

# Painful nipples in nursing mothers: Fungal or staphylococcal?

## A preliminary study

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**P**ainful nipples, or 'breast thrush', in nursing mothers is a well recognised condition. It is a clinical diagnosis characterised by intense nipple pain often radiating into the breast, especially during breastfeeding. Between feeds it may cause a burning sensation and tenderness; breastfeeding may be abandoned because of it. On examination, there is no cellulitis, no masses in the breast, or fever; the usual accompaniments of mastitis or breast abscess. The nipples may contain fissures, be slightly swollen with a shiny appearance, or there may be mild areola erythema. There may be no signs.

Breast thrush implies a fungal (eg. candida) infection.<sup>1-4</sup> Therefore, it is often treated with antifungal creams, lotions or tablets. Sometimes it resolves. However, some clinicians have expressed doubt.<sup>5</sup>

### Methods

Twenty-eight patients with tender nipples were recruited among patients of two of the authors, in addition to several general practitioners in Geelong, Victoria, during 2001. Patients were enrolled on the basis of a clinical diagnosis (before any micro-

biological tests were undertaken). The control group consisted of 23 lactating women recruited at an Australian Breastfeeding Association conference in Geelong in March 2003.

Swabs were taken of the patients' left and right nipples, and a sample of milk was taken from both breasts. Additional swabs were taken from the anterior nares and lower vagina. The babies' oropharynx were also swabbed. All swabs were processed as routine specimens: culture on horse blood agar, incubated at 35°C aerobically for 48 hours (suitable for detecting *Candida* sp and *Staphylococcus aureus*). All suspect colonies were identified by Gram stain and an automated system.

Patients who grew *Staphylococcus aureus* from nipple or milk specimens were offered suitable antibiotic treatment, while those who grew *Staphylococcus aureus* in the nose or vagina only, were assumed to be colonised. Babies who grew *Staphylococcus aureus* from their oropharyngeal swab were also only observed and not treated.

### Results

Of the 28 patients with symptoms, 57% had nipple swabs positive for *Staphylococcus aureus* (none positive for *Candida* sp) and 48% had milk specimens positive for *Staphylococcus aureus* (none positive for *Candida* sp). In contrast, the 'control' mothers had *Staphylococcus aureus* neither on their nipples nor in their milk. Of the mothers with symptoms, 42% were colonised with *Staphylococcus aureus* in their anterior nares. A control group of lactating women without 'breast thrush' had a carriage rate of 26%, not significant ( $p=0.27$ ) (Table 1).

Colonisation of the vagina with *Staphylococcus aureus* appeared uncommon (1/17), as was colonisation with *Candida* sp (0/17) in this group.

The two babies (2/21) with *Staphylococcus aureus* in their oropharynx both had mothers with infected nipples. However, 10 babies without *Staphylococcus aureus* in their oropharynx had mothers with infected nipples or infected milk. Therefore, the risk to the baby of acquiring *Staphylococcus aureus*

**Table 1. Patients clinically diagnosed with 'breast thrush' (n=28) and normal lactating controls (n=23): results of microbiological investigations**

Microbiological culture of	Positive for <i>Staphylococcus aureus</i>		Positive for <i>Candida</i> sp	
	Patients with symptoms	Control group	Patients with symptoms	Control group
Nipples	16/28 (57%)	0/23 (0%)	0/28 (0%)	1/23 (4%)
Milk	13/27 (48%)	0/23 (0%)	0/27 (0%)	0/23 (0%)
Anterior nares	8/19 (42%)	6/23 (26%)	0/19 (0%)	0/23 (0%)
Lower vagina	1/17 (6%)	ND*	0/17 (0%)	ND*
Oropharynx of neonate	2/21 (10%)	0/12 (0%)	1/21 (5%)	3/12 (25%)

NB: The only statistically significant difference ( $p < 0.001$ ) between patients with symptoms and controls was for nipples and milk positive for *Staphylococcus aureus*. No other comparisons reached statistical significance.

\* ND: not done.

oropharyngeal colonisation from an infected mother seems to be low (15%). Four babies had *Candida albicans* in their oropharynx (thrush), but three were 'control' babies. Therefore, the babies' oropharynx may be colonised with *Candida albicans* but this does not correlate with the mother having breast thrush.

## Discussion

Many people are colonised with *Staphylococcus aureus* without any symptoms or apparent adverse effects. Commonly colonised sites include the anterior nares and the skin, especially damp, warm sites (eg. axillae, perineum). *Staphylococcus aureus* is well recognised as infecting the breast (mastitis) and causing abscess formation in this organ. We have found that *Staphylococcus aureus* causes a mild infection of the nipples with concomitant ascending infection of lactiferous ducts and milk contamination, confirming past research.<sup>6-9</sup>

We found no cause for half of the women's symptoms. Perhaps the aetiology is heterogenous and these mothers and infants had attachment problems. Perhaps this is an early stage in a spec-

trum: that tender nipple is a mild staphylococcal infection of the nipple caused by initial trauma from attachment problems that may progress onto an ascending infection of the breast.

We are now undertaking a larger and more detailed study.

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## Implications of this study for general practice

- Breastfeeding mothers with tender nipples are unlikely to have candidiasis of the nipples.
- Some breastfeeding mothers may have nipple infection with *Staphylococcus aureus*.
- The preliminary data of this study suggests that the association may be causal.

Conflict of interest: none declared.

## References

1. Amir L, Hoover K, Mulford C. Candidiasis and breastfeeding. In: Lactation Consultant Series, La Leche League International, Inc. 1995.
2. Amir L, Garland S, Dennerstein L, Farish S. *Candida albicans*: Is it associated with nipple pain in lactating women? *Gynecol Obstet Invest* 1996; 41:30-34.
3. Heinig M, Francis J, Pappagianis D. Mammary candidiasis in lactating women. *J Hum Lact* 1999; 15:281-288.
4. Brent N B. Thrush in the breastfeeding dyad: Results of a survey on diagnosis and treatment. *Clin Paed* 2001; 40:503-506.
5. Noble R. Thrush in the ducts? *Med J Aust* 1991; 155:131.
6. Livingstone V, Willis C, Berkowitz J. *Staphylococcus aureus* and sore nipples. *Can Fam Physician* 1996; 42:654-659.
7. Thomassen P, Johansson V-A, Wassberg C, Petrini B. Breastfeeding, pain and infection. *Gynecol Obstet Invest* 1998; 46:73-74.
8. Livingstone V, Stringer L. The treatment of *Staphylococcus aureus* infected sore nipples: A randomised comparative study. *J Hum Lact* 1999; 15:241-246.
9. Kinlay J, O'Connell D, Kinlay S. Risk factors for mastitis in breastfeeding women: Results of a prospective cohort study. *Aust N Z J Pub Health* 2001; 25:115-120.

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