AVS® Anchor-C Cervical Cage System
Biomechanical Review

- Locking Mechanism Performance
- Expulsion Performance
- Fatigue Torsion
- Fatigue Axial Compression
System Overview

AVS® Anchor-C is an interbody fusion device with internal screw fixation and is intended to be used in anterior cervical discectomy and fusion procedures.

This system integrates a hollow PEEK cage with a titanium screw locking mechanism and is designed to aid in cervical interbody fusion. A tantalum marker is embedded into the cage to help visually confirm the posterior position under fluoroscopy.

The integrated design allows for rigid screw fixation without any added anterior profile. AVS® Anchor-C screws feature an outer clip which engages the titanium face plate on the cage. The interbody device is offered in a variety of lengths, heights and lordotic angles.

Biomechanical Testing

The AVS® Anchor-C Cervical Cage System promotes stability to the cervical spine during fusion by integrating a hollow PEEK cage with a titanium screw clip locking mechanism. The system allows for rigid screw fixation without any added anterior profile. The AVS® Anchor-C Cervical Cage System was shown to be mechanically sound in a series of biomechanical tests designed to challenge the structural integrity of the system. Biomechanical tests included locking mechanism performance, expulsion performance, fatigue torsion, and fatigue axial compression and were conducted in accordance with the applicable American Society for Testing and Materials (ASTM) standards.

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1. Methods:

Static push-through testing was used to assess the assembly strength of the AVS® Anchor-C Cervical Cage System locking mechanism. The push-through strength is measured as the load needed to force the screw to disengage from the cage (set-up shown in Figure 1). Bone screws were assembled and locked into each cage. The cage was inserted into a testing fixture and a compressive load was applied along the longitudinal axis of each bone screw.

2. Results* (Figure 2):

- The AVS® Anchor-C Cervical Cage System utilizes the AVS® Anchor-C bone screws. These screws are locked into the cage by means of a locking clip located on the screw. To verify the locking mechanism performance, the AVS® Anchor-C locking mechanism was compared to the Integra Tether™ plate system, where the screws are locked by similar means as the AVS® Anchor-C Cervical Cage System.
- Values were normalized to the worst case construct, denoted by 100%.
- The AVS® Anchor-C Cervical Cage System was 37% stronger in push-through strength than the Integra Tether™ plate locking mechanism.

3. Conclusion:

The AVS® Anchor-C Cervical Cage System provided higher resistance to screw back-out than the Integra Tether™ system.

*Data on file at Stryker Spine.
Expulsion Performance

1. Methods:

Static expulsion testing was used to assess the ability of the AVS® Anchor-C Cervical Cage System to resist anterior migration from the disc space. The expulsion strength was measured as the maximum load needed to displace the cage 3mm in the anterior direction in Grade 15 foam in accordance with ASTM F-04.25.02.02 (draft) (set-up shown in Figure 3).

2. Results* (Figure 4):

• The AVS® Anchor-C Cervical Cage System uses serrations on the superior and inferior surfaces of the cage to reduce migration of the cage. The AVS® Anchor-C screws have a cancellous thread geometry to promote optimal screw fixation within the vertebral body. The AVS® Anchor-C Cervical Cage was compared to a threaded stand-alone cage that relies on the outer thread geometry.
• Values were normalized to the worst case construct, denoted by 100%.
• The AVS® Anchor-C Cervical Cage System was 233% stronger in expulsion than the cage without screws and was 1% stronger than the threaded stand-alone cage.

3. Conclusion:

The AVS® Anchor-C Cervical Cage with screws inserted provided higher resistance to expulsion than the threaded stand-alone cage.

*Data on file at Stryker Spine.
1. Methods:

Fatigue torsion testing was used to assess the torsion strength of the AVS® Anchor-C Cervical Cage System under a torsional load in accordance with ASTM F2077-03 standard (set-up shown in Figure 5). The fatigue strength is the maximum torsional load that can be cyclically applied to an implant assembly for 5 million cycles without failure (5 million cycles represents approximately 2.5 years of human activity as denoted by ASTM F2077-03).

2. Results* (Figure 6):

• All values were normalized to the maximum torsional load cyclically applied without failure, denoted by 100%.
• The AVS® Anchor-C Cervical Cage System was equivalent in fatigue torsion to the competitive 3-screw stand-alone cage.

3. Conclusion:

Even though the competitive stand-alone device has an additional screw for fixation, the fatigue torsion run-out load for the AVS® Anchor-C Cervical Cage System was equivalent to the competitive 3-screw stand-alone cage.

*Data on file at Stryker Spine.
Fatigue Axial Compression

1. Methods:

Fatigue axial compression testing was used to assess the compressive strength of the AVS® Anchor-C Cervical Cage System under a compressive load in accordance with ASTM F2077-03 standard (set-up shown in Figure 7). The fatigue strength is the maximum load that can be cyclically applied to an implant assembly for 5 million cycles without failure (5 million cycles without failure (which represents approximately 2.5 years of human activity).

2. Results* (Figure 8):

• All values were normalized to the worst case construct (competitive 3-screw stand-alone cage), denoted by 100%.
• The AVS® Anchor-C Cervical Cage System was 75% stronger in fatigue axial compression than the competitive 3-screw stand-alone cage.

3. Conclusion:

The fatigue run-out load for the AVS® Anchor-C Cervical Cage System was greater than the run-out load for the competitive 3-screw stand-alone cage.

*Data on file at Stryker Spine.
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