



## The Possible Link Between Gynecomastia, Topical Lavender, and Tea Tree Oil

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**F**or girls, precocious thelarche denotes the development of definitive palpable breast tissue before the normal age of pubertal onset, which is about 8 years old for black females and about 9 years old for all other ethnicities.

Precocious thelarche (PT) is distinct from precocious puberty, which implies intrinsic abnormalities of the hypothalamic-pituitary-ovarian axis, either gonadotropin-dependent or -independent. Benign PT is usually due to nonhormonal causes; exposure to exogenous estrogens; or an individual's high sensitivity to endogenous estrogens.

Pediatricians are keenly aware of the high rate of the normal developmental variant of male gynecomastia in preteen and teen males. This is a transient — mostly self-limited, but still troubling — phenomenon of 1 to 2 years duration. It may occur in about two-thirds of males older than 11 years with a peak at age 14.<sup>1</sup> We readily reassure parents and child about this normal variant, but it may be more worrisome in a school-aged or preschool boy, even without any further pathologic pubertal development.

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Figure 1. Precocious thelarche in 9-month-old female with daily exposure to bottle of pink baby lotion. Source: Block SL. Reprinted with permission.

For the purposes of this article, I am going to lump female PT and male prepubertal gynecomastia into a single group of “prepubertal gynecomastia,” although most cases have been noted in females.

### TOPICAL LAVENDER AND TEA TREE OIL AS CULPRITS

For more than a decade, in my office practice, I have witnessed a marked

increase in the rates of male and mostly female prepubertal gynecomastia in children 6 months to 3 years (see Figures 1 and 2). Then in February 2007, Henley and colleagues published an article in *The New England Journal of Medicine* documenting the physiologic effects topical lavender and tea tree oil had on three prepubertal boys, aged 4 to 8 years old.<sup>2</sup> Despite an extensive, thorough conventional



Figure 2. Precocious thelarche in an 18-month-old female with daily lavender "calming cream" exposure. Source: Block SL. Reprinted with permission.



Figure 3A. Unilateral PT in 15-month-old female exposed to lavender "calming cream" for a month. Figure 3B. Nine months after lavender use discontinued in child seen in Figure 3A. Source: Block SL. Reprinted with permission.



workup of the boys' gynecomastia, they could trace the only postulated source of the problem back to the skin application of these two products.

In their laboratory, the researchers were able to show that lavender and tea tree oil possessed anti-androgenic and pro-estrogenic proclivities, which caused a hyper-proliferation of human breast tissue cells in vitro. The substances did not uniformly affect all boys, however, as a similarly exposed younger sibling of an index case did not develop gynecomastia. The investigators discontinued the topical substances in the three boys, and the gynecomastia resolved rapidly.

Two current textbooks have accepted these data as supportive evidence that lavender and tea tree oil are implicated in at least male prepubertal gynecomastia.<sup>1,3</sup>

#### INFORMAL CHART REVIEW OF GYNECOMASTIA CASES

In a preliminary retrospective blinded look at all patient charts from 2007 to 2008 in our general pediatric private practice, we extracted data from all patients younger than 5 years with the diagnosis of "gynecomastia" or PT ( $n = 33$ ). This time interval was before most of our parent population with infants and young children was

being educated about the possible association of the condition with lavender and tea tree oil.

The diagnosis of prepubertal gynecomastia, which was based on at least 3 cm to 4 cm of palpable breast tissue, was recorded in 31 (3%) of an approximate 1,100 children birth cohort younger than 6 years old over the 2-year interval. (Many milder cases remained undocumented.)

Only two children were older than 2 years (3 years old and 4 years old, respectively); one child had received soy formula; four were breast-fed; 28 were female; five were male; 30 were white; two were black; one was Hispanic; 12 had documented lavender or tea tree oil use; the remaining children's lotion status was not documented. Twenty-one children were older than 4 months, and only one of these children had a change in height percentile of more than 20% over a 1-year interval. Only one child had unilateral gynecomastia (see Figure 3A). After 1 year of patient follow-up, no more chart notations of gynecomastia were noted in any of the respective charts (see Figure 3B).

#### EXOGENOUS SOURCES OF LAVENDER AND TEA TREE OIL

If you wish to forewarn parents about the possible risks of these agents, you'll

need to know in which products or sources these two agents can be found. After more than 5 years of conducting my own informal research, which included purchasing many lotions and creams and various Internet searches, I discovered a disturbing pattern: Sadly, these ingredients are rarely listed in many of the labels, or if they are, then they are not listed clearly.

The following markers are likely to indicate lavender or tea tree oil as an ingredient:

##### Bottle or Cap Color

Key colors of the bottle exteriors or caps are either purple or dark blue, which often indicates lavender as an ingredient; or pink, which often indicates, specifically, "flower fragrance" (perhaps a lower concentration of the lavender flower), or beeswax as an ingredient. Note: It is not the color of the lotion or cream itself that is an indicator.

##### Key Label Terms

Words such as "calming cream," "for sleep," or "soothing" usually indicate a lavender ingredient. Occasionally, you can find the specific terms of lavender, tea tree oil, or beeswax in the label.

But not always. Using the search functions on the manufacturing websites for



Figure 4. Precocious thelarche in a 21-month-old female with intermittent lavender calming cream exposure. Source: Block SL. Reprinted with permission.

some of the most recognizable names in baby care products, I entered the terms “tea tree oil” and “lavender.” Despite nearly 300 hits, only a fraction of the specific products appearing in the search results actually listed the terms as ingredients. On a popular, beeswax-based skin care brand’s website, a search for “tea tree oil” turned up 189 results for products containing it. Yet, many of these products, when I personally inspected them in the store or online, did not list “tea tree oil” on the respective product’s list of ingredients.

On one popular skin care manufacturer’s website, a search for “lavender” returned 64 results, yet it is not listed as an ingredient on the labels of most of the company’s lotions that I inspected.

Another manufacturer’s website for dermatologic products does not even allow an ingredient search. Meanwhile, “flower fragrance” is a common label ingredient on several of its products.

This lack of transparency for the ingredients used in baby and child skin care and hair care products concerns me.

Note that these substances are also ingredients in many hair conditioners (especially hair salon products), shampoos, and even carpet cleaners. I treated a 1-year-old child with rug burns on her knees, and who had PT without any usual source. She was crawling on carpet sprayed weekly with a popular carpet deodorizer (marketed in a purple bottle with lavender scent). Her PT resolved over a few months once the parents discontinued using it.

My gestalt is that the severity of the prepubertal gynecomastia is likely dependent upon several factors: duration of exposure; potency of exposure (tea tree oil > lavender products > pink bottles/flower fragrance); amount applied to skin (full body, dry skin areas, and scalp). Based on my observations, I advise parents that once the dermatologic agents are eliminated, gynecomastia usually resolves within 9 to 12 months.

### CONCLUSION

Vigilant follow-up of children older than 3 years with prepubertal gynecomastia is essential, with particular attention paid to signs of androgenization, rapid growth spurt, vaginal estrogenization, or dermatologic findings suggestive of McCune-Albright syndrome or neurofibromatosis.<sup>4</sup> I have seen several healthy 3- and 4-year-old girls who had been exposed to either lavender calming cream or hair conditioner, and whose PT resolved within 6 months once the purported offending agent was eliminated. Of note is that neither tea tree oil nor lavender affect patients once they reach puberty.

Thus, when a clinician encounters a normal child younger than 6 years with prepubertal gynecomastia/PT, extensive inquiries about the use of any dermatologic or hair care products (in-

cluding baby wipes) that might contain lavender, “flower fragrance,” tea tree oil, or even beeswax would be prudent. Asking about a topical’s purple or pink color coding of the bottle or bottle cap may yield the only clue to a potential offending dermatologic agent. In my experience, prompt elimination of the substance will nearly always result in a dissipation of the breast enlargement over a period of 9 to 12 months.

PT is not a painful or detrimental condition, but once the parent or physician notices it, it is quite alarming. Avoiding the expensive and upsetting evaluation for precocious puberty, and reassuring the parents of the self-limited nature of their child’s condition (see Figure 4), can be more calming and soothing than any calming cream.

For more information on other environmental factors affecting gynecomastia, please see the *Pediatrics* articles by Buck<sup>5</sup> and Durmaz.<sup>6</sup> ■

### REFERENCES

1. Ali O, Donohue PA. Gynecomastia. In: Kliegman RM, Stanton BF, Geme JW, Schor NF, Behrman RE, eds. *Nelson Textbook of Pediatrics*. Philadelphia: Saunders/Elsevier; 2011.
2. Henley DV, Lipson N, Korach KS, Bloch CA. Prepubertal gynecomastia linked to lavender and tea tree oils. *N Engl J Med*. 2007;356(5):479-485.
3. Personovitz OH and Walwood EC, eds. *When Puberty is Precocious: Scientific and Clinical Aspects*. Totowa, NJ: Humana Press; 2007.
4. de Vries L, Guz-Mark A, Lazar L, Reches A, Phillip M. Premature thelarche: age at presentation affects clinical course but not clinical characteristics or risk to progress to precocious puberty. *J Pediatr*. 2010;156(3):466-471.
5. Buck Louis GM, Gray LE Jr, Marcus M, et al. Environmental factors and puberty timing: expert panel research needs. *Pediatrics*. 2008;121(Suppl 3):S192-S207.
6. Durmaz E, Ozmert EN, Erkekoglu P, Giray B, Derman O, Hincal F, Yurdakök K. Plasma phthalate levels in pubertal gynecomastia. *Pediatrics*. 2010;125(1):e122-e129.

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