This session will serve as a review of reconstructive plastic surgery in the feline species and it will highlight new techniques that have been recently discovered for reconstructing wounds in cats.

**Facial artery cutaneous flap**

The facial artery has perforating direct cutaneous arteries to both the skin and mucosa of the check pouch and lower and upper lips. The facial artery originates near the angle of the jaw and bifurcates to form the inferior and superior labial arteries, and the angularis oris artery. These vessels pass cranially with the inferior labial artery, superior labial artery, and angularis oris artery perfusing the lower lip, upper lip, and commissure of the lips, respectively. The first cutaneous branch extending off the facial artery is located at the level of the lateral mandible, approximately 1 cm caudoventral to the commissure of the lip, which is at the rostral insertion point of the masseter muscle on the mandible. This direct cutaneous artery extends caudally to the level of the wing of the atlas.

The margins of this flap include the following: ventrally, the ventral midline; rostrally, a dorsoventral line passing through the rostral aspect of the masseter muscle; dorsally, a line parallel to the ventral border that is equal distant from the origin of the perforating cutaneous artery; caudally, 1 cm caudal to the wing of the atlas. During flap elevation, the underlying facial muscles (platysma) should be elevated with the flap. This flap is useful for lower lip, upper lip, chin, bridge of nose, and cheek wound reconstruction.

**Angularis oris mucosal flap**

See anatomical description above for vascular anatomy. The facial artery sends direct branches that perfuse the mucosa of the lips (superior labial and inferior labial). The important vessels lie within the thin muscle layer of the lips and cheek pouch (labialis/orbicularis oris).

A long mucosal flap can be made to the level of the canine tooth and the width of the lip. The point of rotation of the flap is in the cheek pouch, at the cranial extent of the masseter muscle. Transillumination of the lips is useful to visualize the path of the vascular supply during the flap dissection. An incision is made in the commissure of the lip, through the skin, yet not through the underlying thin orbicularis oris and labialis muscles. The skin is reflected off the proposed mucosal lip flap. The musculomucosal flap is created by making an incision near the margin of the fixed and attached gingival border and adjacent to the mucocutaneous junction of the lips. The dissection is continued caudally. If desired, the base of the flap can be created as an island flap or left as a peninsular flap design. When creating the island flap design, special care must be taken to maintain the integrity of the vascular supply to the flap. This flap can be used to reconstruct a variety of intraoral defect and is useful to reconstruct hard palatine fistulae.

**Caudal auricular flap**

The blood supply of the caudal auricular flap is based on the caudal auricular artery and vein, which are located just caudal to the base of the ear. Since these vessels are fairly small and do not extend very far down the length of the flap, inconsistent survival to the distal aspect of the flap may be encountered.

The base of the flap is at the level of the caudal ear region (wing of the atlas). The flap is centered over the lateral neck region and its caudal border should not extend beyond the cranial
aspect of the scapular region. Because the caudal auricular artery and vein are small, this flap should not be developed as an island axial pattern flap, but rather as a peninsular flap. A bridging incision should be made to the recipient wound. A defect on the dorsum of the head should have a bridging incision that extends between the ears, as this is the shortest distance to the defect. Wounds located over the check and ventral neck should have a lateral bridging incision. A ventral or dorsal bridging incision can be made for temporal wounds.

**Superficial temporal flap**

The superficial temporal flap is based on the superficial temporal artery and vein, which runs rostral to the base of the ear, over the zygomatic arch. These vessels run within the frontalis muscle, therefore this muscle needs to be included in the flap design. Similar to the caudal auricular flap, distal flap necrosis is common when extended its full length; therefore the longitudinal dimensions should be shortened by 1 to 2 cm (depending on the size of the patient). For this reason this flap should not exceed a 3:1 length to width ratio.

The caudal border of this flap is a line that traverses the forehead just rostral to the ears. The rostral border parallels the caudal orbital border. The base of the flap is at the level of the ipsilateral zygomatic arch. The distal border of the flap is the lateral aspect of the contralateral orbit. As with the caudal auricular flap, the superficial temporal flap should also be developed as a peninsular flap instead of an island.

Complications of using this flap include facial nerve paralysis, transaction of the axial pattern blood supply with resultant partial flap necrosis, difficulty closing the eyelids if too wide of a flap is developed, and dehiscence of the donor site. Facial nerve paralysis can be avoided with meticulous dissection and careful palpation of the course of the nerve as it passes across the zygomatic arch. The blood supply can be safely preserved by maintaining the dissection plane beneath the frontalis muscle. This flap can be used to reconstruct wounds located on the cheek, lips periorbital region, and caudal aspect of the bridge of the nose.

**Omocervical skin flap**

The omocervical cutaneous flap is based on the superficial cervical artery and vein, which exit the musculature cranial to the shoulder at the level of the prescapular lymph node and the cranial shoulder depression. These vessels enter the subcutaneous tissues and travel in a craniodorsal direction.

The boundaries of this flap are as follows: ventrally the acromion of the scapula; caudally, the spine of the scapula; cranially, a line parallel to the caudal border which is twice the distance from the spine of the scapula to the prescapular lymph node; the safe distal border of the flap is the dorsal midline, however, the flap may extend to the contralateral shoulder region. In cats, survival of an omocervical flap that extends to the contralateral shoulder is more consistent than in dogs. This extension of the flap is essential if it is to be used for reconstructing the facial region such as the lateral cheek or dorsum of the head. This flap is used to reconstruct wounds located on the forelimb, thorax, neck, and face.

**Thoracodorsal skin flap**

Thoracodorsal axial pattern flap is a robust and useful flap for fore limb reconstruction. The cutaneous branch of the thoracodorsal artery and vein, which supply this flap exit the body wall at the level of the caudal shoulder depression. This is the point of rotation of the flap. These vessels travel in a dorsal direction along the caudal aspect of the scapula.

The cranial border of the thoracodorsal flap is the spine of the scapula. The caudal border is a line parallel to the cranial border, but twice the distance from the spine of the scapula.
to the caudal shoulder depression. The ventral border of the flap is just ventral to the caudal shoulder depression. The dorsal border can extend over the midline to the contralateral shoulder depression. Extending the flap to this extreme level may result in necrosis of the tip of the flap. Creating an inverted L-shaped flap is another option; however, necrosis of the tip of the flap may be more likely to occur. The thoracodorsal flap may extend to the level of the distal antebrachium. This flap is useful for reconstruction of wounds on the lateral chest, neck, forelimb, and axilla.

_Caudal superficial epigastric flap_

The blood supply to this flap is the caudal superficial epigastric artery and vein. These vessels exit the body wall at the level of the inguinal canal, which is located just cranial and medial to the origin of the easily palpable pectineus muscle. The vessels run cranially in the mammary chain and anastomose with the angiosome of the cranial epigastric artery and vein. Mammary glands 3, and 4 will consistently survive based on the caudal pedicle; however, when gland 2 is incorporated in the flap design the distal aspect of the epigastric flap sometimes becomes necrotic. Typical boundaries of the flap are the following: medially, the midline of the abdomen laterally, a line lateral to the mammary chain; caudally, caudal to the 4th mammary chain; cranially, between glands 1 and 2. The flap can be made fairly wide, but one must make sure that the donor wound bed can be closed. Due to a cat’s body structure, this flap frequently can extend to the level of the toes and survive completely. This flap can be used for wounds located over the hind limb, lateral abdomen, flank, and perineal region.

_Reverse saphenous conduit flap_

The vascular supply to the flap comes from the medial saphenous vein and the saphenous arteries. The flap is elevated from the medial aspect of the thigh and tibial region. It is imperative that the blood supply to the flap is intact at the level of the tarsometatarsal region. The flap can extend to the most proximal aspect of the thigh and consistently survive. As the flap is elevated, it is imperative that the saphenous vessels are also lifted with the skin flap and the cutaneous perforators are preserved.

The point of rotation of this flap is typically just above the hock joint. The flap can reach the recipient wound using either a bridging incision or a tubed flap. The blood supply of this flap is reversed from what normal is, as the origin of the saphenous vessels are ligated and divided. Because the veins have valves, this flap frequently will become edematous for about 7 to 10 days. This flap is useful for reconstruction of distal tibia, hock, and metatarsal/phalangeal wounds.

_Deep circumflex iliac flap_

This flap is based on the ventral branch of the deep circumflex iliac artery and vein, which exit the body wall just distal to the ventral iliac crest. The ventral branch extends down the flank fold and cranial thigh. The point of rotation of the flap is at the cranial and ventral aspect of the ilium. The boundaries of the ventral branch of the flap include the following: caudally, the femur bone; cranially, the cranial thigh; distally, the stifle; dorsally, just dorsal to the ilium. This flap can be used for reconstruction of wounds over the proximal thigh, lateral abdomen, and over the back.