Clinical Decision Making for the Evaluation and Management of Coccydynia: 2 Case Reports

Coccydynia is a painful and potentially debilitating condition that may be related to trauma, obesity, or other unidentifiable causes.1 The coccyx is variable in size and consists of 3 to 5 vertebral units that are usually fused, with the exception of the first segment, which articulates with the distal end of the sacrum and is referred to as the sacrococcygeal joint. In general, the dorsal surface of the coccyx is convex, so that its inferior aspect is sloping anteriorly. The sacrococcygeal joint has a limited amount of movement in flexion and extension, ranging from approximately 5° to 15° in either direction.1 A posterior rotation (flexion) motion occurs when moving from a standing to a sitting position, which is thought to enable optimal force absorption in the seated position. The reverse occurs when moving from a seated to a standing position. Movement also occurs during defecation, where flexion controls descent of feces and extension allows release.1,4–16

Women are 4 times more likely to have symptoms consistent with coccydynia, and individuals with increased body mass index are 3 times more likely to develop this painful disorder.4 Coccydynia is associated with posterior sacrococcygeal subluxation from repeated or prolonged sitting loads.7 Diagnosis of this condition is based on clinical presentation and, often, static-view radiological imaging to identify displacement of the coccyx. Dynamic imaging can also be performed to assess abnormal mobility by comparing the position of the coccyx in standing versus a seated position. Instability of the coccyx has been defined as a flexion movement that exceeds 25° or extension that exceeds 20°; however, recent dynamic magnetic resonance imaging
findings have demonstrated excursion up to 31° of flexion in asymptomatic individuals.4-10 There is, therefore, no imaging gold standard for the diagnosis of coccydynia, and to date there are no reliability studies of manual assessment of mobility abnormalities, which leaves the clinician to rely primarily on the history and physical examination for diagnosis.

Currently, there is a paucity of research for the role of conservative treatment in the management of coccydynia. Treatment descriptions vary but consist of nonsteroidal anti-inflammatory drugs, manual therapy, and local cortisone injections.2,5,7,10,12-14 Compared with placebo intervention, Maione et al11 found that manual therapy in the form of intrarectal manipulation for 3 treatment sessions resulted in better outcomes for pain and function at both 1 and 6 months.8 Furthermore, Maione and Chatellier12 found that intrarectal manual therapy in the form of massage, mobilization, and stretching resulted in a positive success rate of 43% of those treated at 2-year follow-up. Treatment success varied by cause of coccydynia and classification of mobility by plain-film radiography.7 Although both of these studies support the use of mobilization in the presence of chronic coccydynia, effectiveness may vary based on the underlying cause of the painful condition and individual patient characteristics.

The evidence to support the use of corticosteroid injections is also limited but favorable. Wray et al20 compared the outcomes of 120 individuals with coccydynia who were treated with physical therapy consisting of therapeutic ultrasound and shortwave diathermy, local cortisone injection, or cortisone injection and manipulation. They found that the combination of injection and manipulation was successful in 85% of cases, compared to local injection, which had a 60% success rate. Those positive data are in contrast to the use of ultrasound and shortwave diathermy, which had a success rate of 16%. In a study by Mitra et al21 of individuals treated with fluoroscopic-guided injection, patients with pain of less than 6 months in duration were more likely to have significant pain relief at 3-year follow-up than those with longer pain duration, suggesting that early injection may be a viable intervention for this condition. Local injection in this area carries the risk of infection, skin irritation, or, worse, perforation into the rectum, so guided techniques may be the better option for safety.

Coccygectomy, or surgical extraction of the coccyx, has been recommended in cases of acute trauma, including unstable fractures or recalcitrant pain, when conservative management has been deemed unsuccessful or has not provided sufficient relief.1,3,6,13-17 In a retrospective analysis of 32 individuals treated by an orthopaedic spine surgeon over a 5-year period, Hodges et al18 reported that 13% of the patients were treated with nonsteroidal anti-inflammatory drugs alone, 53% were treated with both nonsteroidal anti-inflammatory drugs and local injections, and 34% underwent coccygectomy. In their study, those who underwent coccygectomy had significantly greater pain scores and slightly greater Oswestry Disability Index scores pretreatment than those who were treated conservatively.5 The primary complications of the surgical approach were wound infections that required treatment with antibiotics. Other complications included poor wound healing, hematoma, and wound dehiscence that resulted in reoperation. These findings suggest that surgery may result in positive outcomes, although there are potential complications.

Current evidence is limited for both conservative and nonconservative management of coccydynia, and clinical trials are lacking to establish the relative benefits of conservative versus surgical approaches. Therefore, conservative versus surgical interventions should be considered. This case report describes 2 different clinical presentations and outcomes of coccydynia, both diagnosed through clinical examination that included intrarectal coccyx mobility and pain provocation testing. The cases described are intended to help guide clinicians in the diagnostic testing and clinical decision making for both conservative and surgical management of coccydynia.

### TABLE

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Case 1</th>
<th>Case 2</th>
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<tbody>
<tr>
<td>Age, y</td>
<td>26</td>
<td>31</td>
</tr>
<tr>
<td>Height, cm</td>
<td>157</td>
<td>160</td>
</tr>
<tr>
<td>Weight, kg</td>
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<td>BMI, kg/m²</td>
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<td>Occupation</td>
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<td>Editor</td>
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<tr>
<td>Activity level</td>
<td>Aerobic activity, including elliptical, running</td>
<td>Aerobic activity, primarily running, 5 d per wk, and yoga occasionally</td>
</tr>
<tr>
<td>Symptom duration</td>
<td>5 mo</td>
<td>Newest onset, 2 mo (initial onset, 1.5 y ago)</td>
</tr>
<tr>
<td>Average time sitting per d</td>
<td>8-10 h between classes, teaching assistant, and studying</td>
<td>8 h at work; avoids outside of work</td>
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<tr>
<td>VAS worst (24-h period)</td>
<td>8/10</td>
<td>10/10</td>
</tr>
<tr>
<td>VAS best (24-h period)</td>
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<td>0/10</td>
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<tr>
<td>ODI %</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>FABQ-PA</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>FABQ-W</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index; FABQ-PA, Fear-Avoidance Beliefs Questionnaire physical activity subscale; FABQ-W, Fear-Avoidance Beliefs Questionnaire work subscale; ODI, Oswestry Disability Index; VAS, visual analog scale.
Student. Initial examination of the lumbar and sacral region did not reproduce any of her reported symptoms and was normal for all neurological examinations, including the straight leg raise and seated slump tests, and all lumbar spine segmental motion testing. The patient was also asked to complete an 11-point (0, no pain; 10, maximum pain) visual analog scale for pain and the modified Oswestry Disability Index to assess function (TABLE).

As her primary symptom was pain with sitting and transitioning from sit to stand and the remainder of the clinical examination was essentially normal, a potential diagnosis of coccydynia was considered. At this point, after discussion with the patient, a second opinion from a fellowship-trained manual physical therapist was sought.

Because mobility assessment of the sacrococcygeal joint requires grasping the coccyx through the anal canal with the thumb and index finger (FIGURE 1), the intrarectal nature of the examination was carefully explained and verbal consent obtained prior to performing the examination. Examination of the sacrococcygeal joint revealed perceived reduced mobility in the anterior-to-posterior (AP) direction. Simultaneous to resistance to motion, movement of the coccyx in the anterior direction reproduced the patient’s symptoms.

Based on examination findings, the patient was treated with mobilization in the AP direction (FIGURE 2), utilizing a stretching and oscillating force for 10 to 15 seconds each application. Initial mobilization was done within the tissue slack to facilitate pain mediation. Once tolerated, mobilization at the end range of motion was performed to facilitate tissue stretching. The stretching technique was repeated 4 times on the initial visit and immediately resulted in 100% reduction of the pain perceived when moving from a sitting to a standing position, and 80% reduction of the pain perceived when seated.

Following the treatment session, the patient was instructed to resume regular activities, maintain a pain log, and return to physical therapy in 7 to 10 days. On the second treatment session, 12 days after the initial examination and treatment, the patient reported that the sit-to-stand pain remained resolved but that she was still noticing pain after sitting longer than 1 hour on any surface.

Re-examination revealed residual hypomobility of the sacrococcygeal joint in the AP direction, along with continued reproduction of pain when moving in the anterior direction. Relief of pain was noted when a traction mobilization technique was performed (FIGURE 3). The patient was treated this visit with traction mobilization and AP glides consisting of end-range techniques for 10- to 15-second holds and 4 repetitions in each direction. After this treatment session, it was recommended that the patient resume all activities and reschedule for a subsequent physical therapy appointment within 2 weeks if sitting pain continued to interfere with her daily activities.

The patient returned for a third visit after 17 days and underwent intervention.
consistent with the second session. At the completion of this third treatment session, the patient reported 95% improvement in sitting pain on both soft and firm surfaces, so she was instructed to contact the therapist if any subsequent problems arose. In follow-up communication with the patient at 6 and 12 weeks and 1 year via e-mail, the patient reported continued relief from sit-to-stand pain and only mild pain after prolonged sitting, without any reported disability.

**Patient 2**

A 31-year-old female editor was referred for consultation with a fellowship-trained manual physical therapist for pain in the buttocks region that initially began 1.5 years prior (TABLE). There was no traumatic event leading to the onset of pain; however, she indicated that the pain began following a week at work during which she had to sit 4 extra hours per day for mandatory training. Approximately 4 months after the initial onset of pain, the patient was treated by her primary care physician with a cortisone injection, performed without imaging guidance, to the painful region of her sacrococcygeal joint. At that time, it was also recommended that she use a custom donut pillow for work, which resulted in complete resolution of her symptoms.

After almost 1 year of pain relief from this initial intervention, her symptoms returned, for which she sought medical attention and was referred to physical therapy for examination and treatment. Examination was inconclusive for reproduction of her symptoms with lumbo pelvic testing, and coccydynia was considered the primary cause. The patient was referred to a fellowship-trained manual physical therapist for assessment of the sacrococcygeal joint. Prior to the examination, an explanation of the potential diagnosis and the details of the intrarectal examination procedure were provided to the patient, and her verbal consent was obtained for examination and potential intervention. The mobility assessment of the sacrococcygeal joint in the AP direction revealed perceived hypomobility and reproduction of her symptoms in both anterior and posterior directions. Also, the shape of the distal coccyx was prominent, and a small mass was palpable externally on the dorsal surface of the coccyx and tender to touch.

Following the examination, an initial intervention of sacrococcygeal traction (FIGURE 3) at end range of motion, held 10 to 20 seconds and repeated 4 times, was performed. Immediately following treatment, the patient reported between
60% and 70% relief of sit-to-stand pain, and she was able to sit pain free on both soft and firm surfaces for a short time. The patient was instructed to return to usual activities, resume use of the pillow at work, and return to physical therapy within 10 to 14 days.

At the second visit, the patient reported no change (increase or decrease) in pain when going from sit to stand but return of pain with sitting at work, even when using the donut pillow. Upon re-examination, mobility of the sacrococcygeal joint was perceived to be normal, but pain was still present in the anterior direction and could be relieved with traction. The superficial mass initially perceived with external palpation of the dorsum of the coccyx remained present and tender to palpation. The patient was treated with manual traction to the sacrococcygeal joint, similar to the first treatment, along with AP mobilization with a sustained stretch. This intervention resulted in an immediate improvement in pain-free sitting, with no real change in the sit-to-stand pain. She was again instructed to return to usual activities and to return to physical therapy in 2 weeks. At the third visit, the symptoms with sit-to-stand were slightly improved, but sitting pain returned and there was no change in the palpable mass. The patient underwent 1 more treatment of manual therapy, consisting of both traction and AP mobilization, and again had improved sitting tolerance and slightly better sit-to-stand pain, but only temporarily, as her pain returned with sitting once she returned to work.

Due to conservative management only providing partial and temporary reduction in pain and the presence of a palpable mass over the coccyx, imaging tests were recommended and ordered by a sports medicine physician. The patient initially had static images of her coccyx that were considered normal. Subsequently, given that she previously had complete relief of her symptoms with a corticosteroid injection, she was referred to a physician trained in the utilization of musculoskeletal ultrasound imaging for another injection. Ultrasound examination revealed an abnormal bony spur at the distal tip of her coccyx (FIGURE 4), which seemed to be her most tender area when the coccyx was palpated under ultrasound guidance. This spur was not visualized on previous plain-film radiography but was consistent with the palpable mass felt during the physical therapy examination. Based on these findings, the decision was made to inject corticosteroid, under ultrasound guidance, around this bony spur with a peppering technique. One week after the injection, the patient reported 50% relief of her pain; however, over the subsequent 4 weeks, her pain seemed to return to the prior level, prompting a discussion of surgical options.

This individual was referred for a surgical consult with an orthopaedic physician who specialized in coccygectomy, and the decision to excise the coccyx was made. She underwent successful surgical coccygectomy without complication and, at 8 weeks following the surgery, returned to full level of activity and full-time work pain free. When contacted via e-mail at follow-ups of 6 months, 9 months, and 1 year, the patient reported complete relief of symptoms for all activities and only mild pain with prolonged sitting.

**DISCUSSION**

This case report highlights 2 individuals with similar pain presentation examined and treated by a fellowship-trained manual physical therapist utilizing manual therapy techniques to assess and treat coccyx mobility. Both patients were women of an age consistent with the demographics of individuals with coccydynia reported in the literature and would have been classified as having chronic somatic pain. Neither woman had a body mass index greater than 27.9 kg/m², which would have placed them in a higher risk category. Both cases presented with similar clinical presentation regarding their symptoms, and both had successful outcomes but with different interventions.

Patient 1 was in a motor vehicle accident shortly prior to her initial symptoms, which is not a common source of coccyx injury but cannot be ruled out as
the initiating factor, as she had never had symptoms of coccydynia prior to the accident. The symptoms for patient 2 were attributed to an increase in the amount of time spent sitting over a 5-day period, which may be considered microtraumatic in nature. Neither woman had ever given birth or had a recent history of fall directly on their buttocks.

Both individuals presented with perceived reduced mobility of the sacrococcygeal joint with mobility assessment and pain with sitting, as well as movement from sit to stand, that responded positively to manual intervention on the first visit. Although symptoms continued to improve in patient 1, she returned to physical therapy with reduced mobility in the sacrococcygeal joint at visits 2 and 3. These deficits improved after mobilization, and her symptoms completely resolved and had yet to return 1 year post-intervention, similar to the outcomes reported by Maigne et al. Patient 2, on the other hand, had perceived normal mobility after the initial intervention, and her painful symptoms did not progressively improve with interventions 2 and 3. Her outcomes were similar to the variable responses to manual therapy reported by Maigne and Chatellier. Given these conflicting outcomes in our patients, we propose that after a thorough history and clinical examination that has ruled out red flags and competing diagnoses, an assessment and immediate response to treatment of joint dysfunction may be used to help guide the clinician in decisions for subsequent consultation, examination, and treatment options (FIGURE 5).

Patient 2 also highlights the use of corticosteroid injection in the treatment of coccydynia. There is no uniform agreement in the literature on the location of the injection. Previously, the injection was often performed blind; however, since the advent of musculoskeletal ultrasound, it has been more often performed with guidance. Patient 2’s initial injection with cortisone resulted in 1 full year of pain-free sitting and sit-to-stand. This is consistent with the findings by Wray et al\(^\text{10}\) of a 60% success rate in individuals treated with local injection as first-line intervention. However, in their review of 120 individuals with coccydynia, they found a much greater success rate (up to 85%) when the cortisone injection was combined with manipulation to the sacrococcygeal joint. The lack of long-term success from the local injection in patient 2 might have been due to the lack of other interventions to address coccyx mobility in the early onset of her symptoms.

When examined with musculoskeletal ultrasound in preparation for injection, the tissue abnormality palpated by the physical therapist on the dorsal surface of the coccyx in patient 2 was visualized, although not previously visualized with plain-film radiography. In a study by Maigne et al\(^\text{10}\) of 208 consecutive patients presenting with chronic coccydynia, the authors described a morphological abnormality of bony excrescence on the dorsal surface of the coccyx that they termed a spicule. Thirty of the 208 patients presented with this tissue abnormality and, of those, 22 were associated with immobile coccyges that would cause the greatest irritation in sitting. The abnormality found on patient 2 was consistent with this study, as it seemed to be the point of maximum pain and was palpable on the dorsal surface of her coccyx, though it appeared to have normal mobility after joint mobilization. In their study, Maigne et al\(^\text{10}\) found that a positive anesthetic
block test to the spicule was diagnostic for the lesion producing the coccydynia. This is consistent with the positive but temporary response to direct injection of corticosteroids into the tissue abnormality and provided the examining clinician with evidence that surgical consult for removal may be recommended.

Although the success rate for surgical excision is variable (54%-85%), the positive outcomes found after coccygectomy in patient 2 are consistent with the results of a recent systematic review by Karadimas et al that included 24 manuscripts published between 1980 and January 2010, for a total of 671 individuals treated with coccygectomy. Based on an average 2-year follow-up, 504 (75.1%) of the cases had good to excellent results, which was defined as mild occasional discomfort. Furthermore, Balain et al, in a retrospective analysis of 38 patients undergoing coccygectomy, demonstrated greater long-term success in those individuals with degenerative changes in the coccygeal joints. Given the association with joint abnormalities and reported success with surgical excision, we recommend plain-film radiography and surgical consultation if there is no improvement with intrarectal mobilization or if abnormal tissue findings or mobility disorders such as luxated or hypermobile sacrococcygeal joints are perceived during examination (FIGURE 5).

Plain-film radiography assessment was used in both of our patients and deemed to be normal, and therefore was not consistent with the literature in assisting in diagnosis of coccyx abnormalities. Mobility assessment using intrarectal techniques reproduced both patients’ symptoms, and the use of manual intervention provided immediate relief, suggesting a mechanical origin of the painful symptoms. But, based on our patients’ response and limitations in current research, we propose that manual therapy be considered a reasonable initial option of care, as it poses minimal risk of complications and may be associated with positive outcomes.

CONCLUSION

Conservative and surgical intervention for sacroccygeal pain may be successful management strategies, but there are no clear guidelines allowing the identification of which patients will benefit from which intervention. We presented 2 patients with relatively similar symptoms and findings for coccydynia. Although one patient responded to manual therapy, the other did not and required surgery. We propose that a short-term course of manual therapy may be a safe, viable first option to consider for coccydynia when there is no indication of significant injury and there is a possibility of mechanical aggravating factors. More invasive procedures like injections and/or surgery might then be considered in the presence of trauma or significant injury and/or the absence of improvement with short-term application of manual therapy.

REFERENCES