

## Comparison of curved angles in spinal alignment between patients with chronic pain disease and physically unimpaired persons.

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### SUMMARY

The purpose is to establish an objective index to clarify chronic pain disease by comparing with the difference of the curved angle in spinal alignment between patients with chronic pain disease and physically unimpaired persons.

A total of 40 adult male subjects constituted this study. There were 20 physically unimpaired adults and 20 patients with chronic pain. The spinal curved angles are estimated by multiple regression analysis with use of data of distance with nine items of length and width, and the spinal curved angles are also evaluated by the actual measured value of curved angles using X rays.

The results of multiple regression equation for both patients with chronic pain disease and physically unimpaired persons showed a significant difference for curved angles of lordosis of thoracal vertebrae, but they showed no significant difference for curved angles of kyphosis of lumber vertebrae. X rays also showed similar results to multiple regression analysis. There was no significant difference in both results.

This study revealed that the patients with chronic pain disease had decreased curved angles of lordosis of thoracal vertebrae.

It also revealed that the method with multiple regression equation was useful to estimate the spinal curved angles.

### INTRODUCTION

In clinical diagnosis, we have experienced many hardships that the treatment of chronic pain used to be difficult and also have seen that the spinal curved angles in the patients are different from the angles of original physiological curve of physically unimpaired persons. The obvious cause of chronic pain disease is not still found. The symptomatic therapy has been mainly taken. Therefore, the main approach and treatment for the chronic pain disease have not established.

The purpose is to establish an objective index to clarify chronic pain disease by comparing with the difference of the curved angle in spinal alignment between patients

with chronic pain disease and physically unimpaired persons.

### METHODS

A total of 40 adult male subjects constituted this study. There were 20 physically unimpaired adults (mean age, 30.0±6.3 years) and 20 patients with chronic pain (mean age, 32.4±4.8 years).

The spinal curved angles are estimated by multiple regression analysis with use of data of distance with nine items of length and width, and the spinal curved angles are also evaluated by the actual measured value of curved angles using X rays (Table 1). The results of the estimated spinal curved angles and the angles by X rays are compared. The extracted data of both patients with chronic pain disease and physically unimpaired persons were compared.

The Welch's T-test was used to analyze the data with a significance level of 0.05.

### RESULTS AND DISCUSSION

The results of multiple regression equation for both patients with chronic pain disease and physically unimpaired persons showed a significant difference for curved angles of lordosis of thoracal vertebrae, but they showed no significant difference for curved angles of kyphosis of lumber vertebrae. In the results of X rays, a significant difference for curved angles of lordosis of thoracal vertebrae for both patients with chronic pain disease and physically unimpaired persons were also found, but no significant difference for curved angles of kyphosis of lumber vertebrae was found (Table 2). There was no significant difference in both results.

It is suggested that the curved angles of lordosis of thoracal vertebrae may be an objective index to clarify chronic pain disease and may be a factor to cause

chronic pain disease. The curved angles are able to be estimated by multiple regression equation with distance information in spine.

## CONCLUSIONS

This study revealed that the patients with chronic pain disease had decreased curved angles of lordosis of thoracical vertebrae. Therefore, finding the presence or absence of the curved angles of lordosis of thoracical vertebrae indicates the possible factors of chronic pain disease.

It also revealed that the method with multiple regression equation was useful to estimate the spinal curved angles.

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## REFERENCES

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**Table 1:** Nine Items of length and width used for evaluation of curved angles of vertebrae.

Items	Contents of Items
A	C2 to L5 (Length between lower end of cervical and lumber vertebrae)
B	C7 to L5 (Length between lower end of cervical and lumber vertebrae)
C	L1 to L5 (Length between upper and lower end of lumber vertebrae)
D	Width between apices of curve in cervical vertevra and thoracic vertevra
E	Width between apices of curve in thoracic vertevra and lumber vertevra
F	Width between apices of curve in cervical vertevra and lumber vertevra
J	Width between apices of curve in cervical vertevra and vertical line from heel
K	Width between apices of curve in thoracic vertevra and vertical line from heel
L	Width between apices of curve in lumber vertevra and vertical line from heel

**Table 2:** Comparison of curved angle in spinal alignment between patients with chronic pain disease and physically unimpaired persons.

	Physically unimpaired persons	Patients with chronic pain disease	Results
Age	30.0 ± 6.3	32.4 ± 4.8	ns
Curved angles of lordosis of thoracical vertebrae	37.6 ± 10.3	28.3 ± 6.2	*
Curved angles of kyphosis of lumber vertebrae	31.7 ± 7.9	28.0 ± 7.4	ns

ns: no significant  
\* = P < 0.05