

# Raynaud's Phenomenon, Candidiasis, and Nipple Pain

## Strategies for Differential Diagnosis and Care

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*Breastfeeding pain is the second most common reason women stop breastfeeding (Strong, 2011); therefore it should be recognized early and treated promptly. Often pain from primary Raynaud's Phenomenon of the Nipple (RP-n) imitates Candidiasis, misleading providers who prescribe antifungal medications. Unfortunately, the correct diagnosis comes after multiple doses of medication and no improvement in breastfeeding pain. Antifungals can further complicate diagnosis because they can cause nipple vasospasm as a side-effect of treatment (Bonyata, 2011). This article presents a case study of RP-n mistaken for Candidiasis. Evidenced-based treatment strategies, education, and close follow-up are minimum standards of care for women with breastfeeding pain. Fragmented healthcare systems can interfere with coordinated, evidence-based care. Raynaud's and Candidiasis can present in very similar manners resulting in a clinical dilemma for providers. However, excellent systematic clinical assessment focusing on the characteristics of the pain can help to differentiate between the two conditions. An algorithm to assist providers in differentiating between the two has been developed.*

**Keywords:** Nipple pain, Raynaud's, vasospasm, breastfeeding

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Breastfeeding is being recognized as the healthiest infant feeding method. Unfortunately, difficulties encountered during a breastfeeding experience can have an enduring effect on both the current breastfeeding relationship and attitudes about further attempts (La Leche League International, 2008). Timely resolution of problems is essential if nursing mothers are to achieve their breastfeeding goals. A nurse is often the first and in some cases the only provider to assist new mothers with breastfeeding during the perinatal period. As the largest part of the healthcare team, nurses play a critical role in educating, assisting, and supporting breastfeeding families. In addition, nurses ensure continuity of care by collaborating and/or referring women for complex breastfeeding situations to professionals certified in the clinical management of breastfeeding and human lactation, International Board Certified Lactation Consultants (IBCLCs). This positions both the nurse and the IBCLC as primary interventionists in preventing and solving breastfeeding problems and challenges (Walker, 2008).

Unresolved problems are likely to lead to early weaning and feelings of failure that can influence subsequent feeding decisions (McClellan et al., 2012). This case study presents the clinical dilemma associated with the assessment, diagnosis, and treatment of nipple pain and

vasospasm associated with Raynaud's Phenomenon of the nipple (RP-n). Nipple pain, blanching, and vasospasm can be related to nipple compression or trauma and should be considered during assessment. We will briefly consider these conditions as part of this clinical dilemma. But the focus of this discussion is on the assessment of nipple pain related to RP-n or Candidiasis to further educate clinicians on how to identify and treat these two problems.

### Nipple Blanching and Vasospasm

When the blood flow to the nipple is decreased or cut off temporarily the nipple may turn white, a condition known as nipple blanching. This most often occurs after a feeding and can be, but is not always, associated with pain (Walker, 2008). The nipple is usually white or pale and misshapen after coming out of the infant's mouth. If there is pain, it will occur seconds after nursing as the circulation is restored. The principal problem associated with nipple blanching is mechanical in nature and correcting a poor latch resulting in nipple compression is the first-line treatment choice. Assessment should include contributing factors, such as clamping due to rapid let-down, tongue-tie, or palate variations (Bonyata, 2011).

When blood vessels in the nipple constrict suddenly causing pain after nursing or in between feedings, this is a more serious condition known as vasospasm. This

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condition can be extremely painful for some and not painful for others. Vasospasm can occur in conjunction with other causes of pain or alone but most likely from damaged nipples or Candidiasis (Newman & Kernerman, 2009). Unlike blanching, positioning and latch are not implicated. Healing the nipple trauma should resolve this condition unless the underlying cause is part of a larger syndrome, such as Raynaud's Phenomenon (Australian Breastfeeding Association, 2011; Bonyata, 2011; Goldfarb, 2002-2011).

## Raynaud's Phenomenon

Raynaud's Phenomenon (RP) is a vasospastic disorder associated with exposure to cold temperatures or stress resulting in a decreased blood supply to the outer extremities, generally the hands and feet. More specifically, hyperactivation of the sympathetic system causes extreme vasoconstriction of peripheral arteries and arterioles resulting in tissue hypoxia. The pathophysiology is not completely understood and may be multi-factorial, including vascular, intravascular, and neural mediators (Levien, 2010). Characteristically there is a biphasic or triphasic color change in the affected areas, from white (pallor) to blue (hypoxia) to red (hyperemia), accompanied by numbness, tingling, and pain. When the episode subsides, or the area is warmed, color returns to normal. Not all patients experience color changes associated with classic RP, especially in milder cases. The cyclic color changes of classic RP may disappear during pregnancy because of increased surface blood flow. In nursing mothers, the nipples usually turn white and can be very painful. This phenomenon can be idiopathic (Raynaud's Disease/Primary RP) or associated with a wide variety of other conditions (Raynaud's Syndrome/Secondary RP). Primary RP may be the first presenting symptom of diseases associated with Secondary RP, making this condition an important part of the documented health history (U.S. Department of Health & Human Services, 2011).

Raynaud's Phenomenon affects 20% of all women of childbearing age (O'Sullivan & Keith, 2011). Although RP was first described in 1862, the relationship between nipple vasospasm and RP was not suggested until 1992 (Morino & Winn, 2007). Many practicing clinicians are unaware of this condition and mistake it for Candidiasis. The literature suggests using a bacteriological analysis of breast milk to differentially diagnose Raynaud's syndrome from other infectious conditions (Delgado et al., 2009). Cultures will be negative in RP-n. However, this study was done with a small sample of 10 lactating women, five with

RP-n and five with mastitis. Further research is needed to substantiate this as a valuable diagnostic tool.

In multiple case studies of RP-n that appeared in the literature between 1997 and 2007, the majority of women received antifungal therapy without relief before a diagnosis of RP-n was made. Anecdotal evidence from multiple breastfeeding blog sites indicates that clinicians remain unfamiliar with this condition and may not take it seriously (Hills, 2011; Hoen & Backe, 2009; Sealy, 2011; Yetter, 2011).

Raynaud's Phenomenon of the nipple is a condition that can frequently be managed by avoiding triggers. Normal behaviors associated with breastfeeding, like offering a wet nipple to encourage latch, wearing breast pads that become wet when milk lets down, and feeding during colder nighttime hours, can contribute to vasospasm. High levels of estrogen have also been implicated because of estrogen's association with the body's reaction to cold (Hills, 2011). Other triggers that have been identified include stress, caffeine consumption, smoking, alcohol, and medications that promote vasoconstriction. Women should be instructed to avoid lifestyle triggers, reduce emotional stress, and avoid sudden temperature change or cold environments. Wearing warm clothing and keeping the ambient temperature warm can prevent episodes of vasospasm (Anderson et al., 2004; Bonyata, 2011; Morino & Winn, 2007). Taking a warm shower or applying dry heat to the breast after breastfeeding is also suggested as a method of alleviating discomfort (Riordan & Wambach, 2010). Drinking a hot beverage can also help, as it raises core body temperature.

When prevention is unsuccessful there are a variety of supplements, herbs, and drugs that can be used to control the discomfort associated with this condition. There is evidence to suggest that dietary supplementation with calcium and magnesium or vitamin B<sub>6</sub>, evening primrose oil, olive oil, or fish oil can reduce symptoms (Anderson et al., 2004; Newman & Kernerman, 2009). The medical alternative to complementary therapies is the use of a calcium channel blocker, like nifedipine. These medications inhibit the uptake of calcium by vascular smooth muscles resulting in vasodilation (Garrison, 2002).

## Candidiasis

Candidiasis is an overgrowth of naturally occurring yeast, *Candida albicans*, which lives on the skin, mucous membranes, and genitourinary track. Because the infant's mouth and mother's nipples are warm and moist, this yeast readily grows in these areas. Candidiasis can

occur at any time during lactation, but infants or mothers who have received antibiotic therapy, or mothers with nipple trauma, are more susceptible. Additionally, mothers with vaginal Candidiasis prior to delivery can infect their infants during vaginal birth, who then infect the mothers' breast and nipple during breastfeeding (Brent, 2001; Riordan & Wambach, 2010). Organism transfer has been significantly associated with the use of pacifiers and bottles containing artificial milk fortified with iron (Morrill et al., 2005) or high levels of sugars.

Diagnosing this condition can be problematic because it is based on history, physical examination, and clinical symptoms rather than a laboratory test. There is ongoing controversy in the literature regarding whether *Candida albicans* can reside in the ductal system of the breast and play a significant role in breast pain and infection (Amir et al., 2011; Delgado et al., 2009; Hale et al., 2009). Several studies have attempted to confirm diagnosis with milk and nipple cultures. But the accuracy and methodologies are highly contentious. Lactoferrin, which is present in human milk, inhibits growth of *Candida*. *Candida albicans* is a common fungus colonized in human tissues, and as many as 80 to 90 percent of infants have culturable *Candida albicans* present in their mouths. Another difficulty in using cultures to diagnose *Candida* is that mothers continue to be in pain while waiting on lab results.

Less disputable is the necessity for early recognition and treatment utilizing excellent systematic clinical skills. Typical symptoms given by mothers with presumptive Candidiasis are persistent sore nipples; rapid development of soreness; flaky, red, shiny skin; burning or itching; and shooting or stabbing pains deep into the breast. Mothers usually complain of severe discomfort and tenderness during or immediately after feedings. However, complaints of pain may not present exactly as described.

Assessing and correcting for mechanical abnormalities as well as ruling out pathophysiological reasons, such as vasospasms and Raynaud's phenomenon, are first line treatment approaches. Other interventions include air drying nipples, disposing of wet nursing pads, wearing 100% cotton bras and underwear that can be washed in very hot water, making dietary changes, and taking acidophilus daily for two weeks beyond symptoms (Riordan & Wambach, 2010).

There are a number of treatment options that have not proven effective, such as applying warm wet compresses, tea bags, and oils. First-line pharmacologic treatments include mupirocin 2% ointment, clotrimazole topical antifungal applied in very thin coats to the nipple.

Gentian violet kills *Candida* and can be painted on the nipples and areolae. Miconazole gel can be used for the infant's mouth and can be applied after each feeding.

When all other measures fail and/or culture results confirm *Candida* in the milk, Fluconazole can be used. Fluconazole is a systemic agent that can be used until the mother is relieved from pain. Treatment strategies should occur simultaneously by using pharmacological and non-pharmacological interventions as well as treating mother and infant.

Although Candidiasis is often diagnosed in breastfeeding women presenting with breast pain, other microorganisms have been implicated in breast infection and should not be overlooked. Milk cultures have identified the presence of both *staphylococcus aureus* (s-au) and *streptococcus*. The presence of these two bacteria does not predict a breast infection unless there are other risk factors, such as cracked nipples or a previous mastitis. Cracked nipples potentiate a point of entry for both bacteria and *Candida*. These findings question antifungals as a first-line treatment without laboratory confirmation (Betzold, 2012; Hale et al., 2009).

Evidenced-based treatment strategies, education, and close follow-up are minimum standards of care for women with breastfeeding pain. Candidiasis can lead to frustration in the breastfeeding mother if pain is not relieved. Healthcare providers should encourage women to continue breastfeeding even though they may not get immediate relief. Good documentation is essential to mapping the progression and treatment efforts especially for those women who are more susceptible to Candidiasis.

## Case Presentation

LM was a 30-year old first time mother with a pregnancy complicated by pre-eclampsia and postpartum hemorrhage. Her delivery was induced at 38 weeks following elevated blood pressures and uric acid levels in the presence of a ripe cervix. She delivered a healthy male child with APGAR scores of 9 and 10. LM was a healthcare provider who worked in the same metropolitan hospital where she delivered. She was committed to early and exclusive breastfeeding and was well prepared for a natural childbirth experience with a doula in attendance. She also attended a breastfeeding workshop prior to delivery. Breastfeeding began with skin-to-skin contact immediately following delivery and continued on demand with rooming-in during a three-day hospital stay.

While in the hospital, LM experienced nipple pain that increased with each subsequent feeding. The two

physicians who saw her and the baby in the hospital both supported her desire to breastfeed, but provided no breastfeeding assessment, support, or referral. The nurses provided her with nipple shields for the pain but never did a breast, latch, or feeding assessment. Lactation consultant services were not available over the weekend when she delivered. She quickly lost confidence in the nursing staff and believed they didn't know any more than she did. "They knew what I knew...If I had to say one word it would be nurses are clueless." Therefore, LM was discharged with breast pain without a referral to an IBCLC or community resources.

At one week postpartum, LM encountered a friend who was a lactation consultant (IBCLC). The IBCLC evaluated her latch and identified a disorganized sucking pattern requiring tongue training. After LM taught the infant to suck, the nipple pain subsided temporarily but at five weeks she still felt sharp, shooting, tingling pain from the top of the breast to the nipple. She also noticed "white patches" on the nipples. Several weeks later, the pediatrician noticed a white patch in the infant's mouth and diagnosed him with thrush. During the interval between these two events, LM received a 10-day course of antibiotics. Nystatin Suspension was prescribed for the infant. The obstetrician was notified and requested nipple cultures for yeast, which proved to be negative. At the same visit an oral antifungal and topical cream were prescribed for her. The infant responded well to treatment but the mother continued to experience pain.

By 12 weeks, LM received four rounds of antifungal therapy without relief. At this point she feared she would be forced to stop breastfeeding because she was returning to work and needed to pump. "I hope this doesn't make me quit, not because of the medication, but because of the pumping factor...you can't pump when you have yeast...I was very upset that I had yeast that I couldn't get rid of and I had to pump!"

In frustration LM called her friend, the IBCLC, and arranged for a consultation during which RP-n was noted on assessment. "After everything didn't work, she looked at it and said that looks like Raynaud's." Nifedipine was discussed as a first line treatment but LM, who had a past medical history of low blood pressure, was afraid to take it because of the rapid lowering of blood pressure associated with its use. She continued to breastfeed for thirteen months, pumping while at work, and using warm compresses on the nipple to manage the pain. "I found it to be a good experience even though some crazy things happened. I know a lot more now....I would do it again, I did do it again." LM has subsequently had a second pregnancy and successfully breastfed this infant also.

## Discussion

Breastfeeding support should occur across the perinatal experience. This case illuminates serious issues with the current healthcare system and quality of healthcare provided to breastfeeding women in the hospital and beyond. As we have established earlier, breastfeeding pain is a common reason women stop breastfeeding or decide not to begin. Mothers need support, encouragement, and close follow-up, particularly during the hospital stay and after discharge to promote continuation of breastfeeding. The hospital nurses failed LM because they did not adequately assist her with basic breastfeeding care, nor did they initiate a referral to an IBCLC for a comprehensive assessment prior to leaving the hospital. Problems that should have been identified and addressed early went unresolved, resulting in nipple trauma, unnecessary treatments, and undiagnosed RP-n. LM was very committed to breastfeeding despite the challenges she encountered. However, a less-dedicated mother with fewer informal healthcare resources would likely have given up in the face of these challenges.

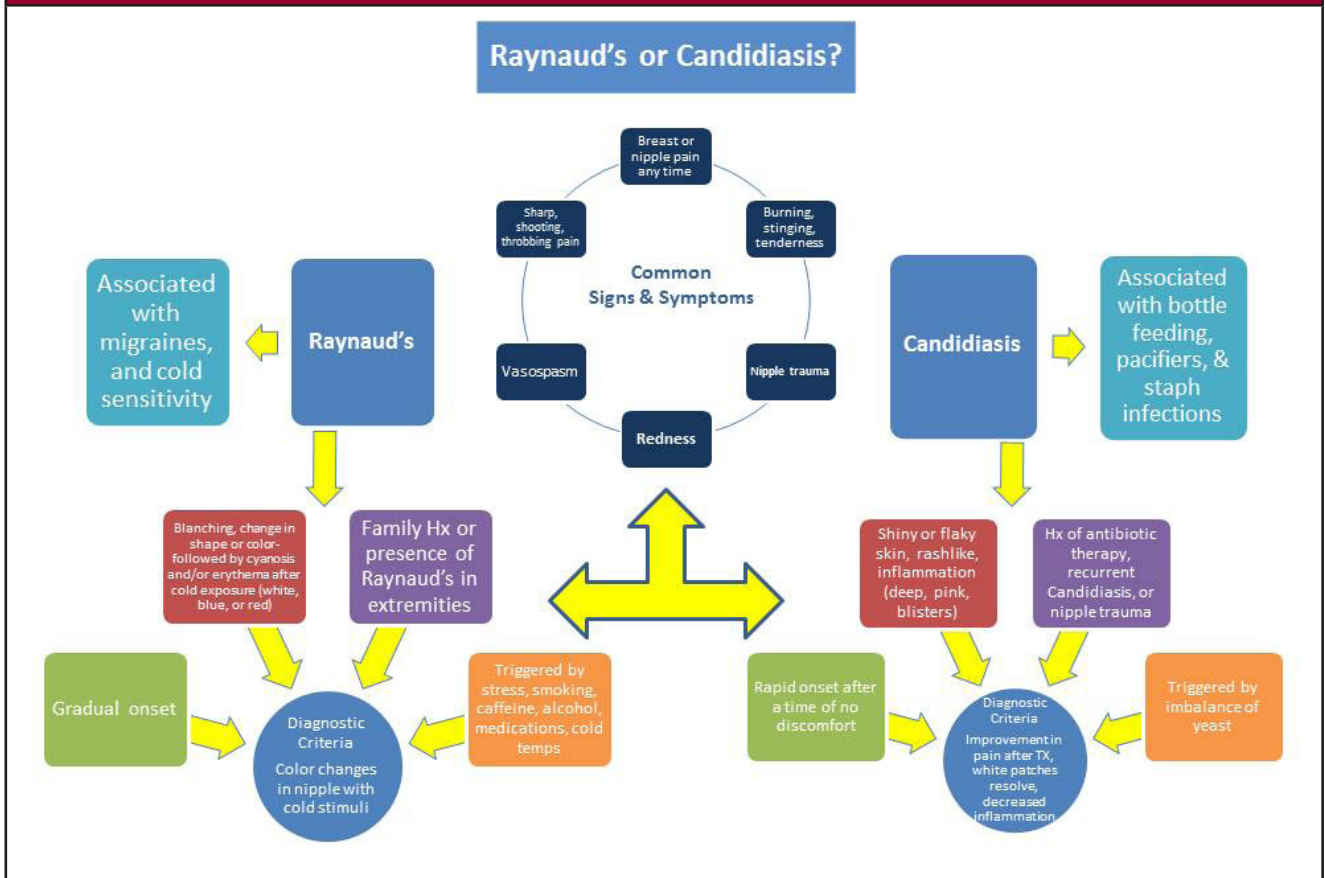
This case study emphasizes the clinical dilemma faced by healthcare providers conducting an assessment for a patient presenting with breastfeeding and nipple pain. Our algorithm (Figure 1) presents the diagnostic criteria for these two complex conditions, with an emphasis on distinguishing characteristics. The intended purpose of an algorithm is to improve and standardize decisions while reducing error in situations of uncertainty. Use of this algorithm can help clinicians conduct a targeted breast assessment, identify distinguishing characteristics, and prevent unnecessary treatment.

## Significance for Health Providers

Nurses and IBCLCs play an integral role as part of the healthcare team, providing evidence-based healthcare, advocating for resources, and identifying the need for referrals. Breastfeeding education, care, and support from nurses as well as comprehensive lactation care including the management of complex breastfeeding problems from IBCLCs are standards of care for women and should be provided and accessible for the prevention, identification, and remediation of early breastfeeding challenges (Walker, 2008). Recommendation 5.6 of the Affordable Care Act ensures that breastfeeding counseling will be covered; but interpretation of who provides this counseling and for how long is unspecified (U.S. Department of Health & Human Services, 2012).

According to the *Surgeon General's Call to Action* (U.S. Department of Health & Human Services, 2011), new

Figure 1. Is It Raynaud's or Candidiasis? (link)



mothers need access to trained individuals with established relationships in the healthcare community who are flexible enough to meet mothers' needs outside of traditional work hours and locations, and who provide consistent information. Yet evidenced-based knowledge, clinical skills, and attitudes of healthcare providers are known to be lacking therefore creating barriers to breastfeeding women (Grossman et al., 2009). Educators are often forgotten as part of the healthcare team, but national organizations (United States Breastfeeding Committee, 2010; U.S. Department of Health & Human Services, 2011) are emphasizing the need for educators to be pivotal leaders in incorporating breastfeeding and human lactation education into all levels of curricula. Additionally, this issue could be addressed through coordinated healthcare systems that partner with community networks in providing breastfeeding support so mothers have access to breastfeeding assistance after they return home. A model program is the Nurse and Family Partnership, an evidence-based home visiting program (<http://www.nursefamilypartnership.org>).

Raynaud's and Candidiasis can be challenging for clinicians to accurately assess and assist with

evidence-based recommendations because they have similar clinical symptoms and a lack of standardized diagnostic tools. This article offers an algorithm to help clinicians better distinguish between RP-n and Candidiasis based on the mother/infant dyad's history and physical examination. Medical treatment may be necessary for either condition but non-pharmacological as well as pharmacological measures should accompany those interventions.

### Implications for Practice

The diagnosis of RP-n or Candidiasis does not mean breastfeeding must stop. However, more research needs to be conducted on better diagnostic tools, additional treatment options, and conditions/predisposing factors associated with both diseases. Research is necessary to explain the pathogenesis of these conditions and to further educate clinicians on how to identify and assist with these two problems. Clinicians are cautioned to consider the differential diagnosis of nipple pain before recommending antifungal treatment.

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Dr. Genae Strong is an Assistant Professor at the University of Memphis, Loewenberg School of Nursing, with over 20 years of experience supporting breastfeeding women through teaching, research, and community service. Dr. Strong has published in the field of lactation and maintains a program of research focused on overcoming the barriers healthcare providers face while assisting the breastfeeding dyad. Currently, Dr. Strong is designing a breastfeeding educational curriculum for pre-licensure nursing students to improve their confidence, competence, and clinical experiences as recommended by national and international practice standards. Serving as the Memphis Area Lactation Consultant Association's (MALCA) president, and an active member of the Shelby County

Breastfeeding Coalition (SCBC), Dr. Strong has a “strong” passion for improving the health of women and their infants.



Dr. Nancy Mele is an Associate Professor at the University of Memphis Loewenberg School of Nursing. She has over 40 years of experience as a maternal child nurse and perinatal clinical specialist. Dr. Mele has worked with nursing mothers in the NICU, postpartum, and the community. She has taught prepared childbirth classes and formed a chapter of the La Leche League in the U.S., and while stationed overseas with her husband. Since entering academia, Dr. Mele has supported student learning through teaching about breastfeeding, serving women and children through the March of Dimes, and conducting research. She currently has two funded research studies on breastfeeding education for pre-licensure nursing students. Dr. Mele's doctoral education focused on health policy and she

is currently active with several professional organizations in protecting women's and infant's health through legislative action. She is a curriculum and evaluation specialist and has plans to obtain her certification as a breastfeeding educator. Protecting and promoting health through breastfeeding has been her foundation for practice throughout her career.

## **New from the Centers for Disease Control and Prevention**

### **Women's Health Year in Review**

In 2012, CDC made numerous contributions to better understand, address, improve, and promote the health, safety, and quality of life of women at all stages of life. [\*Women's Health 2012: A Year in Review\*](#) highlights the Action Guides published to complement *The Surgeon General's Call to Action to Support Breastfeeding*, outlining what doctors, nurses, and healthcare providers can do to make it possible for mothers to breastfeed their babies.