

# **MRI changes of cervical spine in asymptomatic and symptomatic young adults**

**European Spine Journal**  
**August 2002; 11 :358–363**

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## FROM ABSTRACT

Several work-related, psychosocial and individual factors have been verified as being related to neck and shoulder pain, but the role of pathology visualized by magnetic resonance imaging (MRI) remains unclear.

In this study, the relationship between neck and shoulder pain and cervical MRI findings was investigated in a sample of persons in a longitudinal survey.

The study aimed to determine whether subjects with persistent or recurrent neck and shoulder pain were more likely to have abnormal MRI findings of cervical spine than those without neck and shoulder pain.

A random sample of 826 high-school students was investigated initially when the students were 17–19 years, and again when they had reached 24–26 years of age.

The validated Nordic Musculoskeletal Questionnaire was used to collect data about neck and shoulder symptoms.

Two groups were chosen for the MRI study: the first group (n=15) consisted of the participants who had reported no neck and shoulder symptoms in either of the inquiries, while the second group (n=16) comprised those who were suffering from neck and shoulder symptoms once a week or more often at the time of both surveys.

The degrees of disc degeneration, annular tear, disc herniation and protrusion were assessed by two radiologists. The differences between the two study groups were evaluated.

The study found that abnormal MRI findings were common in both study groups.

Disc herniation was the only MRI finding that was significantly associated with neck pain.

These findings indicate that pathophysiological changes of cervical spine verified on MRI seem to explain only part of the occurrence of neck and shoulder pain in young adults.

## THESE AUTHORS ALSO NOTE:

“Neck and shoulder pain is a commonly encountered complaint in medical practice.”

20–65% of women and 15–40% of men have experienced neck and shoulder symptoms during their lives.

15% of adolescents suffer from weekly neck and shoulder symptoms, and the prevalence increases with age.

Neck and shoulder pain is multietiological.

“Discs, ligaments, muscles, joints and dura are capable of eliciting pain in cervical spine when irritated or inflamed.” **[Important]**

Discogenic pain is thought to originate from anular tears or disc degeneration.

The facet joint may be a possible source of idiopathic neck pain.

Neck pain is associated with local hypoxia and decreased energy metabolism in tissues. **[IMPORTANT: this suggests increased sympathetic tone, which is a neurological component of the subluxation complex]**

“Magnetic resonance imaging (MRI) is the most sensitive technique for showing early pathologic changes in cervical spine.”

Cervical disc degeneration is a “fairly common finding among asymptomatic subjects in their 20s,” affecting 17% of men and 12% of women.

“In the population aged less than 40 years 25% of the [cervical] discs have been found to be degenerated or narrowed.” **[Important]**

Disc degeneration of the lumbar spine is a common finding in a 15-year-old population with or without low back pain. **[Amazing]**

The aim of the present study was to examine whether symptomatic young adults had more pathological MRI changes in cervical spine than asymptomatic subjects of the same age.

Two radiologists assessed the MRI images, unaware of the participants’ pain history.

“The posture of cervical spine was evaluated as normal, slightly straightened lordosis, straightened or kyphotic.”

“The degrees of disc degeneration, anular tear, herniation and protrusion were assessed separately.”

"The facet joints were analyzed by assessing hydrops [swelling], osteophytes and narrowing of cartilage."

"The muscles of the spinal area were graded as normal or atrophied."

## RESULTS:

The postures of 84% of subjects were "evaluated as abnormal, a slightly straightened cervical spine being the most common finding." (39%)

"There were no statistically significant differences in the abnormal posture findings between the symptomatic group and the non-symptomatic group."

"No abnormal findings were detected in the facet joints or muscles of the spinal area."

There were four disc herniations visible in the images, all of which were in the symptomatic group.

### MRI FINDINGS ON ASYMPTOMATIC 24 – 27 YEARS OLD

Disc Protrusion	13/15=	87%
Disc Degeneration	11/15=	73%
Disc Anular Tear	10/15=	63%
Disc Herniation	0/15 =	0%
No Findings	2/15 =	13%

### MRI FINDINGS IN RECURRENT/PERSISTENT NECK/SHOULDER PAIN 24 – 27 YEARS OLD

Disc Protrusion	11/16=	69%
Disc Degeneration	9/16 =	56%
Disc Anular Tear	8/16 =	50%
Disc Herniation	4/16 =	25%
No Findings	4/16 =	25%

## DISCUSSION

"The results showed that pathological changes of cervical spine in a 24 to 27 year-old population were equally common in symptomatic and asymptomatic subjects."

"Disc herniation was the only finding significantly associated with neck pain," as all four disc herniations detected were found in symptomatic subjects.

The findings in this study are in agreement with others, in that "abnormal MRI findings are common in asymptomatic subjects."

In this study, disc degeneration and disc protrusion were more common findings in the non-symptomatic group than in the symptomatic group. **[Ironic]**

“In conclusion, pathophysiological changes of cervical spine verified on MRI seem not to explain any remarkable part of the occurrence of neck and shoulder pain in young adults.”

“The results of our study indicate that pathophysiological changes, such as disc degeneration and disc protrusion, are surprisingly common findings in cervical spine even among young adults.”

#### KEY POINTS FROM DAN MURPHY

- 1) 20–65% of women and 15–40% of men have experienced neck and shoulder symptoms during their lives.
- 2) 15% of adolescents suffer from weekly neck and shoulder symptoms, and the prevalence increases with age.
- 3) “Discs, ligaments, muscles, joints and dura are capable of eliciting pain in cervical spine when irritated or inflamed.” **[This is important for chiropractors because spinal adjustments directly and indirectly influence these tissues.]**
- 4) Neck pain is associated with local hypoxia and decreased energy metabolism in tissues. **[IMPORTANT: this suggests increased sympathetic tone, which is a neurological component of the subluxation complex]**
- 5) Prior studies show that 25% of those aged less than 40 years have degenerated or narrowed of the cervical discs. **[Important]**
- 6) Disc degeneration of the lumbar spine is a common finding in a 15-year-old population with or without low back pain. **[Amazing]**
- 7) 84% of these young subjects had reduced cervical lordosis; 39% showed a slightly straightened cervical spine; 45% had a total loss of lordosis or a kyphotic deformity.
- 8) In this study, 87% of asymptomatic 24 –27 years old had a disc protrusion.
- 9) In this study, 73% of asymptomatic 24 –27 years old had disc degeneration.
- 10) In this study, 63% of asymptomatic 24 –27 years old had a disc annular tear.
- 11) Ironically, the prevalence of disc protrusion, disc degeneration, and disc annular tears was greater in the asymptomatic subjects compared to those who suffered from recurrent/persistent neck/shoulder pain.

12) The findings in this study are in agreement with others, in that "abnormal MRI findings are common in asymptomatic subjects."

13) "The results of our study indicate that pathophysiological changes, such as disc degeneration and disc protrusion, are surprisingly common findings in cervical spine even among young adults."

#### COMMENT FROM DAN MURPHY

I believe that the most important chiropractic application from this study include:

- 1) Disc degeneration, annular disc tears, and disc protrusions are extremely common in the patients we treat every day, even in young patients, and that it is more likely that these findings are asymptomatic than symptomatic.
- 2) Therefore, these findings (disc degeneration, annular disc tears, and disc protrusions) are not contra-indications to chiropractic spinal adjusting.
- 3) Disc degeneration, annular disc tears, disc protrusions, and disc herniations apparently occur spontaneously beginning at a very young age, and are not caused by chiropractic adjustments.