

Chronic Lower Back Pain in a Snowboard Cross World Champion

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Introduction

Lumbar disc degeneration is one of the leading causes of chronic lower back pain. The degenerative cascade is often initiated by an imbalance between catabolic and anabolic processes in the intervertebral discs. Due to the extracellular matrix degradation, innervation and neovascularization of the inner annular lamellae occur.

Ultimately, the degenerative process results in disc bulging and loss of nucleus pulposus water content and subsequent loss of disc height. Most patients respond to conservative management, yet a significant number of patients continue to suffer from chronic low back pain.

Due to the high prevalence of long-term discogenic pain, regenerative biological therapies have attracted significant attention considering their potential to directly address the degenerative process.

Written consent was obtained from this patient to publish his medical records and upload his spinal intervention images.

Case Report

The patient is an elite athlete (Snowboard Cross World Champion in 2021), with a strong physical physique, muscular and in very good physical condition. However, for years he has suffered recurrent episodes of non-irradiated low back pain of mixed characteristics (discogenic and facet joint) which represents a burden on his daily life and sports career.

Author

The author declares no conflict of interest.

Physical Examination

The physical examination was unremarkable but, nevertheless, the 2022 MRI exhibits discopathy at L4-5 and L5-S1 with disc protrusions in both segments. Additionally, there were two annular fissures (tear of the annulus fibrosus with *High Intensity Zone* on T2 signal), mild facet hypertrophy L4-5 and L5-S1 bilaterally without conditioning narrowing of the lateral recesses.

Given that this represented an incipient chronic degenerative process, surgical treatment was discouraged but instead regenerative treatment with mesenchymal stem cells (MSC) was highly recommended.

Procedural Review

With the patient placed in the prone position, under monitored anesthesia care, the optimal radiological window for harvesting the iliac crest with Marrow Cellution (MC) was determined. For this purpose, the route described by Schildhauer was implemented. This researcher determined that the “posterior superior iliac spine–anterior inferior iliac spine” path had the largest bony canal lengths, which permitted trans-iliac screws to be placed under fluoroscopic control using standard lateral and obturator oblique-outlet projections, the latter presenting a stereotypical “teardrop” figure above the acetabulum. In this specific case, the C-arm was obliqued 25° contralaterally and 30° in cranial Ferguson projection (outlet view) until the posterior-superior iliac spine and the anterior-inferior spine overlapped one another.

After thoroughly infiltrating ropivacaine 0.5% in the skin, the subcutaneous tissue and the surrounding periosteum, the MC cannula was inserted into the iliac crest (Tuberosity), following the previously determined radiological pathway. A clear-cut contour of “teardrop” along with the MC needle and its blunt cannula assembled can be seen in Fig. 1.



Fig: 1

Image shows MC within Marrow Cavity with Blunt Cannula Inserted.

MC was navigated in a coaxial projection monitoring its depth and correct location above the sciatic notch (Fig. 2).

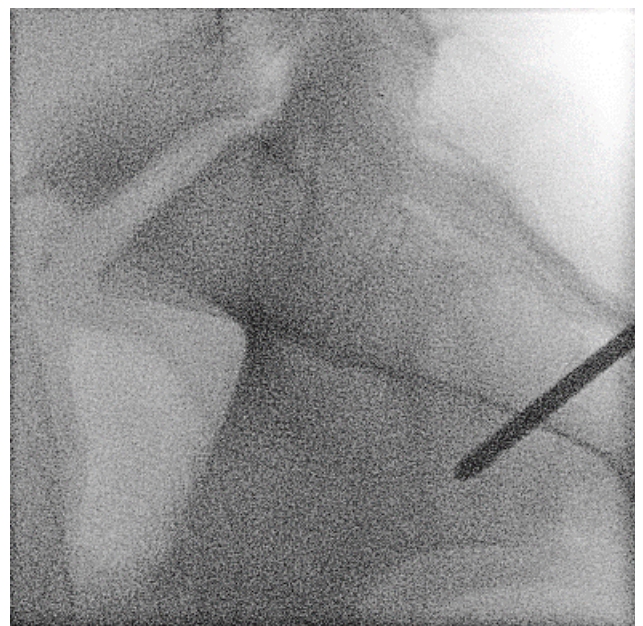


Fig: 2

Fluro image Confirming Projection Pathway.

In this circumstance, the entire length of the cannula portion of the MC device (9 cm) was introduced into the bone marrow thickness allowing for the collection of 18 ml of fresh MSCs to be obtained for immediate infiltration in the corresponding anatomical target zones (Fig. 3).

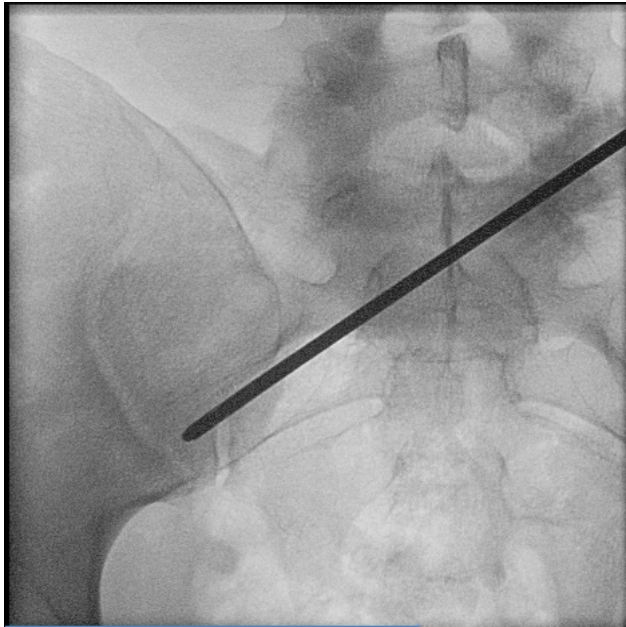


Fig: 3

Fluro image of MC Cannula Fully Deployed.

Intradiscal Bone marrow Aspirate (BMA) Harvesting

25G (4 11/16 in) and 22G (7 in) BD Quincke bevel needles were inserted into the nuclei pulposus of the L4-5 and L5-S1 discs, respectively.

L4-5 Discography:

0.3 ml of non-ionic contrast diluted with ropivacaine 0.25% was injected and a standard nucleogram (Cotton Ball) with no leakage to the epidural space imaged (Fig. 4),

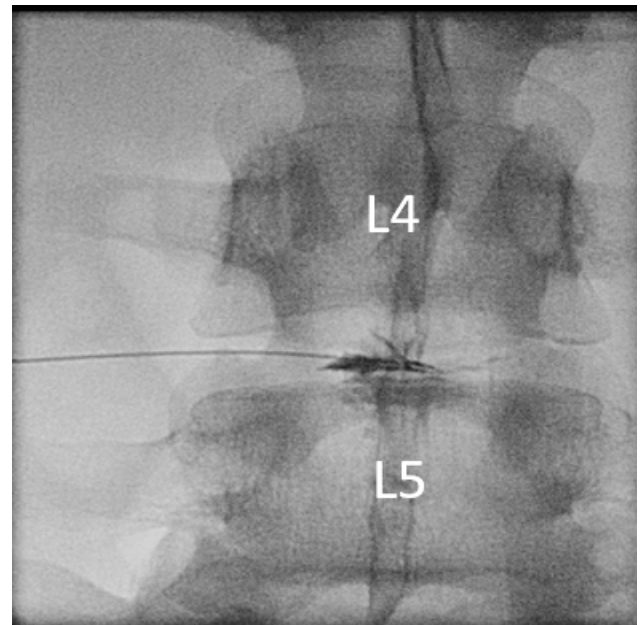


Fig: 4

L4/L5 Discography (Cotton Ball Nucleogram)

L5-S1 Discography:

The L5-S1 approach requires prior insertion of an introducer (18G x 3 1/2 in), which is placed up to the anterior aspect of the SAP of S1, and subsequently the 7-in needle is deployed. A pre-curved specific angle is determined by evaluating the L5-S1 axial MRI slice of every patient (Fig. 5)

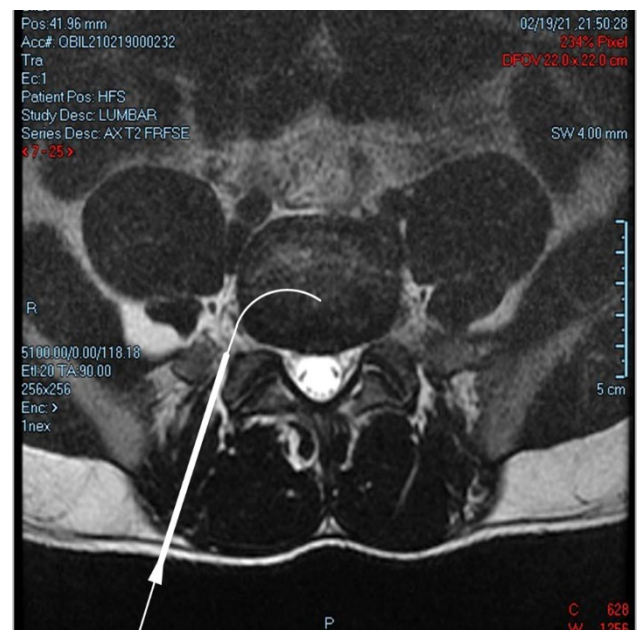


Fig: 5

22G 7'' Curved Needle Deployed Through 18G Introducer Drawn on the Actual L5/S1 Axial MRI.

The same volume of dye was injected but, in this segment, degeneration of the disc was demonstrated with contrast extending throughout the surface of the disc (Fig. 6).

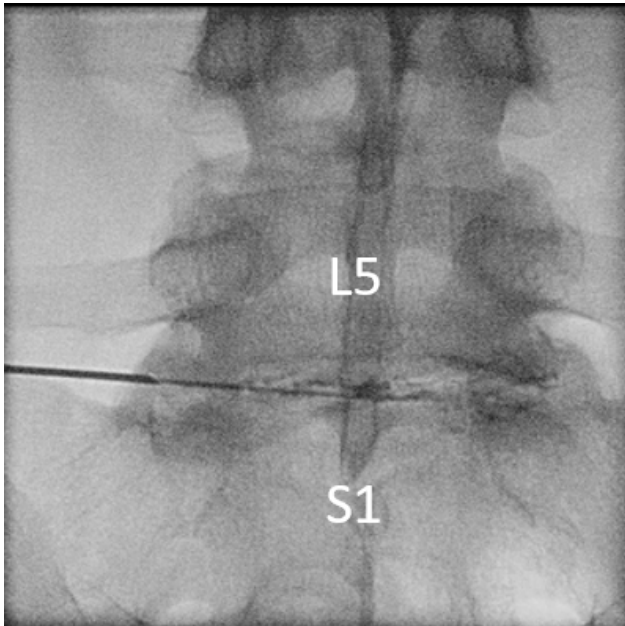


Fig: 6

L5/S1 Discography Revealing a Degenerated Disc

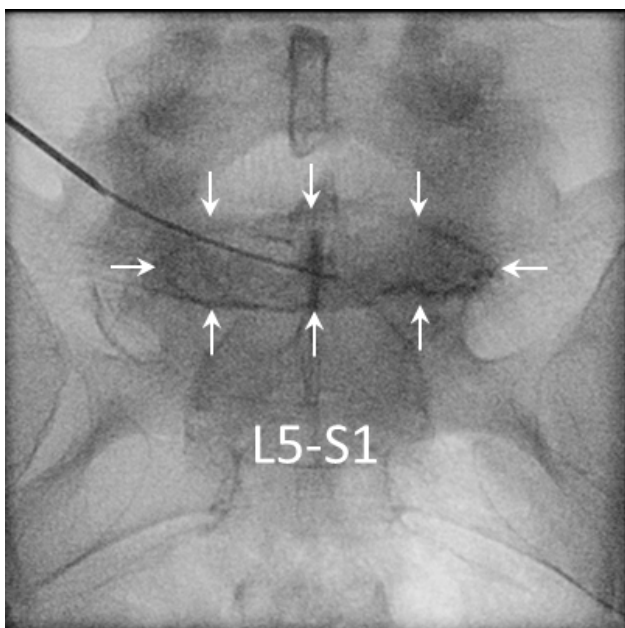


Fig: 7

*L5/S1 Disc Perimeter Visualized with 7" 22G
Needle Tip Located in Center of Target.*

3 ml of BMA (MSC's) were administered into each disc afterwards and the corresponding needles were withdrawn (Fig 7).

BMA (MSC) Administration into Facet Joints

Right and left zygapophyseal joints L4-5 and L5-S1 were then injected and correct arthrograms checked before injecting 1ml of MSC in each affected joint.

Epidural BMA (MSC) Administration

Finally, a fluoro-guided epidural block was performed via an L4-5 interlaminar approach and 8 ml of MSC obtained from the MC bone marrow aspirate were additionally infiltrated.

Evolution

Despite being a time-consuming task and a labor-intensive technique, the patient was discharged the very afternoon with only mild painkillers. Presumably, the treatment procedure including the utilization of fresh BMA obtained with MC will allow him to leave behind his persistent and annoying unspecific low back pain and, without a doubt, will help him to successfully crown future sporting challenges at the highest level.

At three months post procedure, the patient has resumed regular preparatory training for the upcoming 2022/23 snowboard competition season.

His lower back pain has not only substantially decreased over the past 3 months, it has been completely resolved. He is pain free and is looking forward to resuming full competitive activity as the winter season approaches.

References

1. Schildhauer TA, McCulloch P, Chapman JR, Mann FA. Anatomic and radiographic considerations for placement of transiliac screws in lumbopelvic fixations. *J Spinal Disord Tech.* 2002 Jun;15(3):199-205; discussion 205. doi: 10.1097/00024720-200206000-00005