

## **Faculty Disclosure**

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*<u>I disclose the following financial relationships:</u> Consultant : AngioDynamics, Amsel, BTG, Veniti Advisory board of Amsel* 

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## Sandy





### UPDAPE LASER THERAPY: WHICH IS MORE IMPORTANT FOR POSTOPERATIVE RECOVERY: LASER WAVELENGTH OR FIBERS?

NYU SCHOOL OF MEDICINE



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#### So is It Wavelength? 810nm 940nm 980nm 1319nm 1320nm 1470nm

















# So What Do We Know?

### Or is it Fibers?

### Bare Covered



## Laser side effects

- Most likely caused by laser induced <u>vein wall</u> <u>perforation</u> with extravasation of blood into the surrounding tissue
- Perforations are more common with;
  - HSLW, higher power (watts), greater LEEDs

<u>Proebstle TM, Gul D, et al</u>. Infrequent early recanalization of greater saphenous vein after endovenous laser treatment. J Vasc Surg 2003;38:511–516.

<u>Goldman MP, Mauricio M, et al</u>. Intravascular 1320-nm laser closure of the great saphenous vein: a 6- to 12-month follow-up study. Dermatol Surg. 2004;30:1380-1385.

<u>Mundy L, Merlin TL, et al</u>. Systematic review of endovenous laser treatment for varicose veins. Br J Surg 2005;92:1189–1194.

Hemoglobin based wavelengths produce more short term side effects than longer wavelengths at comparable LEED.

<u>Kabnick L</u>. Outcome of different endovenous laser wavelengths for great saphenous vein ablation. J Vasc Surg. 2006 Jan;43(1):88-93.

<u>Proebstle TM, Moehler T, et al</u>. Endovenous treatment of the great saphenous vein using a1320 nm Nd:YAG laser causes fewer side effects than using a 940 nm diode laser. Dermatol Surg. 2005 Dec;31(12):1678-83

Less side effects (pain, bruising) with 1320nm at 5 watts than at 8 watts

## 1320nm

- 1320nm vs. 810nm split leg study:
  LEED=80j/cm
- Results:
  - Pain and bruising less in the 1320nm

<u>Mackay EG, Almeida JI, Raines JK</u>. Do different laser wavelengths translate into different patient experiences? Endovascular Today. 2006 March:45-48.

## 1470nm

<u>Soracco JE, López D'Ambola, JO</u>. NEW WAVELENGTH FOR THE ENDOVASCULAR TREATMENT OF LOWER LIMB VENOUS INSUFFICIENCY. 23rd World Congress IUA, Athens, GR. June 21-25, 2008.

43 GSV 9 SSV, watts 5, LEED 25

30 days 100% closed

minimal side effects

### Dominican Republic Research Site 980 Vs 1470nm Clinical Study



#### Results

#### Table 3.Comparison between Miami Patients and Control Patients

Parameter	Miami Patients	<b>Control Patients</b>	P value
	Mean (SD)	Mean (SD)	
n	41	14	n/a
Age (Yrs)	55.8 (13.5)	51.1 (13.2)	P > 0.1000
% Female	85%	50%	P < 0.0001
CEAP	2.1 (0.4)	2.6 (1.3)	P < 0.0001
Diameter @ SFJ	7.6 (3.0)	7.4 (2.7)	P > 0.1000
(mm)			
Treatment Length	24.9 (11.9)	38.6 (10.5)	P = 0.0241
(cm)			
Ablation Time (sec)	168.8 (88.9)	269.0 (85.0)	P > 0.1000
Pain Score	0.0 (0.0)	1.9 (2.3)	P = 0.0020
@ 48 hours		Range $(0-7)$	

100% closure both groups (1 month)

#### **Results:**



#### moderate to severe ecchymosis 79% of 980 nm 10% of 1470 nm

### What Do We Know About Fibers?

### Bare NeverTouch





Standard 600 um Fiber



#### Jacket Fiber

#### Bare tip



coagulate

cut

## **NYU Pilot Studies**

- Objective: (2006-2012)
  - Observational pilot study -Non randomized , prospective, single center study comparing
  - 810nm, 980nm, 1470nm
  - With covered tip and bare tip

## Statistical Methods

- Minitab 16: (company and location)
  - Descriptive Statistics; mean & standard deviation
  - Student T Test (Two-Tailed) to determine statistical significance between levels
  - Multivariate Analysis
    - Analysis of Variance to determine statistical significance of factors

## DATA

Wavelength	810 nm		980 nm		1470 nm
Fiber	Bare (BT)	Jacketed Tip (JT)	Bare (BT)	Jacketed Tip (JT)	Jacketed Tip (JT)
Power	10W	14W	12W	12W	6W
LEED	50J/cm	80J/cm	80J/cm	80J/cm	42J/cm
Ave 7-Day Pain Scores (1-10)	3.70 (±1.34)	1.69 (±1.77)	2.71 (±1.80)	1.14 (±1.06)	1.32 (±1.02)
Bruising Score (1-5)	x	1.42 (±1.19)	2.00 (±1.44)	0.89 (±1.06)	0.94 (±1.02)
Sample Size	20	52	50	51	40

### 7 – day Average Pain Score (1-10) T - Test Analysis

Comparison Groups	Mean Difference	95% Cl for Difference	P - Value
BT vs. JT (810nm)	2.013	(1.232, 2.794)	< 0.0005
BT vs. JT (980nm)	1.568	(0.988, 2.148)	< 0.0005
810/BT vs. 980/BT	0.993	(0.202, 1.784)	0.015
810J/T vs. 980J/T	0.548	(-0.017, 1.113)	0.057
810/BT vs. 980/JT	2.561	(1.881, 3.242)	< 0.0005
980/BT vs. 810/JT	1.020	(0.319, 1.721)	0.005
810/JT vs. 1470/JT	0.369	(-0.216, 0.954)	0.213
980/JT vs. 1470/JT	-0.179	(-0.607, 0.248)	0.407
980/BT vs. 1470/JT	1.389	(0.790, 1.987)	< 0.0005
810/BT vs. 1470/JT	2.382	(1.687, 3.078)	< 0.0005

#### Bruising Scores (1-5) T - Test Analysis

Comparison Groups	Mean Difference	95% Cl for Difference	P - Value
BT vs. JT (980nm)	1.108	(0.607, 1.609)	< 0.0005
810/JT vs. 980/JT	0.531	(0.090, 0.972)	0.019
980/BT vs. 810/JT	0.577	(0.055, 1.099)	0.031
810/JT vs. 1470/JT	0.484	(0.026, 0.942)	0.038
980/JT vs. 1470/JT	-0.047	(-0.481, 0.387)	0.831
980/BT vs. 1470/JT	1.061	(0.545, 1.577)	< 0.0005
810/BT vs. 1470/JT	2.382	(1.687, 3.078)	< 0.0005

### Pain Scores by Fiber Type



### Bruising Scores by Fiber Type



## What is Important?

• Wavelength

Covered Fiber

## In Conclusion

• Water based lasers (1470nm) allow decreased power and J/cm.

Not as important

- Covered Fibers allow decreased power density (less vein perforations).
  - More important



**Together 1470nm and Covered Fibers** have a superior postoperative safety profile

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