THE EFFECT OF DISKING TECHNIQUE ON PROXIMAL CARIES OF PRIMARY UPPER INCISORS IN TRIBAL PRESCHOOL CHILDREN ATTENDING CHILD DEVELOPMENT CENTERS OF MAE FAH LUANG DISTRICT, AND DOI TUNG DEVELOPMENT PROJECT, CHIANG RAI

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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Pediatric Dentistry
Department of Pediatric Dentistry
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ผลของการตัดรอยผุด้านประชิดของฟันน้ำนมหน้าบนในเด็กก่อนวัยเรียนชาวไทยภูเขา ศูนย์พัฒนาเด็กเล็กอำเภอแม่ฟ้าหลวงและพื้นที่โครงการพัฒนาดอยตุงฯ จังหวัดเชียงราย

นายนิวัฒน์ ธะนะบุญยัง

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
สาขาวิชาทันตกรรมสำหรับเด็ก ภาควิชาทันตกรรมสำหรับเด็ก
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นิวัฒน์ ธะนะบุญยัง : ผลของการตัดรอยผุด้านประชิดของฟันน้ำนมหน้าบนในเด็กก่อนวัยเรียนชาวไทยภูเขา ศูนย์พัฒนาเด็กเล็กอำเภอแม่ฟ้าหลวงและพื้นที่โครงการพัฒนาดอยตุงฯ จังหวัดเชียงราย. (THE EFFECT OF DISKING TECHNIQUE ON PROXIMAL CARIES OF PRIMARY UPPER INCISORS IN TRIBAL PRESCHOOL CHILDREN ATTENDING CHILD DEVELOPMENT CENTERS OF MAE FAH LUANG DISTRICT, AND DOI TUNG DEVELOPMENT PROJECT, CHIANG RAI) อ.ที่ปรึกษาหลัก : รศ. ทพญ. ดร.บุษยรัตน์ สันติวงศ์

วัตถุประสงค์: เพื่อประเมินผลการกรอตัดรอยผุ เปรียบเทียบกับการบูรณะฟันด้วยกลาสไอโอโนเมอร์ซีเมนต์ชนิดดัดแปรด้วยเรซิน บนด้านประชิดของฟันตัดน้ำนมหน้าบนในเด็กก่อนวัยเรียนชาวไทยภูเขา ศูนย์พัฒนาเด็กเล็ก พื้นที่โครงการพัฒนาดอยตุงฯ จังหวัดเชียงราย วัสดุและวิธีการ: ใช้การจับคู่เด็กก่อนวัยเรียนชาวไทยภูเขา 20 คน และสุ่มอย่างง่ายเพื่อเข้ากลุ่มซึ่งแบ่งเป็น กลุ่มควบคุมทำการบูรณะรอยผุจำนวน 26 รอยผุด้วยกลาสไอโอโนเมอร์ซีเมนต์ชนิดดัดแปรด้วยเรซิน กลุ่มทดลองทำการกรอตัดรอยผุด้านประชิดจำนวน 26 รอยผุ หลังการรักษาเด็กทั้ง 2 กลุ่ม ได้รับการทาฟลูออไรด์วาร์นิช หลังจากนั้น 6 เดือนประเมินผลสำเร็จของการรักษา การคงอยู่ ความแนบตามขอบวัสดุบูรณะ ไม่มีการผุต่อ และภาพรังสีไม่มีพยาธิสภาพที่ปลายรากฟัน โดยใช้สถิติ Fisher's exact test ที่ระดับนัยสำคัญ $p<0.05$ ผลการศึกษา: ฟันที่ได้รับการบูรณะมีการคงอยู่ของวัสดุและมีขอบแนบ 22 ด้าน (ร้อยละ 85) และปลายรากฟันไม่มีพยาธิสภาพ 25 ด้าน (ร้อยละ 96) ฟันที่ได้รับการกรอตัดรอยผุไม่มีการผุลุกลาม 24 ด้าน (ร้อยละ 92) และทุกด้านไม่มีพยาธิสภาพปลายรากฟัน (ร้อยละ 100) ผลการรักษาฟันทั้งสองวิธีไม่มีความแตกต่างทางสถิติ ($p=1.000$) สรุป: การจัดการรอยผุด้านประชิดของฟันน้ำนมหน้าบนที่ลึกระดับเนื้อฟันส่วนนอกและเนื้อฟันส่วนกลางด้วยการบูรณะฟันด้วยกลาสไอโอโนเมอร์ซีเมนต์ชนิดดัดแปรด้วยเรซินและการตัดรอยผุ ผลทางคลินิกและผลทางภาพรังสี ไม่พบความแตกต่างอย่างมีนัยสำคัญทางสถิติที่ระยะเวลา 6 เดือน

สาขาวิชา	ทันตกรรมสำหรับเด็ก	ลายมือชื่อนิสิต .....
ปีการศึกษา	2561	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

5975821532 : MAJOR PEDIATRIC DENTISTRY

KEYWORD: disking technique, preschool children, primary upper incisors, proximal caries

Niwat Thanaboonyang : THE EFFECT OF DISKING TECHNIQUE ON PROXIMAL CARIES OF PRIMARY UPPER INCISORS IN TRIBAL PRESCHOOL CHILDREN ATTENDING CHILD DEVELOPMENT CENTERS OF MAE FAH LUANG DISTRICT, AND DOI TUNG DEVELOPMENT PROJECT, CHIANG RAI. Advisor: Assoc. Prof. Busayarat Santiwong, D.D.S., Ph.D.

Aim: To evaluate the effect of disking technique and resin modified glass ionomer cement (RMGI) restoration on proximal caries of primary upper incisors in tribal preschool children, aged 3-5 years, attending child development centers of Doi Tung Development Project, Chiang Rai. Methods: Twenty tribal preschool children were enrolled in this match-paired design study. Twenty-six proximal carious surfaces were randomized for RMGI restoration (control group), and 26 proximal carious surfaces were randomized for disking technique (experimental group). Fluoride varnish was applied in both groups after treatment. At 6-month interval, the treatment success was evaluated including retention of restoration, marginal integrity, no progression of caries and no periapical pathology. Fisher's exact test was used for analysis. Statistical significance was set at $p<0.05$. Results: After 6 months, 22 (85.0%) RMGI restorations still survived, and 25 (96%) RMGI restorations revealed normal periapical area. In disking group, no caries progression was found among the 24 surfaces (92%), all of disking teeth (100%) revealed normal periapical area. There was no statistically significant difference in clinical and radiographic outcomes between these methods ($p=1.000$). Conclusion: In proximal caries management of primary upper incisors limited to dentin outer third and dentin middle third by RMGI restoration and disking technique, no statistically significant difference was found in clinical and radiographic outcomes at 6-month interval.

Field of Study: Pediatric Dentistry Student's Signature .....

Academic Year: 2018 Advisor's Signature .....

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CHAPTER I

INTRODUCTION

Background and Rationale

Dental caries has been considered as one of the most prevalent chronic diseases in preschool children. Many studies showed dental caries was often ignored and most of the cavity was left untreated.(1) Annual Report from Doi Tung Health Center Commemorate 60th Birthday of Queen Sirikit in 2017 revealed that 67.4 % of preschool children attending child development centers experienced dental caries. However, the treatment records of anterior restoration was only 30 teeth.(2) This reflects that numerous dental caries in anterior teeth are left untreated. Presumably, this could be treatment need exceeding manpower. Early treatment of dental caries is essential because untreated caries can lead to complications such as pain, spreading infection causing sepsis, malnutrition because of the lack of ability to eat, and deprived general health. Children with dental caries and uncooperative behavior often require dental treatment under costly general anesthesia or requisite specialty training. Nowadays, there are only 182 pediatric dentists in Thailand.(3)

The traditional management of dental caries includes surgical removal of the infected dental tissue then fill the cavity with dental material to restore the form, function and esthetics of the tooth such as atraumatic restorative treatment (ART) or restoration with composite resin or glass ionomer.(1) The major limitation of conventional restorative treatment in preschool children who are young and anxious is uncooperative behavior, they cannot cooperate for lengthy complex restorative procedures. Tribal children who are from underprivileged families cannot afford the expensive cost of dental treatments. In addition, dental service is not available, traditional restorative treatment should be substituted by other alternative management as possibly can. The alternative treatment as disking is proposed. Disking technique aims to open the contact point of carious proximal surface to promote self-cleansing ability and to create the access for toothbrushing.(4) Disking surface can be applied with fluoride varnish to enhance remineralization.(5) This

technique slows down caries progression. Consequently, the disking teeth may survive until shed.(6) Disking technique is child-friendly short procedure (approximate 5 – 10 minutes), and is easily accepted by very anxious child because local anesthetic injection is not needed. This technique can be done by general dentists because no specialty training is required. Up to present, there is a great lack of clinical study evaluating the effect of disking technique on cavitated proximal caries of primary upper anterior teeth.

The objective of this study was to evaluate the effect of disking technique and resin modified glass ionomer cement (RMGI) restoration on proximal caries of primary upper incisors in tribal preschool children attending child development centers of Doi Tung Development Project, Chiang Rai.

Research Objective

To evaluate the effect of disking technique and RMGI restoration on proximal caries of primary upper incisors in tribal preschool children.

Research Question

To manage proximal caries of primary upper incisors in tribal preschool children, was disking technique effective as RMGI restoration?

Hypothesis

H0: To manage proximal caries of primary upper incisors in tribal preschool children, the disking technique was effective as RMGI restoration.

H1: To manage proximal caries of primary upper incisors in tribal preschool children, the disking technique was not effective as RMGI restoration.

Research Design

Simple random, match-paired design study

Scope of the Research

1. Population

Tribal preschool children aged between 3-5 years old attending child development centers of Mae Fah Luang District, and Doi Tung Development Project, Chiang Rai.

2. Samples

Tribal preschool children aged between 3-5 years old attending child development centers of Doi Tung Development Project, Chiang Rai during September 2018 to May 2019. Healthy co-operative or potentially co-operative tribal preschool children must have cavitated proximal caries on primary upper incisors regard as inclusion criteria. Only the tribal preschool children with written primary caregiver consent were included in this study.

Conceptual Framework

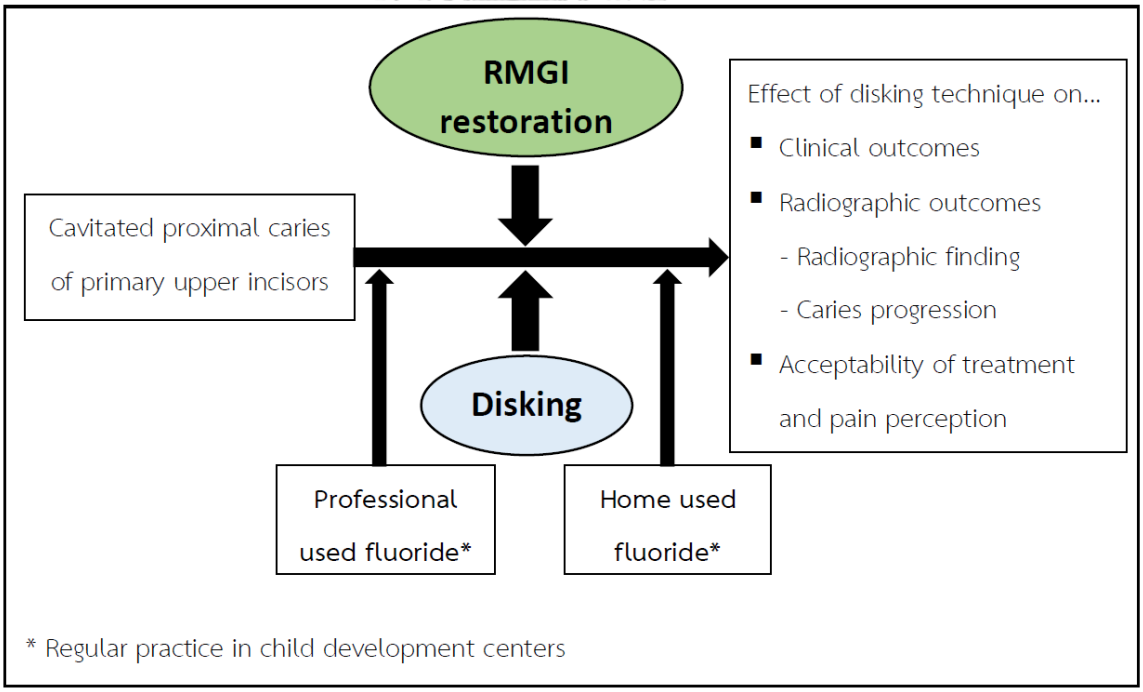


Figure 1 Conceptual Framework

Variables

The independent variable: disking technique, RMGI restoration

The dependent variables: the effect of disking technique and RMGI restoration

Limitation of the Research

Some limitations of this research were addressed as followings.

1. The samples were included only the co-operative or potentially co-operative tribal preschool children in Mae Fah Luang District, and Doi Tung Development Project, Chiang Rai.
2. This research specified for 6-month post-operative evaluation.
3. Considering cognitive level of tribal preschool children, the interviewing could not ask them directly. Primary caregiver interviewing could be some reporting biases.

Ethic Consideration

1. The study protocol was approved by the ethic committees of Faculty of Dentistry, Chulalongkorn University and Chiang Rai Provincial Health Office.
2. Consent

   To obtain the consent, the author informed primary caregivers about the study, and gave them opportunities to ask questions and to make decision for participating in the study. Only the tribal preschool children with written primary caregiver consent were included in this study. All data were disclosed for privacy.
3. Taking the radiograph

   The intraoral radiography on carious primary upper anterior teeth was taken according to the guideline of American Academy of Pediatric Dentistry (AAPD). The samples with periapical lesion on preoperative radiography indicating pulp therapy or extraction were transferred to Doi Tung Health Center Commemorate 60th Birthday of Queen Sirikit, and Mae

Fah Luang Hospital. The post-operative radiography was taken on treated primary upper anterior teeth according to the AAPD guideline.

4. Oral health status

All participants and primary caregivers received child oral health status report, and oral hygiene products (toothbrush and fluoride toothpaste).

Expected Benefits

This research aimed to evaluate the effect of disking the proximal caries of primary upper incisors in tribal preschool children attending child development centers of Mae Fah Luang District, and Doi Tung Development Project, Chiang Rai. Disking technique is a simple and short operative procedure for caries management. This research will provide simple alternative approach for general dentists in the rural governmental hospital to manage dental caries in preschool children.

Operational Definitions

Child Development Center: The institution providing childcare and education for young children aged between 2 and 5 years old to get ready for physical, emotional, mental, social and intellectual development.

Child Development Centers of Doi Tung Development Project: Child development centers located in Doi Tung Development Project. 6 centers are in Mae Fah Luang District, and 4 centers are in Mae Sai District.

Child Development Centers of Mae Fah Luang District: Child development centers under responsibility of Mae Fah Luang Hospital. The centers have the geographical and social characteristics similar with child development centers of Doi Tung Development Project.

Disking: The operation performed to cut proximal carious surfaces to make them accessible for self-cleansing and surface contact to fluoride from the fluoride toothpaste.

Doi Tung Development Project: A holistic and integrated sustainable alternative livelihood development initiative located in Mae Fah Luang and Mae Sai District, Chiang Rai, Thailand.

Proximal Caries: Closed cavitated dental caries locate at proximal surface of close contact primary upper incisors and limit to dentin outer third and dentin middle third.

Tribal Preschool Children: The Akha, Lahu, Tai Yai, and Haw Chinese children aged between 3-5 years old living in Mae Fah Luang District, and Doi Tung Development Project, Chiang Rai, Thailand.

Keywords

disking technique, preschool children, primary upper incisors, proximal caries

CHAPTER II

LITERATURE REVIEW

In this research, the author has reviewed the previous documents and studies as followed.

1. The development of oral diseases
2. Dental caries and caries process
   2.1 Dental plaque
   2.2 Carbohydrate exposure
3. Caries diagnosis
   3.1 Non cavitated and cavitated dental caries
   3.2 World Health Organization (WHO) criteria
4. Caries management
   4.1 Restorative caries management
   4.2 Non-restorative caries management
   4.3 Topical fluoride in caries prevention
5. Children's Behavior in the Dental Office
6. Parental satisfaction
7. Oral health status and current unmet dental services of preschool children

1. The development of oral diseases

Dental plaque, an oral biofilm that much resembling the rest of microbiome, has an important role in very common oral diseases such as caries, gingivitis, and periodontitis. The concepts about oral disease development have developed over time. In the nineteenth century, the lack of technology made scientists cannot identify bacteria associated to disease. This result in the "Non-Specific Plaque Hypothesis" or the concept that the gathering of dental plaque was accountable for oral disease without discerning between the levels of virulence of bacteria.

In the twentieth century, the "Specific Plaque Hypothesis" was evolved and stated that only a few species of the entire microflora are actively associated in disease. Then, a hypothesis was considered that combines key ideas of the two mentioned hypotheses: the "Ecological Plaque Hypothesis", which states that disease is the result of an imbalance in the microflora by ecological stress consequent in an enrichment of certain disease-related microorganisms.

Finally, the recent hypothesis was developed. That is "Keystone-Pathogen Hypothesis" proposing that certain small amount of microbial pathogens can cause inflammatory disease by interfering with the host immune system and altering the microbiota.(7)

2. Dental caries and caries process

Dental caries in preschool children or early childhood caries (ECC), previously mentioned to as nursing bottle caries and baby bottle tooth decay, remains an important public health problem.(8) In 2017, The American Academy of Pediatric Dentistry (AAPD) defined ECC as "the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six". The definition of Severe Early Childhood Caries (S-ECC) refers to "any sign of smooth-surface caries in a child younger than three years of age, and from ages three through five, one or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of greater than or equal to four

(age 3), greater than or equal to five (age 4), or greater than or equal to six (age 5)".(9)

It is now largely known that dental caries is a transmissible and multifactorial disease. The carious lesion develops over the period of time and is the result of complex interaction over time between acid-producing bacteria and fermentable carbohydrate, and many host factors including teeth and saliva. Risk for caries includes physical, biological, environmental, behavioral, and lifestyle-related factors such as high numbers of cariogenic bacteria, inadequate salivary flow, insufficient fluoride exposure, poor oral hygiene, inappropriate methods of feeding infants, and poverty.(10) Dental caries in preschool children is an important dental public health problem in Thailand, and it is a public health challenge. Reportedly, the 7th National Oral Health Survey in Thailand revealed that preschool children aged 3 and 5 years old confronted dental caries 51.7% and 78.5% respectively.(11) Dental caries can arise in early life, develop rapidly in those who are at high risk. In Thailand, a very high prevalence of dental caries was found among children of 18 months (68.1 %), and particularly high caries-affected rate was found among the children even before the age of 18 months.(12)

Dental caries results from interactions over time between acid-producing bacteria, a substrate that the bacteria can metabolize, and many host factors that include teeth and saliva. The mechanisms of the caries process are similar for all types of caries. Endogenous bacteria in the biofilm produce weak organic acids as a by-product of metabolism of fermentable carbohydrates. This acid causes local pH values to fall below a critical value resulting in demineralization of tooth tissues. If the diffusion of calcium, phosphate, and carbonate out of the tooth can continue, cavitation will eventually take place.

Demineralization can be reversed in its early stages through uptake of calcium, phosphate, and fluoride. Fluoride acts as a catalyst for the diffusion of calcium and phosphate into the tooth, which remineralizes the crystalline structures in the lesion. The rebuilt crystalline surfaces, composed of fluoridated hydroxyapatite and fluorapatite, are much more resistant to acid attack than is the original structure.(10, 13)

2.1 Dental plaque

Dental plaque is an example of biofilm with a diverse microbial composition. Dental caries is the result from a shift toward increased proportions of acid-producing and acid-tolerating species, such as mutans streptococci and Lactobacilli which participate in demineralization.

Dental plaque accumulation and poor oral hygiene levels significantly increased the children's risk of developing caries in various ages. Shabani et al who studied in Kosovo, concluded that there is a strong correlation between DMFT and the simplified oral hygiene index (OHI-S) (Greene and Vermillion, 1964) in children 10-15 years old.(14) Study in Nigerian investigated the association between dental plaque index and dmft in preschool children. The researchers found that every unit increase in OHI-S, the child's odds for developing caries increased by 64%.(15)

Oral Hygiene Index (Greene and Vermillion)(16)

The original twelve tooth surfaces plaque index was subsequently reduced to six tooth surfaces as known as "simplified Oral Hygiene Index" or OHI-S, Greene and Vermillion's oral hygiene index has high precision for assessing the oral hygiene of population groups. It measures the amount of dental plaque and debris on the labial surfaces and lingual surface of six selected teeth, 4 posterior and 2 anterior teeth.

When the specific teeth were not possible due to extraction, caries, or restoration, they were substituted by the subsequent element. Scores for dental plaque range from 0 to 3, according to the criteria represented in Table 1. This assessment is simple and reproducible. It was claimed for accurately representing the oral hygiene status of the whole mouth.

Table 1 Criteria for visible dental plaque Index (Greene and Vermillion)

Code	Definitions
0	No debris or stain present
1	Soft debris covering not more than one third of the tooth surface being examined or the presence of extrinsic stains without debris regardless of surface area covered.
2	Soft debris covering more than one third but not more than two thirds of the exposed tooth surface.
3	Soft debris covering more than two thirds of the exposed tooth surface.

2.2 Carbohydrate exposure

Factors associated with the development of dental caries are consumption of sugar and carbohydrate diet, frequency of carbohydrate intake and mutans streprococci. Sugars are unquestionably the most significant dietary factors in the etiology of dental caries and can be willingly metabolized by bacteria involved in dental biofilm formation, producing acid end products that causing demineralization of the tooth surface. Sucrose is specially considered as a cariogenic substrate because of distinctive property, enhancing the synthesis of extracellular glucans by Streptococcus mutans. Lactose also found in breast milk has been shown to be less acidogenic than other sugars and less cariogenic.(17) The term “frequency” is the number of times per day of sugary foods consumption. It is accepted that both consistency and frequency affect the duration that teeth are exposed to sugar.(18) After exposure of dental plaque to a fermentable carbohydrate, acidogenic bacteria in dental plaque rapidly metabolize it producing acidic end products. The pH decreases rapidly and reaches a minimum in approximately 5 to 20 minutes. Then followed by a gradual recovery of the plaque to physiological pH values commonly over 30 to 60 minutes.(19)

The 24-hour dietary recall

The 24-hour dietary recall collects the describing and quantifying weekday dietary intakes both of foods and beverages consumptions within 24-hour period prior to, or during the day before the interview, from the first eating in the morning until the last foods or beverages intake at night before going to bed. Hence, this method is a retrospective method of dietary assessment. The 24-hour dietary recall can be conducted by face-to-face interview or telephone interview. Using interviewing questionnaire helps interviewee recall 24-hour memories by asking about type of food and its characteristics, the net quantity consumed, method of preparation, sauces, dressings, and between meal consumptions.(20, 21)

Advantages

- Not require so much time.
- Can be administered to low literacy populations (via direct interviews).
- Being a retrospective method, the subject's usual consumption is not altered.

Limitations

- Extensive dependence on the recent memory of the study subject (not recommended for the elderly or subjects less than 12 years).
- Depends on interviewer capacity for describing ingredients, food preparation, and dishes.
- One single 24-hour dietary recall does not estimate usual intake.
- Requires well trained interviewers.
- Difficulty in precisely estimating "What, How and How much".
- The tendency to overestimate low intakes and underestimate high intakes.

3. Caries Diagnosis

3.1 Non cavitated and cavitated dental caries

The caries diagnostic criteria were developed based on information from the literature as well as on personal experience with clinical caries diagnosis.

Examination criteria for dental caries in primary dentition classifies lesions as d1 and d2 (Table 2). The d1 lesion describes the non-cavitated dental caries. On the other hand, cavitated dental caries described as d2 lesion. (22)

The d1 classification describes the non-cavitated dental caries include well defined margin chalky white spot lesion in smooth surface adjacent to the gingival margin with no evidence of clinical enamel broken and lightly stained or chalky white area adjacent to pit or fissure, intact surface with no undermined caries.

The d2 classification describes the cavitated dental caries. There are usually found the obvious loss of enamel which usually have chalky white appearance along the cavity with the darker center, the cavitated area can be examined either with visual inspection, the undermined caries beneath the enamel and using explorer for detection the surface tactile.

3.2 World Health Organization (WHO) criteria

WHO system is widely used for caries assessment in clinical practice and oral health surveys. This system has well designed procedure and recording pattern which could been used practically. Permanent dentition status is recorded using numbered scores (0-9) and the primary dentition status is recorded using letter scores (A-G) to define the tooth status. The examination should be conducted with a plane mouth mirror and a metal CPI probe. The use of radiography for detection of proximal caries is not recommended.(23)

Table 2 Classification of dental caries in primary dentition

	d1 Lesions	d2 Lesions
Smooth surfaces		
Appearance/color	Chalky white	Chalky white with darker center
Surface	Intact	Cavitated-definite loss of tooth structure
Tactile	Normal	Soft
Location	Usually adjacent to soft tissue margin	Usually adjacent to soft tissue margin
Pits and fissures		
Appearance/color	May be lightly stained, or have chalky white area adjacent to pit or fissure	Often stained light to dark brown and often with chalky white area adjacent
Surface	Intact	Cavitated-definite loss of tooth structure
Tactile	Normal	Soft
Undermining	Not present	Often evident

4. Caries management

4.1 Restorative caries management

Dental caries is usually seen in preschool children. In early dental caries, maxillary anterior teeth are primarily affected. These children, due to their young age and lack of cognitive abilities, are usually very uncooperative when it comes to dental treatment. Difficulties with behavior management, reluctance on the part of the clinician, variability in the amount of remaining tooth structure, and differences in caries risk are important factors in restoration success.(4) The goal of restoration for primary anterior teeth is to allow the patient to retain these teeth and natural exfoliation without any pulpal complications.(24) Despite the continuing prevalence of dental caries in primary maxillary anterior teeth in children, the esthetic management of these teeth remains problematic. Esthetic restoration of primary anterior teeth can be especially challenging due to: the small size of the teeth; close

proximity of the pulp to the tooth surface; relatively thin enamel; lack of surface area for bonding; and issues related to child behavior.(25)

4.1.1 Class III restoration of primary anterior teeth

Class III (interproximal) restorations of primary incisors are often prepared with labial or lingual dovetails to incorporate a large surface area for bonding to enhance retention. Resin-based restorations are appropriate for anterior teeth that can be adequately isolated from saliva and blood. RMGI have been suggested for this category, especially when adequate isolation is not possible.(25) Class III restorations of primary incisors, on the other hand, can be quite challenging. Due to the smallness of the clinical crown, relatively large size of the pulp chamber, close proximity of the pulp horns to the interproximal surfaces, and thinness of the enamel, repairing interproximal decay in these teeth requires preparations and filled with restorative materials such as resin-based composites, compomers, glass ionomer, resin-modified glass ionomer. The placement of class III esthetic restorations is technique sensitive. Moisture control, hemorrhage control from the gingiva, and retention of the rubber dam are all challenged to achieve a successful result.

4.1.2 Atraumatic restorative treatment (ART)

ART is endorsed by the World Health Organization (WHO) and the International Association for Dental Research. ART aims to restore and prevent dental caries in populations that have little access to dental services and functions as definitive treatment.(25) Smales and Yip reported the success rate of ART in primary teeth after 1 year that the success rates have been approximately 80 – 95 percent for Class I and Class V single-surface restorations, 55 - 75 percent for Class II multi-surface restorations, and 35 - 55 percent for Class III and Class IV restorations.(26) The ART approach involves the use of hand instruments only to remove carious tooth substance and then

restoring the cavity and sealing any adjacent enamel fissures with usually a conventional glass ionomer cement (GIC).(27)

Recommendations:(25)

a) There is expert opinion that proposes the use of resin-based composites as a treatment option for Class III and Class V restorations in the primary and permanent dentition.

b) There is expert opinion that proposes the use of resin RMGI as a treatment option for Class III and Class V restorations for primary teeth, particularly in situations where adequate isolation is difficult.

4.1.3 Full coronal restoration of primary incisors

Full coronal restoration of carious primary incisors may be indicated in multiple surfaces caries, poor oral hygiene, and uncooperative children.(4, 25) Lopez-Loverich et al reported six common types of full-coverage restorations offered for anterior primary teeth which are preformed polycarbonate crowns, resin crowns (strip crowns), stainless steel crowns, open faced stainless steel crowns, pre-veneered stainless steel crowns and zirconia crowns.(28)

4.2 Non-restorative caries management (Disking)

This approach first advocated by GV Black. It has been called non-restorative cavity treatment (NRCT) because no filling is placed. Occasionally, restorative care should take a back seat to other approaches. One of these is disking of caries in anterior teeth. In situations where teeth are near exfoliation, when treatment is not possible, or for isolated lesions, disking can be quick and effective.(6)

Evidence from randomized controlled trails shows that NRCT, where no caries is removed but the cavity is opened to allow the lesion to be brushed, supports the concept of caries control by managing the activity of the biofilm; consequently, it is as effective in generating retention of primary molars. In 2014, Santamaria et al demonstrated comparable results for treatment success between NRCT and conventional restorations, complete caries removal and compomer restoration.(29) Similarly, Mijan et al reported that there was no difference in the survival rates of

molars treated according to the conventional restorative treatment (CRT) using amalgam, atraumatic restorative treatment (ART) using high viscosity glass ionomer, and ultraconservative treatment (UCT) protocol after 3.5 years.(30) UCT used to treat medium-sized dentin carious cavities in primary molars that were not restored but enlarged with a hatchet, to facilitate plaque removal with a toothbrush and fluoridated toothpaste (1,000 ppm) that is similar to NRCT. Moreover, NRCT is the treatment options with positive results for children's pain perception and parents' acceptability of techniques.(31)

Aim

To reduce the cariogenic potential of the lesion by altering the environment of the plaque biofilm overlying the carious lesion through brushing and dietary advice. Making the lesion self-cleansing by slice preparation may aid plaque control.(4, 6)

Advantages

The absence of operative intervention (unless the lesion must be shaped to make it self-cleansing) make this approach acceptable to children.(31)

Disadvantages

Yet, there is no evidence base that this approach is effective. Very reliant on parent/caregiver and child changing their oral behaviors.

The technique puts the responsibility for caries control with the parent. Even if the parents' compliance is not perfect, it is claimed that the technique slows down lesion progression so that the teeth may survive until shed. Slowing the process gives time to change parental attitudes. Counselling and/or motivational interviewing is an essential part of the technique.(6)

Technique for making a lesion self-cleansing

As only enamel and carious dentin are removed, the use of a local anesthesia should not be necessary unless subgingival tooth preparation is required.

1. Using a high-speed handpiece, or hand instrument, remove undermined enamel adjacent to the carious lesion making the surface of the lesion accessible to toothbrushing. The resulting cavity form will vary in shape depending on the lesion. It might be opening out of an occlusal lesion or result in a slice preparation
2. Apply fluoride varnish

This is also a useful technique to treat proximal lesions on upper anterior teeth as well, which have not involved the pulp. It requires full or partial caries removal proximally, leaving either a crown with parallel sides mesially and distally or gently tapering towards the incisal edge. The amount of tooth removal is limited by the proximity of the pulp horns. A high fluoride concentration varnish (e.g. Duraphat®) can be applied after disking to promote remineralization. This approach is most appropriate in children older than three years, since the upper canines are fully erupted by this age. Once the primary canines are erupted it is thought that reduction in the mesiodistal width of the primary incisal edges will not result in space loss.(32)

In time, the lesion will arrest, and the deposition of sclerotic and tertiary dentin is encouraged. Both processes will decrease tooth sensitivity. It is claimed that this management is child-friendly and tolerated by very nervous patients, without the need for a local anesthetic, and that several carious deciduous teeth can be opened for cleaning in about 10 minutes.(6)

4.3 Topical fluoride in caries prevention

4.3.1 Professional Used Fluoride

4.3.1.1 Fluoride Varnish

The first fluoride varnishes were developed during the 1960s and 1970s. In 1964, a method of applying sodium fluoride (NaF) in a natural colophony base, which could adhere to tooth surfaces in the presence of saliva, was presented. This product was further developed and registered as Duraphat® (sodium fluoride varnish). A varnish consisting of silane fluoride in a polyurethane polymer was introduced in the 1970s (Fluor Protector® silane fluoride varnish). The varnishes were originally developed to prolong the

contact time between fluoride and tooth enamel.(33) The application of fluoride varnishes two to four times a year, either in the permanent or primary dentition, is associated with a substantial reduction in caries increment. The effect of fluoride varnish on the primary and permanent dentition is that the use of fluoride varnish is associated on average with 37% and 43% reduction in decayed, missing and filled tooth surfaces respectively.(5)

Indication

1. Children and adolescence especially those being under 6 years old, un-cooperative, and in high caries risk group.
2. White spot lesion

Contraindication(34, 35)

1. Allergy to Colophony, a ubiquitous contact sensitizer which may be present in dental materials, such as periodontal dressings, impression materials, cements, fix adhesives and varnishes. Exposure to a sensitizer in a hypersensitive person may initiate an allergic contact dermatitis/stomatitis. This usually occurs after direct skin/mucosa contact with the sensitizer.
2. Oral ulcer, gingival disease, or mucositis
3. Asthma

Mechanism of action

Fluoride varnishes and other concentrated topical fluorides interact with saliva and form calcium fluoride (CaF2) compounds on enamel. CaF2 is stabilized by pellicle proteins and secondary phosphate at neutral pH. When the pH of plaque drops, CaF2 begins to dissolve and release fluoride ions, thus acting as a prolonged source of fluoride after application.(33) Fluoride will adsorb to the surface of the partially demineralized crystals and attract calcium ions. Since carbonate free or low- carbonate apatite is less soluble, these phases will tend to form preferentially instead of the original mineral, under the nucleating action of the partially dissolved minerals. This new coating will be less soluble due to the exclusion of carbonate and

incorporation of fluoride, rendering the enamel more resistant to future acidic challenges.(13)

Regarding to systematic review of Azarpazhooh et al shows that the enhanced slow release of fluoride from Durafluor and Duraphat makes them the materials of choice at this time, and any protocol on the application of fluoride varnish should be based on risk assessment.(36)

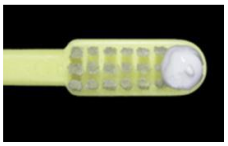
4.3.1.2 Silver Diamine Fluoride (SDF)

The benefits of caries treatment with SDF include its attributes of pain and infection control, easy to use, low costs, non-invasive, and minimal necessity for personnel time and training. On the other hand, the most common reported adverse effect of SDF is black staining because SDF stains carious dentin black permanently. The dark staining could be a result of silver phosphate formation. This may minimize its clinical use in esthetically demanding patients, especially over the upper anterior teeth facial surfaces, which are common sites for dental caries.(37)

4.3.2 Home Used Fluoride toothpaste

There is evidence from meta-analyses that tooth brushing with fluoridated toothpaste significantly reduces dental caries prevalence in the primary dentition with the effect increased in children with higher baseline level of caries, higher concentration of fluoride in the toothpaste, greater frequency in use, and supervision.(38) Toothbrushing should be performed for preschool children by a parent twice daily, using a soft toothbrush of age-appropriate size and the correct amount of fluoridated toothpaste.(39, 40)

Table 3 Recommended amount of toothpaste

Age	Amount of toothpaste (1,000 ppm)	Amount of fluoride (mgF)	Remarks
3 - 6 years	 Crosswise-brush size	0.25	Squeezing toothpaste and assisted brushing by parent

A Cochrane review concludes that children who brush their teeth at least once a day with a fluoride toothpaste will have less tooth decay, and the effect of fluoride toothpaste increased with higher baseline levels of D(M)FS, higher fluoride concentration, higher frequency of use, and supervised brushing.(41)

5. Children's behavior in the dental office

An evaluation of the child's behavior is important for treatment planning. Firstly, information can be collected from the parent through questions about the child's cognitive level, temperament and personality characteristics, anxiety and fear reaction to strangers, and behavior at previous dental visits. Secondly, the dentist can assess cooperative potential by observation of and interaction with the child.(42)

Most dentists characterize children in one of three definable ways.(43)

1. Cooperative behavior

Most children in dental offices are cooperate. This is substantiated by dental office experiences. Cooperative children are reasonably relaxed, minimal apprehensions, and may be enthusiastic. Cooperative children can be treated by a straightforward, behavior-shaping or tell-show-do approach, which allows the dentist to function effectively and efficiently.

2. Potentially cooperative behavior

The potentially cooperative children may be healthy or disabled and have the capability to behave well. The children will be categorized as potentially cooperative when the child's behavior can be modified, the child has the age-related cognitive abilities to learn to deal with dentistry and can become cooperative. These followings are some of the children that have been attached to potentially cooperative behaviors.

2.1 Uncontrolled behavior

An uncontrolled behavior reaction is observed in a potentially cooperative child, usually occurs in a child three to six years of age on the first dental visit. The reaction, a form of tantrum, tears, loud crying, physical lashing out, and flailing of the hands and legs.

2.2 Challenging or defiant behavior

Challenging or defiant behavior can be recognized in children of all ages, it is more typical in the school children. They may shout of “I don’t want to” or “I won’t.” Children who react this way often perform similarly in their home environments.

2.3 Timid behavior

A child may come from an overprotective home environment and may have little contact with strangers. Some children may shield themselves behind a parent. These children are likely highly anxious and can be difficult to treat because they do not always hear or comprehend instructions. The dentist must proceed slowly and gain the child’s confidence.

2.4 Tense-cooperative behavior

Characteristically, these children accept treatment. The dentist should realize that these children are probably quite afraid of the dental treatment. They are extremely tense and try to control their emotions.

2.5 Crying and whining

Crying can be reflected an expression of stress in the dental environment. Some children cry with tears and some without tears. They allow the dentist to proceed, but whine throughout the procedure. It could be considered as an acceptance of the treatment situation, but an expression of serious discomfort at the same time.

2.6 Passive Resistance

The children solemnly slump in the dental chair, and do not respond verbally. When the dentist attempts to involve the child in the procedure, communication fails, and the children may reject the intraoral examination by clenching their teeth. They may be anxiety, a general feeling of dislike, or lack of interest in the circumstances.

3. Lacking cooperative ability

The children lacking cooperative ability include very young children (aged less than three years old) that communication cannot be established, and comprehension cannot be expected. Advanced behavior management

may be required for their treatment. For these children, time usually solves their behavior problems. When they grow older, they will develop into cooperative children and treatment is provided with behavior shaping.

Another group of children who lack cooperative ability are children with special health care needs. The severity of their conditions often prohibits cooperation. Gathered information on their intellectual development can give the dentist valuable information about the expected level of cooperation. At times, advanced behavior management, such as protective stabilization, sedation, or general anesthesia are employed to control body movements.(42)

6. Parental satisfaction

Satisfaction is the part of psychological science. Satisfaction is defined as health care recipients' reaction to salient aspects of the context, process, and result of their service experience. Patient satisfaction is one of the measurements of the quality of care and provides doctor-patient relationships. Most parents preferred the non-pharmacological techniques to pharmacological techniques and almost half of them reported feeling worried about pain at the dental office.(44, 45)

When it comes to parental satisfaction of any new technique or restorative material, esthetics is a prime concern. Esthetic dental management of primary teeth has become crucial, as dental professionals treating children often experience parental influence in the clinical decision-making process. Moreover, parents are more demanding of esthetic restorations than ever before.(46) A survey of pediatric dentists about perceptions about parents' opinions and preferences regarding dental materials by Zimmerman et al reported that 87 percent of parents are concerned with the esthetics of even a posterior restoration.(47) (47) Regarding to dental caries that commonly occurred on upper anterior teeth, using silver diamine fluoride may reduce parent's esthetic satisfaction. Due to the fact that the most common reported adverse effect of silver diamine fluoride is black staining, that is poor esthetics.(37) On the other hand, disking technique is a simple and short operative procedure, it might be satisfyingly accepted by parents.

For young children, parental satisfaction may play an important role reflect success of treatment. Hence, it is essential to access patients' satisfaction about caries management because patients are the key source of data collection regarding the quality and effectiveness of dental care services.

7. Oral health status and current unmet dental services of preschool children

Dental caries in preschool children is an important dental public health problem in Thailand, and it is a public health challenge. Reportedly, the 7th National Oral Health Survey in Thailand revealed that preschool children aged 3 and 5 years old confront dental caries 51.7% and 78.5% respectively. The unmet need for dental treatment of preschool children with dental caries in Thailand is 50.6%.(11) The study in Thai preschool children revealed high caries prevalence with low prevalence of treated lesion of caries, both restoration and extraction. This reflects that these preschool children did not use dental services. Preschool children whose parents did not have them visiting the dentist within 6 months of first tooth eruption and no later than 12 months more likely to have caries experiences 1.6 times.(48) The study by John et al reported that in the tribal school children 62% never visited the dentist; whereas 68.9% of the suburban and 60.6% of the urban children never visited the dentist.(49) In USA, the main reasons for not visiting dentist are fear and high cost of dental treatment, and geographic misdistribution of dentists, and inadequate numbers of dentists treating Medicaid eligible children.(50) Annual Report from Doi Tung Health Center Commemorate 60th Birthday of Queen Sirikit in 2017 revealed that 67.4 % of preschool children attending child development centers experienced dental caries. However, the treatment records of anterior restoration was only 30 teeth.(2) This reflects that numerous dental caries in anterior teeth are left untreated. Preschool children with dental caries require dental treatment by specially trained pediatric dentists. In 2017, there are only 182 board certified pediatric dentists in Thailand.(3) Child development center is the institution providing child care and education for young children aged between 2 and 5 years old to get ready for physical, emotional, mental, social and intellectual development.

Preventive program in child development centers are toothbrushing program after lunch, and fluoride application by dental personals every 6 month.

Doi Tung Development Project is located 1,389 meters above sea level. The tribal population of Doi Tung Development Project is about 10,797. The ethnic diversity is Akha, Lahu, Tai Yai, Lua, Haw Chinese, Tai Lue, Native Northerners, Lisu, and others. The education levels are ranged from primary school to Doctor of Philosophy. Most of them graduated from secondary school, and only a few people graduated from Doctor of Philosophy. Most of the population is engaged in agriculture, employee, trading, governmental officer, business, etc.(51) There are ten child development centers located in Doi Tung Development Project, 6 centers are in Mae Fah Luang District that health care system is under responsibility of Mae Chan Hospital, and 4 centers are in Mae Sai District that health care system is under responsibility of Mae Sai Hospital.

Population of Mae Fah Luang District is about 69,612. The ethnic diversity are the Akha, Lahu, Tai Yai, Lua, Haw Chinese, Tai Lue, Native Northerners, Lisu, and others.(52) There are 45 child development centers in Mae Fah Luang District, 14 centers are in Mae Fah Luang District that health care system is under responsibility of Mae Chan Hospital, and health care system of all remained centers is under responsibility of Mae Fah Luang Hospital.

From the study of Veerarittiphan in 2002, the oral health behavior has been combined into a way of life of the individual and gradually becoming a main component of culture. The Akha believe that dental caries in preschool children is a natural phenomenon, so they do not perceive dental caries is a disease. Simultaneously, the economic and social development consequence in more risks for cariogenic foods, less time for child raising and initiation of improper eating pattern through the television. The risk factors of dental caries in preschool children have dramatically increased, therefore, the conventional oral hygiene practice cannot maintain the balance of good oral health.(53)

Considering the number of trained pediatric dentists in Thailand, it’s not enough manpower to treat the abundant dental caries of these preschool children. Furthermore, conventional treatment is lengthy complex restorative procedures that

required cooperative behavior. Disking technique is a simple and short operative procedure for caries management, allowing children to retain their teeth for natural exfoliation without any pulpal complications. This research will provide simple alternative approach for general dentists in the rural governmental Hospital where treatment needs is exceeding the manpower to manage proximal caries in primary upper anterior teeth.

CHAPTER III

MATERIALS AND METHODS

1. Population and sample

2. Materials and instruments

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5. Study process

6. Data analysis

1. Population and samples

Population

Tribal preschool children aged between 3-5 years old attending child development centers of Mae Fah Luang District, and Doi Tung Development Project, Chiang Rai.

Samples

Tribal preschool children aged between 3-5 years old attending child development centers of Doi Tung Development Project, Chiang Rai during September 2018 to May 2019. Healthy co-operative or potentially co-operative tribal preschool children must have cavitated proximal caries on primary upper incisors regard as inclusion criteria. Only the tribal preschool children with written primary caregiver consent were included in this study.

Inclusion criteria

All samples must match with these following criteria;

1. Tribal preschool children (The Akha, Lahu, Tai Yai, Haw Chinese children, etc.) aged 3-5 years old attending child development centers of Mae Fah Luang District, and Doi Tung Development Project, Chiang Rai
2. Healthy children, no underlying disease (ASA Class I)
3. Non allergy to colophony
4. Co-operative or potentially co-operative behavior
5. Child development centers with toothbrushing program after lunch, and semiannual fluoride varnish application
6. Completed primary dentition
7. Closed contact primary upper incisors with cavitated proximal caries
8. Upper anterior occlusal radiograph revealed radiolucent area limited to dentin outer third or dentin middle third.
9. Tribal preschool children with written primary caregiver consent

Exclusion criteria

Samples were excluded from the study if their primary upper incisors present one or more of these followings;

1. Primary upper incisors with non cavitated proximal caries
2. History of pain from carious teeth
3. Tooth with pulpal exposure
4. Presence of a swelling or fistula on primary upper incisors
5. Tooth with 3rd degree mobility
6. Anterior occlusal radiography revealed the radiolucent area involved dentin inner third to pulp space, periapical lesions, or pathologic root resorption.
7. Tooth that revealed dental restoration during the study period.

Sample Size

Sample size was calculated from the randomized control trial for binary data formula using n4Studies application version 1.4.1 for iOS.(54)

$$n_{trt} = \left[\frac{z_{1-\frac{\alpha}{2}} \sqrt{\bar{p}\bar{q}\left(1+\frac{1}{r}\right)} + z_{1-\beta} \sqrt{p_1 q_1 + \frac{p_2 q_2}{r}}}{\Delta} \right]^2$$

$$p_1 = P(outcome|treatment), q_1 = 1 - p_1$$

$$p_2 = P(outcome|control), q_2 = 1 - p_2$$

$$\bar{p} = \frac{p_1 + p_2 r}{1+r}, \bar{q} = 1 - \bar{p}, r = \frac{n_{con}}{n_{trt}}$$

- According to Chu et al, their prospective controlled clinical trial investigated the effectiveness of topical fluoride applications in arresting dentin caries in Chinese pre-school children. They reported 26 percent of arrested carious and black when excavated soft dentin then applied 5% sodium fluoride varnish every 3 months, and 66 percent of arrested carious and black when applied 5% sodium fluoride (NaF) varnish every 3 months without prior removal of the caries.(55)
- Apha (α): 0.05
- Beta (β): 0.2

From the analysis, 48 surfaces were required in this study. Considering a drop-out rate of 10%, total sample size was 52 surfaces (control group 26 surfaces, experimental group 26 surfaces)

Grouping

Tribal preschool children attending child development centers of Doi Tung Development Project, Chiang Rai were set into 2 groups by using 2 steps sampling.

Step I: Match paired samples according to these followings, respectively;

a) Type of tooth (central or lateral incisors)

b) Depth of proximal caries surface

Step II: Simple random sampling into experimental and control groups

2. Materials and instruments

Materials

1. Ultraspeed dental films No. 2 (Kodak®)
2. 5% Sodium fluoride varnish (Duraphat®)
3. Resin modified glass ionomer cement (Fuji II LC®)
4. Celluloid matrix and wedge
5. Articulating paper, dental floss, gauzes
6. Rubber dam sheet
7. Oral hygiene product including toothbrush, toothpaste, and dental floss
8. Constructed-interview questionnaires
9. Silicone putty impression material

Instruments

1. Dental mobile unit including dental chair, lamp, saliva suction
2. Rubber dam set
3. Mouth mirror, explorer, forceps
4. Mouth-gag
5. Spoon excavator, IPC Interproximal Carver
6. High-speed handpiece with water coolant
7. Slow-speed handpiece
8. High-speed needle diamond bur # 859, superfine diamond bur #858

9. High speed diamond round bur #801/009
10. Steel round bur #012
11. High speed frame shaped white stone
12. X-ray machine (Long cone, set at 10 mA, 70 kVp, and 60 impulses; 1 second)

3. Research methodology

3.1 Baseline data collection

3.1.1 Demographic data collection

Their primary caregiver was interviewed. The questionnaires questions were included the child's demographic background, such as gender, child's birth order, number of family member, relationship of the primary caregiver with the child, primary caregiver education level, primary caregiver employment, and children's oral health behavior including frequency of toothbrushing and between meal carbohydrate intake.

3.1.2 Oral examination

Dental examination

Dental examination performed by first dentist on dental mobile unit using explorer under light source in child development centers during school days with teacher present in classroom. All preschool children participating in this study were evaluated dental status by one dentist according to WHO criteria (dmfs).(23) Dental caries was coded as d1 (non-cavitated dental caries), and d2 (cavitated dental caries) according to Warren et al.(22) The intra-examiner kappa value was 0.98.

The tooth surfaces (4 surfaces in anterior tooth, 5 surfaces in posterior tooth) were recorded with codes as followed.

Table 4 Codes of dental record

Code	Definitions
0	Sound tooth
1	Non-cavitated lesion (d1)
2	Cavitated lesion (d2)
3	Restoration with secondary caries, temporary restoration
4	Restoration without secondary caries
5	Extracted tooth due to caries

Plaque score

Dental plaque was examined with CPI probe without disclosing dye. The dental plaque assessment was modified from Greene and Vermillion's simplified Oral Hygiene Index" (OHI-S).(16) The examiner ran the probe gently along the surface of the tooth from the occlusal/incisal up to the gingiva of 6 index teeth: upper right second molar (buccal surface); upper right central incisor (labial surface); upper left first molar (buccal surface); lower left second molar (lingual surface); lower left central incisor (labial surface); lower right first molar (lingual surface). The examiner analyzed the dental plaque attached on the tip of probe. Plaque score was recorded with codes as followed.

Table 5 Codes of plaque score

Code	Definitions
0	No dental plaque present
1	Dental plaque covering not more than one third of the tooth surface being examined
2	Dental plaque covering more than one third but not more than two thirds of the exposed tooth surface
3	Dental plaque covering more than two thirds of the exposed tooth surface

Record the sum of dental plaque score in surfaces with codes (0, 1, 2, 3) for 6 index teeth. Then, divided the total score by 6. The final score would be 0-3.

3.1.3 Radiographic examination

The radiographic of carious upper deciduous incisors was taken at baseline, and 6 months post-op. The radiographic examination was performed at Doi Tung Health Center Commemorate 60th Birthday of Queen Sirikit.

- The X-ray machine (Long cone) was set at 10 mA, 70 kVp, and 60 impulses (1 second)
- Positioned the child upright and place the lead apron.
- The patient's occlusal plane was parallel to the floor, and the sagittal plane should be perpendicular to the floor.
- Lead paper sized 2 x 2 mm. was patched on ultra-speed film #2 as a reference dot. Then placed the film in the patient's mouth with silicone jig for repeatable post-operative radiographic taking.
- The radiograph was taken by Bisecting-technique
- Manual films were processed by trained dental assistant; film was developed in developing solution for 1 minute, rinsed in water for 20 seconds, fixed in fixing solution, soaked in water for 10 minutes, then dried in room temperature.

Films were consensually interpreted by two dentists using magnifying glass (4.5X magnification). Depth of carious lesion was determined by radiolucent area involved different level of dentin as dentin outer third, dentin middle third, and dentin inner third.

Periapical area was also interpreted either pathologic radiolucent or root resorption.

3.1.4 The 24-hour dietary recall record

Conducted face-to-face interview with primary caregiver for describing and quantifying weekday dietary intakes both of foods and beverages consumptions within 24-hour period prior to, or during the day before the interview, from the first eating in the morning until the last foods or

beverages intake at night before going to bed. Then, identified between meal carbohydrate consumption whether less than 3 time or more than/ equal to 3 times per day.

3.2 Intervention

3.2.1 Interview

Primary caregivers were interviewed at baseline and 6 months post-operative follow up.

3.2.2 Control group

a) The children participating in control group were treated by filling with RMGI at Doi Tung Health Center Commemorate 60th Birthday of Queen Sirikit. The child movement during operative procedure was controlled by their primary care giver. Mouth gag was used to stabilize mouth opening during operative procedure.

Technique for filling

- Isolated the operating area with rubber dam application
- Removed caries by using steel round bur and cavity preparation
- Applied celluloid matrix and wedge
- Applied cavity conditioner for 15 seconds, then rinse with water for 15 seconds
- Restored cavity with RMGI
- Light cured for 20 seconds at labial and lingual surface
- Checked occlusion and flossed

b) The children had received fluoride toothpaste for daily toothbrushing.

c) Child development centers provided after lunch toothbrushing program with 1,000 ppm fluoride toothpaste. Professional used fluoride every 6 months was provided regularly from dental staff of the hospital.

d) All children received 1,000 ppm fluoride toothpaste for toothbrushing at home.

3.2.3 Experimental group

a) The children participating in experimental group were treated by using disking technique in dental unit at Doi Tung Health Center Commemorate 60th Birthday of Queen Sirikit. The child movement during operative procedure was controlled by their primary care giver. Mouth gag was used to stabilize mouth opening during operative procedure.

Technique for disking

- Applied rubber dam by using slit dam technique with finger retraction.
- Used a needle diamond bur # 852-010 with high-speed handpiece to open contact point about 0.5–1 mm. without remaining undercut.
- Disking surfaces were polished by using gold needle diamond burs #167-010. This smoothened the disking surfaces, prevented dental plaque or food retention.
- After disking, the remaining dentin caries was left without excavation.
- Applied fluoride varnish.

b) The children had received fluoride toothpaste for daily toothbrushing.

c) Child development centers provided after lunch toothbrushing program with 1,000 ppm fluoride toothpaste. Professional used fluoride every 6 months was provided regularly from dental staff of the hospital.

d) All children received 1,000 ppm fluoride toothpaste for toothbrushing at home.

4. Post-operative evaluation

4.1 Dental examination

Data was collected through oral examination. Preschool children were examined by second trained dentist at 6-month follow up using standard protocol of the WHO. The intra-examiner kappa value for dental caries was 0.95.

Clinical success criteria

Tooth evaluated at 6-month period was diagnosed as clinical success when fulfilled these following criteria;

Table 6 Clinical success criteria

Disking	RMGI restoration
1. Inactive carious lesion	1. Retention of restoration
2. No tooth sensitivity or tooth pain	2. Good marginal adaptation
3. No fistula or abscess	3. No tooth sensitivity or tooth pain
	4. No fistula or abscess

In contrary, clinical failure was diagnosed when evaluating tooth presents one or more of these following criteria;

Table 7 Clinical failure criteria

Disking	RMGI restoration
1. Active carious lesion	1. Dislodge restoration
2. Pulpal exposure	2. Restoration with secondary caries or fractured margin
3. History of tooth sensitivity or tooth pain	3. History of tooth sensitivity or tooth pain
4. Presence of swelling or fistula	4. Presence of swelling or fistula

4.2 Radiographic examination

The upper anterior radiograph was taken at 6-month follow-up by using the same silicone jig used at baseline radiography. The films were consensually interpreted by 2 dentists.

Caries progression

Films were consensually interpreted by two dentists. Depth of carious lesion was determined by radiolucent area involved different level of dentin as dentin outer third, dentin middle third, and dentin inner third. Each treated surface was radiographically diagnosed as progression or no progression by comparing with the pre-operative depth.

Periapical area was also interpreted either pathologic radiolucent or root resorption.

Radiographic criteria of periapical area

Tooth evaluated at 6-month period was diagnosed radiographically according to these followings;

Table 8 Radiographic criteria of periapical area

Success criteria	Failure criteria
Normal periodontal ligament space	Widening periodontal ligament space
Intact lamina dura	Loss of lamina dura
No periapical radiolucency	Periapical radiolucency
No pathologic root resorption	External or internal root resorption

4.3 Acceptability of treatment and pain perception

For the experimental group, disking technique created spacing inevitably. After treatment, acceptability of treatment was evaluated by interviewing primary caregiver satisfaction regarding esthetic appearance using 5-rating scale (Table 9).(56) Pain perception was also evaluated by interviewing primary caregiver regarding tooth pain and tooth sensitivity at 1- and 7-day post-operative by phone call.

Table 9 Five-rating scale

Code	Definitions
1	Very dissatisfied
2	Dissatisfied
3	Neutral satisfied
4	Satisfied
5	Very satisfied

5. Study Process

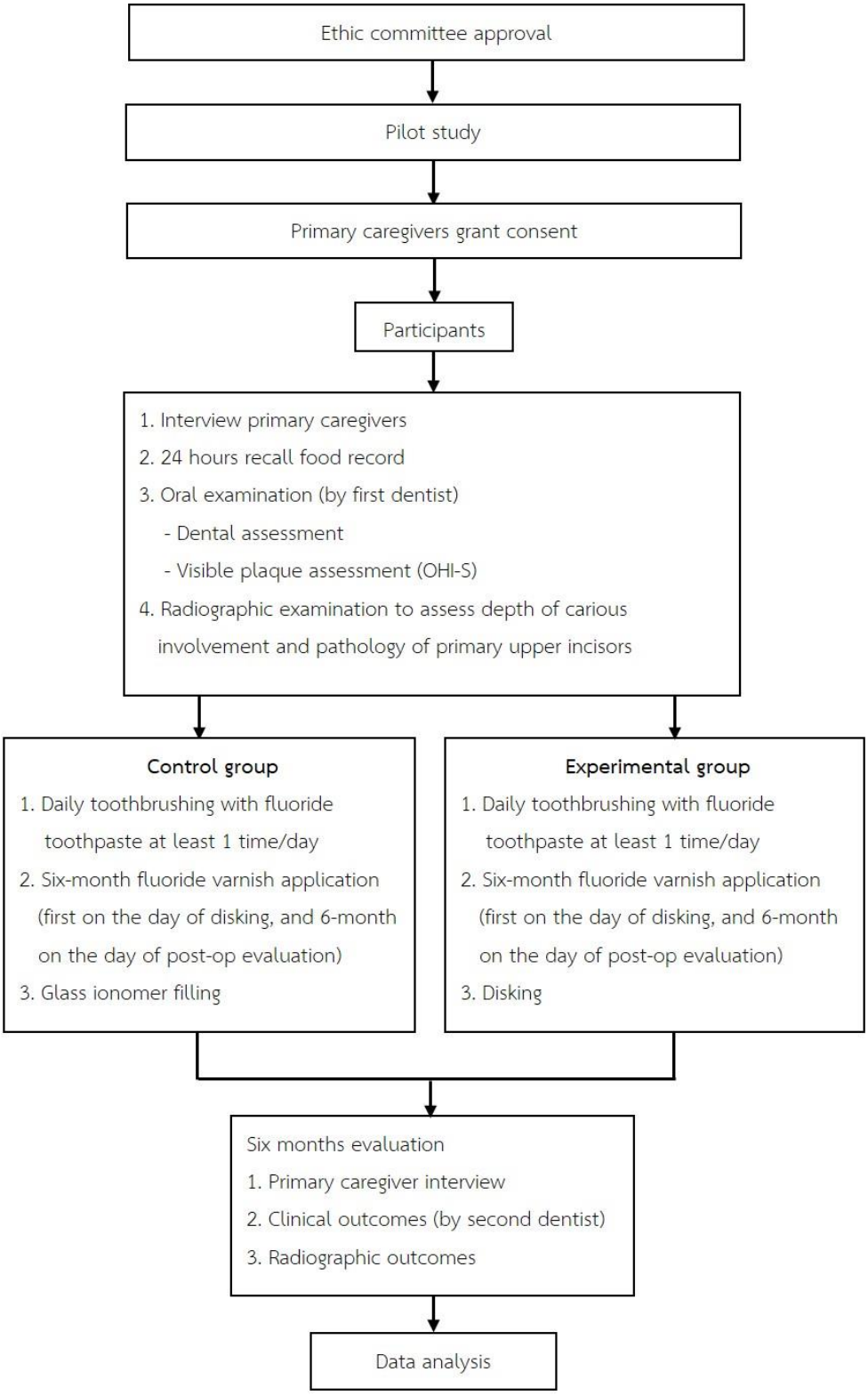

Figure 2 Study process diagram

6. Data Analysis

6.1 Descriptive statistics

Descriptive statistic was used to analyze demographic data, prevalence of dental caries, and OHI-S.

6.2 Analytical statistics

6.2.1 Clinical evaluation

Clinical success/ failure of procedure was compared between control and experimental groups using Fisher's exact test.

6.2.2 Caries progression

Caries progression was compared within disking groups using Fisher's exact test.

6.2.3 Radiographic evaluation

Radiographic success/ failure of procedure was compared between control and experimental groups using Fisher's exact test

6.2.4 Acceptability of treatment

Mean 5-rating scale was interpreted according to these scales.(56)

Table 10 Five-rating scale interpretation

Mean score	Definitions
4.57 - 5.00	Very satisfied
3.51 – 4.50	Satisfied
2.51 – 3.50	Neutral satisfied
1.51 – 2.50	Dissatisfied
1.00 – 1.50	Very dissatisfied

The data was analyzed by using Statistics Package for Social Science (SPSS) for Windows, version 22.0 (SPSS Inc., Chicago, Illinois, USA). The level of statistical significance was set at $p<0.05$.

CHAPTER IV
RESULTS

Demographic data, oral health status and oral health behaviors of participants

One trained dentist recruited 306 tribal preschool children aged 3-5 years, only 20 (6.5%) tribal preschool children were fit the inclusion criteria. The overall baseline dmft and OHI-S were 4.1±2.7 and 0.9±0.4, respectively with no differences between groups for dmft (p=0.052), OHI-S (p=0.159). Fifty-two proximal caries of primary upper incisors (26 RMGI restorations, 26 disking technique) from 20 children (8 boys, 12 girls) were treated. The mean age (years), dmft, OHI-S were presented in Table 11. Children were randomly sampling into control and experimental groups (10 children/26 cavities each group). Oral health behavior of children including frequency of toothbrushing, type of toothpaste use was interviewed from primary caregiver. No statistically significant was found between these groups. Frequency of carbohydrate intake between meal was collected from 24-hour dietary recall record for 1 day. The intra-examiner kappa value for dental caries and plaque index score were 0.98 and 0.87, respectively.

Radiographic examination

Depth of caries on dental radiograph was consensually determined by 2 dentists regarding to radiolucent area involved different level of dentin, categorized as dentin outer third, dentin middle third, and dentin inner third. The inter-examiner kappa value was 0.80. Among proximal caries included in this study, 26 surfaces diagnosed as outer third dentin caries and 26 surfaces as middle third dentin caries. The depth of caries involvement was allocated equally in to control and experimental groups (Table 12). At baseline, no periapical pathology of primary upper incisors was found.

Table 11 Demographic data and oral health behaviors of participants

	RMGI	Disking	p-value
Number of participants (%)	10 (50)	10 (50)	
Mean age (years) (SD)	3.2 (0.4)	3.4 (0.5)	0.481†
Gender (%)			
Boy	3 (15)	5 (25)	0.650*
Girl	7 (35)	5 (25)	
Mean dmft (SD)	3.0 (2.3)	5.2 (2.8)	0.052†
Mean OHI-S score (SD)	1.03 (0.4)	0.78 (0.3)	0.159‡
Frequency of toothbrushing (%)			
<2 time/ day	2 (10)	0 (0)	0.474*
≥2 time/ day	8 (40)	10 (50)	
Between meal carbohydrate intake (%)			
<3 time/ day	7 (35)	6 (30)	1.000*
≥3 time/ day	3 (15)	4 (20)	

* Fisher's exact test, ‡ Independent t-test, † Mann–Whitney U-test

Table 12 Distribution of teeth in the study

	RMGI (%)	Disking (%)
Type of teeth		
Primary upper central incisors	22 (42)	22 (42)
Primary upper lateral incisors	4 (8)	4 (8)
Depth of caries		
Dentin outer third	13 (25)	13 (25)
Dentin middle third	13 (25)	13 (25)

Behavior during treatment and chair time

In control group, the mean chair time of RMGI restoration was 6.58 minutes per cavity. Unquestionably in experimental group, mean chair time of disking technique was 1.43 minutes per cavity. There was statistically significant difference in mean chair time between both groups when using Mann-Whitney U test. Considering behavior of participant during treatment, most of them were co-operative. No statistically difference was found in behavior during treatment between both groups.

Table 13 Participants behavior during treatment and mean chair time per cavity

	RMGI	Disking	p-value
Behavior during treatment (%)			
co-operative	9 (90)	10 (100)	1.000*
potentially co-operative	1 (10)	0 (0)	
Mean chair time (SD)	6.58 (2.60)	1.43 (0.71)	<0.001†

* Fisher's exact test † Mann–Whitney U-test.

Post-operative evaluation

Clinical evaluation

Data was collected through oral examination. Preschool children were examined by a trained dentist at both baseline and 6-month post-operative evaluation using standard protocol of the WHO. The intra-examiner kappa value for dental caries was 0.95. At 6-month post-operative evaluation, the clinical evaluation on caries activity (active or inactive caries, secondary caries), retention and marginal adaptation of restoration were determined. In control group, 26 class III RMGI restorations were examined. Twenty-two (85%) restorations were existing and having good marginal adaptation, 1 restoration revealed secondary caries, and 3 restorations were dislodged (one of teeth with dislodged restoration having active caries and sinus tract opening). Pre-operative depth of dislodge restoration teeth was dentin middle third. In the disking group, 24 (92%) carious surfaces were inactive, but 2

surfaces had active caries. Pre-operative depth of 2 active caries was dentin middle third.

Table 14 Clinical success of treatment after 6-month follow up

	RMGI restoration	Disking	p-value
Evaluation surface (n)	26 (100)	26 (100)	
Success (%)	22 (85)	24 (92)	1.000*
Failure (%)	4 (15)	2 (8)	

* Fisher's exact test

There was no statistically significant difference in clinical outcome between RMGI restoration and disking technique after using Fisher's exact test (p=1.000).

Radiographic evaluation

The radiographic images were consensually interpreted by two dentists using view box and magnifying glass (4.5X magnification). The inter-examiner kappa value was 0.80. The 6-month post-operative evaluation in disking group, depth of carious lesion was determined by level of carious involvement in dentin (dentin outer third, dentin middle third, and dentin inner third). Each treated surface was radiographically diagnosed as progression or no progression by comparing with the pre-operative depth. Periapical area was also interpreted either pathologic radiolucent or root resorption in both groups.

In RMGI restoration group, 22 (84%) restorations were intact radiographically, 4 revealed radiolucent area adjacent to radiopaque area of restoration, and 3 restorations were dislodged. One tooth showed clinical periapical sinus tract opening and apical radiolucent area in radiographic image. In disking group, depth of radiolucent area was determined. Thirteen surfaces were diagnosed as dentin outer third and 13 surfaces were dentin middle third. All surfaces had no progression comparing with baseline radiograph. All of disking teeth showed normal periodontal ligament space, intact lamina dura with no periapical pathology both in clinical examination and radiographic image. Using Fisher's exact test, no statistically

significant difference was found on the outcome between RMGI restoration and disking technique after 6-month post-operative.

Table 15 Radiographic success of treatment after 6-month follow up

	RMGI restoration	Disking	p-value
Evaluation surface (n)	26 (100)	26 (100)	
Success	25 (96)	26 (100)	1.000
Failure	1 (4)	0 (0)	

* Fisher's exact test

Acceptability of treatment and pain perception

Since the disking created spacing between teeth causing the esthetic compromise and tooth sensitivity might arise. After treatment, acceptability of treatment was evaluated by interviewing primary caregiver satisfaction regarding esthetic appearance. Satisfaction level was classified by using 5-rating scale.(56) Primary caregivers were satisfied with child's appearance both RMGI restoration and disking groups with mean score 4.0 and 4.4, respectively.

Pain perception was interviewed at 1- and 7-day post-operative. No pain nor tooth sensitivity were reported.

CHAPTER V
DISSUSSION AND CONCLUSION

Discussion

During academic year 2018, among 306 tribal preschool children in Doi Tung Development Project, only 102 (33%) were caries free. According to oral health screening, all dental caries on primary upper anterior teeth of these children were left untreated. Twenty-nine preschoolers were invited to take dental radiograph, only 20 (6.5%) children had level of caries involvement in outer or middle third dentin.

The study of disking effect on proximal caries of primary upper incisors had not been done. Widely known that the fluoride can arrest caries and inactive carious surface examined after treatment regard as clinical success of disking technique for present study. Therefore, sample size calculation was adopted from study of Chu et al they investigated the effectiveness of silver diamine fluoride and sodium fluoride varnish in arresting dentin caries.(55)

In this study, sample allocation was using match-paired randomization, carious proximal lesions on the same type of tooth (primary upper central incisor or primary upper lateral incisor) and the same level of caries involvement were matched, then were randomized using coin tossing to into control (RMGI restoration) and experimental (disking) groups. Between the both groups, no statistically significant difference was found on age, gender, caries risk, and behavior of preschoolers during treatment.

In this study, retention of class III RMGI restorations (slot preparation) at 6-month post-operative evaluation was 85% (22 out of 26 restoration), clinically diagnosed as clinical success. Four (15%) restorations were failure, 3 restorations were dislodged, and 1 restoration revealed recurrent caries. One tooth showed clinical periapical sinus tract opening and apical radiolucent area in radiographic image. Study of Mohan et al reported that at the end of 6 months RMGI restoration had a success percentage of 94%.(57) Another study in success of class III composite restorations (slot preparation) demonstrated that 72% were in an optimal condition

at 6 months.(58) Factors contributing success of class III restoration are moisture control, the cooperation of the children, and the number of restorative procedures.(59) In present study, dislodge restorations may be due to moisture contamination, use of hand-mixed RMGI, difficulty of RMGI manipulation and small cavity size lead to inadequate RMGI condensation. Study of Dowling et al reported that encapsulated GIC had the better physical properties than hand-mixed GIC.(60) Agreeably, the study of Freitas et al reported that the best clinical performance was achieved by performing restorations with encapsulated GIC.(61) Encapsulated RMGI has constant powder-liquid proportion. However, encapsulated RMGI is expensive. In community dentistry, cost of treatment is one of the vital considerations in annual budgeting of health care centers.

In experimental group, non-restorative caries management by disking was performed. After disking, dentin was exposed, no pain nor tooth sensitivity were reported. Twenty-four (92%) treated surfaces demonstrated inactive caries, only 2 surfaces were active caries. The disking technique in primary dentition had been published in posterior teeth.(29, 30) No previous research was done in anterior teeth. After disking, the remaining carious dentin were left but most of them were not progress at 6-month evaluation. Disking created space between teeth, made the lesion self-cleansing by slice preparation may aid plaque control. The remaining carious dentin directly contacted with fluoride varnish and fluoride toothpaste.(6) After disking, all teeth were applied with fluoride varnish including disking surfaces for preventing tooth sensitivity.(62) Fluoride varnish enhanced remineralization, and stop caries progression and also reduce tooth sensitivity.(6, 13) Mechanism of fluoride to relieve dentin hypersensitivity is that it has chemical ability to reduce and block fluid movements in the dentin tubules through formation of calcium–phosphorous, calcium fluoride and fluorapatite precipitates.(62) In addition, fluoride from 1,000 ppm fluoride toothpaste using at least once a day in child development centers should enhance remineralization. The study of Lo, et al. shown that a daily toothbrushing exercise using fluoridated toothpaste (1000 ppm F) could reharden dentin caries. They also reported that most of the inactive caries were found on the mesial and distal surfaces of the anterior primary teeth.(63) All participants received

1,000 ppm fluoride toothpaste for toothbrushing at home. Negative outcomes of disking technique were associated with inadequate oral hygiene.(29) Therefore, toothbrushing with 1,000 ppm fluoride toothpaste by primary caregiver an school based program is a crucial factor in success of disking technique.

In present study, RMGI restoration was spent more chair time than disking was. Cavity preparation and restorative procedure were not required for disking, thus greatly diminishing chair time. Mean chair time of disking was 1.43 minutes per cavity while RMGI restorations was 6.58 minutes. All preschoolers included in this study were co-operative on oral health screening day. During treatment, 1 child in RMGI restoration group was classified as potentially co-operative. However, no statistically difference was found in child behavior during treatment between both treatment. Straightforwardly, shot chair time procedures tend to be more easily accepted by children. Study of Santamaria et al reported that children's behavior was better during treatment with non-restorative caries treatment when compared to treatment with class II compomer restoration in posterior teeth.(31) According to the study of Jamali et al, treatment duration is a crucial factor, the more increase in treatment duration, the more worsen behavior.(64) Dentists showed more willingness to treat children with co-operative behavior. The previous studies showed that general dentists were not willing to treat young children because of uncooperative behaviors of the child.(65, 66)

To assess caries advancement by superimposed radiographic images at baseline and 6-month post-operative could not be achieved due to radiographic images were not identical even silicone bite registration was used. The silicone bite registrations were distorted at 6-month interval. Moreover, in taking post-operative radiograph, horizontal and vertical angulation of x-ray cone could not be done identically to pre-operative. In addition, the teeth may continuously erupt, and the growth of maxilla may occur. The greatest changes in cranial base growth occurred during the first 5 years especially during the first 2–3 years.(67) So, this study classified only level of caries involvement in dentin.

Disking is an alternative proximal caries management of primary upper incisors for unco-operative child, lacking of manpower and dental treatment in remote area. This technique aims to reduce caries advancement by promoting direct contact of active caries with fluoride from fluoride toothpaste lead to inactive carious lesion. According to the result of present study, caries management strategies of proximal caries of primary upper incisors by disking was not statistically significant difference with RMGI restoration. Disking is easier, less chair time and less expenses than RMGI restoration. Disking technique would be well accepted by children lead to co-operative behavior. And also, general dentists are willing to treat the children. However, long term follow-up is indicated. Further study in management of proximal caries of primary upper incisors involved dentin inner third by disking technique is needed.

Conclusion

In caries management of carious lesion in proximal surface of primary upper incisors limited to dentin outer third and dentin middle third by RMGI restoration and disking technique, no statistically significant difference was found in clinical and radiographic outcomes at 6-month post-operative evaluation.

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APPENDIX

APPENDIX A

Study Protocol and Consent Form Approval

No. 063/2018

Study Protocol and Consent Form Approval

The Human Research Ethics Committee of the Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand has approved the following study to be carried out according to the protocol and patient/participant information sheet dated and/or amended as follows in compliance with the **ICH/GCP**

Study Title	: The effect of disking technique on proximal caries of primary upper incisors in tribal preschool children attending child development centers of Mae Fah Luang district, and Doi tung development project, Chiang Rai
Study Code	: HREC-DCU **2018-021**
Study Center	: Chulalongkorn University
Principle Investigator	: Mr. Niwat Thanaboonyang
Protocol Date	: March 19, 2018
Date of Approval	: July 6, 2018
Date of Expiration	: July 5, 2020

V. Lertchirakarn

(Associate Professor Dr. Veera Lertchirakarn)
Chairman of Ethics Committee

K. Bhalang

(Assistant Professor Dr. Kanokporn Bhalang)
Associate Dean for Research

*A list of the Ethics Committee members (names and positions) present at the Ethics Committee meeting on the date of approval of this study has been attached (upon requested). This Study Protocol Approval Form will be forwarded to the Principal Investigator.

Approval is granted subject to the following conditions: (see back of the approval)

APPENDIX B

Parent Information Sheet

เอกสารข้อมูลคำอธิบายสำหรับผู้ปกครองของอาสาสมัครที่เข้าร่วมในการวิจัย

1. โครงการเรื่อง “ผลของการตัดรอยผุด้านประชิดของฟันน้ำนมหน้าบน ในเด็กก่อนวัยเรียนชาวไทยภูเขา ศูนย์พัฒนาเด็กเล็ก อำเภอแม่ฟ้าหลวงและพื้นที่โครงการพัฒนาดอยตุงฯ จังหวัดเชียงราย”
2. ชื่อผู้วิจัยหลัก นายนิวัฒน์ ธะนะบุญยัง
   ชื่อผู้วิจัยร่วมหรืออาจารย์ที่ปรึกษา รศ.ทพญ.ดร. บุษยรัตน์ สันติวงศ์
   สถาบันที่สังกัด คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
   แหล่งทุนวิจัย วางแผนขอทุนจากคณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
3. วัตถุประสงค์ของโครงการ เพื่อประเมินผลของการตัดรอยผุด้านประชิดของฟันน้ำนมหน้าบน
4. สถานที่ดำเนินการวิจัย
   4.1 ศูนย์พัฒนาเด็กเล็กอำเภอแม่ฟ้าหลวงและพื้นที่โครงการพัฒนาดอยตุงฯ จ.เชียงราย
   4.2 สถานีอนามัยเฉลิมพระเกียรติ 60 พรรษา นวมินทราชินี ดอยตุง อ.แม่ฟ้าหลวง จ.เชียงราย
5. วิธีการที่ใช้ในการวิจัย
   5.1 อาสาสมัครจะได้รับการตรวจสุขภาพช่องปาก
   5.2 อาสาสมัครที่มีฟันผุที่ซอกฟันน้ำนมหน้าบนจะได้รับการถ่ายภาพรังสี เพื่อตรวจหาระดับความลึกของฟันผุ และตรวจหารอยโรคที่ปลายรากฟัน อาสาสมัครที่มีรอยโรค จะได้รับการส่งต่อเพื่อรับการรักษาที่เหมาะสมอาสาสมัครที่มีรอยผุตามเกณฑ์คัดเข้าจะเชิญให้เข้าร่วมงานวิจัย ตรวจสุขภาพช่องปาก สัมภาษณ์ผู้ดูแลหลัก
   5.3 แบ่งกลุ่มอาสาสมัครดังนี้
   ศูนย์พัฒนาเด็กเล็กในเขตจังหวัดเชียงราย เป็นศูนย์พัฒนาเด็กเล็กที่มีโรงพยาบาลต้นสังกัดให้การดูแลทางทันตกรรมป้องกัน คือ การทาฟลูออไรด์ทุก 6 เดือน และการกำกับให้มีการแปรงฟันหลังอาหารกลางวันด้วยยาสีฟันฟลูออไรด์ แบ่งอาสาสมัครออกเป็นกลุ่มทดลองและกลุ่มควบคุม
   5.3.1 *<u>กลุ่มทดลอง</u>* อาสาสมัครที่มีฟันน้ำนมหน้าบนผุตามเกณฑ์จะได้รับการกรอตัดรอยผุที่ซอกฟันน้ำนมหน้าบนและขัดฟันให้เรียบ เพื่อให้เกิดช่องระหว่างฟันเล็กน้อยประมาณ 0.5-1 มิลลิเมตร การเกิดช่องระหว่างฟันทำให้ทำความสะอาดได้ง่าย และทำให้ฟลูออไรด์จากการทาฟลูออไรด์และจากการแปรงฟันด้วยยาสีฟันฟลูออไรด์สัมผัสผิวด้านข้างของฟันโดยตรง ทำให้เกิดการคืนกลับของแร่ธาตุหยุดยั้งการผุต่อ

การตัดฟันจะอยู่ในชั้นของผิวเคลือบฟัน แต่บางกรณีอาจมีเนื้อฟันบางส่วนบางส่วน ซึ่งผู้วิจัยได้ทาฟลูออไรด์ทันทีหลังการตัดฟันเพื่อป้องกันอาการเสียวฟัน

5.3.2 *<u>กลุ่มควบคุม</u>* อาสาสมัครที่มีฟันน้ำนมหน้าบนผุตามเกณฑ์ได้รับการตรวจสุขภาพช่องปาก อุดฟันและเคลือบฟลูออไรด์ หากอาสาสมัครมีฟันผุมากขึ้นหรือผู้ปกครองต้องการให้อาสาสมัครรับการรักษาฟัน ผู้ปกครองสามารถแจ้งผู้วิจัย เพื่อทำการส่งต่อการรักษา

5.4 หลังการรักษา 6 เดือน อาสาสมัครทั้ง 2 กลุ่มจะได้รับการตรวจสุขภาพช่องปากอีกครั้ง สัมภาษณ์ผู้ดูแลหลัก และถ่ายภาพรังสี เพื่อติดตามการลุกลามของฟันผุ รวมทั้งตรวจหาความผิดปกติที่ปลายรากฟัน หากพบความผิดปกติอาสาสมัครจะได้รับการส่งต่อเพื่อรับการรักษาที่เหมาะสม

6. เหตุผลที่เชิญเข้าร่วมเป็นอาสาสมัครในโครงการ

เนื่องจากบุตรหลานของท่านมีฟันผุที่ฟันหน้าบน ตามเกณฑ์การคัดเข้า

7. ความรับผิดชอบของอาสาสมัคร และระยะเวลาที่อาสาสมัครจะอยู่ในโครงการ

ผู้ปกครองเลี้ยงดูบุตรหลานในความดูแลตามปกติ หากบุตรหลานของท่านมีอาการผิดปกติเกี่ยวกับฟัน เช่น มีอาการปวดฟัน บวม ฟันเป็นหนอง ระหว่างที่เข้าร่วมในโครงการวิจัย ให้ผู้ปกครองแจ้งให้ผู้ทำวิจัยได้ทราบเพื่อทำการส่งต่อการรักษา โดยระยะเวลาที่อาสาสมัครจะอยู่ในโครงการคือ 1 ปี

8. ประโยชน์ของการวิจัยที่อาสาสมัครและ/หรือผู้อื่นอาจได้รับ

ผู้ปกครองจะได้รับแจ้งผลการตรวจสุขภาพช่องปากของอาสาสมัครที่เข้าร่วมในงานวิจัย ในกรณีที่อาสาสมัครมีฟันที่ควรได้รับการรักษารากฟันหรือมีรอยโรคของกระดูกเบ้าฟัน เช่น ฟันมีหนองควรถอนฟัน เด็กจะได้รับการส่งต่อเพื่อรับการรักษา

ส่วนผลของการวิจัยที่ประเมินผลของการตัดรอยผุ หากพบว่าวิธีการนี้สามารถชะลอการผุของฟันหรือหยุดการเกิดฟันผุ การตัดรอยผุที่ซอกฟันน้ำนมในกลุ่มทำลองจะทำให้อาสาสมัครมีฟันหลุดตามวัย โดยปราศจากการปวดฟันเนื่องจากฟันผุ การตัดรอยผุเป็นวิธีการรักษาทางเลือกสำหรับการจัดการฟันผุ ที่ทำได้ง่าย ใช้ระยะเวลาสั้น และหมอฟันทั่วไปสามารถให้การรักษาแก่ผู้ป่วยเด็กได้ ทำให้เด็กเข้าสามารถถึงการรักษาได้ง่ายขึ้น

9. ความเสี่ยงหรือความไม่สะดวกที่อาจจะเกิดขึ้นแก่อาสาสมัคร และในบางกรณีแก่ทารกในครรภ์หรือทารกที่ดื่มนมมารดา

ภายหลังการกรอตัดรอยผุที่ซอกฟัน จะทำให้ฟันห่างเล็กน้อย และบางครั้งอาจเกิดอาการเสียวฟันได้ ซึ่งภายหลังการกรอตัดรอยผุผู้วิจัยจะทำการป้องกันการเสียวฟันด้วยการทา

ฟลูออไรด์ หากอาสาสมัครยังคงมีอาการเสียวฟันทำให้ดำรงชีวิตแตกต่างจากปกติ อาสาสมัครจะได้รับการส่งต่อเพื่อรับการรักษาที่เหมาะสมต่อไป

นอกจากนี้ หากรอยผุที่ฟันหน้าบนลุกลามถึงโพรงประสาทฟันและปลายรากฟัน ทำให้อาสาสมัครมีอาการเจ็บ บวม เป็นหนอง อาสาสมัครจะได้รับการส่งต่อเพื่อรับการรักษาฉุกเฉิน

10. ค่าใช้จ่ายที่อาสาสมัครจะต้องจ่าย หรืออาจจะต้องจ่าย

การเข้าร่วมในงานวิจัยในครั้งนี้ อาสาสมัครไม่ต้องเสียค่าใช้จ่ายใด ๆ ทั้งสิ้น

11. การชดเชยใด ๆ และการรักษาที่จะจัดให้แก่อาสาสมัครในกรณีที่ได้รับอันตรายซึ่งเกี่ยวข้องกับการวิจัย

ในการเข้าร่วมงานวิจัยนี้รอยผุที่ฟันหน้าบนของอาสาสมัครอาจมีการลุกลามถึงโพรงประสาทฟันและปลายรากฟัน อาสาสมัครจะได้รับการส่งต่อไปรับการรักษาที่เหมาะสมต่อไป

12. การจ่ายค่าเดินทาง ค่าเสียเวลา แก่อาสาสมัครที่เข้าร่วมในการวิจัย

ในการทำวิจัยนี้ ผู้ทำวิจัยจะจัดหารถรับส่งอาสาสมัครจากศูนย์พัฒนาเด็กเล็กไปยังสถานพยาบาล และอาสาสมัครจะได้รับแปรงสีฟันและยาสีฟันฟลูออไรด์ตลอดระยะเวลาการวิจัย

13. เหตุการณ์ที่อาจจะเกิดขึ้น หรือเหตุผลซึ่งผู้วิจัยจะต้องยกเลิกการเข้าร่วมในโครงการวิจัยของอาสาสมัคร

ในระหว่างการศึกษา ถ้าหากอาสาสมัครมีฟันน้ำนมหน้าบนซี่ที่ทำการศึกษาได้รับการรักษาอื่น ๆ ในระหว่างการศึกษา ฟันซี่นั้นจะถูกคัดออกจากการศึกษา

14. มีการเก็บชิ้นตัวอย่างที่ได้มาจากอาสาสมัครเอาไว้ใช้ในโครงการวิจัยในอนาคตหรือไม่ เก็บจำนวนเท่าไหร่ อย่างไร และที่ไหน

งานวิจัยนี้ไม่มีการเก็บชิ้นตัวอย่าง

15. การกำกับดูแลและควบคุมการดำเนินโครงการ

ผู้กำกับดูแลการวิจัย ผู้ตรวจสอบ คณะกรรมการพิจารณาจริยธรรม และคณะกรรมการที่เกี่ยวข้อง สามารถเข้าไปตรวจสอบการดำเนินโครงการ รวมทั้ง ตรวจสอบบันทึกข้อมูลของอาสาสมัคร เพื่อเป็นการยืนยันถึงขั้นตอนในการวิจัยทางคลินิกและข้อมูลอื่นๆ โดยไม่ล่วงละเมิดเอกสิทธิ์ในการปิดบังข้อมูลของอาสาสมัคร ตามกรอบที่กฎหมายและกฎระเบียบได้อนุญาตไว้ นอกจากนี้ โดยการลงนามให้ความยินยอม อาสาสมัครหรือ ผู้แทนตามกฎหมายจะมีสิทธิตรวจสอบและมีสิทธิที่จะได้รับข้อมูลด้วยเช่นกัน

16. จริยธรรมการวิจัย

การดำเนินการโครงการวิจัยนี้ ผู้วิจัยคำนึงถึงหลักจริยธรรมการวิจัย โดย

1. หลักความเคารพในบุคคล (Respect for person) โดยการให้ข้อมูลจนอาสาสมัครเข้าใจเป็นอย่างดีและตัดสินใจอย่างอิสระในการให้ความยินยอมเข้าร่วมในการวิจัย รวมทั้งการเก็บรักษาความลับของ

   อาสาสมัคร
2. หลักการให้ประโยชน์ไม่ก่อให้เกิดอันตราย (Beneficence/Non-Maleficence) ซึ่งได้ระบุในข้อ 8 และ 9 ว่าจะมีประโยชน์หรือความเสี่ยงกับอาสาสมัครหรือไม่
3. หลักความยุติธรรม (Justice) คือมีเกณฑ์คัดเข้าและคัดออกชัดเจน มีการกระจายความเสี่ยงและผลประโยชน์อย่างเท่าเทียมกัน โดยวิธีสุ่มเข้ากลุ่มศึกษา

17. ข้อมูลที่อาจนำไปสู่การเปิดเผยตัวของอาสาสมัครจะได้รับการปกปิด ยกเว้นว่าได้รับคำยินยอมไว้โดยกฎระเบียบและกฎหมายที่เกี่ยวข้องเท่านั้น จึงจะเปิดเผยข้อมูลแก่สาธารณชนได้ ในกรณีที่ผลการวิจัยได้รับการตีพิมพ์ ชื่อและที่อยู่ของอาสาสมัครจะต้องได้รับการปกปิดอยู่เสมอ และอาสาสมัครหรือผู้แทนตามกฎหมายจะได้รับแจ้งโดยทันท่วงที ในกรณีที่มีข้อมูลใหม่ซึ่งอาจใช้ประกอบการตัดสินใจของอาสาสมัครว่าจะยังคงเข้าร่วมในโครงการวิจัยต่อไปได้หรือไม่

18. หากท่านมีข้อสงสัยต้องการสอบถามเกี่ยวกับสิทธิของท่าน หรือผู้วิจัยไม่ปฏิบัติตามที่เขียนไว้ในเอกสารข้อมูล คำอธิบายสำหรับผู้เข้าร่วมในการวิจัย ท่านสามารถติดต่อหรือร้องเรียนได้ที่ ฝ่ายวิจัย คณะทันต-แพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ตึกสมเด็จย่า 93 ชั้น 10 หรือที่หมายเลขโทรศัพท์ 02-218-8866 ในเวลาทำการ

19. หากท่านต้องการยกเลิกการเข้าร่วมเป็นอาสาสมัครในโครงการนี้ ให้ท่านกรอกและส่งเอกสารขอยกเลิกมาที่

    นายนิวัฒน์ ธะนะบุญยัง

    86/52 The Excel Bearing ซ.ลาซาล 11 ถ.สุขุมวิท 105 บางนา บางนา กทม. 10260

20. อาสาสมัครสามารถติดต่อผู้วิจัยได้**<u>ตลอด 24 ชั่วโมง</u>** ที่:

    นายนิวัฒน์ ธะนะบุญยัง

    86/52 The Excel Bearing ซ.ลาซาล 11 ถ.สุขุมวิท 105 บางนา บางนา กทม. 10260

    โทรศัพท์ 087-0603052

รศ.ทพญ.ดร. บุษยรัตน์ สันติวงศ์
ภาควิชาทันตกรรมสำหรับเด็ก คณะทันตแพทยศาสตร์ จุฬาฯ ถ.อังรีดูนังต์ แขวงวังใหม่ เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์ 081-7330732

ลงนาม.....

(นายนิวัฒน์ ธะนะบุญยัง)

ผู้วิจัยหลัก

วันที่ 21 มิถุนายน 2561

หมายเหตุ - ให้พิมพ์ข้อความโดยละเอียดลงในช่องว่าง โดยใช้ตัวอักษร TH SarabunPKS ขนาด 16

- หลังจากกรอกข้อความครบถ้วน พิมพ์เอกสารทั้งหมด แล้วให้ผู้วิจัยหลักลงนาม
- ทำสำเนาเอกสารข้อมูลคำอธิบายสำหรับอาสาสมัครที่เข้าร่วมในการวิจัย (Parent Information Sheet) มอบให้ผู้ปกครองแต่ละคนๆ ละ 1 ชุด

APPENDIX C

Consent Form

เอกสารยินยอมเข้าร่วมการวิจัย

การวิจัยเรื่อง ผลของการตัดรอยผุด้านประชิดของฟันน้ำนมหน้าบน ในเด็กก่อนวัยเรียนชาวไทยภูเขา ศูนย์พัฒนาเด็กเล็ก อำเภอแม่ฟ้าหลวงและพื้นที่โครงการพัฒนาดอยตุงฯ จังหวัดเชียงราย

ข้าพเจ้า (นาย/ นาง/นางสาว).....

ผู้ปกครองของ (เด็กชาย/ เด็กหญิง) .....

อยู่บ้านเลขที่.....ถนน.....ตำบล/แขวง.....

อำเภอ/เขต.....จังหวัด.....รหัสไปรษณีย์..... .....

ก่อนที่จะลงนามในใบยินยอมให้ทำการวิจัยนี้

1. ข้าพเจ้าได้รับทราบรายละเอียดข้อมูลคำอธิบายสำหรับอาสาสมัครที่เข้าร่วมในการวิจัย รวมทั้งได้รับการอธิบายจากผู้วิจัยถึงวัตถุประสงค์ของการวิจัย วิธีการทำวิจัย อันตรายหรืออาการที่อาจเกิดขึ้นจากการทำวิจัย หรือจากยาที่ใช้รวมทั้งประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียดและมีความเข้าใจดีแล้ว
2. ผู้วิจัยได้ตอบคำถามต่างๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจไม่ปิดบังซ่อนเร้นจนข้าพเจ้าพอใจ
3. ผู้วิจัยรับรองว่าจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับ และจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุป ผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆ ที่เกี่ยวข้องกระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น และผู้วิจัยรับรองว่าหากเกิดอันตรายใดๆ จากการวิจัยดังกล่าว ข้าพเจ้าจะได้รับการรักษาพยาบาลโดยไม่คิดมูลค่า
4. ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมในโครงการวิจัยนี้เมื่อใดก็ได้และการบอกเลิกการเข้าร่วมการวิจัยนี้จะไม่มีผลต่อการรักษาโรคที่ข้าพเจ้าจะพึงได้รับต่อไป

ข้าพเจ้าจึงสมัครใจเข้าร่วมโครงการวิจัยนี้ตามที่ระบุในเอกสารข้อมูลคำอธิบายสำหรับอาสาสมัครและได้ลงนามในใบยินยอมนี้ด้วยความเต็มใจ และได้รับสำเนาเอกสารใบยินยอมที่ข้าพเจ้าลงนามและลงวันที่ และเอกสารยกเลิกการเข้าร่วมวิจัย อย่างละ 1 ฉบับ เป็นที่เรียบร้อยแล้ว ในกรณีที่อาสาสมัครยังไม่บรรลุนิติภาวะจะต้องได้รับการยินยอมจากผู้ปกครองด้วย

ลงนาม..... (อาสาสมัคร) (.....) วันที่...../...../.....	ลงนาม..... (ผู้ปกครอง) (.....) วันที่...../...../.....
ลงนาม..... (ผู้วิจัยหลัก) (นายนิวัฒน์ ธะนะบุญยัง) วันที่...../...../.....	ลงนาม..... (พยาน) (.....) วันที่...../...../.....

ข้าพเจ้าไม่สามารถอ่านหนังสือได้ แต่ผู้วิจัยได้อ่านข้อความในใบยินยอมนี้ให้แก่ข้าพเจ้าฟังจนเข้าใจดีแล้วข้าพเจ้าจึงลงนาม หรือประทับลายนิ้วหัวแม่มือขวาของข้าพเจ้าในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม..... (อาสาสมัคร) (.....) วันที่...../...../.....	ลงนาม..... (ผู้ปกครอง) (.....) วันที่...../...../.....
ลงนาม..... (ผู้วิจัยหลัก) (นายนิวัฒน์ ธะนะบุญยัง) วันที่...../...../.....	ลงนาม..... (พยาน) (.....) วันที่...../...../.....

APPENDIX D

Withdrawal Form

เอกสารยกเลิกการเข้าร่วมวิจัย (Withdrawal Form)

การวิจัยเรื่อง ผลของการตัดรอยผุด้านประชิดของฟันน้ำนมหน้าบน ในเด็กก่อนวัยเรียนชาวไทยภูเขา ศูนย์พัฒนาเด็กเล็ก อำเภอแม่ฟ้าหลวงและพื้นที่โครงการพัฒนาดอยตุงฯ จังหวัดเชียงราย

ข้าพเจ้า (นาย/ นาง/ นางสาว).....

ผู้ปกครองของ (เด็กชาย/ เด็กหญิง).....

บ้านเลขที่.....ถนน.....ตำบล/แขวง.....

อำเภอ/เขต.....จังหวัด.....รหัสไปรษณีย์.....

ลงนาม.....ผู้ยกเลิก

(.....)

วันที่.....เดือน.....พ.ศ. .....

ลงนาม.....พยาน

(.....)

วันที่.....เดือน.....พ.ศ. .....

ลงนาม.....ผู้วิจัยหลัก

(นายนิวัฒน์ ธะนะบุญยัง)

วันที่.....เดือน.....พ.ศ. .....

ที่อยู่สำหรับส่งเอกสาร นายนิวัฒน์ ธะนะบุญยัง 86/52 The Excel Bearing ซ.ลาซาล 11 ถ.สุขุมวิท 105 บางนา บางนา กทม. 10260

หมายเหตุ - สำเนาเอกสารยกเลิกการเข้าร่วมวิจัย แล้วมอบให้ผู้ปกครองแต่ละคน ๆ ละ 1 ชุด

APPENDIX E

Data Record Form

หมู่บ้าน_____ ชนเผ่า_____ รหัสเด็ก_____ วันที่_____

ผู้ดูแลหลัก ☐ บิดา ☐ มารดา ☐ ปู่ย่า/ ตายาย ☐ อื่นๆ (ระบุ)_____

แบบสอบถามสำหรับผู้ดูแลหลัก

ส่วนที่ 1 ข้อมูลทั่วไปของเด็ก

1. เพศของเด็ก ☐ ชาย ☐ หญิง 2. วัน เดือน ปี เกิด _____ 3. น้ำหนักแรกเกิด _____ กรัม 4. น้ำหนักขณะนี้ _____ กิโลกรัม 5. ส่วนสูงขณะนี้ _____ เซนติเมตร 6. โรคประจำตัว ☐ ไม่มี ☐ มี _____ 7. จำนวนบุตรทั้งหมดในครอบครัว _____ คน 8. เด็กเข้าศูนย์พัฒนาเด็กเล็กตั้งแต่ _____	**สำหรับผู้วิจัย** ☐ M ☐ F Age_____ Months

ส่วนที่ 2 ข้อมูลทั่วไปเกี่ยวกับผู้ดูแลหลัก

9. เพศของผู้ดูแลหลัก ☐ ชาย ☐ หญิง 10. วัน เดือน ปี เกิด _____ 11. การศึกษาสูงสุดของท่าน ☐ ต่ำกว่ามัธยมศึกษาปีที่ 3 ☐ มัธยมศึกษาปีที่ 6 หรือเทียบเท่า ☐ มัธยมศึกษาปีที่ 3 ☐ อนุปริญญา, ปวช, ปวส ☐ ปริญญาตรี ☐ สูงกว่าปริญญาตรี ☐ อื่นๆ (ระบุ) _____ 12. อาชีพหลักของท่าน ☐ แม่บ้าน/ ไม่ได้ทำงาน ☐ ค้าขาย ☐ เกษตรกรรม ☐ ลูกจ้าง/ พนักงานบริษัท ☐ รับราชการ/ รัฐวิสาหกิจ ☐ อื่นๆ (ระบุ) _____	**สำหรับผู้วิจัย** ☐ M ☐ F Age_____ Months ☐ ≤ grade 9 ☐ ≥ grade 9 ☐ Unemployed ☐ Employed

ส่วนที่ 3 พฤติกรรมการรับบริการทันตสุขภาพของเด็ก

13. เด็กเคยไปทำฟันหรือไม่	**สำหรับผู้วิจัย**
☐ ไม่เคย ☐ เคย เมื่อ _____	
☐ จำไม่ได้	
(<u>หากไม่เคย หรือจำไม่ได้ ข้ามไปตอบข้อที่ 16</u>*)**	
14. ท่านพาเด็กไปพบทันตแพทย์บ่อยแค่ไหน	☐ Regular
☐ ไม่เคย ☐ ไป 1 ครั้งต่อปี ☐ ไป 2 ครั้งต่อปีหรือมากกว่า	☐ Non-regular
15. เด็กได้รับการรักษาทางทันตกรรมที่ใด	
☐ สถานีอนามัย/ โรงพยาบาลส่งเสริมสุขภาพตำบล	
☐ โรงพยาบาลของรัฐ	☐ Government
☐ คลินิกหรือโรงพยาบาลเอกชน	☐ Private
<u>*ถ้าเคยพาเด็กไปพบทันตแพทย์ ข้ามไปตอบข้อที่ 18</u>**	
16. สาเหตุที่เด็กไม่ไปทำฟันคือ (ตอบได้มากกว่า 1 ข้อ)	
☐ เด็กไม่มีฟันผุ ☐ มีความยากลำบากในการเดินทาง	
☐ เด็กไม่ได้ปวดฟัน ☐ ค่าใช้จ่ายในการรักษาสูง	
☐ เด็กไม่ให้ความร่วมมือ ☐ คิดว่าเป็นเพียงฟันน้ำนมไม่ต้องรักษา	
☐ อายุยังน้อย ☐ อื่น ๆ (ระบุ) _____	

ส่วนที่ 4 พฤติกรรมการดูแลสุขภาพอนามัยช่องปากของเด็ก

17. เด็กได้รับการแปรงฟันหรือเช็ดฟันตั้งแต่อายุ _____ปี ☐จำไม่ได้/ ไม่ทราบ	**สำหรับผู้วิจัย**
18. ในปัจจุบันเด็กได้รับการทำความสะอาดฟันอย่างไร	
☐ เด็กไม่ได้รับการทำความสะอาดช่องปาก **(ข้ามไปตอบข้อ 23***)**	☐ Receive oral care
☐ ทำความสะอาดโดย ( ) เช็ดฟัน ( ) แปรงฟัน ( ) ไหมขัดฟัน	☐ Not receive oral care
19. ใช้ยาสีฟันหรือไม่	
☐ ไม่ได้ใช้ยาสีฟัน	☐ Non-F toothpaste
☐ ใช้ยาสีฟัน ระบุยี่ห้อ_____	☐ F toothpaste
20. ใครเป็นผู้ทำความสะอาดช่องปากให้เด็ก	
☐ เด็ก ☐ ผู้ปกครอง ☐ เด็กและผู้ปกครอง	☐ Non-assisted brushing
21. เด็กแปรงฟันวันละกี่ครั้ง	☐ Assisted brushing
☐ ไม่ทำ ☐ ทำบางวัน	
☐ ทำทุกวัน วันละ 1 ครั้ง ☐ ทำทุกวัน วันละ 2 ครั้ง หรือมากกว่า	☐ < 2
22. เด็กแปรงฟันเวลาใด	☐ ≥ 2
☐ เช้า ☐ กลางวัน ☐ เย็น ☐ อื่นๆ (ระบุ) _____	

<u>*ถ้าเด็กแปรงฟันทุกวัน ข้ามไปตอบข้อ 24</u>** 23. ทำไมเด็กจึงไม่ได้แปรงฟันทุกวัน ☐ เด็กไม่ให้ความร่วมมือ ☐ ทำเด็กแปรงเองไม่เป็น ☐ ผู้ปกครองไม่มีเวลาแปรงให้ ☐ อื่น (ระบุ) _____	

ส่วนที่ 5 พฤติกรรมการรับประทานอาหารของเด็ก

24. ตอนทารก (0 – 18 เดือน) ดื่มนมอะไร (ตอบได้มากกว่า 1 ข้อ) ☐ นมแม่ ตั้งแต่อายุ _____ ถึง _____ (เดือน) ☐ นมขวด ชนิด ( ) จืด ( ) หวาน ตั้งแต่อายุ _____ ถึง _____ ☐ นมกล่อง ชนิด ( ) จืด ( ) หวาน ( ) เปรี้ยว ตั้งแต่อายุ _____ ถึง _____ ☐ น้ำเต้าหู้ ชนิด ( ) จืด ( ) หวาน ตั้งแต่อายุ _____ ถึง _____ b☐ อื่นๆ (ระบุ)_____ ตั้งแต่อายุ _____ ถึง _____ 25. เด็กเลิกดื่มนมมื้อดึกเมื่ออายุ _____ ☐ ยังไม่เลิก 28. เด็กเลิกดื่มนมก่อนนอนถึงอายุ _____ ☐ ยังไม่เลิก ☐ หลับคาขวด 26. ในปัจจุบัน วันเด็กรับประทานอาหาร เครื่องดื่ม ขนม วันละกี่ครั้ง _____ ครั้ง รับประทานอาหารหลักวันละ _____ ครั้ง อาหารว่างวันละ _____ ครั้ง 27. เครื่องดื่มที่เด็กชอบ ☐ ชาเขียว ☐ น้ำอัดลม ☐ น้ำหวาน ☐ อื่นๆ (ระบุ) _____	**สำหรับผู้วิจัย** ☐ Planed milk ☐ Sweetened milk ☐ Without bottle ☐ With bottle ☐ Sleep with bottle ☐ Not sleep with bottle ☐ Night feeding ☐ No night feeding ☐ < 3 between meal ☐ ≥ 3 between meal

ส่วนที่ 6 ความคิดความเชื่อ

28. ฟันน้ำนมมีความสำคัญหรือไม่ อย่างไร ☐ มี ☐ ไม่มี

เหตุผล_____

_____

29. ฟันน้ำนมผุต้องรักษาหรือไม่ ☐ รักษา ☐ ไม่ต้องรักษา

เหตุผล_____

_____

หมู่บ้าน_____ รหัสเด็ก_____ วันที่_____

ผู้ดูแลหลัก ☐ บิดา ☐ มารดา ☐ ปู่ย่า/ ตายาย ☐ อื่นๆ (ระบุ) _____

แบบบันทึกการรับประทานอาหารวันธรรมดา

เวลาที่กิน		อาหารที่กิน	**สำหรับผู้วิจัย**	
เริ่มกิน	กินเสร็จ		ชนิดอาหาร	ความถี่

ตัวอย่างการบันทึกการรับประทานอาหารวันธรรมดา

เวลาที่กิน		อาหารที่กิน	สำหรับผู้วิจัย	
เริ่มกิน	กินเสร็จ		ชนิดอาหาร	ความถี่
7.00	7.20	ข้าวสวย ยำผักกาด หน่อไม้ยัดไส้ ขนมถุง 1 ถุง		
10.00	10.15	นมหวาน ขนมปังกรอบ		
12.00	12.30	ข้าวสวย หน่อนึ่งหมู ผัดผัก น้ำอัดลม ลูกอม		

แบบบันทึกผลการตรวจสุขภาพช่องปากเด็ก

หมู่บ้าน _____ ชนเผ่า_____ รหัสเด็ก _____ วันที่ตรวจ _____

Behavior ☐ Co-operative ☐ Potentially co-operative ☐ Unco-operative

ซี่	O	M	D	B	L	*	หมายเหตุ	ซี่	O	M	D	B	L	*	หมายเหตุ
55								75							
54								74							
53	■							73	■						
52	■							72	■						
51	■							71	■						

ซี่	O	M	D	B	L	*	หมายเหตุ	ซี่	O	M	D	B	L	*	หมายเหตุ
61	■							81	■						
62	■							82	■						
63	■							83	■						
64								84							
65								85							

รหัสตรวจฟัน

0 ฟันดี ไม่ผุ

1 ฟันผุไม่เป็นรู

2 ฟันผุเป็นรู

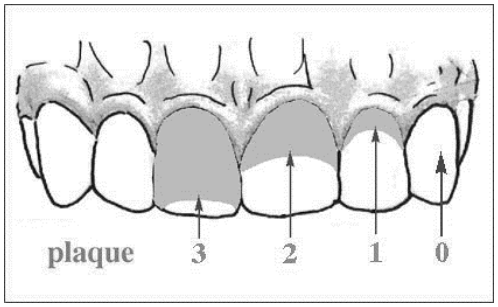
3 ฟันอุดแล้วผุต่อ

4 ฟันอุดแล้วไม่ผุต่อ

5 ฟันที่ถูกถอนไปจากฟันผุในช่อง *

ซี่ฟัน	Plaque index	
55	B	
61	B	
64	B	
75	Li	
71	B	
84	Li	
Total		

Plaque score



(Greene and Vermillion's OHI-S)

หมู่บ้าน_____ ชนเผ่า _____ รหัสเด็ก_____

แบบบันทึกการแปลผลรอยผุด้านประชิดจากภาพรังสี

(ฟันน้ำนมหน้าบน)

☐ Pre-op วันที่ _____

☐ Post-op วันที่ _____

ซี่ฟัน	**Radiographic status**		**Depth of caries**
	Normal	**Pathology**	
52 M			
51 D			
51 M			
61 M			
61 D			
62 M			

Depth of caries

1 enamel outer half
2 enamel inner half
3 dentin outer third
4 dentin middle third
5 dentin inner third
6 carious exposure

แบบบันทึกการติดตามผลการการรักษา

หมู่บ้าน _____ ชนเผ่า_____ รหัสเด็ก _____ วันที่ตรวจ _____

Behavior ☐ Co-operative ☐ Potentially co-operative ☐ Unco-operative

ซี่	M	D	B	L	หมายเหตุ
52					
51					
61					
62					

รหัสตรวจฟัน

0 ฟันดีไม่ผุ

1 รอยผุชนิดไม่ลุกลาม (inactive caries)

2 รอยผุชนิดลุกลาม (active caries)

3 มีตุ่มหนอง

4 ฟันอุดแล้วไม่ผุต่อ

5 ฟันอุดแล้วผุต่อ

6 วัสดุอุดฟันแตก ขอบรั่ว

7 วัสดุอุดหลุด

8 ฟันถูกถอนเนื่องจากฟันผุ

แบบสอบถามหลังการรักษา

ทำเครื่องหมาย ✓ หน้าคำตอบที่เลือก

1. หลังจากที่เด็กได้รับการรักษาฟันผุด้วยการกรอตัดฟัน ท่านมีความพึงพอใจต่อความสวยงามในระดับใด

☐ 5 พอใจมาก ☐ 4 พอใจ ☐ 3 ปานกลาง ☐ 2 ไม่พึงพอใจ ☐ 1 ไม่พึงพอใจมาก

2. ตั้งแต่เด็กได้รับการรักษา เด็กเคยมีอาการเสียวฟันหน้าหรือไม่

☐ ไม่เคย ☐ เคย _____

3. ตั้งแต่เด็กได้รับการรักษา เด็กเคยมีอาการปวดฟันหน้าหรือไม่

☐ ไม่เคย ☐ เคย _____

VITA

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