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BIOMECHANICAL STUDY SUMMARY

Indirect Decompression and Vertebral Body Endplate Strength after Lateral Interbody Spacer Impaction: Cadaveric and Foam-Block Models

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OBJECTIVE: The primary aim of this study was to determine whether implant trialing and impaction of a static lateral spacer results in reduced endplate strength compared to that achieved by insertion of a CALIBER®-L expandable lateral spacer.

METHOD: Using a cadaveric biomechanical and foam-block vertebral model, researchers compared vertebral body endplate strength and distraction potential between static and CALIBER®-L expandable spacer groups. Fourteen lumbar motion segments (seven L2-3 and seven L4-5 specimens) were distributed evenly between static and CALIBER®-L expandable spacer groups. In each specimen, discectomy was followed by trialing and spacer impaction. Motion segments were axially sectioned through the disc, and a metal stamp was used to apply a compressive load to superior and inferior vertebral bodies to quantify endplate strength. A paired, 2-sample for means t-test was performed to determine statistically significant differences between groups ($P \leq 0.05$). A foam-block endplate model was used to control simulated disc tension when a spacer with 2mm and 3mm desired distraction was inserted. One-way ANOVA and a *post hoc* Student Newman-Keuls test were performed ($P \leq 0.05$) to determine differences in distraction.

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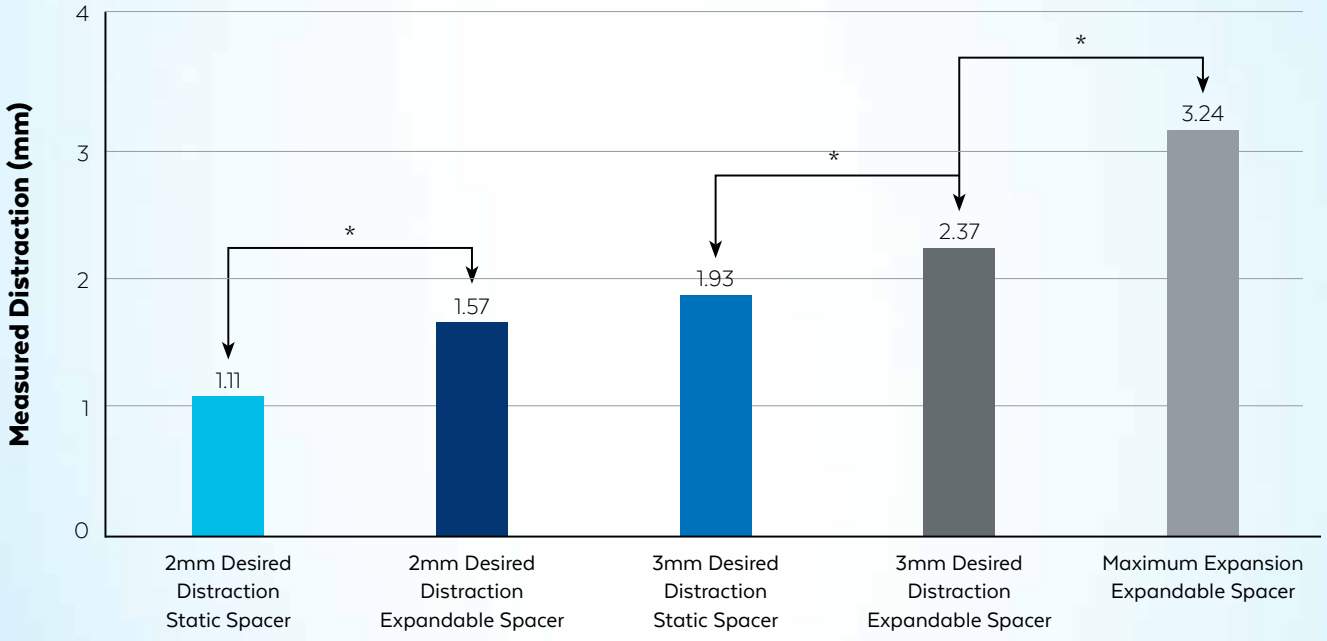
RESULTS:

- Both static and CALIBER®-L expandable spacers restored neural foraminal and disc height to intact levels, after discectomy and device implantation (P > 0.05)
- Maximum peak loads at endplate failure for static and CALIBER®-L expandable spacers were 1764N (± 966N) and 2284N (± 949N), respectively ($P \leq 0.05$).
- CALIBER®-L expandable spacers consistently produced greater desired distraction than that created by the static spacers in the foam-block model ($P \leq 0.05$).
- Distraction created by fully expanded CALIBER®-L expandable spacers was significantly greater than the predetermined goals of 2mm and 3mm ($P \leq 0.05$).



Measured versus desired distraction of static and CALIBER®-L expandable spacers at 240N resistance. *$P \leq 0.05$.

CONCLUSION: This biomechanical study showed that the increased trialing required for a static spacer may lead to additional iatrogenic endplate damage, resulting in less distraction and increased propensity for postoperative implant subsidence secondary to endplate disruption.

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