

# Sexual Dysfunction After Traumatic Injury Corrected by Transcranial Magnetic Stimulation: A Case Report

**Xin Wang**

Jilin University

**Yue-ting Kang**

Jilin University

**Xin-yi Li**

Jilin University Second Hospital

**Wei Liu**

Jilin University Second Hospital

**Zhong-liang Liu**

Jilin University Second Hospital

**Bin Zheng**

University of Alberta

**Xiao-qin Duan** (✉ [15204309769@163.com](mailto:15204309769@163.com))

Jilin University Second Hospital <https://orcid.org/0000-0003-1078-2037>

---

## Short report

**Keywords:** Neurogenic sexual dysfunction, Repetitive transcranial magnetic stimulation, Neural conduction, Neurologic rehabilitation, Case report

**Posted Date:** December 11th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-125031/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

**Background:** Neurogenic sexual dysfunction (NSD) is a common problem in patients after spinal and pelvic trauma. New treatment is needed beyond medicine or psychological therapies. This study probes the potential for using repetitive transcranial magnetic stimulation (rTMS) for NSD rehabilitation, the insights of which can inform further research.

**Methods:** In a 24-year-old man who fell from six floor building, with multiple spinal and pelvic injuries, we used rTMS to treat his subsequent NSD. The therapy lasted for 3 months. Motor and sensory conductivities, as well as sexual function, were evaluated before and after the treatment.

**Results:** The rTMS regimen produced satisfactory improvement on patient's nerve conductivities and sexual activity. Improvements in sexual function were confirmed at 1-year follow-up.

**Conclusions:** rTMS delivered a positive treatment to this patient with NSD. Potential mechanisms by which rTMS regulate sexual function need to be further investigated.

## Introduction

Neurogenic sexual dysfunction (NSD) often results from pelvic fractures that damage the lumbosacral plexus [1]. Affected patients may complain of impotence, premature ejaculation, low sexual desire, retrograde ejaculation, or coital pain during sexual activities. Current treatments on sexual dysfunction with medicine or psychological therapy are unsatisfactory [2]. Here, we report the outcome from a NDS patient who undertaking repetitive transcranial magnetic stimulation (rTMS) treatment.

## Case

A 24-year-old man who fell down from a six-floor building was sent to the Emergency Department of the Second Hospital of Jilin University on October 13th, 2014. X-rays and computed tomography (CT) studies indicated multiple fractures in his head, spine, pelvis, and the extremities (Fig. 1A-E). Physical examination found his lower limb sensation was also diminished, and he had difficulty controlling urination or bowel movements. Six weeks after surgical care, patients' wounds and fractures were healed and he was discharged from hospital. Two months later, the patient returned to a community hospital for rehabilitation (physical therapy, acupuncture, and massage). This program lasted for 2 years. Gradually, he was able to walk and climb stairs. Control of urination and defecation also recovered largely, but his sexual dysfunction persisted, posing a threat to his marriage.

On July 4, 2018, the patient visited our department for further treatment. Electromyography (EMG) examination was performed (Table 1). The Arizona Sexual Experience Scale (ASEX) was used to assess sexual function. He was marked of 27 points (weak sexual drive was, difficult sexual arousal, extremely difficulty in penile erection and no orgasm) on the ASEX, signaling severe sexual dysfunction. He was diagnosed as sacral plexus injury and NSD. He was accepted for the rTMS (CCY-IA, YIRUIDE MEDICAL

Inc., Wuhan, China) treatment to promote nerve repairment. The protocol of rTMS was revised from what we used for dysuria (TMS Manual for Clinical Practice, First Edition, 2017). Stimulation site was S<sub>2</sub>-S<sub>4</sub>, each course lasting 2 weeks. Treatment prescription is presented as Fig. 1F. Three courses of treatment were completed in 3 months. A 1-year follow-up was performed with EMG examination on July 13, 2019. Results (Table 1) suggested that conductivities of peripheral nerves had improved. The patient claimed a significant improvement on his sexual function. His ASEX score was 18 points, where his sexual drive recovered to strong; sexual arousal rose up; penile erection was succeeded; orgasm was improved but not fully unsatisfied). His family life improved dramatically. On June 12, 2019, the patient's wife delivered a healthy baby.

Table 1  
MNCV and SNCV tests before and after rTMS treatment

Nerve and site	Latent time		Amplitude		Conduction velocity	
	(ms)	(ms)	(mV)	(mV)	(m/s)	(m/s)
	Before	After	Before	After	Before	After
<b>Right femoral nerve</b>						
Below Inguinal ligament	5.950	5.300	14.76	30.54		
<b>Left femoral nerve</b>						
Below Inguinal ligament	5.700	5.700	21.54	24.05		
<b>Right tibial nerve</b>						
Popliteal fossa	-	-	-	-		
Below buttocks	-	13.14	-	0.011		
<b>Left tibial nerve</b>						
Popliteal fossa	-	-	-	-		
Below buttocks	-	12.04	-	0.037		
<b>Right peroneal nerve</b>						
Ankle	-	4.40	-	0.127		
Fibula head	13.44	12.49	0.116	0.263	-	35.80
<b>Left peroneal nerve</b>						
Ankle	-	5.35	-	0.064		
Fibula head	-	10.29	-	0.038	-	52.52
<b>Right sural nerve</b>						
Lower leg	1.866	1.533	0.310	0.679	83.03	88.04
<b>Left sural nerve</b>						
Lower leg	2.366	1.933	0.741	1.049	42.25	80.17
<b>Right tibial nerve H-reflex</b>						
M- Wave	4.625	3.62	0.572	0.710		
H-Wave	33.37	31.25	0.028	0.057		
<b>Left tibial nerve H-reflex</b>						
M-Wave	4.00	3.75	0.337	0.735		

Nerve and site	Latent time		Amplitude		Conduction velocity
	(ms)		(mV)		(m/s)
H-Wave	37.25	35.12	0.028	0.047	

## Discussion

At present, treatments of NSD are mainly done by using medicine, psychotherapy and surgical treatment. However, current clinical efficacy and safety vary greatly [2]. So far, rTMS has been used for repairing of damaged peripheral nerves [3]. Some reported therapeutic effect on neurogenic bladder [4], and magnetic stimulation of the cavernous nerve was reported can induce penile erection [5]. However, there is no report of rTMS treating for NSD.

We found that rTMS significantly improved sexual function in the patient with sacral plexus injury. The underlying mechanisms may be multifacts. First, rTMS may facilitates repairment of somatic nerves related to lumbosacral damage then improve NSD. Second, rTMS may promote recovery of the affected autonomic nerves in lumbosacral damage [6]. Thrid, rTMS may revise local chemical transmitter levels (e.g. nitric oxide) to improve sexual function [7]. Nevertheless, the specific mechanisms of rTMS treating for NSD has not yet been reported, and further researches would be needed.

## Abbreviations

NSD: neurogenic sexual dysfunction; rTMS: repetitive transcranial magnetic stimulation; CT: computed tomography; EMG: electromyography; ASEX: Arizona Sexual Experience Scale.

## Declarations

### *Ethics approval and consent to participate*

Ethics approval was obtained from the Research Ethics Board of the Second Hospital of Jilin University (No 2018-049). Informed consent was obtained from the patient included in the study.

### *Consent for publication*

The participant has consented to the submission of the case report to the journal.

### *Availability of data and materials*

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

### *Competing interests*

The authors declare that they have no competing interests.

### ***Fundings***

This work was supported by grants from the Department of Finance of Jilin Province (3D518S603429) and the Jilin Provincial Health and Family Planning Commission (2020J028) in China.

### ***Authors' contributions***

XQD and BZ contributed to the conception and design of the study. XW, YTK, XYL contributed to acquisition, analysis and interpretation of data. XW, XYL, WL, ZLL drafted, modified the text and prepared the figures. All authors read and approved the final manuscript.

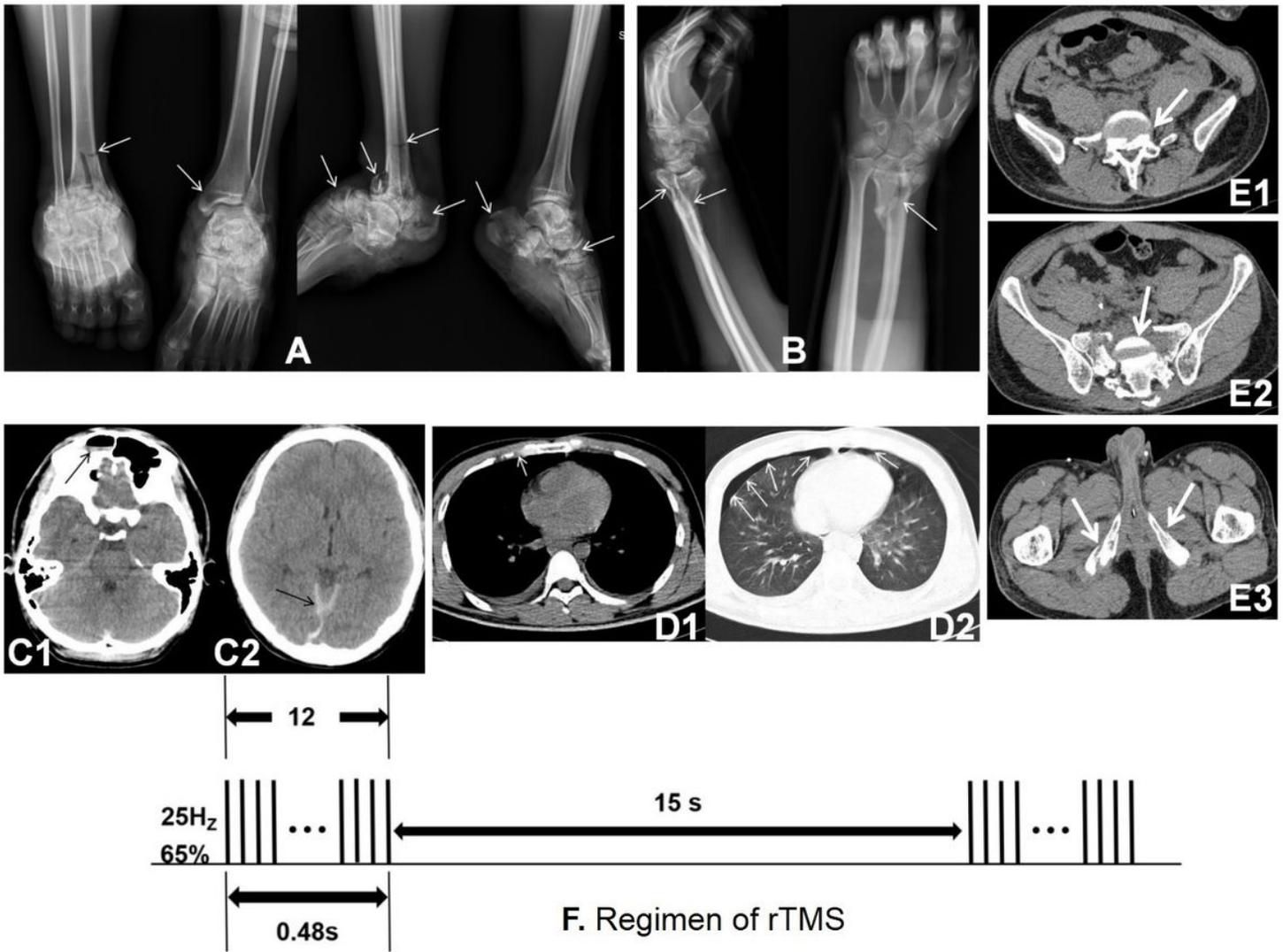
### ***Acknowledgements***

Special thanks should go to BioMed Proofreading LLC in United States who helped with professional proofreading.

## **References**

1. Hasan O, Atif M, Baloch N, Jalbani I, Umer M. Sexual dysfunction in men after high energy pelvic fractures: narrative review of targeted literature. *J Pak Med Assoc.* 2020;70:S65-S69.
2. Stein A, Sauder SK, Reale J. The role of physical therapy in sexual health in men and women: evaluation and treatment. *Sex Med Rev.* 2019; 7:46-56.
3. Chen J, Zhou XJ, Sun RB. Effect of the combination of high-frequency repetitive magnetic stimulation and neurotrophin on injured sciatic nerve regeneration in rats. *Neural Regen Res.* 2020;15:145-151.
4. Nardone R, Versace V, Sebastianelli L, Brigo F, Golaszewski S, Christova M, et al. Transcranial magnetic stimulation and bladder function: A systematic review. *Clin Neurophysiol.* 2019; 130:2032-2037.
5. Shafik A, el-Sibai O, Shafik AA. Magnetic stimulation of the cavernous nerve for the treatment of erectile dysfunction in humans. *Int J Impot Res.* 2000;12:137-142.
6. Soldatos T, Andreisek G, Thawait GK, Guggenberger R, Williams EH, Carrino JA, et al. High-resolution 3-T MR neurography of the lumbosacral plexus. *Radiographics.* 2013;33:967-987.
7. Harsh V, Clayton AH. Sex differences in the treatment of sexual dysfunction. *Curr Psychiatry Rep.* 2018; 20:18.

## **Figures**



**Figure 1**

Patient's images and regimen of rTMS (A) lower limb x-rays showing multiple fractures of both feet, both lower tibias, and right fibula; (B) x-rays of left upper limb with fractured wrist, radius, and ulna; (C) cranial CT images disclosing apparent right frontal bone and frontal sinus (anterior wall) fractures, with frontal sinus fluid (C1) and subarachnoid hemorrhage (C2); (D) chest CT revealing fracture of right ribs (D1) and bilateral pneumothoraces (D2); and (E) spine and pelvic CT images, depicting vertebral burst fracture of L1 (E1) and severe, comminuted fractures involving sacrum, coccyx (E2), and both inferior pubic ramus. (E3). Besides, regimen of rTMS (F): treatment performed daily for 20 min, including 75 cyclic repetitions, each cycle consisting of 12 magnetic stimuli lasting 0.48 sec and a 15-sec rest (stimulation intensity: 65%; stimulation frequency: 25 Hz).

## Supplementary Files

This is a list of supplementary files associated with this preprint. [Click to download.](#)

- [CAREchecklistEnglish2013.pdf](#)