

Peripheral Nerve Stimulation for Chronic Knee Pain: Case Study

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INTRODUCTION

Osteoarthritic knee (OAK) pain is common, yet standard of care often yields unsatisfactory pain relief. There remains a role for novel treatment options. Percutaneous motor peripheral nerve stimulation (mPNS) of the knee is a novel minimally invasive procedure that stimulates motor end points leading to muscle contraction associated with the painful joint. Pain relief is hypothesized to be achieved through central pain modulation.

We report a case of an individual who experienced refractory osteoarthritic knee pain after 9 months of conservative care. The patient then received 7 weeks of mPNS treatment, and pain relief and activities of daily living outcomes were measured using Brief Pain Inventory-Short Form, Knee Injury and Osteoarthritis Outcome Score at 8- and 12-weeks post implant, and Patient Global Impression of Change.

RESEARCH QUESTION

Can motor peripheral nerve stimulation provide improvement in pain relief and activities of daily living in a patient with refractory knee pain due to grade 3 osteoarthritis

METHODS

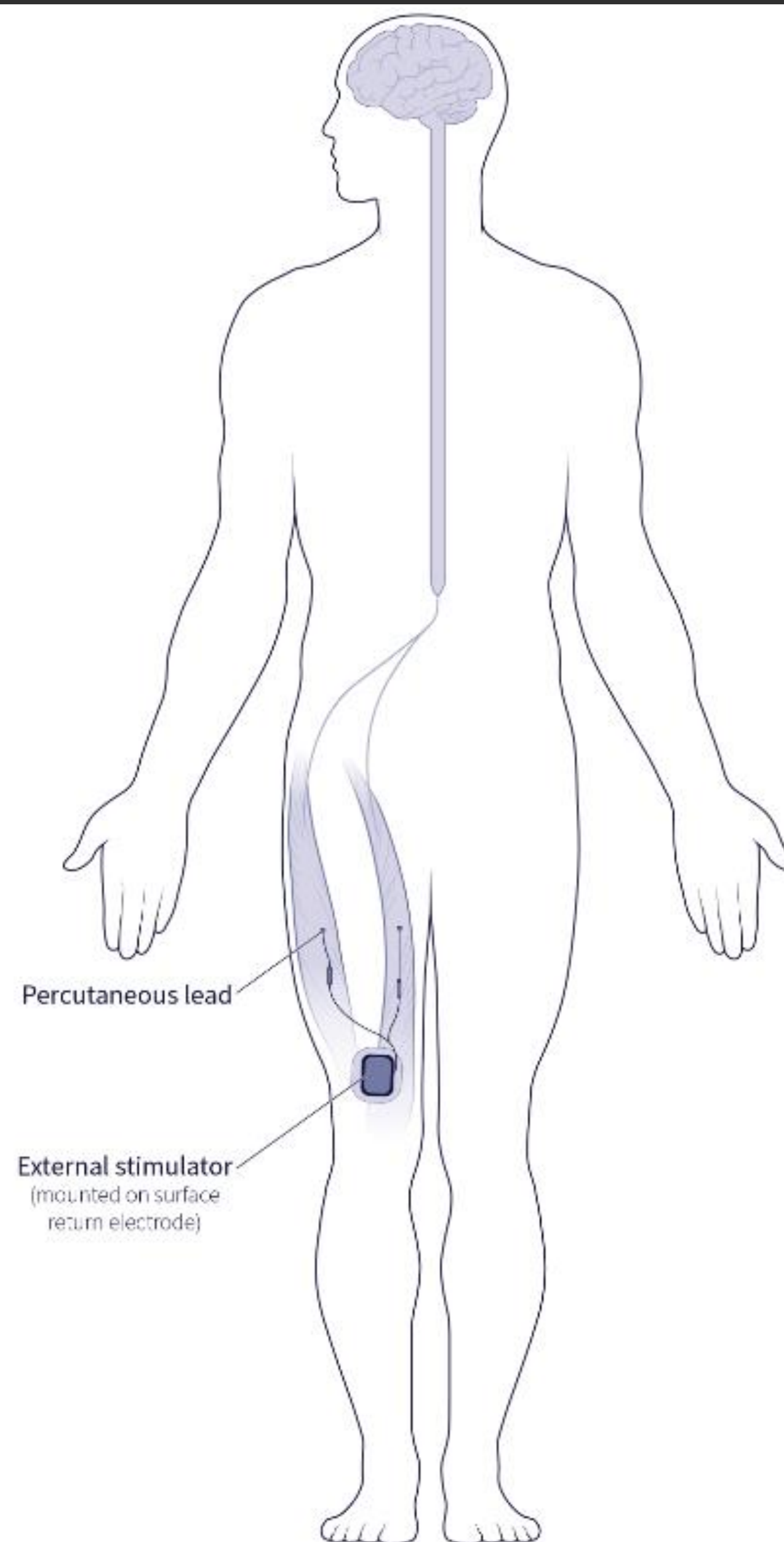


Illustration by Cleveland FES Center

Figure 1. Motor peripheral nerve stimulation was applied through percutaneous leads (SPRINT Extensa™, SPR Therapeutics, Inc., Cleveland, OH) implanted into medial and lateral vasti muscles. An external dual lead stimulator was set to 12 Hz and 20 mA to stimulate motor endpoints of the femoral nerve to produce comfortable contractions. This was applied in 30-second cycles (20 seconds on, 10 seconds off) for six hours daily from weeks 2-8 following lead placement.

RESULTS

TABLE 1. Pain and disability ratings during course of OAK mPNS

Scale	Category	Baseline	8 Weeks	12 weeks
BPI-SF [†]	Worse Pain	8	5	7
	Average Pain	5	3	2
	Current Pain	6	0	1
	Pain Interference	7	1	2
KOOS [‡]	Pain	11	78	83
	Symptom	25	89	86
	ADL	31	65	85
	Sport/Rec	10	65	80
	QoL	0	63	75

OAK: Osteoarthritic knee

mPNS: Motor Peripheral Nerve Stimulation

BPI-SF: Brief Pain Inventory-Short Form

KOOS: Knee Injury and Osteoarthritis Outcome Score

ADL: Activities of Daily Living

Sport/Rec: Sports and Recreation

QoL: Quality of Life

†: BPI scale range 0-10, with 0 indicating no symptoms and 10 the worst pain possible

‡: KOOS scale range 0-100, with 100 indicating no symptoms and 0 the worse possible symptoms

(PGIC) at the end of stimulation was Much Improved

CONCLUSIONS

This case report demonstrates the feasibility of mPNS as a safe and effective treatment alternative for chronic pain related to OAK in a participant with Grade 3 knee osteoarthritis refractory to conservative care.

Limitation: Single site case study; further evaluation is warranted.

DISCLOSURES

Research funding was provided by the MetroHealth System, Cleveland, Ohio. Dr. Wilson and Dr. Kim report working as consultants to SPR Therapeutics, Inc.