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IS BIOFEEDBACK-ASSISTED PELVIC FLOOR MUSCLE TRAINING (PFMT) MORE EFFECTIVE THAN VERBAL INSTRUCTION IN TEACHING PELVIC FLOOR MUSCLE UTILIZATION AND CONTINENCE CONTROL? --- A RANDOMIZED PROSPECTIVE STUDY

Aims of Study

Pelvic floor muscle training (PFMT), among all types of behavioural management, is the earliest and most widest studied conservative treatment option for helping female urinary incontinence. It is not clear, however, how important biofeedback is in helping subjects learning to utilize their pelvic floor muscles (PFM) correctly. The purpose of this study was to examine the comparative effectiveness of verbal vs. biofeedback-assisted PFMT in Taiwanese women with UI, with a specific focus on correlating the subjective reports of UI changes and pelvic floor muscle activity.

Methods

A prospective randomized trial using repeated measures design was conducted and two main outcome variables; UI frequency and PM activity; were used to test the effectiveness of two instruction methods. 147 female subjects were referred between November 10,2000 to May 5, 2001 and subjects were enrolled if she is age 40 or older, living in the community and was incontinent in the past three months with 2 or more UI episodes per-week. 98 subjects were eligible and entered the study after initial assessment. After randomization, both group received an eight-week, four-stage PFMT which included (1) muscle awareness, (2) strengthening, (3) endurance training and (4) muscle utilization training. The verbal instruction group received weekly verbal teaching while biofeedback group use two-channel perineal surface EMG to help subjects learned correct muscle contractions. The Pathway MR-25$_{tm}$ machine was used in the biofeedback group and integrated EMG signal was used for easier subject interpretation. For the perineal channel, two perineal electrodes were placed in 3 and 9 o'clock position adjacent to the anal sphincter and two abdominal electrodes were placed on the right quadrant two inches laterally to the umbilicus and vertical to each other. Both grounded electrodes were placed on a close part of the body with proper skin contact. Weekly bladder diaries were used to document the UI episodes and UI frequency was calculated as percent reduction of UI after PFMT.

Results

The sample included ninety-eight women with a mean age of 54.36years (range 48-82 years).The mean BMI was 23.41, and the severity of UI ranged from 2-70 episodes per-week. Most of the subjects from this sample experience mixed UI (51%), followed by stress UI (31%) and urge UI (18%). Baseline type of incontinence, severity and the duration of UI were similar in two groups, as well as demographic data. The Table below summaries percent changes of pre and post-treatment parameter on UI episodes, pelvic floor amplitude and duration in lying, sitting and standing position. Median UI frequency in the verbal group was reduced from 7 to 2 after the 8-week interventions, with a more remarkable decrease found in the biofeedback group from a median of 7 to 0 accidents per week after intervention. Biofeedback group was significantly more effective than the verbal instruction group in UI frequency and PM activity recruitment.

Descriptive and Test Statistics For the Percent Change for UI frequency and PM activity

	Verbal	Biofeedback	Statictics (p value)
Changes in UI frequency			Mann-Whitney
Group n	49	49	Z=-3.11
Median (%)	77	100	(p=0.002)
Range(%)	-82-100	0-100	

Changes in PM activity(%)

Standing-duration(%)	Mdn=0 Range=-29-267	Mdn=115 Range=0-267	Mann-Whitney Z=-5.698 (p=0.0001)
Standing-Amplitude(%)	Mdn=0 Range=-380-190	Mdn=70 Range=-11-619	Mann-Whitney Z=-4.916 (p=0.0001)

Changes in PM activity(%)

Sitting-duration(%)	Mdn=0 Range=0-850	Mdn=100 Range=0-200	Mann-Whitney Z=-4.81 (p=0.0001)
Sitting-Amplitude(%)	Mdn=1 Range=-82-161	Mdn=144 Range=-20-1179	Mann-Whitney Z=-3.98 (p=0.0001)
Lying duration (%)	Mdn=10 Range=0-175	Mdn=100 Range=-21-750	Mann-Whitney Z=-3.26 (p=0.001)
Lying-Amplitude (%)	Mdn=17 Range=0-124	Mdn=91 Range=0-324	Mann-Whitney Z=-3.57 (p=0.0001)

In addition, there was a significant positive relationship between the improvement of PM activity and %changes in UI frequency (Spearman correlation coefficient 0.36—0.45), with the highest correlation between sitting amplitude and % changes of UI.

Conclusions

This result supported that biofeedback assisted PFMT is statistically more effective than verbal instruction in reduced UI and increased PM activity. This result is consistent with previous research findings that biofeedback-assisted instruction was superior to the verbal instruction alone (1). Though Burn and associates found a significant more increases of intravaginal EMG reading in the biofeedback group than the verbal ($p < 0.005$) and control ($p < 0.007$) group, the reduction of UI episodes between the biofeedback and the verbal instruction group were not significant (2). Hence, the subjects of the biofeedback group are more acquainted with the PM contractions than the verbal group, they failed to demonstrate a further decrease in UI episodes. The current study included both stress and urge UI subjects in the trial and incorporated PME in three positions (sitting, standing and lying), which might make the results of muscle training more utilizable to prevent unwanted urine loss. To the best of our knowledge, it is the first study demonstrating the positive correlation between the changes of UI episodes and the perineal surface EMG measured in three different positions after intensive PFMT.

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