



C A S E S T U D Y

Lumbar Disc Herniation

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INTRODUCTION

The patient is a 52-year-old physical medicine and rehabilitation physician and ultramarathon runner. He had been in good health without previous back problems prior to an acute lifting injury resulting in an MRI confirmed L4-5 disc extrusion that completely effaced the right neural foramen. At the time of the injury, he was running 70-80 miles per week and cycling 25-50 miles per week in preparation for 50 km and 100 mile ultramarathon races 3-5 months later.

GOALS

- Maintain cardiovascular fitness and capacity to be competitive in ultramarathon races planned for 3-5 months after the injury
- Allow for healing of the disc injury

HISTORY / PROGRESSION (see *Progression Table*)

- Six days after the injury, while the runner was still having significant difficulty walking due to pain in the right low back and hip, he walked for 30 minutes at 50% body-weight support. He felt considerably better afterwards and had no increase in symptoms the following day.
- He initiated regular (almost daily) training on the AlterG the following day with workouts ranging from 1-3 hours. Workouts were initially performed at 50% body-weight, and addition of a 5% grade was used to further reduce impact forces. He progressed to 70-80% body-weight by day 12 post-injury. Each workout began with a 10-15 minute warm-up at walking speeds before progressing to running speeds. Running at 100% body-weight was difficult due to weakness of the right leg, but at 70-80% body-weight, he was able to increase the speed to levels allowing him to train at heart rates of over 150 beats per minute. Following each workout, his gait normalized and his pain and mood improved for hours.
- By day 15 post-injury, his back and hip pain had resolved completely. He ran 4 miles very slowly on the roads, experiencing no symptoms other than considerable weakness of the right leg.
- During the third week post- injury, the runner ran 27 miles on the AlterG in the first half of the week, and then progressed to a similar amount on trails and roads during the later part of the week. Most of the running on the AlterG was at 90% body-weight and no grade, and included some interval work with heart rates above 160 beats per minute. Unsupported running remained difficult due to continued, but improving, right leg weakness.

- During the fourth and fifth weeks post- injury, the runner ran 95 and 70 miles, respectively with about 24 miles each week on the AlterG at 85-90% body-weight and 3 trail runs of 20-28 miles. His right leg weakness continued to improve and the sensory loss resolved by the end of the fifth week.
- Six weeks after the injury, he underwent isokinetic strength testing of the knee extensors and flexors which showed a strength and power deficit of approximately 30% on the involved side. Despite the objective strength deficit, he was running comfortably on mountain trails and was back to his regular training schedule of at least 80 miles per week during the sixth week after the injury.

RESULTS

The runner improved upon his previous time and set a new age group course record in a 50-km trail run in 3.5 months after the injury and completed a 161-km trail run 5 months after the injury without symptoms.

Progression Table

Day or Week	Program Walking? Running? % Body Weight	Speed (mph)	Incline (%)	Time (minutes)	Frequency
Day 6 post-injury	Walking at 50% BW	2-3.5 mph	0%	30 minutes	
Day 7 post-injury	Running at 50% BW	Progressing up to 10 mph	0%	60 minutes	
Days 9-14 post-injury	Running at 50% and progressing to 80% BW	Ranging from 7-11.4 mph	0-5%	60-180 minutes	daily
Day 15 post-injury	Outdoor running			40 minutes	
Days 17-19 post-injury	Running at 90% BW	Ranging from 6-9.2 mph	0-5%	60-120 minutes	daily
Days 20-22 post-injury	Outdoor running			60-120 minutes	daily
Day 23 post-injury	Running at 87-90% BW	1 mile intervals to 9.6 mph	0%	70 minutes	
Day 24 post-injury	Outdoor running			6.75 hours	
>Day 24 post-injury	Resumed normal outdoor running training supplemented with AlterG workouts 1-2 times per week				