

Sudan University of Science & Technology (SUST)
College of Graduate Studies

Institute of Laser

***The use of long pulsed Nd:
YAG Laser (1064 nm)
in treatment of viral warts***

*A dissertation Submitted for the Requirements of
the Postgraduate Diploma Degree in
Laser in Medicine / Dermatology*

By
Khalid Abdalla Abdelhameed Shamat
MBBS (U OF K)

Dermatologist, Venerologist and Andrologist.

Membership (S.M.S.B)

Supervised by :

Dr. Wafaa S. A. Rhman
Institute of Laser (SUST)

Dr. Yousif A. Safieldin
Dermatology Department (KSH)

July 2007

Abstract

The objective of this study was to investigate the efficacy of Nd: YAG laser (1064nm) long pulse in the treatment of viral warts. It was designed in a randomized study. The setting held at the Institute of laser, College of postgraduate students, Sudan University for science and technology, Khartoum, Sudan. This was in the period between the 10th of April to the 10th of July 2007. The study covered 52 patients aged 10-52 years. The interventions we administered during a 3 month period were 62 treatments, for a mean \pm SD of 1 ± 1.1 treatments per patient.

The main outcome measure of patients was that, they received therapy until the lesion was clear or until the lesion did not respond to treatment. Evaluation was performed by comparing pre-treatment and post-treatment photographs. The results of these 52 patients who completed the period of treatment and follow up were as follows. The total cure rate of the warts treated with standard mode non contact long pulse Nd: YAG laser was 88.5% after one session, 92.3% after two sessions and 100% after three sessions. High cure rate was obtained in most body sites. Acceptable to poor cure rates were seen in hands and feet.

The conclusion derived from this study is that the Nd: YAG laser therapy of (HPV) wart should be considered as a good and dependable alternative to other traditional techniques. It results in eliminating the verrucae and minimizing the complications of scarring and disorders of pigmentation and postoperative pain.

List of Contents

Chapter One	
Introduction & Basic Concepts	
<u>Section A</u>	
Title	Page
1. 1. Introduction	1
1.2 . Microanatomy of the skin	1
1. 2. 1 Introduction	1
1. 2. 2. Embryology of the skin	1
1. 2. 3. Layers of the skin	2
1. 2. 3.1 Epidermis	2
1. 2.3.2. Dermis	4
1. 2.3.3. Subcutaneous layer	4
1. 2. 4. Derivatives of the skin	5
1.3 Human papilloma virus (<i>HPV</i>)	7
1.4 Viral warts	8
1.4.1 Epidemiology .	8
1.4.2 Incubation period	8
1.4.3 Modes of transmission	8
1.4.4 Pathology	9
1.4.5. Immunity to <i>HPV</i>	9
1.4.6. Clinical features	9
1.4.7 Treatment of viral warts	17

Section B

Title	Page
1.1. Introduction	25
1.2. Historical background	25
1.3. Laser principle	26
1.4. Laser characteristics	27
1.5. Laser types	28
1.6. Laser tissue interaction	29
1.7. Light properties	29
1.7.1 Absorption	29
1.7.2. Reflection, scattering and transmittance	29
1.7.3. Absorption of light energy	32
1.8. Wavelength independent interaction	34
1.9. Selective photothermolysis	35
1.10. Laser parameters	36
1.11. Laser application in dermatology	37
1.11.1 Overview of dermatology laser surgery	37
1.11.2. Some types of dermatologic lasers	38
1.11.2.1. Lasers to resurface the skin	38
1.11.2.2. Lasers to remove vascular lesions	38
1.11.2.3. Lasers to remove pigmented lesions	38
1.11.2.4. Lasers to remove hair	38
1.11.2.5. Lasers to remove tattos	39
1. 12 Laser safety	40
1.12.1 The anticipated laser hazards	41
1.12.1.1 Inherent hazards to laser beam	41

Title	Page
1.12.1.2. Hazards associated with operator work procedure	42
1.12.1.3. Hazards associated with laser use	42
1.12.2 Review of clinical studies	42
1.12.2.1. Causes of laser accidents	43
1.12.2.2. Types of laser accidents	43
1.12.3. Requirements for laser safety	44
1.12.3.1. General laser safety requirements	44
1.12.3.2. Specific laser safety requirements	45
1.13. Objectives of the study	46
Chapter Two Materials & Methods	
2. 1 Introduction	47
2.2 Materials	47
2.3. The patients	49
2.3.1. The patient records	49
2.4. Laser safety	49
2.5. Other materials used	52
2.5.1. Keratolytics	52
2.5.2. Anesthesia	52
2.5.3. Antibiotics	52
2. 6. Procedure	52
2. 7. Assessment	53

Chapter Three

Results & Discussion

Title	Page
3. 1. Introduction	54
3. 2. Sex	54
3. 3. Age	55
3. 4. Duration of warts	55
3. 5. Skin phototypes	56
3. 6 .Sites of the lesions	57
3. 7. Size of warts	58
3. 8. Type(s) of warts	58
3. 9. Anesthesia	59
3. 10. Results	60
3. 10.1 Adverse sequels and complications	65
3.11. Discussion †	65
3.12. Conclusion and recommendations	67
3.12.1 Conclusion	67
3.12.2 Recommendations	67
Appendix (i)The paper used for history taking	68
Appendix(ii) Consent of the patient	69
Appendix(iii)The paper used during the procedure	70
Appendix(iv) Abbreviations	71
References	72