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PACIFIERS: THE DILEMMA BETWEEN TRADITION AND NEW FINDINGS

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ABSTRACT

Pacifiers are devices which babies can suck on to help them calm down and sooth them when they cry, get restless or are struggling to sleep. These are made of a silicon or rubber teat which is attached to a plastic shield, which stops the baby from swallowing or choking on it while being helpful in handling the device. These are generally used to replace the mother's nipple and facilitate and medium for sucking which helps the mother take a break from breastfeeding. When babies suck on a pacifier, toy or thumb, it's called non-nutritive sucking (as it yields no nutrition). Pacifier use during the child's sleep has been associated with the prevention of Sudden Infant Death Syndrome [SIDS] and has been said to help babies learn to control their feelings, relax them, and make them feel secure. Pacifier use has been reported to be associated with a reduced risk of sudden infant death syndrome (SIDS), but most countries around the world, including the United States, have been reluctant to recommend the use of pacifiers because of concerns about possible adverse effects. In this review we shall see the different types of pacifiers, the materials used in their manufacture, the complications arising by their use, and the role they play in preventing Sudden Infant Death Syndrome [SIDS].

Keywords: Pacifiers, non-nutritive sucking, Sudden Infant Death Syndrome.

INTRODUCTION

Types of Pacifiers:

1. Orthodontic pacifiers: The nipples of these are flattened at the bottom and rounded at the top. During sucking these types of pacifiers flatten the baby's mouth which reduces pressure on the developing teeth.
2. Round tip baby pacifiers: These types of pacifiers mimic the shape of an actual nipple, which is why they are often suggested for breastfed babies to prevent nipple confusion.
3. Silicon baby pacifiers: These types are sturdier, easier to clean and more widely available.
4. Latex baby pacifiers: These types tend to be softer and more flexible but the softness of the material also means that there is a potential for tearing with older children with teeth.
5. Multiple-piece baby pacifiers: These are the most common types of pacifiers. These usually consist of a nipple, a guard and a ring which are each manufactured separately before being combined into the traditional pacifier.

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Materials used for the manufacture of pacifiers:

1. Silicon:
   It is a chemical element with the atomic number 14.
   It is a hard, crystalline solid with a slight metallic lustre. Its melting point is 1,414 °C.

These are easier to clean pacifiers which are widely available. They are made up of a single moulded piece of plastic, silicon or latex.

Effects:

Certain children can suffer from latex allergies and this is said to be due to vaccinations especially Hepatitis B vaccinations.

The latex used in this may also lead to health issues. Thought latex provides a smooth and flexible finish to the

silicon pacifier, its presence often leads to allergies and the development of rashes.
This could also lead to:
1. Asthma
2. Interruption to the baby's sleep cycle
3. Breast confusion

Reaction of pacifiers with Saliva:
As they are on constant contact with saliva and oral bacteria, they can be a site for growth of pathogens.
Contamination of pacifiers often leads to Candidiasis and intestinal parasitic infections.
This also leads to Otitis media and oral cavities.

What makes Silicon rubber versatile? :
Silicon rubber is a durable and highly resistant elastomer composed of silicon together with other molecules like carbon, hydrogen, and oxygen.
Its structure always comprises Siloxane backbone and an organic moiety bound to the silicon.
Hence its properties may vary greatly depending on the organic group and chemical structure.
Compared to organic rubber, silicon rubber has Sianobond in its structure and hence it has better:
1. Heat resistance [resist temperatures from 50 – 370C]
2. Chemical stability
3. Electrical insulation
4. Abrasion resistance
5. Ozone resistance

Figure1. Silicon pacifiers:

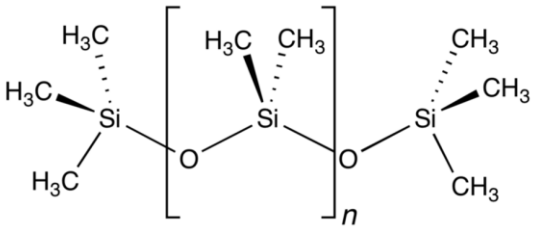

Figure 2. Latex:

2. Latex:

It is a natural product produced from the "*Hevea brasiliensis"* rubber tree. It is the protective fluid contained beneath the bark. It is a cloudy, while liquid similar in appearance to cow's milk.
Synonyms: Natural rubber, Indian rubber, Amazonian rubber, Caucho.
Due to the presence of weakened allelic C-H bonds in each repeat unit of natural rubber it is susceptible to vulcanisation as well as being sensitive to ozone cracking.
Rubber begins to melt at approximately 180 °C (356 °F).
Rubber may be susceptible to degradation by a wide range of bacteria like *Stremptomyces coelicolur, Pseudomonas citronellolis* and *Norcardia*
Measurements strictly followed during manufacturing of pacifiers:
Pacifier's size cannot exceed 30mm to avoid suffocating the child.
The guard must contain at least 2 holes which permit air to pass through the wind pipe.
The diameter of the device must be at least 5 mm and the nipples distance from its base must be from 5 to 6 mm.

Figure 2. 2. Honey pacifiers

3. Honey pacifiers:

These pacifiers are filled with honey in the teat.
The real purpose of these pacifiers is to make them smoother and not to feed the infant.
The presence of a hole may lead to the accidental entry of honey into the mouth of the infant.
Pacifiers filled with corn syrup can be more risky than honey pacifiers.
Disadvantages:
Using these may lead to food poisoning due to the presences of toxins in the honey
Infant botulism is caused by Clostridium botulinum spores which can be found in honey.
When an infant ingests this bacteria the spores can grow and produce toxic that could lead to paralysis.
Symptoms may include constipation, poor feeding, floppiness and weakness of muscles.

Complications with Pacifier use:

1. **BREAST-FEEDING:**

Observational studies and a randomized controlled trial (RCT) showing that pacifier use is associated with early breast weaning have led to concerns. However, an RCT that studied the effect of pacifier use on breast-feeding in 281 mother-infant pairs for three months postpartum had a different conclusion. Although an observational association was noted between pacifier use and early weaning, when the data were analysed further, the intervention (advice to avoid pacifier use) did not significantly reduce weaning at three months. The authors concluded that pacifier use may be a marker of breast-feeding difficulties, but does not appear to be the cause of early weaning. The intervention group used pacifiers less often, but had no significant difference in crying or fussing, suggesting that other soothing methods are as effective as pacifier use. A more recent RCT on preterm infants did not demonstrate a significant effect of pacifier use on early weaning [3,4].

2. **DENTAL HEALTH**

A systematic review found inconsistent results regarding the effect of pacifier use on early childhood caries, suggesting that there is no proven correlation.

A meta-analysis concluded that pacifier use after three years of age is associated with a higher incidence of malocclusion. In one study, the prevalence of malocclusion was roughly 71 percent in children who used a pacifier or sucked a digit for more than 48 months, compared with 32 percent in those who ceased sucking between 36 and 48 months, and 14 percent in those who ceased sucking before 24 months.

The most significant malocclusions occurred in children who continued sucking habits beyond 48 months, but there were notable changes in children who continued beyond 24 months. A more recent study confirms these negative dental effects with pacifier use after two years of age.

Studies comparing orthodontic and conventional pacifiers found minor differences in malocclusion. The American Dental Association and the American Academy of Pediatric Dentistry recommend that pacifier use be discouraged after four years of age.

3. **INFECTION:**

Several studies have shown that pacifiers are often colonized with *Candida* and bacterial organisms (typically non-pathogenic). One study found 21 of 40 pacifiers to have a positive culture finding, with none containing the common pathogens of otitis media. Latex pacifiers are more significantly colonized with *Candida* and *Staphylococcus* than silicone pacifiers.

A population-based study of more than 10,000 infants in the United Kingdom evaluated pacifier use and finger sucking at 15 months of age and their association with infection at 18 months of age. The 36 percent of infants who used a pacifier had a higher incidence of earache and colic compared with the 40 percent of infants who did not suck and the 21 percent of infants who sucked fingers. The 2.7 percent of infants who sucked both a pacifier and fingers had more wheezing and earaches and poorer health in the month before the study. One explanation for the association between pacifier use and illness may be that pacifiers were used to calm sick infants. A direct link between illness and type of sucking habit could not be determined from this study; more research is needed before recommendations can be made.

Pacifiers and the prevention of SIDS:

Sudden infant death syndrome (SIDS) refers to the unexplained death of a baby who seems otherwise healthy.

SIDS is also known as crib death as it most commonly occurs while the child is sleeping. In the United States, an estimated 1,500 children under 12 months die from SIDS yearly. Some factors that raise the risk of SIDS have been uncovered. These include children with brain abnormalities, low birth weight, or respiratory infections; however, the exact causes are still poorly understood. Guidelines are in place to help minimize the risk of SIDS; for instance, babies sleeping on their side or stomach can have more difficulty breathing, soft, fluffy surfaces are more likely to block airways, and babies sleeping in bed with parents is not recommended.

SIDS and asphyxia (a lack of oxygen) are the leading causes of death in infants under 12 months of age, and there are still no effective treatments [5-7].

Pacifier use and sudden infant death syndrome, results from the CESDI/SUDI case control study:

DESIGN: Three year population based, case control study with parental interviews for each death and four age matched controls.

SETTING: Five regions in England (population > 17 million).

SUBJECTS: 325 infants who had died from SIDS and 1300 control infants.

RESULTS: Significantly fewer SIDS infants (40%) than controls (51%) used a pacifier for the last/reference sleep and the difference increased when controlled for other factors. However, the proportion of infants who had ever used a pacifier for day (66% SIDS v 66% controls) or night sleeps (61% SIDS v 61% controls) was identical. The association of a risk for SIDS infants who routinely used a pacifier but did not do so for the last sleep became non-significant when controlled for socioeconomic status.

Conclusion:

To ensure maximal breastfeeding success, mothers need regular support, encouragement, and assistance with developing proper breastfeeding techniques to build confidence in breastfeeding, because these qualities have been observed in mothers who give pacifiers to their infants and continue breastfeeding.

Although the rates of SIDS have halved since recommendations have been made to place infants supine for sleeping, there are still close to 2300 deaths in the United States attributed to SIDS each year, and the declining trend has reversed recently, with the SIDS rate increasing by 2.9% from 2001 to 2002. The association between pacifier use and a reduced incidence of SIDS needs to be explored further because of the implications for infant care practices if evidence for a causal link should become strong. This will require knowledge of the physiological effects of pacifier use, awake and during sleep, in health and disease; further epidemiological studies to explore risk factors not identified in the existing studies; and a full evaluation of potential harm as well as potential benefit. No recommendations on pacifier use can be made in the light of present knowledge [8,9].

The following precautions must be taken by parents while using pacifiers to prevent infection:

1. Boil the pacifier before using and dry properly.
2. Don't tie the pacifier around the child's neck as a necklace.
3. Examine the pacifier and its parts regularly and throw away if shattered.
4. Don't dip the product in sweet substances in order to prevent tooth decay.

As the use of pacifiers does not show any statistically provable results, there must be a search for an alternative to them which is proven to be safer and more effective such that it can provide relief to the user and avoid the chances of infection.

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