



Comparison of Manual Treatment and Co-administration of Methylprednisolone Injection with Manipulation in Coccydynia

Received: 21 Jan. 2020
Accepted: 14 May 2020
Published: 05 June 2020

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Keywords

Coccyx; Orthopedic manipulation; Manual therapies; Methylprednisolone acetate

Abstract

Background: This study was conducted to evaluate the usefulness of manipulation along with local methylprednisolone acetate injection on the improvement of chronic coccydynia.

Methods: A randomized trial was designed. Thirty patients were recruited and divided randomly into two groups. The first group received three sessions of manual therapy based on Maigne and Thiele methods. The other group received manipulation with injection of methylprednisolone acetate around the coccyx and sacrococcygeal and intercoccygeal joints. Then, the patients were followed up for one day, a week, a month, and three months after the intervention. Severity of pain was assessed by Visual Analog Scale (VAS) and the Paris (functional coccydynia impact) Questionnaire during the follow-ups. Finally, the data were analyzed using a repeated measures analysis of variance (ANOVA) model.

Results: The mean duration of coccygeal pain was 23.3 ± 38.3 months. There were not any significant differences between the two groups regarding the

age and duration of coccydynia. The results of repeated ANOVA indicated that the pain decreased during three months of the follow-up in both groups significantly ($P < 0.0001$). However, there was no statistically significant difference between the two groups regarding the pain reduction ($P = 0.691$).

Conclusion: One episode of injection of methylprednisolone acetate can limit the treatment sessions of manipulation to just one session without additive effect on pain reduction.

How to cite this article: Hadianfard M, Zakeri M, Rafiee F. **Comparison of Manual Treatment and Co-administration of Methylprednisolone Injection with Manipulation in Coccydynia.** Phys Med Rehab & Electrodiagnosis 2020; 2(2): 43-8.

Introduction

The coccyx or tailbone is formed from four rudimentary vertebrae and does not contain a spinal canal, pedicles, laminae, or spinous processes. The coccyx has variant anatomy. Hypoplasia, aplasia, incomplete fusion, and bifid coccyx are some of anatomical normal variants of the coccyx. The coccyx also has



different normal anatomic variations in its curvature. It may have a lordotic, kyphotic, S-shaped, or Z-shaped posture. The sacrococcygeal and intercoccygeal joints of a normal person may have anterior subluxation. Coccydynia is a medical term used to describe discomfort from chronic coccyx pain. The pain in the sacrococcygeal joint and the intercoccygeal joints is known as coccydynia, which was added to the medical terminology by Simpson in the mid-nineteenth century.¹

Although the disease may occur for anyone of any age, the prevalence in women is much higher than in men (about 5-fold) and the mean age of its occurrence is about 40 years.² Usually, pain is concentrated in the coccygeal bone and does not spread or radiate into other places. However, sometimes pain is felt in the back, hip, and thigh. The incidence of back pain in patients with coccydynia is higher than in the general population.^{2,3} Most often, coccydynia occurs insidiously but sometimes has a sudden onset. Sitting on a painful coccyx, especially on a rigid surface or a prolonged sit, and rising from a sit aggravate the pain.

Coccygeal pain is located at the tip or sides of the coccyx. The pain is usually dull, though sometimes is a sharp pain. A sense of pressure or an urge to defecate is also described. Occasionally, coccydynia is associated with dyspareunia, dyschezia, dysmenorrhea, and piriformis syndrome. Coccydynia is mostly idiopathic, but it can be a secondary type. A risk factor in coccydynia is obesity. High body mass index (BMI) increases the risk of coccydynia up to 3 times.³ Sometimes, coccydynia is the result of joint laxity and hyper mobility, morphologic anatomic variability, rigid coccyx, and synchondrosis. Traumas such as fall on buttock and/or repeated minor trauma (prolonged sitting on rigid surface and travelling by car) are the common associated histories. Rarely, fractures, dislocations, tumors (e.g., chordomas, chondrosarcoma), and inflammation and infection of the coccyx may be the causes of coccydynia. In addition,

constipation is another cause.⁴

The other etiology is pregnancy and childbirth.⁵ Coccygia also is included in complaints of some patients with fibromyalgia syndrome (FMS). Levator ani syndrome (LAS), perianal abscess and infections, pilonidal cyst, hemorrhoid, anal fissure, and proctalgia fugax are some differential diagnoses of coccydynia. Since the coccyx does not have a clear function in the body movement, treatment of coccydynia only is reduction of its pain. A wide range of therapies including medical treatments, physiotherapy, and even surgical procedures are used. Conservative treatment options include wedge and donut-shape cushions, correct sitting postures, application of heat and cold over the pain location,⁶ topical treatment,⁷ epidural injection, and radiofrequency ablation. Impar ganglion blocks are used in management of this condition.⁸ Different methods of manual treatment or manipulation are offered for coccydynia.⁹ Maigne, one of the pioneers in the field of manual therapies, reported a high degree of efficacy in manual treatments, suggesting that satisfaction in patients after each session of manual therapy was 25%.¹⁰ Methylprednisolone acetate injection in the muscles' tender and trigger points as well as joints is the known treatment in physical medicine. The biggest disadvantage of manipulation is the need for several sessions of treatment and a rectal examination which sometimes is painful and annoying for the patient. One of the promising methods is simultaneous administration of corticosteroids with manual therapy. The initial results, which were done on a few volunteer patients, showed it to be beneficial. Therefore, in this study, we decided to compare the two methods. The first method is manual treatment for three times, while the second method is manipulation along with injection in the pain area just for one time.

Methods

Sample selection: A group of 30 patients who

had chronic coccyx pain were chosen for inclusion in the study. Inclusion criteria for the study were chronic coccygeal pain lasting for more than 2 months, age between 18 and 70 years, lack of any other treatment modality used before, and the patient's consent after complete explanation to him/her.

Patients with acute fractures, diabetes mellitus (DM), osteoporosis, rheumatic diseases, and history of cancer were excluded from the study.

At first, all patients were examined by a physician and assessed completely. A coccyx plane X-ray was taken from all patients.

Treatment interventions and evaluation: The severity of pain in patients was assessed by the Visual Analog Scale (VAS) and the Paris (functional coccydynia impact) Questionnaire (that assesses coccygeal pain in different situations: sleeping, sitting, standing, walking, and travelling with vehicles and is presented in appendix A).

The patients were divided into two groups based on their random specified numbers. The 1st group was treated with three sessions of manual therapy every three days (according to Maigne and Thiele methods). The 2nd group received manipulation with a simultaneous methylprednisolone acetate injection around the coccyx (and also in sacrococcygeal and intercoccygeal joints) only for once. To do coccygeal manipulation, we placed the patient in a prostrate position, our right index finger was impregnated with enough lidocaine and lubricant gel, and the rectal exam was performed; then, according to Thiele's method, massaging of the levator ani and coccygeus muscles was done. Afterwards, we injected a 2 cc syringe containing 1 cc of lidocaine 2% and 1 cc methylprednisolone acetate (40 mg) around the coccyx, sacrococcygeal joint, and distal and proximal intercoccygeal joints. During the injection, the index finger remained in the rectum. It should be noted that injection does not take place on the rectal mucosa and the subcutaneous fat, which causes mucosal

injury or fat atrophy. After this injection, rest was given for 1 minute to allow enough relaxation for the patient, and then the Maigne method was used to continue the treatment. In this method, we put the finger into the rectum, and put the coccyx in the extended position. Then, we held the left hand on the posterior surface of the sacrum, pushing it firmly for 20-30 seconds.² For the other group, 3 manual treatments were performed in the way indicated (Thiele and Maigne methods) every three days for 3 times. The patients were recommended to use an air ring while sitting for two weeks, and trained to perform isometric gluteal, pelvic floor, and hip adductor muscle exercise. The first visit was done at the day after the treatment to evaluate the patients for any complication of the interventions. Then the patients were followed for three months at one week later, one month later, and three months after treatment. The severity of pain was evaluated again on the basis of the VAS and the Paris (functional coccydynia impact) Questionnaire.

Statistical analysis: Data were collected and analyzed using SPSS software (version 15, SPSS Inc., Chicago, IL, USA). Initially, the variables were characterized by the table and the center and dispersion indices [mean and standard deviation (SD)]. The t-test was used to compare the mean of the two groups. In order to compare the reduction of pain during 3 months, repeated measures analysis of variance (ANOVA) was used. Comparison was made between the two groups in the model. In all tests, a P-value below 0.05 was considered significant.

Protection of human subjects: The study protocol was approved by the Institutional Review Boards of Group Health Cooperative and Kaiser Foundation Research Institute.

Results

Data analysis was performed on 30 patients, 15 in each group. All patients were women. The mean age of the patients was 39.4 ± 10.1 years (the mean age of the injected group was

36.8 ± 7.8 years and that of the manipulated group was 42.0 ± 11.6 years). Therefore, it can be concluded that there was no meaningful statistical difference between the two groups in terms of age.

The mean duration of the disease in the samples was 38.3 ± 23.3 months. A large SD was due to the large dispersion of data, since the duration of the symptoms was a minimum of 2 months and a maximum of 15 years. Although the mean duration of the disease was almost twice as significant in the case group (52.5 ± 30.8 vs. 16.2 ± 16.3, respectively), there was not a significant statistical difference between the two groups ($P = 0.335$).

The statistical results based on VAS: In the case group of 15 patients, 10 had a pain duration of less than one year and 5 patients over one year. The mean pain of patients with a duration of less than one year was 7.50 ± 0.52 and for patients with a pain duration of more than one year, it was 3.50 ± 0.74, which was not statistically significant ($P = 0.683$). In the control group of 15 people, 9 patients had a pain duration of less than one year, and 6 had pain for more than one year. The mean pain of patients with a pain duration of less than one year was 5.50 ± 0.75 and those with a pain duration of more than one year had a mean pain of 6.90 ± 0.90, which was statistically insignificant ($P = 0.266$). The mean pain severity in the two groups was as follows: The case group had a mean pain intensity of 5.50 ± 0.05 and the control group had a mean pain intensity of 0.60 ± 0.51.

Comparison of mean pain intensity in the two groups did not show a significant difference ($P = 0.470$). The statistical results of the study groups were based on the Paris (functional coccydynia impact) Questionnaire. During sitting, in the case group, 3 out of 5 patients showed improvement in pain after 3 months, and in the control group, 2 out of 3 symptomatic patients did not observe any change in pain. In rising from sitting, in the case group, all six symptomatic persons improved. In the control group, 2 out of 4

people were felt unchanged. In standing up or walking, 6 of 8 symptomatic patients were recovered in the case group. In the control group, 1 person who was symptomatic had pain after treatment. While travelling with a vehicle, in the case group, all 8 were symptom-free and in the control group, 11 had severe pain, which decreased to 4. Regarding pain at bedtime, in the control and case groups, all four symptomatic patients recovered. The pain reduction during the 3 months of follow-up was significant in both groups. However, no statistically significant difference was found between the two groups. There was a significant decrease in pain, in up to one week after the intervention, but after one week, the case group continued to experience pain reduction, and the control group had an increase in pain; however, this increase was not as severe as before the interventions. Comparison of the mean pain severity in the two groups did not show any significant difference. Figure 1 shows the mean total pain severity in the two groups with a confidence interval (CI) of 95%.

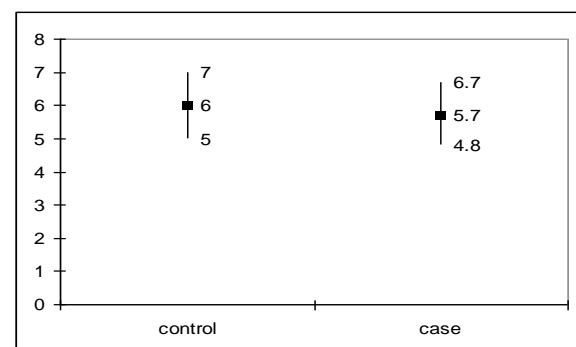


Figure 1. Mean pain severity

Discussion

The results of the data analysis showed that there was no difference between the two groups. In both groups, pain after 3 months of follow-up was significantly reduced. This reduction in the methylprednisolone injection group was higher than the control group, but it was not statistically significant.

Other studies have shown that manual treatments are effective in reducing the pain

of the coccyx. This result is consistent with that of the present study, because physical interventions by manual therapy led to reduction in pain in all patients. Both the Thiele and Maigne methods are effective in treating pain in the coccyx.^{10,11} The important point in our study was the use of corticosteroid injections for increasing the effectiveness of treatment and reducing the manual therapy frequency. As shown in figure 2, there was a difference between the two groups, but this difference was not statistically significant. We did not have an accurate measuring of perineal length, but it seems that in high perineal or large buttocks, manipulation is more difficult and less effective, and it was the source of some clinical difference between the two groups. Another probability for the statistical insignificance between the two groups may be the low sample size. Another additional reason to note is the method of pain severity measurement. In this study, VAS and the Paris (functional coccydynia impact) Questionnaire were used. These methods are based on the patient's opinion, so they are subjective methods. Therefore, it caused a great deal of dispersion. The severity of pain expressed by the patients did not make any significant difference between the two methods.

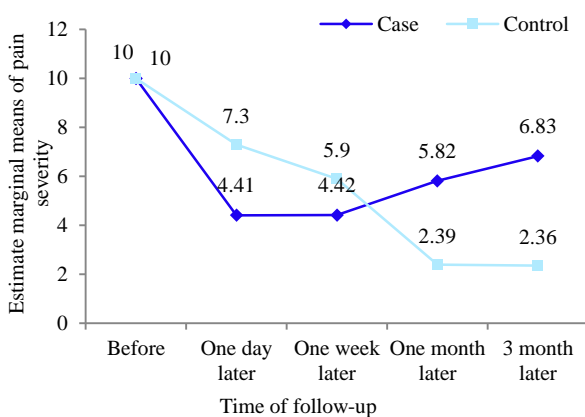


Figure 2. Pain severity trend during 3-month follow-up of patients

Wray et al. in their study stated that manipulation with the injection around the coccyx produced up to 85% recovery. Corticosteroid injection around the coccyx has

been introduced as one of the treatment methods.¹² In a report published by Maigne in 2009, cortisol injections in 4 patients resulted in calcification of the sacrum, and this calcification also increased the pain. He has recommended the use of methylprednisolone for injection in the coccygeal area.¹³ There is low levels of evidence and no recommendation for effectiveness of the various conservative interventions for coccydynia.¹⁴

In our study, the complications of injection such as infection, calcification, increasing pain, bleeding, mucosal atrophy, or change of skin color were not established. In any case, it is certain that corticosteroid injection can be useful based on specific indications. It seems that in order to get a compelling response, randomized studies and two-blinded studies with a sufficient sample size and further evaluations are needed.

Conclusion

Manual therapy is one of the therapeutic approaches for coccydynia treatment, which is more satisfactory than pharmacotherapy and physiotherapy, but because of the vexation of the patients with rectal examination, lessening of sessions of manual therapy is ideal. Combining manual treatment with simultaneous injection can be done in only one session, showing quick response to treatment, and can be less emotionally and physically uncomfortable for the patient. In people with high perineal or large buttocks, manipulation is more difficult and less effective than manipulation plus injection.

Acknowledgments

The authors would like to thank Shiraz University of Medical Sciences, Shiraz, Iran, and also the Center for Development of Clinical Research of Nemazee Hospital. This study received financial support from Shiraz University of Medical Sciences (research project no.: 88-4922, IRCT138811203317N1).

Conflict of Interest

Authors have no conflict of interest.

Appendix A

The Paris (functional coccydynia impact) Questionnaire is as below:

Circle the number which best describes your response. To ensure that your questionnaire will count, please answer all 5 questions.

1) When sitting:

- I have no pain (0)
- I have slight discomfort (1)
- I can only sit in certain positions (2)
- Sitting is virtually impossible for me (3)

2) When standing up from sitting:

- I do not feel any worse than when I am sitting (0)
- Standing up from sitting is painful (1)
- Standing up from sitting is extremely painful (2)

3) Standing still or walking:

- I have no pain (0)
- I am in pain (1)

4) Travelling (by car, train, coach):

- Travelling is not uncomfortable (0)
- Travelling is slightly uncomfortable (1)
- Travelling is extremely uncomfortable (2)

5) At night:

- I have no pain during the night (0)
- I sometimes have pain during the night (1)
- I regularly get woken by pain during the night (2)

Total × 10 = Final score (out of maximum of 100 points)

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