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BENEFITS AND RISKS OF PACIFIER USE - A NARRATIVE REVIEW ON THE MEDICAL IMPACT OF PACIFIER USE DURING INFANCY AND EARLY CHILDHOOD

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ABSTRACT

Background: Pacifier use remains a common practice during infancy and early childhood worldwide that has both benefits and risks. Its use has become highly prevalent in recent years and is sometimes considered overused, as it provides an easy and convenient method for calming and soothing children.

Objective: This review aims to summarize current scientific evidence regarding pacifier use focusing on both positive and negative outcomes to provide an overview that may help with the establishment of the clinical recommendations.

Methods: A narrative review of different randomized controlled trials and cohort studies investigating the positive and negative impacts of pacifier use such as SIDS risk, pain management, otitis media, dental malocclusions and breast-feeding.

Results: The reviewed studies indicate that pacifier use reduces risk of sudden infant death syndrome (SIDS) and is an effective way of pain management during minor medical procedures. However, evidence shows an association between pacifier use and increased incidence of acute otitis media, dental malocclusions in cases of prolonged use and negative impact on breastfeeding when introduced before lactation is well established.

Conclusion: The evidence supports selective use of pacifier, particularly during the first year of life with its introduction delayed until breastfeeding is well established, which happens usually around 1 month of age. Its use should be limited mainly to sleep periods and gradually limited by 12 months of age. Proper timing and restricted duration are key to maximising benefits while reducing risks.

KEYWORDS

Pacifier, Otitis Media, SIDS, Breast-Feeding, Dental Malocclusions, Pain Management

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1. Introduction

Pacifier use in early childhood is still very common and grows in popularity all over the world (Cinar, 2004). Its soothing effect is the most widely recognized beneficial effect that helps parent to easily calm down their child (Martinez et al, 2000). There are many benefits in using the pacifiers that include reduced risk of sudden infant death syndrome (Hauck et al, 2005), decreased discomfort during air travel, and pain control during minor medical procedures such as intramuscular injections (Garcia et al, 2025). The biggest risks of the usage of pacifiers are an increased incidence of acute otitis media, negative impact on breast-feeding, and dental malocclusions that can develop in later life (Nelson, 2012).

The practice of offering pacifier to an infant in different form has a long tradition. Historical reports indicate that objects resembling modern pacifiers for example rags filled with honey or other sweet substances were used for many years prior to modern pacifiers to provide comfort and ease the process of falling asleep (Baby Bottle Museum, 2025). Since then, pacifiers have evolved and are now commonly made of silicone or latex and are shaped in such a way to minimize risks of incorrect dental development. Despite these latest innovations, the debate over their use is still an ongoing issue as studies show both advantages and risks concerning pacifiers use.

Sucking reflex is one of the earliest reflexes present and plays a key role in mostly feeding, but also allayment (Hanzer et al, 2005). Non-nutritive sucking, which means sucking that is not connected with swallowing reflex, is thought to reduce stress, ease sleep indication and sleep maintenance for infants (Hanzer et al, 2005). That is why pacifiers are widely used by care takers to comfort their children, soothe crying and facilitate sleep onset. However, while this function is convenient for parents, it also raises questions about the potential interference with long-term negative outcomes.

The American Academy of Paediatrics has many determined recommendations concerning the usage of pacifiers: using pacifiers during minor medical procedures in infants younger than 6 months; delaying pacifier

use until breastfeeding is normalized (usually around the end of the first month), offering a pacifier when putting an infant to sleep, not forcing the usage of a pacifier on an infant, limitation of usage after 6 months to reduce the risk of otitis media, using pacifiers with a soft nipple and ventilation holes (Garcia et al, 2025). American Academy of Family Physicians (AAFP) agrees with many of the above recommendations and adds the need to educate the mothers of the possible consequences of early pacifier use on the breastfeeding and suggests limiting the use of pacifier after the 6 months of age (Garcia et al, 2025). WHO does not have any official guidelines concerning pacifiers – neither unambiguous encouragement nor contraindication, which leaves the decision to parents or other caretakers.

The aim of this review is to analyse the current scientific evidence on the positive and negative effect of pacifier use – concentrating on the risk of sudden infant death syndrome (SIDS), pain management, otitis media frequency, dental malocclusions in later childhood and impact on breast-feeding technique and success. The analysed research was interpreted in respect to statistically significant correlations and possible pathophysiological mechanisms.

2. Methodology

Several randomised controlled trials and prospective cohort studies were conducted to assess the impact of pacifier use on SIDS, pain management, otitis media, dental malocclusions, breast feeding. In general, these studies indicate that pacifiers have both benefits and risks. A summary of the methodology and results from the included studies is presented below in benefits and risks sections.

2.1 Benefits

2.1.1 Reduced Risk of Sudden Infant Death Syndrome (SIDS)

The cause of sudden infant death syndrome (SIDS) is not known (Hauck et al, 2009). Sudden infant death syndrome remains a main cause of post-neonatal mortality mostly in developed countries with the count of around 0.2–0.5 per 1000 live births (Moon et al, 2022). The peak incidence of SIDS occurs between 2 and 4 months of age (Kinney et al, 2009). The American Academy of Paediatrics recommends using a pacifier at nap time and bedtime throughout the first year of life to protect the infant against SIDS (Moon et al, 2022) as it was observed that the use of pacifier reduces the risk of SIDS mostly when used only for sleeping or napping purposes (Jullien, 2021) (Moon et al, 2012). Pacifier was shown to protect from SIDS even if it falls out of the infant's mouth (Weiss et al, 2001). Other factors that show positive effect on protection against SIDS are breastfeeding on demand, avoiding exposure to nicotine, alcohol and illicit drugs, routine immunization (Moon et al, 2022) (Jullien, 2021). Factors that may increase the risk of SIDS include sleeping on soft surfaces, overheating, overwrapping and bed sharing (Hauck et al, 2009).

There are several mechanisms to explain the correlation between the reduced risk of sudden infant death syndrome and pacifier use. They state that having a pacifier might prevent turning prone face straight down or it may facilitate switching to mouth breathing if nasal occlusion occurs (Engelberts et al, 2000) (Goldwater, 2024). Other hypothesis states that using pacifier correlates with higher pressure and better heart rate control suggesting that dummy use alters cardiac control by increasing sympathetic nervous system response and thanks to that it protects from sudden decline of blood pressure and loss of consciousness during sleep (Horne et al, 2016). Another study found that sucking activates the tongue and pharynx muscles, for example genioglossus muscle, which may protect the upper airways from collapsing (Franco et al, 2000).

2.1.2. Pain Management

Research has shown that even short-term pain in infants can have lasting negative effects in later life (Taddio et al, 1995). Usage of pacifier causes infant to stimulate their sucking reflex without the stimulation of swallowing reflex (Hanzer et al, 2009). Non-nutritive sucking has been observed as an effective non-pharmacological intervention to reduce pain in infants and young children (Gibbins et al, 2001).

Clinical trials have shown that non-nutritive sucking reduces crying time as well as distress behaviours. In one of the studies, it was shown that during the heelstick procedure the crying time was significantly shorter and heart rate increase was significantly lower in a group of infants that were sucking in non-nutritive way rather than in a control group (Corbo et al, 2000). Another study observed a statistically significant reduced crying time in infants with pacifiers undergoing venipuncture procedure (Curtis et al, 2007). There are many studies that compare the use of pacifier to reduce pain sensation in small children to sweet solutions containing

sucrose or glucose (Carbajal et al, 1999). They show that pacifiers have a better analgesic affect than sweet solutions during minor procedures in newborns (Carbajal et al, 1999).

Therefore, it is recommended to use a pacifier as a strategy for managing pain in newborns e.g. during some medical procedures and interventions like vaccination, blood specimen collection, screening.

2.2. Risks

2.2.1. Otitis media

Acute otitis media is one of the most common infections during childhood (Leung et al, 2017). It can occur at any age; however, it is most common between the ages of 6 to 24 months (Danishyar et al, 2023). Around 80% of all children will experience an inflammation of middle segment of ear during their lifetime usually before they reach school age (Danishyar et al, 2023). Typical symptoms of otitis media include pain, irritability or fever in combination with physical evidence of inflammation in the middle ear such as bulging of the tympanic membrane (Harmes et al, 2013). The most common pathogens that causes this disease are bacteria - *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis* (Harmes et al, 2013). Viral pathogens can induce the inflammation process of the middle ear as well with the most common ones being respiratory syncytial virus (RSV), coronaviruses, influenza viruses, adenoviruses, human metapneumovirus, and picornaviruses (Leichtle et al, 2018). It is important to properly cure the disease as it may induce many complications such as acute inflammation of mastoid, paresis of facial nerves, labyrinthitis, sinus vein thrombosis, meningitis and even brain abscess (Leichtle et al, 2018). The most common risk factors include artificial feeding (Ciprandi et al, 2021), adenoid hypertrophy and frequent exposure to other children (Paing et al, 2024). To prevent the development of acute otitis media in children it is advised to prolong the breast-feeding period during infancy and eliminate any tobacco use in the household (Giebink, 1994).

There are many studies that researched the correlation between pacifier use in early infancy and otitis media in later childhood. For instance, a study conducted by Rovers et al. (2008) showed that pacifier use may be a risk factor for otitis media as 35% of children using pacifier developed at least one episode of acute otitis media, whereas as for children from the control group it was 32% (Rovers et al, 2008). The difference was even more visible for recurrent acute otitis media – 16% of children from the pacifier group versus 11% from the control group (Rovers et al, 2008). In another study by Niemela et al. (2000) it was shown that children who did not use a pacifier continuously had 33% fewer acute otitis media episodes than the children who did (Niemela et al, 2000).

There are several different mechanisms that were proposed to explain the relationship between pacifier use and otitis media frequency. Most of them concentrate on the creation of negative pressure in the nasopharynx during sucking that do not bring any nutritional value - that may lead to dysfunction in Eustachian tube functioning due to reflux of nasopharyngeal secretions and problems with adequate ventilation in the segment of middle ear (Torretta et al, 2013).

2.2.2. Dental Malocclusions

The most common dental problems concerning pacifier usage are dental caries, malocclusions and gingival recession (Ponti et al, 2003). What is most important are the implications suggesting that there is a correlation between those dental abnormalities and pacifiers, but only when the use of the pacifier is prolonged. The amount of time given for those dental problems to occur varies between different studies, typically from two to over five years of age (Ponti et al, 2003).

One of the studies showed significant differences in dental arch and occlusion characteristics in children who used pacifier at ages 2 and 3 compared with those that had stopped non-nutritive sucking up until 1 year of age (Warren et al, 2001). Another study found significant increases in overjet that was greater than 4 mm, open bite and posterior crossbite in children who used pacifier between the ages of 2 to 5 years (Adair et al, 1995). The association between those dental deformations and pacifier use was stronger when the pacifier was used for longer duration of time (Adair et al, 1995).

However, it is much easier to control the children exhibition to non-nutritive sucking when a child is using a pacifier than when it sucks on its own thumb. That is why the American Dental Association (ADA) recommends pacifiers over thumb sucking, because it is then easier for the parents to wean a child from non-nutritive sucking (American Dental Association, 2002). Another recommendation is that the pacifier should be clean and not dipped in sugar, honey nor sweet syrups that could favour dental caries development (American Dental Association, 2002).

2.2.3. Impact on Breast-feeding

The major potential disadvantage of pacifier use is its effect on breast feeding. Early introduction of pacifiers, especially within the first month of life, has been consistently associated with reduced breast-feeding duration and more frequent problems with lactation. It is very important to establish adequate milk production and supply at the beginning of infant's life through frequent feeding on demand. Delaying pacifier use until breast-feeding is well established (which usually happens around 4 weeks of age) is strongly recommended (Garcia et al, 2025).

One of the studies shows that introduction of pacifier before 6 weeks of age increases the risk of early weaning (Howard et al, 1999). The study demonstrated that early pacifier use was associated with significantly shorter duration of breast-feeding in comparison to infants that were not exposed to pacifiers during newborn period (Howard et al, 1999). Another study that took under consideration only primiparous mothers found that pacifier use before 4 weeks of age correlates with more than three times bigger risk of shorter breast-feeding duration (Mauch et al, 2012).

The physiological mechanism that explains this correlation is called "nipple confusion", which refers to the difficulty of establishing an effective grip on the breast after being exposed to artificial nipples (Ponti et al, 2003). The sucking technique that is required for the milk flow from the breast to continue is different than that the sucking technique for pacifiers (Shaki et al, 2022). This may cause a problem with learning the correct way of milk extraction from the breasts. The infant can also have a problem with the correct way of grabbing the nipple with the whole mouth as it is more difficult than grabbing nipple-shaped pacifier (Kent et al, 2015). This may cause lactation problems for the mother such as nipple pain and bites (Kent et al, 2015) (Centuori et al, 1999).

Moreover, pacifier use can influence the feeding on demand mechanisms by limiting the stimulation necessary for maintaining adequate milk supply (Tolppola et al, 2022). This may influence the milk production in both ways leading to either milk deficit or milk overflow that can cause obstruction of lactiferous ducts or even mastitis or abscesses (Wilson et al, 2020).

There are also studies that show that introduction of pacifier after 1 month of age, when the lactation is stabilized, does not influence the duration of breast-feeding (Tolppola et al, 2022). A recent meta-analysis demonstrated no statistically significant evidence that later use of pacifier reduced the time of breast-feeding (Tolppola et al, 2022).

3. Discussion

After taking under the consideration the reviewed literature it can be concluded that pacifier use during infancy presents a complex balance between benefits and risks. One of the most important benefit of pacifiers' usage is the association with the reduced risk of sudden infant death syndrome (SIDS). Multiple studies support this correlation, particularly when pacifiers are used during sleep and during the act of falling asleep, which may involve mechanisms such as maintenance of airway patency, enhanced autonomic regulation, and facilitation of mouth breathing in case of nasal obstruction (Engelberts et al, 2000) (Goldwater, 2024) (Horne et al., 2016) (Franco et al, 2000). While these mechanisms remain hypothetical, the consistency of observed data agrees with American Academy of Pediatrics' recommendations to limit the use of pacifiers to naps and nighttime sleep only (Garcia et al, 2025). The underlying cause of SIDS remains unknown, that is why more studies are needed to further investigate another possible risk factors and preventions for this syndrome.

Pacifiers also demonstrate a clear analgesic effect in infants undergoing minor medical procedures. Non-nutritive sucking reduces crying duration which provides an easy non-pharmacological option for management of pain in infants and young children (Gibbins et al, 2001) (Corbo et al, 2000) (Curtis et al, 2007) (Carbajal et al, 1999). However, it is important to note that crying is not a specific feature of pain. More advanced studies are needed to confirm such findings that would take under consideration some objective markers for example heart rate, blood pressure, respiratory rate, muscle tension or cortisol level in blood samples (Carbajal et al, 1999) (Mannel, 2011).

The benefits must be weighed against the existing risks. As studies suggest acute otitis media appears more often in children using pacifier, especially those who use it more frequently and for longer duration of time, which is possibly associated with the negative pressure in the nasopharynx that cause a disruption of Eustachian tube function (Rovers et al, 2008) (Niemela et al, 2000) (Torretta et al, 2013).

Another negative effects of pacifier use are dental malocclusions such as open bite, posterior crossbite, and excessive overjet. It is important to note that such dental problems appear more often in children with extended pacifier use that goes beyond the 3 years of toddler age (Warren et al, 2001) (Adair et al, 1995).

Dental complications are preventable if pacifier use is limited to infancy and then gradually limited before any permanent deformation appears. Further studies are needed to clarify long-term dental outcomes associated with pacifier use.

The impact on breastfeeding is perhaps the most critical to bear in mind while deciding upon the usage of pacifier in the neonatal period. Early pacifier introduction, especially within the first month of life, can interfere with achieving breastfeeding success. This likely happens due to nipple confusion and disruption of feeding on demand, that may contribute to reduction of milk production, supply and outflow or contribute to maternal lactation complications (Howard et al, 1999) (Mauch et al, 2012) (Shaki et al, 2022) (Kent et al, 2015) (Centuori et al, 1999) (Tolppola et al, 2022) (Wilson et al, 2020). Those findings show that careful timing of pacifier introduction is the key to preserving successful lactation. This is defined as having sufficient milk supply, having comfortable and indolent feeding time and appropriate infant weight gain established by normative growth curves (Wilson et al, 2020)

The scientific literature suggests that the benefits can be maximized while also minimizing risks through using the pacifiers in recommended time of infants' lives and for appropriate duration. The most important rules to respect are limiting pacifier use to sleep and naps only, avoiding introduction before breastfeeding is well-established and gradually limiting usage by 12 months of age to gain the optimal balance.

4. Conclusions

The use of pacifiers during infancy is associated with both benefits and risks. Studies support their impact in reducing the risk of sudden infant death syndrome (SIDS) and providing non-pharmacological pain relief during minor medical procedures. On the contrary, prolonged use increases the likeliness of otitis media and dental malocclusions in later childhood. Early introduction may contribute to problems with breastfeeding.

Taking the given studies and results under the consideration it can be concluded that pacifiers should be recommended for usage only in a specific time of the infants' lives. They may be beneficial especially during the first year of life to help with sleep and pain management, but their introduction should be delayed until breastfeeding is well established, usually after the first month. Parents should be advised to avoid pacifiers after 1 year of age to reduce the frequency of otolaryngological and dental side effects. Additionally, parents should be encouraged to choose pacifiers of appropriate design. To conclude, the use of pacifier should be implemented only when necessary and should be gradually limited to the shortest possible duration required.

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