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Review

COCCYGODYNIA

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SUMMARY – The coccyx, the last segment of the spine, joins the sacrum at the base. It has three to five vertebrae, which are typically fused. In front of the sacrococcygeal junction is the ganglion impar, the only unpaired autonomic ganglion. The two sympathetic chains come to a close there. The impar ganglion is traversed by sympathetic nerves carrying pain fibers from the perineum, distal sections of the rectum, the vagina and the urethra. The painful disorder known as coccygodynia, which affects the tail end of the spine, is frequently brought on by birth trauma or is caused by an unidentified factor. Even though the pain may go away on its own or with therapy, it may also linger and worsen over time. Due to increased stress from the female pelvis on the coccyx, it affects women five times more frequently than it does men. Conservative, invasive or surgical treatment options are available for coccygodynia (partial or total coccygectomy). Rest, nonsteroidal anti-inflammatory medicines (NSAIDs) or COX-2 inhibitors, acupuncture, coccyx cushions, physical therapy, manual therapy and invasive therapy, which involves ganglion impar block with injections of local anesthetic and corticosteroid under fluoroscopy, followed by radiofrequency ablation, spinal cord stimulation (SCS) or peripheral nerve stimulation, are examples of conservative treatments. Coccygectomy is recommended in refractory situations.

Key words: *chronic pain; coccyx; tailbone pain; ganglion impar block*

Introduction

Coccygodynia refers to coccyx pain (*os coccygis*; tailbone). Despite not being fatal, this diagnosis can have a major impact on quality of life, particularly when seated. The duration of symptoms can be months, years or even the patient's entire life.

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Anatomy

As a result of how similar it appears to the cuckoo bird's beak, the term "coccyx" was formed from the Greek name of the bird[1] (Figure 1).

The last segment of the spine, the coccyx, joins the sacrum. The vertebrae range from 3 to 5. Four vertebrae are found in 76% of the population. The sacroiliac joint, located on the first coccygeal vertebra, which is the biggest, attaches to the top of the sacrum (SC). The intracoccygeal ligament binds the additional coccygeal vertebrae together (IC). The mobility of the segment SC and the first two segments IC is required for the coccyx to flex and extend physiologically. The SC and IC discs ossify with age, which might result

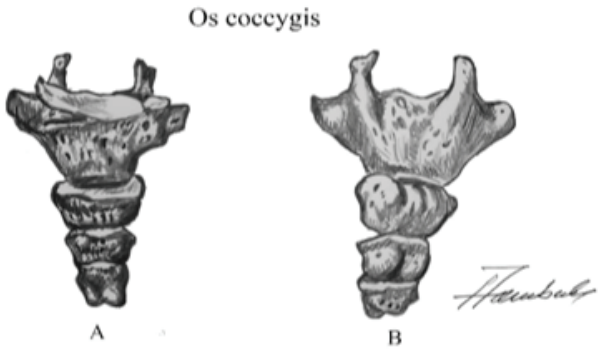


Figure 1. Coccygeal bone from the front (A) and back side (B).

in their merger and the coccyx becoming immobile. Unusual findings do not include the coccyx being immobile[2].

The coccyx serves as a grip for muscles and ligaments: m. gluteus maximus, m. levator ani, m. sphincter ani externus, m. coccygeus, lig. anococcygeale, lig. sacrospinale and lig. sacrotuberale. The coccyx partially supports the rectum[2,3].

The ganglion impar, also known as Walther's ganglion, is a retroperitoneal structure that is actually a terminal fusion of two sacral sympathetic chains. It is localized, with some anatomical variability, between the sacrococcygeal joint and the inferior section of the first coccyx. This ganglion has an important function in the etiopathogenesis of coccygeal pain. Sympathetic fibers are carried by pain fibers that originate in the perineum, distal regions of the rectum, the vagina and the urethra and travel through the ganglion inferior[4].

The coccyx may be mobile or immobile. The physiological movements of the coccyx are flexion and extension. The range of motion is measured in degrees by the Maigne method (Figure 2). If flexion exceeds 25˚, it is called hypermobility, and if it exceeds 30˚ it is called dislocation. If flexion is less than 5˚, this is a fixed coccyx[3,5,6].

Etiology and pathophysiology

Coccygodynia is a painful condition of the final segment of the spine that is frequently brought on by direct damage or a fall, typically from a trampoline, horse, skiing, etc. Straining of the muscles and ligaments that attach to the coccyx is a possible cause, as are contusions and fractures of the coccyx, subluxation and dislocation of the SC segment and/or the intracoccygeal segment (IC) and stretching of the coccyx itself. It is only possible to identify an injury as the proximate cause of coccygodynia if it happened within a month of the condition's inception. Additionally, coccygeal injuries can happen following difficult vaginal deliveries, colonoscopies, or anal surgeries[7,8]. Ossification of the sacral and coccygeal joints occurs with age, resulting in immobility of the coccyx[4].

In one third of the cases, the exact cause of so-called idiopathic coccygodynia is unknown[9].

Other less frequent causes include pain in the piriformis muscle, damage to the pudendal nerve, tumors, pilonidal cysts, and extended sitting.

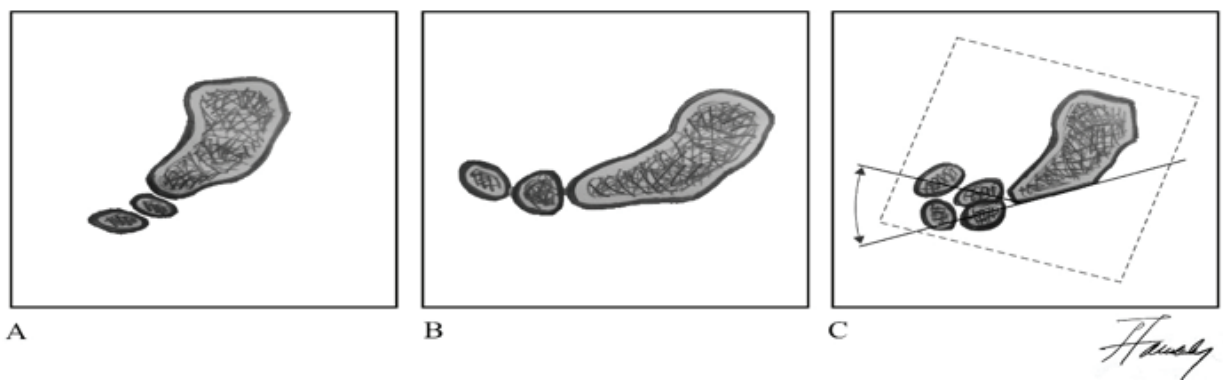


Figure 2. Maigne's technique for comparing positions of sacral and coccygeal vertebrae from lateral standing and seated radiographs. A, Standing view. B, Seated view. C, Super-imposed view shows coccygeal angulation and subluxation.

The physiological flexion of the coccyx during sitting is reduced in people with obesity due to the increased bulk of the gluteal muscles, which causes differential overloading of the coccyx. This explains why obesity is a risk factor for the development of coccygodynia. A body mass index (BMI) of higher than 27.4 in women and 29.4 in men increases the risk of developing coccyx disease[6].

The development of bursitis, which is characterized by coccygodynia, is brought on by a bony growth on the coccyx, which is another frequent cause of the condition. It is more common in individuals with an immobile coccyx[4,10].

Configuration of the coccyx

The normal curvature of the coccyx is highly variable. This classification, originally divided into four types by Postacchini and Massobrio, was changed by Nathan et al. into an expanded classification of six types:

Type I is found in more than 50% of people; the coccyx is slightly bent forward, i.e., it is a continuation of the natural curvature of the sacrum.

Type II is found in 8-32% of people; the coccyx is moderately bent forward.

Type III is found in 4-16% of people; the coccyx is strongly bent forward without subluxation.

Type IV is found in 1-9% of people; the coccyx is subluxated forward.

Type V is the backward-bent coccyx (1-11%).

Type VI is a scoliotic deformity or lateral deviation of the coccyx (1-6%).

Types V and VI are extremely common in women[11,12].

Diagnosis and symptoms

The history, clinical picture and examination, as well as radiological investigations, all contribute to the diagnosis. The location and characteristics of the pain are crucial pieces of knowledge. Severe, searing or cutting pain in the coccyx region is a common complaint from patients. Sitting causes the pain to worsen, but it does not radiate to the back or show any signs of radiculopathy. The pain may also occur during sexual intercourse or defecation[13].

Clinical examination includes inspection of the area SC, external and rectal palpation of the coccyx and examination of the coccygeal range of motion. The normal range of motion should be approximately 13 degrees[4,5].

It is crucial to obtain a radiographic evaluation (lateral view). A dynamic radiograph of the coccyx with lateral views in the sitting and standing positions and angle measurement using the the Maigne method are also important[7]. CT and magnetic resonance imaging do not provide information about the mobility of the coccyx, but show morphological changes of the coccyx (fracture, luxation, tumors, inflammatory changes, degenerative changes, abnormal curvature, spicules, and neuropathic or visceral problems)[9,10].

Therapy

NSAIDs must be taken, and the patient must get used to sitting with a pillow during the acute phase of post-traumatic coccygodynia. Other noninvasive techniques including acupuncture, magnets, lasers and ultrasound may be beneficial. According to some studies, intrarectal manipulations[14,15] and cold and warm compresses[13] may be helpful. Application of topical creams may result in pain relief[16].

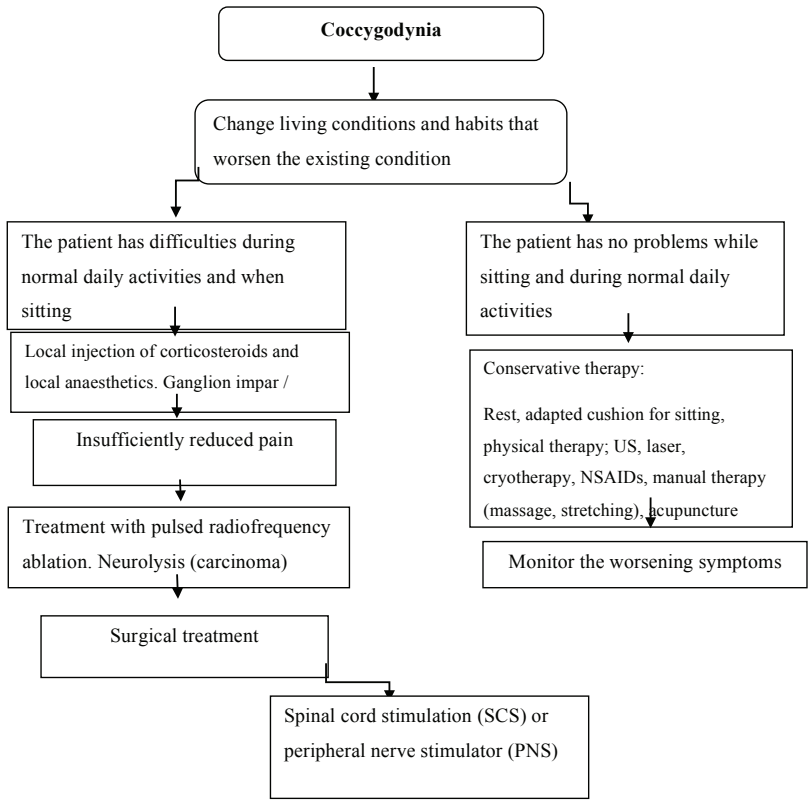
If conservative therapy does not help, infiltration of the local anesthetic alone or with a corticosteroid can be attempted, i.e., ganglion-impar blockade, which has been reported by some studies to have an effectiveness of up to 85%[12,17,18].

Perineal pain with or without malignancy, rectal/anal pain (proctitis), vulvodynia, scrotal pain, pain in the distal urethra, chronic prostatitis, endometriosis and postherpetic neuralgia are indications for this blockade. Radiofrequency ablation of the coccygeal disks and ganglion impar can be performed for intractable coccygodynia[12,19].

Partial or total coccygectomy can be performed in the subacute and chronic phases, but the indications for these procedures are strict indications due to uncertain outcomes and possible complications[20].

Recent studies suggest the possibility of placing spinal cord stimulation (SCS) or a peripheral nerve stimulator in the caudal space for refractory coccygodynia[21,22]. For chronic coccygodynia, the first choice of treatment is a combination of manual mobilization of the sacrococcygeal capsule or the first intercoccygeal joint and infiltration of a local anesthetic with corticosteroid[17].

Algorithm for the treatment of coccygodynia



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Sažetak

KOKCIGODIJA

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Trtična kost je završni dio kralježnice i nastavlja se na krstačnu kost. Sastoji se od tri do pet kralježaka koji su obično spojeni. Ganglion impar, jedini neparni autonomni ganglion, nalazi se ispred sakrokokcigealnog spojnica. To je završni dio dvaju simpatičkih lanaca. Bolna vlakna iz perineum, distalni dijelovi rektuma, vagine i uretre nose simpatička vlakna koji prolaze kroz gangion impar. Kokcigodinija je bolno stanje završnog dijela kralježnice, često posljedica izravnog traumatskog poroda ili nepoznate etiologije. Bol može nestati sama od sebe ili liječenjem, ali može trajati godinama i može se pogoršati. Pet puta je češći kod žena nego kod muškaraca, vjerojatno zato što ženska zdjelica ostavlja trtičnu kost izloženijom. Terapija kokcigodinije može biti konzervativna, invazivna i kirurška (djelomična ili totalna kokcigektomija). Konzervativna terapija uključuje: mirovanje, nesteroidne protuupalne lijekove (NSAID), ili COX-2 inhibitori, akupunktura, jastučić za trtičnu kost, fizikalna terapija, manualna terapija i invazivna terapija ganglio impar block s injekcijama lokalnog anestetika i kortikosteroid pod fluorografijom, nakon toga radiofrekventna ablacija, stimulacija leđne moždine (SCS) ili stimulacija perifernih živaca. Kokcigektomija je indicirana u refraktornim slučajevima.

Ključne riječi: *kronična bol, trtica, bol u trtici, ganglion impar blok*