THYROIDECTOMY

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**STEP 1. EXPOSING THE THYROID GLAND**

The collar incision Figure 1 (curvilinear skin crease incision) is made at 1.5-2 finger breadths above the clavicular heads (when the neck is extended)

A subplatysmal flap is elevated up to the thyroid notch superiorly, to the sternal notch inferiorly and SCM laterally. Figure 2 Note that the platysma is absent in the midline of the neck and is more readily identified at the lateral part of the incision. Alternatively, defining the subplatysmal plane can be aided by finding the anterior jugular veins which are located immediately beneath that plane.

Identify the midline raphe between the sternohyoid muscles. Figure 3 This raphe is divided from the thyroid notch superiorly to sternal notch inferiorly. The sternohyoid muscle is retracted laterally to expose the sternothyroid muscle.

Identify the medial edge of the sternothyroid (ST) muscle which lies deeper and lateral to the medial edge of sternohyoid (SH) muscle. Figure 4

Dissect the sternothyroid muscle off the thyroid gland surface from upper pole to lower pole, keeping the dissection plane close to the muscle. Figure 5 The middle thyroid vein (of which there can be several or be absent), if encountered is ligated and divided

**STEP 2. DISSECTION AND RELEASE OF THYROID UPPER POLE**

The medial 1 cm of the sternothyroid muscle insertion is coagulated and divided to facilitate the upper pole exposure. Figure 6

Using Babcock forceps (Kocher forceps are quite traumatic and may tear the thyroid parenchyma causing bothersome bleeding),
the upper pole of the thyroid is firmly held and pulled inferiorly and laterally. This maneuver exposes the avascular space between the upper pole of the thyroid and the cricothyroid muscle (the space of Reeve). Figure 7

Gentle dissection into this space using the blunt tip of closed Metzenbaum scissors can facilitate exposure of the external laryngeal nerve in the majority of patients. Figures 8, 9

The superior pedicle is ligated below the external laryngeal nerve. Figures 10, 11

**STEP 3. DISSECTION OF TRACHEO-ÖESOPHAGEAL REGION**

After releasing the upper pole, the whole thyroid lobe is rotated medially by separating the remaining alveolar tissue between the gland and the sternothyroid muscle. This step exposes the tracheo-öesophageal region. Figure 12

Capsular dissection (i.e. dissection close to the true thyroid capsule) releases the lower thyroid pole. Attention is drawn to the presence of the inferior parathyroid gland which if seen, should be preserved and dissected off the thyroid gland. The inferior parathyroid glands are normally located between the lower pole of the thyroid and the isthmus, most commonly on the anterior or the posterolateral surface of the lower pole of the thyroid, or located in the lower neck in proximity to the thymus. Sometimes it is not easy to identify the inferior parathyroid gland. Figures 13, 14
Figure 3
Identify midline raphe

Figure 4
Identify the medial edge of the sternothyroid (ST) and sternohyoid (SH) muscles

Figure 5
Dissect the thyroid gland off the sternothyroid muscle

Figure 6
Divide the medial 1 cm of sternothyroid muscle insertion. SH – sternohyoid muscle

Figure 7
Space of Reeve (SOR) exposed with the upper pole of thyroid pulled inferiorly and laterally
After the lower pole is released, an attempt is made to identify the recurrent laryngeal nerve (RLN) lying within the tracheo-oesophageal groove (right side would be more lateral). The RLN is located by carefully dissecting/teasing apart the tissues in Simon’s triangle which is formed by the common carotid artery laterally, the oesophagus medially, and the inferior thyroid artery superiorly. After identification of the recurrent laryngeal nerve, capsular dissection is continued cranially keeping sight of the recurrent laryngeal nerve at all times. The branches of the inferior thyroid artery are divided close to the capsule so that the blood supply to the parathyroid glands is preserved. The superior parathyroid gland is commonly surrounded by a fat pad. This gland is normally located at the level of the upper two-thirds of the thyroid, in a posterior position and is closely related to the Tubercle of Zuckerkandl, about 1 cm above the crossing point of the recurrent laryngeal nerve and inferior thyroid artery. The parathyroid gland has a characteristic orange or rich yellow colour. The gland should be preserved with its blood supply from the inferior thyroid artery by peeling the gland off the thyroid capsule.

Figures 15, 16

After identification of the recurrent laryngeal nerve, capsular dissection is continued cranially keeping sight of the recurrent laryngeal nerve at all times. The branches of the inferior thyroid artery are divided close to the capsule so that the blood supply to the parathyroid glands is preserved. The superior parathyroid gland is commonly surrounded by a fat pad. This gland is normally located at the level of the upper two-thirds of the thyroid, in a posterior position and is closely related to the Tubercle of Zuckerkandl, about 1 cm above the crossing point of the recurrent laryngeal nerve and inferior thyroid artery. The parathyroid gland has a characteristic orange or rich yellow colour. The gland should be preserved with its blood supply from the inferior thyroid artery by peeling the gland off the thyroid capsule. Figures 17, 18

The recurrent laryngeal nerve is traced cranially until it enters into the larynx around 0.5 cm caudal to the inferior cornu of the thyroid cartilage. Berry’s ligament attaches the thyroid gland to the cricoids and first 2 tracheal rings. The ligament can be carefully divided while paying attention to the RLN at its entry point into the larynx. Figures 19, 20

After the division of Berry’s ligament, the thyroid lobe is dissected off the trachea. The isthmus is then ligasure coagulated and divided (or clamped, divided and oversewn with 3-0 vicryl stitches).
Figure 10
The superior pedicle (red arrow) is ligated below the external laryngeal nerve (yellow arrow)

Figure 11
External laryngeal nerve (yellow arrow)

Figure 12
Exposure of the tracheo-oesophageal region

Figure 13
Dissection of inferior parathyroid gland (yellow arrow)

Figure 14
Superior parathyroid gland (yellow arrow)
Inferior thyroid artery (red arrow)

Figure 15
Recurrent laryngeal nerve
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Repeat the same procedure on the other side without dividing the isthmus. The prelaryngeal area should be dissected and examined for the presence of a pyramidal lobe to ensure complete excision of thyroid tissue.

Figure 16
Recurrent laryngeal nerve (yellow arrow)
Oesophagus (blue arrow)
Figure 17
Recurrent laryngeal nerve (yellow arrow) and Superior parathyroid gland (red arrow)

Figure 18
Recurrent laryngeal nerve (yellow arrow) and Superior parathyroid gland (red arrow)
Oesophagus (blue arrow)

Figure 19
Berry’s Ligament (blue arrow)

Figure 20
Berry’s ligament (blue arrow), Recurrent laryngeal nerve (yellow arrow)
KEY POINTS

1. The skin flap is raised in the subplatysmal plane. The platysma is more readily identified at the lateral part of the incision.

2. Inadequate separation of the strap muscles at the median raphe limits lateral retraction and exposure.

3. Limited separation of the sternothyroid muscle from its medial insertion on the thyroid cartilage improves the exposure of the upper pole of the thyroid gland, aiding identification of the external laryngeal branch of the superior laryngeal nerve.

4. When approaching a very big goiter, the overlying strap muscles can be transected horizontally to improve the surgical exposure.

5. Freeing the upper pole of the thyroid gland early in the surgery improves the mobility of the thyroid lobe. By medially rotating the lobe out of the thyroid bed, the tracheo-oesophageal region is opened facilitating dissection and identification of the recurrent laryngeal nerve.

6. Dissection is kept close to the thyroid capsule. This minimizes the chance of injury to both the recurrent laryngeal nerve (before its identification) and the parathyroid glands.

7. Routine identification of the recurrent laryngeal nerve has been shown to reduce the chance of injury.

8. Atraumatic forceps should be used to hold the thyroid tissue during dissection.

9. The Zuckerkandl lobe can be quite big in some patients giving the erroneous impression that the recurrent laryngeal nerve penetrates the thyroid gland.

10. For total thyroidectomy, it is prudent to check for the presence of a pyramidal lobe which, if present, should also be excised.