Electrostimulation protocols to control post-radical prostatectomy urinary incontinence: a scoping review

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Hypothesis / aims of study

The aim of the study was to review the different protocols in the literature that treat urinary incontinence after post-prostatectomy surgery. The hypothesis was that we found two different protocols that treat stress urinary incontinence and urge-incontinence.

Study design, materials and methods

This is a scoping review, which aims to map the literature and deepen the understanding of a topic by identifying its main concepts, nature, and variety of evidence (Tricco et al., 2018).
In this review, it was established that the population would be “men undergoing radical prostatectomy”; the concept would encompass “electrical stimulation protocols” and the context would be related to “urinary incontinence control” (Peters et al., 2020).
In this context, the following research question was formulated: “What electrical stimulation protocols for controlling post-radical prostatectomy urinary incontinence are described in the literature?”In this review, complete and original primary studies were considered, as well as guidelines available online in national and international journals published in Portuguese, English, and Spanish. Works with a free publication period were included, which addressed strategies and interventions related to electrical stimulation for the control of IUPPR.
Studies that combined EE with other approaches, such as PFMT, biofeedback, and drug therapy, were also considered. Editorials, response letters, secondary studies, experience reports, or expert opinions were excluded from this study, as were case reports and series, theses, dissertations, or unedited material.The search strategy was associated with the MESHs of the words urinary incontinence, electrostimulation, and prostatectomy.

Results and interpretation

Seven hundred eighty articles were identified in the literature, and after analyzing the title, abstract, and application of the eligibility criteria, 373 articles were pre-selected for full reading. Among the articles analyzed, 23 were included in this review.
In this review, it was observed that starting the protocol within 30 days was more frequent among the studies; the duration of the protocol was up to 3 months, with 1 to 2 weekly sessions lasting up to 20 minutes. Regarding the location of the electrode, the anal electrode, whether intracavitary or superficial, was most often adopted. All studies associated PFMT with ES in the control group. The most recurrent frequency among the studies was 30–50 Hz, the pulse width was 100–300 Hz, the intensity was the maximum tolerable by the patient, and among the studies that reported the on time, which corresponds to the time in which the current is on, this was more prevalent at 0.5–10 sec, and the off time, which corresponds to the rest period where no current is passing, is 5–30 sec.Regarding the type of current, the protocols described the use of alternating and pulsed currents.
Alternating currents are often used for muscle contraction and sensory stimulation. It is also noted that the intensity of the current, in most studies, was used at the maximum tolerable level because the greater the intensity achieved, the greater the amount of energy delivered to the tissue, increasing the percentage of activated muscle (Barbosa et al., 2018).
This review shows that few studies reported TON and TOFF in ES sessions; however, the studies that reported this parameter say TON from 0.5 to 10 seconds is beneficial. while TOFF is 5–30 seconds. Another important parameter is the pulse width, which in this review was predominant at 100–300 us. This is due to the fact that smaller pulses reduce skin impedance and promote greater current absorption by the tissues, in addition to offering greater comfort to the patient.In this review, it was noted that fifteen authors agree that the use of frequencies between 30 and 50 Hz would be ideal; thus, with frequencies above 30 Hz, the fast fibers of the pelvic floor are better stimulated, in addition to the fact that in this range there is a tetanic contraction with a lower risk of fatigue. The use of frequencies of 50 Hz is commonly used to improve the proprioception of PFM contractions and prepare them to receive higher frequencies, while frequencies above 65 Hz can generate greater muscle strengthening (Dorey, 2000; Zaidan, 2016).Other studies included in this review (Gomes et al., 2017; Kahihara et al., 2006; Kakihara; Ferreira; Nerro Jr., 2006; Kakihara; Sens; Ferreira, 2007; Pedriali et al., 2016) used lower frequencies for the treatment of UI, such as 4 to 10 Hz. This is explained because frequencies in this range promote detrusor inhibition, which is beneficial for those who develop urgency urinary incontinence (UUI) after prostatectomy (Latorre et al., 2020).

Variables	Protocols	Frequency (%)	Studies found
Start of therapy	Not mentioned	03 (13,04)	4, 18, 19
	Up to 7 days after catheterization	03 (13,04)	3, 8, 9
	Up to 30 days after radical prostatectomy	06 (26, 08)	10, 12, 14, 15, 16, 17
	Up to 6 months after radical prostatectomy	04(17, 39)	11, 20, 21, 22
	> 6 months after radical prostatectomy	03 (13,04)	2, 7, 23
	Before and after 6 months	04 (17,39)	1, 5, 6, 13
Duration of the protocol	Not mentioned	01 (4,34)	12
	Up to 3 months	19 (82,60)	2 to 11, 13 to 23
	> 6 months	03 (13,04)	1, 7, 9
Sessions per week	Not mentioned	02 (8,69)	1, 23
	1 to 2 sessions	14 (60,86)	2, 5 to 8, 10 to 12, 14, 15, 16, 18, 21, 22
	Up to 3 sessions	4 (17,39)	13, 17, 19, 20,
	More than 3 sessions	3 (13,04)	3, 4, 9,
Session time	Not mentioned	3 (13,04)	1, 12, 16
	Up to 15 minutes	6 (26,08)	3, 9, 10, 17, 18, 20,
	Up to 20 minutes	10 (44,47)	4 to 8, 11, 13 to 15, 22
	Up to 30 minutes	2 (8,69)	2, 21
	> 30 minutes	2 (8,69)	18, 23
Electrode location	Not mentioned	01 (4,34)	17
	Anal (intracavitary/surface)	17 (73,91)	1 to 9, 11 to 16, 18, 22
	Other locations	05 (21,73)	10,19,20,21,23
Position during electrostimulation	Not mentioned	14 (60,86)	1, 2, 3, 6, 7, 9, 12, 14, 15, 16, 17, 18, 21, 23
	Supine position	02 (8,69)	8, 20
	Lateral decubitus	05 (21,73)	5, 10, 11, 13, 22
	Prone position	01 (4,34)	19
	Sitting	01 (4,34)	4
Associated interventions	No	02 (8,69)	1, 13
	Pelvic floor muscle training (PFMT)	10 (43, 47)	5, 6, 7, 9,11, 16, 18, 21, 22, 23
	Pilates exercises + TMAP	02 (8,69)	14, 15,
	Biofeedback (BFB) + TMAP	05 (21,73)	3, 8, 10, 17, 19
	Other interventions	04 (17,39)	2, 4, 12, 20
Pulse and wave type	Not mentioned	14 (60, 86)	1, 2, 3, 6, 7, 11, 13, 14, 15, 16, 19, 21, 22, 23
	Alternating	03 (13,04)	5, 12, 20
	Pulsed	00	
	Intermittent	01(4,34)	18
	Square	3 (13,04)	9, 10, 17
	Conjugate (pulsed +quadratic)	2 (8,69)	4, 8
Chain type	Not mentioned	13 (56,52)	4, 6, 7, 8, 9, 10, 14, 15, 16, 17, 21, 22, 23
	Biphasic	10 (43,47)	1, 2, 3, 5, 11, 12, 13, 18, 19, 20
Frequency	15 - 29 Hz	04 (17,39)	3, 4, 17, 21
	30- 50Hz	10 (43,47)	2, 8, 9, 10, 12, 14, 15, 16, 18, 23
	Variable (8-10Hz and 35-50Hz)	04 (17,39)	5, 6, 7, 13,
	Variable (2.5 Hz; 15 Hz and 80Hz)	01 (4,34)	19
	> 50 Hz	03 (13,04)	11, 20, 22
	Other	01 (4,34)	1
Pulse width	Not mentioned	08 (34,78)	5, 6, 7, 14, 15, 20, 21, 23
(us,ms,sec)	100-300 us	07 (30,43)	4, 8, 9, 10, 12, 17, 18,
	500- 700 us	03 (13,04)	11, 13, 22,
	1-2 ms	03 (13,04)	1, 16, 19,
	1-5 sec	2 (8,69)	2,3
Intensity (V/ mA)	Not specified	8 (34,78)	1, 5, 6, 7, 14, 15, 20, 23
	Up to visible contraction and the maximum tolerated	8 (34,78)	2, 3, 10, 11, 12, 13, 16, 22
	1 to 5 mA	1 (4,34)	21
	10 to 30 mA	3 (13,04)	4, 8, 17
	> 30 mA	3 (13,04)	9, 18, 19
Contraction time (TON)	Not mentioned	16 (69,56)	1, 2, 5, 6, 7, 8, 10, 12, 13, 14, 15,17, 19, 20, 21, 23
	0, 5 to 10 sec	06 (26,08)	3, 9,11, 16, 18, 22
	> 10 sec		
	Intermittent for 10 min	01(4,34)	4
Time off work (TOFF)	Not mentioned	16 (69,56)	1, 2, 5, 6, 7, 8, 10, 12, 13, 14, 15,17, 19, 20, 21, 23
	5 to 30 sec.	06 (26,08)	3, 9, 11, 16, 18, 22
	60 sec		
	2 min.	01 (4,34)	4
Equipment specifications	Not mentioned	6 (26,08)	6, 9, 12, 17, 20, 21
	Mentioned	17 (73,91)	1, 2, 3, 4, 5, 7, 8, 10, 11, 13, 14, 15, 16, 18, 19, 22, 23
How the information was provided to the patient	Not mentioned	10 (43,47)	1, 5, 6, 7, 11, 12, 13, 16, 19, 23
	Verbally	03 (13,04)	18, 21, 22
	Writing	01 (4,34)	15
	Verbally and in writing	9 (39,13)	2, 3, 4, 8, 9, 10, 14, 17, 20
Professionals who conducted the treatment	Not mentioned	07 (30, 43)	1, 3, 4, 17, 19, 20, 23
	Physiotherapist	13 (56,52)	2, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 18, 22
	Medical	03 (13,04)	8, 9, 21

Concluding message

It is concluded, based on the articles included in this review, that ES can be an effective treatment option for UIPP; however, it is not possible to say that ES would be better than other behavioral interventions due to the lack of consensus in the literature regarding the parameters used and the protocols used.Furthermore, there is a wide variety of parameters used in clinical practice; however, there is no evident justification for the choice of protocols or for parameter modulations, which leads to difficulty in comparing results and analyzing which would be the best approaches. Thus, new studies must be carried out to group similar protocols to identify the best ones to be used in clinical practice.

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