Effect of Low Level Laser Therapy on Anal Pain Caused By Entrapment of Pudendal Nerve

SABBOUR A., PT PhD*, and SHAFIK A., MD**
*Department of Physical therapy for Gynecology and Obstetrics, Faculty of Physical Therapy, Cairo University.
**Department of Surgery, Faculty of Medicine, Cairo University.

ABSTRACT

Objective: *This study has been conducted to determine the effect of Low Level Laser Therapy in alleviating proctalgia pain secondary to pudendal nerve entrapment in females.* ***Subjects:*** *Thirty women complaining from proctalgia due to mild to moderate pudendal nerve entrapment (mean age 36±7years) volunteered to participate in this study. All women were complained from anal pain, numbness and tingling on the perineum with a mean duration 15±3 months. The pain was abrupt, lasting from few minutes up to one hour, sharp, intermittent, not related to defecation, aggravated by sitting, and occurred 2-3times per week with increasing frequency. Anorectal examination was normal except pudendal canal tenderness on digital examination. They were divided randomly into two groups: group (A) fifteen women were treated by active LLLT while, group (B) fifteen women were treated by placebo LLLT both groups received the treatment over certain points on the perineum & sacrum regions three times per week for two consecutive months.* ***Measurement:*** *Evaluation was done for both groups before and after treatment to evaluate the comparative pain scale, the painful symptoms rating score (vulvar sensibility and painful alcock's canal) and the pudendual nerve terminal motor latency (PNTML).* ***Results:*** *Improvement was significant more pronounced in the group treated by low level laser therapy than the placebo group for both painful symptoms rating score and electro-neurophysiological test.* ***Conclusion:*** *According to the results of this study, it can be concluded that LLLT have an excellent effect in relieving proctalgia in cases of pudendal nerve entrapment.*

INTRODUCTION

Proctalgia fugax is a sudden onset of sever anal, rectal or perineal pain without specific cause .it is a chronic intermittent, and cramp like. It lasts for few minutes and disappears[9,11] rarely more than thirty minutes[30]. It may follow staining at defecation (90% of the cases, sudden explosive bowel action. It is aggravated by sitting, relived by standing and absent when the women recumbent or when sitting on toilet seat[25].

The term levator dysfunction syndrome is probably synonymous with proctalgia fugax[23&24] it has been applied to patients who have pain that may be produced by palpating the lateral aspect of the pelvic floor and relieved by lavatory massage this term is widely used un north America, and the syndrome appears to be more common in women than in men[20]. Furthermore, symptoms are often worse at night and frequently waken the patient from sleep[9].numerous causes have been suggested including neuralgia, neuroses, infection, allergy, vasospasm, venous stasis, mechanical factors, psychiatric disorders but none can be supported by conclusive evidence[24].

Nevertheless, proctalgia treatment has many modalities, but no treatment of proven efficiency is available[25]. Hot baths, digital anal dilation, lidocain injection, botulinum a toxin injection, superior hypo gastric block,

behavioral treatment and psychotherapy have been involved in the treatment of proctolgia[20,36].

In 1991, shafik[25] described a new syndrome called pudendal canal syndrome (PCS) in seven females. This syndrome is induced by the compression or the stretching of the pudendal nerve in the Alcock's canal. The complete syndrome presents with anal incontinence, pain, hypo or hyperesthesia and urinary incontinence (and impotence in males). Some important studies were done focusing mainly on pain parameter which is only a part of the syndrome[7,21].

The cause of the PCS is not always clear but it is often possible to find a compression (biking, long time sitting, haematoma) or a stretching (descending perineum, prolonged compression or stretching as pregnancy in the second stage of labor, surgical injuries reported with sacrospinous vaginal vault suspension, vaginal laceration repair and various types of episiotomy) of the pudendal nerve in the Alcock's canal in the history of the patient[29]. A change in the shape or orientation of the ischial spine induced by some athletic activities during the youth could also explain some cases[1]. The clinical signs and investigation results proposed by Shafik[26] to confirm the diagnosis of PCS before surgery are: tenderness over the pudendal canal in the ischio-rectal fossa, diminished perineal sensation, weak or absent anal reflex, reduced EMG activity of the external anal sphincter and increased PNTML. The surgical procedure described by this author (trans-perineal approach) consists in opening the Alcock's canal to give the pudendal nerve a sufficient length to be unstretched and/or to suppress compression.

The benefit of non-surgical treatment seems to be limited (Pisani et al., 1997)[21], although not all patients respond to surgery (Beco et al., 1999)[6]. On the other hand, the efficacy of most conservative treatment options for pudendal canal syndrome is still little known (Beco and Mouchel 2003)[5]. Among the different options for conservative treatment, low level laser therapy may have the potential to induce biophysical effects within the nerve tissue (Naeser et al., 2002)[16]. Experiments on the stimulation of nerve regeneration and on nerve conduction by low level laser therapy (Basford et al., 1990)[2] support the concept that this treatment might facilitate recovery from nerve compression.

There have been many claims for the therapeutic effects of LLLT treatment such as acceleration of wound healing[3], pain attenuation[18,19,31], restoration of normal neural function following injury[22&25], enhanced remodeling and repair of bone, normalization of abnormal hormonal function and modulation of the immune system[38].

Mechanisms suggested as underlying therapeutic effects with low level laser therapy included increased ATP production by the mitochondria[27] and increased cellular oxygen consumption[38], increased serotonin[33] and endorphins[8], anti inflammatory effects[34], and improved blood circulation in some cases[18].

They used gallium-aluminum-arsenide (Ga-Al-As) LLLT in patients with neurosensory impairment, and they reported both subjective and objective improvement after treatment. Because LLLT is relatively noninvasive, its ability to stimulate injured nerves without surgical intervention is desirable[17]. There have been only a few studies recently reported in the literature about the influence of LLLT on neural regeneration of peripheral nerve[2,13,15].

SUBJECTS, MATERIAL AND METHODS

Subjects

This study was carried out on thirty women complaining from proctalgia due to mild to moderate pudendal nerve entrapment (mean age 36±3 years) volunteered to participate in this study. They were selected from the Out Patient Clinic of coloproctology at general surgery department, Kasr El-Aini Hospital, faculty of medicine Cairo University.

All these patients underwent a complete history and clinical examination following the three perineal axis (gynaecological, urological and colo-proctological) according to the concept of perineology[1,3]. Also, neurophysiological test was done to confirm the diagnosis of pudendal nerve entrapment.

All women were complained from anal pain, numbness and tingling on the perineum with a mean duration 12±4 months. The pain was abrupt, lasting from few minutes up to one hour, sharp, intermittent, not related to defecation, aggravated by sitting, and occurred 2-3 times per week with increasing frequency. Anorectal examination was normal except pudendal canal tenderness on digital examination. None of the subjects received medical treatment during the study course might affect the results.

Subjects were divided into two groups: group (A) fifteen subjects were treated by low level laser therapy (LLLT) and group (B): fifteen subjects were treated by placebo LLLT. Both groups were unaware of whether the laser device was active or inactive during the course of the study also, the study procedures were identical for both groups. All Women signed informed consent after reading it and hearing verbal explanations of the relevant doubts before starting the study.

Material

- Computerized electromyography system was used in this study to conduct the neurophysiological test of the Pudendal Nerve Terminal Motor Latency.
- Ranking scales (The comparative pain scale & painful symptoms rating score [Abnormal vulvar sensibility & Painful Alcock's]).
- Low Level Laser Therapy Device: The laser was administered by a gallium-aluminum-arsenide (Ga-Al-As) LLLT manufactured in Belgium was used for providing infrared laser, has a wave length of 904nm, frequency of 5000Hz, power peak of 25 Watt, pulse duration of 200 nanosecond with a laser probe consisting of three diodes. On the laser probe, an A/B switch determined whether active and sham irradiation, because of the invisible nature of the infrared laser beam.

Methods

A. Evaluation procedure:

1- Assessment of pain intensity for each subject was done before and after treatment through the comparative pain scale Which is commonly interpreted as availed report of pain intensity and will be used to record the degree of pain intensity, each patient will be asked to rate the presence and the degree of pain in the affected hand as 0 (no pain experienced) to 10 (worst pain)[4].

2- Abnormal vulvar sensibility test: Sensibility was tested before starting and after the end last treatment session for all participants with a needle comparing the left and the right sides of the vulva and of the skin 2 cm lateral to the anus before starting the treatment and after the end of twenty four session of treatment. The interpretations of the results were done using a four levels ordinal scale: 0 = total

anaesthesia, 1 = reduced sensibility, 2 = normal sensibility, 3 = hypersensibility. 0, 1 and 3 were considered as abnormal sensibility[25].

3- Painful Alcock's canal test: The pain induced by the palpation of the pudendal canal by rectal examination was evaluated using a seven levels ordinal scale: 0 = no pain, 1 = mild pain, 2 = mild pain with Tinel sign (irradiation of the pain), 3 = moderate pain, 4 = moderate pain with Tinel sign, 5 = severe pain, 6 = severe pain with Tinel sign. This was done before and after two consecutive months of treatment for all patients[25].
4- Neurophysiological test: objective evaluation was done bilaterally before starting the 1st session and after the end of 24th session of treatment for all subjects participated in this study. Pudendal Nerve Terminal Motor Latency was measured using the St .Marks electrode which was developed for measuring the pudendal nerve motor time conduction at the St Mark's London Hospital. It consists of a bipolar stimulating electrode fixed on a gloved index finger and a ring recording electrode is placed 3 cm proximally on the base of the finger, using a rectal passway the stimulating electrode is placed near the ischial spine to stimulate the pudendal nerve, the recording electrode is at the level of the anal sphincter to detect the electrical potentials induced in the striated anal sphincter and the normal value of PNTML was less than 3 millisecond[12].

B. Treatment procedure:

All subjects were instructed briefly about the nature of low level laser therapy (LLLT) and it value in controlling the pain. Each woman of both groups (A&B) received a twenty four sessions of LLLT in two consecutive months, either active LLLT in group (A) or placebo LLLT in group (B). The device was adjusted to produce 20w/cm^2 per treatment site in continuous wave mode for approximately 90 seconds per point and safety glasses (goggles) were used to avoid exposure from reflection of laser beams for both researcher and patients to protect their eyes from laser radiation. The woman was positioned in a relaxed comfortable crock lying with knee apart, treatment was applied on the perineum 2 Shoot on Each side of anal orifice by 2cm laterally (the head of the unit was held perpendicular and with direct contact to each treated point to gain the optimal penetration with minimal loss of energy) . After that the subject was asked to lie in prone position with a pillow under her abdomen. Treatment was applied on the paravertebral region from S2, S3 & S4. This area was treated by three shoots for each side. While, the subject in the placebo group, she was positioned in a relaxed comfortable crock and prone lying positions respectively as mentioned before and the LLLT unit was switched on, without pressing the treatment switch.

RESULTS

In this study, the comparative pain scale in both groups before and after was treatment was investigated. As shown in table (1), the severity of Proctalgia in this study group, was a statistically highly significant decrease ($P < 0.01$) after two consecutive months of the treatment by active LLLT while, in the placebo group, there was no statistical difference ($P > 0.05$) between pre treatment and post placebo LLLT, with almost the same severity of anal pain during the course of this study.

Table (1): Shows the comparative pain scale score in the study and control groups before and after treatment.

		Group A				Group B			
		Before ttt		After ttt		Before ttt		After ttt	
No pain		0%	(0)	53.3%	(8)	0%	(0)	0%	(0)
Minor pain	Very Mild	0%	(0)	26.7%	0%	0%	(0)	0%	(0)
	Discomforting	0%	(0)	13.3%	0%	0%	(0)	0%	(0)
	Tolerable	0%	(0)	6.6%	0%	0%	(0)	0%	(0)
Moderate pain	Distressing	0%	(0)	0%	(0)	0%	(0)	0%	(0)
	Very Distressing	6.6%	(1)	0%	(0)	0%	(0)	0%	(0)
	Intense	13.3%	(2)	0%	(0)	20.0%	(3)	13.3%	(2)
Sever pain	Very Intense	13.3%	(2)	0%	(0)	13.3%	(2)	20.0%	(3)
	Horrible	33.3%	(5)	0%	(0)	13.3%	(2)	26.7%	(4)
	Unbearable	20.0%	(3)	0%	(0)	33.3%	(5)	33.3%	(5)
	Unspeakable	13.3%	(2)	0%	(0)	20.0%	(3)	13.3%	(2)
Total		100%	(15)	100%	(15)	100%	(15)	100%	(15)
stat. comp.	X^2	4.83				1.37			
	P-value	0.00089				0.952			
	Sig.	HS				NS			

The results gathered from the symptoms rating score (vulvar sensibility and painful alcock's canal) in both groups before and after treatment showed that in the group (A) there was a statistically highly significant improve ($P < 0.01$) in the vulvar sensibility and highly significant decrease ($P < 0.01$) in the Painful Alcock's canal on rectal examination while , in group (B) there was no statistical difference ($P > 0.05$)in either vulvar sensibility or Painful Alcock's canal on rectal examination after the application of twenty four session of treatment (Table 2 and 3).

Table (2): Shows abnormal vulvar sensibility score in the study and control groups before and after treatment.

	Group A				Group B			
	Before ttt		After ttt		Before ttt		After ttt	
Total anaesthesia	20.0%	(3)	0%	(0)	13.3%	(2)	13.3%	(2)
Reduced sensibility	46.7%	(7)	20.0%	(3)	60%	(9)	53.3%	(8)
Hyper sensibility	33.3%	(5)	0%	(0)	26.6%	(4)	33.3%	(5)
Normal sensibility	0%	(0)	80.0%	(12)	0%	(0)	0%	(0)
Total	100%	(15)	100%	(15)	100%	(15)	100%	(15)
X^2	-4.67				1.23			
P-value	0.000325				0.078			
sig.	HS				NS			

X^2=Chi-square test. P. Value = Probability of error.
HS= Highly significant. NS= Non significant.

Table (3): Shows painful alcock's canal on rectal examination score in the study and control groups before and after treatment.

	Group A				Group B			
	Before ttt		After ttt		Before ttt		After ttt	
No pain	0%	(0)	53.3%	(8)	0%	(0)	0%	(0)
Mild pain	0%	(0)	26.6%	(4)	0%	(0)	0%	(0)
Mild pain with Tinel sign	0%	(0)	6.6%	(1)	0%	(0)	0%	(0)
Moderate pain	0%	(0)	0%	(0)	13.3%	(2)	13.3%	(2)
Moderate pain with Tinel sign	20.0%	(3)	0%	(0)	13.3%	(2)	13.3%	(2)
Severe pain	46.7%	(7)	0%	(0)	40.0%	(6)	46.7%	(7)
Severe pain with Tinel sign	33.3%	(5)	0%	(0)	33.3%	(5)	26.6%	(4)
Total	100%	(15)	100%	(15)	100%	(15)	100%	(15)
X^2	-4.9				1.89			
P-value	0.00056				0.658			
Sig.	HS				NS			

X2=Chi-square test. P. Value = Probability of error. HS= Highly significant. NS= Non significant.

The mean values of Pudendal Nerve Terminal Motor Latency (PNTML) bilaterally in group (A) decreased, Rt. PNTML from (4.977) msec to (2.762) msec and Lt. PNTML from (4.125) msec to (2.133) msec respectively which, was highly significant decrease (P <0.01) While, in group (B) the mean value of PNTML values bilaterally was not statistical significant difference (P>0.05) between before and after treatment [table (4) figure (1)].

Table (4): Shows the mean values of Pudendal Nerve Terminal Motor Latency (PNTML) in the study and control groups before and after treatment.

	Group A				Group B			
	Rt. PNTML		Lt. PNTML		Rt. PNTML		Lt. PNTML	
	Before ttt	After ttt	Before ttt	After ttt	Before ttt	After ttt	Before ttt	After ttt
Mean	4.977	2.762	4.125	2.133	4.389	4.456	5.213	4.989
SD	0.7631	0.6784	0.881	0.628	0.654	0.5687	0.8796	0.8935
MD	2.182		2.992		0.067		0.224	
T-value	15.311		14.881		1.81		1.76	
P-value	0.0091		0.0455		0.083		0.075	
Sig.	S		S		NS		NS	

SD: Standard Deviation t- value: Unpaired t value MD: Mean difference
P. Value = Probability of error S= significant NS= Non significant

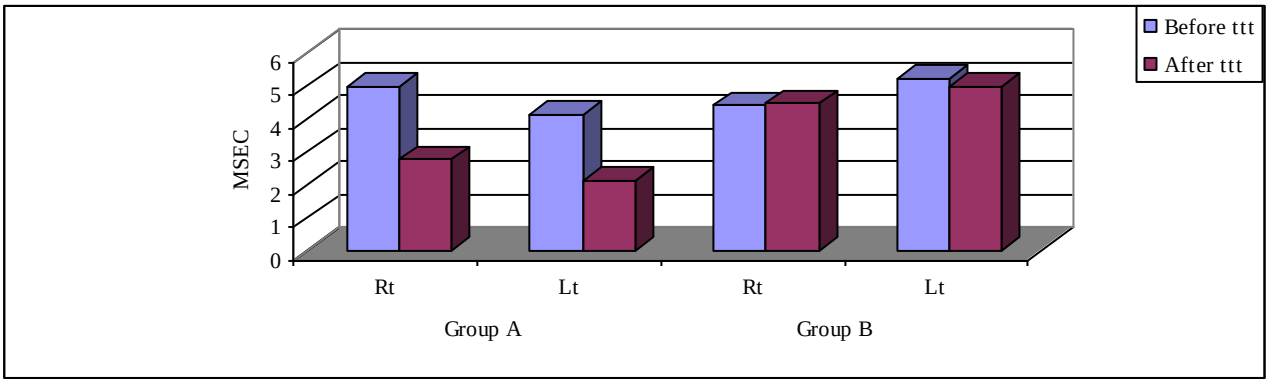

Fig. (1): shows the difference in Pudendal Nerve Terminal Motor Latency (PNTML) before and after treatment in both groups.

DISCUSSION

Low level laser therapy (LLLT) is a newly developing technique in human medicine, although it has been used among medical, dental, physiotherapy, and veterinary professions in some parts of the world for decades. LLLT can offer tremendous therapeutic benefits to patients, such as accelerated wound healing and pain relief[31].

The evidence in medical literature is that a beneficial analgesic can be obtained by using laser radiation of relatively low power density and wavelength that are able to penetrate tissues. It has also been assumed that red and infrared rays posses the greatest penetrating capacity. For these reasons the semiconductor or laser diode is the most appropriate choice in pain reduction therapy[32].

Bjordal et al. (2003)[8] added that low level laser therapy 904 nm is the most appropriate choice in pain reduction. The action of laser drives from the re-establishment of balance in the gate control theory, vasodilator and anti-inflammatory and irradiation of the trigger points, which are the access points to the joint and striated muscles, ligament adjacent to relevant nerve roots and achieved very good results.

All the patients of the current study had clinical presentation and investigative results that confirmed the presence of pudendal canal syndrome as described by shafik[25], their main complaint was anal pain which was felt in the perineum and in the anal canal. The pain was paroxysmal, of short duration, self limited and no relation to defecation. Anorectal examination was normal expect for bilateral pudendal canal tenderness on digital examination. The pudendal senory affection was evident by the presence of perineal hypoesthesia (46.7%) and total anesthehesia (20%). The motor affection was proved by the increased in PNTML which indicated delayed nerve conduction probably due to compression on the distal part.

The main purpose of this study was to investigate the efficacy of LLLT in alleviating the proctalgia pain secondary to pudendal nerve entrapment. The results of this study indicated that LLLT has analgesic efficacy through a strong photochemical and photo activating effects on the living tissues.

Although it has been known that LLLT can effectively suppress pain, this method not yet has been used in clinical practice for the alleviation of proctalgia due to pudendal nerve entrapment. Therefore, the results of this study could not be compared with others, but only

showed the effect of LLLT for relieving pain without medication in the treatment of various rheumatologic, neurologic, and musculo-skeletal disorders such as in: osteoarthritis[18], rheumatoid arthritis, fibromyalgia, trigeminal neuralgia[22], post herpetic pain, low back pain[32], rotator cuff tendinitis lateral epicccondylagia and carpal tunnel syndrome[3].

In this study the analysis of mean values of PNTML, and VAS scores showed that there is significant improvement after treatment in the study group (A) compared to the control group (B). This improvement was supported by Bjordal et al (2003)[8] who proved that low level laser therapy (LLLT) of the joint capsule can reduce pain in chronic joint disorders. In these trials, LLLT was administered to the knee, temperomandibular or zygoapophyseal joints due to the photobiological effects of LLLT. However, all biostimulating effects of LLLT are based on the interaction of laser beam with the body systems, such interaction causes abroad spectrum of effects.

Numbers of researchers have recorded apparent decrease in pain as a result of laser application. Some of the suggested mechanisms underlying therapeutic effects with LLLT have been reviewed and include the following: (1) Increased ATP production by mitochondria and increased oxygen consumption on the cellular level[27] (2) Increased serotonin, and increased endorphin[34] (3) Anti-inflammatory effects, elevation of lymphatic drainage & spasm release of tight muscles (both smooth and striated) which had been creating chronic pain, joint stiffness, and decreased mobility[19] (4) Acts on prostaglandin synthesis[32] (5) Improve blood circulation and decrease ischemic pain[27].

Nobel et al. (2001)[17] explained the analgesic effect of laser, as laser irradiation of low power density along the length of nerve can normalize the speed of transmission, which is produced because of inflammation, by acting on the A-betta fibers rather than a small diameter C fibers. Therefore, the analgesic action of laser drives from the re-establishment of a balance in the gate control system.

Walsh, (1997)[35] demonstrated that LLLT decrease the firing frequency of nociceptive and selectively inhibits a range of nociceptive signals arising from peripheral nerves including neuronal discharges produced by (e.g. pinch, cold, heat and chemical irritation). It also target fibers conducting at slow velocities particularly afferent axons from nociceptors and therefore causes inhibition of substantia gelatinosa that inhibits pain transmission.

Walker, (1983)[33] suggested that He-Ne laser irradiation may affect serotonin metabolism. She noted a large increase in urinary excretion of 5-hydroxy indoleacetic acid (a break-down product of serotonin) in patients who received He- Ne laser treatment in a double-blind study of pain relief.

Ozdemire et al. (2001)[19] have applied either low power laser therapy (LPLT) or placebo laser on 60 patients suffering from cervical osteoarthritis .Pain, paravertebral muscle spasm, lordosis angle, the rang of neck motion, and function were observed to improve significantly in the LPLT group, but no improvement was found in the placebo group. LPLT seems to be successful in relieving pain and improving function in osteoarthritic diseases.

These controversy and conflicting results about the analgesic effect of LLLT application may be due to lack of clear understanding mechanisms of action, Differences in pathological condition, parameters of treatment (energy density, number of treatment session, duration of treatment, wavelength,

mode of delivery and techniques of application[18].

In conclusion, the results of this study objectively demonstrates that proctalgia could be manifestation of pudendal nerve compression and usage of low level laser therapy is an excellent, safe, very effective, non pharmacological new method of alleviating proctalgia pain secondary to pudendal nerve entrapment in comparison to traditional pain relief modalities.

REFERENCES

1- Barbar, M.D., Bremer, R.E., Thor, K.B., Dolber, P.C. and Kuehl, T. J.: Innervation of female levator ani muscles. Am J Gynecol., 187:64-71, 2002.

2- Basford, R., Daube, R., Hallman, O., Millard, L. and Moyer, K.: Does low intensity Hellium-Neon irradiation alter sensory nerve action potentials or distal latencies. Lasers Surgery Med., 10: 35-39, 1990.

3- Basford, R., Sheffield, G. and Harmsen, S.: Laser therapy: A randomized controlled trial of the effect of low intensity ND: YAG laser irradiation on musculoskeletal back pain. Arch Phys Med Rehabil., 80 (6): 647-652, 1999.

4- Beco, J. and Mouchel, J.: Understanding the concept of perineology. Int Urogynecol J Pelvic Floor Dysfunct., 13:275-277, 2002.

5- Beco, J. and Mouchel, J.: Perineology: a new area. Uro-gynecology International J., 17:79-86, 2003.

6- Beco, J., De-Bisschop, G., Dijkstra, R., Nelissen, G. and Mouchel, J.: Perineology... reaching equilibrium and preserving it?. J Gynecol Obstet Biol Reprod (Paris), 28: 855 856, 1999.

7- Benson, J. T. and McClellan, E.: The affect of vaginal dissection on the pudendal nerve. Obstet Gynecol., 82:387-389, 1995.

8- Bjordal, J., Couppe, C., Chow, T., Tuner, J., Ljunggren, A.: Asystemic review of low level laser therapy with location-specific doses for pain from chronic joint disorder. Australian Journal of Physiotherapy, 49: 107-116, 2003.

9- Eckardt, V.F., Dodt, O., Kanzler, G. and Bernhard, G.: Anorectal function and morphology in patients with sporadic proctalgia fugx. Disease Colon Rectum, 39:755-762, 1996.

10- Ger, G.C., Wexner, S. D. and Jorge, J. M.: Evaluation and treatment of chronic intractable rectal pains a frustrating endeavor. Disease Colon Rectum, 36:139-145, 1993.

11- Katesinelos, P., Kalomenopoulou, M. and Christodoulou, K.: Treatment of proctalgia fugax with botulinum a toxin. Euro J Gastroenterol Hepatol., 13:1371-1373, 2001.

12- Kiff, E.S. and Swash, M.: Normal proximal and delayed distal conduction in the pudendal nerves of patients with idiopathic (neurogenic) faecal incontinence. J Neurol Neurosurg Psychiatry, 47:820-823, 1984.

13- Midamba, E.D. and Haanaes, H. R.: Low reactive-level 830 nm (Ga-Al-As) diode laser therapy (LLLT) successfully accelerates regeneration of peripheral nerves in human. Laser Therapy, 5:125-128, 1993.

14- Miloro, M. and Repasky, M.: Low-level laser effect on neurosensory recovery after sagittal ramus osteotomy. Oral Surgery Endo, 89:12-18, 2000.

15- Miloro, M., Halkias, L.E., Mallery, S., Travers, S. and Rashid, R. G.: Low-level laser effect on neural regeneration in Gore-Tex tubes. Oral Surgery Endo, 93:27-34, 2002.

16- Naeser, M.A., Hahn, K.A., Lieberman, B.E. and Branco, K.F.: Carpal tunnel syndrome pain treated with low-level laser and microamperes transcutaneous electric nerve stimulation: A controlled study. Arch Phys Med Rehabil, 83: 978- 988, 2002.

17- Nobel, G., Lowe, S. and Baxter, D.: Monochromatic infrared irradiation (890nm): effect of multi source array upon conduction in the human median nerve. J Clinical Laser Medicine and Surgery, 19(6): 291-295, 2001.

18- Onur, T., Tabak, Y. and Oner, C.: Low power laser treatment in patients with knee

osteoarthritis. Laser Therapy, 134: 254-258, 2004.

19- Ozdemire, F., Birtane, M. and Kokino, S.: The clinical efficacy of low power laser therapy on pain and function of cervical osteoarthritis. J Clinical Laser Medicine and Surgery, 20(3): 181-184, 2001.

20- Pelg, R. and Scvartzman, P.: Low dose intravenous lidocaine as treatment for proctalgia fugax. Reg Anesth Pain Med., 27: 97-99, 2002.

21- Pisani, R., Stubinski, R. and Datti, R.: Entrapment neuropathy of internal pudendal nerve, Report of two cases. Scand J Urol Nephrol., 31:407-410, 1997.

22- Poole, T.E., Holland, I. and Peterson, L.J.: Clinical efficacy of low level laser treatment of oro-facial neurosensory deficits. J Oral Maxil Surg., 12:182-185, 1993.

23- Potter, M.A. and Bartolo, D.C.: Proctalgia fugax. Euro J Gastroenterol Hepatol., 13: 1289-1290, 2001.

24- Rockefeller, R.: Digital dilation for relief of protalgia fugux. Am Fam Physician, 54: 72-76, 1996.

25- Shafik, A.: Pudendal canal syndrome, Description of a new syndrome and its treatment, report of seven cases. Coloproct., 13: 102-109,1991.

26- Shafik, A.: The posterior approach in the treatment of pudendal canal syndrome. coloproctology, 14: 310-315, 1992.

27- Silveria, C., Streck, L. and Pinho, A.: Evaluation of mitochondrial respiratory chain activity in wound healing by low-level laser therapy. J Clinical Laser Medicine and Surgery, 17: 108-113, 2004.

28- Snooks, S.J., Badenoch, D.F., Tiptaft, R.C. and Swash, M.: Perineal nerve damage in genuine stress urinary incontinence: An electrophysiological study. Br J Urol, 57: 422-426, 1985.

29- Snooks, S.J., Swash, M., Mathers, S.E. and Henry, M.M.: Effect of vaginal delivery on the pelvic floor: A 5 year follow up. Br J Surgery, 77: 1358-1360, 1990.

30- Staude, G.: Proctalgia fugax: Differential diagnosis and therapy of anal cramp. Fortschr Med., 110: 278-280, 1992.

31- Sun, G. and Tuner, J.: Low level laser therapy in dentistry. Den Clin North Am, 48(4): 1061-1076, 2004.

32- Tam, G.: Low power laser therapy and analgesic action. J Clinical Laser Medicine and Surgery, 17(1): 29-33, 1999.

33- Walker, J.B.: Relief from chronic pain by low power laser irradiation. Neurosci Lett, 43: 339-344, 1983.

34- Walker, J.B., Akhanjee, L.K., Cooney, M.M., Goldstein, J., Tamoyoshi, S. and Sega-Gidon, F.: Laser therapy for pain of rheumatoid arthritis. Clinical J Pain, 3: 54-59, 1987.

35- Walsh, L.J.: The current status of low level laser therapy in dentistry: Part (1), Soft tissue applications. Aust Dent J, 42: 247-254, 1997.

36- Whitehead, W.E.: Behavioral medicine approaches to gastrointestinal disorders, J Consult Clin Psychology., 60: 605-612,1992.

37- Whitehead, W.E. and Thompson, W.G.: Functional disorders of the anus and rectum. Gut, 45(supp) l2: 1155-1159, 1999.

38- Yu, S., Wu, S., Yu, L., Ko, H. and Chion, H.: He-Ne laser irradiation-stimulate migration and proliferation in melanocytes and induces re pigmentation in segmental type vitiligo. J Invest Dermatol., 1200: 56-64, 2003.

الملخص العربي

تأثير العلاج بأشعة الليزر المنخفض الشدة في علاج الآلام الفرجية الشرجية العصبية

الهدف : يهدف هذا البحث الى دراسة مدى كفاءة العلاج بأشعة الليزر منخفض الشدة في علاج و تخفيف الآلام الفرجية الشرجية العصبية لدى السيدات اللاتي تعانين من اختناق بالعصب الفرجي . العينة المشاركة : تطوع للاشتراك في البحث ثلاثون سيدة تعانين من الآلام شرجية عصبية نتيجة اختناق خفيف أو متوسط بالعصب الفرجي وكان متوسط أعمارهن 36.7 عاما و تم اختيارهن من العيادة الخارجية لأقسام الجراحة وكذلك النساء والتوليد بمستشفى القصر العيني كلية الطب جامعة القاهرة و كانت معظم المريضات تعانين من الآلام فرجية شرجية عصبية و تنميل ووخز في منطقة العجان لمدة 15 شهرا ووجد ان الآلام حادة وتستمر لعدة دقائق وتزيد فى بعض الأحيان عن الساعة وتحدث من مرتين الى ثلاث مرات أسبوعيا و الملاحظ انه لم يكن هناك علاقة بين حدوث الآلام و عملية التبرز . وكان الفحص اليدوي للمستقيم والشرج طبيعيا فيما عدا حدوث إيلام باللمس أثناء فحص قناة العصب الفرجي . وقد تقسيمهن عشوائيا إلى مجموعتين : المجموعة (ا) تجريبيه وتضم خمس عشرة سيدة تم تطبيق عليهن العلاج باستخدام أشعة الليزر منخفض الشدة و المجموعة (ب) وهى المجموعة الضابطة وكانت تضم خمس عشرة سيدات تم تطبيق عليهن العلاج الإيحاائي بأشعة الليزر منخفض الشدة فوق منطقتي العجان والعجزية بمعدل ثلاث مرات أسبوعيا لمدة شهرين متتاليين . التقييم : وقد استخدام فى تقييم المجموعتين قياسات شدة الألم من خلال المقياس المدرج المرئي لقياس الأعراض الفرجية الشرجية المؤلمة وجهاز سرعة توصيل الأعصاب والعضلات لقياس سرعة التوصيل الحركي للعصب الفرجي وقد تم عمل هذه الاختبارات لكل السيدات المشاركات قبل بدء أول جلسة علاجه وبعد الانتهاء من الجلسة العلاجية الرابعة والعشرون . النتائج : أوضحت المعالجة الإحصائية للنتائج أن هناك تحسن ذو دلالة معنوية فى تخفيف شدة الآلام الفرجية الشرجية العصبية والقياسات لسرعة التوصيل الحركي للعصب الفرجي فى المجموعة (ا) التجريبيه بعد الانتهاء من الجلسات العلاجية بالمقارنة قبل بدء العلاج . بينما في المجموعة (ب) الضابطة ولم توجد أية فروق ذات دلالة إحصائية فى المتغيرات القياسية قبل وبعد تكرر العلاج لمدة شهرين متتاليين . الخلاصة : حسب النتائج المقدمة من هذة الدراسة فقد وجد أن العلاج باستخدام أشعة الليزر منخفض الشدة ذو تأثير فعال فى علاج و تخفيف الآلام الشرجية العصبية لدى السيدات اللاتي تعانين من اختناق بالعصب الفرجي ومن الناحية الاخرى لم يكن هناك تأثير لاستخدام العلاج الإيحاائي .