

Update options in the treatment of coccydynia(tail bone pain): article reviewAli Taha Hassan Al-Azzawi ¹**Abstract**

This literature review is intended to provide oversight on the anatomy, incidence, etiology, presentation, diagnosis, and treatment of coccydynia. Relevant articles were retrieved with PubMed using keywords such as “coccydynia”, “coccyx”, “coccyx pain”, and “coccygectomy. Literature accumulated for this study was accumulated from PubMed using sourcombined to form this study. Images were also added from three separate sources to aid in the understanding of the coccyx and coccydynia. Focal points of this study included the anatomy of the coccyx, etiology and presentation of coccydynia, how to properly diagnose coccydynia, and possible treatments for the variety of etioloce. The coccyx morphology is defined using different methods by different authors as presented in this study. There is no conclusive quantitative data on the incidence of coccydynia; however, there are important factors that lead to increased risk of coccydynia such as obesity, age, and female gender. Injury to the coccyx or coccygeal joints with surrounding tissue inflammation and contraction of the muscles attached to the coccyx causes coccydynia. Diagnosis is made predominantly in clinical examinations with static standard radiographs, CT, and routine blood tests. Treatment options include conservative care, physical therapy, intrarectal massage and manipulation, sacrococcygeal injections (including ganglion impar block), and coccygectomy. Many cases are resolved with conservative treatments, despite the wide array of etiologies for the diagnosis. In more extreme cases, physician intervention requires a multidisciplinary approach. Surgical treatment is used as a last resort.

Keywords: Coccydynia, Coccyx, Coccyx pain, Coccygectomy

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Definition

Coccydynia refers to any type of persistent tailbone pain. The tailbone, located at the very bottom of the spine, is medically known as the coccyx. Coccydynia is typically felt as a localized pain that usually worsens when sitting or with any activity that puts pressure on the bottom of the spine [1].

Prevalence

A study of 2000 cases of back pain referred to hospital found that 2.7% were diagnosed as coccydynia. This type of pain occurs five times more frequently in women than in men. It can occur at any age, the mean age of onset being around 40, there are no ethnicity or race associations with coccydynia [2].

Anatomy of the Coccyx (Tailbone)

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 [3].

Function of the Coccyx

Although the tailbone is considered vestigial (or no longer necessary) in the human body, it does have some function in the pelvis. For instance, the coccyx is one part of a three-part support for a person in the seated position. Weight is distributed between the bottom portions of the two hip bones (or ischium) and the tailbone, providing balance and stability when a person is seated [4].

Possible Causes of Coccydynia

A diagnosis of coccydynia will usually identify one of the following underlying causes of pain:

1. Local trauma. A direct injury to the coccyx is probably the most common cause of coccydynia. A fall on the tailbone can inflame the ligaments and injure the coccyx or the coccygeal attachment to the sacrum. Coccygeal trauma usually results in a bruised bone, but may also result in a fracture or dislocation either in the front or back of the coccyx [5].
2. Repetitive stress. Activities that put prolonged pressure on the tailbone, such as horseback riding and sitting on hard surfaces for long periods of time, may cause the onset of coccyx pain. Tailbone pain from these causes usually is not permanent, but if inflammation and symptoms are not managed, the pain may become chronic and cause long-term altered mobility of the sacrococcygeal joint.
3. Childbirth. During delivery, the baby's head passes over the top of the coccyx, and the pressure against the coccyx can sometimes result in injury to the coccygeal structures (the disc, ligaments, and bones). While uncommon, the pressure can also cause a fracture in the coccyx.
4. Tumor or infection. Rarely, coccydynia can be caused by a nearby tumor or infection that puts pressure on the coccyx [6].
5. Referred coccyx pain. In rare cases pain will be referred to the coccyx from elsewhere in the spine or pelvis, such as a lumbar herniated disc or degenerative lumbar disc.
6. Coccydynia can also be associated with nonorganic causes, such as somatization disorder and other psychological disorder [7].

Classification of coccydynia based on aetiology

A: Based on etiology

Idiopathic

Traumatic

B: Based on pathology

Degeneration of the sacrococcygeal and intercoccygeal disc and joints

Morphology of the coccyx, presence of a bony spicule and coccygeal retroversion.

Mobility of the coccyx: hypermobile or posterior subluxation [9].

Referred pain: lumbar pathology or arachnoiditis of the sacral nerve roots, spasm of the pelvic floor muscles and inflammation of the pericoccygeal soft tissues Others: neoplasm, crystal deposits, infection [10].

Pathogenesis

Coccygeal mobility –During dynamic radiographs (sitting to standing), normal coccygeal flexion mobility has been determined to be between 5° and 25° when an individual is sitting [11]. Deviations from this normal range have been found in 70% of patients with coccydynia and this deviation is now associated with condition- Hypermobility: coccygeal flexion mobility exceeds 25° when sitting - Immobile: coccygeal flexion mobility is below 5° when sitting –Posterior subluxation is when the mobile portion of the coccyx displaces posteriorly when sitting. Anterior subluxation is more commonly seen in adolescents • Degeneration –Due of the presence of vertebral discs or disc-like structures in some coccygeal cadaver specimens, degeneration has been proposed as a possible cause of pain in patients with coccydynia. Coccygeal plexus –Nerve entrapment is a potential source of pain that has not been thoroughly investigated [12].

Clinical features

Coccydynia constitutes less than 1% of all non-traumatic complaints of the spine. Women are five times more commonly affected than men [13]. In 1950, Schapiro confirmed the findings of the clinical features of coccydynia and called it Thiele syndrome. Thiele's description of the clinical features still holds true today. This includes the main symptoms of tenderness and pain, or an ache localized in the region of the lower sacrum, the coccyx, or in the adjacent muscles and soft tissues. The patient usually points to the coccyx as the site of pain [14]. The severity of the pain is dependent on various predisposing factors, such as the duration of time spent sitting. Women report an exponential increase in pain during the premenstrual period. Dyspareunia and piriformis syndrome have been infrequently associated with coccydynia. The character of the pain appears to be more related to spasm of the levator muscle, as patients complain of pain during defecation or sexual intercourse [15].

Initial Diagnostic Methods for Coccydynia

A complete medical history collected will likely include information on current symptoms, as well as when and how symptoms developed. A doctor may also look for environmental or lifestyle factors for the patient's pain, such as recent injury, exercise habits, or obesity [16].

After a medical history is collected, a doctor will begin a physical exam. A thorough physical examination for coccyx pain may include [17]:

Palpation to check for local tenderness. A doctor will feel by hand to identify swelling and tenderness around the coccyx. Palpation may also be used to identify potential coccygeal spicules (bone spurs), cysts, or tumors.

Intra-rectal exam and manipulation. In some cases, a doctor may choose to manipulate the coccyx manually through the rectum, in order to assess limited or excessive mobility of the sacrococcygeal joint. Intra-rectal manipulation may also be used to assess any muscle tension in the pelvis connecting to the coccyx [18].

Plain radiographs can help rule out fracture, dislocation, or subluxation of the coccyx at the sacrococcygeal junction or intercoccygeal segments - Dynamic radiographs might be obtained in the sitting and standing positions to determine the coccygeal angle and pelvic rotation during sitting - Dynamic imaging of the sacrum should be done routinely in patients with coccydynia to detect sacrococcygeal dislocation. In the absence of dislocation on these dynamic studies, MRI can be used CT, and routine blood tests, which showed no particular abnormality except in the presence of tumor or infection. Coccydynia is a dynamic disorder which can only be appreciated on dynamic films [19-25]. Dynamic MRI to indicate that the coccyx is mobile during defecation, and were able to demonstrate coccygeal excursion by assessing the difference between its position at maximum contraction and during straining or evacuation [26].

Treatment for Coccydynia (Tailbone Pain)

The goal of coccydynia treatment is usually to reduce pain by keeping pressure off of the tailbone, easing inflammation or muscle tension that add to pain, or reducing pain signals to the brain using medication. A combination of treatments and activity modification usually suffices to control or alleviate tailbone pain [27]. Many studies find that non-surgical treatments are successful in approximately 90% of coccydynia cases.

The first line of treatment typically includes self-care that can be done without the assistance of a medical professional, such as some of the following [28-35]:

- Non-steroidal anti-inflammatory drugs (NSAIDs). Common NSAIDs, such as ibuprofen (Advil), naproxen (Aleve), or COX-2 inhibitors (Celebrex), help reduce the inflammation around the coccyx that is usually a cause of the pain.
- Ice or cold pack. Applying ice or a cold pack to the area several times a day for the first few days after pain starts can help reduce inflammation, which typically occurs after injury and adds to pain.
- Heat or heating pad. Applying heat to the bottom of the spine after the first few days of pain may help relieve muscle tension, which may accompany or exacerbate coccyx pain. Common heat sources include a hot water bottle, chemical heat pack, long-lasting adhesive heat strip, or hot bath (as long as weight is kept off the tailbone in the bathtub).
- Activity modification. Alterations to everyday activities can help take cumulative pressure off of the tailbone and alleviate pain. These activity modifications may include using a standing desk to avoid prolonged sitting, using a pillow to take the weight off the coccyx, or adjusting posture so weight is taken off the tailbone when sitting.
- Supportive pillows. A custom pillow that takes pressure off the coccyx when sitting may be used. Pillows for alleviating coccydynia may include U- or V-shaped pillows, or wedge-shaped pillows with a cutout or hole where the tailbone is. Any type of pillow or sitting arrangement that keeps pressure off the coccyx is ideal and largely a matter of personal preference [36].
- A supportive cushion can be useful in the car, as well as in an office, classroom, or at home.

- Dietary changes. If tailbone pain is caused by or worsened with bowel movements or constipation, increased fiber and water intake, as well as stool softeners, is recommended.

Non-surgical treatment options for coccydynia may include:

1. Injection

An injection of a numbing agent (lidocaine) and steroid (to decrease inflammation) in the area surrounding the coccyx may provide pain relief. The physician uses imaging guidance to ensure that the injection is administered to the correct area. Pain relief can last from 1 week up to several years. If the first injection is effective, patients may receive up to 3 injections in a year [38-40].

2. Manual manipulation

Some patients find pain relief through manual manipulation of the coccyx. Through manual manipulation, the joint between the sacrum and the coccyx can be adjusted, potentially reducing pain caused by inadequate coccyx mobility

3. Massage

Coccydynia may be reduced or alleviated by massaging tense pelvic floor muscles that attach to the coccyx. Tense muscles in this region can place added strain on the ligaments and sacrococcygeal joint, limiting its mobility or pulling on the coccyx

4. Stretching

Gently stretching the ligaments attached to the coccyx can be helpful in reducing muscle tension in the coccygeal area. A physical therapist, chiropractor, physiatrist, or other appropriately trained healthcare practitioner can provide instruction on appropriate stretches for relieving coccyx pain.

5. TENS unit

Transcutaneous Electrical Nerve Stimulator (TENS) units apply electric stimulation that interferes with the transmission of pain signals from the coccyx to the brain. These devices can be good option for patients who wish to keep their intake of medications to a minimum. There are many varieties of TENS units, with some using high-frequency stimulation that are worn for short periods of time, and others using low-frequency stimulation that may be worn longer.

Surgical treatment

If non-surgical treatments fail to relieve the pain, or in cases of cancer, surgery to remove the coccyx (coccygectomy) may be required. In cases where pain persists after surgery, standard drugs for chronic pain, such as tri-cyclic anti-depressants, may help alleviate the pain [41].

Risks and Complications of Coccyx Surgery

Perhaps the biggest risk is continued pain in the coccyx post-operatively, meaning that the patient has endured the long healing process. A possible but uncommon risk of coccygectomy is injury to the rectum as the coccyx is being removed. While it is unlikely, it is possible that if this were to happen, a diverting colostomy would be necessary to allow the rectum to heal.

Other potential risks include wound healing difficulties and/or local infection, which can delay the overall healing process. Unlike most other spine surgeries, there are no significant nerve roots in the region

that would be at risk and still has not had improvement in the symptoms. For this reason, patient selection is crucial to a positive surgical outcome.

Self-care measures

1. The following advice may help reduce pain and allow you to get on with your everyday activities.
2. Use a specially designed coccyx cushion – these can be bought online and from some shops; they help reduce the pressure on your tailbone while you're sitting down
3. Avoid prolonged sitting whenever possible – try to stand up and walk around regularly; leaning forward while seated may also help
4. Wear loose-fitting clothes – avoid clothing such as tight jeans or trousers that may put pressure on your tailbone
5. Apply warm and cold packs to your tailbone – warm packs include hot water bottles and microwaveable heating pads; cold packs are available as freezable gel-filled pads from pharmacies, or you can use a bag of frozen vegetables wrapped in a towel
6. Try laxatives (medicines to treat constipation) if the pain is worse when you are having a poo – many laxatives are available to buy from pharmacies and supermarkets without a prescription
7. Take over-the-counter painkillers [43].

Functional outcomes

Conservative treatment remains the mainstay of treatment. There is wide variation in the results of injection techniques. Publisher result reported that 60% improvement with pericoccygeal injection, 85% with manipulation and injection and 90% with coccygectomy. While published data reported 78% success rate for manipulation and injection, and 87% success rate with surgery. Perkins reported that 75% had relief after injection and 92% after surgery. A few authors have commented on the role of steroid injection as a pre-operative test to assess the efficacy of surgery [44-47].

Other reported that 59% surgical success rate in non-responders following injection, compared with 75% in responders. Powers and Key39 felt that a two-month trial of conservative treatment was sufficient for patients who were non-responders, whereas others recommended three to eight months as an ideal waiting time to determine the outcome of conservative methods. Various authors have reported good to excellent results in patients who underwent coccygectomy for coccydynia [48-50].

Careful patient selection appears to be the key to success. Various clinical and radiological pointers predict a good outcome after surgery. Coccygectomy for coccydynia due to changes in the shape of the coccyx, the presence of a bursa, and a good response to injection has an increased chance of an excellent result after surgery. Infection remains the most important complication of coccygectomy because of the proximity of the incision to the rectum and anal canal. Bayne reported an infection rate of 16.6%, and other reported 14.75% rate [51-55].

Many research papers reported partial skin necrosis and superficial wound infection causing delayed healing in up to 50% of patients. While published manuscript reported that the use of prophylactic antibiotics substantially reduced the risk of infection. Modification of the Kraske technique as described by powers also substantially reduces the incidence of infection [56-58]. Complications such as rectal

injury, anal sphincter injury and incontinence have been rarely reported. Conservative treatment in the form of massage, injection and ganglion impar blocks appear to play a vital role in the management of coccydynia. Coccygectomy is effective in patients with coccydynia, especially for those with specific indications. Even though there appears to be a psychological issue associated with diagnosis, there are studies that report good or excellent results for patients with the appropriate indications undergoing coccygectomy [59,60].

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

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