Cutaneous Malignancies of the Nasal Pyramid: A 36-Case Retrospective Study of Reconstructive Outcomes at the University Hospital Center of Tangier, Morocco.

ABSTRACT

Background: Cutaneous malignancies of the nasal pyramid represent a significant public health burden in sun-exposed populations. Despite their frequency, management remains challenging due to the complex three-dimensional anatomy and aesthetic importance of the nasal subunits. This study describes the epidemiological, clinicopathological, and therapeutic profiles of nasal pyramid tumors in a Moroccan cohort, with emphasis on reconstructive strategies.

Methods:A retrospective, descriptive, and analytical study was conducted over 24 months (October 2020–October 2022) at the Department of Plastic, Reconstructive and Aesthetic Surgery, Kortobi Hospital, Tangier. Thirty-six consecutive patients with histologically confirmed benign or malignant nasal pyramid tumors were included. Data were collected from medical records using a standardized extraction form and analyzed with Microsoft Excel 2019.

Results: The mean age was 68 years (range: 38–88), with male predominance (67%, sex ratio M/F = 2). Most patients (83%) were from rural areas, and 80% had significant occupational sun exposure. The mean diagnostic delay was 36 months. Basal cell carcinoma (BCC) accounted for 72% of cases and squamous cell carcinoma (SCC) for 28%. The lateral nasal wall was most frequently involved (50%). Surgical excision with 5–10 mm margins was performed in all patients. Reconstruction was immediate in 72% of cases, employing skin grafts (33%), local/regional flaps (33%), directed healing (17%), or direct closure (17%). No adjuvant radiotherapy or chemotherapy was required. At follow-up, no recurrences were observed, and aesthetic outcomes were acceptable in the majority, with flaps yielding superior results.

Conclusion: Nasal pyramid tumors in this North African cohort present with advanced disease due to diagnostic delays. Surgical excision with appropriate margins remains the cornerstone of treatment. Immediate reconstruction offers satisfactory oncological and aesthetic outcomes when tailored to defect location and size according to aesthetic subunit principles.

Keywords:nasal pyramid tumors; basal cell carcinoma; squamous cell carcinoma; nasal reconstruction; local flaps; skin grafts; Morocco; sun exposure

I. INTRODUCTION

Cutaneous malignancies represent the most common human cancers in adults, accounting for approximately 90% of all skin cancers, with incidence increasing steadily due to population aging and behavioral risk factors, particularly chronic ultraviolet (UV) exposure [1]. The nasal pyramid, as a central and prominent facial structure, is disproportionately affected due to its continuous photodamage exposure and limited natural protection [2]. Surgical management of nasal tumors presents unique challenges: the nose serves critical aesthetic, respiratory, and social functions, and

its complex three-dimensional architecture—comprising skin, cartilage, bone, and mucosal lining—demands meticulous reconstructive planning [3].

The aesthetic subunit principle, originally described by Burget and Menick, has revolutionized nasal reconstruction by emphasizing the replacement of entire subunits (dorsum, tip, alae, sidewalls, columella) rather than patching defects, thereby optimizing camouflage and contour [4]. However, in oncological settings, strict adherence to subunit principles may be compromised by the need for adequate oncological margins, particularly in advanced or infiltrative tumors [5].

In Morocco and broader North Africa, cutaneous malignancies constitute a major public health concern, characterized by delayed diagnosis, limited access to specialized care, and frequent presentation with locally advanced disease [6]. The present study aims to describe the epidemiological, anatomopathological, clinical, and therapeutic profiles of nasal pyramid tumors managed at a tertiary plastic surgery center in Tangier, and to evaluate reconstructive outcomes using various surgical techniques.

II. MATERIALS AND METHODS

1. Study Design and Setting

This was a retrospective, descriptive, and analytical study conducted at the Department of Plastic, Reconstructive, Aesthetic and Burn Surgery, Kortobi Hospital, Tangier, Morocco. The study period spanned 24 months from October 2020 to October 2022.

2. Participants

Inclusion criteria comprised all male and female patients of any age with histologically confirmed benign or malignant tumors affecting the nasal pyramid and/or adjacent border zones. Exclusion criteria included:

- tumors of other facial locations;
- vascular cutaneous tumors (hemangiomas, angiomas);
- neurocutaneous syndromes (neurofibromatosis, tuberous sclerosis);
- viral-induced lesions;
- incomplete medical records.

3. Data Collection

A standardized data extraction form was developed based on literature review to capture: epidemiological variables (age, sex, profession, phototype, risk factors); clinical data (general examination, local and regional findings, lymph node status); paraclinical investigations (histopathology, imaging); therapeutic details (surgical margins, reconstruction method, anesthesia); and evolutionary outcomes (complications, recurrence, aesthetic and functional results). Data were retrieved from archived medical records and operative reports.

4. Statistical Analysis

Data were organized in Microsoft Excel 2019 and expressed as frequencies, percentages, or means ± standard deviation where appropriate.

5. Ethical Considerations

Data collection was performed anonymously. Patient consent for photographic documentation was obtained. The study was conducted without conflicts of interest and in accordance with the Declaration of Helsinki principles.

III. RESULTS

1. Epidemiological Characteristics

Thirty-six patients were included, with a mean case volume of 18 per year. The mean age at diagnosis was 68 years (range: 38–88 years), with 50% of patients concentrated in the 60–79 year age group. A marked male predominance was observed (67%, n=24; female 33%, n=12), yielding a male-to-female sex ratio of 2:1.

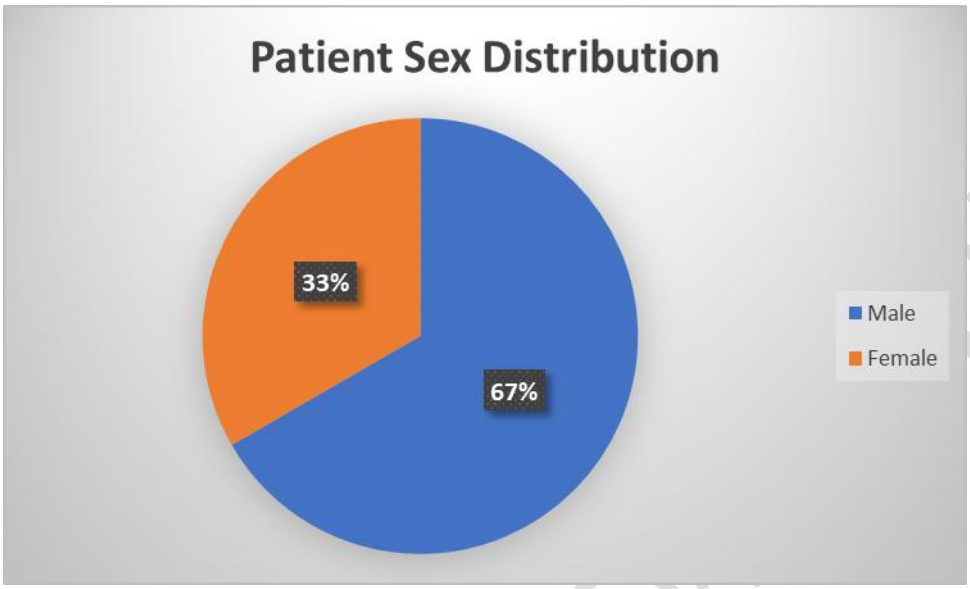

Figure 1: Patient Sex Distribution

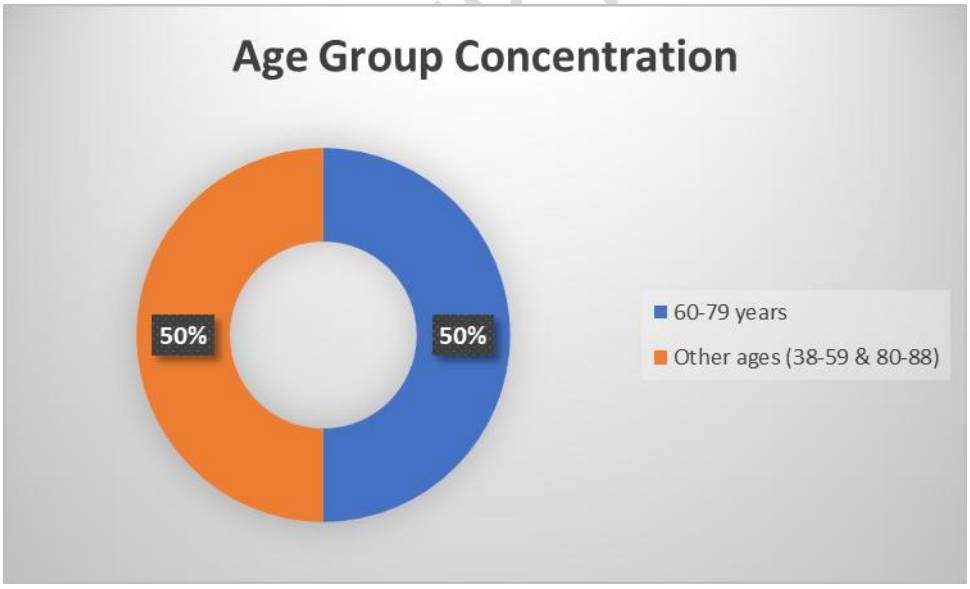

Figure 2: Age Group Concentration

The majority of patients (83%, n=30) originated from rural areas of northern Morocco, while 17% (n=6) were urban residents. Occupational distribution revealed 60% were agricultural workers, 25% were housewives (the majority having performed outdoor work), and 15% held other occupations (manual laborers, military retirees).

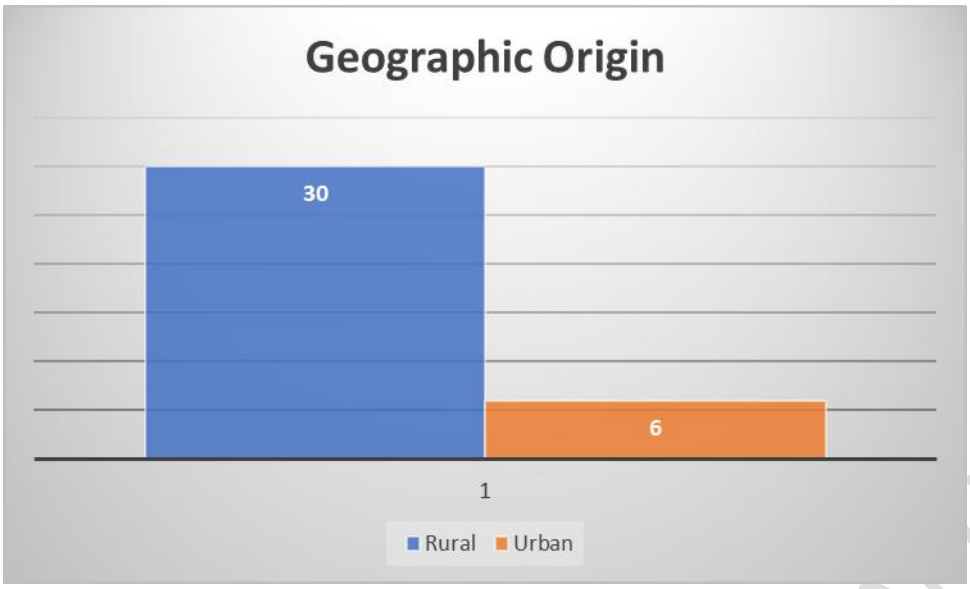

Figure 3: Geographic Origin

2. Risk Factors and Comorbidities

According to Fitzpatrick classification, phototype III predominated (56%, n=20), followed by phototype IV (33%, n=12) and phototype V (11%, n=4). All patients reported childhood and adolescent sun exposure without adequate protection; 80% had significant occupational sun exposure. Smoking was documented in 17% (n=6).

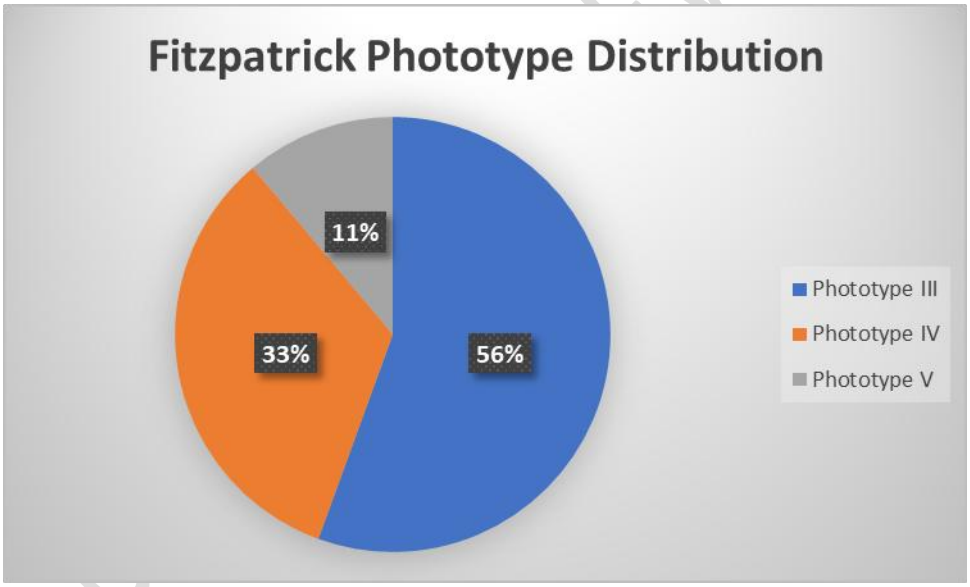

Figure 4: Phototype Distribution

Precancerous lesions were identified in 16% of patients: actinic keratosis (11%, n=4) and melanocytic nevi (5%, n=2). No cases of xerodermapigmentosum, unstable scarring, or albinism were recorded. Associated comorbidities included hypertension (33%, n=12), diabetes mellitus (22%, n=8), and one case of post-thyroidectomy status.

Table 1: Precancerous Lesions, Notable Exclusions, and Associated Comorbidities

Variable	Findings
PrecancerousLesions	Identified in 16% of patients total: • Actinic keratosis: 11% (*n*=4) • Melanocytic nevi: 5% (*n*=2)
Notable Exclusions	No cases of xerodermapigmentosum, unstable scarring, or albinism recorded
Associated Comorbidities	• Hypertension: 33% (*n*=12) • Diabetesmellitus: 22% (*n*=8) • Post-thyroidectomystatus: 1 case

3. Clinical Presentation

The mean diagnostic delay—from lesion onset to consultation—was 36 months (range: 12–60 months). Presenting symptoms included: chronic nodular lesions (56%); inflammatory signs (28%); painful lesions (28%); local superinfection with purulent discharge (22%); bleeding on contact (11%); and necrosis (11%). Notably, several patients reported prior use of traditional herbal remedies or self-mutilation, contributing to diagnostic delay and local aggravation.

Figure 5: Ulcerobudding appearance in a patient from our series.

Figure 6: Ulcerative appearance in a patient from our series.

Figure 7: Budding appearance with central necrosis in a patient from our series.

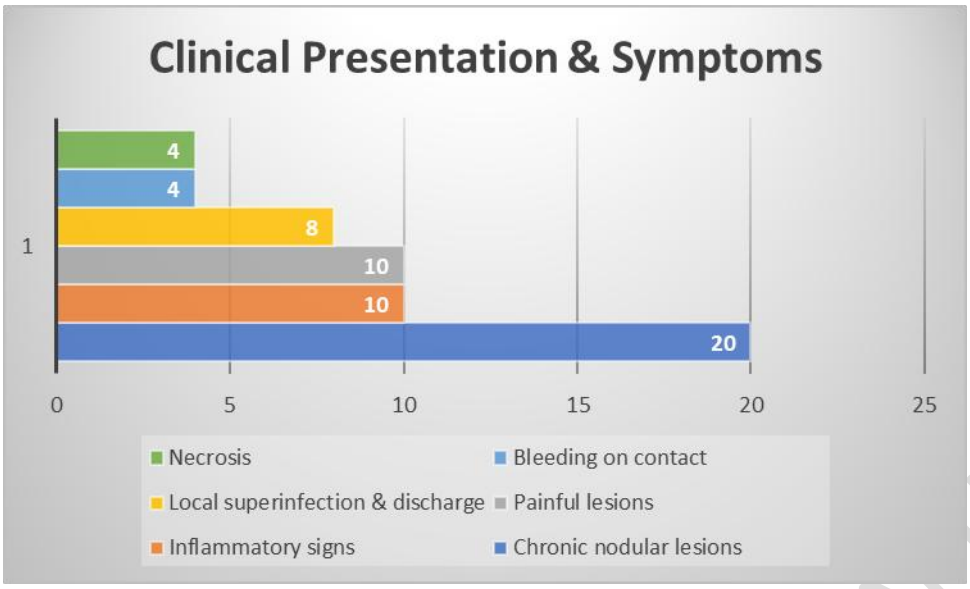

Figure 8: Clinical Presentation and Symptoms

Tumor distribution by aesthetic subunit was: lateral nasal wall 50% (n=18), dorsum 22% (n=8), nasal tip 11.5% (n=4), nasal root 5% (n=2), and extended/multifocal involvement 11.5% (n=4). Tumor size ranged from 10 mm to 50 mm; 33% were ≤2 cm (T1), 55% were 2–5 cm (T2), and 11% involved deep structures (T4). No patient presented with regional lymphadenopathy or distant metastasis (N0M0 in all cases).

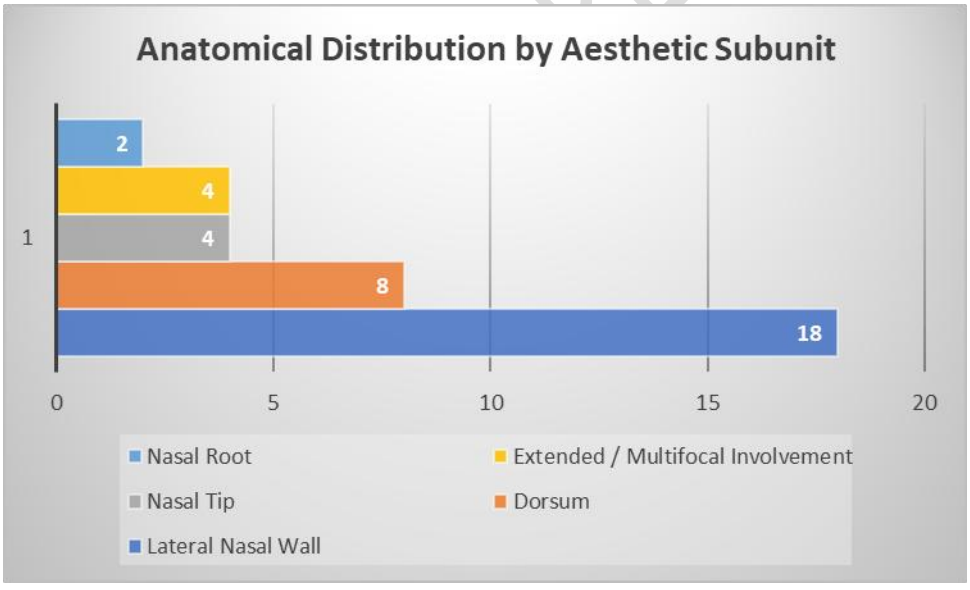

Figure 9: Anatomical Distribution by Aesthetic Subunit

Macroscopic appearance was predominantly budding (39%), ulcerobudding (33%), ulcerative (6%), infiltrative (11%), or necrotic (11%). No patient exhibited nasal obstruction.

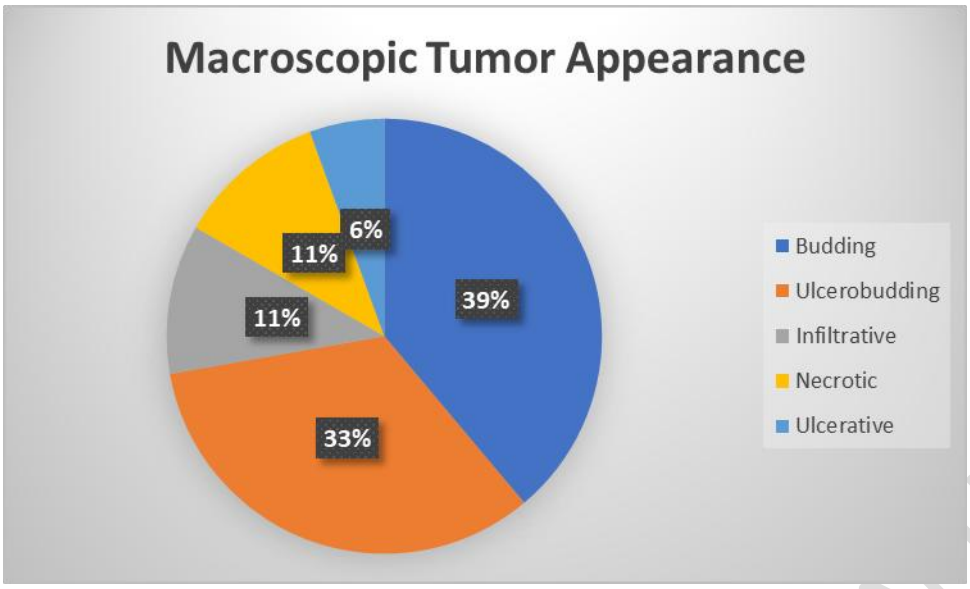

Figure 10: Macroscopic Tumor Appearance

Table 2: Clinical Presentation and Tumor Characteristics

Variable	Findings
Mean diagnostic delay	36 months (range: 12–60 months)
Presentingsymptoms	• Chronic nodular lesions: 56% • Inflammatory signs: 28% • Painful lesions: 28% • Local superinfection with purulent discharge: 22% • Bleeding on contact: 11% • Necrosis: 11%
Contributingfactors to delay	Prior use of traditional herbal remedies or self-mutilation reported in several patients
Tumor distribution by nasal aesthetic subunit	• Lateral nasal wall: 50% (*n*=18) • Dorsum: 22% (*n*=8) • Nasal tip: 11.5% (*n*=4) • Nasal root: 5% (*n*=2) • Extended/multifocal involvement: 11.5% (*n*=4)
Tumor size	10–50 mm
Tumorstaging	• T1 (≤2 cm): 33% • T2 (2–5 cm): 55% • T4 (deep structure involvement): 11%

Regional/distant spread	No regional lymphadenopathy or distant metastasis (N0M0 in all cases)
Macroscopicappearance	• Budding: 39% • Ulcerobudding: 33% • Ulcerative: 6%

4. Histopathological Findings

Histological confirmation was obtained by preoperative biopsy in 44% (n=16) and by excisional biopsy in 56% (n=20). BCC was the predominant type (72%, n=26), followed by SCC (28%, n=10). No melanomas or benign tumors were encountered.

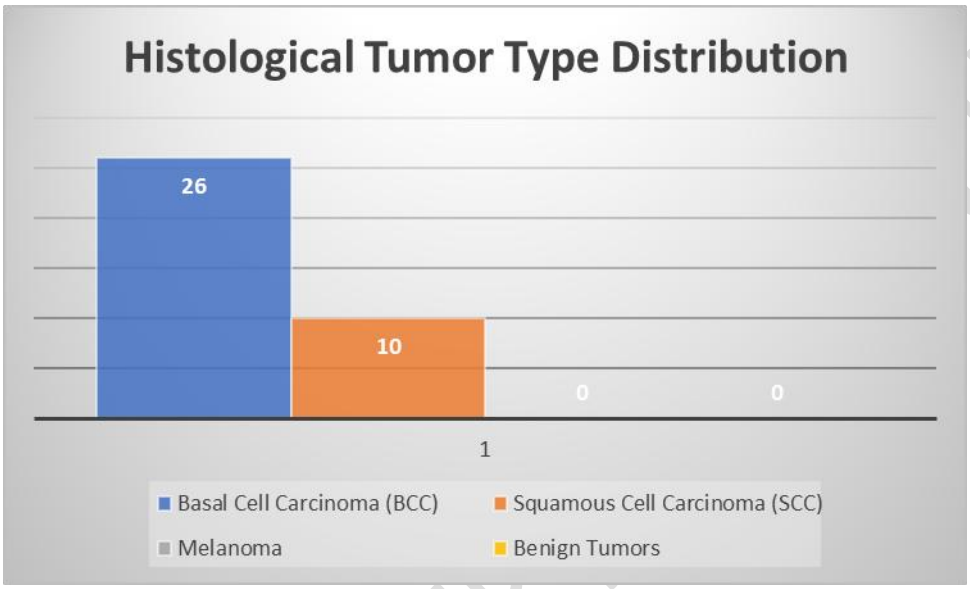

Figure 11: Histological Tumor Type Distribution

Among BCCs, the nodular subtype predominated (78%), with infiltrative subtype in 22%. No sclerodermiform or superficial subtypes were identified. For SCCs: 16% were non-infiltrating (well-differentiated 11%, moderately differentiated 5%) and 12% were infiltrating (all moderately differentiated). No perineural invasion or vascular emboli were detected.

Table 3: Histopathological Findings

Variable	Findings
Mode of histological confirmation	• Preoperative biopsy: 44% (*n*=16) • Excisional biopsy: 56% (*n*=20)
Histologicaltumor types	• Basal cell carcinoma (BCC): 72% (*n*=26) • Squamous cell carcinoma (SCC): 28% (*n*=10) • Melanoma: 0% • Benign tumors: 0%
BCC subtypes	• Nodularsubtype: 78% • Infiltrativesubtype: 22% • Sclerodermiformsubtype: none • Superficialsubtype: none
SCC characteristics	• Non-infiltrating SCC: 16% – Well-differentiated: 11% – Moderately differentiated: 5%

	• Infiltrating SCC: 12% – All moderately differentiated
Perineural invasion / vascularemboli	None detected

5. Surgical Management

All patients underwent surgical excision. Local anesthesia was used for 12 patients (33%) with small lesions (<1 cm), while general anesthesia was required for 24 patients (67%) with larger or complex defects. Preoperative marking of excision margins was systematically performed. Lateral and deep margins ranged from 5–10 mm according to histological type and tumor size. Deep resection involved cartilage in 16% (n=6), mucosa in 11% (n=4), and septum in 5% (n=2); no bony resection was required. All excision margins were histologically clear.

Figure 12: The incision markings in a patient from our series.

Table 4: Surgical Management and Excision Characteristics

Variable	Findings
Surgicaltreatment	All patients underwent surgical excision
Type of anesthesia	• Local anesthesia: 33% (*n*=12) for small lesions (<1 cm) • General anesthesia: 67% (*n*=24) for larger or complex defects
Preoperative planning	Systematic preoperative marking of excision margins performed in all cases
Excision margins	Lateral and deep margins ranged from 5–10 mm depending on histological type and tumor size
Deepresectioninvolvement	• Cartilage: 16% (*n*=6) • Mucosa: 11% (*n*=4) • Septum: 5% (*n*=2) • Bone: none
Histologicalmarginstatus	All excision margins were histologically clear

Figure 13: The extent and depth of the surgical excision in a female patient from our series.

No patient required lymph node dissection. Reconstruction was immediate in 72% (n=26) and delayed (pending histological confirmation) in 28% (n=10). Reconstructive methods included (table 5):

Table 5: Reconstructive Techniques

Reconstructive Technique	n (%)	Indications
Direct suture	6 (17%)	Small defects (<1 cm), dorsum/lateral wall
Directedhealing	6 (17%)	Tip/dorsum defects, patient refusal of reconstruction
Full-thickness skin graft	12 (33%)	Dorsum, tip, root defects; supraclavicular/retroauricular donor sites
Local/regionalflaps	12 (33%)	Various subunits; glabellar, forehead, nasolabial, Rintala advancement
Cartilage graft	6 (17%)	Structural support (conchal, septal, costal cartilage)

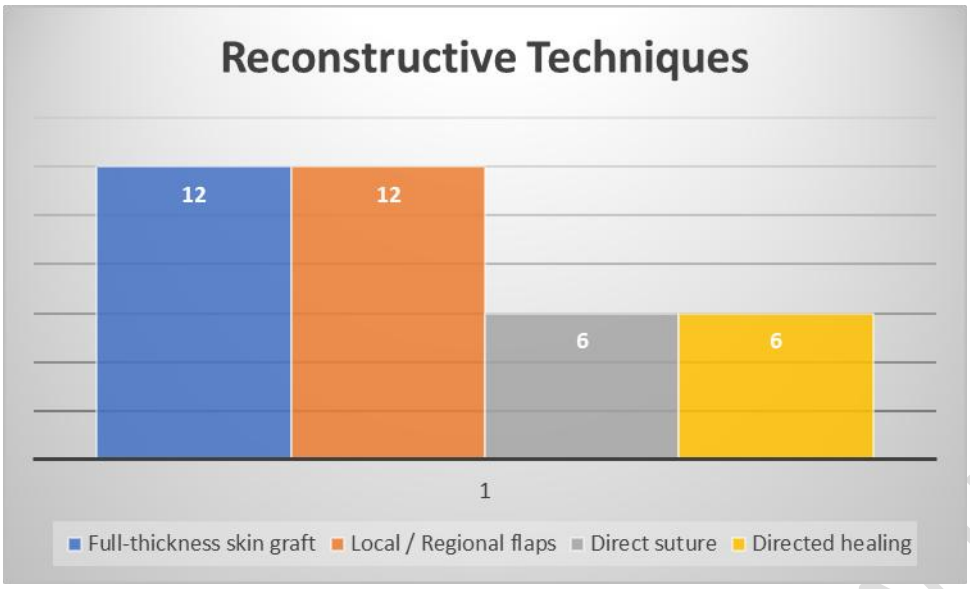

Figure 14: Reconstructive Techniques Distribution

Figure 15:A: Post-tumor excision tissue defect / **B:** Outcome after directed healing (second intention healing) in a female patient who refused reconstruction.

Figure 16: A: Resection of a tumor located at the root of the nose / **B**: Reconstruction using a full-thickness skin graft harvested from the supraclavicular fossa in a patient from our series.

The bilobed flap, nasolabial flap, forehead flap, and Rintala advancement flap were employed according to defect location and size. No free flaps were required.

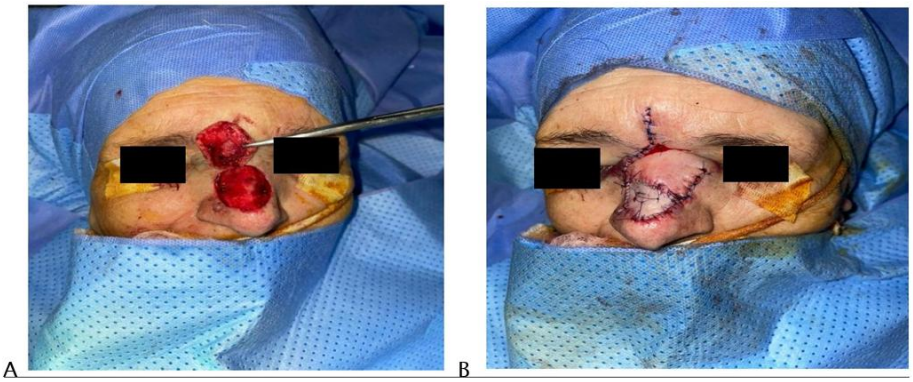

Figure 17:A: Resection of a tumor located on the dorsum / **B:** Reconstruction using a glabellar flap combined with a full-thickness skin graft harvested from the antitragus.

Figure 18: Total excision of the nasal pyramid followed by skin layer reconstruction using a forehead flap.

Figure 19:A: Resection of a tumor located on the dorsum / **B:** Reconstruction using a Rintala advancement flap.

6. Outcomes and Follow-up

No adjuvant radiotherapy or chemotherapy was administered. Immediate postoperative course was uncomplicated in most patients; one hematoma resolved after drainage. No cases of flap necrosis, dehiscence, or graft loss were recorded.

At available follow-up, no local recurrences or new primary lesions were detected. Aesthetic results were judged acceptable in the majority of cases. Functional outcomes (nasal patency, symmetry) were satisfactory. Flap reconstructions yielded superior aesthetic results compared to skin grafts or directed healing, consistent with established principles of like-tissue replacement [7].

Surveillance protocol included: immediate postoperative monitoring to day 15; quarterly clinical examination for 2 years; and annual examination thereafter for 5 years to detect recurrence or new primaries.

Table 6: Postoperative Complications & Safety Outcomes

PostoperativeOutcome	Percentage	Clinical Notes / Resolution
Uncomplicated Course	97.2%	Majority of the cohort
Hematoma	2.8%	Resolvedcompletelyafter drainage
FlapNecrosis	0.0%	None recorded
GraftLoss	0.0%	None recorded
WoundDehiscence	0.0%	None recorded

Figure 20: Aesthetic result 6 months after reconstruction using a glabellar flap.

Figure 21: Aesthetic result of a nasal defect left to heal by directed healing (second intention healing).

Figure 22: Aesthetic result 1 year after reconstruction using a full-thickness skin graft.

IV. DISCUSSION

1. Epidemiological Context

The present cohort demonstrates characteristics typical of cutaneous malignancies in North African populations: advanced age at presentation (mean 68 years), male predominance, rural residence, and significant occupational sun exposure [8]. The male-to-female ratio of 2:1 exceeds some Western series but aligns with regional reports, likely reflecting greater outdoor occupational exposure among men in agrarian economies and protective clothing practices among women [9]. The predominance of phototypes III–IV (89%) reflects the Mediterranean/North African phenotype, which carries intermediate skin cancer risk compared to fair-skinned populations [10].

The 36-month mean diagnostic delay is concerning and exceeds intervals reported in European series (12–15 months) [11]. This delay stems from multiple factors: geographical isolation, limited healthcare access, low socioeconomic status, cultural beliefs leading to traditional remedy use, and the painless, indolent nature of BCCs. Public health interventions targeting early detection in rural communities are urgently needed.

2. Histopathological Profile

The BCC: SCC ratio of 2.6:1 (72%:28%) is consistent with global patterns and regional Moroccan data [12]. The predominance of nodular BCC (78%) and absence of sclerodermiform variants may reflect selection bias toward exophytic, clinically apparent lesions in this retrospective series. The infiltrative SCC proportion (12%) warrants attention given its association with aggressive behavior and higher metastatic potential [13]. Notably, no melanomas were encountered, consistent with the established predilection for acral (plantar) locations in darker-skinned populations [14].

3. Oncological Management

Surgical excision with histologically clear margins remains the gold standard for curative treatment of non-melanoma skin cancer [15]. Our margin policy (5–10 mm) aligns with international guidelines: 3–4 mm for low-risk BCC, extending to 10–15 mm for high-risk or recurrent lesions; and 4–6 mm for SCC <2 cm, with wider margins for larger or high-risk tumors [16]. The 100% rate of clear margins in this series likely reflects the advanced stage permitting macroscopic margin assessment, though it may also indicate adequate surgical technique. Mohs micrographic surgery, which offers superior margin control and tissue preservation, was unavailable at our institution but should be considered for high-risk facial tumors when feasible [17].

The absence of lymph node dissection in all patients is appropriate given N0 status; prophylactic dissection is not indicated in clinically negative necks for non-melanoma skin cancer [18].

4. Reconstructive Considerations

Nasal reconstruction demands restoration of three-dimensional form, function, and aesthetic subunit integrity [19]. Our reconstructive algorithm prioritized simplicity and reliability: direct closure for small defects, skin grafts for superficial dorsal/root defects, and local flaps for larger or complex defects involving multiple subunits.

The 33% flap utilization rate is comparable to published series [20]. Local flaps (bilobed, nasolabial, glabellar, forehead) provided superior color, texture, and thickness match compared to grafts, particularly for the sebaceous nasal tip and alar regions [21]. The forehead flap, though requiring staged pedicle division, remains the workhorse for large nasal defects, offering robust vascularity from the supratrochlear artery and excellent aesthetic outcomes [22].

Immediate reconstruction in 72% of cases did not compromise oncological safety, consistent with recent evidence that immediate flap reconstruction following standard excision does not increase recurrence risk [23]. Delayed reconstruction (28%) was reserved for cases requiring histological margin confirmation or complex multistage procedures.

5. Prevention and Public Health Implications

The heavy burden of advanced disease in this cohort underscores the need for comprehensive prevention strategies. Primary prevention should target sun protection education, particularly for outdoor workers; secondary prevention requires systematic screening of high-risk individuals and prompt referral of suspicious lesions; tertiary prevention focuses on functional rehabilitation and psychosocial reintegration [24]. The frequent use of traditional remedies observed in our patients highlights the importance of culturally sensitive health education.

6. Limitations

This study's retrospective design, single-center setting, and limited sample size (n=36) restrict generalizability. Follow-up duration was insufficient to definitively assess long-term recurrence rates, particularly for SCC where late metastasis may occur. The absence of standardized aesthetic scoring

precludes objective comparison with other series. Additionally, the lack of Mohs surgery availability may have influenced margin status and reconstruction complexity.

V. CONCLUSION

Nasal pyramid cutaneous tumors in this Moroccan cohort present with advanced stage disease due to substantial diagnostic delays, reflecting healthcare access disparities in rural populations. Basal cell carcinoma predominates, with the lateral nasal wall most commonly affected. Surgical excision with appropriate margins and tailored immediate reconstruction achieves satisfactory oncological and functional outcomes. Local and regional flaps provide superior aesthetic results compared to skin grafts or secondary intention healing. Enhanced public awareness, early detection programs, and improved access to specialized care are essential to reduce disease burden and optimize outcomes in similar resource-limited settings.

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