Abstract: Coccygodynia is a painful condition localized in the region of the coccyx. In most cases a traumatic etiology is present. In the idiopathic form other causes such as infections and tumor have to be excluded. Coccygodynia can also be the result of pain referred from visceral structures due to conditions such as disorders of the rectum, the colon sigmoid, and the urogenital system. In case of a traumatic etiology the diagnosis is made based on the typical medical history whereby the pain is provoked by prolonged sitting and cycling. Lateral images of the coccyx are always indicated. The same is true for manual examination of the coccyx. In case of absence of provocation of the coccygeal pain by prolonged sitting and manual examination neurological causes such as lumbar disc hernias are a possible reason for the coccygodynia.

In the acute phase the first choice of treatment are NSAIDs. Treatment for patients with severe pain in the chronic phase consists of manual therapy and/or a local injection of local anesthetic and corticosteroid into the painful segment (2 C+). Other interventional treatments such as intradiscal injections, ganglion impar block, radiofrequency treatment and caudal block are advised only under study conditions (0). Coccygectomy is not recommended because of long-term moderate results and the chance of major complications.

Key Words: evidence-based medicine, coccygodynia, coccyx, perineal pain

INTRODUCTION

This review on coccygodynia is part of the series “Evidence-based interventional pain medicine according to clinical diagnoses.” Recommendations formulated in this chapter are based on “Grading strength of recommendations and quality of evidence in clinical guidelines” described by Guyatt et al.,1 and adapted by van Kleef et al. in the editorial accompanying the first article of this series2 (Table 1). The latest literature update was performed in December 2009. Per agreement of the authors, the names of the anatomical structures are noted in Latin.

Coccygodynia is a painful disorder of the tailbone (coccyx) localized just above the anus, for which a traumatic as well as an idiopathic form can be differentiated. Precise incidence and prevalence figures for the traumatic and idiopathic forms of this condition are not available. However, it is known that the idiopathic form comprises less than 1% of all nontraumatic disorders of the vertebral column.3 In rare cases a precoccygeal
A clear relationship exists between coccygodynia and the female gender; the female/male incidence ratio is 5:1.5 Moreover, a relationship exists between weight and the occurrence of coccygodynia; a body-mass index (BMI) of >27.4 in females and >29.4 in males increases the chance of developing coccygodynia.6 In the acute form of coccygodynia, a trauma (usually a fall in the sitting position) is the cause of the complaints in the majority of the cases.6,7 Repetitive microtrauma resulting from an inadequate sitting posture or from activities such as cycling or motor sports can also give rise to coccygodynia.8,9 In females, parturition can be regarded as a trauma for the development of coccygodynia.10 The coccygeal joints are involved in 70% of traumatic childbirth cases.7 Dynamic, radiological examination of function (coccyx stressed and unstressed) and discography indicate that the following five causes may play a role in these traumatic and idiopathic coccygodynias: anterior luxation, hypermobility, coccygeal spicules, subluxation, and luxation.7,10 MRI studies show that mobility during tightening of the muscles of the pelvic floor and defecation is independent of age, gender, and the presence or absence of coccygodynia.

The coccyx usually consists of four bony segments that are attached cranially to the os sacrum at the sacrococcygeal joint. Between the first two segments, a rudimentary intervertebral disc may be present and can form a potential localization point for post-traumatic hypermobility.6 The other segments are synarthroses and have no mobility.11 Due to a more posteriorly situated os sacrum and coccyx,12 and a longer coccyx relative to men,13 females have a greater chance of developing coccygodynia.

I. DIAGNOSIS

Diagnosis is usually made on the basis of the typical anamnesis in which the symptoms are generally related to a trauma (including parturition). The chance of developing coccygodynia may be increased by repetitive microtrauma from sitting in females with a BMI >27.4 and in males with a BMI >29.4.6

I.A HISTORY

Most patients with coccygodynia complain anamnestically about pain at the site of the tailbone, usually provoked by sitting.14 Due to the direct pressure of the saddle on the coccyx, cycling is usually impossible in these patients.

I.B PHYSICAL EXAMINATION

In addition to standard physical and neurological examination, manual examination of the coccyx is also very important.13 The presence or absence of pain during mobilization of the coccyx can differentiate
between a nociceptive pain of the coccyx with the ligamentous and muscular structures and a referred pain due to pathology in the lower pelvic region. In addition, the Valsalva maneuver should be positive in the case of coccygodynia based on disorders of the neural structures, and negative in the case of primary involvement of the coccyx.\(^{13}\)

### I.C ADDITIONAL TESTS

First of all, lateral images of the coccyx are indicated. Dynamic radiological images of these patients can also be made. In this instance, the angle is measured according to the Maigne method\(^{6,7,10}\) in the standing and sitting (stressful for the coccyx) positions. Coccygeal mobility between \(2^\circ\) and \(25^\circ\) is considered normal. The position of discography is unclear. No specificity or sensitivity studies have been published for all diagnostics.

Given the relationship to the patient being overweight, BMI determination is useful: a body mass index of \(> 27.4\) in females and \(> 29.4\) in males increases the chance of developing coccygodynia.\(^6\) As in the case of all chronic pain symptoms (\(> 3\) months), exploratory psycho-cognitive examination is indicated, during which kinesiophobia, catastrophizing, and depression should particularly be evaluated. If there is any suspicion of other causes, and in particular of idiopathic coccygodynia, more detailed diagnostic techniques such as MRI and/or referral should definitely take place in order to be able to rule out infections, precoccygeal cysts and malignancies.

### I.D DIFFERENTIAL DIAGNOSIS

Three groups of diagnoses can be determined in the differential diagnosis of coccygodynia: a nociceptive (from the coccyx) diagnosis, a neuropathic diagnosis, or a visceral diagnosis. In the case of a nociceptive differential diagnosis, the Levator Ani Syndrome\(^{12}\) should be considered, in which mobilization of the coccyx is not painful as it is in the case of a traumatic etiology. Furthermore, to make the differential diagnosis, osteomyelitis, arthritis and intraossal lipoma, intraossal chordroma, avascular necrosis and precoccygeal cysts should be considered.\(^4,15\)

In the case of a neuropathic differential diagnosis, a lumbar disc herniation should primarily be considered.\(^{12}\) In this case, the symptoms are usually not related to provocation by sitting and manipulation of the coccyx. Other diagnoses that can be the cause of referred neuropathic pain in the coccyx region are neural tumors in this area, such as Schwannomas, neurinomas, arachnoid cysts of the cauda equina, sacrococcygeal meningeal cysts, chordomas, and very rarely, paragangliomas at the caudal end of the coccyx.\(^{12}\)

Coccygodynia can also be the result of pain referred from visceral structures due to conditions such as disorders of the rectum, the colon sigmoidum, and the urogenital system. In these cases, infections as well as primary tumors and metastases can mimic the clinical appearance of coccygodynia.\(^{13}\)

### II. TREATMENT OPTIONS

In general, there have been few controlled studies showing the efficacy of any known coccygodynia treatments. Most treatments have been evaluated in retrospective studies.

#### II.A CONSERVATIVE MANAGEMENT

In the acute phase of a post-traumatic coccygodynia, a conservative policy has been proposed. This conservative approach includes nonsteroidal anti-inflammatory drugs (NSAIDs) and an adapted sitting posture. In a controlled pilot study, conservative treatment, in the sense of mobilization of the coccyx, has been shown to have a long-term effect in \(25\%\) of patients.\(^5\) A subsequent randomized controlled study, by the same group, compared intrarectal manipulation (applied in three 5-minute sessions over a period of 10 days) to shortwave magnetic field physiotherapy (delivered in three sessions over a period of 10 days). Intrarectal manipulation was more effective than the control treatment in improving visual analog scale (VAS) scores as well as functional and pain questionnaires. However, the efficacy was modest.\(^6\) Infrared thermography before and after manual therapy and diathermy in patients with coccygodynia objectively showed decrement of surface temperature correlating \((r = 0.67, P < 0.01)\) with changes of subjective pain intensity after treatment.\(^7\)

#### II.B INTERVENTIONAL MANAGEMENT

In a prospective study, the combination of local injections of corticosteroids/local anesthetic with mobilization was shown to have a positive effect in \(85\%\) of cases, while local injections of corticosteroids/local anesthetic alone produced a \(60\%\) success rate.\(^3\) In this study, it was indicated that the infiltration occurred next to the coccyx and at the level of the caudal end of the spinal column, but that no attempt was made to infiltrate the sacrococcygeal joint. The effect of intradiscal corticosteroid injections into the coccyx has yet to be demon-
strated. The same is true for dextrose prolotherapy in case of recalcitrant coccygodynia. In addition to local injections of corticosteroids/local anesthetic, interventional pain management techniques include radiofrequency (RF) treatment of the sacral roots. However, there are no studies available that prove the utility of RF. The same is true of the caudal block. Only one study of mediocre quality has described the long-term effects of rhizotomy of the S5 and S6 roots. Based on the results and complications reported, this treatment is not recommended.

Blocking of the ganglion impar with local anesthetic was described in a case report as well as in a case series. The series consisted of six patients who were subjected to 20 blocks with 0.5% bupivacaine. Each injection produced pain relief which was scored by the majority of patients as being more than a 75% reduction in pain. The beneficial effect was retained with repeated injections. The case report refers to a patient with 100% pain relief that continued for more than one year.

Reig et al. performed a prospective study on 13 patients, four of whom had been diagnosed with coccygodynia in which an RF thermic lesion of the ganglion impar was performed using two needles. The thermic lesion was only performed if a positive result (pain reduction > 50% in a test block with corticosteroids/local anesthetic) had been attained beforehand. Reig describes significant pain reduction of more than 50% in the entire group (all forms of non-oncological pain in the pelvis) with an average duration of effectiveness of 2.2 months. Given the small size of the group of patients with coccygodynia who were studied, and the relatively short duration of its effectiveness, as well as the risk of puncture of the rectum inherent to this method, this technique can only be recommended in a study context. The authors recommend the technique with two needles since the position of the ganglion impar is extremely variable. This corresponds with the results of an anatomical study performed by Oh.

Surgical Treatment

In the subacute and chronic phases, many forms of treatment for coccygodynia are advised, up to and including surgical removal of the coccyx. Although retrospective studies are still being published concerning coccygectomy, there are strong contraindications to this surgical intervention due to the long-term moderate results and the chance of major complications.

Neurostimulation

Few case reports suggest a possible beneficial effect for spinal cord stimulation at the conus medullaris level or peripheral nerve stimulation in the caudal space or subcutaneously. However, given the paucity of experience and reports, this treatment modality may be considered with much caution only after other more established therapies have failed.

II.C COMPLICATIONS OF INTERVENTIONAL MANAGEMENT

Local anesthetic injection with corticosteroids always carries the risk of going through the disc and penetrating the rectum. The same is true for the ganglion impar block.

II.D EVIDENCE FOR INTERVENTIONAL MANAGEMENT

A summary of the available evidence is given in Table 2.

III. RECOMMENDATIONS

In the chronic stage of coccygodynia, a combination of manual mobilization of the sacrococcygeal articular capsule or the first intercoccygeal joint and a local injection of corticosteroids with anesthetic should be the first choice of treatment. Other interventional pain treatments should only be considered for research purposes.

III.A CLINICAL PRACTICE ALGORITHM

The practice algorithm is illustrated in Figure 1.

III.B TECHNIQUE(s)

Radiofrequency Treatment (RF) of the Ganglion Impar

For this technique, the patient lies face down in the prone position. During radiographic examination, one needle is inserted trans-sacrococcygeally (through the ligamentum sacrococcygeum), while the second needle is inserted through a coccygeal disc (Figure 2). Using a lateral projection, the positions of the needles are checked while contrast agent is administered (Figure 3).

<table>
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<tr>
<th>Technique</th>
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<td>Local injections corticosteroids/local anesthetic</td>
<td>2 C+</td>
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<tr>
<td>Intradiscal corticosteroid injections, ganglion impar block, RF ganglion impar, caudal block</td>
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<td>Neurostimulation</td>
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After stimulation at 50 Hz (up to 1 V) and 2 Hz (no motor reaction up to 3 V), each needle is warmed up to 80°C for 80 seconds by means of RF.

IV. SUMMARY

Coccygodynia is a serious, disabling disorder with few proven therapeutic options. Conservative treatment (NSAIDs) is always—especially in the acute post-traumatic stage—indicated. When other causes are suspected, and in particular, for idiopathic coccygodynia, more detailed diagnostic techniques and/or referral must take place in order to be able to rule out infections and malignancies. In the chronic stage of coccygodynia, a combination of manual mobilization of the capsule of the sacrococcygeal joint or the first intercoccygeal joint and a local corticosteroid/anesthetic injection is the first choice of treatment.

Intradiscal corticosteroid injections, ganglion impar block, RF treatment of the ganglion impar, and caudal block may be considered for research purposes. Neuro-modulation may be considered in appropriately selected, psychologically stable patients only if all other modalities have failed and should only be performed under research conditions.

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REFERENCES


