

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*Sudan University of Science and Technology  
Institute of Laser  
College of Postgraduate Studies*

*Efficacy of Low Power Diode Laser GaAlAs (675nm) in  
the Treatment of Vitiligo Patients*

*A Dissertation Submitted as Partial Fulfillment for the  
Requirement of the Degree of Postgraduate Diploma  
In Laser Application in Medicine –Dermatology*

By

**Dr. Enaam Musaid Elmahi**

*MD Dermatology (Sudan Medical Specialization Board, 2009)*

**Supervisors**

**Dr. Wafa Salih Abdrahman**

Consultant of Medical Laser

**Dr. Ihsan Abdrahman Abdallah**

Consultant of Dermatolog

Consultant of Medical Laser

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## ABSTRACT

Vitiligo is a depigmentary disorder and can be classified into two distinct types: the segmental vitiligo (SV) and the non-segmental vitiligo. While non-segmental vitiligo is often associated with autoimmune diseases, segmental vitiligo occurs in a dermatomal or quasi-dermatomal distribution and is associated sympathetic dysfunction which has significant effects on cutaneous blood flow. Low level laser therapy (Visible light) is a treatment option for segmental vitiligo, and visible light-induced repigmentation is associated normalization of sympathetic dysfunction.

This is prospective trial study was done to evaluate the effectiveness and safety of the low level diode laser therapy 675nm for treating vitiligo. The study was carried out in Medical Laser Centre (Sudan University of Science and Technology Institute of Laser) from January - April 2011. Nine clinically confirmed vitiligo patients were enrolled in the study, 3 were generalized vitiligo, 3 were segmental vitiligo and 3 were focal vitiligo. The study group had children predominance with children to adult ratio 2:1.

The diode laser used in the treatment is (Omega laser system Ltd UK). The Omega Xp machine 100, Semiconductor, Gallium- Aluminum Arsenide (GaAlAs), class 3B laser produces non ionizing radiation. Lesions were treated twice weekly; the number of treatments was ranged from 6-19 sessions. Treatment was done by using single visible red probe wavelength 675nm, power 20mW, in standard mode with spot size  $0.125\text{cm}^2$ , power density  $0.24\text{ cm}^2$ , energy density per point  $3\text{J}/\text{cm}^2$  for 20 seconds and pulsing repetition rate 146Hz.

Poor repigmentation was less than 25% with no satisfaction occurred in 2(22.2%) localized patients (one segmental and other focal vitiligo). Erythema, telengectasia, hypopigmentation, depigmentation and progression of the disease occurred in 2 segmental vitiligo patients. All 3 generalized patients had no repigmentation. The low level diode lasers (630nm, 1J/cm<sup>2</sup> and 635nm, 3J/cm<sup>2</sup>) and He-Ne laser (632.8nm, 3J/cm<sup>2</sup>) have shown better results when compared with our study, this mean that the wavelength may play a role in the results of this study.

The study has shown less effectiveness, erythema, telengectasia, and depigmentation. Further studies are required with more number of patients and sessions to confirm these results. In the future the use of low level diode laser in treatment of vitiligo can be used with low energy density and short wavelength to give better results.

## ملخص البحث

البهاق أو البرص أحد الأمراض الجلدية المنتشرة في العالم ويعرف تحديداً بزوال اللون الطبيعي للجلد على شكل بقع لونية واضحة نتيجة لفقدان الخلايا الملونة التي تنتج مادة الميلانين، والتي توجد بشكل أساسي و طبيعي في الجلد وفي حويصلات الشعر والفم والعيون وبعض من الأجزاء العصبية المركزية. وينقسم البهاق الى نوعين, منتشر(شاملاً للجسم كله) ويكون مرتبط بالامراض ذاتى المناعه, كما قد يكون مستقر" او ثابتا في مكان واحد وهذا النوع مرتبط بالعطل العصبى. ولقد وجد ان الليزر ذات القدره المنخفضه (ذات اللون الاحمر المرئى) هى احدى الخيارات العلاجيه للبهاق الثابت او المستقر.

هدفت هذه الدراسه الى التعرف على فعاليه الديود ليزر (675nm) ذى القدره المنخفضه فى علاج البهاق والتعرف على الاثار الجانبيه له.

اجريت هذه الدراسه العمليه فى مركز الليزر الطبى معهد الليزر بجامعة السودان للعلوم والتكنولوجيا فى (9 حالات من مرضى البهاق فى الفتره ما بين 25 يناير وحتى 24 ابريل وكانت (3 حالات من النوع المنتشر و6 حالات من النوع المستقر. وشكلت الفئه العمريه الاقل من 16 عام نسبه 66.7% وكانت كلها حالات مستقره.

يصنف جهاز الديود ليزر ثالثا حسب قدره الجهاز ويعطى اشعاعا غير مؤين. ولقد استعملت فى الجلسه العلاجيه قدره 20 mW وطاقه  $3 \text{ J/cm}^2$  وزمن تعرض لليزر 20 ثانيه وتردد قدره 146 Hz. وتراوح عدد الجلسات ما بين 6-19 جلسه بمعدل جلتين اسبوعيا. وكانت

نسبه رجوع اللون الطبيعى ضعيفه فى 2 من المرضى الاقل من 16 عام ذوو الحالات المستقره ولم تكن هنالك نسبه من الرضاء او القبول , وايضا هنالك ظهور لشعيرات دمويه و احمرار دائم بالاضافه الى تفتيح وزوال فى اللون الطبيعى فى المرضى ذو المكان الواحد. لا توجد استجابته فى (3) ذو الحالات المنتشر.

ولقد اعطت دراسات سابقه للديود ليزر ذو القدره المنخفضه (  $630\text{nm}$ ,  $1\text{J}/\text{cm}^2$  ) و (  $\text{nm}$  )  $635$ ,  $3\text{J}/\text{cm}^2$  ) وايضا الهيليوم نيون (  $632.8\text{nm}$ ,  $3\text{J}/\text{cm}^2$  ) نتائج ايجابيه وجيده مقارنة بهذه الدراسه وهذا يؤكد ان الطول الموجى له دور فعال فى هذه النتيجة. وقد خلصت هذه الدراسه الى ضرورة زياده عدد المرضى وعدد الجلسات واستعمال طول موجى قصير وطاقه اقل للحصول على نتائج جيده فى المستقبل.

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