

Supplement 1. Patient cohort construction with defined clinical phenotyping and exclusion criteria. ICD-9/10, International Classification of Diseases 9th or 10th version; CPT, Current Procedural Terminology; ACDF, anterior cervical discectomy and fusion.

Supplement 2. Top 10 principal admitting diagnoses for patients with biomechanical cage anterior cervical discectomy and fusion implants

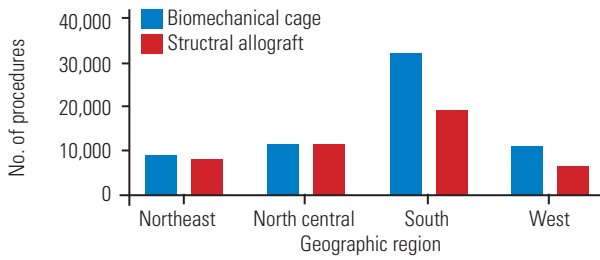
Principal diagnosis code (ICD-9 or ICD-10)	No. of patients	Definition
722.0	21,479	Displacement of cervical intervertebral disc without myelopathy
721.0	9,930	Cervical spondylosis without myelopathy
722.71	7,804	Intervertebral disc disorder with myelopathy, cervical region
721.1	7,990	Cervical spondylosis with myelopathy
722.4	5,985	Degeneration of cervical intervertebral disc
723.0	4,696	Spinal stenosis in cervical region
M48.02	1,319	Spinal stenosis, cervical region
M47.22	745	Other spondylosis with radiculopathy, cervical region.
M47.12	713	Other spondylosis with myelopathy, cervical region
M50.02	523	Cervical disc disorder with myelopathy, mid-cervical region
Total	61,184	

ICD-9/10, International Classification of Diseases 9th or 10th version.

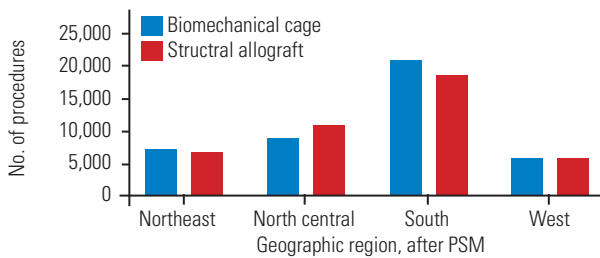
Supplement 3. Top 10 principal admitting diagnoses for patients with structural allograft anterior cervical discectomy and fusion implants

Principal diagnosis code(ICD-9 or ICD-10)	No. of patients	Definition
722.0	17,407	Displacement of cervical intervertebral disc without myelopathy
721.0	7,623	Cervical spondylosis without myelopathy
722.71	5,156	Intervertebral disc disorder with myelopathy, cervical region
721.1	5,334	Cervical spondylosis with myelopathy
722.4	3,443	Degeneration of cervical intervertebral disc
723.0	3,503	Spinal stenosis in cervical region
M48.02	504	Spinal stenosis, cervical region
M47.12	290	Other spondylosis with myelopathy, cervical region
M47.22	238	Other spondylosis with radiculopathy, cervical region.
722.91	200	Other and unspecified disc disorder, cervical region
Total	43,698	

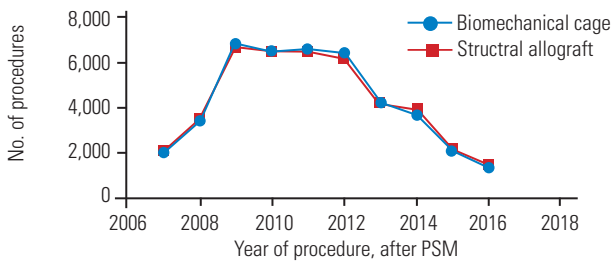
ICD-9/10, International Classification of Diseases 9th or 10th version.



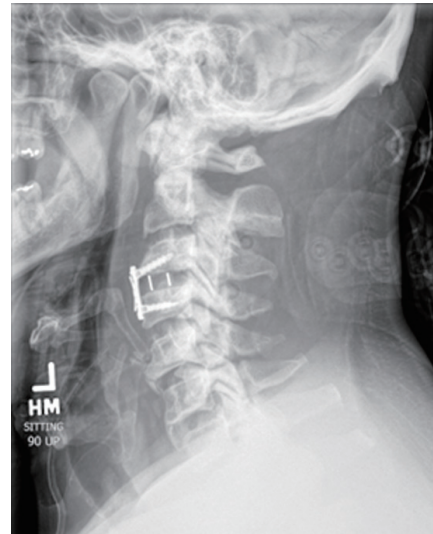
Supplement 4. Cage vs. allograft procedures by geographic region.



Supplement 5. Cage vs. allograft procedures by geographic region after propensity-score matching (PSM).



Supplement 6. Cage vs. allograft procedures by year of procedure after propensity-score matching (PSM).



(A) Biomechanical cage ACDF



(B) Structural allograft ACDF

Supplement 7, ACDF Procedure description. (A, B) Anterior cervical discectomy and fusion (ACDF) procedures take an anterior surgical approach, using commonly a horizontal incision or vertical for cases involving multiple levels. The Smith and Robinson exposure, a relatively small opening, is commonly used to allow multiple-level intervention with minimization of neurologic complications. Under fluoroscopic guidance, the entire disc is removed and cartilage endplates on vertebrae are removed to expose the cortical bone. Next, decompression usually involves the removal of the posterior longitudinal ligament to eliminate additional disc material and partial or full removal of the uncinate processes and any osteophytes. Finally, fusion involves the insertion of a graft or cage into the evacuated disc space; often, to encourage fusion as well as increase stability, an anterior plate is attached to the spine by screws into each vertebral bone.