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Alternative Method for Posterior Lumbar Discectomy and Development of Associated Bench Top Test

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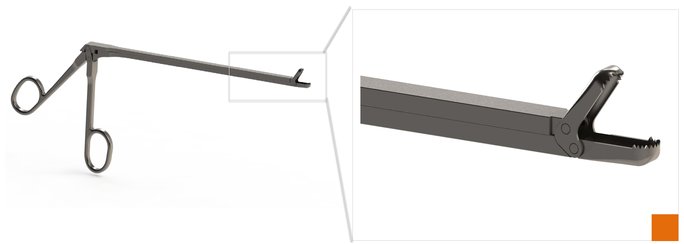
Posterior Lumbar Discectomy

Discectomy procedures are performed to remove the fibrous disc material between adjacent vertebrae in the spine, known as vertebral disc. The disc is removed, an implant is introduced, and the vertebral end plates are scraped to promote bone growth and fusion to implants. The purpose for an alternative method for posterior lumbar discectomy is to reduce the surgery time from three hours, while increasing the effectiveness of disc removal and improving patient safety.

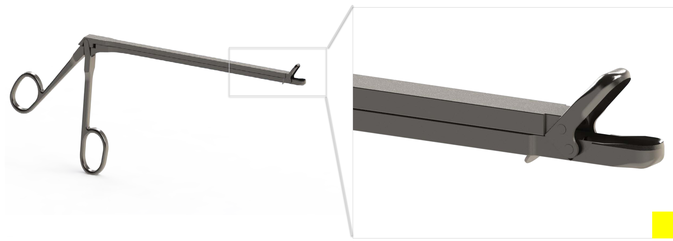
Aspirated Rongeur

The development of an aspirated rongeur allows for a faster surgery time while improving the degree of safety by reducing the number of entries into the body. This is accomplished through development of instrumentation which incorporates an aspiration tube at the proximal end supplying vacuum pressure, aiding in the removal of disc material.

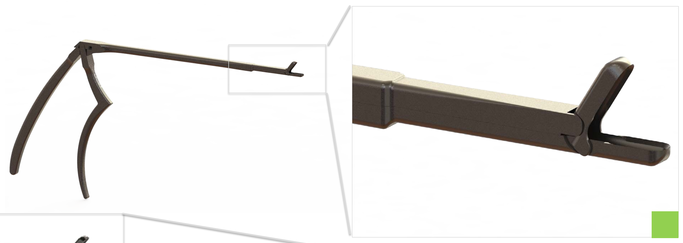
Instrument Progression



Revision 1
- Based on industry standard
- Added 5mm cannulation
- Modified hinges to accommodate cannulation



Revision 2
- Increased diameter of cannulation.
- Step down added at distil tip
- Teeth replaced with overbite
- Suction blocking apparatus added to upper mandible

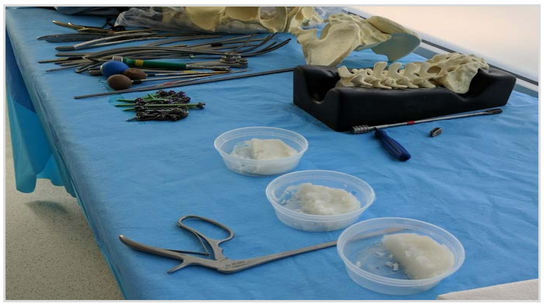


Revision 3
- Modified handle for pistol grip.
- Decreased instrument footprint
- Removed overbite
- Increased tolerance for manufacturing

Revision 4
- Increased cannulation diameter
- Decreased mandible width
- Added internal lip to cannulation
- Modified tolerance for manufacturing

Synthetic Disc

The synthetic disc material contains a mixture of Silicone, Carbonic Acid Monosodium Salt, and vegetable oil. This mixture creates a fibrous and grainy membrane which replicates a human disc



Bench Top Testing

The purpose of a bench top testing is to recreate patient disc anatomy without requiring access to expensive and single-use cadavers. This allows for the test of new medical devices while in the prototype stage of development.

VCU School of Engineering

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