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ORIGINAL ARTICLE

Recommendations from Pediatric and Pediatric Dentistry Associations of the Americas Regarding Pacifier Use

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ABSTRACT

Objective: To identify online recommendations from pediatric and pediatric dentistry associations of the Americas regarding the pacifier habit. **Material and Methods:** A search was conducted on the associations' website (November/2021 to March/2023) to the questions: (1) Recommend using a pacifier?, (2) What care?, (3) Advantages and (4) disadvantages, (5) Ideal age, and (6) methods for habit removal. **Results:** Among the 36 American countries, 21 were represented on websites, social media, and official guides. The most significant portion of pediatric dentistry associations (23.81%) does not recommend the use of a pacifier if the infant is exclusively breastfeeding, and recommends avoiding the offer of a pacifier in the first days of life to facilitate the establishment of breastfeeding. Some pediatric (29.63%) associations suggested that use reduces the risk of sudden infant death syndrome. Most pediatric dentistry associations (85.71%) and some pediatric associations (22.22%) linked pacifier use to breastfeeding difficulties and the occurrence of orthodontics. Most of the 20 pediatric dentistry associations stated that the habit should be removed by a maximum of three years of age (90.48%). The most reported recommendations were behavior modification techniques and positive reinforcement. **Conclusion:** Most pediatric dentistry associations recommend the care and disadvantages of pacifiers and the ideal age to remove them. The few pediatric associations that provide information address indications, care, advantages and disadvantages of pacifiers, age, and methods for removing them.

Keywords: Pediatric Dentistry; Child; Sucking Behavior; Pacifiers; Counseling.

Introduction

The use of a pacifier or other sucking device is a common practice among children in many countries and is among the most prevalent nonnutritive sucking habits [1]. The prevalence of pacifier sucking among Brazilian children between four months and six years of age ranges from 20% to 61.6% [2-4], and the prevalence on the global scale is around 42.5% of children up to one year of age [1]. This device is a cultural practice and is often included in the layette for infants, which may explain the high prevalence [3,5].

Pacifier sucking generates feelings of well-being, comfort, emotional pleasure, and protection. Thus, parents incorporate this device as a way to calm a child during moments of agitation or to induce sleep [3,6,7]. Moreover, pacifier sucking has been associated with the oral stimulation of sucking and swallowing reflexes and increases breastfeeding rates for premature newborns when short-term results are observed [8]. Studies have also suggested that pacifier sucking reduces the risk of sudden infant death syndrome (SIDS), which could favor its use [9,10].

On the other hand, when the pacifier habit extends beyond infancy and becomes frequent, intense, and prolonged, it can harm the dental arches [1,6,11]. Studies have demonstrated that prolonged pacifier use can lead to malocclusions, mouth breathing, abnormal facial development, and the early interruption of exclusive breastfeeding [11-14].

Among the divergences of opinion regarding the advantages and disadvantages of pacifier use, conflicts arise in the counseling given by different pediatric and pediatric dentistry associations worldwide. The present study justifies the need for pediatricians and dentists to make scientifically based recommendations. It is essential for national and international pediatric and pediatric dentistry associations to furnish uniform information on their websites and social media that is easy to understand and based on scientific evidence [15].

The present study aimed to perform a scope review to identify and analyze online recommendations regarding the pacifier habit from pediatric and pediatric dentistry associations of the Americas.

Material and Methods

Study Design

A review was performed of orientations provided by pediatric and pediatric dentistry associations of the Americas to answer questions related to pacifier use by children.

Identification of Countries and Pediatric/Pediatric Dentistry Associations

The countries that compose North, Central, and South America were identified using the United Nations Children's Fund (UNICEF) website. A researcher (LVM) then performed an electronic search to determine which of these countries has national associations affiliated with the International Association of Paediatric Dentistry (IAPD), International Pediatric Association (IPA), *Associação Latino-Americana de Odontopediatria* (ALOP [Latin American Pediatric Dentistry Association]) or *Associação Latino-Americana de Pediatria* (ALAPE [Latin American Pediatric Association]). Each national association's websites and social media were then identified and registered. Furthermore, all associations with an available electronic address were contacted by e-mail.

Search Strategy

The search strategy was developed using keywords and synonyms in the three official predominant languages of the Americas (Spanish, English, and Portuguese) with no publication date restriction. Keywords

were obtained from Health Science Descriptors: sucking behavior, habits, and pacifier. Table 1 displays the search terms and synonyms used in the search strategy in the different languages.

Table 1. Search terms are used according to each language.

Language	Terms
Portuguese	(*chupeta OU chupetas OU "hábito bucal" OU "hábitos bucais" OU "hábito oral" OU "hábitos orais" OU "hábito de sucção" OU "hábitos de sucção" OU "sucção não nutritiva" OU "sucção não-nutritiva" OU "sucção oral" OU "sucção bucal"*)
English	(pacifier OR pacifiers OR "oral habit" OR "oral habits" OR "sucking habit" OR "sucking habits" OR "suction habit" OR "suction habits" OR "nonnutritive sucking" OR "non nutritive sucking" OR "nonnutritive sucking" OR "non nutritive suction" OR "nonnutritive suction" OR "nonnutritive suction" OR "oral sucking" OR "oral suction")
Spanish	(*chupete O chupetes O pacificador O "hábito bucal" O "hábito oral" O "hábitos orales" O "hábito de chupar" O "hábito de succión" O "hábitos de succión" O "succión no nutritivo" O "succión no nutritivos" O "succión no nutritiva" O "succión oral" O "succión bucal"*)

Data Collection

Searches were performed by two independent reviewers (LVM and TCJS) between November 30, 2021, and March 31, 2023. An advanced search was conducted on each association's website based on the defined search strategy. A manual inspection of the entire website was performed to identify documents with orientations on the topic of interest. Moreover, each term of the search strategy was inserted individually into the search tool of the associations' websites (available by the presence of a magnifying glass icon or the command 'CTRL + F'). Advanced searches were also performed using the Google search mechanism with a combination of the names or acronyms of the associations and each search term individually. On each website, it was checked whether there was an indication of the entity's social network (Facebook, Instagram, or Twitter). Otherwise, the name or acronym of each association was manually searched from the three social networks. When the association pages were located, all publications were inspected. Questions and disagreements between the reviewers regarding the recommendations identified were resolved by consensus.

Data Extraction

Two reviewers (LVM and TCJS) read all the content identified on the associations' websites. The following data were extracted from all material found: name of the association, country, year of the recommendation, and, when available, answers to the following questions: 1) Does the association recommend using a pacifier? 2) In cases of pacifier use, what care should be taken? 3) What does the association highlight as the advantages of pacifier use? 4) What are the disadvantages of pacifier use highlighted by the association? 5) What is the ideal age for removing the habit? 6) What methods are recommended for removing the habit?

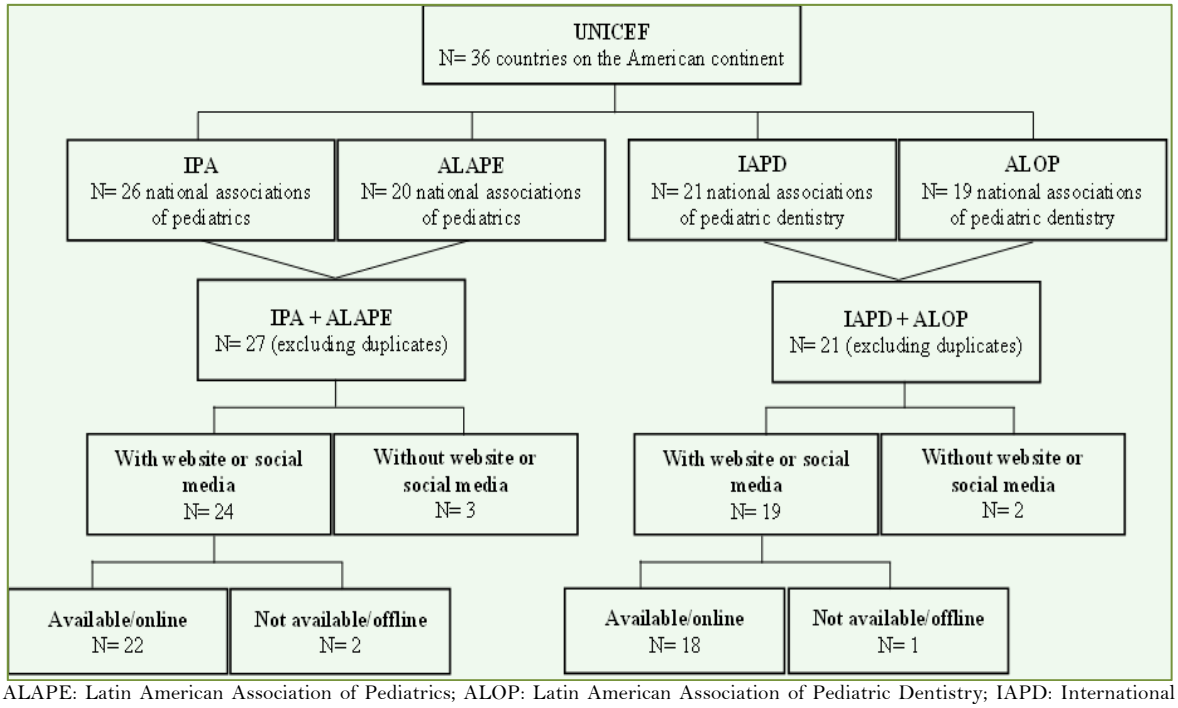
Data Analysis

The data were tabulated in the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive analysis was performed for all variables of interest, with the determination of absolute frequencies.

Results

The Americas includes 36 countries listed on the UNICEF website, among which 21 associations are affiliated with IAPD, 19 with ALOP, 26 with IPA, and 20 with ALAPE. Three pediatric and two pediatric dentistry associations did not have websites or social media during data extraction. Figure 1 shows the search

and selection processes of the websites. Among the 36 countries of the Americas, 21 (60%) were represented based on the availability of data on websites, social media, and official guides of at least one association: Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Ecuador, United States, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Dominican Republic, Uruguay and Venezuela (Supplementary Material A and B). The oldest publication date was in 2013, and the most recent was in 2021; however, not all website publications have dates. Although all associations with an available electronic address were contacted by e-mail, only one (*Sociedad de Dentistas Pediátricos de Puerto Rico* [Society of Pediatric Dentists of Puerto Rico]) returned to the contact with answers to the questions investigated in the study.



ALAPE: Latin American Association of Pediatrics; ALOP: Latin American Association of Pediatric Dentistry; IAPD: International Association of Pediatric Dentistry; IPA: International Association of Pediatrics; UNICEF: United Nations Children's Fund. Offline websites: Off the air.

Figure 1. Process of identification and selection of websites of American Associations of Pediatrics and Pediatric Dentists.

Pediatric dentistry associations represented 20 countries. Pediatric associations represented 11 countries, and ten countries were represented by both types of association (Table 2).

Table 2. Countries represented by Pediatrics and Pediatric Dentistry Entities.

Countries	Pediatric Dentistry Entities	Pediatric Entities
Argentina	‡	‡
Bolivia	‡	∇
Brazil	‡	‡
Canada	∇	‡
Chile	‡	‡
Colombia	‡	‡
Costa Rica	‡	‡
El Salvador	‡	‡
Ecuador	‡	∇
United States	‡	‡

Guatemala	‡	∇
Honduras	‡	∇
Mexico	‡	‡
Nicaragua	‡	∇
Panama	‡	∇
Paraguay	‡	‡
Peru	‡	∇
Puerto Rico	‡	∇
Dominican Republic	‡	∇
Uruguay	‡	‡
Venezuela	‡	∇

‡: Country represented by at least one association; **∇:** Country not represented by associations.

The online content review (Table 3) revealed that eight pediatric dentistry associations and six pediatric associations offered orientation regarding Question 1. The most significant portion of pediatric dentistry associations (23.81%: Chile, Costa Rica, Mexico, Paraguay, and Venezuela) stated that pacifier use is not recommended if the infant is exclusively breastfeeding. Two pediatric associations (Argentina and Paraguay) offered the same counseling. Two pediatric associations (33.33%: Brazil and El Salvador) and one pediatric dentistry association (United States) stated that the decision to offer a pacifier to the child was up to the parents.

Nineteen pediatric dentistry associations and eight pediatric associations offered orientation regarding Question 2. The vast majority of pediatric dentistry associations (90.48%: all but the United States) and a large portion of pediatric associations (29.63%: Argentina, Brazil, Canada, Mexico, United States) recommended avoiding the offer of a pacifier in the first days of life to facilitate the establishment of natural breastfeeding. Seven pediatric dentistry associations stressed the importance of controlling the duration of the habit, limiting its use to moments of anxiety and sleep, and removing the pacifier as soon as the infant falls asleep (33.33%: Brazil, USA, Chile, Costa Rica, Mexico, Paraguay, Venezuela, and Puerto Rico). Pediatric associations also recommended this (14.81%: Brazil, Canada, Paraguay, and the United States). Some associations stated the importance of not immersing the pacifier in sweet substances before offering it to the child (33.33% of pediatric dentistry associations: USA, Chile, Costa Rica, Mexico, Paraguay, Puerto Rico, Venezuela; 18.52% of pediatric associations: Argentina, Canada, Mexico, Paraguay, and the United States).

Only two pediatric dentistry associations (9.52%: the United States and Puerto Rico) identified the advantages of pacifier use (Question 3), and both reported the substituting of digit (finger/thumb) sucking for pacifier use, which is easier to remove. The association from the United States also stressed pacifier use to reduce the risk of SIDS, maintain the sucking reflex in children who are not breastfed, as well as relieve pain and stress. Among the pediatric associations, nine reported advantages of pacifier use. A large part suggested that use reduces the risk of SIDS (29.63%: Argentina, Brazil, Canada, Chile, Colombia, El Salvador, Mexico, and the United States). Among these associations, those of the United States, El Salvador, and Mexico restricted this benefit to pacifier use during sleep, and the association from Canada restricted use to the first year of life. The Uruguayan Society of Pediatrics reported that it is unclear whether a pacifier is helpful for the prevention of SIDS. Two pediatric associations (7.41%: El Salvador and Canada) also noted that the pacifier habit is easier to remove than digit sucking, and two (7.41%: Brazil and El Salvador) associated a pacifier with the modulation of agitated behavior in infants.

Table 3. Frequency of answers obtained concerning the questions, considering all associations with available websites.

Questions	Pediatric Dentistry Entities (N= 21)		Pediatric Entities (N= 27)	
	N	%	N	%
DOES THE ASSOCIATION RECOMMEND THE USE OF A PACIFIER?	8 Provided Information		6 Provided Information	
No information obtained	13	61.91	21	77.78
Not recommended under any circumstances	0	0	1	3.70
It is not recommended but accepted in situations where the need for suction is not satisfied	1	4.76	0	0
Not recommended if the baby exclusively breastfeeds	5	23.81	1	3.70
Yes, in cases of digital suction	2	9.52	0	0
Yes, when the baby returns to birth weight, the mother has no difficulty breastfeeding, and breastfeeding is exclusive	0	0	1	3.70
Yes, it is offered in the first days of life in babies with adapted breastfeeding	0	0	1	3.70
It's up to the parents to decide	0	0	2	7.41
IN CASES OF PACIFIER USE, WHAT CARE SHOULD BE TAKEN?	20 Provided Information		8 Provided Information	
No information obtained	1	4.76	19	70.37
Avoid offering the pacifier in the first days of the baby's life so that natural breastfeeding is better established	19	90.48	8	29.63
Control the duration of the habit, limiting its use to moments of anxiety and sleep	7	33.33	4	14.81
Do not dip the pacifier in sweet substances when offering	7	33.33	5	18.52
The pacifier shield should be wider than the child's mouth	3	14.28	1	3.70
Do not tie the pacifier close to the child's body	3	14.28	3	11.1
Keep a pacifier always clean	2	9.52	1	3.70
Choosing a soft nipple pacifier	0	0	2	7.41
Frequently inspect the pacifier for wear or deterioration	2	9.52	2	7.41
Never leave the baby unattended with the pacifier	2	9.52	2	7.41
Not cleaning the pacifier with the saliva of the parents	2	9.52	1	3.70
Use the smallest model of pacifier possible	2	9.52	1	3.70
Do not allow its use for a very long period	2	9.52	0	0
Consult the instructions on the package to purchase a pacifier suitable for the age group	1	4.76	1	3.70
Do not allow the pacifier to be chewed by the child	0	0	1	3.70
Use a quality pacifier that adapts to the child's palate	0	0	1	3.70
Do not use the pacifier to replace or delay meals	0	0	1	3.70
ADVANTAGES OF PACIFIER USE	2 Provided Information		9 Provided Information	
No information obtained	19	90.48	18	66.67
Reduces the risk of sudden newborn death	0	0	8	29.63
Pain management in the newborn	0	0	2	7.41
The modulation of the agitated behavior of the baby	0	0	2	7.41
Satisfaction of the infant's basic sucking need	0	0	1	3.70
Aid in reducing stress, weight gain, and gastrointestinal development of hospitalized premature babies	0	0	1	3.70

Replacement of digital suction as it is easier to remove	2	9.52	2	7.41
DISADVANTAGES OF PACIFIER USE	20 Provided Information		7 Provided Information	
No information obtained	1	4.76	20	74.07
Breastfeeding difficulties	18	85.71	6	22.22
Orthodontic and jaw development problems	20	95.24	5	18.52
General dental problems	0	0	2	7,41
Dental injuries	1	4.76	0	0
Dental caries	1	4.76	0	0
Alteration of the emotional or social well-being of children and adolescents	16	76.19	0	0
Atypical swallowing	1	4.76	0	0
Breathing alterations	1	4.76	1	3.70
Speech development problems	1	4.76	2	7.41
Otitis	0	0	3	11.11
Infections	0	0	1	3.70
Occurrence of oral addictions in adult life	0	0	1	3.70
Dependence on the habit by the baby	0	0	1	3.70
IDEAL AGE FOR REMOVING THE HABIT	20 Provided Information		6 Provided Information	
No information obtained	1	4.76	21	77.78
By a maximum of one year of age	0	0	2	7.41
Around 1 year and a half old	1	4.76	0	0
By a maximum of two years of age	1	4.76	2	7.41
By a maximum of three years of age	19	90.48	0	0
Between 2 and 4 years old	0	0	1	3.70
By a maximum of four years of age	0	0	1	3.70
WHAT METHODS ARE RECOMMENDED FOR REMOVING THE HABIT?	3 Provided Information		3 Provided Information	
No information obtained	18	66.67	24	88.89
Do not use punishments or traumatic measures	1	4.76	2	7.41
Parental guidance and encouragement	0	0	2	7.41
Behavior modification techniques	2	9.52	1	3.70
Positive reinforcement techniques	2	9.52	2	7.41
Offering other objects when the child uses the pacifier	1	4.76	1	3.70
Use of creativity (playful proposals)	2	9.52	0	0
A gradual reduction in pacifier offering times	2	9.52	0	0
Do not leave pacifiers available in the house	2	9.52	0	0
Good communication	0	0	1	3.70
Do not relapse after withdrawal from the habit	0	0	1	3.70

Seven pediatric and 20 pediatric dentistry associations offered information on the disadvantages of pacifier use (Question 4). Most pediatric dentistry associations (85.71%: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, El Salvador, Uruguay, and Venezuela) and a large portion of pediatric associations (22.22%: Brazil, Uruguay, Paraguay, El Salvador, Canada and Chile) linked pacifier use to breastfeeding difficulties. All pediatric dentistry associations (95.24%) and some pediatric associations (18.52%: United States, Uruguay, Paraguay, Chile, and Canada) reported the occurrence of orthodontic and jaw development problems. Pediatric dentistry associations drew attention to the risk that pacifier sucking may alter the emotional or social well-being of children and adolescents (76.19%: Bolivia, Argentina, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, El Salvador, Uruguay, and Venezuela). Four pediatric dentistry associations pointed out the occurrence of otitis as a consequence of pacifier sucking (19.04%: Uruguay, Canada, Brazil, and the United States).

Regarding Question 5 on the ideal age for removing the pacifier habit, most of the 20 pediatric dentistry associations stated that removal of the habit should occur by a maximum of three years of age (90.48%: all respondents). These associations also pointed out that the likelihood of the self-correction of possible malocclusions is more significant if the habit is removed before two years of age. Among the six pediatric associations that provided this information, two indicated the removal of the habit by a maximum of one year of age (7.41%: Brazil and Mexico), and two stated that removal should occur by a maximum of two years of age (7.41%: Chile and Paraguay).

Three pediatric dentists and three pediatric associations proposed removing the habit (Question 6). The most reported recommendations were behavior modification techniques (9.52% of pediatric dentistry associations: Puerto Rico and United States; 3.70% of pediatric associations: United States), positive reinforcement techniques (9.52% of pediatric dentistry associations: Puerto Rico and United States; 7.41% of pediatric associations: Canada and United States) and the non-use of traumatic measures, such as punishment or humiliation for removal of the habit (4.76% of pediatric dentistry associations: Brazil; 7.41% of pediatric associations: United States and Puerto Rico).

Among the pediatric dentistry associations, the Canadian Academy of Pediatric Dentistry was the only one that offered no information on its website for the questions of interest. Among the pediatric associations identified in the present study, it was not possible to gain access to the recommendations of 16 associations due to the absence of websites (or because the websites were offline) and social media, the lack of such information on these platforms or the fact that the associations did not respond to the e-mails (Belize, Bolivia, Cuba, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Panama, Peru, Puerto Rico, Dominican Republic, Trinidad and Tobago and Venezuela) (Supplementary Material C and D).

Discussion

The critical narrative review aimed to identify and analyze recommendations available online by pediatric and pediatric dentistry associations of the Americas related to the habit of pacifier sucking. Since a large part of the lay population and health professionals see these associations as sources of information considered reliable and accessible [16].

Twenty-one countries offered information on pacifier use, corresponding to only 60% of the countries of the Americas. Not all subjects investigated were mentioned on the websites of associations of pediatrics and pediatric dentistry in the Americas, limiting the population's and dentistry professionals' access to relevant

information on the subject. Pediatric associations had lower response rates and greater heterogeneity in the information. In contrast, only one pediatric dentistry association did not have information on any of the questions posed. The most conflicting arguments between the two groups were those related to Question 3 (advantages of pacifier use) and Question 5 (ideal age for removing the habit). The most homogeneous answers between the two groups were related to care with the use of the device (Question 2).

Regarding Question 1 (Does the association recommend using a pacifier?), only one association did not recommend its use in any situation. Some recommended it in specific conditions, such as when breastfeeding is well established, when the sucking needs of the child are not fulfilled, or in the presence of the digit sucking habit. Most pediatric dentistry and two pediatric associations suggested that a pacifier should not be offered if the infant is exclusively breastfed. Although some of the associations did not explain this recommendation, it may be because the sucking needs of the child are met by exclusive breastfeeding, which would not justify pacifier use [17]. Another possible explanation would be the risk of early weaning due to pacifier use.

Studies report that pacifier use is a risk factor for the early interruption of breastfeeding when introduced prior to the establishment of breastfeeding [11,18]. Aarts et al. [19] state that the production and offer of breast milk are maintained by frequent efficient suckling at the breast and that a pacifier can interfere with and diminish this activity due to the "nipple confusion" phenomenon, which is characterized by the infant's preference for one mechanism over the other, as pacifier sucking requires less effort than suckling at the breast. With the preference for the pacifier, breast milk production is reduced [20-22]. However, other systematic reviews have reported that pacifier use does not affect breastfeeding newborns [21,23]. According to Krammer et al. [24] and Buccini et al. [11], the refusal of breastfeeding and the preference for a pacifier may be an indicator that an infant is having difficulty breastfeeding and seeks the pacifier to meet its sucking needs.

Two pediatric associations and one pediatric dentistry association stated that parents have the power to decide over offering an infant a pacifier or not, which may explain the low rate of recommendations with regard to Question 1. Tolppola et al. [23] agree that the power of decision should be in the hands of parents based on the individual needs of the newborn and rational use (four to six hours per day) until studies can provide more conclusive evidence.

For Question 2, which addressed the care to be taken in cases of pacifier use, most pediatric dentistry associations, in consensus with pediatric associations, do not recommend using a pacifier in the first days of life to contribute to the better establishment of breastfeeding. As reported in the previous question, using a pacifier before the establishment of breastfeeding may be associated with nipple confusion [20,22]. Another standard recommendation was the limitation of nonnutritive sucking to times of anxiety and sleep, which could avoid dependence on the pacifier and reduce the harmful effects resulting from prolonged frequent use [25]. Seven pediatric dentists and five pediatric associations recommended not immersing the pacifier in sweet substances. The same recommendation comes from Molina Escribano et al. [26], who consider this counseling to be a prevention measure for dental caries and are in agreement with the recommendations of the World Health Organization that free sugars should not be offered to children before completing two years of age [27].

Among the pediatric dentistry associations, only two identified advantages related to pacifier use (Question 3), reporting greater ease in removing the habit compared to digit sucking, which was also reported by one pediatric association and stated in the literature [28]. The ease of access to a finger or thumb makes the habit more likely to persist [12]. For the majority of pediatric associations that addressed this issue, most reported that the advantage was the reduction in the risk of sudden infant death syndrome (SIDS), which is corroborated in the literature [9,10]. Some associations limited the indication for pacifier use to the moment of

sleep and up to the first year of life. The protection mechanism of a pacifier concerning SIDS is not yet well understood. The main hypotheses include the lower likelihood of the infant rolling into the prone position [29], reductions in the occurrence of sleep apnea and gastroesophageal reflux [30], and better autonomic control of respiration [31]. Moreover, a systematic review states that pacifier use during sleep may improve clearance of the airways due to the lower position adopted by the tongue. Still, there are no randomized clinical trials to support or refute this recommendation [32].

One pediatric association stated that a pacifier assists in the development of hospitalized premature infants, confirmed in a systematic review that attributed pacifier use to weight gain, a better transition from the feeding tube to oral feeding, and earlier discharge [8]. Another advantage reported by two pediatric associations and confirmed in the literature is the contribution of a pacifier to the non-pharmacological management of pain in newborns by diminishing behavioral and physiological responses to pain during medical procedures [33].

Many of the pediatric and pediatric dentistry associations of the Americas reported early weaning as a disadvantage regarding pacifier use (Question 4). Indeed, the use of this device has been associated with the interruption of breastfeeding [18]. Moreover, there is a consensus among the pediatric and pediatric dentistry associations that addressed this issue that pacifier use can interfere with craniofacial development and contribute to the occurrence of malocclusions. The prolonged presence of a pacifier in the oral cavity makes the tongue assume a lower position, which favors the widening of the lower dental arch. Moreover, pressure is exerted on the palate, which could result in its narrowing. These interferences can lead to the establishment of malocclusions [34]. Studies have shown associations between pacifier use and the development of anterior open bite and posterior crossbite [13,14].

Most pediatric dentistry associations described changes in emotional and social well-being among children and adolescents who use pacifiers, which needs to be clarified in the scientific literature. Moreover, a small group of pediatric associations stated that pacifier use can trigger acute middle ear infection, which is compatible with the data described in the literature. Studies suggest that sucking promotes the reflux of secretions from the nasopharynx to the middle ear and contributes to occlusal changes, leading to dysfunction of the Eustachian tube, which connects the tympanic cavity to the nasopharynx [35]. Two pediatric associations and one pediatric dentistry association reported that pacifier use can affect speech. Indeed, the literature states that changes in the production of phonemes occur mainly due to the anteriorization of the tongue position between the dental arches [36]. Moreover, two pediatric associations pointed to the possibility of oral fixations in adulthood. Studies have demonstrated that harmful behavior in adulthood, such as smoking, may replace oral habits from childhood, as the stimulation mechanism of these behaviors retains similarities, along with the capacity to calm as well as diminish stress and anxiety [37].

One pediatric dentistry association reported the occurrence of atypical swallowing in children who use a pacifier. This nonnutritive sucking habit can exert a negative impact on the tone of muscles involved in chewing and compromise normal swallowing dynamics [38]. Moreover, anterior open bite, which is found with greater frequency in patients who use a pacifier [14], may also be an etiological factor in the development of atypical swallowing, as swallowing dynamics are compromised in such cases due to lingual interposition and the absence of lip seal [39]. One pediatric dentistry association and one pediatric association reported the occurrence of mouth breathing in patients who use a pacifier. The mouth breathing habit may be established due to the absence of lip seals resulting from prolonged pacifier use, consequent hypotonicity of the facial and lingual muscles [40], and poor tooth positioning, commonly found in these patients [41].

Question 5 (ideal age for removing the pacifier-sucking habit) was addressed more by pediatric dentistry associations and had the highest agreement rate among these associations. In contrast, it was one of the least addressed and most discordant issues among the pediatric associations. Most pediatric dentistry associations recommend the removal of the habit by three years of age. Still, they emphasized that removal by two years of age would be ideal to increase the likelihood of the self-correction of possible disharmonies in the dental arches. The literature has established that the habit can contribute to malocclusions when extended beyond three years of age [42] because the deciduous teeth are erupted and occluded by this age [43]. If the habit is removed before three years, occlusal alterations may be less pronounced, and spontaneous resolution can occur after removing the habit [44].

Regarding Question 6 (What methods are recommended for removing the habit?), most pediatric and pediatric dentistry associations that addressed this issue indicated the need for follow-up with a pediatric dentist to establish effective measures and counseling, highlighting psychological therapy, such as positive reinforcement and rewards. Studies have also pointed to the importance of positive and negative reinforcement, by which children and parents are warned of the consequences of prolonging the habit [28]. Offering other objects, such as toys and rewards at times when the child most uses a pacifier, was the recommendation of one pediatric dentistry association and one pediatric association. According to the literature, this method could work due to the transference of the pleasure of pacifier sucking to the object or reward offered [45]. Furthermore, pediatric dentistry associations recommend not leaving pacifiers available throughout the house and stress the importance of gradually removing the habit by reducing the times at which it is offered. Garbin et al. [3] report that the abrupt removal of the device can cause behavioral changes in children.

In agreement with one of the pediatric associations, a systematic review addressing the best way to remove the pacifier-sucking habit indicated that the use of orthodontic appliances, such as a palatal gride as a physical barrier to inhibit the nonnutritive sucking habit, which could be used alone or in combination with psychological interventions [6]. Besides being a physical barrier, this method serves as a reminder therapy. For a better prognosis, however, consent and cooperation should be obtained from the child [46].

Approximately 40% of the countries in America were not represented in this study, as the pediatric and pediatric dentistry associations in these countries did not provide online data or did not respond to contact by e-mail. Despite this, a broad search was conducted of sites, social media, and educational materials to obtain the maximum possible quantity of information. Although more numerous, pediatric associations have fewer websites and social networks available, providing less information than pediatric dentistry associations. As contact with families and infants generally first occurs with pediatricians and only later with pediatric dentists, these professionals need to agree with each other and be armed with scientific evidence to offer adequate counseling on the prevention of oral health problems as well as refer these patients to more specialized care, when necessary [47,48].

When health information is addressed in a conflicting way, there is a tendency toward skepticism and low acceptance of practices [48]. Thus, counseling patients and their families concerning health-related decision-making in a reliable way based on scientific evidence is essential and contributes to positive results in the long term [49]. The offer of recommendations and dialog among associations improves the dissemination of proper practices, even in culturally distinct countries. Regular encounters should occur among associations to establish standard practices and contribute to the prevention of oral health problems in children of the Americas.

Conclusion

Most pediatric dentistry associations recommend the care and disadvantages of pacifiers and the ideal age to remove them. The few pediatric associations that provide information address indications, care, advantages and disadvantages of pacifiers, age, and removal methods.

Authors' Contributions

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All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study as well as supplementary material can be made available upon request to the corresponding author.

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