

SELECTIVE NECK DISSECTION

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SELECTIVE NECK DISSECTION

STEP 1 INCISION

It is important to know the anatomy and boundaries of the anatomical triangles of the neck.

A horizontal upper neck skin incision is made from the anterior border of the SCM to the midline of the neck just below the level of the hyoid bone. The incision should provide access from the lower border of the mandible to tissue at the level of the cricoid cartilage. **Figure 1**

Subplatysmal flaps are elevated up to the lower border of mandible and inferiorly to the level of the cricoid until the omohyoid muscle is seen. The external jugular vein and great auricular nerve should be identified lying on the SCM. **Figure 2**

The skin flaps can be anchored superiorly and inferiorly with 2–0 silk sutures.

STEP 2 LEVEL I DISSECTION

Start the dissection at Level Ia with clearance of fibrofatty tissue in the submental triangles until both anterior bellies of the digastric (the lateral borders of the triangles) and the mylohyoid muscle (the floor of the triangles) are exposed, and inferiorly to the position of the upper border of the hyoid bone (the inferior border of the triangle). **Figure 3**

The surgeon next addresses Level Ib of the neck.

Subcapsular dissection: The fascia (capsule) overlying the submandibular gland is incised horizontally over the midpoint of the gland and is dissected from the gland in a superior direction in a subcapsular plane so as to avoid injuring the marginal mandibular nerve. With this technique the marginal mandibular

LEVEL I

DISSECTION

nerve is not routinely identified. The assistant however watches for twitching of the lower lip as this indicates proximity to the nerve during live surgery when no muscle relaxant has been administered.

Positive identification of marginal mandibular nerve: The mandibular nerve crosses the facial artery and vein which are both identified by blunt dissection with a fine haemostat at the mandibular notch where the facial vessels cross the mandible. Once they have been identified, find the marginal nerve crossing superficial to the vein. After identification of the nerve the facial vein is divided inferior to the nerve and slung upwards to protect the marginal mandibular nerve during the dissection. This method is recommended when clearance of perifacial lymph nodes in oral cavity cancer is indicated. **Figures 4, 5**

Next attention is directed to the fibrofatty tissue anterior to the gland between the anterior belly of digastric and mylohyoid

muscle. Nodes here are especially important to remove in malignancies of the anterior floor of mouth. To resect these nodes the anterior belly of digastric is retracted forward and the tissue is delivered using electrocautery dissection with the plane of deep dissection being the mylohyoid muscle. Vessels and nerves to the mylohyoid muscle are encountered and need to be divided. **Figure 6**

To identify the lingual and hypoglossal nerves, the posterior free edge of the mylohyoid muscle is retracted with a right angle retractor. Inferior traction on the gland brings the lingual nerve and the submandibular duct into view. Parasympathetic secretomotor fibres that travel from the lingual nerve to the submandibular ganglion are divided under direct vision taking care not to injure the lingual nerve. The duct is divided after clear identification of both the lingual (superficial to its plane) and hypoglossal



Figure 1
Upper neck incision

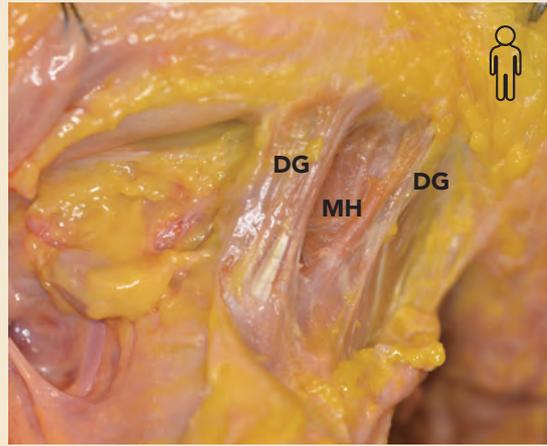


Figure 3
Level Ia to expose the digastric muscles (**DG**) and mylohyoid muscle (**MH**)

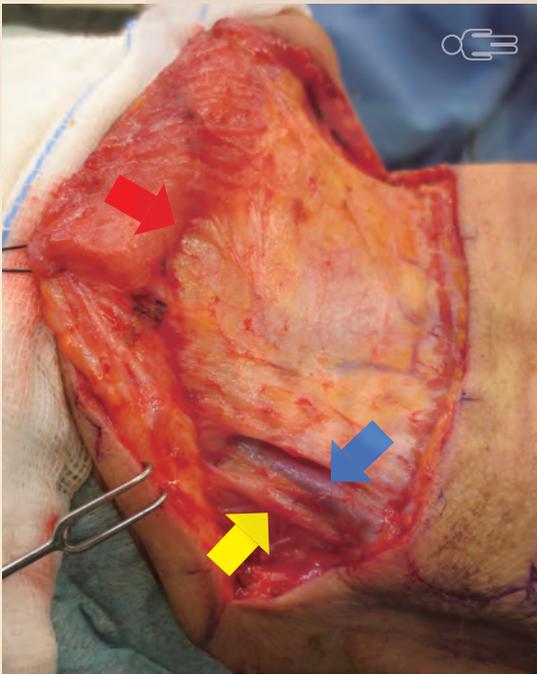


Figure 2
Subplatysmal flap (red arrow) raised to identify great auricular nerve (yellow arrow) and external jugular vein (blue arrow)

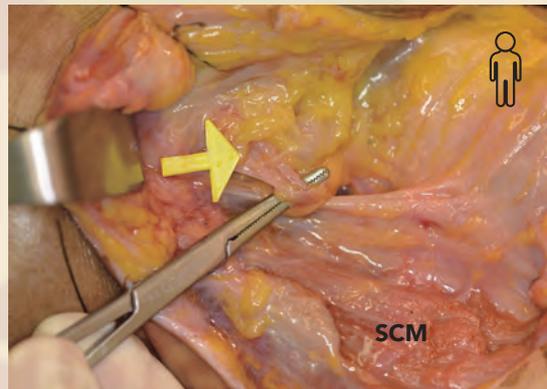


Figure 4
Marginal mandibular nerve (yellow arrow) cross the facial vessel at the mandibular notch
SCM – sternocleidomastoid muscle

LEVEL II DISSECTION

(deep to its plane) nerves. By exposing the posterior belly of digastric the proximal portion of the facial artery that loops from its superior border into the gland can be identified and divided. **Figures 7-9**

STEP 3 LEVEL II DISSECTION

Dissect fatty tissue containing lymphatics in the anterior parts of Levels II and III from the underlying infrahyoid strap muscles in a posterior direction towards the carotid sheath. The dissection also follows the medial or deep surface of the SCM and exposes deeper structures including the IJV and omohyoid muscle. A number of small segmental vessels entering the SCM are encountered and cauterized. The dissection is carried posteriorly along the deep or medial surface of the muscle in a subepimysial plane to the posterior edge of the SCM. **Figure 10**

LEVEL IIB CLEARANCE

Use retractors to pull the upper part of the SCM and the tail of parotid laterally. This will expose the accessory nerve and Level IIb lymphatic tissue. With a haemostat, create a tunnel immediately posterior to the IJV down to the prevertebral muscles. This manoeuvre speeds up the subsequent dissection of Level IIb by clearly delineating the posterior wall of the IJV. The transverse process of the C1 vertebra can be palpated immediately posterior to the accessory nerve and IJV and serves as an additional landmark for the position of these structures in difficult surgical cases. The accessory nerve should be freed from the surrounding fibrofatty tissue atraumatically using a haemostat. Fibrofatty tissue is mobilized from the postero-superior corner (medial to the retracted SCM) with anterior traction on the fibrofatty tissue. The occipital artery passes across to the top of Level IIb and its

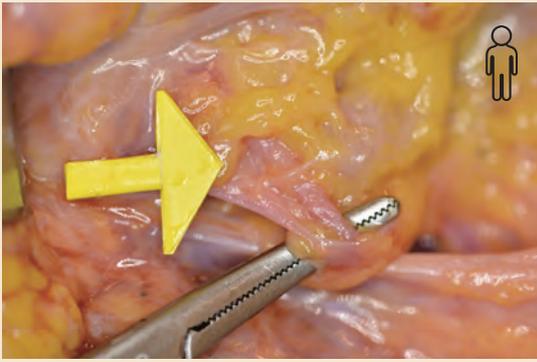


Figure 5

Close up view for the marginal mandibular nerve (yellow arrow)

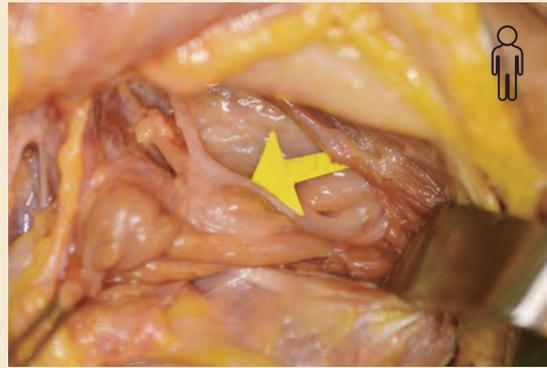


Figure 8

Lingual nerve (yellow arrow) identified after mylohyoid muscle retracted

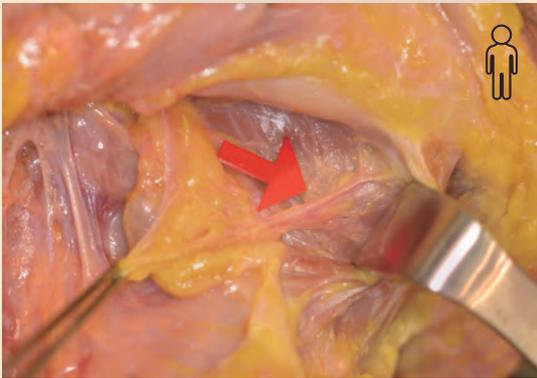


Figure 6

Mylohyoid artery (red arrow) exposed with anterior belly of digastric retracted

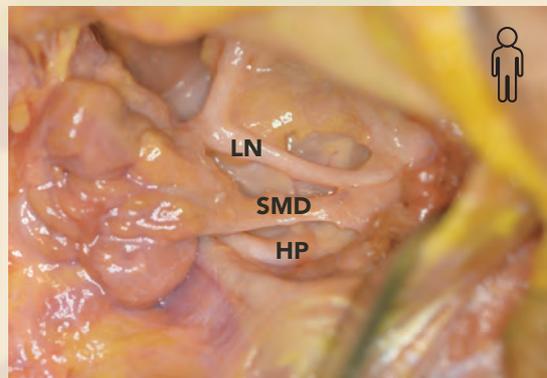


Figure 9

Identification of lingual nerve (**LN**), submandibular duct (**SMD**) and hypoglossal nerve (**HP**)



Figure 7

Posterior border of mylohyoid muscle (red arrow)

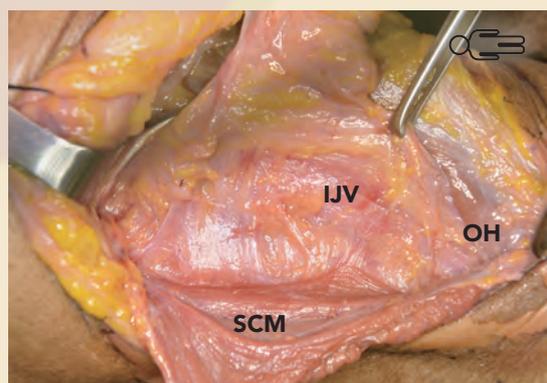


Figure 10

Dissection along the medial surface of SCM to expose the IJV and **OH**-omohyoid muscle

LEVEL III DISSECTION

branches may need to be tied should they be severed while dissecting the superior part of Level IIb. Dissect through the fibrofatty tissue and onto the deep muscles of the neck which are seen to course in a postero-inferior direction. Once the fibrofatty tissue of Level IIb has been fully mobilized from the underlying muscles, pass the tissue antero-inferiorly under the mobilized accessory nerve. **Figures 11-15**

STEP 4 LEVEL IIA & III DISSECTION

While retracting the SCM posteriorly and the fibrofatty tissue of Levels II and III anteriorly with sharp-toothed rake retractors, dissect the fatty tissue of Levels II and III in an anterograde direction from the medial or deep posterior border of SCM. The deep dissection plane is the muscular floor of the neck, encountered by dissecting between the branches of the

cervical plexus which need to be identified and preserved. **Figure 16**

The phrenic nerve and brachial plexus are not seen in this dissection, but are relevant if Level IV is dissected. Continue the anterograde dissection with a scalpel or scissors until the ansa cervicalis, the carotid sheath containing the common and internal carotid arteries, vagus nerve and IJV are sequentially exposed. The carotid sheath is incised along the full course of the vagus nerve and the neck dissection specimen is dissected off the IJV by dissecting inside the carotid sheath.

Continue dissecting the fat and lymphatics from the anterior aspect of the IJV until the common carotid artery is again reached. Divide and ligate tributaries of the IJV with ligatures.

Inferiorly, the fibrofatty tissue at the junction of Levels III and IV is divided at the level

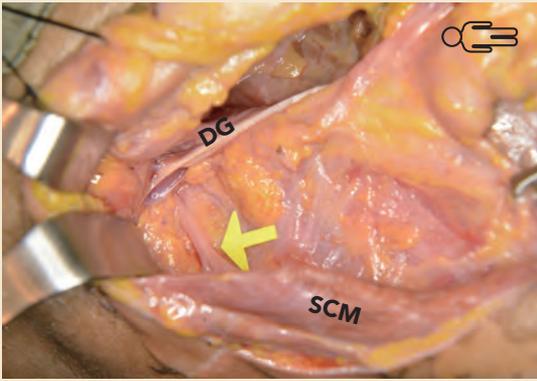


Figure 11

Accessory nerve (yellow arrow) identified at Level II, **DG**–posterior belly of digastric and **SCM**–sternocleidomastoid muscle

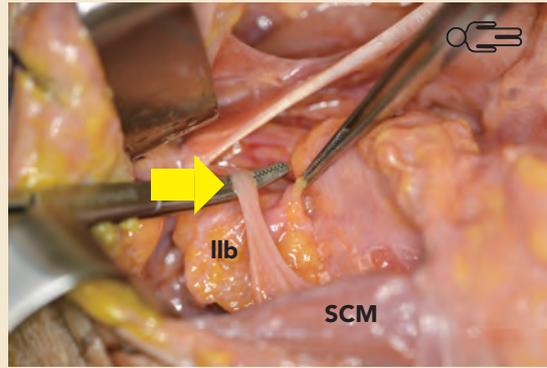


Figure 14

Level IIb tunnel under the accessory nerve (yellow arrow)

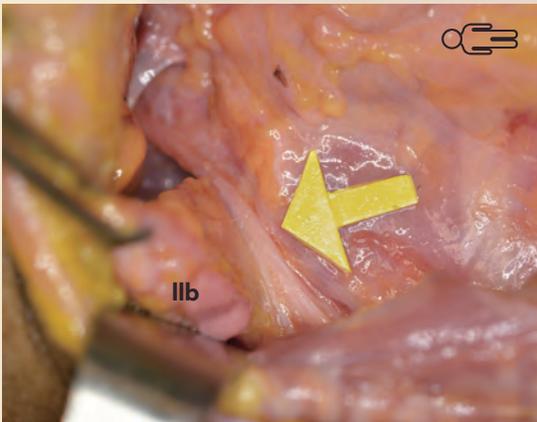


Figure 12

Accessory nerve (yellow arrow) and Level IIb

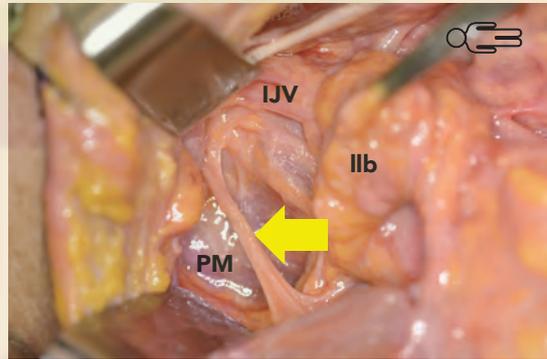


Figure 15

Completed Level IIb dissection, accessory nerve (yellow arrow), Internal jugular vein-**IJV** and Prevertebral muscle-**PM**

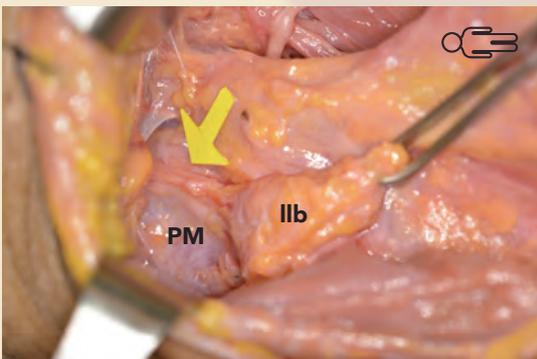


Figure 13

Level IIb dissected free from the underlying prevertebral muscle (**PM**) and accessory nerve (yellow arrow)

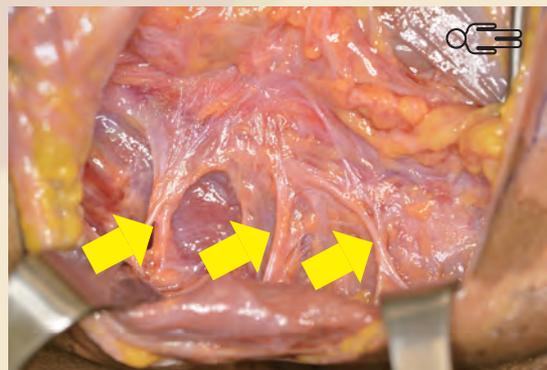


Figure 16

Cervical plexus (yellow arrows)

LEVEL IV DISSECTION

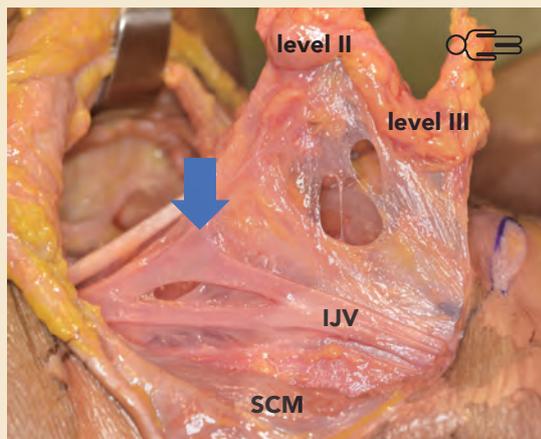


Figure 17

A bifurcated internal jugular vein (**IJV**) and its tributary (blue arrow)

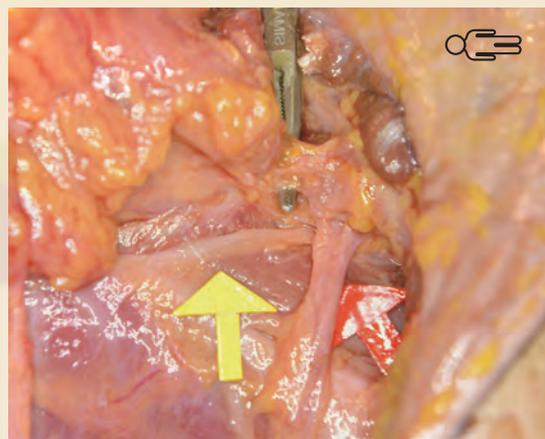


Figure 18

Level IV lymphatics (on top of the curved artery) and the relationship with the transverse cervical artery (red arrow) and phrenic nerve (yellow arrow)

of the omohyoid (in a supraomohyoid neck dissection). Identify and preserve the superior thyroid artery where it originates from the external carotid artery. **Figure 17**

STEP 5 LEVEL IV DISSECTION

With a lateral neck dissection, Level IV is dissected by applying traction to the fibrofatty tissue deep to the omohyoid muscle in a cephalad direction and to the omohyoid muscle in a caudal direction, while dissecting the fibrofatty tissue from Level IV. The transverse cervical vessels

may be encountered and its ascending branches need to be ligated. A finger may also be used to establish a dissection plane between the fat of Level IV and the brachial plexus and phrenic nerve. Be vigilant for the thoracic duct (left neck) or right lymphatic duct (right neck) or their tributaries which may unknowingly be transected resulting in a chylous leak.

Figure 18

The final step is to strip the neck dissection specimen off the infra-hyoid strap muscles. Remember to take care not to injure the hypoglossal nerve and pharyngeal veins superiorly.

KEY POINTS

1. A horizontal incision from the anterior border of the SCM to the midline of the neck just below the level of the hyoid bone is made.
2. Level Ia dissection clears tissue between the anterior bellies of both digastrics and off the mylohyoid muscle.
3. Incising the submandibular capsule horizontally over its midpoint and dissecting the gland in a subcapsular plane avoids injuring the marginal mandibular nerve which is not routinely identified.
4. If the facial artery and vein are identified with a fine haemostat at the mandibular notch, the marginal nerve will be found crossing superficial to the vein.
5. Fibres that travel from the lingual nerve to the submandibular ganglion are divided under direct vision so that the lingual nerve is not injured.
6. The submandibular duct is divided after identifying both the lingual (superficial to its plane) and hypoglossal (deep to its plane) nerves.
7. Identify the accessory nerve from its position adjacent to the IJV superiorly deep to the posterior belly of digastric to its entry into the SCM.
8. Dissect all fibrofatty tissue from the posterior border of the SCM in an anterior direction preserving the branches of the cervical plexus, vagus nerve, carotid artery and off the IJV.
9. Identify and preserve the superior thyroid artery where it originates from the external carotid artery, this is the medial limit of dissection.
10. Establish a dissection plane between the fat of Level IV, the brachial plexus and phrenic nerve, and be vigilant for the thoracic duct.