

## Comparing the Therapeutic Effect of Local Corticosteroid Injections and Laser in Treating coccyx Pains (Sacrum)

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### ABSTRACT

Coccydynia (*pain* in the coccyx or tailbone) is a fairly common pain in the bottom of backbone that spreads towards sacrum and lower legs. Supportive treatments, such as corticosteroids, use of muscle relaxants and correction of body position can help relieve the pain. In recent years, the use of laser is introduced as an effective method to reduce backbone pain. The purpose of this study is to compare the effects of corticosteroids and laser in treating tailbone pains. 61 patients with tailbone pain referred to the orthopedic clinic of Rasul Akram Hospital were entered into the study and randomly divided into two groups of laser and local corticosteroid injection. The mean difference in pain score was compared in both groups at the beginning of the study, end of the second week and end of the second month to determine the response to treatment. Data were analyzed using SPSS software. Of the patients enrolled, 24 were males (37.6%) and 37 were females. The mean age of subjects studied was 36.16 years old. The mean difference in pain scores at the beginning of the study and at the end of the second month in the group treated by laser and corticosteroid was 2.54 and 3.8, respectively, that this difference was also statistically significant ( $P: 0.019$ ) Effect of corticosteroid injection for pain relief was better than laser. The study should be done in a longer timeframe.

**Key words:** Corticosteroids, Laser, Tailbone, Pain.

### INTRODUCTION

Tailbone pain is a fairly common pain in the bottom of backbone that spreads towards sacrum and lower legs. Its prevalence in women is more than men and often occurs at 40s<sup>1</sup>. The pain at the bottom of tailbone has often vague causes, which a part of it is due to the complex structure of sacrococcygeal. The pain is sometimes concerned with damage after direct trauma, childbirth or

backbone surgery. Other rare causes are enchondroma, giant cell tumor, *intraluminal schwannoma*, perineural cysts, intraosseous lipoma or *precoccygeal glomus* bodies<sup>2</sup>. Among these items, trauma is the most common cause. On the other hand, the pain at the bottom of tailbone may be idiopathic in a third of cases<sup>3,4</sup>. Its most common symptoms are pain when sitting on or standing up from a chair and tailbone is significantly sensitive<sup>5</sup>. These symptoms may be associated with mental health problems<sup>5</sup>. Treating the pain at the bottom of

tailbone mainly consists of supportive treatment methods such as NSAIDs and some drugs like opioids, gabapentin, pregabalin, muscle relaxants, posture training,, use of special mattresses, physical therapy (massage, bathing, and electrical stimulation), local anesthesia and steroid injection<sup>1,3,5,6</sup>. Pain relief can be achieved with supportive therapy in a quarter of the patients. The success rate in those who have normal mobility has been reported up to 43%, while the rate is reduced down to 16% in non-movable tailbone. Rest, sitting on a ring cushion and nonsteroidal drugs are recommended for two months at the beginning of treatment<sup>7</sup>. Local steroid injection is performed in cases with persistent pain rather than supportive treatment. Steroid compound (40 mg methylprednisolone) and long-acting local anesthetic have been reported effective for pain relief<sup>8</sup>. Laser therapy with recommended dose and efficient range reduces pain and improves chronic joint disorders, such as the joint tested in lumbar spine<sup>9</sup>. Lasers used in surgery, burn throughout the tissue. But *low-level laser therapy* (LLL) has constructive effects. This type of laser has dramatic effects on intracellular structures such as mitochondria<sup>10</sup>. When delicate but penetrating radiations of LLL radiates to cellular mitochondria, energy production increases in these organelles and may help to relieve local pain and inflammation<sup>10</sup>. Low level laser therapy can also effective in the process of wound and tissue healing with increase in micro-circulation, induction of cell proliferation, and decrease in inflammatory activity associated with chronic pain cycle<sup>11, 12</sup>. In recent studies, a direct impact on cellular material flow by reducing the length of axons has been detected that shapes the wiring of neural cell<sup>13</sup>. Low light essentially numbs the nerve cells. Researchers discovered that neural inhibition induced by laser is the consequences of some changes and a mechanism for pain relief induced by the laser. Repeated application of laser in clinical systems modulates the pain perception and reduces the pain<sup>14</sup>. Using laser therapy for chronic pains provides another nondrug option for the control of chronic pain.

#### Patients and Methodology

This study was a one-blinded clinical trial one. The study population consists of patients with

pain at the bottom of tailbone referred to the orthopedic clinic of Rasul Akram Hospital and wished to enter the study. Definition of disease severity is based on VAS (visual analogue scale). Exclusion criteria were considered the age younger than 15 years old and more than 70 years, a history of trauma, malignancy and rheumatic therapy. People with the age of 15-75 years old with tailbone pain were considered idiopathic and sampling was simple random. A careful history was taken from patients referred with tailbone pain, and then examined, if exclusion criteria did not exist on the basis of history and physical examination, after explaining the research project and filling out a consent form, patients were randomly divided into two groups of laser and local corticosteroid injection. 40 mg methylprednisolone with 10 ml of 2% lidocaine was injected into the disc to inject an AMP and laser therapy group patients had undergone laser with 400 mw of power, a wavelength of 830 nm, intensity of 400 mw and frequency of 10Hz for seconds in 10 sessions in coccyx regions. Air ring was used for both groups of patients and patients should not use another treatment during the follow-up. Follow-up was performed by an orthopedic specialist at 1 week, 3 weeks and 3 months later. The mean difference in pain score was compared in both groups at the beginning of the study and at the end of the second week, as well as, at the beginning of the study and at the end of the second month to determine the response to treatment and t-test was used for this reason. Chi-square tests, t-tests and ANOVA were used to evaluate the impact of trauma, the mean time to onset of pain and repetition of the same pain in the patient's history. In all statistical analyzes, significance level of P was considered less than 0.05.

#### RESULTS

61 patients were enrolled of which 31 were treated with laser therapy and 30 with corticosteroids. Of the patients enrolled, 24 were males (37.5%) and 37 were females. The mean age of the subjects was 36.16 years old and the mean age of patients received corticosteroid therapy and treated with laser was 36.9 and 35.46, respectively (other demographic groups can be seen in Table 1).The mean pain score in patients

undergoing laser therapy at the beginning of the study was calculated 5.54 and in those who received corticosteroids 5.9. The mean difference in pain score at the beginning of the study and at the end of the second week in the group treated with corticosteroids was 1.6, that the amount was more than that of laser therapy group (0.8). A difference which was statistically significant (P=0.007). Also, the mean difference in pain score at the beginning of the study and at the end of the second month in the groups treated with laser and corticosteroids was 2.54 and 3.8, respectively, that the difference was statistically significant (P=0.019). However, there was no significant differences in both the methods used in terms of eliminating the symptoms (reset the pain score to zero) (P: 0.592). 11 of patients who underwent laser therapy (35.4%) had a history of coccyx trauma and also, 21 (70%) of patients who received corticosteroid therapy, had a history of damage to the region. However, A

history of trauma was created no statistically significant differences in response to treatment at the end of the second week (P=0.65) and at the end of the second month (P=0.647). The mean time of pain onset to therapeutic action was 4.16 months in laser-treated group and 3.08 in corticosteroid-treated group and this time had no effect on the response of patients to treatment (whether in laser therapy or corticosteroid group) after the second week and the second month. (P=0.19 and 0,147, respectively). Repetition of the same pain in patient's history is as follows: 22 individuals were complaining of a pain episode and 9 individuals of two pain episodes in laser-treated group and 19 of a pain episode, 8 of two pain episodes and 3 of pain episodes in corticosteroid-treated group. With increasing frequency of pain experienced, the response to treatment also decreased in both treatment groups and this reduction was statistically significant in the results at the end of the second month. (P: 0.006)

**Table 1: Demographic Data and pain scores in course of Follow-Up between two groups**

Variables	Laser Therapy	Corticosteroids Therapy
Age (year)	35.45 ± 1.04	36.9 ± 1.04
Gender	24 (37.5%)	37 (57.8%)
First visit pain score Median	5.54 ± 1.315	5.9 ± 1.396
Pain Score after two weeks	4.62 ± 1.81	4.3 ± 1.87
Median	5	4
Pain Score after two months	3 ± 2.69	2.1 ± 2.42
Median	5	4
Interval between pain onset and intervention	4.19 ± 4.97	3.08 ± 2.14
History of trauma	11 (35.48%)	21 (70%)

Mean ± SD for quantitative variables and frequency (%) for quantitative variables are expressed.

**DISCUSSION**

The present study was done on 61 patients with tailbone pain referred to the orthopedic clinic of Rasul Akram Hospital. 30 patients underwent a local depedron injection (methylprednisolone) in the lesion location and 31 patients underwent laser therapy sessions.

In the study group, there was no significant difference in terms of pain location, the mean pain time, and the mean age. In both groups studied, a

history of trauma inflicted on coccyx did not cause any significant difference in the response to treatment at the end of the second week and at the end of the second month. The mean difference in pain score at the beginning of the study and at the end of the second week in corticosteroid-treated group was higher than that in laser-treated group. A difference that was statistically significant. Effect of corticosteroid injection for pain relief was better than that in laser therapy. Also, corticosteroid injection had a significantly better effect on reducing pain compared to before treatment in

subsequent times of 2 weeks, 2 months and 3 months later. The mean time of pain onset to therapeutic action was different in both groups, but the time had no effect on patient response to treatment (whether in laser therapy or corticosteroid group) after the second week and after the second month. Some disadvantages and advantages will be outlined to compare therapeutic methods. However corticosteroid injection is an invasive procedure, it has some advantages such as short period of treatment, only one injection. While laser therapy requires more sessions and its duration of treatment is longer. Therapeutic effects of low level laser on the treatment of chronic pains have long been tested. The effects have been tested on carpal tunnel syndrome pain, chronic neck and back pain and other *musculoskeletal* pains. Dacowicz *et al.* (2011) carried out a study on 38 patients with carpal tunnel syndrome that confirms the therapeutic effect of reducing pain by low-level laser<sup>15</sup>. Chow and *et al.* (2009) examined the effectiveness of low level laser therapy on neck pain in a review study. The results showed that laser therapy heals and reduces pain speedily in acute cases and full

treatment will be observed during 22 weeks of treatment in chronic cases. No significant difference was observed on the side effects in treatment and control groups<sup>16</sup>. Also Wray *et al* investigated the effective treatment methods in pain at the bottom of tailbone in a prospective study over 5 years. This study showed that local corticosteroid injection along with local anesthetic will be successful up to 60%. As a result, they introduced this method as the first-line treatment<sup>8</sup>. However, anesthetic injection with corticosteroid will always face with the danger of crossing the disk and penetrating into the rectum<sup>17</sup>. Limitations of this study include the short duration of the study after treatments. Another limitation of this study is that other clinical parameters such as the impact of treatment on patients' performance and also, patients' satisfaction have not been investigated in terms of the treatment process. Another limitation is reduced sample size due to the withdrawal of some patients. It is suggested that a similar study to be performed with larger sample size and longer duration (at least one year).

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