

# A History of Coccydynia

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## Early history

Remarkably, the two earliest surviving accounts of coccyx injury, written over a thousand years ago, describe treatment methods which remain in frequent use today: manual adjustment of the coccyx via the anus, and coccygectomy.

The first of these accounts was written in Greek about 680 AD by Paul of Aegina [1], which advises: ‘When the ‘sacred bone’ is fractured, the index-finger of the left hand is to be introduced into the anus, while with the other we manage as we best can the fractured bone; or if we feel any piece broken off, we make an incision and lay hold of it, and apply bandages and suitable treatment’. The Greek ‘heiron osteon’, meaning ‘sacred bone’, is often translated into English as ‘sacrum’, though in ancient Greek it could also mean the sacrum plus coccyx, and in some cases just the coccyx.

The second early account of treatment of coccyx injury was written in Arabic about 1000 AD by Albucasis (Abu al-Qasim al-Zahrawi), who worked in the city of Córdoba, in what is now Spain [27]. His description of treatment is very similar to Paul’s, and apparently derived from it.

Paul wrote that he based his work on the work of earlier writers, in particular Oribasius (about 320 – 403 AD). Most of Oribasius’s work is now lost, including any advice on treating coccyx injury. However, Oribasius’s surviving works includes an unmistakable reference to surgical removal of the coccyx in cases of infection, rather than for injury. Oribasius wrote, in a section on surgery for fistulas: ‘When the fistula is positioned low down and the ‘sacred bone’ becomes moist or decayed, one should not be afraid of doing what is needed because of its name, for it is not an essential part. But if the condition requires excision, the way to operate is described in other cases of bone decay.’ [21] Oribasius, like Paul, was mainly a compiler of earlier medical works, and wrote that this part of his compilation was based on works by the renowned surgeons Heliodorus and Antyllus (1st and 2nd centuries AD).

The transmission of the advice on treating coccydynia continued in Guy du Chauliac’s *Inventarium Sive Chirurgia Magna*, written in Latin and completed in 1363 in Avignon [8]. This work was translated into several European languages, including a 15th century translation into Middle English [20], in which the advice is similar to that of Paul, though omitting the instructions for coccygectomy: ‘If the uttermeste bone forsothe of the croupe be broken, putte the thombe of thi left hande into the foundement and arighte the broken bone with that other hand after that it is possible. Afterward putte on it a plaster and splentz and streyne it with byndinge.’

Lusitano Amato, writing in Latin, gave the first known case history of coccydynia in 1556, an account of how he treated 27-year-old Giovanni Cordella of Ancona in Italy using the technique described by Paul of Aegina [17]. Cordella had great pain and inflammation in the region of the anus after riding on a jolting horse. Lusitano’s assistant surgeon manipulated Cordella’s coccyx via his anus, and the patient was restored to health within a few days.

In 1575 Ambroise Paré, royal surgeon to four French kings, published his collected works in Latin, including treatment of injuries to the coccyx. In the words of the translation into English of 1649, ‘The fracture of these bones shall be cured by putting your finger into the patient's fundament, and so thrusting it even to the fractured place. For, thus you may thrust the fragment forth, and fit and restore it to the rest of the bones by your other hand lying on the back. But that it may be sooner healed, it is fit for the patient to keep his bed, during all the time of the cure.’ [23]

Another early case history of coccydynia caused by injury was given in 1668 by Jobi van Meek'ren [30]. Van Meek'ren recorded: ‘And so following the prescribed manner of Ambroise Paré, a finger of the left hand was dipped in oil of roses and inserted into the rectum, moved in various ways, feeling the place with the right hand, the small bone returned to its proper place, which with quick effect removed all the symptoms.’

Jean-Louis Petit, who was the first director of the French Royal Academy of Surgery, published a treatise on maladies of the bones in 1705 [24]. This work contained the first detailed study of coccydynia, its causes and treatment. Petit considered luxation outwards caused by difficult childbirth, and inwards caused by falls. For luxations outwards, he advised pressing the bone back into place, then holding it there using specially designed compresses (Figure 1).

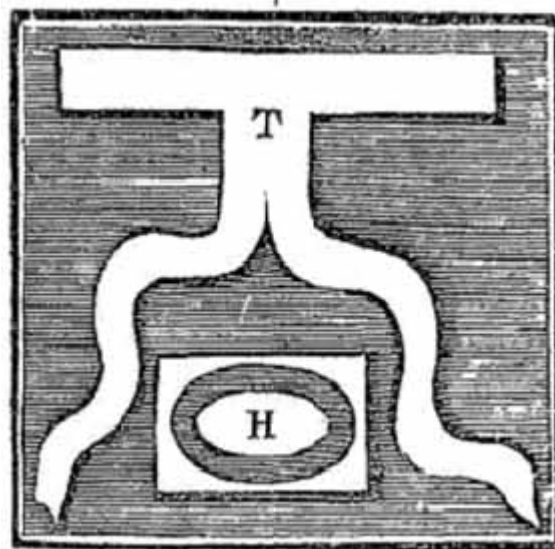


Figure 1. Jean-Louis Petit's design for graduated compresses (H) and a bandage (T), to be placed in such a manner ‘that the patient may go to stool and urine without taking off the dressing’.

For luxations inwards, he wrote, ‘one must dip one's forefinger in oil of olives, or of sweet almonds, and introduce it into the anus as far as is necessary to get beyond the end of the coccyx, in order to raise it’. Petit wrote that he had cured ‘a great many’ luxations of the coccyx without difficulty. He included three case histories where complications had occurred due to abscesses. A complete cure was achieved in two of the cases. In the other case, an abscess the size of an apple had formed, and when it was cut open the pus ‘drowned us with its quantity, and poisoned us with its stench’. The coccyx was no longer surrounded by tissue and Petit removed it to allow dressings to be applied. The treatment was not successful, and the woman died six

months later. This is the first surviving case report we have of a coccygectomy, though it was unplanned.

In the 18th and 19th centuries, it was recognised that if a woman has a coccyx sharply angled forwards, and ankylosed in that position, it may cause problems in childbirth by obstructing the birth canal. In 1742 Ould recommended that in such cases the physician should introduce his oiled thumb into the woman's anus and break the ankylosed joint [22].

An angled coccyx can even cause the death of the child. Summers described being summoned to a woman well advanced in labour [28]. He found the child's skull had a large gash, as if cut by a sharp instrument. The child was delivered dead, as the woman's two previous children had been. He found the woman's coccyx to be projecting into the pelvic cavity 'nail-like, firmly upwards'. Summers was called early to the woman's next delivery, and managed by the use of both thumbs and some effort to break the angulated coccyx, resulting in the safe delivery of her child, and did the same for two further deliveries.

## **Surgery**

After the mentions of coccygectomy by classical and Islamic authors, there was a long gap before the next mention of the operation. In 1828 Blundell suggested that when pain and inflammation of the sacrococcygeal joint proceeded to suppuration, removal of the coccyx should be considered, followed by paring away the diseased extremity of the sacrum, but gave no examples [6].

On 2nd July 1843, Josiah Nott, Professor of Surgery in Alabama Medical College, carried out the first known planned coccygectomy [19]. The patient was a 25 year old woman, who had '...excruciating pain at the point of the coccyx, which became intolerable when she sat up, walked, or went to stool.' Nott removed the two lower joints of her coccyx, initially causing extremely violent pain, but eventually relief. Nott's paper was published in a provincial publication with an uninformative title, and was not generally noticed by other surgeons.

In 1859 the distinguished Edinburgh surgeon Sir James Simpson published a lecture on coccydynia and its treatment by surgery [25]. This paper started an international wave of interest in the condition, and was followed by dozens of papers by surgeons detailing their experiences. The American Journal of the Medical Sciences described coccydynia as 'the disease made celebrated by the recent admirable researches of Dr. Simpson' [2].

Simpson originally named the condition 'coccyodynia'. Others pointed out that the etymologically correct derivation from the Greek words for coccyx and pain would be 'coccygodynia'. A third spelling, 'coccydynia', possibly a typographical error, soon began to be used, so that all three spellings were in use in medical journals in English within two years of the publication of Simpson's paper. 'Coccygodynia' became the dominant spelling in the 19th and early 20th centuries. In the 21st century, 'coccydynia' has become the dominant spelling, outnumbering 'coccygodynia' by about two to one in recent papers on PubMed.

Simpson introduced a surgical procedure, later called coccygotomy, in which a long narrow tenotomy knife is inserted near the tip of the coccyx and used to effect 'the complete separation from the coccyx of the muscular and tendinous fibres that are in connexion with it'. He described the procedure as 'easy and rapid of performance, like other examples of subcutaneous surgery is not attended with bleeding, and is attended with no great degree of suffering'. He did not report the

number of patients treated, but said that ‘the result is in almost every case instant relief of the pain, and in most cases a perfect and permanent cure of the disease’.

Simpson clearly performed the operation without anaesthesia, since he reported a case in which a patient felt the effect instantly: ‘I was dividing the last fibres of the coccygeal attachments, when the slender knife gave way, and broke among the dense structures. I told the patient of it, and she at once raised herself up in alarm to hear of the calamity; but before I had done telling her of what had happened, she had had time in sitting up to discover that she had been cured of her disease, and rejoiced at the discovery. She quickly replied, “Oh! never mind; my pain is gone - let the knife remain.”’

Coccygotomy was taken up by a number of other surgeons, the great majority reporting success in relieving the pain of coccydynia. Barwell used a modified method of coccygotomy, and in 1894, unusually for the time, reported the numbers of patients he treated and the success rate [3]. Out of 23 patients treated for coccydynia over a number of years, Barwell carried out coccygotomy on 17, and reported that 16 were ‘quite recovered of the coccydynia.’

In his 1859 paper, Simpson reported that in one case where coccygotomy failed, he carried out a coccygectomy, and suggested that he had been the first to carry out the operation. Nott wrote to him pointing out his prior publication, and a correction to Simpson’s paper was printed to acknowledge Nott.

After the initial wave of papers on coccygotomy, many surgeons turned to coccygectomy. In 1875 Irish wrote: ‘In all those cases, so far as I know, in which the two last segments of the bone have been removed, the cure has been complete and permanent. Removal of the whole or the larger portion of the bone seems to me preferable to subcutaneous division of the attachments, because the former procedure precludes all chance of a return of the disease and but slightly increases the gravity of the operation.’ [13]

As coccygectomy became frequently reported in the medical journals, there was disagreement among surgeons about the proportion of operations which were successful. Nott wrote: ‘These operations have been found not infrequently to fail, in the hands of others as well as myself. I have seen several cases of failure which had been operated upon by Sir James Simpson.’ [18]

The operation has been the subject of swings in medical fashion. In 1937 Duncan wrote that Simpson’s paper ‘laid the foundation for what amounted to a fad for coccygectomy, and for many years afterward it was a common operation. Nonoperative treatment, utilizing hot sitz baths, a soft cushion to sit on and massage, was revived following the fad for coccygectomy and used almost universally until after the turn of the last [19th] century. The nonoperative form of therapy again was not yielding satisfactory relief to many patients, and some surgeons once more advocated resection of the coccyx.’ [10]

### **Mechanical fixation of the coccyx**

When other joints such as an ankle or a shoulder are dislocated, doctors have traditionally applied splints or bandages to hold the bones in the correct relationship while healing of the joint takes place. When the dislocation of the coccyx was outwards, some surgeons attempted to stabilise it using a splint or bandage.

For dislocations inwards, the difficulty of holding the coccyx in place is much greater. Skey encountered a case of an inward dislocation in a young woman who had injured her coccyx in a fall [26]. He cut down on the coccyx, passed a silk thread

around it and drew the thread tightly round a wooden splint fixed to the woman's back. The woman became 'hysterical, and even maniacal' from the pain of this procedure, but Skey claimed that the treatment was ultimately successful.

Gant reported a case in which mechanical fixing was successful: '...by placing a finger in the bowel and pressing the bone outward. A needle carrying chromicized catgut was then passed through the skin down to the bone, catching the tendinous attachments, and brought out near the point of entrance, where the suture was tied across a small gauze pad. Pain was relieved immediately, and the patient was discharged in two weeks feeling perfectly well.' [11]

Bergkamp and Verhaar described treating a woman with a coccyx displaced forwards. [5]. The coccyx was forced back into place and fixed to the sacrum using four vicryl sutures as tension bands. Radiological examination at 6 months showed normal alignment of the coccyx, and at two years the patient had no complaint.

Kim, Han and Kim took a different approach to fixation, using a percutaneous pin to hold the coccyx in the correct alignment with the sacrum [16]. The patient was advised not to sit for 6 weeks, and the pin was removed after 4 weeks. X-rays taken after 6 months showed normal alignment, and the patient had no pain in the area.

Despite the apparent success of these last three operations, each fixation of a coccyx has been a unique event, not applied to further cases.

## **Manual treatments**

All early descriptions (and some later ones) of manual treatments for coccydynia describe it as a repositioning of the coccyx, and do not mention repeated treatments. The first description of manual treatment as massage, repeated a number of times, is by Berghman in 1873 [4]. He reported a case in which a 30-year-old woman had suffered coccydynia for two years, and had acute pain when rising from sitting. She was relieved of her pain by eight days of treatment by massage and afterwards remained well.

Duncan was the first to give statistics of the success rate of manual treatment [10]. He examined 54 coccydynia patients at 1 to 4 years after non-operative treatment at the New York Orthopaedic Dispensary and Hospital. All but two of the 54 patients had obtained relief from their pain, most within one month of starting treatment, but five of them required six months of treatment.

George Thiele of Kansas City, USA, took a special interest in coccydynia, treating over 300 patients, mainly using manual methods, and writing a series of papers on the subject over 27 years [29]. Thiele argued that most coccydynia was caused by spasms in the levator ani and/or coccygeus muscles, and could be relieved by massage of these muscles. He applied massage with a gentle stropping motion, moving back and forth lengthwise along the muscles ten to fifteen times, repeated daily for four to five days, then every other day for a week and gradually less often until pain disappeared.

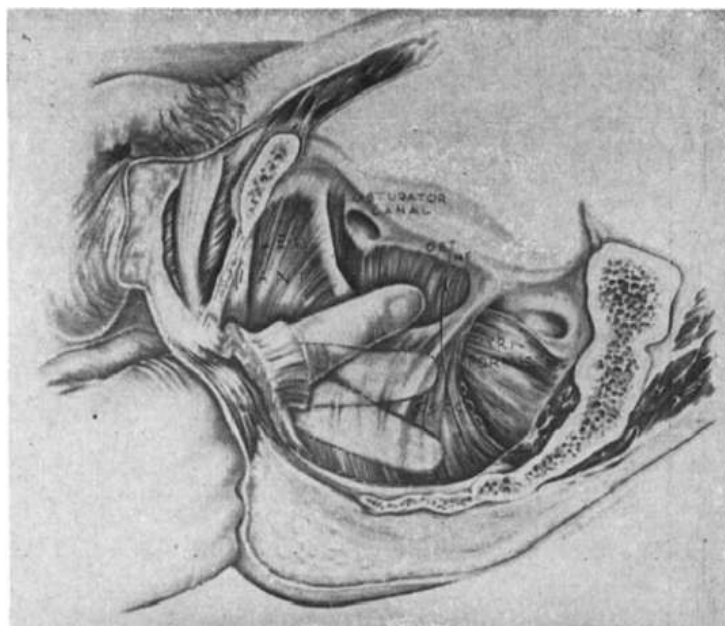


Figure 2. The movements of the finger in massaging muscles to relieve coccydynia, from Thiele [29].

Hobart described manipulation under anesthesia in 1937 [12]: ‘First the coccyx is manipulated gently between the thumb on the outside and the index finger inside. The coccyx is moved backward and forward and sideways, if possible. Next I try, without too much force, to push the coccyx back in place to the right. Now with the index finger a gentle massage is done all about the coccyx, rubbing up and down lengthwise, being very careful not to injure the rectal mucosa.’. Hobart did not report treating any patient more than once. Of 15 patients treated, he found 8 cured and 2 relieved at two months to four years after treatment.

Up until the mid-twentieth century surgeons reported carrying out repeated massage of the muscles attached to the coccyx, but this changed in favour of a single manipulation with corticosteroid injection under anaesthetic. Repeated manual treatment of the coccyx is still carried out by many practitioners such as chiropractors, osteopaths and physical therapists, with reported success by them and by their patients. The website [www.coccyx.org](http://www.coccyx.org) lists 192 such practitioners in the USA alone [32]. Manual therapists very rarely carry out controlled trials, and do not publish in medical journals, so many doctors are unaware that such treatments exist.

### **Injections and nerve blocks**

A great variety of substances have been injected in attempts to relieve coccydynia, in various locations around the coccyx and the nerves supplying the area. The intentions of those using injections have also varied: some have aimed to reduce inflammation, some aimed to cause irritation and increase inflammation, on the theory that this will cause ligaments to strengthen (prolotherapy), and some to block pain signals temporarily with anaesthetics or permanently by destroying nerves.

De Vesian was the first to treat coccydynia using injections of alcohol in 1914, taking the idea from the treatment of facial neuralgia by this method [9]. His patient had coccydynia with no history of injury, and refused surgery. He injected 2 ml of 60% alcohol at the sacrococcygeal junction, and 2 ml along the posterior surface of

the coccyx. The patient had relief from the pain, which continued during four months follow-up. This method was taken up by others such as Yeomans and Waters, claiming success in most cases [33,31]

Kersey recommended injection of a mixture of steroid and local anesthetic into the sacrococcygeal joint, using a gloved and lubricated finger in the rectum of the patient to accurately locate the joint [14]. He reported that the procedure was simple and quick, and could be used in general practice. All of the five patients he had treated were pain-free for at least 6 months.

### **Psychological and neurological treatments**

Psychological explanations for coccyx pain were offered by some doctors, such as Bremer in 1896, in a paper entitled ‘The knife for coccydynia: a failure’ [7]. He gave an account of a woman whose coccydynia had not been cured by surgery. From subtle clues including a tendency to pull her head back, Bremer decided that ‘in the present case the coccygodynia is of an hysterical nature’, and advocated psychotherapy. Like other practitioners advocating psychotherapy, he did not describe a single case treated by this method.

Duncan protested that ‘The diagnosis of hysteria or neurasthenia is always dangerous and should never be made until all possible traumatic and organic lesions are ruled out. [...] One does not make a diagnosis of hysteria in cases of pain in the knee, ankle or any other joint after injury because one has come to recognize that ligaments and muscles may be partially or even completely ruptured. Why should one not judge the painful coccyx following injury on the same basis? Sprain of the sacrococcygeal or intercoccygeal joints does not differ from a sprain about the ankle or knee, except that the symptoms may be of longer duration. Sprained ankles or knees can be placed at rest, whereas the coccyx is almost always in motion and subject to repeated small traumas.’ [10]

Key discussed the different beliefs of doctors about coccydynia: ‘One group, composed largely of neurologists, believe that the condition is entirely a functional neurosis and that treatment directed at the coccyx does little or no good. The other group, composed largely of surgeons, believe that the condition is due to some pathological lesion in the coccyx, or in the coccygeal plexus of nerves which surround it, and that treatment of the coccyx should be instituted in an effort to relieve the pain’ [15]. Key wrote this in the USA in 1937, and in my own experience as a UK coccydynia patient over the past twenty years, there is still a division between those trying to treat the underlying cause and those who believe that this is pointless, and treat only the pain.

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