

**A Comparative Study of Nd:YAG Laser
Versus Combined Sequential Delivery of
Intense Pulsed Light and Nd:YAG for
Treatment of Lower Extremity
Tangiectasia and Reticular Veins**

Thesis

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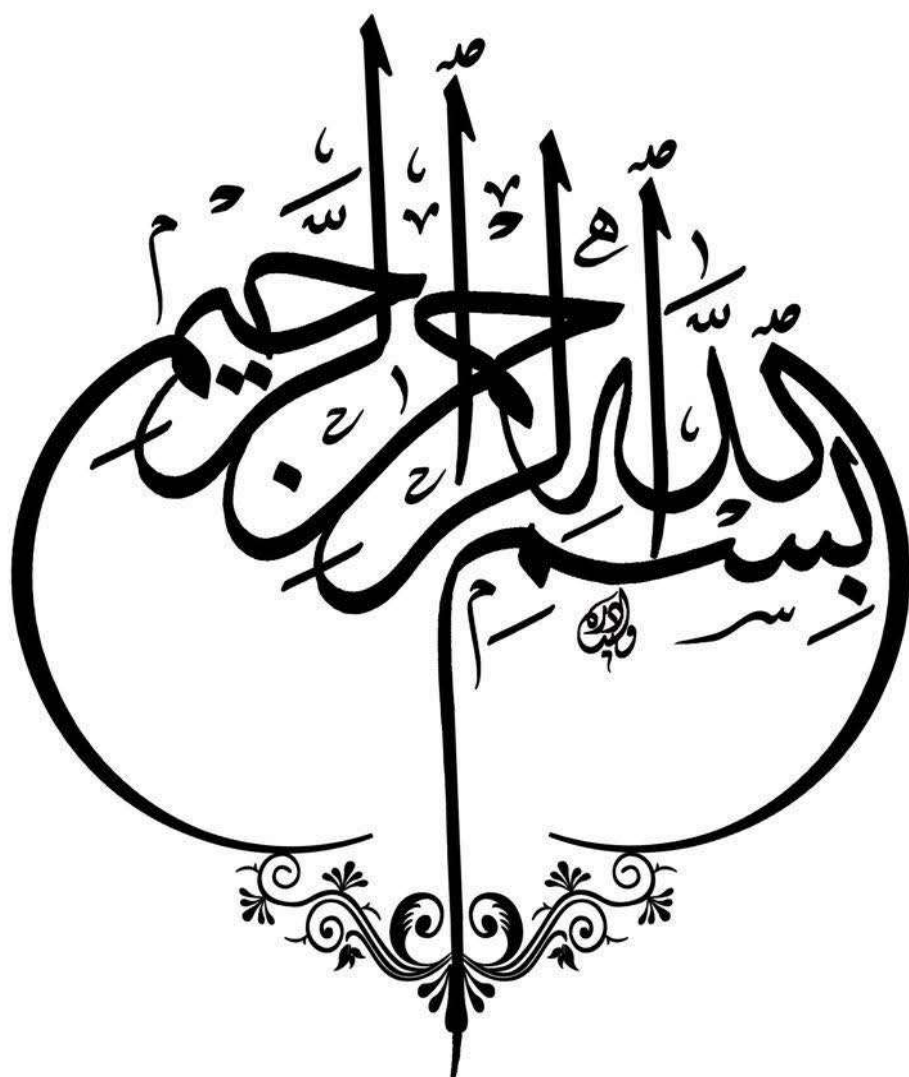
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List of Contents

Title	Page No.
List of Abbreviations	5
List of Tables	i5
List of Figures	8
Introduction	1
Aim of Study	14
Review of Literature	
▪ Telangiectasia and Reticular Veins	15
▪ Intense Pulsed Light (IPL)	24
▪ Neodymium-doped Yttrium Aluminium Garnet Laser (Nd:YAG)	32
Patients and Methods	45
Results	55
Discussion	84
Conclusion & Recommendations	89
Summary	91
References	94
Arabic Summary	—

List of Abbreviations

Abb.	Full term
<i>BPH</i>	<i>Benign prostatic hyperplasia</i>
<i>CEAP</i>	<i>Comprehensive Classification System for Chronic Venous Disorders</i>
<i>DVT</i>	<i>deep venous thrombosis</i>
<i>GVHD</i>	<i>Graft Versus Host disease</i>
<i>HIV</i>	<i>Human Immunodeficiency Virus</i>
<i>IPL</i>	<i>Intense Pulsed Light</i>
<i>IQR</i>	<i>Interquartile range</i>
<i>J / Cm²</i>	<i>Joule / centimeter²</i>
<i>KTP</i>	<i>Potassium titanyl phosphate</i>
<i>LANAP</i>	<i>Laser assisted new attachment protocol</i>
<i>LASER</i>	<i>Light amplification by stimulated emission of radiation</i>
<i>Mm</i>	<i>Millimeter</i>
<i>MS</i>	<i>Millisecond</i>
<i>Nd:Yag</i>	<i>Neodymium-doped yttrium aluminum garnet laser</i>
<i>NICE CG</i>	<i>National institute of health and care excellence clinical guidelines</i>
<i>Nm</i>	<i>Nanometer</i>
<i>Q-switched</i>	<i>Quanta switched</i>
<i>SPSS</i>	<i>Statistical Package for Social Science</i>

List of Tables

Table No.	Title	Page No.
Table (1):	Causes of telangiectasia and reticular veins	16
Table (2):	CEAP classification for chronic venous disorders.....	18
Table (3):	Comparison of sclerosing agents used in telangiectasia treatment	20
Table (4):	Lasers and light sources for the treatment of leg veins	21
Table (5):	Description of age and disease duration among cases.	55
Table (6):	Changes of hemoglobin variation regarding Nd:YAG plus IPL treated side.	56
Table (7):	Comparison between hemoglobin variation before and after treatment in NdYAG and IPL treated side.....	57
Table (8):	Changes of hemoglobin variation regarding Nd:YAG treated side.	58
Table (9):	Comparison between hemoglobin variation before and after treatment in Nd:YAG treated side.....	59
Table (10):	Comparisons between the difference of hemoglobin variation regarding each treated.	60
Table (11):	Description of percent of change in hemoglobin variation due to treatment in each of Nd:YAG and IPL treated side and Nd:YAG treated side.	61
Table (12):	Comparisons between two treatments as regard percent of change in hemoglobin variation.....	61
Table (13):	Description of physician's assessment and patient satisfaction after treatment in Nd:YAG plus IPL treated side.	62

List of Tables cont...

Table No.	Title	Page No.
Table (14):	Description of physician's assessment and patient satisfaction after treatment in Nd:YAG treated side.	63
Table (15):	Comparisons between two treatments as regard Physician's assessment and Patient satisfaction.	64
Table (16):	Description of site of lesion among cases.	66
Table (17):	Comparison between above and below knee cases as regard improvement in hemoglobin variation in nd yag plus IPL group.....	66
Table (18):	Comparison between above and below knee cases as regard Patient satisfaction in nd yag plus IPL group	67
Table (19):	Comparison between above and below knee cases as regard Physican's assessment in Nd:YAG plus IPL group	67
Table (20):	Comparison between above and below knee cases as regard improvement in hemoglobin variation in Nd:YAG only group.....	68
Table (21):	Comparison between above and below knee cases as regard Physician's assessment in Nd:YAG only group	68
Table (22):	Comparison between above and below knee cases as regard Patient satisfaction in Nd:YAG only group	69
Table (23):	Description of adverse effects after treatment in Nd:YAG plus IPL treated side.	70
Table (24):	Description of adverse effect after treatment in Nd:YAG treated side.	71
Table (25):	Comparisons between two treatments as regard adverse effects.	72

List of Figures

Fig. No.	Title	Page No.
Figure (1):	Absorption spectra of hemoglobin and oxyhemoglobin	21
Figure (2):	Clinical uses of intense pulsed light according to filter used	26
Figure (3):	An 18-year-old man (A) before treatment and (B) 49 days after one treatment of port wine stain, with excellent response. Parameter settings: 560 nm single pulse with pulse width of 6 ms, fluence of 20–21 J/cm ²	28
Figure (4):	A 47-year-old Japanese man	29
Figure (5):	A 54-year-old woman	30
Figure (6):	A) Deep palmoplantar wart three days after treatment. (B) After one week. (C) After two weeks of Nd:YAG laser.....	35
Figure (7):	a) Before and (b) 2 months after seven treatments resulting in a clinical improvement of melasma using Nd:YAG laser	36
Figure (8):	Acne scarring (a) before treatment; (b) mild improvement after six treatments by 1320 Nd:YAG.....	37
Figure (9):	Leg veins with mixed red and blue vessels.....	40
Figure (10):	A: Pretreatment close-up lateral view photograph. B: Photograph obtained 10 days after 6 monthly sessions of treatment with Nd:YAG.....	41
Figure (11):	Onychomycosis with <i>T. rubrum</i> treated with four sessions of Nd-YAG laser	42
Figure (12):	Camera used in study Nikon D5100 and lens used Nikon dx af-s nikkor 18-55mm.	47

List of Figures Cont...

Fig. No.	Title	Page No.
Figure (13):	Antera 3D Camera and image showing leg telangiectasia using hemoglobin mode of the camera.....	49
Figure (14):	Cynosure Elite plus Aesthetic Workshop Device used in study.....	50
Figure (15):	Cynosure SmartCool Cryo-6 Chiller Laser Treatment Cooling System used along with Nd:Yag laser	51
Figure (16):	Clear Light Optimized Intense Pulse Light System used in study.....	52
Figure (17):	Comaprison between Nd:YAG plus IPL versus Nd:YAG treated side as regard clinical improvement when assessed by treating physician.....	65
Figure (18):	Comparison between Nd:YAG plus IPL versus Nd:YAG treated sides as regards patients' satisfaction.....	65
Figure (19):	Comparison between Nd:YAG plus IPL versus Nd:YAG treated side as regards side effects (Hyperpigmentation, edema and purpura).....	73
Figure (20):	Female Pt. (A) 18 years old treated with 3 sessions of Nd:YAG plus IPL. (a) before treatment and (b) after treatment.....	74
Figure (21):	Female Pt. (A) 18 years old treated with 3 sessions of Nd:YAG plus IPL.	74
Figure (22):	Female Pt. (A) 18 years old treated with 3 sessions of Nd:YAG only. (a) before treatment and (b) after treatment.....	75
Figure (23):	Female Pt. (A) 18 years old treated with 3 sessions of Nd:YAG only.....	75

List of Figures Cont...

Fig. No.	Title	Page No.
Figure (24):	Female Pt. (B) 42 years old treated with 3 sessions of Nd:YAG plus IPL. (a) before treatment and (b) after treatment.....	76
Figure (25):	Female Pt. (B) 42 years old treated with 3 sessions of Nd:YAG plus IPL.	76
Figure (26):	Female Pt. (B) 42 years old treated with 3 sessions of Nd:YAG only. (a) before treatment and (b) after treatment.....	77
Figure (27):	Female Pt. (B) 42 years old treated with 3 sessions of Nd:YAG only.....	77
Figure (28):	Female Pt. (C) 23 years old treated with 3 sessions of Nd:YAG plus IPL. (a) before treatment and (b) after treatment.....	78
Figure (29):	Female Pt. (C) 23 years old treated with 3 sessions of Nd:YAG plus IPL.	78
Figure (30):	Female Pt. (C) 23 years old treated with 3 sessions of Nd:YAG only. (a) before treatment and (b) after treatment.....	79
Figure (31):	Female Pt. (C) 23 years old treated with 3 sessions of Nd:YAG only.....	79
Figure (32):	Female Pt. (D) 21 years old treated with 3 sessions of Nd:YAG plus IPL. (a) before treatment and (b) after treatment.....	80
Figure (33):	Female Pt. (D) 21 years old treated with 3 sessions of Nd:YAG plus IPL.	80

List of Figures Cont...

Fig. No.	Title	Page No.
Figure (34):	Female Pt. (D) 21 years old treated with 3 sessions of Nd:YAG only. (a) before treatment and (b) after treatment.....	81
Figure (35):	Female Pt. (D) 21 years old treated with 3 sessions of Nd:YAG only.....	81
Figure (36):	Female Pt. (E) 36 years old treated with 3 sessions of Nd:YAG plus IPL. (a) before treatment and (b) after treatment.....	82
Figure (37):	Female Pt. (E) 36 years old treated with 3 sessions of Nd:YAG plus IPL.	82
Figure (38):	Female Pt. (E) 36 years old treated with 3 sessions of Nd:YAG only. (a) before treatment and (b) after treatment.....	83
Figure (39):	Female Pt. (E) 36 years old treated with 3 sessions of Nd:YAG only.....	83

INTRODUCTION

Telangiectasia is a confluence of dilated intradermal venules less than 1 mm in caliber. Synonyms include spider veins, hyphen webs, and thread veins. They represent dilatations of preexisting vessels without any new vessel growth. The color of the telangiectasia depends on the caliber of the dilated venule. Large dilatations (up to 1 mm) are dark blue in color; the smallest (0.1 mm) are very superficial and are red in color. They do not empty on limb elevation. It is suggested that the difference in the color of the telangiectasia results from difference in the oxygenation in capillary loops. The red ones represent dilatation from the arterial and the blue from the venous loop of the capillary (*Mortimer et al., 2010*).

Reticular veins are dilated bluish subdermal tortuous veins of 1-4 mm in diameter. Most of the patients are women and are asymptomatic. Majority seek medical attention for cosmetic reasons. However, some women have symptoms of lower extremity throbbing pain and aches, worse during menstrual periods. The throbbing pain is aggravated by prolonged standing and sitting and relieved by elevation and compression stockings. It is surprising that the severity of symptoms is totally out of proportion to the size of the involved veins (*Vaidyanathan, 2015*).

Laser is one of the fast growing fields directly affecting dermatology. Laser therapy has offered effective and non-

scarring treatment modalities to patients with vascular lesions including telangiectasia. In vascular lesions the targeted chromophore is oxyhemoglobin and deoxyhemoglobin (*Haiguang et al., 2017*).

Long-pulsed neodymium-doped yttrium aluminum garnet laser (Nd:YAG) is used in many dermatological diseases. In vascular lesions the laser's chromophore is the oxyhemoglobin and deoxyhemoglobin. The laser's beam is poorly absorbed in water and absorbed by hemoglobin. Due to its poor absorption in water, the laser penetrates deeply into the tissue. As it passes through tissues, the laser beam emits heat and thus affects tissue down to the depth of about 7-10 mm, a process called selective photothermolysis. Its selective absorption by hemoglobin results in selective photocoagulation within the blood vessels making it a perfect choice for treating vascular lesions including telangiectasia (*John et al., 2016*).

Intense Pulsed Light (IPL) devices are not lasers but rather contain a powerful flash lamp that produces noncoherent, polychromatic light that can be tuned to provide a variety of wavelengths, fluences, and pulse durations. One of the major advantages of IPL is its absorption by both oxygenated and deoxygenated hemoglobin, its ability to penetrate deep into the tissues and its relatively large head size causing minimal purpura (*Sadick and Sorhaindo, 2014*).

AIM OF STUDY

The aim of current work is to compare the effectiveness of Nd:YAG versus combined sequential IPL and Nd:YAG in treatment of lower limb telangiectasia and reticular veins.

Chapter 1

TELANGIECTASIA AND RETICULAR VEINS

I- Definition of telangiectasia:

Telangiectasia is an abnormal dilation of preexisting intradermal vessels less than 1 mm in diameter without the growth of new vessels. They are also known as spider veins or thread veins. Reticular veins are dilated bluish subdermal tortuous veins of 1-4 mm in diameter (*Vaidyanathan, 2015*).

II- Clinical Presentation:

Telangiectasia and reticular veins are often a source of significant distress to the patient whether or not symptoms are present. They are more common in women than in men. Majority seek medical advice for cosmetic reasons. A minority of patients complain of throbbing pain worse after prolonged standing and during menstrual period and relieved by elevation (*Al Meida and Raines, 2009*).

Their color vary between red and blue, the large deeper ones tend to be blue in color and the superficial smaller one tend to be red in color. They may occur at any site in the body but more in the face and lower limbs. The treatment of the ones located in lower limbs is more challenging than that of other sites as they are located deeper, usually larger in diameter and under more hydrostatic pressure (*Parlar et al., 2014*).