

Nursing Bra Clip-System

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Contextual Review and Concept: The American Academy of Pediatrics recommends that babies should be exclusively breastfed until 6 months old and should continue to have breastmilk as part of their diet until 2 years old (AAPA, 2012; Brown & Hodges, 2015). However, the CDC (2021) recently reported that approximately only 46% of babies in the U.S. are exclusively breastfed for 3 months, and by 6 months that rate drops to 25%. It is reported that 60 percent of mothers do not breastfeed for the duration that they initially intend to due to issues with latching, unsupportive work policies, and cultural norms (CDC, 2021). Furthermore, breastfeeding is a time-consuming process in which mothers report feeding their infants approximately every 3 hours for 20-30 minutes per feeding session (Gordon, 2015). This equates to about 4 hours per day. Due to this time, and the repetition of body posture and sitting position throughout the day, women reported backaches and tension through their shoulders, as well as neck, arm, and wrist pain while breastfeeding (Gordon, 2015; Gjerdingen et al. 1993). With all of this in mind, *the design challenge was to invent a technology and design solution to help mothers address issues with breastfeeding in hopes to facilitate a better breastfeeding experience and as a result, increasing the duration in which mothers breastfeed their infants. Research questions included:* What are barriers to breast exposure while breastfeeding? What mechanisms can be used to decrease physical discomfort during breastfeeding? And how can a nursing bra be redesigned to better accommodate the needs of both mom and baby?

Process, Technique, and Execution: The researcher utilized the Apparel Design (AD) Framework (Lamb & Kallal, 1992) to develop a clip system with integrates into a nursing bra to hold up a mother's shirt while she breastfeeds, pumps, or expresses milk. Stage 1 of the design process is problem identification. The researcher used sociocultural capital (e.g. personal experiences/events) to serve as the influence to invent this design solution. The researcher struggled with neck and back pain, the inconvenience of not being able to feed comfortably in public due to not being able to take off her shirt, and the struggle to find breastfeeding-friendly apparel. As previously mentioned in the literature review, mother's reported experiencing aches in their neck and back while breastfeeding (Gordon, 2015; Gjerdingen et al.

1993), one component contributing to this is that many mothers hold their shirts hem up under their chin while breastfeeding. This tucked, chin to chest, position is very uncomfortable for a short period of time, let alone, up to 4 hours a day. Another challenge of this shirt holding technique is that it is very hard for a mother to adequately view her breast to assist her baby with a proper latch. Therefore, the

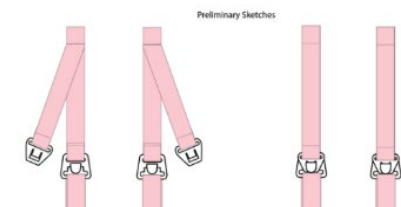


Figure 1. Preliminary Technical Sketch of Clip System

goal of this design project was to invent a technology that would assist mothers in holding up their shirts, away from the breast, while breastfeeding. In stage 2 of the design process, the researcher explored preliminary ideas to hold a mother's shirt up. It was during this time, that the researcher explored several design solutions but quickly realized that a solution which integrated into the nursing bra a mother was wearing would be the most effective. It would allow mothers to quickly and easily breastfeed and not have to keep track of or purchase another product. During the next phase of the design process, design refinement, the researcher explored ways to integrate an additional set of clips into a nursing bra with the idea that the clips could have an additional strap to hold up the shirt. The researcher explored several different ways to integrate additional clips into the strap of the bra (fig. 1). The next step was to develop a prototype, the researcher used several nursing bras to deconstruct the straps/clip-down cups and to add the additional invention of the second set of clips and straps that work in the opposite direction of clips that were already part of the bra. During the evaluation phase, the researcher constructed a fully fleshed-out prototype to determine in fact the invention of the clip system did solve both issues for lactating mothers. It was at this stage in the process, that the researcher filed for and was granted a US Provisional Patent, No. 63/272,426.



Figure 2. Clip System

The fully fleshed out prototype bra with the clip system integrated was constructed of a performance fabric containing 82% nylon, and 18% spandex. This fabric was selected for its performance features including moisture-wicking, shaping, and compression, along with its cooling properties. Additional notions used for construction include 5/8 in fold-over elastic, bra strapping, and black nursing bra clips. Draping techniques and then flat patterning was used to pattern the bra. The bra design takes into consideration the size of nursing bra pads which most breastfeeding mothers use to contain leaks. The cups were sized and shaped to accommodate both disposable and reusable nursing pads. The elastic band around the bottom of the bra keeps the bra fitted to the body and in place while also providing support and comfort. The extra clips that make up the clip system are strategically placed below the collar bone area to reduce stress on the body. The back of the bra has a typical bra sizer clasp to accommodate the change breast size of lactating mothers. Additionally, the bra has two fabric sling pieces that sit along the outside edge of the breast as an underlayer. These slings anchor the bra to the body when the clips are released to expose the breast for breastfeeding.



Figure 3. Unilateral Exposure Using Clip System

Aesthetic Properties and Visual Impact: The bra has been sewn with black fabric to meet the needs of mothers who show a preference for neutral colors in undergarments (Gordon, 2015). Furthermore, the bra has classic lines and shapes of both a traditional bra and a sports bra. The traditional strap placement and size allow for mothers to wear this underneath a variety of garments. The sports bra with joint cup style accommodates variation in breast size throughout the course of the day as lactating mothers can experience engorgement of breasts. The style of the bra provides symmetrical moderate coverage for mother's as they are nursing on one side of the body as modesty is often a concern that mothers have with breast exposure. The clip system itself nicely blends in with the strap configuration and is hardly noticeable as an added feature creating unity. This makes the addition of the clip system appealing to customers as it does not affect the overall aesthetic appeal of the bra.

Design Contribution and Innovation: The clip system integrates into the strap of a nursing bra and allows a mother to quickly and easily, clip their shirt up to allow for access to their breast. The system is made up of two clips (fig. 2), the first that unlatches the cup of the bra that folds down to expose the breast for feeding, and the second, the new patent-pending invention, which unclips to serve as a strap that loops through the hem and neckline of a mother's shirt and then clips to hold the shirt up and in place. The clip system can work bilaterally for a mother who wants to double pump or who is feeding twins, or unilaterally (fig. 3) for single breastfeeding or pumping. Furthermore, this research adds to the body of work that aims to increase breastfeeding satisfaction in hopes of increasing the duration in which mothers breastfeed supporting the goals of the CDC's Healthy Humans of 2030 (CDC, 2021). Future research includes wear trials and exploring the use of the clip system to support medical tubes for infants in the NICU during kangaroo care.

References:

- American Academy of Pediatrics. (2012). Breastfeeding and the use of human milk. *Pediatrics*, 129(3), e827–e841. <http://dx.doi.org/10.1542/peds.2011-3552>
- Brown, V. & Hodges, N. N., (2015) "An Exploration of Dress and Identity among New Mothers: The Implications of Breastfeeding for Clothing Choice", *International Textile and Apparel Association Annual Conference Proceedings* 72(1).
- Centers for Disease Control and Prevention. (2021). *Births: Provisional data for 2020*. Centers for Disease Control and Prevention. Retrieved February 6, 2022, from <https://stacks.cdc.gov/view/cdc/104993>
- Gjerdingen, D. K., Froberg, D. G., Chaloner, K. M., & McGovern, P. M. (1993). Changes in women's physical health during the first postpartum year. *Archives of Family Medicine*, 2(3), 277.

- Gordon, L. A. (2015). *The Development of Design Requirements for Breastfeeding Apparel: A User-Oriented Product Development Approach* (Order No. 1606839). Available from ProQuest Dissertations & Theses Global. (1757513038).
<https://login.proxy.lib.fsu.edu/login?url=https://www.proquest.com/dissertations-theses/development-design-requirements-breastfeeding/docview/1757513038/se-2?accountid=4840>
- Gordon, L., & Bye, E. (2013, January). Understanding the Apparel Use, Needs, and Preferences of Breastfeeding Mothers. In *International Textile and Apparel Association Annual Conference Proceedings* (Vol. 70, No. 1). Iowa State University Digital Press.
- Lamb, J. M., & Kallal, M. J. (1992). A conceptual framework for apparel design. *Clothing and Textiles Research Journal*, 10(2), 42–47. <https://doi.org/10.1177/0887302x9201000207>
- U.S Department of Health and Human Services. (n.d.). *Increase the proportion of infants who are breastfed at 1 year - mich-16*. Increase the proportion of infants who are breastfed at 1 year - MICH-16 - Healthy People 2030. Retrieved March 15, 2022, from <https://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/increase-proportion-infants-who-are-breastfed-1-year-mich-16>

