



## Can an Incidental Schmorl's Node Be a Cause for Low Backache? – Enigma Resolved By a First Ever Prospective Case Control Study in A South Indian Town Population

Authors

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### ABSTRACT

**INTRODUCTION:** *Schmorl's nodes are intraosseous cartilaginous nodes representing vertical disk prolapses through areas of weakness in the vertebral endplates. Whether or not they are responsible for low backache has always been an enigma posing difficulties in giving specific treatment for the same. To our knowledge, this is the first ever prospective case control study in a south Indian town population demonstrating low backache because of Schmorl's nodes.*

**AIM:** *This study is aimed to assess the role of Schmorl's nodes as a cause of low backache in a south Indian town population.*

**MATERIALS AND METHODS:** *Hospital based Prospective Case Control Study among patients with low back ache with no known cause identified, attending the radiology department of a south Indian town hospital was done in 1.5 T MRI. Age and sex matched controls of same number without low backache were selected and studied after informed written consent.*

**RESULTS:** *Of the total 568 patients presenting with low backache, 336 patients had known cause for low backache at the time of MRI. 232 patients were subjected MRI LS spine. The cause of low backache was identified in MRI spine study for 141 patients with diagnosis other than Schmorl's nodes. Of the remaining 81 subjects, 68 had Schmorl's nodes and no other significant pathology as a cause for their symptom and the rest 13 had normal MRI LS spine. Age and sex matched asymptomatic controls showed Schmorl's nodes without surrounding edema in 6 individuals. The occurrence of schmorl's node was very high in cases (84%) than in controls (7.4%). The chi-square test of association  $\chi^2 = 1.239$ ,  $P = 0.266$  was insignificant. It was hence inferred that Schmorl's nodes does cause low backache.*

**CONCLUSION:** *Schmorl's node does cause low backache! The knowledge of this will help clinicians do timely intervention and treat the same.*

**KEYWORDS:** *Schmorl's nodes, Low backache.*

## INTRODUCTION

Schmorl's nodes are intraosseous cartilaginous nodes representing herniation of nucleus pulposus through areas of weakness in the adjacent cartilaginous endplates of vertebral bodies or subchondral trabeculae of the vertebra.<sup>(1,2,3)</sup>

Schmorl's nodes (SNs) are named after the German pathologist Christian Georg Schmorl (1861–1932) who described it in 1927,<sup>(4,5,6,7,8)</sup> although it was first described by VonLushka in the year 1958.<sup>(9)</sup> They are also called as Schmorl's nodes, Cartilaginous node or intraspongious disc herniation.<sup>(8)</sup>

Schmorl's nodes are seen more in men than in women.<sup>(10)</sup> Some researchers proposed a positive association with increasing age,<sup>(11)</sup> while others argue that age could not be a significant factor.<sup>(12)</sup> They are more commonly seen in motor cyclists,<sup>(13)</sup> elite gymnasts,<sup>(14)</sup> soccer players,<sup>(15)</sup> athletes,<sup>(16)</sup> weight lifters<sup>(16)</sup> and elite skiers.<sup>(17)</sup> A Chinese study showed that males, taller and heavier individuals had increased likelihood of

SN.<sup>(18)</sup> Even though Schmorl's Nodes can occur in any vertebra, they are seen more commonly in thoracolumbar regions especially upper end plates of lower thoracic vertebrae and lower end plates of upper lumbar vertebrae.<sup>(19)</sup>

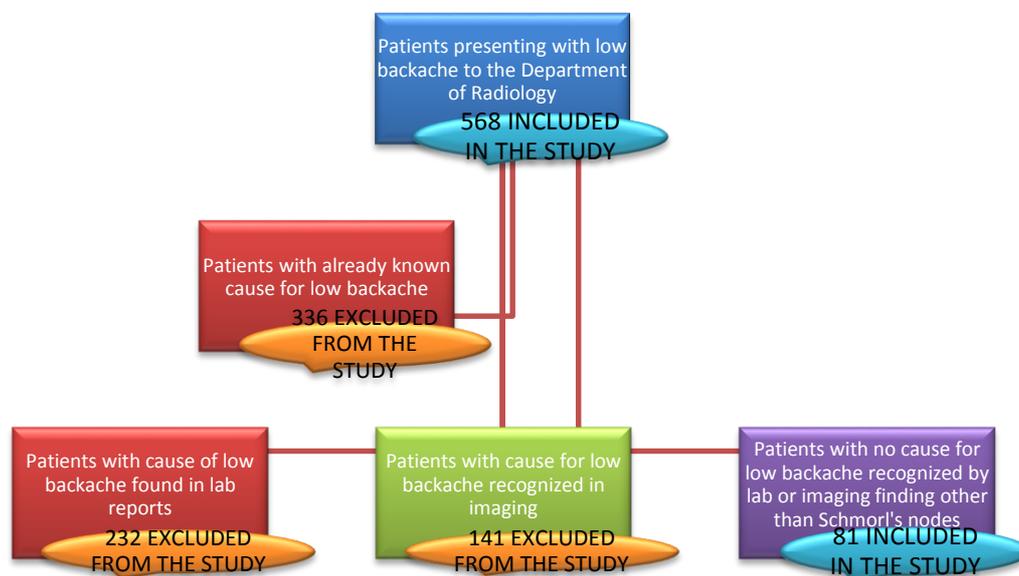
## AIM

- This study is aimed to assess the role of Schmorl's nodes as a cause of low backache in a south Indian town population.

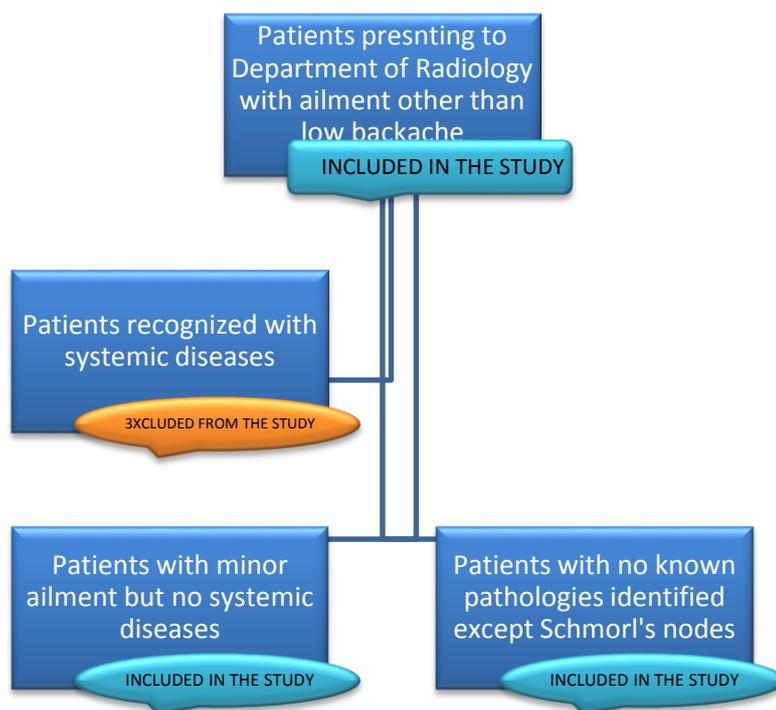
## MATERIALS AND METHODS

Hospital based Prospective Case Control Study among patients with low back ache with no known cause identified, attending the radiology department of a south Indian town hospital was done in 1.5 T MRI. Age and sex matched asymptomatic controls of the same number were selected and studied after informed written consent.

### Selection of cases



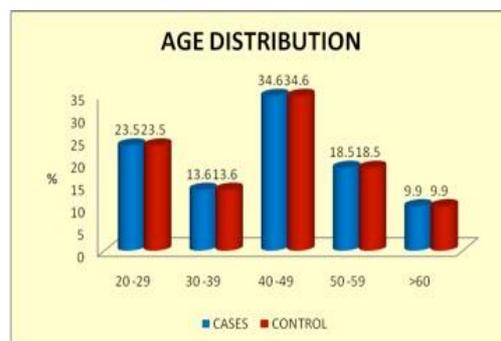
**Selection of Controls:**



Of the total 568 patients presenting with low backache, 336 patients had known cause for low backache at the time of MRI. 232 patients were subjected MRI LS spine. The cause of low backache was identified in MRI spine study for 141 patients with diagnosis other than Schmorl’s nodes. The rest 81 patients with low back pain and 81 controls were selected for the analysis. Case-control design was employed. The patients and controls were examined for the occurrence of schmorl’s nodes inMRI lumbo sacral spine. The associations of BMI and axial loading with Schmorl’s nodes were evaluated using chi-square test of association and odds ratio. The frequency distribution statistics was performed for all the selected outcome variables. The entire statistical procedure is carried out using statistical packages of social sciences (SPSS-21).

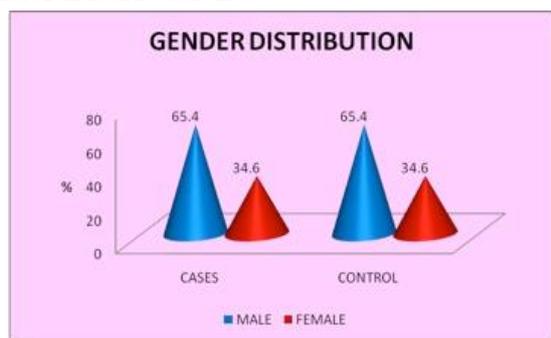
**OBSERVATIONS AND RESULTS**

Age (in years)	Cases		Control		Test of Homogeneity One Way ANOVA	
	N	%	N	%	‘F’ value	‘P’ value
20-29	19	23.5	19	23.5	0.001	0.973
30-39	11	13.6	11	13.6		
40-49	28	34.6	28	34.6		
50-59	15	18.5	15	18.5		
≥ 60	8	9.9	8	9.9		
Total	81	100	81	100		
Mean	42.44		42.37			
S.D.	13.74		13.58			



Out of 81 patients, the youngest patient was 23 years of age and the oldest was 72 years of age with a mean age of 42.44years. Majority of the patients were in the age group between 40 - 49 years, in which 34.6% are observed both in cases and controls.

**Gender Distribution**



Males constituted 65.4% and females represented 34.6% in our study with a male female ratio of 1.8:1.

**Duration of Low backache:**



About 58% of the patients have low backache for greater than 8 months of duration. 27.2% have low backache for duration of less than or equal to 1.5 months or 6 weeks duration. Only 14.8% have duration of low backache between 1.5 months to 8 months.

**Location of Schmorl's nodes:**

	Cases	Control
L1-2 SUP EP	40	3
L1 - 2 INF EP	6	1
L3 - SUP EP	20	2
L3 - INF EP	12	-
L4 - 5 SUP EP	28	-
L4 - 5 INF EP	8	-
S1 - SUP EP	4	-
T1 - 4 SUP EP	-	-
T1 - 4 INF EP	-	-
T5 - 8 SUP EP	-	-
T5 - 8 INF EP	2	-
T9 - 12 SUP EP	8	-
T9 - 12 INF EP	28	1
Total	156	7

A total of 156 Schmorl's nodes are observed in cases and 7 in controls.

In cases group, the occurrence of Schmorl's node was highest in superior end plates of upper lumbar vertebrae (N = 40).

The next common site of occurrences was inferior end plates of lower lumbar vertebrae (N = 28) and inferior end plates of lower thoracic vertebrae (N = 28).

In control group, a total of 7 numbers of schmorl's nodes were observed with 3 in superior end plate of upper lumbar vertebrae, 2 in superior end plates of L3 and 1 each in inferior end plates of L1 and T12.

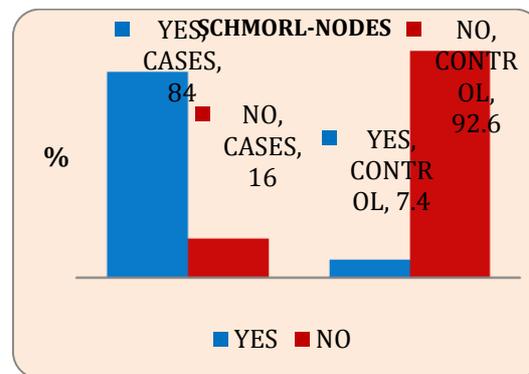
**Number of Schmorl's nodes:**

Number	Cases		Control	
	N	%	N	%
1	32	47.1	5	83.3
2	12	17.6	1	16.7
3	12	17.6	-	-
4	6	8.8	-	-
5	-	-	-	-
6	2	2.9	-	-
7	4	5.9	-	-
Total	68	100	6	100

About 47.1% of patients had single Schmorl's node. Each of 17.6% of patients had 2 and 3 Schmorl's nodes. About 8.8% of patients have 4 Schmorl's nodes and 5.9% of patients had 7 Schmorl's nodes.

Among controls, 83.3% had single Schmorl's node and 16.7% had two nodes.

**Occurrence of Schmorl's nodes:**



The schmorl's node occurrence is very much high in cases (84%) than in controls (7.4%). The chi-square test of association  $\chi^2 = 1.239$ ,  $P = 0.266$  is insignificant. Therefore, the rate of occurrence of schmorl's nodes is different for cases and controls. As the occurrence is very much high in cases, it is inferred that schmorl's nodes occurrence is significantly higher in cases than in controls, establishing a causative role.

## DISCUSSION

Association between Schmorl's nodes and back pain was never confirmed in a large population-based epidemiological study.

SNs are highly variable in their ethnic population. Prevalence depends on factors like how SNs are classified (i.e minimal size of the concavity to be considered as a node); definition of SNs (one or multiple cases of SNs); different modalities used for identifying SNs, like Magnetic resonance imaging (MRI), Computed tomography (CT) scans, roentgenograms, autopsies and skeletal material; demographics (sex ratio, ethnic origin, etc) & socioeconomic and lifestyle characteristics (mainly daily activities) of examined population.<sup>(21)</sup> Prevalence of SNs varies from 5 to 76% in international literature. Indian studies have shown prevalence of around 9%<sup>(21,22)</sup>

Our study shows that majority of the patients were in the age group between 40 - 49 years (34.6%) in consistent with Devimeenal et al<sup>(22)</sup> who also found a majority in the seventh decade as well. Some researchers proposed a positive association with increasing age, while others argue that age could not be a significant factor. There are studies that state that SNs are seen more commonly in teen age. The youngest patient was 23 years old and the oldest patient was 72 years old with a mean age of 42.44 years.

Majority of our study population consisted of males with male: female ratio of 1.8:1, which is in consent with north Indian study by Munsif et al<sup>(21)</sup> but not accepting with the only south Indian study done by Devimeenal et al, which has shown an equal distribution of SNs between both the genders.<sup>(22)</sup>

About 47.1% of patients had single Schmorl's nodes. Multiple nodes were seen in 36 cases (52.94%) with a maximum of 7 nodes seen in 4 cases.

We have found the majority of SNs in the thoraco lumbar transition region in our study in consistent with many literatures.<sup>(12, 20, 21, 22)</sup>

The schmorl's node occurrence is very much high in cases (84%) than in controls (7.4%). The chi-

square test of association  $\chi^2 = 1.239$ ,  $P = 0.266$  is insignificant. It is inferred that Schmorl's nodes occurrence is significantly higher in cases than in controls, thereby raising the possibility that Schmorl's nodes does cause low backache.

## CONCLUSIONS

The prevalence of Schmorl's nodes in subjects with low backache in our present study representing a South Indian town population is 84%, majority of whom were males (65.4%) with male: female ratio of 1.8:1. the occurrence of Schmorl's node was highest in superior end plates of upper lumbar vertebrae. The occurrences of schmorl's nodes were very high in cases (84%) than in controls (7.4%). Schmorl's nodes occurrence is significantly higher in cases than in controls, thereby establishing a causative role. Hence, Schmorl's nodes does cause low backache. But care should be exercised inconjunction with clinical datas while making the diagnosis.

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