The oral examination is an integral part of every general physical examination for companion animals. Lesions in the oral cavity may be clinical manifestations of metabolic disease.1–4 Similarly, the general physical examination may provide important clues to intraoral disease processes.5 A general physical examination is also fundamental to choosing the optimal anesthesia protocol necessary to perform a comprehensive oral examination.6 In essence, the two examination components complement each other.

A comprehensive oral examination includes a nonsedated patient evaluation of the head, neck, and oral cavity and a sedated or anesthetized intraoral evaluation. A systematic approach using a dental chart with an anatomic checklist is most efficient. Abnormal or suspicious findings are recorded on the dental chart using objective indices. This practice helps avoid missing important details and allows for comparison of findings between periodic examinations.7

Examination of the Awake Patient

Facial Symmetry and Related Observations

The extraoral examination begins with a careful evaluation of facial symmetry (Figure 1). Palpation of the face may identify firm or fluctuant masses. Palpation of lymphatic and salivary tissue may reveal abnormalities related to intraoral disease. Alopecia; draining tracts; discharge; scarring; malodor from the ears, nose, mouth, or skin; and any other external findings are noted on the dental chart or anatomic checklist. Opening and closing the mouth may reveal popping and clicking sounds or crepitus within the temporomandibular joint. Palpating the left and right mandibles may reveal fractures or symphyseal instability.

Cephalic Index

Skull shape and size influence the incidence of certain dental conditions.8 Understanding skull classifications is important because anatomic variations play a significant role in the extraoral and intraoral appearance and in dental occlusal relationships.7

The cephalic index categorizes dog and cat breeds based on skull shape and size.8,10 A relatively wide, short skull characterizes brachycephalic breeds, such as bulldogs, shih tzu, Himalayans, and Persians. Mesocephalic breeds, such as Alaskan malamutes, German shepherds, and Labrador retrievers, have muzzles of intermediate width and length. Dolichocephalic breeds, represented by borzois, standard poodles, and whippets, have relatively long, narrow muzzles.

Brachycephalic Breeds

Brachycephalic breeds with a complete permanent dentition often have dental crowding with tooth rotation and a relatively high incidence of periodontal disease.9 Dental crowding and tooth rotation often result in abnormal dental eruption. Teeth may partially erupt or fail to erupt and remain embedded in subgingival tissue. The first premolars are commonly affected, and the lower first premolars are...
An oral examination should be part of every thorough physical examination. Veterinarians must be familiar with normal anatomy and variations between breeds to be able to identify potential problems.

**Mesocephalic Breeds**
Dental crowding and periodontal disease are less common in mesocephalic breeds. The mesocephalic facial profile is intermediate between the brachycephalic and dolichocephalic profiles. Mesocephalic breeds have an increased incidence of missing premolars, especially the first and fourth premolars. To confirm that missing teeth are not simply unerupted, dental radiographs should always be obtained when teeth appear to be missing. Unerupted teeth can result in dentigerous cysts.

**Dolichocephalic Breeds**
Dolichocephalic breeds may exhibit caudal (posterior) crossbite, a malocclusion in which the upper fourth premolars (the carnassial teeth) are positioned lingual to the lower first molars rather than the normal buccal orientation. This condition is particularly common in collies. It may result in less effective “shearing” activity of the carnassial teeth, leading to increased accumulation of plaque and calculus and, ultimately, periodontal disease.

Young to middle-aged dolichocephalic animals may be at increased risk of developing fungal (Aspergillus fumigatus) infections of the nasal passages compared with animals with other skull shapes. These animals initially present with a unilateral hemorrhagic and mucopurulent nasal discharge that often becomes bilateral with disease progression. Depigmentation of the nasal planum may occur. Manipulation of the nose is often painful for these animals. Rhinoscopy, computed tomography, and fungal cultures help establish the diagnosis.

Veterinarians should be prepared for anesthetic complications when working with brachycephalic patients. Tracheal intubation may be difficult because of tracheal hypoplasia, and partial airway obstruction may complicate anesthesia recovery. Brachycephalic patients should remain intubated as long as possible and should be monitored continuously after extubation to ensure normal breathing.

Brachycephalic feline breeds seem to be at increased risk for developing nasal aspergillosis–penicilliosis.

Evaluation for CORS should be performed before intubation and without tongue retraction. The soft palate should not extend caudal to the tip of the epiglottis. Everted laryngeal saccules appear as off-white mushroom-shaped structures rostral to (in front of) the vocal cords. Laryngeal collapse is identified as medial tipping of the corniculate processes and flattening of the cuneiform process of the arytenoid cartilage. Images and further descriptions of these structures are published elsewhere.

Veterinarians should be prepared for anesthetic complications when working with brachycephalic patients. Tracheal intubation may be difficult because of tracheal hypoplasia, and partial airway obstruction may complicate anesthesia recovery. Brachycephalic patients should remain intubated as long as possible and should be monitored continuously after extubation to ensure normal breathing.

Brachycephalic feline breeds seem to be at increased risk for developing nasal aspergillosis–penicilliosis.

**QuickNotes**

*An oral examination should be part of every thorough physical examination. Veterinarians must be familiar with normal anatomy and variations between breeds to be able to identify potential problems.*
Oral Examination of Cats and Dogs

The Intraoral Examination

The initial examination of both cats and dogs is attempted with the mouth closed. To avoid injury to the patient and the examiner, it is helpful to have an assistant restrain the patient. The upper and lower lips are viewed and then gently separated to get views of the dentition, oral mucosa, and dental occlusion. Front and side views of the oral cavity may allow observation of some surfaces of all of the teeth. I use a 6-inch cotton-tipped applicator to help avoid personal injury while viewing oral anatomy.

For cats, I prefer to sit or stand directly behind the patient. To reduce stress and help comfort the cat, I speak softly and gently pet the cat's head and neck before palpating the neck and mandibular lymph nodes. I then tilt the cat's head back to point the nose toward the ceiling. This relaxes the lower jaw, which I gently pull down with a finger to open the mouth. I can then view the oral cavity (Figure 4).

For dogs, I approach from the side, using gentle techniques to relax the patient. Many dogs respond favorably to their name spoken in a slow, calm, soft voice. Repeated gentle petting can also be reassuring. An assistant gently secures the dog's head and body while I perform a closed-mouth examination from the front and both sides (Figure 5). The assistant then holds the mandible and maxilla in the premolar region to slowly and gently encourage the dog to open its mouth. Allowing a dog to open and close its own mouth helps with the awake oral examination. Forcing the mouth open and holding it open results in patient resistance and difficulty for the examiner; therefore, in my practice, we do not force the mouth into an open position. Caution and patience are strongly advised. Some fearful or aggressive animals require chemical restraint.

The gingiva, alveolar mucosa, cheek mucosa, lips, palate, incisive papilla, tongue, and floor of the mouth are briefly viewed during the awake patient intraoral examination. All observed abnormalities can be investigated further after the animal is sedated or under anesthesia.

The awake patient intraoral examination can be very revealing. All observed abnormali-

QuickNotes

Using patience and a gentle technique during the oral examination allows optimal visualization of oral structures and identification of potential problems while avoiding injury to the evaluator and patient.
ties should be discussed with clients to help convey the importance of performing a comprehensive intraoral examination under general anesthesia. Diagnostics help to establish an accurate diagnosis and carry out an optimal treatment plan.

**Examination of the Anesthetized Patient**

Anesthesia allows a meticulous, systematic approach to the intraoral examination. The larynx, oropharynx, tonsils, soft palate (Figure 6), hard palate, incisive papilla, gingiva, alveolar mucosa, buccal mucosa, tongue, floor of the mouth, and salivary structures can all be visualized. After thorough scaling (above and below the gum line) and polishing, the teeth, along with the periodontal tissue, are evaluated visually, by tactile probing, by dental radiography, and by transillumination. The number, color, shape, size, and condition of the teeth are assessed. The use of objective indices allows for consistent dental evaluations.

**Equipment and Instrumentation**

A comprehensive intraoral examination requires an adequate light source with magnification, a Finoff transilluminator or bright penlight, a dental radiography machine, periodontal explorer probes, appropriate anesthesia equipment and supplies, atraumatic tissue retractors, and mouth gags. An adequately sized, uncluttered work area is preferred to avoid distraction of the evaluator.

**Evaluation of the Occlusion**

While performing the intraoral examination, the examiner must answer the following questions to determine whether findings are normal or further evaluations are indicated.

**Is the bite right?** The patient is first evaluated for a normal occlusion ("scissors bite") with the mouth closed. In a normal canine occlusion, the upper incisors overlap the lower incisors, with the coronal tips of the lower incisors resting on the cingulum of the upper incisors. The lower canines should fit into the diastema (space) between the upper canines and the adjacent third incisors without contact between any teeth. The upper and lower premolars should interdigitate, with the lower premolars positioned rostral to the upper opposing teeth. The coronal tips of the lower premolars are positioned in the interdental spaces of the upper premolars, and these opposing teeth do not come into contact. The lower fourth premolar cusp tip is positioned between the upper third and fourth premolars. The preceding third, second, and first premolars have the same relationship bilaterally. The crown cusps

**QuickNotes**

The use of a systematic approach and objective indices enables a meaningful evaluation of dental, periodontal, oral, and extraoral tissue. All abnormal findings should be recorded on a dental chart or anatomic checklist.
of the lower premolars are positioned lingual to the opposing premolars of the upper dental arches. The mesial crown cusp of the upper fourth premolar is positioned lateral to the interdental space of the lower first molar and the adjacent fourth premolar.

Adult cats have occlusal relationships similar to those in dogs; however, they have fewer teeth. When the normal adult feline occlusion is viewed from the front with the mouth closed, the upper incisors slightly overlap the lower incisors or have direct coronal contact. The lower canines fit into the narrow diastema between the upper canines and the adjacent third incisors. When the occlusion is viewed from the side with the mouth closed, the relationship of the upper and lower premolars is similar to that in dogs; however, cats normally have two fewer premolars and molars on each mandible and one less premolar and one less molar on each upper dental arch. (Sample feline and canine dental charts are available at CompendiumVet.com.) The lower premolar teeth are oriented rostral to the upper premolar teeth, and the crown cusp of the lower fourth premolar is positioned in the interdental space of the upper fourth and third premolars. The teeth in the upper and lower arches do not come into coronal contact. The lower third and fourth premolars are oriented lingual to the premolars of the upper dental arch. The upper fourth premolar in cats is positioned similar to that in dogs. The mesial aspect of the crown cusp of the upper fourth premolar is positioned lateral to the interdental space of the lower molar and the adjacent fourth premolar tooth. The orientation of the upper fourth premolars is clinically significant. Cats often present with mandibular mucosal “oral masses” or “lesions” as a result of occlusal trauma.

Do the teeth occlude functionally and atraumatically? Traumatic malocclusions, such as tooth-on-tooth or tooth-on-soft tissue contact, can be very painful for companion animals. Traumatic malocclusion is particularly common when there is a discrepancy in jaw length or a variation in tooth position.

Is the number of teeth present normal? Missing or supernumerary teeth must be recognized and charted. Dental radiographs are needed to establish the correct diagnosis.

Do the teeth appear normal? Abnormal tooth structure (enamel defects or fractures), shape (malformations), or discoloration may be identified. Fractured and worn teeth may be present. All of these abnormal findings should be charted.

### Number of Teeth

Fundamental knowledge of the normal deciduous, permanent, and mixed (deciduous and permanent) dentition is necessary to perform the oral examination. A basic understanding of deciduous and permanent tooth eruption (TABLE 1) and the normal number of teeth (BOX 1) is important to be able to differentiate between normal and abnormal development.

I prefer to start the dental examination with the patient in left lateral recumbency and evaluate the right upper and lower dental arches for the full complement of teeth. There should be one canine and three incisors on each side of each arch. On the upper arch, the right upper fourth premolar is the largest tooth. In adult dogs, the third, second, and first premolars are found in successive positions rostral to

### TABLE 1 Eruption Times for Deciduous and Permanent Teeth in Cats and Dogs

<table>
<thead>
<tr>
<th></th>
<th>Eruption of Deciduous Teeth (weeks of age)</th>
<th>Eruption of Permanent Teeth (months of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dogs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incisors</td>
<td>3–4</td>
<td>3–5</td>
</tr>
<tr>
<td>Canines</td>
<td>3</td>
<td>4–6</td>
</tr>
<tr>
<td>Premolars</td>
<td>4–12</td>
<td>4–6</td>
</tr>
<tr>
<td>Molars</td>
<td>None</td>
<td>5–7</td>
</tr>
<tr>
<td><strong>Cats</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incisors</td>
<td>2–3</td>
<td>3–4</td>
</tr>
<tr>
<td>Canines</td>
<td>3–4</td>
<td>4–5</td>
</tr>
<tr>
<td>Premolars</td>
<td>3–6</td>
<td>4–6</td>
</tr>
<tr>
<td>Molars</td>
<td>None</td>
<td>4–5</td>
</tr>
</tbody>
</table>
the fourth premolar, and the first and second molars are immediately caudal to the fourth premolar. Adult cats have three upper premolars and one upper molar. On the lower arch, the first molar is the largest tooth. In adult dogs, the four lower premolars are rostral to the first molar, and the second and third lower molars are caudal to it. Adult cats have two lower premolars and one lower molar. I then evaluate the left side and compare it with the right side. Missing teeth are circled on the dental chart, and supernumerary teeth are drawn on the chart in the locations where they are observed.

Plaque, Calculus, and Periodontal Disease
Accumulations of plaque and calculus, the presence of gingival inflammation, furcation exposure, and tooth mobility are noted on the dental chart. A furcation is the space between two roots of the same tooth. Periodontal disease results in bone loss, which exposes the furcation. Furcation exposure and tooth mobility are important findings that suggest advanced periodontal disease or other pathology. Tooth mobility can also be related to root fracture, metabolic disease, or neoplasia.26

Periodontal probing and dental radiographs are needed to evaluate the extent of periodontal disease. To make evaluations simple and consistent between periodic oral examinations and between evaluators, calculus, plaque, and gingival indices (BOXES 2, 3, AND 4) are used. Tooth furcation and mobility indices (BOXES 5 AND 6) with periodontal disease staging (BOX 7) may also be recorded.

I use a three-point index or stage for each assessment (four stages for periodontal disease) and chart only abnormal findings. For plaque and calculus, stage 1 indicates a relatively small amount, with 2 and 3 indicating moderate and heavy accumulations, respectively. Gingival stages of 1, 2, and 3 indicate minimal, moderate, and significant inflammation. The furcation, gingival, mobility, and periodontal disease stages are recorded next to each tooth, whereas the plaque and calculus indices are general assessments of the full dentition.

It is important to recognize areas of the dentition that have particularly heavy accumulations of plaque and calculus compared with the contralateral side, as these may indicate inadequate occlusal function or lack of chew-

<table>
<thead>
<tr>
<th>BOX 1</th>
<th>Tooth Identification Systems for Use in Dogs and Cats5,8</th>
</tr>
</thead>
</table>

The Anatomic Tooth Identification System
These dental formulas are used to evaluate for the full complement of teeth. Each formula denotes the teeth on one side. The upper number represents the upper dental arch; the lower number, the lower arch. The total number of teeth is determined by multiplying the formula total by two because the left and right sides are symmetric.

**Dogs**
- Deciduous dentition: \( I^3, C^1, P^3, M^3 \times 2 = 28 \)
- Permanent dentition: \( I^3, C^1, P^4, M^2 \times 2 = 42 \)

**Cats**
- Deciduous dentition: \( i^3, c^1, p^3, m^3 \times 2 = 26 \)
- Permanent dentition: \( i^3, c^1, p^3, m^1 \times 2 = 30 \)

\( c = \) deciduous canine, \( C = \) permanent canine, \( i = \) deciduous incisor, \( I = \) permanent incisor, \( m = \) deciduous molar, \( M = \) permanent molar, \( p = \) deciduous premolar, \( P = \) permanent premolar

The Modified Triadan System
I use the modified Triadan system for medical records. For case reports sent to referring veterinarians, I use both the anatomic and modified Triadan systems to avoid misunderstanding. The modified Triadan system can be used for all species. The system for veterinary use is based on three-digit numbers because the upper dental arches of dogs normally have 10 teeth and the lower arches have 11 teeth.

In this system, the dental arches are numbered from the right upper (100), to the left upper (200), to the left lower (300), and finally to the right lower (400). Individual teeth are then numbered successively from the most rostral to the most caudal tooth. For example, the incisor adjacent to the facial midline of the upper right dental arch is numbered 101, while the right lower first incisor adjacent to the mandibular symphysis is numbered 401. The adjacent incisors on the right side are numbered 102 and 103 (upper arch) and 402 and 403 (lower arch), respectively. All cuspids or canine teeth are numbered 04, all fourth premolar teeth are numbered 08, and the first molars are numbered 09.

In dogs, the four right lower premolars from rostral to caudal are numbered 405, 406, 407, and 408. The right lower molars from rostral to caudal are numbered 409, 410, and 411, respectively. In cats, gaps are left in the numbering sequence for the teeth that are normally absent. For example, the right upper first premolar observed in normal feline dentition is numbered 106 because 105 is absent. From rostral to caudal on the right upper dental arch, the adjacent teeth are designated 107, 108 (the third and fourth premolars, respectively), and 109 (the only molar tooth). On the right lower dental arch, the first encountered premolar tooth is numbered 407 (405 and 406 are absent), the adjacent premolar (the fourth premolar) is labeled 408, and the most caudal mandibular tooth is labeled 409 (the only molar tooth).

5See the charts at CompendiumVet.com for an example of the modified Triadan numbering system in use.
Oral Examination of Cats and Dogs

ing due to oral pain or other causes. Regional disparity between objective indices necessitates careful observation, tactile assessments, and full-mouth dental radiographs.

Periodontal and explorer probes are used for tactile assessments of teeth and periodontal tissue assessment. Explorer probes are made with various working ends. A number 17 explorer probe is useful for subtle evaluation of enamel, dentin, and cementum or evidence of pulp exposure. The shepherd's hook explorer probe is useful for the evaluation of dental integrity and evidence of pulp exposure. The periodontal probe is used for a three-dimensional assessment of the periodontium. It is placed at six imaginary points of the tooth. I prefer to probe the buccal surface from the mesial aspect (front) to the middle point and then the distal aspect (back) of the tooth. I then position the probe at the distal aspect of the lingual or palatal surface and continue to the middle and mesial points of each tooth. With experience, periodontal probing of the four dental arches takes approximately 60 seconds with the help of a dental assistant recording abnormal findings on the dental chart.

Tooth Color

Tooth color depends on dental care, diet, age, and other factors. Professional and home dental care reduces accumulations of plaque and calculus that affect tooth color. Dietary factors can influence accumulations of plaque and calculus as well as introduce biochemicals that may affect tooth color. I often see patients with tooth surfaces that are discolored red or black, presumably from minerals in local water supplies (Figure 7).

Young cats and dogs have teeth with wide pulp chambers and thin dentin walls compared with those of older animals. As animals age, the dentin walls develop (or enlarge), resulting in greater tooth density with a yellow, tan, or off-white appearance. Elderly patients may develop sclerotic dentin and pulp chamber shrinkage, which may result in a glassy or transparent appearance of the teeth. The outer enamel layer of the tooth is nonliving and remains approximately the same thickness throughout the animal's life. However, nutrition, general health, and antimicrobial therapy may affect enamel formation and, ultimately, tooth color. For example,
tetracycline administration during tooth development may affect the formation of hydroxyapatite of permanent teeth. Changes related to enamel abrasion and attrition also affect tooth color. Infectious disease, malnutrition, or trauma may disrupt normal enamelogenesis and result in enamel defects (FIGURE 8). These defects can result in irregular dentin formation and plaque and calculus retention, which contribute to tooth discoloration.

Extraoral or intraoral occlusal trauma may result in tooth wear, fractures, or pulpitis. Dentin responds to chronic trauma by producing reparative (tertiary) dentin. Reparative dentin increases the tooth density and affects tooth color. The pulp responds to trauma with inflammation as an attempt to repair itself; however, pulp necrosis with tooth discoloration frequently occurs.

Teeth that are purple, pink, tan, brown, black, or just off-white should be evaluated further. Discolored teeth may have reversible or irreversible pulpitis (FIGURE 9) or may be nonvital. Discolored teeth should be evaluated tactiley with an explorer probe for dentin or pulp exposure and with dental radiographs for endodontic pathology.

Transillumination of discolored teeth may help determine tooth vitality, particularly in younger patients. I use a Finoff transilluminator to direct light through the potentially nonvital tooth. A pink glow indicates illumination of blood flowing through the pulp and is consistent with tooth vitality. A tooth that appears relatively dark and does not have a pink glow when compared with adjacent and contralateral teeth is likely nonvital. Transillumination is an inexact procedure in older patients because of the variability in tooth density.

**Tooth Shape and Size**

Knowledge of the correct shape and size of teeth is necessary to recognize anomalous teeth, such as peg teeth, which are small and have a single cusp. Skulls, models, photographs,

**Mobility Index**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-0</td>
<td>Normal physiologic movement (&lt;0.2 mm), not charted</td>
</tr>
<tr>
<td>M-1</td>
<td>Slight tooth mobility in any direction other than axial (0.2–0.5 mm)</td>
</tr>
<tr>
<td>M-2</td>
<td>Moderate tooth mobility in any direction other than axial (0.5 to 1 mm)</td>
</tr>
<tr>
<td>M-3</td>
<td>Severe tooth mobility in any direction other than axial (&gt;1 mm)</td>
</tr>
</tbody>
</table>

*American Veterinary Dental College Nomenclature Committee.

**Periodontal Disease Index**

Periodontal disease is staged based on the degree of periodontal destruction. Dental radiographs with periodontal probing are the fundamental diagnostic tests used.

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD-1</td>
<td>Stage 1 periodontal disease; no attachment loss</td>
</tr>
<tr>
<td>PD-2</td>
<td>Stage 2 periodontal disease; 0–25% attachment loss</td>
</tr>
<tr>
<td>PD-3</td>
<td>Stage 3 periodontal disease; 25%–50% attachment loss</td>
</tr>
<tr>
<td>PD-4</td>
<td>Stage 4 periodontal disease; &gt;50% attachment loss</td>
</tr>
</tbody>
</table>
and dental charts are commercially available for comparison with a patient's dentition to help veterinarians recognize anomalous teeth. Anomalous teeth may be an incidental finding, a functional problem, or a contributing factor in the development of periodontal disease (Figure 10). All anomalous teeth should be probed for enamel and periodontal defects as well as radiographed for periodontal and endodontic pathology (Figure 11).

**Defects and Trauma**

Coronal defects may involve only the enamel, the enamel and dentin (Figure 12), “near pulp exposure,” or direct pulp exposure (Figure 13). Teeth with coronal defects often have rough surfaces with accumulations of plaque and calculus.

The carnassial teeth are frequently chipped or fractured in dogs that are allowed to chew hard objects. Caged animals with separation...
anxiety frequently incur defects or fractures on the distal surfaces of incisors, canines, and premolars while trying to escape from their cages. These defects are particularly common in dogs, and their presence has been called cage chewer syndrome (FIGURE 14). Dogs that habitually carry tennis balls develop severe dental abrasion. Dental attrition is abnormal coronal wear due to excessive mastication or chewing (FIGURE 15).

Slab fracture of a carnassial tooth (FIGURE 16) frequently results in suborbital swelling. However, dental radiography should be performed before extracting the fractured tooth to ensure accurate diagnosis and treatment of the tooth or teeth causing the swelling. Tooth root abscess of the upper third premolar or upper first molar, foreign body penetration, and infectious or neoplastic diseases can also cause swelling and must be ruled out via dental radiography. Lingual fractures of the lower first molars are also common but are often missed during routine oral examination.

Tooth resorption in cats (formerly called neck lesions, resorptive lesions, erosive lesions, or feline odontoclastic resorptive lesions) is very common (FIGURE 17). Tooth resorption occasionally occurs in dogs. Identification of tooth resorption on oral examination is a strong indication for dental radiography. An animal with one visible lesion is likely to have more.

Dogs may have dental caries (cavities) (FIGURE 18). Dental caries may involve the crown or root but are most commonly found on the occlusal surfaces of the molars.

**Soft Tissue Evaluation**

I prefer to evaluate the soft tissue after the teeth have been evaluated. I assess all four dental arches for normal gingival color and anatomy. My initial focus is on the attached gingiva. There should be a minimum of 2 to 3 mm of attached pink gingiva around every tooth. Gingival defects or recession may result in less than 2 mm of attached gingiva. Gingival discoloration, inflammation, and edema may also be evident. Because the attached gingiva protects the teeth and other periodontal structures, its loss creates a risk for periodontal disease progression, endodontic disease development, and the eventual loss of adjacent teeth.

The mucogingival line is a clinically important region. If discharge or fistulas are identified at or apical to the mucogingival line (FIGURE 19), endodontic disease of the adjacent tooth is likely. If discharge or fistulas are identified coronal to the mucogingival line, periodontal disease is suspected. Dental radiographs are necessary when these fistulas are identified.

The buccal mucosa is carefully examined for defects, enlargements, lacerations, masses, and ulcerations. Chronic ulcerative parodontal stomatitis (CUPS) is a common problem in dogs. It is an immune-mediated response to plaque bacteria that has also been referred to as plaque intolerance. These animals present with ulcerative lesions of the buccal mucosa and the tongue surfaces that come in contact with the teeth (FIGURE 20). CUPS is similar to feline stomatitis.
Conclusion

An awake patient oral examination is an integral part of every physical examination. Familiarity with normal anatomy and breed variations is essential for recognizing potential problems. Abnormalities identified during the initial awake patient examination need to be investigated further. The comprehensive oral examination under anesthesia is a detailed and systematic evaluation of dental, periodontal, and oral cavity structures. The use of a dental chart with an anatomic checklist helps the evaluator avoid missing problems and allows comparison between examinations.

Plaque and calculus indices are quantitative assessments of plaque and calculus deposition on teeth. Gingival, furcation, mobility, and periodontal disease staging is useful in assessing periodontal health. These indices are charted only when problems are identified. Dental charts provide excellent documentation of the oral examination for the medical record. Dental radiographs, periodontal and dental probing, and transillumination of teeth are fundamentally important diagnostic tests used in the comprehensive oral examination.

Information from the comprehensive oral examination can be used in dental consultations with clients for effective communication about necessary treatment plans for their companion animals.

1. Which patient characteristic is usually best evaluated during the sedated patient examination?
   a. cephalic index
   b. anomalous teeth
   c. facial symmetry
   d. occlusion

2. Which statement regarding the cephalic index is true?
   a. Cephalic indices allow the veterinary dentist to assess the patient for endodontic therapy.
   b. The cephalic index is a measurement of the coronal width and height of the right mandibular first molar tooth.
   c. The cephalic index categorizes dog and cat breeds based on skull shape and size.
   d. The cephalic index applies to cat breeds but not to dog breeds.

3. Which statement is false with regard to dental occlusion?
   a. In a normal canine occlusion, the upper incisors rest on the cingulum of the lower incisors.
   b. In a normal canine occlusion, the upper and lower premolars interdigitate, with the lower premolars positioned rostral to the upper opposing teeth.
   c. The patient can be evaluated for a normal occlusion with the mouth closed.
   d. Traumatic malocclusions with tooth-on-tooth or tooth-on-soft tissue contact can be painful for companion animals.

4. Which statement(s) regarding number of teeth is/are true?
   a. If teeth appear to be missing, dental radiographs are indicated.
   b. Mixed dentition refers to patients having deciduous and permanent teeth.
   c. Adult cats normally have only one molar tooth in each dental arch.
   d. all of the above

5. Which breed is most likely to have CORS?
   a. bulldog
   b. whippet
   c. saluki
   d. Great Dane

6. Which statement regarding tooth color is true?
   a. Tooth color depends on dental care, diet, age, and other factors.
   b. Tooth discoloration is an indication for teeth scaling.
   c. Teeth normally change from yellow to white at approximately 9 to 11 years of age.
   d. Discolored teeth are common and rarely a reason for concern.

7. Which statement regarding diagnostic tests is true?
   a. Dental radiographs are useful for endodontic evaluation but not for periodontal evaluation.
   b. The periodontal probe is the only diagnostic test for tooth resorption.
   c. The periodontal probe is used for a three-dimensional assessment of the periodontium.
   d. Dental radiographs are rarely useful for diagnosis of tooth resorption.

8. Which statement regarding enamel defects is true?
   a. Enamel defects are rarely of clinical significance.
   b. Enamel defects may involve only the enamel or both the enamel and the dentin.
   c. Enamel defects are usually inherited problems.
   d. Enamel defects are unlikely to be related to occlusal trauma.

9. Cage chewer syndrome refers to __________ resulting from the patient chewing metal cages.
   a. periodontal disease
   b. a pathologic condition associated with toxicity
   c. an enamel defect
   d. a combination of three problems (an enamel defect, bacterial invasion of the pulp, and endodontic and periodontal diseases)

10. Which statement is true?
   a. Dolichocephalic dogs are affected by periodontal disease more often than brachycephalic breeds because they have a greater incidence of dental crowding.
   b. A minimum width of 2 to 3 mm of attached gingiva is needed to protect the adjacent tooth.
   c. CUPS is not an immune-mediated condition.
   d. all of the above