



## Morphometric Evaluation of Facet Joint Arthrosis in Patient of Neck Pain By Ct Scan In North Indians

Kanhaiya Jee\*<sup>1</sup> Yogesh Yadav,<sup>2</sup> Nisha V Kaul,<sup>3</sup> Harshita Pant<sup>4</sup>

<sup>1-3</sup> Dept. of Anatomy, Santosh Medical College, Ghaziabad

<sup>4</sup> Dept. of Radiodiagnosis, MIMS, Barabanki, UP

\*email id- kanhaiyaj51@gmail.com

### ABSTRACT

Facet joint arthrosis to be assessed in patients with neck pain using a CT scan at the cervical levels (C3-C7) and its correlation to gender, age and cervical spinal levels (C3-C7). The present clinical case control study was conducted for duration of 2 years. Diagnosed OPD cases of neck pain (20- 80 years) with suspected facet joint arthrosis in Department of Anatomy and Radio diagnosis at Santosh Medical College (SMC), Ghaziabad. During OPD hours, all clinical history was taken and related clinical examination and relevant information through consent was collected in a structured data also collected through interviews. CT scan for the cervical spine region was performed for all the enrolled subjects. Total 83 subjects were enrolled in this study with all most equal representation from both sexes i.e males (49.4%) and females (50.6%). It was found that 13.3% and 10.5% of study subjects displayed severe degeneration of the right and left facet joints respectively. Approx every subject the neck pain was presenting neurological symptom. The facet joints are synovial joint and the articulations participate in the posterior arch of the vertebrae. They provide important role in important structural stability to the vertebral column. These joints are surrounded with a strong fibrous capsule and connect the superior and inferior articular facets of the cervical vertebrae.

**KEYWORDS:** Facet joint osteoarthritis, Spinal nerve injury.

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### INTRODUCTION

A cervical vertebrae protect the spinal cord, support the head and allows for movement of the head in multiple directions [1]. There are many reasons why it can narrow, from tumors to infections to trauma to osteophytes to osseophytes and disc herniations to degenerative changes. [2]. Numbness, tingling sensation around distribution of dermatomes, weakness, spasticity, and paresthesia are some of the most common symptoms of facet joint arthritis. These variables may lead to an increase in spinal cord compression and increase the risk of facet joint arthrosis [3-4].

The Zygapophyseal joints are affected by osteoarthritis (OA) of the spine. Located between sequential spinal levels, facet joints function as synovial joints and these joints are paired diarthrodial joints present in the posterior part of the vertebral column. When it comes to facet joint osteoarthritis (FJOA), A significant influence on health care and the economy of developed nations is believed to be caused by both FJOA and degenerative disc disease [4]. Facet joint osteoarthritis (FJOA) is characterized by facet articular cartilage loss and bony hypertrophy, finally affects the entire joint, including cartilage along with surrounding ligaments [5]. The facet joints are most important structures in determining factor of the biomechanical of the cervical spinal column [6].

### MATERIAL AND METHODS

#### Study design

The present study was case control at Santosh Medical College (SMC), Ghaziabad, NCR, and MIMS (Mayo Institute of Medical Sciences), Barabanki, Uttar Pradesh, this study was conducted in the Department of Anatomy and Radiodiagnosis., before data collection obtained approval of ethical from Institutional Ethics Committee (IEC No. SU/2022/1831[2]; Santosh Medical College and Hospital Ethics Committee, Ghaziabad, UP).

### Study subjects and sample size

The present study included Patients with cervical facet joint arthrosis (20-80 years) diagnosed with neck pain. In addition to paresthesia, neck muscles are weak, hypotrophic, and rigid due to a lack of sensibility connecting them to dermatomes from OPD of Department of Orthopaedics and Department of Neurology referred to Radio diagnosis department for cervical CT scan was chosen as study subjects. Before to selection of subjects into the our study, written informed consent was obtained from subjects after explaining in detail related the purpose of study, as well as sampling method. The total 83 patients were enrolled in the present study. Psychiatric patients, patients with histories of head or spine trauma, patients with a history of spinal surgery, pregnant women, and patients with head or neck tumors, congenital anomalies related to cervical spinal were excluded from the study.

### Data collection

Duration of OPD hours, related clinical history was taken along with specific clinical examination and related information was collected through interviews. Each selected subject underwent a CT scan of the cervical region (Brand name: SIEMENS; Model No: Somatom Scope [G-XL-91368]; Version of machine: CTVC30; and Number of Slices of machine: 16) and An experienced radiologist interpreted the CT scan image in the report. From C3 to C7, cervical vertebrae were considered. The subjects were weighed using a digital weight machine. Height measurements were taken on the subject in cm with measurement tape which was attached to the wall.

**Figure 1: Axial CT scan image of cervical region**



### Statistical analysis

The data was entered in MS EXCEL sheet and analysis was done by using Statistical Package for Social Sciences (SPSS). Results were analysed with baseline demographic and Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean  $\pm$  SD. The r square and adjusted r square were calculated using age, gender, height, and weight as parameters for multiple linear regression analysis of neck pain grading; right & left facet joint degeneration..

### RESULT AND DISCUSSION

Eighty-three patients were enrolled in the our study with an average age of  $57.98 \pm 7.63$  years. According to Freedman BA et al, patients were enrolled A mean age of  $64.4 \pm 13.4$  years was found among the patients who met the diagnostic criteria for being in the "myelopathic" group [7]. Female enrolled in our study were 50.6% and male enrolled 49.4%. According to Kalichman et al. [8] a greater prevalence of Facet joint osteoarthritis (FJOA) in a community (59.6% of males and 6.7% of females). In our study, cervical facet joint hypertrophy and expansion of the cervical facet joint capsule secondary to joint effusion may cause such neural compression [9]. Also, due to swollen of cervical facet joint capsule may compress the surrounding spinal nerve root [10]. Facet joints are important factor of spinal pain generators, according to different studies individuals with painful facet joints can get benefit from certain manual therapies. However bony overgrowth can be an important cause of neuroforaminal narrowing, giving rise to irradiating pain [11]. In our study shows the cervical facet joint degeneration features in the sample with Neck pain was a high prevalence of Joint space narrowing (50.6%), Osteophytes of joint (38.5%), Irregularity of articular surface of joint (49.4%) and 2<sup>nd</sup> degree of cervical In our study, 37.3% of the facet joints were degenerated. It was concluded by Prabavathy et al. that the superior and inferior articular processes of the pedicles of the cervical vertebrae and vary in height of cervical vertebrae decreased towards the lower cervical level [12]. In our study, Frequency of neurologic symptoms such pain (98.8%), Numbness (53.0%), Tingling sensation (25.3%), Weakness of muscle (7.2%) and Gait Instability (6%). The published radiological investigations report no correlation between the clinical symptoms of low back pain and degenerative spinal changes observed on radiologic imaging studies [13]. Facet joint

relaxation with instability and secondary facet arthrosis may then set in [14]. In this situation, flexion and extension can be associated with rocking of the posterior joints, giving rise to potentially severe damage, including fractures of the articular facets [15]. One of the source of discomfort may the cervical facet joint [16].

**Table 1: A description of the case baseline characteristics**

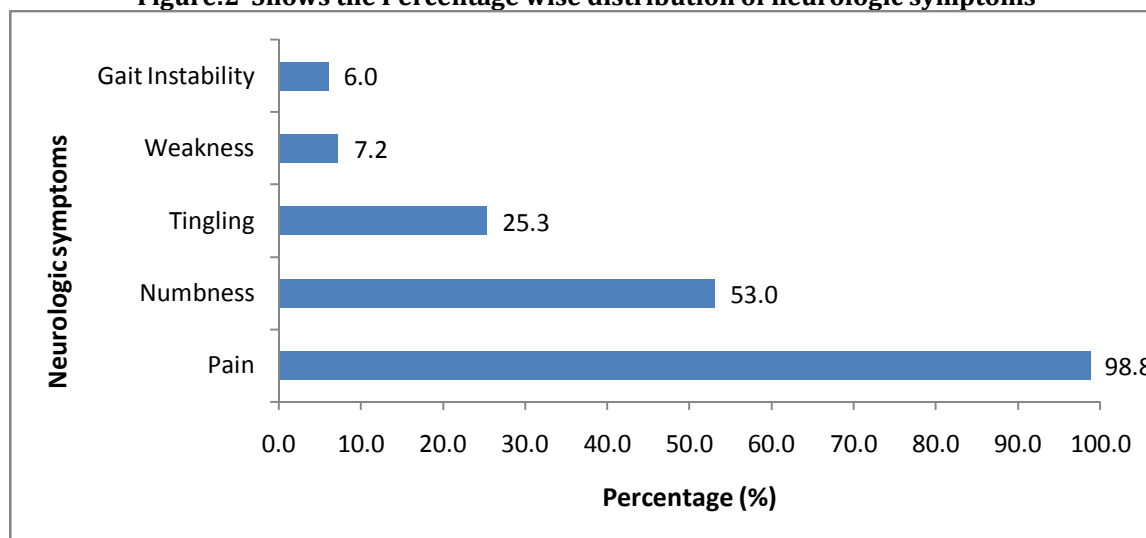
Variable	Number and (%)/ Mean±SD
<b>Gender</b>	
Male	41 (49.4)
Female	42 (50.6)
<b>Age (in years)</b>	57.98±7.63
<b>Age groups (in years)</b>	
40-50	14 (16.8)
51-60	36 (43.3)
61-70	30 (36.1)
>70	3 (3.6)
<b>Height (in cms)</b>	167.18±8.37
<b>Weight in kg</b>	67.47±9.71
<b>Body mass index (BMI) (kg/m<sup>2</sup>)</b>	24.20±3.72

**Table 2: Characteristics among study subjects, there was degeneration of the cervical left and right facet joints**

Standard	A degenerative condition of the left cervical facet joint	A degenerative condition of the right cervical facet joint
<b>Facet joint space narrowing</b>		
Confirmed	42 (50.6)	40 (48.2)
Not Confirmed	41 (49.4)	43 (51.8)
<b>Osteophytes of cervical facet joint</b>		
Confirmed	32 (38.5)	30 (36.1)
Not Confirmed	51 (61.5)	53 (63.9)
<b>The articular surface of the cervical facet joint is irregular</b>		
Confirmed	41 (49.4)	38 (45.8)
Not Confirmed	42 (50.6)	45 (54.2)
<b>Graduation of degenerative changes in the cervical facet joints</b>		
0	21 (25.3)	21 (25.3)
1	20 (24.0)	25 (30.1)
2	31 (37.3)	28 (33.7)
3	11 (13.3)	09 (10.5)
<b>Severity</b>		
Mild	20 (24.0)	25 (30.1)
Moderate	31 (37.3)	28 (33.7)
Severe	11 (13.3)	09 (10.5)

**Table 3. Multiple Linear Regression analysis of cervical facet joint degeneration among study subjects using independent variables.**

Measured variable	Manipulate variables	R Square	Adjusted R Square	P-value
Right cervical facet joint	Age	0.0119	-0.0388	0.9178
	sex			
	Height			
	Weight			
Left cervical facet joint	Age	0.0085	-0.0424	0.9548
	Sex			
	Height			
	Weight			

**Figure:2 Shows the Percentage wise distribution of neurologic symptoms****CONCLUSION**

The facet joints are synovial joint and the articulations participate in the posterior arch of the cervical vertebrae. They provide important role in important structural stability to the cervical vertebral column. These joints are surrounded with a strong fibrous capsule and connect the superior and inferior articular facets of the cervical vertebrae. The posterior ligamentous complex keeps the cervical facet joints and the cervical vertebrae in a fixed position with each other.

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