significantly impacted all acne scar types ( $P=0.0001$ ), with a more pronounced effect on ECCA score than non-ablative laser for V-type and U-type acne scars
- PicoWay treatment significantly reduced acne scar height ( $P=0.041$ ), while NAFL did not ( $P=0.785$ )
- Greater patient satisfaction with pore size appearance and atrophic scars after PicoWay treatment compared to NAFL



## Summary of peer-reviewed articles

### **Novel application of the 730 and 785 nm picosecond titanium sapphire lasers for the treatment of Nevus of Ota.**

Loh TY, Wu DC. Lasers Surg Med. 2021 Mar 25.

#### **CASE STUDY 1**

- A 22-year-old Asian female with Fitzpatrick skin type III presented for laser removal of a nevus of Ota on the left cheek
- The patient underwent 4 monthly sessions with the PicoWay 730 nm HP (4 passes with 1.8 J/cm<sup>2</sup> and 3 mm spot size for the 1st treatment and 4 passes with 1 J/cm<sup>2</sup> and 4 mm spot size for successive treatments)
- At 1 month follow-up after 4th PicoWay 730 nm treatment, there was 75% resolution of the nevus of Ota
- No post-inflammatory pigmentary changes or adverse side effects throughout treatment

#### **CASE STUDY 2**

- A 43-year-old Asian female with Fitzpatrick skin type IV presented for laser removal of a nevus of Ota on the left cheek
- No significant improvement after 2 initial monthly sessions with 755 nm picosecond Alexandrite laser (Picosure®, Cynosure) with 2.33 J/cm<sup>2</sup> and 3 mm spot size
- No significant improvement after 2 monthly sessions with PicoWay 1064 nm spot treatment of focal hyperpigmentation (4.30 J/cm<sup>2</sup> and 3 mm spot size) and PicoWay 1064 nm treatment of diffuse hyperpigmentation with 4 passes of 0.60 J/cm<sup>2</sup> and 6mm spot size
- After 3 months of no treatment, the patient underwent 3 sessions with the PicoWay 785 nm HP (4 passes with 1 J/cm<sup>2</sup> and 3 mm spot size)
- At 2 months follow-up after PicoWay 785 nm treatments, there was near-complete resolution of the nevus of Ota
- No post-inflammatory pigmentary changes or adverse side effects throughout treatment

## Summary of peer-reviewed articles

### **Dual toning method with the combination of picosecond and microsecond Nd:YAG in refractory melasma unresponsive to picosecond alone.**

Hai L, Phuong B, Ha L, Lam V, Van B, Al-Niimi F. J Cutan Aesthet Surg. 2021 Jan-Mar;14(1):101-106.

#### **Study Design:**

- 20 Vietnamese females with Fitzpatrick skin type IV, age ranging from 31 to 58 years (mean 41.9 ± 6.4 years), presented with severe dermal and mixed-type melasma that was unresponsive to 8 sessions of picosecond laser treatment alone
- Patients underwent 3 monthly combined treatments with PicoWay 1064 nm HP (2-3 passes with 0.6 – 0.8 J/cm<sup>2</sup>, 8 mm spot size, 10 Hz repetition rate, and 20–30% overlap) followed immediately by multiple stacked passes with a microsecond Nd:YAG laser (Clarity™, Lutronic) with a 15 mm spot size, 0.35 ms pulse duration, 2.6 J/cm<sup>2</sup>, repetition rate of 10 Hz, and cooling
- 2 blinded independent dermatologists reviewed the clinical photographs to provide Melasma Area and Severity Index (MASI) scores

#### **Results after treatment series:**

- MASI score reduced by a mean of 5.35 ± 2.64 points and 35.15 ± 13.51% following the 3 combined treatments
- Patients also noted an improvement in skin tone, smoother skin texture, and uniform pigmentation
- Erythema was mild and transient. No adverse events

## Summary of peer-reviewed articles

### **Safety and Efficacy of a Novel 730 nm Picosecond Titanium Sapphire Laser for the Treatment of Benign Pigmented Lesions.**

Lipp MB, Angra K, Wu DC. Lasers Surg Med. 2020 Sept 1;10.1002/lsm.23314.

#### **Study Details:**

- Retrospective review of 22 patients assessed (19 females, 3 males, mean 45±10 years), majority Fitzpatrick Skin Type III (40.9%) and IV (45.5%), out of 64 patients treated for benign pigmented lesions
- Clinical diagnosis of melasma in 68% (15) subjects. Treatment indications included: Solar lentigines = 15 (68%), Seborrheic keratosis = 4 (18%), Dermatositis papulosa nigra = 2 (9%) and ephelides = 1 (5%)
- Mean of 1.1±0.3 treatments with PicoWay® 730 nm titanium-sapphire laser-pumped laser were administered: spot size adjusted to the size of the lesion (mean 2.2±0.4 mm), fluence adjusted to achieve whitening of the target lesions (mean 3.4 ± 1.0 J/cm²)
- Blinded evaluation by 2 physicians of photographic improvement in pigment severity (0: no pigment, 1: light pigment, 2: medium pigment, and 3: dark pigment) and by 2 non-treating investigators for percentage improvement, using a 12-point scale (–1: worse, 10: 100% clearance)

#### **Results at 4-8 weeks after treatment series:**

- Statistically significant reduction ( $p<0.05$ ) in discrete pigmentation (mean 1.39 ± 0.6 versus 2.04 ± 0.7 at baseline)
- 86% of patients showed improvement in pigmentation: 60% had ≥50% improvement
- 1–2 days of mild edema and erythema, 3–5 days of mild pigment darkening and superficial crust
- No hypopigmentation, scarring or prolonged erythema

## Summary of peer-reviewed articles

### **Histological Characterization of Age-Related Skin Changes Following the Use of Picosecond Laser: Low Versus High Energy.**

Kirsanova LV, Araviyskaya ER, Rybakova MG, et al. Dermatol Ther 2020 May 21.

#### **Study Details:**

- 28 women (mean age 51.3 years, range 36 – 60) with signs of age-related photodamage underwent a picosecond laser treatment with the Resolve 1064 nm handpiece
- Group 1 subjects (n=14) received 4 passes in a horizontal and vertical pattern with low energy fluence of 1.1 J/cm², while Group 2 (n=14) received high energy treatment (2.1 J/cm²)
- Clinical assessment included skin turgor and texture, wrinkle severity and pore openings
- Histological analysis was performed by 2 independent dermatopathologists

#### **Results at 3 weeks after treatment series:**

- Group 2 showed significant improvement with a more pronounced effect on facial skin than in Group 1
- Histopathological examination demonstrated minimal changes in the epidermis and dermis in Group 1 compared to more pronounced morphological changes in Group 2, with a marked elevation in collagen type III expression antibodies in the high fluence group



## Summary of peer-reviewed articles

### **A Randomized, Split-Face, Double-Blind Comparison Trial Between Fractionated Frequency-Doubled 1064/532 Nm Picosecond Nd:YAG Laser and Fractionated 1927 Nm Thulium Fiber Laser for Facial Photorejuvenation.**

Wu DC, Jones IT, Boen M, Al-Haddad M, Goldman MP. Lasers Surg Med. 2020 Apr 14.

#### **Study Details:**

- 20 subjects (19 females), with mean age  $56.5 \pm 11.6$  [range 40–73] years and Fitzpatrick skin type II–V, were randomly assigned to split-face treatment with PicoWay Resolve (532/1064 nm picosecond lasers) treatment to one side of the face and 1927 nm fractionated thulium fiber laser (TFL) to the contralateral side
- 3 monthly treatments: ½ face 2 passes Resolve 1064 nm laser with energy 1.9 - 2.5mJ, followed by 2 passes with Resolve 532 nm with energy 0.54 - 1.2mJ; ½ face TFL with pulse energy of 20mJ, treatment levels 3 – 7, correlating with a 30%–50% density, and 8 passes. Forced air-cooling throughout was used for all treatments.
- Blinded, non-treating evaluator assessments of photodamage at 6-month follow-up

#### **Results:**

- Statistically significant improvement was noted in both treatment groups
- Subject 14-day daily diaries showed significantly less downtime (redness, swelling, etc.) associated with Resolve treatments compared to TFL treatments

## Summary of peer-reviewed articles

### **The first commercial 730nm picosecond-domain laser is safe and effective for treating multicolor tattoos.**

Bernstein EF, Schomacker KT, Shang X, Alessa D, Algzlan H, Paranjape A. Lasers Surg Med. 2020 Mar 245.

#### **Study Details:**

- 15 subjects (5 males, 10 females, mean 45 years, Fitzpatrick Skin Types I–III) with 20 tattoos were enrolled
- 4 treatments with a new 730nm, titanium-sapphire laser-pumped laser were administered
- Blinded evaluation by 4 physicians of photographic improvement of pre- and 2-month post-treatment cross-polarized digital images, using an 11-point scale in 10% increments (0 = no improvement, 10 = 100% or complete removal)

#### **Results:**

- Blinded assessment showed 70%, 77%, 83%, 83%, 26%, and 8% clearance from baseline images for black, green, blue, purple, red and yellow pigments, respectively
- Mild edema and erythema immediately after treatment were common
- No scarring or pigmentary alteration visible in any follow-up images

## Summary of peer-reviewed articles

### **Retrospective Photographic Review of Nontattoo Indications Treated by Picosecond Laser.**

Mehrabi JN, Friedman O, Al-Niaimi F, Artzi O. J Cosmet Dermatol. 2020 Mar;19(3):612-621.

#### **Study Details:**

- Retrospective chart and photographic review of 233 patients (195 females and 38 males) treated with PicoWay and Resolve handpieces for nontattoo indications (i.e. pigmented lesions, acne scars)
- Number of treatments and parameters were compiled by clinical indication
- Follow-up ranged from 3 to 9 months post final treatment
- 2 blinded, independent physicians evaluated treatment outcome, using a visual analog scale consisting of six levels of treatment response (Grade 0, 0%-5% change to Grade 5, 100% improvement)

#### **Results:**

- While every type of skin lesion exhibited improvement, there was variability observed in the response to treatment; epidermal nevi exhibited the greatest improvement with treatment, while acne scarring demonstrated the least
- Average number of treatments for all lesions was 3
- Transient pigmentary changes, purpura, blistering were observed. No scarring occurred

## Summary of peer-reviewed articles

### **Successful treatment of pigmentary disorders in Asians with a novel 730-nm picosecond laser.**

Lee SJ, Han HS, Hong JK, Park KY, Seo SJ. Lasers Surg Med. 2020 Mar 14.

#### **CASE STUDY 1 DETAILS**

- Korean female (age 21 years, Fitzpatrick skin type III) with multiple freckles on both cheeks and periorbital area
- Single PicoWay 730 nm picosecond laser treatment with fluence of 1.4 J/cm<sup>2</sup>, 3 mm spot size and single pass with minimum overlap
- At 6 weeks post-treatment, independent evaluation of global assessment, by 2 dermatologists, indicated excellent response (75–94% lightening)

#### **CASE STUDY 2 DETAILS**

- Korean female (age 49 years, Fitzpatrick skin type IV) with melasma, freckles, lentigines and erythema on both cheeks and the zygomatic area
- PicoWay 730 nm laser treatment with fluence of 1.7 J/cm<sup>2</sup> and 3 mm spot size on the disseminated freckles and lentigines and 1064 nm laser treatment, with low fluence of 0.6 J/cm<sup>2</sup> and 6 mm spot size for the rest of the face
- At 6 weeks post-treatment, independent evaluation of global assessment, by 2 dermatologists, indicated good response (50–74% lightening)



## Summary of peer-reviewed articles

### **A Prospective Study of Fractionated Dual-Wavelength Picosecond Laser in Treating Acne Scars.**

Yang CS, Huang YL, Cheng CY, Hu S, Chang SL, Lee MC. Lasers Surg Med. 2020 Jan 21.

#### **Study Details:**

- 18 subjects (10 males, 8 females) with acne scarring, skin phototypes III-IV and mean age 30.8 (range 22 - 45) years underwent 6 Resolve treatments
- At each session: full-face treatment with the 532 nm handpiece at 0.3–0.5 J/cm<sup>2</sup> fluence and 5Hz frequency, followed by full-face treatment with the 1064 nm handpiece at 1.5–1.9 J/cm<sup>2</sup> fluence and 8Hz frequency. The 1064 nm handpiece was then applied to areas of scarring with high fluence (2.1–2.5 J/cm<sup>2</sup>)
- 2 dermatologists assessed outcome using the Goodman and Baron's quantitative global acne scarring grading system (GSS)

#### **Results at 3 months post treatments:**

- Significant improvement after the 1st treatment ( $p < 0.05$ ) that persisted to the 3-month follow-up
- Subject assessment, using a 5-point Visual Analog Scale, showed improvement from average score of 4.28 at baseline reduced to 2.00 at follow-up
- Transient erythema and swelling, some purpuric spots lasting 2-3 days
- No patient complaints of hyper- or hypo-pigmentation or scarring

## Summary of peer-reviewed articles

### **Histology of ex vivo skin after treatment with fractionated picosecond Nd:YAG laser in high and low-energy settings.**

Yeh YT, Peng JH, Peng P. J Cosmet Laser Ther. 2020 Jan 3:1-5.

#### **Study Details:**

- 6 skin samples were taken from clinically normal-looking perilesional areas of East-Asian subjects: 1 biopsy sample was from a female arm (age 36 years, Fitzpatrick skin type III) and 5 samples were from a male thigh (age 46 years, Fitzpatrick skin type IV)
- After biopsy, 3 skin samples were treated with Resolve 532-nm handpiece (pulse duration 375 ps; fluence of 0.3 or 0.2 mJ/microbeam) and 3 samples with Resolve 1064-nm handpiece (pulse duration 450 ps; fluence of 1.9 or 2.3 mJ/microbeam)
- Samples were examined by a dermatopathologist for intra-epidermal, laser-induced optical breakdowns (LIOBs) and intra-dermal, laser-induced cavitations (LICs)

#### **Results:**

- Superficial, intra-epidermal LIOBs were seen in skin treated with higher laser energies.
- Deep, intradermal LICs were seen in skin treated at lower energies
- Lesions were spaced in 600- $\mu$ m intervals or its multiple
- Lesion sizes and depths were consistent with previously reported values on Caucasian skin

## Summary of peer-reviewed articles

### **Successful treatment of ephelides in Asian skin using the picosecond 785-nm laser.**

Chung HJ, McGee JS, Lee SJ. J Cosmet Dermatol. 2019 Dec 20.

#### **CASE SERIES DETAILS**

- 2 Korean females (age 29 and 25 years, Fitzpatrick skin type III) with ephelides on the cheeks and/or nose were treated
- Subjects received a single PicoWay 785-nm laser treatment with Fluence of 1.2 or 1.3 J/cm<sup>2</sup>, pulse duration of 300 picoseconds, 3-mm spot size and 1-2 passes, until the end point of slight darkening of the ephelides was reached (without crust formation)

#### **Results:**

- Patients achieved appreciable improvement to near complete clearance of the ephelides without any complications
- No post-inflammatory hyperpigmentation observed

## Summary of peer-reviewed articles

### **Evaluation of the Safety and Efficacy of the Dual Wavelength Picosecond Laser for the Treatment of Benign Pigmented Lesions in Asians.**

Kung KY, Shek SY, Yeung CK, Chan HH. Lasers Surg Med. 2019 Jan;51:14-22.

#### **Study Details:**

- 12 female subjects (mean age 47.3 years, range 37-57; Fitzpatrick skin types III to IV) with benign pigmentary disorders
- PicoWay 532nm and 1064nm treatments at 2 to 6-week intervals
- Blinded evaluation of % clearance using clinical photography
- Follow-ups at 4, 8, and 12 weeks after the last treatment session

#### **Resultss:**

- Over 90% of all pigments achieved good or excellent response (>50% lightening) at both 1-month and 2-month follow-ups
- Clinical improvement was better for freckles and lentigines than melasma
- Lower rate of PIH induced by picosecond laser is explained by a much more targeted photomechanical and lesser photothermal effects than Q-switched laser



## Summary of peer-reviewed articles

### **Dual Wavelength Treatment Protocol with a Picosecond Laser for the Reduction of Facial Wrinkles.**

Gold MH. J Cosmet Laser Ther. 2018 Jun 8:1-5. doi: 10.1080/14764172.2018.1481514.

#### **Study Details:**

- 20 subjects (19 females; mean age 55±7 years, Fitzpatrick Skin Types II-IV) with bilateral facial wrinkling (mean Elastosis Score (ES) 5.7±0.9) in the perioral and periorbital regions
- 4 treatments at 1-month intervals with Resolve 1064nm handpiece (2 passes to full face) followed by 2 passes with the Resolve 532nm handpiece to the full face
- 2 blinded dermatologists reviewed the digital clinical images and assigned a score for the full face, using the Fitzpatrick Wrinkle and Elastosis scale (1=mild elastosis to 9=severe elastosis) at 12 weeks after the 4th treatment

#### **Results at 12-week follow-up after 4th treatment:**

- Blinded assessment showed 75% of subjects had at least 1-point improvement
- Blinded assessment correctly identified 75% (15/20) of the baseline images
- Investigator improvement rate was 100%, with a statistically significant mean ES improvement of 2.1±0.8 points compared to baseline assessment (p<0.001)
- Transient erythema and edema associated with treatment, resolving within several hours. 1 case of mild purpura and no pigmentary changes, blistering or scarring

## Summary of peer-reviewed articles

### **A novel titanium sapphire picosecond-domain laser safely and effectively removes purple, blue, and green tattoo inks.**

Bernstein EF, Bhawalkar J, Schomacker KT. Lasers Surg Med. 2018 May 20.

#### **Study Details:**

- 15 subjects (5 males, 10 females, skin phototypes II-IV, mean age 36 years) with 22 multi-color tattoos, containing black (n=15), blue (n=8), or green (n=13) tattoo ink
- 4 treatments at 6–10 week intervals with 785nm handpiece, 2-4 mm spot size, 3Hz repetition rate, mean 1.4, 2.6, 3.0 and 2.0 J/cm<sup>2</sup> for treatments 1-4, respectively
- 3 blinded physicians reviewed digital clinical images, using a 11-point scale (0=no clearance, to 10=100% or total clearance)

#### **Results at 8-week follow-up after 4th treatment:**

- Blinded assessment found 85%, 81%, 74%, 61%, 11%, and 5% clearance from baseline photos for purple, blue, green, black, red, and yellow pigments, respectively
- Typical erythema, edema and one case of pinpoint bleeding. No hyper-, hypo-pigmentation or scarring
- The 785nm laser wavelength has special affinity to purple, blue and green tattoo pigments
- In practice, the 1064nm wavelength would be used for black ink, while the 532nm laser would be reserved for yellow and red ink

## Summary of peer-reviewed articles

### **Picosecond 532-nm neodymium-doped yttrium aluminum garnet laser-a promising modality for the management of verrucous epidermal nevi.**

Levi A, Amitai DB, Mimouni D, et al. Lasers Med Sci. 2018 Jan.

#### **Study Details:**

- 6 subjects (3 males, 3 females) with skin phototypes I-II with verrucous epidermal nevus (VEN) on the body or face
- 4 of the 6 subjects had been unsuccessfully treated with laser and/or cryotherapy
- 2-6 PicoWay Zoom 532nm treatments, with spot size of 3 mm and fluence of 1.8 J/cm<sup>2</sup> (up to 3 passes) at 8 to 10-week intervals
- 2 blinded dermatologists assessed clinical images at 4 months after the final treatment, using a 5-point scale of 0 (exacerbation) to 4 (76-100% improvement)

#### **Results:**

- 100% of subjects demonstrated significant improvement (mean  $\pm 3.7 \pm 0.45$ ) on the 0-4 scale
- Treatments were well tolerated with minimal complications
- 100% subject satisfaction
- No residual adverse effects or scarring

## Summary of peer-reviewed articles

### **Treatment of acne scarring with a novel dual-wavelength, picosecond-domain laser incorporating a novel holographic beam-splitter.**

Bernstein E, Schomacker KT, Basilavecchio LD, et al. Lasers Surg Med. 2017 Nov;49(9):796-802.

#### **Study Details:**

- 19 subjects (3 males, 16 females) with mild-severe facial acne scars (rolling or boxcar), skin phototypes III-V and mean age 45 (range 23 to 70) years treated with Resolve 1064nm handpiece
- 8 subjects (1 male, 7 females) with skin phototypes III-IV and mean age 45 (range 23 to 65) years treated with Resolve 532 nm handpiece
- 4 monthly treatments
- 3 blinded physicians reviewed 81 digital clinical images, using a 10-point scale (1=10% improvement up to 10=100% improvement)

#### **Results:**

- Blinded assessment correctly identified 75% of the baseline images
- 81% of subjects showed improvement
- High patient satisfaction
- Mild and transient erythema and edema associated with treatment, resolving within several hours
- No hyper- or hypo-pigmentation or scarring

## Summary of peer-reviewed articles

### **Treatment of photoaging with a dual-wavelength, 532 nm and 1,064 nm picosecond-domain laser using a holographic optic.**

Bernstein E, Schomacker KT, Paranjape AS. J Drugs Dermatol. 2017 Nov 1;16(11):1077-1082.

#### **Study Details:**

- 14 subjects (2 males, 12 females) with mild-moderate wrinkles, skin phototypes I-IV and mean age 45 (range 23 to 70) years treated with Resolve 1064nm handpiece
- 10 female subjects with skin phototypes II-IV and mean age 45 (range 23 to 65) years treated with Resolve 532 nm handpiece
- 5 treatments with 1064nm & 4 treatments with 532nm
- 3 blinded physicians reviewed 72 digital clinical images, using a 11-point scale (0=no improvement up to 10=100% improvement)

#### **Results:**

- Blinded assessment correctly identified 72% of the baseline images
- 86% of subjects treated with 1064nm and 80% of subjects treated with 532nm were satisfied to very satisfied with outcome
- Mild and transient erythema and edema associated with treatment, resolving within several hours.
- No hyper- or hypo-pigmentation or scarring

## Summary of peer-reviewed articles

### **Picosecond 532-nm neodymium-doped yttrium aluminum garnet laser - a novel and promising modality for the treatment of café-au-lait macules.**

Artzi O, Mehrabi JN, Koren A, et al. Lasers Med Sci. 2018 May;33(4):693-697.

#### **Study Details:**

- 16 subjects (5 males, 11 females) with skin phototypes II-IV and mean age 26 years with 1-3 café-au-lait macules (CALMs) present since birth
- 1-4 PicoWay Zoom 532nm treatments, with spot size of 4–5 mm and fluence of 0.8–1.6 J/cm<sup>2</sup> at 4 to 8-week intervals
- Follow-up at 9 months after the final treatment
- 2 blinded dermatologists assessed clinical images, using a 6-point scale (0 = exacerbated to 5=complete (96–100%) clearance)

#### **Results:**

- 15 subjects evaluated at 9 months; 1 non-responder dropped from the study
- All 15 patients demonstrated good to excellent improvement (mean  $\pm 3.76 \pm 0.94$ ) on the 0-5 scale
- Treatments were well tolerated with minimal complications
- Only two patients experienced partial recurrence
- High subject satisfaction and comfort associated with treatment



## Summary of peer-reviewed articles

### Laser treatment of professional tattoos with a 1064/532-nm dual-wavelength picosecond laser.

Kauvar ANB, Keaney TC, Alster T. Dermatol Surg. 2017 Dec;43(12):1434-1440.

#### Study Details:

- 60 subjects (23 males, 37 females) with skin phototypes I-VI and mean age 34±11 years with 75 professional tattoos
- Up to 10 PicoWay Zoom 532/1064nm treatments at 6-week intervals
- Blinded assessment of digital clinical images, using a 5-point scale (1=0-24%; 2=25-49%; 3=50-74%; 4=75-95%; 5≥95% clearance)

#### Results:

- Most of the tattoos contained black pigment with 40% having additional red, blue, green or other colored pigments
- By blinded evaluator consensus, 86% of the treated tattoos showed at least 50% clearance after 3 treatments (mean clearance score of 3.11)
- By investigator assessment, 70% of tattoos showed at least 75% clearance after 5 treatments
- Treatments were well tolerated with minimal complications
- High subject satisfaction and comfort associated with treatment

## Summary of peer-reviewed articles

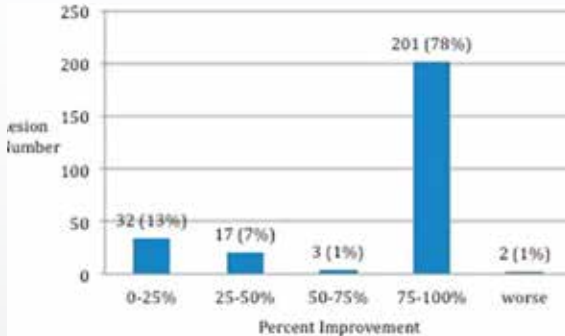
### Picosecond 532 nm neodymium-doped yttrium aluminum garnet laser for the treatment of solar lentigines in darker skin types: safety and efficacy.

Guss L, Goldman MP, Wu DC. Dermatol Surg. 2017 Mar;43(3):456-459.

#### CASE STUDY DETAILS

- 255 discrete pigmentary lesions in 6 Skin Type IV patients (3 women and 3 men) underwent a single treatment with the 532nm PicoWay Zoom handpiece
- 78% of lesions (201/255) had 75-100% clearance after 1 treatment
- 2 lentigines (0.8%) worsened because of PIH, both in a patient who admitted to picking the treated area.
- No other cases of PIH or adverse events

TABLE 1. Patient Demographics			
Sex	Skin Type	Ethnicity	Age
M	IV	Hispanic	19
M	IV	Chinese	32
F	IV	Chinese	20
F	IV	Hispanic	54
M	IV	Korean	33
F	IV	Vietnamese	30



## Summary of peer-reviewed articles

### Successful treatment of a red and black professional tattoo in skin type VI with a picosecond dual-wavelength, neodymium-doped yttrium aluminum garnet laser.

Friedman DJ. Dermatol Surg. 2016 Sep;42(9):1121-3.

#### CASE STUDY DETAILS

- A 29-year-old female (of Ethiopian lineage) with Fitzpatrick skin Type VI was treated for a 9-year-old professional black and red tattoo on the neck
- 3 treatments at 3-week intervals with PicoWay Zoom 1064nm (black tattoo) and PicoWay Zoom 532nm (red tattoo) with large spot sizes
- Mild and transient localized edema and erythema in the treatment area immediately after the procedure, which resolved within 24 hours
- No adverse events
- 90% clearance for the red ink and ~75% clearance for the black ink

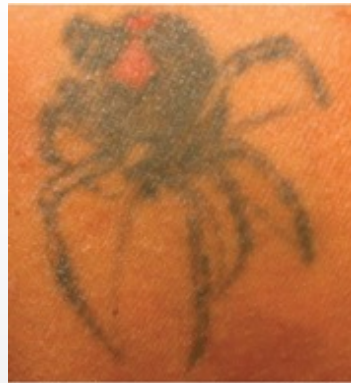


Figure 1. A 29-year-old woman with Fitzpatrick skin Type VI and a professional black and red tattoo on the neck.



Figure 2. Clinical response was approximately 75% clearance for the black ink and 90% clearance for the red ink, after 3 treatments performed over 1.5 months.

## Summary of peer-reviewed articles

### A novel dual-wavelength, Nd:YAG, picosecond-domain laser safely and effectively removes multicolor tattoos.

Bernstein EF, Schomacker KT, Basilavecchio LD, et al. Lasers Surg Med. 2015 July.

#### Study Details:

- 21 subjects (Fitzpatrick Skin Type I-IV) with 31 tattoos (black or multi-colored green, blue, purple, red, and yellow)
- Up to 7 treatments with PicoWay Zoom 532nm/1064nm handpieces, at 6 to 10-week intervals
- 3-5 mm spot size, 1.4 - 5.3 J/cm<sup>2</sup> fluence with 1064nm wavelength (Black, blue, green, and purple inks), 0.4 to 2.1 J/cm<sup>2</sup> fluence with 532nm wavelength (red and yellow inks)
- Blinded assessment of photos, using 10-point scale (0=no improvement to 10=100% or total clearance)

#### Results:

- Mean score for blinded evaluation: 7.94±0.09 - corresponding to 79% removal after an average of 6.5 treatments
- Average 92% clearance of black ink after an average of 6.5 treatments
- Average 80% clearance of red ink after an average of 4.5 treatments
- No scarring, or moderate or severe pigmentary alterations were seen in the 3-month follow-up cross-polarized images

PicoWay® system

Remove boldly.  
Treat lightly.

The PicoWay Zoom handpiece (532 nm, 1064 nm) treats benign pigmented lesions and tattoo removal.  
The PicoWay 730 nm & 785 nm handpieces remove blue and green tattoos and benign pigmented lesions.<sup>3-5</sup>

PICOWAY ZOOM AND TITANIUM SAPPHIRE SPECIFICATIONS			
LASER TYPE	ND:YAG	FREQUENCY DOUBLED ND:YAG	TITANIUM SAPPHIRE
Wavelengths	1064 nm	532 nm	730 nm & 785 nm
Maximum Energy	400 mJ	200 mJ	100 mJ
Pulse Duration	450 ps	375 ps	250 ps (730) 300 ps (785)
Peak Power	0.89 Gigawatts	0.53 Gigawatts	0.4 GW (730) 0.3 GW (785)
Spot Sizes	2, 3, 4, 5, 6, 7, 8, 9, 10 mm		2, 3, 4 mm
Repetition Rate	Single, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 Hz		
Delivery System	Articulated arm with 2 wavelengths Zoom handpiece		2 dedicated handpieces
Warm Up Time	2 minutes		
User Interface	Touchscreen with GUI		
Size	42" H x 18" W x 27" D 107 cm H x 46 cm W x 69 cm D		
Weight	275 lbs. / 125 kg.		
Power Requirements	200-240 VAC, 50/60 Hz, 30 A, 4600 VA single		



The PicoWay Resolve Fusion handpiece (532 nm) treats benign pigmented lesions.  
The PicoWay Resolve handpieces treat acne scars (1064 nm), wrinkles and benign pigmented lesions (532 nm & 1064 nm).<sup>1-2</sup>

PICOWAY RESOLVE SPECIFICATIONS			PICOWAY RESOLVE FUSION™ SPECIFICATIONS
LASER TYPE	ND:YAG	FREQUENCY DOUBLED ND:YAG	FREQUENCY DOUBLED ND:YAG
Wavelengths	1064 nm	532 nm	532 nm
Max Energy / Central Beam	2.9 mJ	1.5 mJ	0.7 mJ
Max Fluence / Diffuse Ring	0.35 J/cm2		
Pulse Duration	450 ps	375 ps	375 ps
Spot Size	6 mm X 6 mm		
Matrix	10 X 10 Microbeam array		
Repetition Rate	Single 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 Hz		
Delivery System	Articulated arm with Resolve & Resolve Fusion handpieces		



For more information about how the PicoWay system may help achieve your practice goals, contact your local Candela sales professional or visit [candelamedical.com](http://candelamedical.com).



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