PLACE OF THE ILIAC BONE GRAFT IN MAXILLO-FACIAL SURGERY (About 12 cases)

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Case Report

ABSTRACT

INTRODUCTION Autologous bone grafts are frequently used in Stomatology and Maxillofacial Surgery to fill maxillofacial bone defects as well as pre-implant surgery. The iliac bone is an important cortico-cancellous bone donor site allowing major bone reconstructions.

MATERIALS AND METHODS We carried out a retrospective study, over a period of five years, extending from: January 2012 to December 2016, collecting 12 patients for whom iliac bone grafts were performed. We studied the indications, the volume of graft harvesting and the postoperative follow-up.

RESULTS AND ANALYSIS The main indications were the loss of bone substances of tumoral origin for 06 patients or 50%, traumatic for two patients or 16.66% and infectious in a single patient or 8.33%, two of gingivoperiosteoplasty, and in the remaining patient sequelae of the scleroderma was the origin of the loss of bone substance. The samples were very variable in size. In our series, we note two cases of graft resorption, which is 16.66%.

DISCUSSION The harvesting of an iliac bone graft has a multitude of indications.

The choice of the iliac bone as the donor site for autologous bone grafts remains the golden rule in maxillofacial surgery, despite the morbidity that accompanies this donor site.

It is the most used technique in our department of Stomatology and Maxillofacial Surgery with satisfactory results.

CONCLUSION Our results seem quite favorable and in agreement with a number of studies addressing the subject of iliac bone graft indication and the morbidity associated with this type of harvesting.

Key Words: Iliac bone graft, loss of substance, maxillofacial reconstruction.

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INTRODUCTION

Autologous bone grafts are commonly employed in Stomatology and Maxillofacial Surgery to address maxillofacial bone defects and prepare for pre-implant surgery. These bone losses can result from various factors, including tumor excision, trauma, infection, or congenital conditions.

Utilizing bone harvested from the patient themselves offers significant advantages in terms of histological and immunological compatibility, thus reducing the likelihood of immunological reactions and the risk of infectious transmission.

The iliac bone emerges as a logical choice due to its availability, anatomical accessibility, stability, volume, and quality of cortico-cancellous composition.

However, as with any surgical procedure, there are inherent risks. Complications, ranging from minor to severe, can arise during and/or after surgery, both at the donor and recipient sites. The iliac bone is no exception, with a spectrum of complications documented in our study and existing literature.

MATERIALS AND METHODS

This retrospective study, spanning a duration of five years, focused on patients treated at the Stomatology and Maxillofacial Surgery department of the Military Hospital Moulay Ismail in Meknes who received maxillofacial reconstruction utilizing autologous iliac bone grafts.

Data collection was conducted retrospectively, utilizing patient hospitalization records and a questionnaire incorporated into a standardized operating sheet with a 12-month follow-up period post-surgery.

RESULTS AND ANALYSIS

Over a five-year period, we identified 12 patients who underwent autologous iliac bone graft removal. The

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average age of these patients was 31.5 years, ranging from 14 to 50 years.

The male-to-female sex ratio was 2. Hospitalization duration varied from a minimum of 4 days to a maximum of 15 days.

Among the 12 cases in our study, we observed 4 cases of active smoking, with an average of 16.4 pack-years.

None of the patients with tumors in our study received radiotherapy treatment.

All 12 patients in our study presented with maxillofacial bone substance loss, indicating the need for bone grafting (see Figure 1).

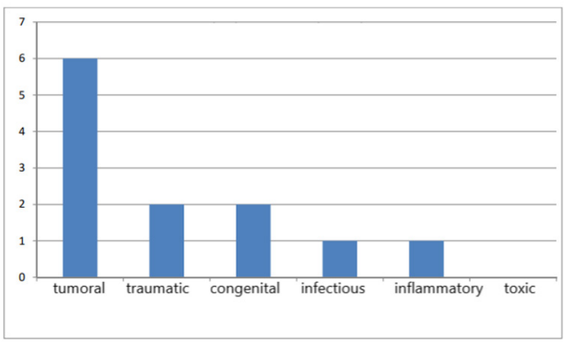

Figure 1: distribution of patients according to the origin of the loss of bone substance

In our study, the loss of bone substance stemmed primarily from tumor excision in 6 patients, comprising 50% of the cases. Among these, ameloblastoma was identified in 3 patients (see Figure 2), along with one case each of bone myxoma, giant cell tumor, and venous hemangioma infiltrating the superciliary arch.

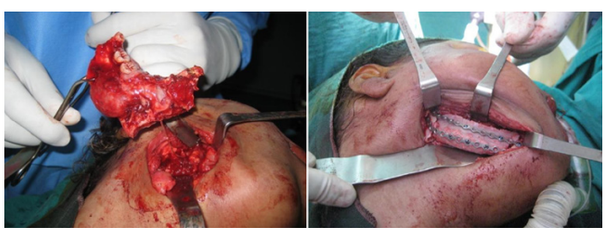

Figure 2: image showing an operating specimen of a mandibular ameloblastoma and mandibular graft in place fixed by reconstruction plates.

In our series, two patients experienced traumatic-related bone substance loss, accounting for 16.66% of cases. Additionally, two patients presented with congenital bone substance loss manifested as alveolo-palatine clefts, also constituting 16.66% of cases.
One case of bone substance loss was attributed to an infectious origin, specifically located on the nasal pyramid, comprising 8.3% of cases.
Another case of bone substance loss resulted from sequelae of scleroderma, indicating an inflammatory origin and representing 8.33% of cases.
Regarding the recipient site of the iliac bone graft in our series, 5 patients underwent mandibular reconstruction, 2 cases involved maxillary reconstruction, and 2 patients required nasal pyramid reconstruction. Additionally, 2 patients received iliac bone grafts for orbital region reconstruction (including the superciliary arch and floor of the orbit), with one case involving the zygomatic region (see Figure 3).

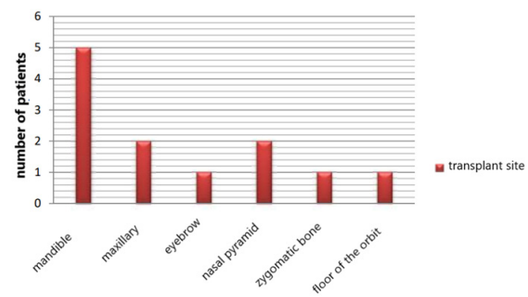

Figure 3: distribution of our patients by site

In our study, graft sizes ranged from a maximum of 8 cm to a minimum of 2 cm, with an average size of 5 cm, excluding the solely spongy samples.
Postoperative consequences may occur regardless of the recipient site, although certain complications are specific to the recipient site. Throughout our series, early postoperative follow-up revealed edema in all patients. Additionally, one patient experienced infection at the mandibular site, complicated by mild cellulitis requiring hospitalization on the 4th postoperative day (see Figure 4).

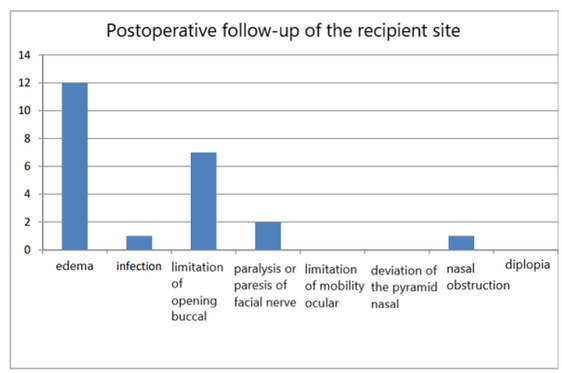

Figure 4: Postoperative follow-up of the recipient site in our series.

In the postoperative period, the graft site was characterized by limited mouth opening, with mild restriction observed in 3 patients and moderate restriction in 2 patients; however, no cases of severe limitation were noted. Additionally, transient facial paresis occurred in 2 patients at the recipient site. At the mandibular recipient site, two patients experienced slight mouth opening limitation, while at the maxillary site, similar limitation was observed in two patients. Among the 12 patients who underwent surgery in our study, the surgical team placed a suction drain at the bone graft donor site for only one patient.

Throughout our study, two patients experienced no difficulty in walking immediately after surgery. However, 6 patients encountered difficulty walking until the 2nd postoperative day, 2 patients until the 3rd day, and the remaining two patients experienced difficulty until the 4th day postoperatively.

Notably, none of the patients in our series reported complaints of sciatic nerve pain, either immediately or in the long-term postoperative period.

DISCUSSION

The loss of bone substance of the face, solutions of permanent continuity of the bone tissues of the face, can be secondary to the surgical excision of a tumor of the face, to a trauma, to an infection or to a radionecrosis, [1, 2, 3, 4, 5]. They are most often part of a multi-tissue loss of substance which also involves the skin, muscle and mucosa. Depending on their extent, they have a variable impact on masticatory, respiratory, phonatory and visual functions, the facial morphology of patients as well as on their psyche [1, 5, 6].

The iliac bone is an important cortico-cancellous bone donor site allowing significant bone rehabilitation. In maxillofacial surgery, the removal of an iliac bone graft has a multitude of indications. These indications are dominated by loss of substance of tumoral, congenital or infectious origin.

The losses of maxillofacial bone substances of tumoral origin are rather related to the large bone resection and not the tumor itself.

Treating specific benign tumors may necessitate extensive bone resection, which can sometimes be disruptive, particularly at the mandibular level, and may extend into the surrounding soft tissues. These tumors predominantly include odontogenic tumors like ameloblastoma and certain cysts such as epidermoid cysts, known for their recurrence rates akin to ameloblastoma.
Malignant tumors that develop within or invade maxillofacial bone tissue are typically epithelial, with squamous cell carcinoma being the most common, and primary bone tumors like sarcoma, plasmacytoma, and malignant histiocytofibroma being less frequent, along with secondary tumors like metastases from breast or lung cancers.
A distinction is made between odontogenic tumors, non-odontogenic tumors, and metastases in terms of treatment approaches. Treating these tumors typically involves extensive resections, often accompanied by complementary radiotherapy, resulting in significant loss of bone substance. Traumatic causes contribute substantially to losses of maxillofacial bone substance, often stemming from severe trauma leading to notable bone displacement or segment disappearance, frequently accompanied by soft tissue injuries. Loss of bone substance from infectious causes has become rare, but it may reoccur in instances of immunodeficiency or during worsening health conditions. These infections can originate post-traumatically, from dental issues progressing to osteitis, or from even rarer systemic causes such as actinomycosis, syphilis, or tuberculosis, leading to bone loss due to osteoradionecrosis. [7] Osteitis commonly manifests in the mandible, primarily due to the bone's proximity to the mucosal plane and its terminal vascularization pattern. Significant disparities exist between the epidemiological data in our study and that found in the literature, largely due to the various surgical indications encountered (figure 5). [8, 9, 10, 11]

	Our series	Schaaf series	Fasolis Series	Nkenke series	Freilich series	Becker series
Kind of study	Retrospective	Retrospective	Retrospective	Retrospective	Retrospective	Retrospective
Number of cases	12	75	130	50	40	97
Duration of the study	5 ans	2 ans	7 ans et 8 mois	20 mois	4 ans	4 ans
Average frequency	2.4 cas/ an	37.5 cas/an	17 cas/an	30 cas/an	8 cas/an	24.25 cas/ an
Average duration of follow-up	1 an	1 an	48.78 mois	1 mois	14 jours	1 an
Median age	31.5 ans (14-50)	47.6 ans (16-80)	45.6 ans (8-70)	52.5 ans (31-65)	48.4 ans (16-73)	55 ans (17-89)
Sex ratio M/F	2	1.34	0.73	0.67	Non précisé	1.02

Figure 5: The epidemiological data of our series versus the data epidemiological data from different series.

The majority of studies referenced in the literature, including ours, are retrospective in nature. Our study spanned a duration of 5 years, which aligns closely with other retrospective series ranging from 4 to 7 years.

The notable male predominance observed in our series can be attributed to our military environment, where males predominate, in contrast to several studies that indicate a significant female predominance. For instance, the sex ratio in the Nkenke series is reported as 0.67. [10]

Moreover, the average age of patients in our series, which falls in the early thirties, appears to be among the youngest compared to studies reporting average ages in the latter half of the forties and early fifties [8, 9,10,11, 12] . This discrepancy can be attributed to the differing indications for surgery compared to other series.

There is significant variability between our procedural frequency, which stands at 2.4 procedures per year, and that of other series, such as the Schaaf [8] series at 37.5 cases per year and the Becker series at 24.25 cases per year. This disparity can be attributed to the limited indication for pre-implant surgery in our Moroccan context.

The average duration of follow-up in our series aligns with other retrospective studies [8, 9,12], averaging one year.

Our study reports a longer hospital stay duration, which can be attributed to the fact that our patients underwent surgeries for more severe pathologies. This is in contrast, for instance, to the Freilich study [11], where all procedures were performed on an outpatient basis.

During our study, bone samples were predominantly of the cortico-spongy type, accounting for 75% of cases. Among these, tricortical samples were predominant, representing 66.66% of cases, while bicortical samples were observed in 16.66% of cases. Spongy-type bone samples were observed in two cases, constituting 16.33% of the total. These two patients underwent gingivoperiosteoplasty with bone grafting.

The significant predominance of tricortical samples in our series can be attributed to the extensive size of bone substance loss and the frequent occurrence of mandibular location.

CONCLUSION

The utilization of iliac bone as the primary donor site for autologous bone grafts remains the standard practice, despite the accompanying morbidity. Factors such as defect volume and long-term morbidity play a pivotal role in selecting the iliac bone as the donor site. Long-term complications, including bone resorption, chronic iliac pain, sensory disturbances, mobility limitations, and disfigurement, often associated with iliac bone grafting, were notably absent in our study but are frequently reported in the literature.

Interestingly, we observed that patient discomfort post-procedure was not solely dependent on complications but also on long-term outcomes, particularly graft resorption in two patients.

Our study findings align favorably with existing literature on iliac bone graft indications and associated morbidity. Additionally, ongoing scientific advancements aim to refine sampling techniques, potentially reducing donor site complication rates.

Despite encountered perioperative and postoperative complications, the majority of our patients expressed satisfaction with the outcomes and expressed willingness to undergo iliac bone sampling again, if needed.

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

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