

Coccydynia: An Overview of the Anatomy, Etiology, and Treatment of Coccyx Pain

Lesley Smallwood Lirette, MD, Gassan Chaiban, MD, Reda Tolba, MD, Hazem Eissa, MD

Department of Pain Management, Ochsner Clinic Foundation, New Orleans, LA

ABSTRACT

Background: Despite its small size, the coccyx has several important functions. Along with being the insertion site for multiple muscles, ligaments, and tendons, it also serves as one leg of the tripod—along with the ischial tuberosities—that provides weight-bearing support to a person in the seated position. The incidence of coccydynia (pain in the region of the coccyx) has not been reported, but factors associated with increased risk of developing coccydynia include obesity and female gender.

Methods: This article provides an overview of the anatomy, physiology, and treatment of coccydynia.

Results: Conservative treatment is successful in 90% of cases, and many cases resolve without medical treatment. Treatments for refractory cases include pelvic floor rehabilitation, manual manipulation and massage, transcutaneous electrical nerve stimulation, psychotherapy, steroid injections, nerve block, spinal cord stimulation, and surgical procedures.

Conclusion: A multidisciplinary approach employing physical therapy, ergonomic adaptations, medications, injections, and, possibly, psychotherapy leads to the greatest chance of success in patients with refractory coccyx pain. Although new surgical techniques are emerging, more research is needed before their efficacy can be established.

INTRODUCTION

Coccydynia, or coccygodynia, is pain in the region of the coccyx. Simpson first introduced the

term in 1859,¹ but accounts of coccygeal pain date back to the 16th century.¹⁻⁴ Despite the identification of chronic coccygeal pain hundreds of years ago, its treatment can be difficult and sometimes controversial because of the multifactorial nature of coccygeal pain. Many physiologic and psychological factors contribute to its etiology. Most cases of coccydynia resolve within weeks to months with or without conservative treatment, but for a few patients, the pain can become chronic and debilitating. This article provides an overview of the anatomy, physiology, and treatment of coccydynia.

ANATOMY AND FUNCTION

The coccyx is the terminal segment of the spine. The word coccyx is derived from the Greek word for the beak of a cuckoo bird because of the similarity in appearance when the latter is viewed from the side.^{3,5,6} The coccyx is a triangular bone that consists of 3 to 5 fused segments, the largest of which articulates with the lowest sacral segment. In addition, the first coccygeal segment contains rudimentary articular processes called the coccygeal cornua that articulate with the sacral cornua. The lower part of the filum terminale, also called the coccygeal ligament, inserts onto this first segment. The coccyx is bordered anteriorly by the levator ani muscle and the sacrococcygeal ligament. Moving anteriorly to posteriorly, the lateral edges serve as insertion sites for the coccygeal muscles, the sacrospinous ligament, the sacrotuberous ligament, and fibers of the gluteus maximus muscle. Inferiorly, the iliococcygeus muscle tendon inserts onto the tip of the coccyx. These ligaments and muscles help support the pelvic floor and also contribute voluntary bowel control. In a study of the gross anatomy of intercoccygeal joints, Maigne, Guedj, and Straus describe the extensive variability in the structure of the joints: from intact discs resembling lumbar intervertebral discs to intermediate disc structures with cystic or fibrotic changes to synovial joints. In some cases, the joints are fused together.⁷ Certain types of coccygeal morphology also can lead to a predisposition to coccydynia.⁸

Address correspondence to
Lesley Smallwood Lirette, MD
Department of Pain Management
Ochsner Baptist Medical Center
Napoleon Medical Plaza Building
2820 Napoleon Avenue, Suite 950
New Orleans, LA 70115
Tel: (504) 842-5300
Email: llirette@ochsner.org

Keywords: Coccyx, pain-intractable, sacrococcygeal region

The authors have no financial or proprietary interest in the subject matter of this article.

Despite its small size, the coccyx has several important functions. Along with being the insertion site for multiple muscles, ligaments, and tendons, it also serves as one leg of the tripod—along with the ischial tuberosities—that provides weight-bearing support to a person in the seated position. Leaning back while in a seated position leads to increased pressure on the coccyx. The coccyx also provides positional support to the anus.

INCIDENCE AND ETIOLOGY

The exact incidence of coccydynia has not been reported; however, factors associated with increased risk of developing coccydynia include obesity and female gender.⁹ Women are 5 times more likely to develop coccydynia than men. Adolescents and adults are more likely to present with coccydynia than children.¹⁰ Anecdotally, rapid weight loss can also be a risk factor because of the loss of mechanical cushioning. The most common etiology of coccydynia is external or internal trauma. External trauma usually occurs due to a backwards fall, leading to a bruised, dislocated, or broken coccyx.¹¹ The location of the coccyx makes it particularly susceptible to internal injury during childbirth, especially during a difficult or instrumented delivery. Minor trauma can also occur from repetitive or prolonged sitting on hard, narrow, or uncomfortable surfaces.⁶ Nontraumatic coccydynia can result from a number of causes, including degenerative joint or disc disease, hypermobility or hypomobility of the sacrococcygeal joint, infectious etiology, and variants of coccygeal morphology. Coccydynia can also be radicular or referred pain, although this type of pain usually is not associated with the hallmark coccygeal tenderness on physical examination. Less commonly, neoplasms have been associated with coccydynia. Coccydynia can also be associated with nonorganic causes, such as somatization disorder and other psychological disorders.¹²

PRESENTATION AND DIAGNOSIS

The classic presentation of coccydynia is localized pain over the coccyx. Patients present complaining of “tailbone pain.” The pain will usually be worse with prolonged sitting, leaning back while seated, prolonged standing, and rising from a seated position. Pain may also be present with sexual intercourse or defecation. History may be significant for a recent trauma with an acute onset of pain, or the onset of pain may have been insidious with no clear inciting factor. Physical examination will reveal tenderness over the coccyx. Rectal examination allows the coccyx to be grasped between the forefinger and thumb. Manipulation will elicit pain and may reveal

hypermobility or hypomobility of the sacrococcygeal joint. Normal range of motion should be approximately 13 degrees.⁹ Other causes of coccyx pain, such as infection etiologies (eg, pilonidal cyst), masses, and pelvic floor muscle spasms, should be ruled out. Radiographic images can more closely evaluate for the presence of fractures, degenerative changes, or masses. Imaging studies, including dynamic x-ray and magnetic resonance imaging, can help diagnose sacrococcygeal joint hypermobility or hypomobility.⁶

TREATMENT

Multiple conservative treatment options are available for coccydynia. Conservative treatment is successful in 90% of cases, and many cases resolve without medical treatment.¹³⁻¹⁵ Relatively simple measures are sufficient in most cases. Modified wedge-shaped cushions (coccygeal cushions) can relieve the pressure on the coccyx while the patient is seated and are available over the counter. Circular cushions (donut cushions) have been suggested for the treatment of coccydynia but they can place pressure on the coccyx by isolating the coccyx and ischial tuberosities and are more useful for treating rectal pain. Training patients to adopt proper sitting posture can correct poor postures that can be contributing factors. The application of heat and cold over the site also may be beneficial. Patients should try both as one has not been shown to be superior to the other. Nonsteroidal antiinflammatory drugs (NSAIDs) are the most common analgesic prescribed for coccyx pain; opioids generally are not recommended and are reserved for severe pain—usually from an acute injury—that is not responsive to other measures. Although to our knowledge no literature exists on the use of topical NSAIDs for coccydynia, studies have shown that these preparations are useful for other painful conditions such as osteoarthritis. Topical creams are generally well tolerated and can be associated with fewer systemic side effects than oral medications.¹⁶⁻¹⁸

For the few cases that do not respond to these conservative treatments, more aggressive treatments may be indicated. Pelvic floor rehabilitation can be helpful for coccydynia that is associated with pelvic floor muscle spasms. Manual manipulation and massage can be both diagnostic and therapeutic. Intrarectal manipulation can identify and potentially correct a dislocated sacrococcygeal joint. Manual manipulation and massage can help relieve associated muscle spasms or ligament pain.¹⁹ Transcutaneous electrical nerve stimulation can be beneficial, employing either an external technique with 2 cutaneous probes or an internal technique with 1

cutaneous probe and 1 intrapelvic probe. Psychotherapy is indicated if an underlying nonorganic cause is suspected.¹²

Although evidence-based literature supporting the effectiveness of interventional procedures is lacking, many specialists advocate these procedures' use in cases of chronic coccydynia but without reaching clear consensus on the best site of injection. Imaging guidance, such as fluoroscopy or ultrasound, is recommended for injections around the coccyx because of its position relative to other structures, especially the rectum that lies just anteriorly.²⁰ Injections around the coccyx, usually at the sacrococcygeal junction or around the sacrococcygeal ligaments, of local anesthetic with steroid can be both diagnostic and therapeutic.²¹ These injections can also help identify patients who might benefit from a coccygectomy if all other conservative treatments fail.¹² Caudal epidural steroid injections have been used to treat cases of coccyx pain resulting from Tarlov cysts and to treat lower sacral radicular pain.^{3,22} Another approach is to target the ganglion impar, also known as the ganglion of Walther. The ganglion impar is the pelvic portion of the sympathetic trunk located in the midline anterior to the sacrococcygeal junction. This block is useful in refractory cases and cases associated with pelvic pain, as well as for pain associated with malignant neoplasms. Radiofrequency ablation of the ganglion impar also has been described for the treatment of severe pain due to carcinoma.^{21,23,24} Data on the use of spinal cord stimulation are limited, but a case report of success with this modality was presented in 2008.²⁵

Surgical procedures for the treatment of coccydynia are used only as a last resort once all other treatment options have failed. A coccygectomy is the surgical amputation of the coccyx just proximal to the sacrococcygeal junction. Limited data support this procedure, with most of the available literature being case reports and retrospective case series. The current literature suggests that a coccygectomy may provide relief in an appropriate subset of patients who have failed all other treatments.^{9,15,26,27} However, this procedure can be associated with a high complication rate and failure to relieve the pain. Consequently, based on current available information, this procedure generally is not recommended. Dean et al describe a procedure in which polymethylmethacrylate cement is injected to treat a coccyx fracture. They termed this procedure a "coccygeoplasty."²⁸ Bergkamp et al used tension sutures around a dislocated coccyx to maintain its integrity.²⁹ More research is needed on these procedures before any recommendations can be made as to their efficacy.

CONCLUSION

Coccydynia is a common condition that is often self-limited and mild. Although the vast majority of patients who seek medical attention respond to conservative treatments, some patients require more aggressive treatments. In these cases, the etiology of the coccydynia may be complex and multifactorial. A multidisciplinary approach employing physical therapy, ergonomic adaptations, medications (NSAIDs), injections, and, possibly, psychotherapy leads to the greatest chance of success in these patients. Surgical coccygectomy generally is not recommended, and although different surgical techniques are emerging, more research is needed before their efficacy can be established.

REFERENCES

1. Simpson J. Clinical lectures on the diseases of women. Lecture XVII: coccydynia and diseases and deformities of the coccyx. *Med Times Gaz.* 1859;40:1-7.
2. Grosso NP, van Dam BE. Total coccygectomy for the relief of coccygodynia: a retrospective review. *J Spinal Disord.* 1995 Aug; 8(4):328-330.
3. Howorth B. The painful coccyx. *Clin Orthop.* 1959;14:145-160.
4. Kim NH, Suk KS. Clinical and radiological differences between traumatic and idiopathic coccygodynia. *Yonsei Med J.* 1999 Jun; 40(3):215-220.
5. Sugar O. Coccyx. The bone named for a bird. *Spine (Phila Pa 1976).* 1995 Feb 1;20(3):379-383.
6. Pennekamp PH, Kraft CN, Stütz A, Wallny T, Schmitt O, Diedrich O. Coccygectomy for coccygodynia: does pathogenesis matter? *J Trauma.* 2005 Dec;59(6):1414-1419.
7. Maigne JY, Guedj S, Straus C. Idiopathic coccygodynia. Lateral roentgenograms in the sitting position and coccygeal discography. *Spine (Phila Pa 1976).* 1994 Apr 15;19(8):930-934.
8. Postacchini F, Massobrio M. Idiopathic coccygodynia. Analysis of fifty-one operative cases and a radiographic study of the normal coccyx. *J Bone Joint Surg Am.* 1983 Oct;65(8):1116-1124.
9. Maigne JY, Doursounian L, Chatellier G. Causes and mechanisms of common coccydynia: role of body mass index and coccygeal trauma. *Spine (Phila Pa 1976).* 2000 Dec 1;25(23):3072-3079.
10. Maigne JY, Pigeau I, Aguer N, Doursounian L, Chatellier G. Chronic coccydynia in adolescents. A series of 53 patients. *Eur J Phys Rehabil Med.* 2011 Jun;47(2):245-251.
11. Schapiro S. Low back and rectal pain from an orthopedic and proctologic viewpoint; with a review of 180 cases. *Am J Surg.* 1950 Jan;79(1):117-128.
12. Nathan ST, Fisher BE, Roberts CS. Coccydynia: a review of pathoanatomy, aetiology, treatment and outcome. *J Bone Joint Surg Br.* 2010 Dec;92(12):1622-1627.
13. Thiele GH. Coccygodynia: Cause and treatment. *Dis Colon Rectum.* 1963 Nov-Dec;6:422-436.
14. Capar B, Akpınar N, Kutluay E, Müjde S, Turan A. Coccygectomy in patients with coccydynia [in Turkish]. *Acta Orthop Traumatol Turc.* 2007 Aug-Oct;41(4):277-280.
15. Trollegaard AM, Aarby NS, Hellberg S. Coccygectomy: an effective treatment option for chronic coccydynia: retrospective results in 41 consecutive patients. *J Bone Joint Surg Br.* 2010 Feb;92(2):242-245.

16. Altman RD, Dreiser RL, Fisher CL, Chase WF, Dreher DS, Zacher J. Diclofenac sodium gel in patients with primary hand osteoarthritis: a randomized, double-blind, placebo-controlled trial. *J Rheumatol*. 2009 Sep;36(9):1991-1999. Epub 2009 Jul 31.
17. Barthel HR, Haselwood D, Longley S 3rd, Gold MS, Altman RD. Randomized controlled trial of diclofenac sodium gel in knee osteoarthritis. *Semin Arthritis Rheum*. 2009 Dec;39(3):203-212. Erratum in: *Semin Arthritis Rheum*. 2010 Aug;40(1):95.
18. Simon LS, Grierson LM, Naseer Z, Bookman AA, Zev Shainhouse J. Efficacy and safety of topical diclofenac containing dimethyl sulfoxide (DMSO) compared with those of topical placebo, DMSO vehicle and oral diclofenac for knee osteoarthritis. *Pain*. 2009 Jun;143(3):238-245. Epub 2009 Apr 19.
19. Maigne JY, Chatellier G. Comparison of three manual coccydynia treatments: a pilot study. *Spine (Phila Pa 1976)*. 2001 Oct 15; 26(20):E479-E483; discussion E484.
20. Gupta D, Jain R, Mishra S, Kumar S, Thulkar S, Bhatnagar S. Ultrasonography reinvents the originally described technique for ganglion impar neurolysis in perianal cancer pain. *Anesth Analg*. 2008 Oct;107(4):1390-1392. Retraction in: Bhatnagar S. *Anesth Analg*. 2010 Dec;111(6):1560.
21. Mitra R, Cheung L, Perry P. Efficacy of fluoroscopically guided steroid injections in the management of coccydynia. *Pain Physician*. 2007 Nov;10(6):775-778.
22. Foye PM, Buttaci CJ, Stitik TP, Yonclas PP. Successful injection for coccyx pain. *Am J Phys Med Rehabil*. 2006 Sep;85(9): 783-784.
23. Plancarte R, Amescua C, Patt RB, Allende S. Presacral blockade of the Ganglion of Walther (Ganglion Impar). *Anesthesiol*. 1990 Sept;73(3A):A751. (Abstract).
24. Toshniwal GR, Dureja GP, Prashanth SM. Transsacrococcygeal approach to ganglion impar block for management of chronic perineal pain: a prospective observational study. *Pain Physician*. 2007 Sep;10(5):661-666.
25. Haider N. Coccydynia Treated with Spinal Cord Stimulation; A Case Report. American Academy of Pain Medicine 24th Annual Meeting. 2008: Poster 144. <http://aapm.confex.com/aapm/2008am/techprogram/P2716.HTM>. Accessed December 2, 2013.
26. Wray CC, Easom S, Hoskinson J. Coccydynia. Aetiology and treatment. *J Bone Joint Surg Br*. 1991 Mar;73(2):335-338.
27. Perkins R, Schofferman J, Reynolds J. Coccygectomy for severe refractory sacrococcygeal joint pain. *J Spinal Disord Tech*. 2003 Feb;16(1):100-103.
28. Dean LM, Syed MI, Jan SA, Patel NA, Shaikh A, Morar K, Shah O. Coccygeoplasty: treatment for fractures of the coccyx. *J Vasc Interv Radiol*. 2006 May;17(5):909-912.
29. Bergkamp AB, Verhaar JA. Dislocation of the coccyx: a case report. *J Bone Joint Surg Br*. 1995 Sep;77(5):831-832.

This article meets the Accreditation Council for Graduate Medical Education and the American Board of Medical Specialties Maintenance of Certification competencies for Patient Care and Medical Knowledge.