

Challenges of Resection and Reconstruction of a Hemorrhagic Darier and Ferrand Dermatofibrosarcoma Protuberans of the Head in Resource-Limited Setting: A Case Report

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ABSTRACT

Dermatofibrosarcoma protuberans (DFSP) of Darier and Ferrand located on the head is frequently hemorrhagic. Reconstruction following oncologic resection must carefully balance functional preservation with esthetic outcomes. A 54-year-old woman presented with a recurrent, hemorrhagic tumor on the forehead extending onto the scalp. She underwent surgery by a multidisciplinary team comprising plastic and neurosurgeons. A right anterior cervicotomy was performed. A loop was placed around the external carotid artery (ECA) for a temporary clamping when facing a massive bleeding during the resection of the tumor. Bipolar cautery, targeting ECA branches was done along with progressive running vicryl sutures on the resected margins. A wide oncologic resection of the tumor was carried out. Burring of the outer calvarial table was performed. A split-thickness skin graft was applied after a granulation achieved by a secondary intention wound healing. Residual alopecia was cosmetically concealed with a wig. Histopathological examination confirmed DFSP with negative surgical margins. At 10-year follow-up, the patient remained recurrence-free and expressed high satisfaction with the outcome. This case highlights the management of an hemorrhagic dermatofibrosarcoma protuberans of the head in a limited resource setting where plastic surgeons and neurosurgeons are available. Exposure and placing a vascular loop around the external carotid artery is encouraged. This enables temporary clamping of the artery when facing a massive bleeding. Resection must be wide and oncologically sound. Burring of the outer table of the calvarium is essential when split-thickness skin grafting is selected for defect coverage.

KEYWORDS

Scalp bone burring; Scalp reconstruction; Scalp tumor; SCARE case report; Temporary arterial clamping

Please cite this paper as:

Dje Bi Dje – Assi V, Zunon-Kipre Y, Christophe Allah K, Nasser D, Baptiste Sie-Essoh J. Challenges of Resection and Reconstruction of a Hemorrhagic Darier and Ferrand Dermatofibrosarcoma Protuberans of the Head in Resource-Limited Setting: A Case Report. *World J Plast Surg.* 2026;15(3):1-9.
doi: 10.61186/wjps.15.3.**

INTRODUCTION

Dermatofibrosarcoma protuberans (DFSP) of Darier and Ferrand is a rare, locally aggressive, and recurrent malignant cutaneous mesenchymal tumor^{1,2}. Craniofacial locations account for 10% to 15% of all DFSP cases with a predilection for the scalp, forehead, and cheek^{1,2}. In craniofacial regions, recurrence rates range from 30% to 50%². In resource-limited settings, diagnosis is frequently delayed until advanced stages³.

Given the high recurrence risk associated with DFSP of the head, treatment aims to achieve complete oncologic resection while restoring anatomical integrity with satisfactory functional and aesthetic outcomes^{1,4}. Craniofacial DFSP lesions are often large and highly hemorrhagic,^{1,3} leading to significant blood loss that is further exacerbated by the extensive margins required for oncologic excision. Beyond the need for massive perioperative blood transfusions and their associated morbidity, hemorrhage control may be effectively achieved through management of the external carotid artery (ECA)⁵. In Côte d'Ivoire, resection of craniofacial DFSP is typically performed by a multidisciplinary team involving plastic surgeons, neurosurgeons, and vascular surgeons^{3,6}. However, control or temporary clamping of the ECA has never previously been considered in the surgical management of such tumors in this setting^{3,6}. In the present case, in addition to standard local hemostatic measures,

temporary clamping of the ECA was incorporated into the preoperative planning. We report this case with emphasis on the surgical technique, particularly regarding hemorrhage control, resection-specific considerations, and the method used to reconstruct the resulting tissue defect. Written informed consent was obtained from the patient. This case report has been prepared in accordance with the SCARE 2025 criteria⁷

CASE REPORT

A 57-year-old female patient retired teacher presented to the Department of Plastic Surgery at the Teaching Hospital of Treichville in Abidjan, IVORY COAST, on May 27, 2015. She was referred by the Neurosurgery Department for a bilobed, hemorrhagic scalp mass (Figure 1). The lesion first appeared in 2008 as a painless scalp tumor. She underwent excision at that time without histopathological examination. The tumor recurred one year later, progressively increasing in size, becoming ulcerated, and causing pain and intermittent bleeding until 2015, when she sought medical care. Her history was negative for signs of intracranial hypertension. She had no relevant past medical history. Her general condition was preserved, although she exhibited severe clinical anemia. Physical examination revealed a large fronto-parietal mass covering the entire forehead and extending onto the scalp. The lesion was bilobed,



Figure 1. Bilobed tumor involving the forehead and scalp predominant on the right side



Figure 2. Patient presenting with an ulcerated, hemorrhagic tumor of the forehead and scalp

infiltrative, and covered by an ulcer with irregular, indurated borders. The tumor was firm, mobile, and bled easily on minimal contact, measuring 15×10 cm (Figure 2). No satellite lymphadenopathy was palpable. The patient was hospitalized for clinical and paraclinical investigations. Cranioencephalic computed tomography showed a well-demarcated, subcutaneous, fronto-parietal isodense round mass without bony erosion or intracranial extension. A biopsy was performed on June 24, 2015, under analgesia in the operating room, during which massive tumor hemorrhage occurred, necessitating manual compression and an emergency blood transfusion. The patient was discharged from hospital ten days later on anti-anemic therapy. Histopathological analysis, available one month and a half later, confirmed the diagnosis of DFSP of Darier-Ferrand. The indication for wide resection was made in collaboration with neurosurgeons. Preoperative workup was completed.

The tumor was predominant on the right side. Temporary right external carotid artery (ECA) clamping was planned as a preventive measure against intraoperative hemorrhage. The patient was readmitted on August 4, 2015, and surgery performed on August 11, 2015.

She was sedated, intubated, ventilated, and placed supine with slight neck flexion that could be adjusted intraoperatively. Surgical margins were marked at 5 cm from the tumor on the scalp and 3.5 cm on the forehead. Next, slow infiltration of the scalp with 2% lidocaine with epinephrine was performed. The first surgical step involved exposure of the ECA via an anterior pre-sternocleidomastoid cervicotomy



Figure 3. Intraoperative view showing the vascular loop placed around the external carotid artery, accessed via an anterior pre-sternocleidomastoid cervical incision. a wig, satisfied with the surgical outcome, 10 years postoperatively

at the level of the third to fifth cervical vertebrae. The superficial layer of the pretracheal cervical fascia was opened, the omohyoid muscle retracted, and the carotid-jugular neurovascular bundle identified. After opening the vascular sheath, the carotid bifurcation, internal jugular vein, and vagus nerve were visualized. A vascular loop was placed around the right ECA and clamped when facing a significant bleeding during tumor resection (Figure 3). Skin incision down to bone began in the right temporal region. A circumferential incision was made extending from 12 cm above posterior to the hairline, laterally above the ear, and anteriorly just above the eyebrows. Hemostasis was continuously maintained with a bipolar cautery, targeting the right ECA branches, starting with the superficial temporal artery and posteriorly the extracranial branches of the occipital and posterior auricular arteries. Running vicryl sutures were made on the resection margins were progressively. Clamping of the ACE was not performed. Once circumferential dissection was complete, the tumor, including overlying skin, subcutaneous tissue, and associated muscles, was meticulously elevated from the calvarium using a periosteal elevator and hemostatic electrocautery (Figure 4). The outer table of the calvarium was left exposed, with no evidence of bony infiltration (Figure 5). Periosteal stripping was then performed by meticulous burring of the outer table, with hemostasis achieved using bone wax. Special attention was paid to burring at the scalp suture lines. Intraoperative blood loss remained minimal, and no other complications occurred. The vascular loop around the right ECA was removed,

and the cervical incision was closed. The resulting tissue defect measured 20 × 17 cm.

It was temporarily covered with petrolatum-impregnated gauze and secured with a circumferential dressing. The postoperative course was uncomplicated, and no blood transfusions were required during or after the resection. While awaiting final histopathology results, vaseline fat dressing was applied every two days. Antibiotics were prescribed. The patient was discharged from hospital on September 11, 2015. Dressing was done on an outpatient basis. Histopathology one-month post-resection confirmed DFSP with negative surgical margins (Figure 6). Reconstructive planning initially included scalp flaps with potential secondary tissue expansion. However, due to the patient's financial constraints, the defect was managed with

honey-based healing. A granulation tissue was obtained after 60 days. December 9, 2015, the granulating was covered with a split-thickness skin graft harvested from the inner thigh (Figure 7). The patient was discharged from hospital on December 21, 2015, with near-complete healing. She was lost to follow-up until June 2016, when she presented with delayed scalp healing. She was readmitted on June 3, 2016, and a second split-thickness skin graft, harvested from the same donor site, was performed on June 5. She was discharged on June 10 after the first postoperative dressing confirmed 100% graft take. Outpatient follow-up continued until complete healing of both scalp and donor site by the end of June 2016. At a follow-up visit in 2018, clinical examination revealed no signs of local recurrence. Hypopigmentation (vitiligo) of the scalp was noted,

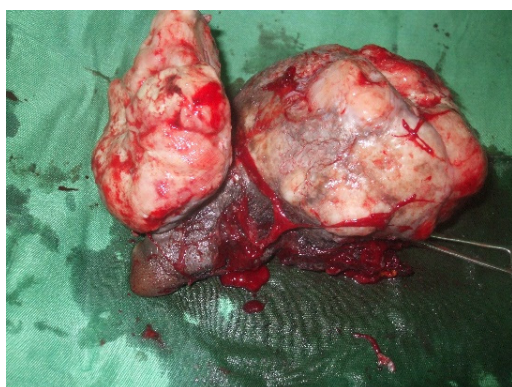


Figure 4. Surgical specimen of the excised bilobed tumor



Figure 5. Intraoperative view of the residual tissue defect following tumor resection

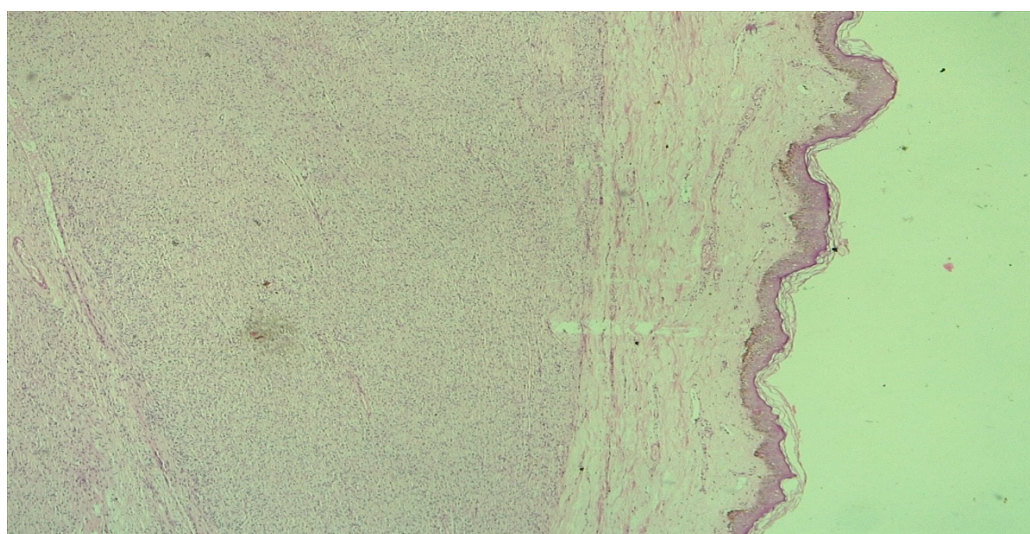


Figure 6. (a) Histological section confirming the diagnosis of Darier and Ferrand dermatofibrosarcoma protuberans. At low magnification, histological examination shows a dermal lesion separated from the epidermis by a thick band of healthy dermis

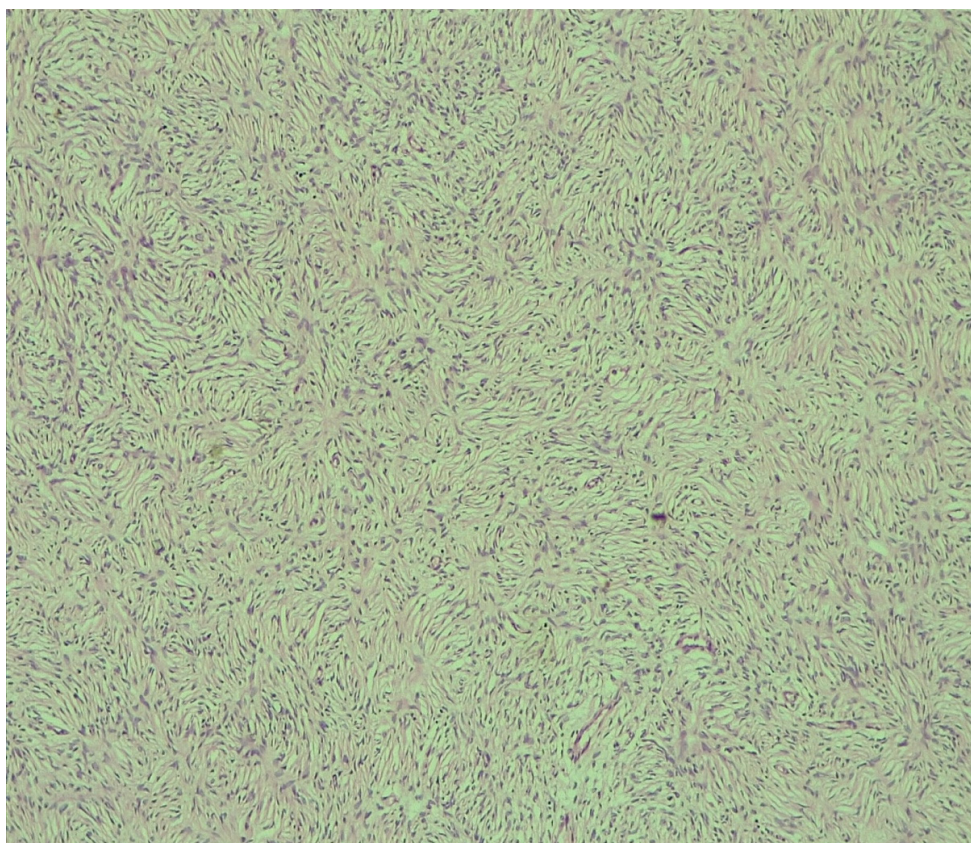


Figure 6. (b) Histological section confirming the diagnosis of Darier and Ferrand dermatofibrosarcoma protuberans. At medium and high magnification, it appears as a connective tissue tumor proliferation forming short bundles arranged in a swirling or storiform pattern. The tumor cells are fibroblastic in type with slight cyto-nuclear atypia



Figure 7. Split-thickness skin graft applied to the defect three months after honey-assisted directed healing



Figure 8. Patient at 10-year follow-up, showing dyschromia of the grafted area



Figure 9. Patient wearing a wig, satisfied with the surgical outcome, 10 years postoperatively

which the patient concealed with a wig for cosmetic reasons. The patient was seen again in March 2024 and most recently in October 2025 (10 years after initial resection) with no evidence of recurrence. She reported no functional impairment, expressed high satisfaction with both aesthetic and surgical outcomes, and continued to wear a wig when leaving home to avoid questions about her residual alopecia (Figures 8 and 9). The chronological sequence of events is summarized in Table 1.

DISCUSSION

This case illustrates the management of a hemorrhagic dermatofibrosarcoma protuberans (DFSP) of Darier and Ferrand involving the scalp and forehead, diagnosed at an advanced stage in a tropical, resource-limited setting. A wide resection

followed by reconstruction with a split-thickness skin graft was performed. At 10-year follow-up, there was no evidence of recurrence, and the patient expressed satisfaction with the functional and aesthetic outcome despite residual alopecia.

During this multidisciplinary procedure, carried out jointly by plastic and neurosurgeons, we elected to expose the external carotid artery (ECA) for temporary clamping. This technique was performed by El-Fol⁸ to establish a relatively bloodless surgical field during tumor excision. Patients undergoing temporary ECA clamping experience approximately one-quarter of the blood loss observed in those without such vascular control⁸. Access to cervical vessels for hemostatic control in craniofacial surgery has been previously documented⁵. Some authors have even proposed irreversible ligation of the ECA⁹. In our case, we opted for temporary clamping of

Table 1. Timeline of clinical events

Date	Event
2008	Onset of symptoms. Surgical excision. No histological investigation or surgical documentation.
27/05/2015	Consultation in plastic surgery. Hospitalization for clinical and paraclinical investigations (CT scan).
24/06/2015	Operating room biopsy: hemorrhagic incident – blood transfusion.
05/07/2015	Discharge on day 10 after biopsy. Histological result: DFSP (Dermatofibrosarcoma Protuberans).
04/08/2015	Hospitalization. Joint meeting with neurosurgeon: planning for temporary clamping of the external carotid artery (ECA).
11/08/2015	Surgical procedure: temporary ECA clamping and wide tumor excision. No intraoperative incident. Surgical specimen sent for histological examination.
11/09/2015	Discharge on day 30 of hospitalization. Simple postoperative course. Directed wound healing with dressing changes every two days. Histological result confirmed the diagnosis of DFSP.
08/12/2015	Hospital admission for full-thickness skin graft (FTSG).
09/12/2015	Procedure: full-thickness skin graft (FTSG).
21/12/2015	Discharge – simple postoperative course – graft successfully taken. Follow-up as an outpatient.
15/01/2016	Patient did not attend follow-up appointment.
May 2016	Patient seen in consultation for delayed healing of the scalp.
03/06/2016	Hospitalization for additional FTSG on the scalp.
05/06/2016	Procedure: full-thickness skin graft (FTSG).
10/06/2016	Discharge after first dressing change: graft successfully taken.
September 2018	Consultation: dyschromia of the total skin graft on the scalp. The patient wears a wig. No signs of recurrence.
March 2024	Follow-up consultation: normal examination.
October 2025	Follow-up consultation: normal examination, no functional or aesthetic complaint.

the ECA. But this procedure was not performed since local hemostasis was meticulous. Bipolar cautery, targeting ECA branches was done along with progressive running vicryl sutures on the resected margins. Notably, no blood transfusion was required during or after the definitive resection, unlike during the initial biopsy, which triggered massive hemorrhage and necessitated packed red blood cell transfusion.

Oncologic resection in the craniofacial region is particularly challenging because it must achieve complete tumor removal while preserving options for functional and aesthetic reconstruction^{1,4,10}. Mohs micrographic surgery minimizes the excision of healthy tissue by allowing precise margin control¹. However, this technique requires intraoperative histopathological analysis—a resource unavailable in our setting—and significantly prolongs operative time¹. Furthermore, it is technically demanding for large or extensive lesions¹. Therefore, we performed a wide, en bloc excision in accordance with established oncologic guidelines^{1,4,10}. Therefore, we performed a

wide, en bloc excision in accordance with established oncologic guidelines^{1,4,10}. Histopathological examination confirmed negative surgical margins. Deeply, the pericranium was completely excised. Additionally, meticulous burring of the outer table was extended into the diploic space¹¹, to ensure thorough tumor clearance.

Particular attention was paid to cranial suture lines during burring, as their involvement is a known risk factor for intracranial tumor extension. The resulting tissue defect was extensive, regardless of the classification system applied^{12,13}. Reconstructive options for large scalp defects are diverse and often technically complex¹¹⁻¹³. In our practice, local flaps are feasible and align with the fundamental reconstructive principle of replacing scalp tissue with like tissue—thereby preserving hair growth potential¹³.

Given the significant size of the defect, tissue expansion followed by flap reconstruction would have been the ideal approach. It not only provides sufficient hair bearing tissue but also minimizes

donor-site alopecia. However, the prohibitive cost of tissue expanders represented a barrier for our patient in this resource-limited setting. Consequently, we opted for a more accessible alternative. A secondary intention wound healing followed by split-thickness skin grafting was performed. For large scalp defects, skin grafting is a well-established indication¹. It circumvents the need for complex, multi-stage reconstructive procedures, given the convexity of the skull, the limited mobility and the fixed nature of the scalp layers to the underlying calvarium^{1,4}. Such advanced flap techniques are often lengthy, require specialized equipment, and depend on highly trained surgical teams, resources not consistently available in our context¹. Moreover, skin grafting offers a practical advantage in oncologic follow-up. The recipient bed remains easily inspectable, facilitating early detection of potential local recurrence^{1,11}.

Burring the outer table to the diploic space provides a vascular bed for granulation tissue, favorable to skin grafting^{11,12}. Natural honey dressings promotes granulation phase and prepares a favorable wound bed for grafting¹⁴.

Our patient developed alopecia and dyschromia, common sequelae of skin grafting on the scalp. Hair play a critical role in concealing scars, enhance appearance, and mitigate psychosocial distress, especially among women⁴. Despite these outcomes, our patient expressed high satisfaction with both the surgical result and her overall recovery.

She manages her residual alopecia with a wig, a widely accepted and culturally common cosmetic solution in many African communities, even among women without hair loss.

From an oncologic standpoint, tumor recurrence following a good esthetic reconstruction is considered as a treatment failure⁴. Fortunately, our patient remains disease-free at 10 years.

This case report has limitations. Intraoperative blood loss was not quantified, and the total operative duration was not recorded. Regarding preoperative imaging, cranial computed tomography was performed, but magnetic resonance imaging remains the gold standard for evaluating calvarial tumors^{1,3}.

CONCLUSION

This case highlights the management of a hemorrhagic dermatofibrosarcoma protuberans

of the head in a limited resource setting where plastic surgeons and neurosurgeons are available. Exposure and placing a vascular loop around the external carotid artery is encouraged. This enables temporary clamping of the artery in face of a massive bleeding. Resection must be wide and oncologically sound. Burring of the outer table of the calvarium is essential when split-thickness skin grafting is selected for defect coverage. It promotes granulation tissue favorable for skin grafting.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest

FINANCIAL

None declared.

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