

# Infra Red Rays an Effective Tool for Pain Management?

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This prospective, clinical trials were conducted on 5147 patients at Physiotherapy department of Sir Ganga Ram Hospital Lahore from July 1999 to December 2001. Physiotherapist mainly deals with the management of acute and chronic musculo-skeletal pain which is very difficult to treat. Purpose of the study was to evaluate the effectiveness of non-luminous, high voltage infra red rays with a broader area of application in the management of pain arising from deeply located pathology and can it alone be labeled as a treatment of choice in the management of musculoskeletal disorders? Non luminous infra red rays (NLIRR) with a voltage of 1980/2070 voltage, 1350W, 50-60HZ with a broader area of exposure i.e. 76cm\*35 cm, was employed. Traditionally and universally, it is considered good only for the management of superficial pathology but present study strongly reflects that it is equally suitable for deeply located pathology without any side effect. Its application for low back pain, sciatica, frozen shoulder, pelvic inflammatory disease etc produced good and long-term results. More over it has more applications over other modalities like short wave diathermy, micro wave diathermy, ultra sound and transcutaneous electrical nerve stimulation e.g. in mastalgia. Thus this study rejects the concept of NLIRR being superficial. Therefore, it is strongly recommended to use NLIRR alone as a treatment of choice in both superficial and deep pathology whether acute or chronic.

**Key words:** Pain management, Non luminous infra red rays & Physiotherapy, comparative study of SWD, MWD, US, TENS & NLIRR.

Pain is a universal, subjective, unpleasant sensation<sup>1</sup>. It is important to appreciate that pain is not a monolithic syndrome; many variables associated with pain origin, transmission, perception, and response must be understood in order to provide the best pain relief in a clinical patient<sup>2</sup>. Pain must be considered as a disease that can and must be eliminated or at least attenuated.<sup>3</sup> In Physiotherapy clinics, popular means of relieving pain includes short wave diathermy (SWD), Micro wave diathermy (MWD), ultrasound therapy (US), transcutaneous electrical nerve stimulator (TENS) etc along with the appropriate and specific exercises and ergonomics. Traditionally, Non-luminous Infra red rays (NLIRR) are merely used for the management of superficially located pathology like sprain and as an aid to other modalities<sup>4,5</sup>. But it is not considered as a treatment of choice alone and not recommended for treating deep pathology<sup>4,5</sup>.

This study just deals with the role of high voltage and high wattage non-luminous infra red rays in the management of pain originating from deeply located pathology, whether acute or chronic, and at any part of the body.

## Methodology

This prospective clinical trials were conducted on 5147 patients at Physiotherapy department of Sir Ganga Ram Hospital Lahore from July 1999 to December 2001. Study consists of male (n=1996, 38.77%) and female (n=1230, 61.22%) patients >15 years of age, both acute and chronic cases while excluding patients <15 years of age, unconscious patients and pain of cardiac origin, malignant, infected and tuberculosis pain. Non-luminous infrared rays (NLIRR) lamp with specification of 1980/2070 voltage,

1350W with surface area of 76cm long and 35cm wide was used. Duration of treatment was fixed to 20-minutes/day and patients were irradiated daily. Distance between patient and lamp was adjusted according to the condition and tolerance of the patient.

Effect on body temperature and that of area exposed was noted in 80 patients by thermometer before and after exposure to NLIRR. Clinically, results obtained were compared with that obtained from other modalities via literature review in order to ascertain the effectiveness of NLIRR.

However general body temperature remained unaffected before and after irradiation.

## Mode of action

NLIRR are electromagnetic waves<sup>4</sup>. Irradiation with these results in the production of heat in the superficial tissues and heat is conveyed to deeper tissues by conduction and by circulating fluids<sup>4</sup>.

a)-It perhaps act by local rise of temperature with resultant enhanced vascularity in the region bringing increased quantity of nutrition, oxygen and other necessary products and drain waste products from the tissues<sup>4</sup>.

b)- It may act according to the gate theory of pain i.e., heat produced in the tissues by irradiation with NLIRR has "gating" or inhibitory effect on impulse transmission<sup>6,7</sup>. Thus giving rise to pain relief.

c)-It is strongly considered that it acts by the combined effects of above two i.e. by enhanced vascularity<sup>4</sup> and by pain gate theory<sup>6,7</sup>.

d)- By sedative effects on sensory nerve endings and pain receptors.

### Unusual effects

1)- In April 2000, a very lean 35 years old female visited this department, with complaints of polyarthritis, sciatica, constipation, insomnia, malaise, and dysmenorrhea and pelvic pain since 18 years. She was unable to carry out her normal activities of daily life, used spoon for drinking water as she could not open her mouth fully and was almost bed ridden. She was treated with NLIRR. Each complaint was treated individually, took about 120 days as a whole for treatment. Improvement was recorded by decrease and absence of pain, increased range of movement, functional recovery, restoration of activities of daily life, relieved off constipation, increased appetite, weight gain of about seven Kg (from 45 kg increased to 52Kg). No adverse effect was recorded. Her follow-up for one year was done that showed effects of irradiation with NLIRR are persistent. Now she is passing her normal life.

2)- A fifty years old female suffering from bilateral mastalgia since six months was treated with NLIRR. Her pain was constant and sharp in nature. Oral medicines relieved her symptoms initially six months ago. But it reoccurred again after few days and remained persistent and did not respond to any medicine. Then she was not recovered by medicines. She relieved after six days of therapy with NLIRR without any medications. Another young lady suffering from severe unilateral Mastalgia since one year was recovered in just three days.

3)- A 36 years female suffering from severe low back pain and pelvic inflammatory disease (PID) was treated with NLIRR for two weeks. She had vaginal abscess and urinary tract infection. After first week of therapy, her vaginal abscess drained automatically although her gynecologist had already planned for its drainage after two weeks of therapy. Her urinary tract infection was also cured as evidenced by urine examination before and after therapy.

4)- Constipation responded by increased intestinal motility in one female during irradiation for PID

5)- A young boy of 23 years old suffered from Groin pain after getting injured during playing cricket since three months was successfully irradiated with NLIRR for two weeks. Effect was long term as evidenced by his follow-up after one year. Afterwards, another patient with similar complaint was treated here.

6)- A male suffering from numbness on left shoulder since last one year was relieved off numbness during treatment of frozen shoulder which he developed six months ago. It means his numbness was not related with frozen shoulder.

7)- Pelvic inflammatory diseases and dysmenorrhea recovered in two weeks in 1.04% patients.

8)- A young lady of 26 years old, suffering from severe throat pain, dysphagia unrelieved by medications was referred by ENT department. She was found to be suffering from ulcer of Pharynx as diagnosed after three application of NLIRR and same was employed for another four days for ulcer healing which healed very well. Her

pain decreased, dysphagia vanished and she returned to her normal life. These effects were long-term as indicated by her follow-up, done for six months.

9)- Three patients with fever due to sore throat were irradiated for low back pain and sciatica without any side effect and without increase in general body temperature.

### Results

Study reflects female (n=3151, 61.22%) predominance to males (n=1996, 38.77%). Table-1 indicates that 36.93% patients of LBP, 3.20% of acute LBP, 18.72% of cervical spondylosis, 18.08% of osteoarthritis of Knee, 18.88% of frozen shoulder, 1.04% of pelvic inflammatory disease and 0.29% patients of mastalgia were treated with NLIRR.

Table-1 Conditions and number of patients treated from July 999 to Dec.2001

Disease	Total( n=5147)
LBP & Sciatica	1901(36.93%)
Acute LBP	165(3.20%)
Cervical Spondylosis	964(18.72%)
O.A Knee	931(18.08%)
Frozen Shoulder	972(18.88%)
Left Frozen Shoulder	449(8.72%)
Right Frozen Shoulder	426(8.27%)
Bilateral Frozen Shoulder	97(1.88%)
Heel Pain	44(0.85%)
Groin Pain	09(0.17%)
Trigger finger	70(1.36%)
Pelvic Inflammatory Disease/Dysmenorrhea	54(1.04%)
Mastalgia	15(0.29%)

Temperature of area exposed increased from 4°F (n=20, 25%) to 6°F (n=30, 37.5%) and 8°F (n=30, 37.5%) as shown in Table-2. But general body temperature remained unaffected.

Table-2 Effects of NLIRR on temperature of area exposed to irradiation (N=80, t=20 minutes)

Before irradiation	After irradiation	Difference
98°F	104°F	6(37.5%) (n=30)
96°F	102°F	8(37.5%) (n=30)
98 °F	102°F	4(25%) (n=20)

Table-3. Period of therapy with NLIRR

Disease	Period of irradiation
Cervical pain	2 w
Frozen shoulder	6-8 w
Backache	3 w
O.A Knee	10d-2w
Dysmenorrhea/pelvic inflammatory disease	2w
Mastalgia	3-6 d

"W" denotes to weeks and "d" to days.

Table-3 indicates that LBP, cervical spondylosis, frozen shoulder and dysmenorrhea/pelvic inflammatory disease relieved in three, two, six to eight, and two weeks

respectively. However osteoarthritis of knee relieved in 10 days to two weeks and mastalgia from three to six days. NLIRR also relieved symptoms of mastalgia, drained vaginal abscess, relieved constipation, dysphagia, groin pain etc

### Discussion

Pain is the main complaint in almost all disciplines of health especially Physiotherapy department. It is very important for a good clinician to manage the pain effectively. Basically it is the art and technique of application of the modality influenced by individual expertise, wide knowledge and experience that determine the outcome of therapy and satisfy the patients. In Physiotherapy clinics, Physiotherapist mainly deal with the management of acute and chronic musculo-skeletal pain. But Musculoskeletal problems are often multifactorial and consequently can be challenging to treat<sup>8</sup>. Therefore, it is crucial to understand onset, nature and type of the pain, its etiology/origin, whether local, referred, sharp or dull in order to effectively combat it<sup>2</sup>. But selection of the type of modality employed has a key role in the management of pain. Thus, it is very difficult to decide that what modality should be applied to effectively and efficiently combat the ailment of the patients as well as to satisfy them. That's why Pain management continues to challenge the clinical veterinarian<sup>2</sup>.

In present study, NLIRR with a broader surface area and high voltage was employed to provide the best pain relief in a clinical patient. Although traditionally, it is considered to be less penetrating (1-10mm) as compared to other modalities like short wave diathermy which penetrate full body, micro wave diathermy 3cm and Ultrasound waves penetrate from 5cm to 1.5cm with 1000,000HZ and 300,000HZ respectively<sup>5</sup>.

According to old concept, NLIRR are merely used to irradiate/treat superficial pathology<sup>4, 5</sup>. But clinical evidence in this study rejects this concept.

In this study, NLIRR has beneficial and long term effects on deeply located pathology like low back pain, frozen shoulder, sciatica, pelvic inflammatory disease etc as do have SWD, MWD and US. Heat generated in the tissues in response to irradiation, is conveyed to deeper structures by conduction<sup>4</sup>. Thus affecting deep pathology. Secondly, when clinical experience of author with the utility of other modalities, was correlated with the present study, it was found that NLIRR has taken the same duration of therapy as that with SWD and US for treating low back pain, cervical spondylosis, frozen shoulder and osteoarthritis of knee i.e. 2-3 weeks, 2-weeks, 6-8 weeks, and 10 days to 2-weeks respectively. However, it takes additional five days more for pelvic inflammatory disease and dysmenorrhea as compared to that of SWD. But US is contraindicated in this condition<sup>4</sup>.

In fact, it has been proved more beneficial, has more applications than other modalities e.g. SWD, MWD and

US and TENS. In present study, NLIRR relieved mastalgia in 3-6 days but SWD could not be applied here because of its depth of penetration<sup>5</sup> and its effect on the presence of any undiagnosed cardiac condition. Same is true for US and MWD<sup>5</sup>.

Vaginal abscess was automatically drained with irradiation to NLIRR during the treatment of pelvic inflammatory disease. But SWD, MWD as well as US cannot be applied for this purpose and especially at this site due to their specific techniques of application and indications<sup>4, 5</sup>.

In the study of Vance et al. Microwave diathermy (45 W total power) was administered for 20 minutes each month on the day symptoms began (usually the first day of menstruation)<sup>9</sup>. Over a 7-month interval, diathermy was followed by almost-immediate and long-lasting relief of symptoms<sup>9</sup>. When compared with NLIRR, it provides a long lasting relief in a short period of just 2-weeks of irradiation in this condition. But Ultra sound therapy has harmful effects on ovaries and testes<sup>4</sup> so it could not be employed for this condition.

TENS is also documented to be an effective mean of managing musculo-skeletal pain but study of Lampl C proved that for long term effects, TENS Therapy is not beneficial<sup>10</sup>.

Three trials, including 294 patients with knee OA were included. Only one trial (n=74) compared therapeutic ultrasound to placebo<sup>11</sup>. This trial showed no difference in range of motion, pain or gait velocity after 4 weeks of therapeutic ultrasound<sup>11</sup>. Two trials compared therapeutic ultrasound to an active therapy (n=220). These trials showed no statistical difference between galvanic current or short wave diathermy for the outcomes of pain and patient-assessed improvement<sup>11</sup>. Thus Ultrasound therapy appears to have no benefit over placebo or short wave diathermy for patients with knee OA<sup>11</sup>. But in this study, Osteoarthritis of knee joint was relieved in 10 days to 2-weeks with NLIRR applied with consequent improvement in pain, range of motion, gait velocity and functional recovery.

Body temperature remained unaffected. However local rise of temperature occurred. But no side effect was recorded. Patients gave feedback of NLIRR as being very soothing, comfortable and pleasant.

All these evidences strongly support that NLIRR are very beneficial, equally effective for treating/ managing deeper pathology as that of SWD, MWD and US and in some conditions its effects are more superior, has more applications over these modalities. Therefore, it is recommended to use NLIRR frankly for the management of musculoskeletal disorders regardless of being superficial or deep. However, author encourage further studies on the validity of NLIRR for pain management.

### Conclusion

Thus NLIRR can alone be used for the management of any deep as well as superficial musculo-skeletal pathology in

any area of the body provided if it has high voltage, high watts and a broader surface area of application. Therefore, NLIRR can be labeled as a treatment of choice in the management of musculo-skeletal pain.

#### Dedication

This article is dedicated to Dr. Asadullah Malik and my dear brother Mr. Khalid Abdul Rahman.

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