ELASTICALLY DEFORMABLE CERVICAL PLATE PROMOTES RAPID ROBUST BONE FUSION

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• Darryl J. DiRisio is a co-founder and equity holder (30%) in ReVivo Medical LLC
Introduction

• Anterior cervical discectomy & fusion (ACDF) is intended to stabilize the spine for bone formation.
• Load-sharing between the plate & interbody space is conducive to bone formation.
• Dynamic plates only load-share over a limited range before they “top out” or “bottom out” and act like static plates.
• Controlled continuous load-sharing can be achieved by elastic micro-motion.
• We evaluated an elastically deformable anterior cervical plate for promoting interbody fusion.
Methods

- 14 Alpine-Nubian goats (Noble Life Sciences).
- ACDF with interbody cage & graft.
  - Local autograft in PEEK cage.
- \( n=8 \) Elastically deformable plate (ReVivo Medical).
- \( n=6 \) Dynamic plate (DePuy-Synthes).
- CT scans at 8, 12 weeks.
  - Fusion status, bone formation, bridging bone.
- Undecalcified histology at 14, 18 weeks (Alizee Histo).
  - Bone fraction in interbody

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At 8 & 12 weeks, CT scans demonstrated that elastically deformable plates had **superior fusion**.

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• At 8 & 12 weeks, CT scans demonstrated that elastically deformable plates had superior bony bridging.
Results - Histology

• At 14 weeks, all elastically deformable levels demonstrated superior bone formation relative to all translationally dynamic levels via histology.

• Bone volume fraction was significantly higher in elastically deformable levels relative to translationally dynamic levels via histology.
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![Zones With Bridging Bone](chart.png)
Results from this study demonstrate that improved load-sharing through elastic micro-motion accelerates bone formation and interbody fusion.

This is significant as enhanced bone formation may lead to higher fusion rates in challenging patient populations such as smokers, diabetics, and those with osteoporosis.

While optimal implant stiffness is not known, results demonstrate that the elastically deformable implant promoted superior early bone formation and fusion in the challenging goat ACDF model.
Summary

• Load-sharing through elastic micro-motion accelerates bone formation in the challenging goat ACDF model.
• The elastically deformable cervical plate used in this study may promote early bony bridging and increased rates of fusion.

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