FROM ABSTRACT:

Five years or more after automobile accidents which caused soft-tissue injuries of the neck in 146 patients who had no pre-existing cervical degenerative changes, evaluation revealed statistically significant positive correlations between poor results and the following findings shortly after injury:
1) Upper extremity numbness and/or weakness.
2) Sharp reversal of the cervical lordosis visible on roentgenograms.
3) Restricted motion at one interspace as shown by flexion-extension roentgenograms.
4) Need for a cervical collar for more than 12 weeks.
5) Need for home traction.
6) Need to resume treatment more than once because of recurrence of symptoms.

Symptomatic recovery occurred in 57% of the 146 patients.

Degenerative changes developed after the injury in 39%.

THIS AUTHOR ALSO NOTES:

“This study was undertaken in an effort to identify the initial or early symptoms and the physical and roentgenographic findings that are important in predicting the results in patients whose initial roentgenograms after [whiplash] injury show no evidence of arthritic changes, narrowing of an intervertebral disc, or spur formation.”

These authors re-xrayed 146 patients who had injured their neck in an automobile collision at least 5 years before and whose initial x-rays at the time of injury showed no evidence of degenerative changes.

The average age of the 54 males was 27.2 years and of the 92 females, 30.7 years. [Quite a young population who should have no evidence of any degenerative spinal disease.]

Initial exam findings included:
72% had muscle spasm and restriction of movement.
34% had a forward head carriage.
3% had a deficit in neural function.
The initial symptoms were:
98% neck pain
95% neck stiffness
72% headache
36% shoulder pain
35% low back pain
20% interscapular pain
12% arm and hand pain
12% arm and hand numbness
10% loss of consciousness

If a seat had been damaged or torn from its tracts the “patient’s initial symptoms were more severe.”

Initial x-rays showed:
42% had a cervical lordosis
35% had a straight cervical curve
14% had a sharp reversal of cervical lordosis
9% had a minor reversed cervical lordosis

Treatment followed no fixed routine, and included cervical collar, heat, physical therapy, massage, and traction.

The minimum follow-up on these patients was 5 years, and the average was greater than 7 years 3 months.

Post-traumatic cervical spine degenerative changes were defined as x-ray evidence of disc narrowing, spur formation, or arthritic changes during the follow-up period.

Evidence indicates that the incidence of degenerative changes should not exceed 6% in an uninjured population. [Very Important]

RESULTS:

57% reported symptomatic recovery at follow-up.

43% had continued symptoms at follow-up.

39% had developed degenerative changes at follow-up.

“27% of the patients continued to have symptoms in the absence of degenerative changes, indicating that persistent neck symptoms did not necessarily mean that degenerative changes would develop or had developed during the period covered in this study.” [Important]
“Physical findings during the first month after injury were not helpful in predicting if symptoms would persist or degenerative changes would occur, except in patients who had some early neurological loss.” [Very Important]

Older patients were more likely to have long-term symptoms.

Older patients were more likely to have progressive degenerative changes.

“The incidence of recovery from symptoms was significantly higher in men than in women.”

“There was no sex difference with respect to the development of degenerative changes.”

“The duration of symptoms bore no relation to the amount of [vehicle] damage.”

“Patients in whom degenerative changes developed had been in the automobiles with greater [vehicle] property damage.”

Degenerative changes developed in 64% of those who had lost consciousness.

Degenerative changes developed in 36% of those who had not lost consciousness.

“Radiating pain or numbness in the upper extremities showed a significant positive correlation with a bad prognosis for symptomatic recovery.” [Very Important]

“Symptoms lasted for an average of 21 months in patients with no late degenerative changes and for an average of 30 months in those whom degenerative changes developed.” [Very Important]

“Patients with symptoms lasting for less than 6 months (mean 2 months) were compared with those whose symptoms persisted for more than 18 months (mean 65 months). There were no significant differences between these 2 groups with respect to age, sex, type of collision, property damage, muscle spasm, or cervical curve, but there was a significant difference in terms of the severity of early symptoms. The group with symptoms less than 6 months tended to have mild early symptoms while the group with symptoms lasting for 18 months or more for the most part had moderate to severe initial symptoms.”

“There was a significantly higher incidence of degenerative changes in the patients who had a sharp reversal of the normal cervical curve.” [Very Important]

“Restricted motion at one intervertebral level [on flexion-extension x-rays] tended to have a poorer symptomatic recovery and a considerably increased incidence of degenerative changes” compared to the patients without restriction of motion.
Of the patients who wore a cervical collar for more than 12 weeks, “symptoms persisted in 68% and degenerative changes developed in 63%.

17% of those who had settled legal claims still had symptoms after 5 years.

62 % of those who had settled legal claims after 18 months still had symptoms after 5 years.

“There was no significant relationship between damage to the automobile and the amount of the [legal] settlement.”

DISCUSSION

The population of patients in this study was the “usual, predominantly ‘walk-in’ type of patient.”

“The 43% incidence of residual symptoms in this series was within the 20% – 46% range reported in other series.”

After following the patients in this series well beyond the time of their legal settlements, “it was evident that a considerable percentage of them still had symptoms apparently attributable to the original accident.”

Because this study of injured patients showed a much higher incidence of cervical spine degenerative disease as compared to studies of patients who never had neck injury, “trauma was probably a causative factor.” [Very Important]

“Numbness or pain in the upper extremity is associated with a significantly greater incidence of residual symptoms, but not with an increased incidence of degenerative changes.”

“Sharp reversal of the cervical curve is associated with a higher incidence of degenerative changes, but not with a significant alteration in the rate of symptomatic recovery.”

The author notes several published studies that comment on the significance of loss of cervical lordosis, including:

1) “Loss of the normal lordosis is indicative of mechanical derangement of the posterior intervertebral joints.” [Important, consistent with a subluxation]

2) “Loss of lordosis is an important finding, it is an antalgic position, and it is a protective position to avoid further soft-tissue damage.”

“A sharp reversal of the curve after injury is a harbinger of degenerative change in 60% of patients.”
“Intervertebral disc degeneration often occurs without associated symptoms.”

KEY POINTS FROM DAN MURPHY

1) Any of the following findings occurring shortly after a whiplash injury are associated with a poor prognosis for recovery:
   A) Upper extremity numbness and/or weakness.
   B) Sharp reversal of the cervical lordosis visible on roentgenograms.
   C) Restricted motion at one interspace as shown by flexion-extension roentgenograms. [This underscores the importance of performing flexion-extension x-rays and evaluating them for segmental motion.]
   D) Using a cervical collar for more than 12 weeks.
   E) Need to resume treatment more than once because of recurrence of symptoms.

2) 43% of patients injured in a whiplash event will have ongoing symptoms at a 5-year follow-up.

3) 39% of patients injured in a whiplash event will develop radiographically demonstrable degenerative changes of the cervical spine at a 5-year follow-up.

4) 27% of the patients continued to have symptoms in the absence of degenerative changes, indicating that persistent neck symptoms did not necessarily mean that degenerative changes would occur. [Important]

5) “Physical findings during the first month after injury were not helpful in predicting if symptoms would persist or degenerative changes would occur, except in patients who had some early neurological loss.” [Very Important]

6) Older patients were more likely to have long-term symptoms.

7) Older patients were more likely to have progressive degenerative changes.

8) “The incidence of recovery from symptoms was significantly higher in men than in women.”

9) “The duration of symptoms bore no relation to the amount of [vehicle] damage.” [Very Important]

10) Degenerative changes developed in 64% of those who had lost consciousness.

11) “Radiating pain or numbness in the upper extremities showed a significant positive correlation with a bad prognosis for symptomatic recovery.” [Very Important]
12) “Symptoms lasted for an average of 21 months in patients with no late degenerative changes and for an average of 30 months in those whom degenerative changes developed.” **[Very Important: it indicates that typical whiplash-injured patients do not recover in a period of weeks, but over a period of many months to a few years.]**

13) Vehicle property damage was not able to predict those who would have symptomatic recovery within 2 months vs. those who had symptoms persisting for 65 months. **[Very Important]**

14) There is a significantly higher incidence of degenerative changes in the patients who have a sharp reversal of the normal cervical curve. **[Important]**

15) “Restricted motion at one intervertebral level [on flexion-extension x-rays] tended to have a poorer symptomatic recovery and a considerably increased incidence of degenerative changes” compared to the patients without restriction of motion. **[Again, this underscores the importance of performing flexion-extension x-rays and evaluating them for segmental motion.]**

16) This study shows a significant correlation between long-term use of a cervical collar, the persistence of symptoms, and the development of degenerative changes. **[Very Important]**

17) Settlement of legal claims did not eliminate symptoms: 62 % of those who had settled legal claims after 18 months still had symptoms after 5 years; these long-term residual symptoms are “attributable to the original accident.”

18) Trauma is the “probably causative factor” of the much higher incidence of cervical spine degenerative disease as compared to studies of patients who never had a neck injury. **[Very Important]**

19) Numbness or pain in the upper extremity is associated with a significantly greater incidence of residual symptoms.

20) Sharp reversal of the cervical curve is associated with a higher incidence of degenerative changes.

21) “Loss of the normal lordosis is indicative of mechanical derangement of the posterior intervertebral joints.” **[Important, consistent with a subluxation]**

22) “Loss of lordosis is an important finding, it is an antalgic position, and it is a protective position to avoid further soft-tissue damage.”

23) “A sharp reversal of the curve after injury is a harbinger of degenerative change in 60% of patients.”

24) “Intervertebral disc degeneration often occurs without associated symptoms.”