

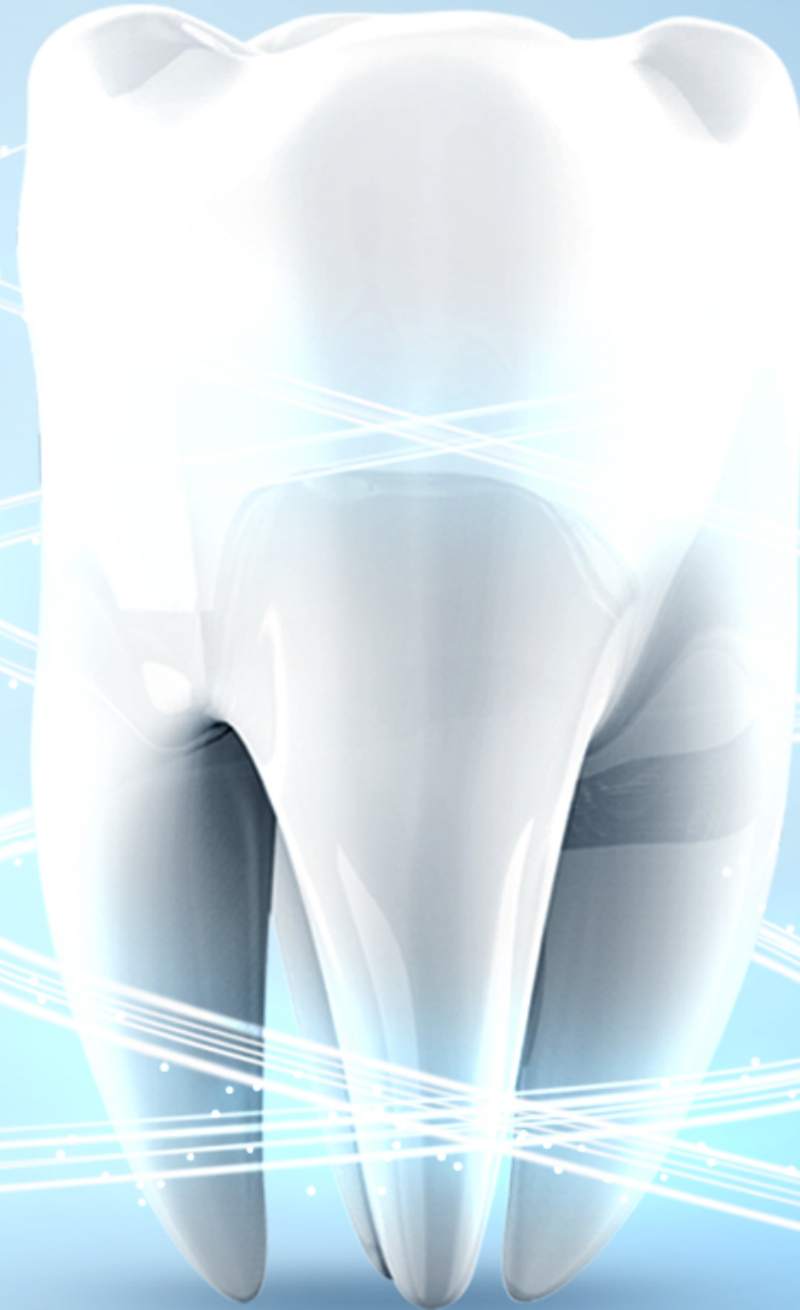


Dental Healthcare Service

QRAY

LINKDENS

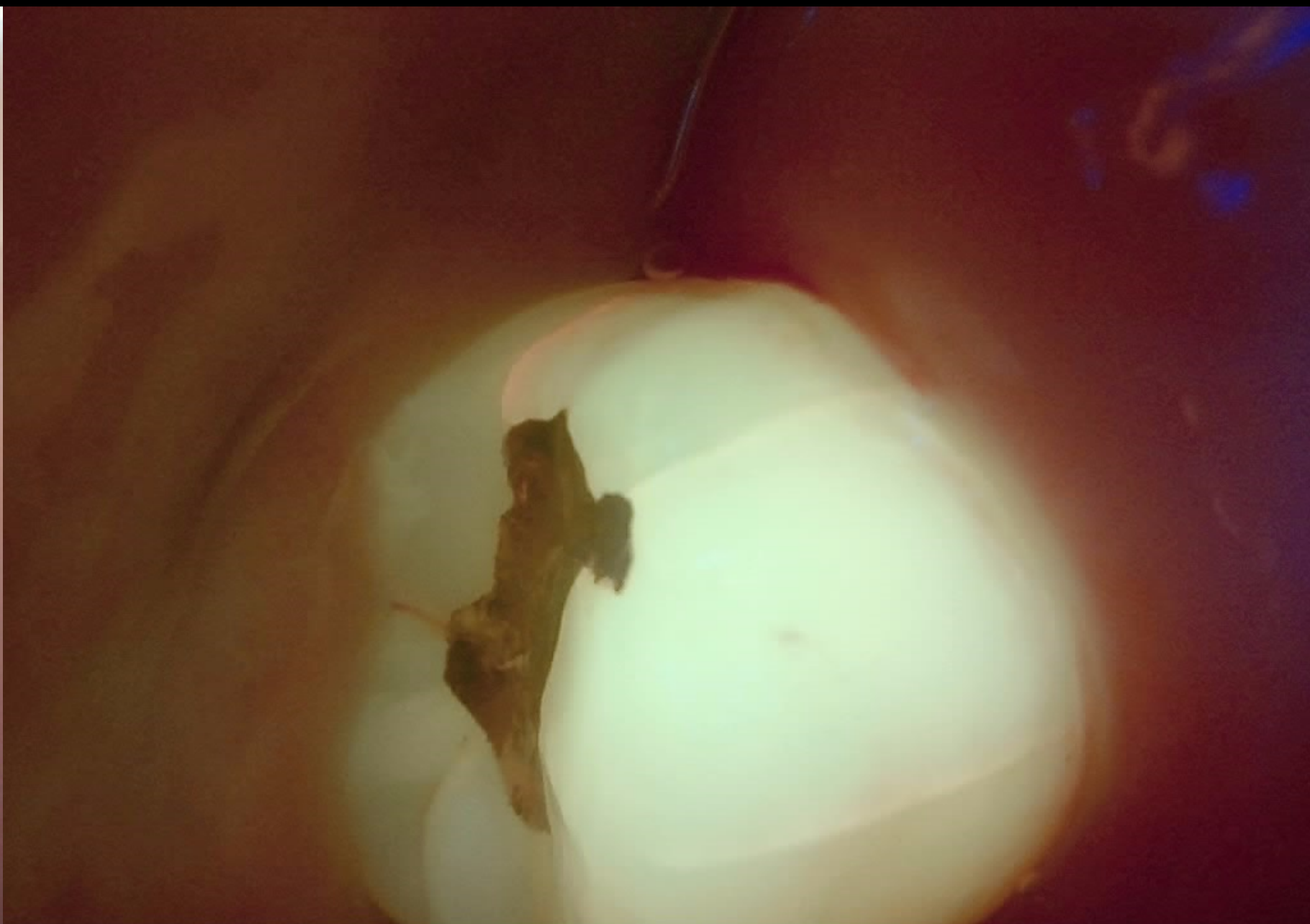
CDSS



The background of the slide features a soft-focus image of a smiling woman on the left side. Overlaid on the right side are two dental diagnostic pens, one in the foreground and one slightly behind it. The pens are light blue with dark blue accents and have the brand name 'Quip' and 'OLF Technology' printed on them. The overall color scheme is a gradient of light blue to teal.

Crack Tooth Diagnosis

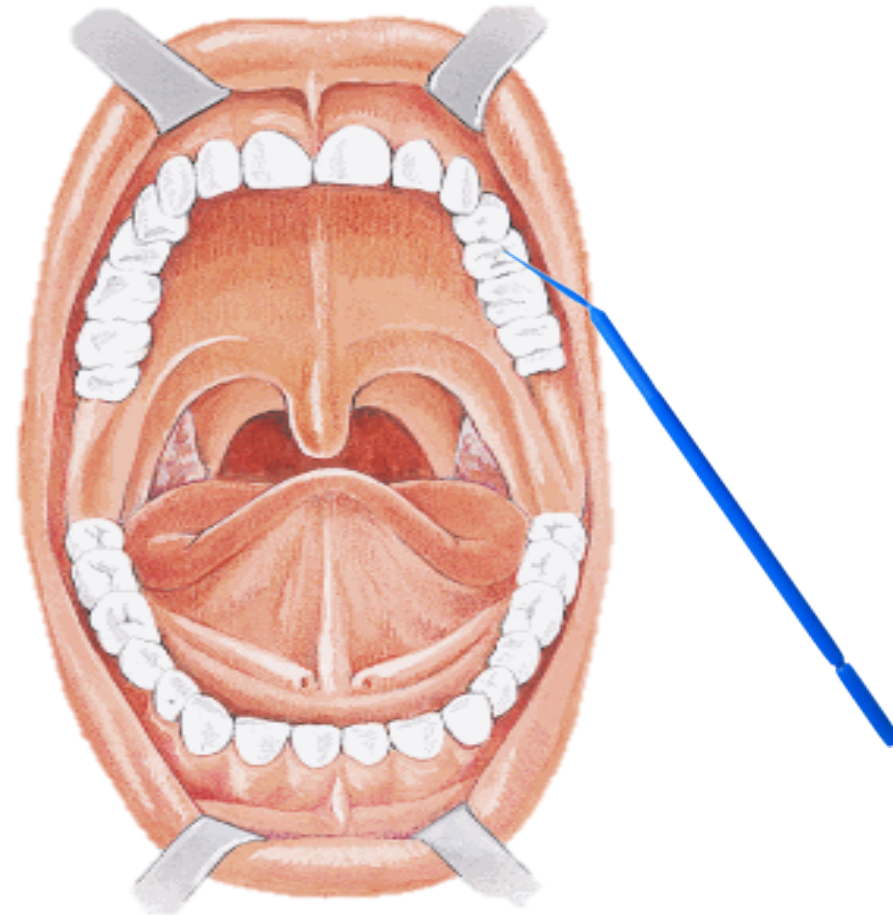
균열치아진단



Microcosm biofilms model

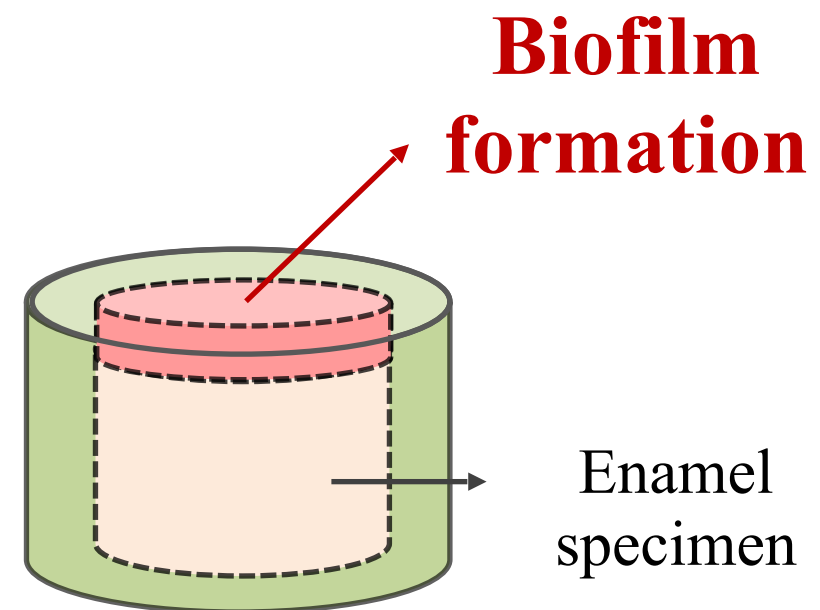
LINK DENS

Oral cavity



in vivo

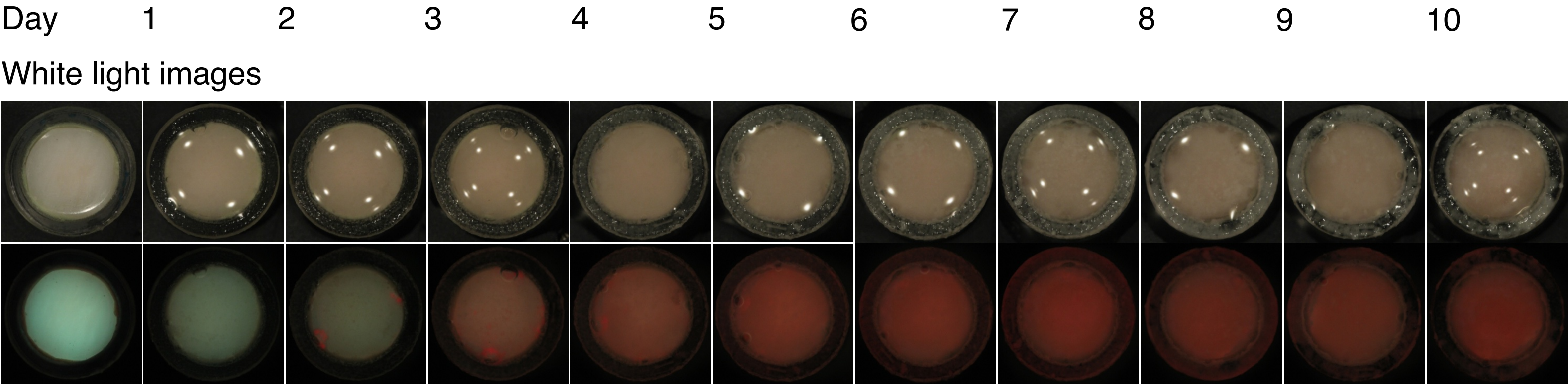
Microcosm
Model



in vitro

Kim YS. Monitoring the maturation process of a dental microcosm biofilm using the Quantitative Light-induced Fluorescence-Digital (QLF-D). Journal of Dentistry. 2014

Changes in red fluorescence from biofilm



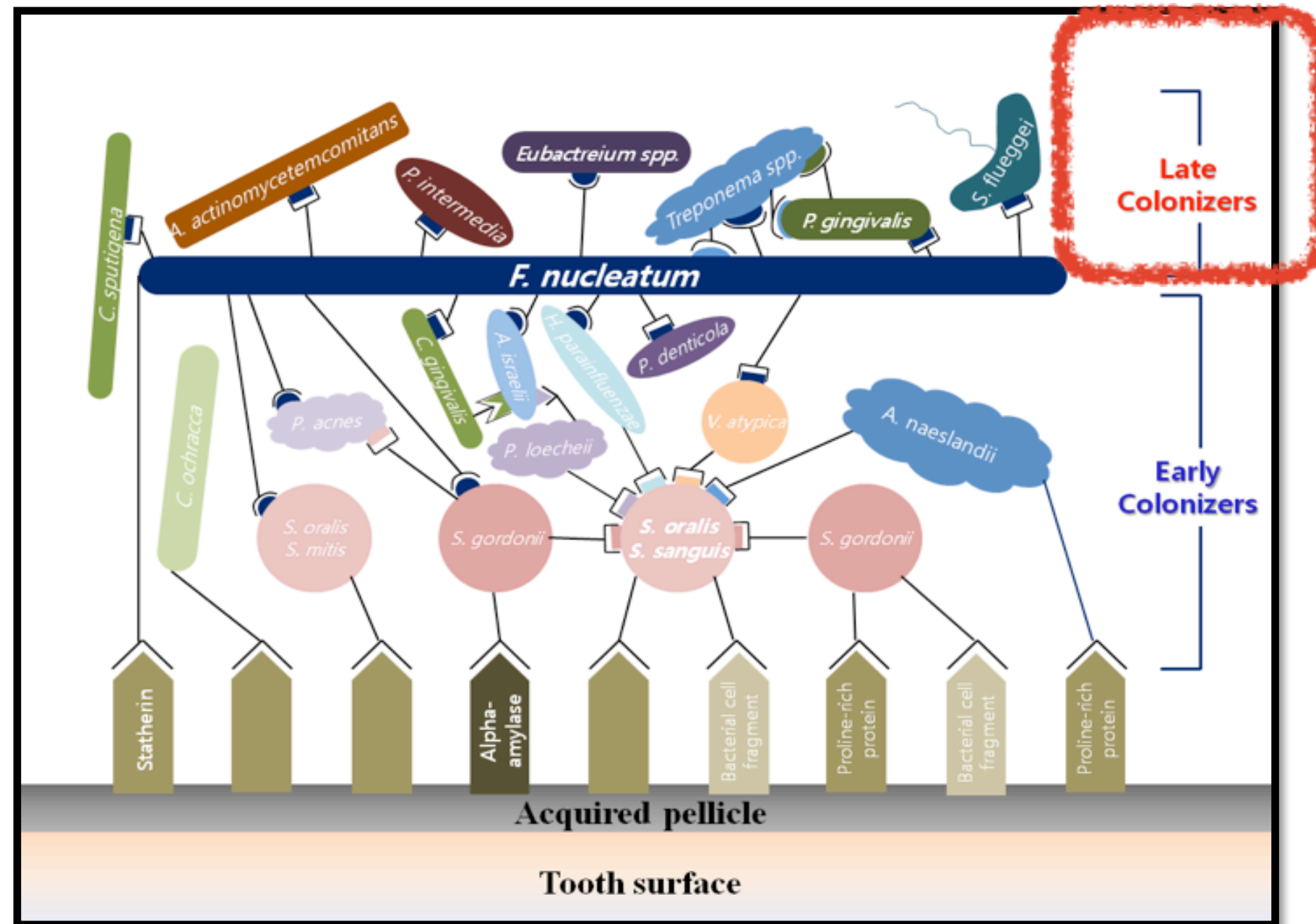
3 days old mature plaque

Incubating in a specially designed stuff similar with oral cavity environment

Courtesy of Prof. YS Kim



The **late colonizer** is known to produce unique bacterial metabolites such as **porphyrin**.

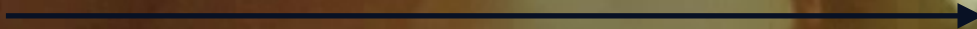


Courtesy of Prof Baekil Kim

1



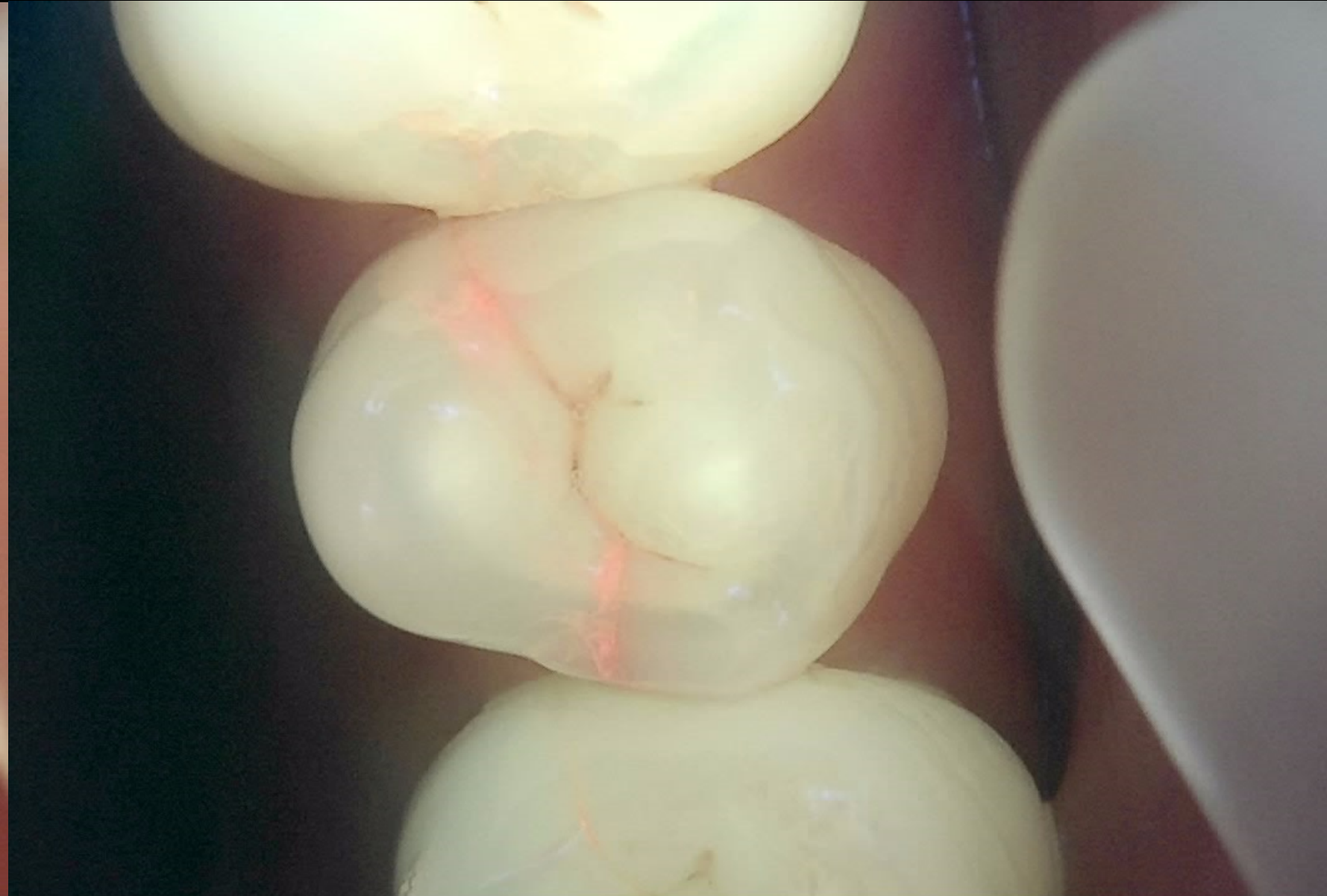
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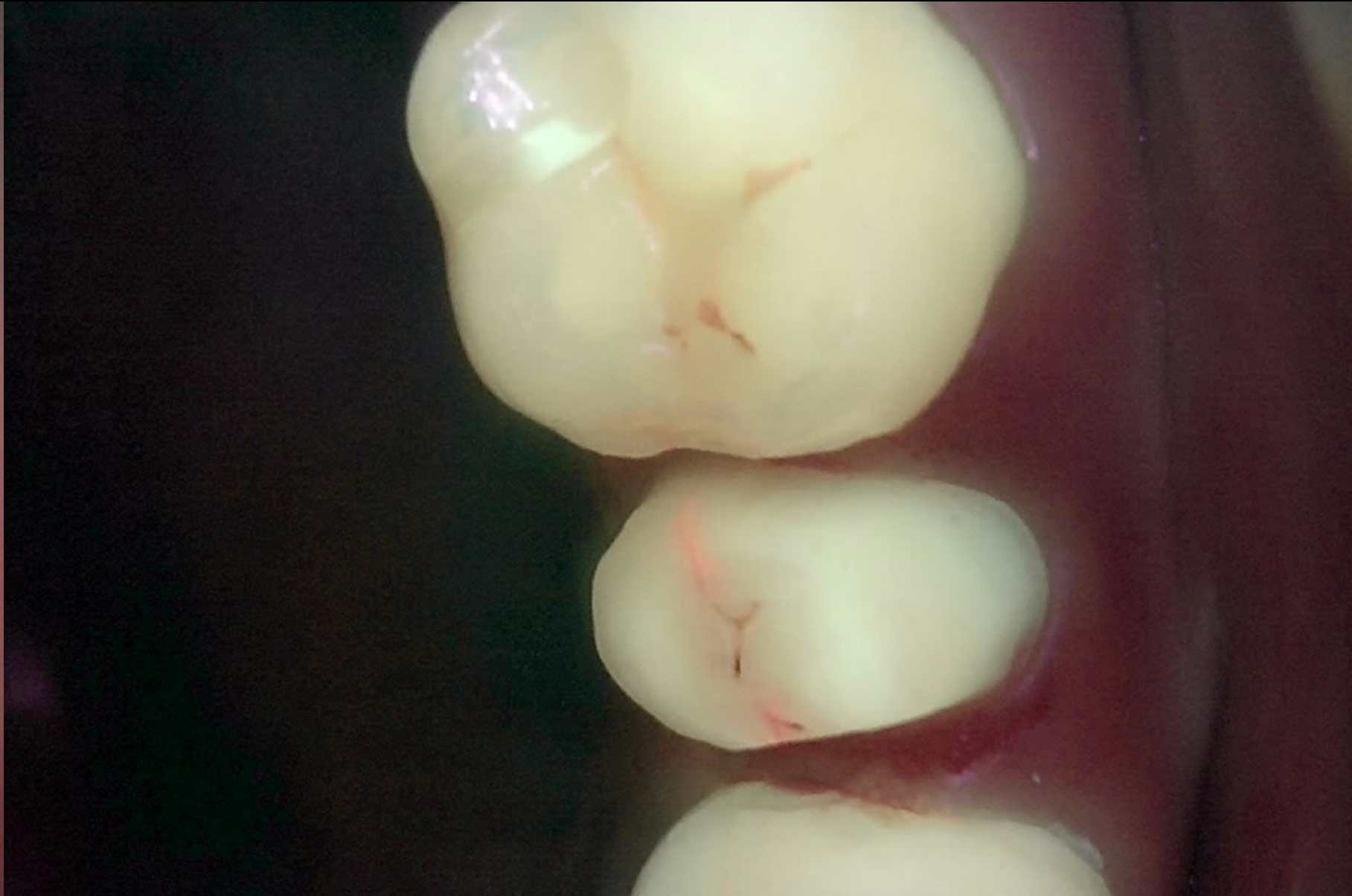
3



Craze line with Red fluorescence



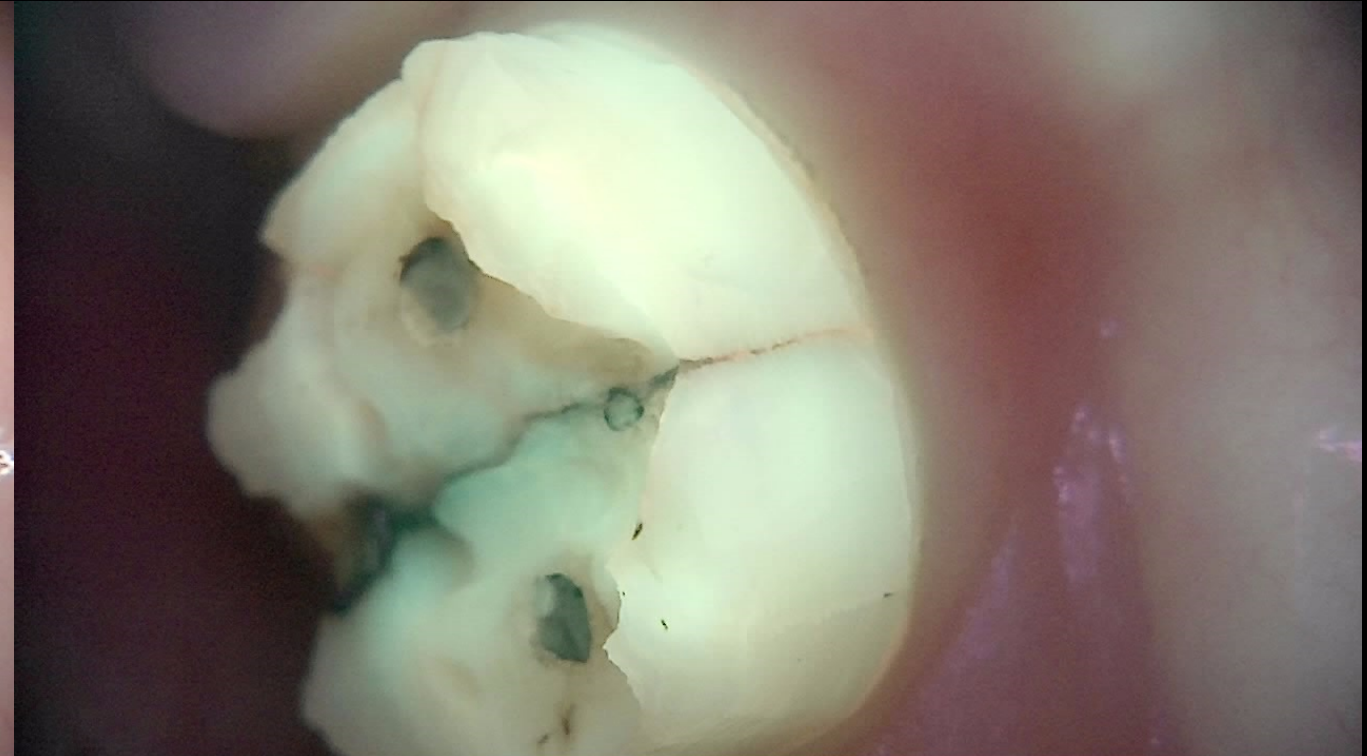
Craze line with Red fluorescence



Craze line with Red fluorescence



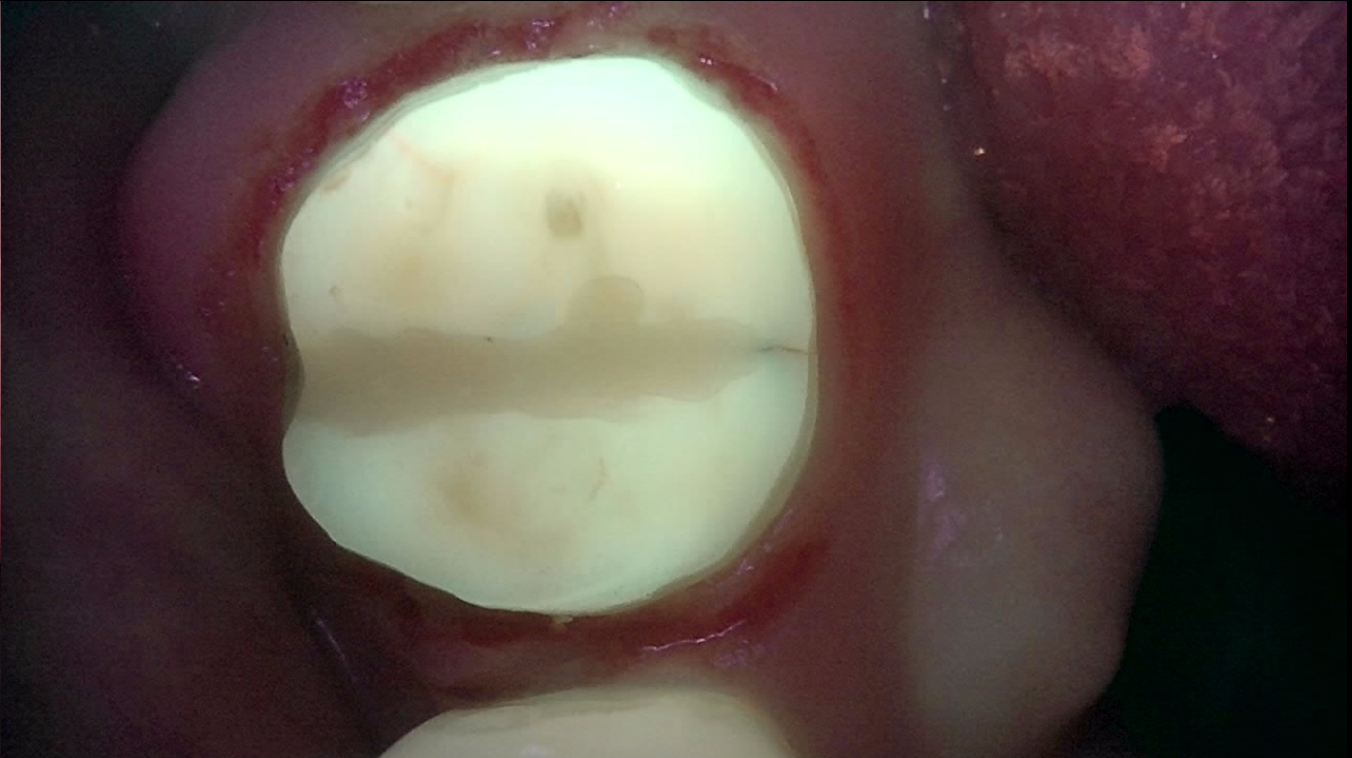
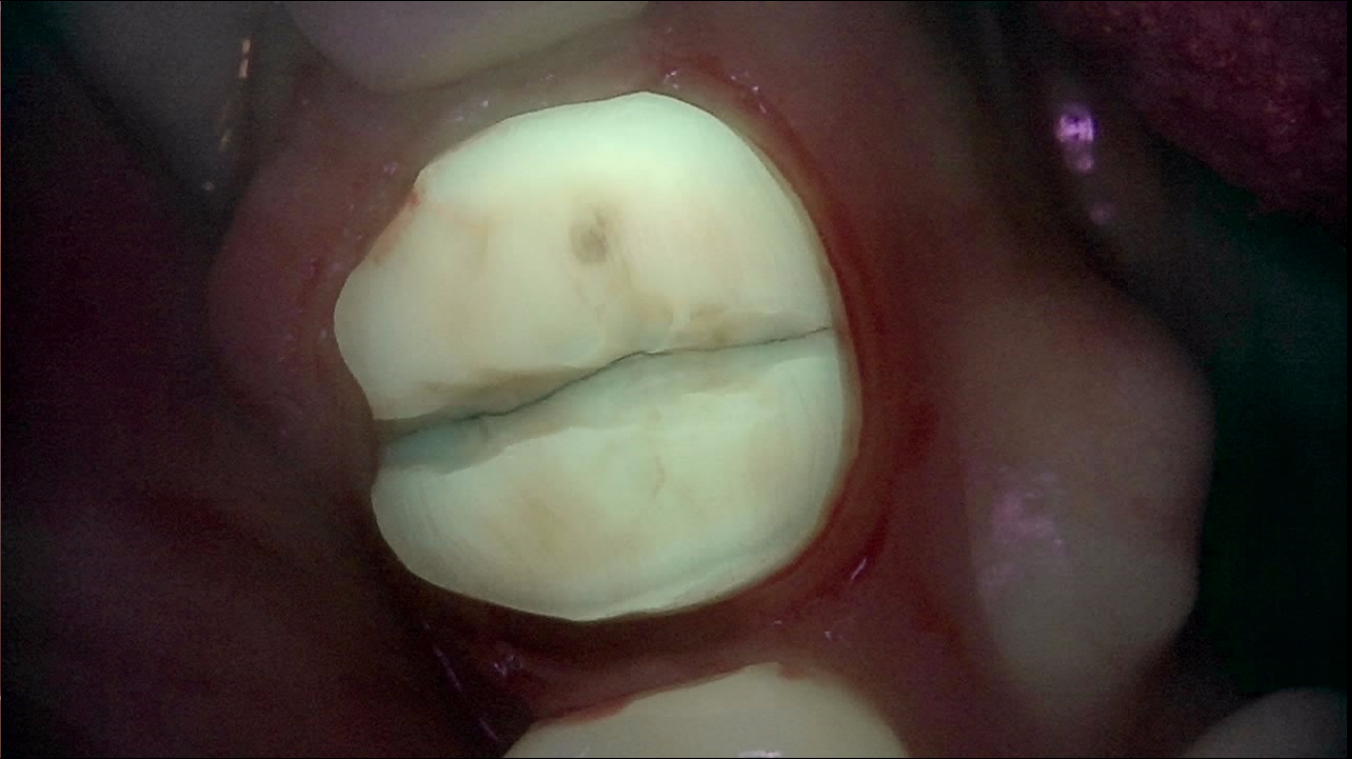
Split tooth



Craze line with Red fluorescence



Split tooth





A close-up of the Qraycam pro device, which is a white, handheld dental instrument with a blue and red logo.

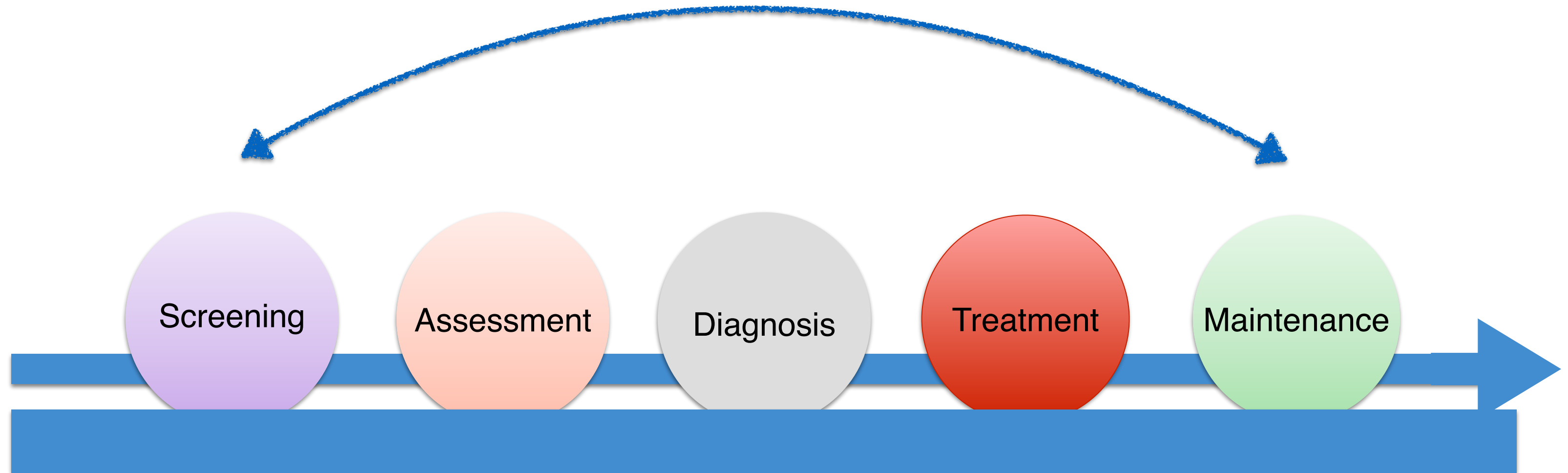
Biofilm

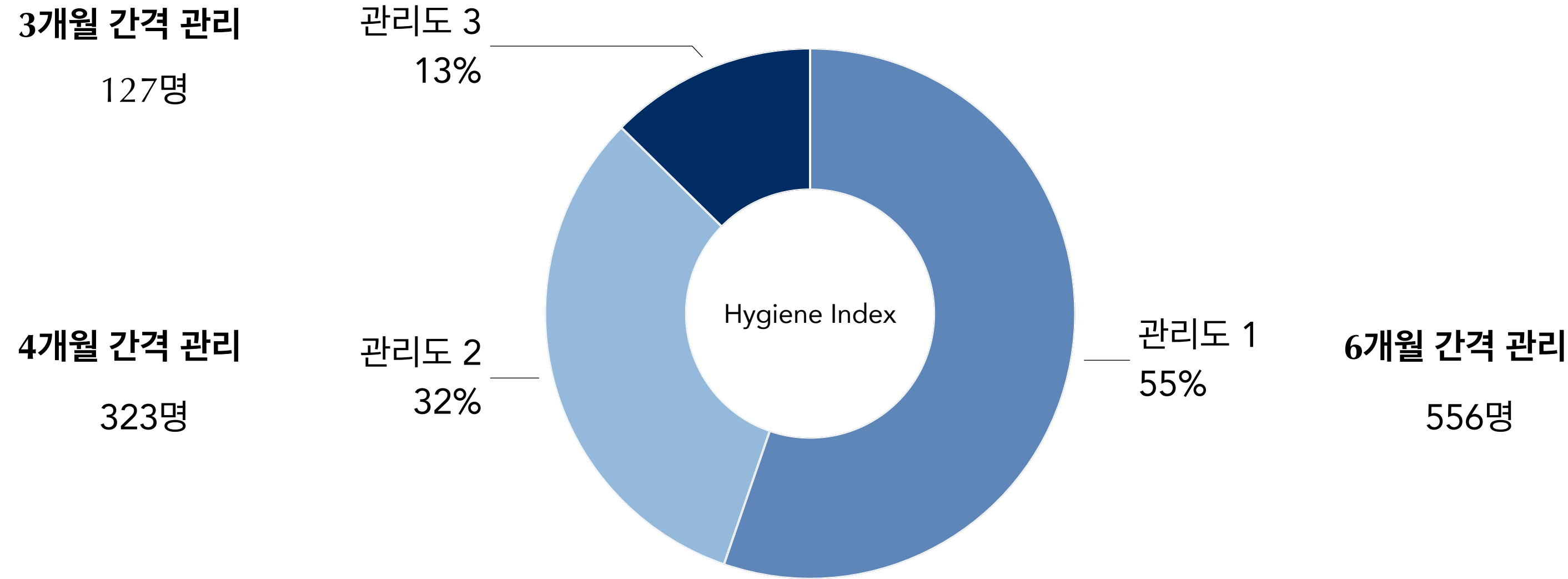
Caries

Crack

5- steps dentistry

LINK DENS





Total 1006 명

31th March 2023

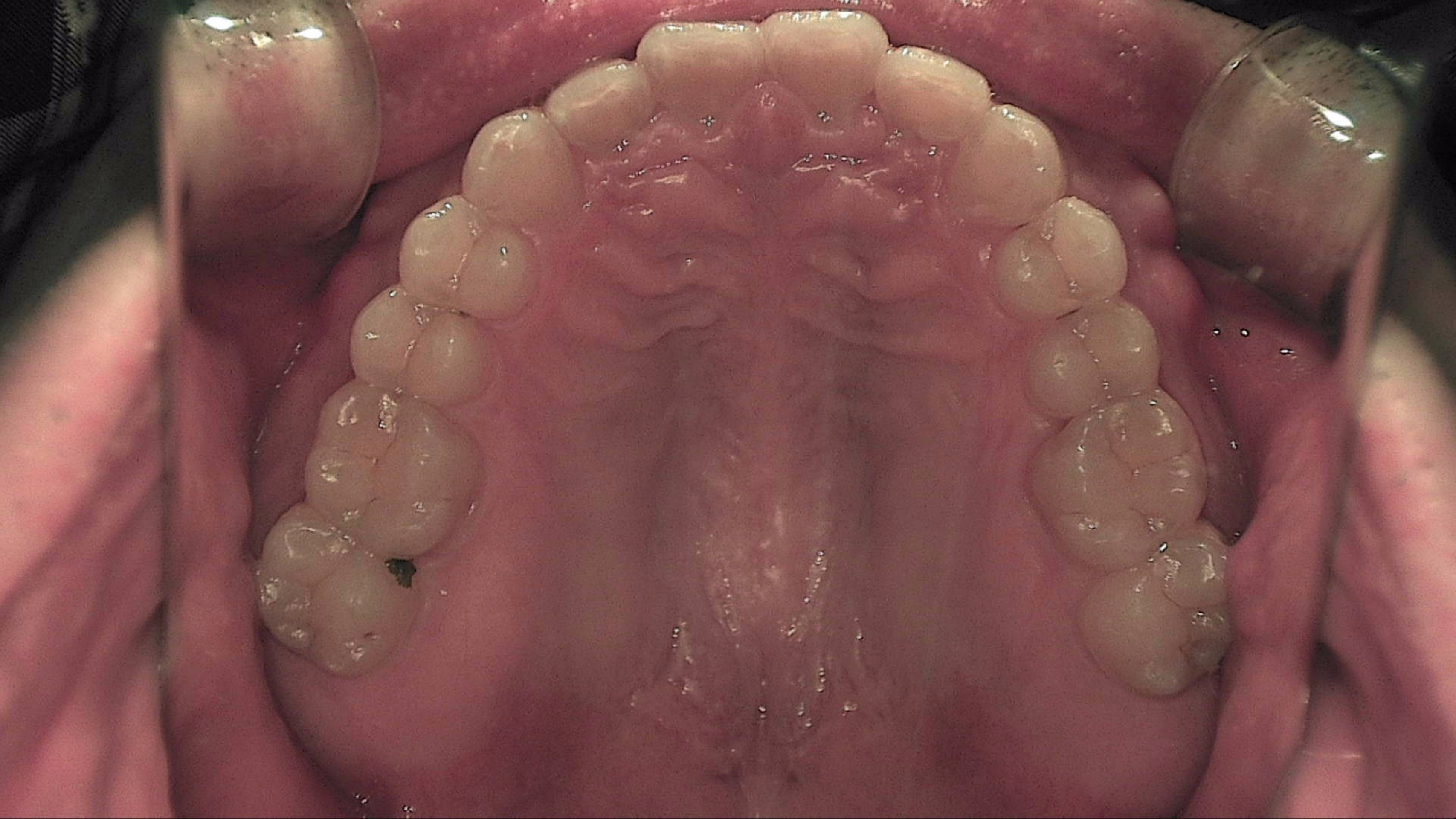
BestDen Dental clinic





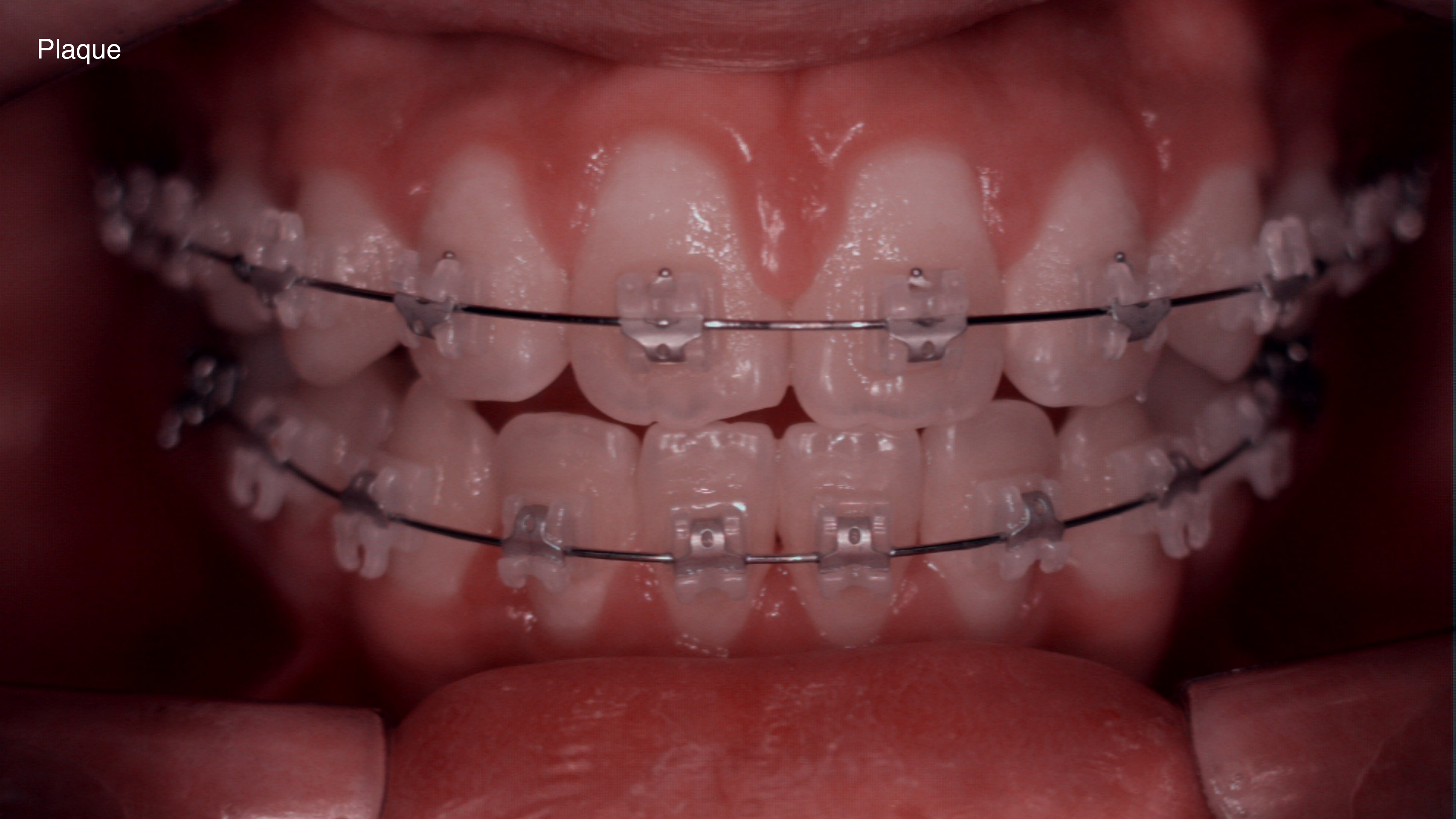








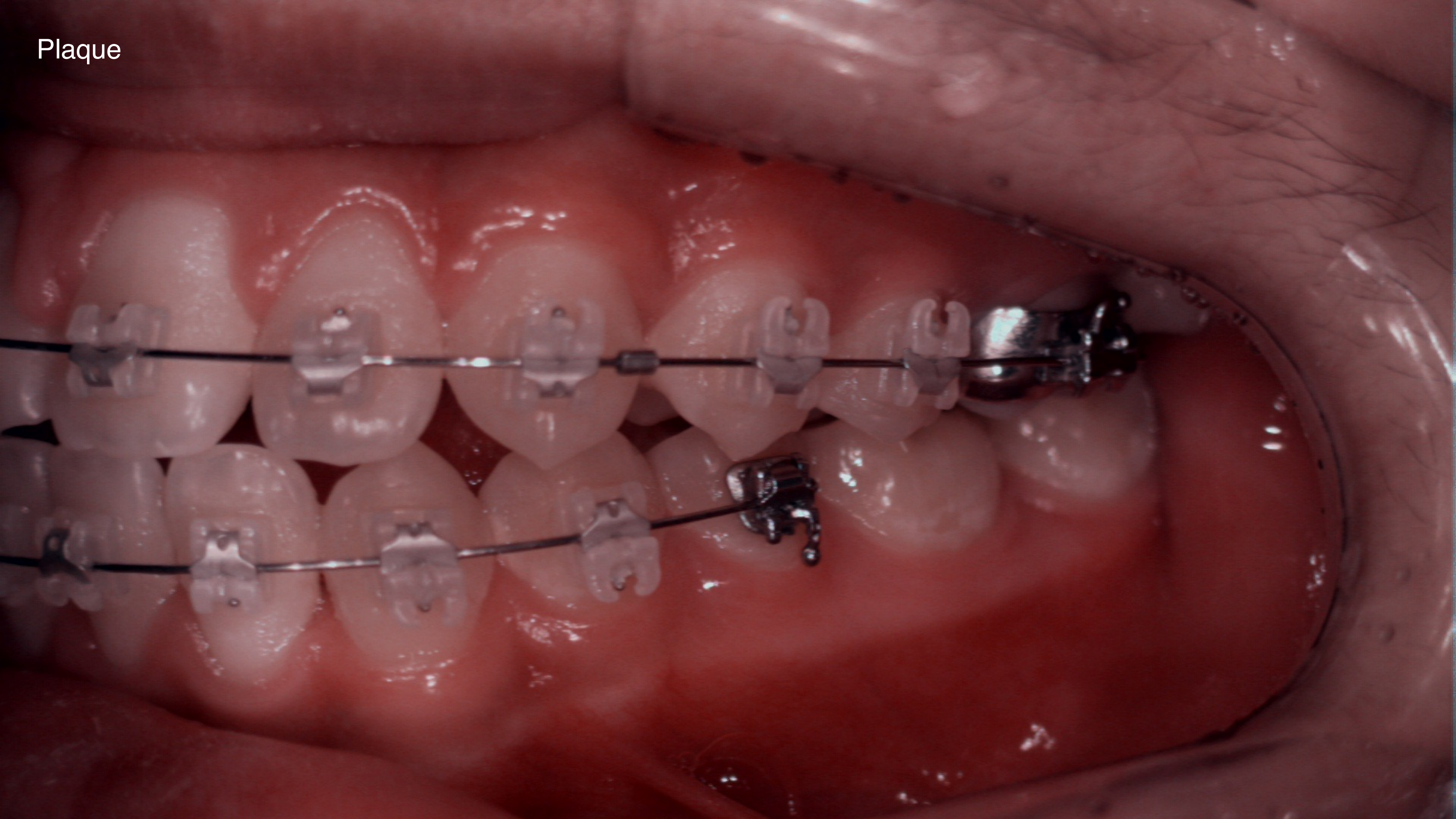
Plaque



Plaque



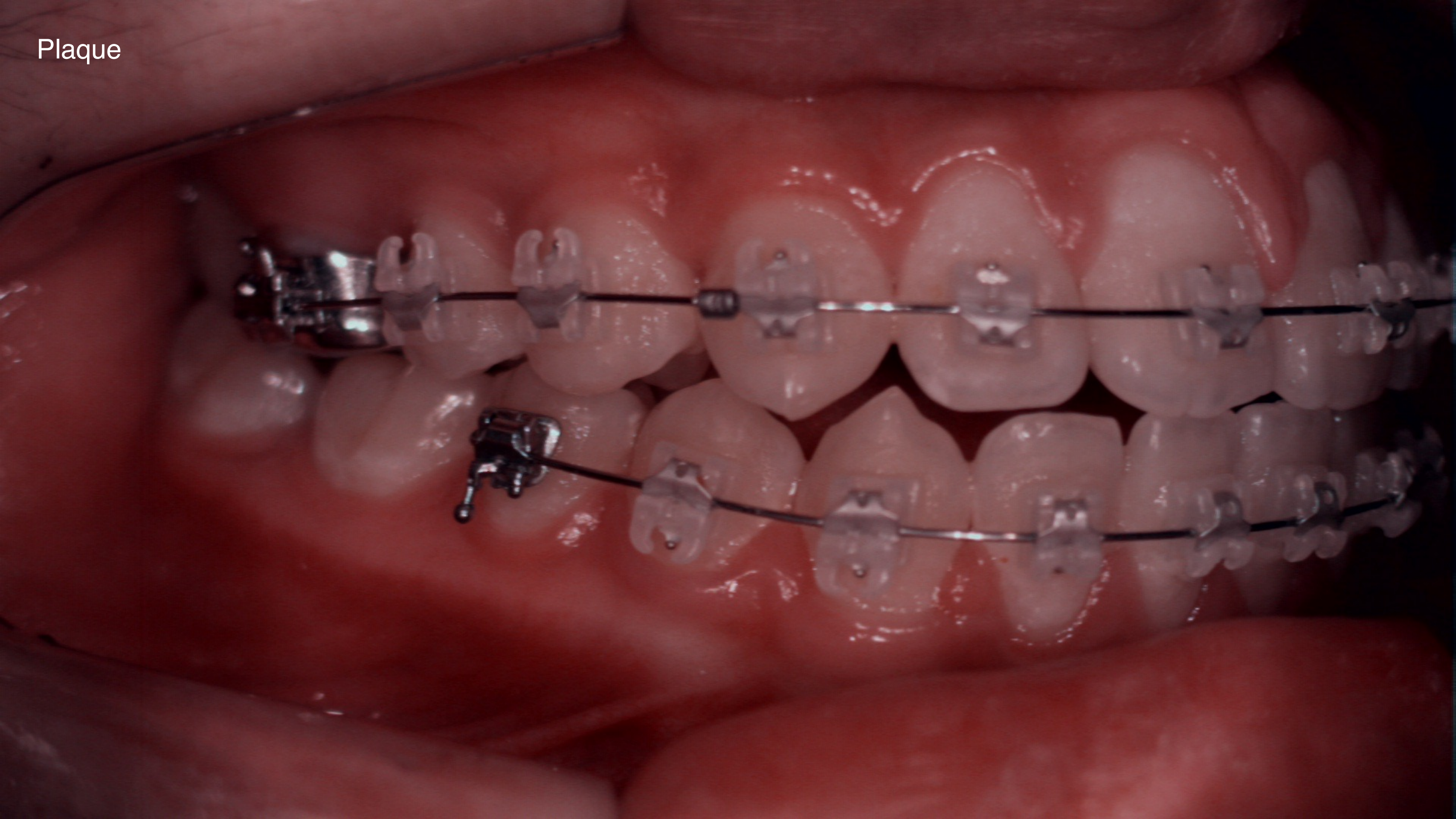
Plaque



Plaque

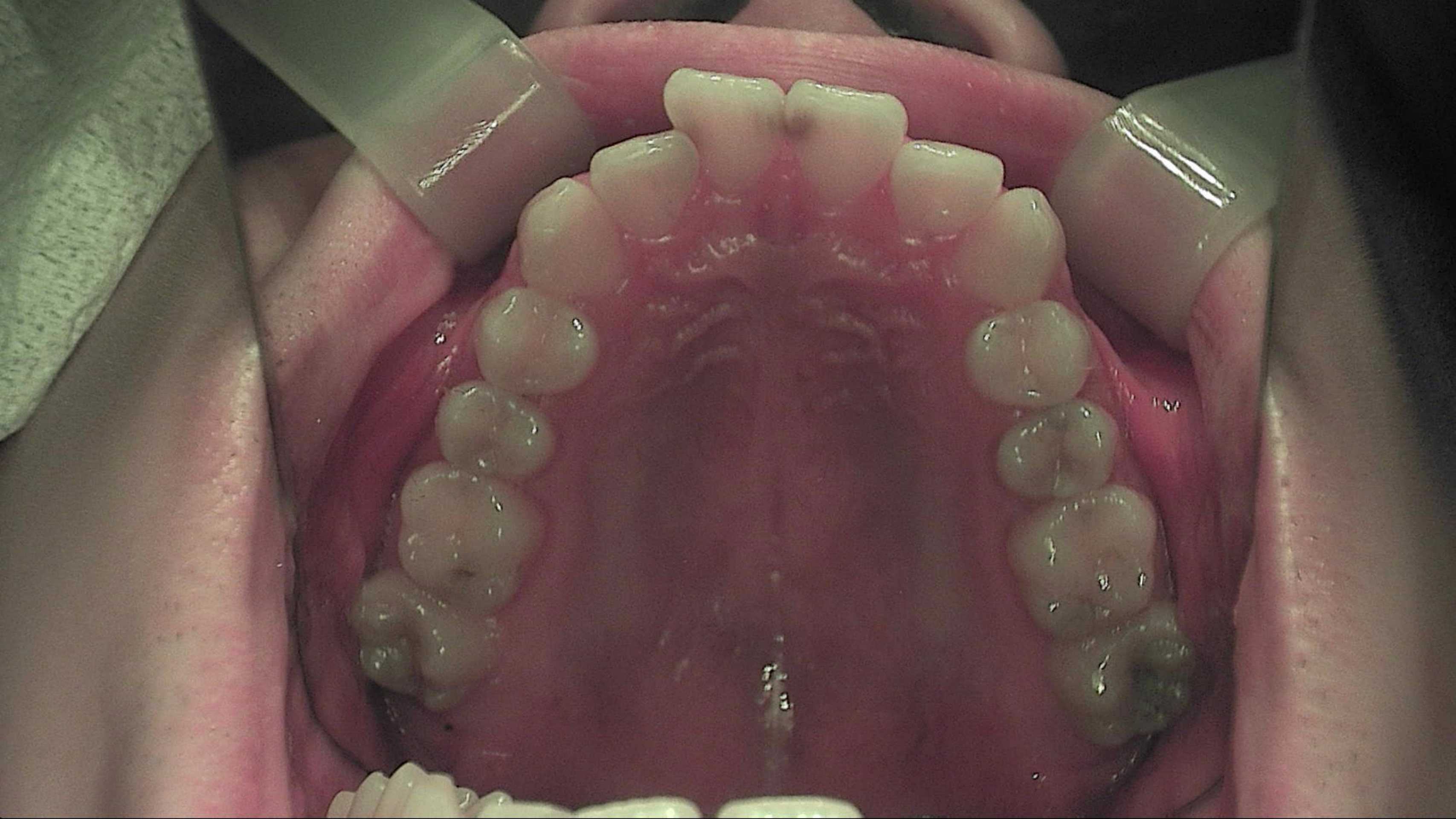


Plaque



Plaque











RESEARCH ARTICLE

Open Access



Analysis of the characteristics of cracked teeth and evaluation of pulp status according to periodontal probing depth

Sung-Eun Yang, A-Ra Jo, Hye-Jin Lee and Sin-Young Kim*

Abstract

Background: The purpose of this study was to analyze the characteristics of cracked teeth and to evaluate pulp status according to periodontal probing depth (PPD).

Methods: A total of 182 cracked teeth were included. The location and type of the cracked teeth, age and gender of the patients, restoration type, pulp status, PPD, and radiographic findings were analyzed.

Results: Mandibular second molars (25.3%) were the most frequently involved teeth, followed by mandibular first molars (22.5%), maxillary first molars (22.0%), and maxillary second molars (17.6%). The patient age was most frequently 50–59 years. Cracks occurred mainly in nonbonded restorations, such as gold (26.9%), and were usually found in intact teeth (37.9%). A total of 103 teeth (56.6%) had an initial PPD of less than 3 mm, while 40 (22.0%) had a PPD of 4–6 mm, and 39 (21.4%) had PPD of 7 mm or more. A total of 33 cracked teeth (18.1%) were diagnosed with pulp necrosis, 40 (22.0%) with irreversible pulpitis, and 97 (53.3%) with reversible pulpitis. The incidence of pulp necrosis was 31.8% among cracked teeth with a PPD of 4–6 mm, and 28.6% among those with a PPD of 7 mm or more.

Conclusions: Cracks occurred mainly in molar teeth, and were commonly found in intact teeth with no restoration. Patients with cracked teeth were most frequently aged 50–59 years. Cracked teeth showing a PPD of more than 4 mm were more likely to show pulp necrosis.

Keywords: Characteristics, Cracked teeth, Periodontal probing depth, Pulp status

서울 성모병원
2011년 7월~ 2014년 3월(2년 8개월)
182개의 균열 치아

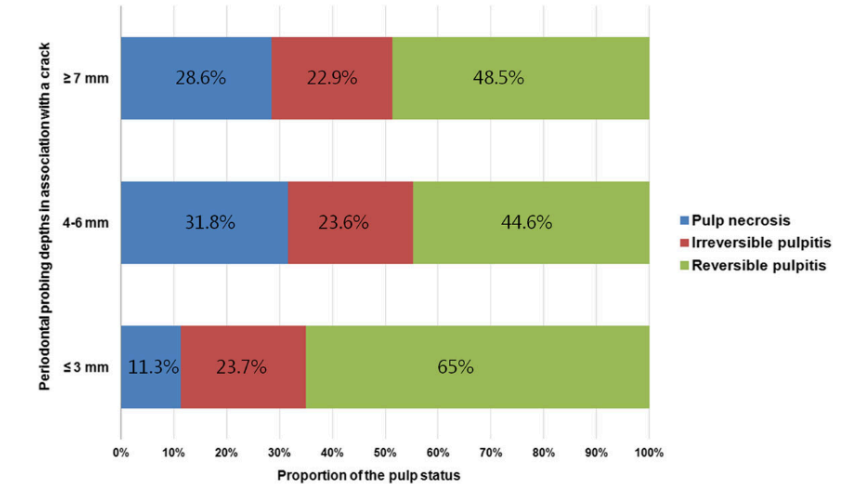


Fig. 1 Pulp status of cracked teeth according to periodontal probing depth (p for trend <0.05). Pulp status was classified into three categories

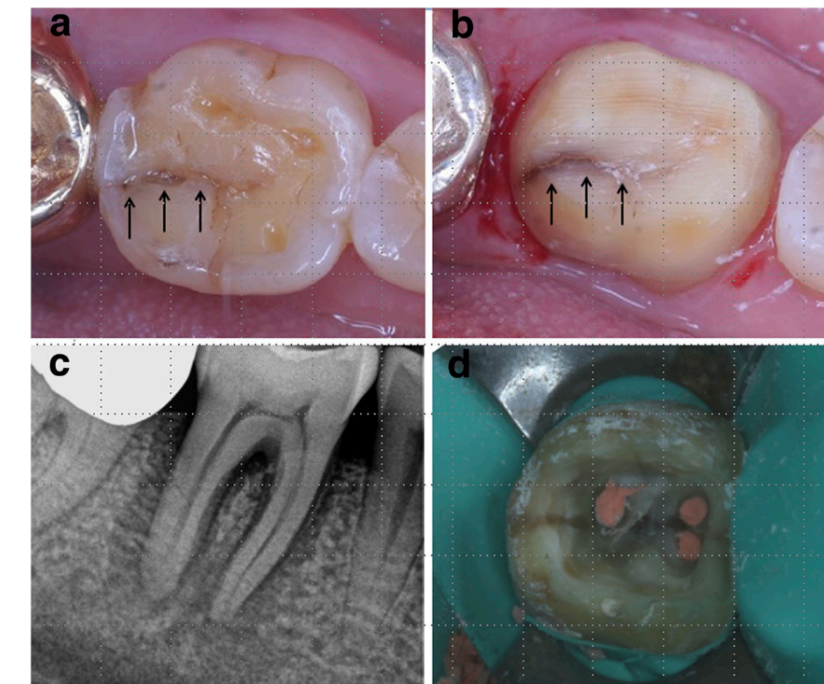


Fig. 2 Crack that developed in a mandibular first molar with no restoration. **a, b** A distal crack line (black arrows) was observed in the central groove of the mandibular first molar. **c** Periapical lesion was detected in the periapical radiograph. **d** During an endodontic procedure, a crack line extending to the pulp chamber floor was seen

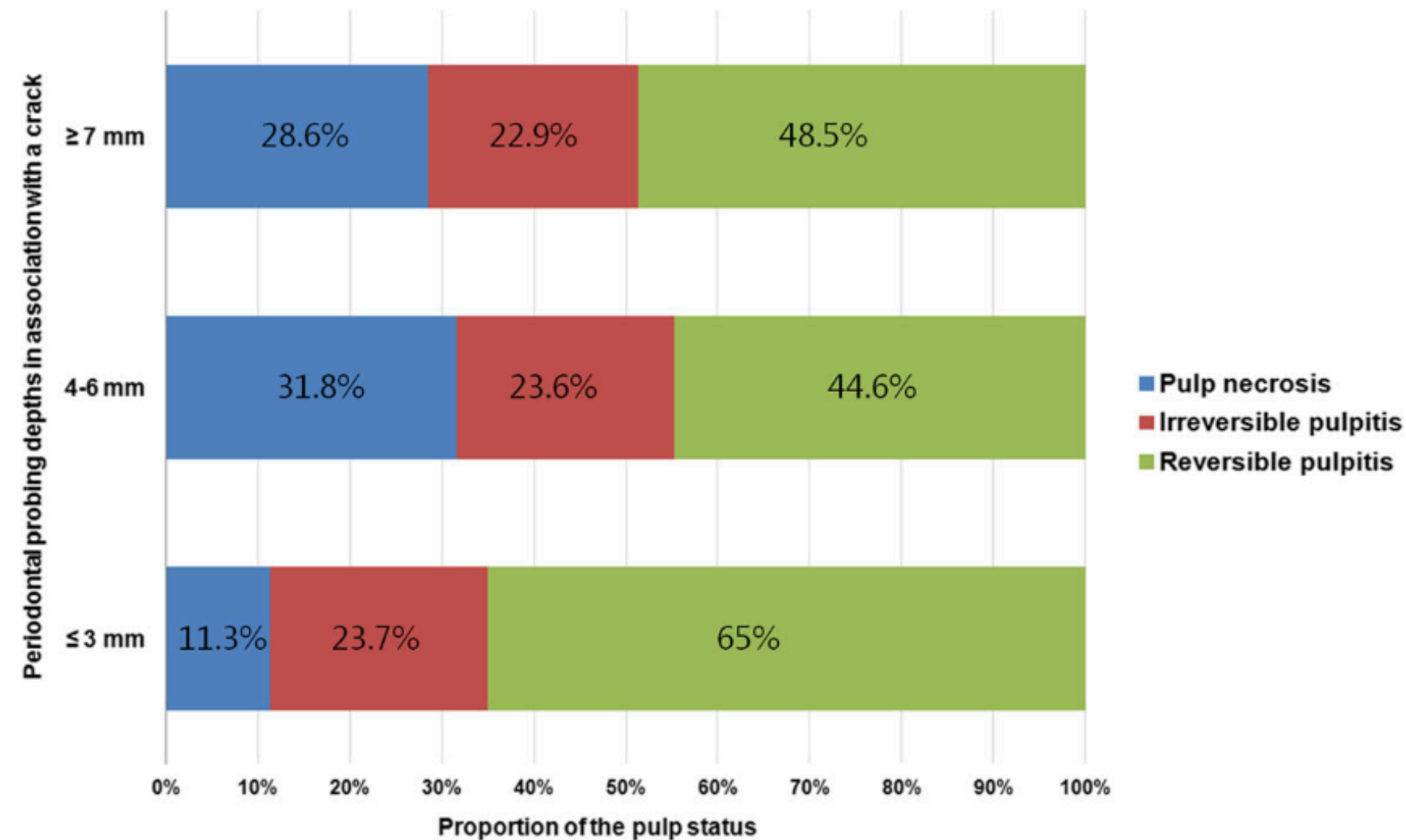


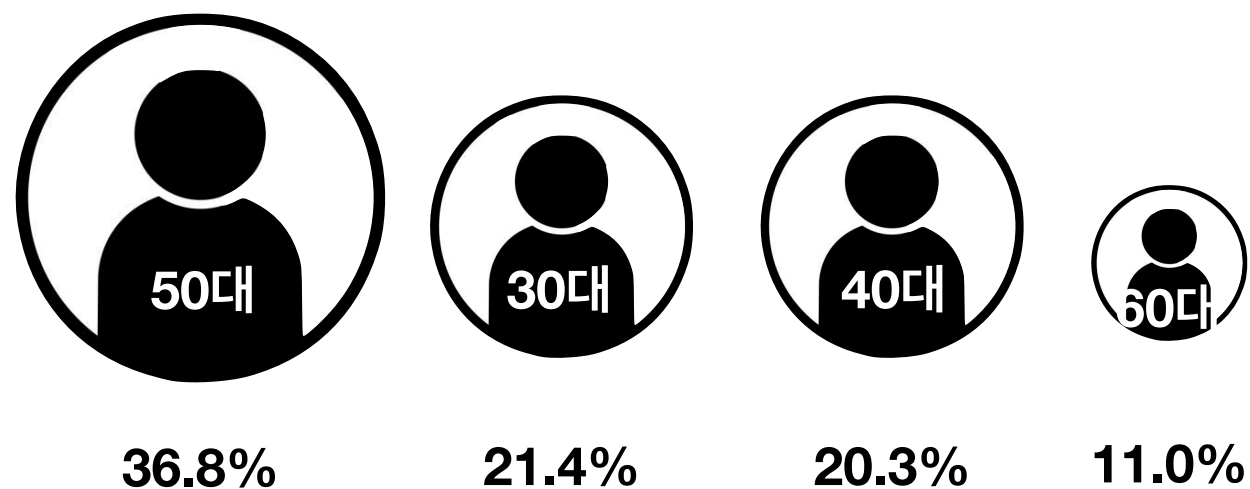
Fig. 1 Pulp status of cracked teeth according to periodontal probing depth (p for trend <0.05). Pulp status was classified into three categories

Analysis of the characteristics of cracked teeth and evaluation of pulp status according to periodontal probing depth

S.-E. Yang et al., BMC Oral Health, 2017, 17:135

LINK DENS

균열 치아를 가지고 있는 환자의 연령 분포



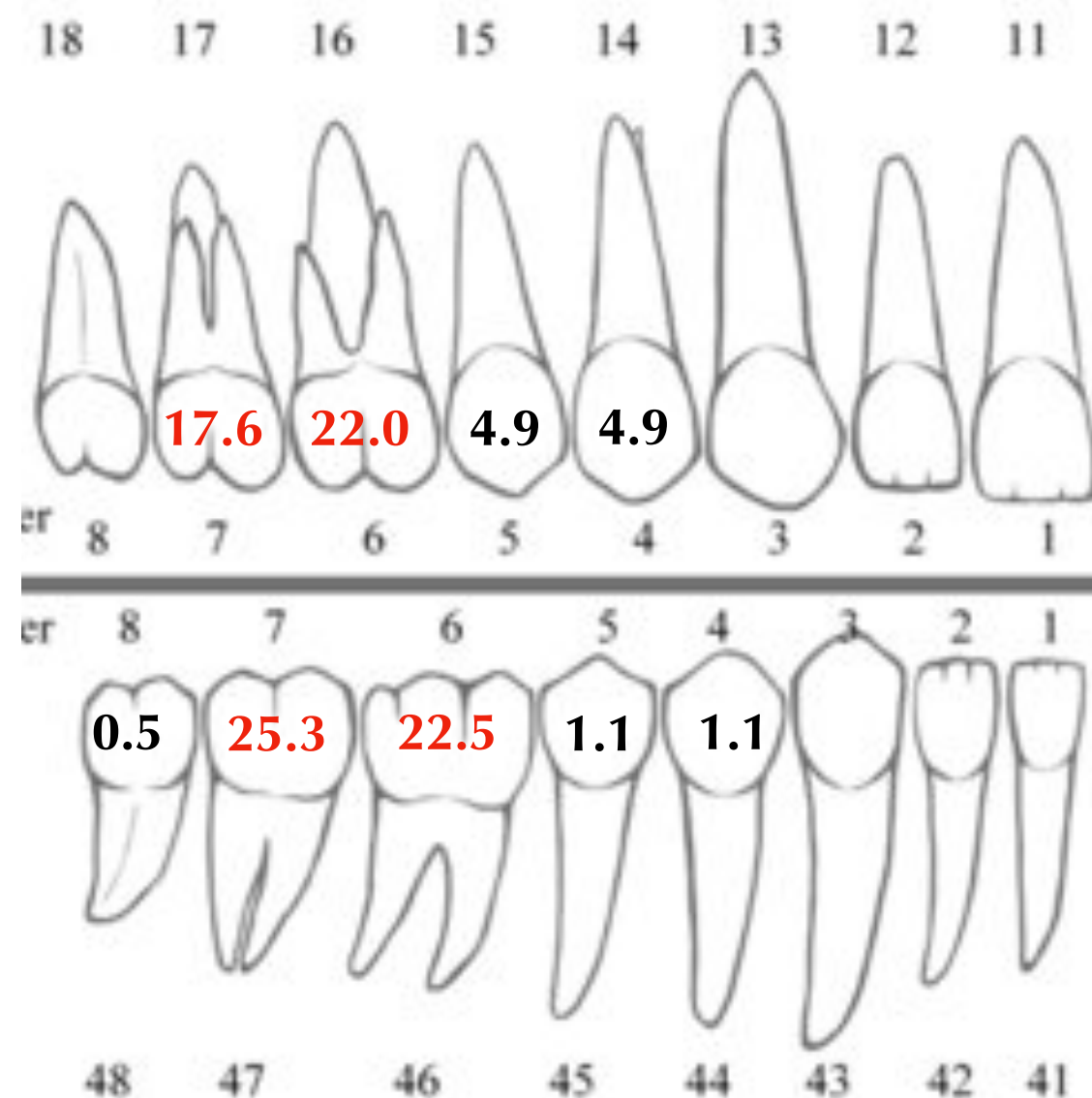
수복물 종류에 따른 균열 치아 케이스 퍼센티지(%)

182개의 균열 중, 113개에서 수복물을 볼 수 있었음. 62%



균열 평가

182의 균열 중, 치아 위치별 균열 케이스 퍼센티지(단위: %)





Journal of
Endodontics

Available online 23 August 2021

In Press, Corrected Proof



Case Report/Clinical Techniques

The Effectiveness of a Quantitative Light-induced Fluorescent Device for the Diagnosis of a Cracked Tooth: A Case Report

Sung-Ae Son DDS, MSD, PhD *, Jae-Hoon Kim DDS, MSD, PhD †, Jeong-Kil Park DDS, MSD, PhD * ㉠

부산치대
손성애
김재훈
박정길
Aug 2021

ARTICLE IN PRESS

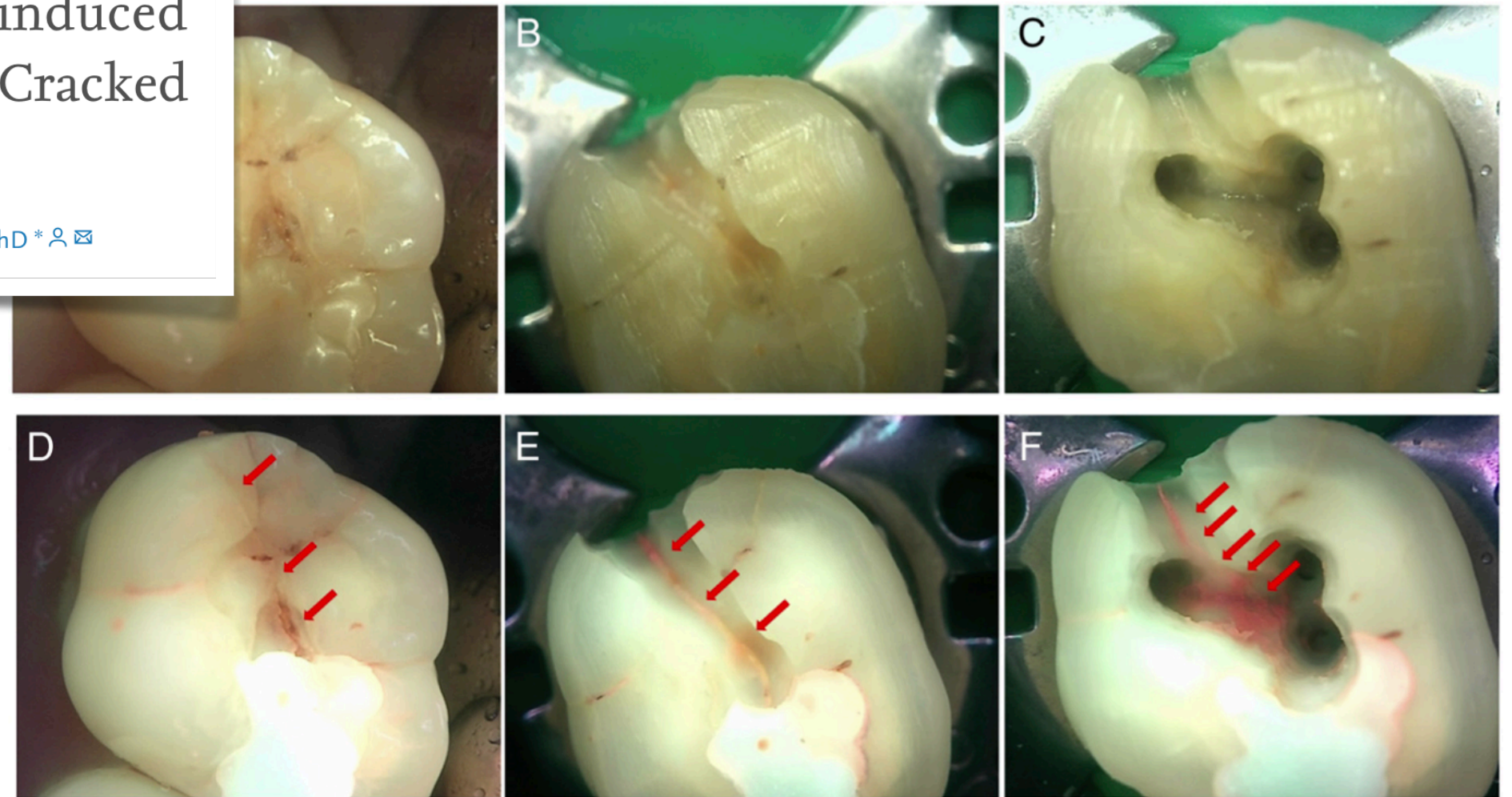


FIGURE 3 – (A–C) White-light and (D–F) fluorescence images taken with a Q-ray penC. Images taken (A and B) before and (D and E) after crack line removal. (B and E) Images of the cavity traced the crack from the occlusal surface to the distal side. (C and F) The crack connecting the distal side extended to the bottom of the pulp chamber. The *arrows* indicate the crack lines.

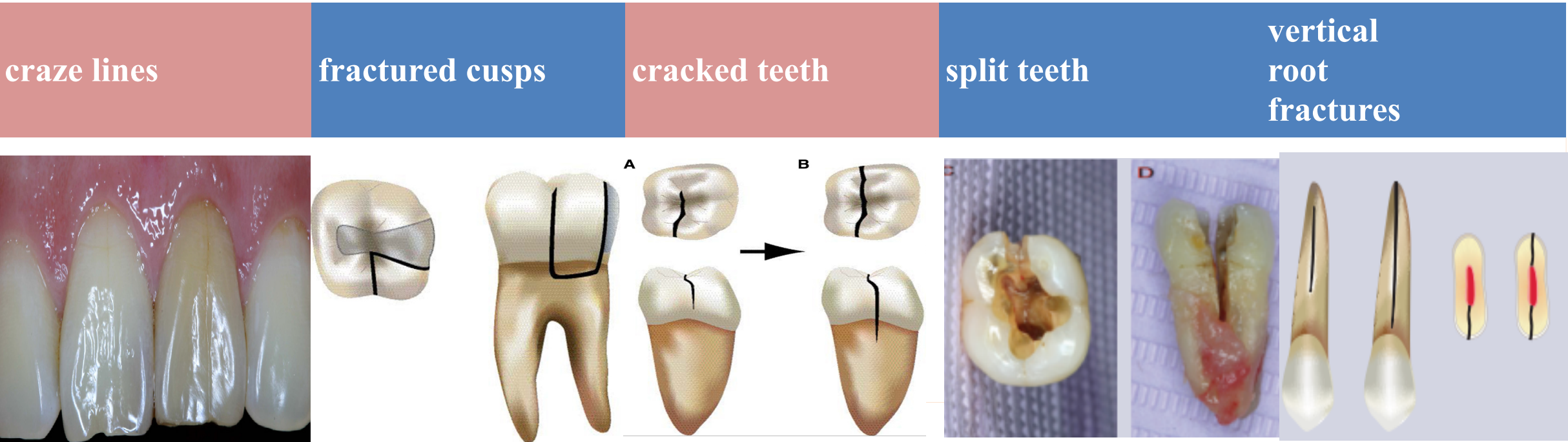
ABSTRACT

Diagnosing a cracked tooth is a challenge for dental clinicians. This report describes the use of a quantitative light-induced fluorescent (QLF) device that detects fluorescence reactions with visible light (405 nm) to visually identify microscopic tooth cracks during the diagnosis and treatment of cracked teeth that caused pulp disease. Fluorescence images of the occlusal surface, before and after removal of the restoration, and inside of the access cavity for root canal treatment were obtained using an intraoral capture-type QLF device (Q-ray penC; AIOBIO, Seoul, Korea). The device provided visual information such as enhanced magnification and fluorescent images to identify cracks on the exterior of the tooth, around restorations, and inside the cavity after removal of the restoration by a simple image capture process. The device was able to demonstrate the existence of the crack line and to predict the depth of cracks during treatment. The QLF device showed a potential benefit in the diagnosis and characterization, including the location and depth, of tooth cracks.

(J Endod 2021; ■:1–5.)

Table 3. American Association of Endodontists classification of cracked teeth.

Classification	Originate	Direction	Symptoms	Pulp Status	Prognosis
Craze Line	Crown	Variable	None	Vital	Excellent
Fractured cusp	Crown	M-D and/or F-L	Mild and generally, only to biting and cold	Usually vital	Good
Cracked tooth	Crown±Root	M-D often Central	Acute pain on biting Occasionally sharp pain to cold	Variable	Questionable: Dependent on depth and extent of the crack
Split tooth	Crown+Root	M-D	Marked pain on chewing	Often root filled	Poor unless crack terminates just subgingivally
Vertical root fracture	Roots	F-L	Vague pain Mimics periodontal disease	Mainly root filled	Poor: Root resection in multi-rooted teeth



American Association of Endodontists Classification of cracked teeth

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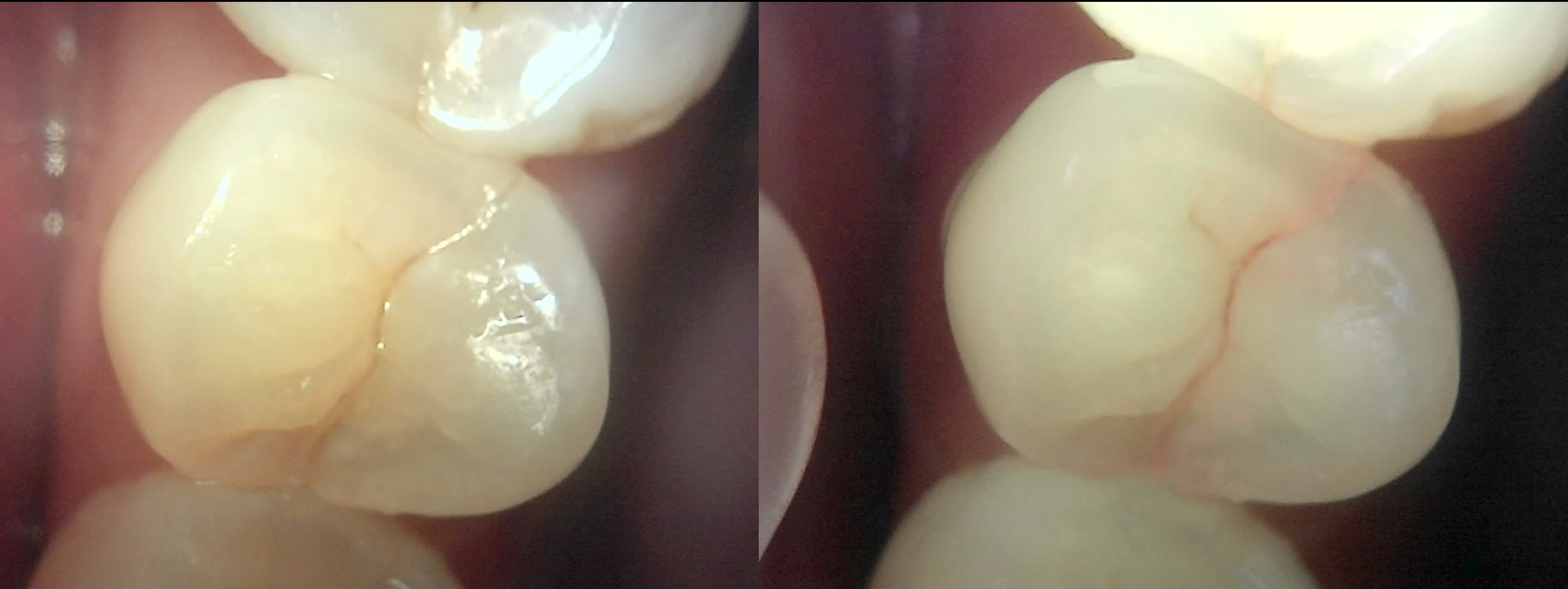
American Association of Endodontists Classification of cracked teeth

Classification	Originate	Direction	Symptoms	Pulp status	Prognosis
Craze line	Crown	Variable	None	Vital	Excellent
Craze line with red fluorescence	Crown	Variable	None	Vital	Questionable
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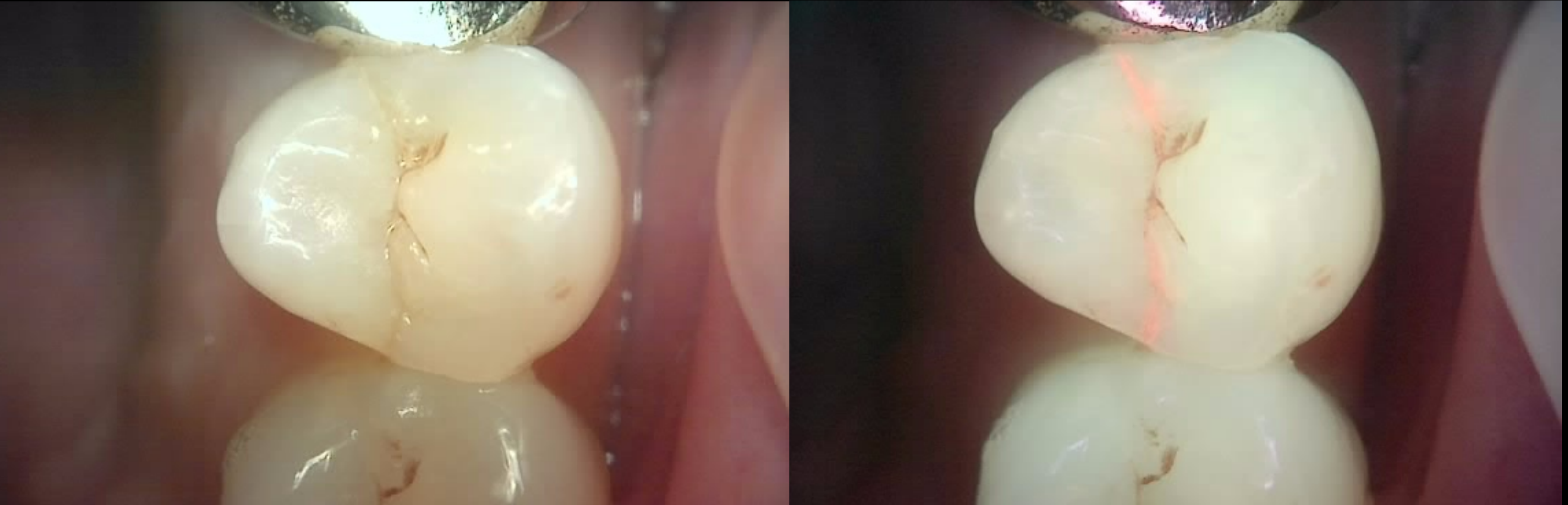
Craze line



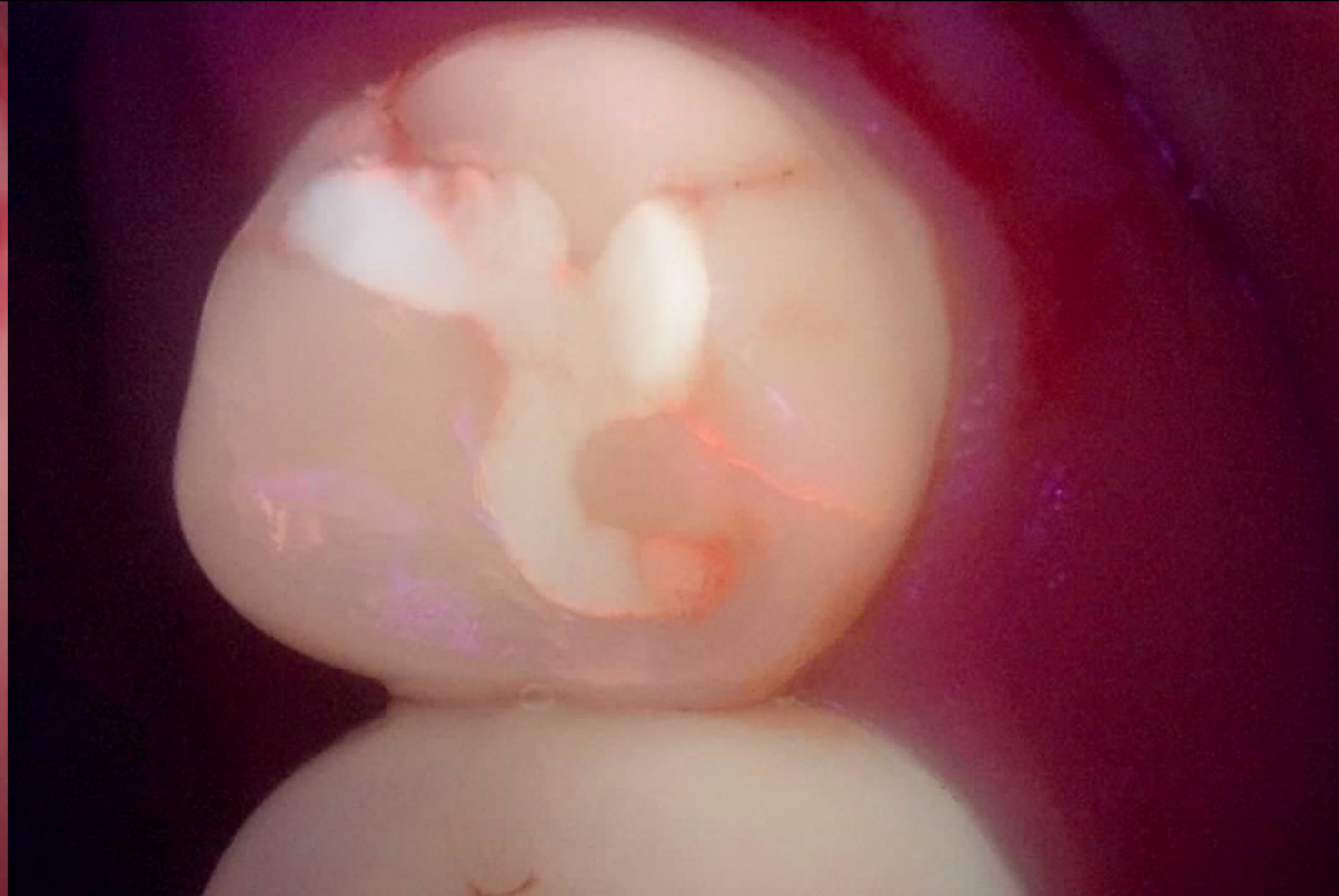
Craze line with Red fluorescence



Craze line with Red fluorescence



Craze line with Red fluorescence

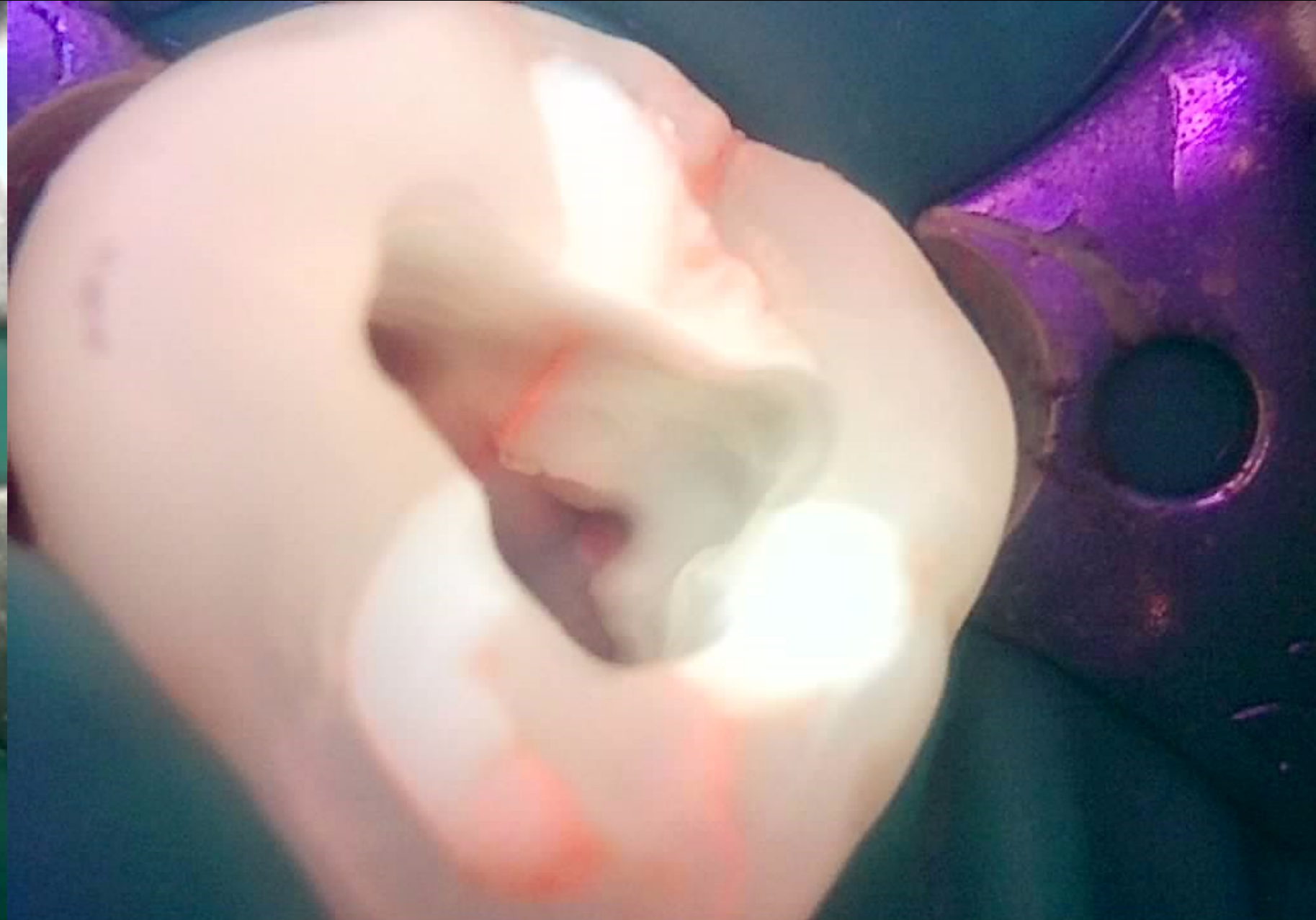
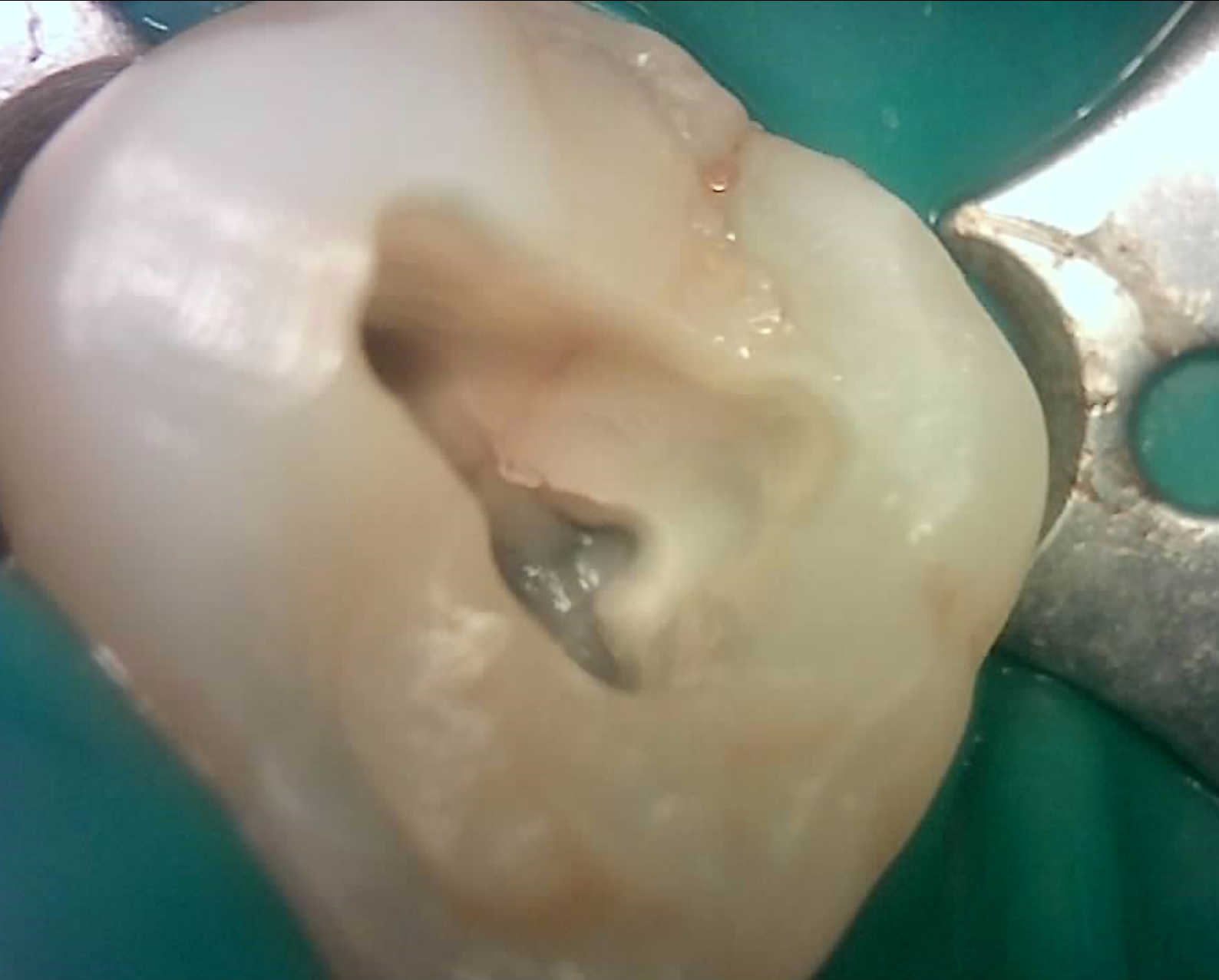




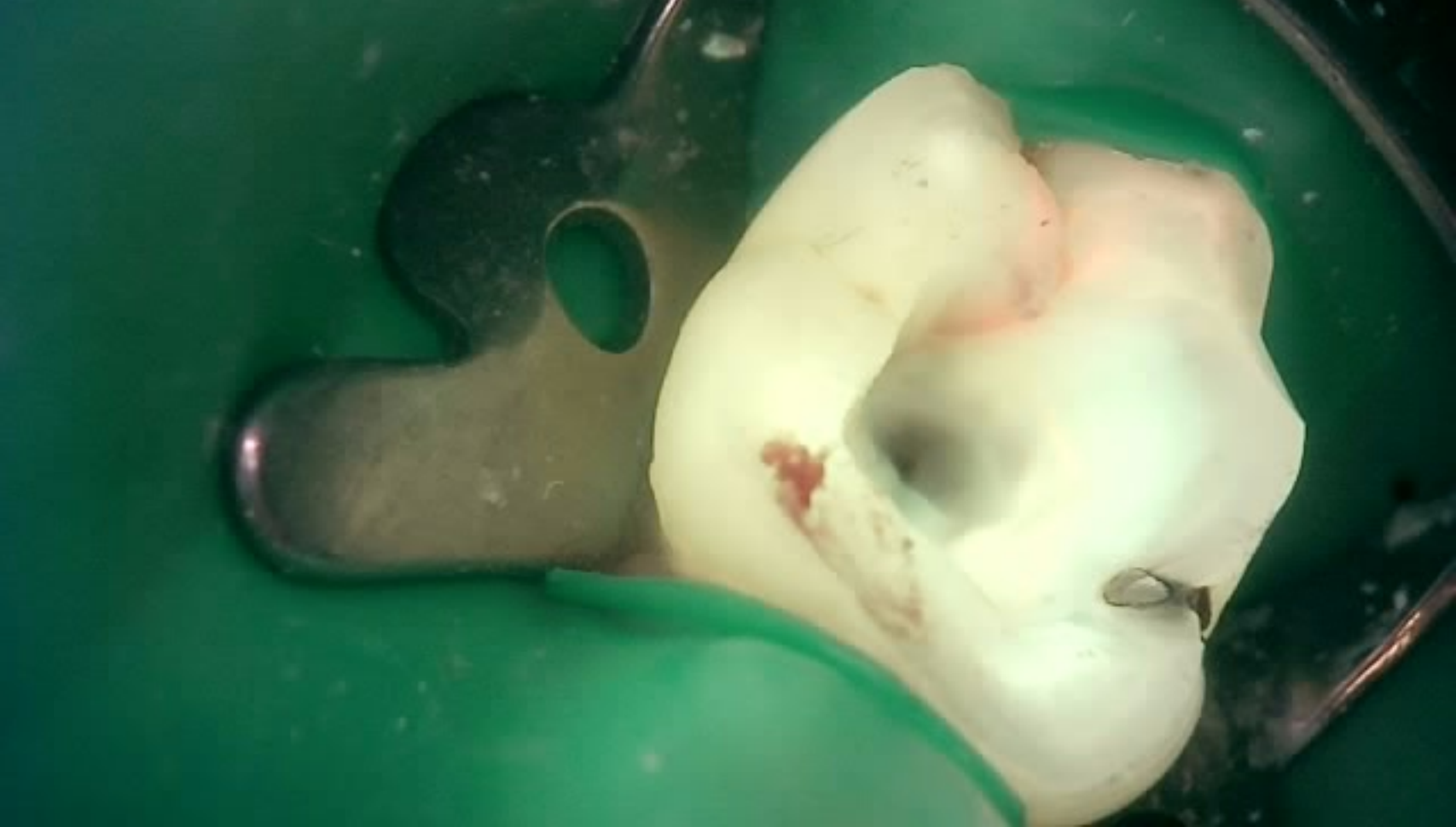
Craze line with Red fluorescence



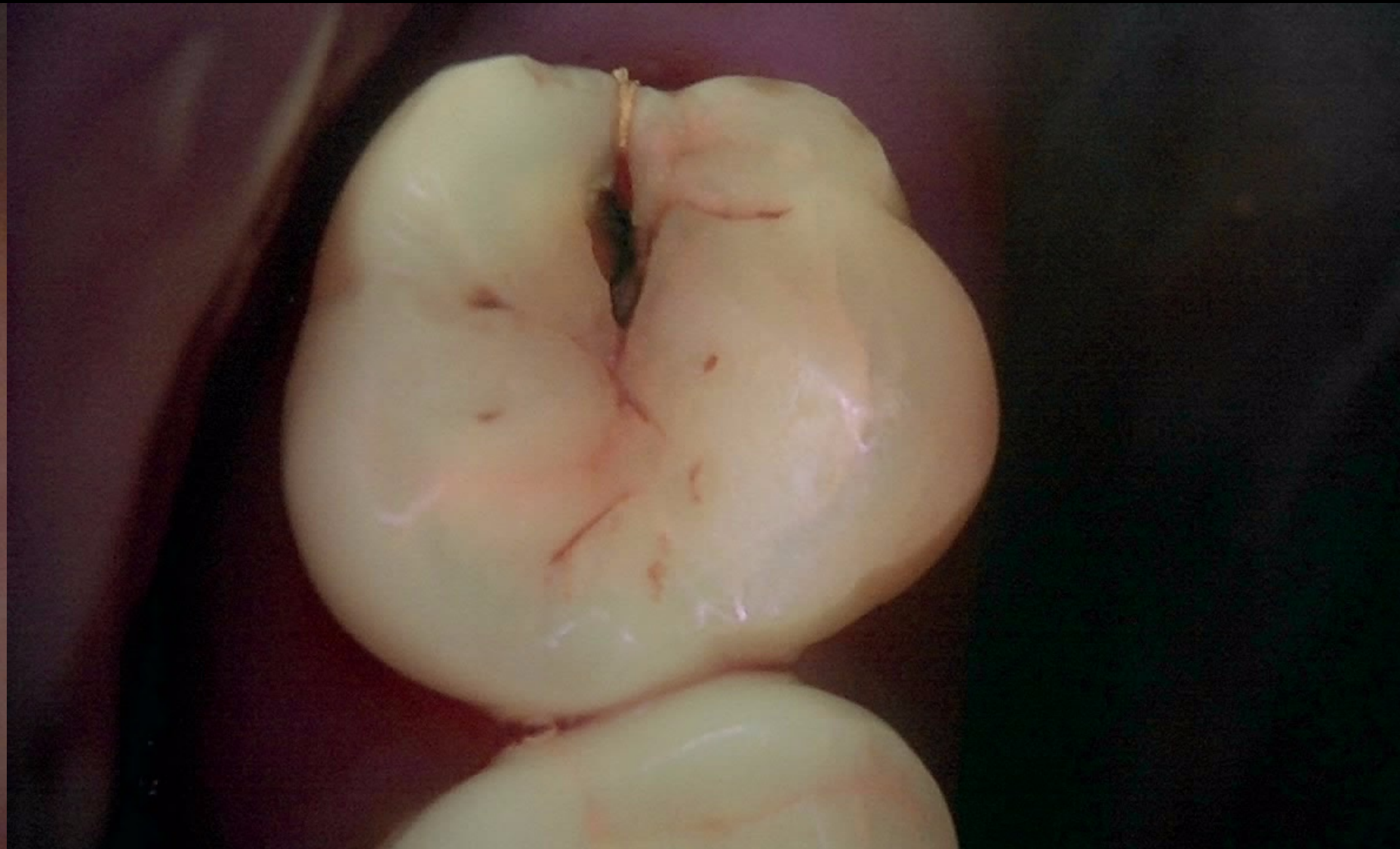
Cracked tooth



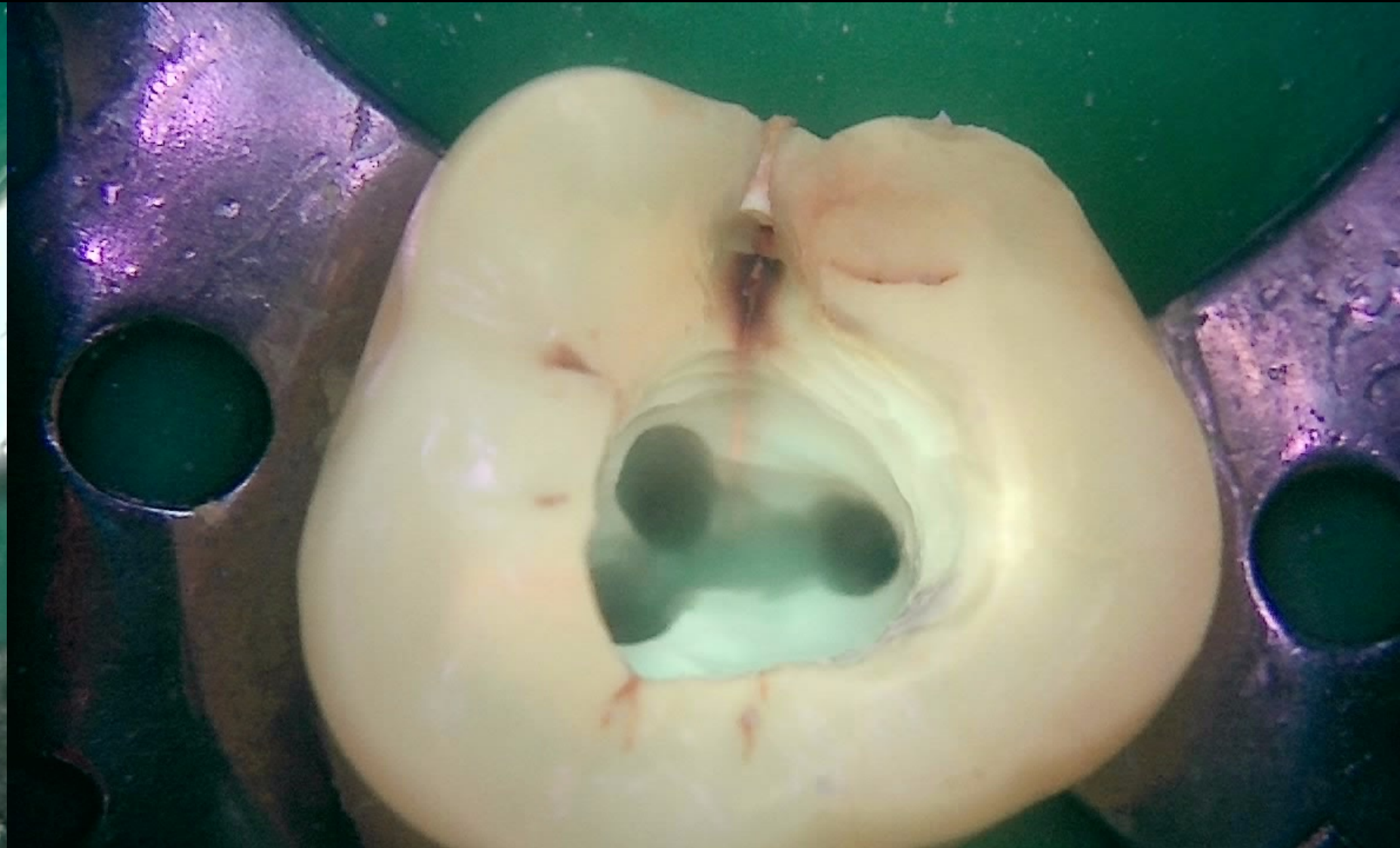
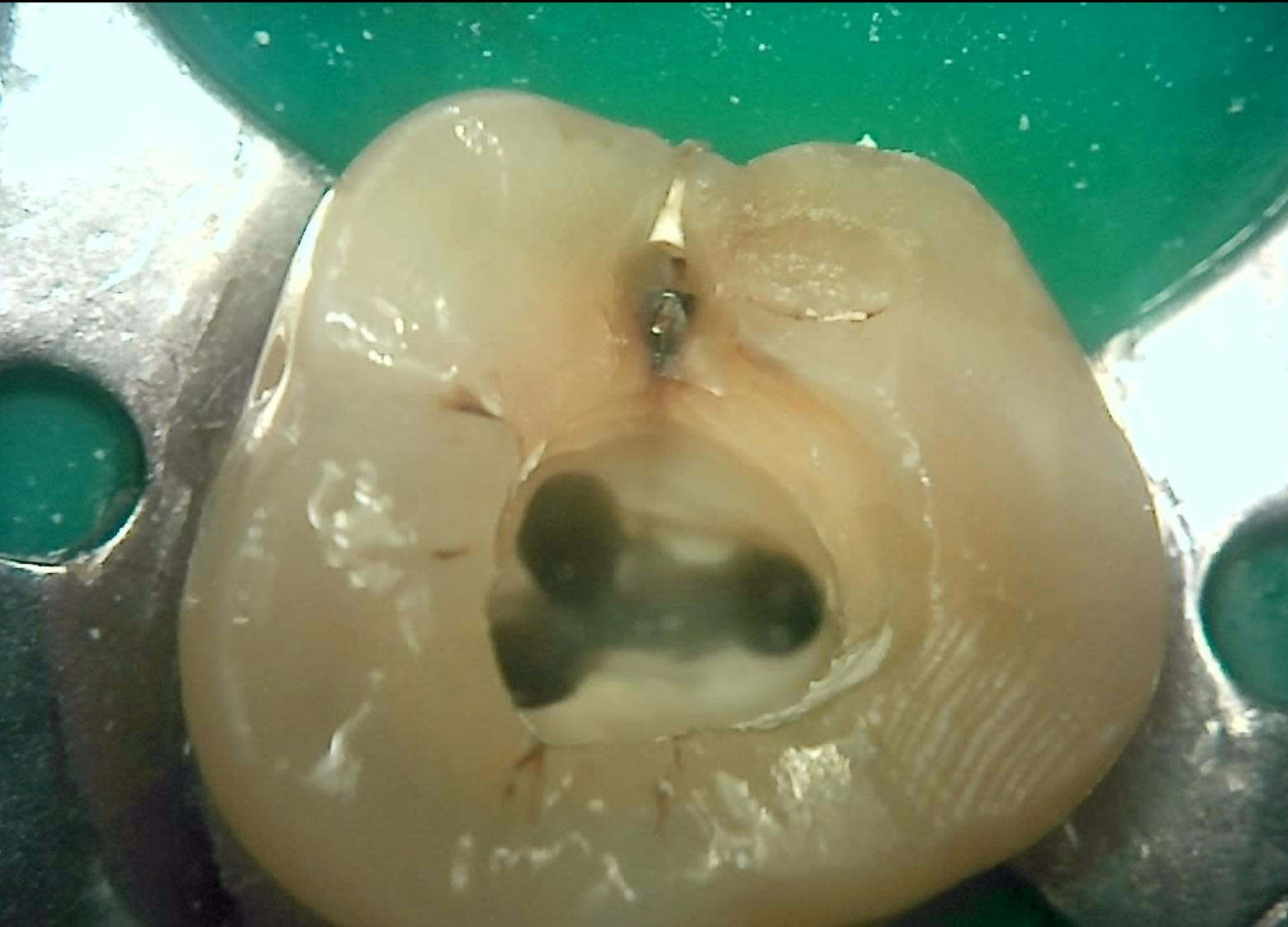




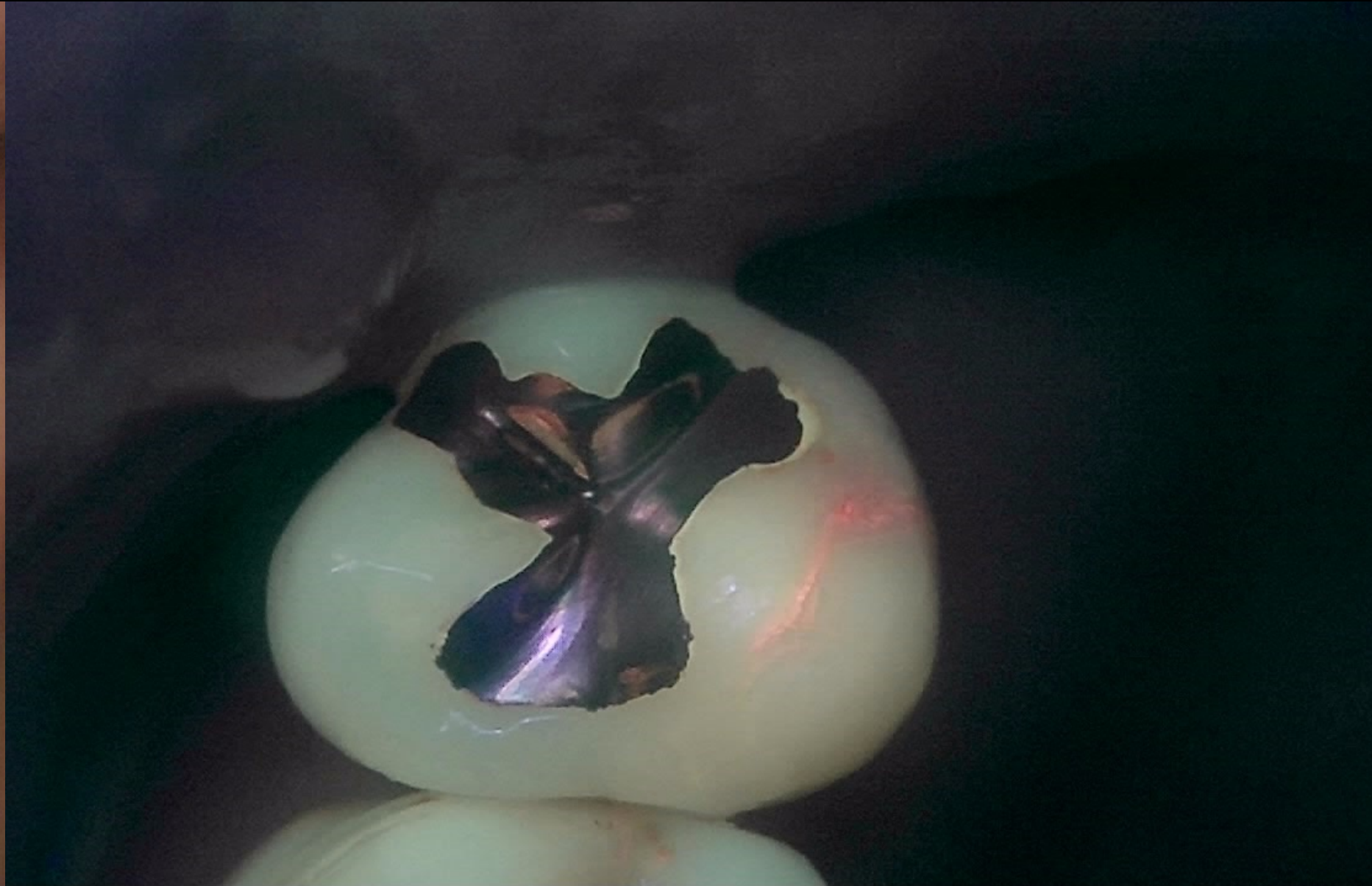
Craze line with Red fluorescence



Craze line with Red fluorescence



Craze line with Red fluorescence



Craze line with Red fluorescence



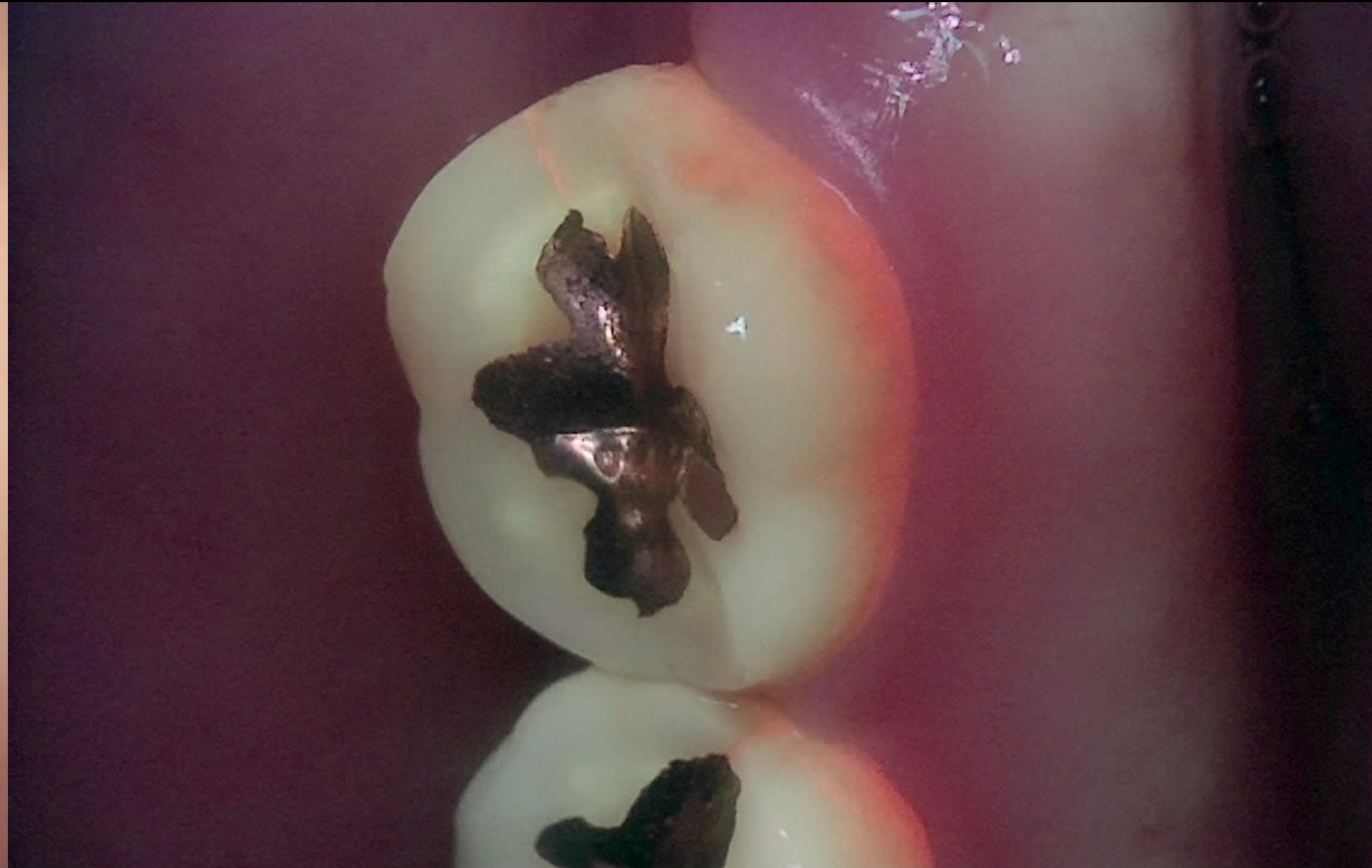
Craze line with Red fluorescence



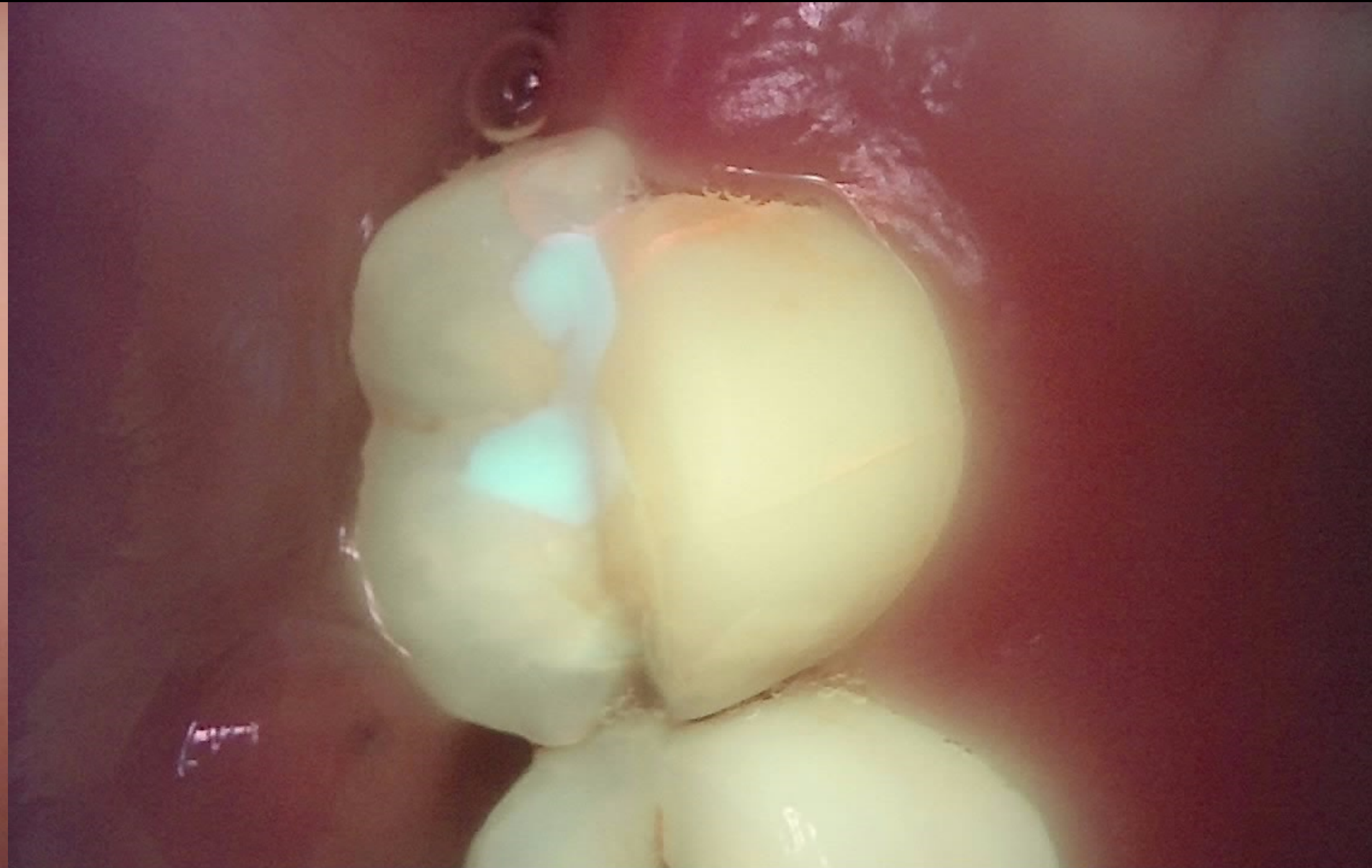
Craze line with Red fluorescence



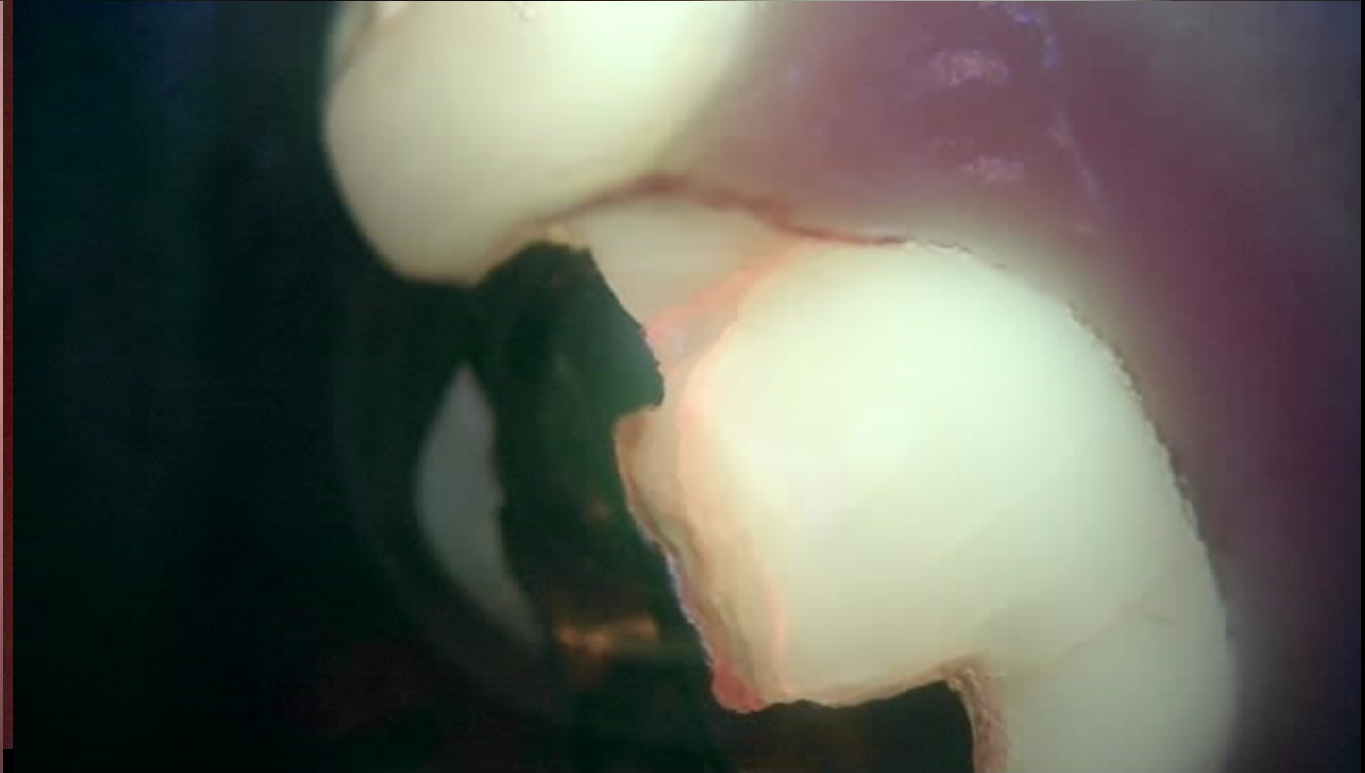
Craze line with Red fluorescence

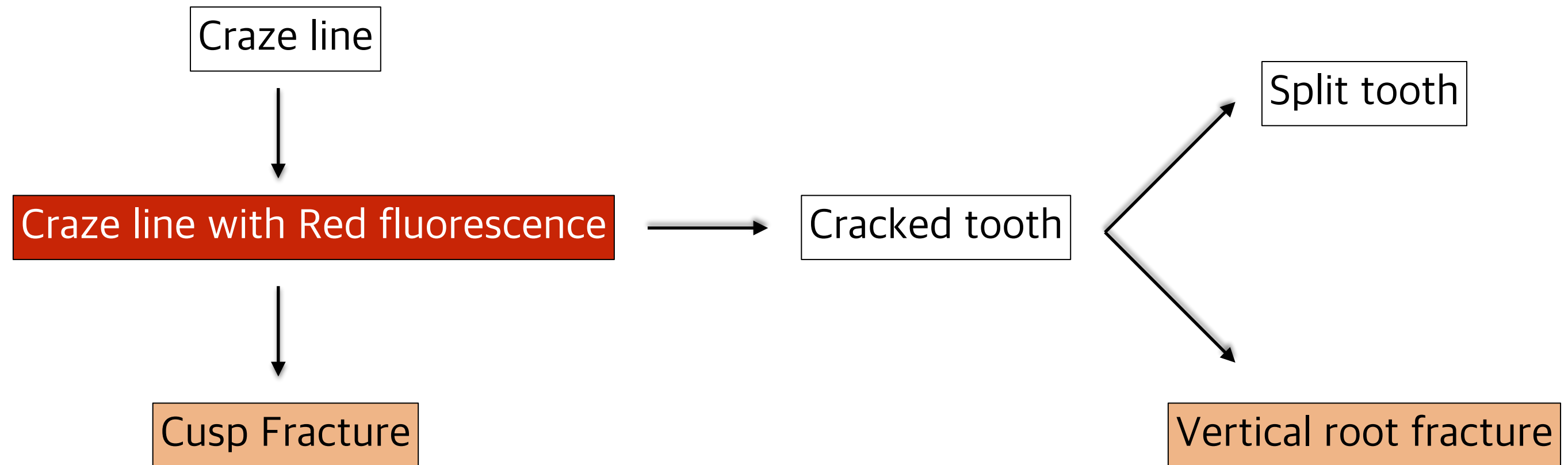


Craze line with Red fluorescence



Craze line with Red fluorescence







A close-up of the Qraycam pro device, which is a white, handheld dental instrument with a blue and red logo. It is positioned against a dark blue background.

Biofilm

Caries

Crack





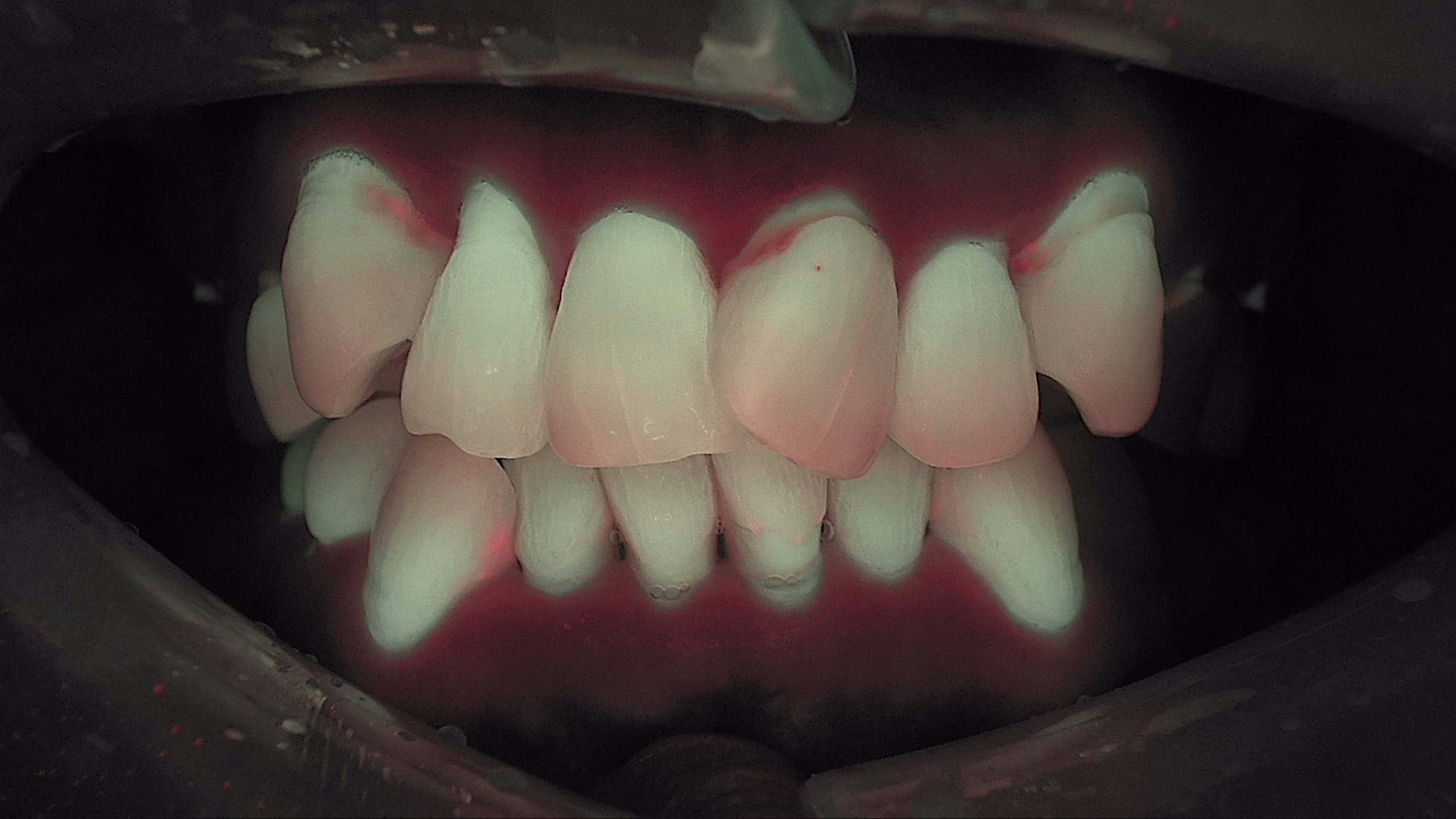
















Craze line with Red fluorescence

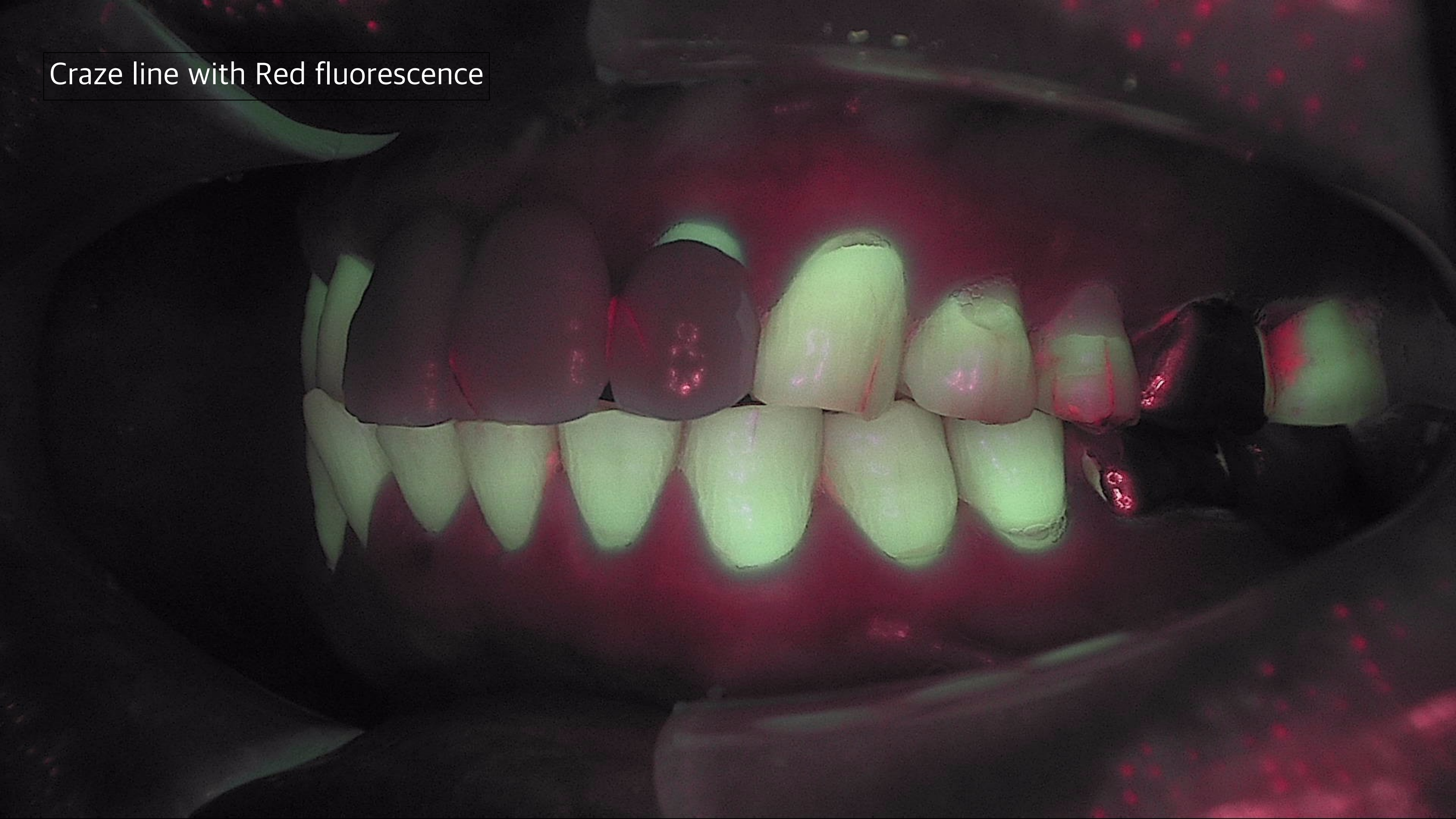


Craze line with Red fluorescence

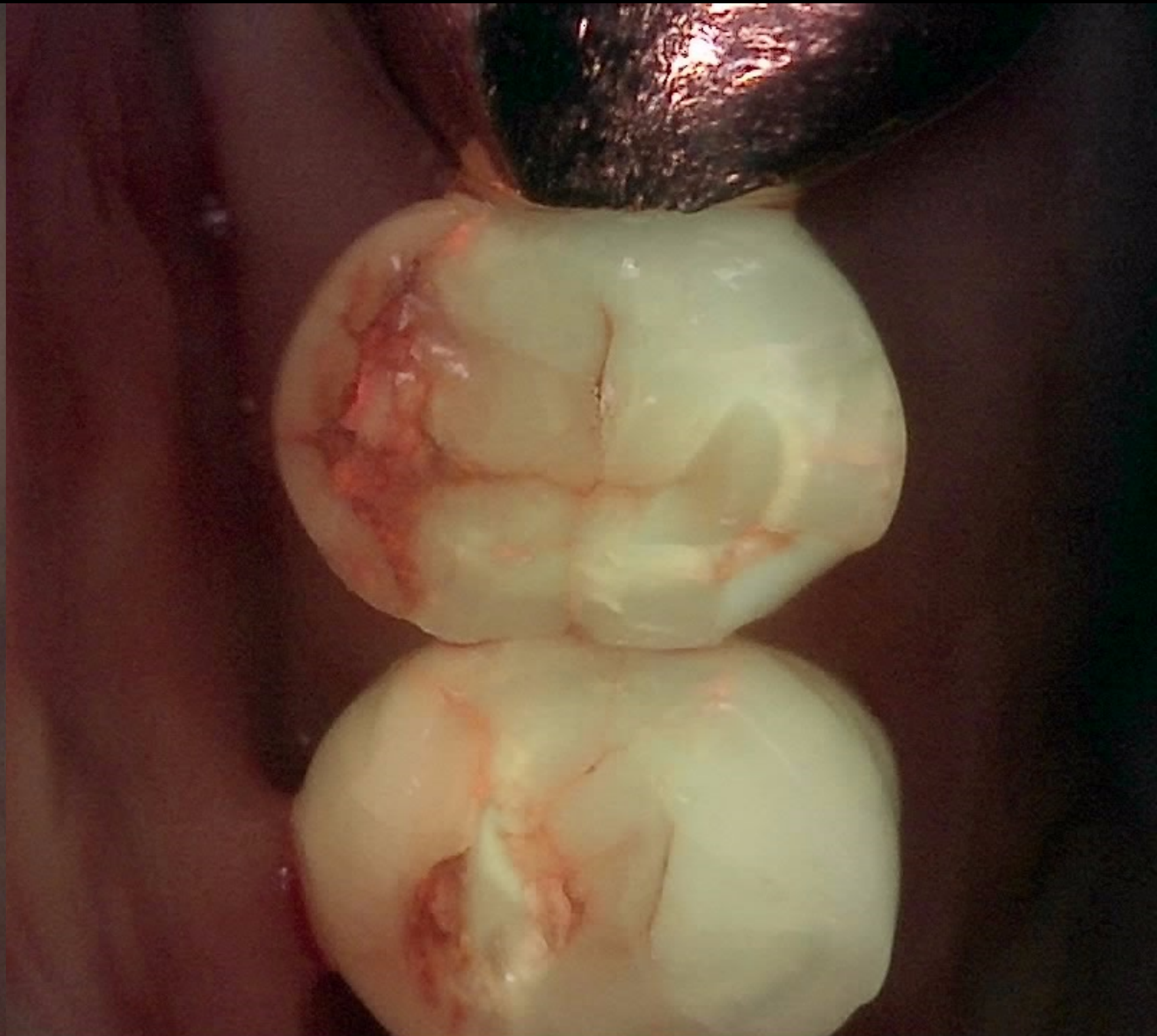


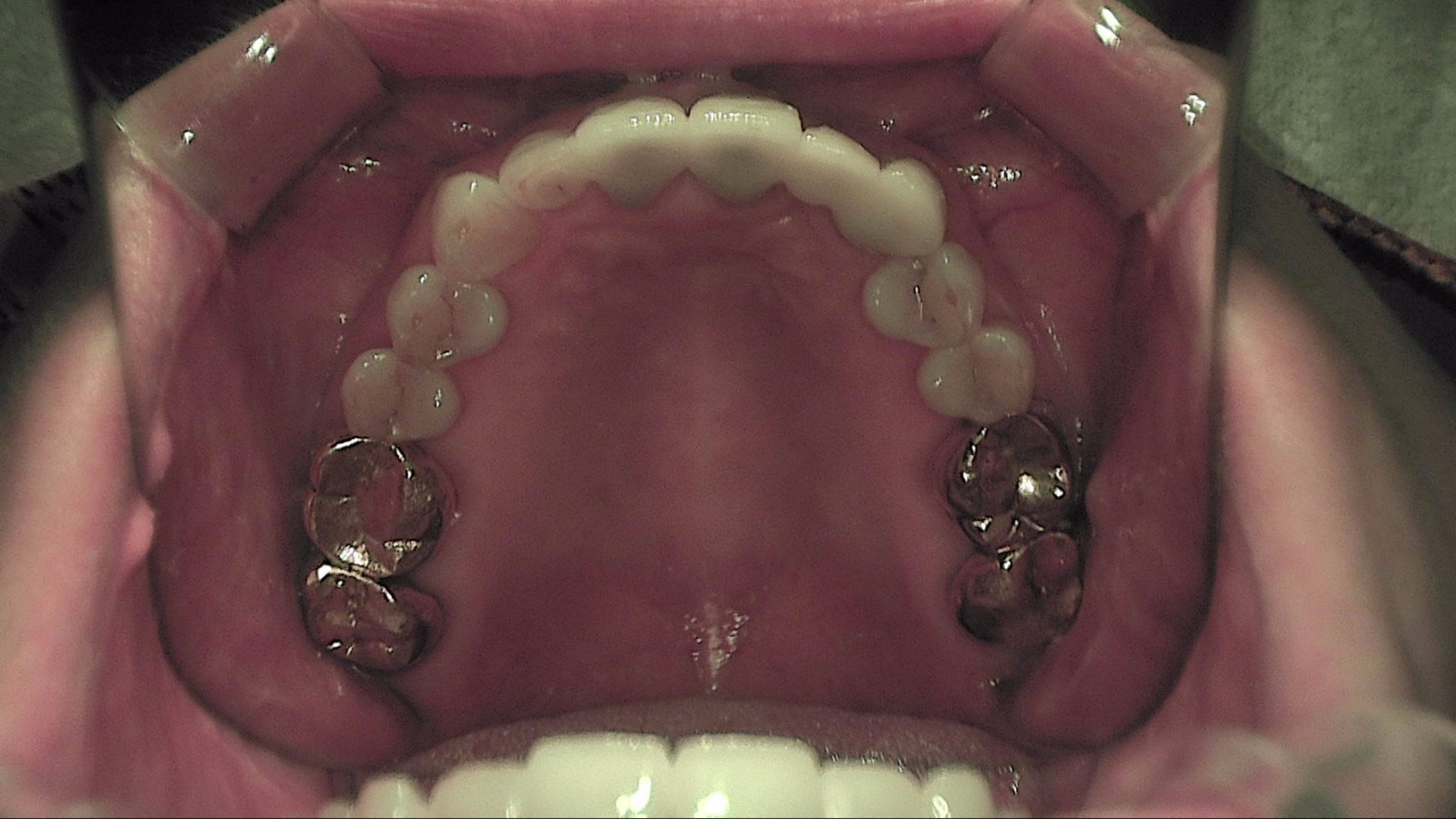


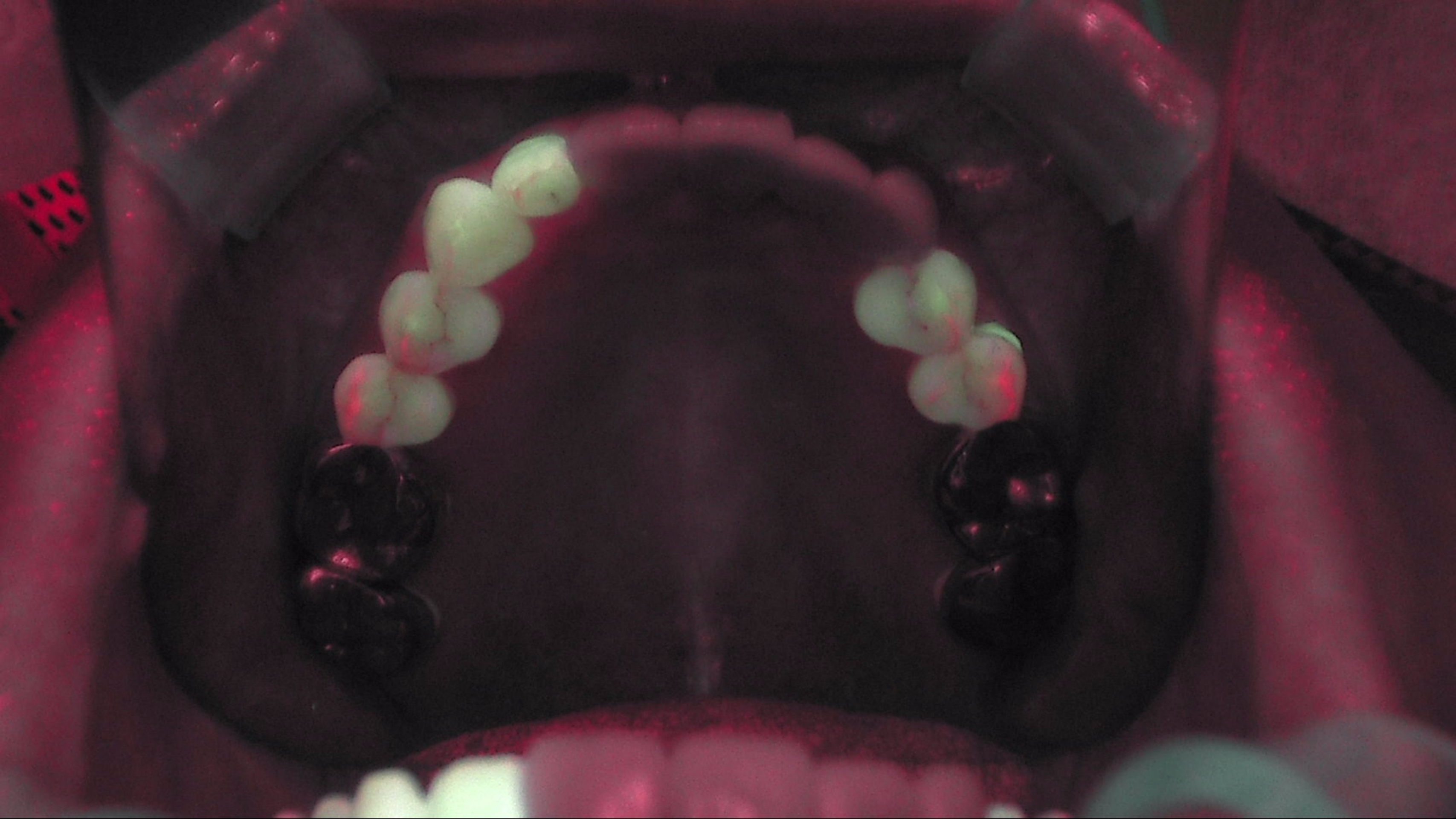
Craze line with Red fluorescence

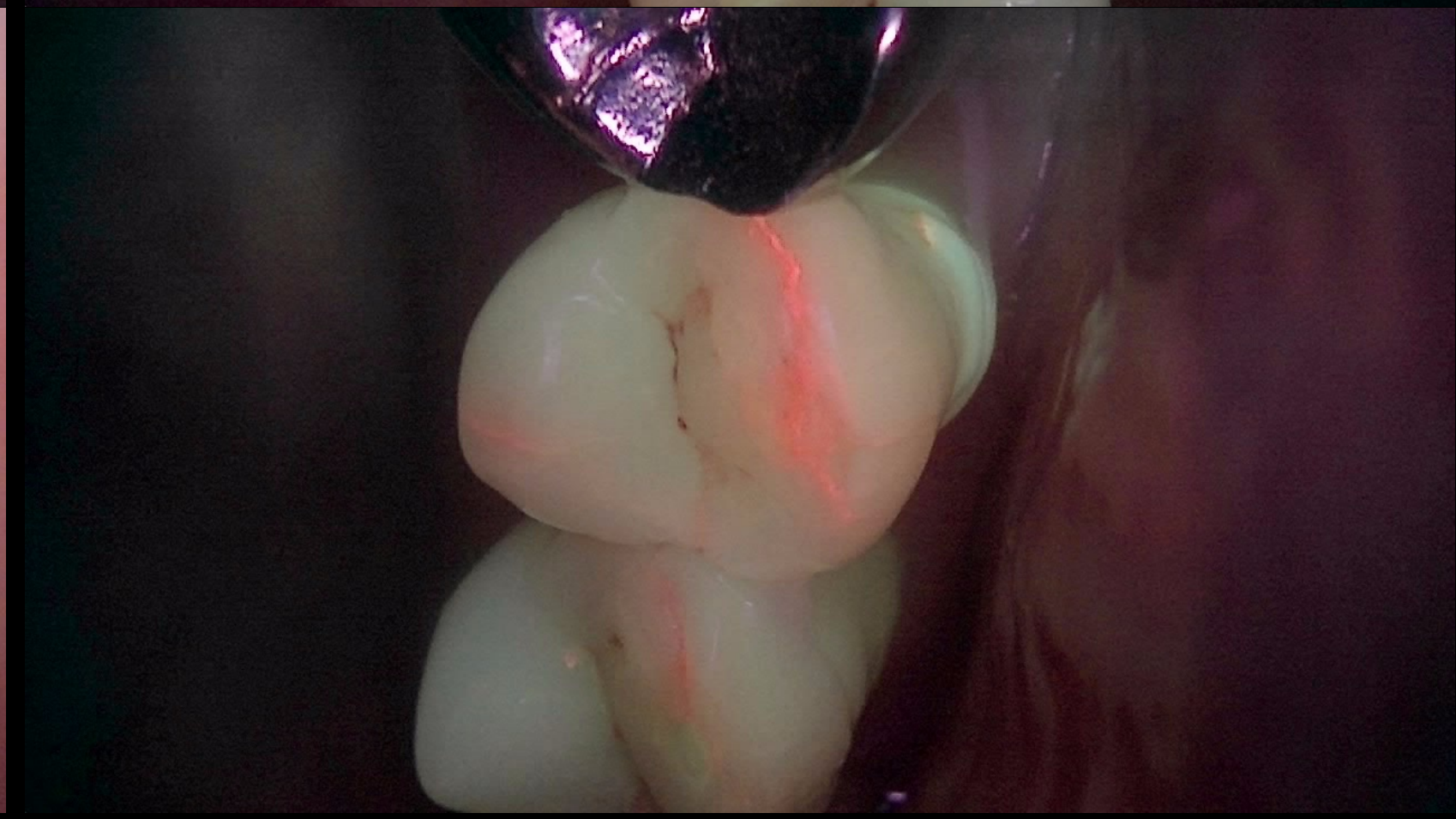
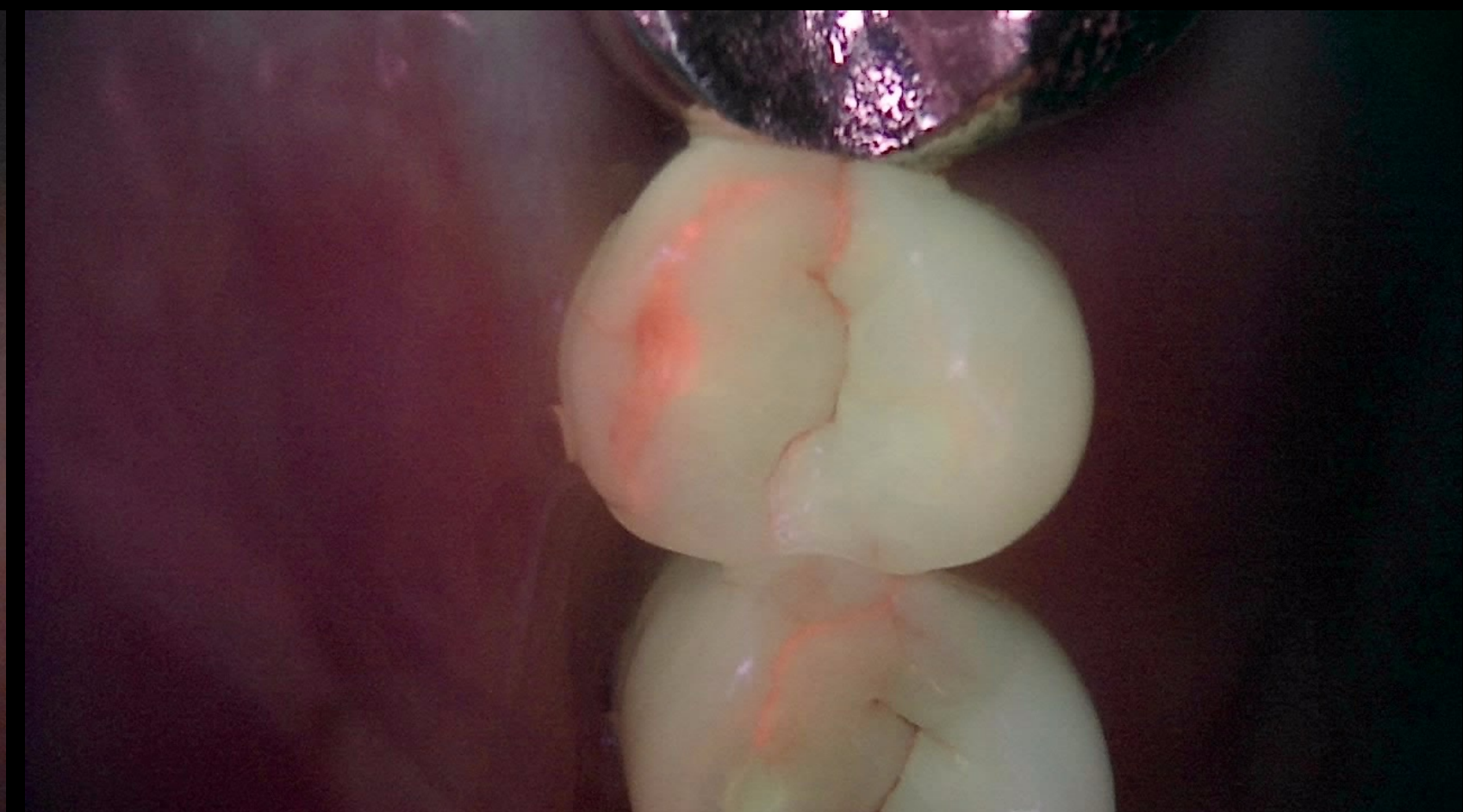


Craze line with Red fluorescence

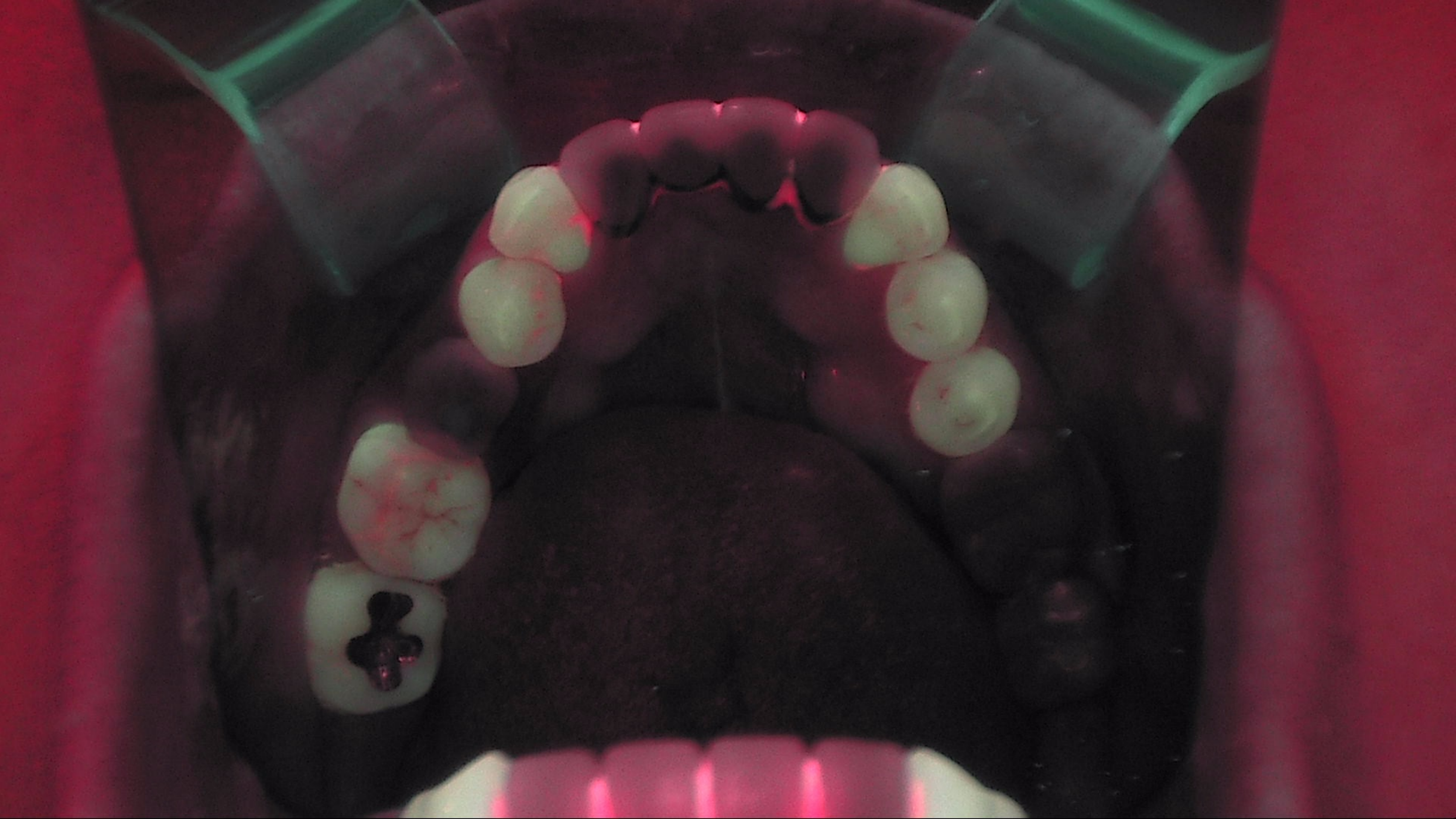


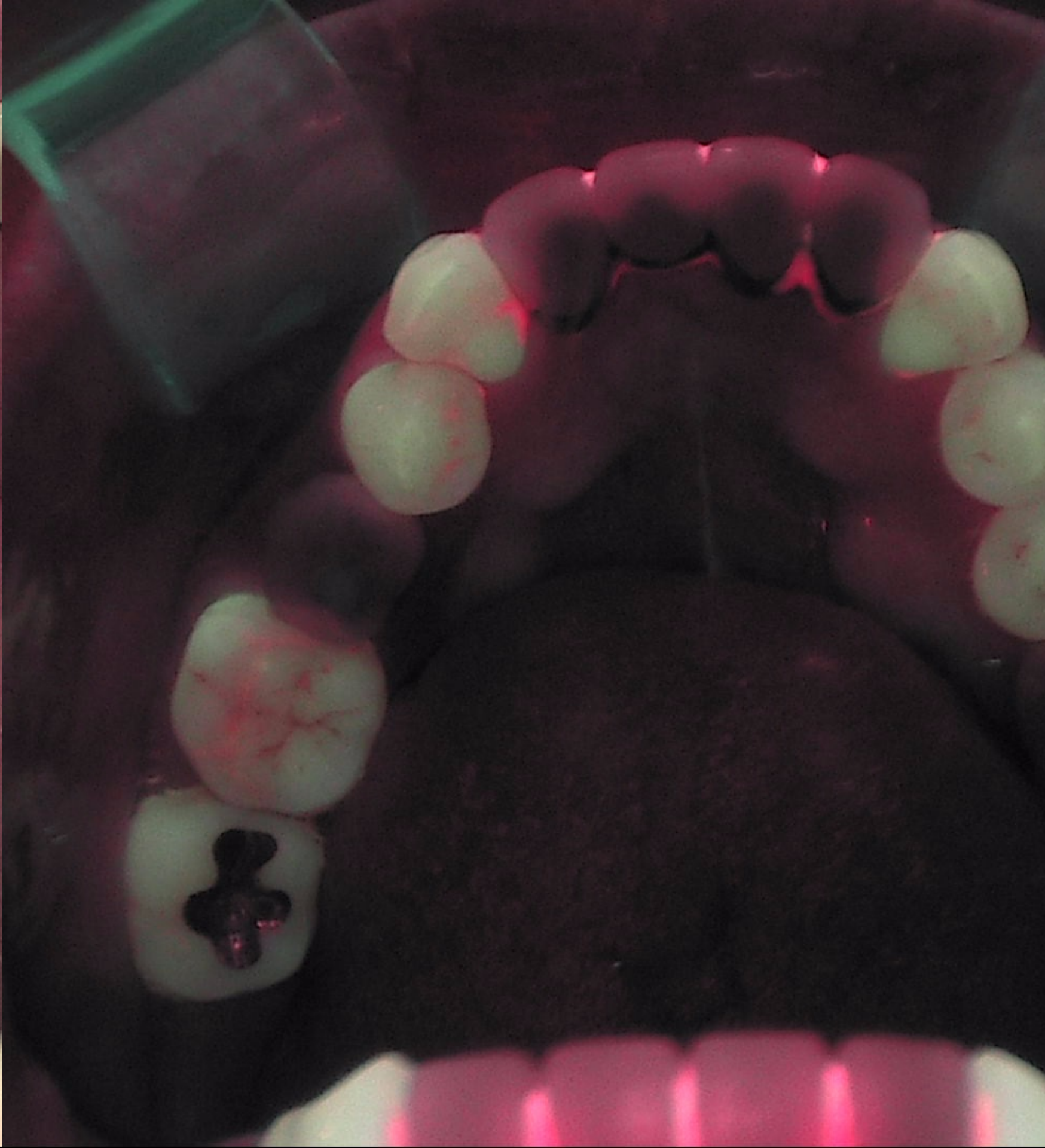




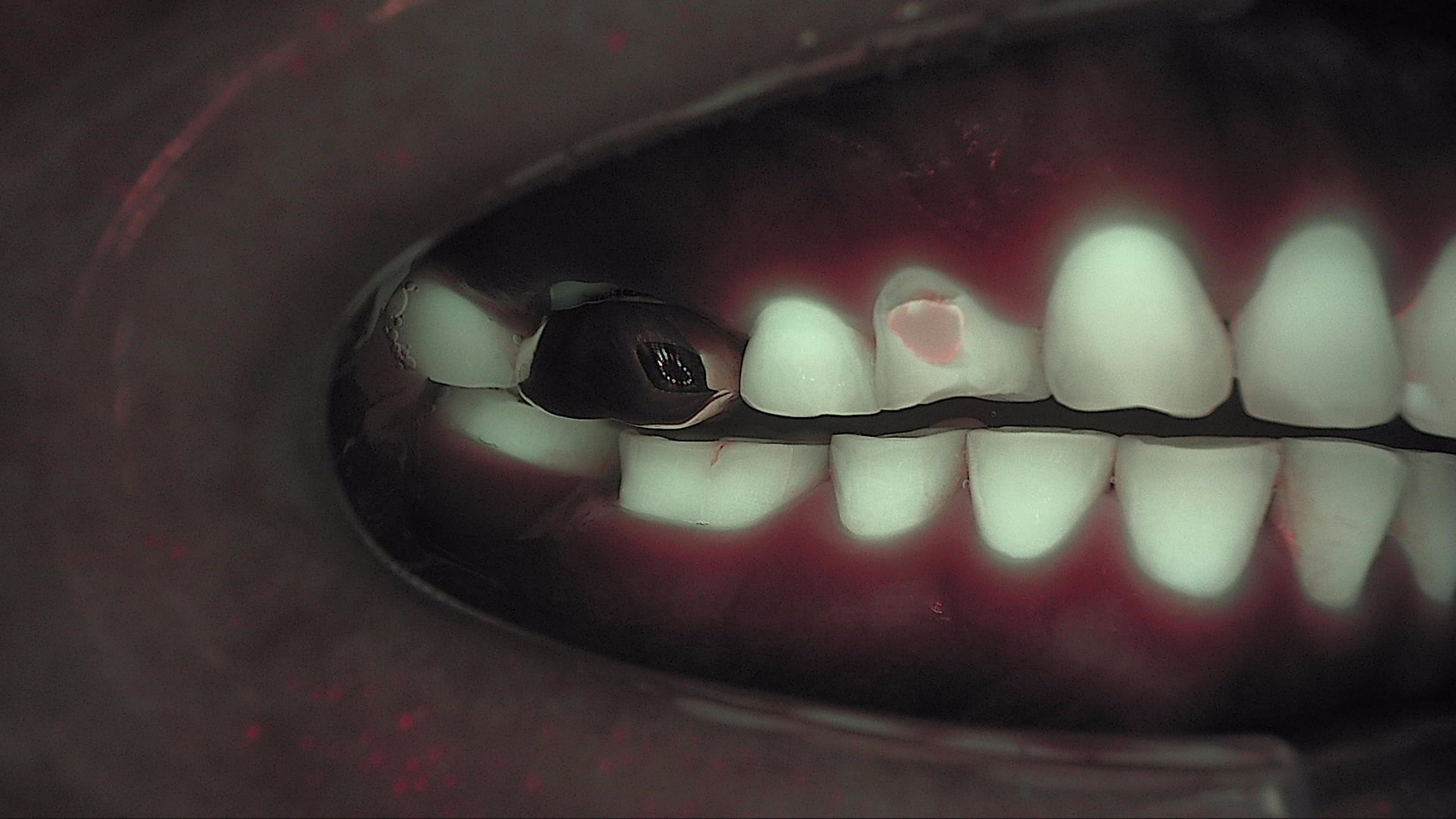










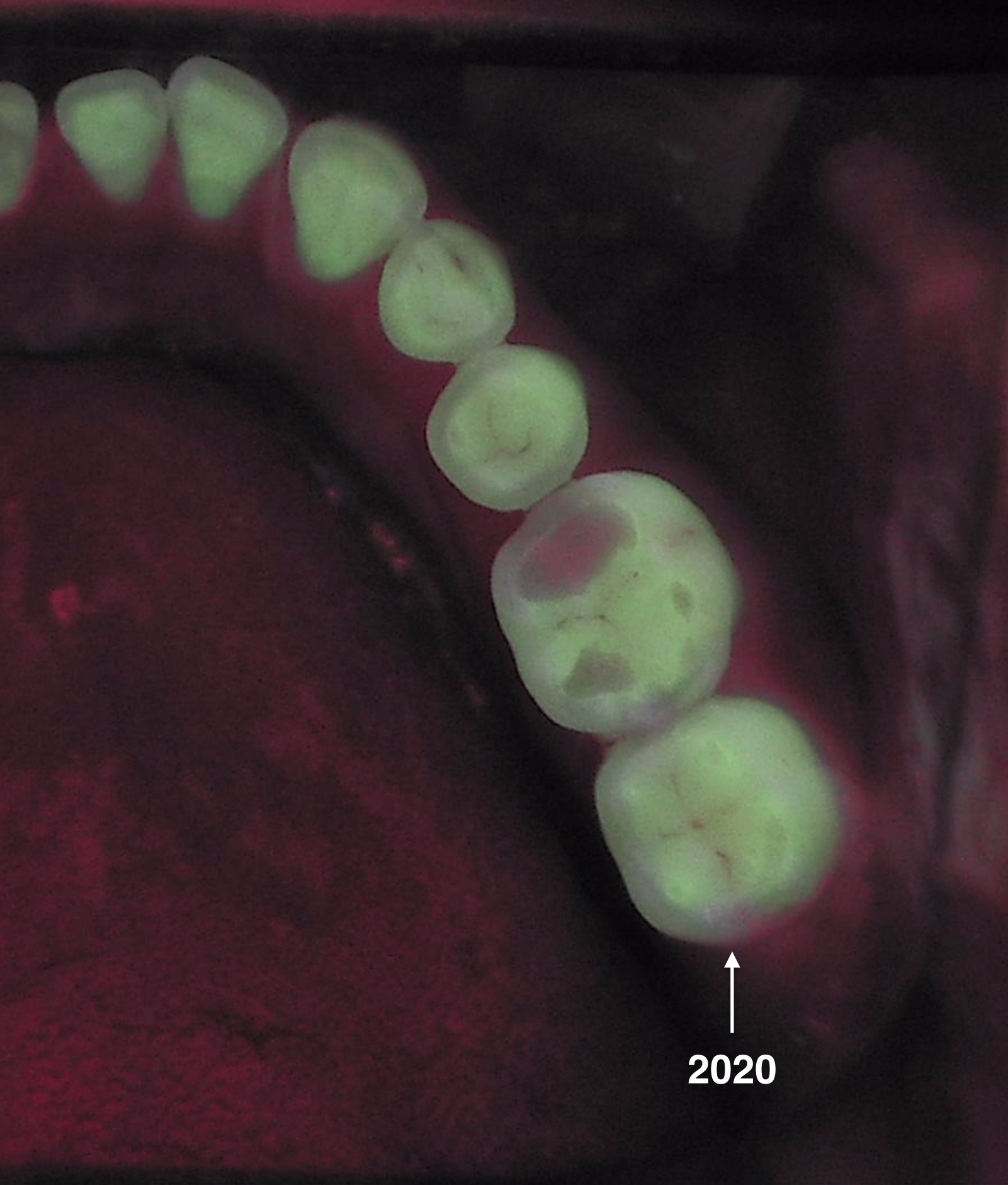








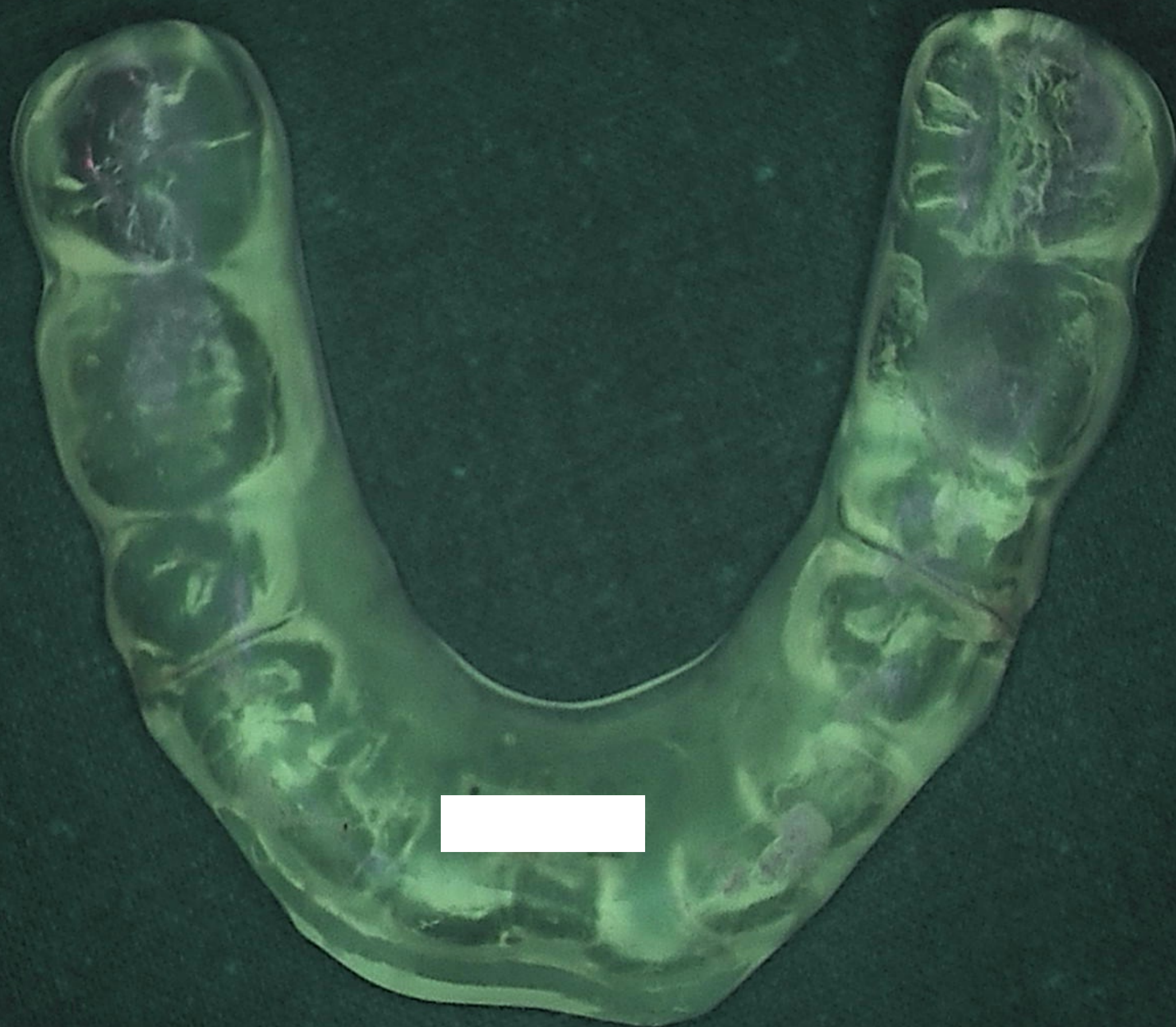




Craze line with Red fluorescence







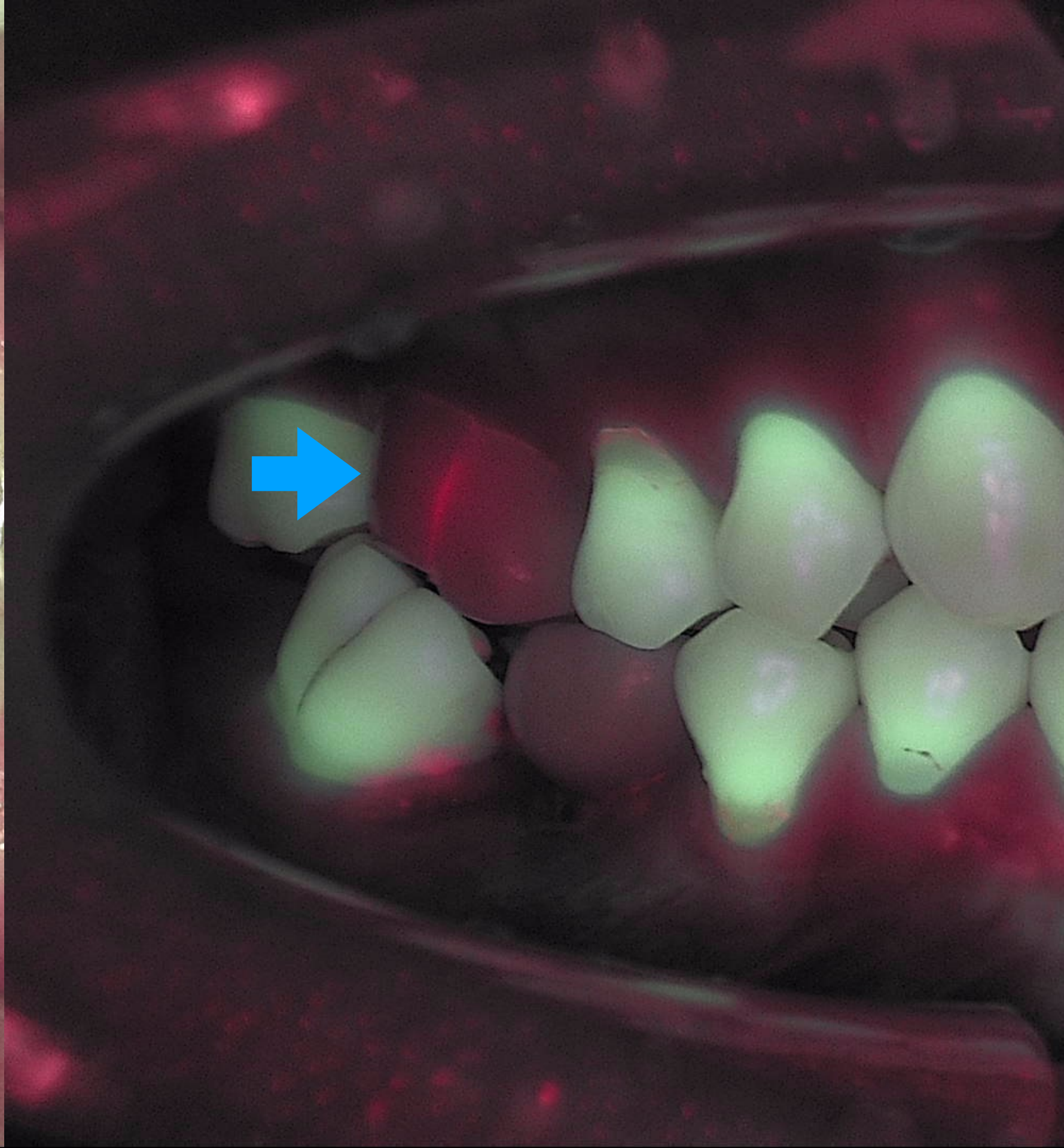
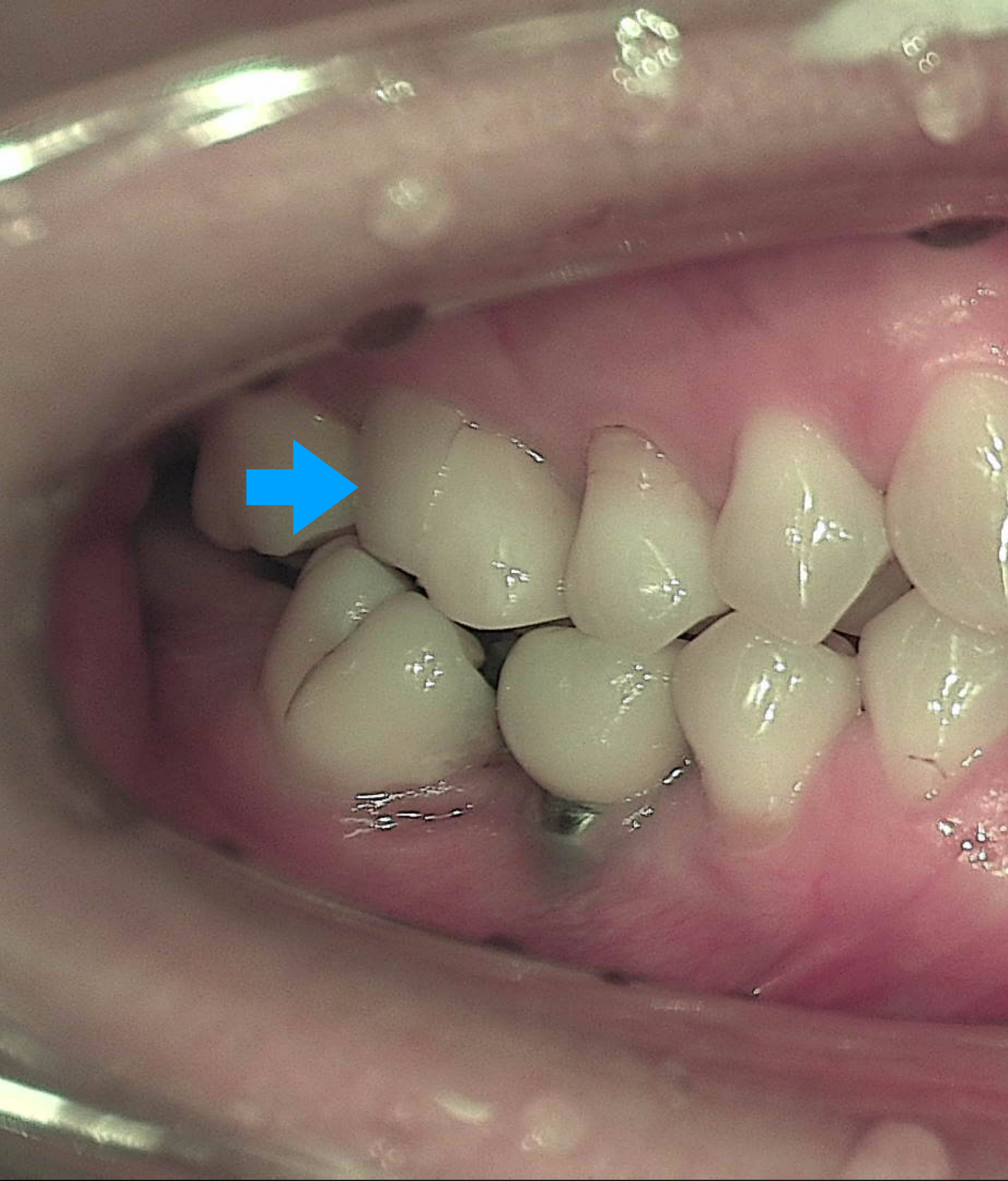
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Vertical root fracture	Roots	F-L	Vague pain Mimics periodontal disease	Mainly root filed	Poor: Root resection in multi-rooted teeth



Laminate





220308



220308

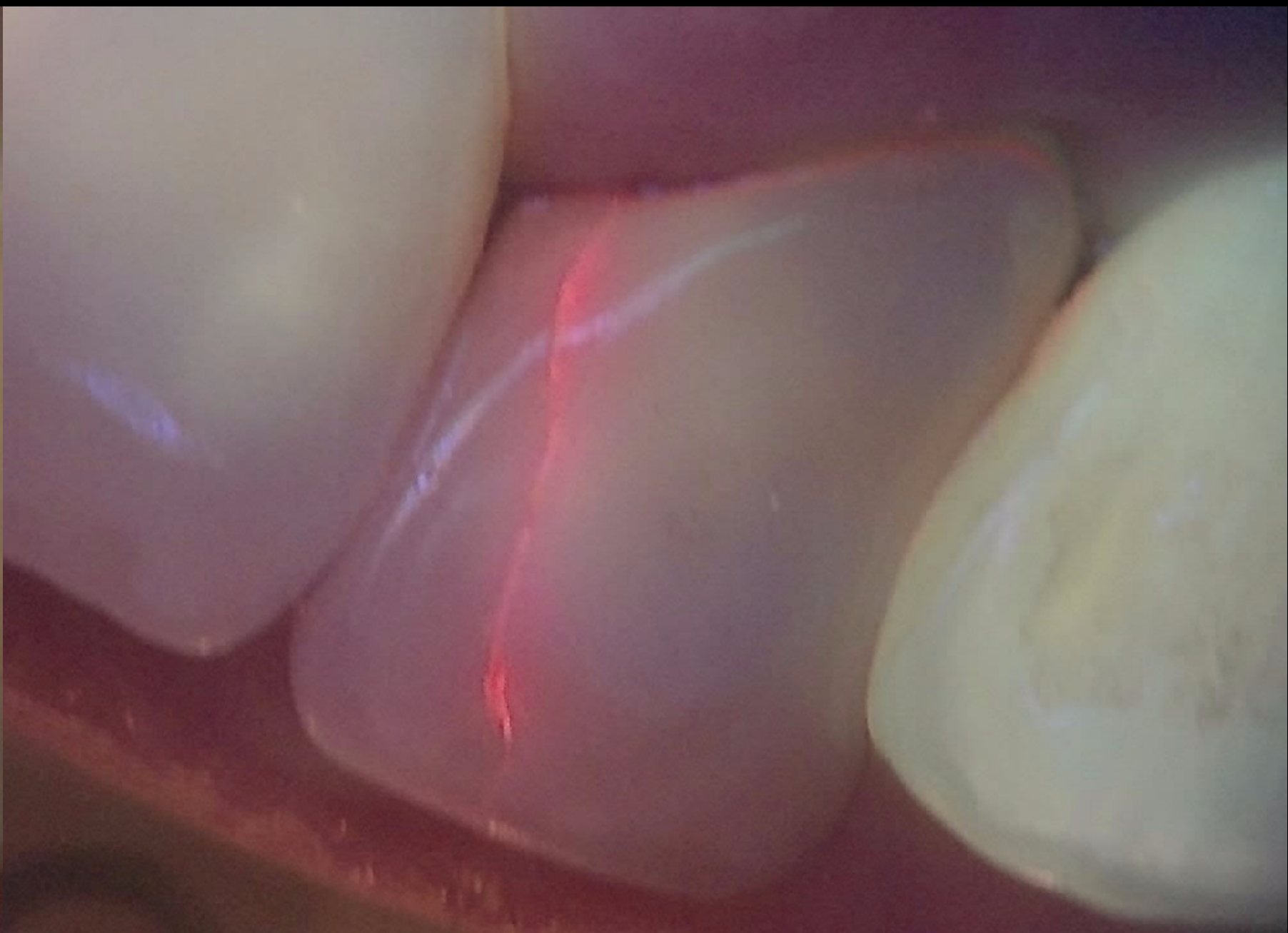


220705



220705





LinkDens Web for Dental Office

AIOBIO Data Dentistry Platform

2023-04-26

- My Tasks
- Patients
- Results
- Schedule
- Communications
- Comparison

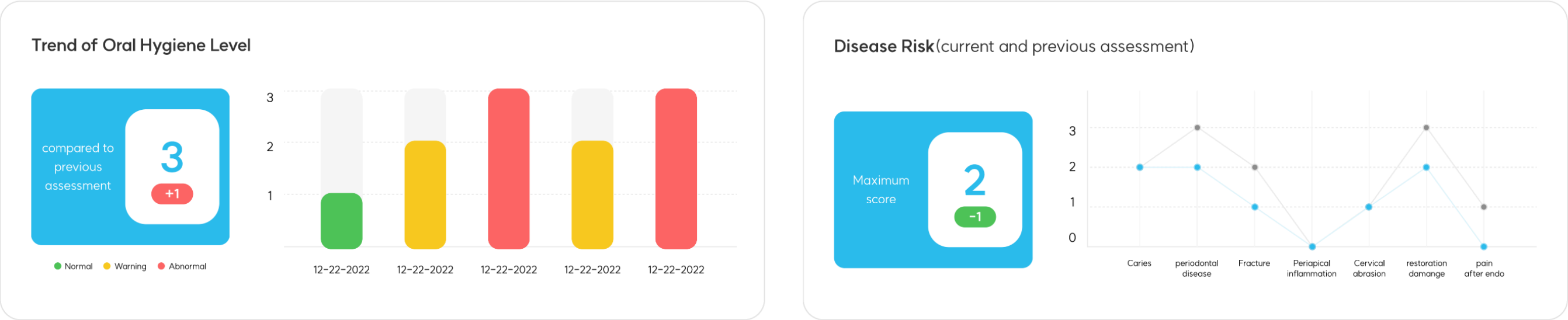
Patients > Patient Detail

Edit Patient

Ronald Richards | M | Chart ID 00000000

1984-09-05 010-7468-0068

New Assessment



Status	ID	Assessment Type ID	Assessed at	Clinic	DDS	Chart ID	Hygiene Level	Disease Risk	Result	3D	Delete
Initiated	933	2022100600907	2022-12-22	Comprehensive Dental Care	David Rhew	19101702	1	1			
In progress	933	2022100600907	2022-12-22	Comprehensive Dental Care	David Rhew	19101702	2	2			
Completed	933	2022100600907	2022-12-22	Comprehensive Dental Care	David Rhew	19101702	3	3			

Results > 04/18/2023

Ronald Richards | M | Chart ID 00000000

1984-09-05 010-7468-0068

Preview results

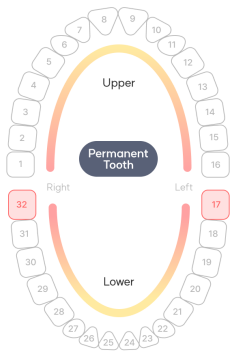
Oral Hygiene Status

See dentist

Excellent See dentist Danger

See dentist! next Check-up recommended after three month

Teeth AT Risk

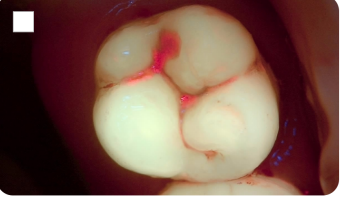


1 Low Risk

2 Moderato [Wait&See]

3 High [Need immediate treatment]

Tooth Number	Caries	Periodontal disease	Fracture	Periapical inflammation	Cervical abrasion	restoration damage	pain after endo
#17	3	-	-	-	-	-	-
#32	2	-	-	-	-	-	-



Gray Cam Pro Images

Normal intraoral images



Q-ray images



Oral Cavity



👤 Ronald Richards | M | [Chart ID](#) 00000000

visit 04-08-2023

📅 1984-09-05 📞 010-7468-0068



Status	ID	Assessment Type ID	Assessed at	DDS	Chart ID	Hygi
Initiated	933	2022100600907	2022-12-22	Comprehensive Dental Care	David Rhew	19101702
In progress	933	20221006009		e Denta		
Completed	933	20221006009		e Denta		



« < 1 2 3 4 5 6 7 8 9 10 > »

White Light Images Gray Images





Go to LinkDens App and find your status

CHART ID 00000000
PATIENT NAME Ronald Richards
DATE OF BIRTH 1987-03-28
ASSESSED AT 2023-04-18
DDS David Rhew

Comprehensive Oral Assessment Report

DDS comment

Oral hygiene is managed to some extent, but some parts are not managed and caries progressed around the restoration of the occlusal surface or tooth #37. Please visit the dentist as soon as possible.

Oral Hygiene Status



See dentist



Excellent



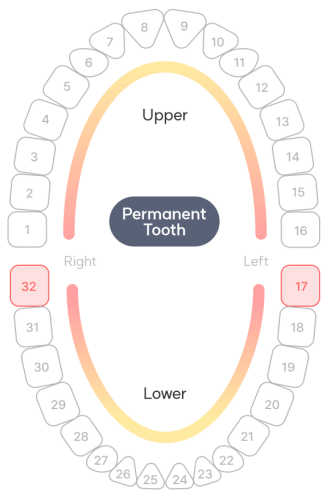
See dentist



Danger

See dentist! next Check-up recommended after **three month**

Teeth AT Risk



- 1 Low Risk
- 2 Moderato [Wait&See]
- 3 High [Need immediate treatment]

Tooth Number	Caries	Periodontal disease	Fracture	Periapical inflammation	Cervical abrasion	restoration damage	pain after endo
#17	3	-	-	-	-	-	-
#32	2	-	-	-	-	-	-

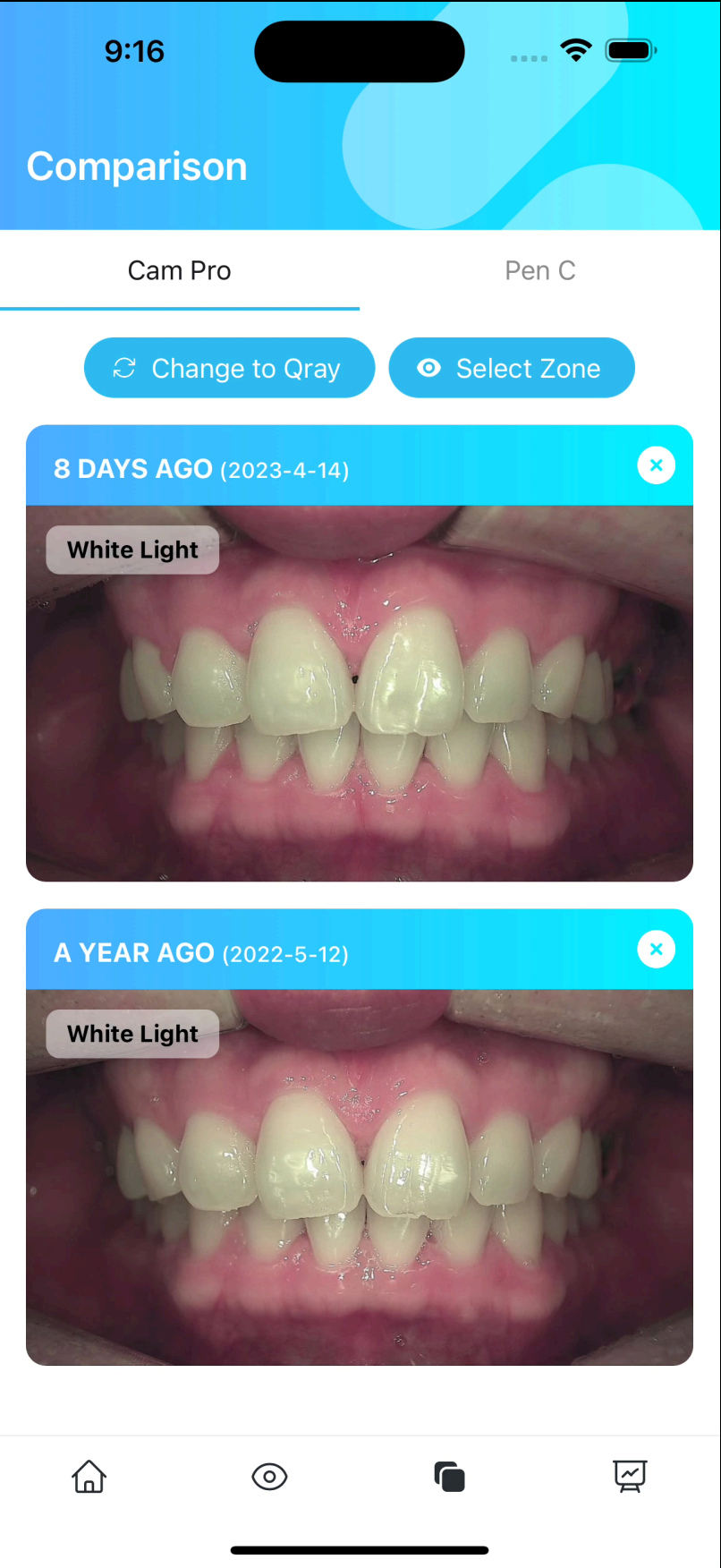
Gray Cam Pro Images

Normal intraoral images



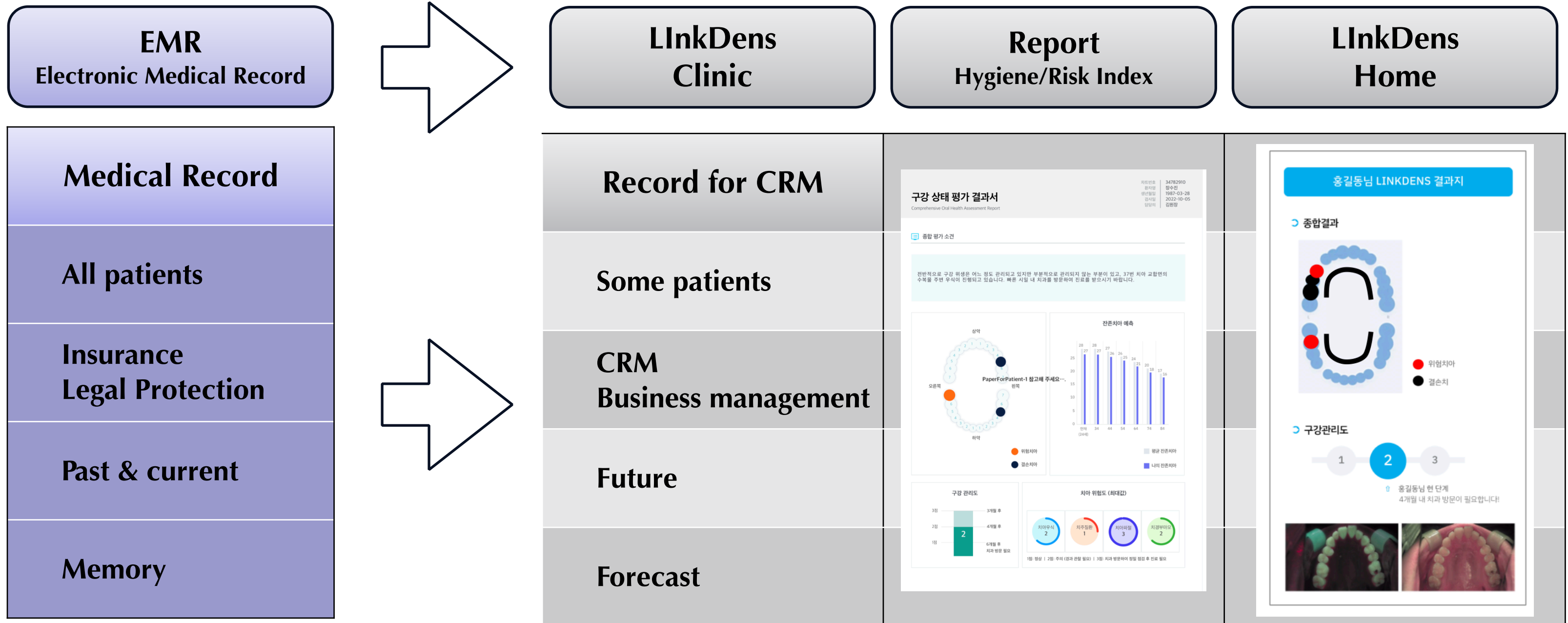
Q-ray images





Forecasting future dental treatment needs

LINK DENS



Business planning, Tailoring of recall intervals, Preventive advice

6 Steps of Persuasion : William McGuire 's Model

LINK DENS

Exposure
Presentation

Attention
Awareness

Comprehension
Understanding

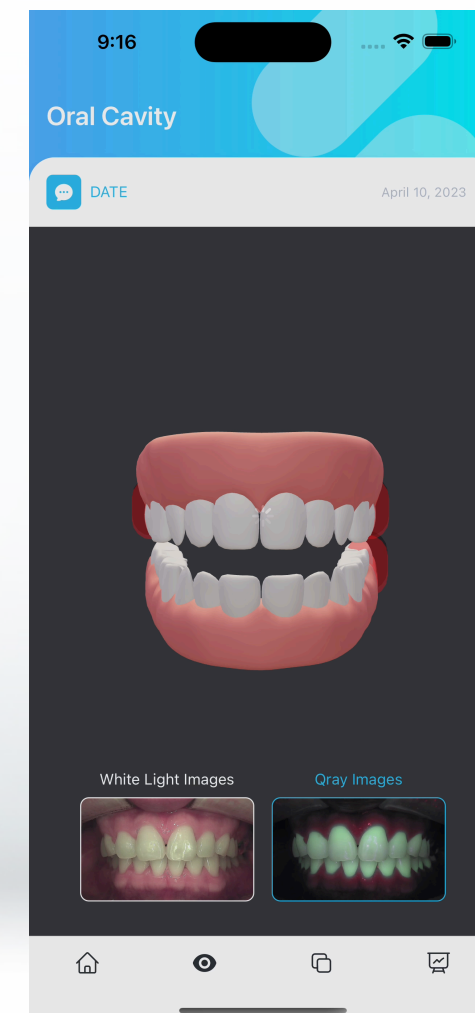
Acceptance

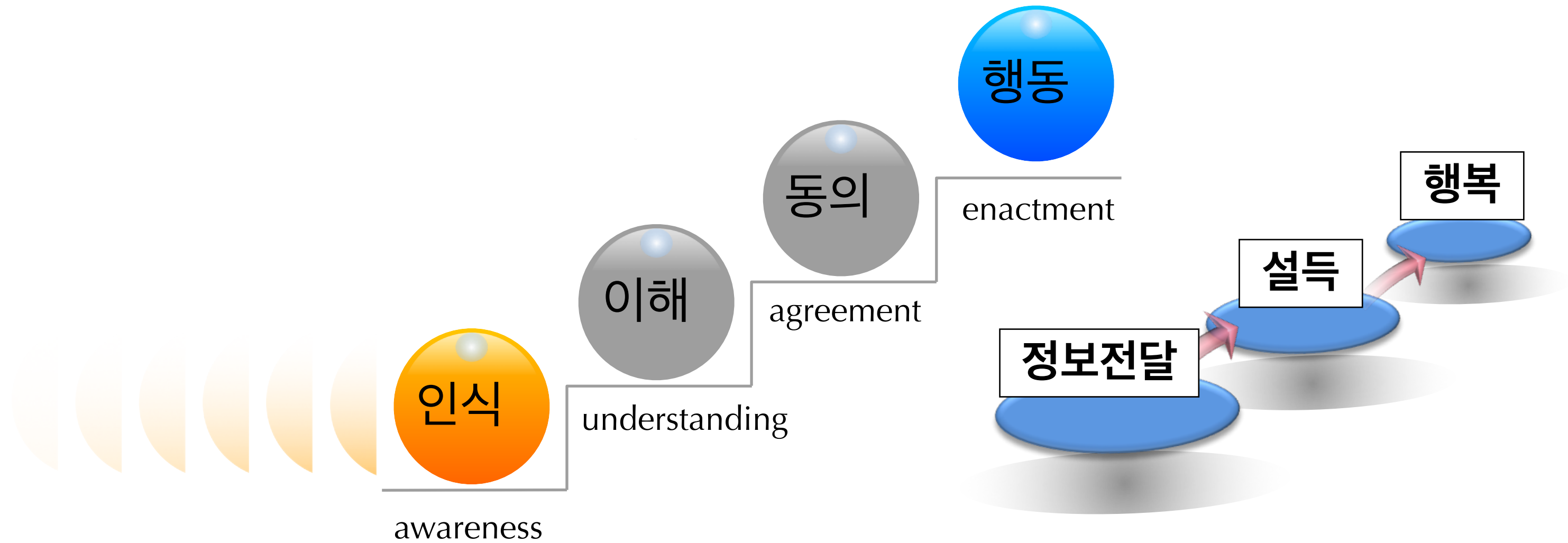
Retention

Action



LINK DENS





전자차트에서 Patient Engagement Program 시장으로 확대

LINK DENS

✓국내와 미국 등에서도 치과병의원 구인난 증대

- 효율적 환자관리와 예약관리를 위한 최신 ICT 기술도입 필요



치의신보

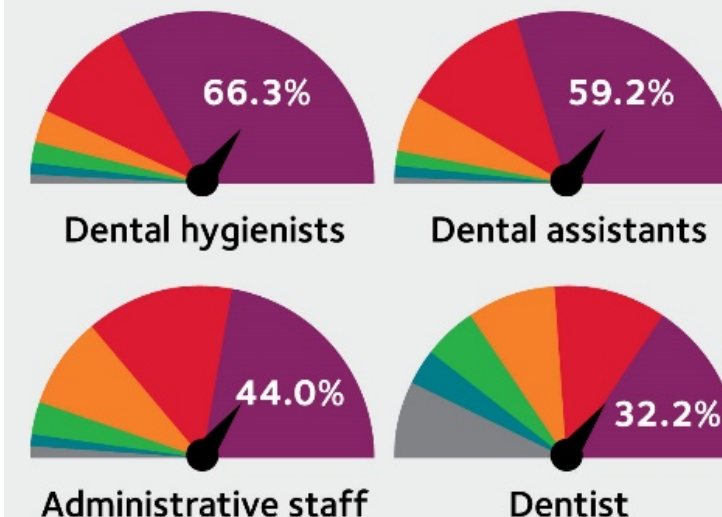
<https://www.dailydental.co.kr/>

치과의사 10명 중 9명 "치과위생사 부족" 하소연

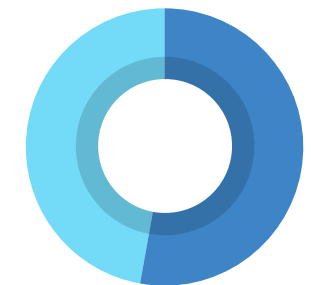
1명 이상 구인 '76.2%', 2~5년차 인력 선호 74%
인력부족 근본 원인 근무환경, 임금, 업무범위 순
특정 구인 사이트 편중, "광고비·독과점 해결해야"
특집 : 치협 구인 구직난 타파 치과 종사자 설문 조사①

최상관 기자 skchoi@dailydental.co.kr | 등록 2022.02.09 20:53:40

Majority of hiring dentists report recruitment challenges

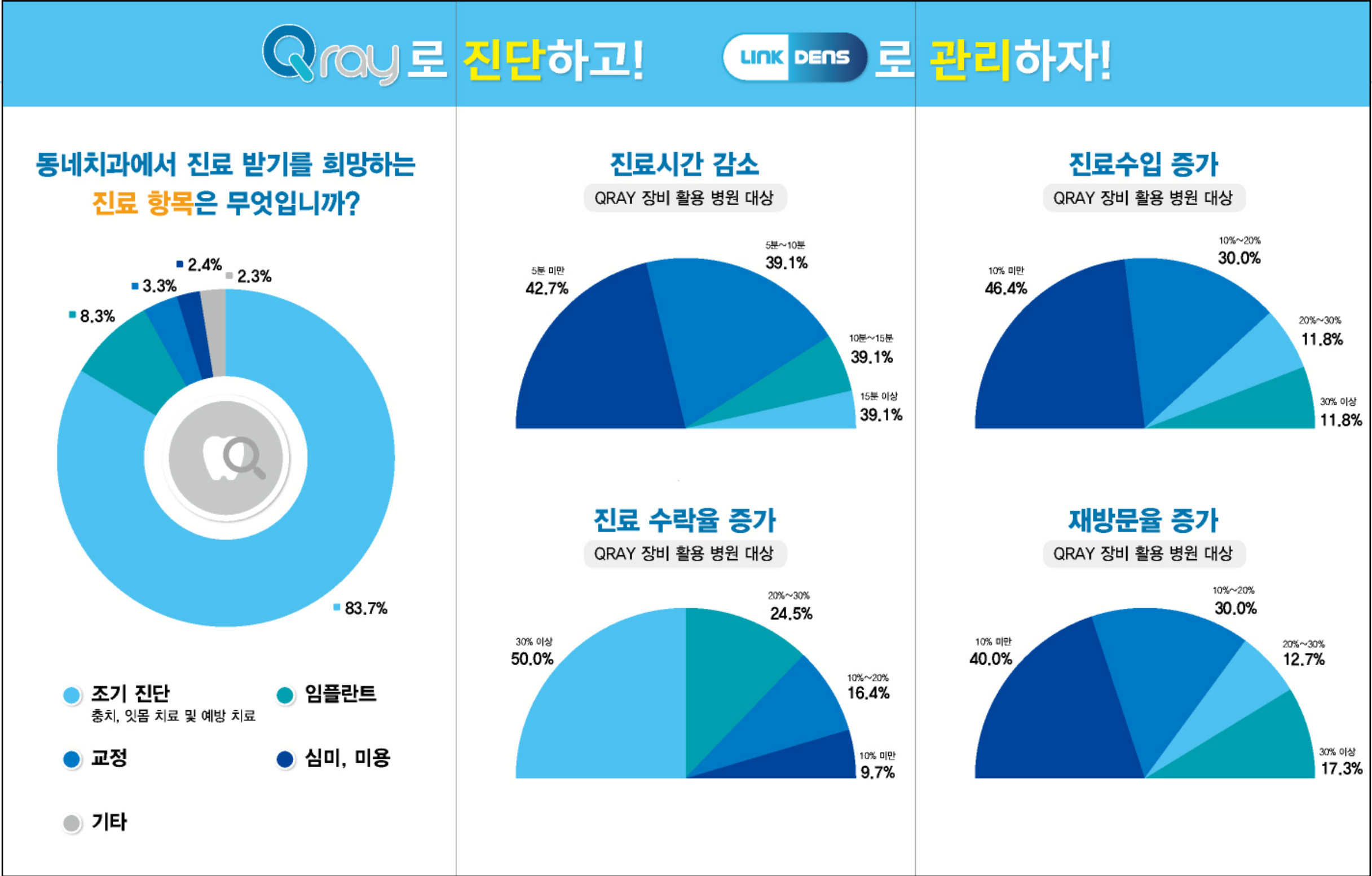


[미국 치과병원 인력난]



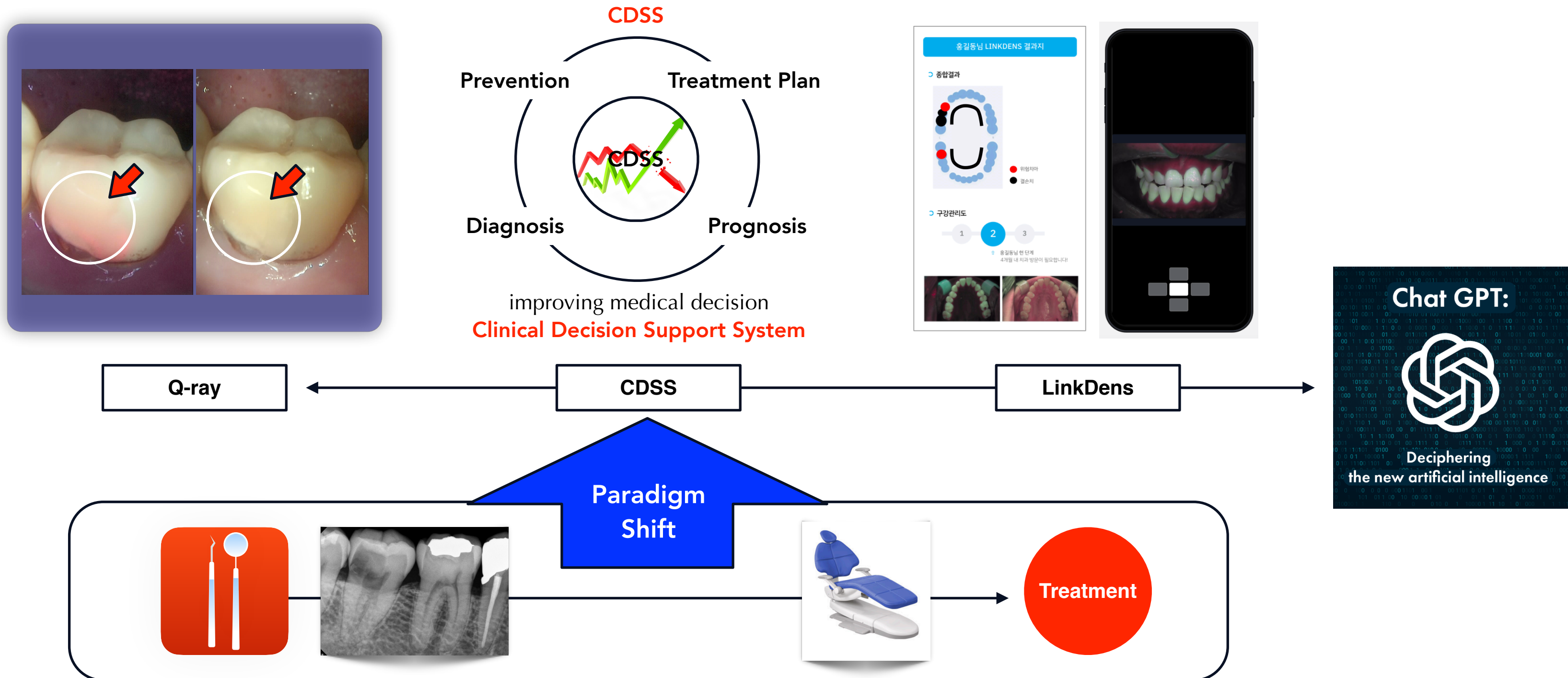
■ Extremely challenging ■ Slightly challenging
■ Very challenging ■ Not challenging at all
■ Moderately challenging ■ Not sure/Not applicable

Source: ADA Health Policy Institute, COVID-19 Economic Impact on Dental Practices: Week of May 17, 2021. Available from: ADA.org/HPI



Forecasting future dental treatment needs

LINK DENS





Dental Care

Health Care

Life Care

AIOBIO : Advanced Inspection of Biofilm

