History of the coccygectomy procedure

Levon Doursounian

Saint-Antoine University Hospital, Paris, France

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HISTORY OF THE COCCYGECTOMY PROCEDURE

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The first written mention of what may relate to a coccygectomy goes back to Paulus of Aegineta (c.625-c.690), an itinerant Byzantine Greek physician of the 7th century [Fig 1]. He recommended in a few words (in the seven books – [Fig 2]) the removal of a fractured coccyx fragment.

"When the os sacrum 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. "

Figure 1

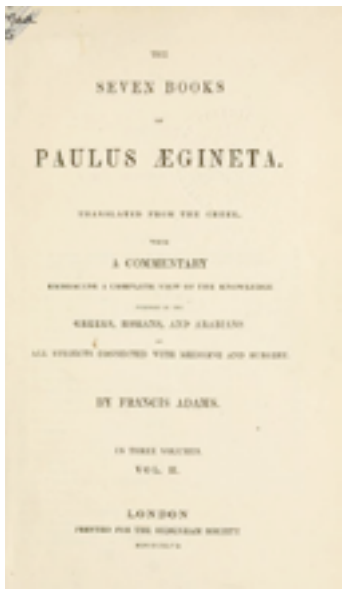

Figure 2

It is only in the 18th century that appear in the European surgical literature the first descriptions of an actual surgical coccygectomy. Two names are mentioned: **Jean-Louis Petit** [Fig 3] from France (1674-1750) and Van Onsenoort from Belgium. I have only found indirect descriptions for the latter, but Petit, in his treatise on Bone Disease republished in **1758** [Fig 4](the first edition came out around 1720) describes an unfortunate coccygectomy.

Figure 3

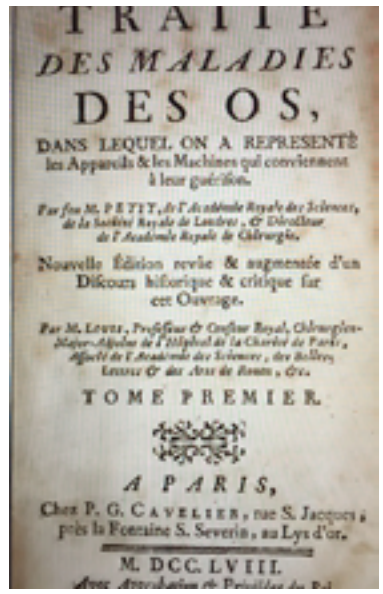

Figure 4

This was a post-traumatic coccygodynia evolving into an abscess, which was then treated by bloodletting, ointments, and then opening of the abscess through a rectal approach, and resection of the coccyx through the same route.

« … she had fallen upon a corner stone, which struck the coccyx near the junction with the os sacrum. The same bashfulness which was prejudicial to the former, was much more so to this; her pains indeed were not violent, but she felt an uneasy weight in the rectum, which became more considerable from day to day. She would not consent to be touched until her excrements could no longer pass through the rectum; having placed her upon the bedside in the same posture as one who is to take a glister [enema], I introduced my forefinger dipped in oil as high as I could into the anus. I touched with great difficulty a tumour of the bigness of a middling pippin; and with my forefinger of the other hand which I placed without near the end of the os sacrum, and the beginning of the coccyx, I discovered a fluctuation, which answered from one finger to the other as I moved them alternatively, which made me believe there was an imposthume [abscess]; the business was to open it. Having declared the danger of deferring it, I prepared linen rags, a compress and bandage. Then I again put my forefinger into the anus with the same precaution, I even thrust it in farther. I touched the tumour a little better, and forcing it outwards as much as was possible, to bring the pus near the place where I had felt it, with the forefinger of the other hand, I plunged the point of an incision knife directly to the seat of the purulent matter, which issued out in great abundance; and the interior swelling disappeared. I put my finger into the wound, and I found the point of the os sacrum, and the head of the coccyx entirely bare and stripped of the peritoneum, as well as rotted

by the pus, which drowned us with its quantity, and poisoned us with its stench. The head of the coccyx being entirely by itself, was separated and parted so as to give way for, and facilitate the dressings which continued for a long time, and had not good success, the patient died at the end of six months, by the melting of the grease of the pelvis and by extraordinary suppurations, which were attended with a slow fever and a looseness until her death. «

[Fig 5 to 9]: Contemporary artistic interpretation of Petit's text (M.Donon &L.Doursounian)

Figure 5

Figure 6

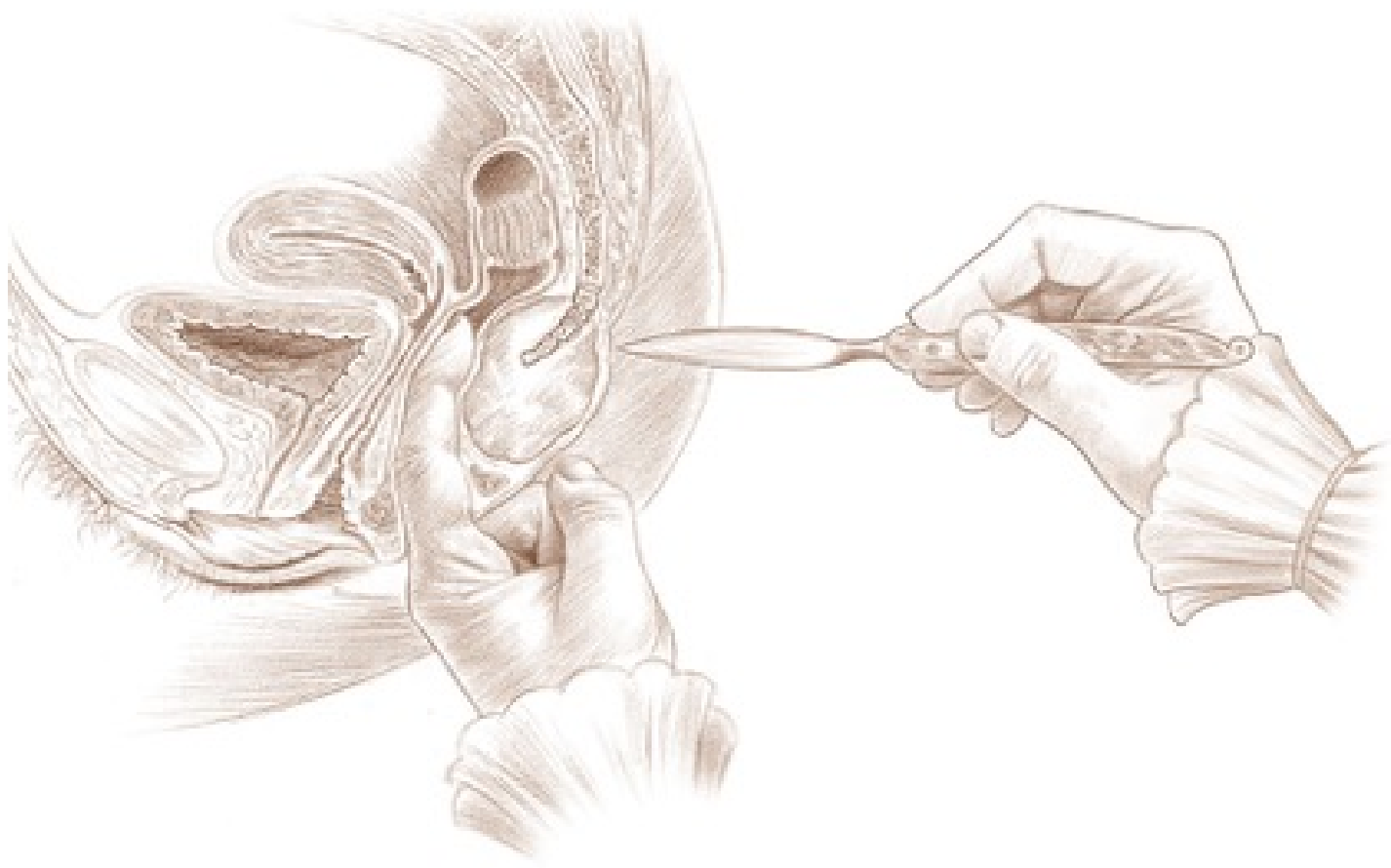

Figure 7

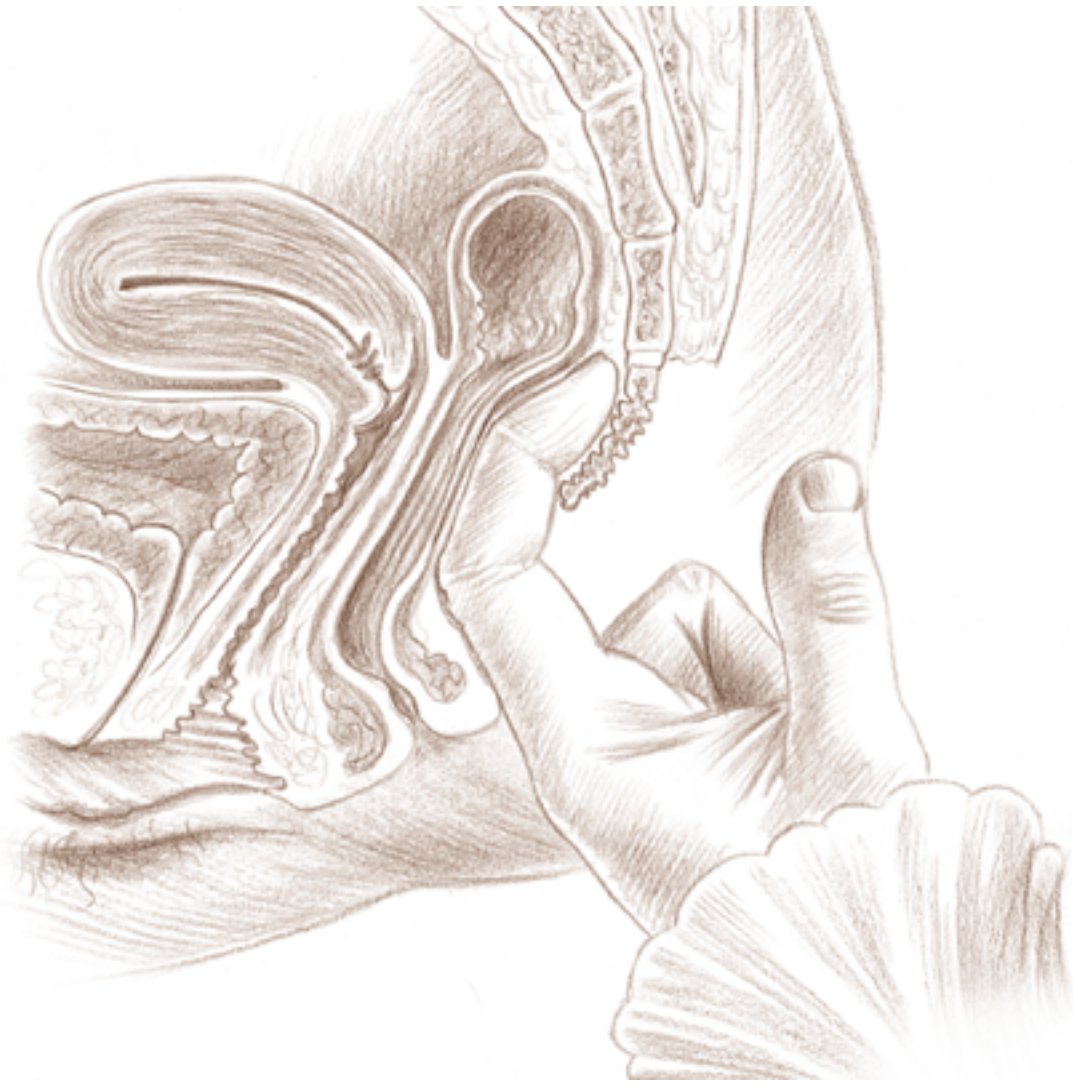

Figure 8

Figure 9

This description by Petit was quoted in 1770 in the dissertation in Latin by Jean Cosme d'Angerville, surgeon at the Hôtel-Dieu Hospital in Paris. This dissertation titled «On the dislocation of the tailbone» was translated into French 245 years later by a practitioner at the Hôtel Dieu of Paris, Jean Yves Maigne.

Caesar Hawkins (1798-1884), a British surgeon at St George's Hospital in London [Fig 10] published in **1832** in the Paris Medical Gazette «Lessons of Mr. Caesar Hawkins on pelvic abscesses».

Figure 10

He describes the cure of a case of anal fistula, the debridement of which had led to the resection of the coccyx and part of the sacrum.

«This is the coccyx of one of my patients, which I extirpated with part of the sacrum. This man had a fistula in ano that was about to be operated upon, when feeling bare bone at the end of the probe led to a change of mind. I made an incision behind the sacrum; I removed everything that was diseased; and though the rectum had been perforated by the abscess, the fistula healed.»

Alfred Armand Louis Marie Velpeau (1795–1867) of the Faculty of Medicine of Paris [Fig 11] in Volume II of «New Surgical Medicine Elements», written in **1839** [Fig 12]:

«The coccyx, the tip of the sacrum among others have often been removed, either because of a fall on the bottom or some other straining, or because an internal arrangement had brought necrosis or decay ...

In a case of fistula in ano, maintained by a decay of the coccyx, Mr. Van Onsenoort, who performed the removal of this bone, did as follows. The index of the left hand introduced into the rectum, supports the coccyx. An incision is made from the base to the top of the bone on its median part. Using a transverse incision at its tip, the latter can be dissected, and the deep aspect of the coccyx separated from the soft parts. The operation was completed by disarticulation. Healing was quick and without incident.»

Figure 11


NOUVEAUX ÉLÉMENTS
DE
MÉDECINE
OPÉRATOIRE,
D'UN ATLAS DE 32 PLANCHES IN-4° GRAVÉES,
LES PRINCIPALES PROCÉDÉS OPÉRATOIRES
ET UN GRAND NOMBRE D'ENCHEVILLEMENTS DE CHIRURGIE;
PAR
Aug.-A.-L.-M. VELPEAU,
TOME DEUXIÈME.
PARIS,
CHEZ J.-B. BAILLIÈRE,

Figure 12

Michael Jaeger (1795–1838), German surgeon [Fig 13] in "Die Resection der Knochen" published by Franz Jordan von Ried in **1847**, wrote:

«Resection of the tail bone. The extraction of the necrotic tail bone has been made repeatedly. Van Onsenoort undertook the extirpation of this bone because of caries; he made a long midline incision through the skin, from the base to the tip, and at the lower end thereof a cross-section. After detachment of the flaps of the posterior surface the tip was cleared first. Then the anterior surface was freed from soft tissue. Eventually the bone was disarticulated from the sacrum. Wound healing was rapid and without pitfalls.»

Figure 13

In the New Orleans Medical Journal of May, **1844**, 57-60, **Josiah C. Nott** (1804-1873), Professor of Surgery at the Medical College of Mobile, Alabama [Fig 14] published «Facts Illustrative of the Practical Importance of a Knowledge of the Anatomy and Physiology of the Nervous System.»

In this paper, he described the case 2:

«Miss —, aged about 25, had been very much deranged in general health and suffering from neuralgia for ten months, for which she was treated by an eminent physician in Charleston, and afterwards by Prof. Jones in New Orleans. She came under my care the latter part of June, 1843, at which time her condition was a deplorable one; her general health was completely shattered and strength exhausted; dyspepsia; constant nervous headaches; menstruation regular though difficult; excruciating pain at the point of the coccyx; pains in the uterus, vagina, neck of the bladder, and back. The most prominent symptom was the excruciating pain at the point of the coccyx, which became intolerable when she sat up, walked, or went to stool, or in short when motion or pressure was communicated to it in any way. This symptom was so peculiar, that I was led to suspect some organic lesion about the coccyx, and on questioning her closely, she informed me that she had fallen about four years ago and received a blow upon the coccyx, which gave her a good deal of pain at the time and for several weeks afterwards; but these symptoms passed off, and did not return until about ten months before I saw her.

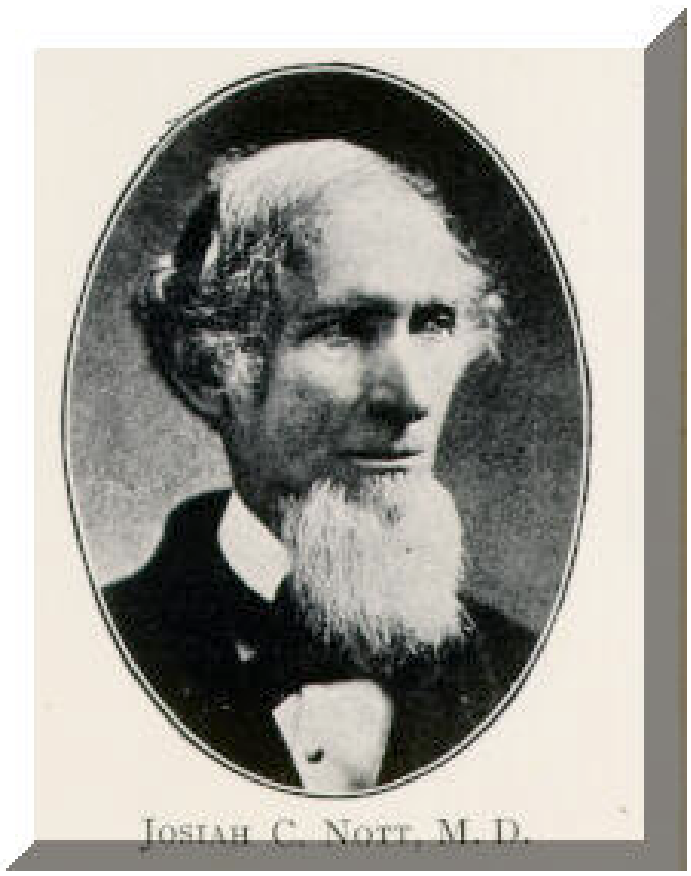

Figure 14

She consented, and on examining the whole course of the spine, I found no tenderness of any consequence until my finger touched the point of the coccyx, when she screamed with pain. I then proposed the extirpation of this bone as the only chance of relief. She had suffered so long and so severely that she did not hesitate, and told me she was in my hands to do what I thought best, and would submit to anything I would advise.

Accordingly, On the 2d of July, I made an incision down to the bone, and extending from the point upwards two inches; I then disarticulated the bone at the second joint, divided the muscular and ligamentous attachments, and without much difficulty dissected out the two terminating bones. On examining the bones after the operation, I found the left one carious and hollowed out to a mere shell; the nerves were exquisitely sensitive, and the operation, though short, was one of the most painful I ever performed. For several hours after, the pains were extremely violent, coming on every ten or fifteen minutes, and accompanied by a sensation of bearing down like labor-pains. Morphine in large doses and other anodynes afforded no relief; the pains became gradually less frequent and less violent; the wound soon healed, and at the end of a month the local disease disappeared and the general health was much improved …

The case is novel and instructive - I know of no one like it on record. No doubt many similar cases have occurred and their true nature been overlooked. I have another at this moment under my charge, produced by a fall on the sacrum, and almost identically the same in every respect - it will probably also require an operation for relief.»

Nott is credited as being the first to apply the insect vector theory to yellow fever but he was also a supporter of the notion of polygenism, which claims that humanity originates from different lineages. He believed that God had created each race and positioned each race in separate provinces. He used his influence and his science to defend the subjugation of Blacks through slavery.

Figure 15

Sir James Young Simpson (1811 – 1870), 1st Baronet [Fig 15] was a Scottish obstetrician and an important figure in the history of medicine. Simpson discovered the anesthetic properties of chloroform (discovered by E. Soubeiran) and successfully introduced it for general medical use. In his treatise «Clinical Lectures on Diseases of Women – **1862**» there is a chapter of 20 page on coccygodynia and diseases and deformity of the coccyx.

«*But as she recovered from her uterine disease, and as the symptoms attendant on it began to disappear, she commenced to complain, after sitting on the damp grass in her avocation as a washerwoman, of a dull, aching pain seated in the very lower extremity of the spinal column, for which my nephew contented himself with prescribing in the first instance a belladonna plaster, and afterwards various local anodynes and general tonics for a space of two or three weeks. As this pain, however, instead of abating, seemed always to become more constant and harassing, and as the patient could not sit down except on one hip at a time, and even then with the greatest suffering, an examination was made of the painful part, when it was found that the coccyx was unusually straight and long, so that it reached far backwards and downwards, while the very tip of it was felt through the rectum to be projected suddenly forwards. Pressure of the coccyx and movement of it in any direction caused pain. To subdue this sensibility thirty drops of a watery solution of the bimeconate of morphia were twice injected into the soft parts around the bone, on two different occasions, and with an interval of several days between each injection. This measure had the effect each time*

of deadening the pain, but it led to no permanent result. The next step employed for her relief was the separation of the coccyx from all the surrounding muscles, tendons, and ligaments, which was done subcutaneously, with a tenotomy knife. Three or four weeks afterwards the patient returned, saying that for a time she had felt better, but that during the last week she had suffered as much pain as ever, and was incapacitated for work from it. She was, in consequence, sent into the Hospital; and on Saturday, June 3, I removed the two lower segments of the coccyx by cutting down upon them through the skin, and dividing the bone with a pair of bone pliers; and then the separated portion being pushed through the wound by the finger of an assistant passed into the rectum, it was easily detached from the soft parts, and so removed. The edges of the wound were brought together with two iron wire stitches, which were removed some days afterwards, and the wound is now almost closed up. Amputation of the coccygeal bones has been had recourse to in this patient, as it seemed to afford her the best chance of relief from a peculiar form of disease, which is anything but rare, although no written account of it has, as far as I know, as yet appeared.

…happily it is a means which proves successful in almost every case —is the complete separation from the coccyx of the muscular and tendinous fibres that are in connection with it. To effect this, you must introduce a tenotomy knife underneath the skin, at a short distance from the tip of the coccyx, pass it along the posterior aspect of the bone, and then divide the muscular and tendinous attachments, first on one side and then on the other, and finally all round the tip of it. It is not in every case necessary to make such a free division as I have indicated. In some instances division of the fibres of the gluteus maximus of one or the other side will suffice, or detachment from the coccyx of the sphincter and levator ani may be all that is requisite for a cure. This simple operation is 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; and the result is in almost every case instant relief of the pain, and in most cases a perfect and permanent cure of the disease.»

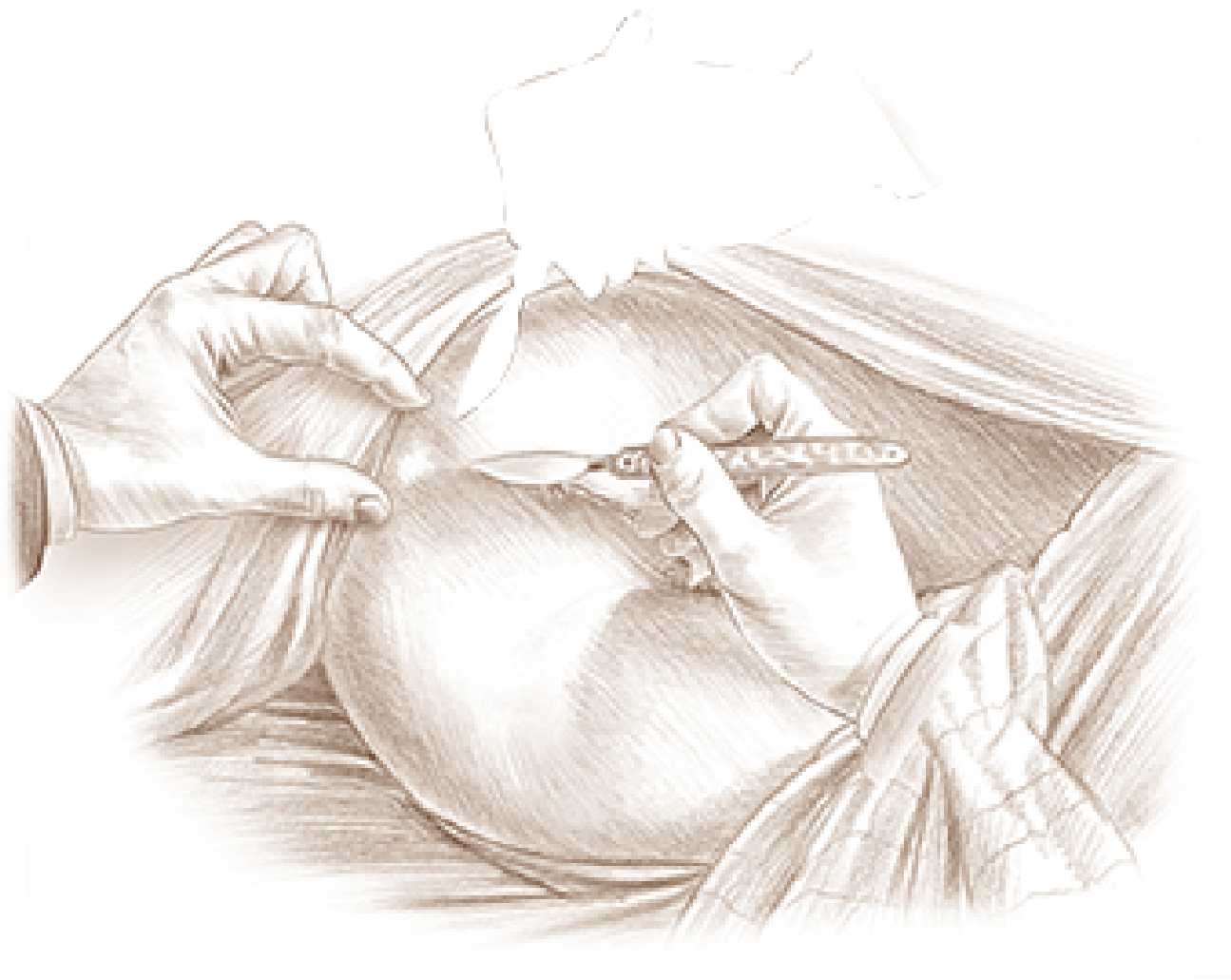

Figure 16

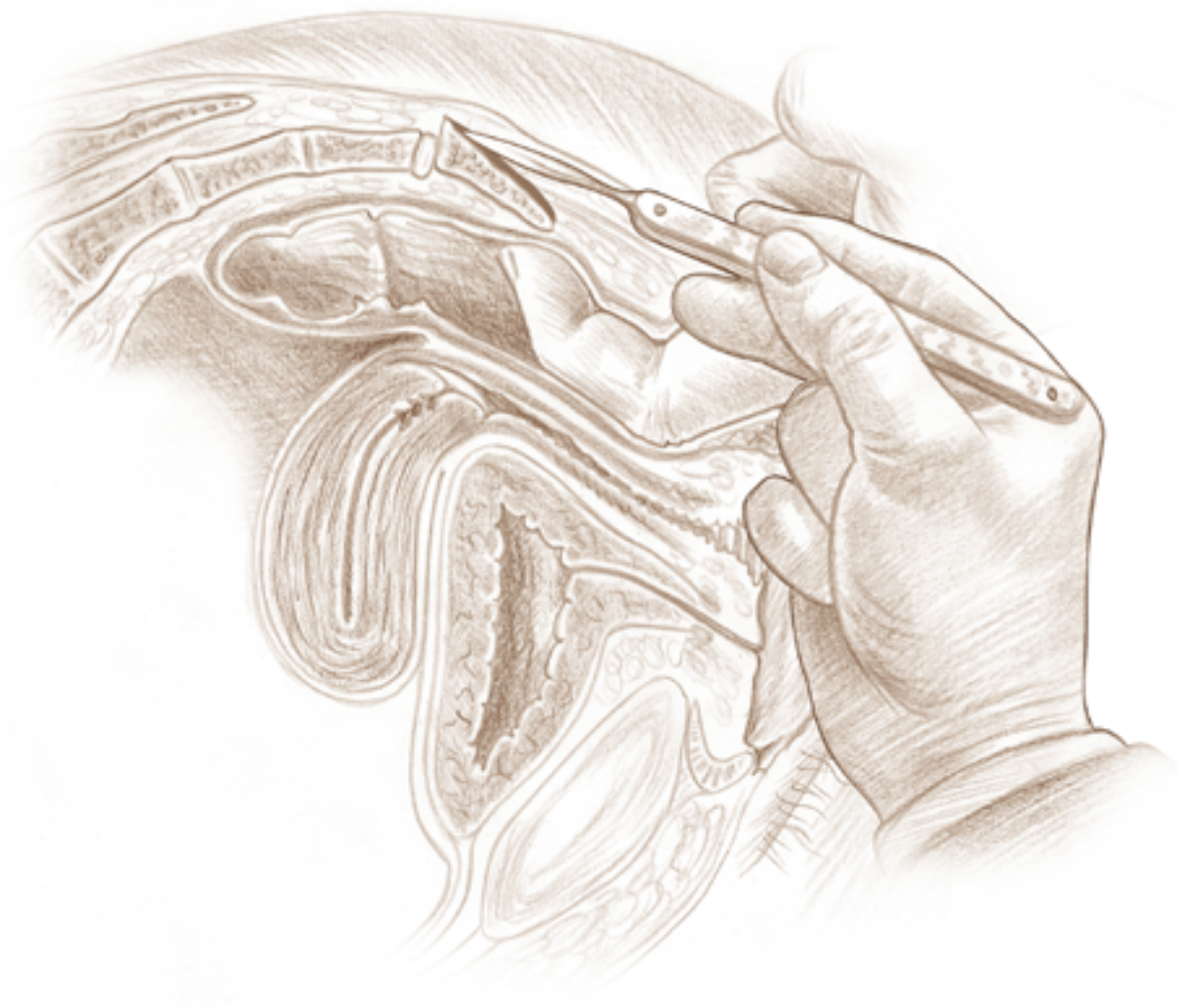

Figure 17

Simpson analyzes the symptoms as the result of mechanical stress on the coccyx and advises percutaneous peri-coccygian tenotomy. This procedure separates the coccyx from the structures that might exert pulling on it and denervates it. It is therefore not a coccygectomy proper.

He does not speak of anesthesia but insofar as it evokes injections of morphine solution in the soft tissues around the coccyx as analgesic treatment, one can think that practice local anesthesia ...

He mentions some failures and admits that in some «nervous» patients who have pain elsewhere than on the coccyx general treatment might suffice.

J.C. Nott, in American Journal of Obstetrics and diseases of women and children

Volume I 1869, Extirpation of Two Lower Bones of Coccyx. 253

«My method of operating is a little different from that of Prof. Simpson, and the operation performed on Mrs. W. O. S - will illustrate the method usually adopted by me. There was free motion only in the middle articulation of the coccyx, and when the finger was introduced into the rectum and motion communicated to this point, severe pain was instantly produced. I therefore determined to amputate at the movable articulation. The patient was placed on the right side, with the nates drawn close to the edge of the bed. The index-linger of the left hand was introduced into the rectum and made to press the coccyx firmly outward. With a short strong scalpel, an incision was made in the median line, down to the bone, extending a little beyond the articulation above and the tip of the bone below—the attachments of the bone throughout its whole length were freely separated on each side, and the knife passed through the articulation so as completely to separate the bones ; the left hand was then disengaged, and the upper end of the detached bone being seized with Ferguson's bull-dog forceps, it was pulled firmly outward, and by passing the knife behind, it was lifted from its bed. I have never before had any trouble with haemorrhage in a similar case, and although in this there was no visible artery, the haemorrhagic tendency (from the condition of the system) was so great that blood continued to ooze from every

pore, and it became necessary to plug the wound with cotton steeped in persulphas ferri. This was an unfortunate necessity, as it caused irritation and pain, and prevented healing by first intention, which usually takes place.

The wound was a month in healing, and while the parts were still very tender, the patient, feeble and unable to sit up, was compelled, by circumstances I need not specify, to start on a journey of a thousand miles by railroad. The result of the case, therefore, is yet to be learned, but I hope at some future time to be able to give satisfactory information.»

Nott, who makes the same remarks as Simpson, notes that there is not always a traumatic explanation in patients he has treated and discusses the role of a gland at the tip of the coccyx and of the contraction of the pelvic floor muscles.

«While throwing these notes together, a member of the Medical Journal Association very kindly attracted my attention to a short article in the New York Medical Gazette, on the «Glandula Coccygeal of Man» taken from Virchow's Archives of Pathology, 1860, vol. XVIII., in which an account is given of the discovery of a small gland, usually about the size of a hemp-seed…

…I confess that I knew little about vaginismus before the book of Dr. J. Marion Sims was published, and might well have overlooked the contraction of the vaginal sphincter in my earlier cases.»

T. Gaillard Thomas (1832 – 1903) professor of obstetrics and diseases of women and children in New York [Fig 18], in A practical treatise on the diseases of women, **1872** quotes the descriptions by Nott and Simpson and the technique of the latter, which he recommends. He makes the following remark:

«In fat women subcutaneous section of the muscles attached to the coccyx is by no means so easy a matter as one would suppose who has not made the experiment. Under these circumstances the operation is simplified and rendered more certain by making an incision down upon the coccyx, lifting the exposed extremity of this bone

Figure 18

with the finger, and then with a pair of scissors severing the muscles. This procedure is both easy of performance and certain as to result.»

Meanwhile in France, **J.Lisfranc** (1787-1847) surgeon at the Pitié Hospital in Paris **[Fig 19]**, in his Treatise of Operative Medicine, Volume II, pp. 544 – **1846** describes some cases of coccygectomy in the context of chronic suppuration

Figure 19

«I have twice, after opening an abscess, performed the extraction of a completely isolated splinter of bone that we deal with and that belonged to it; it was bathed by the purulent matter: on another occasion and still after a fall on the buttocks, I successfully resected about the lower half of the necrotic coccyx; The operation was a success. I had performed surgery on a fistula in ano; the wound would not heal; I examined many times in vain whether the fistula did not extend beyond my incision; eventually, a stylus made me realize that this track was communicating with the extension of the coccyx; I spread my incision onto the decayed bone point; I peeled the bone and I removed two-thirds of it with shears of Colombat.»

Lisfranc gives two warnings:

«It is good to warn that falls on the buttocks sometimes have very serious consequences, when, for excessive modesty, patients conceal that accident, or refuse to the surgeon's examination. Thus the sister of a famous tragic actor, not having wanted to let herself get examined, despite the pain she felt in the coccyx area, presented with a purulent discharge, at which opening I found this fractured and decayed bone as well as the outside of the sacrum. « Lessons of C» Boyer on bone diseases, collected in a full treatise on these diseases by Richerand, vol. 1, p. 166, 1803.

One should guard against serious inflammation that can develop in the cellular tissue of the pelvis, extend far and become fatal; sometimes, one can observe this inflammation after a simple fistula in ano operation, even leading to a small rise in the intestine and located outside near the lower orifice of the rectum.»

Louis Léopold Ollier (1830 – 1900) [Fig 20], in his well-known «Experimental and clinical treatise on bone regeneration» Volume II 1867, page 184 [Fig 21], describes a case in a young girl who had a violent trauma of the coccyx progressing to abscess, then chronic osteitis for 7 years. He performed a coccygectomy that cured the chronic infection but the price of 6 months of hospital care (Suppuration slow to dry up ...)

«Here is how we performed the operation in the case of decay of the coccyx that we observed:

Method for subperiosteal removal of the coccyx

The patient lying on her stomach, one should recognize the limits of the coccyx by introducing a finger into the rectum, and holding the bone between the finger and another placed on the rear side. One then makes an incision of 7 to 8 cm, so as to exceed by one centimeter at the top and a few millimeters at the bottom the tip of the coccyx. This incision reaches right away to the bone and incise the posterior fibrous coating. One then detaches the fibrous coating on the right and left, so as to expose the posterior surface of the bone. To perform this denudation more fully and not be hindered in the disarticulation of the coccyx horns, one should cross the first incision at the sacrococcygeal junction with a second transverse incision.

The sacrococcygeal joint being laid bare by denudation of the posterior surface, one incises its fibro-cartilage; is stripped with a sharp raspatory the horns of the bone, and the denudation is continued onto the lateral edge on both sides. One then introduces under the coccyx through the sacrococcygeal joint a retractor or a curved raspatory, and one uses this instrument like a lever to lift the bone that is freed by this movement of its fibrous coating. If the parts of the coccyx are not fused together, they are removed separately. In our operation on the living, we left in place one or perhaps two lower parts that were independent and healthy. If the sacrum were diseased, it should be remembered that the sacral canal is closed posteriorly and caudally only by fibrous tissue.»

This technique of subperiosteal resection of the coccyx is quite close to the modern procedure with bone exposure subperiosteally by raspatories except that the surgeon performs the cut by

Figure 20

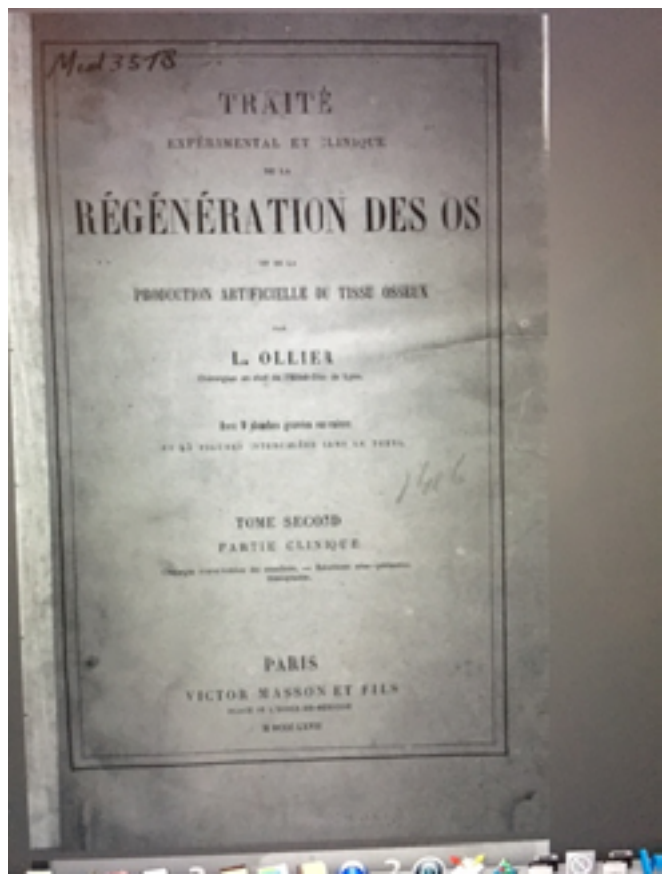

Figure 21

guiding the approach first by placing a finger in the rectum and that a transverse incision is used as needed.

A case of post-traumatic osteitis with fistula in a 23-year-old woman with favorable outcome is described

Then several cases of tuberculous osteomyelitis are discussed, but in two cases the suppuration more or less continued.

Paul Denucé (1824-1889) [Fig 22], in "On ossifluent fistulae of the anal region

On the resection of the coccyx and its indications – **1874**", reviews the described cases of osteitis of the coccyx and describes a personal case of multiple fistulae of the anus treated by resection of the coccyx. Furthermore, he explains the interest of the coccyx resection to improve surgical exposure in surgery of the rectum.

And he mentions coccygodynia and the publications by Nott and Simpson.

Figure 22

In 1876, two American surgeons, Mursick and Rockwell, publish their cases of coccygectomy.

George Andrew Mursick (1834-1895) was surgeon in charge of the US Army General Hospital at DuValls Bluff, Arkansas in 1864 and started a practice in Nyack in 1869. American Journal of the Medical Sciences - Vol LXXI - **1876**

Art. XIV he described «Two Cases of Excision of the coccygeal Bones for Coccygodynia.»

«Case I Miss W., aged 29 years, a strong built, muscular woman, fell, in March, 1872, from a chair upon which she was standing, to the floor, striking heavily upon her fundament…

Failing to get relief from her suffering, she finally came under my care in May, 1873, fourteen months subsequent to the injury…

The nature of the disease and the remedy for it were explained to the patient. She assented to an operation, and accordingly, on June 2, 1873, I proceeded to remove the two displaced bones. After anaesthesia by ether the patient was placed on her right side, the nates being brought close to the edge of the bed; the index finger of

the left hand was introduced into the rectum, and the bones pressed well back, when, with a scalpel, an incision two inches in length was made in the median line down to the bone, and its attachments severed from it as far as possible. The left hand was then disengaged and the bones seized with a strong forceps, drawn outwards, their remaining attachments severed, and the bones removed without difficulty. Severe pains shooting through all the pelvic organs followed the operation for several days, requiring the liberal use of opium. There was also retention of urine for three days, rendering the use of the catheter necessary. The wound was dressed with a weak solution of carbolic acid; the discharge from it was very profuse for ten days, and nearly six weeks elapsed before it healed….

Remarks.—The result of these operations was a cure of the coccygodynia, and relief from its disagreeable attendants. The subject of Case I., after appropriate treatment, entirely recovered from the uterine complication, and is now in perfect health. Of Case II., the patient is still under treatment for her dysmenorrhoea, with what result remains to be seen.

The operation is simple and easy of performance, but the constitutional disturbance following it is out of all proportion to its magnitude—though as far as I am aware it is devoid of danger. The subsequent pain is very severe, and lasts for days. The wound is slow to heal, and the discharge is profuse and thin. This condition of things may depend upon general debility induced by disturbed nutrition following long-continued pain.

These are two post-traumatic cases in young patients suffering for a long time before deciding to undergo surgery.

The procedure is performed under ether anesthesia but without following the current rules of surgery (the left index finger is placed in the rectum and guides the incision made by the right hand) and postoperative suppuration is considered as part of the healing process that eventually happens.»

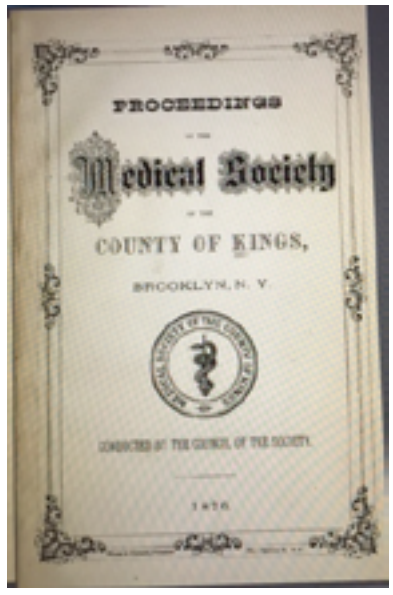
PROCEEDINGS
Medical Society
COUNTY OF KINGS,
BROOKLYN, N. Y.

Figure 23

Franck W. Rockwell (1843-1889) in «Proceedings of the Medical Society of the County of Kings» stated meeting, december 19, **1876** [Fig 23] Notes on cases of traumatic coccygodynia" gave the first modern description of the coccygectomy (no mention of a finger in the rectum, anesthesia, current technique and postoperative suppuration inconsequential).

«Etiology.—Simpson himself believed that in almost every instance injury to the bone—such as fracture, dislocation or pressure during parturition, violence inflicted by falls, blows, etc., was the prime factor in the causation of the disease, and in this opinion he is closely followed by most recent writers, with the exception of Prof. J. G. Thomas, who thinks it "very generally a neuralgic state due to uterine or ovarian disease….

Treatment.—All authorities agree as to the obstinacy of the disease, and its intractability to any but the most radical treatment, especially in cases having a traumatic origin. Simpson expressed the opinion that permanent relief rarely followed anything but operative treatment, and was accustomed to isolate the bone from its attachments by subcutaneous incision. This is not by any means a simple operation and even in his skillful hands often proved unsuccessful. Thomas recommends as an improvement on this plan the exposure of the bone by incision, the last steps of the operation being completed by the scissors, cutting from below upward, and severing all the attachments between the coccyx and muscles or ligaments inserted therein. Should this fail, removal of the bone is the only resource left us. In the cases reported below the simpler procedure

was not resorted to, since the symptoms seemed to point to destructive changes in the tissues of the part, and the patients insisted upon certain and permanent relief.-

The first case is that of Mrs. K., whom I saw with Dr. E. S. Bunker, under whose care she had been for several months. About two years previous to this time, while descending some steep steps into the yard—her arms being filled with something she was carrying—she slipped and fell, striking the sacrum against a sharp edge of the stair. She experienced acute pain, but managed to crawl into the house after a little while, and in a few days resumed her usual duties. Gradually, however, the pain returned, and finally became intolerable. At times, even when sitting upon soft cushions, ease could only be obtained by resting upon one hip. Defecation, walking and stooping were all extremely painful, and she was at times compelled to neglect her household duties while trying to obtain ease by perfect rest. The doctor had exhausted routine treatment, opiates, tonics, subcutaneous injections, etc., but had only succeeded in mitigating her sufferings. Upon examination per rectum, an exquisitively sensitive spot was found near the base of the coccyx, the patient screaming out when this was touched, even with the greatest care. The coccyx was neither more nor less movable than usual, and pressure made in the direction of its long axis did not seem to increase the pain. Believing the disease to be in the fibrous structures about the bone, its extirpation was advised and eagerly assented to by the patient.

She was anaesthetized, and an incision about 2 1/2 inches long made over the bone. It was then detached from the soft parts covering it, bent sharply forward and disarticulated from the sacrum, where, without much difficulty, it was dissected away from the rectum and removed. An ulceration extending through the entire thickness of the periosteum was found upon its anterior surface, in the location which had been so sensitive to pressure. The diameter of the ulcer was about three or four lines. The bone and its articular surfaces were all apparently healthy. The next day the patient complained of some pain in the wound, but said "the old pain was all gone.» Owing to an accident, the wound, which had healed throughout its whole length, was re-opened on the fourth day, and suppuration ensued. The cavity was washed out for a few days with a weak solution of carbolic acid, and the patient rapidly recovered. The operation was performed in Jan., 1875, and the patient has had no return of her pain.»

From 1880 on, many more or less isolated cases of effective coccygectomies were published

Jenks, in Medical record, **1880**, recommends coccygectomy with the advice as to regularize the stump and to remove the cartilage.

Ward in New York medical journal and Obstetrical review, **1882**

James Edmund Garretson (1829-1895) was a professor at the Dental College of Philadelphia, a clinic for oral surgery. In Philadelphia Medical Times **1882**, he his credided of a coccygectomy performed with a dental burr.

«Operation. —The patient being etherized and placed partially upon her abdomen, an arm being under the body at the region of the diaphragm, to secure freedom in respiration, an incision was made through the skin and superficial fascia the length of the coccyx. These tissues being carried to either side by means of retractors, a second incision was made through the periosteum, and by means of a chisel shaped knife this structure was raised and everted. In this last is the peculiar operation as practised by Prof. Garretson : it is as though one might cut down the centre of the upper surface of an envelope, exposing, in the turning aside of the paper, a letter lying upon the lower face of the envelope, the turned-aside upper part being of continuity with the bottom of the paper. A succeeding step employs the engine. A circular burr, the face side alone of which is cut, is placed in the grasp of the hand-piece, and, while in revolution to the extent of ten thousand times to the minute, is applied, with delicacy of manipulative touch, to the surface of the bone. In the case being recorded, five minutes sufficed for the disappearance of the coccyx in the shape of bone-dust, the under face of the periosteum remaining as undisturbed as though it had never been in relation with the coccyx.»

Harrison in Transaction of obstetrical Society of New York, **1883** published «Removal of the coccyx after-injury -A case of traumatic coccygectomy»

Followed by an interesting discussion [Fig 24]:

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flexion of the womb, bound down by perimetric adhesions. He succeeded in restoring the uterus to its normal position, and the patient was comparatively well until the accident before mentioned. Dr. Emmet thought the symptoms were due to perimetric inflammation, and directed treatment accordingly; but, as no improvement followed, the coccyx was then removed, with the exception of the first bone, which was firmly anchylosed with the sacrum. The bone itself was not apparently diseased.

Dr. Dawson asked whether, in cases in which motion could be detected in the coccyx, attended by pain and all the symptoms mentioned by Dr. Harrison, which were not relieved by other means, it was justifiable to remove the movable extremity. About a month ago he removed the fractured coccyx from a patient who had suffered for years from pain apparently attributable to a fall, striking the coccyx against the edge of a trunk. He had under care at present a young girl who had for years been treated for uterine disease such as had existed in Dr. Harrison's patient, and had been only partially relieved; but the coccyx was movable, and was the seat of considerable tenderness and pain, following a fall upon that point some years before, and the question had arisen whether the bone should not be removed.

Dr. Harrison replied that, as the symptoms referred to still existed after relief of the uterine trouble, it would be entirely justifiable to remove the coccyx. Dr. Emmet had observed that in many cases symptoms which were apparently attributable to disease of the coccyx had disappeared on directing treatment to the uterus or its appendages, and he made it a custom, therefore, not to proceed immediately to the removal of the coccyx until it had been determined that the symptoms were not of a reflex nature.

Dr. Lee remarked that he believed the subject of coccygodynia had not received the attention in this city, and perhaps throughout this country, which it deserved. This might have been due to the fact that many years ago, when the operation was being performed extensively in England, it was found subsequently that it had been done in many cases in which there was no necessity for it, and it therefore fell into disrepute. He believed that the view held by Dr. Emmet—viz., that in most cases in which symptoms of coccygodynia existed they were due to pelvic cellulitis behind the uterus—was, perhaps, open to criticism. He himself was cognizant of several cases in which removal of the coccyx had been attended with the greatest possible benefit, after a great variety of other means had failed to give any relief whatever. He had performed the operation with a successful result in two cases within the past year, all other means having failed. In one case there was found to be fracture of one of the bones, and in the other chronic periostitis, arising from a fall upon the stairs.

Dr. Chamberlain remarked that, although we should discountenance any unnessary operative procedure which mutilated the body, he was not aware that any evil result had followed excision of the coccyx, and, the part being comparatively an unimportant one, it might be justifiable to remove it, even though it had not been positively demonstrated to be the seat of the trouble.

Figure 24

William Odell in The Lancet May 28, **1887**

A case of removal of the coccyx; remarks.

WH. Allingham (1829-1908), Fellow of the Royal College of Surgeons of England

Surgeon at the Great Northern Central Hospital and at St. Mark's Hospital, was one of the first surgeons in England to specialize in the treatment of diseases of the rectum, out of which he made a considerable fortune. In «The Diagnosis and Treatment of Diseases of the Rectum - Fifth edition **1888**» he described 3 cases, including 1 man, with favorable outcome after the intervention if coccygodynia is caused by the mobilization of the coccyx.

«My first case was a married woman set. 54, with seven children…

As nothing I could do seemed to benefit her, and she had been under many eminent physicians and surgeons without getting better, I determined to remove the coccygeal bone at the joint ; and this I did. Making a straight vertical incision along the bone, and taking care not to wound the rectum, I dissected it out and disarticulated it without any difficulty. There did not appear to be any appreciable pathological change in the bone. The wound healed rapidly, and I was much pleased to find that the patient was cured. She was able, nine months after the operation, to sit down in comfort, and to walk about without any pain.

…. I by no means intend to advocate the frequent removal of the coccyx for pains in the neighbourhood of that bone, yet I think in some cases, where all other means have been exhausted, and there is good evidence that the pain is induced by every movement of the bone, its excision is called for and may be the means of curing an otherwise incurable disease. I do not see any particular danger in the operation, and that the coccyx may be dispensed with without any evil resulting is, I think, certain.»

Post and Goldthwait at the Boston city hospital in the Boston Medical Journal in September **1890**

Alfred Cooper & F. Swinford Edwards from St. Mark's Hospital of London, in Diseases of the rectum and anus, **1892**:

«*Excision of the coccyx is a simple operation, and if all goes on well, the patient should be convalescent in a fortnight. The steps of the operation are as follows:*

- (1) A longitudinal incision, two inches in length, is made over the dorsum of the coccyx and lower part of the sacrum.

- (2) The tissues are reflected on either side, and the bone is dissected out, the edge

of the scalpel being directed towards it. If only moderate care be taken, there is no danger of injuring the gut.

- (3) The wound may be closed by sutures over a small drainage tube, which can be removed after twenty-four hours, the usual antiseptic dressings being applied. The wound may also be packed with iodoform gauze and allowed to remain open, being thus left to heal by granulation. This we think the safer plan, even if somewhat more tedious. There is no need to give astringents to lock up the bowels.»

Rufus Elmer Darrah(1861-1916) practicing in Boston and Newport made «A report of three cases of caries of the coccyx» in Boston Medical and Surgical journal. January 12, 1893.

«*3 cases of fistula of the anal area with coccyx osteitis leading to more or less complete resection of the coccyx. Conclusions:*

From the above, I think, we can draw the following conclusions.

(1) That caries of the coccyx occurs very infrequently.

(2) That it is more common in females than males.

(3) That there are these important points in considering the diagnosis of these cases:

(a) history of injury;

(b) constant pain;

(c) multiple and persistent sinuses (not always present);

(d) that persistent sinuses should lead one to suspect caries of the coccyx;

(e) that excision of the coccyx is the best treatment for all cases when there is disease of that bone.

Note—Precautions taken previous to operation: bowels moved with cathartic the day previous to operation, and by enema on the day of operation. Parts should be scrubbed with soap and water, alcohol, ether and corrosive sublimate (1-3000).»

T.B. Earley gynecologist from Philadelphia, in «The medical bulletin of medicine and surgery, **1893**»

Extirpation of the coccyx for the relief of an irreducible dislocation «*I would advise complete extirpation of the coccyx, as being the only effectual means of affording complete and permanent relief. The operation suggested by Simpson of the subcutaneous division of the muscular and ligamentous attachments of the coccyx is, in my opinion, inadvisable, as the results are far from good. I desire to call attention to the following important points in the technique of these operations:*

1. That the strictest aseptic precautions be taken throughout these operations.

2. That the incision be of sufficient size to allow of free manipulation.

3. That in the separation of the muscular and ligamentous attachments of the coccyx care be taken not to wound the rectum.

4. That bleeding be thoroughly controlled before closing the incision. To accomplish this nothing is more effectual than gauze sponges previously dipped in hot water.

5. That the incision should be closed without drainage»

Lewis Adler Jr. from Philadelphia reports a case of post-traumatic coccygectomy in 1895. Anterior displacement reduction attempt after 2 years followed by rectal suppuration.Coccygectomy with curvilinear sacrococcygeal paracoccygeal incision very inflammatory perirectal context. Septic outcome and healing after 2 months of hospitalization.

Back in France, **Antoine Chipault** (1866 – 1920) from Hôtel-Dieu de Paris, in Spinal Surgery Studies, page 362, **1894** made a summary of publications on the surgical treatment of coccygodynia and proposed a classification into:

a- traumatic disorders

b- decay of the coccyx

c- coccygodynia sine materia

With a wide bibliographic development on the very unpredictable aspect of the operation described by Simpson, who carries out a pericoccytomy, the author, considering Nott's publications in 1844 and a dozen of publications until 1892, recommends coccygectomy in all case where an organic cause is demonstrated.

Ludwig Bremer, Neurologist from St Louis, Missouri, cooled down the surgical enthusiasm, in his article published in Medical Record (New York) in 1896: The knife for coccygodynia: a failure.

«In all cases of coccygodynia that I have seen, a history could be elicited, if not of hysteria proper or some allied neurosis in the ascendants, at all events of the existence of the hysterical temperament. In all of them an immediate or provoking cause, a provoking agent (agent provocateur of Charcot-Guinon) could be demonstrated. A trauma, severe and prolonged emotional and intellectual strain, infectious diseases, convalescence, parturition and lactation, chronic intoxication (alcoholism, saturnism, etc.) can generally be shown to have existed before or at the time of the cropping out of the trouble. The case briefly reported above is one of traumatic (monosymptomatic) hysteria. The time will come when another generation of medical men will look upon such operations as one of the most remarkable aberrations of the science of medicine. The trouble is in the brain, but not at the periphery, neither bone nor skin. It is projected from the centre to the periphery, as an irritation of the ulnar nerve at the «crazy bone» is to the little and fourth fingers. I do not mean to say that never and under no circumstances has the removal of the coccyx been successful in curing the pain. Perhaps there are cases in which the operation has been beneficial. Personally I do not know of any. Even in cases of success the question is legitimate: Would not other and simpler means have been equally effective? Generally speaking, the results of coccygodectomy are as hopeless as neurectomy in facial neuralgia.»

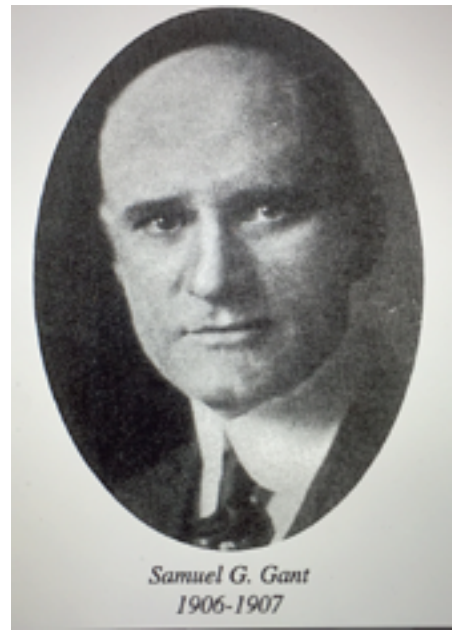
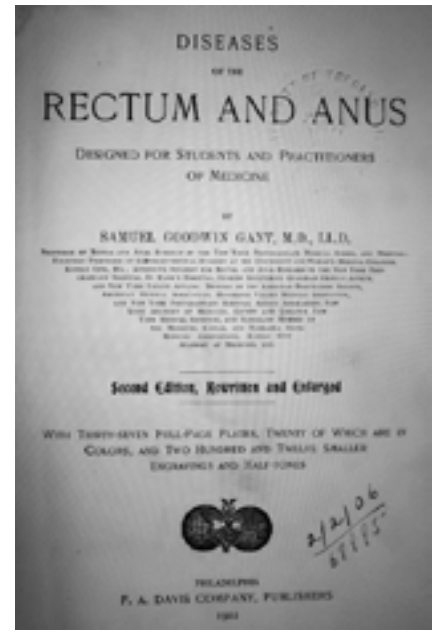


Figure 25


DISEASES
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BY
SAMUEL GOODWIN GANT, M.D., LL.D.
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Figure 26

Samuel G. Gant [Fig 25], President of the American Society of Colon & Rectal Surgeons in 1906-1907, practiced in Kansas City before coming to New York City as Professor of Proctology at the New York Postgraduate Medical School. Dr. Gant published the first of his several books on rectal diseases after a book salesman who called on him in Kansas City happened to mention that his publisher suffered from hemorrhoids. Their conversation led to a referral, and the publisher was so well satisfied with the surgery Dr. Gant performed that he suggested a second career as an author. Dr. Gant was one of the first proctologists to advocate the use of local anesthesia in rectal surgery and gained some prominence for his advocacy of sterile water alone as an anesthetic agent.

In Diseases of the Rectum and Anus, **1902** [Fig 26] he wrote:

«Where palliative measures fail to relieve the patient, the surgeon should then be called in. A surgical operation is indicated when there is fracture, dislocation, deformity, necrosis, or periostitis of the coccyx. Surgical Procedures. Two operations have been devised for the alleviation of painful manifestations about the coccyx (coccygodynia), namely:

1. Excision of all or a part of the coccyx (Nott's operation).

2. Separation of the muscles and ligaments

attached to the coccyx (Simpson's operation).

Nott's Operation of Excision (Coccygogectomy).

The operation is given this name by the author because, in his opinion, Dr. Nott was the first surgeon to remove the coccyx for the relief of coccygodynia. The steps in the operation are as follows:

1. A dorsal incision from two to three inches (5.08 to 7.62 centimeters) in length is made directly over the coccyx.

2. The bone is reached by dissections and freed from its muscular and ligamentous attachments, care being taken not to injure the bowel.

3. The coccyx is then disarticulated or cut through with bone-forceps, and removed.

4. The wound is closed by sutures after inserting a tube or gauze drain.

Simpson's Operation of Tenotomy.

This operation was first performed by Prof. J. Y. Simpson, and the results following it were very satisfactory. Of late the operation seems to have fallen into disrepute. The technic is as follows:

1. Introduce a tenotomy-knife through a small incision in the skin near the tip of the coccyx, and pass it upward along the posterior aspect of the bone.

2. Next sever all tendinous and muscular attachments from both sides, underneath, and at the end of the coccyx.

3. Then remove the knife and dress the wound.

There is no question but that many cases of coccygodynia can be speedily relieved by this operation, because rest from muscular activity is assured.

The author prefers the operation of partial or complete excision of the coccyx to that of tenotomy, for three reasons:

1. In the open or excision method any large vessel severed during the operation can be immediately secured.

2. In the tenotomy operation the muscles only are divided, and the inflamed joint is left, to be aggravated by walking and sitting.

3. By extirpation the offending body be it an elongated, diseased, fractured, inflamed, or dislocated bone is removed permanently.

While the operation of excision is preferable, the original method of performing it has been greatly improved upon. As done in the past, it required many instruments, was bloody, consumed considerable time, from twenty to thirty minutes, and a drain was left in the wound, which delayed healing.

Gant's Operation of Coccygogectomy. [Fig 27-28]

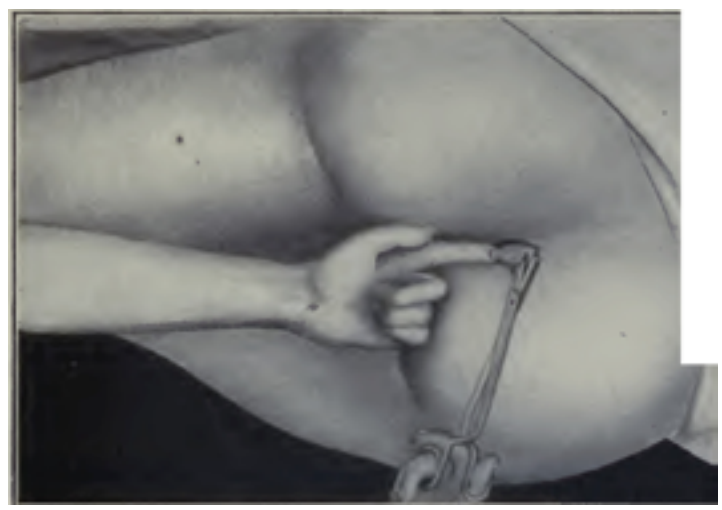

Figure 27

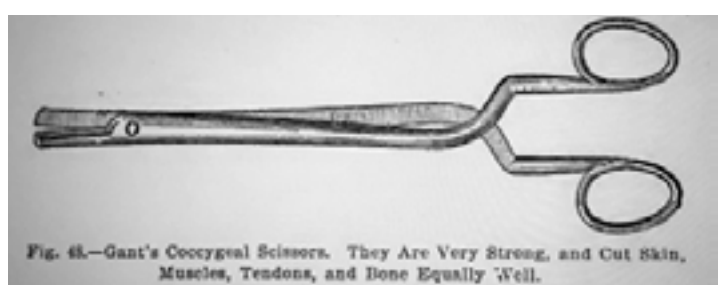

Fig. 48.—Gant's Coccygeal Scissors. They Are Very Strong, and Cut Skin, Muscles, Tendons, and Bone Equally Well.

Figure 28

By this simple procedure all or a part of the coccyx can be extirpated in short order. The operation may be finished in from three to five minutes. It is bloodless, and the only requisites for its performance are a specially-constructed pair of strong, blunt scissors [Fig 48]; a large, curved needle; and two or three catgut sutures.

Technic.

1. With the thumb and finger grasp the skin and deeper tissue over the end of the coccyx so as to make a fold at right angles to the latter.

2. With one stroke of the scissors cut through these structures down to the bone, making an incision one inch (2.54 centimeters) long and parallel with the coccyx.

3. Free and lift the end of the coccyx upward with the left index finger, and, by rapid cuts, detach all ligaments and muscles, first from one side, then the other, and finally from the end of the bone, keeping the scissors pointing outward.

4. Without changing the position of the finger, place the scissors at a right angle to the os coccyx [Fig 49] and disarticulate or divide it, as the case requires.

5. Close the wound with two or three interrupted catgutsutures, and dress it with sterile gauze held in place by adhesive straps.

The author has performed this operation for the relief of pathologic conditions of the coccyx 35 times without an unpleasant complication or sequel except in 3 cases. In 1 a fistula remained after the operation and refused to heal under local treatment. Finally a portion of a silk-worm-gut suture was discharged, and the patient promptly recovered. In another, where the wound was dressed with iodoform gauze, a dermatitis ensued, which was followed by sloughing of the tissues over the end of the sacrum until the bone was bare. It required six months to heal the wound; during this time the patient suffered intensely. In the third case plain catgut was used; on the fourth day the patient went to the closet without permission, and while there tore the wound open, thus delaying his recovery several days. Occasionally, when proper aseptic precautions have not been observed, stitch abscesses occur. The author has used wire, silk, silk-worm gut, chromicized and plain catgut for closing the wounds after this operation, and he very much prefers the latter. The advantages claimed for this method of excising the coccyx are that it is bloodless, painless, can be performed quickly (in from two to three minutes), and with two instruments (scissors and needle) ; primary union can be obtained along the entire cut because drainage is necessary ; unpleasant sequels have rarely been known to follow it; and, further, because the patients are not required to remain in the hospital more than a week or ten days.»

In the early twentieth century, a small number of publications address coccygectomy and do not add anything new. In **1937, Albert J. Key**, surgeon in St. Louis, Missouri **[Fig 29]**, published in the Journal of Bone and Joint Surgery his surgical experience of 15 coccygectomy operations, and he describes his surgical technique.

The coccygectomy technique he describes is noteworthy because quite modern. It is the one that is used today, at least the one I used in the past 25 years on more than 500 coccygectomies:

- Vertical midline incision centered on the tailbone,
- Prudent release of all connections of the coccyx
- Distal to proximal progression, protecting the rectal wall anteriorly
- Suture closure of the fascial plane.

Key concluded his article thus:

- Most cases of acute and chronic mild coccygodynia respond to conservative treatment
- In severe chronic coccygodynia, excision of the coccyx, followed by careful restoration of the pelvic floor, may be expected to relieve the symptoms and causes to no disability.

I think this also deserves to be the conclusion of this historical overview of coccygectomy.

Figure 29