# Does Preoperative Bone Mineral Density Impact Fusion Success in Anterior Cervical Spine Surgery? A prospective cohort study

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INTRODUCTION: The purpose of this study was to identify risk factors for pseudarthrosis in patients undergoing anterior cervical discectomy and fusion (ACDF) with a focus on the role of bone mineral density (BMD) on arthrodesis.
METHODS:
We retrospectively reviewed a prospectively collected database of patients undergoing 1-4 level ACDF for degenerative indications between 2012-2018 at a single institution. All patients were required to have undergone a preoperative dual-energy x-ray absorptiometry (DEXA) scan. Fusion status was assessed on computed tomography (CT) scans obtained 1 year postoperatively. Patients were divided into subgroups based upon fusion status and compared on the basis of demographic, BMD, and surgical variables to determine risk factors for pseudarthrosis.
RESULTS: We identified 79 patients for inclusion in this study. Fusion was achieved in 65 patients (82%), while 14 patients (18%) developed pseudarthrosis. The pseudarthrosis subgroup demonstrated significantly lower BMD than their counterparts who achieved successful fusion in both mean hip (-1.4 ± 1.2 vs -0.2 ± 1.2, respectively; P=0.002) and spine t-scores (-0.8 ± 1.8 vs 0.6 ± 1.9, respectively; P=0.02). The pseudarthrosis group had a substantially higher proportion of patients with osteopenia (57.1 vs 20.0%) and osteoporosis (21.5 vs 6.2%; P<0.001) than the fusion group. Multivariate analysis demonstrated osteopenia (OR 8.76, P=0.04), osteoporosis (OR 9.97, P=0.03), and low BMD (OR 11.01, P=0.002) to be associated with an increased likelihood of developing pseudarthrosis.
DISCUSSION AND CONCLUSION: The results of this study suggest that both osteopenia and osteoporosis are associated with increased rates of pseudarthrosis in patients undergoing elective ACDF.