placed under the control of the law. In this way, and in this way only, would it seem possible to contribute to the betterment of the human race and to hold out a helping hand to our brother, no matter in what condition or position of life his lot may have been cast.

PROPOSITIONS FOR DISCUSSION.

1. The State, in the exercise of its duty as guardian of the privileges and of the rights of its citizens, and, as well, charged with the duty of affording protection against conditions which are harmful to its social integrity, has the right to enact laws which will prevent the perpetuation of criminality and of degeneracy by inhibiting procreation in the confirmed criminal and in the defective subject.

2. The confirmed criminal and the defective subject may be rightfully regarded as in a state of disease, mental, moral and physical, and therefore, the legitimate subjects for medical and surgical treatment.

3. Extended experience on the part of competent students of criminalology and sociology, confirms the opinion that neither education nor punitive measures are effective in restoring the criminal and defective subject to normal conditions.

4. As heredity is conceded to be an important factor in the perpetuation of criminality and degeneracy, through the power of procreation, the fundamental treatment of these conditions consists in the abrogation of this power.

5. Experience teaches that in many of the criminal and defective subjects inverted or perverted sexual desires and practices are the dominating factors of their disordered conditions. In such subjects remedial and curative results can only be obtained by depriving them, through the chosen surgical procedure, of the sexual power.

6. That the testes and ovary produce an internal secretion which is necessary to the normal functioning of the body tissues has been demonstrated. It is believed that after cord or tube ligature a sufficient blood supply, through the collateral circulation which is established, is distributed to these organs to maintain this secretion.

7. Surgical procedures instituted for the prevention of procreation in the confirmed criminal, pervert, degenerate, idiot, imbecile, epileptic and vicious insane should not be regarded as a method of punishment, but as a remedial measure, the sole objects of which are the betterment of the human race, through the arrest of the continually flowing stream of degeneracy and the mental, moral, and physical improvement of the defective subject.

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A CONTRIBUTION TO THE STUDY OF COCCYODYNIA.

BY CHARLES GREENE CUMSTON, M.D., BOSTON.

Having had several cases of coccyodynia, three of which I deemed advisable to operate upon, and finding a very meagre reference to the subject in both American and Continental text-books, it occurred to me that a short study of this interesting affection might not be out of place at the present time. The disease is characterized by a very severe pain in the ano-coccygeal region, the factors capable of giving rise to the process are many, the pathology is most variable and the violent localized pain is the only constant symptom. There are few affections more painful or more stubborn to treatment, and, strange to relate, the works on gyneco-logy alone pay a little attention to it.

As far as I am aware, the first article on the subject of coccyodynia was by Dr. J. C. Nott of Mobile, and appeared in 1844 in The New Orleans Medical Journal. The question was not referred to again until 1869, when Simpson of Edinburgh published his work which contains a chapter on coccyodynia and diseases and deformities of the coccyx. Then later on came the articles by Scanzoni, Erichsen, Gosselin, Erb, Nélaton and others.

The coccyx is primarily composed of several independent pieces, true rudimentary coccygeal vertebrae, usually five in number, which become united together. The anterior aspect of the coccyx is concave and smooth and is in direct relation with the posterior aspect of the rectum. The posterior aspect is convex and rough. The lateral aspects are oblique from above inwardly, thus giving the bone a pyramidal shape. To the sides are attached the ischio-coccygeal muscles whose condition of relaxation or contraction can be estimated by digital examination per rectum.

The base of the coccyx presents an oval facet, articulating with the sacrum. Back of the articular surface are to be seen two projections, the cornua of the coccyx, which articulate with corresponding projections from the sacrum. The apex of the coccyx is rounded, occasionally bifide. It gives attachment to the anal sphinc-ter and to the levator. The coccyx retains its relations with the surrounding structures by the muscles attached to its borders and tip, and particularly by its articulation with the sacrum. The articulation is effected by anterior, posterior and lateral ligaments. The anterior ligament is formed by the periosteum extending from the base of the coccyx to the tip of the sacrum,
while its slight solidity explains why the coccyx can readily be pushed backwards.

On the other hand, the posterior ligament is thick and resisting. It is attached to the borders of the inferior groove of the sacral canal and reaches the posterior aspect of the coccyx. It is reinforced by two lateral expansions which are fixed to the lateral aspects of the sacral apex and to the upper angles of the coccyx.

A rather hard interossous fibrocartilage is present between the articular surfaces, and the greater the mobility of the coccyx, the more this fibrocartilage is resistant. During gestation this fibrocartilage softens, thus allowing the coccyx to be easily pushed backwards during labor. It undergoes ossification between the ages of thirty-five to forty years and then the sacro-coccygeal joint becomes completely ankylosed.

It happens occasionally that the several pieces forming the coccyx do not become united and not infrequently one finds little joints, particularly between the first and second, or second and third coccygeal pieces. These little joints are composed of small articular facets, between which little fibrocartilaginous disks are interposed and are united by a fibrous sheath.

From the writings of gynecologists one would be led to assume that coccyodynia was an affection peculiar to the female, and although it undoubtedly is far more frequent in women, nevertheless, it is not exceptional in the male. Therefore one must admit an obstetrical, genital and traumatic factor in the production of the lesion.

In cases where coccyodynia begins after a labor, difficult or not, its occurrence may be explained as follows: The traumatism of the labor acts on the coccyx and neighboring structures. The forced backward displacement of the coccyx and rupture of the lateral sacrococcygeal ligaments are certainly quite enough to set up an exudation resulting from a hyperemic process between the several ligaments of the coccyx and this bone and the sacrum. The various dislocations and synostoses which often result in the bony structures after labor, giving rise to a change of position in the posterior and lateral coccygeal ligaments, causes compression and stretching of the coccygeal nerves. It would appear that the use of the forceps is prone to cause coccyodynia, although this is by no means always the case, as the following instance will show.

Case I. Mrs. G., 28 years of age, Provincetown, Mass. Primipara. First child three years ago; second labor nine months ago. Both labors long but ended without forceps. From the date of the last birth the patient has suffered from severe pain at the end of the spine when lying down or sitting. She gets up from chair with difficulty on account of severe pain. Defecation painless. Coitus impossible.

Examination revealed a slightly lacerated cervix and perineum. Uterus in good position, adnexa normal. With two fingers in the vagina the coccyx can be made to move backwards and forwards like a loose tooth in its socket. Pressure over coccyx gives rise to intense pain. The patient demanded relief, therefore resection of the bone was advised and carried out. The operation gave instant relief and the patient has remained free from pain since it was done two months ago. The cervix and perineum were of course repaired.

Case II. Mrs. W., aged 34 years, Brookline, Mass. Primipara. Forceps delivery two and a half years ago, since which time the patient has suffered from violent pain at end of spine, particularly when sitting and during defecation. Is obliged to keep on side when in bed. The pain has considerably increased during the last year, to such an extent that the patient has been obliged to resort to the use of narcotics.

Examination showed a slightly lacerated perineum, uterus and adnexa normal. The coccyx is very freely movable and the surrounding structures are thickened as if edematous. Great pain elicited when coccyx is pressed upon. An evidently localized seat of pain and history of the case, resection of the coccyx was done. This is now four years ago and the patient has been free from pain ever since.

Referring now to the genital origin of coccyodynia, it may be said that diseases of the uterus or adnexa are supposed to give rise to it by gynecologists, but when this is the case I am of the opinion that the coccygeal pain is purely neurasthenic, resulting from the pelvic lesions. Chronic metritis, ovarian and tubal inflammation and retroversion of the uterus are supposed to produce coccyodynia, but from the surgical viewpoint one can only come to the conclusion that an unbalanced nervous system is at the bottom the causative factor in the coccygeal pain. For this reason I have never interfered with the coccyx in these cases and have merely directed proper surgical measures for the pelvic lesions.

In the male a violent pain may be encountered in the anococcygeal region in cases of chronic prostatitis, but this is rather a topalgia, the result of marked nervous depression and sexual hypochondria, if such a condition exists, which I rather doubt.

The etiologic circumstances which will now be examined are encountered both in the male and female, likewise in children. Here we have traumatic and nontraumatic factors. For the latter one has diseases of the anus and rectum, such as fistula, ulceration, fissure, hemorrhoids and various neoplasms which react on the perineal muscles. The local effect of cold in the production of coccyodynia is simply a myth and not to be considered by the twentieth century medical man. Contamination has likewise, been considered a causative factor, but here, again, there must be a perverted judgment on the part of the profession who look upon this cause seriously. I shall point out in considering the semeiology of coccyodynia, that the characteristic pain of this affection is considerably in-
Cocecyodynia may result from traumaism. Equitation has been supposed to produce it, but I would point out that army surgeons do not appear to meet with it among the cavalry, where it should not be infrequent were this factor of any considerable importance.

Most usually when one is dealing with a traumatic cocecyodynia the cause is a fall on, or shock involving the coceyx directly, probably producing a dislocation, fracture or a simple contusion of the bone.

From what has been said, it is clear that cocecyodynia can be produced by most varied causes. However, the etiology of the affection allows one to conclude that cocecyodynia is more frequently met with in the female, labor being its principal factor. Outside of this, cocecyodynia is encountered with equal frequency in both sexes.

Cocecyodynia has been met with in children by Hörschelmann, one case being three, the other five years of age. Curroy and Nélation have met with it in young girls without any genital lesions, but it is probable that these writers were dealing with neurasthenic individuals.

From what has been said of the etiology of cocecyodynia it is evident that little can be said of its pathology, for autopsies on these cases must be very infrequent. In some cases, however, the lesions present can explain the affection by ankylosis of the sacrococcygeal joint, sacrococcygeal arthritis, ostitis of the coccyx, or fracture or dislocation of this bone. But these cases are not commonly met with and in the large majority no lesion can be made out that explains the painful phenomena, so that one is compelled to place them in the class of topalgias.

The pathogenesis of cocecyodynia is most obscure as it cannot be elucidated by either pathology or etiology. It is clear that there are some cases that can be explained by bone or nerve lesions following upon a fracture of the coceyx, but when no evident lesion can be detected the cause and origin of the affection are very difficult of explanation. It hardly can be due to a neuritis of the coccygeal branches because never have any trophic or vasomotor disturbances been observed. Many writers think that it is a functional disturbance, the initial traumaism having produced a violent pain; this persists without there necessarily being any anatomical change in the parts. Thus may be explained cases of cocecyodynia following complete fracture of the coceyx and those resulting from a simple contusion of the sacrococcygeal region.

As has been remarked, cocecyodynia is characterized clinically by painful phenomena localized in the sacrococcygeal region. The pain prevents the patient from lying with comfort in bed or sitting, and sometimes walking is interfered with.

The commencement of the affection may be sudden or it may progressively develop. When sudden, it appears after labor or a trauma. The pain is sharp, severe and continuous, or it may occur in paroxysms.

When the affection develops progressively, the pain comes on slowly. At first it is dull, the patient complaining more of a feeling of weight or tension. But it daily increases until it reaches considerable intensity.

When fully developed, the pain, which is the first evidence and principal symptom of the trouble, is most frequently complained of over the sacroococcygeal joint, the maximum point being in the median line or slightly to the side. Generally it is limited to the sacroococcygeal region but infrequently it may radiate a certain distance. The pain is continual and severe but may occur in paroxysms several times daily. These take place sometimes spontaneously, but usually are produced by some movement on the part of the patient. When perfectly quiet and all pressure removed from the coccygeal region the pain is at its minimum, but in some cases the slightest movement causes it to reappear in all its acuteness. A change in position or a constipated stool are the most frequent causes of the exacerbation. Cold or heat do not seem to produce the paroxysm and the same may be said of light pressure over the cutaneous surface of the region, a condition observed in certain types of neuralgia.

In order to prevent the pain from coming on the patient is compelled to adopt certain positions, but sitting for any length of time is impossible and the dorsal position in bed can never be assumed. In some few cases, fortunately very infrequent, the pain is continuous no matter how the patient may be placed, so that life actually becomes a burden.

Local examination shows nothing abnormal over the coccygeal region and alone palpation gives any clue to the affection. This causes severe pain over the cocceyx, but better still, is to palpate through the vagina or per rectum in the male. One thus explores the anterior aspect of the bone, and any abnormal condition is readily detected by the exploring finger. By pressure with the finger, in order to ascertain the mobility of the coccyx, great pain is elicited and may last for several hours, therefore care should be taken to limit this part of the examination as much as possible.

Sometimes the cocceyx will be found deformed or increased in size, in which case there is probably an osteoperiosteal hypertrophy similar to that found in cases of stubborn neuralgia. Generally, however, no change in the bone can be detected. In one or two cases I have found considerable thickening of the surrounding soft structures which appeared to be of an edematous nature.

Cocecyodynia may undergo its evolution in an
acute way and soon disappear, but unfortunately this is very uncommon, and usually it takes on a chronic type. This is more prone to occur in fracture or dislocation due to labor or trauma. Under these circumstances, when left untreated, the affection continues with alternatives of increase and improvement.

From the detailed description given of the symptoms of coccydynia, the consideration of the diagnosis will be rendered easier. It might appear difficult to mistake this affection for some other lesion, since spontaneous pain increased by pressure and movements is practically pathognomonic. But if the diagnosis of coccydynia is generally an easy matter, there, nevertheless, are cases which may be overlooked, and in every case where a patient complains of pain in the coccygeal region a careful digital examination should be carried out.

In considering the differential diagnoses the following conditions are to be sought for: A methodical examination of the coccyx by palpation will eliminate any lesion if none is present. In sacrococalgia the pain is distinctly located in the sacroiliac joint and not in the sacrocoxygeal articulation. Then again, pressure over both iliac crests awakens the pain in sacrocoxygeal but does not give rise to any in coccydynia. Neuralgia of the lumbar plexus need not call for our attention but that of the sacral plexus may give rise to some confusion if a careful exploration is not carried out. I would point out that in the preatonic period of tabes fulminating pains may occur in the anococcygeal region, but the true nature of the trouble will be detected by the pupillary symptoms particularly.

We will now briefly refer to the treatment of coccydynia since ars medica est id quod est propter therapeuticon, and let it be said at once that medical treatment has proved itself useless so that no mention will be made of the many drugs and procedures which have been advocated from time to time.

The treatment is strictly surgical and if one is dealing with a real case of coccydynia very excellent results will be obtained by resection of the coccyx in most cases. I purposely say "in most cases," because my third operative case was not so successful as the first two reported, and although great relief was procured by the interference, still the patient experiences some dull pain from time to time although by rest it is relieved.

Case III. Mr. J., aged 37 years, no profession, had always enjoyed good health. While in the country he sustained a fall, striking with considerable force on the coccygeal region. At the time there was acute pain but this subsided after a few days. However, about three weeks later the patient began to be troubled with paroxysms of sharp pain occurring several times daily, particularly after exercise.

When he consulted the writer he had been suffering severely for over six months.

Examination per rectum revealed an ununited fracture at about the middle of the bone and a very great amount of pain over the sacrocoxygeal joint when the coccyx was forced backwards.

Resection of the coccyx was done, resulting in giving much relief from the acute pain. The operation was done over five years ago and although quite satisfactory to the patient, he still has more or less dull pain from time to time but which is quite bearable.

Among the operations advised, resection of the coccyx is the only one worthy of consideration. The patient is placed in right lateral decubitus so as to render the perineal and coccygeal regions accessible.

An incision measuring from seven to eight centimeters, starting one centimeter above the sacrocoxygeal joint is carried down to one centimeter below the tip of the coccyx, includes all the structures covering the bone, including the fibrous covering. The soft parts are then peeled off with a periosteal elevator and with a chisel the coccyx is disarticulated. It is then drawn out of the wound and the lateral ligaments and sphincter are detached from it. Care must be taken not to wound the rectum, which lies fairly close to the bone.

If the patient is fat a second incision made transversally over the sacrocoxygeal joint will give the surgeon a larger operative field in which to carry out the disarticulation.

The hemorrhage is only slight, requiring but few ligatures. The deep structures are brought together with kangaroo sutures while the skin incision is closed with silkworm gut. On account of the proximity to the anus, I think it advisable to insert a small cigarette drain, bringing it out at the upper angle of the wound.

The patient is kept in bed for a few days and then allowed to be up and about. The bowels should be confined for the first four days, by which time the drain is out and the wound practically healed.

Clinical Department

RESULTS OF THE COMPLEMENT FIXATION TEST FOR GONORRHEA AT THE MASSACHUSETTS GENERAL HOSPITAL.

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The antigens used in the great majority of the tests were made from mixtures of cultures of gonococci from 3 to 11 different patients. The method of preparing the antigen which has seemed most practical consists in scraping off the 24 hour surface growth on hydrocele agar,