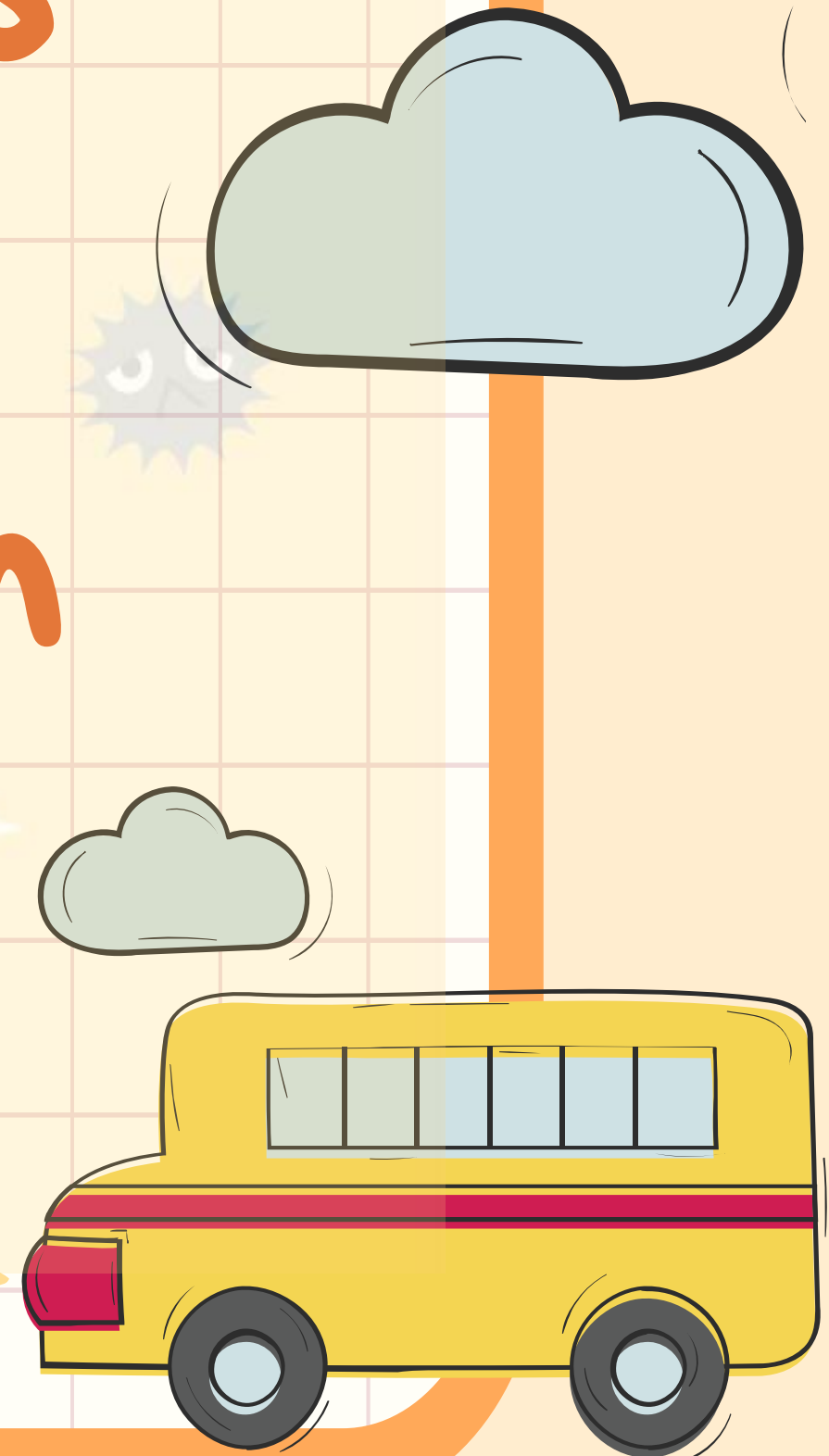
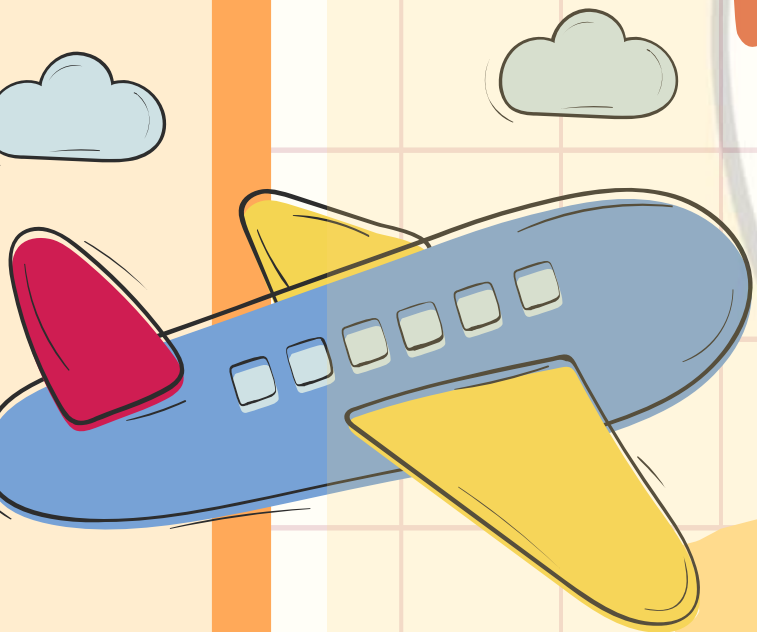


Dental sealants & Preventive resin restoration

Worawit Sakulthai, DDS, MS
(Pediatric & Geriatric Dentistry)



Step

1

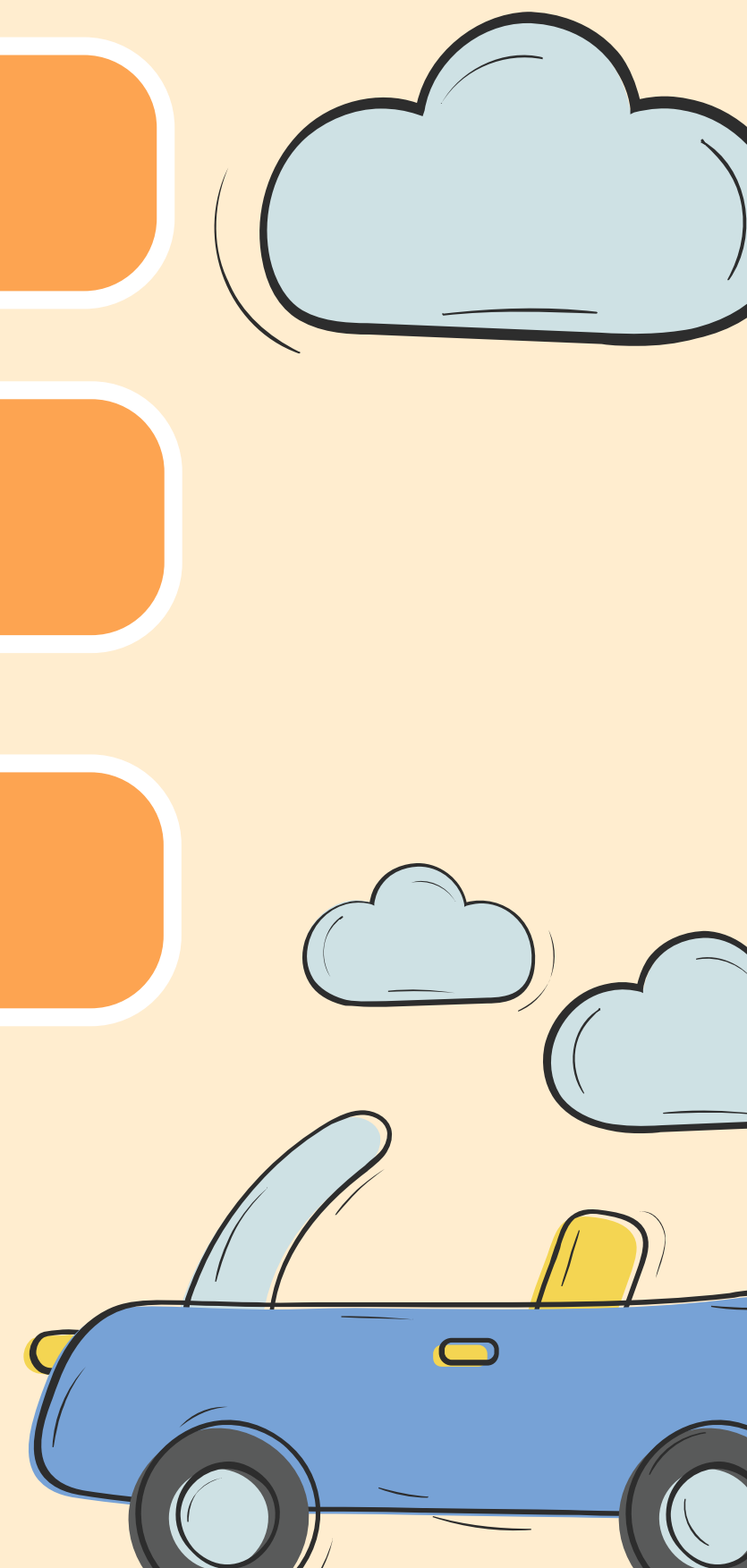
Before treatment

2

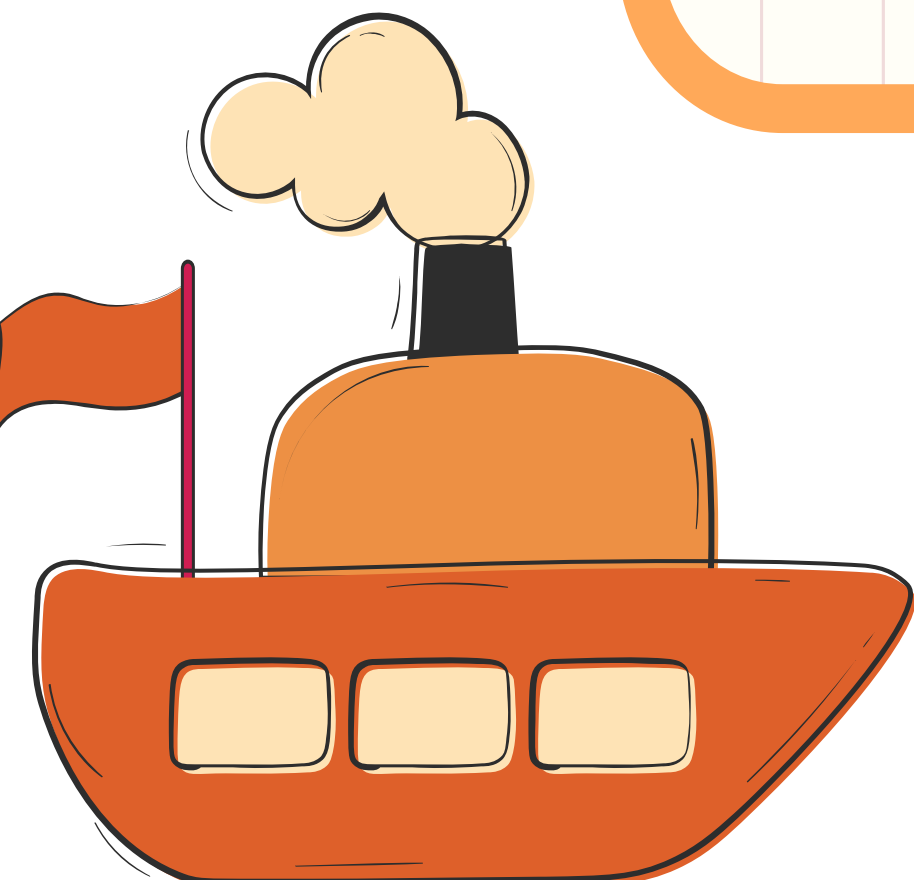
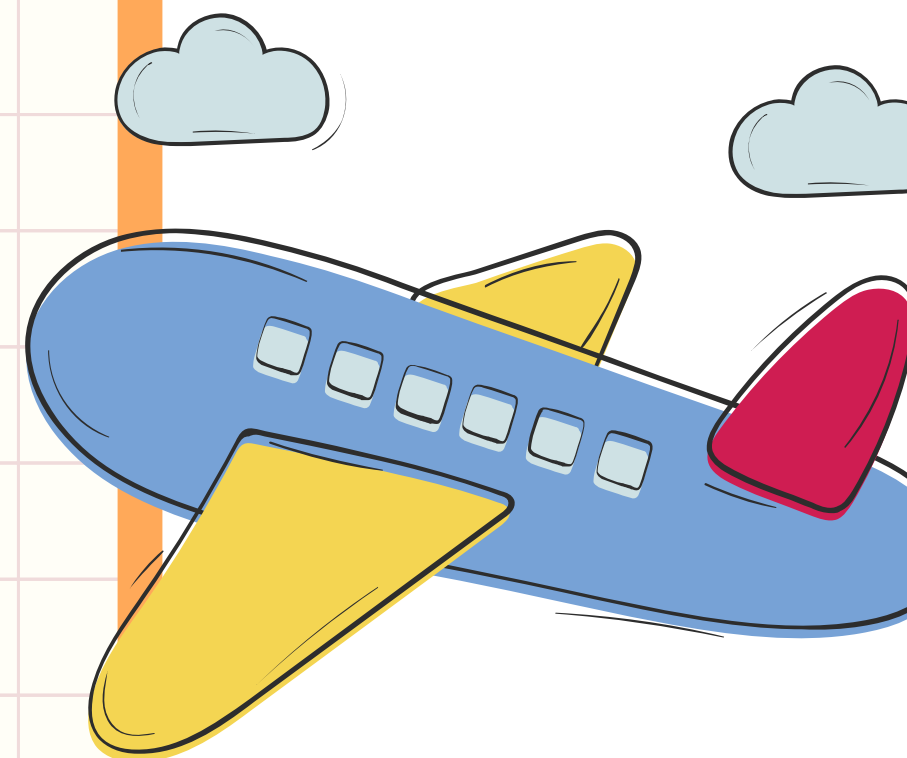
During treatment

3

After treatment

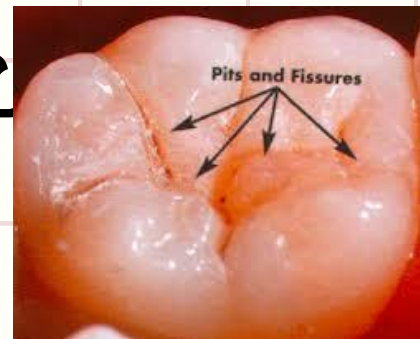


1. Before Treatment



Deep pit & Fissure

บริเวณที่มีความเสี่ยงสูงในการเกิดฟันผุ ตามลักษณะ morphology ข



บริเวณที่พบบ่อย

- 1st 2nd permanent molar (#6,#7) : occlusal , Buccal groove , Palatal groove
- 2nd primary molar (#E) : Occlusal
- Upper permanent lateral incisor (12,22) : palatal pit
- Premolar : occlusal

Deep pit & Fissure



Physical barrier

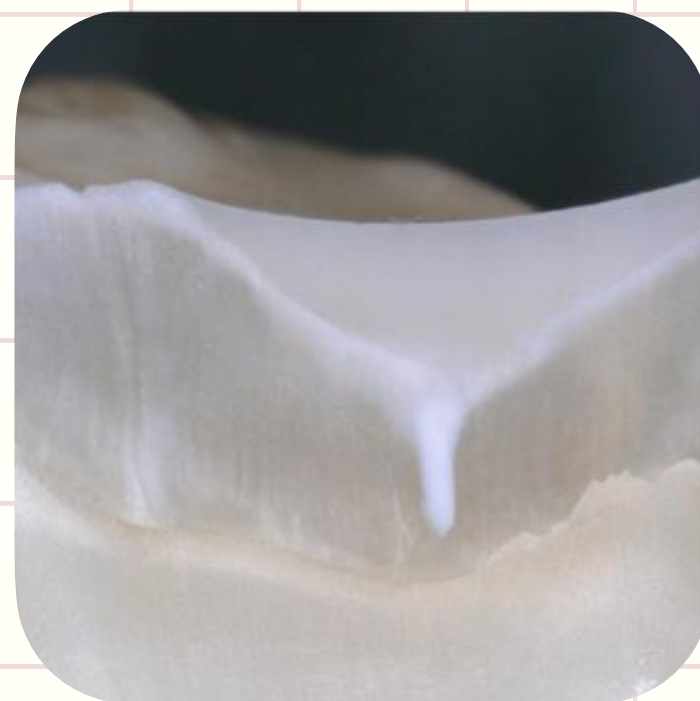


Preventing decay



Easier to clean and

maintenance



SEALANT

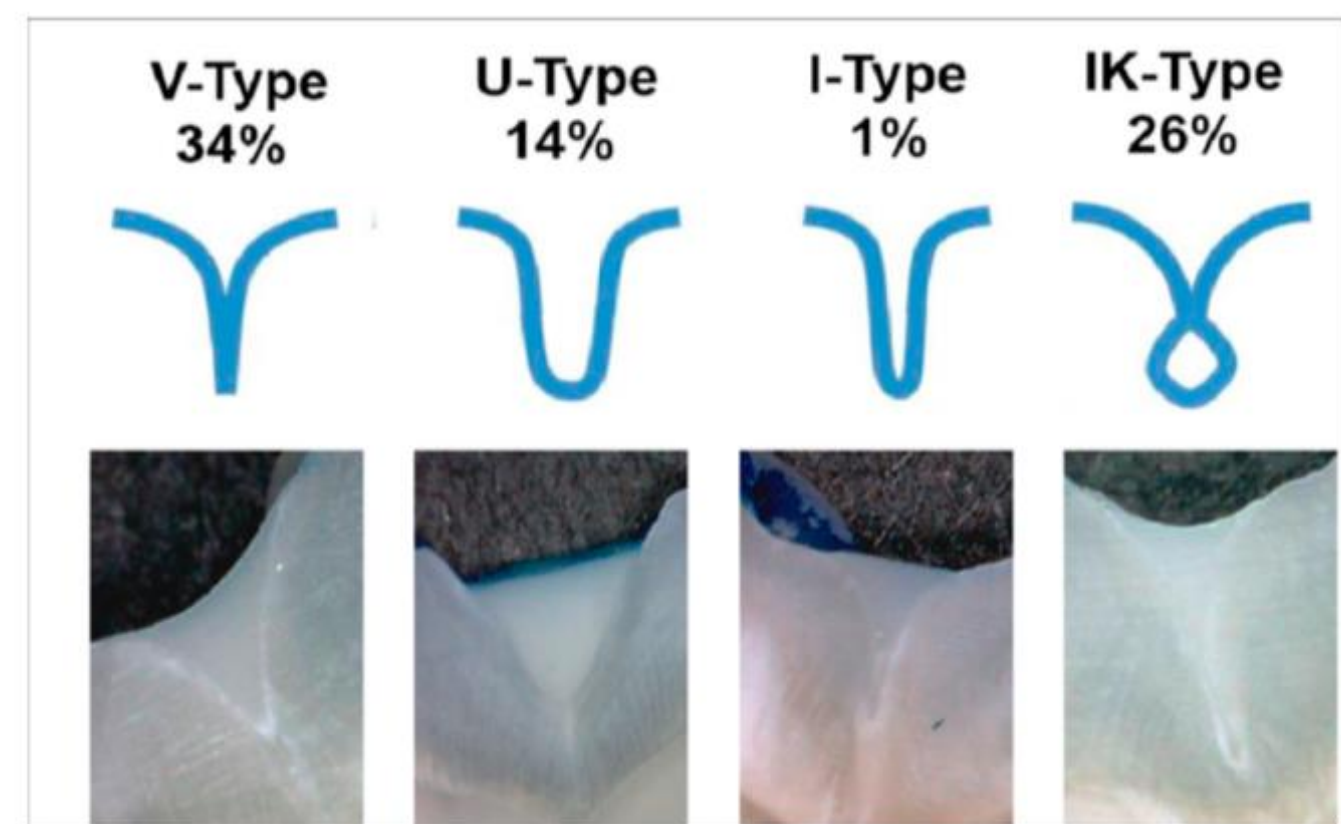


Figure 1. Different shapes of fissures.

Barbara Cvikl, Andreas Moritz and
Katrin Bekes, 2018

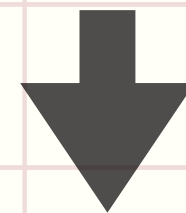
Deep pit & Fissure



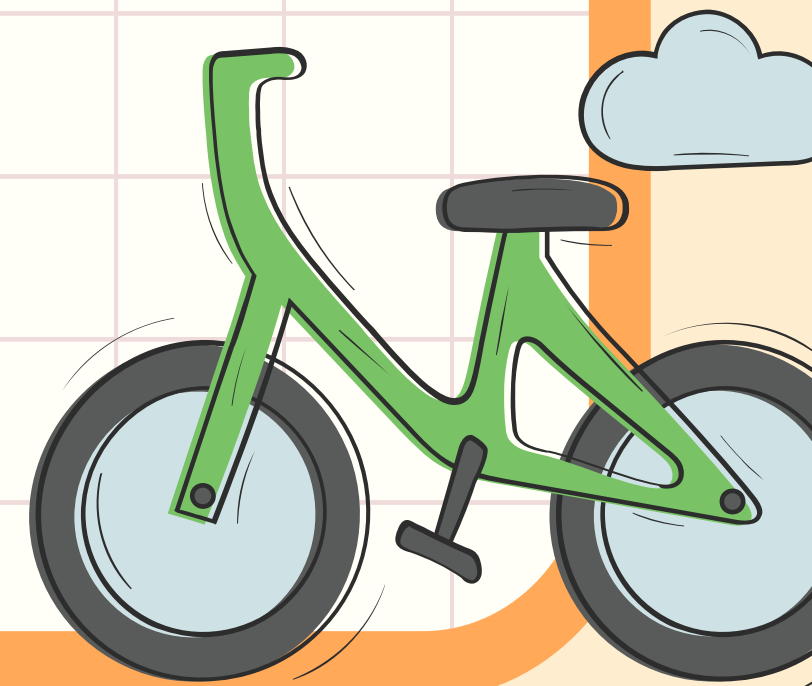
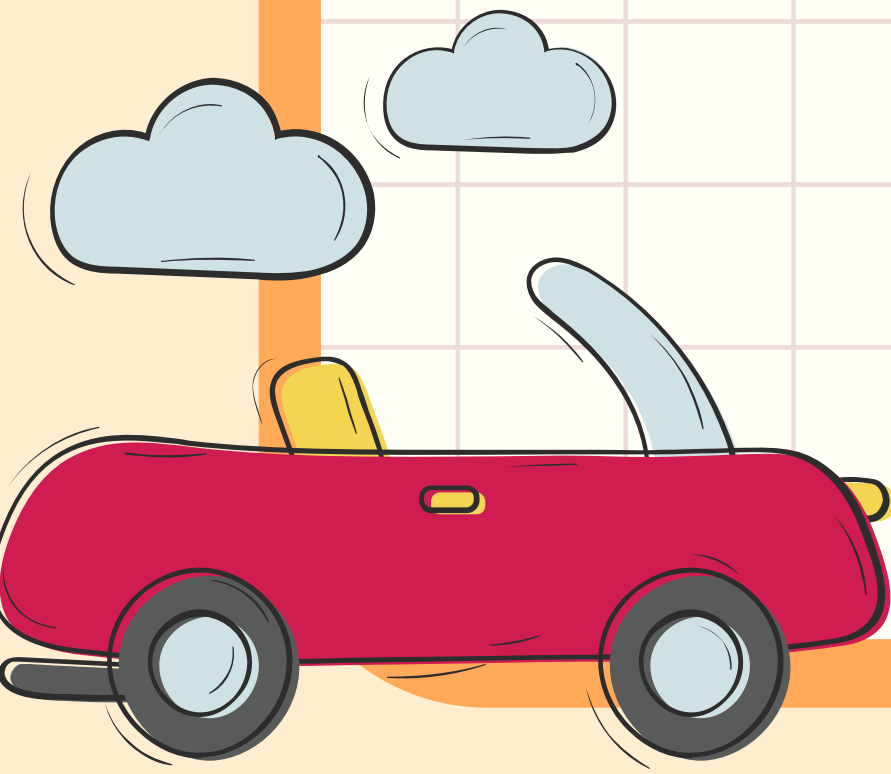
Inaccessible

- easily trap food particles
- promote bacterial biofilm

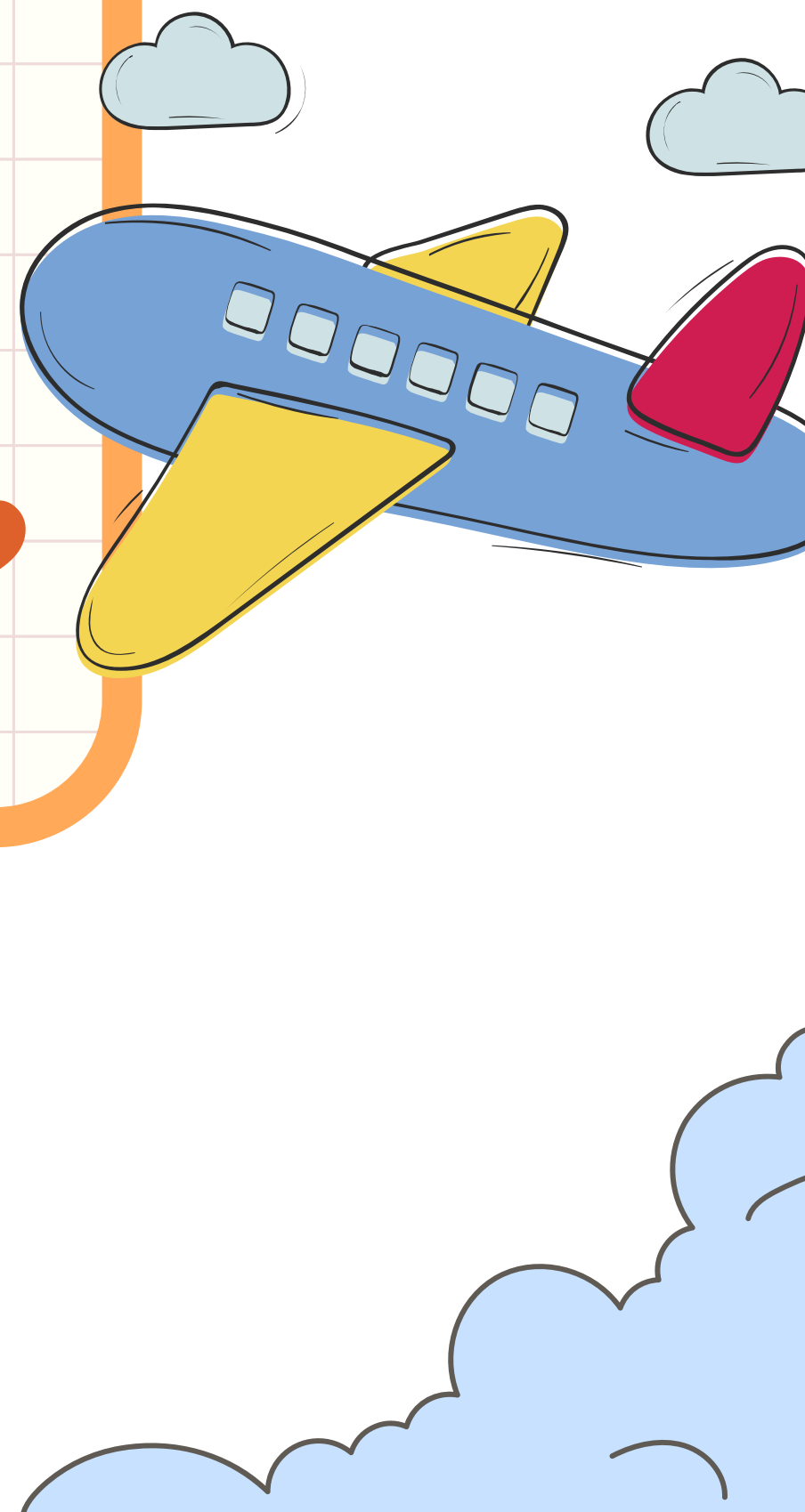
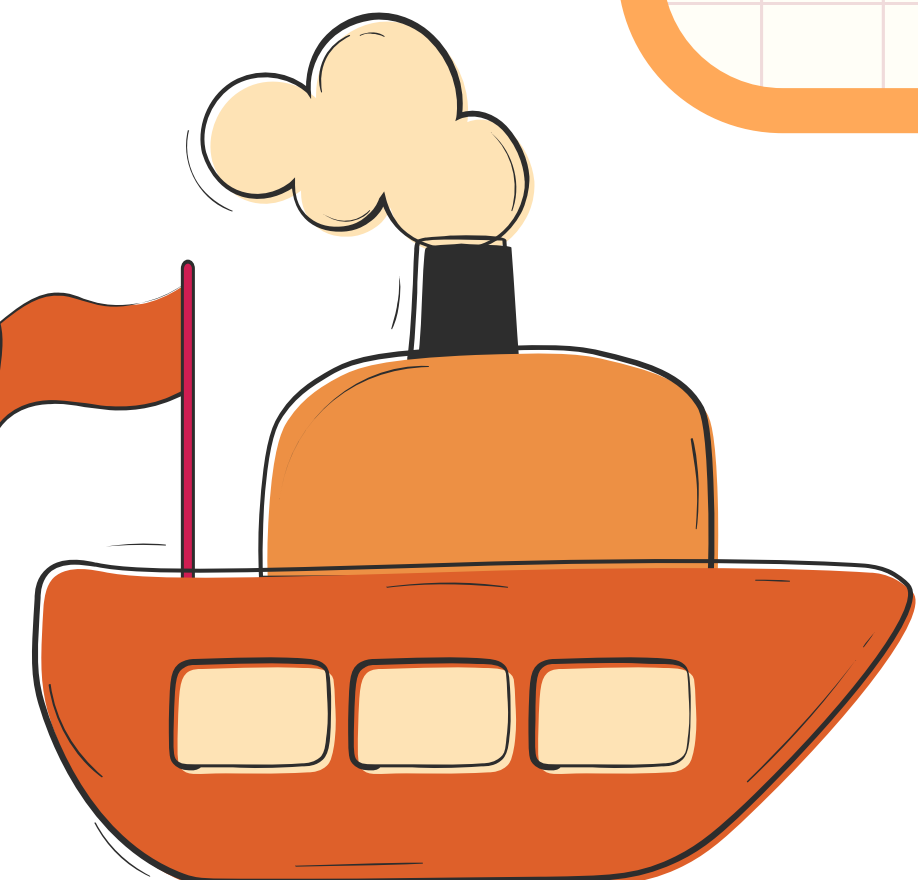
Proximity to DEJ



**CARIES
PROGRESSION**



Sealant



What is Sealant

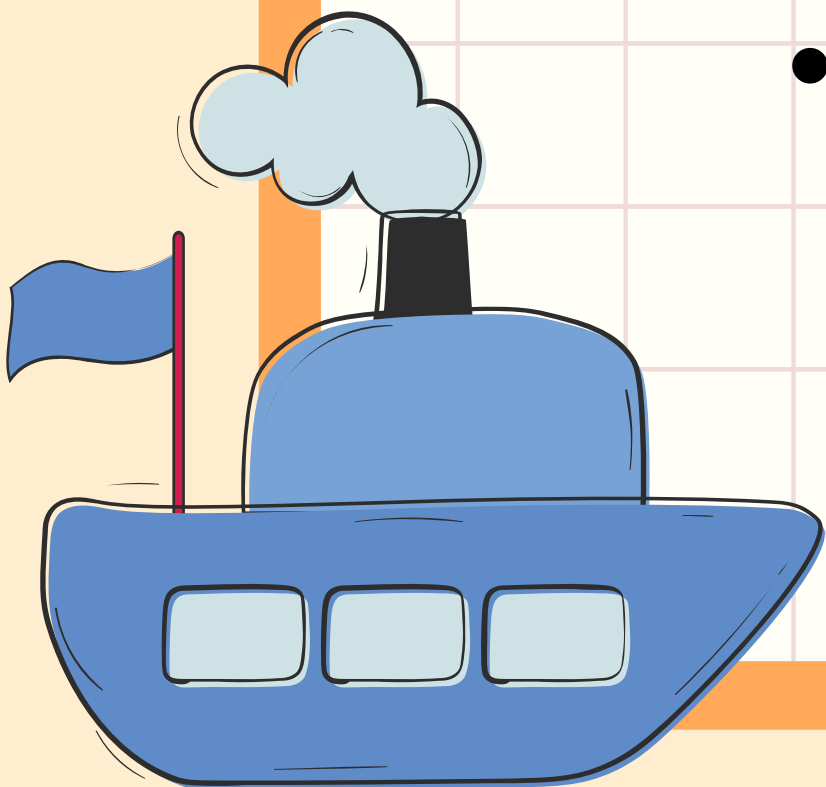
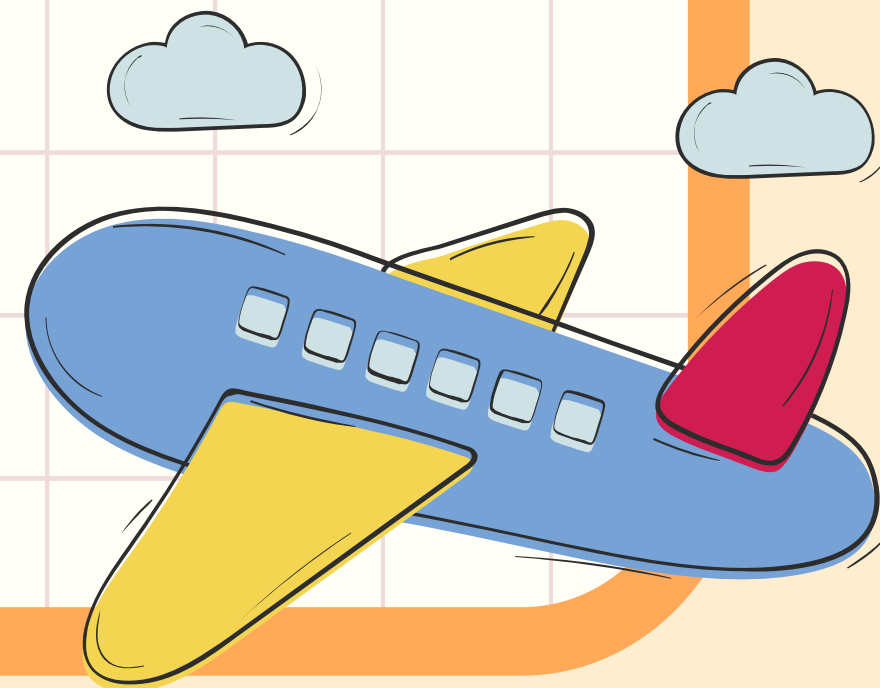
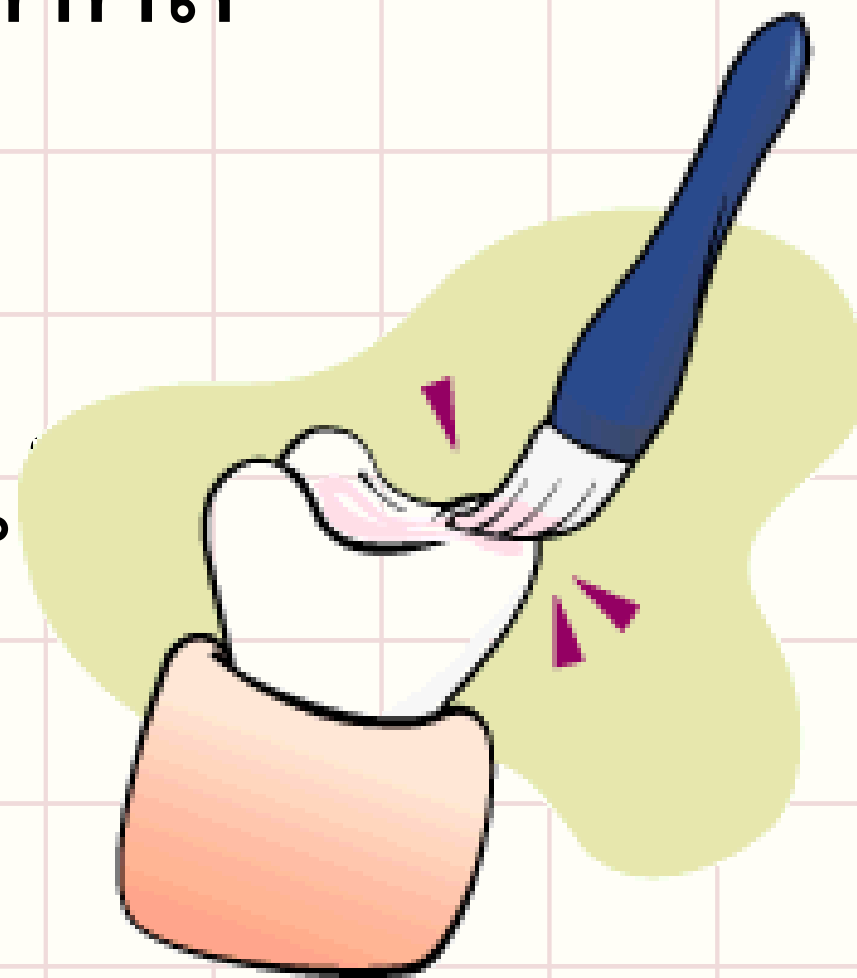
Material that is introduced into the occlusal pits and fissures of caries-susceptible teeth, thus forming a micromechanically-bonded, protective layer cutting access of caries-producing bacteria from their source of nutrients



Simonsen R. J. et al., 1978

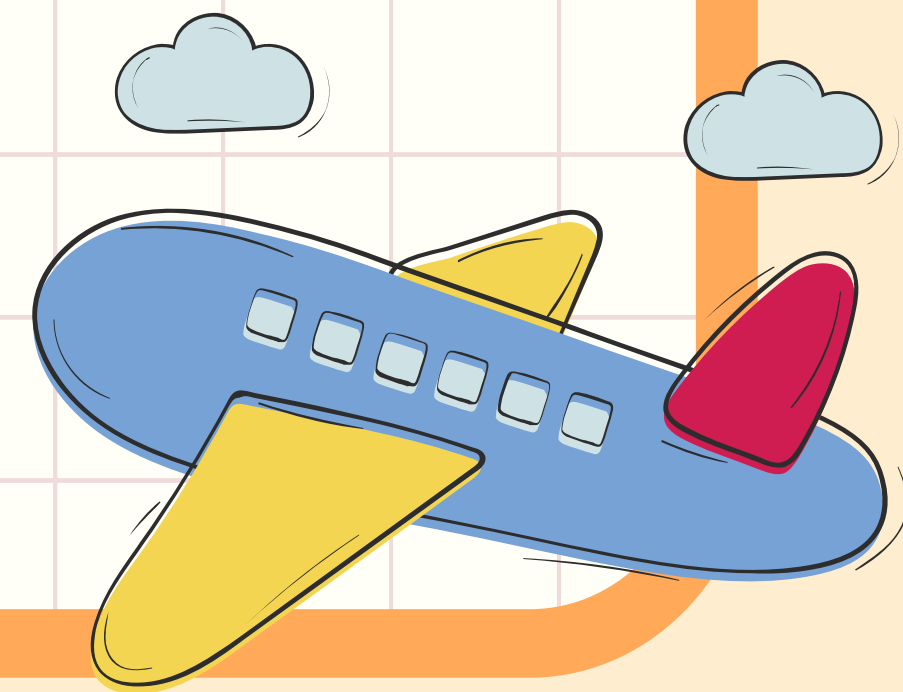
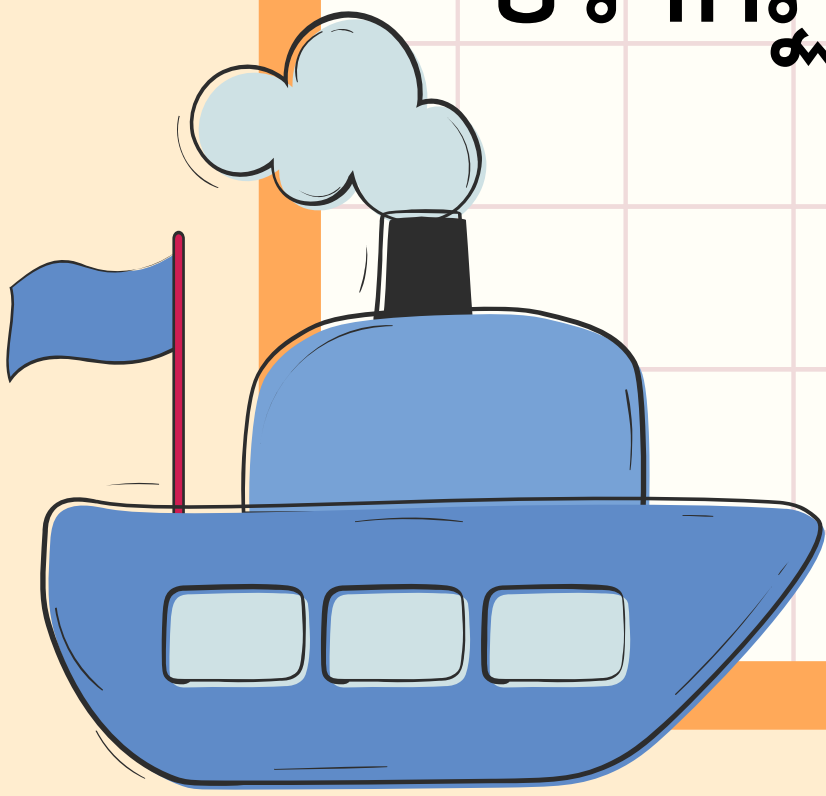
Sealant selection criteria

- ลักษณะทางกายภาพของฟัน
- ความเสี่ยงฟันผุเฉพาะบุคคล
- อนามัยช่องปาก
- การตรวจทางคลินิก
- การให้ความร่วมมือของ
- การติดตามผล



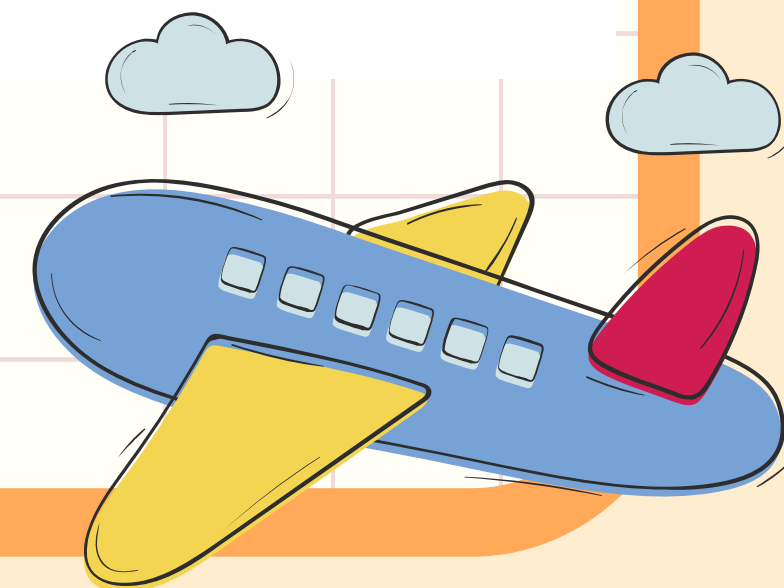
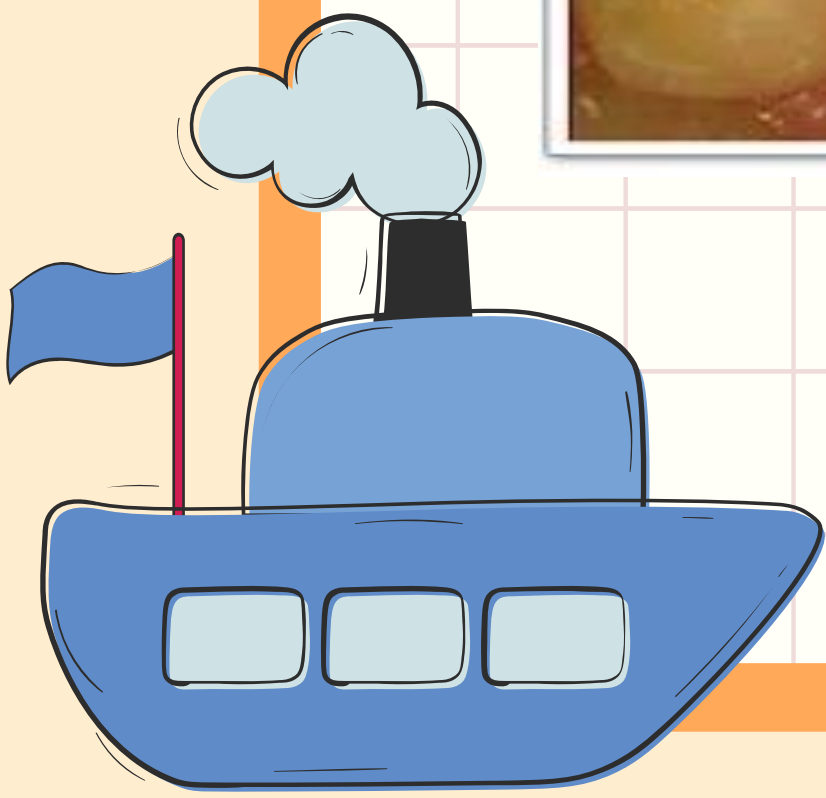
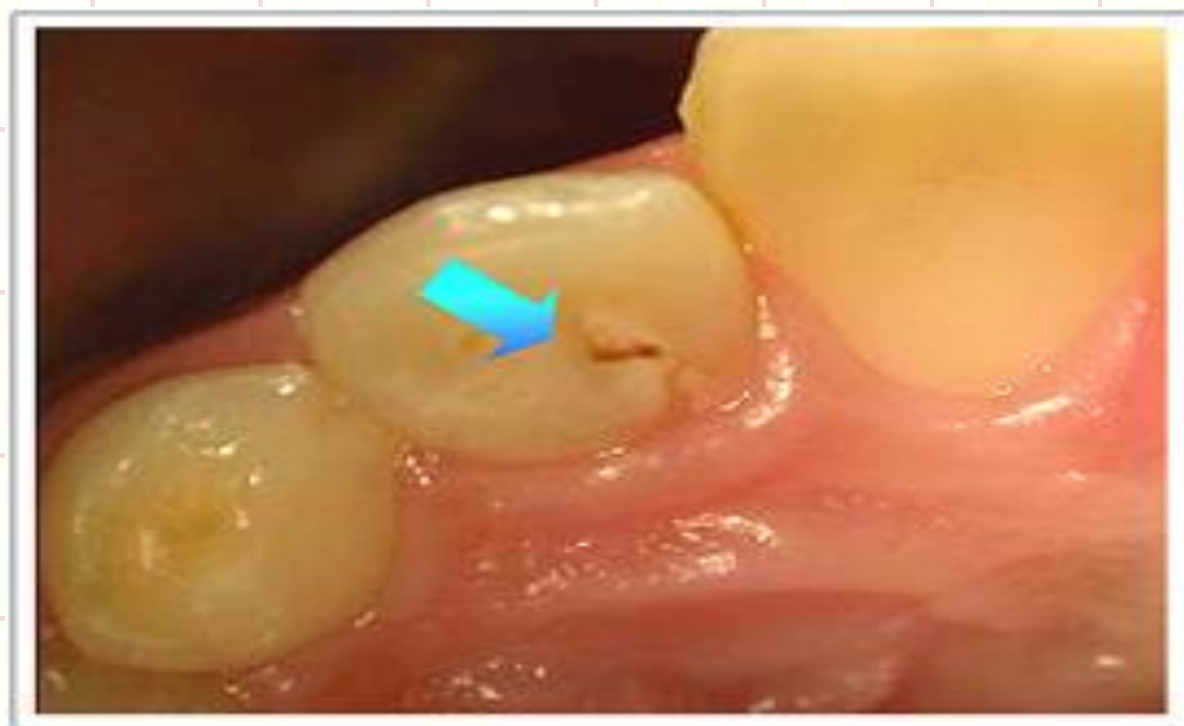
Sealant selection criteria

1. หลุมร่องฟันที่ลึก และแคบ ทำความสะอาดยาก เชี่ยวติดด้วย explorer
2. หลุมร่องฟันที่มีคราบสีติด พร้อมเริ่มปรากฏ decalcification

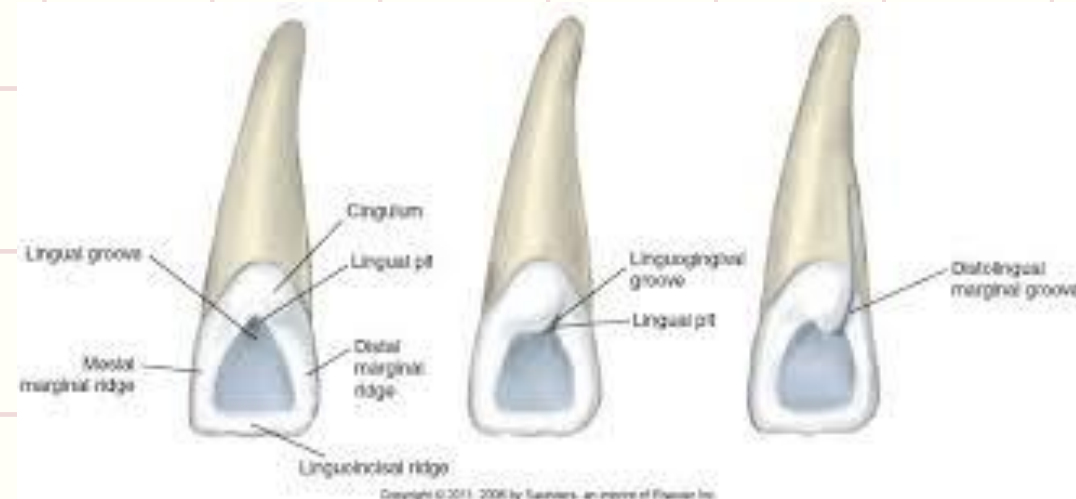
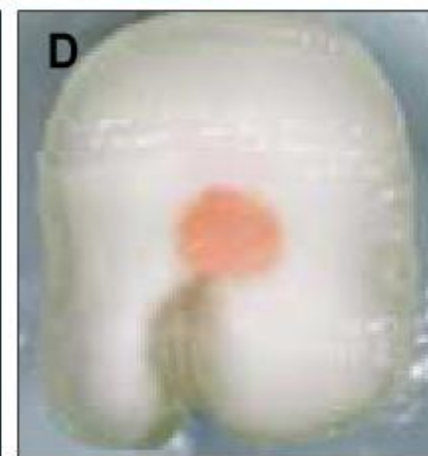


Sealant selection criteria

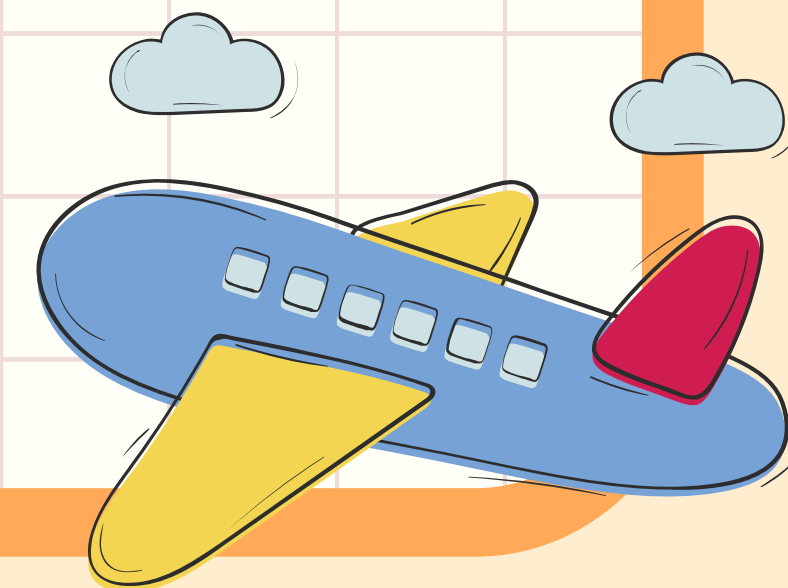
หลุมและร่องฟันลึกด้านลิ้นของฟันหน้า



Sealant selection criteria



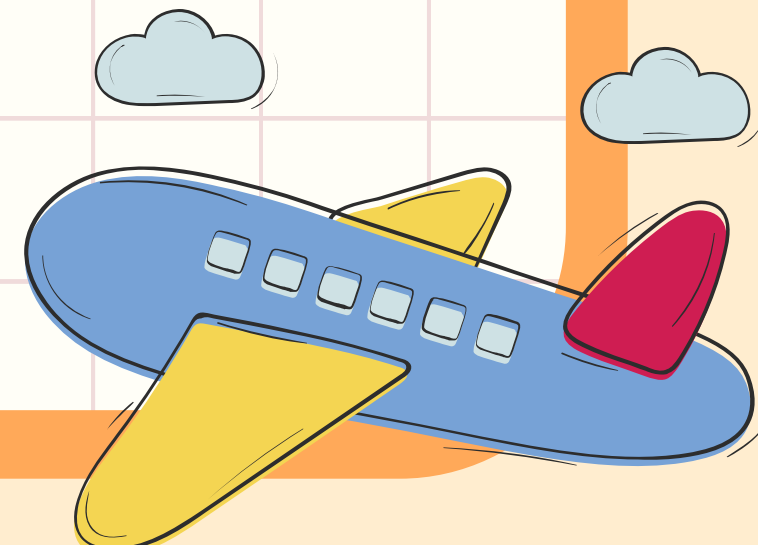
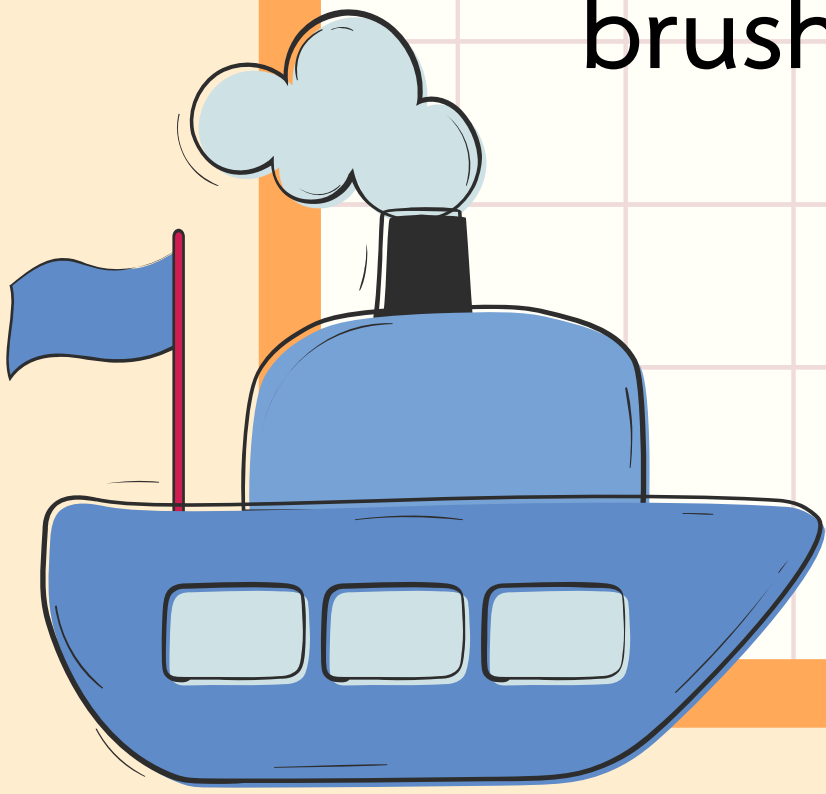
yun-Il Kim, Young-Shin Noh, Hoon-Sang Chang, Hyun-Wook Ryu, Kyung-San Min



Sealant selection criteria

Occlusal surfaces of posterior teeth are the most susceptible sites for the development of caries because of their deep and narrow anatomy of pits and fissures which can host bacteria coming from plaque, unreachable during brushing

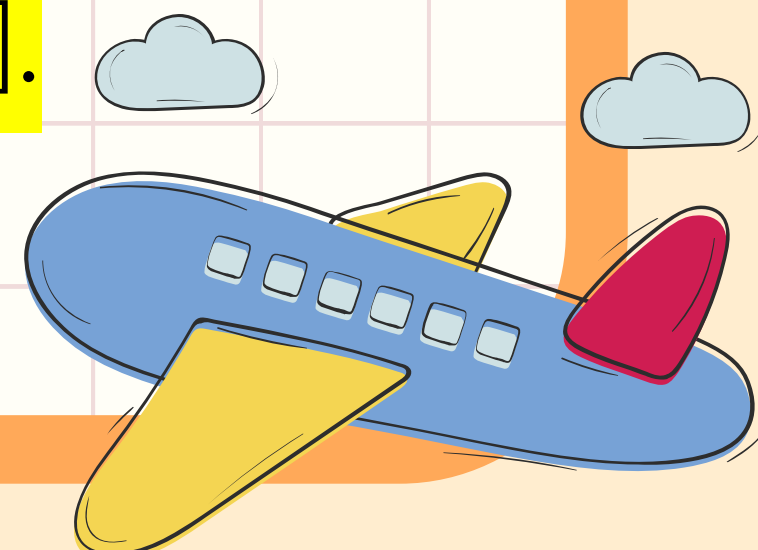
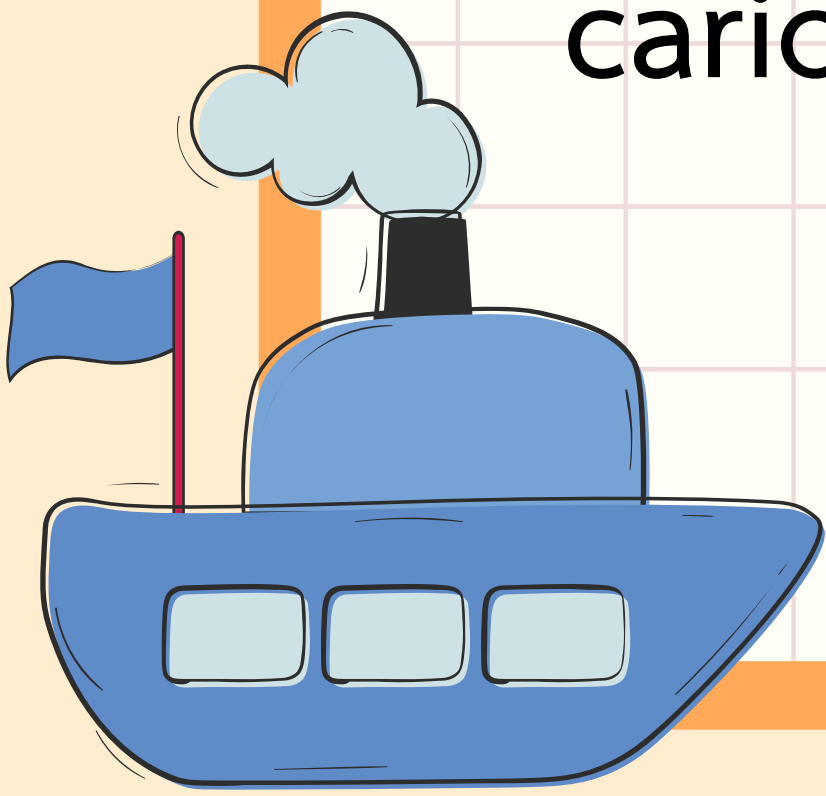
[Beuchamp J, 2008].



Sealant selection criteria

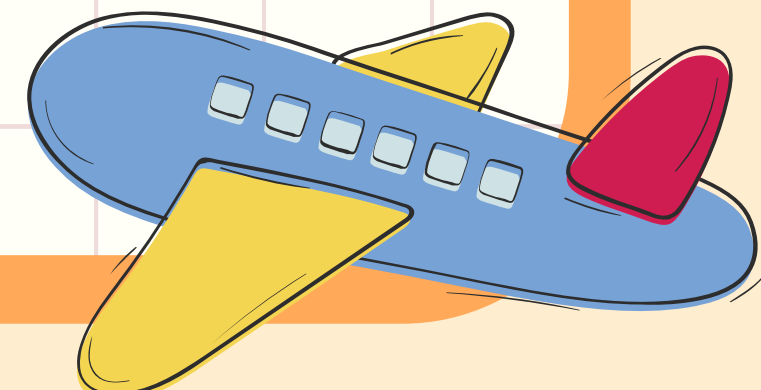
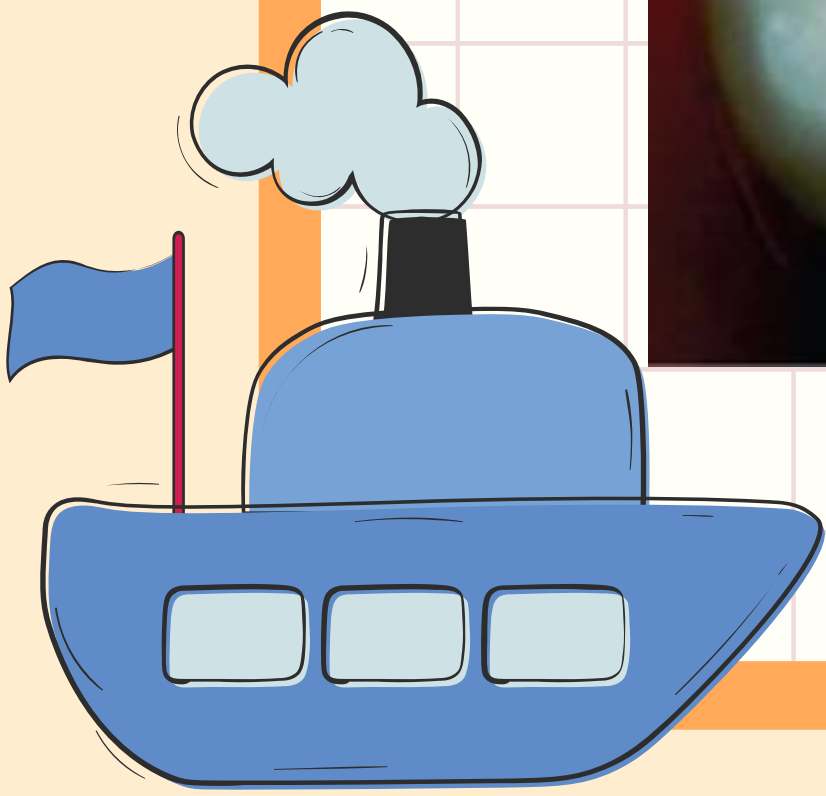
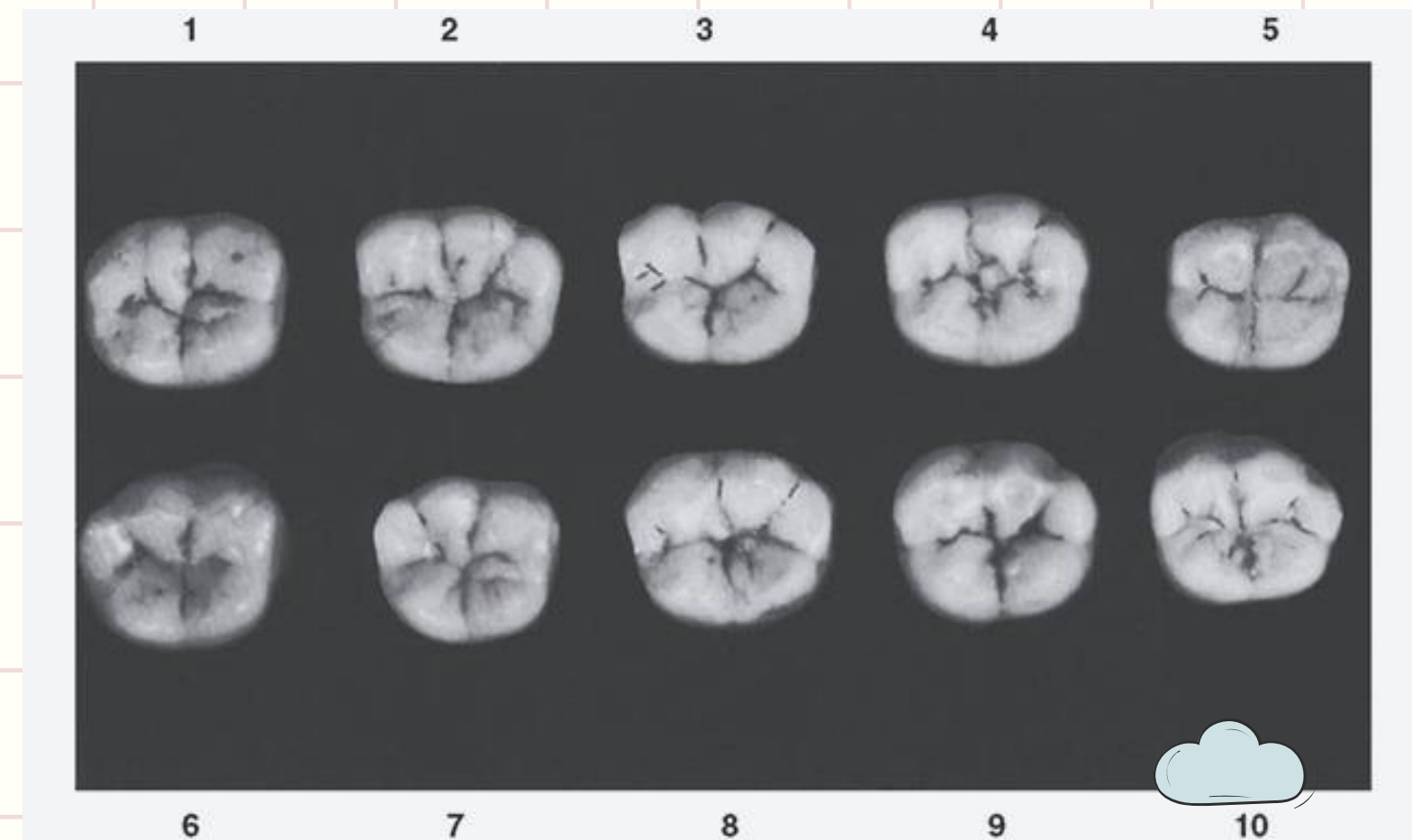
Current evidence indicates that sealants are also an **effective secondary preventive approach** when placed on early non-cavitated carious lesions, by inhibiting caries progression

[Holmgren, 2014].



Sealant selection criteria

ฟันน้ำนมที่มีหลุมและร่อง





Sealant selection criteria

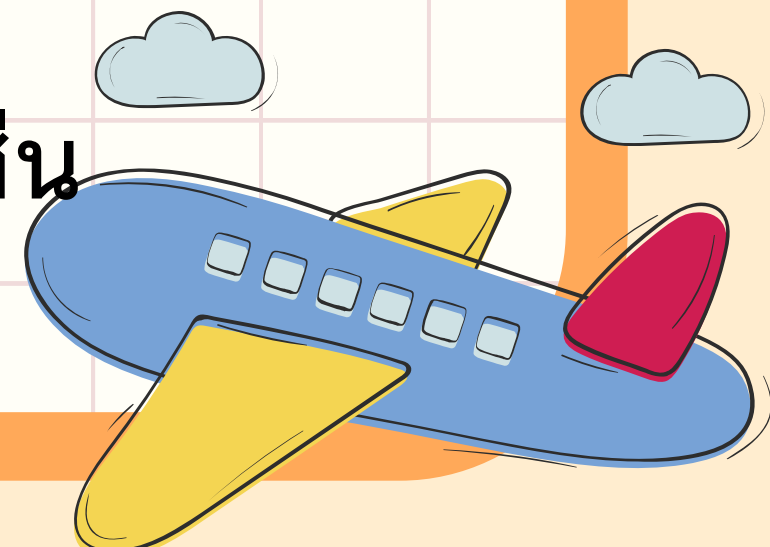
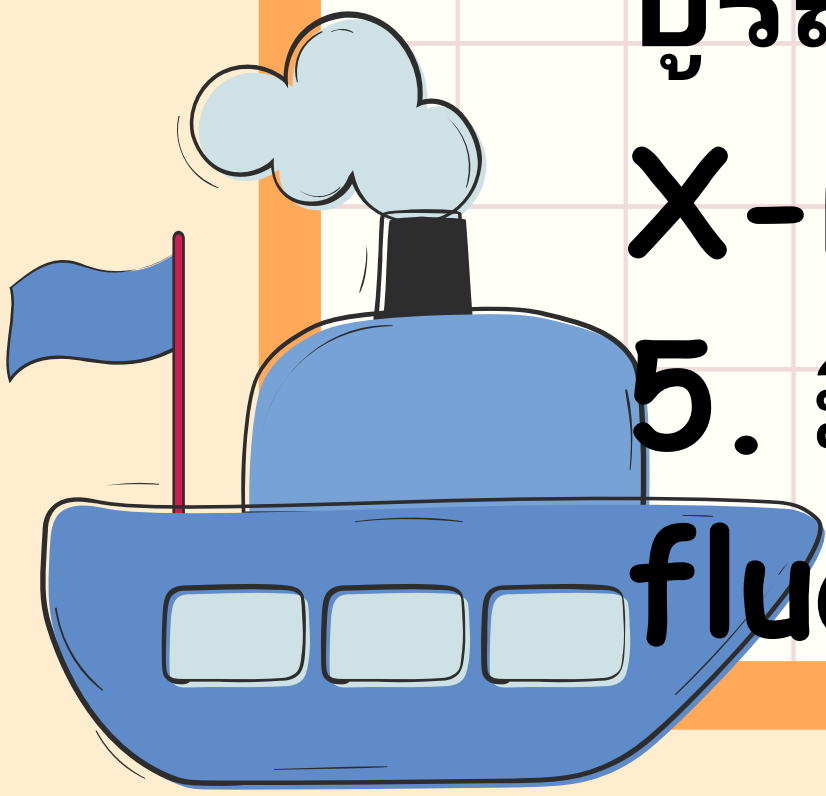


3. มี pit & fissure caries หรือ restoration บริเวณ pit & fissure ของฟันกรามซี่อื่นๆ

4. เป็นฟันที่ไม่มีฟันผุด้านประชิดที่ต้องทำการบูรณะ จึงควร

X-ray bitewing ก่อน

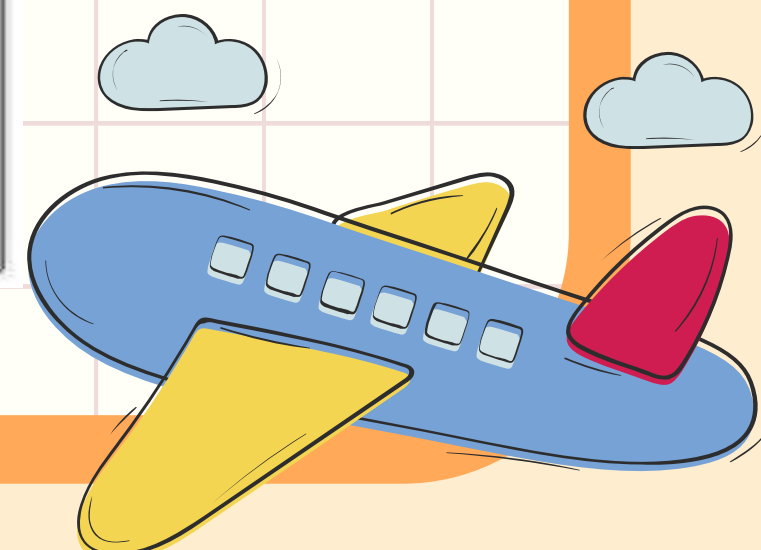
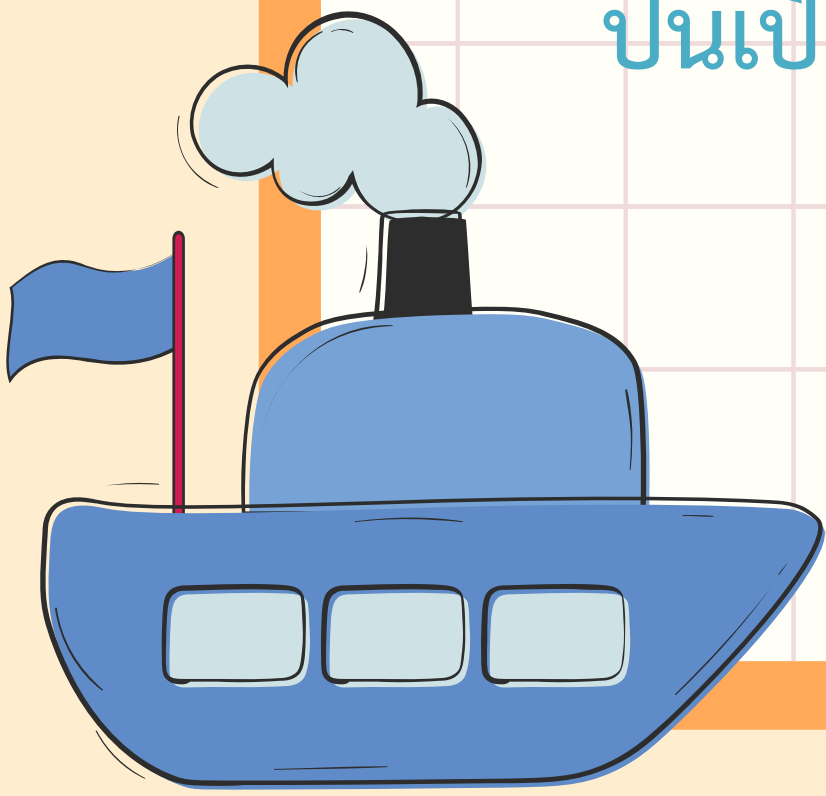
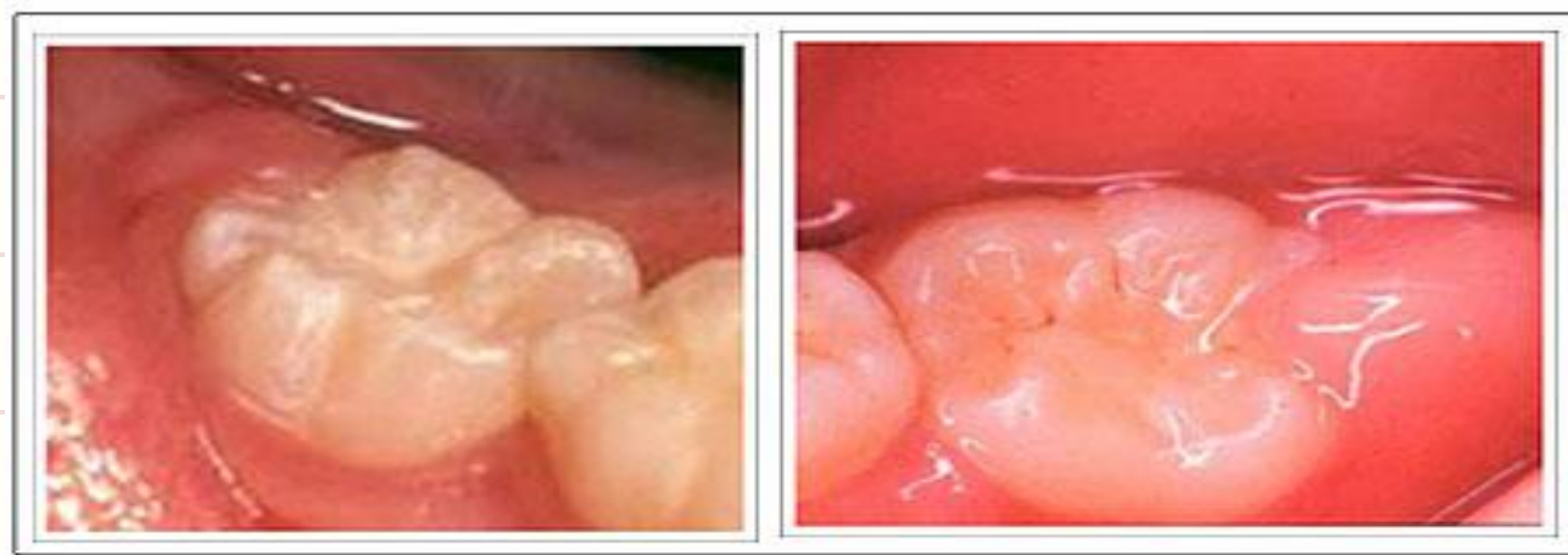
5. มีการใช้ preventive treatment อื่นๆ เช่น fluoride



Sealant selection criteria

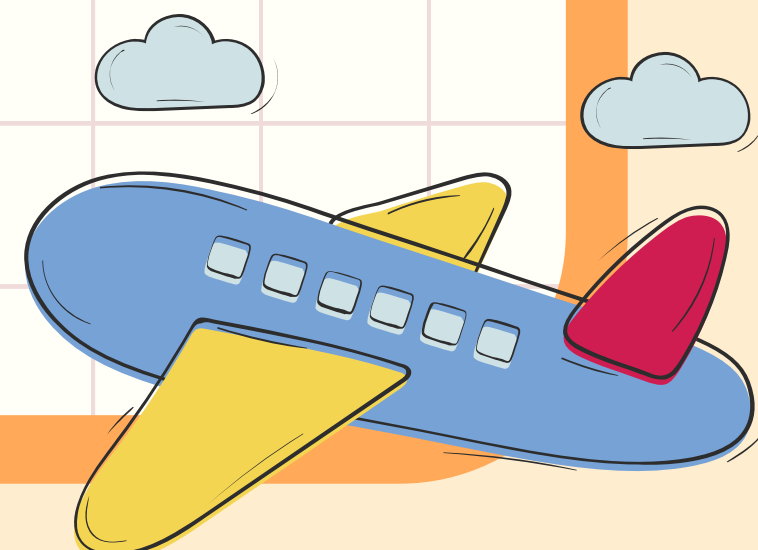
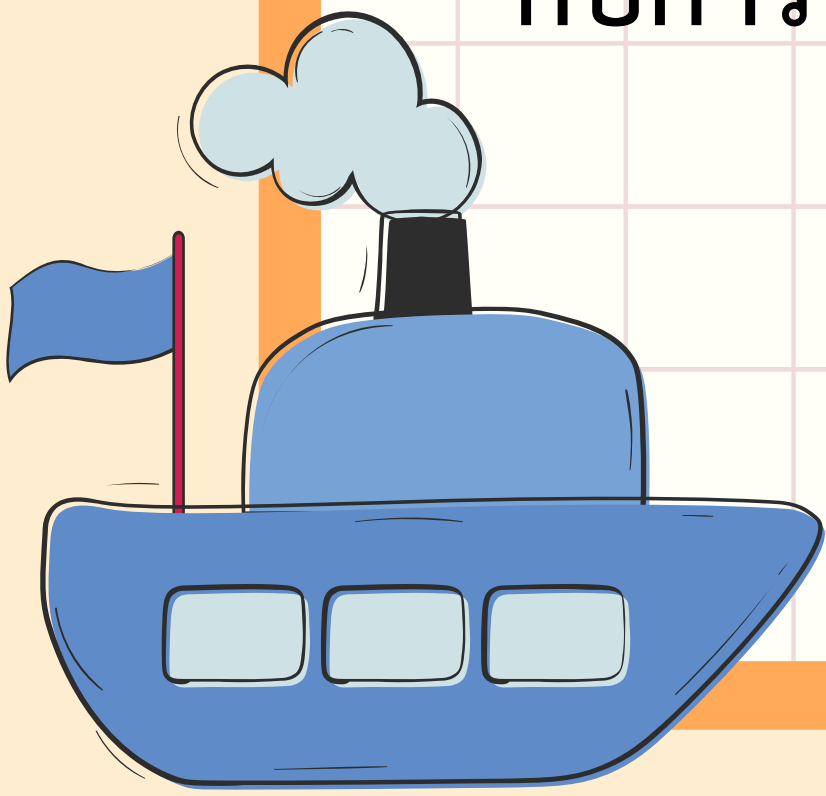
6. สามารถกันน้ำลายได้ดี

ระดับการขึ้นของฟัน พิจารณาเคลือบหลุมและร่องฟันในกรณีที่ระดับการขึ้นของฟันนั้นเอื้ออำนวยให้สามารถกันน้ำลายได้ เนื่องด้วยความสำเร็จในการเคลือบหลุมและร่องฟัน ขึ้นกับความสามารถในการป้องกันการปนเปื้อนของน้ำลาย



Sealant selection criteria

7. เป็นฟันที่เพิ่งขึ้นมาไม่นานกว่า **4** ปี แต่ในข้อนี้มีข้อโต้แย้ง
ระยะเวลาที่ฟันขึ้นมาในช่องปาก การผุด้านบนดเคี้ยวพบได้มากในช่วง
3-4 ปีแรกหลังจากฟันขึ้น จึงเป็นช่วงที่ควรจะให้ความสำคัญเป็นพิเศษ
กับการป้องกันการผุนด้านบนดเคี้ยว อย่างไรก็ดี

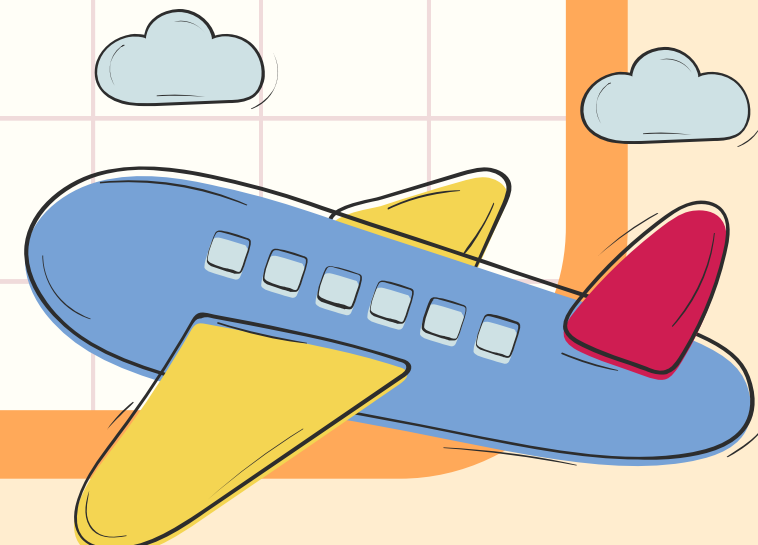
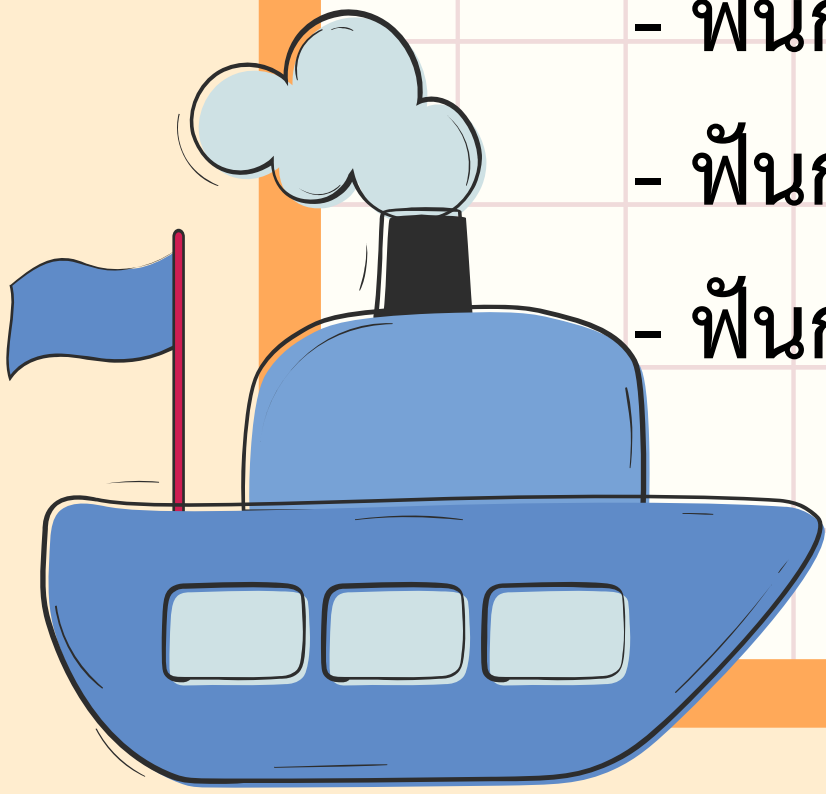


Sealant selection criteria

อายุที่เสี่ยงต่อการเกิดฟันผุด้านหลุมและร่องฟันของฟันซี่นั้นๆ

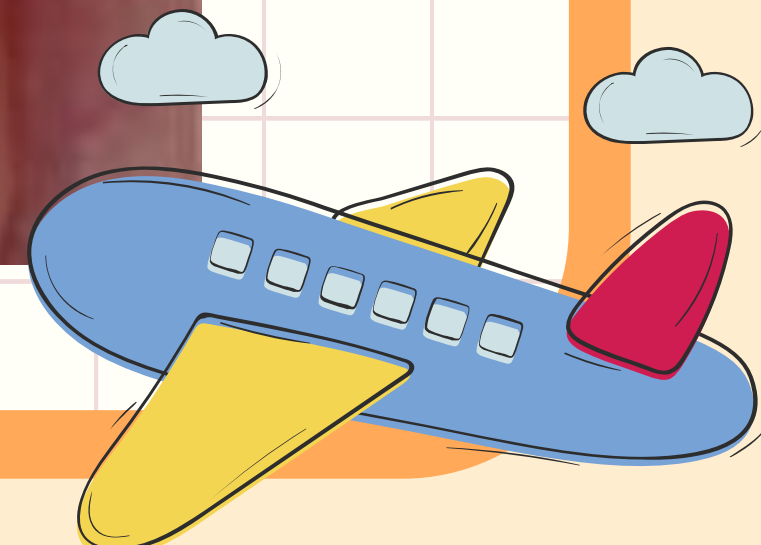
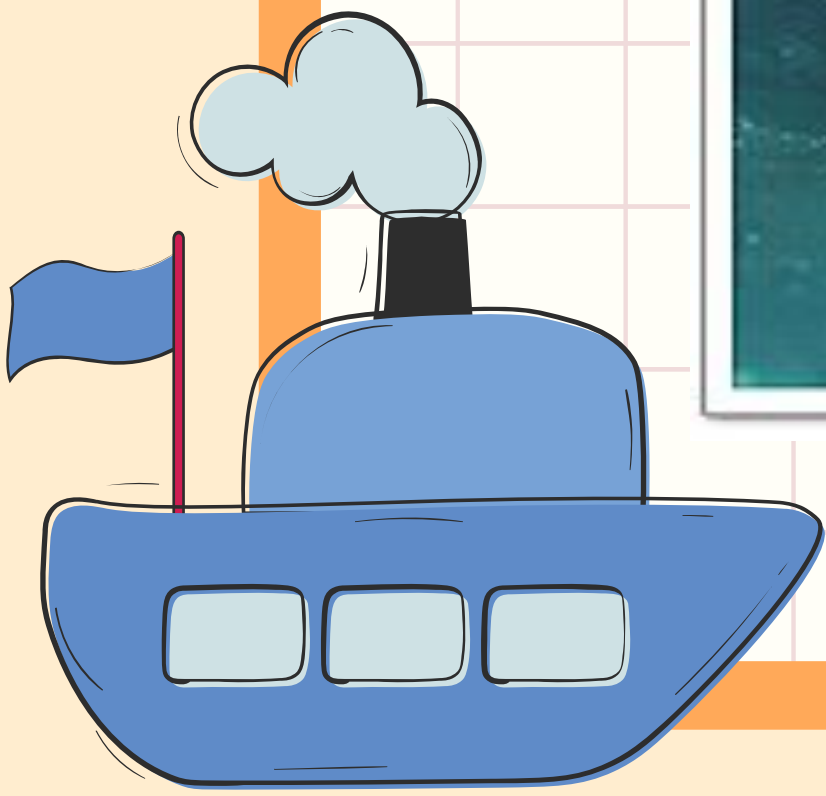
อายุที่เหมาะสมเมื่อพิจารณาจากอายุที่เสี่ยงต่อการเกิดฟันผุด้านหลุมและร่องฟันของฟันแต่ละซี่ พบว่า

- ฟันกรามแท้ซี่แรก กลุ่มเป้าหมายคือเด็กอายุระหว่าง 6-8 ปี
- ฟันกรามแท้ซี่ที่สอง กลุ่มเป้าหมายคือเด็กอายุระหว่าง 11-13 ปี
- ฟันกรามน้อย กลุ่มเป้าหมายคือเด็กอายุระหว่าง 11-13 ปี
- ฟันกรามน้ำนม กลุ่มเป้าหมายคือเด็กอายุระหว่าง 3-4 ปี

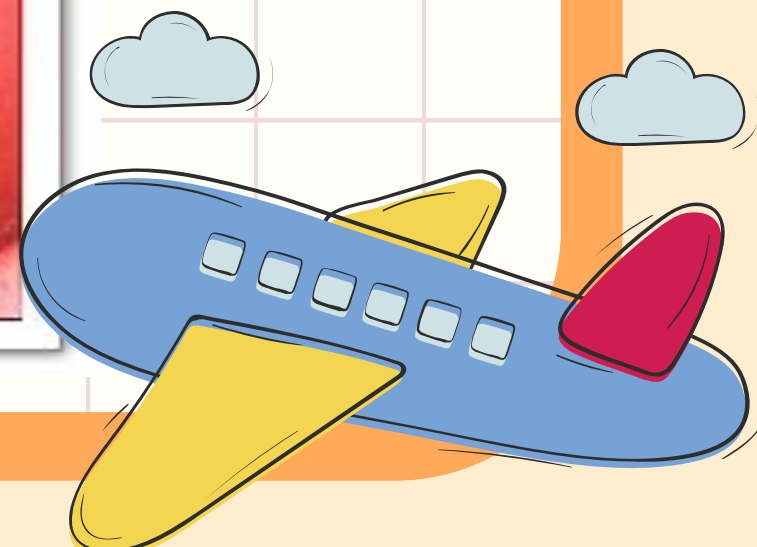
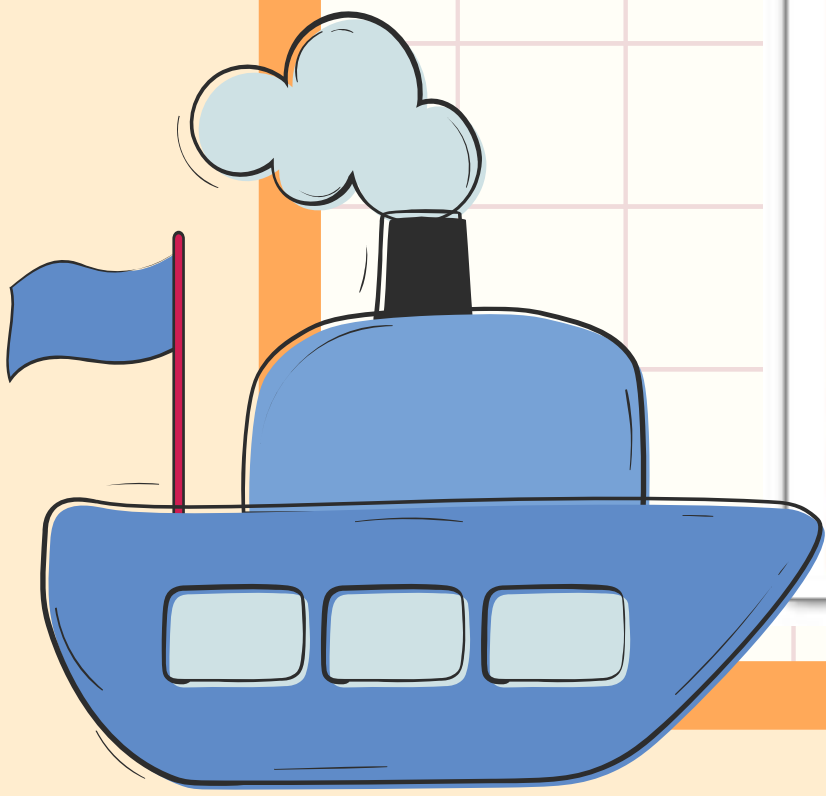


Sealant selection criteria

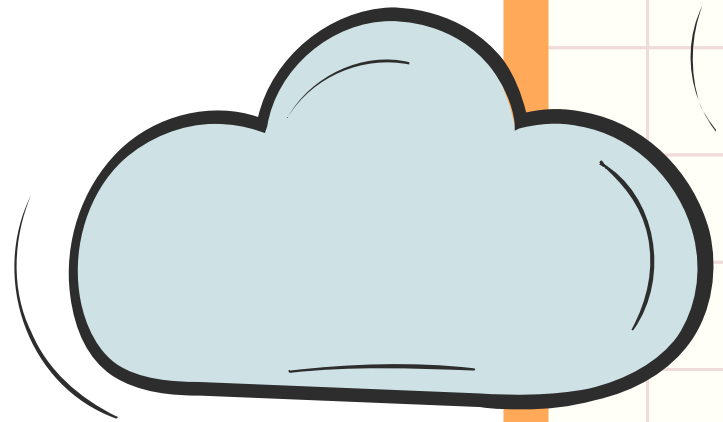
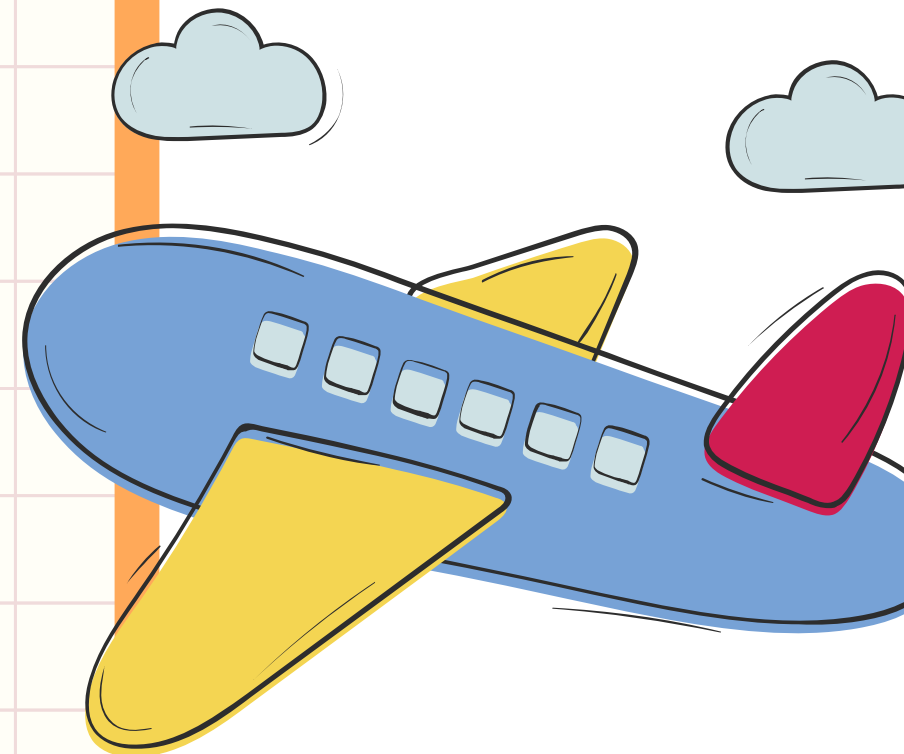
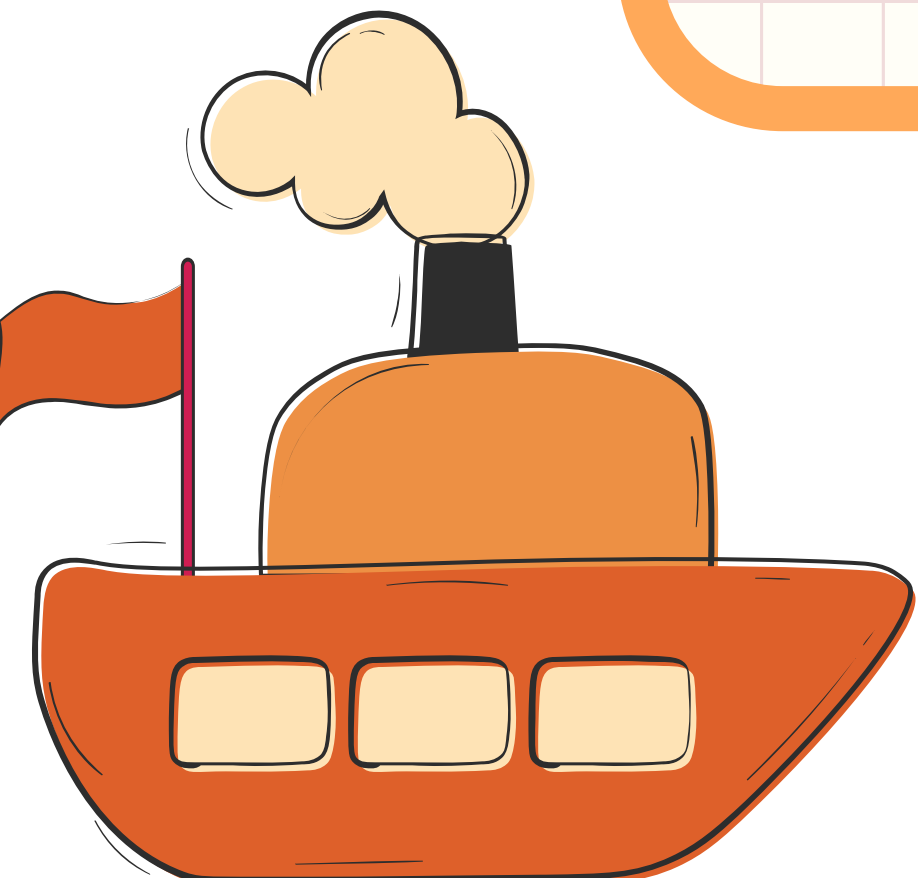
ฟันขึ้นพ้นเหงือกแล้ว (B pit)



Sealant selection criteria



Carries Risk Assessment t



Caries Risk Assessment

ทันตแพทยสมาคมแห่งประเทศไทยฯ

การประเมินความเสี่ยงต่อการเกิดโรคฟันผุ 2561

การประเมินความเสี่ยงต่อการเกิดโรคฟันผุ (Caries risk assessment) สำหรับผู้ที่อายุน้อยกว่า 18 ปี

ปัจจัย	ระดับความเสี่ยงต่อการเกิดฟันผุ	
	สูง	ต่ำ
ส่วนที่ 1 – สถานะสุขภาพ		
มีโรคประจำตัวหรือความบกพร่องที่ทำให้การทำความสะอาดช่องปากมีประสิทธิภาพลดลง ^{1*}	ใช่	ไม่ใช่
ส่วนที่ 2 – การตรวจช่องปาก และการตรวจทางภาพรังสี		
มีคราบจุลินทรีย์ที่ชัดเจน ^{2,3,**}	ใช่	ไม่ใช่
มีรอยโรคขุนขาวชนิดที่มีการดำเนินของโรคบนผิวเคลือบฟัน (Active white spot lesions) ^{4,5} หรือฟันผุในช่องปาก ⁵	ใช่	ไม่ใช่
มีฟันผุในชั้นเคลือบฟันหรือลึกกว่าจากภาพรังสี ⁵	ใช่	ไม่ใช่
มีความผิดปกติของผิวฟันและหลุมร่องฟันลึกในฟันกรามแท้ ¹	ใช่	ไม่ใช่
ส่วนที่ 3 ปัจจัยเสี่ยงและการป้องกันฟันผุ		
แปรงฟันโดยใช้ยาสีฟันผสมฟลูออไรด์ (ตั้งแต่ 1,000 ppm F ขึ้นไป) อย่างน้อย 2 ครั้ง/วัน ^{6,7}	ไม่ใช่	ใช่
ดูดนมรสหวานหรือเครื่องดื่มที่มีน้ำตาลจากขวดนม ^{4,8,9}	ใช่	ไม่ใช่
ดูดนมกลางคืนหลังจากเด็กอายุ 12 เดือน ⁴	ใช่	ไม่ใช่
รับประทานอาหารว่าง / ขนม / เครื่องดื่ม ที่มีน้ำตาลระหว่าง มื้อหลักมากกว่า 2 ครั้งต่อวัน ^{1,10}	ใช่	ไม่ใช่
ใส่เครื่องมือในช่องปาก (Intra oral appliance) ¹¹	ใช่	ไม่ใช่

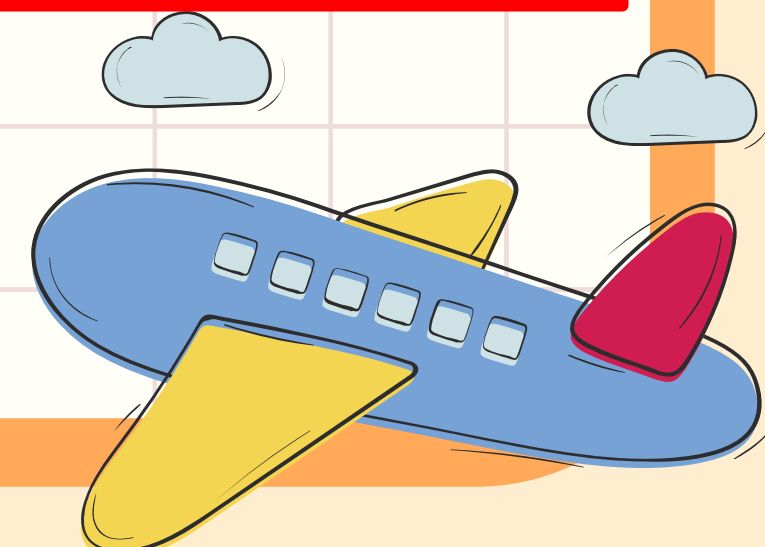
หมายเหตุ

* การมีโรคประจำตัวหรือความบกพร่องทางการพัฒนาการของร่างกาย และ จิตใจ ที่ทำให้การทำความสะอาดช่องปาก มีประสิทธิภาพลดลง และผู้เลี้ยงดูไม่สามารถช่วยทำความสะอาดช่องปากได้ รวมถึงผู้ป่วยที่มีภาวะน้ำลายไหลน้อยหรือได้รับยาที่ลดอัตราการไหลของน้ำลายอย่างต่อเนื่อง เช่น ยาแก้แพ้ (anti-allergy medications) ยาแอนติฮิสตามีน (anti-histamine)

** การพบคราบจุลินทรีย์ที่ชัดเจนมีความสัมพันธ์กับการเกิดฟันผุอย่างชัดเจน แต่อย่างไรก็ตามการศึกษาส่วนใหญ่ทำในเด็กเล็ก อายุต่ำกว่า 5 ปี และศึกษาคราบจุลินทรีย์ที่เห็นชัดเจนบริเวณฟันหน้าบนเท่านั้น

การประเมินระดับความเสี่ยงต่อการเกิดฟันผุของผู้ป่วยในภาพรวม

ให้พิจารณาเฉพาะข้อมูลจากระดับความเสี่ยงของปัจจัยในส่วนที่ 1 และ ส่วนที่ 2 ก่อน โดยหากมีข้อใดข้อหนึ่งอยู่ในระดับสูง หมายถึง ความเสี่ยงต่อการเกิดฟันผุของผู้ป่วยในภาพรวมอยู่ในระดับสูง หากในส่วนที่ 1 และ 2 ไม่มีข้อใดอยู่ในระดับสูง ให้พิจารณาว่าปัจจัยในข้อมูลส่วนที่ 3 ส่วนใหญ่อยู่ในความเสี่ยงระดับใด ให้ถือว่าความเสี่ยงต่อการเกิดฟันผุของผู้ป่วยในภาพรวมอยู่ในระดับนั้น



Caries Risk Assessment

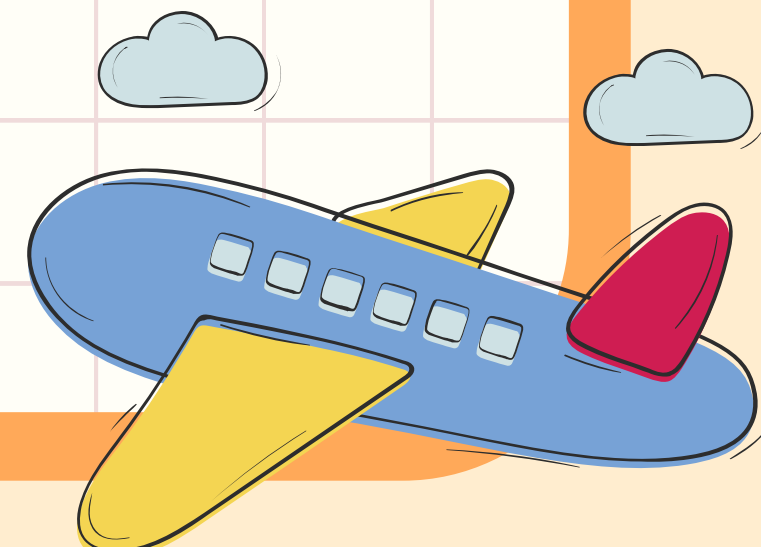
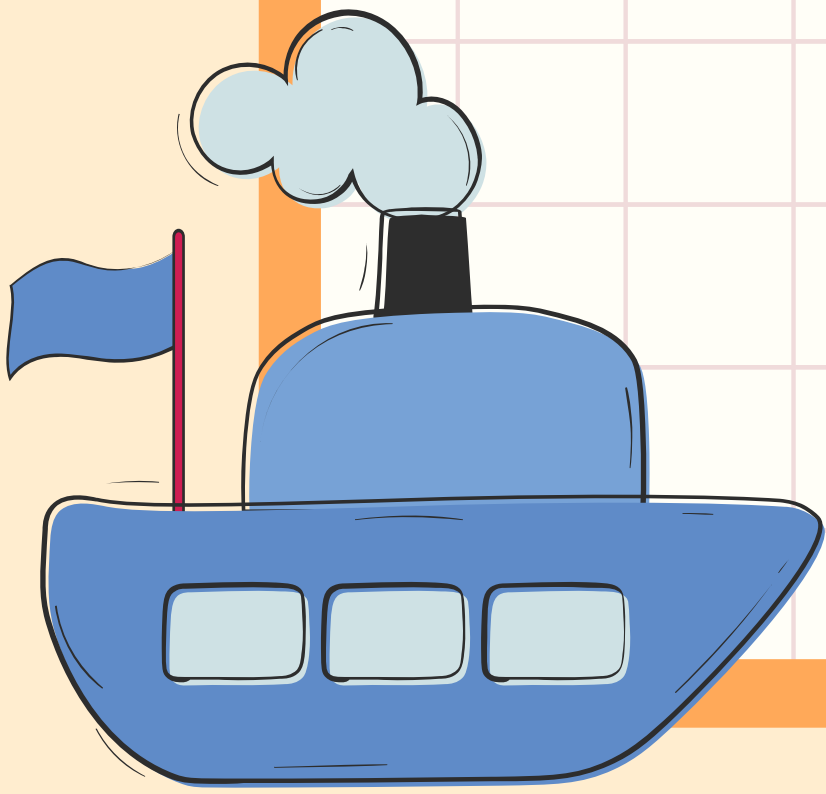
การประเมินระดับความเสี่ยงต่อการเกิดฟันผุของผู้ป่วยในภาพรวม

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HIGH CARIES RISK

All permanent molars have sealed

Primary posterior teeth and Premolar should be sealed



Caries Risk Assessment

International caries detection and assessment system(ICDAS)

ICDAS II

Score 0	Score 1	Score 2	Score 3	Score 4	Score 5	Score 6
No visual signs of carious lesions or any enamel defect	First visible changes in the enamel. Visible only after drying with air. Changes in coloration confined to areas of pits	Change in visible enamel even in the presence of moisture. More extensive and not restricted to pits.	Destruction located in enamel without visible dentin, discontinuities of enamel surface	Dark shadow on the underlying dentin, with or without localized destruction of enamel	Clear cavity with visible dentin; cavity that involves less than half the dental surface	Extensive cavity evident in dentin; cavity deep and wide, involves more than half of the tooth
						

Fig. 1 - Images of the different classification scales established by the ICDAS II shown to the respondents during the interview.

Caries Risk Assessment

International caries detection and assessment system(ICDAS)



Code 0



Code 1



Code 2



Code 3



Code 4



Code 5



Code 6

Figure 1. One example of each ICDAS II coding.

Caries Risk Assessment

International Caries Detection and Assessment System (ICDAS)

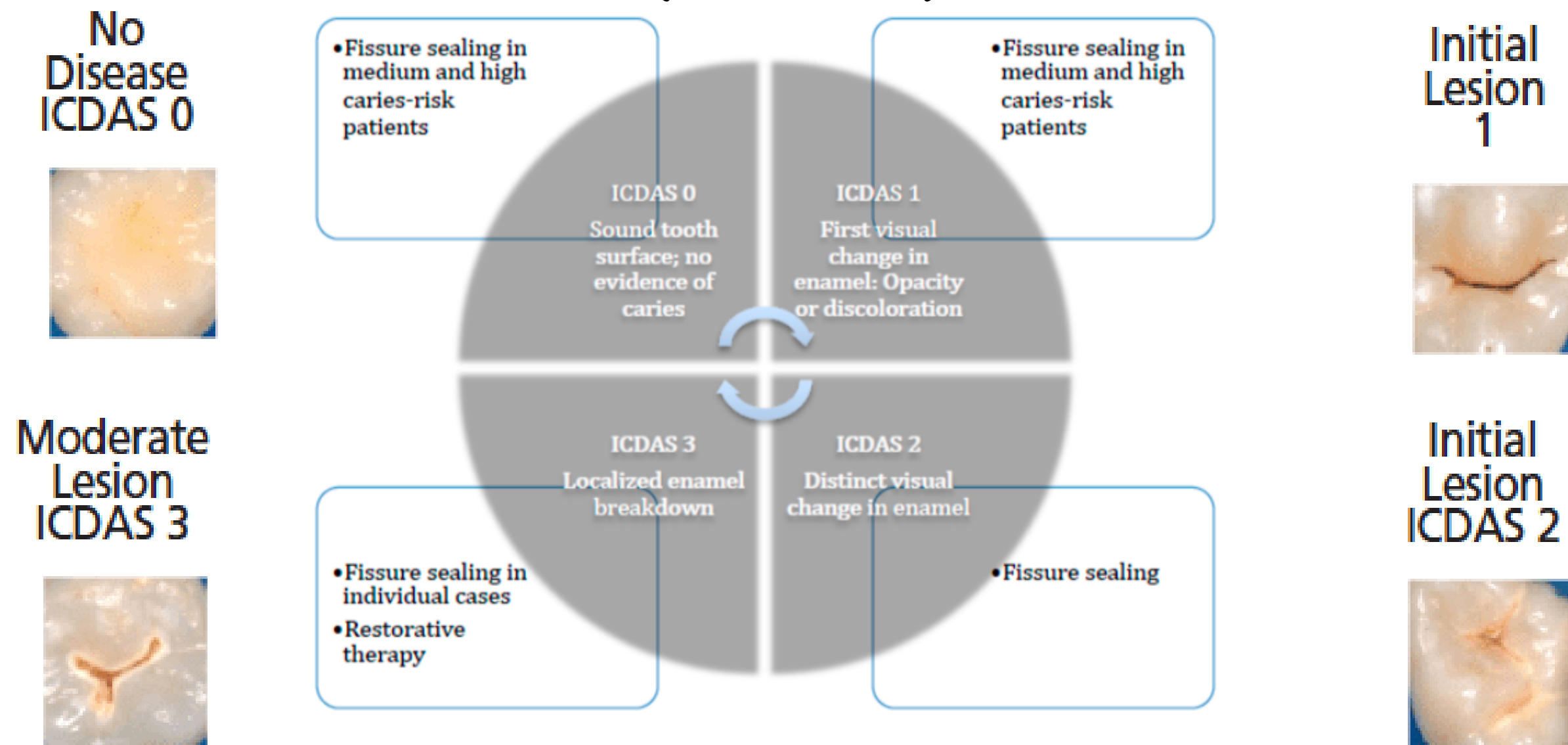
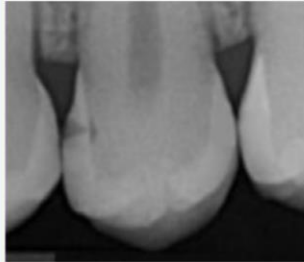
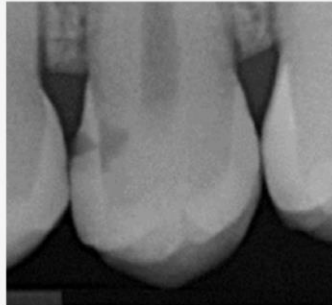
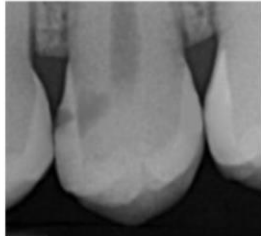
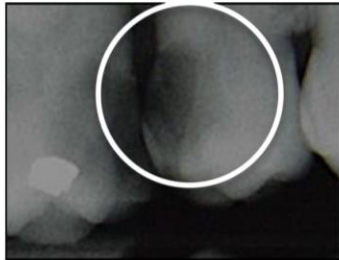


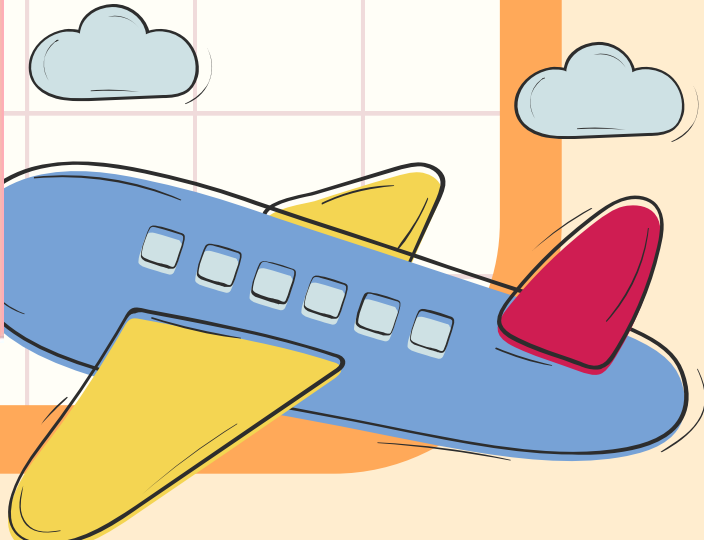
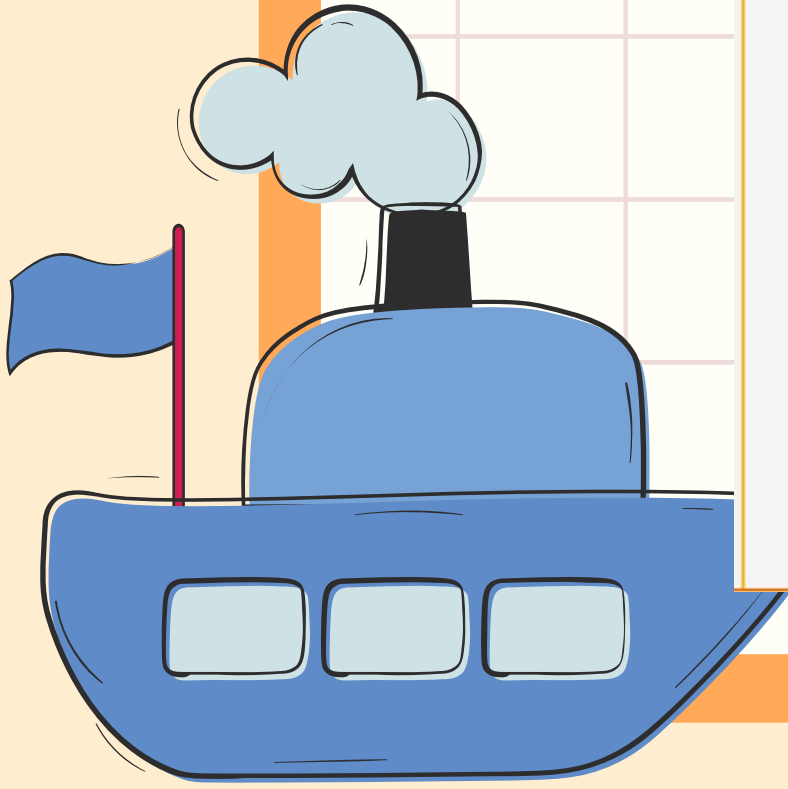
Figure 2. Treatment options depending on the ICDAS (International Caries Detection and Assessment System) codes.

Caries Risk Assessment

Radiographic Scoring	Radiographs
RA 1,2,3 (Initial stages)	RA1 : Radiolucency in the outer 1/2 of the enamel  RA2 : Radiolucency in the inner 1/2 of the enamel +- EDJ  RA3 : Radiolucency limited to the outer 1/3 of dentin 

Radiographic Scoring	Radiographs
RB 4 (Moderate stages)	RB4 : Radiolucency reaching the middle 1/3 of dentin 

Radiographic Scoring	Radiographs
RC 5,6 (Extensive stages)	RC5 : Radiolucency reaching the inner 1/3 of dentin, clinically cavitated  RC6 : Radiolucency into the pulp, clinically cavitated 



Caries Risk Assessment

ทันตแพทยสมาคมแห่งประเทศไทยฯ

การวินิจฉัยโรคฟันผุและการจัดการ 2561

Dental Caries Diagnosis and Management

Occlusal surface/ Pits and fissures

Depth of lesion	Cavitation	Caries activity	Clinical appearances	ICDAS	Management	
					Permanent teeth	Primary teeth
Enamel caries	Non-cavitated lesions	Inactive	Shiny, hard and smooth surface white, brown, or black color without plaque deposition	1,2	Routine oral care ^a	
		Active	Rough, white, or yellow color with plaque deposition	1,2	Sealant ¹⁻³	
	Cavitated lesions	Inactive	Enamel breakdown without dentin visible, hard, brown or black color without plaque deposition	3	Sealant ³	
		Active	Enamel breakdown without dentin visible, soft with plaque deposition		Sealant (if regular check-up is possible) ⁵ / Minimally invasive restoration ^{4,b}	Sealant ³
Dentin caries	Non-cavitated lesions	Probably active	Smooth surface with dark shadow under enamel surface without enamel breakdown	4	Sealant (if regular check-up is possible) ⁵ / Minimally invasive restoration ^{4, b}	
	Cavitated lesions	Inactive	Underlying dark shadow from dentin Enamel breakdown without visible dentin, hard, brown, or black color without plaque deposition	4	Minimally invasive restoration ^{6,b}	

Caries Risk Assessment

ทันตแพทยสมาคมแห่งประเทศไทยฯ

การวินิจฉัยโรคฟันผุและการจัดการ 2561

Proximal surface (with contact)

Depth of lesion	Cavitation	Caries activity	Clinical appearances	Radiograph	ICDAS	Management	
						Permanent teeth	Primary teeth
Enamel caries	Non-cavitated lesions	Inactive	Shiny, hard and smooth surface white, brown, or black color may be seen around proximal area without plaque deposition	Radiolucency in enamel	RA 1,2	Routine oral care ^a	
		Active	Rough, white or yellow color may be seen around proximal area with plaque deposition			Surface remineralization, e.g. fluoride varnish ¹² / Sealant ^{13,14,16}	
	Cavitated lesions	Inactive	Enamel breakdown without dentin visible, hard, brown or black color may be seen around proximal area without plaque deposition			Routine oral care ^a	
		Active	Enamel breakdown without dentin visible, soft with plaque deposition*			Minimal invasive restoration ^b	
Dentin caries	Non-cavitated lesions	Probably active	Discoloration of tooth surface, non-tearing of dental floss during flossing*	Radiolucency : limited to the outer 1/3 of dentin	RA 3	Surface remineralization ¹² / Sealant ^{13,14,16} (if regular dental check-up is possible) / Minimal invasive restoration	

Caries Risk Assessment

Use of Pit and Fissure Sealants: Evidence-Based Clinical Recommendations¹

These images² are examples of non-cavitated lesions that may be considered for sealants. Non-cavitated lesion refers to pits and fissures in fully erupted teeth that may display discoloration not due to extrinsic staining, developmental opacities or fluorosis. The discoloration may be confined to the size of a pit or fissure or may extend to the cusp inclines surrounding a pit or fissure. The tooth surface should have no evidence of a shadow indicating dentinal caries, and, if radiographs are available, they should be evaluated to determine that neither the occlusal nor the proximal surfaces have signs of dentinal caries.



Tooth surface with an early (noncavitated) carious lesion that exhibits a white demineralization line around the margin of the pit and fissure and/or a light brown discoloration within the confines of the pit-and-fissure area.



A small, distinct, dark brown early (noncavitated) carious lesion within the confines of the fissure.



A deep fissure area (arrow 1) and another area exhibiting a small light brown pit and fissure (arrow 2). Note that the lesion does not extend beyond the confines of the pit and fissure.



A more distinct early (noncavitated) carious lesion (arrow) that is larger than the normal anatomical size of the fissure area.



A more distinct early (noncavitated) carious lesion (arrow) that is larger than the normal anatomical size of the fissure area.

ADA American Dental Association®
America's leading advocate for oral health

¹ADA Council on Scientific Affairs. Use of Pit and Fissure Sealants: Evidence-based clinical recommendations. JADA 2008;139(3):257-68. Copyright © 2008 American Dental Association. All rights reserved. Adapted with permission. To see the full text of this article, please go to <http://jada.ada.org/cgi/content/full/139/3/257>.

²Images provided courtesy of Dr. Amid I. Ismail, the Detroit Dental Health Project (National Institute of Dental and Craniofacial Research grant U-54 DE 14261-01).

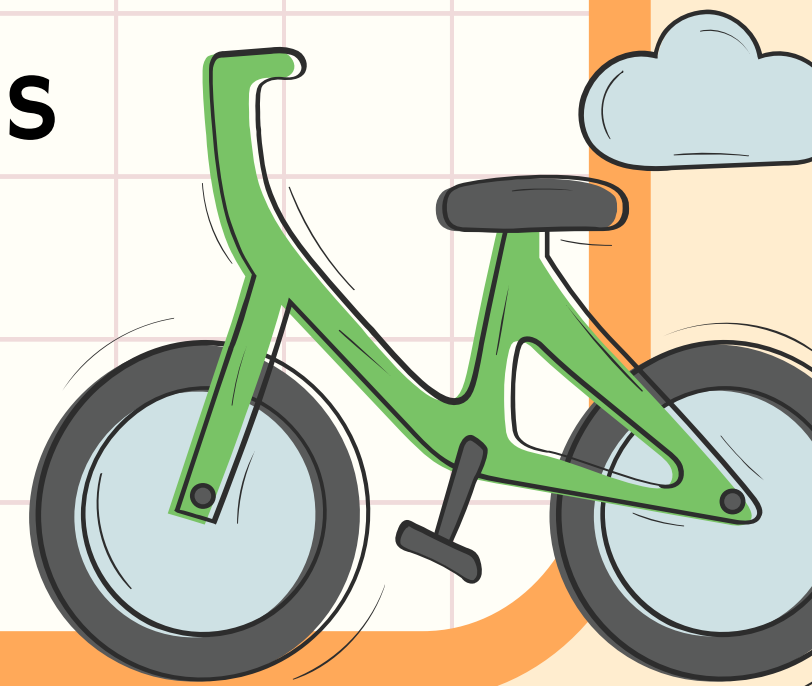
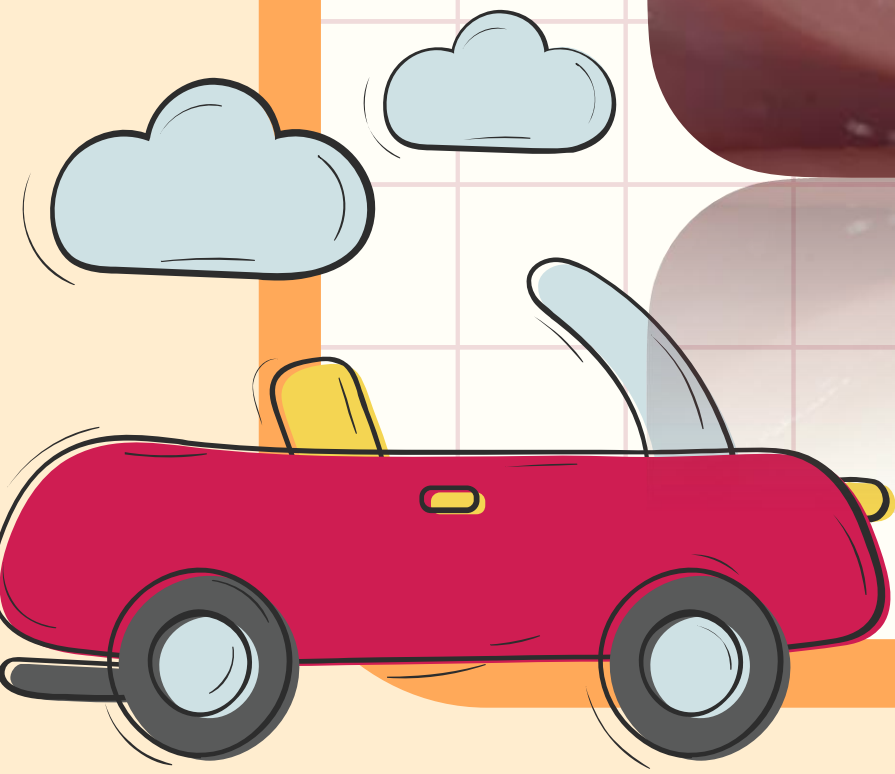
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Wright JT, Crall JJ, Fontana M, et al. Evidence-based clinical practice guideline for the use of pit-and-fissure sealants: A report of the American Dental Association and the American Academy of Pediatric Dentistry. J Am Dent Assoc. 2016;147(8):672-682.e12.

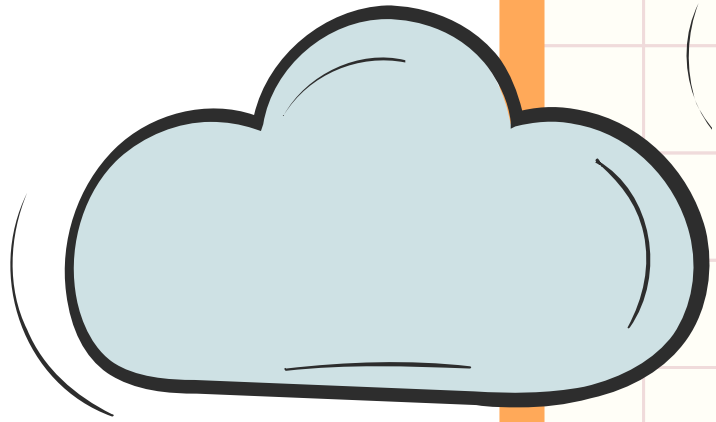
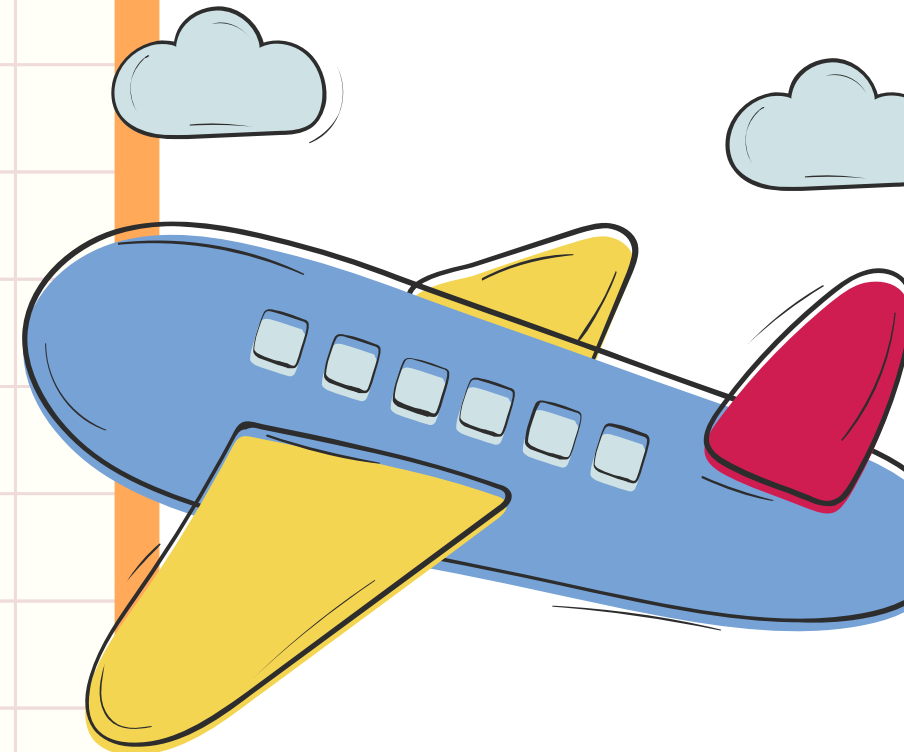
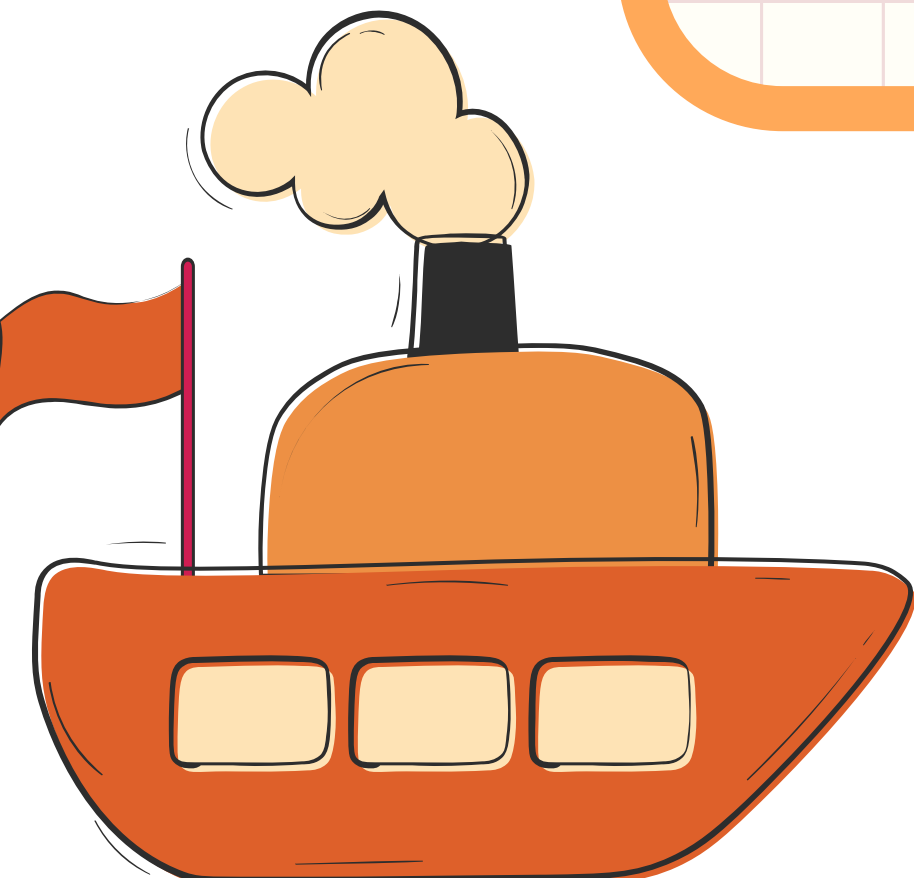
Contraindications



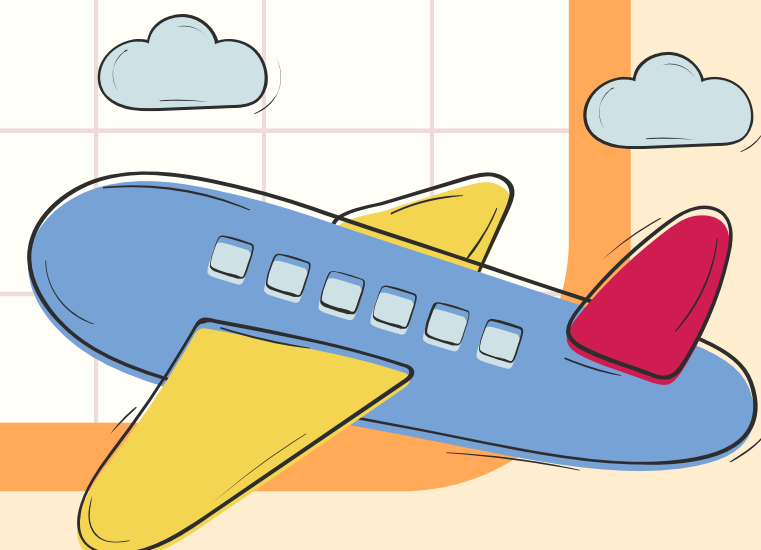
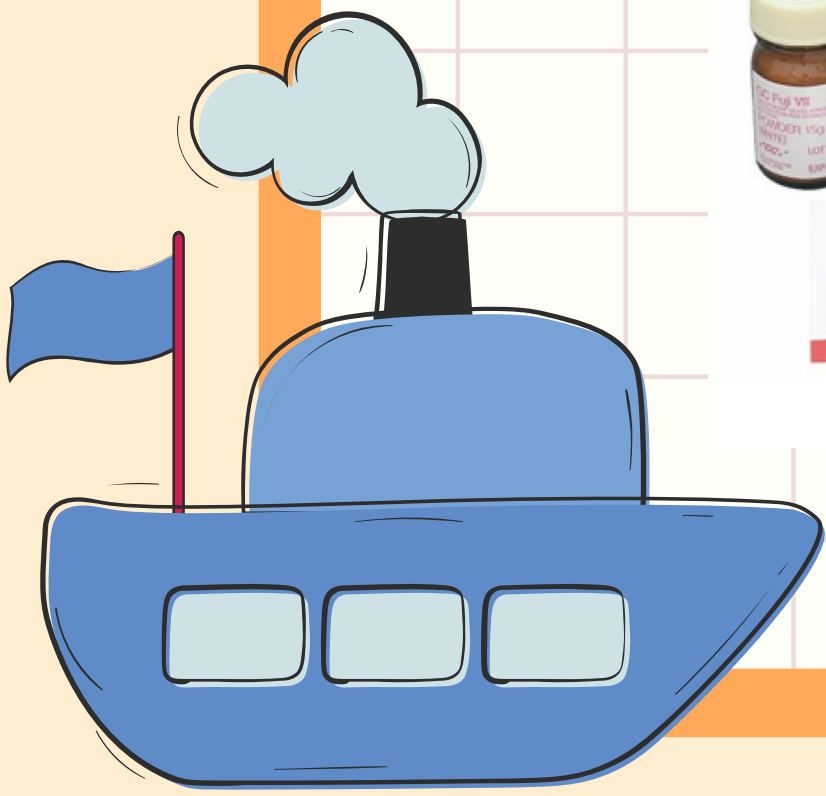
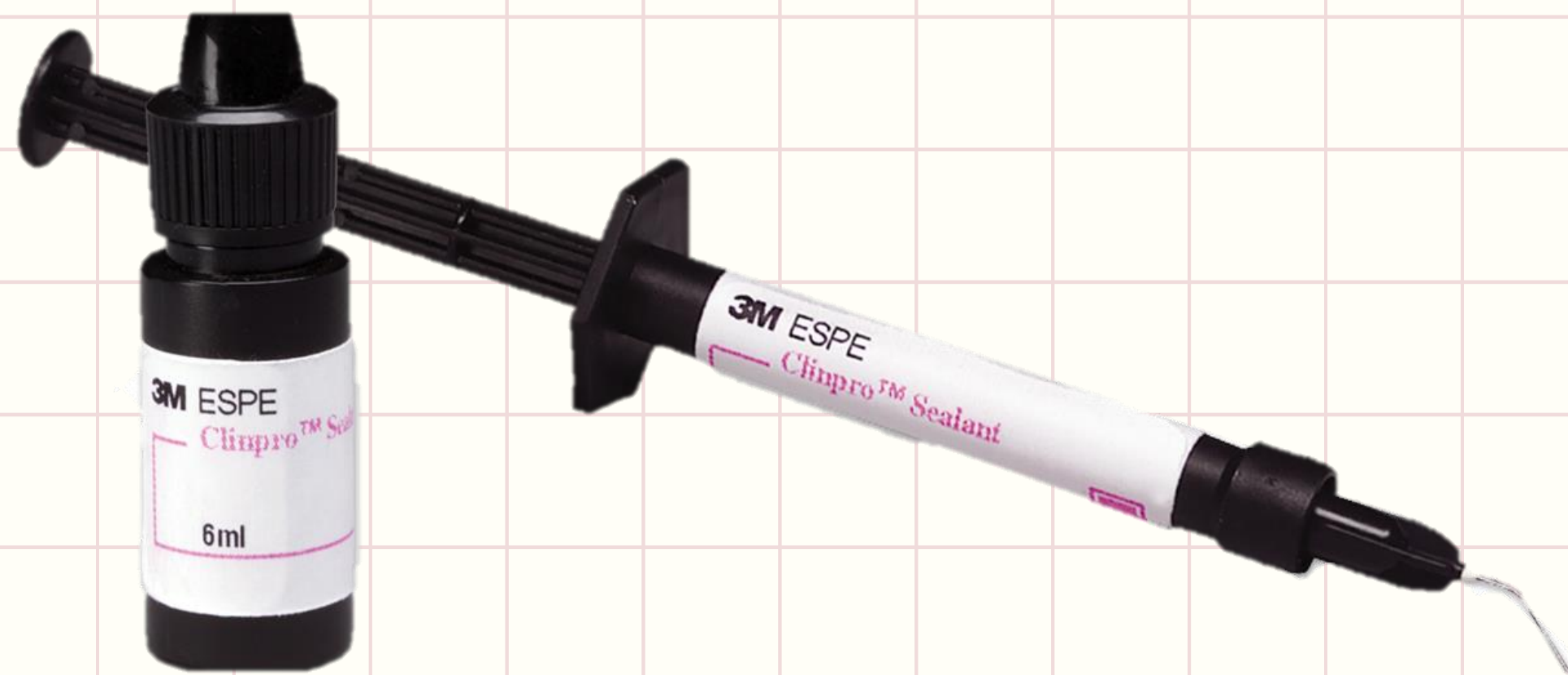
- **SELF-CLEANSING PIT AND FISSURES**
- **DENTIN CAVITATED**
- **CARIOUS LESIONS**
- **PROXIMAL CARIES**



Sealant Materials



Sealant Materials



Sealant Materials

RESIN-BASED SEALANTS

- BIS-GMA
- Acid-etch
- Mechanical bond
- No fluoride release
- Better retention
- Technique-sensitive
- Longer chair-time
- Act as barrier only, no residual effect if lost

GI SEALANTS

- Aluminosilicate glass
- Polyalkenoic acid
- Physicochemical bond
- Fluoride release
- Poorer retention
- Less moisture sensitive
- Short chair-time
- The fluoride-releasing effect continues, even if lost

Sealant Materials

Risk of loss of complete retention of sealant materials

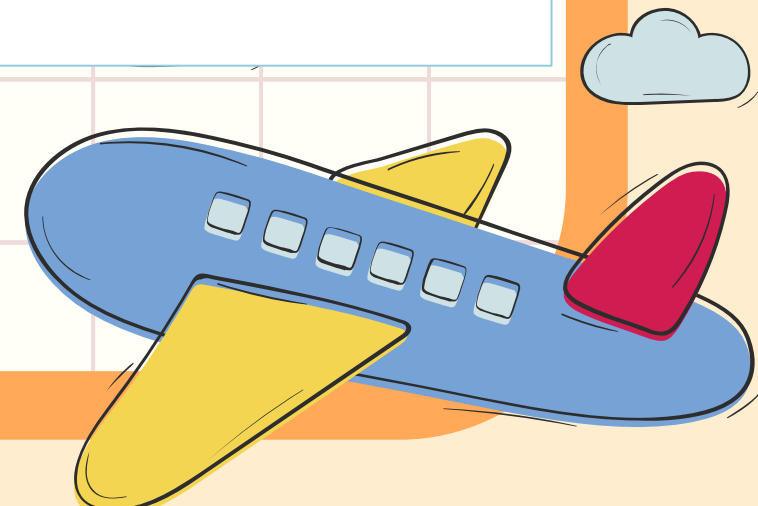
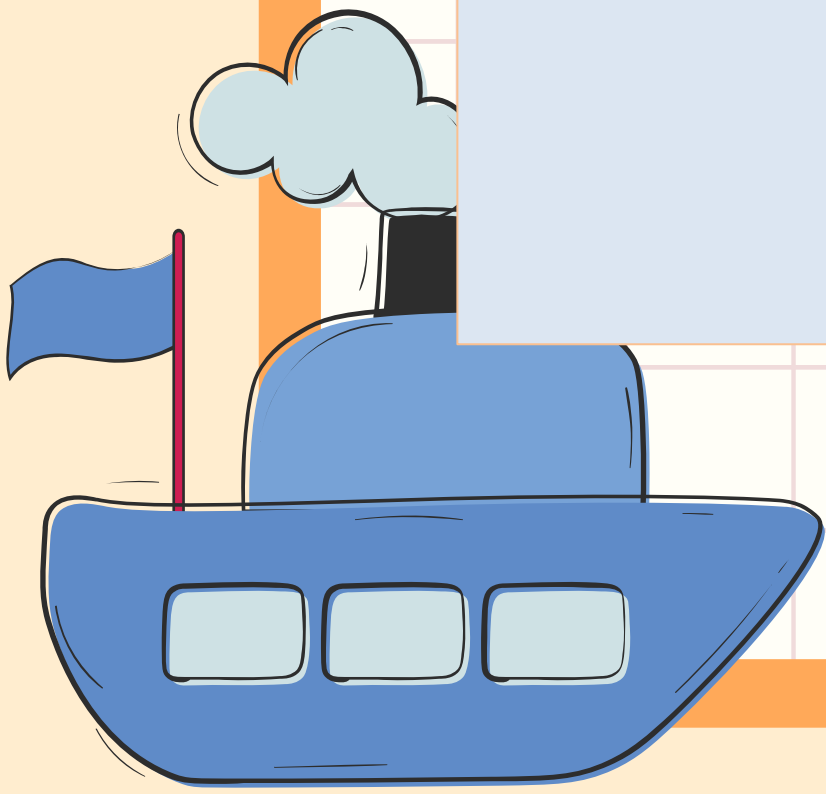
Resin sealants

- mostly lost in bulk, leading to uneven margins
- risk of developing caries occurrence.

GI sealants

- appear to wear excessively, small particles remained in the bottoms of fissures
- fluoride reservoir → slow release of fluoride → nearby enamel remineralization.

Mickenautsch and Yengopal, 2013



Sealant Materials

RESIN SEALANT CLASSIFICATION

POLYMERIZATION METHOD	COMPOSITION	COLOR	FLUORIDE
• UV light activated • Auto polymerization • Visible light activated	• Unfilled resin • Filled resin	• Opaque • Clear	• Fluoride release modified resin • Non-fluoride release

Sealant Materials

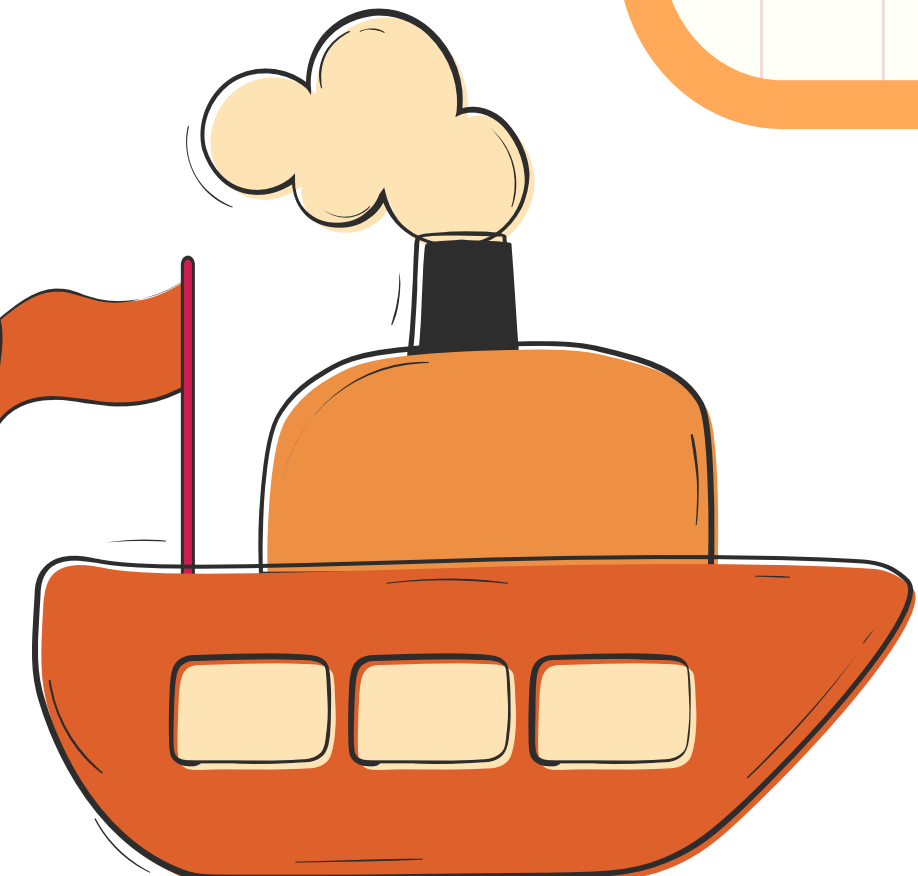
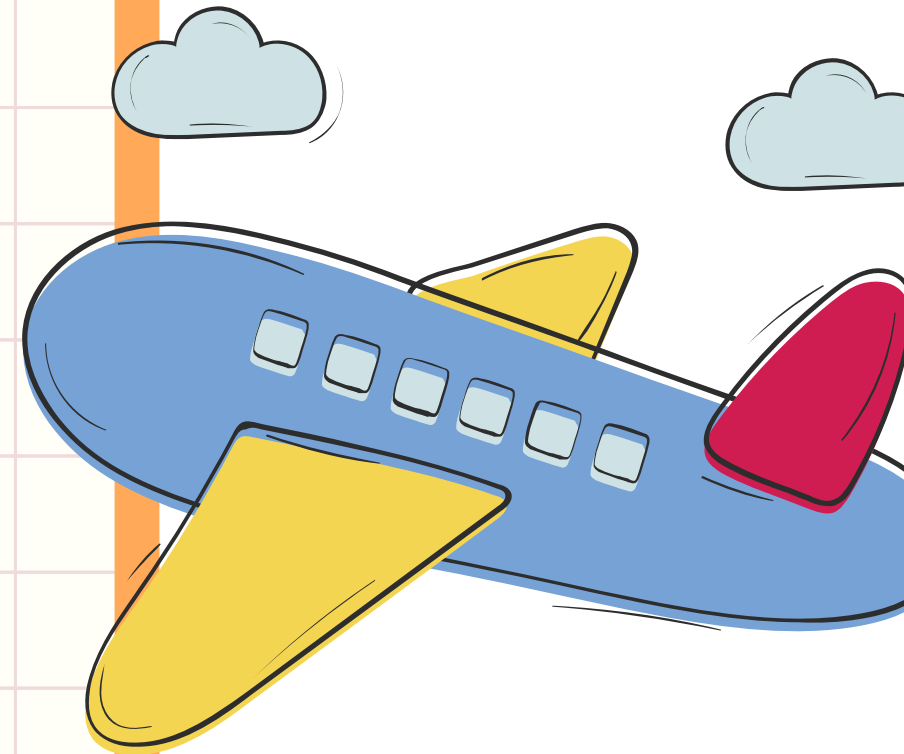
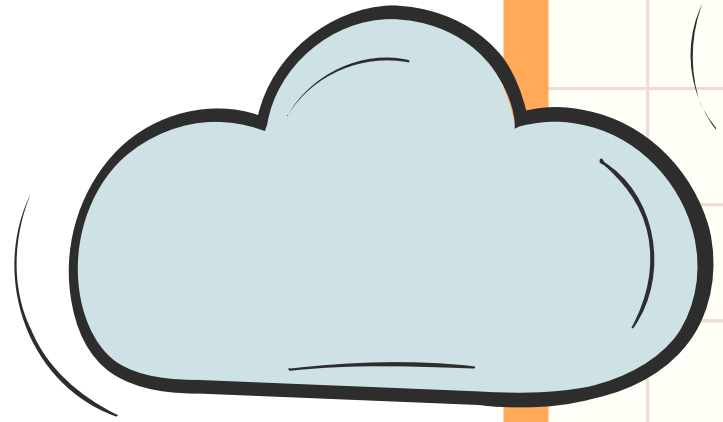
CLINICAL USE

Concise White Sealant (3M ESPE)



- Both self-curing and light-curing version available.
- Easy application and check due to white colouring.
- The integrity of the sealing can be quickly and safely checked by the patient thanks to the white opaque colouring.

2. During Treatment



Resin-based sealant procedure

1. ISOLATION

2. PROPHYLAXIS

3. ETCHING

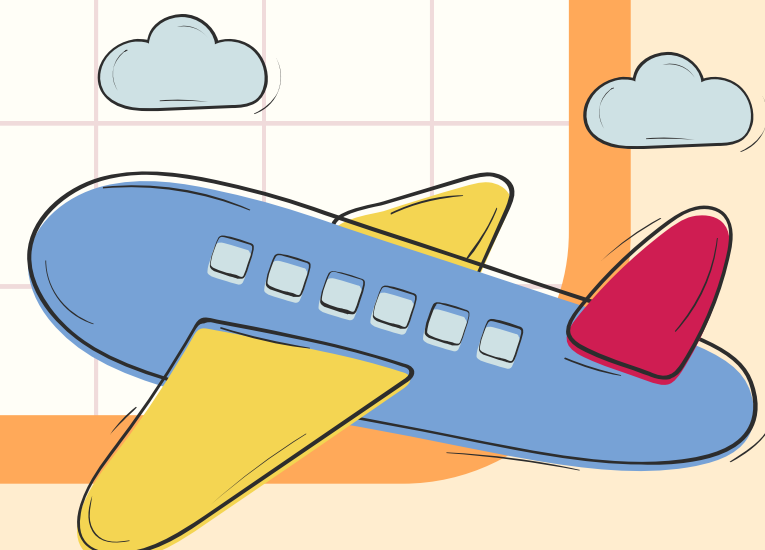
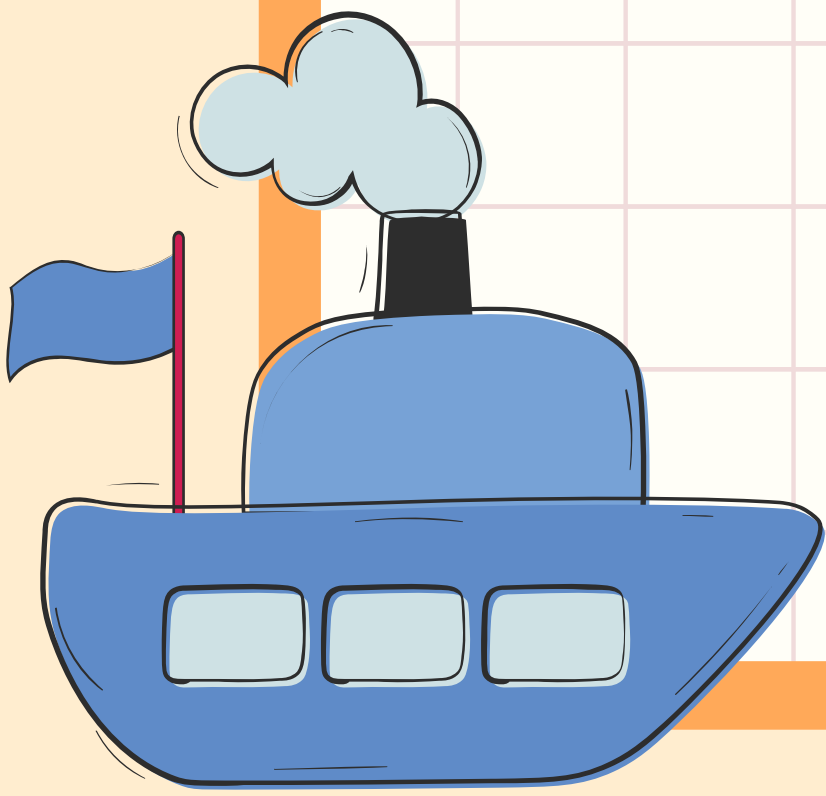
4. WASHING & DRYING

5. SEALANT APPLICATION

6. POLYMERIZATION

7. EVALUATION

8. PERIODIC EVALUATION

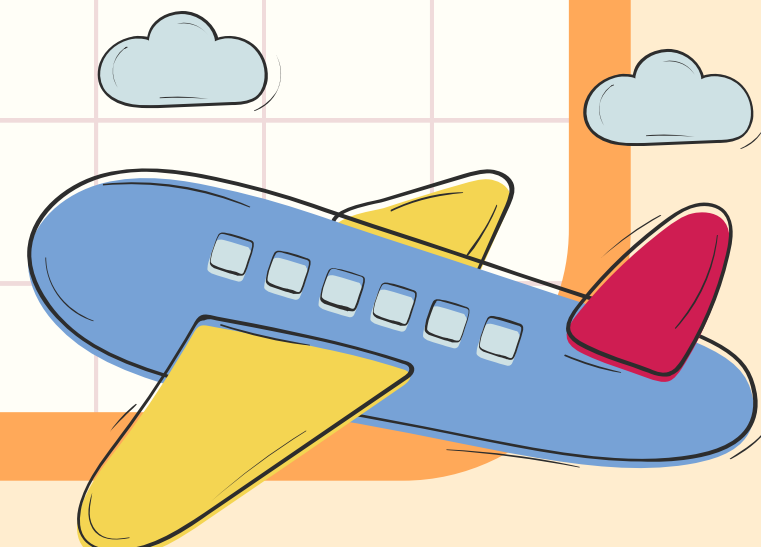
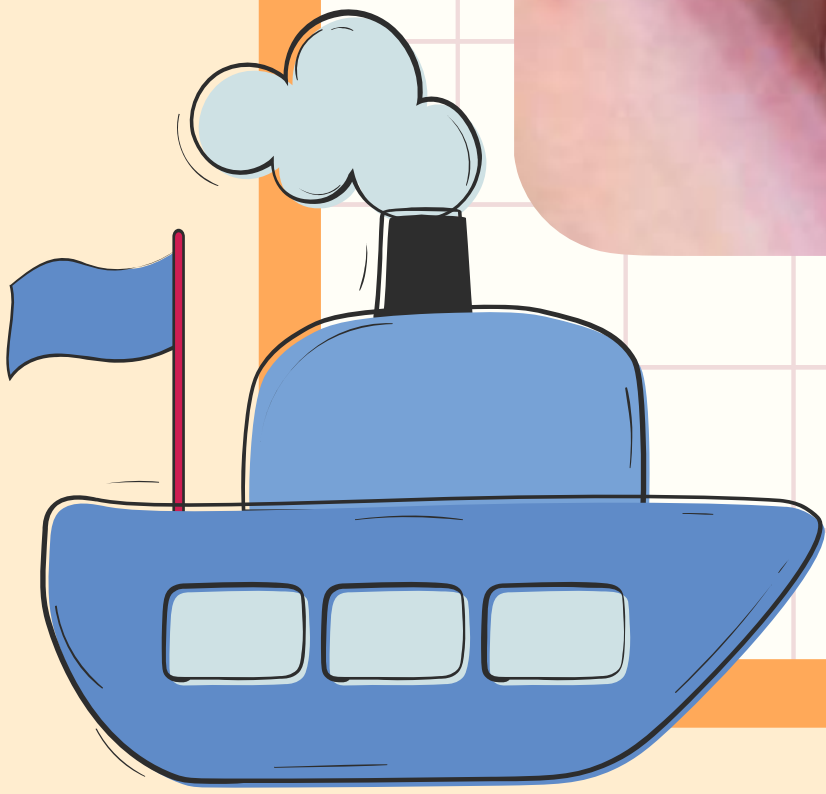


Resin-based sealant procedure

1. ISOLATION



- Rubber dam / cotton rolls
- Saliva ejector
- Patient 's Head Postion
- Mouth gag



Resin-based sealant procedure

2. PROPHYLAXIS

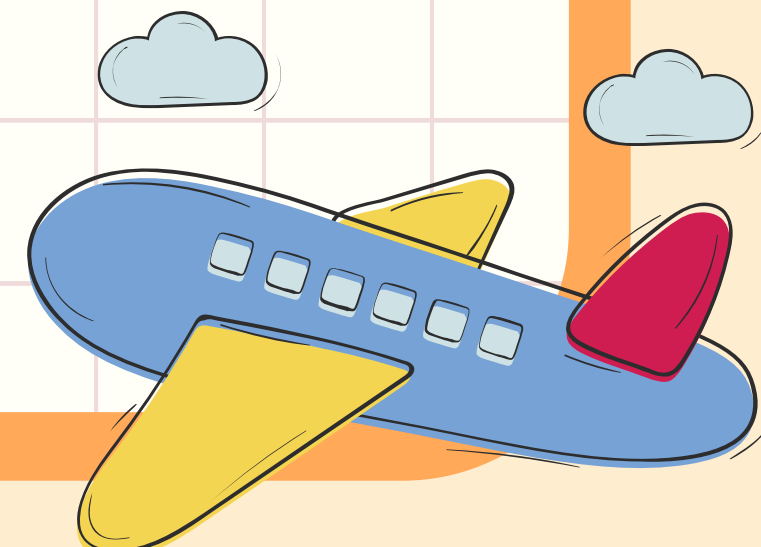
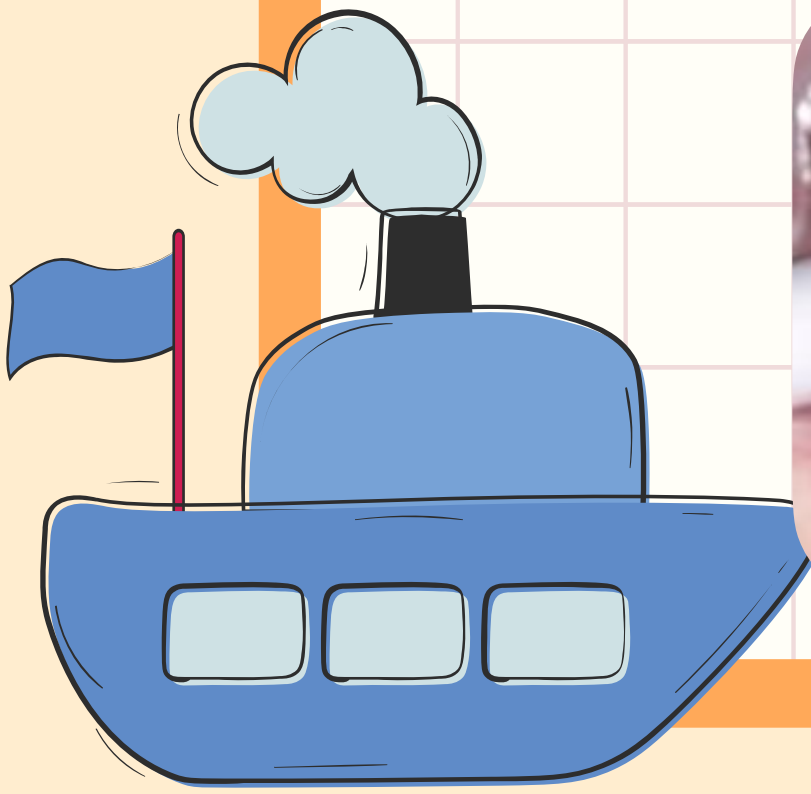


- Using prophy cup and pumice to remove plaque and debris

- Gently pulling the explorer or probe through the fissures



- Dry the tooth to avoid diluting the etch

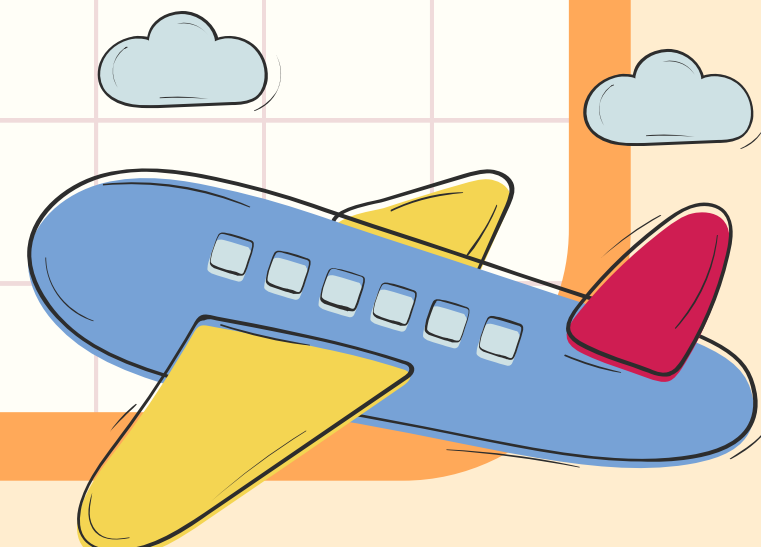
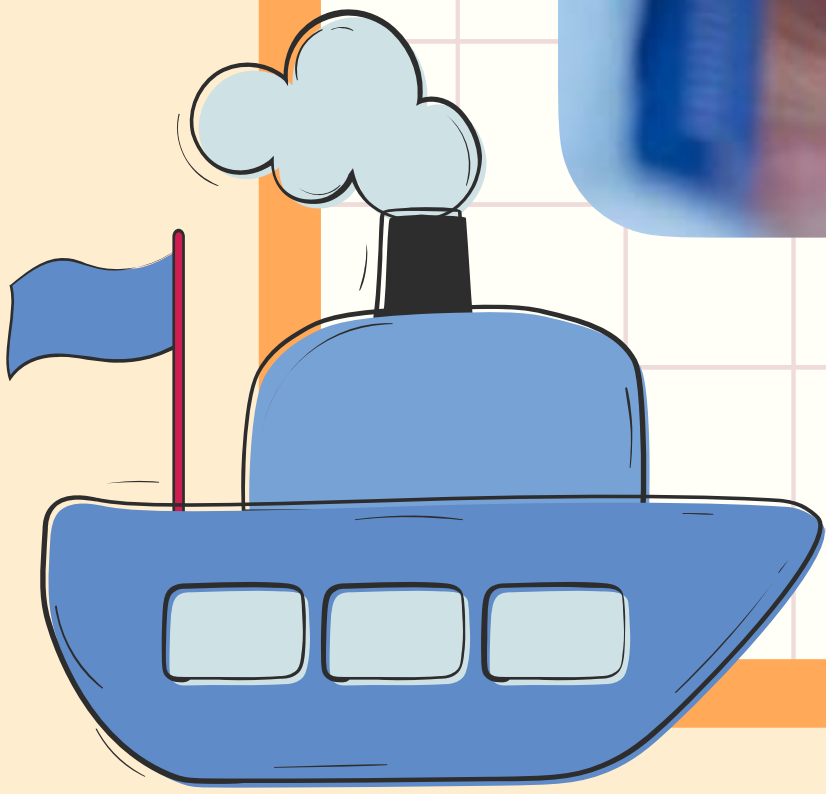


Resin-based sealant procedure

3. ETCHING



- Apply 37% Phosphoric acid 30-50% for 15-60 seconds and thoroughly rinse

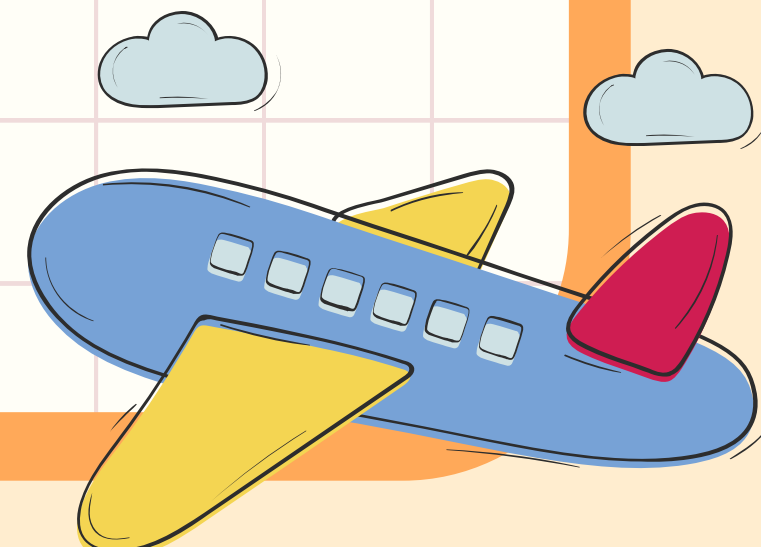
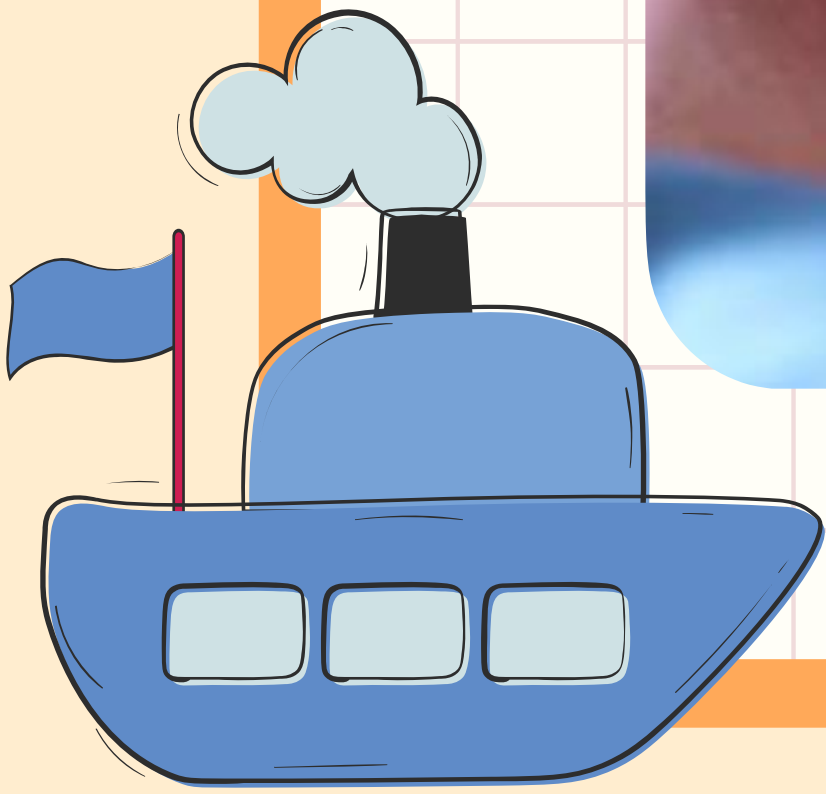


Resin-based sealant procedure

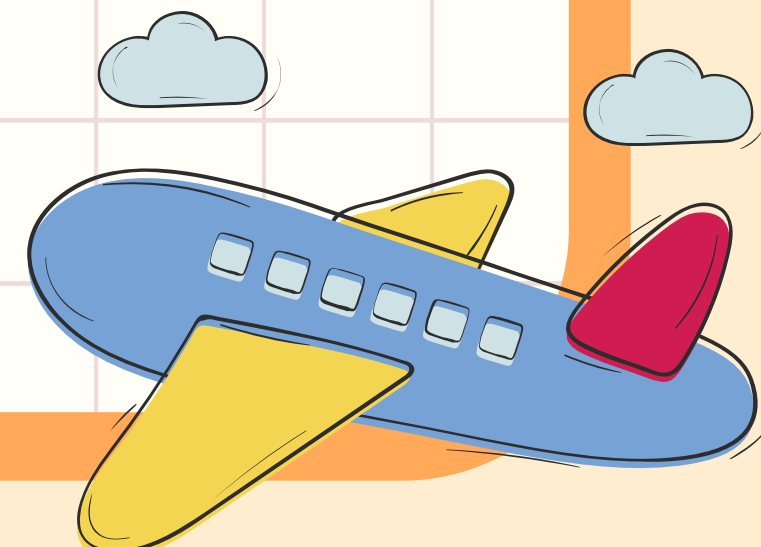
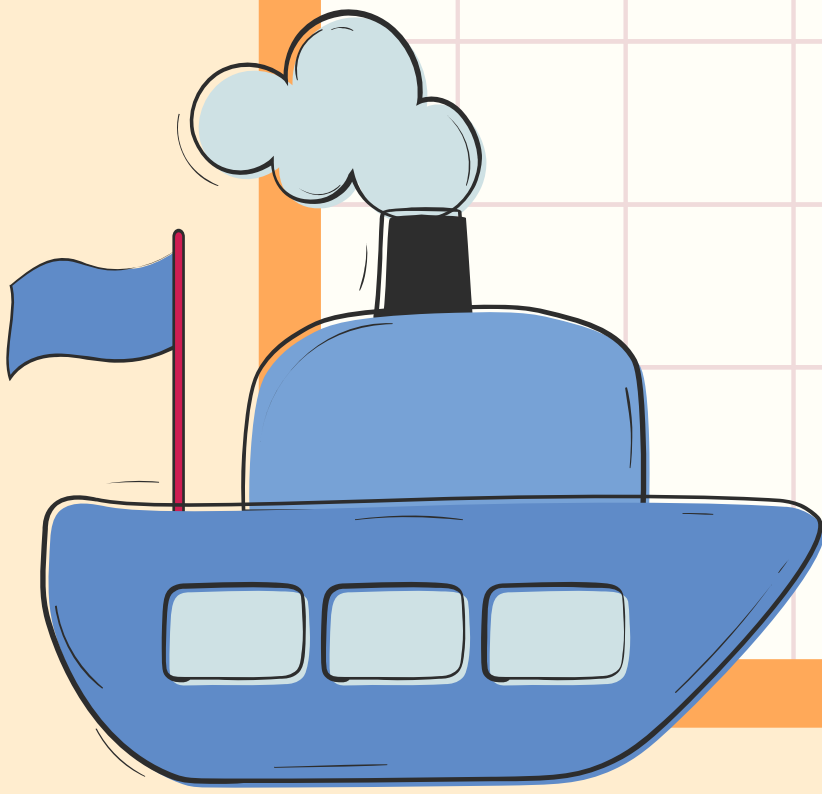
4. WASHING & DRYING



- Chalky or frosted appearance
- Avoid moisture contamination when changing cotton wool rolls



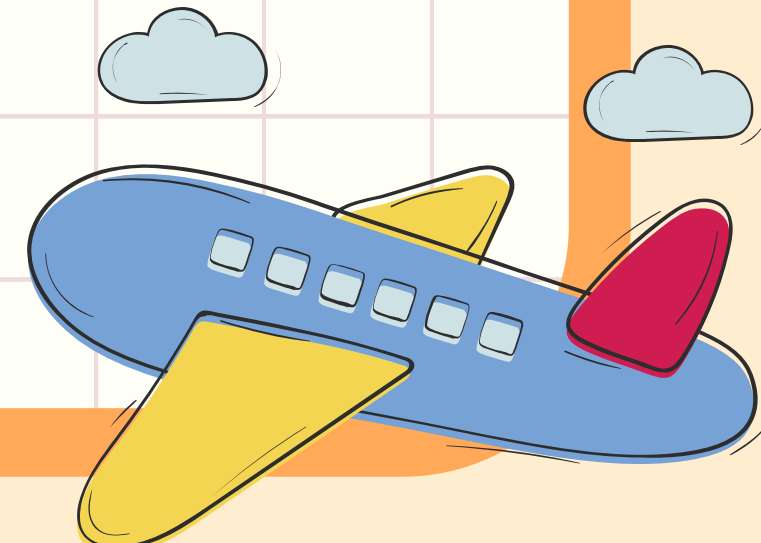
Resin-based sealant procedure



Resin-based sealant procedure



Photo by Dr.Worawit Sakulthai

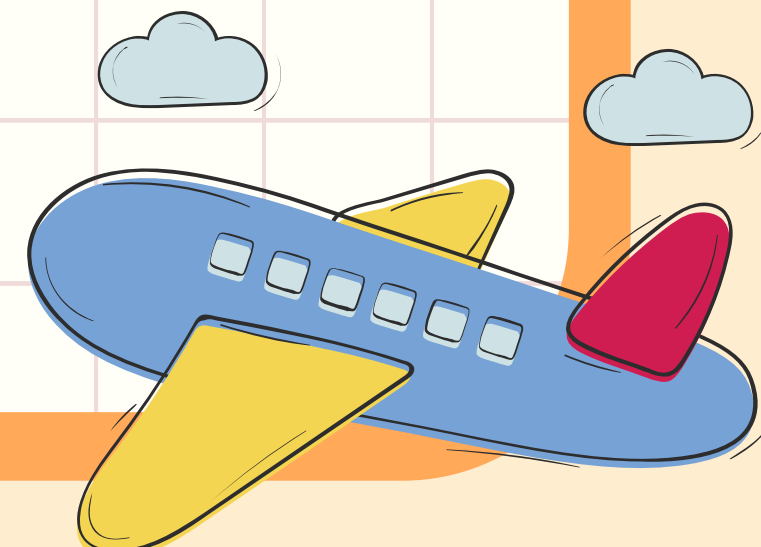
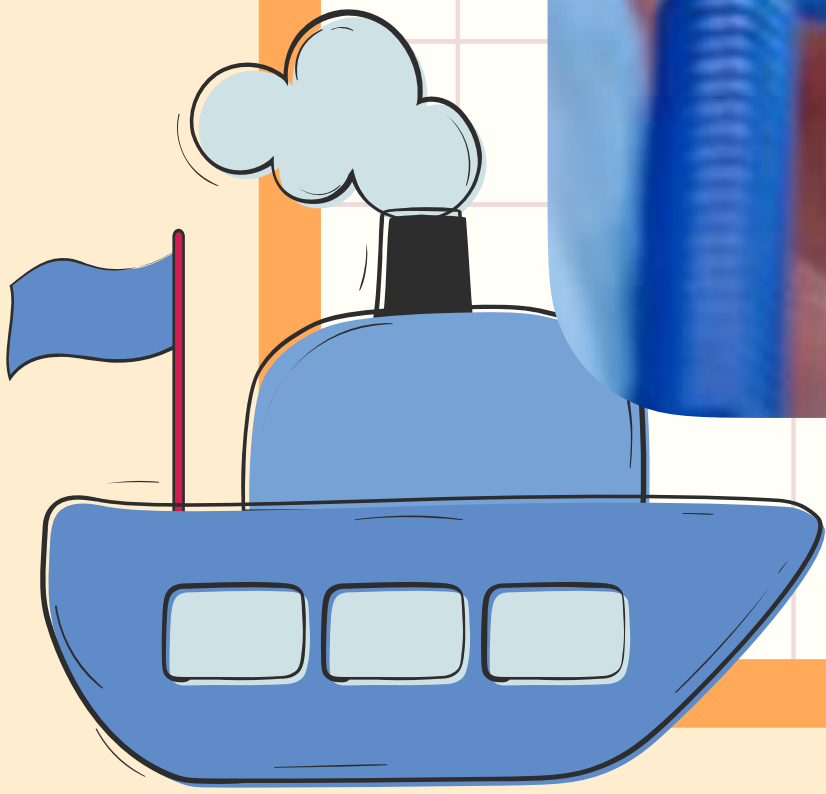


Resin-based sealant procedure

5. SEALANT APPLICATION



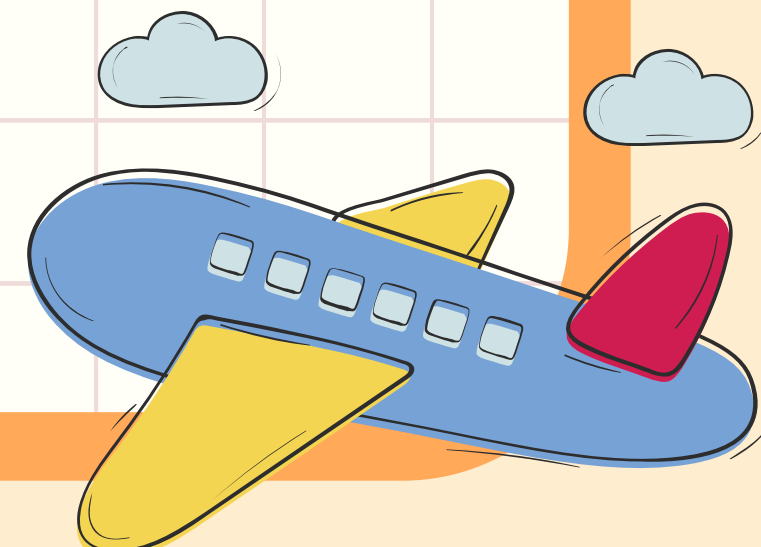
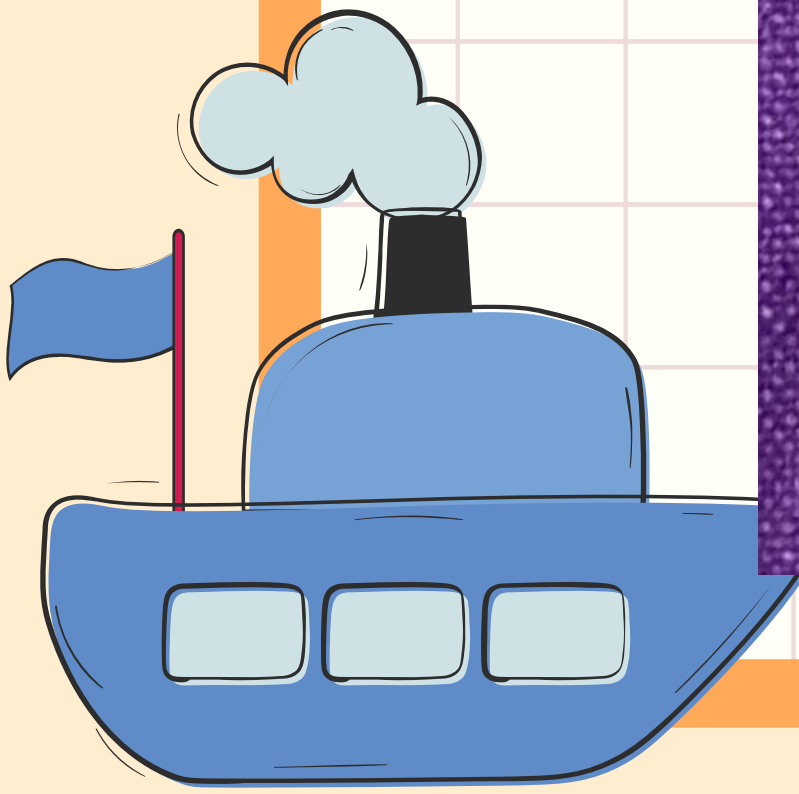
- Apply resin to etched enamel
- Allow the sealant to flow without air inclusions
- Do not overflow the sealant into incline plane
- Do not overflow the sealant into gingival sulcus



Resin-based sealant procedure



Photo by Dr.Worawit
Sakulthai

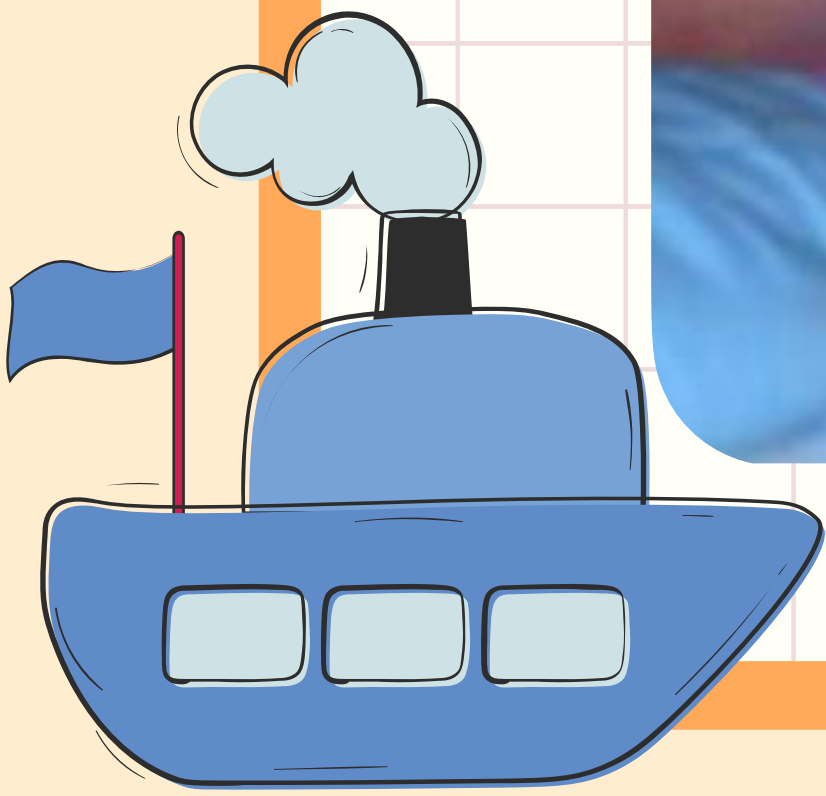


Resin-based sealant procedure

6. LIGHT ACTIVATED POLYMERIZATION

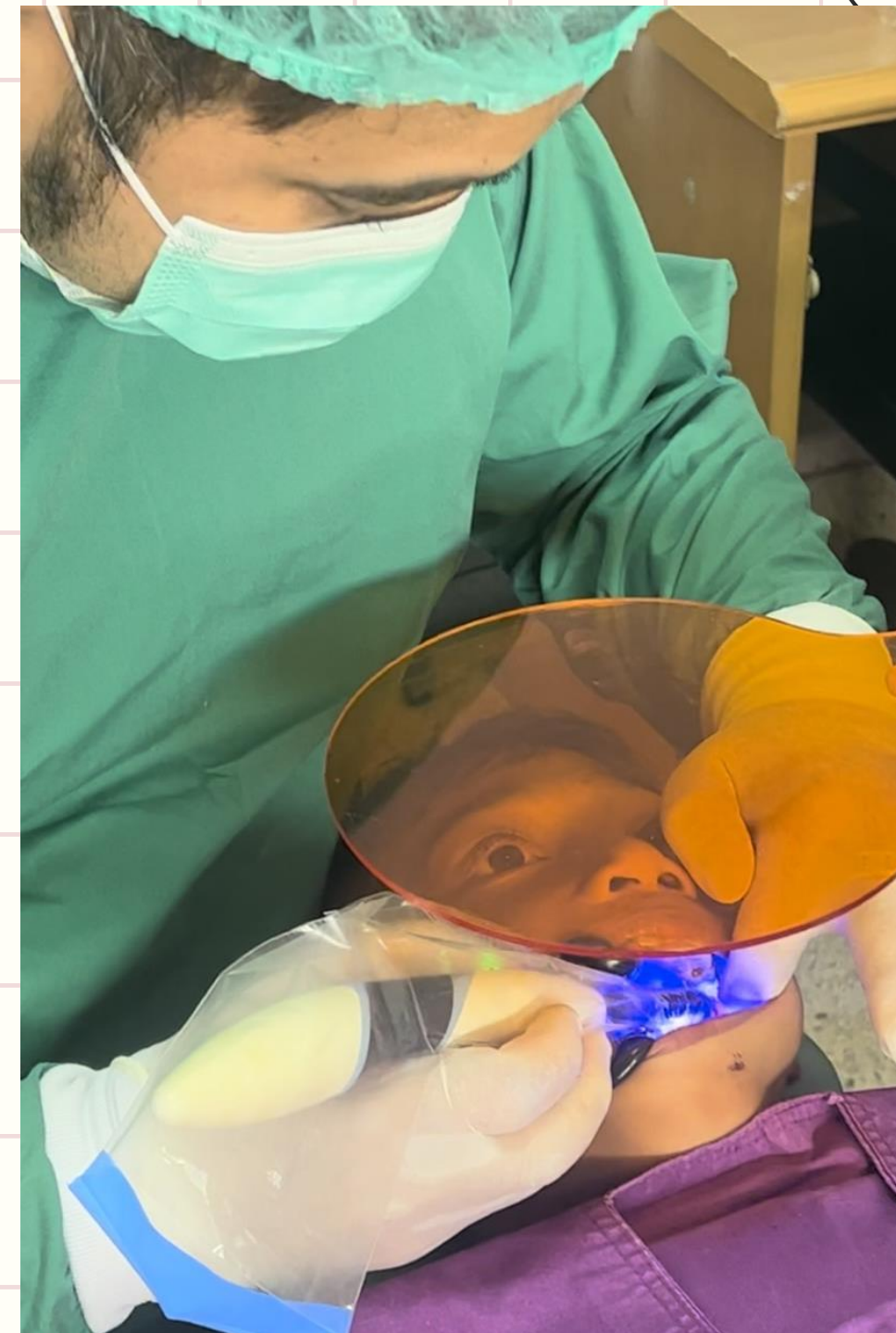
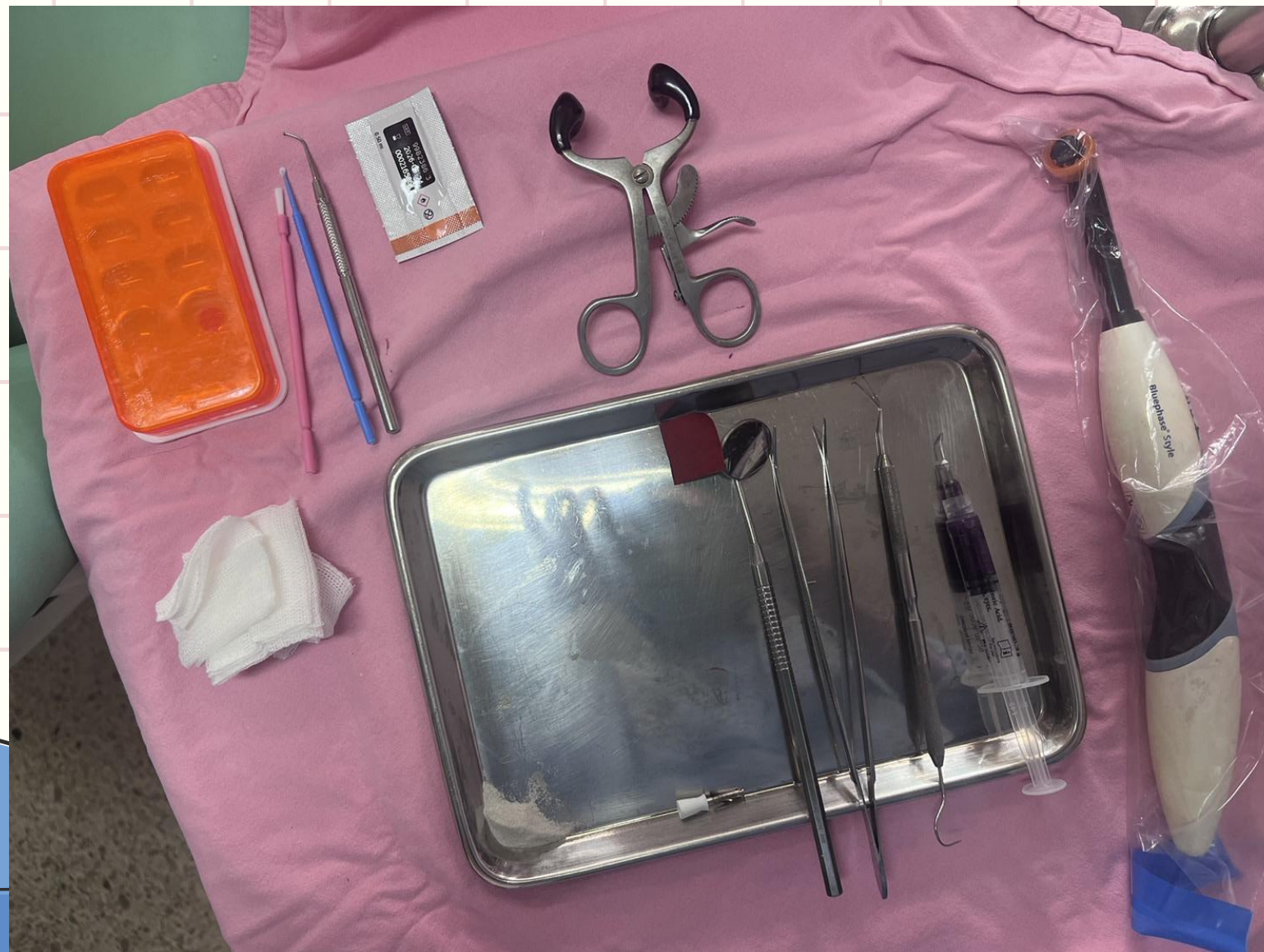


- According to manufacturer's instruction



Resin-based sealant procedure

Visible Light Cured Sealant

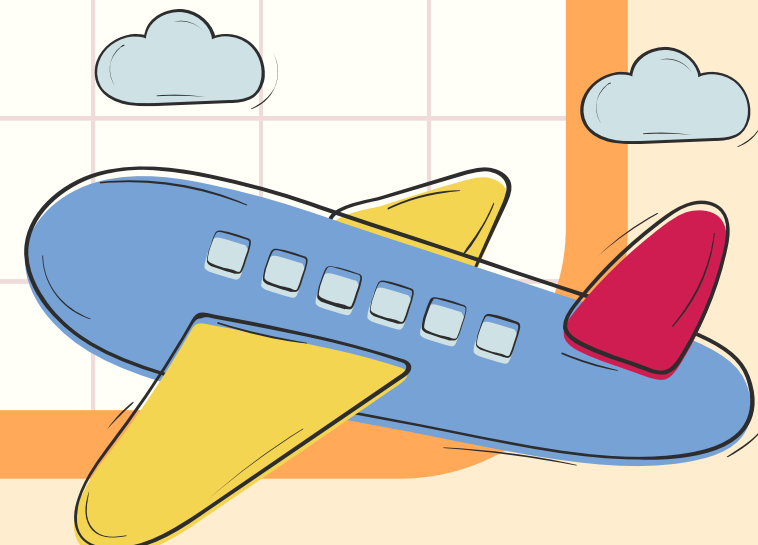
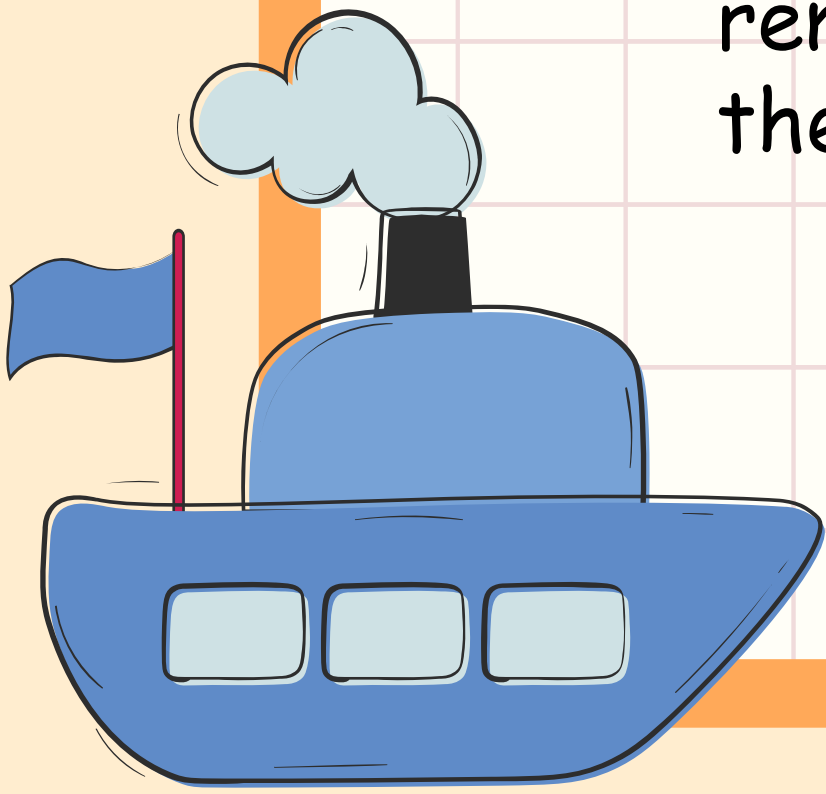


Resin-based sealant procedure

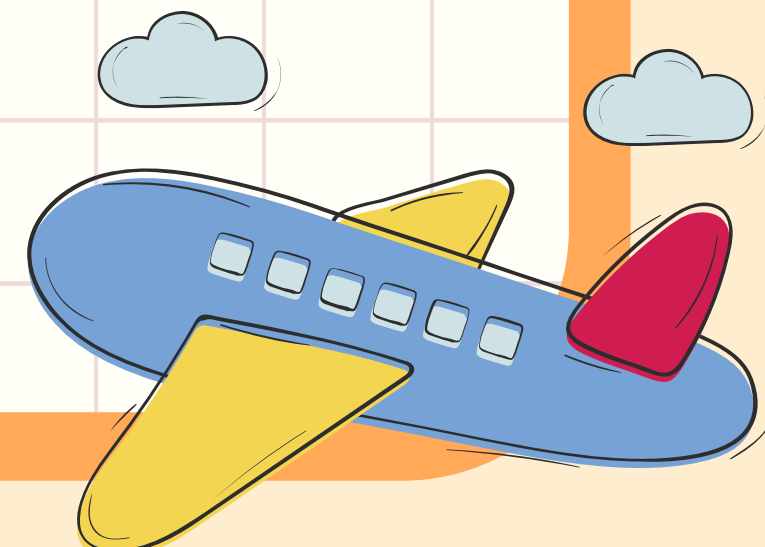
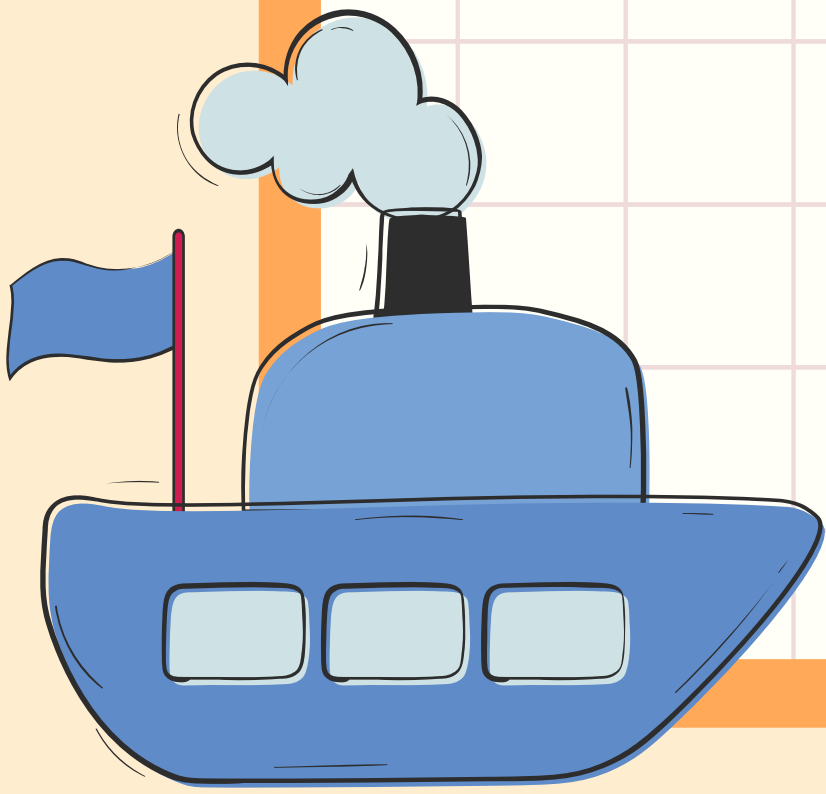
Visible Light Cured Sealant

- The tip of curing light should be held 3 mm to 5 mm from the surface of the sealant
- After the sealant has set, wipe the surface with a wet cotton pellet so that air inhibited layer of non-polymerized resin is removed and failure of this step leaves an objectionable taste in the patient's mouth

Athira Sreedevi; Melina Brizuela; Shamaz Mohamed.,2020



Resin-based sealant procedure



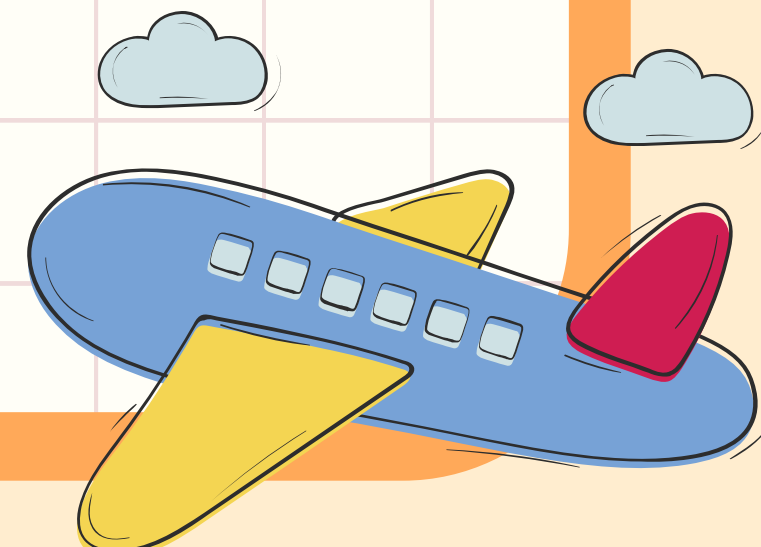
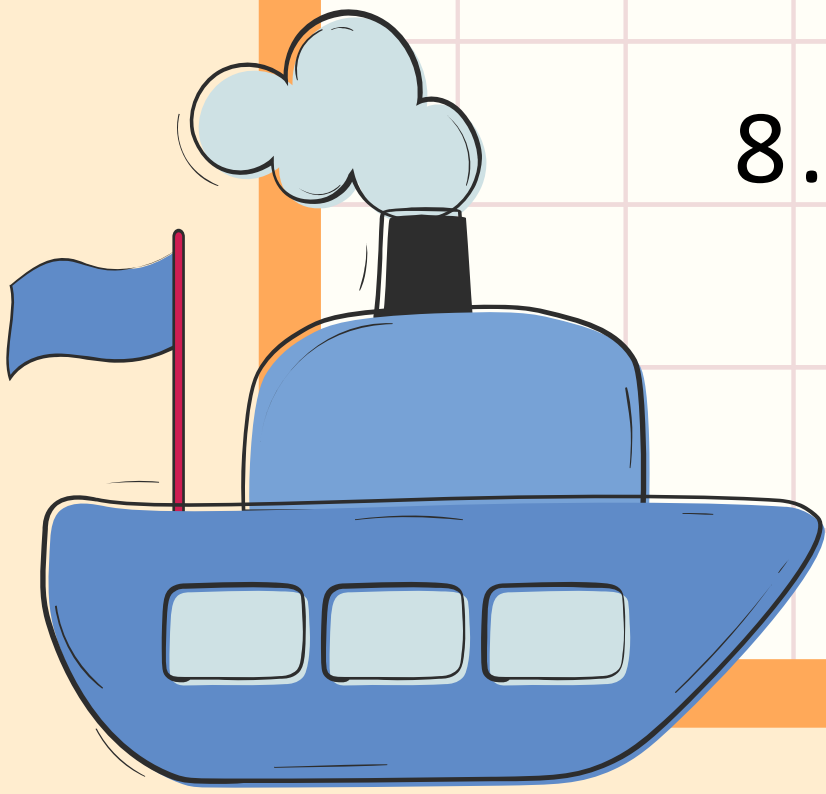
Resin-based sealant procedure

7. EVALUATION



- Retention
- Absence of voids or bubbles
- Small voids —> Top-up
- Check occlusion : No high spot

8. PERIODIC EVALUATION

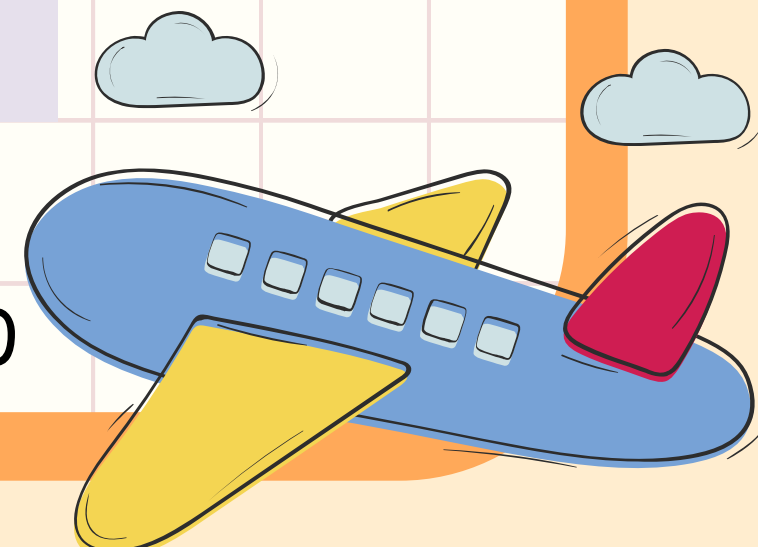
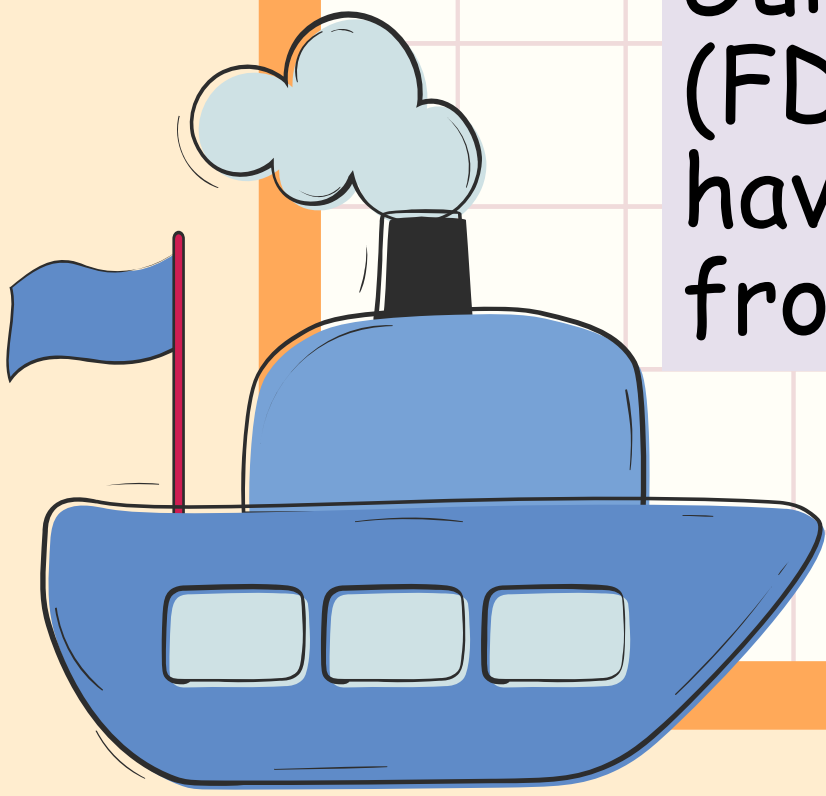


Resin-based sealant procedure

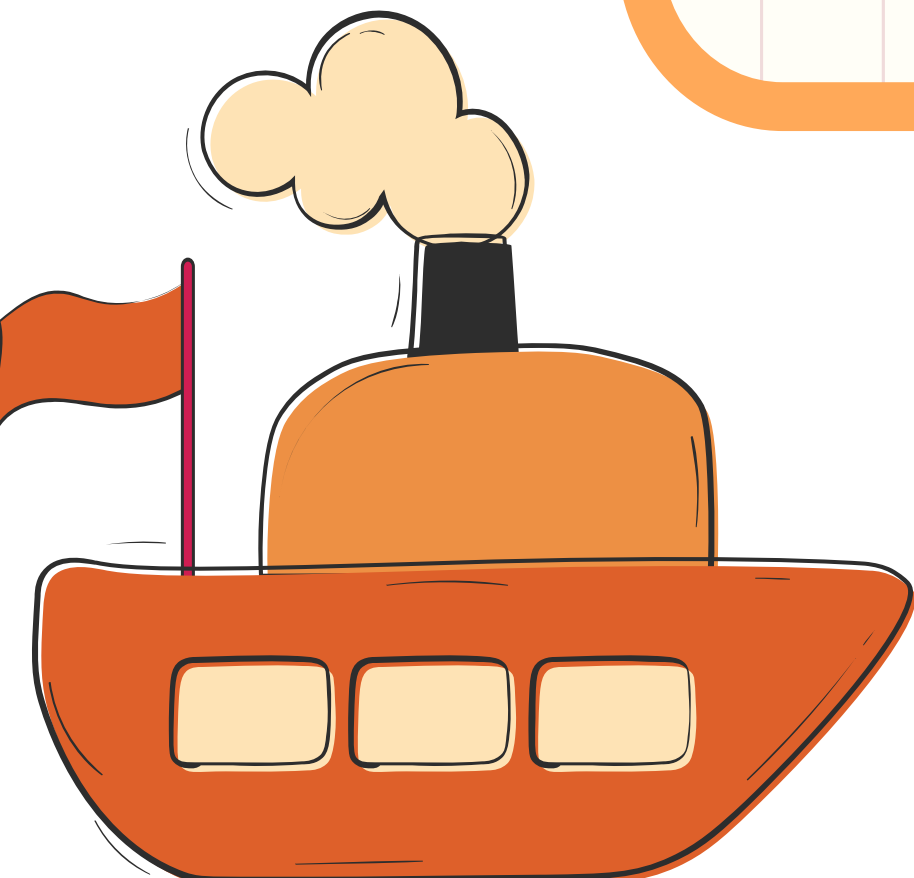
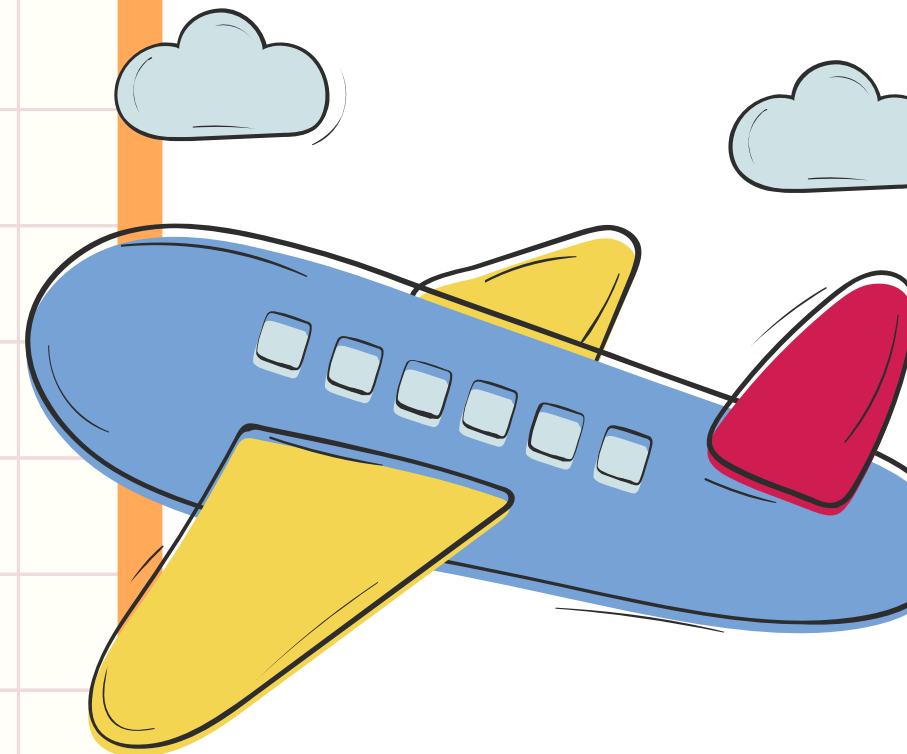
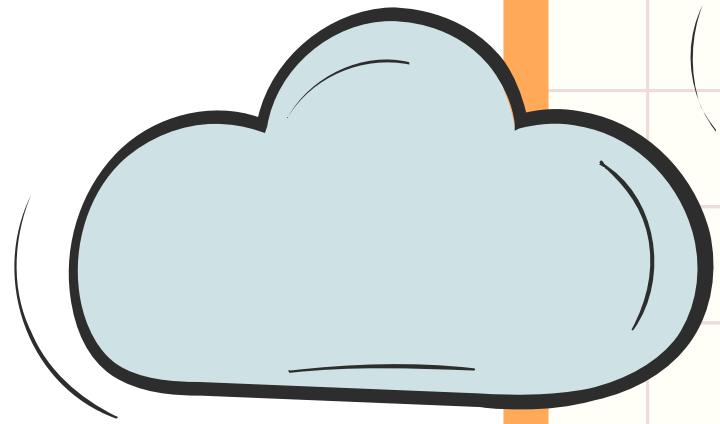
Toxicity

According to a few studies, the release of significant sealant components, like bisphenol A (BPA), impairs the development, health, and reproductive system in animals. However, the American Association of Pediatric Dentistry Guidelines, the US Drug and Food Administration (FDA), and the American Dental Association (ADA) have concluded that the low-level of BPA exposure from dental sealants poses no known health risks.

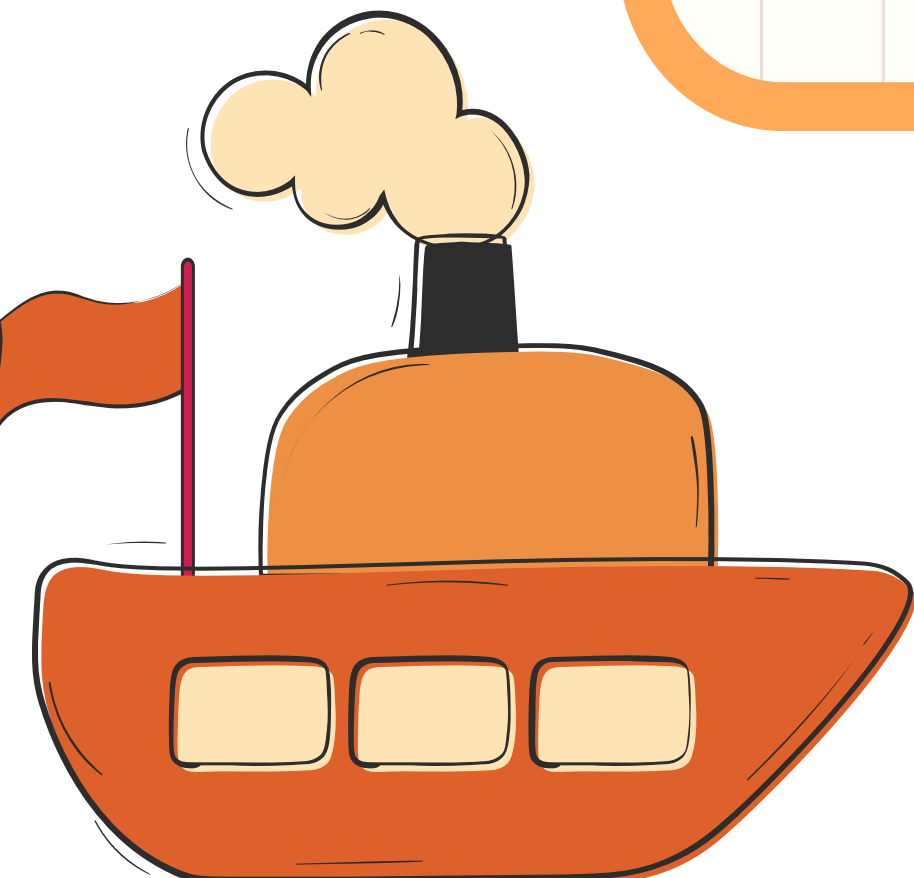
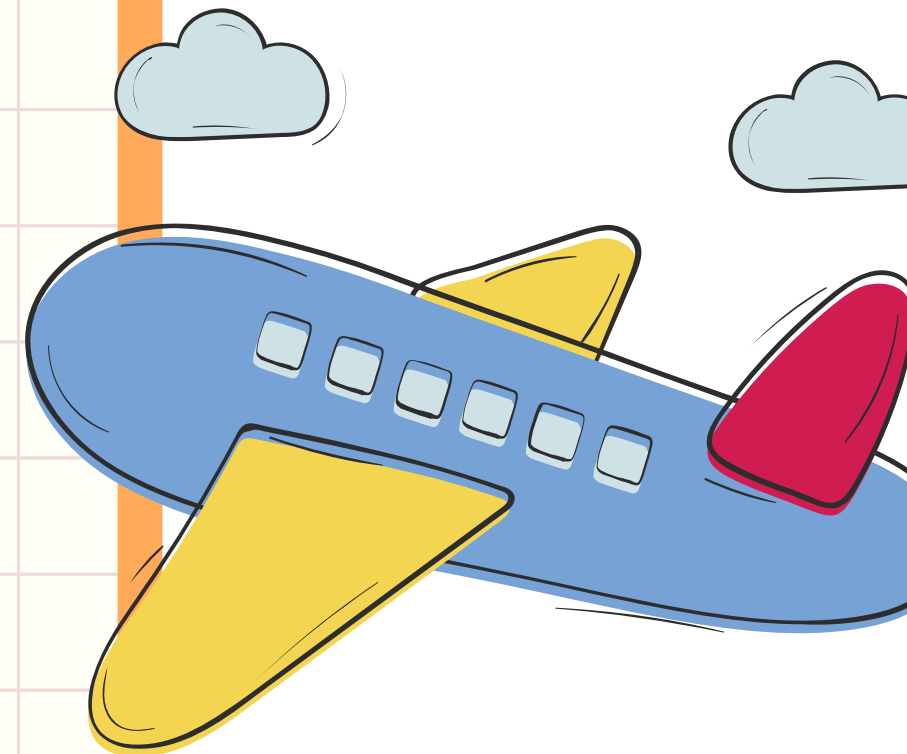
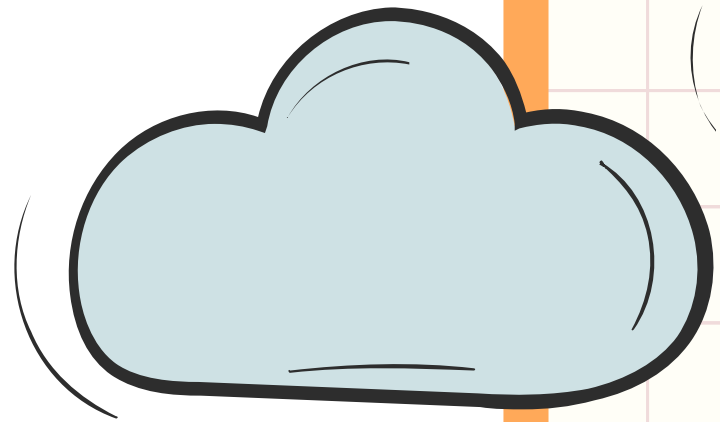
Athira Sreedevi; Melina Brizuela; Shamaz Mohamed.,2020



3. After Treatment



Resin-base Sealant Failure



Resin-based sealant failure

- IMPROPER PROPHYLAXIS

- ETCHING INSUFFICIENT

- CONCENTRATION ,TIMING

- IMPROPER AREA OF ETCHING

- CONTAMINATION

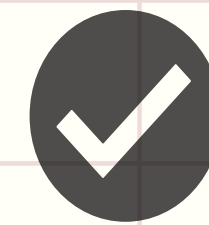
- SALIVA

- MOISTURE

- MOST LOSS

- 6MONTHS TO 1 YEAR

AFTER SEAL



CHALKY WHITE



REAPPLICATION



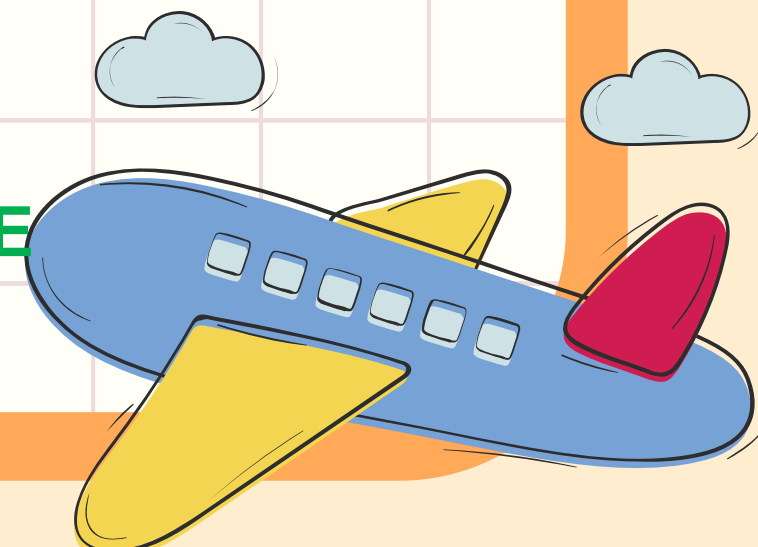
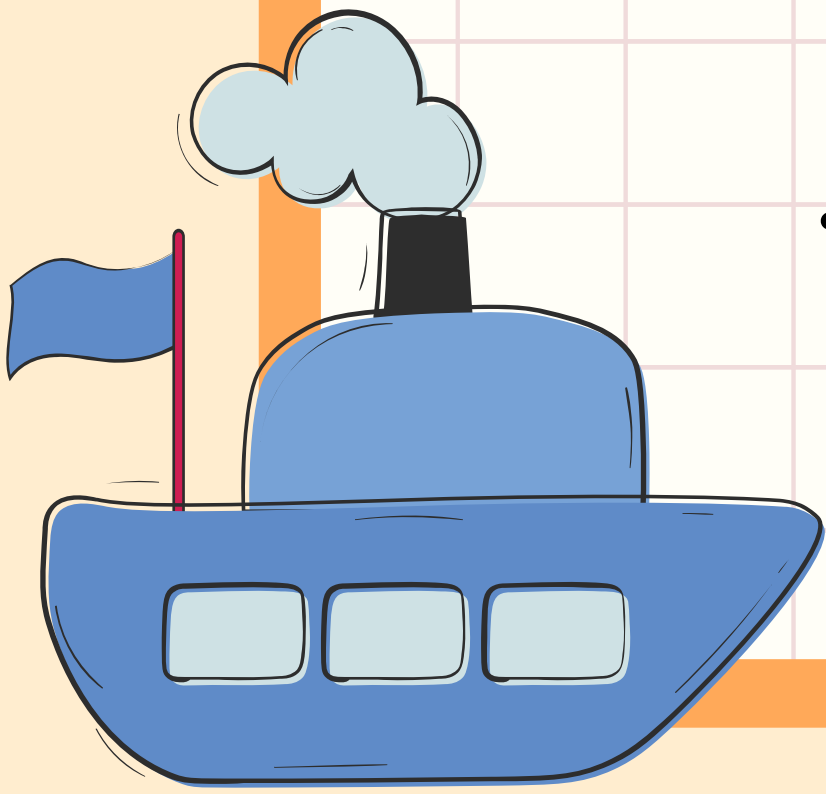
ISOLATION

RE-ETCH

CHECK

TRIPLE

SYRINGE

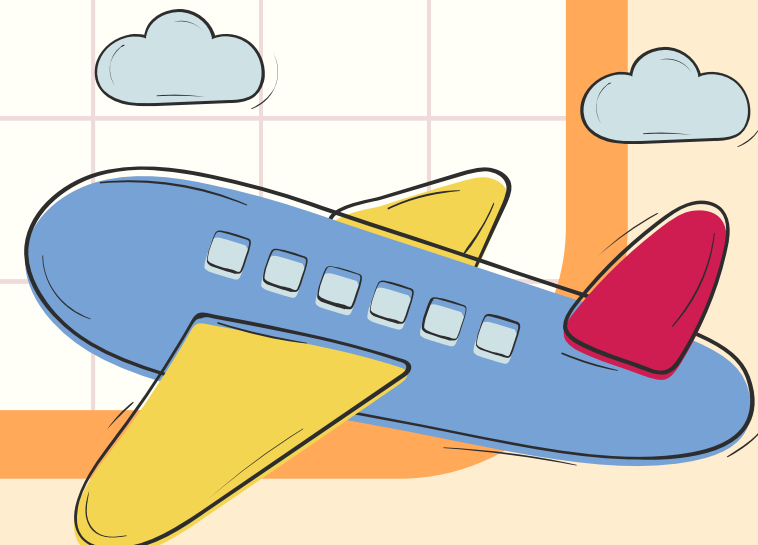
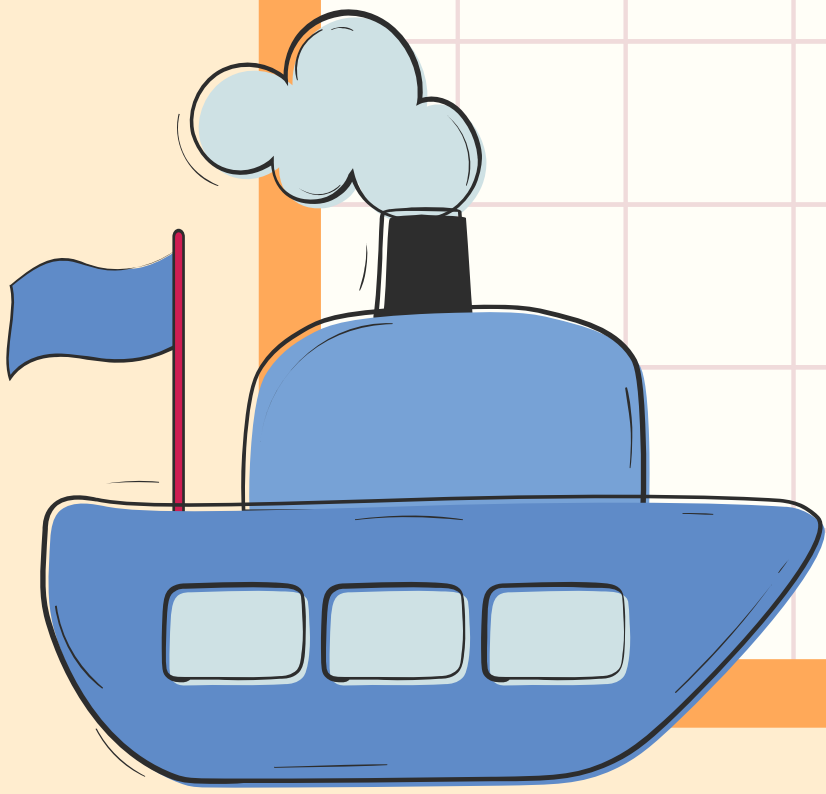


Resin-based sealant failure

most common failures

1. Partial retention with ledge and caries present
2. Loss of sealant at poor oral hygiene surfaces
3. Loss of sealant at the cervical part of the buccal groove of lower molars
4. Loss of sealant at distal groove of the occlusal surface of lower molars
5. Thickness of void

- Tianviwat S., et al., J Dent Assoc 2015



Resin-based sealant failure

1. Partial retention with ledge and caries present



ติดบางส่วน มี ledge และพบฟันผุ



- Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

2. Loss of sealant at poor oral hygiene surfaces



poor oral hygiene surfaces



60.7% of all failures of dental sealant

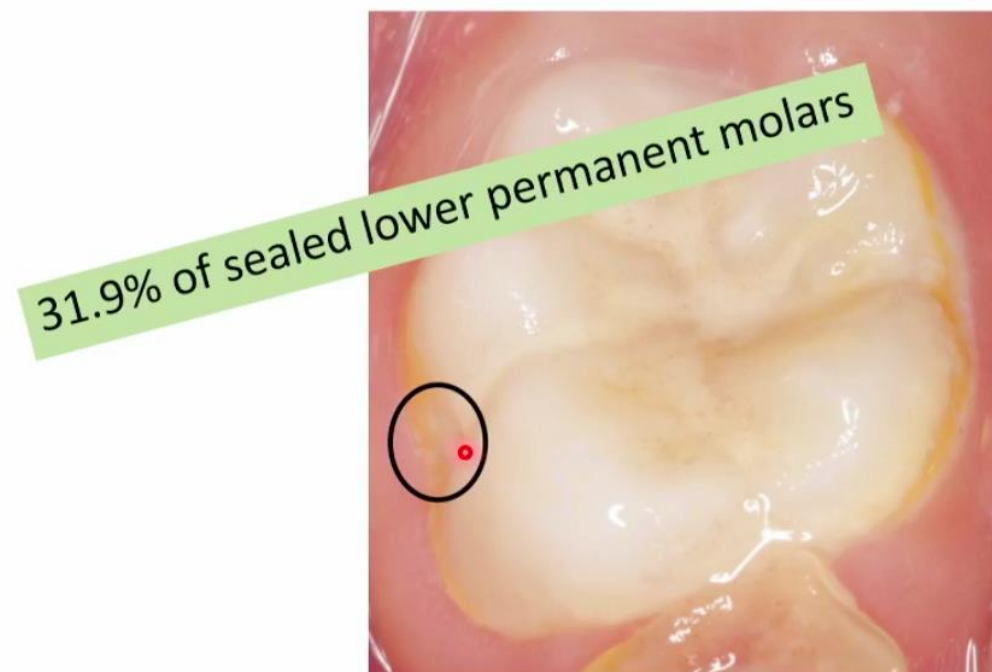
- Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

3. Loss of sealant at the cervical part of the buccal groove of lower molars



หลุดบริเวณใกล้ขอบเหงือก Buccal groove



- Tianviwat S., et al., J Dent Assoc 2015

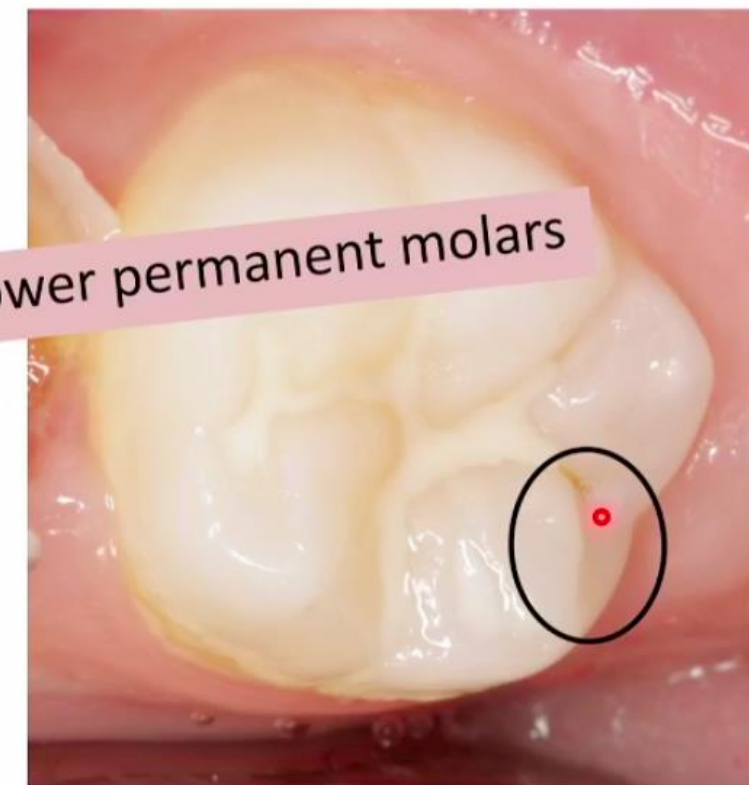
Resin-based sealant failure

4. Loss of sealant at distal groove of the occlusal surface of lower molars

หลุดบริเวณ distal ของฟันล่าง



16.3% of sealed lower permanent molars



- Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

5.Thickness of void

ลักษณะอื่นที่พบได้ เช่น Void, หนา, accessory groove



ลักษณะอื่นที่พบได้ เช่น Void, หนา, accessory groove



ลักษณะอื่นที่พบได้
เช่น Void, หนา,
accessory groove



- Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

Failure types	Calculation	Frequency (%)	
1. Partial retention with ledge and caries present	Percentage of failure type 1 among number of total and partial sealant loss	125/2,423	(5.2 %)
	Percentage of failure type 1 among number of caries on sealed surfaces with partial sealant loss	125/141	(88.7 %)
2. Loss of sealant at poor oral hygiene surfaces	Percentage of failure type 2 among number of total and partial sealant loss	1,471/2,423	(60.7 %)
3. Loss of sealant at the cervical part of the buccal groove of lower molars	Percentage of failure type 3 among number of sealed lower molars	763/2,391	(31.9 %)
4. Loss of sealant at distal groove of the occlusal surface of lower molars	Percentage of failure type 4 among number of sealed lower molars	389/2,391	(16.3 %)

• Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

Material cost of resin sealant per 1 sealed tooth (only sealant)

Subcost Center*	Direct Cost				Indirect Cost Inside	Indirect Cost Outside	Full Cost	Output (Cases ^b)	Unit Cost
	Labor Cost	Material Cost	Capital Cost	Total					
P1 [H]Examination and OHI	1948	607	1142	3697	2282	5451	11 429	105	109
P2 [M]OHI	1183	0	188	1371	1283	3263	5916	145	41
P3 [H]Sealant	327	216	120	662	239	571	1472	11	134
P4 [M]Sealant	7385	3547	234	11 166	1601	4073	16 839	181	93
P5 [H]Fluoride	223	21	33	276	65	156	497	3	165
C1 [H]ExtractOther	27 166	6500	6634	40 300	13 255	31 666	85 220	—	—
C2 [H]ExtractChild	3058	1098	1120	5276	2238	5347	—	—	—
C3 [M]Extract	2040	533	65	2637	442	—	—	—	—
C4 [H]FillAmgOther	36 184	5292	4241	45 718	—	—	—	—	—
C5 [H]FillAmgChild	3062	746	598	—	—	—	—	55	154
C6 [M]FillAmg	1469	204	—	—	—	—	2162	15	144
C7 [H]FillLC	12 358	—	—	—	—	5762	35 253	111	318
C8 [H]Root canal treatment	—	—	—	—	1000	2388	18 405	46	400
C9 [H]ScalingOther	—	—	—	16 377	2564	6126	25 067	118	212
C10 [H]Sealant	—	—	35	160	43	104	307	2	154
C15 [H]Others	—	84	16	1569	106	270	1945	12	162
R1 [H]Fixed prostheses	2193	626	98	2917	196	467	3580	9	398
R2 [H]Complete denture	663	487	76	1227	152	363	1742	7	249
R3 [H]Removable partial denture	1183	838	188	2209	1283	3263	6754	145	47
R4 [H]Temporary plate	4546	1011	1903	7460	3803	9084	20 347	175	116
[A1] Oral Health Survey	1624	8419	65	10 109	130	311	10 551	6	1758
[A2] Oral Health Surveillance	6498	14 370	87	20 955	174	415	21 544	8	2693
Total	2599	14 849	87	17 535	174	415	18 124	8	2265
	975	2136	65	3176	130	311	3618	6	603
	23 280	340	985	24 605	—	11 400	36 006	—	—
	15 058	159	632	15 849	—	7995	23 843	—	—
	180 948	79 068	23 427	283 443	43 374	123 764	450 581	2321	—

Abbreviations: Amg, amalgam filling; LC, tooth-color filling materials; OHI, oral hygiene instruction.

*P, preventive and promotive services; C, curative services; R, rehabilitative services; A, dental activities; H, hospital-based services; M, mobile or school-based services.

^bCases are the number of completed service episodes, so an individual can have more than 1 case per year.

Material cost of resin sealant 15-18 Baht

Tianviwat S. et al., Asia Pacific J of public health, 2009

Phetcharoan W., วารสารวิชาการแพทยเขต 11, 2019

- Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

Good moisture control
complete retention 2.3 เท่า
Checking after sealing
complete retention 2.8 เท่า

Journal of Public Health, January-April 2011

Vol. 41 No. 1

Factors Related to Short-term Retention of Sealant
in Permanent Molar Teeth Provided in the School
Mobile Dental Clinic, Songkhla Province, Southern
Thailand

Sukanya Tianviwat*** Janpim Hintao**
Virasakdi Chongsuvivatwong*** Songchai T...

of sealant retention could be applied by reallocating dental manpower and sealant training to
emphasize sealant checking procedure.

Key words: Short-term sealant retention, factors, mobile dental clinic

J Public Health 2011; 41(1): 50-58.

Correspondence

Tianviwat S. et al., J Public Health, 2011

* Departmen

** Common Oral Diseases and Epidemiology Research Center, Faculty of Dentistry, Prince of Songkla University, Songkhla, Thailand

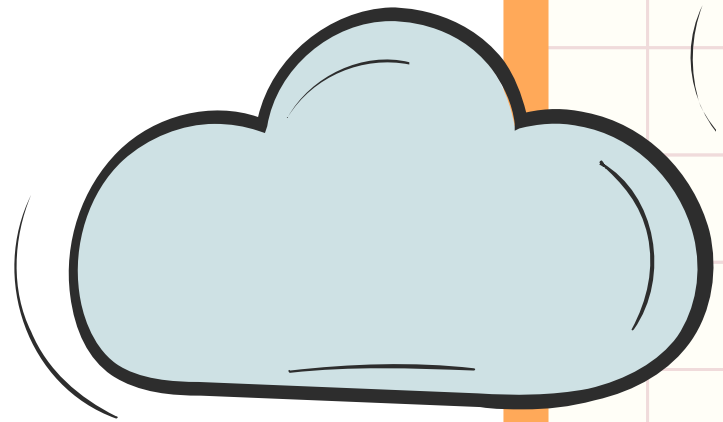
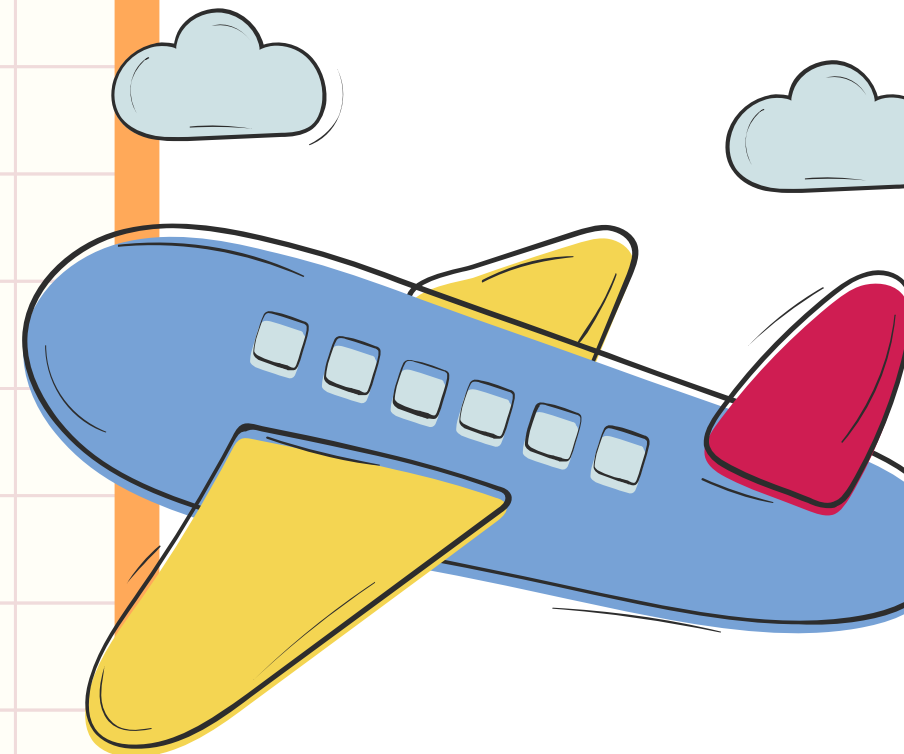
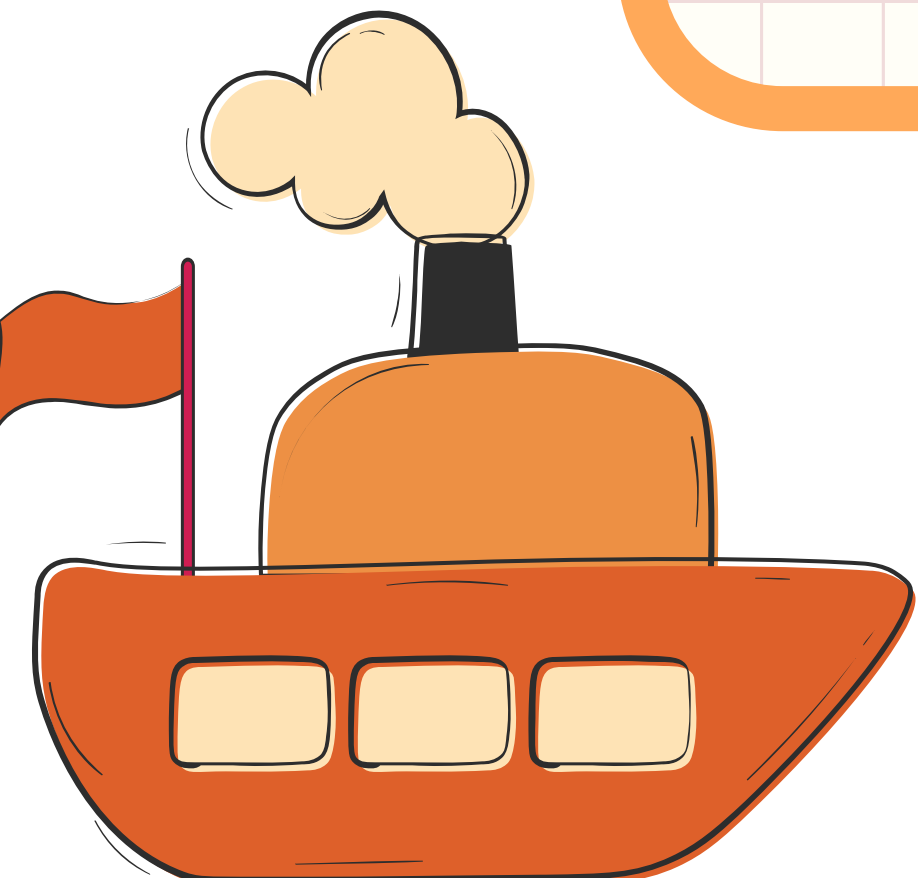
• Tianviwat S., et al., J Dent Assoc 2015

Resin-based sealant failure

ประสิทธิภาพการทำ sealant ในประเทศไทยดีขึ้นเรื่อยๆ
complete retention และป้องกันฟันผุเป็นได้
โดยเน้นคุณภาพในทุกขั้นตอน

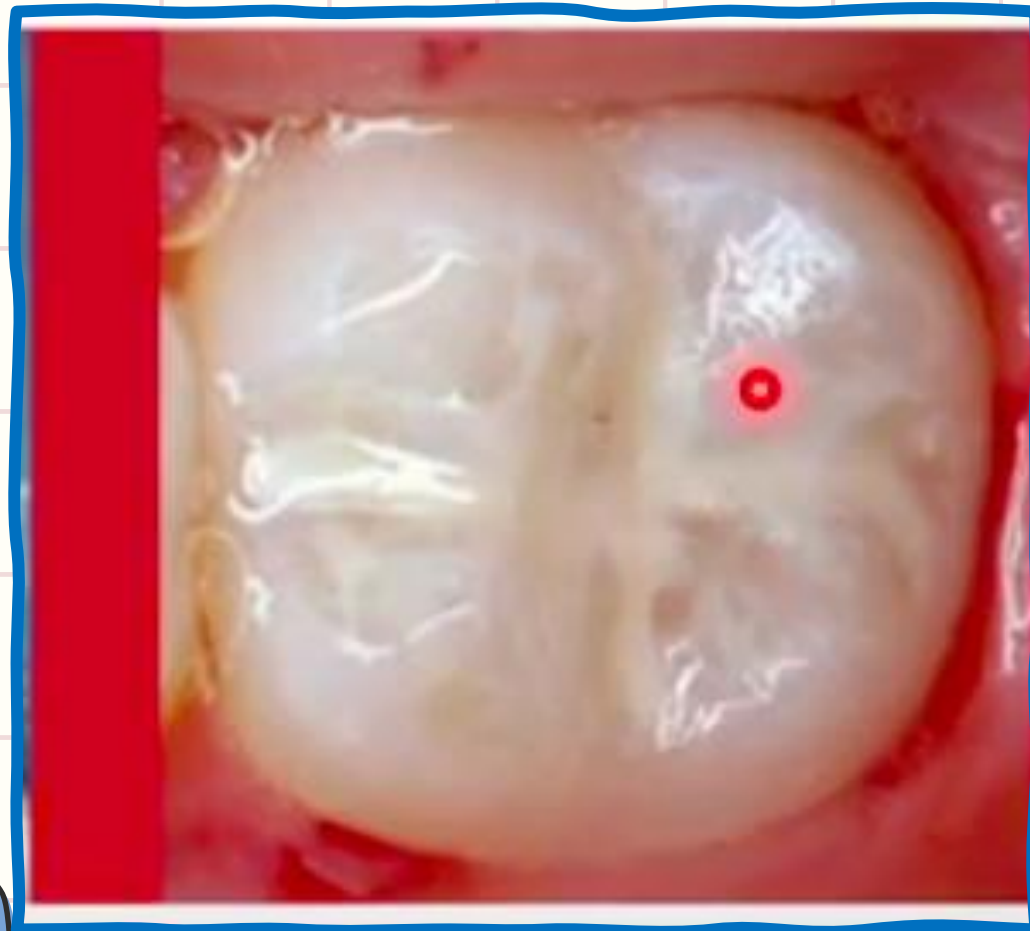
- Tianviwat S., et al., J Dent Assoc 2015

GI Sealant

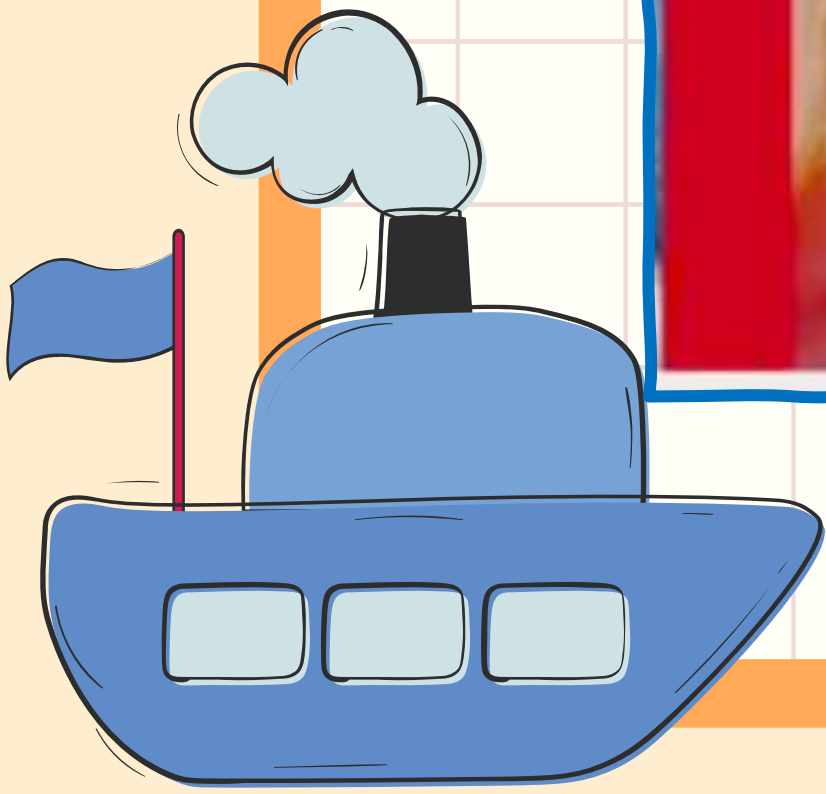


GI sealant

INDICATIONS

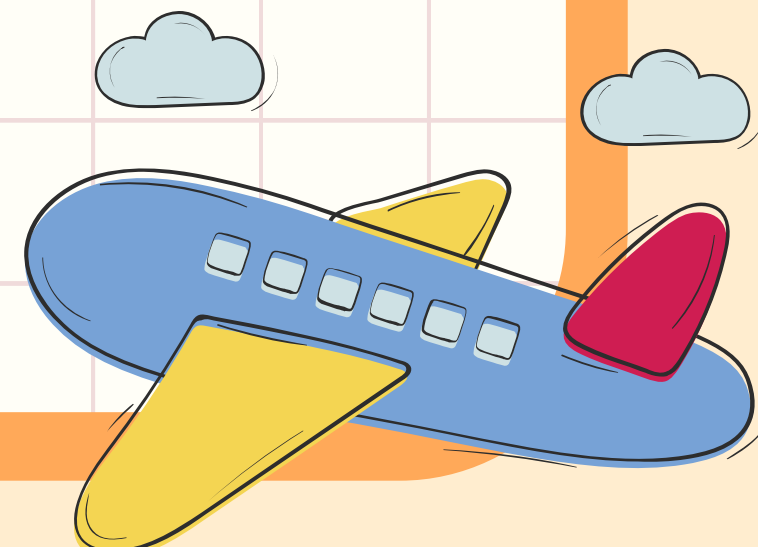
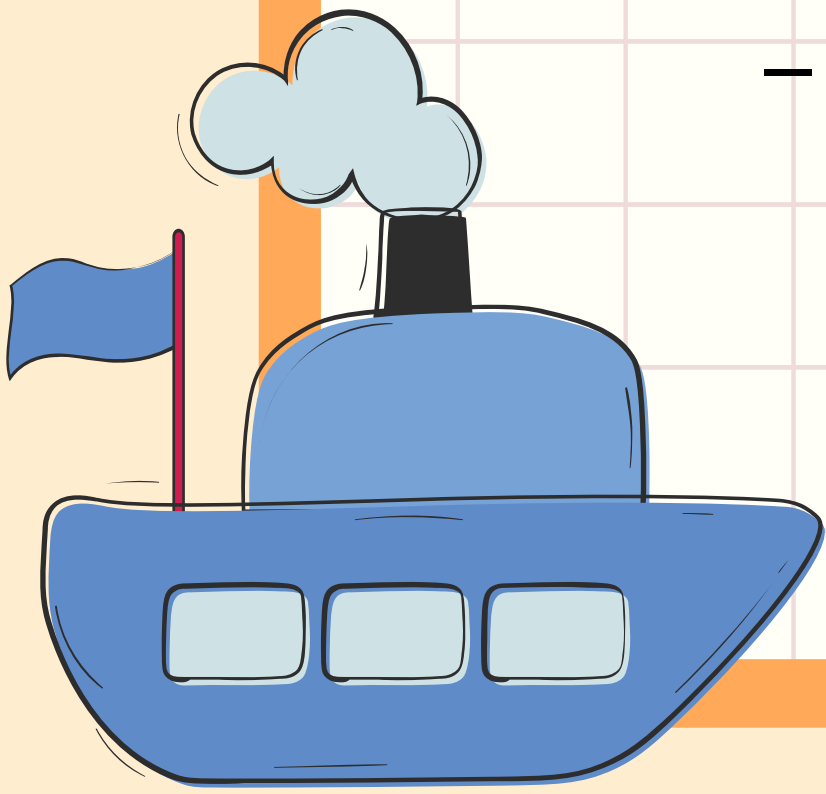


- UNCOOPERATIVE CHILD
- PARTIAL ERUPTION TOOTH
- CAN'T MOISTURE CONTROL
- TEMPORARY SEALANT



GI sealant

- Lower technique sensitivity, good adherence, and fluoride-releasing properties
- The caries prevention effect of GI sealants is not associated with retention.
- GI sealants **may be** a good alternative
 - community service with limited equipment, no chairside assistant,
- Resin sealant may be preferable
 - provide good caries prevention effect and better retention. → makes follow-up examinations easier
 - Except → ideal isolation is not possible.



GI sealant

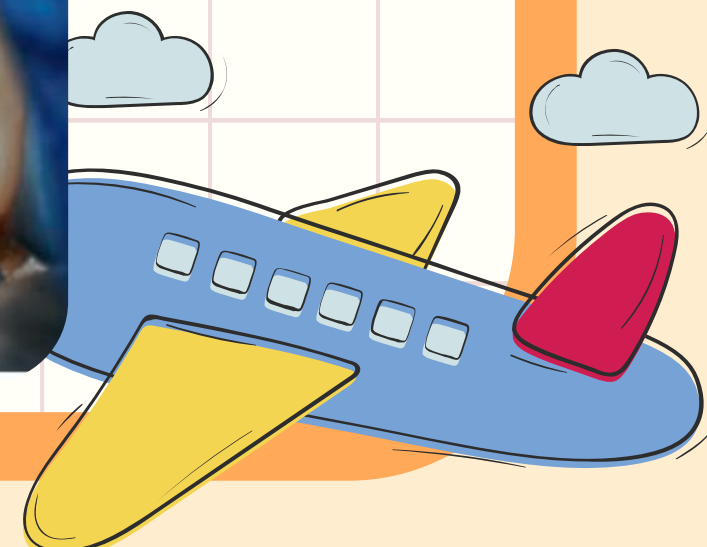
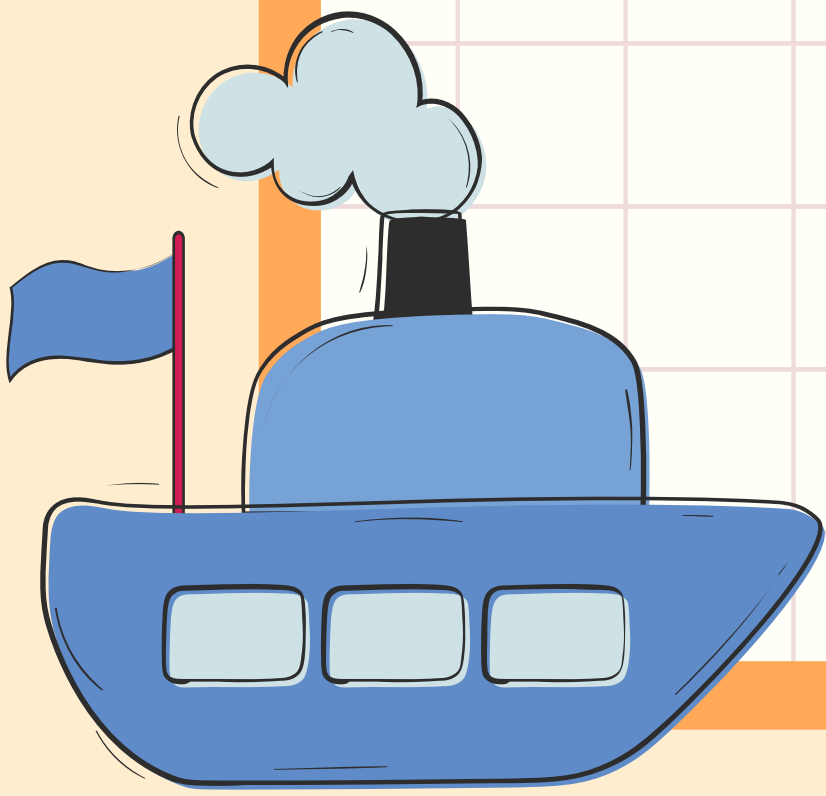
1. ISOLATION

- Rubber dam / cotton rolls
- Saliva ejector



2. PROPHYLAXIS

- Using prophy cup and pumice to remove plaque and debris
- Mechanically **remove plaque** from the fissures using a brush cone
- Gently pulling the explorer or probe through the fissures
- Dry the tooth to avoid diluting the etch



GI sealant

3. CONDITIONER

- Applied either 10% polyacrylic acid solution (for 20 seconds) or 20% polyacrylic acid solution (for 20 seconds), and thoroughly rinsed.
- After rinsing, **remove excess moisture** with a sponge or cotton pledget (**avoid over-drying the tooth**)
- The tooth should have a **moist shiny surface**



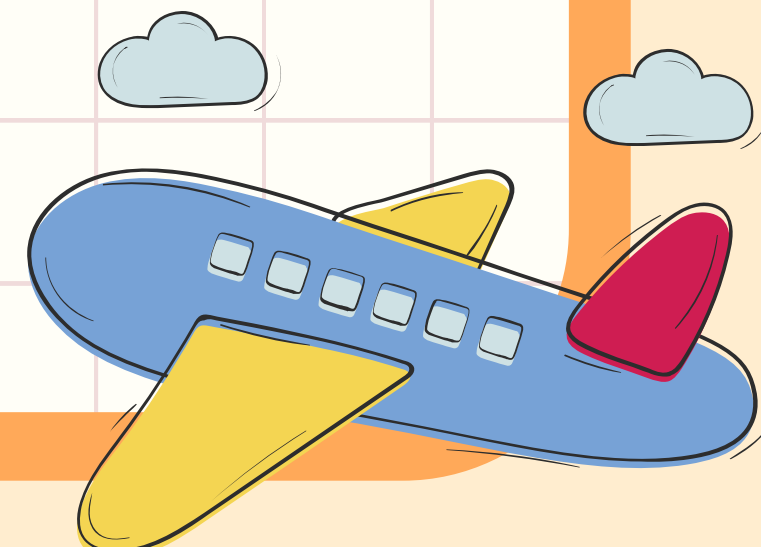
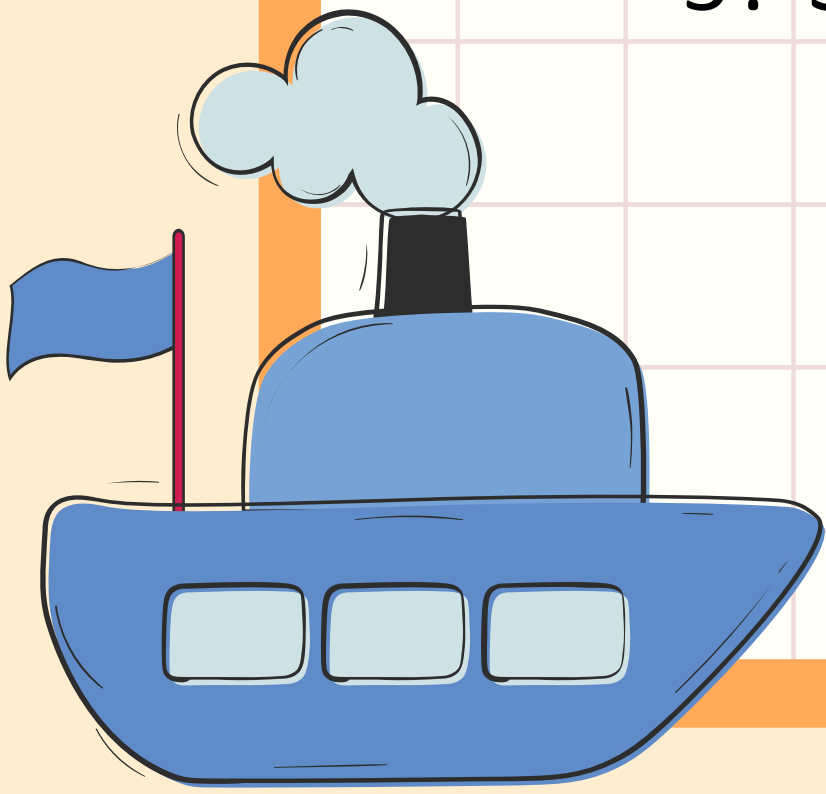
Caption

GI sealant

4. GI SEALANT APPLICATION AND POLYMERIZATION

- Spread a thin film of GC Fuji VII over the occlusal surface, including pits and fissures
- According to manufacturer's instruction

5. SURFACE COATING



GI sealant

6. EVALUATION

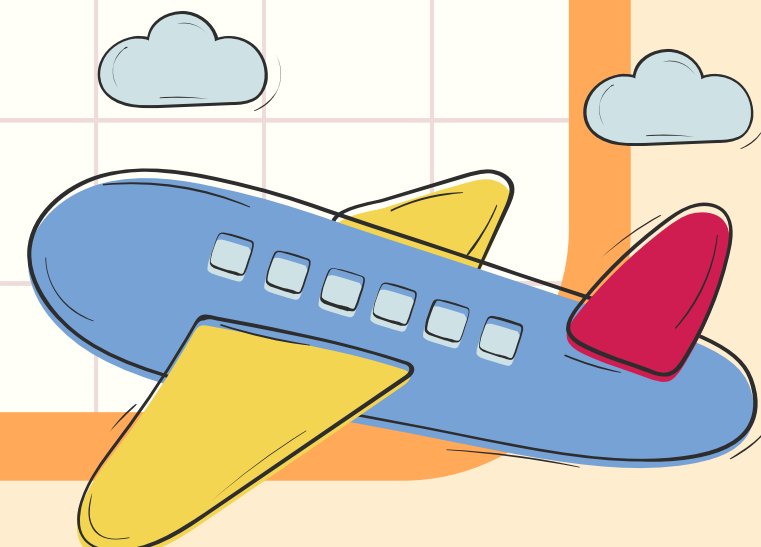
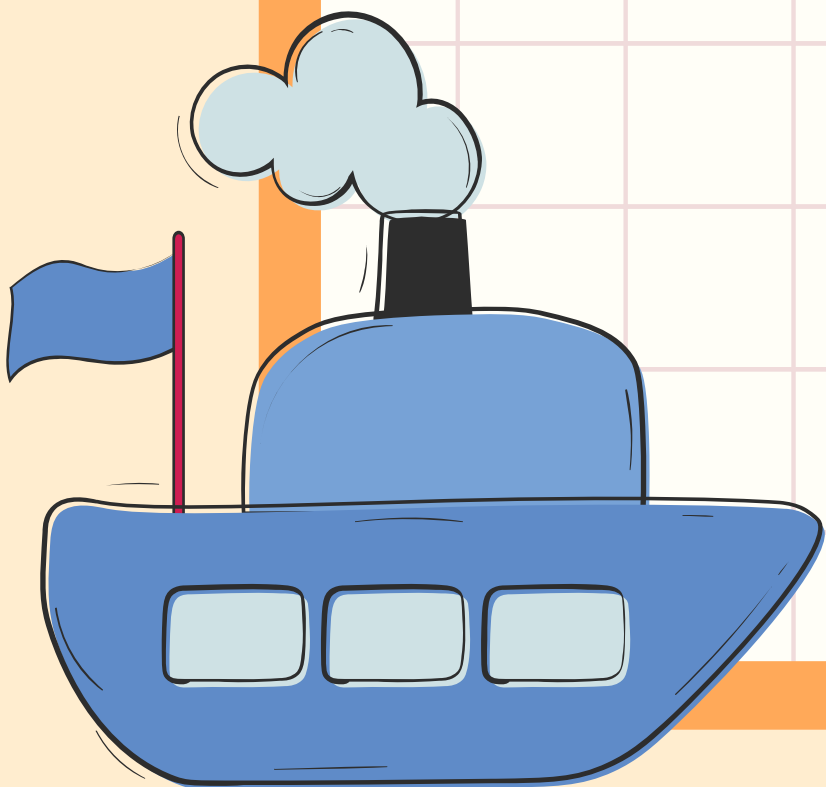
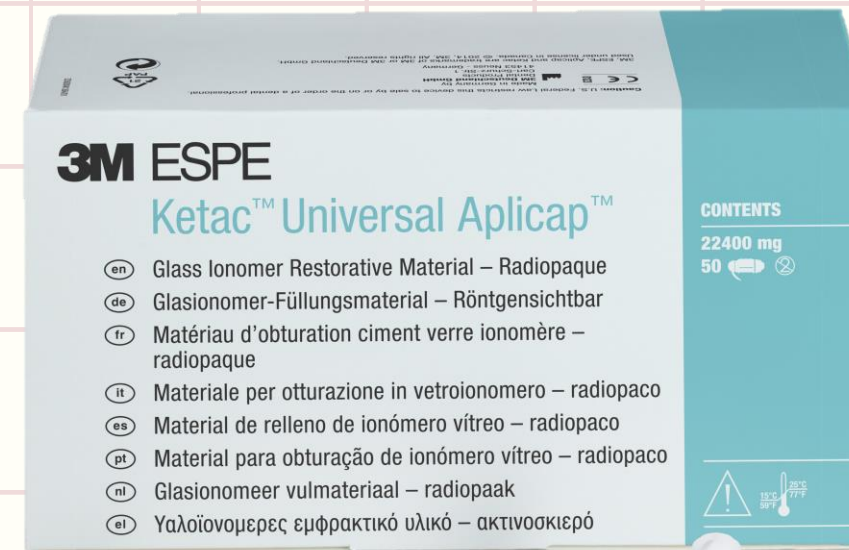
- Retention
- Absence of voids or bubbles
- Small voids —> Top-up
- Check occlusion : No high spot



7. PERIODIC EVALUATION



GI sealant



GI sealants compared with resin-based sealants

Sealant Materials	Summary of Findings	Level of Significance	Quality of Evidence
GI vs. RBS	Sound occlusal surface: GI reduces caries incidence by 37%	Non-significant	Very low
	Non-cavitated occlusal carious lesion: GI Very low increases incidence of caries by 53%	Non-significant	
	Risk of retention loss: GI has a 5 times greater risk of loss	Significant	
GI vs. RMGI	Sound occlusal surface: GI increases caries incidence by 41%	Non-significant	Very low
	Risk of retention loss: GI has a 3 times greater risk of loss	Significant	
RMGI vs. Polyacidmodified resin sealant	Sound occlusal surface: RMGI reduces caries incidence by 56%	Non-significant	Very low
	Risk of retention loss: RMGI has an increased risk of loss of 17%	Non-significant	
Polyacid-modified resin sealant vs. RBS	Sound occlusal surface: Poly-acid modified resin sealant increases caries incidence by 1%	Non-significant	Very low
	Risk of retention loss: Poly-acid modified resin sealant has a decreased risk of loss of 13%	Non-significant	

TABLE 4 Summary of evidence-based findings when comparing different sealant materials [Naaman et al., 2017].

GI sealants compared with resin-based sealants

The effect of GI sealants compared with resin-based sealants in a population of patients with noncavitated occlusal carious lesions, the data suggest that

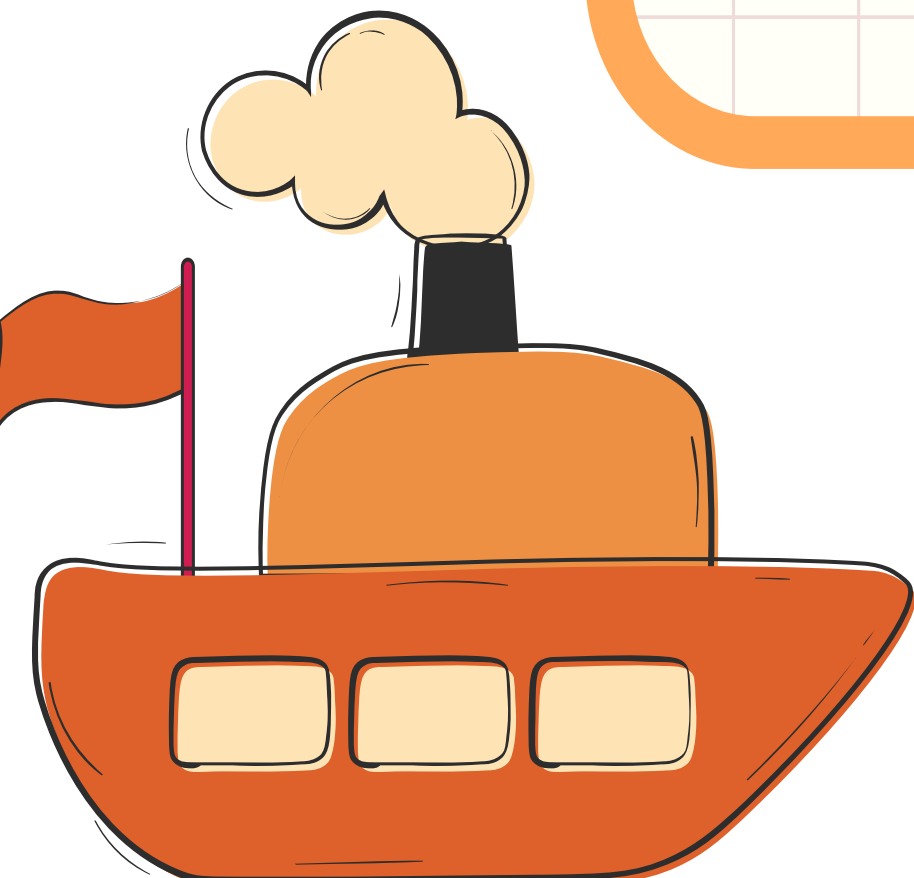
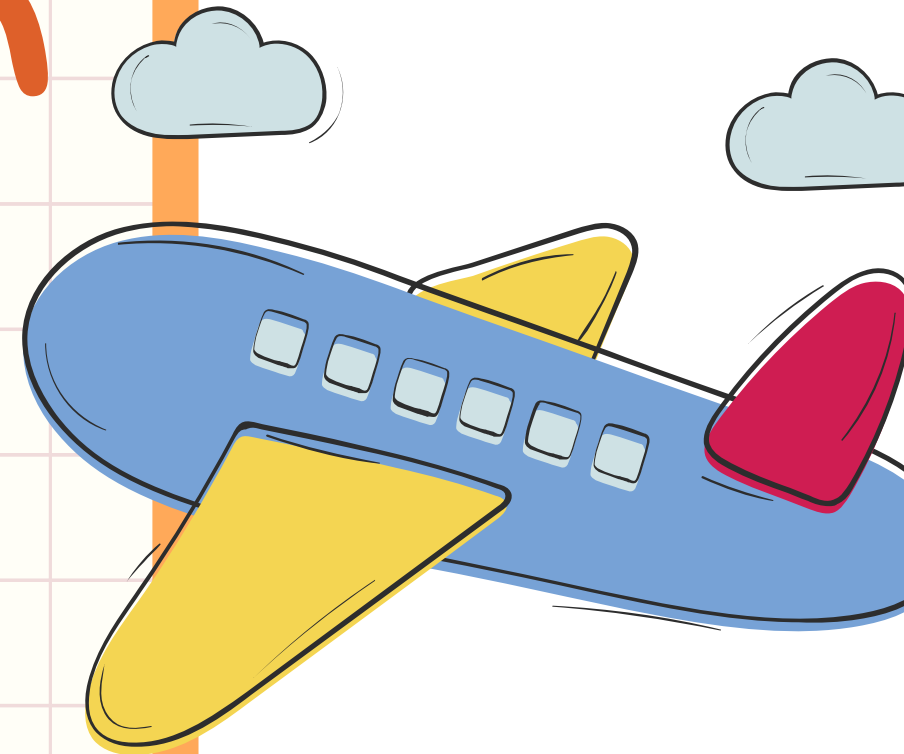
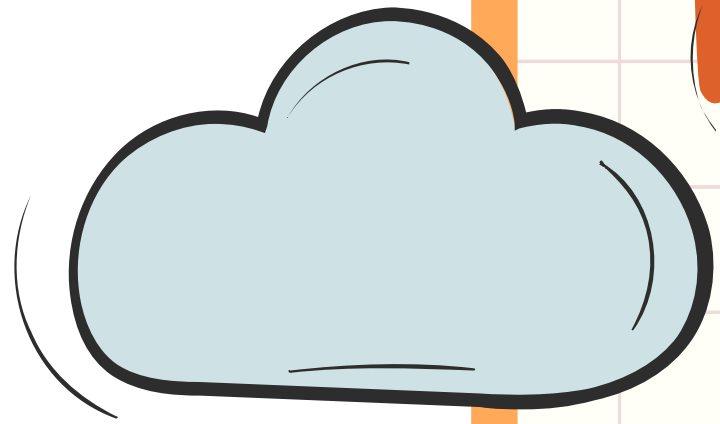
GI sealants may increase the incidence of carious lesions by 53% (OR, 1.53; 95% CI, 0.58-4.07); however, this difference was not statistically significant ($P=.39$).

Assessing retention, **glass ionomer sealants** may have **5 times greater risk of experiencing loss of retention** from the tooth compared with resin-based sealants after 2 to 3 years of follow-up (OR, 5.06; 95% CI, 1.81-14.13).

Summary of Resin-based sealants

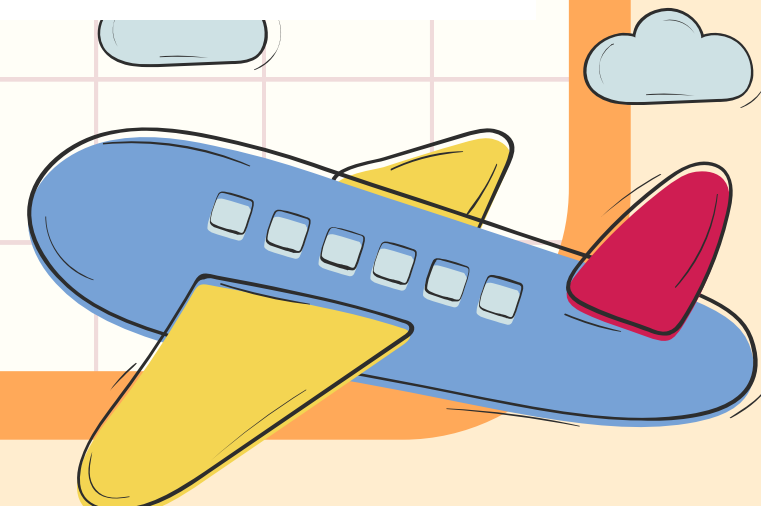
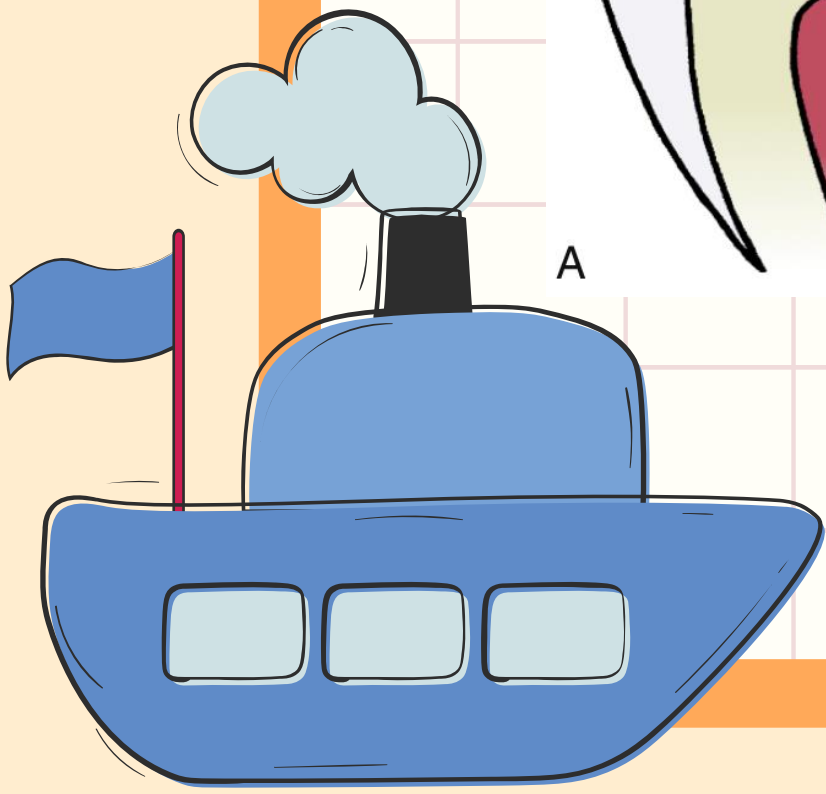
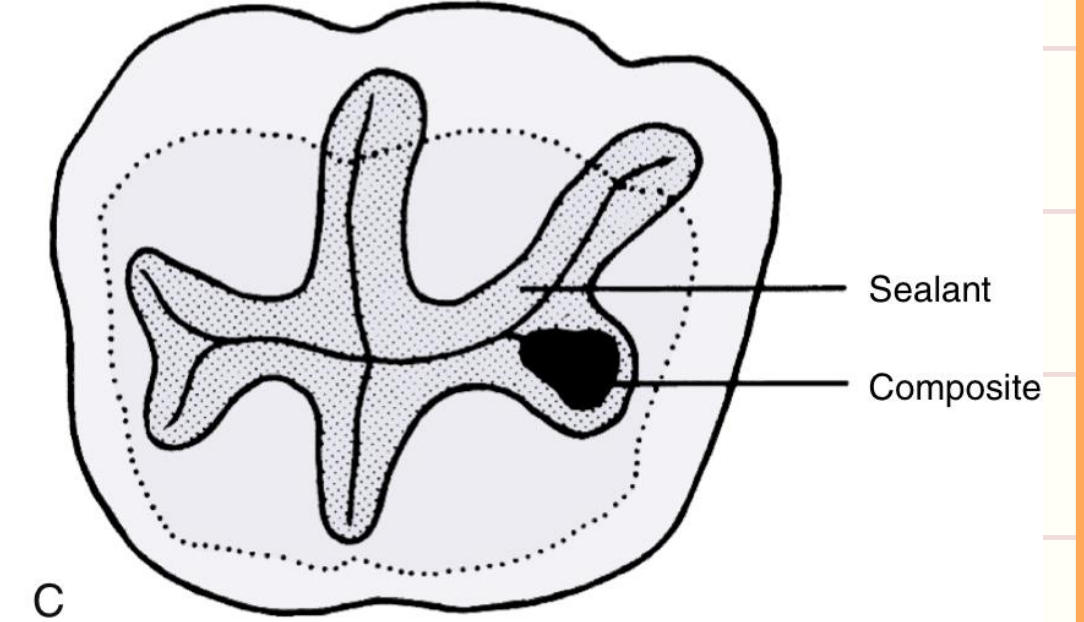
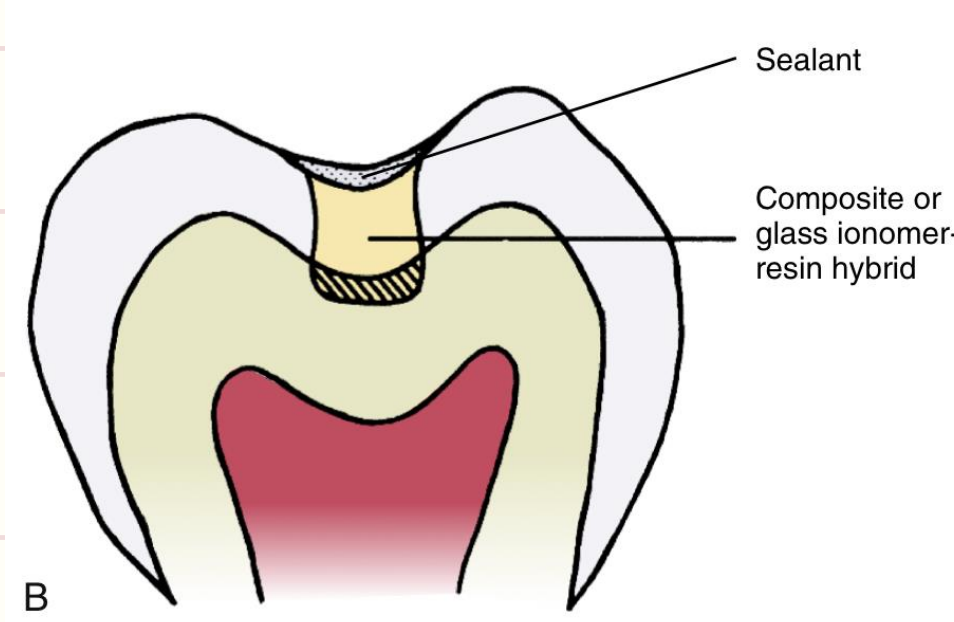
- Resin-based sealants **are the first choice of treatment**, and glass ionomer sealants may be utilized as a provisional agent when the placement of a resin-based sealant is indicated, but absolute isolation cannot be achieved, and therefore moisture control is compromised.
- **Glass ionomer sealants** contain fluoride that can help to prevent caries through their release over a prolonged period.

Preventive Resin Restoration (PRR)



PRR

- Minimal tooth preparation for caries removal
- Restored cavity, Sealed susceptible fissure



PRR

Small carious lesion Questionable caries

Caries limited in enamel
< 1mm in width

Remove caries

Sealant

Caries limited in enamel
> 1mm in width

Remove caries

CR placement

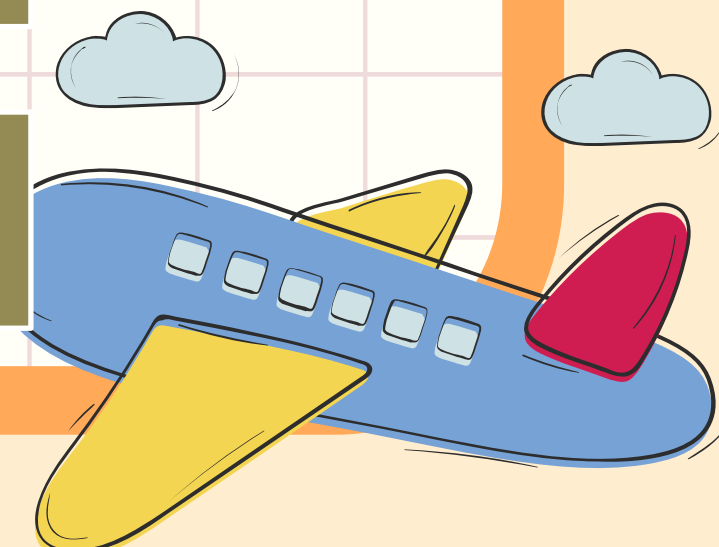
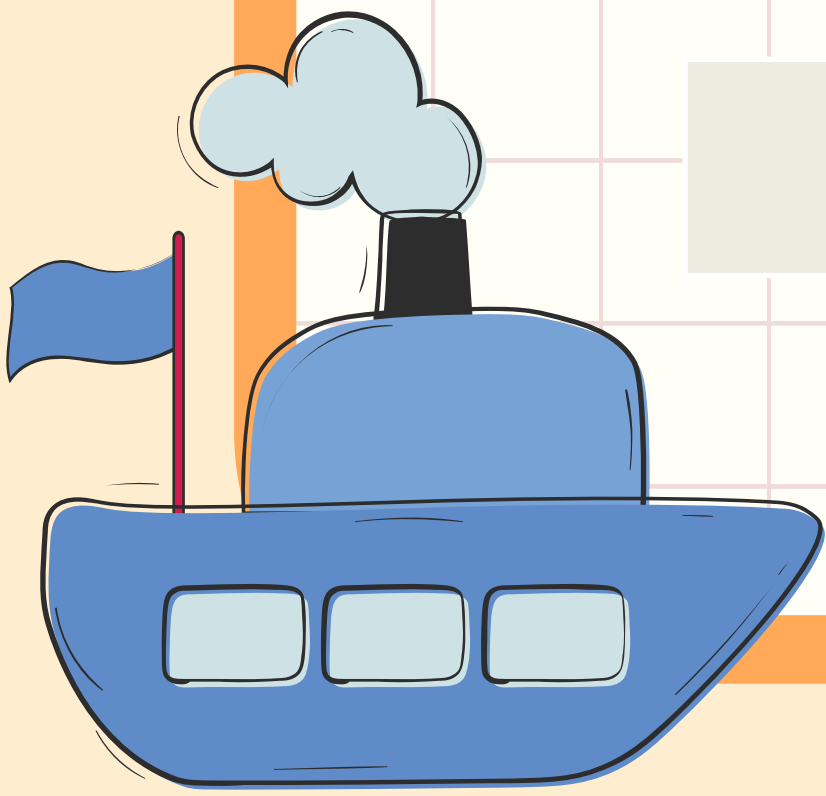
Sealant

Caries extend into dentin

Remove caries

CR placement, lining
if deep

Sealant



PRR

ทันตแพทยสมาคมแห่งประเทศไทยฯ

การวินิจฉัยโรคฟันผุและการจัดการ 2561

Dental Caries Diagnosis and Management

Occlusal surface/ Pits and fissures

Depth of lesion	Cavitation	Caries activity	Clinical appearances	ICDAS	Management	
					Permanent teeth	Primary teeth
Enamel caries	Non-cavitated lesions	Inactive	Shiny, hard and smooth surface white, brown, or black color without plaque deposition	1,2	Routine oral care ^a	
		Active	Rough, white, or yellow color with plaque deposition		Sealant ¹⁻³	
	Cavitated lesions	Inactive	Enamel breakdown without dentin visible, hard, brown or black color without plaque deposition	3	Sealant ³	
		Active	Enamel breakdown without dentin visible, soft with plaque deposition		Sealant (if regular check-up is possible) ⁵ / Minimally invasive restoration ^{4,b}	Sealant ³
Dentin caries	Non-cavitated lesions	Probably active	Smooth surface with dark shadow under enamel surface without enamel breakdown	4	Sealant (if regular check-up is possible) ⁵ / Minimally invasive restoration ^{4,b}	
	Cavitated lesions	Inactive	Underlying dark shadow from dentin Enamel breakdown without visible dentin, hard, brown, or black color without plaque deposition	4	Minimally invasive restoration ^{6,b}	

PRR

ทันตแพทยสมาคมแห่งประเทศไทยฯ

การวินิจฉัยโรคฟันผุและการจัดการ 2561

Depth of lesion	Cavitation	Caries activity	Clinical appearances	ICDAS	Management	
					Permanent teeth	Primary teeth
Dentin caries	Cavitated lesions	Inactive	Distinct cavity with visible dentin, hard, brown, or black color without plaque deposition	5,6	Minimally invasive restoration ^b	Routine oral care (if cleansable) / Minimally invasive restoration ^b
		Active	Underlying dark shadow from dentin Localized enamel breakdown without visible dentin	4	Minimally invasive restoration ^b	Minimally invasive restoration ^{6,b}
			Distinct cavity with visible dentin	5,6	Minimally invasive restoration ^b (Selective removal to soft dentin ^c : one visit or Stepwise removal ^d) ⁶	Minimally invasive restoration ^b (Selective removal to soft dentin ^c : one visit or SDF if inaccessible service) ¹¹

หมายเหตุ: คำจำกัดความและเอกสารอ้างอิงอยู่ด้านท้ายตาราง

PRR



Code 0



Code 1



Code 2



Code 3



Code 4



Code 5

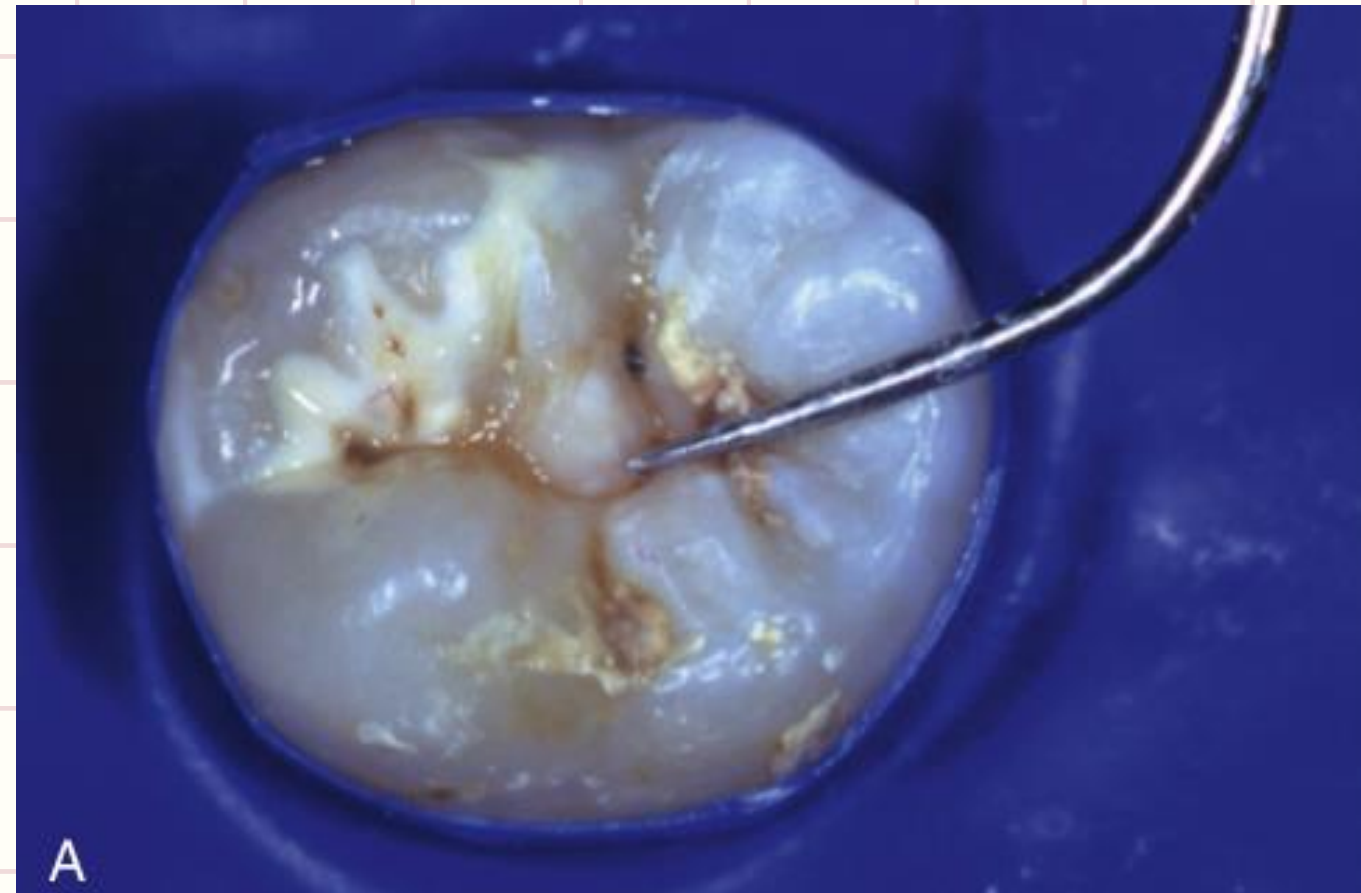


Code 6

Figure 1. One example of each ICDAS II coding.

Procedures for PRR

Step 1:
Clean tooth surface & Isolation & Re-examination

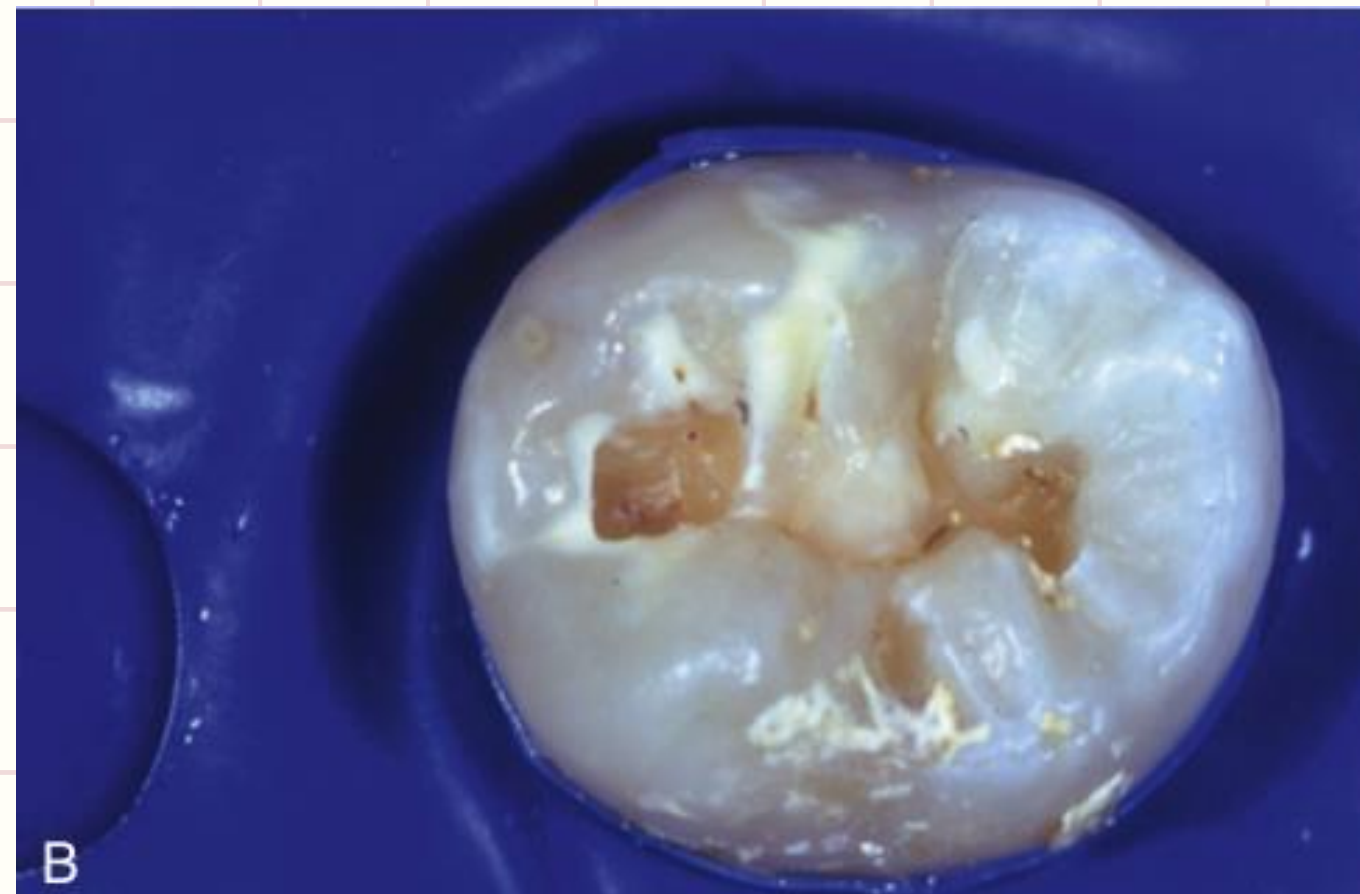


Procedures for PRR

Step 2 :

Cavity preparation & Caries removal

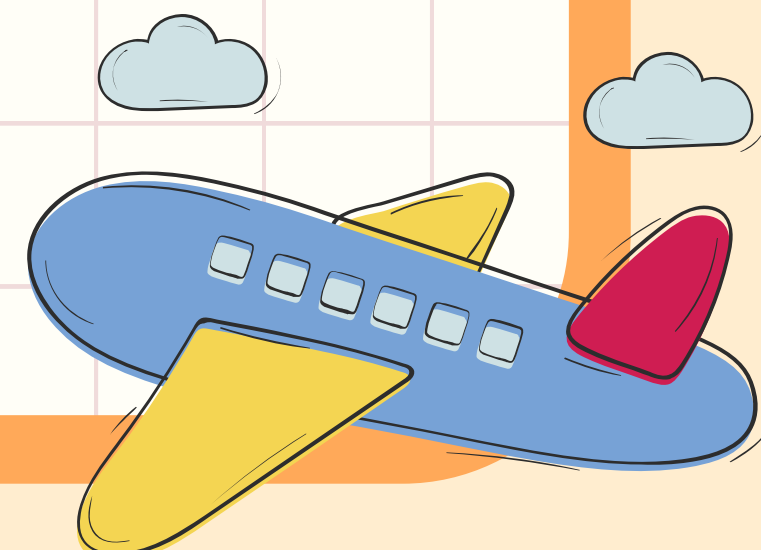
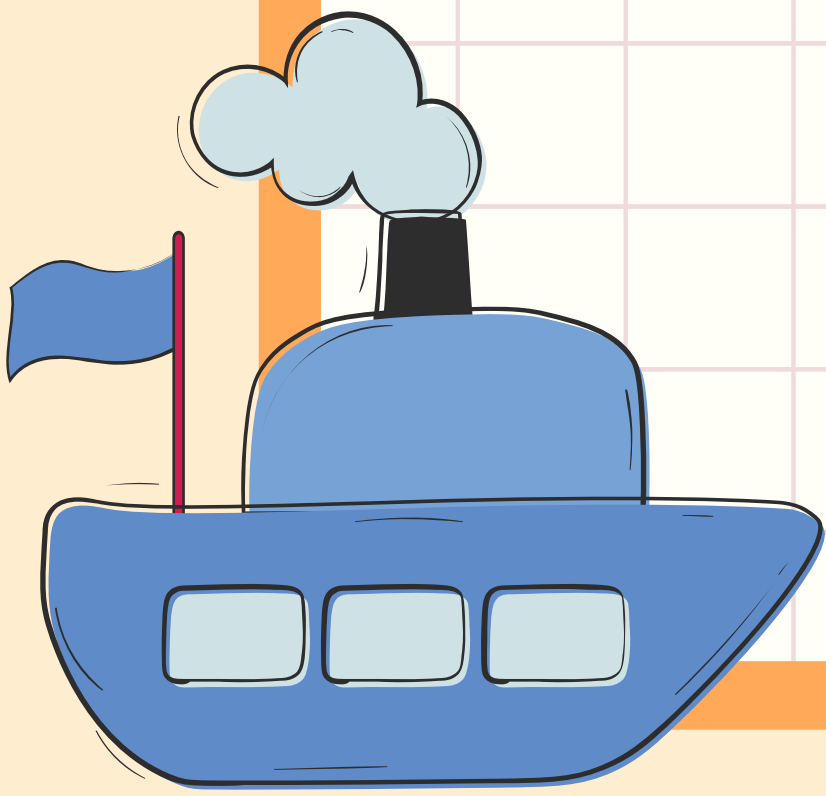
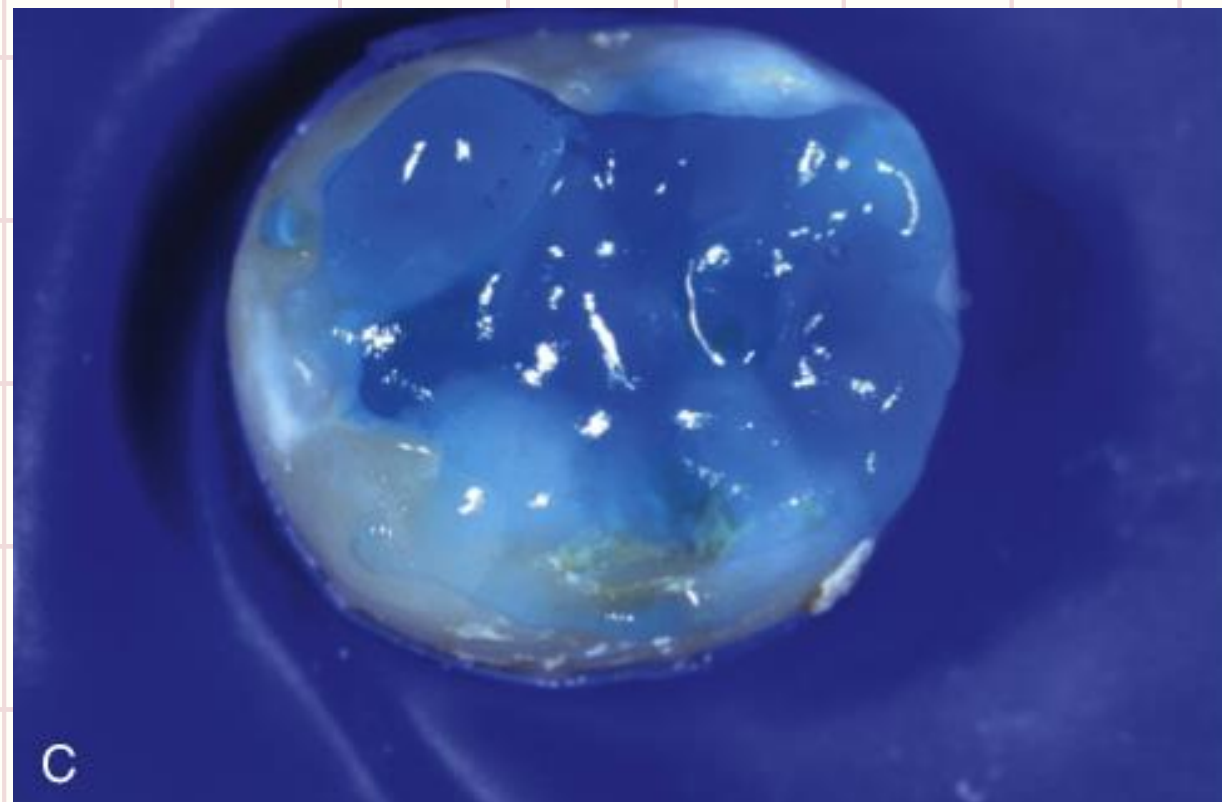
กรณีรอยผุขยายลงไปใน dentine มาก > Subbase/Base



Procedures for PRR

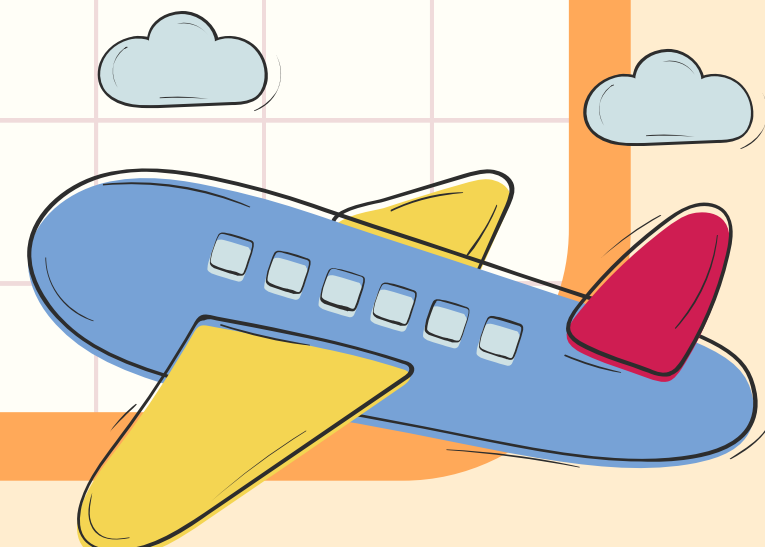
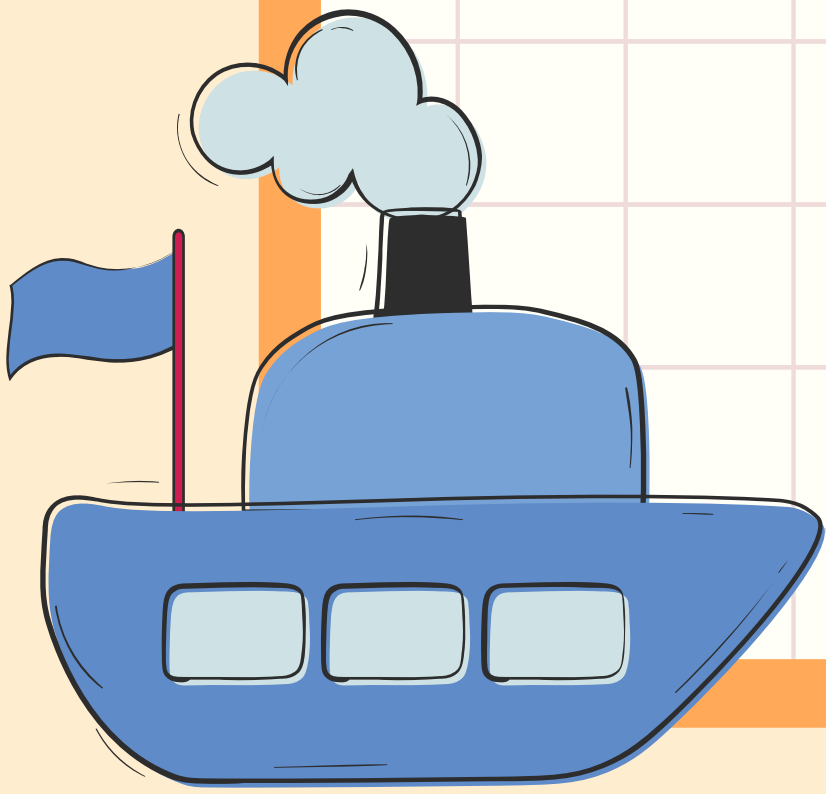
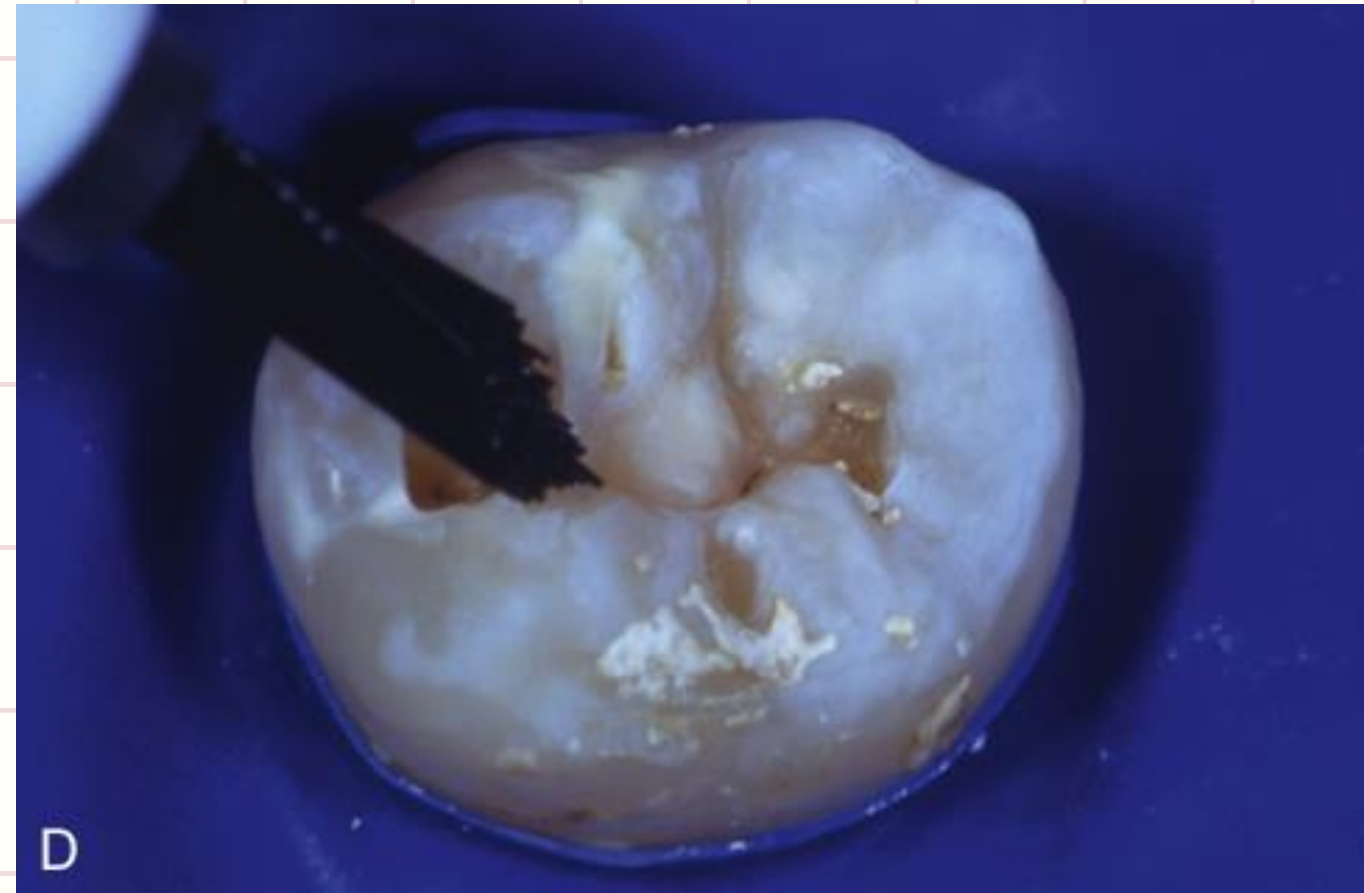
Step 3 :

Etching with 37% Phosphoric acid for 15 sec
ล้างน้ำ 20 – 30 sec แล้วเป่าให้พอดิบ
หากปนเปื้อนเลือด/น้ำลาย re-etch 10 sec



Procedures for PRR

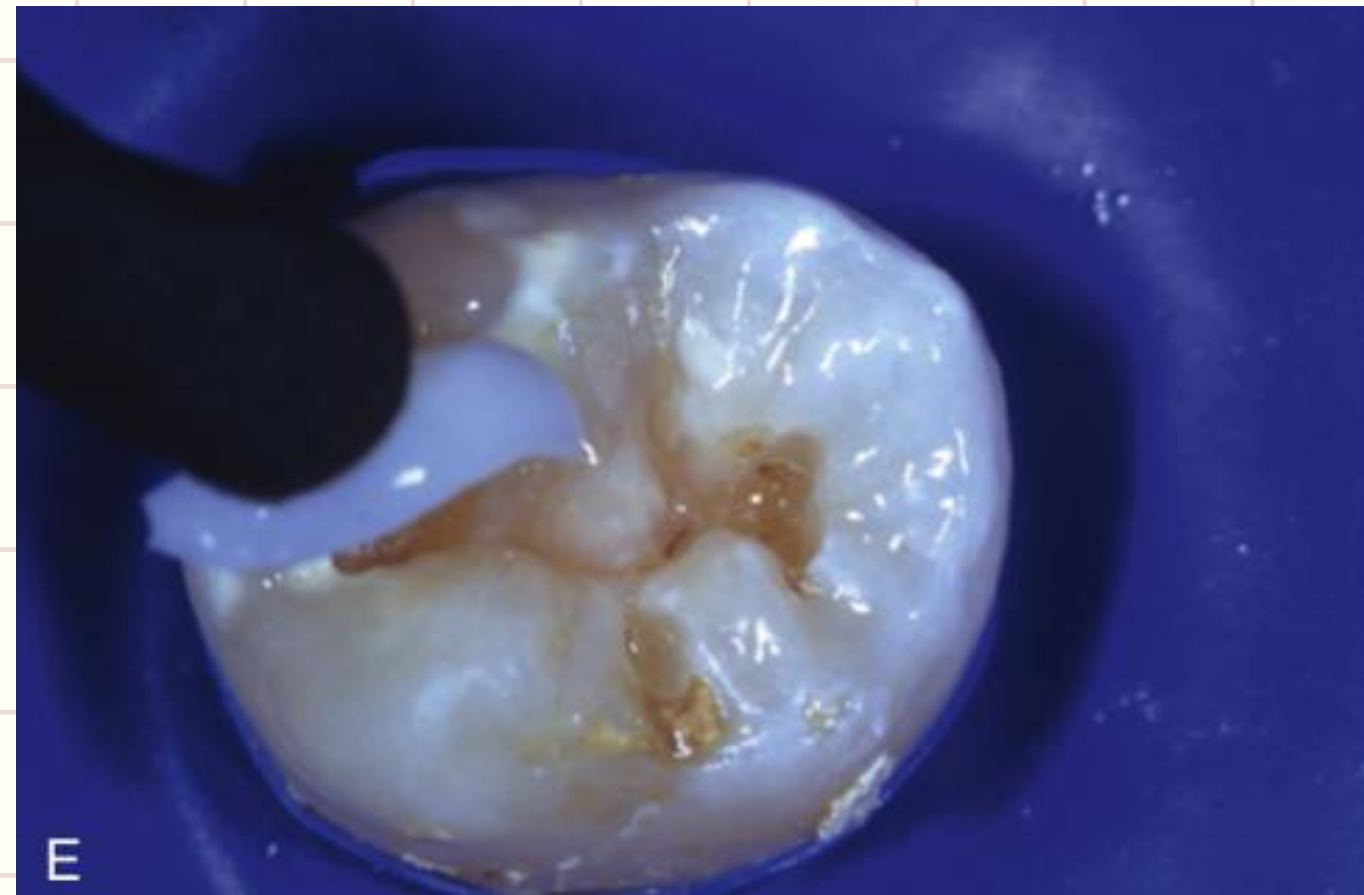
Step 4: Apply Bonding agent



Procedures for PRR

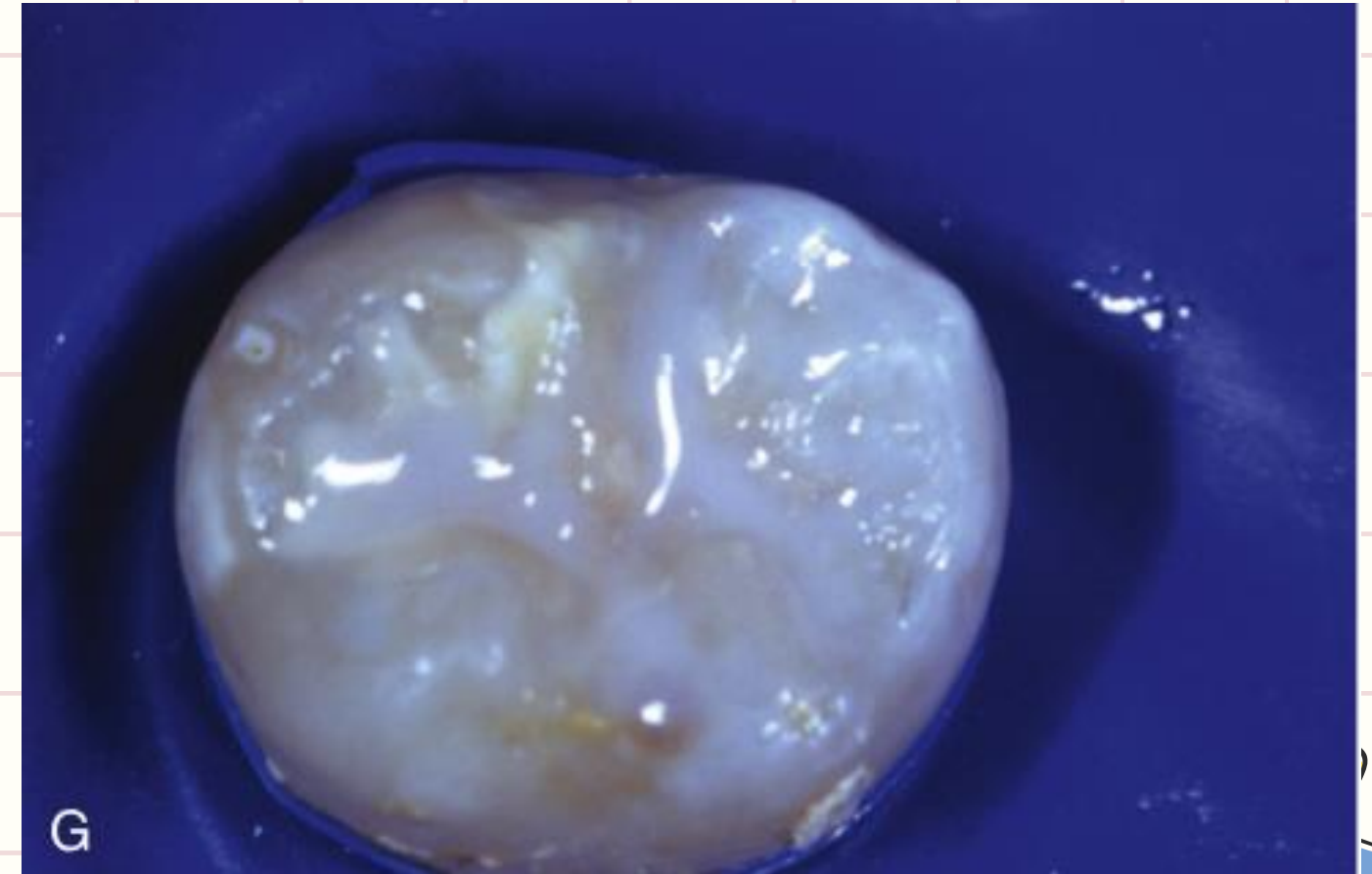
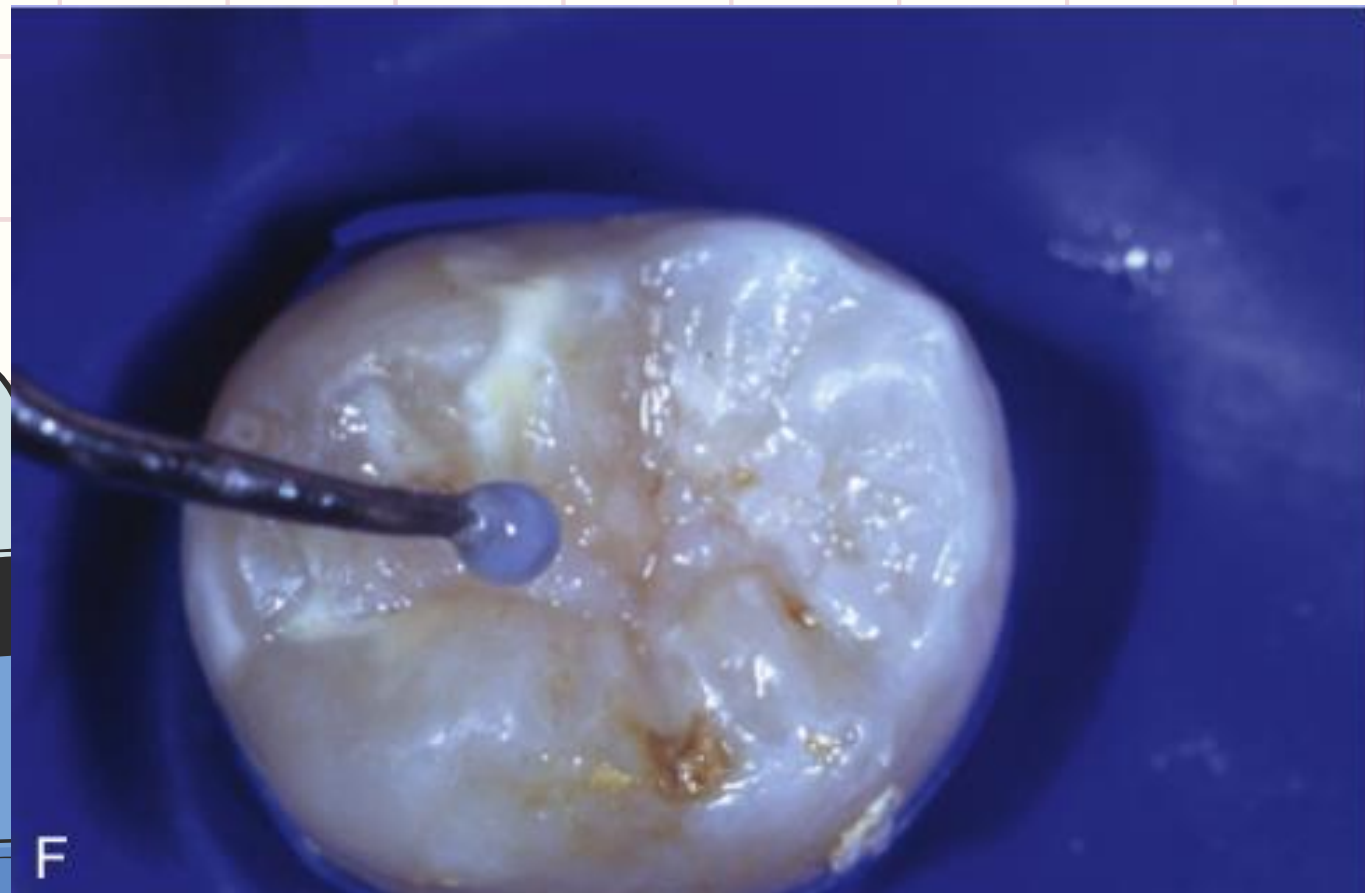
Step 5 :

Restored with resin composite & light cure



Procedures for PRR

Step 6 : Apply sealant & curing

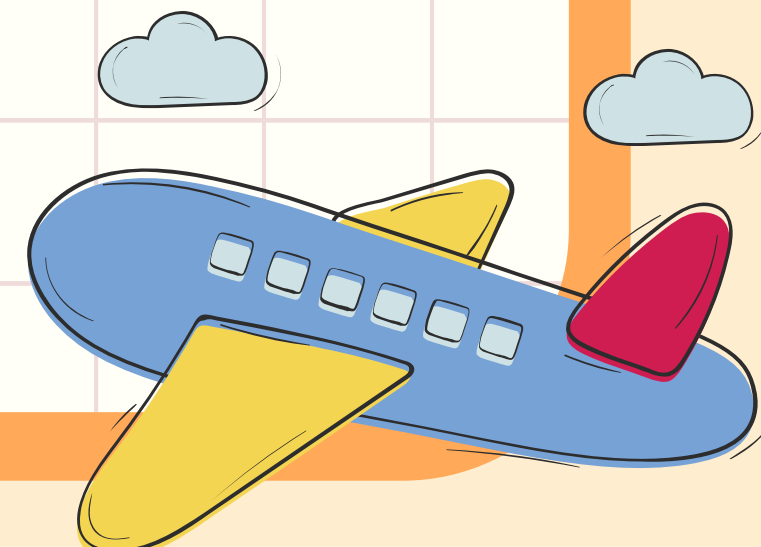
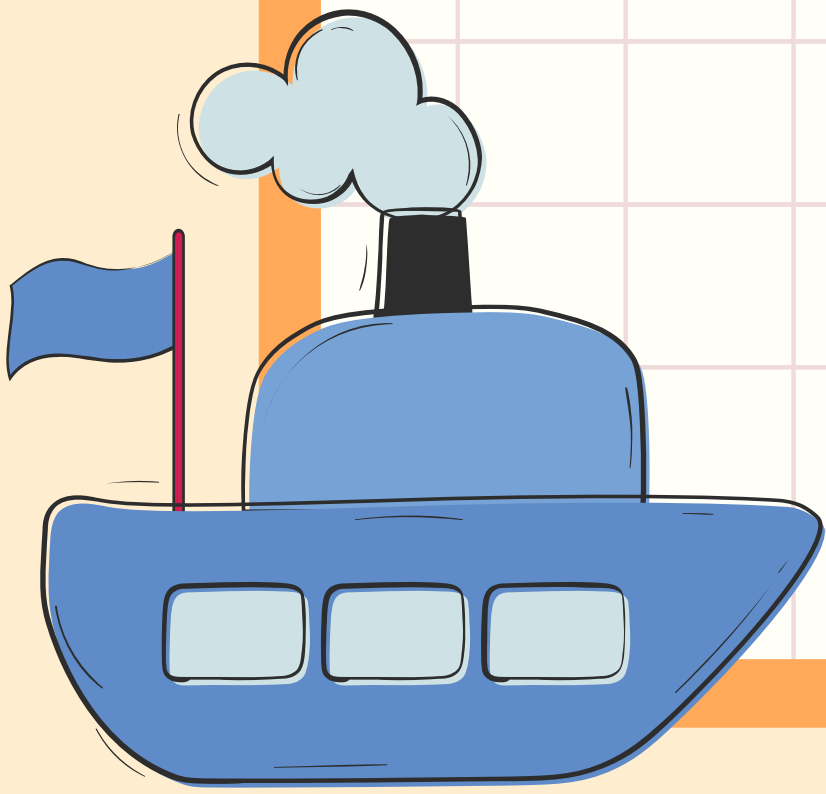
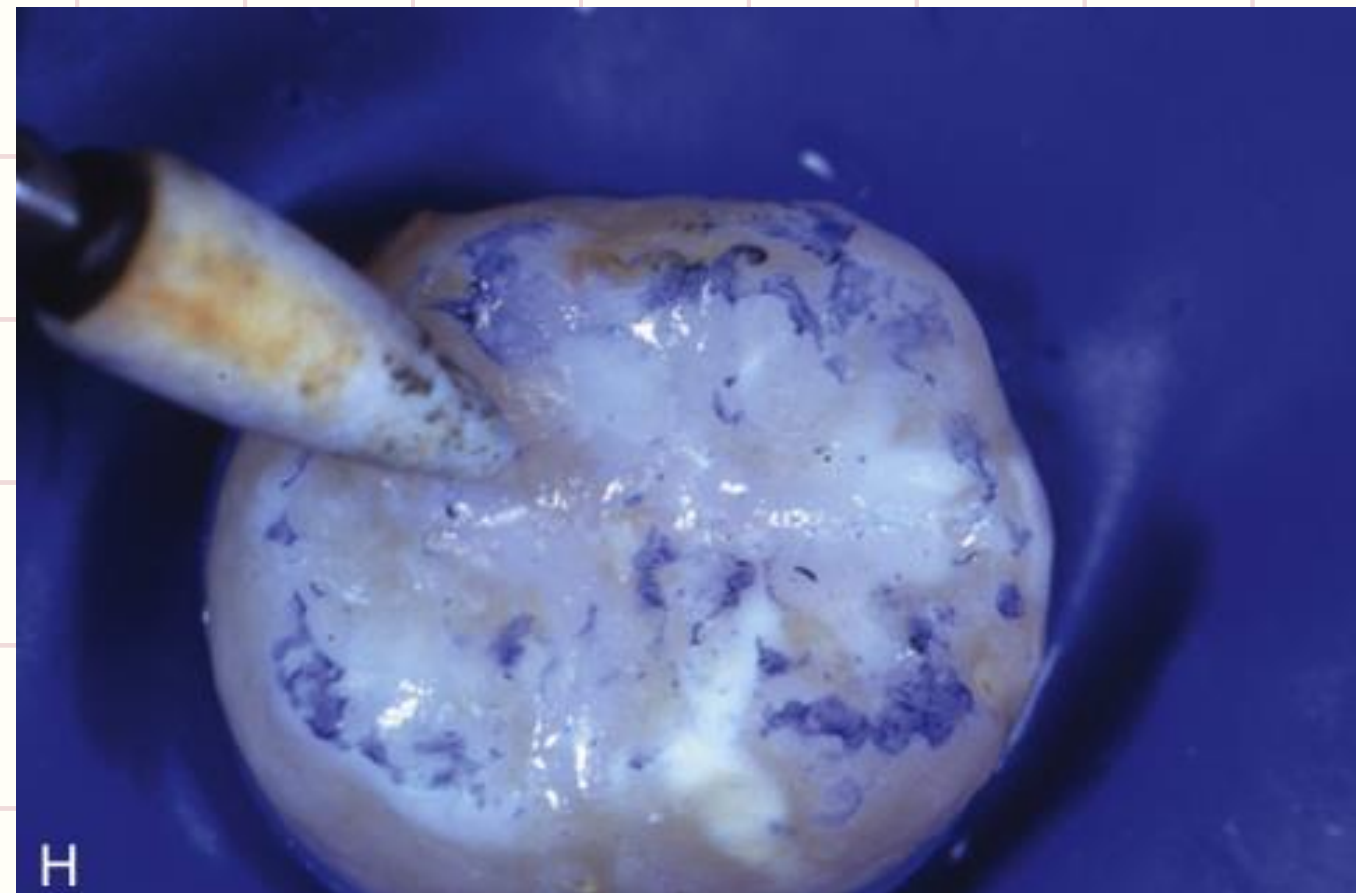


Procedures for PRR

Step 7:

PRR assessment

- Check occlusion & adjustment





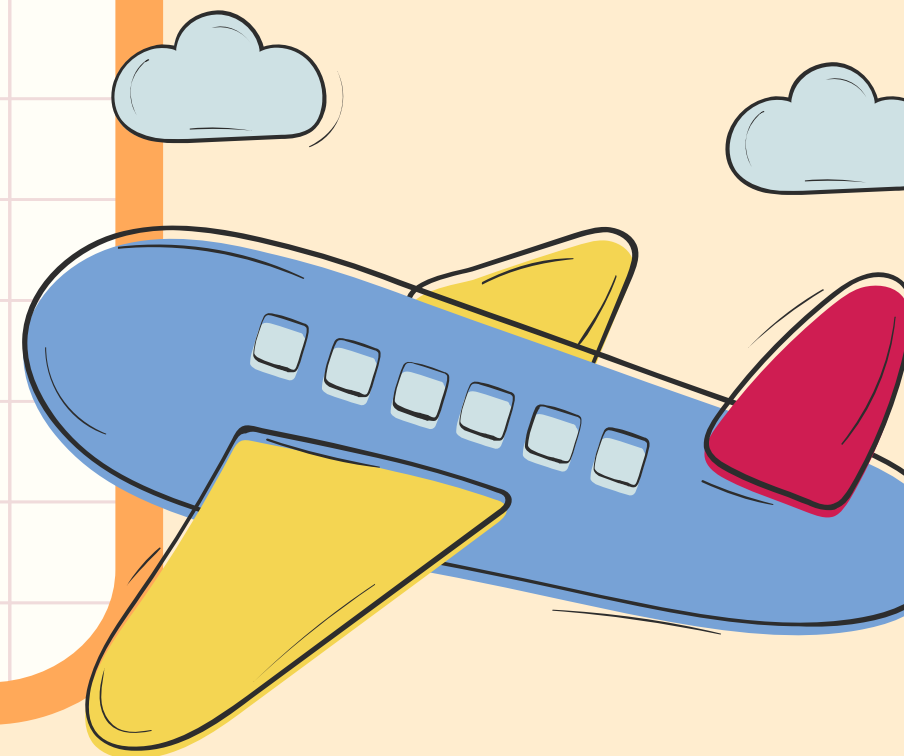
Question Time



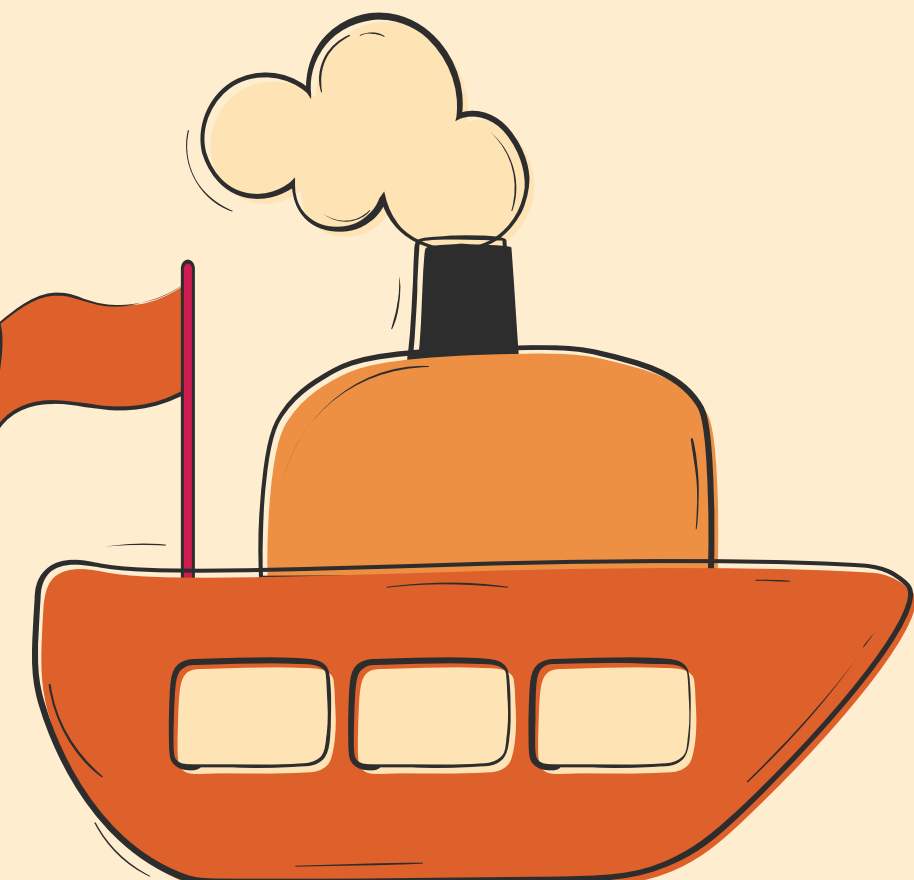
Let's start



Thank You



solventum





คำถาม

1.ทำไมฟลูออไรด์วาร์นิช จึงเหมาะสมสำหรับการใช้ในกลุ่มเด็กเล็ก

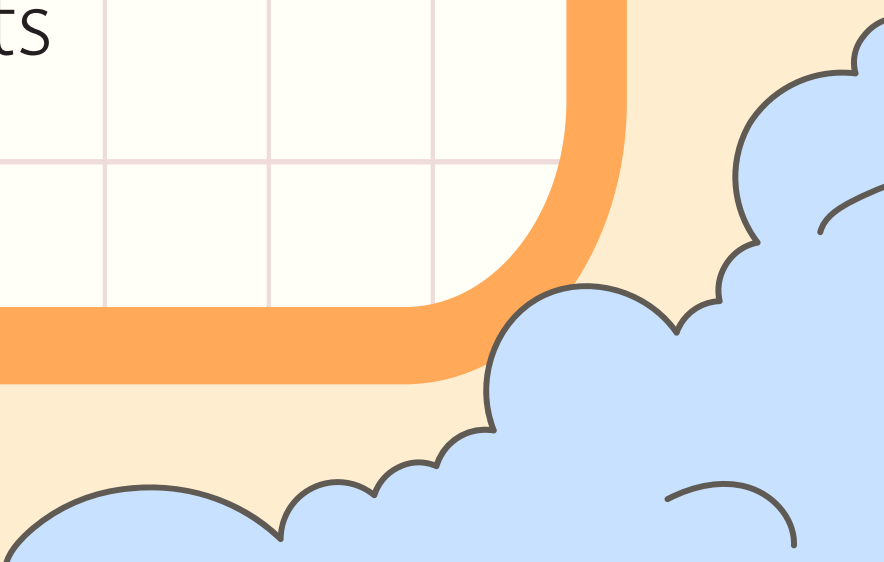
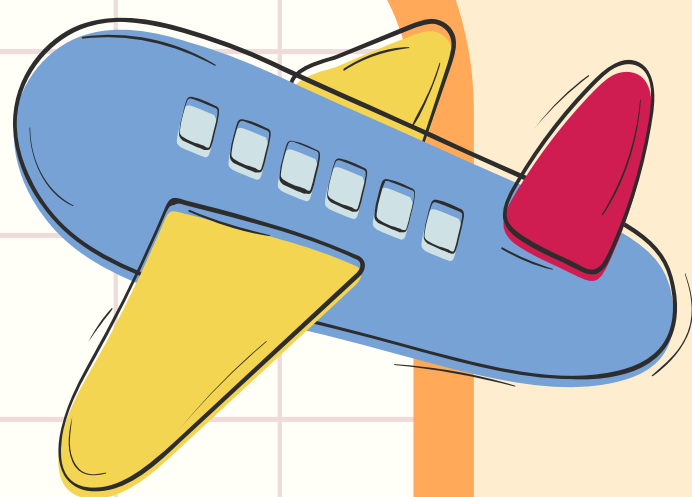
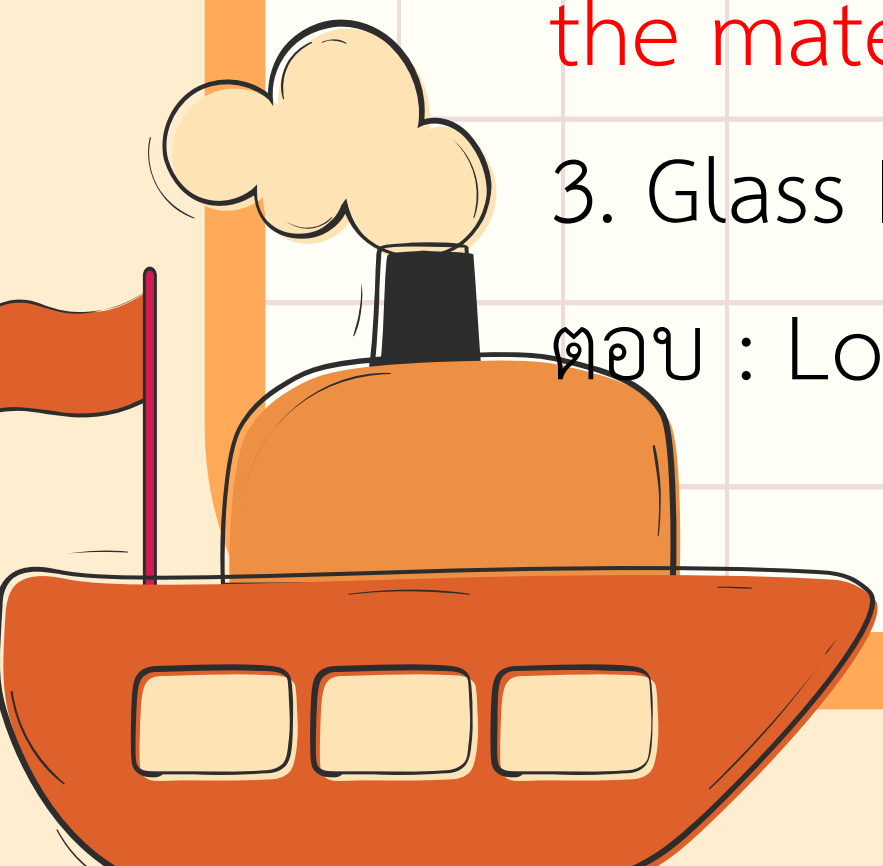
ตอบ เหมาะสมสำหรับเด็ก ที่ยังควบคุมการกลืนไม่ได้

2. **Resin-based sealants** หลังจาก etching ไปแล้ว surface เกิดการ contaminated คือทำอย่างไร เพราะอะไร

ตอบ re-etching ; any fluid blocking the resin tags, decreasing the retention of the material.

3. Glass Ionomer Sealant ควรเลือกใช้ GI กลุ่มไหน และมีข้อบ่งชี้อย่างไร

ตอบ : Low viscosity, difficulties in isolation with resin sealants



Bye bye!!