

# The beneficial effects of low intensity laser acupuncture therapy in chronic tonsillitis

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## Abstract

The purpose of this study was to evaluate the beneficial effects of low intensity laser acupuncture therapy in chronic tonsillitis. Forty patients had chronic tonsillitis were participated in this study. Their age ranged from 30 to 55 years. The patients were randomly divided into 2 groups of equal number: Group (1); received infrared laser acupuncture therapy, 2 sessions per week for one month in addition to medical treatment while Group (2); received medical treatment only for one month. VAS, IgM, IgA and IgG were measured at the beginning and after one month of treatment. By comparing both groups after treatment; the results of the study showed significant differences as regard to IgG and VAS but no significant differences as regard to IgA and IgM. Also the results showed that there was normalization to levels of IgG, IgA& IgM in group 1 while there were still abnormalities in certain readings in IgG, IgA& IgM in group 2. On conclusion; Laserpuncture has an effects for enhancement of immune response and decrease level of pain in chronic tonsillitis patients.

## Key Words

Low intensity laser acupuncture therapy - Immunoglobulins- Chronic tonsillitis.

## Introduction

The tonsils are part of the secondary lymphatic system in which B lymphocytes are predominant. Tonsils have important role in specific immunity. Palatine tonsils play a prominent role in the development of the immune system, being the first organ in the lymphatic system that analyses and reacts to antigenic stimulation. Tonsillar plasma cells produce all classes of Igs (immunoglobulins)<sup>1</sup>.

Inflammation of the tonsils, or tonsillitis, caused by bacterial or viral infection, can be acute or chronic. The uncomplicated acute form usually lasts 4 to 6 days. Symptoms of tonsillitis are generalized inflammation of the pharyngeal wall (throat), swollen tonsils with or without pus on their surface, Purulent (with pus) drainage when pressure is applied to the tonsils and fever and generalised body aches<sup>2</sup>.

Immunoglobulin or antibodies are gamma globulin proteins that are found in blood or other bodily fluids of vertebrates, and are used by the immune system to identify and neutralize foreign objects, such as bacteria and viruses<sup>3</sup>.

Acupuncture is a treatment based on Traditional Chinese Medicine (TCM), a system that dates back thousands of years. Acupuncture attempts to regulate and restore energy balance by stimulating specific points along the paths and hence treat the disease. Acupuncture has been shown to stimulate the immune system<sup>4</sup>.

Classical acupuncture has existed for centuries. However, with the introduction of new technologies

for health care, needles have been often replaced by electroacupuncture and laser acupuncture. Both of these methods are non-invasive and less painful. All methods of acupuncture follow the same classical acupuncture principles<sup>5</sup>.

Laserpuncture (laser acupuncture, photopuncture, laser acu-therapy) is the application of therapeutic laser to acupoints on the body, ear, or hand. It is a simple, effective, noninvasive approach that has been shown to be a dependable pain management tool<sup>6</sup>.

laser acupuncture has some distinct advantages over the traditional needle method. Many patients who are usually afraid of needles, such as children, prefer laser acupuncture. Use of a laser makes it a typically noninvasive, aseptic procedure, which significantly reduces the pain and recovery time associated with invasive treatments. Generally, laser acupuncture can treat the same range of complaints as needle acupuncture<sup>7</sup>.

Patients were frequently seen in otolaryngology practice for complaints related to the tonsils and adenoid. The most common complaint is tonsillitis which caused by infection and lower immunity. Increase the recurrence of tonsillitis lead to tonsillectomy that is the most common major surgical procedures. By normalization of the immune elements, there is enhancement of the immune system and the rate of tonsillitis recurrence is decreased and so on decrease the need of tonsillectomy so there is more restoration to the immunity as the tonsil is a part of the immune system in the body. Also there is a direction to reduce the dependence on medications as every drug has side-effects, drug interactions, allergies, contraindications, and other complications. Through this study, the effect of laser acupuncture in chronic tonsillitis were studied by determining its immunomodulatory effects.

## Patients and Methods

### Subjects

This study was carried out on 40 patients ( 9 male and 31 female), who had chronic tonsillitis. Patients were selected from outpatient department at Teaching Hospital in Cairo, Egypt, from the period of July 2009 to February 2010. They received the treatment at National Institute of Laser Enhanced Sciences (NILES), Cairo, Egypt. All patients had three or more episode of chronic tonsillitis in one year, their age ranged from 30 to 55 years. Reasons for exclusion were patients had any

disease affect the result of the study such as allergic rhinitis, asthma, atopic dermatitis, diabetes mellitus and any other causes of immunity modulation. Also patients had pregnancy, fever, alcoholic and smoker patient were excluded.

The patients were randomly divided into 2 groups of equal number: Group (1); received infrared laser acupuncture therapy in addition to medical treatment (oral penicillin "ospen" in the dose of 1000 mg/12h for one month on empty stomach) while Group (2); received the same medical treatment only.

### Ethical consideration

The experimental protocol was explained in details for each patient before the initial assessment and signed informed consent was obtained from each participant before enrollment in the study. The trial protocol was approved by the meeting of the department of surgery, faculty of physical therapy, Cairo university. There was no harm inflicted on the patients. On the contrary, all had benefited from the final results of the study.

### Measurements

#### Measurement of serum immunoglobulins

Blood sample was taken from each patient in both groups before and after one month of treatment for determination of IgM, IgG and IgA serum content. 3cm<sup>3</sup> blood was taken from each patient and then emptied into plain tube (red tip tube) which had the patient's name and number of assessment. The sample was analyzed by the lab through using MININEPH™ device (MININEPH™, ED 200, Serial number: 4730).

#### Measurement the level of pain

Visual Analogue Scale (VAS) was used to assess level of pain. Operationally a VAS is horizontal line, 100 mm in length, represented by a number from zero to ten, anchored by word descriptors at each end, with one end meaning no pain and the other end meaning the worst pain imaginable. The patient marks on the line the point that represents his perception of their current state. The VAS score is determined by measuring in millimetres from the left hand end of the line to the point that the patient marks<sup>8,9</sup>.

#### Treatment procedures

Infrared diode laser equipment ( model Giotto, Sp A version 2.0.2. Via selciatella<sup>40</sup>. APRILIA (LT) ITALY, Laser class: 3B laser product, Power supply: 90-240 Volt, AC: 50-60 Hz, Fuse: 2 x T4A ( 90 V. AC), 2 x T2A (240 V. AC), S.N: 2035055307, Beam: invisible beam) used in this study. The parameters used in this study were (wave length 905nm, intensity 0.2 mw, frequency 100 Hz, energy 20 mJ for 100 seconds)<sup>10</sup>.

Group (1); received infrared laser acupuncture therapy. The treatment procedure was started during the attack of chronic tonsillitis. Each patient was placed in a comfortable position and worn protective eye glass to avoid permanent eye damage resulting from direct exposure to laser beam. The acuopoints for laser puncture were cleaned before the application.

The parameters were settled and the probe was placed contact with the skin perpendicular over the acupuncture point CV 22 (Tian Tu), GV 14 (Daz Hui), LI 4 (He Gu), LU9 (Tai Yuan), SI 17(Tian Rong), ST 9 (Ren Ying) & ST 36 (Zu San Li), for both sides of the body table (1). The frequency of treatment was two days per week for one month. In addition to laser treatment, patients received medical treatment (oral penicillin "ospen" in the dose of 1000mg/12h for one month on empty stomach). Group (2); received same medical treatment only.

### Statistical Analysis

Data were expressed as mean ± standard deviation (SD). The mean, the standard deviation and range were used as a primary source of connecting facts about each parameter to measure central tendency. Paired t test was used to detect level of significance in each group before and after the treatment. Unpaired t test was used to detect significance level between the two groups. Both the descriptive and the analytic statistical were used to examine, describe and analyze the collected data in order to detect if there was any difference before and after treatment applications. Analysis was performed using SPSS/PC software (SPSS Inc., Chicago, IL, USA). All p values less than 0.05 were considered to be statistically significant.

### Results

Data concerning the patients' demographic data as well as clinical data ( age, sex, VAS, IgA, IgG, IgM) had been collected at the beginning of the study. Follow up evaluation of VAS, IgA, IgG, IgM had been performed after one month of treatment.

Demographic and clinical characteristics of the patients.

As shown in table (1), there were no statistical significant differences (P>0.05) observed between both groups concerning general characteristics (age, sex) as well as clinical characteristics (VAS, IgA, IgG, IgM) before intervention.

**Table 1:** Statistical analysis of the demographic & clinical characteristics of patients between both groups before intervention.

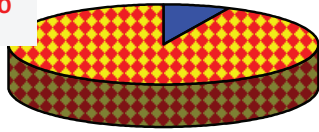
	Group 1	Group 2	P value
Age (years)	46.2±7.2	48.8±6.5	0.238*
Sex(male/female)	4/16	5/15	0.708*
VAS	7.6±1.9	8.2±1.7	0.277*
IgA	378.7±34.2	394.25±48.88	0.251*
IgG	1862.9±191.1	1917.5±153.4	0.326*
IgM	133.8±84.1	137.9±72.3	0.853*

P-value=Probability level,\*Non-Significant (P>0.05).

Comparative analysis of VAS, IgA, IgG, IgM between both groups after intervention.

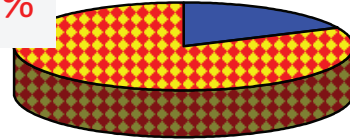
As shown in table (2) the mean value, standard deviation and p value of VAS, IgA, IgG, IgM between both groups. The results showed highly significant difference as regard to IgG and significant difference as regard

93%



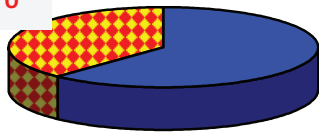
Percentage of improvement of VAS in  
Group (1).

82%



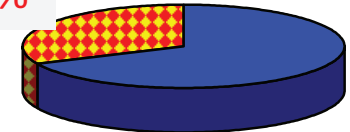
Percentage of improvement of VAS in  
Group (2).

38%



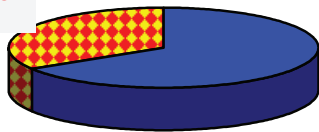
Percentage of change of IgA in  
Group (1).

32%



Percentage of change of IgA in  
Group (2).

34%



Percentage of change of IgG in  
Group(1).

20%



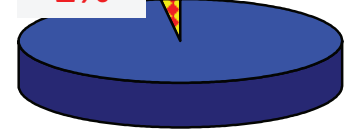
Percentage of change of IgG in  
Group(2).

8%



Percentage of change of IgM in  
Group(1).

2%



Percentage of change of IgM in  
Group (2).

to VAS (p value <0.05) but no significant difference as regard to IgA and IgM (p value >0.05).

**Table 2:** Results of VAS, IgA, IgG, IgM between both groups after intervention.

	Group 1	Group 2	P value
VAS	0.5±0.95	1.4±1.6	0.048**
IgA	234.54±34.8	265.77±62.44	0.058*
IgG	1229.5±111.6	1525.0± 128.8	0.000***
IgM	132.7±83.9	135.0±71.76	0.835*

P-value=Probability level \*Non significant \*\* Significant \*\*\* highly significant

## Discussion

Tonsils are ball-like areas of soft tissue on both sides of the throat; they are part of the secondary immune system. They help the body fight infection by filtering out germs that enter the body through the mouth and nose. The tonsils are involved in the production of mostly secretory IgA, which is transported to the surface providing local immune protection<sup>11</sup>.

The immunological effects of laser sources have remained insufficiently studied especially in form of laser puncture, which has restricted the use of laser in the treatment of diseases associated with immune system disorders. This study was an attempt to study the immunological effects of laserpuncture as this still remain poorly studied.

The results showed significant differences as regard to IgG and VAS but no significant differences as regard to IgA and IgM by comparing both groups after treatment. Also The results showed that there was normalization to levels of IgG, IgA& IgM in group 1 while there were still abnormalities in certain reading in IgG, IgA& IgM in group 2. This confirm the effectiveness of Laserpuncture for enhancement of immune response and decrease level of pain in chronic tonsillitis patients.

Laser light acts on cellular immunity. Laser therapy produces an immunomodulating action on T-lymphocytes and an immunostimulating one on B-lymphocytes, potentiating phagocytic ability of neutrophils<sup>12</sup>. Laser irradiation and the resulting from its primary and secondary effects enhance the neuro - humoral reactions leading to activation of the immune system and increase the adaptive hormones concentration<sup>13</sup>.

Several publications indicate normalization of the immunoglobulins content after a course of treatment sessions with red and/or IR laser light in patients with bronchial asthma and rheumatoid arthritis, as well as for the pre-surgery preparation of cardiovascular patients<sup>14-16</sup>.

Combination of the acupoint Shaoshang (LU 11) and Shangyang (LI 1) for the purpose to clear away heat and dissolve toxins simultaneously was used to treat 58 outpatients of acute tonsillitis in the study of SUN Yu et al. At the moment, sore throat was relieved obviously and difficulty in swallowing disappeared. On the next day, congestion in the tonsil disappeared and pustule was absorbed. The results showed cure in 38 cases,

remarkable effect in 17 cases and failure in 3 cases by one treatment, and the total effective rate in 95%<sup>17</sup>.

Volkov and Volkov<sup>5</sup> compared the response of Biological Active Points (BAP's) to Low Energy Laser Therapy (LELT), as compared to needle acupuncture and electroacupuncture. They found that the effect of laser acupuncture is more profound and lasts longer than of either electroacupuncture or classical needle acupuncture

According to Cocilovo 18 article, stimulation of body points CV-22, LU-1, LU-7& LI-11 in case of upper respiratory infection, pharyngitis with sore throat lead to a positive effect as there is improvement in symptoms and sense of well being from the day of treatment. And the case with the same condition was treated with antibiotics only, and was much slower to recover.

Stoyanov and Iliev<sup>19</sup> measured the immunological changes to patient who had suffered more than 15 recurrences per year of herpes simplex infection after direct irradiation of the herpetic lesions with He-Ne laser and Body acupuncture to immunomodulating points GV.20 (Bai Hui), LI.4 (He Gu), LI.11 (Qu Chi), ST.36 (Zu San Li), SP.6 (San Yin Jiao) and GV.14 (Da Zhui). immunological parameters were measured before and after treatment of patients show a tendency towards normal values in response to the treatment.

According to the data of other authors<sup>20-22</sup>; reporting there is normalization of Ig levels after irradiation with visible and IR light from low-intensity laser. From the results of the current study and from the previous literatures, it can be concluded that low intensity laser acupuncture therapy is effective for treating chronic tonsillitis due to its immunomodulatory effects and normalizations of Ig levels.

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