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Effect of Posterior Tibial Nerve Stimulation on Erectile Dysfunction Among Elderly Patients

Nilavan.T, *Kumaresan. Abathsagayam, Sharmila.R, Prathap Suganthira Babu, Vignesh Srinivasan, Surya Vishnuram, Priyadharshini Kumar, VinodhkumarRamalingam

Saveetha College of Physiotherapy, SIMATS, Chennai, Tamil Nadu, India.

Email: kresh49@gmail.com, kumaresan.scpt@saveetha.com

Abstract

Background and Aim: Erectile function is a complex system that involves a complex interplay between vascular, neuronal and psychological components. Genital problems are a tough issue to discuss since they are typically socially stigmatised and can cause patients to feel isolated. The aim of the study to improve the erectile functions among elderly individuals by transcutaneus posterior tibial nerve stimulation and thus improves the quality of life as well as their social and emotional well beings.
Methods: This study was a pilot study involving 13 erectile dysfunction patients, conducted at saveetha institute of medical and technical science (SIMATS) for a period of 12 weeks. All the participants were assessed with Arizona sexual experience (ASEX) scale. The subjects were given Transcutaneous posterior tibial nerve stimulation for 30 minutes alternative days for 3 days a week.
Result:All the procedures were conducted in a safe and comfortable environment. TPTNS produced visible motor response and tolerable sensory response in all the patients. At the end of the study, there is a positive change noted in erectile function. Comparing the baseline score and end score of ASEX, there was a significant reduction in the erectile dysfunction frequency upon the intervention.
Conclusion: This study implies that TPTNS is rather helpful and faster way of treating patients with erectile dysfunction. The result showed a significant reduction in symptoms of erectile dysfunction and betterment in the quality of life.

Keywords

Erectile Dysfunction, posterior tibial nerve stimulation, Arizona Sexual Experience score

Introduction

Erectile function is a complex system that involves a complex interplay between vascular, neuronal and psychological component. (Calabrò, R. S., et al., 2016) Nerves of the autonomic and somatic systems (i.e., sacral parasympathetic [pelvic], thoracolumbar sympathetic [hypogastric and lumbar chain], and somatic [pudendal] nerves) are involved in erectile function. The hypothalamus and limbic circuits are important in this process. Erectile dysfunction is linked to a number of medical conditions other than aging (erectile dysfunction). The inability to maintain or sustain a penile erection as a result of central and/or peripheral neurologic dysfunction is known as neurologic ED (Rego, R. M. P.,et al., 2019). They usually

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present as progressively resolving perineal pain with a persistent sensory deficiency of the glans and scrotum on one side or the other.

Reduced or lost libido, unpleasant or painful genital sensations (burning, tingling, numbness), and/or altered orgasmic response are all examples of sexual dysfunction in both men and women. Reduced vaginal lubrication and dryness in women, anorgasmia, and poor sex drive are possible side effects Men might find it hard to get and/or keep an erection, and their frequency of ejaculations may decrease (Lombardi, G., et al., 2015). Humans experience penile erection in reaction to touch, visual, and imaginative stimuli.The synchronisation of somatic and autonomic pathways, the involvement of many locations with the brain and spinal cord, and the vulnerability of sexual behaviour in general and erection in particular to neurologic injury and disease. The neurological inputs required for sexual behaviour, including erection, are processed, coordinated, and then distributed by sites in the brain and spinal cord working together. Penile tumescence has been linked to the pharmacological or electrical activation of neurons in several of these areas. (Steers W. D. et al., 2000.). After stimulating somatic and visceral peripheral nerves, cortical evoked potentials could be obtained. When somatic and visceral evoked potentials are paired with sacral reflex latencies in this investigation, neurological anomalies in people with urological dysfunction can be pinpointed (Mentes, B.B. et al., 2007)

Transcutaneous posterior tibial nerve stimulation involves electrical stimulation of the posterior tibial nerve at the ankle level using electrodes attached to the overlying skin (PTNS). The posterior tibial nerve is formed from the ventral branches of the fourth and fifth lumbar nerves, as well as the first, second, and third sacral nerves, and contains motor and sensory components. Because the nerve contains sacral nerve fibres, stimulation of its peripheral fibres in the ankle area sends impulses to the sacral nerves, neuromodulating the rectum and anal sphincters mechanically. The stimulation of posterior tibial nerve can modify urine, defecatoryand erectile functions in male. In addition, transcutaneous PTNS is a realistic, noninvasive, and safe therapeutic option (Bondar, A., et al., 2010).

Therefore, the aim of the study is to understand the effect of TPTNS in erectile dysfunction and difficulties faced by geriatric people.

Methodology

Study Setting: The study was conducted at SIMATS and Collection of sample was conducted in neuro IPD and physiotherapy OPD at saveetha hospital for a period of 12 weeks between May 2022 and July 2022.

Inclusion and Exclusion Criteria

The patients with the history of erectile dysfunction, Age group above 60 years, Arizona sexual experience scale score greater than or equal to 19, with intact genitals and erectile sensation, only males are set as inclusion criteria.

Patients with erectile dysfunction occurred shortly after undergoing a pelvic surgical procedure [radical prostatectomy, transurethral prostatic resection, or sigmoid resection]. Impotent after laminectomy due to a herniated disc, numbness or sensory disorders in the genitalia, hands, or feet, open injury at the stimulation site, active implants including a cardiac pacemaker, significant cognitive impairment as indicated by a mini mental state test score of

20, neurological diseases, and patients who had previously received radiation therapy were all ruled out.

Sample size
Total of 13 patients who were all came with the complaint of erectile dysfunction to saveetha physiotherapy outpatient department. Participants were randomized and allotted in one group only.

Procedure
Participants in the intervention group were given posterior tibial nerve stimulation with electrode pads measuring 50 mm by 50 mm. During the TTNS session, the participant was asked to lie in a comfortable supine position with a pillow or blanket placed on the lower half of the leg to hide the subject's vision of their foot. The inactive electrode is positioned over the foot and the active electrode is placed posterior and superior to the medial malleolus (calcaneal region). Four electrodes are used to stimulate the bilateral leg (quadripolar method). With a pulse duration of 200 ls, a frequency of 10 Hz, and a current of 0-100mA, continuous stimulation was used The amplitude was chosen to provide a sensory input in the patient's ipsilateral foot at a level that was comfortable. The stimulation lasts 30 minutes and was done on alternate days three times a week.

Outcome measure
ASEX [Arisona Sexual experience scale] scale was set as a primary outcome measure and 3-days erectile function as secondary outcome measure. Erectile function was measured for 3-days before initiating the treatment with the help of nurses during the off-duty hours of the therapist. Total duration of the study was 12 weeks and both the outcomes were measured before initiating the treatment, and then assessed every month. Then end measure was assessed at the end of 12 weeks and the measures were statistically analyzed.

Results and Methodology

The outcome measures of 13 subjects were assessed for normality using shapiko-wilk test and showed that the collected data were normally distributed. Wilcoxin signed rank test was used to analyse the significance between the pre-test and post-test values of outcome measures-ASEX.

Table 1: Pretest and Posttest Values of Asex

Group	Median	25%	75%	p value
Pre-Test	24.00	22.50	26.50	<0.001
Post-Test	18.00	16.00	19.00	

The outcome measure ASEX showed a significant change (table 1) from the baseline score and the change was greater than that would be expected by chance with a pre-test median value of 24.00 to post-test median value of 18.00 (graph:1). The p value obtained (p value >0.001) by analyzing pre- test and post-test values showed that there was a significant different. Hence, TPTNS had shown statistically significant improvement in the symptoms and reduction of the erectile dysfunction among elderly individuals.

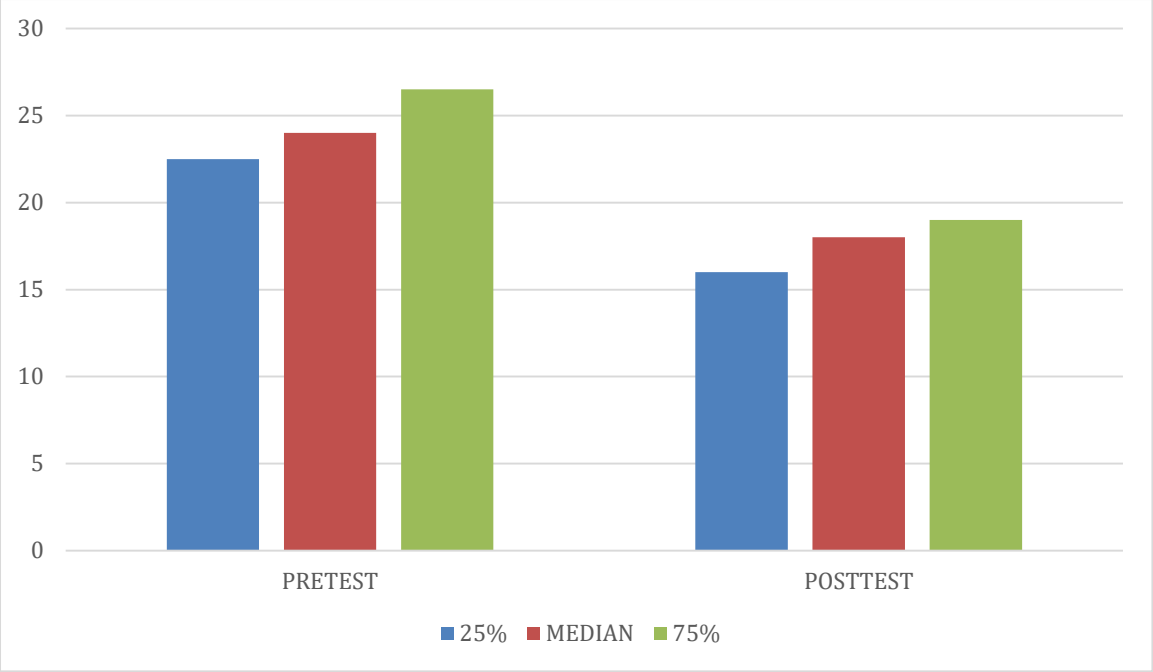

Figure 1: Median Value of Pre-Test and Post-Test Measure of Asex

Erectile function is a complicated mechanism that involves a complex interplay of vascular, neurogenic, and psychological factors. Erectile function is clearly influenced by the posterior tibial nerve. Erectile dysfunction is substantially more common among neurologically impaired men, particularly those with lesion S2-S4, than among men without neurological disability, according to (Calabret al.2016). Rego presented the transcutaneous posterior tibial stimulation protocol in 2019, with the goal of demonstrating the efficacy of this potential treatment for increasing bowel movement frequency and consistency, as well as improving overall quality of life (Rego et al., 2019). The dorsal nerve of the penis innervates the glans, frenulum, and penile skin. This afferent route sends enough sensory information to the brain areas to establish and maintain a penile erection. In 2020, bhide investigated the use of tibial nerve stimulation in a heterogeneous group of patients with overactive bladder, refractive overactive bladder and neurogenic overactive bladder in both male and female (Bhide et al.,2020). In this study, we look into the effects of transcutaneous posterior tibial nerve stimulation on erectile dysfunction in senior people, with the goal of improving erectile function. B.B. mentees showed in 2007 that posterior tibial nerve stimulation can be an effective treatment for faecal incontinence caused by spinal cord injury (Mentes, et al.2007). The total ASEX score and its categories were observed to be decreased in older patients in our research. Furthermore, when compared to young individuals, elderly patients had poorer erectile dysfunction. On stimulation the posterior tibial nerve, many individuals with genitocerebral circuit anomalies had signs of recovery in other sensory pathways. On the other hand, predicting the integrity of dorsal nerve-to-brain connections based solely on ankle stimulation data would be less exact since there is no reliable electro diagnostics to functionally.

Conclusion

The study concluded that Transcutaneous posterior tibial nerve stimulation is effective in treating erectile dysfunction thereby improving the quality of life.

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