Subaxial Cervical Sagittal Alignment following C1-C2 Fusion for Atlanto-Axial Osteoarthritis

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Introduction: Few studies have evaluated the outcomes following C1-C2 fusion for atlanto-axial osteoarthritis (AAOA). Previous studies in rheumatoid arthritis (RA) patients with atlanto-axial instability have demonstrated unexpected development of subaxial kyphosis following C1-C2 fusion, however this complication in patients with AAOA remains unknown. Therefore, we set out to evaluate subaxial cervical sagittal alignment following C1-C2 fusion for AAOA.

Methods: We performed a retrospective review of all patients following C1-C2 fusion from a single center, single-surgeon from 2002-2012. All charts, records and imaging studies were reviewed for each case, and pre-operative, immediate post-operative and final follow-up plain films were evaluated. Patients were divided into 3 diagnostic categories for further comparison: AAOA, rheumatoid, and trauma.

Results: A total of 29 patients were included in the review, with an average radiographic follow-up of 38 months. There were 14 patients with AAOA, 4 patients with RA/gout (1 gout patient with C1-C2 pannus causing spinal cord compression), and 11 patients treated for a traumatic etiology. Overall we found patients with AAOA did not have a significant change in subaxial sagittal alignment from pre-op to final follow-up (-11.7 to -13.8 deg, p = 0.23, (- deg) = lordosis, (+deg) = kyphosis), which was similar in the trauma group (-9.7 to -8.4 deg, p = 0.47). This was comparable to the RA/gout group that demonstrated a significant change in sagittal alignment from -20.5 to -0.2 deg (p = 0.04).

Conclusion: Our study demonstrates patients with non-rheumatologic conditions, (AAOA and trauma), undergoing C1-C2 fusion, do not develop post-operative subaxial cervical kyphosis. We postulate the loss of subaxial lordosis in the rheumatologic patients may be a function of their underlying systemic disease.