

# Precision Rehabilitation following Restorative Neurostimulation Implantation for Multifidus Dysfunction

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## Background

- Chronic low back pain (CLBP) debilitates and burdens individuals with painful dysfunction and low quality of life<sup>1</sup>
- Mechanical CLBP** (not surgically amenable, without neuropathic pain) requires precise medical management of multifidus dysfunction with fatty infiltration (Fig 1)
- Restorative neurostimulation** shows durable and effective recovery of function and quality of life<sup>2,3</sup>
- Aim: Enhance multifidus dysfunction rehabilitation guidance for patients with restorative neurostimulation implantation**

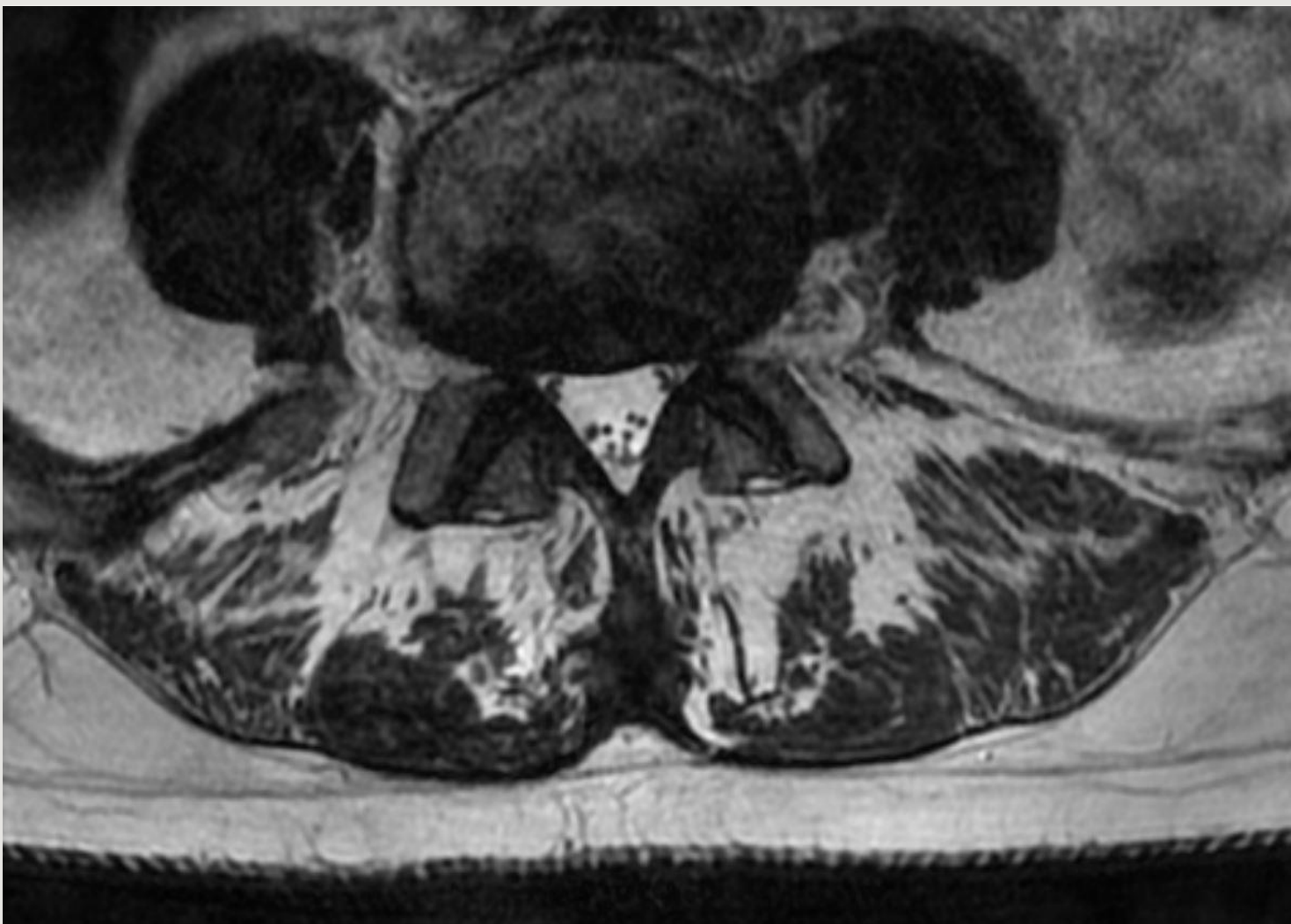


Fig 1. Axia view of T2-weighted MRI at L4L5 with fatty infiltration of multifidi and erector spinae

## Methods

- Inform on ideal patient selection** with patient-reported outcomes, clinical testing, imaging, and history
- Develop rehabilitation guidance consensus** from physicians and rehabilitation specialists with experience managing patients with CLBP and restorative neurostimulation

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- Chronic mechanical low back pain** that has failed optimal medical management may involve **multifidus dysfunction**
- Restorative neurostimulation implantation addresses multifidus dysfunction**, providing long-lasting pain and functional improvements
- Post-implant rehabilitation phases** target key milestones, provide synergy with implant for quality recovery from multifidus dysfunction

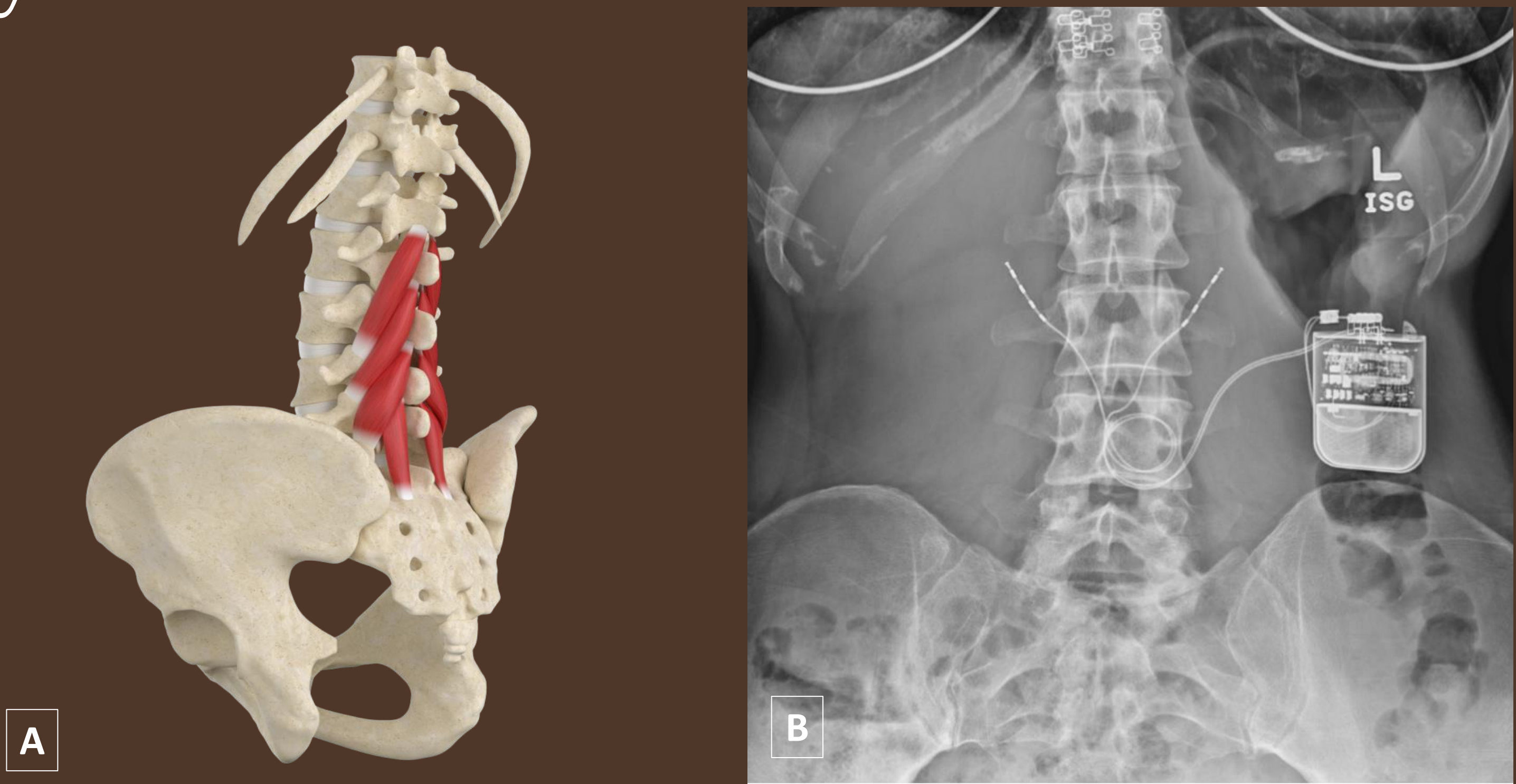


Fig 2. Multifidus muscle restoration in chronic low back pain. A) Model of lumbar intermediate multifidi; B) Restorative neurostimulation implant in place to stimulate L2 medial branch nerves of the dorsal rami

## Results

- Consensus highlights the approximate 6 weeks needed for leads and tissue scar formation. (Table 1)

**Table 1. Phases of Restorative Neurostimulation Rehabilitation**

| Phase                                   | Action                                                                                                                |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 0-2 Weeks post-op                       | Relative rest/ADLs/low intensity activity                                                                             |
| Activation Visit<br>2 weeks post-op     | Neurostimulation programmed (protocol: 2x30 min sessions/day) (Fig 2)                                                 |
| Initial Activation<br>2-6 weeks post op | Review protocol, reinforce quality lumbopelvic movement with all ADLs, steady increase of aerobic low impact activity |
| PT Phase 1<br>~2-6 weeks post op        | Restore lower chain joint mobility, diaphragmatic breathing, focused lumbopelvic motor control                        |
| PT Phase 2<br>~4-6 weeks post op        | Proficiency in functional lumbopelvic and lower chain movements with large and small motions                          |
| PT Phase 3<br>~6-8 weeks post op        | Functional capacity development, self-correction, proper intensity and training efficiency                            |

## Discussion

- Providing precision patient-centric medical management with a robust rehabilitation presence allows patient and neurostimulation device to gain quality synergy
- Targeted rehabilitation is a cornerstone to quality recovery

<sup>1</sup>Wu, A. *et al.* Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017. *Ann Transl Med.* (2020)  
<sup>2</sup>Gilligan, C. *et al.* An implantable restorative-neurostimulator for refractory mechanical chronic low back pain: a randomized sham-controlled clinical trial. *Pain.* (2021)  
<sup>3</sup>Gilligan C, *et al.* Three-Year Durability of Restorative Neurostimulation Effectiveness in Patients With Chronic Low Back Pain and Multifidus Muscle Dysfunction. *Neuromodulation.* (2023)