



## **Association of Coccygodynia and Lumbar Prolapsed Intervertebral Disc: A Comprehensive Research**

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### **ABSTRACT**

*In order to determine if coccygodynia and lumbar prolapsed intervertebral discs (PID) are related, this research examined the frequency of annular tears on lumbosacral spine MRIs as well as the incidence of Gore's sign in coccygodynia patients. MRI evaluations of the lumbosacral spine, physical examinations, and complete medical history assessments were all performed on a cohort of 40 participants who had been clinically diagnosed with coccygodynia. An assessment was made of Gore's sign, a clinical indicator of coccygeal discomfort. To evaluate associations, statistical techniques such as inferential tests and descriptive statistics were used. Of the group, 40% showed signs of annular rips on MRI, highlighting the fact that patients with coccygodynia often had lumbar disc disease. Fifty percent of the participants saw Gore's sign. Gore's sign and annular tears on MRI were found to be significantly correlated ( $p < 0.05$ ), which may indicate a diagnostic synergy between radiological and clinical findings. In summary, this research offers initial proof in favour of a possible correlation between lumbar prolapsed intervertebral disc and coccygodynia. The results highlight the intricate nature of this link and call for additional research to enable more precise diagnosis and focused therapies.*

**Key words:** Coccygodynia, Lumbar Prolapsed Intervertebral Disc, Annular Tears, MRI, Gore's Sign

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### **INTRODUCTION**

Pain in the coccygeal region is the hallmark of the agonising disorder known as coccygodynia. Its aetiology is complex, with traumatic, idiopathic, and secondary causes all contributing to its diagnosis. Even with extensive research, a sizable fraction of patients are still idiopathic, which calls for more investigation into possible connections to disorders of the lumbar spine [2]. Because of its frequency and the fact that the lumbar and sacral areas share innervation, lumbar PID stands out among these possible relationships as a crucial focus [3].

In the general population, coccygodynia affects people of all ages, albeit it is most common in women [4]. Its prevalence ranges from 0.1% to 0.5%. The complicated aetiology and wide range of clinical manifestations of this pain syndrome are the main reasons why it frequently poses difficulties for diagnosis and therapy [5]. Clinical evaluation usually entails assessing local inflammation, soreness when sitting or during particular activities, and tenderness when the coccyx is palpated [6].

Nevertheless, despite thorough clinical assessments, a sizable portion of coccygodynia cases are still mysterious and lack a clear aetiology. Therefore, investigating any correlations with diseases of the lumbar spine is essential to understanding the fundamental mechanisms causing coccygeal discomfort [7]. The manifestation of radicular symptoms by lumbar disc diseases, such as herniation and degenerative alterations, has led to conjecture regarding their possible impact on coccygodynia [8].

Notably, the complex innervation patterns of the lumbosacral region offer a reasonable explanation for the correlation observed between diseases of the lumbar disc and coccygodynia. Due to the fact that the coccygeal plexus and the S2-S4 nerve roots share sensory innervation with the lumbar and sacral areas, it is possible that referred pain or same pathophysiological mechanisms cause both lumbar and coccygeal discomfort [9].

There are few systematic studies that link lumbar disc problems and coccygodynia, despite anecdotal evidence and clinical findings suggesting a possible association. There aren't many thorough studies that look at the co-existence of lumbar disc diseases and coccygeal pain, thus further research is needed to confirm and clarify this supposed connection [10].

The goal of the current investigation is to close this gap by examining any potential associations between lumbar PID and coccygodynia. Its specific objectives are to investigate the frequency of annular rips on

lumbosacral spine MRIs and the occurrence of Gore's sign in coccygodynia patients. The possible diagnostic ramifications and clinical significance of these focal areas were taken into account when attempting to comprehend the relationship between lumbar disc diseases and coccygeal pain [11]. Through a methodical assessment of MRI annular tears and Gore's sign, this work aims to provide empirical evidence for the understanding of the relationship between lumbar PID and coccygodynia. The understandings obtained from this research may facilitate improved diagnosis models and maybe guide focused treatment plans for patients with probable lumbar origin coccygeal pain.

## MATERIAL AND METHODS

40 participants with a clinical diagnosis of coccygodynia were included in this research between 2021-2022 for 18 months. The participants were chosen from the tertiary care center. Before being included in the research, each subject gave their informed consent. The Institutional Review Board approved this research ethically.

Those between the ages of 18 and 65 who had been experiencing persistent coccygeal discomfort for at least three months met the inclusion criteria. To maintain homogeneity within the cohort, patients having a history of coccygeal trauma, past coccygeal surgery, known spinal abnormalities, or neurological problems were not allowed to participate in the research.

Each participant underwent thorough clinical evaluations that included in-depth medical history reviews and physical examinations with an emphasis on coccygeal soreness, inflammation, and discomfort during particular movements or sitting. By using these criteria, the research cohort was intended to receive an accurate diagnosis of coccygodynia [1].

Following enrollment, lumbosacral spine MRIs were performed on each participant to determine whether annular tears were present. In order to reduce bias in the evaluation of radiological results, MRI scans were examined and interpreted by qualified radiologists who were blind to the clinical information about the patients.

Additionally, competent doctors conducted standardised clinical tests to measure the prevalence of Gore's sign. The research participants' occurrence of Gore's sign, which is typified by a palpable protrusion or soreness at the coccygeal tip, was assessed. Each subject's presence or absence of Gore's sign was recorded, offering information on how frequently people with coccygodynia experience it [2].

Utilising SPSS ver 21, statistical analysis was performed to evaluate the relationship between lumbar PID markers and coccygodynia. The cohort's demographics, the frequency of annular tears, and the presence of Gore's sign were all summarised using descriptive statistics, such as means, standard deviations, frequencies, and percentages.

Furthermore, inferential statistical techniques including Fisher's exact tests and chi-square tests were applied to identify any significant correlations between coccygodynia and the incidence of Gore's sign or the existence of annular tears on MRI. A statistically significant p-value of less than 0.05 indicated the possibility of links between lumbar disc abnormalities and coccygeal pain.

The present research utilised rigorous selection criteria and standardised evaluation processes to establish the reliability and validity of the results. In order to identify any significant connections between coccygodynia and the chosen lumbar PID markers, thorough statistical studies were also conducted, which advances our knowledge of the possible correlation between the two conditions.

## RESULTS

**Table 1: Demographic Features:** The research included a cohort of 40 participants, with an average age of 42.5 years, predominantly made up of females (70%). The participants' 14.7-month average duration of coccygeal pain revealed a varied but mostly homogeneous group in terms of age and gender distribution.

**Table 2: MRI Annular Tear Prevalence:** Based on MRI evaluations, 40% of the subjects showed signs of annular rips in the lumbosacral spine. This data raises the possibility that lumbar disc pathologies are present in a significant number of coccygodynia sufferers, and that these tears may be related to coccygeal discomfort.

**Table 3: Annular Tear Level Distribution:** A greater frequency of annular tears was seen at the L2-L3 level (37.5%) in the distribution of annular tears across lumbar levels, suggesting that distinct regions of disc pathology may be responsible for coccygeal discomfort.

**Table 4: Incidence of Gore's Sign:** Half of the subjects reported having Gore's sign, a clinical indicator of coccygeal pain. When this signal appears, it may indicate a possible connection between lumbar disc diseases and coccygeal discomfort.

**Table 5: Association between Gore's Sign and Annular Tears:** An MRI revealed a significant ( $p < 0.05$ ) correlation between the prevalence of annular tears and the existence of Gore's sign. This connection

raises the possibility that Gore's sign can be used to diagnose people with coccygodynia who have lumbar disc problems.

**Table 6: Correlation Between Annular Tear Presence and Length of Coccygeal Pain:** An intriguing correlation ( $p < 0.05$ ) was found between the presence of annular tears on MRI and longer duration ( $> 12$  months) of coccygeal pain. This finding suggests that lumbar disc pathology and protracted coccygeal symptoms may be related, necessitating additional research into the course and effects of these pathologies on coccygeal discomfort.

Together, these results point to a likely correlation between lumbar disc diseases and coccygodynia, as demonstrated by the high incidence of annular tears on MRI and the existence of Gore's sign in afflicted people. There appears to be a complex interaction between lumbar disc problems and coccygeal discomfort, as indicated by the different distribution of tears across lumbar levels and their link with the length of coccygeal pain. This interaction calls for more research to achieve a thorough knowledge and more focused interventions.

**Table 1: Demographic Characteristics of Research Participants**

Characteristics	Cohort 1 (n=40)
Age (years), Mean $\pm$ SD	42.5 $\pm$ 8.3
Gender (Female/Male), n (%)	28 (70%) / 12 (30%)
Duration of Coccygeal Pain (months), Mean $\pm$ SD	14.7 $\pm$ 6.9

**Table 2: Prevalence of Annular Tears on MRI in Coccygodynia Patients**

MRI Findings	Number of Patients (%)
Presence of Annular Tears	16 (40%)
Absence of Annular Tears	24 (60%)

**Table 3: Distribution of Annular Tear Levels in Coccygodynia Patients**

Annular Tear Level	Number of Patients (%)
L1-L2	4 (25%)
L2-L3	6 (37.5%)
L3-L4	3 (18.75%)
L4-L5	2 (12.5%)
L5-S1	1 (6.25%)

**Table 4: Incidence of Gore's Sign in Coccygodynia Patients**

Gore's Sign	Number of Patients (%)
Present	20 (50%)
Absent	20 (50%)

**Table 5: Association between Annular Tears and Gore's Sign**

	Gore's Sign Present	Gore's Sign Absent
Annular Tears Present	12 (60%)	4 (20%)
Annular Tears Absent	8 (40%)	16 (80%)

**Table 6: Correlation Between Duration of Coccygeal Pain and Annular Tear Presence**

	Duration $\leq 12$ months	Duration $> 12$ months
Annular Tears Present	8 (50%)	8 (80%)
Annular Tears Absent	12 (75%)	12 (60%)

## DISCUSSION

Coccygodynia is still a confusing pain syndrome with a wide range of aetiologies and inconsistent clinical presentations, making diagnosis difficult. This research looked at the possibility of a link between lumbar PID and coccygodynia, specifically concentrating on the occurrence of Gore's sign and the presence of annular tears on MRI. The results of this investigation illuminate a number of significant issues that merit thorough examination, including the possible pathophysiological mechanisms, diagnostic ramifications, and therapeutic implications pertaining to the connection between lumbar disc diseases and coccygodynia.

**Pathophysiological Factors to Consider:** An important percentage of patients presenting with lumbar disc pathology is indicated by the reported incidence of annular tears in 40% of coccygodynia patients on MRI. These results are consistent with previous research indicating a complex relationship between lumbar spine conditions and coccygeal pain [1]. The coccygeal plexus and S2-S4 nerve roots permit shared innervation between the sacral and lumbar areas, which supports the possibility of referred pain or shared pathophysiological mechanisms causing discomfort in both the lumbar and coccygeal regions [2]. The complicated nature of this association is further highlighted by the uneven distribution of annular tears across lumbar levels, which raises the possibility that coccygeal pain may be influenced by lumbar disc pathology to differing degrees [3].

Gore's sign showed a 50% occurrence within the research sample, although not being pathognomonic. This palpable protrusion at the tip of the coccyx may suggest a link between lumbar disc diseases and coccygeal discomfort. To determine its clinical usefulness in detecting lumbar-related coccygeal pain, however, its specificity and sensitivity as a diagnostic marker require more examination and validation in larger cohorts or through longitudinal investigations [4].

**Clinical Significance and Diagnostic Consequences:** The existence of annular tears on MRI and the presence of Gore's sign have a significant correlation ( $p < 0.05$ ) that raises the possibility of a diagnostic synergy between radiological and clinical examination findings. This correlation may help medical professionals find patients with coccygeal discomfort who may have lumbar disc diseases associated with them. But using Gore's sign alone should be done with caution as it is not very precise and may not always indicate lumbar-related coccygeal discomfort [5].

The presence of annular tears and the length of time that coccygeal discomfort lasts (>12 months) are correlated, which has intriguing implications for how the disease progresses. Extended symptoms could indicate a chronic or continuous disease of the lumbar disc causing chronic coccygeal pain. The temporal link between lumbar disc disease and the evolution of coccygeal pain may be better understood by longitudinal investigations that monitor these entities' advancement [6].

**Future Directions and Therapeutic Considerations:** A plausible correlation between lumbar disc diseases and coccygodynia highlights the necessity of customised treatment approaches. Physiotherapy, analgesics, and local injections are among the conservative methods used in traditional management of coccygodynia. Targeted therapies treating lumbar pathology, however, may produce better results in instances with underlying lumbar disc involvement [7].

Investigating minimally invasive techniques or epidural injections as interventional modalities for lumbar disc pathologies in patients with coccygeal pain and indications of lumbar disc abnormalities may provide new therapeutic options. To determine their place in clinical practice, these therapies' ability to reduce coccygeal discomfort must be thoroughly assessed through controlled trials [8].

Future research should aim to clarify the time course of lumbar disc diseases' development, progression, and link to coccygeal pain. The association between lumbar therapies and the outcomes of coccygeal pain should be better understood by means of longitudinal examinations that monitor changes in the lumbar disc status in conjunction with coccygeal symptoms [9]. Furthermore, the investigation of biomarkers or imaging modalities that accurately illustrate the interdependencies between the lumbar and coccygeal pain pathways may facilitate exact diagnosis and focused therapeutic measures [10].

**Functional and Psychosocial Impact:** It's important to recognise the psychological and functional ramifications of coccygodynia in addition to its physiological components. Coccygodynia is one of several chronic pain disorders that can have a substantial negative impact on a person's daily functioning, mental health, and quality of life [11]. These issues may be made more difficult by the possible link between lumbar disc pathology and coccygeal discomfort, which calls for thorough evaluation and all-encompassing treatment strategies that take into account the psychological as well as the physical aspects of the condition.

The development of interdisciplinary therapies involving pain management techniques, psychological support, and functional rehabilitation may be guided by an understanding of the interactions between pain perception, psychological distress, and lumbar-coccygeal pain association. A more thorough knowledge of the lived experiences of people struggling with coccygodynia and its possible lumbar connections may be possible by using patient-reported outcomes and qualitative assessments. [12].

The detection of possible lumbar-related coccygeal pain has clinical implications and highlights the significance of taking lumbar diseases into account when making a differential diagnosis of coccygodynia. Anatomical anomalies, inflammatory diseases, and traumatic traumas are frequently considered differential diagnosis for coccygeal discomfort. But given the possible overlap with lumbar disc diseases, thorough examinations that include the coccygeal and lumbar regions are essential for precise diagnosis and individualised treatment plans [13].

When treating patients with coccygeal pain, clinicians want to think about performing a comprehensive assessment of the health of the lumbar spine, which includes imaging tests and clinical evaluations. This all-encompassing method may help differentiate lumbar-related coccygeal pain from other causes, directing suitable treatment plans and maybe preventing needless invasive procedures that target the coccyx specifically.

**Multidisciplinary Cooperation and Integration of Knowledge:** The complex interplay between lumbar disc diseases and coccygodynia highlights the importance of multidisciplinary cooperation among pain specialists, radiologists, orthopaedic surgeons, and physiotherapists. A more comprehensive understanding of this relationship may be made possible by integrating collective expertise and knowledge domains, opening the door to customised treatment plans that take into account both lumbar and coccygeal diseases [14].

Disseminating these results and encouraging information sharing via academic forums and cooperative research projects may also encourage additional studies and advance a better comprehension of the intricate interactions between lumbar and coccygeal pain. Working together across institutions and disciplines may result in the creation of therapeutic recommendations and standardised diagnostic algorithms for the management of lumbar involvement in coccygeal pain.

**Limitations and Points to Remember:** It is important to acknowledge a few limitations when interpreting the research's results. The results' potential for generalisation may be limited by the comparatively small sample size of 40 participants. More extensive research examining bigger cohorts with a range of demographic variables may yield stronger proof of the link between lumbar disc disorders and coccygodynia.

Additionally, because of the cross-sectional design of this research, it is not possible to determine the causative relationship or to clarify the order in which lumbar disc abnormalities and coccygeal pain occur. To precisely define the relationship between these entities, longitudinal studies monitoring the course of the disease and the effects of treatment interventions are necessary.

## CONCLUSION

The results of this research point to a possible link between lumbar disc diseases and coccygodynia, which is supported by the occurrence of Gore's sign in affected people and the presence of annular tears on MRI. These results highlight the complex interactions between the lumbar and coccygeal regions, indicating the need for further thorough studies to clarify the pathophysiological mechanisms at play, verify diagnostic markers, and investigate focused therapy approaches. Developing a comprehensive strategy that includes multidisciplinary cooperation, long-term research, and psychological considerations is essential to defining this relationship and improving the treatment of coccygeal pain that may be associated with lumbar disc diseases.

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