



Introduction

The SI joint and the pelvis are adjacent to a fused segment after lumbar fusion surgery. SI joint pain has been regarded as a form of adjacent segment disease. Prior studies suggest increase stress to the SI joint and pelvis with lumbar fusion. The goal of the study is to evaluate whether the extent of lumbar instrumentation induces changes to lumbopelvic parameters.

Methods

Among 355 patients underwent lumbar fusions at our institution between fall 2010 to winter 2012, 80 patients met criteria for the study. Inclusion criteria included age > 18, appropriate imaging available (pre operative and post operative lateral films), fusion where the rostral extent is up to L1 and the caudal extent at most S1. Exclusion criteria included prior lumbar fusion, history of SI joint syndrome, inappropriate follow up (<1 year), fusion involving thoracic levels, and inadequate films (unable to visual appropriate anatomy). The patients were subdivided into groups based on extent of lumbar instrumentation. The patients were evaluated based on age, sex, diagnosis, lumbar lordosis (LL), pelvic incidence (PI), pelvic tilt (PT), and sacral slope (SS). The values were compared preoperatively among the groups, postoperatively among the groups, and preoperative vs postoperatively with the same group.

Results

There were no statistically significant differences between preoperative and postoperative lumbopelvic parameters among each fusion group.

Table 1: Patient Demographics

|   |                     |       |
|---|---------------------|-------|
| No. of patients                                 | 80                  | %     |
| Age, years, mean +/- standard deviation (range) | 57.9+/-11.5 (27-82) |       |
| Male gender                                     | 42                  | 52.5  |
| Average follow up (days)                        | 518                 |       |
| Diagnosis                                       |                     |       |
| Lumbar instability / stenosis                   | 41                  | 51.2  |
| Degenerative spondylolithesis                   | 27                  | 33.8  |
| Isthmic spondylolithesis                        | 5                   | 6.3   |
| Synovial cyst                                   | 4                   | 5.0   |
| Recurrent disc herniation                       | 3                   | 3.8   |
| Fusion level                                    |                     |       |
| L1-L2   | 0                   | 0     |
| L1-L3   | 0                   | 0     |
| L1-L4   | 1                   | 1.25  |
| L1-L5   | 1                   | 1.25  |
| L1-S1   | 0                   | 0     |
| L2-L3   | 0                   | 0     |
| L2-L4   | 0                   | 0     |
| L2-L5   | 3                   | 3.75  |
| L2-S1   | 1                   | 1.25  |
| L3-L4   | 1                   | 1.25  |
| L3-L5   | 9                   | 11.25 |
| L3-S1   | 17                  | 21.25 |
| L4-L5   | 12                  | 15    |
| L4-S1   | 28                  | 35    |
| L5-S1   | 7                   | 8.75  |

Table 2: Data

|    |         | L3-L5           | L3-S1           | L4-L5           | L4-S1           | L5-S1           |         |
|----|---------|-----------------|-----------------|-----------------|-----------------|-----------------|---------|
|    |         |                 |                 |                 |                 |                 | p value |
| LL | pre     | 48.93 +/- 15.29 | 49.33 +/- 17.91 | 41.48 +/- 13.35 | 49.12 +/- 13.78 | 49.40 +/- 15.37 | 0.60    |
|    | post    | 45.39 +/- 12.12 | 45.72 +/- 16.32 | 43.27 +/- 8.28  | 45.08 +/- 12.13 | 45.74 +/- 15.17 | 0.58    |
|    | p value | 0.59            | 0.54            | 0.70            | 0.25            | 0.66            |         |
| SS | pre     | 33.03 +/- 13.96 | 34.16 +/- 10.77 | 30.43 +/- 8.79  | 36.75 +/- 11.79 | 36.23 +/- 9.45  | 0.56    |
|    | post    | 37.63 +/- 12.60 | 33.25 +/- 11.10 | 34.02 +/- 9.27  | 35.62 +/- 10.09 | 37.30 +/- 10.65 | 0.82    |
|    | p value | 0.47            | 0.81            | 0.34            | 0.70            | 0.85            |         |
| PT | pre     | 28.86 +/- 14.11 | 18.79 +/- 9.79  | 25.27 +/- 10.09 | 16.84 +/- 10.00 | 23.89 +/- 8.33  | 0.017   |
|    | post    | 21.42 +/- 13.30 | 18.40 +/- 10.62 | 19.72 +/- 9.14  | 19.47 +/- 9.89  | 25.24 +/- 13.38 | 0.69    |
|    | p value | 0.27            | 0.06            | 0.69            | 0.33            | 0.82            |         |
| PI | pre     | 67.76 +/- 13.66 | 61.22 +/- 11.20 | 67.76 +/- 13.56 | 64.61 +/- 11.04 | 62.87 +/- 5.96  | 0.53    |
|    | post    | 66.26 +/- 11.93 | 59.65 +/- 8.50  | 63.93 +/- 11.15 | 66.39 +/- 11.89 | 67.27 +/- 10.42 | 0.31    |
|    | p value | 0.81            | 0.65            | 0.46            | 0.57            | 0.35            |         |

Conclusions

The results imply that the extent of instrumentation, including the involvement of the sacrum, may not alter lumbopelvic parameters. This appears to argue against the idea that longer fusion constructs induce more stress on the pelvis and SI joint.

Selected References

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