A Review of Dental Anatomy and Charting
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It is important to be able to identify oral pathology and anomalies. It is equally important to correctly record the pathology on dental charts.

A thorough dental examination includes both conscious and anesthetized examinations as well as charting disease processes, pathology and anomalies, and treatment plans.

Why is dental charting important? A dental chart is a diagrammatic representation of the dentition where information can be entered in a pictorial and/or notation format. It allows you to keep a record of the patient’s oral health, track changes in oral health and record treatment. A dental chart is also a legal document.

In order to ensure efficient record keeping the chart should include:

- a chart with a key
- brief descriptions to clarify disease and treatments
- procedure performed
- therapeutic plan
- prognosis
- dental arcade

Chart only abnormal findings. Charts can be in either a fill in or check off format. The chart needs to have basic vital information that is similar to the items needed in all veterinary records.

- Patient/Client ID
- Chief complaint
- General health history
- Dental history
- Specific findings
- Treatment plan
- Anesthesia protocol
- Follow up care
- Radiographic interpretations
- Assessment of treatment
- Prognosis
- Documentation of discussions and/or consultations
- Declination of Treatment
- Deviations from recommended follow up care
- Informed consent

There are commercially available dental charts available but you can develop your own.

Oral examination
An oral examination on a conscious patient is important but limited to a visual inspection and digital palpation. The examination involves more than just the oral cavity. It should also include palpation of the facial bones and zygomatic arch, evaluation of the temporomandibular joint, salivary glands and lymph nodes.

Dental occlusion should also be evaluated by gently retract the lips to look at the soft tissue, the bite and the buccal aspects of the teeth.

On an anesthetized patient a thorough oral examination can be completed. All the structures of the oral cavity must be evaluated including: oropharynx, lips and cheeks, mucous membranes, hard palate, floor of the mouth and tongue, and the teeth. The periodontium of each tooth needs to be evaluated. The periodontium includes the gingiva, periodontal ligament, cementum and the alveolar bone.

In animals with large amounts of calculus on the teeth, it may be necessary to remove these deposits to accurately access the periodontium. The use of a calculus removal forceps is a recommended method to remove supragingival calculus. Use care when using this instrument to ensure that the gingivae and tooth crown are not damaged.

Instruments used to evaluate the periodontium include a periodontal probe, a dental explorer and a dental mirror.

Indices should be evaluated for each tooth; gingivitis, periodontal probe depth, gingival recession, furcation involvement, mobility and periodontal attachment levels.
Being aware of dental formulas, oral anatomy as well as terminology is crucial to proper charting.

**Dental formulas**
- Adult Dog
  - $2x(3/3I, 1/1C, 4/4P, 2/3M) = 42$
- Puppies
  - $2x(3/3i, 1/1c, 3/3p_{r}) = 28$
- Adult Cats
  - $2x(3/3I, 1/1C, 3/2P, 1/1M) = 30$
- Kittens
  - $2x(3/3i, 1/1c, 3/2p) = 26$

**Head type of the animal as well as malocclusions need to be noted.**
- **Mesiocephalic** = Medium
  - Retrievers, Shepherds, DSH
- **Brachycephalic** = Short
  - Boxers, Bulldogs, Persians
- **Dolichocephalic** = Long
  - Greyhounds, Collies, Siamese

**General anatomy terminology**
- Maxilla = Upper Jaw
- Mandible = Lower Jaw
- Gingiva = Gum tissue
- CEJ = Cemento-Enamel Junction
- Sulcus= Area b/w free gingiva and tooth
- Subgingival = Below gingiva
- Supragingival = Above gingiva
- Coronal – crown
- Apical – toward apex
- Occusal – chewing surface
- Gingival – toward gingiva
- Interproximal – between teeth
- Occlusion – the way teeth fit together
- Furcation – are where roots join
- Recession – loss of gingival tissue
- Inflammation – swelling, redness, infection

**Tooth identification system**
The Anatomical System uses the first letter of each tooth type along with a number to identify each tooth.

Advantage of the anatomical system is that it is easy to remember and many teeth can be identified at one time. Disadvantages are that is can be more time consuming to identify individual teeth and some computer systems may not be alpha numeric friendly.

The Triadan numbering system gives each tooth a three digit number. The first digit represents the quadrant of the mouth and the other two numbers represent the tooth identification. The rule of 4 & 9 helps to identify the teeth. The number 04 is always given to the canine tooth and the number 09 is always given to the first molar.

Advantages - quicker to say and can be used with most computers. Disadvantages - not intuitive and that you must know the code. This system is gaining in popularity.
Know the number of roots for each tooth. The root systems for both canine and feline are illustrated in the figures seen in the anatomical numbering system.

**Periodontal indices**

Plaque observed on the teeth prior to cleaning should be recorded. Plaque is the soft, gelatinous matrix of bacteria and bacterial by-products that lead to gingival irritation and gingivitis may be necessary to use a disclosing agent to visualize. The amount of plaque should be recorded as light, moderate or heavy.

- Calculus (tartar) is calcified plaque. The amount of calculus should be recorded as light, moderate or heavy.
- Calculus can only be removed by either hand scaling or power scalers.

**Gingivitis index (GI)**

The gingival index (GI) is a measurement of gingival health. The assessments of gingival changes are scored using the following criteria.

- 0 - normal healthy gingiva
- 1 - moderate inflammation, moderate redness, not bleeding on probing, edema
- 2 - moderate inflammation, moderate to severe redness, edema, bleeding upon probing
- 3 - severe inflammation, severe redness, edema, ulceration, spontaneous bleeding

Each tooth is given the most severe score. In some clinics a gingival score is given per quadrant.

**Probe depth (PD)**

Probe depth (PD) is a measure of the depth the periodontal pockets often found in periodontal disease.

The probe depth is measured at multiple sites of the tooth. A periodontal probe with millimeter markings is gently placed between the free gingival and the tooth surface, and carefully advanced until soft tissue resistance is felt. The tip of the probe should be parallel to the long axis of the tooth. The pocket depth is recorded as the distance in mm from the free gingival margin to the bottom of the pocket. The probe may be glided or walked along the tooth to measure the varying pocket depths. A normal gingival sulcus depth is 1-3 mm in dogs and 0.5 to 1mm in cats. Measurements in excess of these values should be recorded in the appropriate location on the dental chart.

**Gingival recession**

Gingival recession is also measured with the periodontal probe. It is the distance from the cemento-enamel junction to the margin of the free gingiva. At sites with gingival recession the probe depth may be normal despite the loss of alveolar bone. Areas of gingival recession should be noted on the dental chart.

**Furcation index (FI)**

The furcation index (FI) measures the loss of bone support in multi-rooted teeth. A periodontal probe is placed perpendicular to the long axis of the tooth and slid along the free marginal groove to the furcation site.

The following criteria are used to assign a numerical score.

- 0 - no loss of bone support
- 1 - horizontal loss of supporting tissues not exceeding one-third of the width of the tooth
2 - horizontal loss of supporting tissues exceeding one-third of the width of the tooth but not encompassing the total width of the furcation area.
3 - horizontal through and through loss of supporting tissue.
A furcation index of 1-3 should be noted on the dental chart.

**Mobility index (MI):**
The mobility index (MI) measures the loss of bone support by indicating the amount of movement of the tooth.
The length of the periodontal probe is placed on the buccal surface of crown of the tooth and gentle pressure is applied to the tooth.
The following criteria are used to assign a numerical score.
Stage 0 - no mobility
Stage 1 - perceptible mobility but less than 1 mm buccolingually
Stage 2 - definite mobility between 1-2 mm
Stage 3 - gross mobility exceeding 2 mm buccolingually and/or vertical mobility
A mobility index of 1-3 should be noted on the dental chart.

**Periodontal attachment level (PAL):**
This measurement is similar to the probe depth measurement. In the PAL the pocket depth is measured from the base or apex of the pocket to the cemento-enamel junction. This is a more accurate assessment of tissue loss in periodontitis. PAL can be directly measured or it can be calculated as the sum of PD plus gingival recession.

**Stage of periodontal disease:**
The stages of periodontal disease can be used to help price your periodontal therapies and need to be recorded so that the progression of disease can be determined. These stages are determined by either measuring clinical attachment level or radiographically.
Stage 1 -Gingivitis only with attachment loss.
Stage 2 - Less than 25% attachment loss. Grade 1 furcations present.
Stage 3 - 25 to 50% attachment loss. Grade 2 furcations present
Stage 4 - Over 50 % attachment loss. Grade 3 furcations present.

**Oral masses**
Oral masses need to drawn onto the chart and noted. This includes epuli and gingival hyperplasia.
This is important to note the size and description of the mass in order to have a record of the mass recognize changes in future examinations. Document gingivectomies or the removal of excess gingival tissues.

**References**
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