

The impact of body positions on the pelvic floor muscle activity during electrical stimulation in women with stress urinary incontinence

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53rd Annual Meeting of the International Continence Society (ICS), Toronto, 2023

AIMS OF STUDY:

The present study is the first one to report on the impact of different body positions on the electromyographic (EMG) activity of pelvic floor muscles (PFM) during electrical stimulation (ES) in women with stress urinary incontinence (SUI).

Several authors have studied the relationship between body position and resting/voluntary PFM activation, reporting on the effects of gravitational forces and varying pressure on the structures of the pelvis in different positions [1-2]. Similar factors are expected to be in action during ES, however no study till date has investigated their effect on PFM activation during ES.

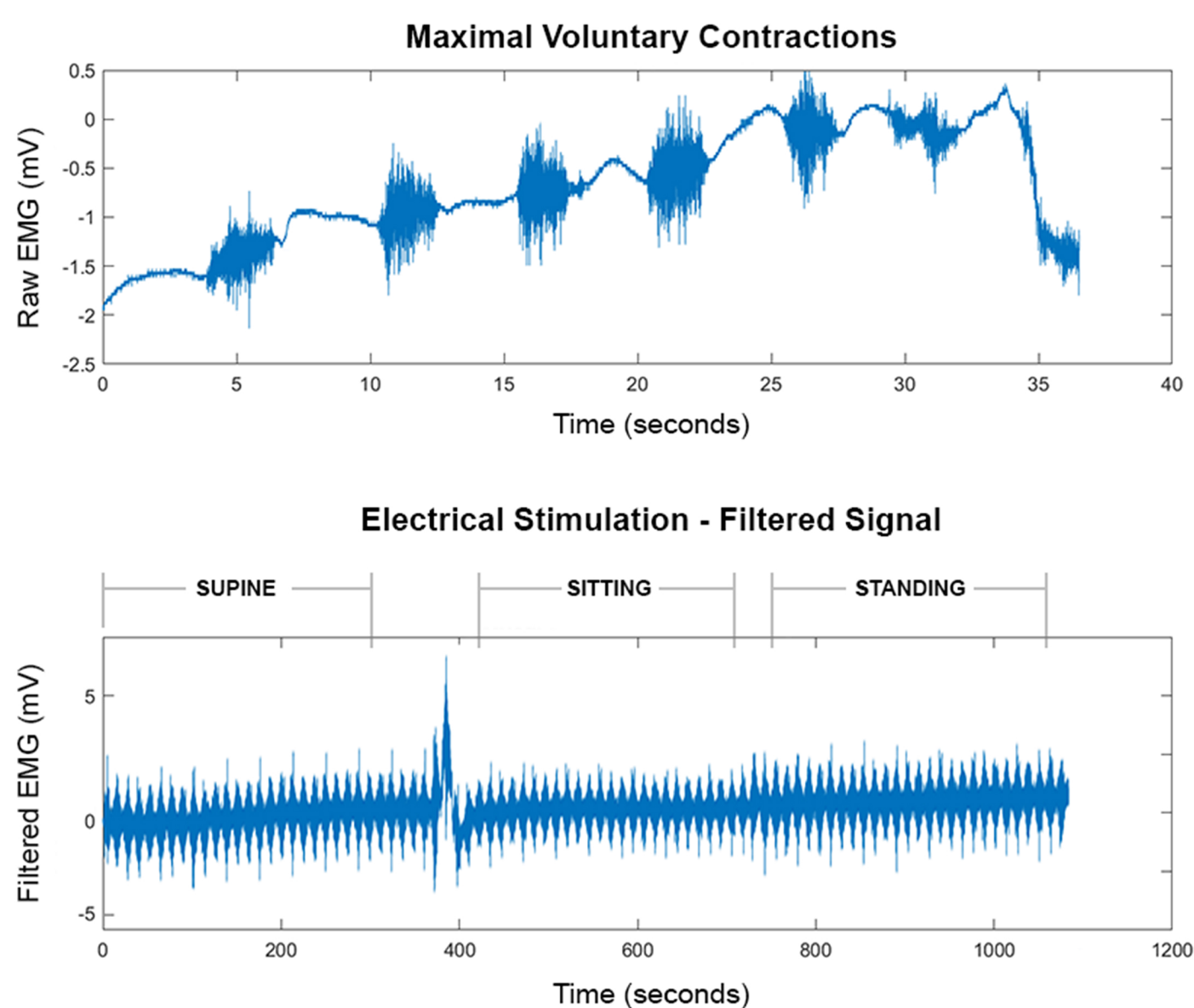


Figure 1: Sample PFM electromyography data (top: MVC, bottom: ES - Filtered)

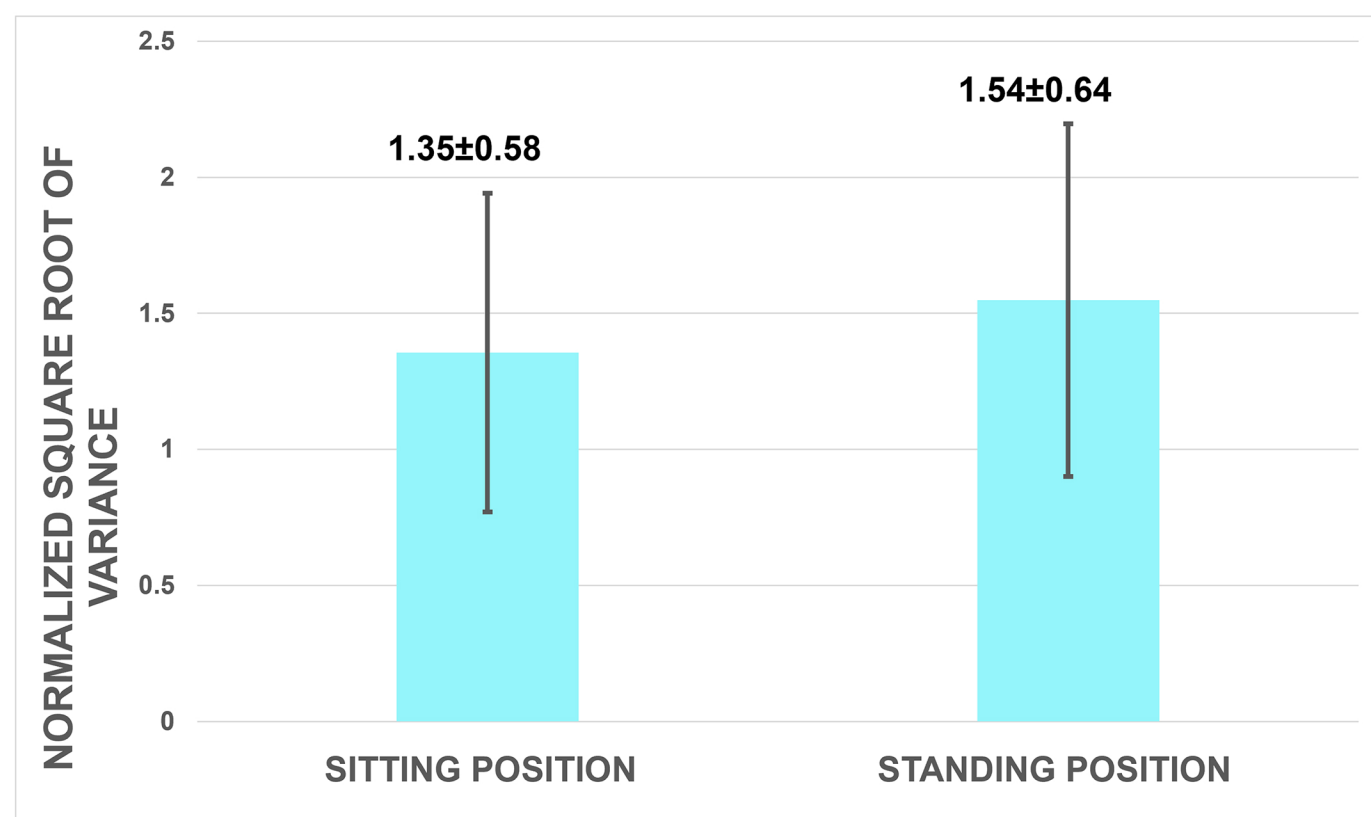


Figure 2: Normalized Square Root of Variance of PFM activity in Sitting and Standing Positions (Normalized with respect to Square Root of Variance of PFM activity in Supine Position)

CONCLUDING MESSAGE:

Results of the present study highlight the importance of body position during an ES session. Future studies should look at the long-term clinical effects of administering ES treatment for SUI with changing body positions.

References:

1. Chmielewska, D., Stania, M., Sobota, G., Kwaśna, K., Błaszczak, E., Taradaj, J. and Juras, G., 2015. Impact of different body positions on bioelectrical activity of the pelvic floor muscles in nulliparous continent women. BioMed Research International, 2015.
2. Lee, K., 2019. Investigation of electromyographic activity of pelvic floor muscles in different body positions to prevent urinary incontinence. Medical Science Monitor: International Medical Journal of Experimental and Clinical Research, 25, p.9357.

STUDY DESIGN, MATERIALS, AND METHODS:

Subjects: Total 16 sessions were conducted with 08 female subjects with SUI, aged between 18 and 60 years.

Electrical stimulation and EMG:

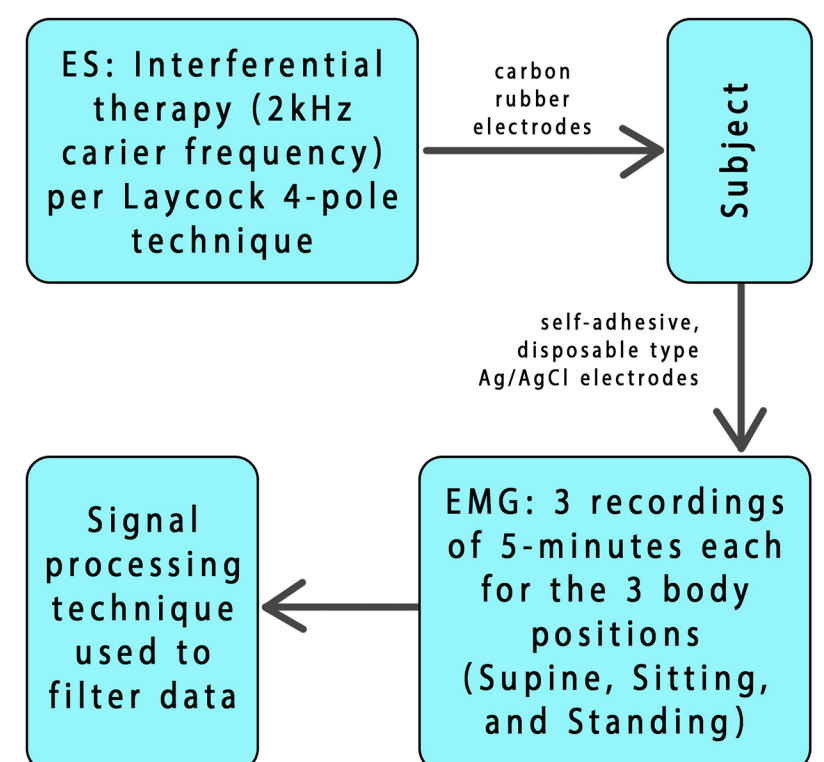


Figure 3: Overview of 20-minute session protocol

Signal processing and analysis:

The square root of variance values for PFM activity in supine position were used for normalization of the corresponding values in all positions. This normalization scaling was selected over the conventional normalization with respect to maximal voluntary contractions to address the inter-subject variability caused by different stimulation current intensities. The normalized values were then used to statistically analyze the differences across body positions.

RESULTS & THEIR INTERPRETATION:

The normalized PFM activity in both sitting (1.35 ± 0.58) and standing position (1.54 ± 0.64) was higher than that in supine position (Figure 2). The normalized PFM activity in supine position was significantly different from that in sitting ($p=0.028$ (<0.05)) and standing ($p=0.006$ (<0.01)) positions. No statistically significant differences were seen between sitting and standing positions.

These results show that PFM activation can be influenced by different body positions during ES. Further work is required to investigate how the effectiveness of PFM contraction is affected when body position is changed during an ES session and what its long-term implications are on the clinical effectiveness of ES treatment.

Small number of subjects and investigation of only one ES mode (interferential therapy) as limitations of the present study.

Source of Funding:

Research supported under fellowship (File: 5/3/8/9/ITR-F/2022-ITR) from Indian Council of Medical Research (ICMR), India.