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Various Aetiologies of Non-Traumatic Coccydynia Cause Pain in the Posterior Sacrococcygeal Leg of the Pelvic Tripod: A Burden on the Healthcare Sector

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Abstract

Introduction: Coccydynia, television disease, and coccygodynia are the different names given to this disabling disease, which can become chronic. It was described by Simson in 1859. Coccydynia means pain at the end of the vertebral column. Non-traumatic coccydynia is a diagnosis, which is never straightforward like traumatic coccydynia because the onset is unclear, and both the patient and the unaware clinician face many challenges in treating it on time and with accuracy. Coccyx was likened to a cuckoo bird's beak as a curved bone of fused 3 to 5 vertebrae with remnant disc material in some rare cases, unfused segments, linear scoliosis or subluxations and deformities. Stress X-rays of the coccyx in the antero-posterior and lateral views in standing and sitting reveal the "Dynamic Instability" due to congenital coccygeal morphological, pathological and mechanical variations. **Material and Methods:** This is a complex study having retrograde data collected from online publications from various databases, like PubMed, Embase, and Cochrane Library and also antegrade data collected from 100 patients with their consent from patients in Adam and Eve Specialised Medical Centre-based at Abu Dhabi, UAE and data was processed in the research centre of Krushi Orthopaedic Welfare Society based in India between 2014-2024 following all guidelines of Helsinki and approved by the ethics board of Krushi Orthopaedic Welfare Society. **Clinical Presentation:** The coccyx is painful, with aches, spasms, and an inability to sit. This affects daily activities without any particular date of onset. The onset remains insidious for the non-traumatic variety of coccydynia. **Aetiology and Patho Anatomy:** Non-traumatic coccydynia can be caused by a myriad of reasons, like congenital morphological variations, acquired dynamic instabilities, and hidden trauma remaining quies-

cent to re-surface as a strain-induced pain. **Radiological Presentations:** Unless clarity is focused on these coccygeal views, the errors of the un-evacuated rectum, non-dynamic standing views, improper X-ray exposure and refuge by insurance companies to approve the much needed but multiple views in radiological investigation (Stress X-ray), MRI scan, lack of awareness by the clinician, all lead to missed diagnosis with its repercussions as **congenital variations in morphology, acquired changes in structure/mobility**, pathologies like tumours like **congenital teratoma** & adult onset **chordoma, Tarlov cysts, pilonidal sinus** or infections—even **tuberculosis**, dural syndrome, stiff coccyx due to **ankylosing spondylitis** and many others like relation to neurosis have all been documented. **Treatment options** are outside the scope of this research topic, as only the differential diagnosis is being stressed here, so that the clinician and the patient do not overlook the varying aetiology, which is the first step to timely and appropriate treatment. **Conclusion:** Level 3 evidence is available pointing towards many aetiologies causing non-traumatic coccydynia, and in this study of 100 patients by Krushi O W S, a non-profit organisation, the results were as follows: 1) Coccydynia is more common in Type II coccyx and bony spicules. 2) Coccydynia is more prevalent when the sacrococcygeal joints are not fused. 3) Coccydynia is more prevalent when there is subluxation at the intercoccygeal joints. 4) Coccydynia is more when the sacral angle is lower. 5) Coccydynia is associated with higher sacrococcygeal curved length. 6) Coccydynia is associated with a lower sacrococcygeal curvature index. 7) Gender variations: The coccygeal curvature index was lower **in females** with coccydynia; the intercoccygeal angle was lower **in males**. 8) Both obese and thin individuals can get affected due to different weight-bearing mechanics in play.

Keywords

Coccydynia, Coccygodynia, Pelvic Floor, Chordoma, Pilonidal Sinus, Fused Sacrococcygeal Segment, Non-Traumatic Coccydynia, Entrapment of Coccygeal Nerves, Dural Syndrome

1. Introduction

Simpson coined the term coccydynia in 1859, which is typically a state of pain at the end of the vertebral column caused by traumatic or non-traumatic causes. Coccydynia observed since the early 18th century remains less understood even today. The coccyx was likened to the beak of a cuckoo bird as it is a curved bone of fused 3 to 5 vertebrae with remnant disc material in some rare cases, unfused segments, linear scoliosis or subluxations, and deformities.

Figure 1 is an artist's drawing of the coccyx and its dermatomal representation around the anus (Co1).

The pivotal role played by the coccyx is explained in the pioneering work done by Barral in 1988, who described the coccyx attachments to the Sacro tuberous ligaments as per the book by Ravin (2007) while being attached to the dural sac by the filum terminale and also gives a posterior anchor to the pelvic

floor muscles.

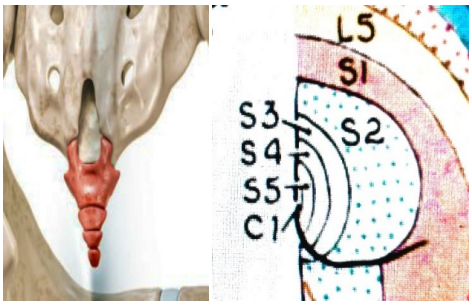


Figure 1. Coccydynia is pain at the tip of the coccyx.

Mechanical dysfunctions caused by its dural attachments, visceral dysfunctions caused by strains in the muscle and tendon of the pelvic floor, and weight-bearing dysfunction in very thin individuals, which causes over-flexion and leads to somatic dysfunctions like low backache, incontinence, and headaches.

Radiology assumes extreme importance, and proper sitting and standing lateral stress X-rays of the coccyx are mandatory along with the A.P. view if the right diagnosis is to be made and if more information is needed, an MRI/CT scan may also be needed to identify the dynamic instability.

Aim:

1) To educate the seeker about non-traumatic coccydynia, which is caused by variations in the load-bearing mechanics due to morphological, pathological, prolonged sitting, obesity or excessive leanness—like varying causes arising from the proximal sacrum to the coccyx with its attached musculature, tendons that were always there waiting to be correctly evaluated by proper collation and analysis.

2) The medical student or the practitioner is given an easily referable birds-eye view of all available literature on this topic as this study covered a lot of published information, which saves time for the learner or the clinician who wants to know more.

2. Material and Methods

From 2014-2024, the research wing of Krushi Orthopedic Welfare Society, based in India, screened 100 patients as an antegrade study confirming the varying aetiology of non-traumatic coccydynia with radiology inputs coming from Dr. Elsy Biju Oommen MD, Chief Radiologist, Adam and Eve Specialised Medical Center, Dr. Ahmed Khalid, HOD Radiology, Royal Medical Centre, Abu Dhabi, UAE. Also, this study contains additional data from already published articles, which adds more information of a retrograde nature to this actual study of 100 patients in the voluntary organization, making it a more complex study that included deep research into various databases like PubMed, Embase, Cochrane Library by searching for the keywords and the selected references were cited with data till 2024. Conclusions were drawn from the analysis of the data pooled in this study.

Anatomy: Normally, the **sacrum consists** of 5 fused vertebrae. If lumbarisa-

tion of the S1 is present, the sacrum has four segments, and if sacralisation is present, the sacrum may seem to have six vertebrae.

The **Coccyx** is usually made up of four vertebrae—five segments in 11% of the population and three segments in 13% of the population [1].

The Coccyx, or the tailbone, is a small triangular-shaped bone comprised of four or five fused **coccygeal vertebrae** and is the distal tip of the vertebral column **and serves as the wall of a true pelvis.**

The Coccyx consists of the following parts:

- Base. It is the broadest part of co1 below the S5 and has two unique features:

- Transverse processes: These are bony points for pelvic soft tissue attachment.

- Coccygeal cornua: Two horn-like coccygeal cornua from the base of the Coccyx articulate with the cornua of the sacrum and form a sacrococcygeal symphysis joint, and there is an intervertebral foramen through which **the S5 nerve** passes.

- The posterior surface shows spinous processes of the fused coccygeal vertebrae.

- **Anterior surface.** Slightly concave grooves are vestigial vertebral foramina.

- **The lateral surface gives** attachment to nearby soft tissue.

- **Apex.** The apex gives a pivotal attachment for the pelvic muscles and tendons supporting the pelvic floor and the anus.

The presence or absence of discs between the coccygeal segments will also be a cause of DISCOGENIC PAIN, "While there are numerous causes of pain in the coccyx area, a coccygeal disc herniation remains a rare entity" SP Galanakos *et al.* [2], as demonstrated by the provocative discography by Maigne *et al.*, who showed that the pain was induced by the procedure in 15 out of 21 patients [3].

Muscle attachment: Gluteus maximus, Levator and Coccygeus.

Ligaments: Anterior sacrococcygeal ligament, deep posterior sacrococcygeal ligament, superficial posterior sacrococcygeal ligament lateral, and sacrococcygeal ligament interarticular ligaments anococcygeal raphe help support the position of the anus.

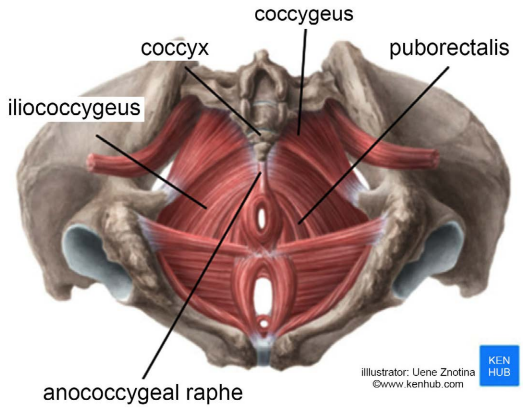


Figure 2. Pelvic floor muscles.

Figure 2 is a representation of the pelvic floor muscles forming support to the three orifices: urethra, vagina, and anus.

There are six types of Coccyx:

1) Type I: The Coccyx is curved slightly forward apex oriented caudally **{70%}.**

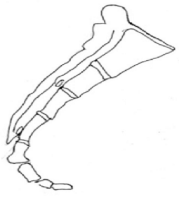
(a)

(b)

Figure 3. Type I. (a) Coccyx with an anterior smooth curvature. (b) X-ray of type I coccyx.

Figure 3(a) shows a type 1 coccyx with an anterior smooth curvature, and the X-ray Figure 3(b) is supported by data from Adam and Eve Specialised Medical Center.

2) Type II: The Coccyx is oriented anteriorly, with the apex pointing straight forward. **Coccydinia is reportedly more with this type II Coccyx {15%}.**



Type II

Figure 4. Anterior curvature of the distal end of the coccygeal segments.

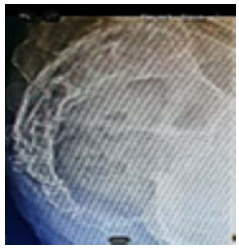


Figure 5. Image from AESMC.

Figure 4 and Figure 5 show anterior curvature of the coccygeal segmants.

Figure 4 is from an article by Shams*et al.* (2021) [4]. Figure 5 is Type II Coccyx as found in the study of by Krush O W S Research wing with inputs from Adam & Eve Specialised Medical Center, Abu Dhabi, UAE.

Type III: There is sharp forward angulation of the Coccyx between the first and second or the second and third segments {5%}.

Type III

Figure 6. Sudden anterior flexion of the coccygeal segments.

Figure 7. CT scan.

Figure 8. MRI scan.

Figure 6 is from an article by Shams*et al.* (2021) [4]. Figure 7 and Figure 8 are CT scan & MRI scan data as per Krushi O W S study with inputs from Adam &Eve Specialised Medical Center, Abu Dhabi.

Dangers posed by Type III coccyx: This Type III coccyx is associated with obstructed delivery, difficulties in the second stage of delivery, perineal tears and elevated risk of infant and maternal mortality.

4) Type IV: The Coccyx is subluxated at the level of the sacrococcygeal joint anteriorly or at the level of the first or second intercoccygeal joints (10%).

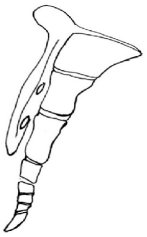
Type IV

Figure 9. Subluxation of the coccyx.

Figure 10. K O W S study with input AESMC, AUH, UAE.

Figure 9 and Figure 10 show the subluxation of the coccygeal segments as displayed in the article by Shamseldine *et al.* (2021) and also seen in our research patients of Krushi Orthopaedic Welfare Society.

5) Type V: Coccyx with retroversion or posterior spicules.



Type V

Figure 11. Coccyx with retroversion.

(a) (b)

Figure 12. (a) Retroverted coccyx. (b) Posterior spicules.

Figure 11 and Figure 12 are from an article from Shamseldine *et al.* (2021) and from the research archives of Krushi Orthopaedic Welfare Society showing the retroverted nature of the coccygeal segments.

Type V Coccyx with retroversion and posterior bony spicules.

This type V coccyx: posterior spicules may irritate the soft tissues and can develop into a chronic painful adventitious bursa with or without infection.

6) Type VI: The coccyx is scoliotic (lateral deviation).

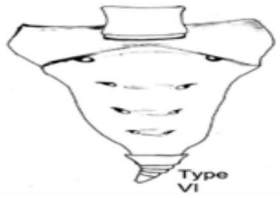


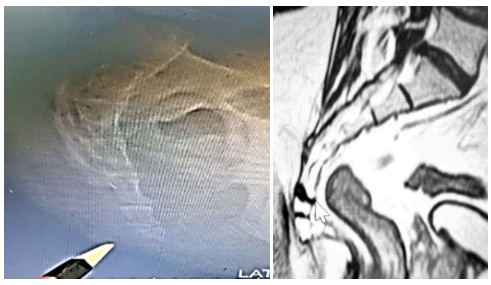
Figure 13. Type VI coccyx with SCOLIOSIS.

Figure 14. Scoliotic curvatures.

Figure 13 and Figure 14 display the scoliotic curvatures that may be present in the coccygeal segments.

Notable points:

The segmentation of the sacrococcygeal segments and intercoccygeal joints is variable, but the number of sacrococcygeal segments is consistent.



(a) (b)

Figure 15. (a) Unfused coccygeal segments. (b) Intact full/ rudimentary discs in the coccygeal segments on MRI scan.

Figure 15(a) displays unfused coccygeal segments, which are more prone to cause Coccydynia (As found in the study of Krushi O W S Research wing with inputs-AESMC, AUH, UAE). Figure 15(b) displays the rare, degenerative disc material in all coccygeal segments while in the Sacral segments ,rudimentary partial discs with bony fusion posteriorly is seen (Photo Courtesy: Radiologist Dr. Khaled

Ahmed Mohammed HOD, and Radiology Manager Mr. Shabeer Hussain-Royal Medical Centre, AUH, UAE with patients permission).

SACROCOCCYGEAL FUSION [4]**:** If the 1st coccyx vertebra is Sacralised onto the 5th sacral vertebra, then the sacrum on the antero-posterior view looks as if it has **five foramina on either side…An indicator for Sacrococcygeal FUSION.**

Figure 16. The possibility of fusion at the sacrococcygeal segments.

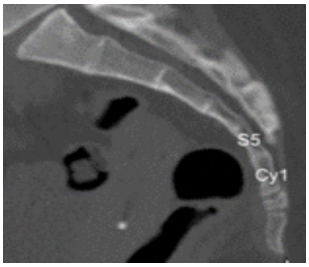


Figure 17. Radio graphics of the possibility of fusion at the sacrococcygeal segments.

Figure 16 and Figure 17 show the possibility of fusion at the sacrococcygeal segments, which causes a higher incidence of non-traumatic coccydynia.

The Coccyx acts as the posterior leg of the Tripod and can usually be elevated by bending forward if it is of average length. However, even at very long sacrococcygeal lengths, this postural adjustment may fail to give relief because the longer coccyx weight bears even before the ischial tuberosities touch the sitting platform. Hence, coccydynia occurs as a result of mechanical overloading. "Along with being the insertion site for multiple muscles, ligaments, and tendons, it also serves as one leg of the Tripod—along with the ischial tuberosities—that provides weight-bearing support to a person seated" [5].

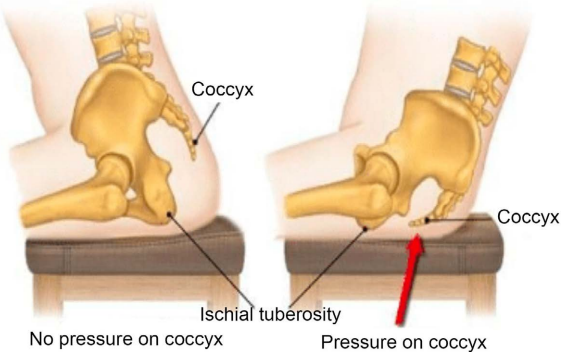


Figure 18. Leaning forward in sitting posture.

Figure 19. Krushi O W S image.

Figure 18 and **Figure 19** represent the elevation of the coccyx during sitting by forward shifting of the centre of gravity.

The best way to see the Coccyx is by: 1) weight-bearing and 2) non-weight-bearing rays.

Figure 20. (a) Alterations in the coccyx in standing and on sitting. (b) Coccyx flexes and folds inside.

Figure 21. AESMC, AUH, UAE.

Figure 20(a), **Figure 20(b)**, and **Figure 21** depict the importance of taking non-weight-bearing and weight-bearing X-rays as they are a dynamic mode of simple investigation that reveals vital information.

The problem of **DYNAMIC INSTABILITY of the Coccyx** is not revealed with average standing non-weight-bearing X-rays, and only when **X-rays in weight-bearing, *i.e.* sitting, are taken, the coccygeal instability is** revealed. **These weight-bearing and non-weight-bearing X-rays of the Coccyx are essential as they participate in the following:**

1) Coccyx endures all forces that pull and push mechanisms in everyday life, as well as in childbirth and obesity.

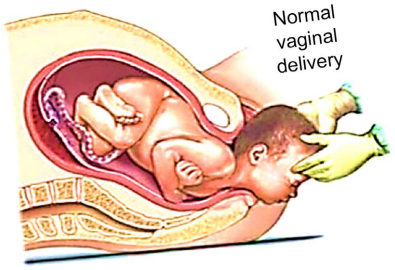


Figure 22. Normal vaginal delivery under assistance.

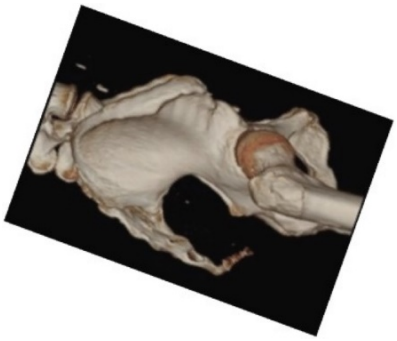


Figure 23. Type II coccyx on CT scan. (Krushi O W S study).

Figure 22 and Figure 23 demonstrate the difficulties during delivery as the type incurred type 2 coccyx can obstruct normal delivery.

A Typical type 1 coccyx allows a smooth vaginal delivery.

When the **COCCYX is flexed and also fused at the Sacro-coccygeal junction,** it can produce obstructed labour and difficult deliveries with perineal tears and severe persistent coccydynia for a long time as it will be severely sprained during delivery (In my experience, recently, a patient stated that her first child was by standard vaginal delivery but had a lot of difficulties and delay and the Coccyx was strained and later on her two deliveries were by caesarean as her Coccyx had hyper flexed and was obstructing the standard delivery).

C.T. Scans reveal varying findings as below:

- FUSION of the sacrococcygeal joint or cornua is at the sacral, and coccygeal cornua is at 50%. A **Rigid coccyx is the result** of a fusion of the sacrococcygeal and all coccygeal joints, which was shown on a midline sagittal C.T. scan by Skalski *et al.* (2020) [1].

FUSION AT Co1 to Co2 is at 17% only, and Co2 - Co3 is at 61%.

- SACRALISATION of the 1st coccyx vertebra may be found unilaterally in 5% and bilaterally in 7%, in which case the transverse processes are also fused.

Pathologic intercoccygeal motion may be found at levels outside the actual sacrococcygeal joint, causing coccydynia.

Maigne *et al.* described a superimposition technique of X-rays to measure dynamic mobility, and there are also other methods that are not yet standardised but are recommended to get an idea of the mobility [3].

Figure 24. The range of the movements.

Figure 24 displays the range of the movements present in normal coccygeal segments. The superimposition of a lateral view of coccyx X-rays will give a simple idea about the mobility.

Maigne *et al.* also a classification to assess the Four types of mobility of the Coccyx [3].

Type 1: LUXATION: Posterior subluxation on sitting is seen more in the obese {raised intra-pelvic pressure}.

Type 2: HYPER MOBILITY: If it becomes more than 25 degrees flexed, pain may commence, as seen in: 1) Thin individuals and 2) Sacrum with spicules.

Type 3: IMMOBILE: In sitting posture, if the Coccyx flexes less than 5 degrees, this can lead to isolated pain and may also be associated with a posterior spicule.

Type 4: Normal: The Coccyx moves 5 to 25 degrees on dynamic radiography.

MRI SCAN: Modic changes of type 1 nature are common in chronic coccydynia with subluxation or hypermobility.

Grassi *et al.* showed that the Coccyx moves into a higher normal range when the levator ani is strained while standing than while sitting (defecation, etc.) [6].

Clinical presentation: The pain in the Coccyx may be sharp or just an ache in the lower sacrum or the Coccyx, increasing on sitting on hard surfaces, increasing during the premenstrual period in some, increasing after sexual intercourse, defecation in some due to probable pressure on the levator ani muscles.

3. Results

1) **Coccydynia is more common in Type II coccyx and bony spicules.**

2) **Coccydynia is more prevalent when the sacrococcygeal joints are NOT fused.**

3) **Coccydynia is more prevalent when subluxation occurs at the intercoccygeal joints.**

4) **Coccydynia is more when the sacral angle is lower.**

5) **Coccydynia is** associated with **higher sacrococcygeal curved length**.

6) **Coccydynia is** associated with a lower **sacrococcygeal curvature index.**

7) **Gender variations:**

The coccygeal curvature index was lower **in females with** coccydynia, the intercoccygeal angle was lower **in males**.

Differential Diagnosis & Analysis of various aetiologies that can cause Non-Traumatic Coccydynia:

1) **Morphometric parameters playing a role in coccydynia:**

a) Coccygeal straight and curved lengths;
b) Coccygeal curvature index;
c) Sacrococcygeal and intercoccygeal joint angles;
d) Sacral straight and curved lengths;
e) Sacral curvature index;
f) Sacral angle;
g) Sacrococcygeal straight and curved lengths;
h) Sacrococcygeal curvature index; and
i) Sacrococcygeal angle.

A priceless publication of Shams *et al.* (2021) in the Global Spine Journal shows invaluable data as follows [4]:

- Cocydinia was more when **there were three coccygeal segments**, more in type 2 coccyx, more when a bony spicule was present, more when sacrococcygeal fusion was present, more when intercoccygeal fusion was absent, more when intercoccygeal fusion was present at Co2 - Co3, more when the sacrococcygeal straight length was more.

These morphological factors determine the altered ergonomic effects that decide the sick leave incidence that summates to the loss of productive hours by the employees and have to be adequately addressed on time by the health administrators by providing aligned chairs and tables and arranging timely breaks for physical movements to distress the bones and joints to cut loss of working hours and prevent overloading average employees so that the sick leaves are minimised.

2) **Neuro-cranial-vertebral syndrome:** This syndrome has been documented to be associated with either when the sacrococcygeal angle is between 89 and 110 degrees or with cerebellar Tonsillar Descent when the intercoccygeal angle is between 90 and 140 degrees. Usually, this syndrome occurs after trauma, but non-traumatic NCVS can also happen if degenerative wear and tear with failure of other protective tissue mechanisms needed for stability, which may hamper the normal biomechanics, for example, hypermobility, hyperflexion of the coccygeal segments beyond 25 degrees [7]. **Other congenital anomalies**, such as dural syndrome or unproved sacrococcygeal syndrome, are where tension develops in the Filum Terminale.

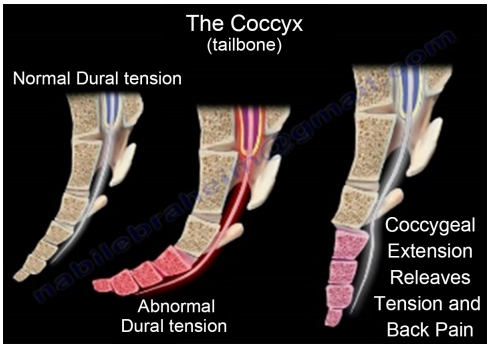


Figure 25. Three models of normal and abnormal stretch.

Figure 25 displays the three models of normal and abnormal stretch that the filum terminale is put to by the dural stretch.

3) **Nervous and muscular deficits**, which Alter the Positioning on the Coccyx. There is an entity called **PELVIC FLOOR HYPERTONICITY: PFH** [8] where there can be non-traumatic coccydynia along with many other troubling symptoms like urinary incontinence, bowel dysfunction, sexual dysfunctions and others that may develop from the age of adolescence and often difficult to be diagnosed as PFH. **It occurs in 1 in 10 persons, both males and females**. The aetiology of PFH varies from Habitual holding of urine to trauma, childbirth, prolonged sitting, poor posture, obesity, degenerative joints and repetitive strain.

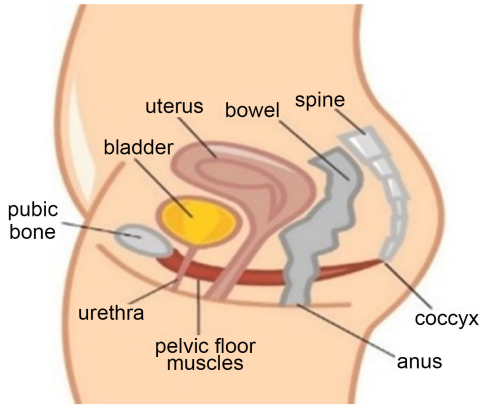


Figure 26. The normalcy of the enclosed reproductive and urogenital organs.

Figure 26 depicts the normalcy of the enclosed reproductive and urogenital organs only as long as the pelvic floor is sufficiently strong.

4) **Limb length discrepancy** of even a few centimetres can cause gross pelvic tilt and produce several signs and symptoms in which coccydynia can also appear.

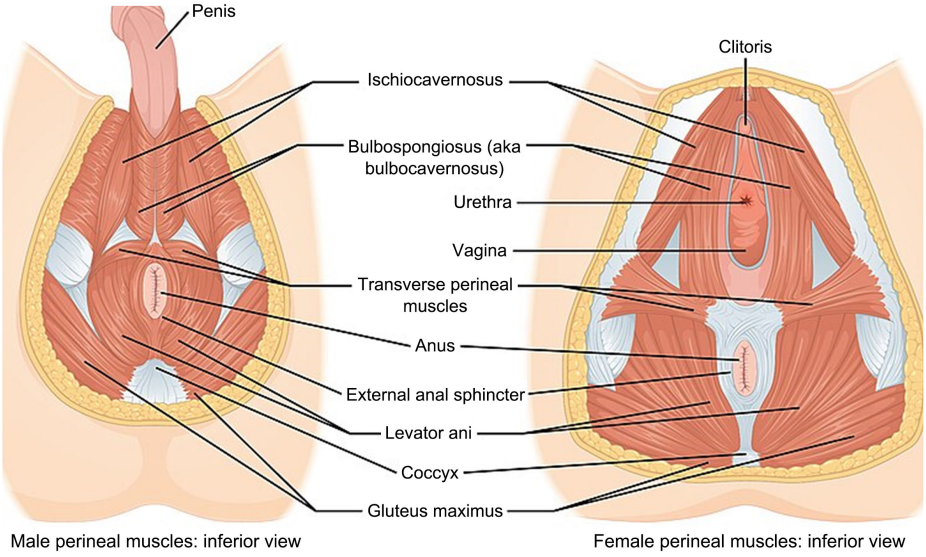


Figure 27. Strong pelvic floor support in both genders.

Figure 27, an attempt, has been made to display the importance of strong pelvic floor support in both genders (https://images.app.goo.gl/yCTRTwvkhp31SEFr8).

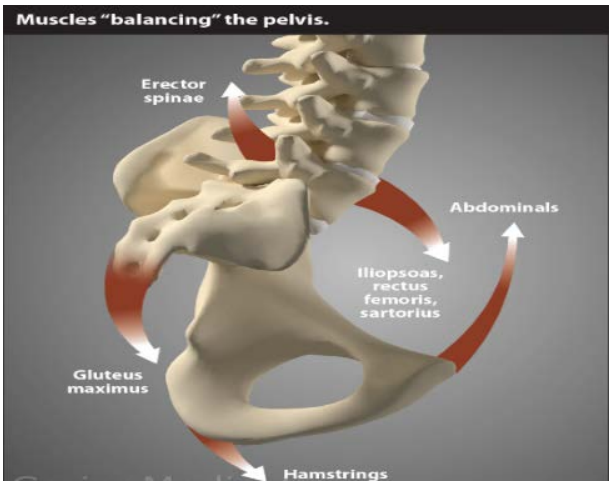


Figure 28. Ross A. Hauser-pelvic tilt.

In Figure 28, the importance of a balanced pelvis is stressed, which can be imbalanced when there is any difference in the limb length, pelvic diameters or intrapelvic measurements (https://www.sciencedirect.com/science/article/pii/S1555415520304438).

FORCES causing increased posterior pelvic tilt with lumbar flexion… move the Coccyx anteriorly, making it bear more weight and coccydynia on prolonged sitting. Non-traumatic coccydynia may ensue in limb length discrepancy as a result of pressure over the Coccyx [7].

5) **Stiffness due to ankylosing spondylitis can cause Coccydynia** [9].

6) **Tumours like chordoma** [10] **can take origin in this region.** This is an X-ray of the sacrococcygeal region in a 21-year-old man with coccydynia, and I found the lower sacrococcygeal region completely eroded with an expansile lesion. Teratomas in the neonates are also noted though rare [11].

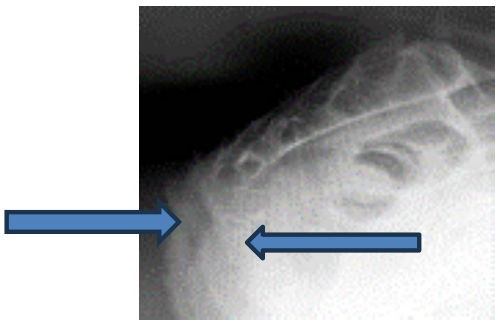


Figure 29. Chordoma.

Figure 29 shows the X-ray of the SACRO-COCCYGEAL spine when presented to Dr. Venkata Kiran V S N in Adam and Eve Specialised Medical Center, AUH, UAEA. The clinical & radiological diagnosis was a CHORDOMA and was made

by Dr. Venkata Kiran V S N, Orthopedic Surgeon and Dr. Elsy Biju Oommen, Head of the Radiology department of AESMC as it was an erosive lytic lesion.

An MRI SCAN was advised, which showed an extensive erosive lesion arising from the sacral segments.

Figure 30. Data from AESMC.

Figure 31. MRI scan of the extensive nature of chordoma.

Figure 32. MRI scan of the aggressive nature of chordoma.

Figures 30-32 show the extensive and aggressive nature of Chordoma confirmed by CT scan (Adam and Eve Specialised Medical Centre, AUH, UAE):

EXCISION of the sacrum till the 2nd sacral vertebra was done, but after four months, it recurred, and now the patient is again operated on but lost to follow up.

CHORDOMA was the diagnosis [10].

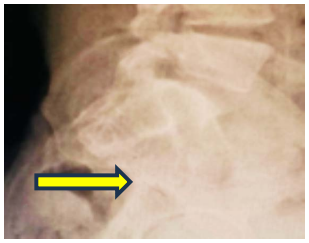


Figure 33. Post-excision surgery X-rays.

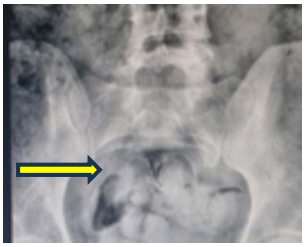


Figure 34. Courtesy of patient M.A.

Figure 33 and Figure 34 reveal post-excision surgery X-rays; Courtesy of patient M.A. M/21 years {chordoma}. As per the present follow-up, this excised chordoma recurred, and re-surgery was done.

Also, a rare osteoid osteoma was found in literature [12].

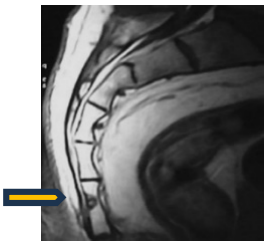


Figure 35. Osteoid osteoma of the coccyx.

Figure 35 shows osteoid osteoma of the coccyx/Picture courtesy from Krushi Orthopedic Welfare Society.

7) **Infections directly within or outside from, for example, a pilonidal sinus/abscess** [13].

Figure 36. Pilonidal sinus around the coccyx region.

Figure 36 Picture shows a Pilonidal sinus around the coccyx region which was caused by an infection that can cause an abscess and chronic irritation of tissues (Krushi's O W S research wing).

8) Expansions of bone and irritation of the sacrococcygeal nerves by benign but persistent compressions, e.g. **perineural cysts or TARLOV cysts** [14].

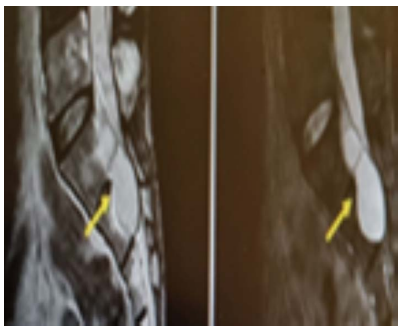


Figure 37. Perineural cysts or Tarlov cysts.

Figure 37 MRI scan showing perineural cysts in the sacrum with scalloping and expansion.

9) **Entrapment of coccygeal nerve roots as a cause of coccydynia** [15]: The S4, S5, and C01 anterior rami form the coccygeal plexus, which gives out the ano coccygeal nerve supplying the skin around the Coccyx and the sacrotuberous ligament.

Figure 38. Images courtesy: https://www.kenhub.comwww.kenhub.com/.

Figure 38 displays the exiting spinal nerves from the sacral and coccygeal foramina which can be entrapped along their course.

10) **Calcium salt deposition in the Coccyx is Rare but is reported, so it must be kept in the differential diagnosis** [16].

4. Conclusion

Coccydinia is to be interpreted only after considering the morphological and anatomical aspects of the sacrococcygeal features, strain patterns and sitting and other aspects of obesity or leanness, working hours and the rare incidence of tumours

of the sacrum and coccyx and the perineural cysts, which may cause scalloping pressure effect from inside the sacral canal and cause varying sacral nerve dysfunctions in addition, pelvic floor hypertonia, craniovertebral syndrome and many other rare conditions like a remnant intercoccygeal degenerative disc herniation, neurosis are to be kept in mind as there is a level 3 evidence that these all cause non-traumatic coccydynia.

Declaration

This is a VOLUNTARY NON-PROFITABLE RESEARCH PROJECT made by **KRUSHI Orthopaedic Welfare Society, a Voluntary organization** in Visakhapatnam, Andhra Pradesh, India. Each author is affiliated with separate job and study occupancies globally, as mentioned in the affiliations column {international research volunteers of KRUSHI O W S}. The research wing of this organisation is the main hub for compiling and editing, revisions and submission for acceptance of the manuscript.

Adam and Eve Specialised Medical Centre is a reputed Specialised Medical Centre in Abu Dhabi, United Arab Emirates, where the information was adopted in this manuscript on mutual consent with the management and the expert radiologist Dr. Elsy.

There is no financial benefit to KRUSHI O W S, Adam and Eve specialised medical centre, or participants, and the role of each was on a voluntary basis only.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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