

# **Clinical Evaluation of Suture-Based Herniated Disc Repair Following Lumbar Microdiscectomy**

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# Disclosures

- I, **Dr. George Van Huffmon**, declare that in the past 12 months:
- I have received consulting fees from the following companies
  - Anchor Orthopedics XT Inc. in the last year dollar range of \$0.01-\$1,000
  - Medtronic in the dollar range of \$1,000-\$10,000

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## INTRODUCTION

- Lumbar microdiscectomy involves the resection of intervertebral disc material in order to alleviate nerve root pressure for patients suffering from radicular leg pain with or without motor and/or sensory deficit.
- Despite significant symptomatic pain relief following this procedure, recurrent disc herniation is reported in up to 18% of patients, and is a significant source of persistent pain and repeat surgery.<sup>1</sup>
- Herniated disc repair has been proposed as a means of reducing the rate of recurrent disc herniation.<sup>2</sup>
- The purpose of the current study was to examine and report on the clinical feasibility of integrating suture-based herniated disc repair.



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## METHODS

- Patients undergoing microdiscectomy at a single centre, between 29-Jan-2018 and 05-Sep-2018, were considered for herniated disc repair.
- A pre-operative assessment was made to exclude discs under 4mm of height.
- An intra-operative assessment of annular tissue and instrument access was made following index procedure.
- If the defect was deemed repairable, suture-based repair was attempted.
- The suture was comprised of non-absorbable ultra-high molecular weight polyethylene suture and was delivered using a single-use delivery device.
- Post-operative follow-up was completed at eight weeks to assess for reherniation symptoms and other surgical complications.

[1] McGirt, M. J., et al. "A prospective cohort study of close interval computed tomography and magnetic resonance imaging after primary lumbar discectomy: factors associated with recurrent disc herniation and disc height loss." *Spine* 34.19 (2009): 2044-2051.

[2] Bateman, A. H., et al. "Closure of the annulus fibrosus of the intervertebral disc using a novel suture application device—in vivo porcine and ex vivo biomechanical evaluation." *The Spine Journal* 16.7 (2016): 889-895.

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## RESULTS

- Thirteen microdiscectomy patients were considered for suture-based herniated disc repair.
- Of the 13 patients considered, intra-operative assessment revealed 9 patients to have repairable annulus fibrosus defects.
- All 9 patients, aged  $41 \pm 11$  years, received successful suture-based repair of the annulus fibrosus.
- Herniated disc repair was not attempted if there was insufficient competency of the annulus fibrosus tissue or inaccessibility of the defect margins.
- There were no signs of surgical complications, nerve root irritation, or reherniation during standard eight week surgical follow-up time.

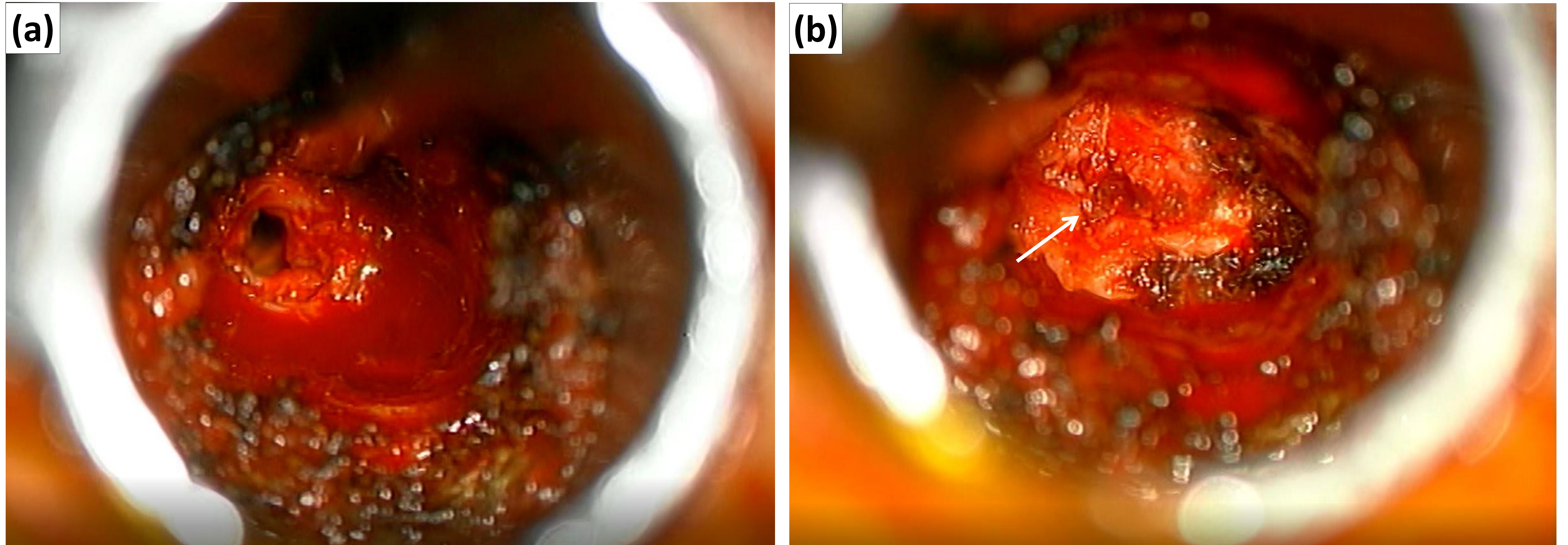


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**Figure 1:** An open (a) and repaired (b) annulus fibrosus defect in the lumbar spine.



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**Table 1:** Patient and Herniation Characteristics of Patients Considered for Herniated Disc Repair

Patient	Repair Attempted	Sex	Level of Spine	Herniation Location	Tissue Quality	Successful Repair
1	X	M	L4/L5	Medial	Poor, calcified disc fragments	X
2	X	M	L5/S1	Lateral	Poor, inadequate disc height	X
3	✓	M	L4/L5	Lateral	Good	✓
4	✓	F	L5/S1	Lateral	Good	✓
5	✓	F	L5/S1	Lateral	Good	✓
6	✓	M	L5/S1	Lateral	Good	✓
7	✓	F	L5/S1	Lateral	Good	✓
8	✓	M	L4/L5	Lateral	Good	✓
9	✓	F	L2/L3	Lateral	Good	✓
10	X	F	L4/L5	Lateral	Unknown	X
11	✓	Unknown	Unknown	Unknown	Unknown	✓
12	✓	Unknown	Unknown	Unknown	Unknown	✓
13	X	Unknown	Unknown	Unknown	Unknown	X

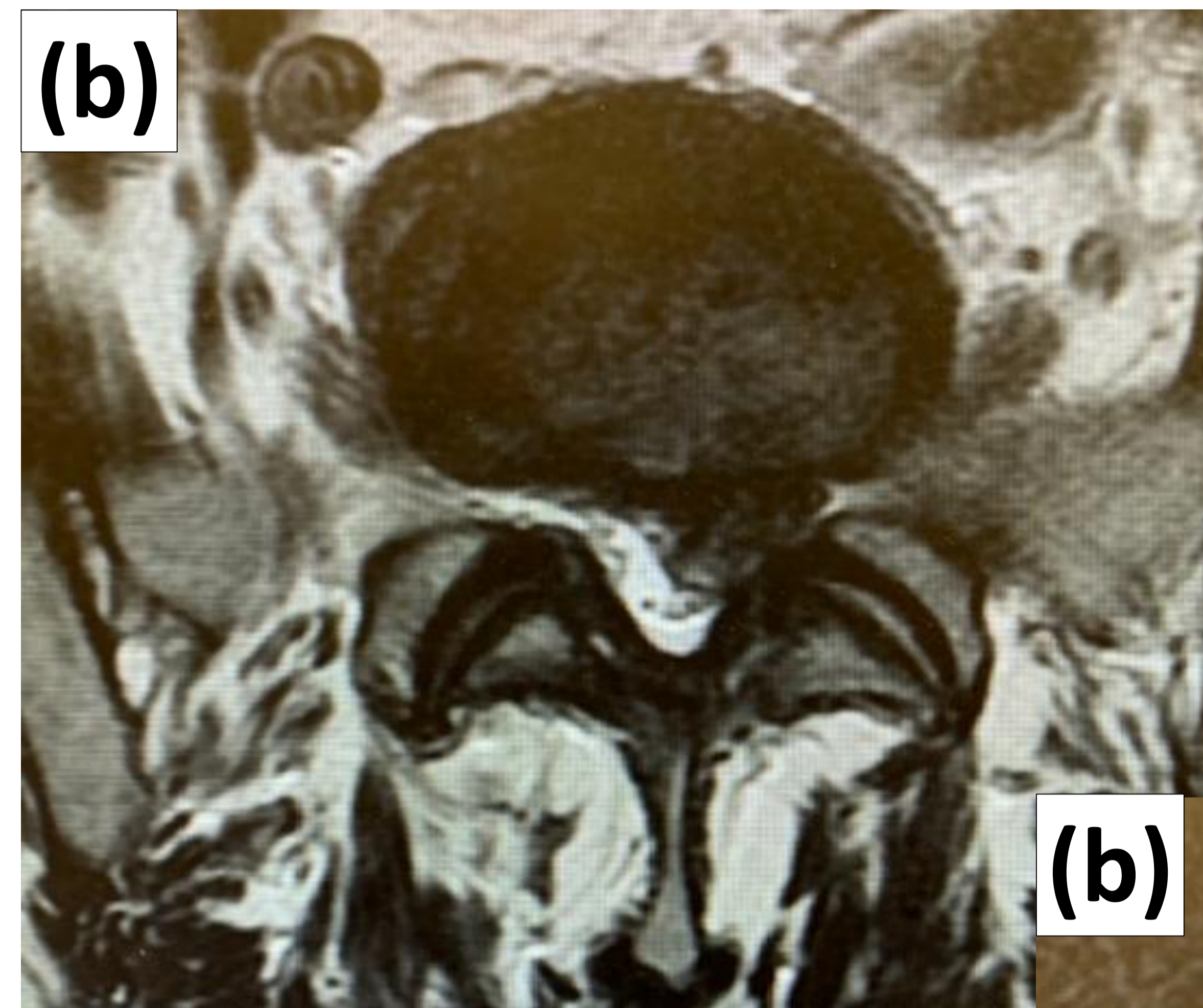


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**Figure 2:** To the left, the sagittal (a) and axial (b) MRIs for patient 2. Repair was not attempted due to inadequate annulus tissue at L5/S1.



**Figure 3:** To the right, the preoperative axial (a) and sagittal (b) MRIs for patient 5. Successful herniated disc repair was achieved at L5/S1.



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## DISCUSSION

- Herniated disc repair after microdiscectomy is a straightforward addition to the procedure.
- Satisfactory herniated disc repair was achieved in all attempted patients.
- The technique is not difficult and may improve outcomes in an already successful procedure.
- Although this device can address a variety of annular tissue quality, very large defects in the annulus are more difficult to repair.
- Defects with little annular cuff or only posterior longitudinal ligament are less amenable to successful repair.
- Further study is required to assess the broader applicability of herniated disc repair, and the potential impact on the rates of recurrent herniation and revision surgery.



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## SUMMARY

- Microdiscectomy patients at a single centre, between 29-Jan-2018 and 05-Sep-2018, were considered for herniated disc repair.
- Of the 13 patients considered, intra-operative assessment revealed 9 patients to have repairable defects.
- All 9 patients received successful herniated disc repair.
- There were no signs of surgical complications, nerve root irritation, or reherniation during standard eight week surgical follow-up time.
- Annulus tissue competency and instrument access appear to be key elements of intraoperative patient selection.

