Sacroccocygeal Pain Syndromes: Diagnosis and Treatment

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ABSTRACT: Sacroccocygeal pain can arise from the sacroccocygeal joint, from contiguous structures sharing the same innervation, or from distant sites. True coccygodynia consists of pain arising from the sacroccocygeal joint, whereas pseudococcygodynia consists of pain referred to but not arising from the coccyx. Coccygodynia can usually be distinguished from pseudococcygodynia by physical examination with the diagnosis being confirmed by injection of local anesthetic into the sacroccocygeal joint. The etiology of pain not relieved by intraarticular injection can be further defined by selective neuroblockade. A method for defining the anatomic basis for sacroccocygeal pain is presented as well as a discussion of the relevant anatomy and differential diagnosis of sacroccocygeal pain.

Introduction

Coccygodynia, a well recognized but poorly understood entity, is characterized by pain in the coccyx. The pain may arise from the coccyx, from contiguous structures, or from distant sites. Coccygodynia caused by trauma is usually easy to diagnose and treat in contrast to idiopathic coccygodynia, for which the causes are less clear and treatment less satisfactory. Failure to distinguish pain of coccygeal origin from pain referred to the coccyx may lead to inappropriate therapy and unsatisfactory outcome.

This article presents a classification for coccygodynia, reviews the differential diagnosis of coccygeal pain, and describes an approach for distinguishing true coccygodynia from coccygeal pain referred from distant sites.

Anatomy

The coccyx, a bony structure attached to the caudal end of the sacrum, is composed of three to five segments. The first and second segments may be separated by an intervertebral disk, but more commonly the segments are fused. The coccyx articulates with the sacrum by a synarthrosis, the sacroccocygeal joint. The mobility of this joint and the potential for movement between the first and second coccygeal segments predispose the coccyx to fracture and dislocation.

The coccyx is innervated by the coccygeal nerves and by branches of the fifth sacral root as they leave the caudal canal at the sacral hiatus (Fig 1). The coccygeal nerves also join with the posterior primary rami of the fourth and fifth sacral segments to supply the skin overlying the coccyx. The fifth sacral nerve, which exits the sacral hiatus and travels medially and inferiorly to the sacral cornu, supplies the distal coccyx. The coccygeal nerves are derived from the lower sacral roots and share segmental innervation with nerves supplying the pelvic musculature. The pelvic splanchnic nerves also transmit parasym pathetic fibers from the second, the third, and occasionally the fourth sacral segments carrying nociceptive stimuli from pelvic viscera. This pattern of innervation explains the potential referral of pain from pelvic structures to the coccygeal region.

Less well understood are the referral patterns of pain associated with dural irritation and lesions of the lower lumbar and upper sacral segments. Referral of pain to the coccyx may relate to overlapping receptor fields in the dorsal horn of the spinal cord or more proximal structures.

Differential Diagnosis of Coccygeal Pain

Acute coccygodynia is most often caused by trauma to the coccyx and surrounding structures. It commonly arises from a fall in the half-seated position in which the impact of the fall is directed to the coccyx rather than the ischial tuberosities. The onset of pain is sudden; exquisite
tenderness to palpation and pain on movement of the coccyx are characteristic. Typically, patients have pain only when sitting or when changing positions. Night pain is unusual, as is pain occurring with coughing, sneezing, or defecation.

The causes of chronic coccygeal pain are less clear than those of acute coccygodynia. The most common causes are faulty posture while sitting and trauma to the coccyx during childbirth. Sitting in the slouched position puts stress on the coccyx rather than on the ischial tuberosities. In childbirth, the pressure of the fetal head is thought to cause injury to sacral structures. Other causes for coccygeal pain such as chronic infection and dysfunction of the musculature of the pelvic floor have been suggested but not proved.

Coccygeal pain may be the presenting complaint of patients with midline disk herniations. Diskogenic disease can cause nonsegmental referral of pain related to dural irritation. Segmentally referred pain from compression of a spinal root or nerve is also possible; lesions of the first, fourth, and fifth sacral roots have been reported to cause sacroccocygeal pain.

Patients with lumbar facet arthropathy may also present with coccygeal pain. Back pain is usually present but may not be a major complaint; referral of pain to the midsacrum, buttock, or coccyx is not uncommon.

Neuralgic pain related to sacral plexopathy or sacrococcygeal neuropathy is often referred to the coccyx. Tumors such as neurofibromas, chordomas, and carcinomas can invade the sacrum, causing intractable sacroccocygeal pain. Patients with these lesions usually report persistent, unremitting discomfort in the buttocks or rectum. Their pain may be increased by sitting but typically is not relieved by lying down. A history of changing bowel habits, difficulty with micturition, or complaints of rectal pain or paresthesias should suggest a process infiltrating the presacral space or compressing the cauda equina.

Although uncommon, coccygeal pain of psychogenic origin is usually easy to recognize. This possibility is raised when one observes what is psychiatrically termed
"abnormal illness behavior." Patients with psychogenic pain often describe their symptoms in bizarre terms, giving histories that are not typical for either visceral or somatic disease. A lack of objective physical findings is characteristic, yet the diagnosis is based more on history than on physical examination. Inability to identify a source for pain does not signify a psychogenic etiology. Coccygeal discomfort may be the initial manifestation of tumor appearing before any abnormalities are detectable.

**Discussion**

Coccygodynia, the term used to describe a syndrome of coccygeal pain, can be classed as belonging to one of three categories on the basis of etiology: 1) Pain arising from the coccyx; 2) pain referred to the coccyx from either visceral organs or dural irritation; and 3) neurogenic pain originating in a root, plexus, or peripheral nerve. Groups 2 and 3 are best classified as pseudococcygodynia because the coccyx is not the primary source of pain; this term is semantically more correct than "secondary coccygodynia" because "secondary" implies but does not indicate causation.

By definition, the pain of pseudococcygodynia does not arise from the coccyx. It is referred from pelvic structures, from the spine, or from the lumbosacral plexus or nerves emanating from it. The pain of pseudococcygodynia may be either segmental or nonsegmental in distribution. Segmental pain—that is, pain arising from a sacral root or peripheral nerve—is usually neuralgic in character with patients reporting numbness, tingling, or burning. In contrast, nonsegmental pain referred from spinal dura or from viscera does not follow the distribution of either spinal or peripheral nerves. In pseudococcygodynia the coccyx and sacrum may be tender to palpation, but pain on movement of the sacrococcygeal joint is unusual. Examination may demonstrate abnormalities in the rectum, prostate, cervix, proximal urethra, or bladder. Spasm of the levator muscle is not uncommon.

Coccygodynia can usually be distinguished from pseudococcygodynia by history. The patient with coccygodynia has pain related to posture and activity. Discomfort not relieved by lying down is cause for questioning the diagnosis of coccygodynia. Pain increased by coughing, sneezing, or defecating is more typical of spinal than coccygeal disease. Pain that is worse at night should suggest the possibility of tumor or infection.

It is imperative that a complete physical examination be performed. The physician should carefully examine both perirectal and pelvic structures. Developmental cysts, anterior sacral meningoceles, and sacrococcygeal tumors frequently can be identified by rectal examination. Developmental cysts are usually midline in location, presenting as soft non tender masses. Anterior sacral meningoceles are typically sensitive to palpation; having the patient perform a Valsalva maneuver while the physician examines the rectum may cause the mass to increase in size. Tumors such as chordomas usually present as large solid masses fixed to the sacrum. This is in contrast to neurofibromas, which are usually small and eccentrically located high on the posterior rectal wall. Tumors, whether benign or malignant, tend to be firm and fixed to surrounding structures. In the presence of tumor the sacrum may be tender to palpation, providing a clue to osseous spread. However, exquisite tenderness is more a feature of abscess than of tumor. Systemic signs such as fever and leucocytosis should suggest the presence of infection. When an abscess is suspected, proctosigmoidoscopy may reveal a sinus tract on the posterior rectal wall or pus draining from an anal crypt.

One should examine both the genitalia and the rectum. In men, the testicles and prostate must be carefully examined. When examining women, finding excessive discomfort during palpation of the muscles and ligaments of the pelvic floor should suggest the diagnosis of levator ani syndrome. One should recognize, however, that levator ani syndrome is a poorly understood entity of unknown etiology whose existence has been questioned.

The coccyx should be palpated through the rectum anteriorly as well as posteriorly. The presence of pain on movement of the coccyx has diagnostic value, but the degree of mobility has less importance. Normally the tip of the coccyx will move up to 30° anteriorly and 1 cm laterally.

Roentgenologic studies are more useful for evaluating pseudococcygodynia than coccygodynia. Roentgenograms of the coccyx can be used to identify fractures and destructive processes. After excluding these processes, the relationship between radiographic findings and symptoms is poor; structural abnormalities are present in many asymptomatic patients. Plain radiographs of the sacrum should be examined closely. Deformities of the sacrum are seen with anterior sacral meningoceles and developmental cysts. Infiltrating neoplasms causing expansion of bone and tumors such as teratomas, which produce erosions of the anterior aspect of the sacrum, can often be identified by plain roentgenograms. Isotopic bone scans are useful in identifying inflammatory and neoplastic disease. Metastatic and infectious processes may cause reactive new bone formation or may alter blood flow to produce abnormal uptake of isotope on radiographs.

When pseudococcygodynia is considered, computed tomography (CT) of the lumbar spine and sacrum is helpful in identifying spinal or pelvic disease. The entire lumbar spine should be scanned because lesions of the upper lumbar region can refer pain to the sacrum and coccyx. When visualization of intraspinal contents is important, subarachnoid contrast-enhanced CT scans pro-
TABLE

EFFECT OF DIAGNOSTIC NEUROBLOCKADE ON PAIN

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Coccygodynia</th>
<th>Pseudococcygodynia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacroccocygeal joint injection</td>
<td>Decrease</td>
<td>No effect</td>
</tr>
<tr>
<td>Sacroccocygeal nerve blocks</td>
<td>Decrease</td>
<td>No effect</td>
</tr>
<tr>
<td>Caudal epidural anesthesia*</td>
<td>Decrease</td>
<td>Decrease or no effect</td>
</tr>
<tr>
<td>Lumbar epidural anesthesia</td>
<td>No effect</td>
<td>Decrease</td>
</tr>
<tr>
<td>Lumbar facet blocks</td>
<td>No effect</td>
<td>Decrease</td>
</tr>
</tbody>
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* Blocks pain coming from not only the coccyx but also all structures innervated by the sacral roots and plexus.

Provide a better view of intrathecal structures; arachnoiditis, perineural cysts, and spinal cord tumors may not be seen when using unenhanced tomography. More recent data suggest that magnetic resonance imaging (MRI) can reliably visualize the spinal canal and its contents. In addition, MRI studies of the pelvis are useful for evaluating sacral and presacral regions, and MRI is the imaging modality of choice when looking for pelvic lesions.

Selective neuroblockade can help identify the source of coccygeal pain (Table). The diagnosis of sacroccocygeal arthritis is confirmed by pain relief following intraarticular injection of local anesthetic or blockade of the coccygeal nerves. Failure to obtain relief following these injections should suggest the possibility of pseudococcygodynia with referred pain. In this situation, epidural anesthesia will help define the cause of pain (Fig 2).

Pain not relieved by low volume caudal anesthesia (blockade of sacral segments) is likely to be referred from more proximal sites. If caudal anesthesia does not relieve pain, one can investigate further by injecting local anesthetic into the lumbar epidural space. Relief of pain with lumbar but not caudal epidural anesthesia would indicate that pain is arising from lumbar rather than sacral segments. Although epidural anesthesia cannot determine whether the source of pain is articular, diskogenic, or radicular, it will assist in deciding what further studies would be appropriate. Infrequently, sacroccocygeal pain may be referred from the lower lumbar facet joints; in these cases, relief of pain following lumbar facet blocks will be diagnostic.

Having a correct diagnosis is a prerequisite for successful therapy. Most cases of coccygodynia caused by arthritis will respond to intraarticular injection of cortico-

Fig 2: Localization of pain source by neuroblockade.
steroid or to the use of a doughnut-shaped pillow when sitting. Recalcitrant cases can be treated with coccygeal neurolysis or by coccygectomy. Sacral rhizotomy is less useful because it has a greater potential for causing deafferentation pain. The treatment of pseudococcydynia should be disease oriented rather than symptom oriented. Therapy directed at the coccyx is ineffective.

References