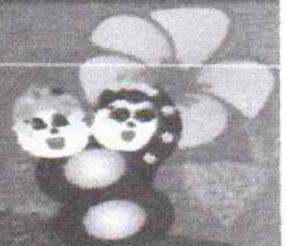
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The Indonesian Society of Dentistry for Children idgai

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*Diverse Clinical Experiences Contribute to Novel Quality of Pediatric Dentist Community*

Sanur Paradise Plaza Hotel, Bali, May 24-26, 2012



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## IDENTIFIKASI STREPTOCOCCUS AND INISIAL AQUISION IN BABIES

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### ABSTRACT

Background. Mutans Streptococci are considered as major bacteria in dental caries whose prevalence is very high on human dental. Nowadays, the transmission of Streptococcus is very rapid toward babies, which occurs directly and indirectly by salivary contact of the mother or baby sitter, so Streptococcus initial acquisition in baby comes in very early age, around 7-8 months. The younger the child acquires MS, the higher the dental caries risk on the child. Purpose. The purpose of this study is to know the kinds of Streptococcus species and initial acquisition in babies at Posyandu RW VI-VIII Kelurahan Simomulyo, Surabaya city. Method. Monthly plaque samples using a sterile cotton bud and examinations were taken in order to see the kinds of Streptococcus species in babies until the initial acquisition was determined, after that the Streptococcus species were isolated by using BHI and TYC broth respectively, then the Streptococcus species were reproduced by using BAP/Lavental. After that Streptococcus species were identified by using gram staining and API 20 Strep. Result. As the result 24% Mutans Streptococcus and the average initial acquisition age of babies was 7,5 month, 4% *S.sobrinus* and the average initial acquisition age of babies was 10 month, 20% *S.sanguinis* and the average initial acquisition age of babies was 7,4 month, 16% *S.salivarius* and the average initial acquisition age of babies was 7,75-month, 16% *S.oralis* and the average initial acquisition age of babies was 7,75 month, 4% *S.bovis* and the average initial acquisition age of babies was 9 month, 4% *Lactococcus lactis* and the average initial acquisition age of babies was 9 month, 12% were not identified and the average initial acquisition age of babies was 9 month. Conclusion. Because identification MS very high so the caries in subject was predicted high and need comprehensive prevention. To give a knowlegde about transmission bacteria from salivary contact directly or indirectly for mother/baby sitter.

**Key words:** Initial Acquisition, Streptococcus, Streptococcus mutans, caries, babies, identification

## INTRODUCTION

Oral and dental diseases are major problems suffered by 90% of Indonesian people. The oral and dental disease most commonly found in the society is dental caries (litbang, 2008). Research in European countries, American countries and Asian countries including Indonesia showed that 80-95% children under 18 years old suffered from dental caries (usebrains). *Streptococcus mutans* and *Streptococcus sobrinus* are microorganisms which play an important role in forming dental caries (Klein et.al, 2004).

Normal biota in mouth cavity whose existence affecting host defense are *Streptococcus orali*, *Streptococcus mitis*, and *Streptococcus salivarius*. These biota are *Streptococcus* species which pioneered the colonization in baby's mouth cavity in the first year of life (Caufield et al, 2000). As time goes by, bacteria are also obtained from outside such as *Streptococcus mutan* and *Streptococcus sobrinus* which are dominantly found in saliva and dental plaque (Gronos, 2000).

*Streptococcus mutans* is also reported as a contagious bacterium and it can spread from one person to another. This bacterium can spread through saliva. Many research reported that mother is the primary source of *Streptococcus mutans* spreading toward the baby (Kozai et al, 1999). *Streptococcus mutans* transmission occurs through saliva, either through direct contact or indirect contact. The examples of indirect contacts are through spoon, toothbrush, tooth paste, and other media that are contaminated by saliva (Alaluusa S, 1991). If a permanent and stable colonization happens in the oral cavity, then initial acquisition takes place (Klein, 2004). *S. mutans* can only be found following dental eruption, the use of obturator or artificial dental (Tedjosongko, 2002).

According to a research done by Kohler et al (1988), the sooner the baby acquired, *Streptococcus mutans* the higher the risk of the baby to had dental caries. So, it is likely that the early *Streptococcus mutans* initial acquisition causes a high number of Indonesian babies with dental caries. In other word, the high dental caries risk on a baby shows that Indonesian babies acquire *Streptococcus mutans* initial acquisition in the early age. From the research that has been done by Tedjosongko et al (2005), the average baby initial acquisition age in Puskesmas Pucang Sewu is 9,7 months. Another research done by Maria (2010) showed that the average baby initial acquisition age in Tropodo area is 8,64 months. One more research done by Citra (2011) showed that the average baby initial acquisition age in Simomulyo area is 7,76 months.

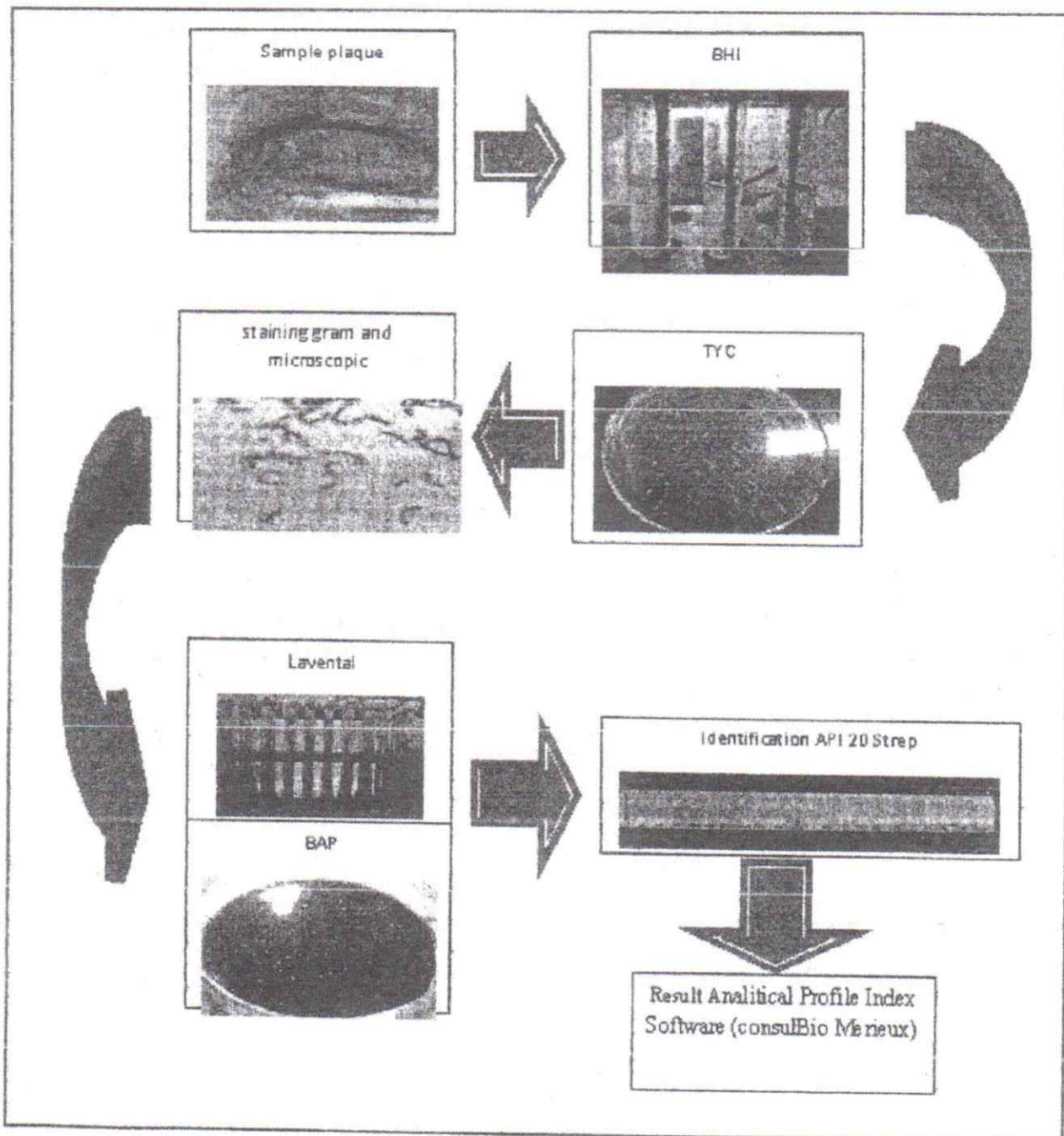
These three research showed that the dental caries risk on Indonesian babies is high. To know the species of *Streptococcus*, the writers use API 20 Strep from BioMeriux which is good to manually identify microorganism to the species level accurately based on a wide database and required standard. This system is easily applied, safe and quick with a more economical cost than any other methods. API 20 Strep uses software that can give detail reports to obtain organism identification.

## MATERIALS AND METHODS

*Streptococcus* identification was done by laboratory work that is by gram coloring and API 20 Strep that was previously flourished in TYC (Tryptone Yeast Cystine) media and multiplied in BAP (Blood Agar Plate)/Laventai.

*Streptococcus* bacterium was planted in BAP (5 plate)/Laventai (10 reaction tubes) and incubated for 24 hours. Then, the bacterium was taken out and put into reaction tube filled with Na Cl 85% with volume 2 and homogenized to that bacterium suspension, then equaled with Mc Farland 4 standard. The incubation box then was filled with sterilized

### Identification Streptococcus



aquadest on the sumuran? as much as 5 ml to maintain the humidity. A strip test filled with enzyme and sweets then was put on top of the incubation box. A 100 µl bacterium suspension then poured into the strip test which was previously matched with Mc farland 4 standard to 10 enzymatic test sumuran? that contain enzymes : VP; HP; ESC; PYRA; α GAL; B GUR, B GAL; PAL; LAP; and ADH from the side of the tube (prevent air bubble from happening). On 2 ml API GP medium ampul, a 0,5 ml bacterium suspension was added then homogenized. The mixture of API GP and bacterium suspension was put into 10 fermentation test arrangements filled with sweets : RIB; ARA; MAN; SOR; LAC; TRE; INU; RAF; MAD; GLYG; each as much as 100 µl and mineral oil was dropped on top of ADH sumuran and 10 sumuran? sweets test then it was incubated in the 37 celcius degree temperature for 4 hours. After being taken from the incubator, 1 drop of reagen VP 1 and 1 drop of VP2 were added to each of the sumuran VP, 1 drop of reagen NIN to sumuran HIP, 1 drop of ZYM A and 1 drop of ZYM B to sumuran PYRA; α GAL; B GUR, B GAL; PAL and LAP. Wait until they changed color (for the enzymatic test changes it took 10 minutes and for fermentation test it took 24 hours) then they were being matched with API-web software and scored according to the color changing and then the total score was read with Analytical Profile Index Software (consulBio Merieux).

## RESULT

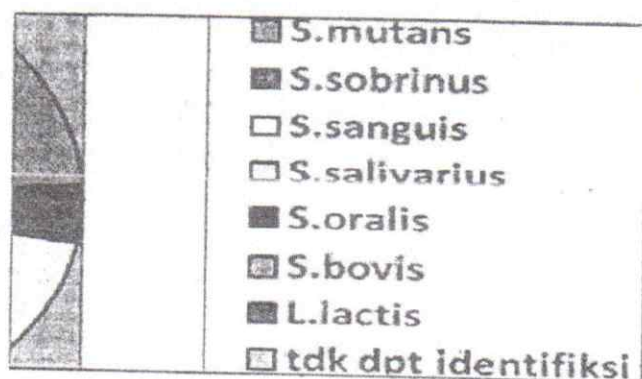
From the result of the research, it was found that the average *S.mutans* initial acquisition age is 7,5 months with the average identification accuracy of 93,05% and the number of sample percentage is 24%, the average *S.sobrinus* initial acquisition age is 10 months with the average identification accuracy 81,3% and the number of sample percentage is 4%, the average *S.sanguis* initial acquisition age is 7,4 months with the average identification accuracy 92,06% and the number of sample percentage is 20%, the average initial acquisition age is 7,75 *S.salivarius* months with the average identification accuracy 91,5% and the number of sample percentage is 16%, the average initial acquisition

Table 1 Result Identification Streptococcus

No	Spesies	Average Initial Aquisition	Average Identification Accuracy	Number of Sample Percentage
1.	<i>Streptococcus mutans</i>	7,5 bulan	93,05 %	24 %
2.	<i>Streptococcus sobrinus</i>	10 bulan	81,3 %	4 %
3.	<i>Streptococcus sanguis</i>	7,4 bulan	92,06 %	20 %
4.	<i>Streptococcus salivarius</i>	7,75 bulan	91,5 %	16 %
5.	<i>Streptococcus oralis</i>	7,75 bulan	93,53 %	16 %
6.	<i>Streptococcus bovis</i>	9 bulan	80,9 %	4 %
7.	<i>Lactococcus lactis</i>	9 bulan	97,5 %	4 %
8.	Unidentification	7 bulan	-	12%

age is 7,75 months with the average identification accuracy 93,53% and the number of sample percentage is 16%, the average *S.bovis* initial acquisition age is 9 months with the average identification accuracy 80,9 *S.oralis* % and the number of sample percentage is 4%, the average *Lactococcus lactis* initial acquisition age is 9 months with the average identification accuracy 97,5% and the number of sample percentage is 4%, and the average unidentified initial acquisition age is 7,75 months with the number of sample percentage 12%.

Fig.1 Prosentage result by identification Streptococcus with API 20 Strep.



## DISCUSSION

It is not easy to obtain accuracy in identifying *Streptococcus mutans*, it takes lots of time, needs carefulness and some methods in laboratory work (Kozai Katsuyuki, 2005). In this research, the writers used enzymatic test technique and sweets test technique which became one tool, that is API 20 Strep. This technique only took 1 day (24 hours) to identify Streptococcus bacterium plus 6-day microbiology laboratory work, so the total work day is 7 days. Besides, the cost spent for this research is cheaper than any other techniques.

Normal biota in mouth cavity whose existence affecting host defense like *Streptococcus orali*, *Streptococcus mitis*, and *Streptococcus salivarius* are *Streptococcus* species which pioneered the colonization in baby's mouth cavity in the first year of life (Caufield et al, 2000). As time goes by, bacteria are also obtained from outside such as *S. mutan* and *S.sobrinus* which are dominantly found in saliva and dental plaque (Gronos, 2000). This research is useful to see bacteria species type potentially occurred in milk teeth, that is to say *Streptococcus mutans* (Avila FA et al, 2007).

Some research that have been done found that the age of initial acquisition is varied from 7 to 36 months (Caufield et al, 1993). *Streptococcus* initial acquisition can happen when there is a direct transfer from the infected host to another host, or by indirect transfer through object contaminated by saliva, such as food and water, and the riskiest period of getting contaminated is when the teeth grow from 8 months to 3 years (Gronos, 2000).

The younger the age of a baby is, the higher the risk of having dental caries. Based on the research done by Roeters et al (195), the age of a baby acquired *Streptococcus mutans*

initial acquisition can become the most influential risk factor toward the occurrence of caries in the future. From 6 baby samples used in this research with the percentage of 24%, it was found that the average *Streptococcus mutans* initial acquisition is 7,50 months, while the earliest age exposed to *Streptococcus mutans* is 7 months. Thus, the average *Streptococcus mutans* initial acquisition age resulted from this research is earlier than the two previous research done by Tedjosasongko et al in the year of 2007, which is 9,67 months and by Maria in the year of 2009, which is 8,64 months.

*Streptococcus mutans* transmission on baby can happen vertically and horizontally. Vertical transmission is microba transmission from mother/baby sitter to baby, while horizontal transmission is microba transmission among family members or babies (Berkowitz, 2006). Many research reported that mother is the primary source of *Streptococcus mutans* spreading on baby. This is based on the similarity of *Streptococcus mutans* strain type of the baby with the people around him/her especially the mother (Caufield, 1993; Kozai et al, 1999; Tedjosasongko, 2002). Direct contact happens when the infected host feeds the baby with spoon contaminated with saliva and when the mother kisses the baby. According to some research using fenotive and genitive methods, it is proved that mother is the primary spreading source of *Streptococcus mutans*. However, it is also possible that the baby got contaminated by other sources (Klein et al, 2004).

Research done by Kohler et al (1998) showed that the age of a baby on initial acquisition influences the risk of caries occurrence in the future. The easier the baby acquires this bacterium, the higher the dental caries risk on the baby. Therefore, it is essential to do some preventive actions concerning dental caries that happen to babies.

From this research, there are some suggestions that can be given to prevent dental caries to happen, such as giving information about bacterium transmission process from the infected host to the baby that can cause dental caries, avoiding the habit of sharing food and drink that can cause bacterium transmission trough saliva, avoiding the habit of sharing food utensils without being washed first, avoiding the habit of kissing the baby on the mouth, reducing or eliminating bacterium transfer from the mother to the baby by gargling with mouth wash, regularly go to the dentist every 6 month to evaluate the health and cleanliness of the mouth and teeth.

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