

Treatment for lactation suppression: Little progress in one hundred years

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Our goal was to characterize the postpartum symptoms experienced by women who do not breast-feed and to review data on the efficacy of nonpharmacologic methods of lactation suppression. The placebo arms of randomized clinical trials of pharmacologic methods for lactation suppression were used to characterize postpartum symptoms. A subset of the placebo arms was reviewed to assess current strategies for treatment of symptoms associated with lactation suppression. Studies of nonpharmacologic methods of lactation suppression were also reviewed to assess efficacy. Engorgement and breast pain may encompass most of the first postpartum week. Up to one third of women who do not breast-feed and who use a brassiere or binder, ice packs, or analgesics may experience severe breast pain. Specific studies of nonpharmacologic methods of lactation suppression were limited and inconclusive. Available data suggest that many women using currently recommended strategies for treatment of symptoms may nevertheless experience engorgement or pain for most of the first postpartum week. (*Am J Obstet Gynecol* 1998;179:1485-90.)

Key words: Lactation, lactation suppression, breast-feeding

In the United States approximately half of women do not breast-feed their newborn infants.¹ Most of these women choose not to breast-feed, but others may be unable to because of maternal illness, newborn illness or death, or infant adoption. Women may experience considerable pain and engorgement, as well as emotional pain, before lactation cessation occurs, yet the prevalence, duration, and severity of these symptoms are poorly characterized.² From the 1930s until the late 1980s, pharmacologic methods were used in the United States to suppress lactation.² Since 1988 the US Food and Drug Administration has recommended against the routine use of pharmacologic methods (other than analgesics) for lactation suppression and for relief of associated physical symptoms because evidence from randomized controlled studies on the safety and efficacy of those drugs for that purpose is lacking.³

For centuries, physicians and midwives have advised non-breast-feeding mothers to use nonpharmacologic methods to suppress lactation and for relief of accompanying physical symptoms.⁴ From the 16th through the 19th centuries these techniques included strapping or binding the breasts, emptying the breasts by massage or pump, initiating uterine discharge or bleeding by intrauterine instillation of caustic agents or warm douches,

restricting fluids and diet, and applying external products to the breasts and nipples (eg, belladonna ointment).^{4, 5} Morphine and codeine were recommended for analgesia when needed.⁵ Twentieth century nonpharmacologic methods of lactation suppression have included strapping or binding the breasts or wearing a tightly fitting brassiere, expressing milk from the breasts mechanically or manually, avoiding milk expression, restricting fluid intake, forcing fluids, and applying external products to the breasts and nipples (eg, ice packs, cabbage leaves, and jasmine flowers).^{6, 7}

The evolution of recommendations for lactation suppression during the 20th century is exemplified by a review of 19 editions of a standard text (Table I). Use of tight binders was recommended before 1905; by 1908 the recommendation was changed to ice packs and no tight binders. In 1961 tight binders were once again recommended; in 1976 the recommendation for tight binders was changed to one for comfortable binders. Since 1966 mild analgesics have been recommended.

Whereas a range of nonpharmacologic methods has been recommended for lactation suppression, little attention has been given to evaluating the efficacy of these methods. In addition, little is known about the symptoms of women who do not breast-feed. To review these issues, we characterized the symptoms experienced by postpartum women who do not breast-feed and reviewed the data on the efficacy of nonpharmacologic methods of lactation suppression; we have also suggested future research directions for studying the effectiveness of nonpharmacologic methods. Pharmacologic methods have

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Table I. Chronicle of management of lactation suppression as recommended in *Williams' Obstetrics**

Publication year	No.	Management
1903	1	None stated.
1908-1941	2-8	Leave breasts alone—Do not express milk, massage breasts, or use tight binder; use ice packs if necessary; use placebo for pain or, if severe, 1 dose of morphia; use loose binder for large breasts.†
1945	9	Same as above, plus aspirin and codeine for severe pain. Stillbestrol acknowledged but not recommended.
1950	10	Same as above plus restrict fluids to a bare minimum; for severe pain, use 1 grain of codeine and repeat if necessary.
1956	11	Same as above. Hormone therapy acknowledged but not recommended.
1961	12	Use tight uplift binder and ice packs; limit fluids to a bare minimum; do not pump breasts; use analgesia for severe pain.
1966-1971	13-14	Same as above plus mild analgesics.
1976	15	Use a comfortable binder, ice packs, and mild analgesics.
1980	16	Same as above. Bromocriptine acknowledged but not recommended.
1985-1989	17-18	Same as above. Bromocriptine recommended only after development of severe mammary engorgement.
1993	19	Same as above. Acknowledged that in 1988 the US Food and Drug Administration concluded that no drug should be routinely used to prevent postpartum lactation; acknowledged that several long-acting parenteral forms of drugs are used to prevent lactation outside of the United States.

*Complete citations available from the authors on request.

†Recommended management before 1905 included covering breasts with belladonna ointment, bandaging of breasts tightly, pumping "excess" milk from breasts after they became very engorged and painful, and repeating the process as frequently as necessary.⁵

been reviewed in detail elsewhere,² and they are not recommended for use in the United States, so we have focused on nonpharmacologic methods of lactation suppression.

Material and methods

We searched MEDLINE, *Psychological Abstracts*, and POPLINE for English language reports on lactation suppression beginning in the years 1965, 1974, and 1970, respectively, through January 1997. For these sources we searched the terms *lactation suppression* and *lactation inhibition* appearing anywhere in the article. The Cochrane Pregnancy and Childbirth Database, a database of systematic reviews of published and unpublished controlled trials in pregnancy and childbirth, was also searched for relevant reports for the years 1950 through August 1996. In that database we searched terms appearing anywhere in the title, such as *lactation suppression*, *lactation cessation*, *lactation stopping*, *lactation inhibition*, *stopping lactation*, *breast engorgement*, and *drug effects*. Finally, we searched the terms *lactation prevention* and *breast-feeding* in the Index Catalog for the Library of the Surgeon General's Office, which is a guide to primary sources in medicine and includes more than 3 million books, articles, and pamphlets from the 16th century through the last data set in 1961.

To characterize the symptoms experienced by postpartum women who do not breast-feed, we reviewed data from the placebo arms of pharmacologic studies of lactation suppression. Our criteria for selection were as follows: (1) a randomized trial design, (2) a placebo arm with at least 45 women included, and (3) data on lacta-

tion symptoms by either onset, peak days, degree of severity, or use of analgesics for pain. Studies with at least 45 control subjects were chosen to increase the precision of the effect measures. Fourteen studies met these criteria.⁸⁻²¹ We also included a study of pharmacologic and nonpharmacologic methods of lactation suppression that met these criteria.⁷ For each of the 15 studies we extracted data on the percentages of women experiencing moderate or severe milk leakage, breast engorgement, and pain and the percentage of women using analgesics for postpartum breast pain.

For our review of studies on nonpharmacologic methods of lactation suppression our criteria for selection were as follows: (1) a clear statement of research question(s) with a focus on measuring the effect of nonpharmacologic methods on lactation suppression; (2) descriptions of the sample, data source, and data collection methods; and (3) data from the United States or another developed country. We identified 5 studies meeting these criteria,^{7, 22-25} then reviewed and compared the studies on the basis of their study design, treatment groups, data collection method, and results. Two of the 5 studies compared the efficacy of pharmacologic methods; we eliminated these treatment groups for our review.

Finally, to characterize the symptoms experienced by postpartum women who do not breast-feed and who use a brassiere or binder, ice packs, or analgesics (ie, a currently recommended treatment method for lactation suppression), we restricted our review to the data from the placebo arms of the 15 pharmacologic studies of lactation suppression identified here. Eight of these studies included women in the placebo group who used a

Table II. Symptoms of lactation suppression in postpartum women who do not breast-feed* among placebo groups in clinical trials of pharmacologic lactation suppression methods†

	<i>Milk leakage</i>	<i>Engorgement</i>	<i>Breast pain</i>
Onset	Days 1-3 ²¹	Days 1-3 ²¹ Days 2-3 ¹² Days 2-4 ⁷	Days 1-3 ²¹ Days 2-3 ¹²
Peak days	Days 3-4 ^{14, 17} ; days 3-5 ²¹	Day 4 ⁷ Days 3-4 ^{14, 17} Days 3-5 ²¹	Day 3 ⁷ Days 3-4 ^{14, 17} Days 3-5 ²¹
Degree of severity			
Moderate	22%-49% ^{14, 15, 20}	21%-66% ^{9, 10, 13-15, 17, 18, 20}	29%-68% ^{10, 12-17, 19, 20}
Severe	17%-47% ^{8, 11, 14, 15, 20}	1%-56% ^{7, 8, 11, 14, 15, 18, 20}	10% to 49% ^{8, 10-12, 14-16, 20}
Variability in definitions			
Moderate	Mild to moderate ¹⁵	Tender and congested, ⁹ firm, ^{10, 17, 18} mild to moderate, ¹⁵ or moderate or severe ¹³	Moderate or severe, ¹³ mild to moderate, ¹⁵ tender or tender to palpation, ¹⁷ painful lactation ¹⁹
Severe		Hard, painful, reddened ⁷ or rock hard ¹⁸	

*Includes studies of women who were instructed to use a brassiere or binder to suppress lactation^{7, 14-20}; of these, 4 studies included women who were also instructed to use ice packs^{14-16, 18} and 7 included women who were also advised to use analgesics for pain.^{7, 14-16, 18-20}
†One study⁷ included pharmacologic and nonpharmacologic methods of lactation suppression.

brassiere or binder to suppress lactation^{7, 14-20}; of these, 4 included women who were also instructed to use ice packs,^{14-16, 18} and 7 included women who were also advised to use analgesics for pain.^{7, 14-16, 18-20} For the 8 studies we extracted data on the percentages of women in the placebo group who, despite using a brassiere or binder, ice packs, or analgesics, experienced moderate or severe milk leakage, breast engorgement, and pain and the percentage of women who used analgesics for postpartum breast pain. For none of the trials was use of the recommended treatment verified.

Throughout this report, except in Table I, the term *brassiere* is used when the original reports cited the term *tight brassiere*, *tightly fitting brassiere*, *supporting brassiere*, or *supportive brassiere*. The term *binder* is used when the original reports cited the term *supporting binder*, *tight uplift binder*, or *tight breast binding*. Definitions of these terms were given in only 1 of the original reports.²⁴

Results

Symptoms in postpartum women who do not breast-feed. Among women who do not breast-feed, milk leakage and breast pain begin between 1 to 3 days post partum and engorgement begins between 1 and 4 days post partum (Table II). Milk leakage, engorgement, and breast pain peak at 3-5 days post partum. Considerable pain and engorgement can continue after postpartum day 4.^{7, 9, 17, 19} In 1 study 29% and 10% of women experienced moderate and severe pain, respectively, 14 days post partum.¹⁶ Between one sixth and one half of women experience moderate or severe milk leakage, and up to two thirds experience moderate or severe engorgement and breast pain (Table II). Use of analgesics for breast pain was reported by 22% to 47% of women.^{7, 8, 13, 16}

Studies on nonpharmacologic methods of lactation suppression. The results of the 5 studies on nonpharmacologic methods of lactation suppression are varied because of different study designs, treatment groups, and data collection methods. Only 2 studies^{22, 24} reported statistically significant associations between treatment and outcome (Table III). Bristol²² found that women who wore “binders” were significantly more likely to report breast pain than those who wore “bras or binders.” Brooten et al²⁴ found that women who wore brassieres or binders were significantly more likely to use analgesics than women who had restricted fluid intake. Brooten et al²⁴ also found that women wearing binders were significantly less likely to experience milk leakage than those wearing brassieres or those who had restricted fluid intake. However, these findings are based on small numbers of women.

Symptoms in postpartum women who do not breast-feed and who used a brassiere or binder, ice packs, or analgesics. Among women using a brassiere or binder, ice packs, or analgesics, moderate and severe milk leakage was reported in 22% to 48% and 17% to 40% of women, respectively.^{14, 15, 20} Moderate breast engorgement was reported in 21% to 52% of women^{14, 15, 17, 18, 20} and severe engorgement was reported in 1% to 44% of women.^{7, 11, 14, 15, 18, 20} Moderate pain was reported in 29% to 68% of women,^{7, 14-20} and severe pain was reported in 10% to 33% of women.^{11, 14-16, 20} In only 1 study⁷ was the proportion of women using analgesics for pain reported (42%).

Comment

In the United States 2 million women are delivered of live infants each year and do not breast-feed.¹ Our review

Table III. Studies on nonpharmacologic lactation suppression methods in postpartum women who do not breast-feed

<i>Study</i>	<i>Study design</i>	<i>Treatment group</i>	<i>Age (yr)</i>
Duckman and Hubbard, ⁷ 1950*	Prospective	Group 1 (n = 139): Forced fluids (2500-5000 mL/d) Group 2 (n = 50): Fluids as usual (1500-2500 mL/d)	Unknown
Bristol, ²² 1966	Prospective, randomized trials. Exclusion criteria: Cesarean deliveries or fever during first 10 postpartum days	Group 1 (n = 19): Binder Group 2 (n = 19): Brassiere or binder	16-35
Meserve, ²³ 1982	Prospective, nonrandomized trials. Exclusion criteria: Cesarean deliveries or multiple births	Group 1 (n = 8): Mechanical breast pumping, brassiere Group 2 (n = 5): Ice packs, binder, manual milk expression	Unknown
Brooten et al, ²⁴ 1983*	Prospective, randomized trials. Exclusion criteria: Cesarean deliveries, lacerations, preexisting medical conditions, or pregnancy complications	Group 1 (n = 19): Brassiere Group 2 (n = 18): Restricted fluids (1500 mL/m ² per day) Group 3 (n = 16): Binder	16-38
Webster, ²⁵ 1986	Prospective, nonrandomized trials	Group 1 (n = 59): Manual or mechanical breast pumping (some used binder) Group 2 (n = 42): Brassiere or binder, fluid restriction, no breast or nipple stimulation	Unknown

*Group that received pharmacologic treatment excluded from these comparisons.

suggests that despite current nonpharmacologic treatment for lactation suppression up to one third of women may experience severe breast pain post partum. Thus each year hundreds of thousands of women may experience moderate or severe symptoms associated with lactation cessation.

In 1752 Smellie²⁶ reported that "...a turgency commonly begins about the third day; but by rest, moderate sweating, and the use of...applications, the tension and pain will subside about the fifth or sixth day, especially if the milk runs out at the nipples...." Since then, the characterization of the natural progression of lactation cessation in women who do not breast-feed has progressed little. To our knowledge no studies have focused primarily on the symptoms of postpartum women who do not breast-feed. The placebo arms of randomized trials of pharmacologic methods of lactation suppression offered an opportunity to characterize these symptoms, but this method is imperfect because of the different treatment

groups, measurement instruments and definitions, and analytic and reporting methods used for each study. Thus future studies of the natural progression of lactation cessation in women who do not breast-feed are needed to more accurately describe the symptoms experienced by these women.

Our review indicates directions for future research. For example, published studies have examined various nonpharmacologic methods that may decrease symptoms in women who do not breast-feed. We suggest future research studies that include treatment groups for (1) wearing a breast binder, (2) wearing a tightly fitting brassiere, (3) pumping breast milk mechanically or manually, (4) applying ice packs to the breasts, (5) applying topical analgesics or other substances to the breasts, and (6) taking only oral analgesics. Careful attention will need to be focused on defining and reliably measuring each of these treatments.

Studies with sufficient sample sizes and appropriate

<i>Parity</i>	<i>Treatment instructions for all women</i>	<i>Data collection method</i>	<i>Results</i>
37% primiparous	Use brassiere as needed; use 0.032 g codeine with 0.65 g aspirin as needed	Daily interviews and physical examination for 5 days or up to 8 days if still in hospital	Pain, engorgement, and use of analgesics: No significant differences between groups
Unknown	Use ice bags if necessary and aspirin as needed	Daily interviews and physical examination until discharge; subsequent interviews on postpartum days 5, 10, and 18	Pain: Group 1 significantly more than group 2. Milk leakage, engorgement, and use of analgesics: No significant differences between groups
Unknown	Unknown	Self-administered questionnaire and investigator measurement 3 times daily until engorgement subsided; telephone interviews at 2, 3, and 4 weeks post partum	Milk leakage, engorgement, and pain: Group 1 less than group 2
32% primiparous	Wear brassiere; use ice if necessary and analgesics as needed; do not stimulate breasts	Daily interviews and physical examination on first 3 postpartum days and on postpartum day 5; subsequent interviews on postpartum days 4, 6 or 7, 10, and 14	Use of analgesics: Groups 1 and 3 significantly more than group 2. Milk leakage: Group 3 significantly less than groups 1 and 2. Engorgement (change in breast circumference), incidence and severity of pain, and use of ice: No significant differences between groups
Unknown	Unknown	Self-administered questionnaire 3 times daily until 14th postpartum day	Pain and use of analgesics: No significant differences between groups

power to detect statistically significant differences are needed. In addition, treatment groups should be stratified by parity and previous breast-feeding history because previous childbearing or breast-feeding may affect the natural lactation process.⁹ Although not requisite for valid study results, population-based studies would improve the generalizability of the results.

Future studies should also concentrate on selecting appropriate outcome measures and the means of evaluating them. Not all lactation symptoms may cause discomfort (eg, milk leakage). Other measures (eg, breast pain) are not easily measured objectively, and the study results will depend heavily on the subjective perceptions of the respondents. Researchers will need valid and reliable measurement tools that allow for characterization of outcome measures by onset, duration, prevalence by day, and degree of severity. Observation should extend to at least the first 14 postpartum days, because some symptoms will remain until then.¹⁴

A review of the studies of women who do not breast-feed and who use a brassiere or binder, ice packs, or analgesics indicates that the nonpharmacologic strategies for lactation suppression that are currently recommended most often may leave a substantial proportion of women in considerable pain for most of the first postpartum week. New research is needed to look at existing and alternative strategies. In the meantime we need to recognize and relieve the pain and discomfort associated with lactation cessation; mild analgesics may be insufficient for many women. In 1909 Storrs,⁵ in referring to strategies for management of lactation symptoms at the beginning of the 20th century said that "...a mere list of the suggestions made is bewildering and affords convincing evidence that the vaunted treatment was either inefficacious or useless, or both." One hundred years later, available strategies remain largely unevaluated; existing evidence suggests that current strategies may be inadequate for many women.

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