

Extended Table 1 | Introduction of seven modalities.

Modality	Terminology (ZH)	Introduction
Lateral X-ray (LAT)	侧位片	Provides a standardized sagittal projection of the craniofacial complex, commonly utilized in orthodontic diagnosis and cephalometric analysis.
Panoramic X-ray (PAN)	全景片	Produces a comprehensive two-dimensional representation of the maxillofacial structures, enabling evaluation of dentition, alveolar bone, temporomandibular joints, and pathological lesions.
Intraoral Left View (INL)	口内左侧位照	Provides localized imaging of the left oral quadrant, supporting diagnostic evaluation of dental pathology and soft tissue conditions.
Intraoral Right View (INR)	口内右侧位照	Provides localized imaging of the right oral quadrant, supporting diagnostic evaluation of dental pathology and soft tissue conditions.
Intraoral Front View (INF)	口内正位照	Delivers a frontal intraoral perspective of the anterior teeth, frequently employed for esthetic assessments and anterior dental pathology.
Upper Dental Arch View (UPP)	上牙列照	Presents an occlusal view of the maxillary arch, used to assess alignment, arch symmetry, and dental development.
Lower Dental Arch View (LOW)	下牙列照	Presents an occlusal view of the mandibular arch, used to assess alignment, arch symmetry, and dental development.

Extended Table 2 | Introduction of 17 multi-class tasks about oral diseases

Oral Diseases (Multi-class)	Terminology (ZH)	Introduction	Labels
Caries	龋坏	An oral disease where bacteria in the mouth produce acids that demineralize and damage tooth enamel, leading to the formation of holes or cavities.	Yes, No
Periodontal Disease	牙周病	A group of inflammatory conditions affecting the tissues surrounding the teeth, often leading to gum recession, tooth loss, and bone damage.	Yes, No
Wedge-shaped Defect	楔状缺损	A V-shaped indentation at the cervical (neck) area of a tooth, typically caused by stress or grinding.	Yes, No
Demineralization	脱钙	The loss of minerals from the tooth enamel, leading to weakened tooth structure and increased susceptibility to decay.	Yes, No
Soft Deposit	软垢	Non-hardening substances such as food debris, bacteria, and mucus that accumulate on the teeth and gums.	Yes, No
Tooth Wear	牙磨损	The loss of tooth structure due to mechanical forces, such as grinding, or chemical erosion from acidic foods and drinks.	Yes, No
Impacted Tooth	阻生牙	A tooth that is unable to fully erupt or emerge into its correct position, often causing pain or infection.	Yes, No
Prosthetic Crown	修复冠	A custom-made cap placed over a damaged tooth to restore its shape, size, and strength.	Yes, No
Root Canal Therapy	根管治疗	A dental procedure to remove infected or damaged pulp inside a tooth, followed by sealing and restoration to save the tooth.	Yes, No
Fillings	充填物	Materials used to restore a tooth that has been damaged by decay, filling the cavity to restore its function and appearance.	Yes, No
Prosthetic Bridge	固定桥	A dental appliance that spans the gap created by one or more missing teeth, anchored to adjacent teeth or implants.	Yes, No
Apical Periodontitis	根尖周炎	An infection of the tissue surrounding the tip of a tooth's root, typically caused by untreated tooth decay or injury.	Yes, No
Residual Root	残根	A root fragment that remains embedded in the alveolar bone after the clinical crown has been lost, typically due to extensive caries, trauma, or incomplete extraction.	Yes, No
Implant	种植体	A titanium post surgically placed into the jawbone to replace a missing tooth, on which a crown or bridge is mounted.	Yes, No
Residual Crown	残冠	The portion of a tooth's crown left after significant structural loss, typically from extensive decay, fracture, or endodontic access.	Yes, No
Insufficient Space for Primary Tooth Eruption	乳牙萌出空间不足	A condition where there is not enough space in the dental arch for a baby tooth to emerge properly.	Yes, No
Calculus	牙结石	Hardened plaque on the teeth that forms over time, often leading to gum disease and requiring professional cleaning to remove.	Yes, No

Extended Table 3 | Introduction of 17 multi-class tasks about malocclusion

Malocclusion (Multi-class)	Terminology (ZH)	Introduction	Labels
Angle's Classification	安氏分类	A system used to categorize the alignment of teeth based on the relationship of the upper and lower molars.	Angel Class I, II, III
Skeletal Classification	骨性分类	A system that categorizes malocclusions into three classes based on the anteroposterior (front-to-back) relationship between the maxilla and mandible	Skeletal Class I, II, III
Dental Crowding	牙列拥挤	A condition where there is insufficient arch space, causing the teeth to overlap or become misaligned.	Yes, No
Dental Spacing	牙列间隙	The presence of gaps or spaces between the teeth, often due to missing teeth or excessive jaw size.	Yes, No
Deep Overbite	深覆骀	A malocclusion characterized by excessive vertical overlap of the upper incisors over the lower incisors.	Yes, No
Deep Overjet	深覆盖	A condition marked by excessive horizontal protrusion of the upper incisors relative to the lower incisors.	Yes, No
Open Bite	开骀	A malocclusion where the upper and lower teeth do not meet when the mouth is closed, creating an open space, typically affecting chewing and speech.	Yes, No
Dental Protrusion	牙前突	The outward positioning of the upper or lower teeth beyond the normal alignment, often leading to aesthetic and functional concerns.	Yes, No
Maxillary Protrusion	上颌前突	A condition where the upper jaw (maxilla) extends forward, resulting in the upper teeth appearing more prominent than the lower teeth.	Yes, No
Maxillary Hypoplasia	上颌发育不足	Underdevelopment of the upper jaw (maxilla), which can lead to a receded or retruded appearance of the upper teeth relative to the lower teeth.	Yes, No
Mandibular Protrusion	下颌前突	A condition where the lower jaw (mandible) extends forward, causing the lower teeth to appear more prominent than the upper teeth.	Yes, No
Mandibular Retrognathism	下颌后缩	A condition where the lower jaw is positioned further back than the upper jaw, often resulting in a "weak chin" or underbite.	Yes, No
Anterior Crossbite	前牙反骀	A malocclusion where one or more of the upper front teeth bite behind the lower front teeth, causing misalignment when the mouth is closed.	Yes, No
Posterior Scissor Bite	后牙锁骀	A condition where the upper teeth excessively overlap the lower teeth in the back of the mouth, often causing discomfort and difficulty in chewing.	Yes, No
Posterior Crossbite	后牙反骀	A malocclusion where the upper teeth bite inside the lower teeth in the back of the mouth, often leading to jaw misalignment and functional issues.	Yes, No
Midline Deviation	中线偏斜	A condition where the center of the upper and lower teeth do not align properly when the mouth is closed, often leading to aesthetic concerns.	Normal, Abnormal
Sagittal Relationship	矢状关系	The alignment of the upper and lower jaws in the front-to-back direction, classified as either normal or abnormal based on the positioning of the jaws.	Normal, Abnormal

Extended Table 4 | Introduction of 2 multi-label tasks about malocclusion

Malocclusion (Multi-label)	Terminology (ZH)	Introduction	Labels
Types of Malocclusion	错骀类型	A task to recognize and assess deviations from an ideal bite by determining which malocclusions are present.	Dental Crowding, Dental Spacing, Deep Overbite, Deep Overjet, Open Bite, Dental Protrusion, Maxillary Protrusion, Maxillary Hypoplasia, Mandibular Protrusion, Mandibular Retrognathism, Anterior Crossbite, Posterior Scissor Bite, Posterior Crossbite
Facial Profile	面型	A task to recognize and assess facial characteristics related to jaw positioning.	Normal, Maxillary Protrusion, Maxillary Hypoplasia, Mandibular Protrusion, Mandibular Retrognathism

Extended Table 5 | Introduction of locations in dentition, where the FDI two-digit notation of each tooth is represented as xy . Finally, nine different descriptions are summarized as the complete set of location information ([Supplementary Note 1](#)).

Locations	Terminology (ZH)	Introduction
Upper Dentition	上牙列	Refers to the maxillary teeth (i.e. $x \in \{1, 2, 5, 6\}$).
Lower Dentition	下牙列	Refers to the mandibular teeth (i.e. $x \in \{3, 4, 7, 8\}$).
Left Posterior Region	左侧后牙区	Includes the left premolars and molars. (i.e. $x \in \{1, 4, 5, 8\} \cap y \in \{4, 5, 6, 7, 8\}$)
Anterior Region	前牙区	Encompasses the incisors and canines (i.e. $y \in \{1, 2, 3\}$).
Right Posterior Region	右侧后牙区	Comprises the right premolars and molars. (i.e. $x \in \{2, 3, 6, 7\} \cap y \in \{4, 5, 6, 7, 8\}$)

Extended Table 6 | Question list used for dataset construction

Task	EN	ZH
Oral Diseases (Multi-class)	Does the patient have oral diseases related to {task}?	患者是否存在{task}的口腔疾病?
	Based on the imaging, determine whether the patient has {task}?	根据影像, 判断患者是否存在{task}?
	Please confirm whether the patient has {task}?	请确认患者是否患有{task}?
	Examine the imaging to determine whether there are diseases related to {task}?	检查影像, 判断是否存在{task}的疾病?
	Evaluate through imaging whether the patient has {task} issues?	通过影像评估患者是否有{task}问题?
	Identify from the imaging whether there are oral diseases related to {task}?	从影像中识别是否有{task}的口腔疾病?
	Based on the imaging analysis, does the patient have {task}?	根据影像分析, 患者是否存在{task}?
	Evaluate the imaging and confirm whether the patient has {task} disease?	评估影像, 确认是否患有{task}疾病?
	Based on the imaging, determine whether the patient has {task} abnormalities?	根据影像判断, 患者是否有{task}异常?
Types of Malocclusion	What malocclusion issues does the patient have?	患者存在的错骀问题有哪些?
	Based on the imaging, identify the patient's type of malocclusion?	根据影像, 识别患者的错骀类型?
	Analyze the images and list the patient's malocclusion issues?	分析图像, 列出患者的错骀问题?
	Please identify the possible types of malocclusion?	请识别可能的错骀类型?
	Please list the patient's malocclusion conditions?	请列举患者的错骀情况?
	Diagnose the types of malocclusion in the imaging?	诊断影像中的错骀类型?
	Based on the imaging analysis, list the types of malocclusion?	根据影像分析并列出错骀类型?
	Identify malocclusion issues in the imaging?	识别影像中的错骀问题?
	Evaluate the imaging and list the possible malocclusion issues?	评估影像, 列出可能的错骀问题?
Midline Deviation, Sagittal Relationship, Facial Profile	What is the patient's {task} presentation?	患者的{task}表现是什么?
	Based on the imaging, analyze the patient's {task} presentation?	根据影像, 分析患者{task}的表现?
	Please assess the patient's {task} condition?	请判断患者{task}的情况?
	Evaluate the imaging and describe the patient's {task} presentation?	评估影像, 描述患者的{task}表现?
	Examine the imaging and analyze the patient's {task}?	检查影像, 分析患者的{task}?
	Extract the patient's {task} presentation from the imaging?	从影像中提取患者{task}的表现?
	Identify the patient's {task} issues through imaging?	通过影像识别患者{task}的问题?
	Based on the imaging, evaluate the patient's {task}?	根据影像评估患者的{task}?
	Diagnose the patient's {task} issues in the imaging?	诊断影像中患者的{task}问题?

Task	EN	ZH
Angle's Classification, Skeletal Classification	What is the patient's {task}?	患者的{task}是什么?
	Identify the patient's {task} based on the imaging?	根据影像, 识别患者的{task}?
	Please determine the patient's {task}?	请确定患者的{task}?
	Assess the imaging and determine the patient's {task}?	根据影像判断患者的{task}?
	Extract the patient's {task} category from the imaging?	从影像中提取患者的{task}类别?
	Evaluate the imaging and determine the patient's {task}?	评估影像, 确定患者的{task}分型?
	Analyze the imaging and determine the patient's {task}?	根据影像分析患者的{task}?
	Please determine which type of {task} the patient has?	请判断患者属于哪种{task}?
	Based on the imaging, please determine the patient's {task}?	分析影像, 确定患者的{task}?
Dental Crowding, Dental Spacing, Deep Overbite, Deep Overjet, Open Bite, Dental Protrusion, Maxillary Protrusion, Maxillary Hypoplasia, Mandibular Protrusion, Mandibular Retrognathism, Anterior Crossbite, Posterior Scissor Bite, Posterior Crossbite	Does the patient have {task}?	患者是否存在{task}的错骀问题?
	Does the patient have malocclusion problems related to {task}?	请问患者是否存在{task}的错骀问题?
	Analyze the imaging to determine whether the patient has issues related to {task}?	分析影像, 确定患者是否有{task}的问题?
	Please determine whether the patient has {task}?	请判断患者是否存在{task}?
	Based on the imaging, assess whether the patient has {task}?	根据影像评估患者是否存在{task}?
	Identify from the imaging whether the patient has issues related to {task}?	从影像中识别患者是否患有{task}的问题?
	Examine the imaging and confirm whether there are malocclusion problems related to {task}?	检查影像并确认是否有{task}的错骀问题?
	Based on the imaging, assess whether the patient has abnormalities related to {task}?	根据影像, 评估患者是否有{task}的异常?
	Through imaging analysis, does the patient have {task}?	通过影像识别, 患者是否患有{task}?

Extended Table 7 | Prompt list used for rationale annotation.

Task	Prompt
System	You are a highly professional oral healthcare specialist.
Instruction for Rationale Annotation with Location	<p>Question: {question} Answer: {answer} Lesion Area: {areas}</p> <p>The above constitutes an instruction sample for the {task} based on the input image. Please provide a rationale based on the image and the annotated lesion area. The required response format is: Answer: xxx Rationale: xxx</p> <p>Ensure that the answer remains exactly the same as the original. The rationale should include a brief introduction to relevant symptoms, followed by an analysis combining both the image and the provided lesion area. It is essential to maintain consistency with the original answer while keeping the rationale concise and accurate. Please return only the annotated content.</p>
Instruction for Rationale Annotation without Location	<p>Question: {question} Answer: {answer}</p> <p>The above constitutes an instruction sample for the {task} based on the input image. Please provide a rationale based on the image. The required response format is: Answer: xxx Rationale: xxx</p> <p>Ensure that the answer remains exactly the same as the original. The rationale should include a brief introduction to the relevant symptoms and an analysis based on the image. It is essential to maintain consistency with the original answer while keeping the rationale concise and accurate. Please return only the annotated content.</p>

Extended Table 8 | Prompt list used for rationale translation. The “reference dictionary” is constructed based on the terminology appearing in the rationale ([Extended Table 2-5](#)).

Task	Prompt
System	You're a professional stomatologist.
Instruction for Translation	<p>{rationale}</p> <p>The above is the rationale from an oral visual question-answering dataset. Please refer to the list of terms I provided to translate it into English. Term Reference: {reference dictionary}.</p> <p>Therefore, please only return the translated rationale:</p>

Extended Table 9 | Prompt lists used for baseline models in comparison. The “prefix” refers to either Angle or Skeletal, depending on the task. The “potential list” indicates the predefined set of labels ([Extended Table 4](#)).

Task	Prompt (EN)	Prompt (ZH)
System Definition	You are a professional dentist who can extract the final results based on images and communication records.	你是一名专业的口腔医生，能根据沟通记录，提取最终结果。
Oral Diseases (Multi-class)	Therefore, does the patient have an oral disease related to {task} (please answer only with 'yes' or 'no'):	所以，患者是否存在{task}的口腔疾病(请仅回答是或否)：
Angle's Classification, Skeletal Classification	Therefore, the patient's {task} is classified as (please answer only with '{prefix} Class I', '{prefix} Class II', or '{prefix} Class III'):	所以，患者的{task}为(请仅回答{prefix}I类、{prefix}II类或{prefix}III类)：
Midline Deviation, Sagittal Relationship	Therefore, how does the patient's {task} present (please answer only with 'normal' or 'abnormal'):	所以，患者的{task}表现为(请仅回答正常或异常)：
Facial Profile	Therefore, how does the patient's facial type present? If normal, please return 'normal' only; else please only return a list of the identified problems, with each description referencing {potential list}:	所以，患者的面型表现为(若正常则仅返回正常，否则仅返回存在的问题列表，每种问题的表述参考{potential list})：
Types of Malocclusion	Therefore, the types of malocclusion for patient are (only return a list of malocclusion issues, with each description referencing {potential list}):	所以，患者存在的错骀问题有(仅返回错骀疾病的列表，每种疾病的表述参考{potential list})：
Dental Crowding, Dental Spacing, Deep Overbite, Deep Overjet, Open Bite, Dental Protrusion, Maxillary Protrusion, Maxillary Hypoplasia, Mandibular Protrusion, Mandibular Retrognathism, Anterior Crossbite, Posterior Scissor Bite, Posterior Crossbite	Therefore, does the patient have a malocclusion issue of {task} (please answer only with 'yes' or 'no'):	所以，患者是否存在{task}的错骀问题(请仅回答是或否)：

Extended Table 10 | Prompt lists used for baseline models in lesion region detection. The “potential area lists” indicates the predefined set of location descriptions ([Supplementary Note 1](#)).

Task	Prompt (EN)	Prompt (ZH)
System1	You are a professional dentist who can answer questions and provide brief explanations based on images.	你是一名专业的口腔医生，能根据影像回答问题并给出简要的解释。
Instruction for Obtaining the Initial Response	<p>{question} If so, please specify the area where the disease has occurred. The description of the area should strictly follow the reference (the teeth covered by each area are listed in parentheses):</p> <p>the right posterior region of both the upper and lower dentition (All premolars and molars on the right side of the patient's upper and lower teeth), the anterior region of both the upper and lower dentition (All incisors and canines in the front of the patient's upper and lower teeth), the left posterior region of both the upper and lower dentition (All premolars and molars on the left side of the patient's upper and lower teeth), the right posterior region of the upper dentition (All premolars and molars on the right side of the patient's upper teeth), the anterior region of the upper dentition (All incisors and canines in the front of the patient's upper teeth), the left posterior region of the upper dentition (All premolars and molars on the left side of the patient's upper teeth), the right posterior region of the lower dentition (All premolars and molars on the right side of the patient's lower teeth), the anterior region of the lower dentition (All incisors and canines in the front of the patient's lower teeth), the left posterior region of the lower dentition (All premolars and molars on the left side of the patient's lower teeth).</p>	<p>{question} 如果是的话，请给出疾病发生的区域。区域的表述请严格参考（括号内为各区域覆盖的牙齿）：上、下牙列的右侧后牙区（患者口腔右侧的所有前磨牙和后磨牙），上、下牙列的前牙区（患者口腔前侧的所有切牙和尖牙），上、下牙列的左侧后牙区（患者口腔左侧的所有前磨牙和后磨牙），上牙列的右侧后牙区（患者口腔右侧上牙列的所有前磨牙和后磨牙），上牙列的前牙区（患者口腔前侧上牙列的所有切牙和尖牙），上牙列的左侧后牙区（患者口腔左侧上牙列的所有前磨牙和后磨牙），下牙列的右侧后牙区（患者口腔右侧下牙列的所有前磨牙和后磨牙），下牙列的前牙区（患者口腔前侧下牙列的所有切牙和尖牙），下牙列的左侧后牙区（患者口腔左侧下牙列的所有前磨牙和后磨牙）</p>
System2	You are a professional dentist who can extract the final results based on images and communication records.	你是一名专业的口腔医生，能根据沟通记录，提取最终结果。
Instruction for Extracting the Final Answer	Therefore, please select the area where the disease is present from the following options.({potential area lists}):	所以，请从下列的备选区域中选出疾病存在的区域（{potential area lists}）：

Extended Table 11 | Introduction of 4 tasks about rare diseases.

Rare Diseases	Terminology (ZH)	Introduction	Labels
Bone Islands	骨岛	Benign, dense cortical-like focus within cancellous bone; silent clinically, found incidentally on radiographs.	Yes, No
Embedded Tooth	埋伏牙	Tooth that fails to erupt on schedule because of obstruction or ectopic path; risks crowding, resorption, or cyst formation.	Yes, No
Cyst	囊肿	Epithelium-lined, fluid-filled osseous cavity (e.g., radicular, dentigerous) that expands bone and displaces teeth.	Yes, No
Veneer	贴面	Ultra-thin porcelain or composite shell bonded to labial enamel to mask discoloration, refine contour, and elevate aesthetics with minimal preparation.	Yes, No

Extended Table 12 | Detailed scores from junior and senior dentists on DentVLM-generated response in oral disease related tasks across six dimensions.

	Accuracy		Correct-ness		Complete-ness		Fairness		Faithful-ness		Accepta-bility	
	J	S	J	S	J	S	J	S	J	S	J	S
Caries	2.78	2.56	4.47	4.32	4.34	4.26	4.56	4.50	4.34	4.33	4.50	4.33
Periodontal Disease	2.67	2.61	4.45	4.51	4.37	4.36	4.53	4.68	4.41	4.53	4.43	4.47
Wedge-shaped Defect	2.82	2.87	4.64	4.75	4.55	4.63	4.75	4.78	4.62	4.70	4.65	4.70
Demineralization	2.79	2.48	4.50	4.23	4.43	4.18	4.57	4.32	4.45	4.12	4.48	4.20
Soft Deposit	2.78	2.54	4.49	4.39	4.49	4.25	4.62	4.46	4.59	4.29	4.56	4.24
Tooth Wear	2.83	2.57	4.76	4.34	4.71	4.25	4.76	4.42	4.67	4.34	4.76	4.23
Impacted Tooth	2.79	2.65	4.42	4.37	4.31	4.36	4.42	4.52	4.34	4.42	4.34	4.42
Prosthetic Crown	2.92	2.86	4.70	4.67	4.59	4.59	4.61	4.70	4.60	4.62	4.58	4.60
Root Canal Therapy	2.48	2.55	3.98	4.20	3.92	4.09	4.12	4.30	3.88	4.15	4.05	4.07
Fillings	2.77	2.44	4.25	4.04	4.14	3.95	4.43	4.15	4.26	3.99	4.23	3.94
Prosthetic Bridge	2.85	2.73	4.49	4.59	4.41	4.52	4.48	4.59	4.43	4.53	4.38	4.48
Apical Periodontitis	2.51	2.51	4.14	4.17	4.06	4.13	4.25	4.26	4.04	4.16	4.20	4.12
Residual Root	2.81	2.66	4.41	4.45	4.26	4.40	4.37	4.54	4.29	4.39	4.33	4.33
Implant	2.87	2.84	4.41	4.62	4.24	4.54	4.34	4.69	4.26	4.51	4.26	4.59
Residual Crown	2.70	2.59	4.12	4.40	3.96	4.32	4.14	4.54	4.03	4.37	4.11	4.32
Insufficient Space for Primary Tooth Eruption	2.46	2.30	4.10	4.00	4.01	3.88	4.14	4.16	4.07	4.05	4.13	3.89
Calculus	2.74	2.58	4.56	4.45	4.44	4.29	4.59	4.48	4.47	4.39	4.56	4.42

Extended Table 13 | Detailed scores from junior and senior dentists on DentVLM-generated response in malocclusion related tasks across six dimensions.

	Accuracy		Correctness		Completeness		Fairness		Faithfulness		Acceptability	
	J	S	J	S	J	S	J	S	J	S	J	S
Types of Malocclusion	2.41	2.44	3.93	4.22	3.78	4.07	3.96	4.43	3.85	4.28	3.96	4.19
Facial Profile	2.42	2.29	3.84	3.90	3.75	3.90	4.00	4.14	3.81	4.08	3.96	3.87
Angle's Classification	2.34	2.38	3.88	4.04	3.77	3.94	4.04	4.21	3.90	4.04	4.04	3.92
Skeletal Classification	2.63	2.56	4.24	4.35	4.12	4.18	4.25	4.46	4.29	4.31	4.29	4.25
Dental Crowding	2.65	2.63	4.26	4.48	4.18	4.40	4.40	4.57	4.17	4.41	4.24	4.40
Dental Spacing	2.80	2.65	4.41	4.51	4.31	4.40	4.41	4.51	4.33	4.40	4.29	4.41
Deep Overbite	2.78	2.66	4.46	4.45	4.26	4.38	4.44	4.51	4.34	4.42	4.34	4.34
Deep Overjet	2.77	2.69	4.41	4.47	4.23	4.40	4.51	4.65	4.30	4.44	4.36	4.46
Open Bite	2.89	2.81	4.51	4.78	4.34	4.64	4.45	4.78	4.39	4.72	4.38	4.64
Dental Protrusion	2.62	2.54	4.12	4.22	3.95	4.12	4.08	4.37	4.01	4.29	4.01	4.26
Maxillary Protrusion	2.69	2.49	4.19	4.24	4.01	4.13	4.23	4.35	4.11	4.13	4.08	4.09
Maxillary Hypoplasia	2.81	2.80	4.53	4.60	4.45	4.54	4.54	4.61	4.44	4.62	4.54	4.54
Mandibular Protrusion	2.78	2.72	4.56	4.44	4.45	4.39	4.52	4.49	4.42	4.39	4.47	4.34
Mandibular Retrognathism	2.65	2.45	4.40	4.18	4.40	4.10	4.53	4.25	4.41	4.08	4.53	4.17
Anterior Crossbite	2.91	2.83	4.65	4.70	4.53	4.64	4.57	4.77	4.53	4.75	4.59	4.72
Posterior Scissor Bite	2.85	2.72	4.38	4.56	4.32	4.51	4.47	4.56	4.44	4.53	4.40	4.51
Posterior Crossbite	2.74	2.59	4.38	4.35	4.27	4.30	4.43	4.43	4.33	4.35	4.41	4.35
Midline Deviation	2.44	2.45	4.02	4.07	3.94	4.07	4.20	4.29	3.98	4.11	4.02	3.96
Sagittal Relationship	2.79	2.58	4.44	4.11	4.39	3.93	4.49	4.18	4.43	4.07	4.40	4.03

Extended Table 14 | Prompt list used for multi-agent collaborative framework integrating DeepSeek-R1. The “_history” denotes the historical dialogue context, “cur_query” represents the current user query, and “cur_local_response” is the response generated by DentVLM.

Task	Prompt (EN)	Prompt (ZH)
Instruction for DeepSeek-R1	<p>[Historical Conversation] {_history if _history else "No history record"}</p> <p>[Question] {cur_query}</p> <p>[Initial Response] {cur_local_response}</p> <p>[Task] As an experienced dentist: - According to the user's question, integrate imaging information, historical conversation, clinical symptoms, and your professional knowledge to make a judgment and provide a specific answer and explanation; - If the initial response is accurate, polish it to make the answer logically clear, structurally sound, and user-friendly; - If the initial response is inadequate or incorrect, provide correct diagnosis and suggestions, ensuring the information is comprehensive and well-organized.</p> <p>Please respond in a professional and compassionate tone, avoid fabricating patient personal information, and ensure that the response does not contain irrelevant information to the current question.</p>	<p>【历史对话记录】 {_history if _history else "无历史记录"}</p> <p>【用户问题】 {cur_query}</p> <p>【初始回答】 {cur_local_response}</p> <p>【任务】 请你作为资深口腔科专家： - 根据用户问题，综合历史对话记录、影像信息、临床症状和专业知识进行判断，并给出具体答案和解释； - 若初始回答准确，在此基础上润色，使回答逻辑清晰、结构合理且用户友好； - 若初始回答存在不足或错误，请给出正确的诊断意见和建议，确保信息充实、条理清晰。</p> <p>请以专业且关怀的语气回答，避免捏造患者个人信息，并确保回答中不包含与当前问题无关的信息。</p>