A Face Lift Approach for Sentinel Node Biopsy in Head and Neck Melanoma Patients

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Background: Management of head and neck melanoma has changed dramatically with the use of sentinel node biopsy for staging. Nodal dissection may now be delayed or deferred based on the results of the sentinel node biopsy. The authors suggest using a face lift incision to access the nodal basins for sentinel node biopsy in head and neck melanoma.

Methods: A face lift incision was used successfully for sentinel node biopsy in 21 patients. The diagnosis of melanoma, histologic subtype, and depth of penetration were established by biopsy with permanent sections. All patients underwent lymphoscintigraphy on the morning of their surgery. If the scan showed multiple nodes at various levels of the neck or parotid, the patient was selected for a face lift incision for biopsy.

Results: The study comprised 14 men and seven women between the ages of 26 and 82 years (mean age, 55 years). The sites of melanoma included the temple in six patients, cheek in five, neck in four, and ear and scalp in two patients each. The average Clark's level and Breslow depth were 3.67 and 1.76 mm, respectively. The average number of basins involved was 2.14; the average number of nodes was 3.33, with an average of 1.56 nodes per basin. Follow-up ranged from 2 to 53 months (average, 26 months). Only two patients had sentinel nodes that were positive for metastatic melanoma. One complication, a transient paresis of the right marginal mandibular nerve, was observed.

Conclusions: Using a face lift incision for sentinel node biopsy in head and neck melanoma is a safe, reliable technique. It provides excellent access to multiple nodal basins, well-concealed incisions, wide exposure for delayed therapeutic nodal dissection, and local and regional flap options for reconstructing the excision site. (*Plast. Reconstr. Surg.* 120: 1533, 2007.)

The management of cutaneous head and neck melanoma is a challenge. The combination of resecting wide margins in aesthetically sensitive areas and complex reconstruction creates a unique situation that is often best addressed with plastic surgery principles. In the United States, the incidence of cutaneous melanoma is increasing at a dramatic rate of 5 percent per year. To place this problem in perspective, comparing the years 1950 and 2000, the incidence of cutaneous melanoma has increased 619 percent and the annual mortality from melanoma has increased 165 percent. In 2004, approximately 55,000 Americans were diagnosed with melanoma and 7900 died as a result of the disease.[1]

The use of sentinel node biopsy represents the most significant advancement in the management of melanoma. After the histologic diagnosis of cutaneous melanoma, pathologic staging of the primary tumor determines the prognosis and options regarding further surgery or adjuvant therapy. Nodal involvement has emerged as the most important predictor of recurrence and survival. Currently, sentinel lymph node biopsy is favored over elective lymph node dissection for staging. The use of this technique has decreased the higher incidence of postoperative complications associated with elective node dissections.[2]

Approximately 15 to 20 percent of cutaneous melanomas occur in the head and neck.[3] These melanomas offer a particular challenge because the lymphatic drainage patterns of the head and neck are multiple and extremely variable.[4,5] This

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situation is further complicated by the fact that vital structures including cranial nerves run throughout the lymphatic basins. Preoperative lymphoscintigraphy is essential in head and neck melanoma to map out the specific drainage pattern and identify all of the nodal basins involved before performing a sentinel node biopsy.[2]

PATIENTS AND MATERIALS

One hundred twenty-eight patients with melanoma were evaluated by the Department of Plastic Surgery at Georgetown University Medical Center between July of 2000 and February of 2005. Of these patients, 43 were diagnosed with head and neck melanoma. The diagnosis of melanoma, histologic subtype, and depth of penetration were already established by biopsy with permanent sections. Patient selection was based on the results of preoperative lymphoscintigraphy. All patients underwent lymphoscintigraphy on the morning of their surgery. If the lymphoscintigraphic scan showed multiple nodes at various levels of the neck or parotid nodal involvement, the patient was deemed to be a candidate for a face lift incision for sentinel node biopsy (Fig. 1).

Lymphoscintigraphy

On the morning of surgery, technetium-99m, which has a half-life of approximately 6 hours, was injected around the primary melanoma site at four to six circumferential locations for a total volume of 0.05 to 0.1 ml. Anteroposterior and lateral radiographs were obtained at 1 minute, 10 minutes, and 2 hours after injection to map the location of the nodal basins involved. Sentinel nodes are defined as any nodes that receive afferent lymphatic drainage from the primary site. The skin overlying the involved nodal basin or basins is then marked with indelible ink for intraoperative identification.

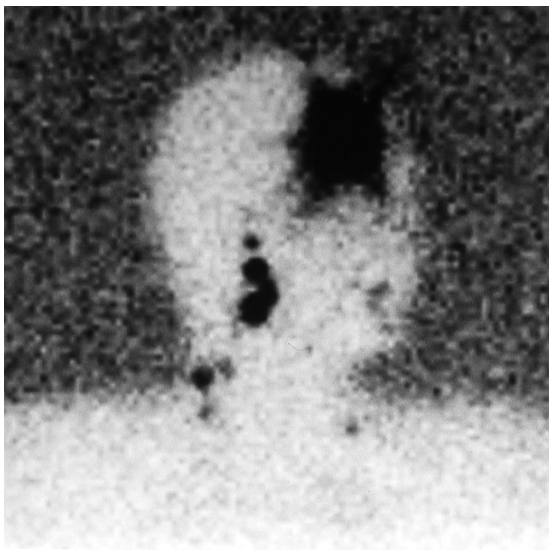

Fig. 1. Lymphoscintigraphy demonstrates drainage to multiple nodal basins at various levels of the right neck.

Isosulfan Blue Dye

Immediately after the induction of general anesthesia or conscious sedation, 0.5 to 1.0 cc of isosulfan blue dye (Lymphazurin; Zenith Parenterals, Rosemont, Ill., or Hirsh Industries, Richmond, Va.) was injected intradermally around the primary melanoma site. The patient was then prepared and draped for surgery, allowing the necessary 15 to 20 minutes for the injected blue dye to travel through the afferent lymph vessels and stain the first draining lymph nodes. The sentinel node biopsy was performed before the excision of the primary melanoma site to avoid an excessive accumulation of blue dye in the lymphatic basin that might make the identification of the sentinel node more difficult. This technique differs from that of other surgeons who prefer to remove the primary tumor first to decrease background radiation caused by the primary tumor injection site.

Face Lift Incision

The patient is marked with their head turned approximately 60 degrees to the opposite side to expose the pretragal area. A pretragal face lift incision is marked along the ear from the top of the helix around the lobule and up the postauricular crease. An incision is made along the markings and an anterior flap is raised with the plane of dissection deep to the superficial musculoaponeurotic system (SMAS) and superficial to the parotid fascia. This plane of dissection is deeper than the subcutaneous face lift plane but necessary to access the parotid and supraomohyoid nodes and provides a better vascularized plane for subsequent flap closure.

If the parotid is involved, the plane is extended medially until the position of the intraparotid node is identified by the gamma probe. Once the position is confirmed, the parotid fascia is incised horizontally parallel to the path of the facial nerve. Parallel blunt dissection is then used to expose the blue node, which is then excised (Fig. 2).

When supraomohyoid nodes are involved, the original face lift incision is continued around the lobule and up the postauricular crease and down the posterior hairline. The dissection is extended

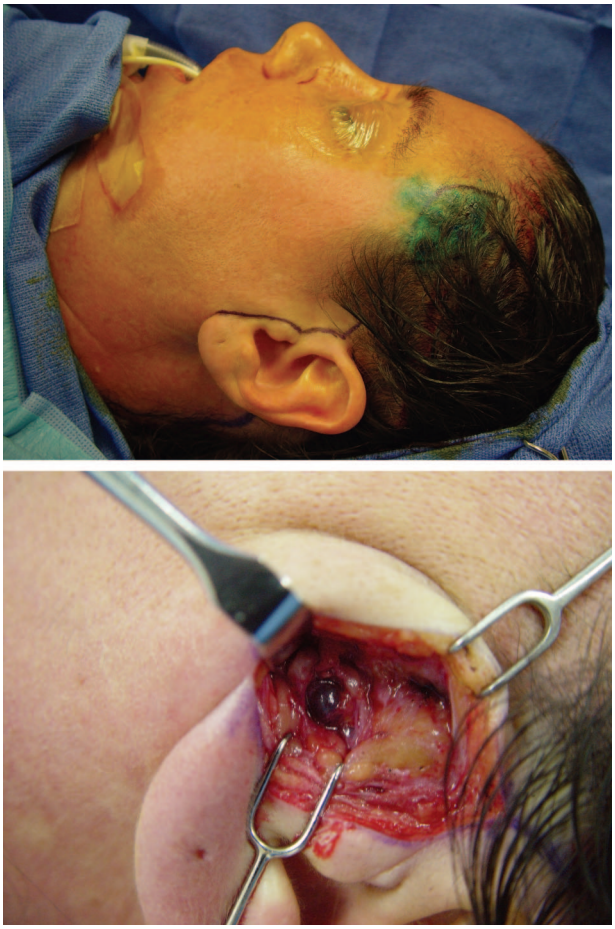

Fig. 2. (*Above*) A pretragal face lift incision is marked along the ear from the superior aspect of the helix, around the lobule, and up the postauricular crease. (*Below*) Blunt dissection parallel to the direction of the facial nerve is performed to expose and excise the blue-stained sentinel node.

inferiorly in the same plane as previously described. The platysma is reflected anteriorly and the sternocleidomastoid is reflected posteriorly to expose the lymphatic basins of the supraomohyoid nodes.

If nodal involvement extends beyond the supraomohyoid nodes into levels IV and V, the same incision can be extended down as far as the clavicle. This incision can be incorporated into a cervicofacial flap used for closure of the primary melanoma site. An additional 1- to 2-cm horizontal incision may be required to expose the inferior level IV nodes and level V nodes. In this situation, the horizontal incision is positioned to function as a "back-cut" for the cervicofacial flap. The cervicofacial flap is raised deep to the platysma and the SMAS, maximizing the vascular perforators (Fig. 3).

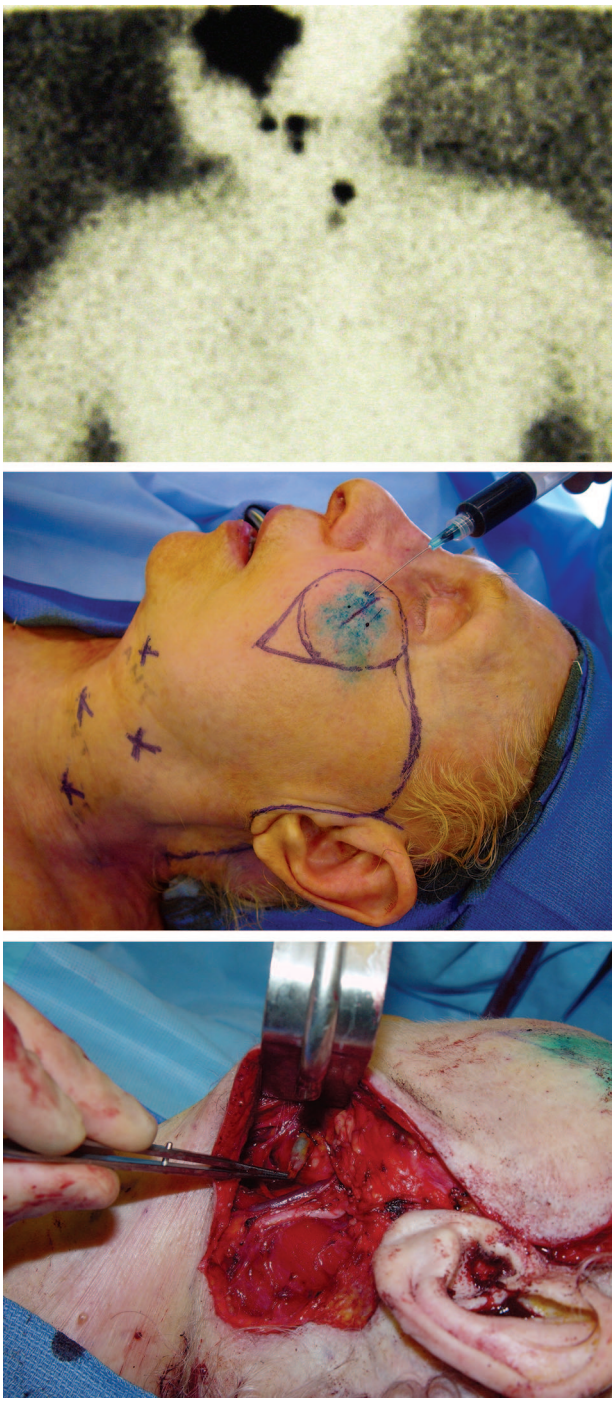

Fig. 3. (*Above*) Lymphoscintigraphy demonstrates drainage to multiple nodal basins including levels IV and V. (*Center*) The patient is marked for excision of melanoma following sentinel node biopsy. Isosulfan blue is injected at the melanoma site and the markings extend inferiorly to allow for exposure of level IV and V nodal basins. (*Below*) The extension of the face lift incision down the posterior hairline allows for adequate surgical access to nodal basins at levels IV and V. This incision is easily incorporated into a cervicofacial flap used for closure of the primary melanoma site.

Table 1. Patient and Melanoma Characteristics

Patient	Age (yr)	Sex	Location	Clark's Level	Breslow (mm)	Type	No. of Basins	No. of Nodes	Follow-Up (mo)
1	70	F	Right cheek	4	1.3	SS	3	7	21
2	57	F	Right ear	4	0.94	SS	2	2	12
3	31	M	Left temple	4	1.4	SS	2	2	25
4	47	F	Right medial canthus	2	0.31	SS	4	3	26
5	57	M	Left cheek	4	1.9	SS	2	2	37
6	44	M	Right temple	4	1.0	SS	2	3	43
7	34	F	Left cheek	4	2.2	N	2	2	31
8	41	M	Right ear	4	3.0	N	2	6	50
9	38	F	Right neck	2	0.6	SS	2	8	31
10	82	M	Posterior neck	2	3.0	SS	1	2	53
11	40	M	Posterior neck	3	0.9	SS	2	2	52
12	69	M	Scalp	4	3.5	N	2	2	24
13	62	M	Right neck	4	1.1	SS	1	1	26
14	76	M	Scalp	4	1.6	SS	4	5	47
15	56	M	Right forehead	4	1.1	SS	2	5	10
16	26	F	Right temple	5	2.5	N	2	4	44
17	65	M	Left cheek	4	2.0	N	2	2	7
18	56	M	Left temple	4	3.0	N	1	1	3
19	64	M	Left temple	4	1.5	SS	3	4	4
20	79	F	Right cheek	3	0.42	SS	2	3	2
21	55	M	Right temple	4	3.6	SS	2	4	3
Mean	55			3.67	1.76		2.14	3.33	26

M, male; F, female; SS, superficial spreading; N, nodular.

Intraoperative Identification of Sentinel Nodes

After the required skin flaps were raised, all basins identified by preoperative lymphoscintigraphy were explored using the handheld gamma probe (C-Track; Care Wise Medical Products, Morgan Hill, Calif.). All blue nodes identified were measured for radioactivity and removed as sentinel nodes. Ex vivo sentinel node to residual nodal basin radioactivity percentages were calculated. Additional "hot" nodes were removed until the percentage of the residual basin to the hottest ex vivo sentinel node was less than or equal to 10 percent.[6] If a node was found to be positive for metastatic melanoma then, at the time of the lymphatic dissection, the investing fascia of the nodal basin was removed. This technique was performed to adhere to sound oncologic principles. The face lift incision is not located immediately over the area of the nodal biopsy; therefore, it does not need to be incorporated in the excision and nodal dissection.

RESULTS

Patient and melanoma characteristics are listed in Table 1. The study comprised 14 men and seven women between the ages of 26 and 82 years (mean, 55 years). The most common site of melanoma was the temple region (six patients), followed by the cheek (five patients), neck (four patients), and ear (two patients), and scalp (two patients). Only two histologic types of melanoma were identified (superficial spreading and nodular), with the average Clark's level being 3.67 and the average Breslow depth being 1.76 mm. The average number of basins involved was 2.14, and the average number of nodes was 3.33, with an average of 1.56 nodes per basin. Only two of the 21 patients had sentinel nodes that were positive for metastatic melanoma. Both patients had pos-

Fig. 4. A full-thickness skin graft will often result in a suboptimal color match when used for head and neck reconstruction.

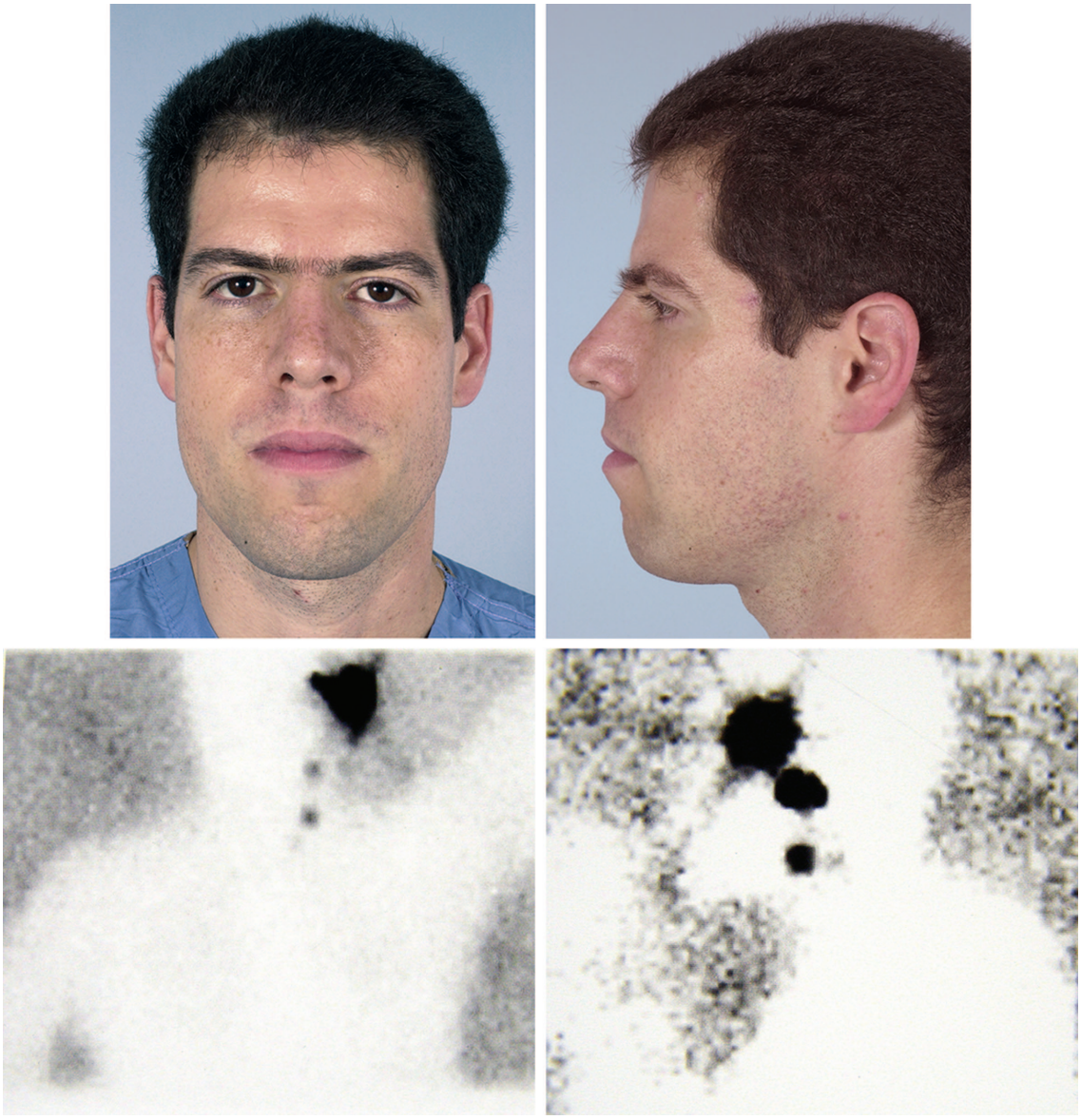

Fig. 5. (*Above*) Preoperative photographs of a 31-year-old man with a superficial spreading melanoma located on his left temple. Biopsy revealed a Breslow depth of 1.4 mm. (*Below*) Lymphoscintigraphy demonstrates drainage to the parotid nodes and level II nodal basin.

itive nodes that were located in the superficial lobe of the parotid gland. They subsequently underwent superficial parotidectomy with supraomohyoid neck dissections. Fortunately, their metastatic disease was limited to the sentinel nodes. The follow-up ranged from 2 to 53 months, with an average of 26 months.

There was only one complication in the series. One patient sustained a transient paresis to the right marginal mandibular nerve. She was treated conservatively with observation and her symptoms resolved in 2 months.

DISCUSSION

The reliability and utility of sentinel node biopsy in head and neck melanoma patients have been well established.[7] However, the approach to the lymphatic basins in sentinel node biopsy is of strategic importance because the melanoma defect is often large and in close proximity to the sentinel node. Traditionally, sentinel node biopsy in head and neck melanoma has been performed in one of two ways. The first consists of multiple small incisions over the lymphatic basins of the neck, and the latter requires a long extended neck incision across levels II

Fig. 6. A face lift incision is used to access both the parotid nodes and the level II nodes. After sentinel node biopsy, the melanoma site is excised with 2-cm margins and the defect is reconstructed with a combination of a cervicofacial flap and a scalp flap. Note that a pretragal incision was used in this particular case.

through IV. Either option is adequate for accessing the lymphatic basins; however, when the multiple incision approach is applied, these incisions cannot be reused should a therapeutic node dissection be required in the event of positive sentinel nodes. In addition, the multiple incision approach and the extended neck incision both compromise local and regional flap reconstruction, often necessitating a skin graft for reconstruction of the melanoma defect. This results in a suboptimal skin color match (Fig. 4).

Ideally, facial and temporal defects are best reconstructed with like tissue from the supraclavicular region. Melanoma defects can be quite large, given the 1- to 2-cm margins often required, resulting in a defect of 2 to 6 cm in diameter. These defects can usually be reconstructed either entirely with a cervicofacial rotation flap or as a component of both a cervicofacial rotation flap and a forehead rotation flap or a scalp flap (Figs. 5 through 7).

Using a face lift incision for accessing the parotid gland in melanoma surgery is not a new concept.[8] However, this approach not only is useful to access the parotid gland but is also the most strategic way to approach the multiple lymphatic basins of the neck. Head and neck melanoma lymphoscintigraphy rarely shows a single isolated sentinel node. It this situation, the approach to the sentinel node biopsy is not complicated. More often, multiple lymphatic basins are involved at various levels of the neck and require careful plan-

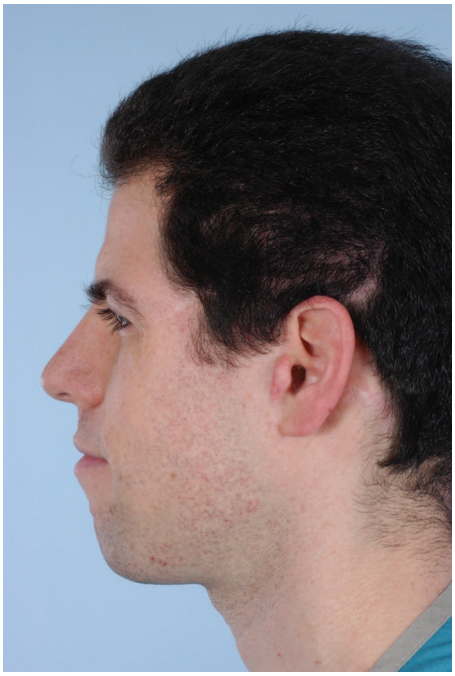

Fig. 7. Postoperative results at 6 months show an aesthetic reconstruction facilitated by strategic sentinel node access.

ning to remove all of the sentinel nodes without compromising the reconstructive options for the melanoma excision site.

The face lift approach has four main advantages over the multiple incision and extended neck incision approaches. First, it provides excellent access to the multiple lymphatic basins. Parotid nodes and levels II through IV and postauricular nodes can easily be accessed by means of this approach directly or with a small postauricular extension of the incision. Second, the final line of closure is located in an aesthetically favored place. Third, if a sentinel node is found to be positive for metastatic disease, the same incision can be used for either parotidectomy or elective nodal dissection. Lastly, and most significantly, the face lift incision does not violate the local tissues of the neck, preserving the cervicofacial flap for reconstruction.

CONCLUSIONS

Lymphoscintigraphy for sentinel node biopsies in head and neck melanoma frequently demonstrates involvement of multiple lymphatic basins at various levels of the neck. In this situation, the authors suggest using a face lift incision to access the nodal basins for sentinel node biopsy. This technique provides excellent access to the nodal basins, conceals the incisions in an aesthetically favorable location, can provide wide exposure should a therapeutic nodal dissection be required, and preserves flap options for reconstruction. The approach is reliable and can be performed with a high degree of safety.

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DISCLOSURE

The authors have no financial interest, commercial association, or conflicts of interest in any of the products, materials, or techniques mentioned in this article.

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