photography of the first permanent molar. A total of 667 teeth were recorded. The assessment of teeth included determining if they had fully erupted, fissure morphology, and if they had been sealed.The evaluation of fissure morphology followed Koning's method. All photographs were taken using a digital camera (Canon EOS M200) and been standardized. All images were manually labeled with labelme (version 5.1.1) based on the records, and were divided into training and testing sets (525/142). TResNet on PyTorch was applied to the identification task. The data was analyzed using the PyTorch and scikit-learn libraries in Python (https://pytorch.org, https://scikit-learn.org). F1-score, and ROC-AUC were used to evaluate the model performance.

RESULTS: The model demonstrated excellent capabilities in detecting deep fissures (F1-score of 0.847, AUC of 0.948) and the sealing material (F1-score of 0.953, AUC of 0.997). Reliable results were also achieved in distinguishing fully erupted teeth, with an F1-score of 0.770 and AUC of 0.867. The model exhibited a weaker ability to detect shallow fissure (F1-score of 0.669, AUC of 0.817) and incompletely-erupted teeth (F1-score of 0.693, AUC of 0.780).

CONCLUSION(S): This study has developed a novel artificial intelligence model to help self-examination of indication of fissure sealing in first permanent molar of children aged 7-9. All tasks have achieved acceptable performance.

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Differences and Co-variation of oral microbiota in Childhood Caries

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AIM or PURPOSE: To analyze the bacterial and fungal community characteristics of different spatial sites in severe early childhood caries (S-ECC) children and caries-free (CF) children, construct the co-variation network of the flora, and discuss their interaction relationship.

MATERIALS and METHOD: Children aged 3-4 years from Guangzhou, China were selected, including 33 CF children (CF group) and 28 children with S-ECC (SE group). Oral clinical examination was conducted on the sample population, and plaque and saliva samples were collected. DNA of fungi and bacteria was extracted, followed by PCR amplification, sequencing, and bioinformatics analysis.

RESULTS: Across all samples, we identified 15 dominant bacterial genera, including Streptococcus, and 2 dominant fungal genera, Candida and Aspergillus, with salivary bacterial diversity being lower than that of plaque. The SE group demonstrated increased fungal diversity in saliva and on healthy tooth surfaces, while caries lesions exhibited significant enrichment of Streptococcus mutans and Candida albicans. Furthermore, significant variations were observed in the bacterial-fungal correlations across different spatial sites within the oral cavity.

CONCLUSION(S): The diversity of fungal communities in saliva and healthy dental surfaces was significantly increased in children with caries compared to those without caries. There were significant differences in the composition of bacterial and fungal flora, as well as the correlation between bacteria and fungi, at different spatial sites under different caries statuses.

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Bacterial and Fungal Shifts in Early childhood Caries Progression

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AIM or PURPOSE: To analyze the characteristics of bacterial and fungal communities at different spatial sites and time points in children progressing from caries-free to caries-affected status.

MATERIALS and METHOD: A total of 29 aged 3-4 years old children from a longitudinal follow-up cohort in Guangzhou, China, who progressed from caries-free (CF) to caries-affected (SE) status, were selected. Saliva and plaque samples were collected from the children at five follow-up time points: 0, 3, 9, 18, and 26 months. PCR amplification, sequencing, and bioinformatics analysis were performed on the collected samples.

RESULTS: Fourteen bacterial genera and three fungal genera were detected across all samples, with Streptococcus, Neisseria, and Vanrjia being notable. Fungal diversity in saliva and plaque rose with caries progression, while the prevalence of Vanrjia.sp decreased, ultimately vanishing as Aspergillus.sp prevalence grew in SE children's samples compared to CF.

CONCLUSION(S): As dental caries progresses, the diversity of fungal communities in children's saliva and plaque gradually increases. After the dominant fungi in the oral cavity undergo changes, suggesting that the corresponding major genera: Varijia and Aspergillus, may be key fungi involved in the development and progression of dental caries.

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Comparative Analysis of Caries Risk Factors in Mother-Child Pairs

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AIM or PURPOSE: This pilot study aimed to compare caries risk factors between caries-affected and caries-free mother-child pairs using the Cariogram model.

MATERIALS and METHOD: The study enrolled two mother-child pairs (n=4) from the Department of Pediatric Dentistry, Faculty of Dentistry, Istanbul Gelisim University. Caries status was assessed using DMFT/dmft indices, supplemented by evaluations of dietary habits, plaque accumulation, and fluoride usage. Saliva analyses, including flow rate, buffering

capacity, and counts of Streptococcus mutans, Lactobacillus, and yeast, were conducted at Istanbul University, Dentistry Faculty, Basic Sciences, Oral Microbiology Department.

RESULTS: In the caries-affected pair, saliva flow rates ranged from 0.5 to 1 ml/min, with S. mutans counts ranging from 1.2×105 to 3×105 cfu/ml and Lactobacillus ranging from 2.7×104 to 8.1×104 cfu/ml. Conversely, in the caries-free pair, saliva flow rates varied from 0.4 to 1.2 ml/min. S. mutans counts ranged from below 104 to 2×105 cfu/ml, while Lactobacillus counts ranged from below 103 to 5.5×104 cfu/ml.

In both mothers, yeast counts were detected at low levels, while no yeast was detected in children. When analyzed using the Cariogram model, the caries-affected pair exhibited a very low chance of avoiding new cavities, while the caries-free pair showed a very high chance.

CONCLUSION(S): The findings suggested an association between saliva parameters, microbial levels, and caries susceptibility within mother-child pairs. Further research with larger sample sizes is warranted to validate these findings and explore additional factors influencing caries risk.

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AIEs for photodynamic inactivation S.mutans in anti-caries therapy

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AIM or PURPOSE: To explore the photodynamic inactivation of Streptococcus mutans with aggregation-induced emission luminogens in anti-caries therapy.

MATERIALS and METHOD: To address this issue, a series of cationic pyridinium-substituted photosensitizers with aggregation-induced emission (AIE) have been designed. A structure-oriented design strategy was conducted to finely tune their biological activity. Photophysical and antibacterial activity experiments were conducted to evaluate their performance, and additional in vivo rodent anti-caries experiments were performed.

RESULTS: All these AIE luminogens exhibit outstanding microbial visualization and photodynamic killing of S. mutans, thanks to their luminous fluorescence and efficient singlet oxygen generation ability. Notably, one of the membrane-anchored AIEgens (TDTPY) presented in this study can inactive planktic S. mutans and its biofilm without causing significant cytotoxicity. Importantly, application of TDTPY-mediated photodynamic treatment on rodent models in vivo have yielded commendable imaging results and effectively slowed down caries progression with assured biosafety.

CONCLUSION(S): This research offers a promising theragnostic platform for daily oral hygiene, aiding in caries prevention.

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Artificial intelligent model for detecting caries in primary teeth

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AIM or PURPOSE: The objective of this study is to develop a deep learning model utilizing intraoral images for the accurate detection of occlusal surface caries-free, caries, and fillings status in primary teeth.

MATERIALS and METHOD: The study received approval from the ethical committee (Project ID: KQEC-2022-34-01), and informed consent from both the school authorities and parents. The primary dentition of students aged 7-9 from three primary schools in Guangzhou, China, was examined and photographed. A total of 2467 occlusal images of primary teeth were included in this study, of which training set: test set =1973:494. The evaluation items included caries-free, caries and fillings. The diagnostic criteria of caries were based on WHO dental caries diagnostic criteria. All photographs were captured by the same physician using a Canon EOS M200 digital camera and underwent standardization. All images were manually labeled using labelme (version 5.1.1) according to the inspection records. The identification task was performed using Tresnet on PyTorch. The data were analyzed using PyTorch and scikit-learn libraries in Python (https://pytorch.org, https://scikit-learn.org). Model performance was evaluated using F1-score and ROC-AUC.

RESULTS: The model demonstrates outstanding advantages in caries-free (F1-score = 0.953, AUC = 0.949) and caries (F1-score = 0.777, AUC = 0.964) detection, and is also reliable in identifying fillings (F1-score = 0.746, AUC = 0.893).

CONCLUSION(S): Our study developed a novel artificial intelligent model to assist in the examination of caries-free, caries, and fillings of primary teeth occlusal surfaces in children aged 7-9, so that help patients preliminarily judge their dental medical needs.

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Primary prevention methods of dental caries

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AIM or PURPOSE: Studying the role of chewing gums(CGs) in prevention of major dental diseases among school children.

MATERIALS and METHOD: During the study the organoleptic characteristics(taste, refreshing effect, density, consistency, etc.) of CGs produced by several countries were studied. The prevalence of major dental diseases among 120 children aged 8-15 years in 4 schools in Sabail district, Baku, Azerbaijan was studied. 68 schoolchildren participated in clinical studies. All participants had regular and confident oral hygiene habits before the study. For evaluation the effects of CGs on oral hygiene and equal distribution of masticatory force, “Orbit” CGs for children were used in our research.

RESULTS: It was found that American and Canadian CGs are less common in Baku. Despite the fact that companies of these countries play a leading role in production of CGs, the share of these gums in the local market is only 8.9±3.4% of the total market.

It was determined that 62 of the 120 examined schoolchildren follow standard oral hygiene rules along with CGs usage. Also, it was found that 27.6±2.8% of younger age group schoolchildren use CGs produced by unknown companies, and these gums contain carcinogenic substances coded as E121, E123, E240. The analysis of the purpose of using CGs