

Efficacy Report of the Whittlestone Breast Expresser as a Treatment for Breast Engorgement

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Introduction

The most often stated reason for cessation of breastfeeding in the first two weeks postpartum is pain. Breast engorgement is a painful problem that can lead to pre-mature weaning. Breast engorgement occurs in 72%¹ to 85%² of women. Dr. Ruth Lawrence defines engorgement as "The swelling and distention of the breasts, usually in the early days of initiation of lactation, due to vascular dilation as well as the arrival of the early milk."³ Commonly, engorgement occurs within three to six days after delivery.⁴ Not to be confused with breast fullness, breast engorgement can occur any time during lactation when milk is not transferred from the breast.

Breast engorgement and breast fullness are different. Breast fullness is characterized by swollen yet compressible breast tissue. The infant is able to latch on properly and suckle effectively at a full breast. Breast engorgement is characterized by swelling, heat, hardness of breast tissue, breast skin tightness, flatness of nipples, discomfort, and pain. The infant may have difficulty latching to an engorged breast due to the hardness of the tissue, which can decrease the amount of milk transferred from mother to baby. The inability of the infant to transfer milk can exacerbate the engorgement.⁵ Due to the varying severity of breast engorgement, several methods are used to quantify it: Thermography,⁶ the Roberts' Durometer,⁷ and the Six-point Engorgement Scale¹.

Many methods have been used to relieve the symptoms of engorgement. Alternating warm and cold compresses can be used to relieve the painful swelling.⁴ Cabbage leaf compresses are used to decrease discomfort.⁸ Hand-expressing can be used to remove milk and ease fullness. Breast pumps can be a useful tool as well.⁹

Dr. Wight suggests that, "the use of hand expression or an electric breast pump can help establish milk flow and maintain a good milk supply. Even brief pumping can soften the breast to make it easier for an infant to attach appropriately and extract further milk."⁵ Riordan and Auerbach recommend that only electric pumps that provide intermittent vacuum at minimum pressure should be used to relieve engorgement. They further suggest that pumping the breasts to relieve engorgement "should also be limited to a maximum duration of 10 minutes to avoid traumatizing the distended breast tissues."⁹ page 228

The desire to breastfeed is great with many mothers. Helping women to have a successful breastfeeding experience is the goal of lactation consultants. New methods to assist mothers in achieving a successful breastfeeding experience must be tested to assure efficacy.

This study examined the effectiveness of a new device, the Whittlestone Breast Expresser (WBE), for milk expression. These researchers investigated the use of this device to relieve symptoms of engorgement. The questions being addressed were: 1) Will the WBE elicit milk ejection? 2) Will the WBE remove milk from an engorged breast with a corresponding reduction in swelling? 3) Does the WBE cause visible damage to the breast tissue after a sustained period of milk extraction? 4) Is the pain of engorgement reduced through the use of this device? 5) Can infants latch on properly after the use of this device?

The WBE was used on women complaining of pain in the breasts due to breast engorgement. This device differs substantially from all breast pumps. Pumps use vacuum in suck and release cycles as their primary means of milk extraction. The WBE uses compression and pulsation¹⁰ with an underlying constant vacuum as its primary means for expressing milk.

Methods

A sample of twenty women was recruited for the study. Estimating a confidence interval of ninety-five percent (α of .05), a sample size of twenty women provides a power of 80%. Women arriving at clinic during their first week postpartum seeking lactation management assistance for painful, swollen breasts were asked to participate in the study. The women reported that the infants were not able to latch on the breast and suckle properly. The women also reported pain in the breast and nipple associated with efforts to breastfeed. The women were then asked to use the WBE. After consent was obtained, the breasts were palpated by an Internationally Board Certified Lactation Consultant. The breasts were assessed for hardness, lumps, heat, dilation of the veins, flatness of nipples and visible tissue damage. The lactation consultant scored the level of engorgement based on the Six-Point Engorgement Scale¹ as seen in Table 1. No pre-treatments, such as cabbage leaves, hand expression, warm or cold compresses, or massage, were used prior to use of the WBE. The WBE was then placed on the woman's breasts. The pressure was set on the lowest setting and increased slightly to comfort as indicated by the woman. Milk ejection (ME) was timed in quarters of a minute. Total expressed volume from both breasts was measured in milliliters (ml). Total time expressing was measured in minutes with a maximum time of twenty minutes. After expressing, the breasts were visually inspected by the lactation consultant for any changes in breast tissue and again scored for engorgement level using the Six Point Engorgement Scale.¹ Each woman was asked 1) Did she feel relief? 2) How did the WBE feel? 3) Was pain caused by the WBE (yes or no)?

Table 1

Six-point Engorgement Scale ¹	
Score	Description
1	Soft, no change in breasts
2	Slight change in breasts
3	Firm, non-tender breasts
4	Firm, beginning tenderness in breasts
5	Firm, tender
6	Very firm, very tender

The After engorgement scores and answers to the questions were recorded, then the infants were placed at the breast. The women were assisted with positioning and instructed in recognizing correct latch-on. Each infant was allowed to nurse from both breasts until they were deemed satisfied. Mini-tab, a statistical analysis program, was used to perform all statistical analysis. Groups were compared for differences using paired t-tests and the Wilcoxin Signed Rank test.

Results

Twenty-one women were asked to participate. One woman declined to participate stating that breastfeeding was "too painful" and she only wanted advice on weaning. She was given verbal and written information on breast care during weaning. The average age for the women in the study was 25.5 years and the average education level was twelve years. Seventy percent of the subjects were Caucasian, twenty percent were Hispanic, and ten percent were other ethnicities. Half of the women were first time breastfeeders but not necessarily primiparas. The other half of the women had two or more breastfeeding experiences. Forty-five percent of the women had flattened nipples prior to using the expresser. The average time to milk ejection was 1.3 minutes with one person taking ten minutes before milk appeared. Removal of this high value lowered the average time to milk ejection to 1.2 minutes ($\pm .8$) with an N=19 which normalized the standard deviation, but did not significantly change the mean. The average time of expressing was sixteen minutes. The average Total Volume was eighty-two mls of milk. The difference in Engorgement score before and after use of the expresser was statistically significantly different ($p < .001$). The Wilcoxin Signed Rank Test was used to compare the difference

Separating the women into two groups, first-time breastfeeders (FTB) and multiple-time breastfeeders (MTB), shows statistically significant differences in the amount of time expressed and the Before and After engorgement scores. Age, Total Volume Expressed, and Flow Rate were not statistically

significantly different between the two groups of women. This data is summarized in Table 2 and was compared using paired t-tests.

Prior to expressing, five women in the FTB group had bright red and flattened nipples, one woman had abrasions on the nipples, three women had scabs on the nipples, and one woman had a crack on one nipple. Immediately after use of the Whittlestone Breast Expresser, four of the women with red nipples had a normal pink appearance to their nipples. The remaining women in the FTB had no increase in damage to the nipples. All the women in the FTB group had slightly protruding nipples after use of the expresser. In the MTB group, before using the Whittlestone Breast Expresser, five women had no visible damage to their nipples. Four women had flattened nipples, three women had bright red nipples and two women had abrasions. After expressing, eight of the women in the MTB group had no visible damage with a normal appearance to the nipples. All the women in the MTB group had slightly protruding nipples after use of the expresser. The other members of the MTB group had no change to the appearance of their nipples after using the WBE.

All the participants stated that they received relief of pain and swelling using the WBE. Many women stated that they felt even further relief after the baby nursed. Eighteen of the women stated that the expresser felt gentle and/or soothing. All the women stated that the WBE was not painful. Even the women with abrasions, scabs, or cracks stated that the WBE did not increase the pain they already felt from the nipple damage nor did it make the existing damage worse. All infants were able to latch on and nurse after using the WBE.

Table 2

Mean values for First-time Breastfeeders and Multiple-time Breastfeeders (N=20)		
	First-time Breastfeeders (n=10)	Multiple-time Breastfeeders (n=10)
Age (years)	24 _± 6	27 _± 7
Time to Milk Ejection (ME in min)	1 _± .5 ^{***}	1.4 _± 1
Level of Engorgement Score Before	5.1 _± 9 ^{**}	4.8 _± 8 ^{**}
Level of Engorgement After	2.3 _± 5 ^{**}	1.9 _± ^{**}
Time Expressing (min)	19 _± 1.3 [*]	13 _± 3.6 [*]
Total Volume Expressed (mls)	95.5 _± 52	69 _± 17
Flow Rate (mls/min)	4.9 _± 2.7	5.6 _± 1.5
* Statistically significantly different (p=.01)		
** These values were significantly different (p<.001) Before and After, not between groups		
*** One outlier removed		

Discussion

Milk ejection is important as an indicator of oxytocin release (milk let-down). Milk ejection was elicited quite rapidly in all but one of the women studied. When a baby latches properly at the breast milk ejection occurs. This immediate transfer of milk helps prevent engorgement. When ME does not occur, the breasts remain hard, full, and in need of relief. If the baby is not able to transfer milk from the breast, other means of milk extraction must be found to assure continued milk production. Reardon and Auerbach have reported that "An erratic or delayed milk ejection reflex is common when a mother must respond to a mechanical device rather than her baby"^{9 page 311} The WBE elicited a quick ME (less than 1.5 minutes) in 95% of the women studied.

The WBE was effective in removing milk from engorged breasts and thereby reduced swelling for the twenty women that participated in this study. It is difficult for babies to latch properly and transfer milk effectively from an engorged breast. Poor transfer can result in increased engorgement. Poor transfer of milk can compromise the infant's health by decreasing intake and causing poor weight gain. Initially, the infants of the women studied were not transferring milk effectively due to engorged breasts. The goal was to get the infant latching correctly and transferring milk from the breast with minimal discomfort to the mother. This goal was accomplished for every woman that participated in this study. Research by Alekseev, et al. indicates that the use of compression enhances milk secretion and stimulates breast milk flow.¹¹ That conclusion is supported by this study for use on women with engorged breasts. The use of compression via the WBE did enhance milk secretion and stimulate breast milk flow.

The WBE did not cause visible damage to breast tissue. Even with sustained use beyond the recommended ten minutes⁹ visible damage did not occur nor did it exacerbate existing damage to nipples in these subjects. Tissue damage, either on the breast or the nipples, is associated with pain in most women. Breast or nipple damage can cause pain and inhibit let-down.^{9 page 311} The WBE did not cause pain to the women studied. Two women reported that the expresser "tickled," saying that it felt good as it performed.

Conventional suck and release pumps are associated with pain in some women with or without engorged breasts. Fewtrell, et al. noted that although mothers most commonly find breastfeeding to be a pleasant experience, this often is not so for mechanical milk expression.¹² Many of the MTB group were very hesitant to use the expresser expecting additional pain despite the eventual relief. They were pleased that their perceptions were incorrect. Once expressing began unsolicited comments such as "comfortable" and "soothing" were common especially among the MTB group.

One woman in the MTB group was extremely apprehensive about using an electrical device for expressing milk. She was concerned about pain after having a negative experience with an electric breast pump in a previous lactation, but was willing to "try anything" to relieve the engorgement and get the baby latching on and transferring milk. Much to her relief, she did not experience pain while using the WBE. Twenty mls of transitional milk was expressed from the left breast and twenty-four mls of transitional milk was expressed from the right breast. The baby then latched on to the left breast and vigorously transferred milk for six minutes. The baby was burped and nursed on the right breast until falling asleep.

The ultimate goal is to encourage women to continue breastfeeding. One woman initially wanted to wean but was willing to try using the WBE to get some relief as her breasts were very large and painful (level 6 on the Engorgement Scale). This was a very young mother who was concerned about her baby's weight loss and her ability to supply adequate milk for her baby's needs. She was able to express a total of 161 mls of milk in 18 minutes and felt confident about her milk supply. After nursing the baby without pain, the woman decided that she would continue with breastfeeding.

Conclusions

- 1) The WBE did elicit milk ejection.
- 2) The WBE was able to remove milk from the engorged breasts studied with a corresponding decrease in breast swelling.
- 3) The WBE did not cause visible damage to the breast tissue even after 20 minutes of use.
- 4) Use of the WBE reduced the pain of engorgement in the women studied.
- 5) Infants in this study were able to nurse successfully after the use of the WBE

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