EMPHASIS:
Mandibular fracture repair can be a challenge. Often there is osteomyelitis and osteoporosis due to chronic dental disease; the fractures are typically open and contaminated; bilateral involvement and comminution are frequently present. Despite these difficulties, success can usually be achieved with proper surgical technique. In this article we will review the options for stabilization of mandibular fractures.

PREOPERATIVE DIAGNOSTICS:
1. Physical examination

AXIOM: These views should be taken with the patient sedated; this should not be performed until the patient is stable.

AXIOM: If the fracture has occurred due to blunt trauma such as a fall or automotive injury, two-view thoracic and abdominal radiographs should be performed to identify any internal injuries.

4. Palpation of the mandibles and TM joints with the patient sedated.

PREOPERATIVE CARE:
1. Indwelling cephalic catheter.
2. Intravenous anesthetic induction protocol.
3. Endotracheal intubation and inflate cuff.

AXIOM: In some cases, the surgeon may prefer to place a tracheostomy or pharyngotomy tube, so that there is no endotracheal tube to interfere with assessment of occlusion intraoperatively. We find this to be rarely necessary.

4. Isoflurane inhalant anesthesia to effect.
5. Lead II ECG and pulse oximetry monitoring during prep and surgery.
6. Clip and prepare the mandibular region for aseptic surgery.

AXIOM: Depending on the location of the fracture and the intended method of repair, the patient may be placed in either lateral, oblique or dorsal recumbency.

7. Cefazolin 20 mg/kg IV immediately preoperatively.

SURGICAL OPTIONS:
AXIOM: With any technique, the most important goal is to obtain proper occlusion.

1. External Fixation

AXIOM: Particularly in small patients, older pets with dental disease and secondary osteomyelitis/osteoporosis, and bilateral or comminuted fractures, we feel that external fixation is the preferred option. It is minimally invasive and does not disrupt the soft tissue attachments to the fractured bones.

a. Through stab incisions, 2-4 pins are placed at oblique angles relative to each other, into each of the fracture segments. (See Figure 1)

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b. For additional stability, these pins can be passed into the opposite mandible, creating Type II fixation once the acrylic is applied.
c. With the fracture held in reduction, dental acrylic is placed to form a connecting bar between the pins. (See Figure 2)

AXIOM: Of course, a connecting bar and clamps can also be used, but we find it less cumbersome to use the acrylic.

AXIOM: If desired, the pins may be bent (using pliers) to insure that they are held rigidly by the acrylic.

2. Mandibular Symphyseal Trauma
   a. A single wire placed just caudal to the canine teeth will give excellent results. (See Figure 3)
   b. Place the wire twist ventrally, rather than leaving this rough wire end exposed within the oral cavity.
   c. The wire can be removed in 12 weeks.
   d. Lag screw fixation can be performed in larger patients. (See Figure 4)

3. Interdental Wiring (See figure 5)
   AXIOM: This is most easily performed in larger patients. If necessary, dental acrylic can be placed over and around the wires to help retain them.

DANGER:
If the patient is missing teeth, or the pet is small, it can be difficult to place the wires securely enough that they will not dislodge. In such cases, a similarly placed interfragmentary wire can be used (See Figure 6). In this technique, a hole is drilled in the cortex to achieve secure wire positioning.

4. Interfragmentary Wiring
   a. Perform a ventrolateral approach to the region.
   b. Drill holes and place two wires as shown, one relatively ventral, and one relatively dorsal. Otherwise, when pressure is exerted on the mandible during chewing, the fixation will be unstable. (See Figure 7)

AXIOM: The dorsal edge is the tension side of the mandible.

DANGER:
Avoid the tooth roots by careful placement of the drill holes in the mandible.

AXIOM: This technique is most useful if the contralateral mandible is intact, since there is less overall jaw instability. Although bilateral interfragmentary wire techniques can be used, the prognosis is more guarded for success.

5. ASIF Plating
   a. Perform a ventrolateral approach to the region.
   b. Application of an ASIF plate will now give excellent stability. (See Figure 8)

AXIOM: Plating is easiest in larger patients, with fractures in the mid to caudal region of the mandible.

In smaller patients or in fractures of the rostral half of the mandible, it can be difficu-
cult to place the screws without traumatizing the tooth roots, particularly the canine tooth root.

6. Conservative Management
Often indicated for unilateral severely comminuted caudal fractures, (such as those resulting from a bite wound). If the occlusion is being suitably maintained by the opposite intact mandible, no fixation may be required. A tape muzzle may be placed if warranted, but we find this is rarely needed.

7. Partial Mandibulectomy
This may be advised if the fracture fragment is completely devitalized.

POSTOPERATIVE CARE:
1. Clindamycin 20 mg./kg. PO tid for 7 days.
2. Pain management using oral, injectable or transdermal analgesics.
3. Feed a gruel diet, mixing soft food with water in a blender, for 2-6 weeks.
4. Follow-up radiographs at 4 and 8 weeks postoperatively.
5. For external fixation patients: removal of the external fixator, when there is radiographic evidence of sufficient bone union and stability.
6. Elizabethan collar at all times until the fixator is removed.

DANGER:
No chew toys, rawhides, roughhousing, etc. should be allowed until the fracture is healed.

PROGNOSIS:
Optimistic, since adequate healing and occlusion can be achieved in almost all cases.
DIMENSIONS IN SURGERY

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AUTHOR’S NOTE
If you have any questions concerning this paper, additional references, surgical supplies or sources of products mentioned or used in this protocol, please FAX us at 1-310-479-8976. We will answer your questions promptly.

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Coming Attractions
In the dog there are several indications for a partial gastrectomy. Devitalization of the region of the greater curvature in GDV cases is common; gastric neoplasia, or gastric ulcers are also indications for this procedure.
Next month, we shall present our surgical protocol for partial gastrectomy to treat gastric neoplasia.
See you then!