

Disposable Diapers : A Hygienic Alternative

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Abstract. The use of disposable diapers has offered improved health care benefits. Urine and fecal matter leakage from the cloth nappies and the hand - to - mouth behavior in infants leads to many illnesses with a feco-oral mode of transmission. Also, the tender skin of the infant is more prone to nappy rash. The modern age disposable diapers, when compared to cloth nappy, have displayed a superior ability in containment of urine and feces, thereby reducing contamination and transmission of infection. Also disposable diapers contain Super Absorbent Material (SAM) that successfully reduces the incidence of nappy rash. [Indian J Pediatr 2003; 70 (11) : 879-881] E-mail : ram@drmalkani.com

Key words : Fecal contamination; Disposable diaper; Nappy rash; Super Absorbent Material (SAM)

Disposable diapers have almost become an indispensable item in the list of baby care products. Apart from providing convenience benefits, disposable diapers also offer health benefits. Furthermore, over the last couple of decades, the technology of diapers has also advanced with introduction of a Super Absorbent Material (SAM) and better designs to ensure leakage protection. Compared to cloth nappy, disposable diapers offer benefits that help reduce the possibility of potential infections.

CONTAINMENT OF URINE AND FECES WITHIN THE DIAPER AND PREVENTION OF CONTAMINATION

The leakage prevention feature is an important aspect of disposable diapers. Leakage of feces and urine through cloth nappies leads to contamination of hands (of the baby and the caretakers) and also the inanimate objects in the surroundings. Such contamination and the 'hand - to - mouth' behavior of infants increase the potential for transmission of infectious diseases. Such a feco-oral route of transmission has been a common cause for acquisition

of diarrhoeal illness in children in day care centres.¹ It has been documented that transmission of diarrhoea associated with *Clostridium difficile*, *Shigella*, *Giardia* and *Rotavirus* occurs in day care centres due to poor hygiene facilities.^{2,3,4} Besides diarrhea, fecal contamination can also be responsible for transmission of hepatitis.⁵ Diarrhea caused by *E. coli* 0157:H7 can get complicated, since the antibiotic treatment for the same increases the risk for HUS (Hemolytic Uremic Syndrome).⁶

In another day care study designed to quantify the distribution of fecal coliforms (a measure of fecal contamination and disease transmission risk), it is reported that the number of contaminated objects (hands, toys, inanimate surfaces) was significantly less (with a probability of <2%) in rooms where diapers were worn, compared to very similar settings where children wore cloth nappies and plastic overpants.⁷

The modern age disposable diapers are designed for maximal leakage prevention. Different manufacturers can have different designs of disposable diapers, but the Fig. 1. highlights the advantages offered by a disposable diaper over a cloth nappy.

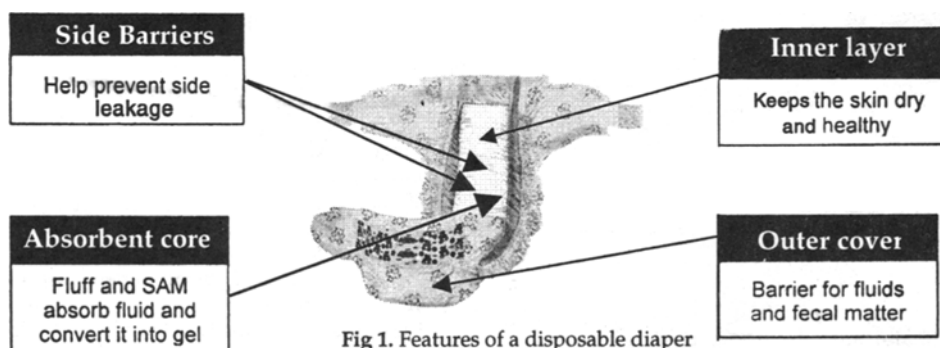


Fig 1. Features of a disposable diaper

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TABLE 1. Comparison of Disposable Diapers with Cloth Nappy

	Disposable Diapers	Cloth Nappy
Containment of waste	Side barriers protect from side leakage	Loose fitting garment promotes side leakage
Barrier Protection	Outer cover is barrier for fluids and fecal	Not fluid resistant
Absorbency	Super Absorbent Material absorbs fluids for dryness	Remains wet

Modern disposable diapers have side leak guards that help prevent leakage of urine and fecal matter and thereby keep baby's surroundings hygienic. Also the outer cover of the disposable diaper (though porous enough to let moisture evaporate out) acts as a barrier for urine and stools to leak out.

Disposable diapers have an absorbent core with Super Absorbent Material (SAM). SAM is a revolutionary material that can absorb water up to 100 times its weight i.e. 1 gm of SAM can absorb up to 100 gm of water. SAM is added to the inner core of the diaper and it absorbs urine and converts it into a gel. It wicks away the urine and prevents the mixing of urine and feces, further contributing to better containment of feces within the diaper. Disposable diapers have been significantly more effective in prevention of leakage of urine and feces as compared to cloth nappies (with or without overlying plastic/vinyl pants) (Table 1).⁸

SKIN DRYNESS AND REDUCED INCIDENCE OF NAPPY RASH

Nappy rash, also known as Diaper Dermatitis, is one of the most common pediatric dermatological problems encountered in infancy.⁹ A multitude of factors contribute towards the occurrence of nappy rash. The interplay of various factors and the crucial roles of feces and urine on hyperhydrated skin have been illustrated in Fig 2.

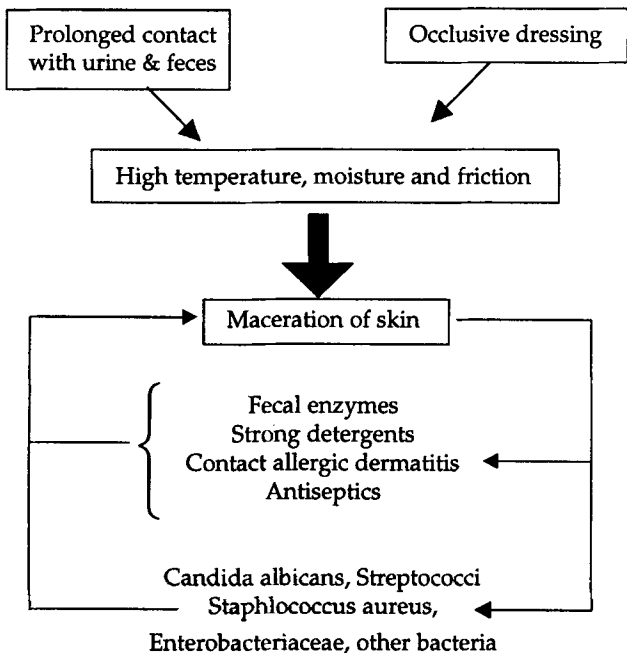


Fig 2. Pathogenesis of diaper dermatitis. (Adapted from Gelmetti C¹⁰)

Most Indian families have been accustomed to the use of cloth nappies. However, the usage convenience, increasing safety and easy availability of disposable diapers has provided a good alternative to the traditional use of cloth nappies.

A cloth nappy does not have an absorbent capacity and unless changed soon enough after urination, it would lead to hyperhydration and maceration. Also much attention needs to be paid in the washing and laundering of cloth nappies, taking care that the detergent has been washed away thoroughly and also simultaneously disinfected effectively. In contrast, the modern age disposable diapers have an absorbent core (as explained above) that does not allow the release of the moisture back to the skin from the inner core, thus preventing the 're-wet' phenomenon. The isolation of wetness from the baby's skin has reduced the incidence of diaper dermatitis.¹¹ But irrespective of the type of nappy, it should be changed immediately when the baby defecates, because of the irritant property of feces.

SAFETY ISSUES CONCERNING SAM (SUPER ABSORBENT MATERIAL) IN DISPOSABLE DIAPERS

While disposable diapers offer superior health benefits, are they really safe for their usage in infants? Disposable diapers have undergone extensive clinical and safety studies and have been proven safe. The SAM is within the inner core of the diaper and does not come in contact with the baby's skin.

In any case, studies have confirmed that SAM has no untoward/harmful effects externally or internally.^{12,13} Similarly SAM has been used safely for years in sanitary napkins and in adult incontinence products, the clinical and scientific safety being proved time and again.¹⁴

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