

Lasers emitting at 532nm: technical and practical comparisons of an Nd : Yag laser with frequency doubled by KTP crystal and an Optically Pumped Semi-conductor Laser named Iris.

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Lasers emitting at 532nm are reference treatments for vascular anomalies. Their mechanism of action is the selective photocoagulation of visible vessels. The aim of our study was to compare two different laser technologies emitting at 532nm to show the benefits of the technology of an OPSP laser.

Materials and methods

The tested laser devices were the Aura® laser (Cutera, USA) and the Iris laser® (Ilooda, Korea)

A technical and then practical comparison by treating five patients with each laser was performed.

Results

Technical Comparison

		Laser Aura®	Laser Iris®
Technology		KTP Crystal used to frequency double the 1064nm wavelength of an Nd :Yag laser.	Semiconductor using a laser diode pumping quantum wells with intra-cavity frequency doubled by an LBO crystal. Technology named Optically Pumped Semi-conductor Laser (OPSL).
Power		10W	8W
Handpiece		1 and 2mm (2 different handpieces)	0,7, 1.2, 2 et 2.8mm (smart handPiece)
Minimum Pulse Duration (MPD)		1ms	5ms
MPD at 11J/cm ² (« effective fluence »)		1ms	5ms (0.7mm) 16ms (1.2mm)
Scanner	Shape	Hexagonal	Square or circle
	Spacing	Fixed	Variable
	Microspot size	1mm	1.2mm
	Max area	130 cm ²	400 cm ²
	Speed	9 cm ² /s	40 cm ² /s
Versatility		No cooling and additional wavelength (need to purchase higher end product range)	Cooling option can be added and 940nm wavelength available
Measured Energy/ Displayed energy (equipment OPHIR NOVA DISPLAY and laser head L40(150)A-SH-V2)		90%	100%

Practical comparison

Treatments using the smart handpiece :

Telangiectasia of the face and nose (Fig. 1 and 2):

- Immediate similar effectiveness with immediate removal of the blood vessel in 90% of cases
- Required fluences 10-20% lower and pulse durations necessarily longer for Iris 1.2mm compared to the Aura 1mm to achieve the desired effect ($11\text{J}/\text{cm}^2$ -15ms vs $13\text{J}/\text{cm}^2$ - 10 ms). ; Identical for the 0.7mm smart Handpiece.

Treatments using the scanner:

- Duration of treatment for the two cheeks and chin between 15 and 20 minutes for the Aura laser, 3 to 5 minutes for the Iris laser
- Pain evaluated at 5/10 for Aura, 7/10 without cooling and 2/10 with cooling (with 20x20 size) for Iris laser
- Fluences required 10-20% lower and pulse durations necessarily longer for Iris 1.2mm compared to the Aura 1mm to achieve the desired effect

Discussion

This is to our knowledge the first comparison of two devices emitting at the 532 nm wavelength. The OPSL technology has recently been developed by Coherent Inc (USA), and integrated into the Iris® laser. This technology has the advantage of getting the same beam (surface, diameter, divergence) regardless of the power used. Also the small size, robustness and reliability of the OPSL lasers compared to the KTP laser, and a lower manufacturing cost which affects the end user price of this laser, less expensive to purchase are additional benefits.

We chose to compare the Iris® OPSL laser to the Aura® laser which remains the KTP laser mostly used by dermatologists.

In practical terms, we have not seen any significant difference in the clinical efficacy of the two lasers using the smart handpiece with very similar settings. The decrease in the fluence required for the Iris® OSPL laser may be explained by a nominal delivered energy (compared to the Aura® KTP laser, which was only 90% of the nominal power), a little larger spot size and/or a greater beam quality. The versatility of the Iris® laser allows to treat very small vessels (with a short TRT) with 0.7mm handpiece which allows short pulse durations, while that of 1.2mm to 2.8mm can treat wider vessels with longer TRT.

The main advantage of the OSPL laser was its fast scanner allowing to treat an entire face in less than 5 minutes. There was also a better surface covering by overlapping square spots. The possible use of contact chilltip was beyond a doubt a comfort to make the treatment virtually painless.

Conclusion

Lasers emitting at 532nm whichever technology is used OPSL for Iris® or Nd :YAG flashlamp for Aura® have the same therapeutic effect. The main advantage of the Iris® laser, in addition to its lower cost, is the speed of the scanner and the possibility of an optional contact cooling tip.

Telangectasia (Fig 1 - Iris)



Alar vessels (Fig 2 - Iris)

