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Measurement of Quality of Life of Free Flap Transfer in Reconstrucion of the Head and Neck Tumor Defects after Ablative Surgery in Asturias, Spain

Thesis

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,

To my Father, Mother,

My Wife Nehal

Jody and Salma

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LIST OF ABBREVIATIONS

AJCC : American Joint Committee on Cancer

AR: After rehabilitation

ALT: Anterolateral Thigh Flap

BMI: Body mass index

BR: Before rehabilitation

BFI: Brief Fatigue Inventory

BPI: Brief Pain Inventory-Short Form (BPI)

CARES: Cancer Rehabilitation Evaluation System

CNS: Central Nervous System

EORTC: European Organization for Research and Treatment of Cancer

EORTC C30: QLQ of EORTC for cancer patients as concerns the general staging

EORTC H&N 35: QLQ of EORTC for head and neck cancer patients.

FAMM: Facial Artery Musclomucosal Flap.

FACT-G: Functional Assessment of Cancer Therapy-General

FFOCF: Free Fibula Osteocutaneous Flap

HPV: Human Papiloma Virus

HRQOL: health- related quality of life

HNC: Head and neck Cancer

IMRT Intensity-modulated radiation therapy

IARC: International Agency for Research on Cancer

KPS: Karnofsky Performance Scale

MDADI: MD Anderson Dysphagia Inventory

PSS-H&N: Performance Status Scale - Head and Neck

PMMF: Pectoralis Major Myocutaneous Flap

QOL: Quality Of Life

QLQ: Quality of Life Questionnaire

RT: Radiotherapy

RFFF: Radial Forearm Free Flap

SCC: Squamous cell carcinoma

SPADI: Shoulder Pain and Disability Index

SIP: Sickness Impact Profile

TNFα : tumor necrosis factor-alpha

UW QOL: University of Washington Quality of Life Questionnaire

UICC: International Union for Cancer Control

VHNSS: Vanderbilt Head and Neck Symptom Survey

V-RQOL: Voice related QOL

VCAM-1: vascular cell adhesion molecule-1

VEGF: vascular endothelial growth factor

WHO : World Health Organization

XQ: Xerostomia Questionnaire

Chapter 1

Introduction

INTRODUCTION

Modern head and neck surgery is characterized by its emphasis on reconstruction and rehabilitation. Before the 1960s the drive to ablate head and neck cancer, seemingly at all costs, frequently resulted in radical ablations with horrible deformities and significant morbidity. Aesthetic and functional considerations were thought to be secondary, and many of these tumors were considered inoperable as ablative attempts produce large composite defects with exposure of vital structures.

Over the past two decades, there has been a steady advance in the available surgical techniques for reconstruction of head and neck defects. Before, surgery most defects, irrespective of size and location, were closed either with local tissues or with random pattern skin flaps that were pedicle and "walked" to the head and neck from the trunk in long, tedious staged procedures (1).

Reconstruction after tumor ablation is considered not only the bridge that allows for aggressive tumor resection, but more importantly the first step in rehabilitation of cancer patients, as it preserves and restores the patient's preoperative level of activity and quality of life (QOL). The patient's QOL as a result of an oncologic resection can factor heavily into the choice of treatment procedure.

Many reconstructive techniques are now available, and the appropriate method of reconstruction, must be based on the surgical defect and on the individual patient's characteristics. Familiarity with the different reconstructive techniques facilitates the optimal functional and aesthetic result (2). However, this was also the time that regional flaps were coming into use, and further microvascular advances were delayed until the 1970s. The unique advantages of free tissue transfer is simplified in the delivery of well vascularized and specialized tissue to the recipient site, and it is significantly applied in the most difficult and challenging reconstructive situations involving, the mandible, pharynx, oral cavity soft tissues of the head and neck (3).

Head and neck defects after tumor resection are often need hospitalization; requiring contact with saliva, nasal secretions, and tissues usually previously exposed to radiation and surgery. Well-perfused free flaps may suited to these conditions, and allow the harvest of exactly tailored grafts, while minimizing donor site morbidity. More also free tissue transfer is usually associated with less post-operative atrophy, eliminating the need to over correct.

Bone reconstruction is now virtually synonymous with free tissue transfer. Resorption, which plagued non-viable bony transfers, is eliminated. Transferring well tissue incites a strong union with the surrounding bone in as little as one to two months, eliminating the long-term use of reconstruction plates (4, 5). Soft tissue transfers capable of sensation are plausible with the use of neurofasciocutaneous free flaps. The long-standing experiences with microvascular technique and the new donor-sites have resulted in reduction and change in the nature of the complications encountered in the literature. The objective of this work is to provide a good functional and aesthetic reconstruction for head and neck cancer patients with complex defects resulted from radical crippling ablation, through microvascular free tissue transfer.

Free flaps from different donor-sites will be used in reconstruction of complex defects in scalp, mid-face, oral cavity, mandible, and pharynx. The choice of the donor-site will be dictated by the reconstructive needs of the defect as well as donor-site availability. The microvascular anastomoses, flap outcome, and other complications will be evaluated. The ultimate functional and aesthetic outcomes will be discussed in relation to the site of reconstruction (6).

Chapter 2

Review of Literature

2.1: Head and Neck Cancer

Head and neck cancers can arise in the oral cavity, pharynx, larynx, nasal cavity, paranasal sinuses, thyroid, and salivary glands and include a variety of histopathologic tumors.

2.1.1: EPIDEMIOLOGY AND RISK FACTORS:

There are large geographic differences in the incidence and primary site of head and neck cancers. Each year there are approximately 560,000 new cases of and 300,000 deaths due to HNC (7). The highest incidences of HNC in the world are found in South Asia, and parts of central and southern Europe, these likely reflect the prevalence of risk factors, such as tobacco and alcohol consumption, as well as genetic differences among populations. (8)

Although the highest rates of head and neck cancer are in older males, the incidence has been increasing in females as more women use tobacco, and in young non-smokers as human papillomavirus (HPV) plays an increasingly prominent role as an etiologic factor in the development of oropharyngeal head and neck cancer. (9)

Tobacco (smoked and smokeless) is the most important known risk factor for the development of head and neck cancer. There is some evidence for a genetic predisposition to the carcinogenic effects of tobacco. In addition, tobacco and alcohol consumption appear to have a synergistic effect. The repeated exposure of the mucosa of the upper aerodigestive tract to the carcinogenic effects of tobacco, alcohol, or both appears to cause multiple primary and secondary tumors in this “condemned mucosa”, a phenomenon described as "field cancerization". (10)

HPV infection is a causative agent for head and neck cancer. HPV-associated head and neck cancers occur primarily in the oropharynx (tonsils and base of tongue), account for the younger age of patients with oropharyngeal squamous cell carcinoma, and define a subset of patients with improved treatment outcome. However, the use of HPV status in clinical decision making remains investigational at this time, and treatment is the same as for patients without an HPV-associated tumor. Other head and neck cancer risk factors include betel nut chewing, radiation exposure, vitamin

deficiencies, periodontal disease, immunosuppression, and other environmental and occupational exposures. (11)

2.1.2: PATHOLOGY

Squamous cell carcinomas account for 90 to 95 percent of the lesions in the oral cavity and larynx. They can be categorized as well differentiated (greater than 75 % keratinization), moderately differentiated (25 to 75 % keratinization), and poorly differentiated (less than 25 % keratinization) tumors. Less common histologies include verrucous carcinoma (a variant of squamous cell carcinoma), adenocarcinoma, adenoid cystic carcinoma, and mucoepidermoid carcinoma. (12)

Squamous cell carcinoma of the head and neck cancer often develops through a series of changes from premalignant entities.

SQUAMOUS CELL CANCER PRECURSORS

Leukoplakia, erythroplakia and leukoerythroplakia

The clinical terms leukoplakia, erythroplakia, and leukoerythroplakia are squamous proliferations manifested as white, red, or speckled mucosal plaques, respectively, and do not denote specific pathologic entities. However, it is helpful to the pathologist to know whether a lesion demonstrates erythroplakic features, since these are more frequently associated with dysplasia or overt malignancy. The diagnosis of dysplasia or invasive carcinoma requires biopsy and microscopic examination. (13)

Squamous hyperplasia

Squamous hyperplasia is a reactive phenomenon consisting of a thickened squamous epithelium, and includes both acanthosis (increased thickness of the spinous layers) and expansion of the basal cell layer (increase in basal/parabasal cells). (14)

Squamous dysplasia

Squamous dysplasia is accepted as the precursor of squamous carcinoma. Dysplasia is a premalignant proliferation of squamous epithelium; its severity is graded based upon a loss or dysfunction of cytoplasmic maturation as cells advance from basal to superficial layers and divided to four types:

Mild dysplasia: Abnormal architectural and cytological features largely confined to the lower third of the epithelium.

Moderate dysplasia: The dysplastic process extends into the middle third of the epithelium.

Severe dysplasia: Extension of the process into the upper third of the epithelium.

Carcinoma in-situ: Full thickness involvement is present in the absence of invasion. For practical purposes, severe dysplasia and carcinoma in-situ are synonymous. (14)

SQUAMOUS CELL CARCINOMA:

Under this category there are multible pathologic aspects of conventional squamous cell carcinoma (SCC) (ie, "not otherwise specified [NOS]") as well as some variants with special features that may reflect differences in behavior or prognosis. These include verrucous, basaloid, and spindle cell variants of SCC, as well as nasopharyngeal carcinoma. (15) They are two important types :

1- Invasive squamous cell carcinoma.

2- Non Invasive squamous cell carcinoma.

2.1.3: CLINICAL PRESENTATION

The clinical presentation of head and neck cancer varies widely depending upon the primary site and exposure to various risk factors. (16)

•***Oral cavity tumors*** – Patients may present with mouth pain or nonhealing mouth ulcers, loosening of teeth, ill-fitting dentures, dysphagia, odynophagia, weight loss, bleeding, or referred otalgia. Up to 66 percent of patients with primary tongue lesions have cervical lymph node involvement, depending on T-stage and depth of invasion, while the incidence is substantially lower in patients with hard palate cancers. (17)

•***Tongue cancer*** may grow as an infiltrative and/or exophytic lesion. The presenting symptom is often pain, with or without dysarthria. Dysarthria implies deep muscle

invasion of advanced tumor stage. There may be a history of longstanding leukoplakia or erythroplakia. (18)

•***Lip cancer*** usually presents as an exophytic or ulcerative lesion of the lower lip, occasionally associated with bleeding or pain. Some patients complain of numbness of the skin of the chin due to involvement of the mental nerve. (19)

•***Significance of otalgia***: Cranial nerves 5, 7, 9, and 10 contribute afferents to the external and middle ear. Referred otalgia is considered a "red flag" in the evaluation of a patient with a possible head and neck malignancy. (20)

2.1.4 : TNM STAGING SYSTEM

The tumor node metastases (TNM) staging system of the American Joint Committee on Cancer (AJCC) and the International Union for Cancer Control (UICC) is used to classify cancers of the head and neck (21). The T classifications indicate the extent of the primary tumor and are site specific; there is considerable overlap in the cervical node (N) classifications.

2.1.5: DIAGNOSIS AND STAGING EVALUATION

Initial evaluation

The initial assessment of the primary tumor is based upon a thorough history and combination of inspection, palpation, indirect mirror examination, or direct flexible laryngoscopy. Physical examination should include careful assessment of the nasal cavity and oral cavity with visual examination and/or palpation of mucous membranes, the floor of the mouth, the anterior two-thirds of the tongue, tonsillar fossae and tongue base (best seen on mirror examination or flexible laryngoscopy), palate, buccal and gingival mucosa, and posterior pharyngeal wall.

A metastatic work-up with appropriate imaging is recommended for all newly-diagnosed head and neck cancer patients, with particular attention to regional lymph node spread. Visualization of lesions outside the mouth is best accomplished by mirror examination and/or the use of a flexible fiberoptic endoscope with the goal of examining all of the mucosa in the nasopharynx oropharynx, hypopharynx, and larynx.

An examination under anesthesia often is performed to best characterize the extent of the tumor, to look for synchronous second primary tumors, and to take biopsies for a tissue diagnosis. This exam is particularly useful for patients with posterior third of the tongue malignancies.

Symptom-directed panendoscopy (laryngoscopy, bronchoscopy and esophagoscopy) reveals a 2.4 to 4.5 percent incidence of second primary tumors of the upper aerodigestive tract, but not of the lower airways (22).

Imaging studies may augment the physical exam and evaluation of squamous cell carcinoma of the head and neck, particularly for assessing the degree of local invasion, involvement of regional lymph nodes, and presence of distant metastases or second primary malignancies. The most common metastatic sites are the lungs, liver, and bone, while the most common sites of second primary malignancies are the head and neck, followed by the lungs and esophagus. Ideally, imaging should take place prior to biopsy, which may distort anatomy and create a false positive.

***Imaging studies*:**

Imaging studies (computed tomography [CT] magnetic resonance imaging [MRI], PET, and integrated PET/CT) are important for assessing the degree of local infiltration, involvement of regional lymph nodes, and presence of distant metastases or second primary tumors.

Fine needle aspiration biopsy of a suspected involved lymph node in the setting of an established primary tumor may provide relevant information when clinical and imaging evaluations of neck lymph nodes are equivocal and a positive or negative finding would change the clinical treatment approach. (23 – 24)

Another promising strategy for increasing the accuracy of overall staging is ***sentinel lymph node biopsy*** (25). Like cutaneous melanoma, this technique utilizes preoperative lymphoscintigraphy, intraoperative blue dye, and handheld gamma probe. Sentinel lymph node biopsy is a reliable and reproducible method for staging the clinically and radiologically N0 neck in patients with early stage head and neck cancer.

Primary tumor (T)	
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ
T1	Tumor 2 cm or less in greatest dimension
T2	Tumor more than 2 cm but not more than 4 cm in greatest dimension
T3	Tumor more than 4 cm in greatest dimension
T4a	Moderately advanced local disease*
	Lip: Tumor invades through cortical bone, inferior alveolar nerve, floor of mouth, or skin of face, that is, chin or nose
	Oral cavity: Tumor invades adjacent structures only (eg, through cortical bone [mandible or maxilla] into deep [extrinsic] muscle of tongue [genioglossus, hyoglossus, palatoglossus, and styloglossus], maxillary sinus, skin of face)
T4b	Very advanced local disease
	Tumor invades masticator space, pterygoid plates, or skull base and/or encases internal carotid artery
Regional lymph nodes (N)	
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none

	more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in single ipsilateral lymph node more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node more than 6 cm in greatest dimension
Distant metastasis (M)	
M0	No distant metastasis
M1	Distant metastasis

Table (1): Tumor node metastases (TNM) staging system for cancer of the lip and oral cavity (NCCN Guide line February 2014).(31)

2.2: Treatment of early head and neck cancer (stage I and II) (26)

Squamous cell carcinoma is the predominant malignancy that occurs in the oral cavity. Minor salivary gland cancers and sarcomas are less common.

The treatment of early stage oral cavity cancer is presented here. The management of locally advanced oral cavity cancer and the treatment of metastatic and recurrent cancers are discussed separately, as are other types of oral cavity tumors.

2.2. 1 : ANATOMY AND STAGING

The oral cavity extends from the skin-vermilion junction of the lips to the junction of the hard and soft palate above and to the line of circumvallate papilla of the tongue below. The anterior tonsillar pillars and glossotonsillar folds serve as the lateral boundaries between the oral cavity and oropharynx. (27)

Sites of origin of oral cavity cancer include the lip, floor of the mouth, oral tongue (anterior two-thirds of the tongue), lower alveolar ridge, upper alveolar ridge, retromolar trigone (retromolar gingiva), hard palate, and buccal mucosa. Rarely, an oral cavity cancer can originate within the mandible (eg, osteosarcoma.) Most odontogenic lesions, including ameloblastoma, are not malignant. (28- 29)

The tumor node metastases (TNM) staging system of the American Joint Committee on Cancer (AJCC) and the International Union for Cancer Control (UICC) is used to classify lip and oral cavity carcinoma (30-31). By definition, patients with early (stages I and II) disease have tumors <4 cm in its greatest dimension without deep invasion into surrounding structures and have no evidence of lymph node involvement (32).

2.2. 2: MANAGEMENT OF PRIMARY TUMOR

Pretreatment evaluation

Tumor size, the extent or depth of invasion, and the presence or absence of regional lymph node metastases are critical for planning treatment. The depth of invasion of early stage squamous cell carcinoma involving the oral tongue is particularly difficult to assess preoperatively. Oral cavity cancers tend to invade bone and soft tissue early in their natural history. Therefore, pretreatment imaging studies are required in addition to a thorough inspection and palpation of the oral cavity.

Computed tomography (CT) with intravenous contrast is widely used to detect bone invasion; CT has largely replaced older techniques such as plain radiography and panoramic radiography of the maxilla and mandible.

Magnetic resonance imaging (MRI) may complement or replace CT scanning by providing better visualization of soft tissue involvement and gross perineural spread, while also having good accuracy in detecting bone invasion. Whereas CT scanning may be limited by metallic dental restorations and cortical defects, MRI is limited by motion artifact and inflammatory reactions.

Combined positron emission tomography (PET)/CT scans may add accuracy in evaluating the extent of the primary tumor and aid in target delineation if definitive radiation therapy (RT) is being considered. PET scanning may help to identify pathologically involved lymph nodes that are suspicious on CT or MRI but do not meet traditional size based criteria for classification as being abnormal (33-35).

2.2.3.: Surgery versus radiation therapy

Both primary surgery and definitive radiation therapy (RT) are options for patients with oral cavity cancer. Outcomes with primary surgery and definitive RT appear to be similar based upon retrospective studies, but the two modalities have not been compared in randomized trials.

Surgery is generally preferred because it is typically associated with less morbidity than RT. Definitively RT is reserved for patients who cannot tolerate surgery or for whom surgical resection would result in particularly severe functional impairment. (34) The latter circumstance is uncommon in stages I and II oral tongue and floor of mouth primaries but is sometimes applicable to early tumors of the retromolar trigone since external RT can achieve similar outcomes to surgery with acceptable morbidity.

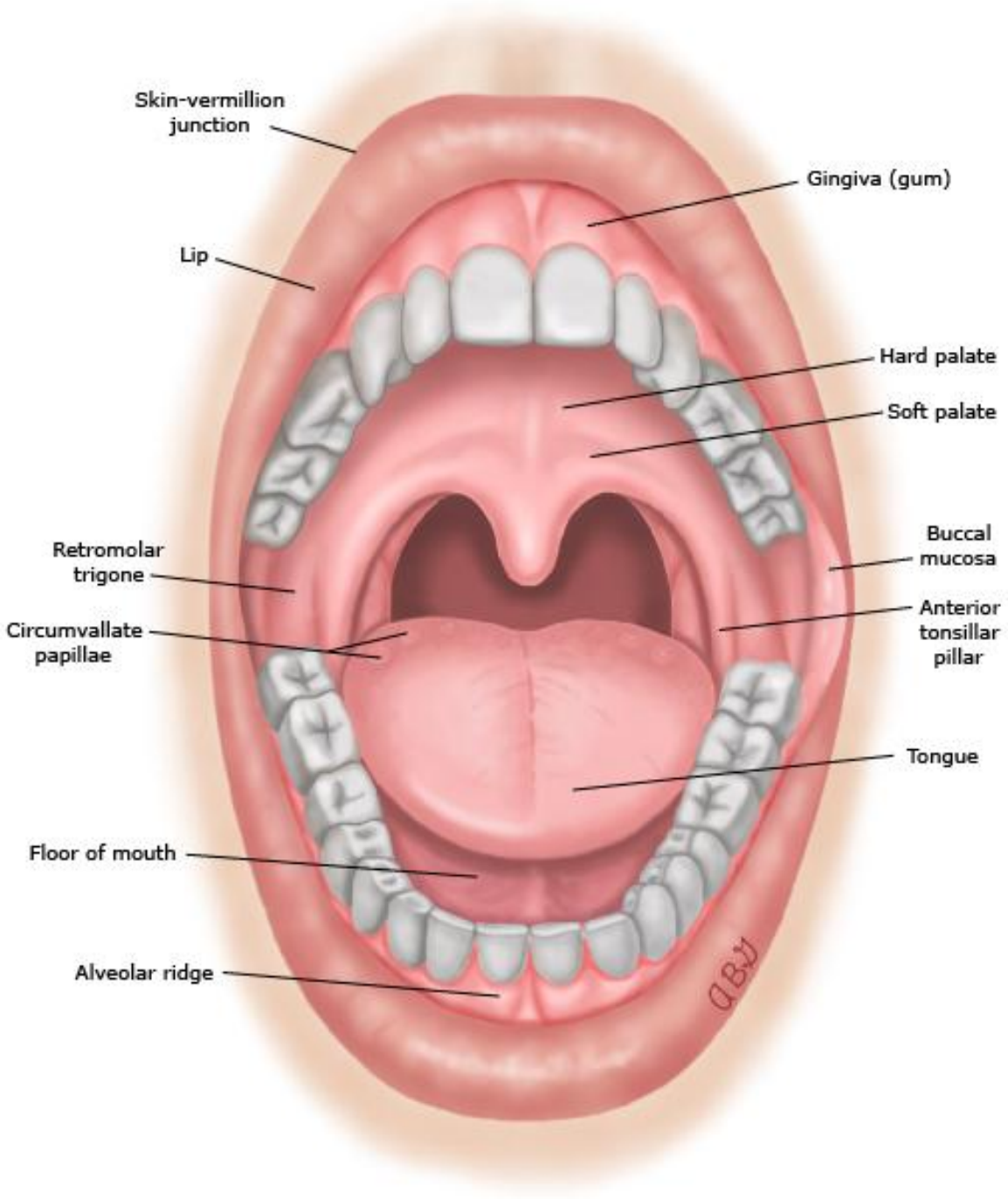


Figure (1): Anatomy of Oral Cavity (31).

2.2.4 : Surgery

Traditional surgical approaches are generally used for patients with early stage oral cavity cancer. Although minimally invasive surgery, such as transoral laser resection or robotic surgery has been used, the relative advantages of one versus another surgical technique have not been well established (35). The primary benefit of minimally invasive technology is its ability to access structures, such as the

oropharynx and larynx, which are not easily approached with standard instruments. However, early stage oral cavity tumors are usually accessible via traditional transoral approaches.

Most early stage oral cavity cancers can be excised with minimal long-term functional or cosmetic deformity. Swallowing function is generally excellent with appropriate reconstruction and postoperative rehabilitation. Likewise, short-term perturbations in speech (e.g. difficulty pronouncing the letter "t" after tongue surgery) can be corrected to normal or near-normal function. (34-35) As an example, an oral cavity cancer patient employed in telephone sales would generally be expected to be able to return to full-time work within three months of surgery.

Every attempt should be made to ensure negative resection margins, since positive margins are associated with a worse prognosis (34-35). If feasible, reresection of any positive margin is preferred. Otherwise, postoperative RT, with or without chemotherapy, is indicated. Close margins, typically defined as less than 5 mm, may also portend a worse prognosis.

Acute surgical complications can include infection, bleeding, aspiration, wound breakdown, flap loss, and fistula. (35) Surgical procedures such as hemiglossectomy, maxillectomy, and mandibulectomy can cause functional defects in speech and swallowing, although these may be minimized by optimal reconstruction.

2.2.5: Radiation therapy

Both external beam RT, using contemporary conformal techniques, and brachytherapy can have a role in the management of early stage oral cavity cancer. The general principles of RT and the role of radiation dose and schedule are discussed elsewhere. (36)

Small tumors in most oral cavity sites can be managed with intraoral cone or interstitial brachytherapy in order to minimize exposure of normal tissue. These techniques do not treat regional lymph node basins, however, and are therefore only appropriate to use as a single modality in selected stage I patients where the risk of occult nodal involvement is very low. Factors associated with high risk disease of lymph node involvement include deep invasion, and lymphovascular invasion (37).

External beam RT is used as the primary mode of irradiation when regional lymph nodes are at significant risk for subclinical involvement, and intraoral cone-beam radiation or interstitial brachytherapy may be added as a boost to the primary tumor.

Significant acute RT toxicities include mucositis, skin reaction, loss of taste, and dysphagia. Late complications may include skin and soft tissue atrophy and fibrosis, osteoradionecrosis (particularly with brachytherapy), lymphedema, and trismus.

Xerostomia commonly occurs during the course of RT and persists after treatment. Xerostomia may recover after treatment with modern RT techniques such as 3D conformal or intensity-modulated radiation therapy (IMRT). However, recovery of xerostomia in patients with oral cavity tumors may be more limited than with other head and neck sites because of higher doses of radiation to the submandibular glands and larger volumes of oral mucosa and minor salivary glands in the treatment fields (37).

2.2 .6: MANAGEMENT OF THE NECK

Elective treatment of the neck in patients with clinically N0 stages I and II oral cavity cancer remains controversial. Rates of occult metastasis as high as 45 percent are found in patients with early stage oral cavity cancer, particularly for cancers of the oral tongue and floor of mouth (38-39-40). Due to this, an elective neck dissection is generally recommended for patients with stage II disease to reduce the chance of regional recurrences.

The indications for an elective neck dissection in patients with stage I disease are controversial, since the incidence of occult metastases for T1 tumors is generally less than 15 to 20 percent. Some clinicians use a threshold of >10 percent for performing elective node dissection while others do not. Other clinical and histologic factors have been investigated to help determine which patients are at highest risk to develop regional lymph node disease.

Tumor thickness may be a useful parameter for predicting occult metastases in squamous cell carcinoma, particularly for tumors arising in the tongue. The definition and measurement of tumor thickness or depth of invasion has varied between studies. However, most reports have found that tumor thickness greater than 2 to 4 mm is associated with the presence of occult metastases and reduced recurrence-free and overall survival (41-42).

Noninvasive techniques to assess tumor thickness (clinical palpation, CT, PET, MRI, intraoral ultrasonography, and frozen section analysis) all have limitations. Thus, the thickness of the primary tumor is generally unknown prior to an elective neck dissection unless a two-stage procedure is planned. As a consequence, many experienced head and neck surgeons adopt a "thick" versus "thin" strategy and will defer elective neck dissection for only the most superficial cancers (42).

The optimal extent of neck dissection is uncertain; limiting the extent of dissection reduces the morbidity. A supraomohyoid neck dissection that includes levels I to III is typically sufficient for clinically N0 oral cavity cancer since level IV and V lymph nodes are rarely involved without clinical disease at other levels. (43). This approach includes removal of the submandibular gland but preserves the spinal accessory

nerve, the internal jugular vein, and the sternocleidomastoid muscle. Sublevel IIB may also be preserved in patients with early stage oral cavity cancer, thus minimizing the risk of shoulder dysfunction from damage to the spinal accessory nerve, which runs through sublevel IIB. One exception to this approach is oral tongue cancer, which may develop skip metastases to level IV (44).

For patients with oral cavity cancer, we can perform an ipsilateral selective neck dissection, levels I to III/IV, for stage I cancers with greater than 2 mm of invasion and all stage II disease. Levels IIB and IV are dissected at the discretion of the surgeon. Level V dissection is usually unnecessary. Patients with primary tumors close to or involving the midline should be managed with bilateral neck dissection (45).

More specific recommendations, incorporating the primary tumor site, include the following: Elective neck treatment is usually not performed for T1 lower lip cancers. For T2 and larger cancers, elective dissection can be limited to levels IA and 1B (suprahyoid dissection) since lower lip cancers usually do not metastasize to lower cervical nodes without first invading facial, submental and submandibular lymph nodes (46).

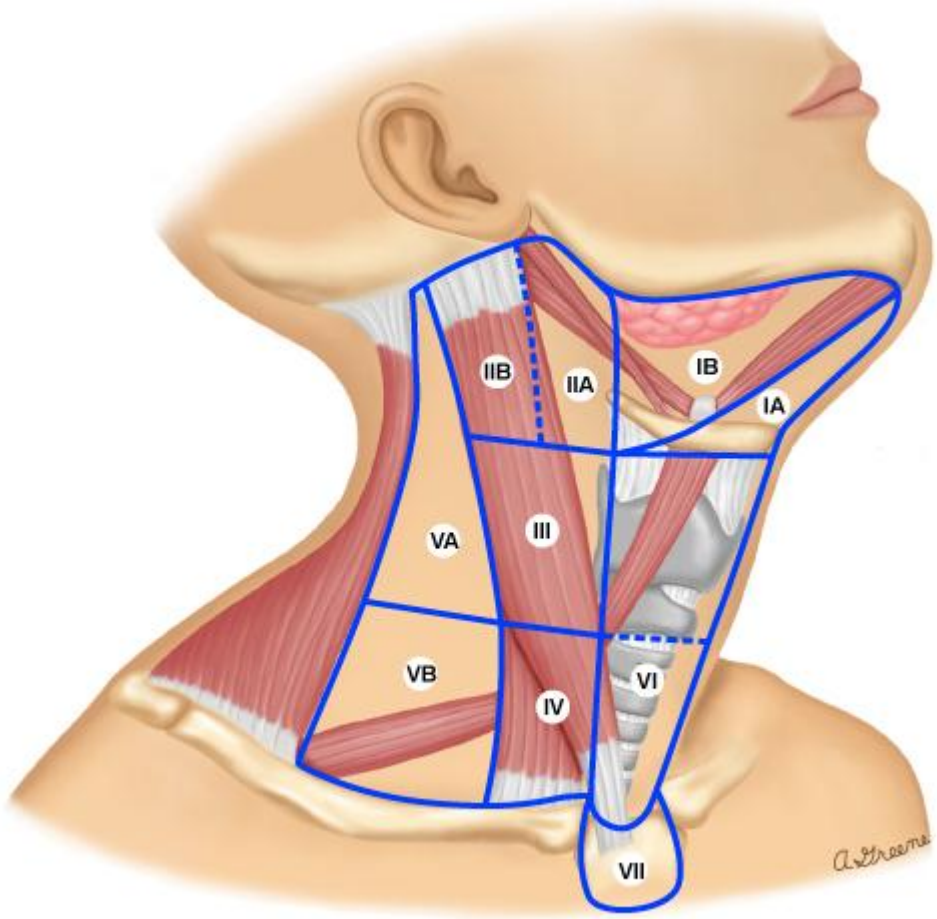
For all T1 and T2 oral tongue cancers with ≥2 mm depth of invasion, we can perform an elective lymph node dissection. (53) There is no consensus on what levels of lymph node dissection are appropriate for high risk T1 or T2 oral cavity cancers.

For all lower alveolar ridge and retromolar trigone cancers, regardless of size, we suggest elective neck dissection, including levels I to III, given the particularly high incidence of occult nodal metastases. (47)

For early stage cancers of the upper alveolar ridge and hard palate the incidence of occult cervical lymph node metastases is low; therefore, elective treatment of the neck is usually not indicated.

For buccal mucosa cancers, the facial lymph nodes adjacent to the facial artery and vein at the mandibular ramus are at high risk of metastasis, and particular attention should be paid to this area during an elective neck dissection.

For patients whose primary treatment is RT, elective irradiation of the neck follows the same indications as for elective neck dissection.



Figuer (2): Surgical Level of Lymph Node in the Neck (32).

Level I, submental (IA) and submandibular (IB); level II, upper internal jugular nodes; level III, middle jugular nodes; level IV, low jugular nodes; level V, posterior triangle nodes; level VI, central compartment; level VII, superior mediastinal nodes.

2.2.7: ADJUVANT THERAPY

Adjuvant postoperative radiation, with or without concurrent chemotherapy, is indicated for patients who have positive or close final resection margins (if not re-resected), bone invasion, or pathologically positive lymph nodes. Postoperative RT should also be considered if there is lymphovascular or perineural invasion in the primary tumor (44).

Contemporary conformal RT techniques should be used to minimize treatment-related morbidity, particularly late xerostomia (47).

There is no evidence to support the use of chemotherapy for early-stage oral cavity cancer.

2.3: Treatment of locoregionally advanced (stage III and IV) head and Neck Cancer. (48)

There are multiple information's from randomized clinical trials to introduction of an optimal strategy for patients with stages III and IV head and neck cancer.

Decisions about the optimal management of surgery, RT, and chemotherapy for each patient should be made with multidisciplinary studies. The management plan should take into account the likely functional consequences of treatment, as well as the expertise of the treatment team. (48)

2.3.1: Locoregionally advanced oral cavity cancers:

There are aggressive malignancies with high rates of recurrence after definitive treatment with either surgery or radiation therapy (RT) alone (49). Thus, a combined approach is generally indicated when accepted by the patient's overall condition.

Surgery is recommended as the primary therapy for locally advanced oral cavity cancers (50). In most cases, resection and reconstruction at the same time are done with acceptable functional outcomes. RT and/or chemoradiotherapy are other option for patients who refuse surgery, have a technically unresectable tumor (eg, due to carotid artery encasement, vertebral or brain invasion), would have an unacceptable functional outcome with surgery, or are medically ill patients.

2.3.2: Initial surgery:

Surgery is preferred as the first step in the management of locoregionally advanced oral cavity cancer, although information comparing surgery with RT are limited. (51-52).

2.3.3: Surgical Resection:

Transoral approach or a combined transoral and transcervical approach can be used in oral cavity cancers. Traditional surgical techniques are generally used for locally advanced cancers. There is no advantage to minimally invasive approaches, such as transoral laser resection or robotic-assisted surgery, particularly given the complexity of the reconstruction that is often required.

Every resection should be made to undertaken negative resection margins, since there is an increased risk of treatment failure in patients with positive surgical margins, even when postoperative RT or chemoradiotherapy is used. (53) If positive margins are identified, reresection is indicated when feasible. Postoperative RT or chemoradiotherapy is indicated when positive surgical margins are identified.

2.3.4 : Postoperative RT and chemoradiotherapy

Postoperative RT with or without using of chemotherapy should be strongly recommended standard of treatment for patients with resected locoregionally advanced oral cavity cancer since these patients are at significant risk for local recurrence after surgery. (50)

Indications for chemoradiotherapy:

Risk factors associated with a particularly increased risk of recurrence include extracapsular nodal spread, positive resection margins, N2 or N3 nodal disease, nodal disease in levels IV or V, perineural invasion, or vascular invasion, all of which are indications for chemoradiotherapy. The presence of T3 or T4 disease, without any other high risk features, is an indication for RT alone.

Postoperative RT is generally preferred over preoperative RT for patients with locoregionally advanced oral cavity cancer. The administration of preoperative RT can delay surgery and increases the risk of postoperative complications. (56)

Initial radiation therapy and/or chemotherapy:

Functional organ preservation approaches are widely used for patients with locoregionally advanced oropharyngeal, hypopharyngeal, and laryngeal cancers. However, this approach has not been widely applied to patients with oral cavity cancer. Data are more limited, there are concerns about increased toxicity (54), and no survival advantage has been demonstrated for patients with stage III or IV primary tumors of the oral cavity (52,55,56).

A combined modality approach utilizing both chemotherapy and RT is appropriate for patients who are not surgical candidates but whose overall condition will tolerate the potential increase in toxicity. Approaches that may be used include using of chemotherapy followed by definitive chemoradiotherapy or RT and immediate concurrent chemoradiotherapy.

RT without chemotherapy is appropriate for patients who are not surgical candidates and whose medical condition will not tolerate the increased toxicity associated with chemotherapy or concurrent chemoradiotherapy.

For patients where a nonsurgical approach was not used because of either irresectable tumor or the morbidity associated with resection, complete resection may be indicated as a salvage procedure for residual disease.

2.3.5: Oral cavity subsites

Lip: Although squamous cell carcinomas are the most frequent histologic type of lip cancer, these tumors generally are more related to skin cancers than to other oral cavity cancers. Because they are readily visible, most lip cancers are diagnosed at early stages, with T3 and T4 tumors representing a very small proportion of cases. (58-59)

Occasionally, definitive RT may be functionally and cosmetically preferable to surgical resection. In cases with bone or nerve invasion, resection with postoperative RT is indicated (60).

Floor of the mouth: Locally advanced cancer of the floor of the mouth is typically treated with surgical resection to achieve negative margins, followed by postoperative RT, with or without concurrent chemotherapy. The combination of surgery and postoperative RT has been associated with better local control than either modality alone, as surgical resection alone (with 1 to 2 cm margins) for stages III and IV disease results in five-year overall survival of only 46% and 26 %, respectively. (61-62)

Cancer of the floor of the mouth has a high rate of mandibular invasion and cervical lymph node metastases. Furthermore, anterior floor of mouth cancers often involve the geniohyoid tubercle and genioglossus muscle anteriorly. Thus, surgery will frequently require segmental mandibulectomy as a marginal resection of bone is generally not possible in the coronal plane.

Oral tongue:

The oral tongue is the most common subsite for oral cavity cancer. Cancer of the oral tongue has been associated with a worse prognosis compared with other oral cavity subsites in some but not all series. (63,64). Typically, five-year disease-specific

survival rates of 39 and 27 percent have been achieved for stage III and IV disease, respectively. (65)

Partial glossectomy is commonly required for locoregionally advanced disease. Total glossectomy is occasionally required in cases where bilateral lingual arteries are involved by cancer. (66)

Lower alveolar ridge and retromolar trigone:

The surgical approach to resection of locoregionally advanced oral cavity cancer involving the lower alveolar ridge depends upon the status of the teeth. Patients with dentition in good status are often candidates for marginal resection of the mandible, which can be performed transorally. In contrast, edentulous patients and those with loose teeth involved by cancer require segmental resection of the mandible to ensure adequate clearance of disease.

Similarly, locally advanced retromolar trigone lesions typically require segmental mandibulectomy followed by postoperative RT. (67-68) Resection of the ascending ramus of the mandible including the pterygoid muscles is important to ensure eradication of disease. Microvascular reconstruction with a fibular free tissue transfer provides optimal functional and cosmetic rehabilitation.

Upper alveolar ridge and hard palate:

Hard palate cancers are rare. Locally advanced lesions typically involve the underlying bone, and primary surgery is used more commonly than definitive RT. (69) Resection is generally well tolerated. These patients can be reconstructed with either an immediate surgical obturator or microvascular-free tissue transfer.

Buccal mucosa:

Buccal mucosa cancers have a high tendency to recur locoregionally. Consequently, patients with buccal mucosa cancers have a worse survival rate compared with patients with cancer in other oral cavity subsites. (70) Exposure of a buccal mucosa cancer can be difficult via a transoral approach, which makes it difficult to obtain clear radial margins in an en bloc fashion. Furthermore, the small distance between the buccal mucosa and the buccal space permits early invasion to deep structures or to anterior cheek skin. Extension of the buccal space, parotid, and skin is needed to maximize outcome, although this is achieved with a considerable cost to cosmesis.

Cancer of the buccal mucosa can be treated with definitive RT. However, deeply invasive cancers should be managed with surgery and postoperative RT. Regardless of the method of treatment, there is a high risk of severe, irreversible trismus. Aggressive reconstruction and rehabilitation is required to optimize functional outcomes.

2.3.6: Supportive care measures:

Prophylactic tracheostomy is generally required for locoregionally advanced oral cavity cancers undergoing surgery, except for cancers of the upper alveolar ridge and hard palate. The tracheostomy can usually be removed within a couple of weeks of surgery and prior to adjuvant therapy. In some cases, tracheostomy is maintained during adjuvant RT or chemoradiotherapy.

Feeding tubes:

The majority of patients receiving chemoradiotherapy for locoregional disease experience significant weight loss due to treatment-related side effects such as mucositis and dysphagia. Feeding tubes may limit malnutrition, which is associated with poorer scores on QOL instruments. Whether the prophylactic placement of feeding tubes is of benefit is controversial. On the one hand, a randomized study showed significantly higher QOL scores (European Organization for Research into the Treatment of Cancer [EORTC]) in the group receiving prophylactic gastrostomy. (39) However, some argue that prophylactic feeding tube placement leads to disuse of swallowing muscles and ultimately higher rates of feeding tube dependence. The importance of these issues led to the development of a specific instrument that measures the impact of enteral feeding tubes on the QOL of these patients. (40)

2.3.7: MANAGEMENT OF THE NECK

Patients with stages III and IV oral cavity cancer either have clinically involved lymph node(s) in the neck or are at significant risk of subclinical nodal involvement due to the size and extent of the primary tumor. Thus, treatment of the neck is indicated; (70) this usually includes unilateral or bilateral neck dissection with postoperative radiation therapy (RT).

The extent of neck dissection remains controversial. Limiting the extent of dissection reduces surgical morbidity, particularly if level V is excluded. A selective dissection

including levels I to III, a supraomohyoid neck dissection, is typically sufficient for clinically N0 oral cavity cancer, as level IV and V nodes are rarely involved without clinical disease at other levels. (71- 72) This dissection includes the submandibular gland but preserves the spinal accessory nerve, the internal jugular vein, and the sternocleidomastoid muscle. Some cancers of the oral tongue, however, involve level IV lymph nodes without disease being present in levels I to III, a phenomenon known as "skip metastases". (73).

Patients with clinically involved regional lymph nodes may benefit from a complete modified neck dissection. Contralateral metastases, and hence the need for bilateral neck treatment, are more likely for tumors that approach or cross the midline. (74) In addition, oral tongue and floor of the mouth cancers are at very high risk for bilateral nodal involvement. If postoperative RT is planned for the ipsilateral neck, some groups advocate RT to the contralateral N0 neck rather than neck dissection. Bilateral neck dissection combined with bilateral neck RT has a high risk of significant lymphedema, although surgical sparing of the jugular vein is the most important aspect of preventing edema in patients undergoing a bilateral neck dissection. (75)

2.3.8: COMPLICATIONS

Both surgery and RT can have a profound effect on the quality of life, given the role of the oral cavity in speech, mastication, and swallowing. Thus, careful patient selection and surgical planning is required for all locoregionally advanced oral cavity cancer patients. The use of a multimodality approach in locally advanced oral cavity cancers increases the risk of serious complications.

Potential direct surgical complications include infection, bleeding, aspiration, wound breakdown, flap loss, and fistula. (76)

Irradiation of the oral cavity and neck may result in mucositis, skin reaction, xerostomia, loss of taste, and dysphagia. Late toxicities may include skin and soft tissue atrophy and fibrosis, osteoradionecrosis, xerostomia, and trismus. Recovery from xerostomia after irradiation of the oral cavity, even with modern conformal techniques, is more limited than with other head and neck sites because of higher doses of irradiation to the submandibular glands and larger volumes of oral mucosa and the minor salivary glands in the treatment fields. (77) Xerostomia also

exacerbates other late complications, such as difficulty swallowing, impaired speech, and dental caries. (78)

Osteoradionecrosis of the mandible is a particularly feared consequence of high-dose radiation to the oral cavity, and one of the primary reasons that surgery is often preferred to definitive RT. (79)

2.3.9: PROGNOSIS

The Surveillance, Epidemiology and End Results (SEER) Cancer Statistics review for the years 1975 to 2007 reports a five-year relative survival for locally advanced oral cavity and oropharyngeal cancer of 54.7 percent, in contrast to 82.5 percent for early-stage disease. (80) Although stage IV patients have worse outcomes than stage III patients, it has been suggested that the subset of stage IV patients with pT4N0 disease may have similar outcomes to stage III patients. (81)

Lymph node involvement is the single most important prognostic factor for outcome in oral cavity cancer. (82) In addition to the presence or absence of lymph node metastasis, other factors include the number and size of positive lymph nodes, the presence of extracapsular extension, and the ratio of positive lymph nodes to total number of excised lymph nodes. (83-84) With regard to the primary lesion, higher histologic grade, the presence of perineural invasion and increasing size have been correlated with worse outcomes. (85-87)

2.4.: Type of Free Flap commonly used in Head and Neck Reconstruction

1- Free Fibular Osteocutenous flap (87),

Tissue: Bone with adjacent periosteum and soft tissue. It can be harvested with or without a skin paddle.

Innervation: Not sensate.

Blood supply: Peroneal artery.

Artery: Large caliber of 1.5 to 4 mm.

Vein(s): Two venae, usually similar in size to the artery. One is often very large.

Pedicle length: The short pedicle can be made longer by dissecting it free of the proximal fibula, and using the distal bone for the reconstruction.

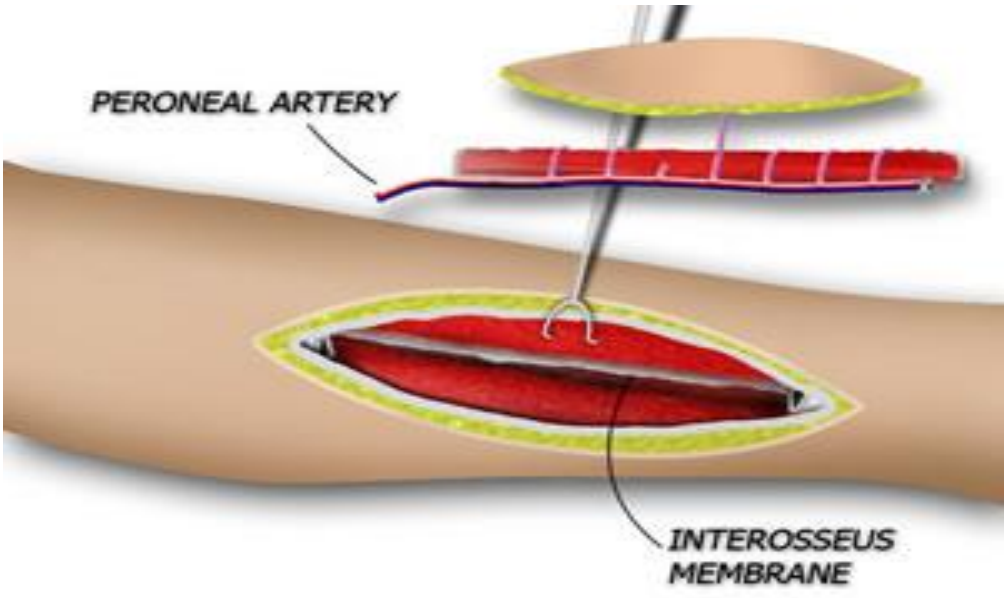


Fig (3) : Blood supply of fibular flap (49).

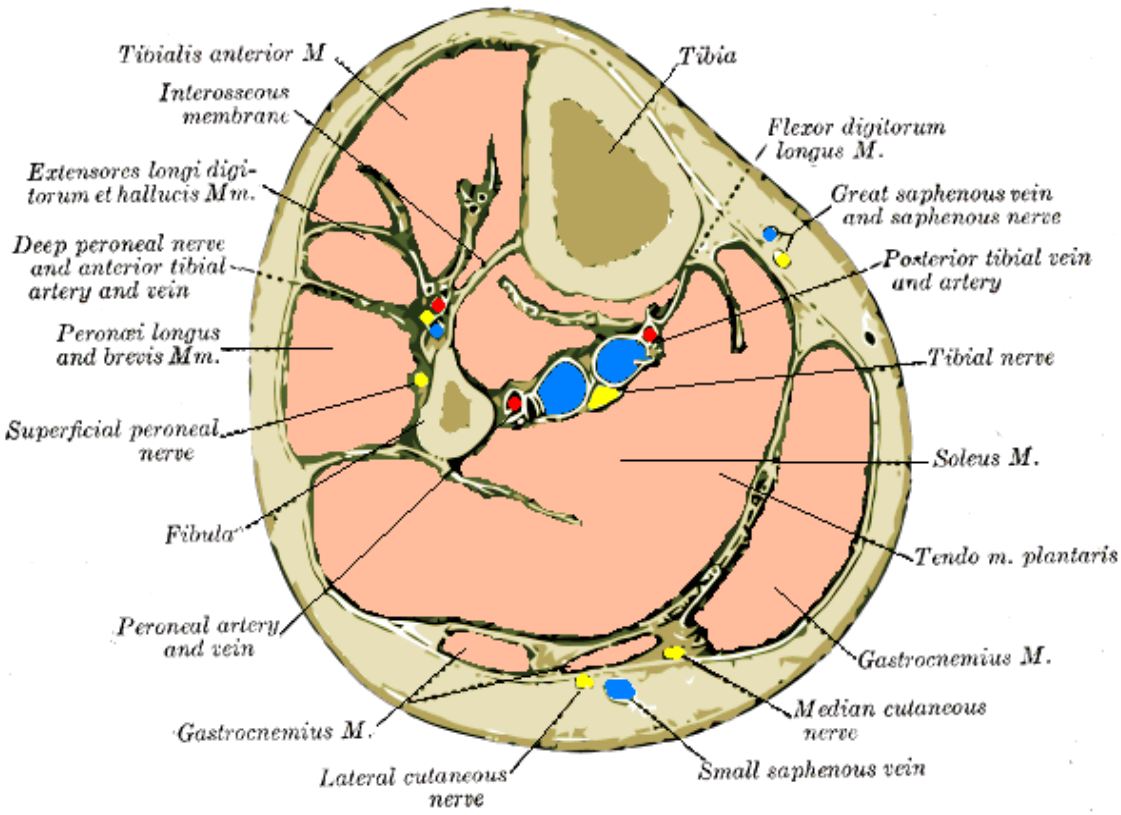


Fig (4) : Cross-section through middle of leg. (Fibular artery labeled as Peroneal at bottom right)(49).

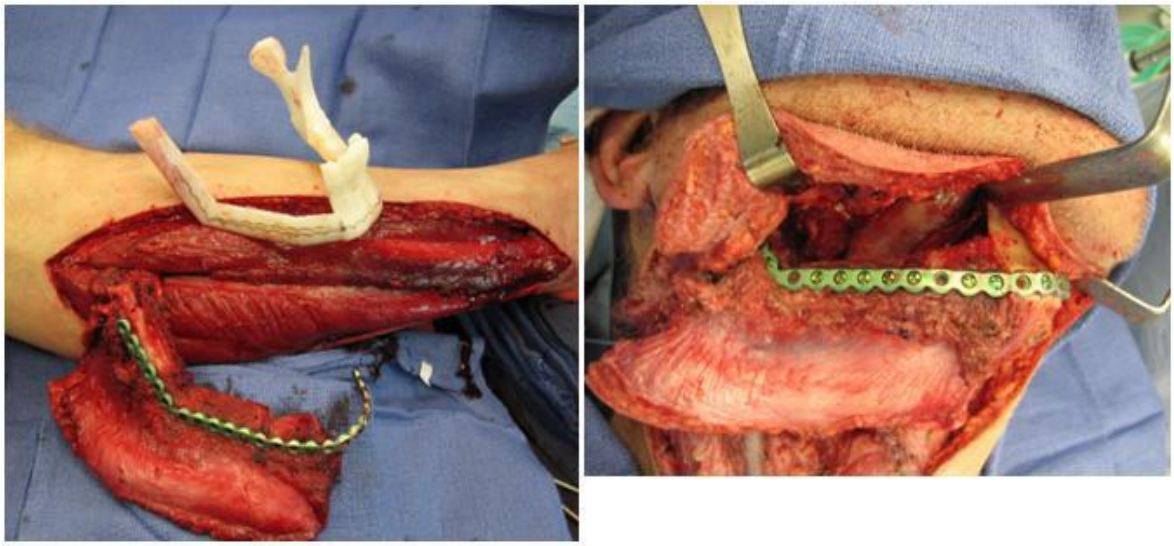


Fig (5) : Mandibular Reconstruction using Free Fibular Osteocutenous Flap (51).

2- Radial Forearm Free Flap (87),

Tissue: Skin and fascia: optional tendon and bone

Innervation: No.

Blood supply: Radial artery and perforators from the radial artery.

Artery: Large caliber artery.

Vein(s): The venae of the radial artery can be small. The subcutaneous venous system or cephalic vein can be used for drainage, making for a larger caliber vessel.

Pedicle length: Can be dissected up to the takeoff from the brachial artery just distal to the antecubital fossa.

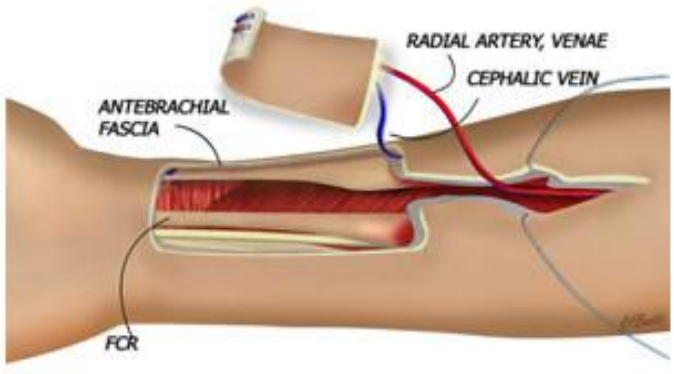


Fig (6) : Radial Forearm Free Flap (49).

Fig (7) :Radial forearm flap in Reconstruction of tongue defect (49).

3- Antero Latral Thigh Flap (87),

Tissue: A skin, fat and fascia flap it can be thinned free of fascia. Or the skin and fat can be removed to make it a thin fascial flap. It can be made up to 8 x 25 centimeters, or larger if the donor area is grafted.

Innervation: Yes - lateral femoral cutaneous nerve of the thigh.

Blood supply: Descending branch of lateral femoral circumflex artery.

Artery: 1.5 to 2.5 millimeters

Vein(s): Slightly larger than artery when taken to the origin.

Pedicle length: Up to 7 centimeters or longer, depending on how the flap is designed and where the perforator(s) enter the flap.

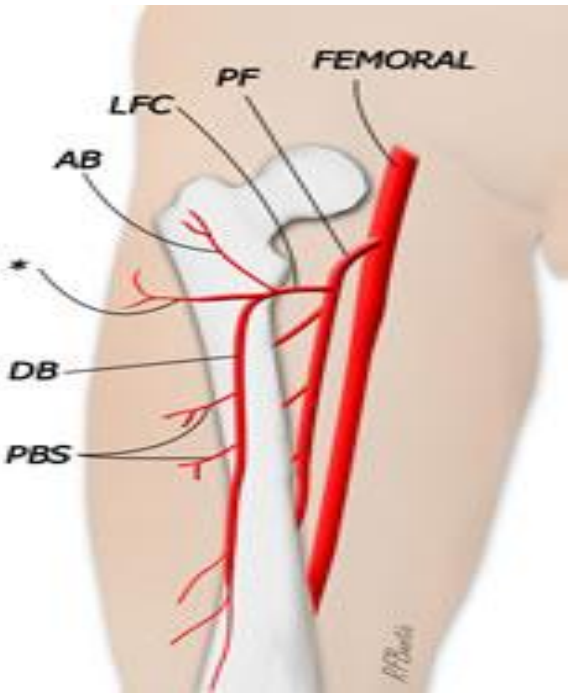


FIG (8):Vascular anatomy of the lateral thigh. (51).

The ALT flap is nourished by perforating branches (PBS) from the descending branch (DB) of the lateral femoral circumflex (LFC) vessels.
(PF) profunda femoral
(AB) ascending branch
(*) perforator through TFL muscle to skin

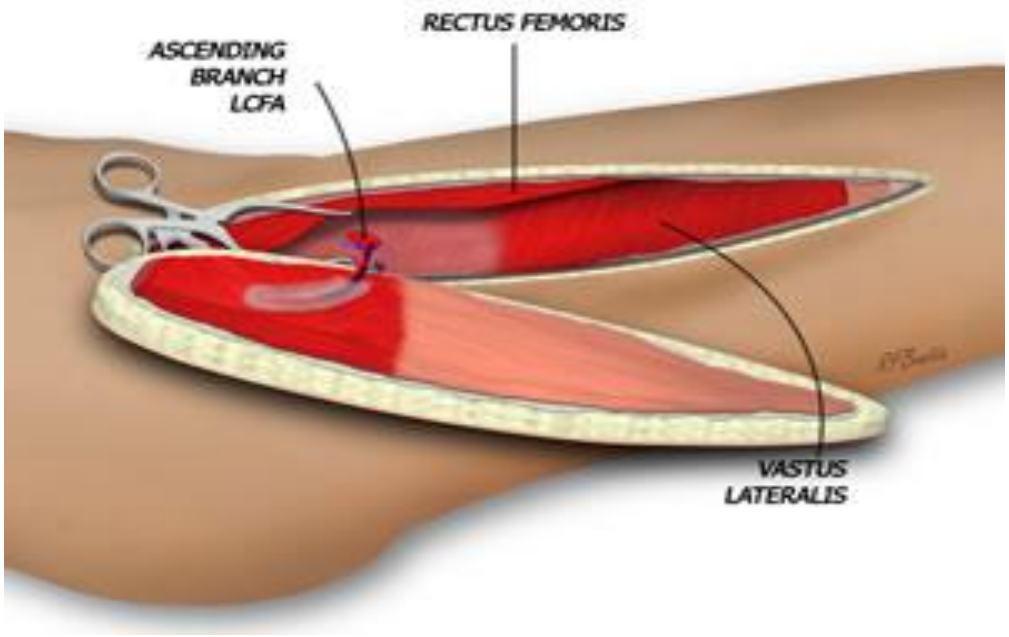


Fig (9): ALT Flap (51).

Fig (10) : Lateral Facial Reconstruction Using an ALT Flap. (51).

2.4.4 Scapular and Para Scapular flap

Tissue:

A skin and fat flap. It can be incorporated on the subscapular tree to make a chimeric flap. Flap sizes can be up to 10 by 25 centimeters. The lateral border of the scapula can be included to provide vascularized bone.

Innervation:

None.

Blood supply:

A transverse branch of the circumflex scapular artery.

Artery:

Large caliber if traced to the subscapular from 2 to 4 millimeters.*:*

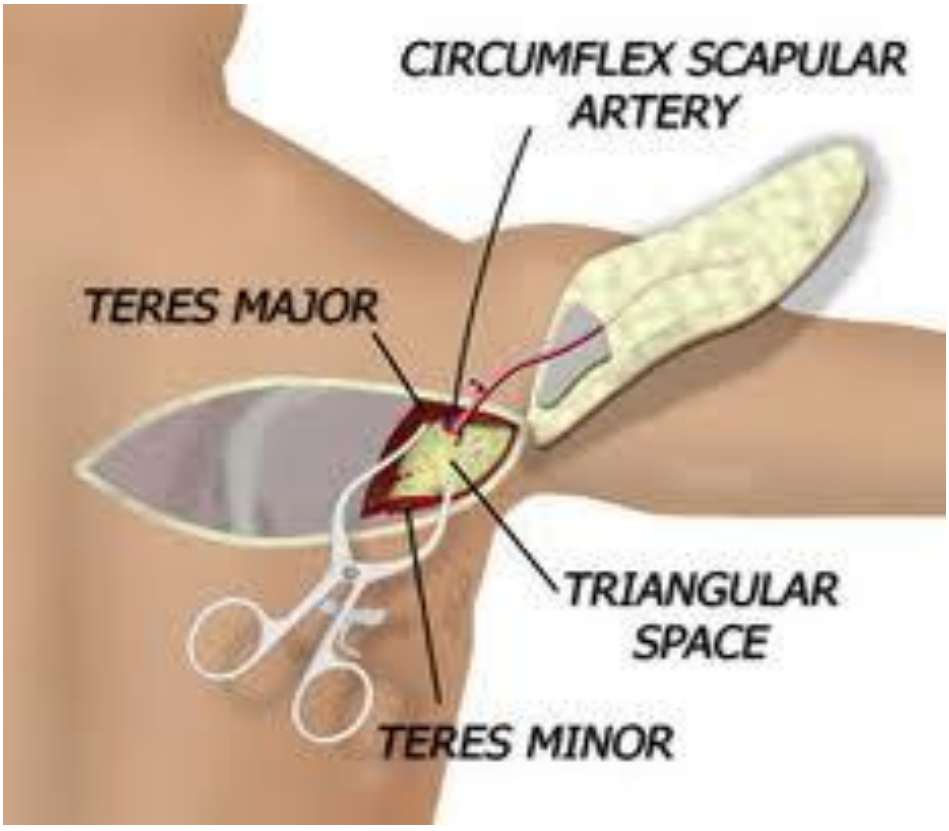


Fig 11 : Scapular Flap (51).

2.4.5 : Navigational systems

Like global positioning system, navigation provides 3D road map. (88) Advantages are accuracy, least trauma, shorter duration of surgery, reduced complications, fewer chances of recurrence and excellent success rate. Used mainly by neurosurgeons for removal of brain tumours that are seen on computed tomography or magnetic resonance imaging but are clinically difficult to distinguish from normal brain tissue.

Its use in soft tissue resections of head and neck is yet to be established. It has been used for lymphatico venous anastomosis, (89) At present, it is being used for reduction of fractures of orbital floor and zygoma. Software is based on digital mirror image of the normal side or matching image from database is used for exact reduction. Size and volume are restored accurately. (90)

2.4.6 : Stereo lithographic models

Computer aided planning and CAD is used to evaluate exact site, size and shape of the defect preoperatively by using 3D imaging of the area involved. Virtual mandibular resections are done to prepare customized plate or implant. Similar technique can be used to develop a template for fibular bone osteotomy. It also guides in deciding which part and surface of fibula is best for dental implant in case primary implant based dental restoration is planned.–(91) It is used for planning in craniofacial surgeries or for making cranial bone implant that is, polyetheretherketone (PEEK) implant. (92)

Though it provides several advantages, it still does not appear to decrease operative time enough to justify its cost, plus facility may not be available. (93)

2.4.7 : Robotic surgery

Vinci robotic arm positioned near patient reach inaccessible region easily. Performing surgeon has comfortable sitting position at console. With 3D, endoscopic, microscopic image and sensitive controls desired procedure can be

done even from a remote place. Currently, robotic surgery is being used for resections and reconstruction of tumours at base of tongue and larynx, avoiding mandibulotomy for access which has its own morbidity. (94) With trans-axillary approach, thyroid, para thyroid adenoma and neck lymph node can be operated without giving scar on the neck.

2.4. 8: Tissue engineering

Tissue engineering is an exciting new field that has potential to revolutionize reconstructive surgery.

Autologous flaps are limited and have donor area morbidity. They do not match exactly. Prosthetic materials may fail to integrate with body tissue. With tissue engineering technique and stem cell therapy, tissues can be regenerated, replaced or repaired for specific purposes. Biologic mediators or scaffolds (95) are used for specific tissue. Three components: Scaffold, signalling molecule and cells decides success of tissue engineering. For the regeneration of tissue either all or some of these components are introduced, followed by *in-vitro* growth and maturation, to produce tissue or even organs.

Natural collagen, demineralized bone matrix, acellular matrix; or polymers - polyglycolic acid or metal - titanium are used as a scaffold at present. Maximum progress of tissue engineering is in bone and cartilage regeneration.

2.4.9 : Cartilage tissue engineering

Cartilage does not have ability to repair or regenerate. Reconstruction of cartilage defects are challenging due lack of suitable donor sites and prosthetic materials used have their own associated problems. Tissue engineering cartilage is relatively simple because it consists of only one cell type, the chondrocyte. It does not need neovascularization. It survives on the diffusion fluid for nutrition and excretion of waste products. Different shaped cartilage like ear or temporomandibular joint

have been produced. (21) Clinical use of tissue engineered cartilage, in head and neck is still not established as it still gets reabsorbed to a certain extent.

2.4.10 : Tissue engineered bone

Bone is a highly vascular tissue. It has ability to remodel and heal without scarring. Random non-vascular bone graft can manage small defect. Large defect or unfavourable environment like postradiotherapy need vascularised bone graft for reconstructions with microsurgical expertise. Available bone graft may not be adequate. Allografts have their own problems of reabsorption and infection.

Tissue engineered bone is either cell-based or growth factor based. Both need 3D scaffold as carrier. Bone morphogenetic proteins (BMPs) are most important growth factors for formation and differentiation of bone.

Bone morphogenetic proteins promote bone formation. They are used for treating nonunion of long bones, Le Fort osteotomies, in spine surgery and for alveolar regeneration and sinus floor augmentation.

Orthotopic or heterotopic bone formation is possible with the application of BMPs, process is called osteoinduction.
To fabricate tissue engineered bone, one needs an adequate number of cells with osteogenic capacity, appropriate scaffold for seeding cells, and factors to stimulate osteogenesis. But it needs blood supply for its transfer to a distant site. It has been possible to fabricate bone in latissimus dorsi muscle and then transferred it as free bone muscle flap. (97) Mandibular defect has been reconstructed with this method. A titanium mesh cage was filled with autologous bone, infiltrated with BMP-7 and then implanted into latissimus dorsi muscle. After 7 weeks transferred as free bone muscle flap to repair mandible defect . (98)

2.4.11 : Future

Gene therapy and immune system targeting are being explored, and research wants to attack cancer at cellular or molecular level. In the future, progress in this technology

will determine how much role surgery, chemotherapy and radiotherapy will have in treatment of cancer. However, mass education to improve oral hygiene and healthy habits has a great role in the prevention of these cancers in India.

2. 5: Quality of life in head and neck cancer

Head and neck cancer (HNC) includes those cancers originating in the oral cavity, pharynx (nasopharynx, oropharynx, or hypopharynx), nasal cavity, paranasal sinuses, salivary glands, and larynx.

HNC arises in structurally complex and functionally important areas. Impairment of these areas from both disease and therapy can interfere with basic functions, including eating and speech, and can have a profound effect on social interactions and psychological state. (99)

Radiation thereby and chemotherapy, has increased disease control for locally-advanced HNC. These combined multimodality treatment, including surgery, chemotherapy, and improvements have come at the expense of increased acute and late effects, which may have a more profound effect on function and (QOL) than has been previously recognized. (100, 101)

QOL is a broad concept, a subjective multidimensional global construct that seeks to provide a comprehensive picture of the patient's perception of himself or herself in the world. (102) The World Health Organization (WHO) defines QOL as an "individual's perception of his or her position in life in the context of the culture and value systems in which the patient lives and in relation to his or her goals, expectations, standards, and concerns". (103)

Health-related QOL focuses upon the patient's perception of the impact of illness before, during, and after treatment. The fundamental premise of health-related QOL includes:

-Multidimensionality QOL encompasses a broad range of domains [104]. These include:

•Physical health (eg, pain, fatigue, sleep).

•Psychological (eg, body image, mood, memory, and concentration).

•Level of independence/function (eg, mobility, activities of daily living, work capacity).

•Social (eg, work, personal relationships, sexuality).

•Environment (eg, financial resources, transportation resources).

•Spirituality/religion/personal beliefs

●Subjectivity: Different people may have substantially different reactions to a similar illness or disability. (105)

QOL must be evaluated from the patient's perspective rather than the clinician's perspective, (106) because the patient ratings are more sensitive and reliable than those of their clinicians. (107)

Specific Domain in QOL of Head and Neck Cancer:

- Appearance.
- Swallowing.
- Chewing.
- Speech.
- Shoulder dysfunction.
- Saliva.
- Taste.

2.5.1 : SIGNIFICANCE OF QOL MEASURES IN HNC

Values of using QOL measures applications that reflecting on the patients, clinics and researches (99-106):

1. Guide clinical decision making by identifying patient preferences and treatment goals.
2. Help monitor changes in response to treatment.
3. Facilitate communication between the clinician and the patient.
4. Identify problems that have a significant impact on QOL.
5. Help clinicians to prioritize treatment of problems most worrisome to the patient.
6. Help train staff to be more responsive to patients' needs and concerns including patient education services and rehabilitative services.
7. Help in the development of patient liaison services.

8. Shape public policy and healthcare decisions made by the government and private institutions.
9. Guide research agendas of pharmaceutical companies and cooperative groups.

2.5.2 : Criteria of a good QOL questionnaire (99-106):

1. Validity (measure what they say they do).
2. Reliability (reproducible if repeated in the same group).
3. Sensitivity (respond to changes in the patient's condition).
4. Ease of administration (length of time, manpower, and resources required to collect and analyze data).
5. Patient comprehension.
6. Ease of scoring and interpretation.
7. Clinical relevance (ie, changes in score are clinically significant, or meaningful benchmarks exist at which point a treatment could be considered to have improved QOL).

2.5.3: Methodological considerations for QOL research study design include:

1. No selection bias.
2. No floor effect (able to detect worsening of QOL in patients with existing poor QOL).
3. No ceiling effect (able to detect improvement of QOL in patients with existing good QOL).
4. Appropriateness across multicultural/multiracial populations
5. Ease of clinical applicability.
6. Has an overall global score and domain scores.
7. Multidimensional.
8. Self-administered.

The choice of tool depends on the study objective, target population, and psychometric properties of the scale. (102)

There are six major categories of tools that are available to assess QOL. Examples of questionnaires for each category are included below (99, 106, 107):

A- ***General health***, which can be used across a range of disease states:

- EQ-5D (formally EuroQOL). (108)
- Medical Outcomes Study (MOS) short form 36 (SF-36). (109)
- Sickness Impact Profile (SIP). (110)

B- ***Disease specific***, which have been developed specifically for patients with cancer:

- The Cancer Rehabilitation Evaluation System (CARES). (111)
- European Organization for Research into the Treatment of Cancer (EORTC) QLQ-C30. (112)
- Functional Assessment of Cancer Therapy-General (FACT-G) version 4. (113)

C- *Site specific*, for head and neck cancer patients:

- University of Washington QOL Questionnaire (UWQOL). (114)
- EORTC-Head and Neck QLQ. (115)
- FACT-H&N; (30) Performance Status Scale for Head and Neck Cancer Patients.
- MD Anderson Symptom Inventory-Head and Neck (MDASI-HN) [116), Vanderbilt Head and Neck Symptom Survey (VHNSS) version 2.0. (117)

D- Domain specific:

- Voice related QOL (V-RQOL). (118)
- MD Anderson Dysphagia Inventory (MDADI). (119)
- Xerostomia Questionnaire (XQ) and (XQOL). (120)
- Shoulder Pain and Disability Index (SPADI). (121)

E- ***Treatment specific****:*

- UWQOL for surgical patients. (122)
- Head and Neck Radiotherapy Questionnaire (HNRQ). (123)
- Quality of Life Radiation Therapy Instrument Head and Neck Module (QOL-RTI/H&N), (124)
- Liverpool Oral Rehabilitation Questionnaire. (125)

F- Symptom specific:

- Brief Fatigue Inventory (BFI). (126)
- Brief Pain Inventory-Short Form (BPI). (127)

2.5.4 : Specific symptoms that frequently affected in head and neck cancer treatment

Appearance:

Physical changes from HNC, as a result of the tumor or its treatment (surgery, radiotherapy), can cause disfigurement of the face and a resultant decline in QOL. (128) The face is a highly visible and socially significant body structure in terms of body image, as well as for its role in social eating and speech.

Cancers involving the cheek, lip, and nasal cavity are particularly susceptible to impaired body image and psychosocial functioning. There appears to be an additive effect of functional and appearance related impairments that contribute to poorer body image. (129) Conversely, some studies have not found a link between extensive disfiguration and QOL, perhaps as a result of patient adaptation or a perceived tradeoff between life/death and disfigurement. (130) Even loss of speech and permanent stoma were found to not significantly determine QOL. (131)

Dysphagia:

On average 50 percent of patients suffer from dysphagia at 6 and 12 months after treatment, with 15 percent having moderate to severe dysphagia. (132) Concomitant chemoradiotherapy increases the incidence and severity of dysphagia. Dysphagia at the beginning of treatment is typically from the tumor itself or related to surgery. At the end of therapy (6 and 12 months), dysphagia influenced global QOL and appetite.

Swallowing:

On average 60% of patients cannot be swallow and suffer from dysphagia at 6 and 12 months after treatment, with 15 percent having moderate to severe dysphagia. (133) Concomitant chemoradiotherapy increases the incidence and severity of dysphagia. Dysphagia at the beginning of treatment is typically from the tumor itself or related to surgery. At the end of therapy (6 and 12 months), dysphagia influenced global QOL and appetite.

Speech:

As oral cavity is siting of formation and articulation of speech any tumor in this area affect directly the speech function.

Shoulder dysfunction

Shoulder pain after neck dissection can only be attributed to dysfunction of the spinal accessory nerve in about 50%. If patients experience shoulder pain after neck dissection examination of the trapezius muscle and active bilateral abduction of the shoulder should be made to find out if the spinal accessory nerve is involved**.**

Xerostomia:

Xerostomia is one of the most frequent adverse effects experienced by patients who receive radiotherapy. An inverse relationship between xerostomia and QOL has been observed. Xerostomia, the subjective complaint of dry mouth, more strongly affects QOL than does hyposalivation, the objective finding of decreased salivary flow.

2.5.5 : Tumor-related factors and their effect on QOL :

Oral cavity cancers tend to have worse scores for a variety of domains (physical or cognitive functioning, fatigue, appetite, pain, nausea/vomiting, dyspnea, social eating, social contact, mouth opening, and coughing) compared with the other sites. (132-133).

Oropharyngeal tumors are recognized as a distinct biological and prognostic subset of HNC. Interest in the effects of treatment on patients with oropharyngeal primaries has increased with the epidemic of human papilloma virus (HPV) associated/p16-positive tumors.

2.5.6 : Cancer stage :

Some studies have found that cancer stage is not significantly associated with any QOL scales, (134) while other studies reported stages III and IV advanced disease stages were associated with reduced QOL. Stages I and II at diagnosis had better QOL

at one year with regards to eating, appetite, supplement use, role and social functioning, pain, trismus, dry mouth, and financial difficulties. (135)

Importantly, higher stage disease (T3, T4, N2, or N3) is an indication for treatment with either adjuvant chemoradiotherapy or radiation therapy, and these therapies might result in reduced QOL.

2.5.7: IMPACT OF TREATMENT

Surgery

Surgery for HNC can cause disfigurement, voice loss, and difficulty with chewing or swallowing. Other symptoms may include drooling, choking, respiratory problems, impaired vision, a decreased sense of smell, or other problems. For early stage disease, patients may be treated with curative intent with surgery alone and attain high long-term QOL. (136)

Radiation:

Intensity-modulated radiation therapy (IMRT) has been found to be superior to former radiation techniques (either 2D or 3D) as it allows for improved conformal dose distributions with better sparing of surrounding normal tissue. (137) Radiation can result in xerostomia (which leads to oral health impairment: dental problems, osteoradionecrosis, and oral infections), impaired swallowing and chewing, lymphedema, and trismus.

Adjuvant radiotherapy for laryngeal cancer patients had the greatest impact on QOL with significant negative impact on the following domains: swallowing, smell, mouth opening, dry mouth, oral pain, dyspnea, and fatigue. Additionally, irradiated patients had worse role and social functioning than nonirradiated patients. (134)

Surgery and radiation:

Type of treatment affects various aspects of QOL differently. Some studies have reported similar long-term QOL for patients with advanced carcinoma of the oral cavity whether they underwent resection of the tumor of the floor of mouth or tumor resection in the tongue or received concurrent chemoradiotherapy for organ preservation (138).

Chapter 3

Hypothesis and objectives

3- Hypothesis and objectives

Does the QOL of patients afflicted from head and neck canceres whose post-ablative defects are reconstructed with free flaps instead of local or regional flaps, is better or not?

Aim of the Work

We have collected data on the patients of head and neck cancer treated with tumor resection and reconstruction with free flap transfer in the descriptive part of this research.

We were looking for the most affected age group, sex, primary tumor site, pathological and histological type of the tumor, type of neck dissection, method of free flap reconstruction and using of radiotherapy and chemotherapy.

The aims of this work were the following:

1) To study functional results in patients of head and neck cancer treated by tumor resection and reconstruction with free flap.

2) To examine and follow up the changes in the QOL of head and neck cancer patients through comparisons before the surgery and after the surgical resection and reconstruction with free flap transfer after one month, three months, six months and nine months after the surgery.

Chapter 4

Patients and Methods

Patients and methods

4.1: Location of Data Collection

Our work was conducted by collaboration between Maxillofacial, Head and Neck Surgery Unit in Surgery Department in Sohag University Hospitals in Sohag ,Egypt, and Oral and Maxillofacial Surgery Department in Central University Hospital of Oviedo, Asturias, Spain, between January 2013 and September of 2015 after the approval of ethical committee and taken written informed consent of the patients.

4.2: Patients Characteristics:

Total number of patients who had been collected for this research study 40 patients.

Of these patients, 35 (87.5%) were eligible and agreed to participate in this study. Of the other 5 patients (12,5%): 2 of them (5 %) refuse to participate in this study, other 2 patients (5 %) were missing during the course of the study and not caming for continues follow up in our department, and finally, 1 patient (2.5 %) die in the early post operative period.

Consequently, this thesis included only 35 patients who were eligible and agreed to participate in this study and categorized into two groups*:*

- ***First group:*** Oro mandibular reconstruction group *(10 patients).*
- ***Second group*****:** Soft tissue reconstruction group (*25 patients*) including; oral cavity, parotid region, mid-face, lateral face and scalp region.

Twenty five patients were treated at the Oral and Maxillofacial Surgery, in Central University Hospital of Oviedo, Asturias, Spain and 10 patients at the Maxillofacial, Head and Neck Surgery Unit in Surgery Department in Sohag University Hospitals in Sohag, Egypt.

4.3: Exclusion Criteria

Patients with recurrent or second primary head and neck cancers, metastatic cases, and patients not willing for such lengthy technique, were excluded from this work.

4 .4: Study Design

This study was conducted as a prospective study.

4.4.1 : Initial clinical assessment

All patients were subjected to full history taking, through clinical examination and determination of primary site, the lymph node involvement and staging. Details of previous treatment including radiotherapy and chemotherapy were reported. The presence of medical conditions such as, respiratory disorders, atherosclerosis hypertension, coronary disease, peripheral vascular disease, diabetes, coagulation disorders, connective tissue disorders and smoking, were also considered.

4.4.2 : Pathologic studies

An incisional biopsy was taken from the primary site for histologic examination.

4.5: Uses of University of Washington Quality of Life Questionnaire for patients of Head and Neck Cancer:

The study was carried out in 2 steps:

1- The first was the linguistic and cultural translation of the UW-QOL from English into Spanish and Arabic language.
2- The second was an investigation of the statistical validity and reliability of the Spanish and Arabic version of UW-QOL on the patient of head and neck cancer treated with free flap reconstructions in both Egypt and Spain, which will be discused later.

4.5.1: Translation process

The forward-backward translation of UW-QOL was performed according to internationally accepted guidelines**.**

4.5.2: Patient recruitment

The final Spanish and Arabic versions were tested on a consecutive series of patients at the Department of Oral and Maxillofacial Surgery in Hospital University of Oviedo,

Asturias, Spain and Maxillofacial, Head and Neck Surgery Unit in Surgery Department in Sohag University Hospitals in Sohag, Egypt, from January 2013 until September 2015. The study included patients newly diagnosed as having head and neck cancer. Patients were required to speak and read Spanish or Arabic language. Eligible patients were invited to participate in the study. Age, sex, tumor site, TNM tumor stage, histological tumor type, and treatment data were recorded as the demographic and clinical characteristics of the study sample.

4.6: How We Can Use University of Washington Quality of Life Questionnaire for patients of Head and Neck Cancer?

The patients were asked to complete 5 sets of questionnaires: the first set was given 1 day before beginning treatment; the second set, one months after the completion of treatment, and the third set, 3 months after the beginning of the surgical treatment, the fourth one after 6 months from starting the surgical treatment, and the last one was presented to the patients after 9 months of starting the surgical treatment. Because the acute effects of treatment typically diminish by 3 months, we administered the second set of questionnaires one month after completion of treatment to evaluate the impact of treatment. The third set was administered 2 months after the second set to measure test-retest reliability because 2 month was considered a sufficient interval to ensure that the patients would not remember their responses to the second set of questionnaires. We continue for our patients follow up for another 2 sets after 6 and 9 months from starting the treatment to ensure the effect and result from reconstruction of head and neck cancer by free flaps.

The statistical analysis of the collected data was undertaken using the SPSS statistical program version 20.

4.7: Laboratory investigations including

- Complete blood picture.
- Coagulation profile.
- Serum cholesterol.
- Blood urea and serum creatinine.
- Liver function test.

- Blood glucose level.
- Blood electrolytes.

4.8: Radiologic investigations including;

- Plain x-ray chest.
- Skull: P.A and lateral views , 3-dimensional C.T scan and MRI.
- Mandible: P.A. and bilateral oblique views or panorex , 3- dimensional C.T and MRI.
- Post third of the tongue: Endoscopy and C.T. neck.
- Electrocardiogram.
- Others when needed:
    - Echo cardiograph
    - Blood gases

The radiographic techniques used in this work were differente in Spain and in Egypt.

4. 9 : Oral hygiene assessment

The condition of the oral mucosa was recorded particularly as regard; dentition, oral functions and associated mucositis or fungal infection. In case of the latter, local and systemic antifungal treatment was instituted.

4.10: Caring for malnourished patients:

Malnourished patients are at high risk for postoperative complications including free flap failure. Correction attempts were considered mainly after the surgery, through hyperelemination. It was conducted via a nasogastric tube either intermittently every 2 hours or by continuous drip over 16 hours in semi-sitting position in order to reduce the risk of aspiration. In case of continuous drip, the administration rate

was gradually increased starting with a rate of 50 mL/hr and with daily increment of 25 mL/h until the desired rate was reached.

4.11:Surgical Procedures:

4.11.1: Ablation:

Tumor resection was conducted by the oncologic team and tracheostomy was done prior to resection, if the airway was likely to be compromised postoperatively. In case of segmental mandibular resection, resulting defects were classified according to the scheme proposed by Urken (3). After resection, the recipient vessels were localized, isolated and prepared for microvascular anastomoses.

4.11.2: Flap Harvesting

Harvesting the flap was done simultaneously by the reconstructive team during tumor ablation. We used four types of free flaps during conducting this work, fibula osteosepto-cutaneous flap using the technique of Wei and El-Gammal (5)), radial forearm fascio-cutaneous flap using the technique of Urken (3), anterolateral thigh flap using the technique of Koshima (4), scapular and para scapular flap and ulnar fore arm flap.

The flap was marked and measured according to the defect size. Magnifying loupes (with magnification power ranging from 2.5 x to 3.5x) were used in raising the flaps. A tourniquet was applied in extremities. After raising the flap, it was left in place attached to its pedicle (the tourniquet was deflated when applied) for flap reperfusion until the time of transfer.

4.11.3: Flap Inset

In soft tissue, the flap was secured by a few sutures to the defect until microvascular anastomoses were completed, then final closure was done.

In mandibular bone Reconstruction, shaping osteotomies in the fibula to create the new mandible was performed after flap separation from its pedicle. The bone was shaped with the aid of the surgical specimen and the

contoured titanium plate (reconstructive plate). In five cases we used templates made preoperatively by planification technic. These osteotomies were planned so that they do not jeopardize the septal perforators. We used a fine side-cutting saw to create closing-wedge osteotomies on the medial aspect of the fibula. For bone fixation, we used 2.7 mm or 3.0mm titanium reconstructive plates or 2.0 mm titanium mini-plates previously contoured to the mandible, next, the flap was secured by a few sutures to the defect until microvascular anastomoses were completed then final closure was done.

4.12: Microvascular anastomoses:

The microvascular anastomoses were performed using an operating microscope. Branches of the external carotid artery were used for the arterial anastomoses. The external jugular vein, and more commonly branches of internal jugular vein were used as recipient veins. We usually performed more than one venous anastomoses. Using intermitted technique with 9/0 or 10/0 nylon suture, an end-to end anastomoses technique was done for both the artery and the vein. Occasionally, terminolateral anastomosis were performed. Drainage was provided using a suction drain or a piece of rubber glove. The donor-site defects were primarily closed or by means of a skin graft.

4.13: Post-operative care

All patients were admitted in the I.C.U. for 2 to 5 days, where close monitoring was carried outfor:

-Vital signs.

-Central venous pressure.

-Blood gases.

-Sequences of any preoperative medical problems.

The flaps were monitored clinically by the color, temperature, turgor, muscle contractility and pin prick test every hour for the first 24 hours, every 2 hours for 48 hours, and then every 4 hours until patient discharged. Bone healing was assessed

radiological through postoperative, convential radiology, 3-dimensional C.T. scan 3D-CT), and bone scintigraphy.

All patients were followed up postoperatively as follows:

1- Flap success.

2- Postoperative morbidity and mortality.

3 - Functional and aesthetic outcome according University of Washington Quality of Life Questionnaire for patients of Head and Neck Cancer.

4 -Tumor recurrence at a minimum follow-up period of 6 - 9 months.

Chapter 5

Results

Results

A series of 35 patients with head and neck cancer composite defect after tumor resection underwent 35 reconstructive procedures by microvascular free tissue transfer:

- ***First group:*** Oro mandibular reconstruction group *(10 patients).*
- ***Second group*****:** Soft tissue reconstruction group (*25 patients*) including; oral cavity, parotid region, mid-face, lateral face and scalp region.

Twenty five patients were treated at the Oral and Maxillofacial Surgery, in Central University Hospital of Oviedo, Asturias, Spain and ten patients at the Maxillofacial, Head and Neck Surgery Unit in Surgery Department in Sohag University Hospitals in Sohag, Egypt,between Januaray 2013 and Septemper 2015.

5.1 : AGE:

The average age of patients in this study was 57 (range of 26 to 88 years).

5.2: SEX:

Twenty-seven patients were males (27 males) with percentage of 77, 1% and eight patients were females (8 females) with percentage of 22, 9%.

Sex					
		Number of Patients	Percentage	Valid percentage	Acumolated Presentage
	Male	27	77.1	77.1	77.1
	Female	8	22.9	22.9	100.0
	Total	35	100.0	100.0	

Table (2): Demonstrate number of male and female patients and their percentage.

5.3: Patients:

All patients had definitive preoperative clinical and histological diagnosis. 30 patients are with squamous cell carcinoma, 3 patients are with mucoepidermoid carcinoma, one case of adenoid cystic carcinoma of the parotid and one case with retinoblastoma (stage 2 , stage 3, stage 4).

In this study we have 7 patients with gingival mandibular carcinoma (20%), 11 patients with carcinoma of anterior two-thirds of the tongue (31,4%), 3 patients with posterior one-third of tongue carcinoma (8,6%), 4 patients with cancer of the floor of the mouth (11,4%), 2 patients with carcinoma of retromolar trigone (5,7%), 3 patients with cancer of the maxilla (8,6%), one patient with carcinoma of the scalp (2,9%) and one patient with a retinoblastoma (2,9%).

	Number of Patients	Percentage	Histological Diagnosis
Gingival Mandibular Carcinoma	**7**	**20.0**	**Squamous cell carcinoma**
Cancer Tongue Anterior 2/3	**11**	**31.4**	**Squamous cell carcinoma**
Cancer Tongue Post 1/3	**3**	**8.6**	**Squamous cell carcinoma**
Cancer of the Floor of the Mouth	**4**	**11.4**	**Squamous cell carcinoma**
Cancer Retromolar Trigone	**2**	**5.7**	**Squamous cell carcinoma**

Cancer Maxilla	**3**	**8.6**	**2 cases of Squamous cell carcinoma**
			1 case of Mucoepidermoid carcinoma
Parotid Carcinoma	**3**	**8.6**	**2 cases Mucoepidermoid carcinoma**
			1 case Adenoid cystic carcinoma
Retinoblastoma	**1**	**2.9**	**Retinoblastoma**
Scalp Carcinoma	**1**	**2.9**	**Squamous cell carcinoma.**
Total	**35**	**100.0**	

Table (3): Demonstrate the preoperative tumor site, percentage and histology.

5.4 : Type of Neck Dissection:

Our patients undergo two types of neck dissection which divide them into 2 groups:

a) ***First Group***: 29 patients we made for them Functional Neck Dissection (82.9%).
b) ***Second Group***: 6 patients' we made for them Radical Neck Dissection (17.1%).

Type of neck dissection			
	Number of patients	Percentage	percentage valid
Functional Neck Dissection	29	82.9	82.9
Radical Neck Dissection	6	17.1	17.1
Total	35	100.0	100.0

Table (4) : demonstrate types of neck dissection used and their percentage.

5.5 : Radiotherapy:

In our study, some patients' undergo radiotherapy and the rest of patients did not. Thus, we divide our patients' in two groups:

a) ***First Group****:* 29 patients taken radiotherapy (82, 9%).
b) ***Second Group:*** 6 patients' not undergo radiotherapy (17,1%).

Radiotherapy			
	Number of patients	percentage	percentage valid
Radiotherapy	29	82.9	82.9
No Radiotherapy	6	17.1	17.1
Total	35	100.0	100.0

Table (5): Demonstrate number of patients those treated with radiotherapy.

5.6: Chemotherapy:

In our study some patients' undergo chemotherapy and the rest of patients did not. Thus, we divide our patients' in two groups:

a) ***First Group**:* 19 patients taken chemotherapy (54,3%).
b) ***Second Group:*** 16 patients' not undergo chemotherapy (45, 7%).

Chemotheraby			
	Number of patients	Percentage	Percentage valid
YES	19	54.3	54.3
NO	16	45.7	45.7
Total	35	100.0	100.0

Table (6): Demonstrate number of patients those treated with chemotheraby

5.7: Type of Free Flap Used:

Of the 35 defects, 10 required a composite osseous flaps for reconstruction (combined bony and soft tissue or oro-mandibular group), and 25 needed only soft tissue flaps (soft tissue group). Primary reconstruction was performed in all cases using five different types of vascularized free flap:

- Antero-lateral thigh free flap in 15 cases 42,85%.
- Vascularized free fibula flap in 6 cases 17,14%.
- Radial forearm free flap in 9 cases 25,71%
- Free Scapular Flap in 4 patients' 11,47%.
- Ulnar forearm flap in one patient 2,85%

Type of free flap used			
	Number of patients	percentage	percentage valid
ALT	15	42.85	42.85
Free Fibula Flap	6	17.14	17.1
Radial Forearm Flap	9	25.71	25.7
Scapular Free Flap	4	11.47	11.47
Ulnar Fore arm Flap	1	2.9	2.9
Total	35	100.0	100.0

Table. (7): Demonstrates incidences of different types of free flaps used in the study.

We had 35 successful procedures of flap transfer included in this series, representing a percentage of 100%.

The most commonly used recipient *artery* was the common ***facial artery***, in 20 cases (Fig.17), the second one was the ***superior thyroid artery*** in 15 cases. The most commonly used recipient vein was the common ***facial vein***, in 24 cases (Fig. 14), the second one was the ***external jugular vein***. In 13 cases, the venous drainage was conducted through anastomoses with two recipient veins. End to end interrupted technique, using 9/0 or 10/0 nylon suture, was performed for micro vascular anastomoses of both the artery and the vein in all cases.

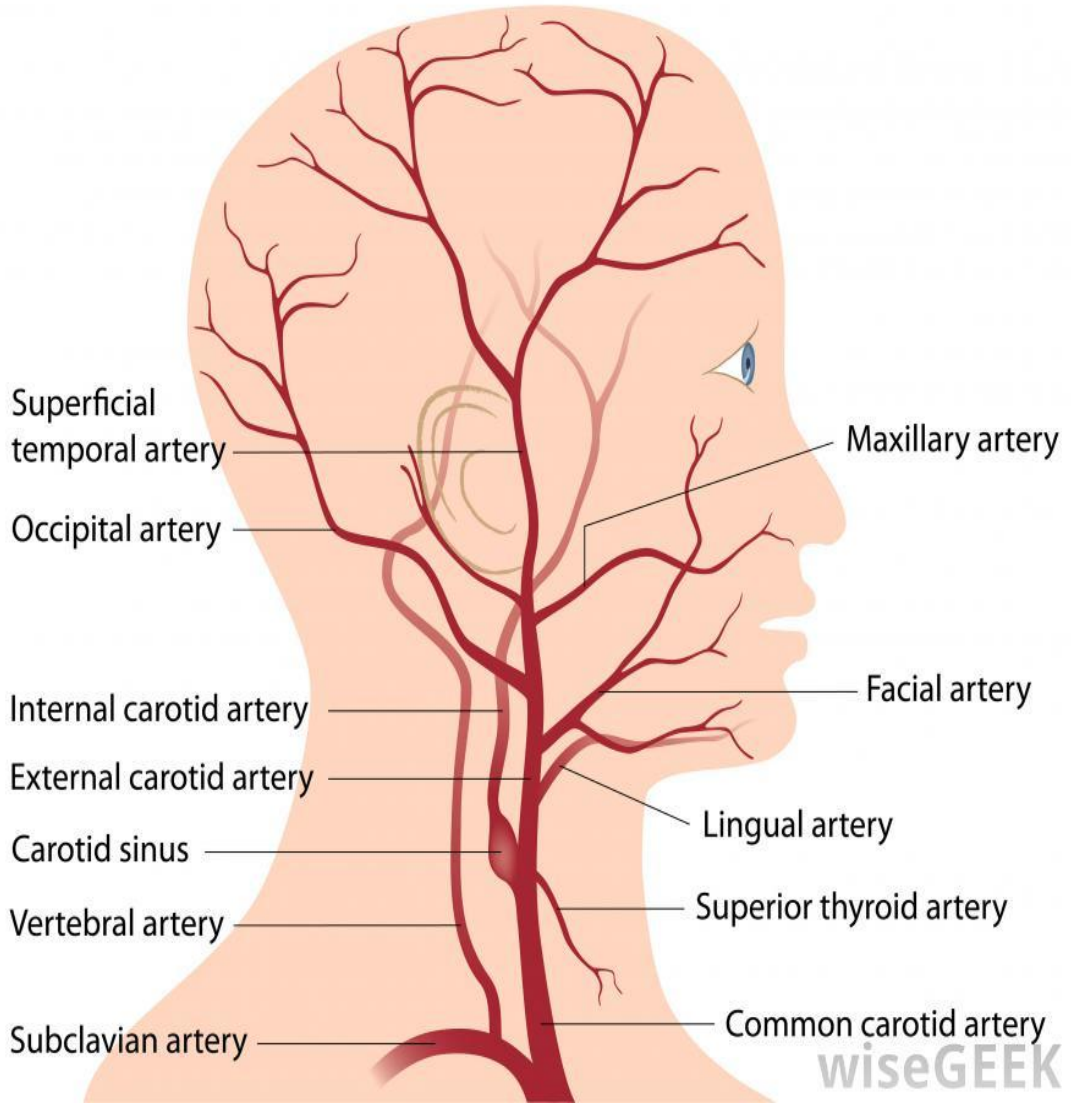


Fig.(12): Recipient arteries.

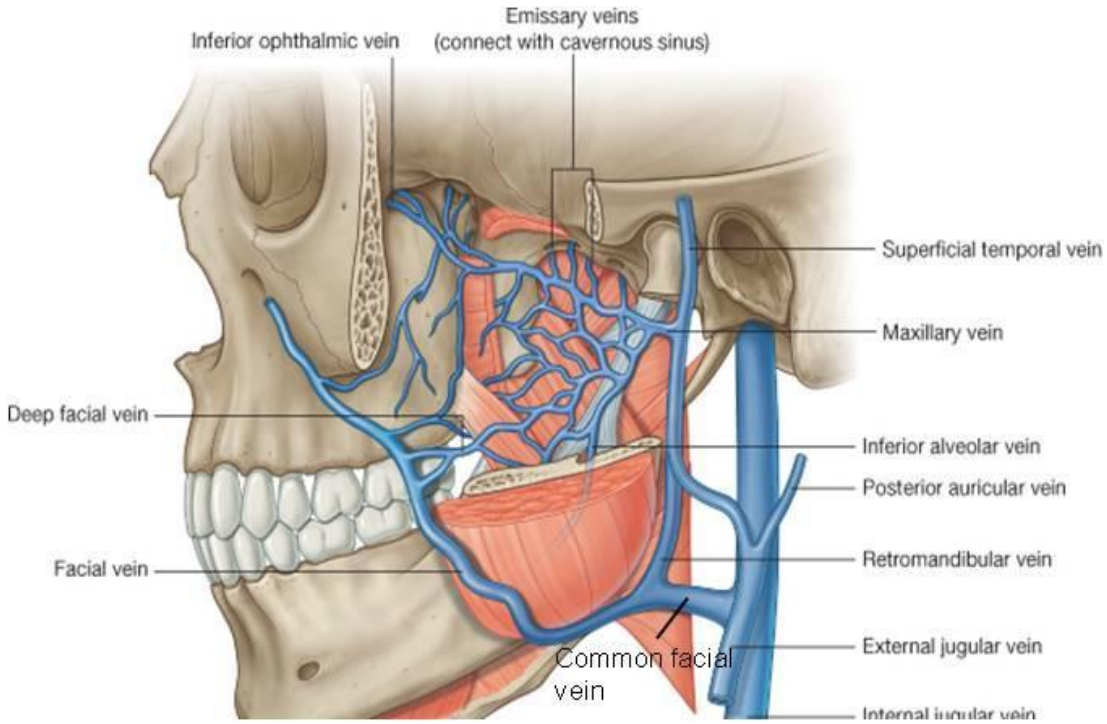


Fig (13): Recipient Veins

The operative time ranged from seven to thirteen hours with an average of 10.5 hours for the oromandibular group and 7.3 hours for the soft tissue group.

The main number of units of blood transfused was 1.3 units with a range of 1 to 5 units.

A- Oromandibular Reconstruction Group

Ten vascularized free bone flaps were used in reconstruction of composite oro-mandibular defects in 10 patients. Eight patients (80%) were having a composite bone and soft tissue defects, and two patients were having only bone defects, representing about (20%) of cases. Osteo-septocutaneous fibula was harvested in 6 patients (60%). The mean length of fibula used was **8.7** cm with **range** of **6 to** 12 **cm.** In 10 patients, we used the 6 free fibular flaps and 4 scapular flaps to re-establish mandibular continuity. In 10 patients single to multiple wedged osteotomies: One osteotomy was needed in two patients, two osteotomies in five patients and in two patients three osteotomies were needed. In one patient, we re-fashioned the angle with one osteotomy.

A skin island was raised in 6 patients based on at least one septo- cutaneous perforator, seen passing through the posterior intermuscular septum. The skin island diameter was a minimum of 3 x 4 cm and a maximum of 8 x 9 cm. The skin paddles were used to cover soft tissue defects in 8 cases.

5.8 : Flap Monitoring:

Flap viability was monitored clinically through skin paddle observation and Doppler, and radiologically through bone scintigraphy done during the first postoperative week. Vascularized fibular graft transfer was successful in 6 patients. The skin paddles were viable in all successfully transferred flaps, with no instance of isolated skin loss alone.

5.9 : Bone Healing:

Bone healing was assessed in the 10 successfully transferred flaps with sequential panorex which revealed good bone healing of the neo-mandible in all cases. Three dimensions CT scanning was performed in six cases and it revealed excellent bone shaping of the graft through variable numbers of osteotomies.

Ten patients were considered for post-operative adjuvant therapy none of them faced a bone healing problems. Five patients received radiation, three patients received chemotherapy and two patients received combined chemo-radiation.

5.10 : Soft tissue Reconstruction Group

In this group of patients we reconstruct only a soft tissue defect. We have 11 patients with a carcinoma of anterior 2/3 of the tongue, 3 patients with posterior 1/3 tongue carcinoma ,4 patients with cancer of thefloor of the mouth, 2 patients with carcinoma of retromolar trigone area, 3 patients with cancer of the maxilla , one patient with a scalp carcinoma and one patient with retinoblastoma .

The size of the defect following resection ranged from 3 x 6 cm to 10 x15 cm. Anatomically these defects could be divided into;

1- Tongue defects (lateral, anterior, and posterior).

2- Soft tissue defect in the floor of the mouth.

3- Compound maxillary defect.

4- Soft tissue defect of retromolar trigone.

5- Soft tissue defect of parotid region (soft tissue – skin) .

6- Scalp defect.

We used three types of flaps to treat these defects, antero-lateral thigh free flap in 15 patients (42.85%), the radial forearm free fascio-cutaneous flap was used for reconstruction in 9 patients (25.71%), ulnar forearm flap in one patient (2,85%).

Follow up period up to 9 months.

5 .12: ANALITICAL RESULTS:

1- **Pain**

	Mean	Standard Deviation	*P*
Pre operative	**85.429**	**17.944**	< 0.005
1month post operative	**76.429**	**14.434**	**1.000**
3 month post operative	**79.286**	**7.217**	**0.005**
6 month post operative	**85.571**	**7.217**	**0.005**
9 month post operative	**98.286**	**7.217**	**0.005**

In table (8), we show the initial diagnostic statistics (mean, standard deviation)

Pillai, lambda of Wilks, Hotelling, and Roy test give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that pain changes over the time. Thus, the mean level of pain occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the epsilon index in order to correct the previous result which can be estimated using Greenhouse-Geisser or Huynh-Feldt tests.

On table 8, we show the data obtained from "Pain" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significantly different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5, have been observed. No other differences appeared in our series.

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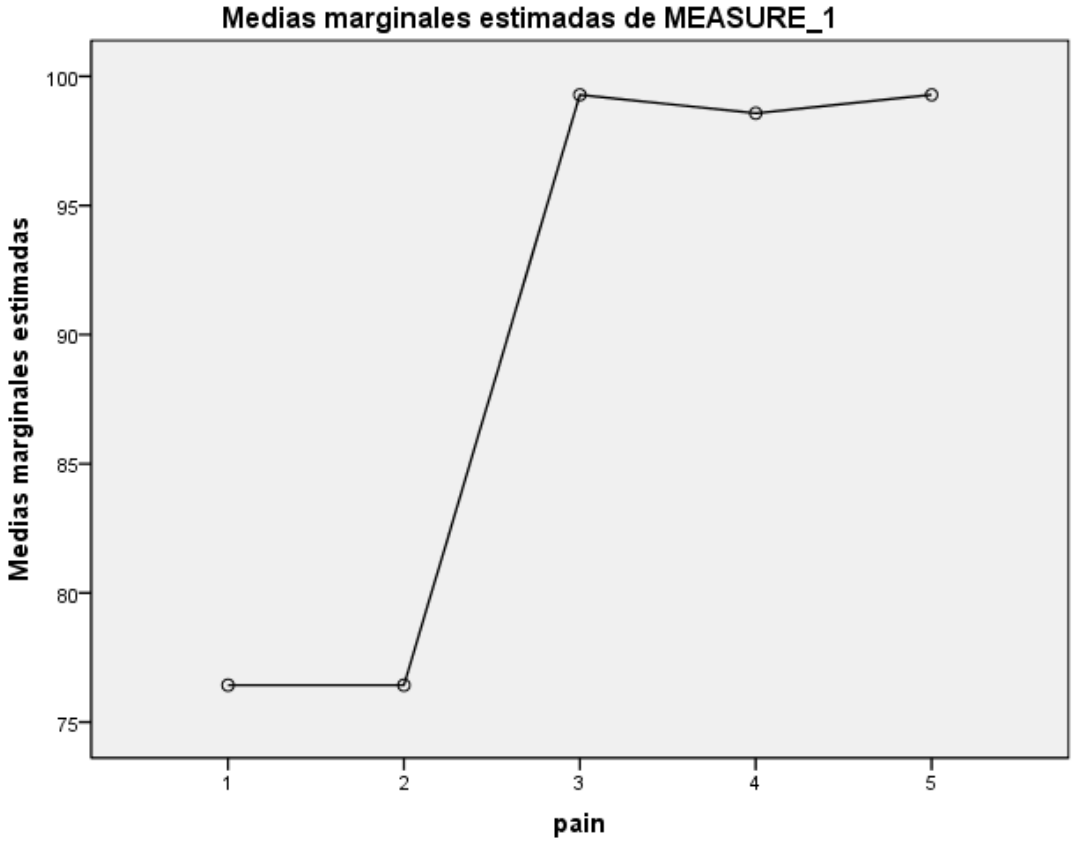


Figure (14):

Figure clearly shows a nonlinear change in pain evaluation over the period of 9 month.

2 – Appearance

	Discreptive Study		
	Mean	Standard Deviation	*P*
Pre operative	85.83	17.944	< 0.005
1month post operative	55.83	14.434	< 0.005
3 month post operative	70.92	7.217	.001
6 month post operative	71.92	7.217	.018
9 month post operative	77.92	7.217	.864

In table (9), we show the initial diagnostic statistics (Mean and Standard Deviation).

Pillai, lambda of Wilks, Hotelling, **and Roy test** give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that appearance changes over the time. Thus, the mean level of appearance occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the epsilon index in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 9, we show the data obtained from "appearance" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1

and 3, 1 and 4, 1 and 5, have been observed. No other differences appeared in our series.

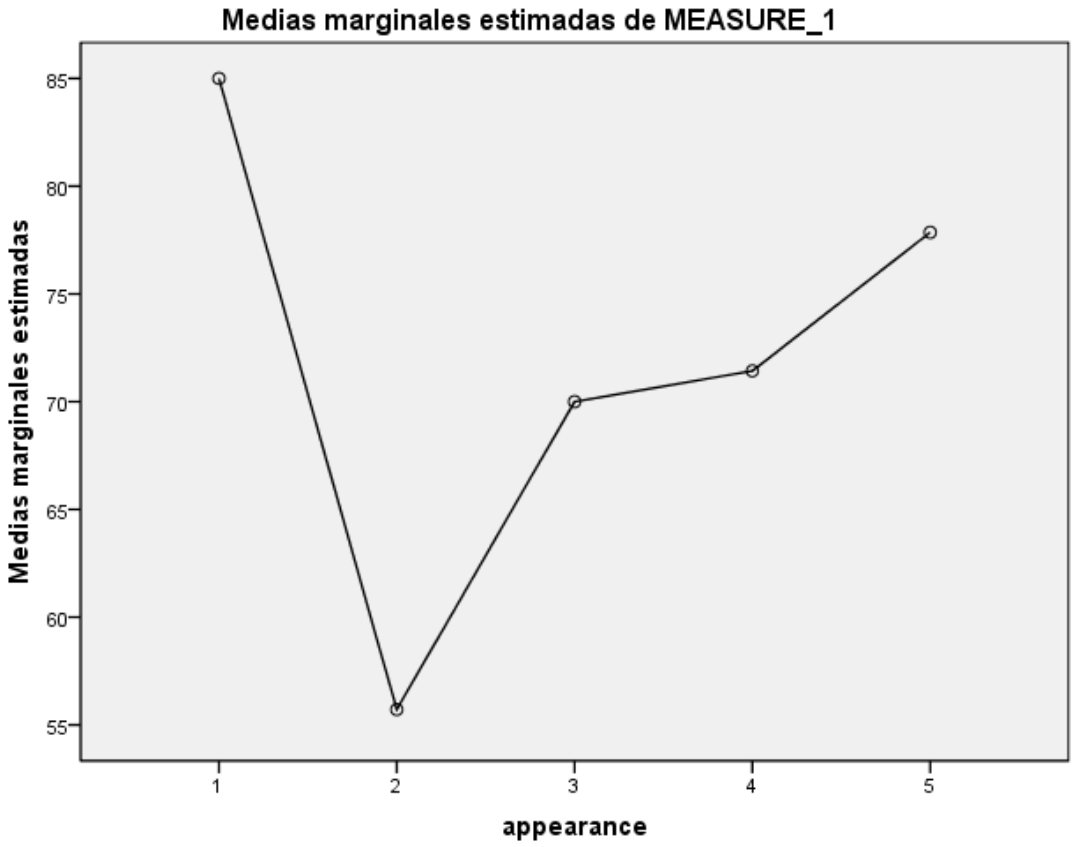


Figure (15):

Figure shows a nonlinear change in appearance evaluation over the period of 9 month.

3 – Activity

Descriptive Study			
	Mean	**Standard deviation**	*P*
Pre operative	**92.50**	**13.056**	< 0.005
1month post operative	**67.25**	**24.133**	**<0.0005**
3 month post operative	**88.75**	**15.540**	**1.000**
6 month post operative	**92.83**	**14.434**	**1.000**
9 month post operative	**95.83**	**14.434**	**1.000**

In table (10), we show the initial diagnostic statistics (mean and standard deviation)

Pillai, lambda of Wilks, Hotelling, and Roy test give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that activity changes over the time. Thus, the mean level of activity occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the epsilon index in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 10, we show the data obtained from "activity" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5, have been observed. No other differences appeared in our series.

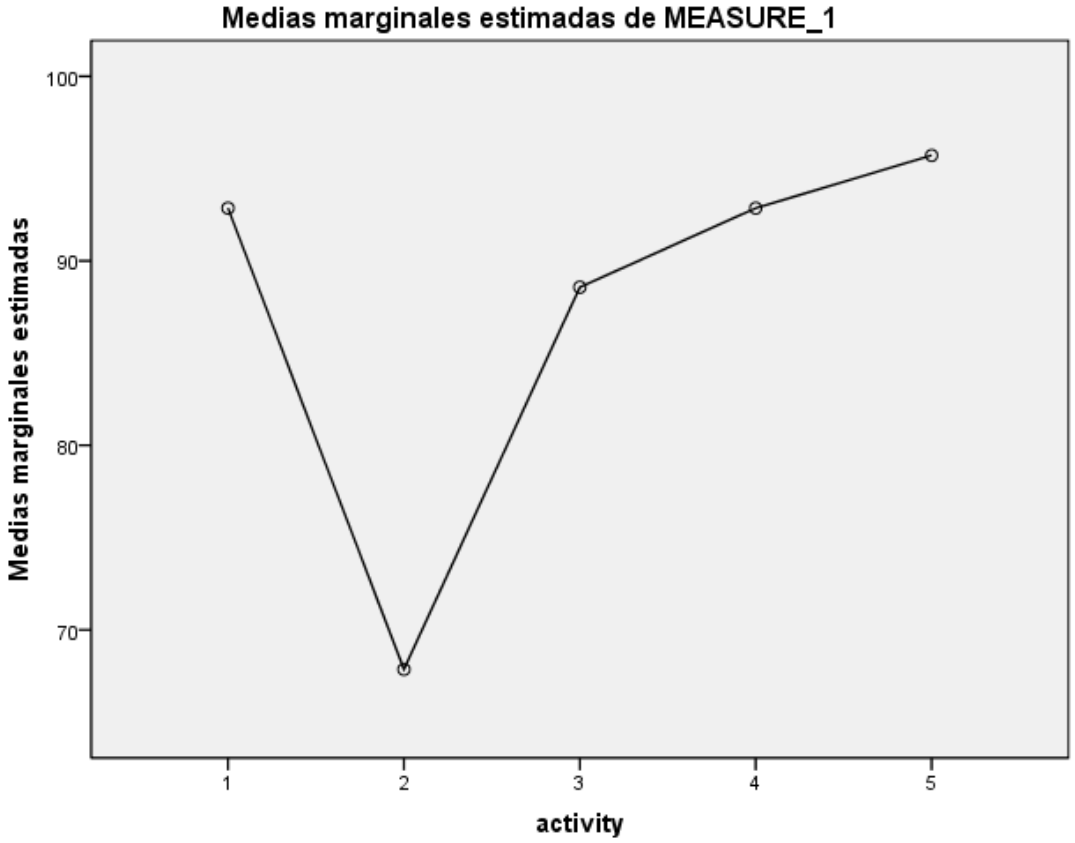


Figure (16):

Figure shows a nonlinear change in activity evaluation over the period of 9 month.

4 – Recreation

Descriptive Study			
	Mean	Standard Deviation	Significance P value
Pre operative	90.33	19.462	0.005
1month post operative	72.75	21.651	<0.0005
3 month post operative	90.33	12.123	1.000
6 month post operative	93.92	7.217	1.000
9 month post operative	95.92	7.217	.897

In table (11), we show the initial diagnostic statistics (Mean and Standerd Deviation).

Pillai, lambda of Wilks, Hotelling, and Roy test give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that recreation changes over the time. Thus, the mean level of recreation occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 11, we show the data obtained from "recreation" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series.

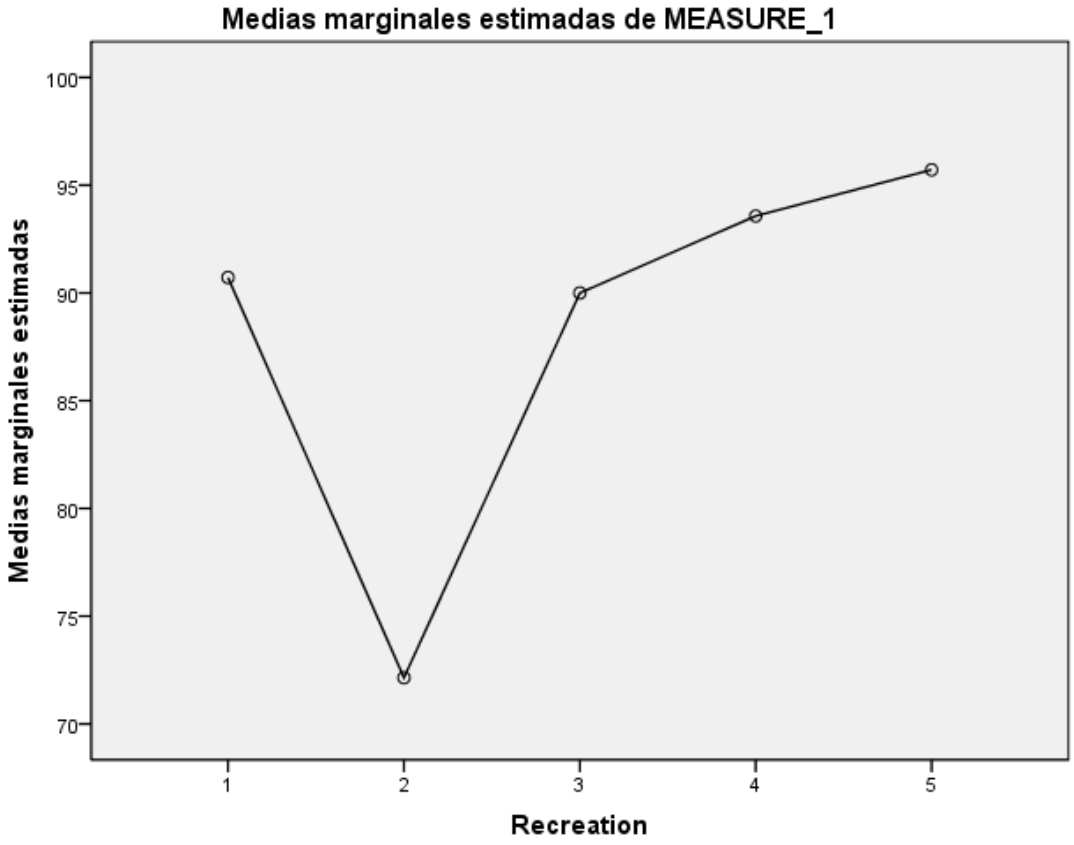


Figure (17):

Figure clearly shows a nonlinear change in recreation evaluation over the period of 9 month.

5 – Swallowing

Descreptive Study			
	Mean	**Standerd Deviation**	Significance P value
Pre operative	**80.67**	**22.088**	**0.005**
1month post operative	**39.67**	**33.934**	**<0.0005**
3 month post operative	**57.83**	**17.816**	**<0.0005**
6 month post operative	**74.50**	**13.568**	**1.000**
9 month post operative	**77.67**	**20.597**	**1.000**

In table (12), we show the initial diagnostic statistics (Mean and Standard Deviation)

Pillai, lambda of Wilks, Hotelling, and Roy test give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that swallowing changes over the time. Thus, the mean level of swallowing occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 12, we show the data obtained from "swallowing" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference

between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5, have been observed. No other differences appeared in our series.

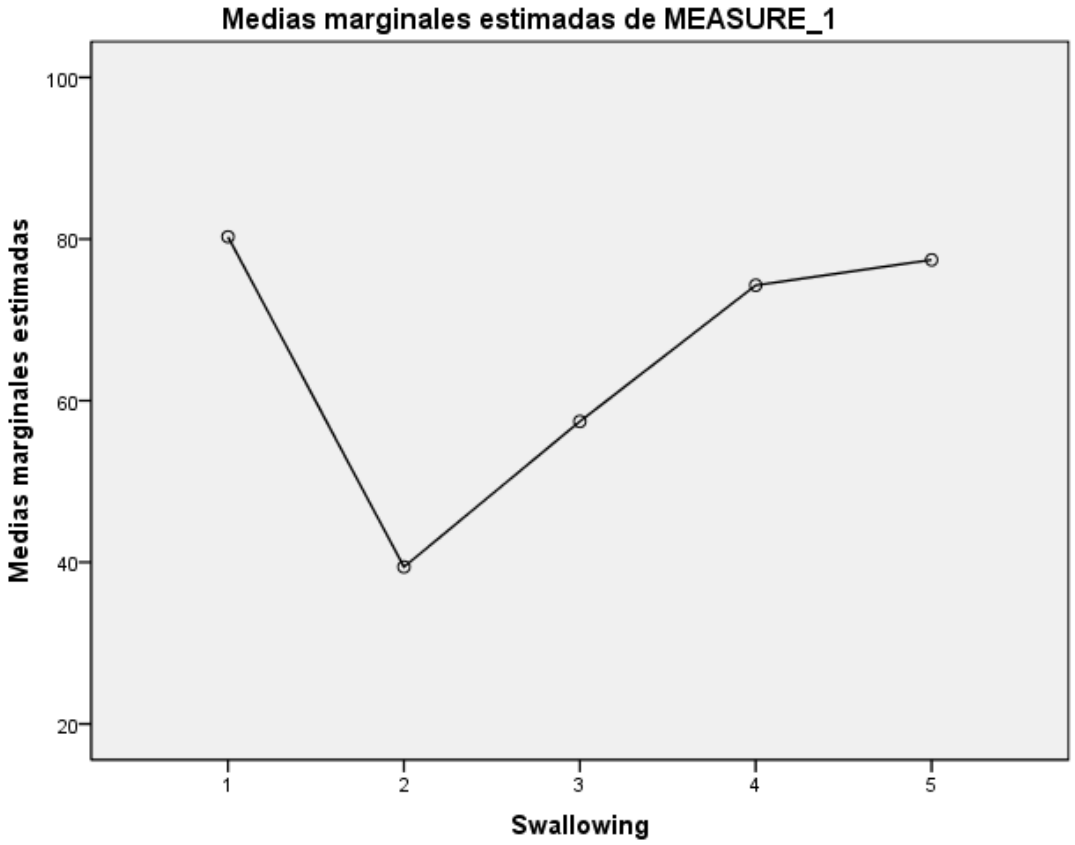


Figure (18):

Figure clearly shows a nonlinear change in swallowing evaluation over the period of 9 month.

6 –**Chewing**

Descreptive Study			
	Mean	Standard Deviation	Significance P value
Pre operative	64.33	28.868	< 0.005
1month post operative	12.42	37.323	<0.0005
3 month post operative	25.67	26.054	<0.0005
6 month post operative	42.50	24.909	<0.0005
9 month post operative	54.33	23.677	1.000

In table (13), we show the initial diagnostic statistics (Mean and Standard Deviation)

Pillai, lambda of Wilks, Hotelling, **and Roy test** give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that chewing changes over the time. Thus, the mean level of chewing occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 13, we show the data obtained from “chewing” and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series

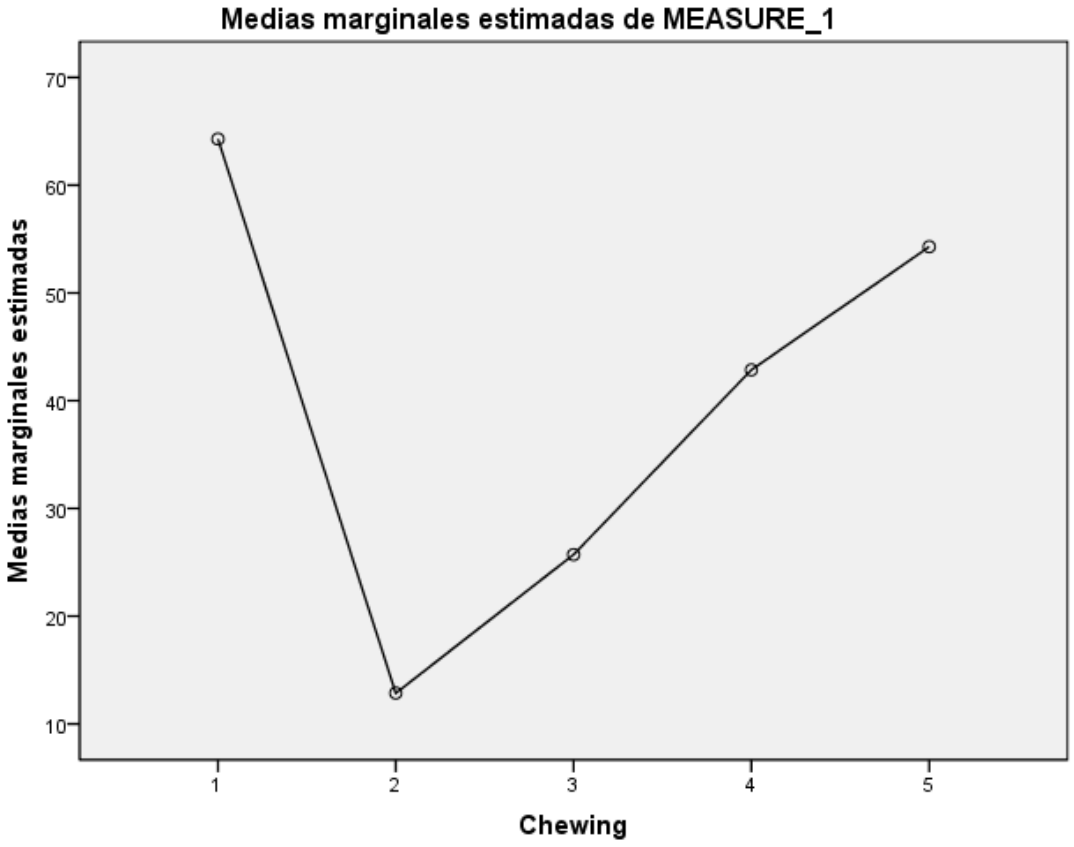


Figure (19):

Figure clearly shows a nonlinear change in chewing evaluation over the period of 9 month.

7 –Speech

Descreptive Study			
	Mean	Standard deviation	Significance P value
Pre operative	83.92	13.568	.005
1month post operative	38.00	28.123	<0.0005
3 month post operative	61.92	8.649	<0.0005
6 month post operative	69.50	13.568	,<0.0005
9 month post operative	73.50	15.448	.015

In table (14), we show the initial diagnostic statistics (Mean and Standerd Deviation).

Pillai, lambda of Wilks, Hotelling, **and Roy test** give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that speech changes over the time. Thus, the mean level of speech occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 14, we show the data obtained from “speech” and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series.

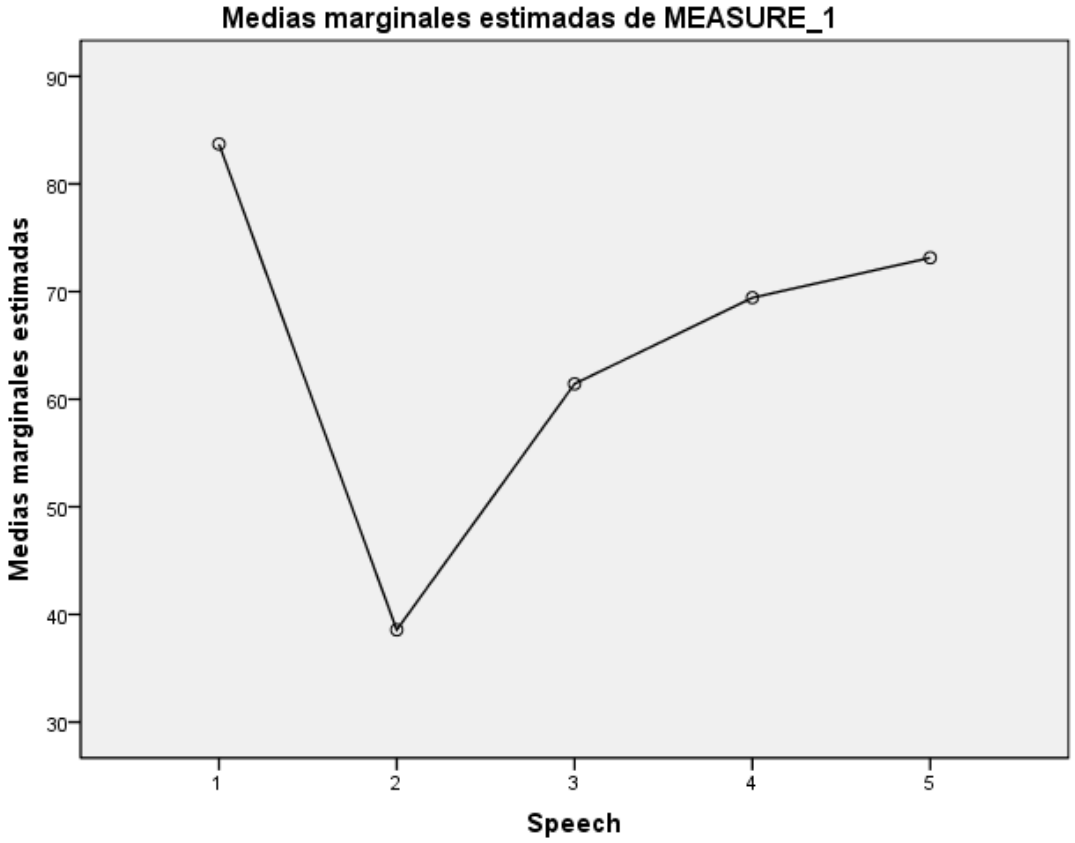


Figure (20):

Figure clearly shows a nonlinear change in speech evaluation over the period of 9 month.

8 – Shoulder

Descreptive Study			
	Mean	**Standerd Deviation**	Significance P value
Pre operative	**100.00**	**.000**	**.005**
1month post operative	**81.83**	**27.122**	**.007**
3 month post operative	**85.50**	**13.568**	**.021**
6 month post operative	**91.50**	**13.568**	**.008**
9 month post operative	**91.00**	**11.677**	**.008**

In table (15), we show the initial diagnostic statistics (Mean and Standerd Deviation).

Pillai, lambda of Wilks, Hotelling, **and Roy test** give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that shoulder changes over the time. Thus, the mean level of shoulder occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 15, we show the data obtained from "shoulder" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5, have been observed. No other differences appeared in our series.

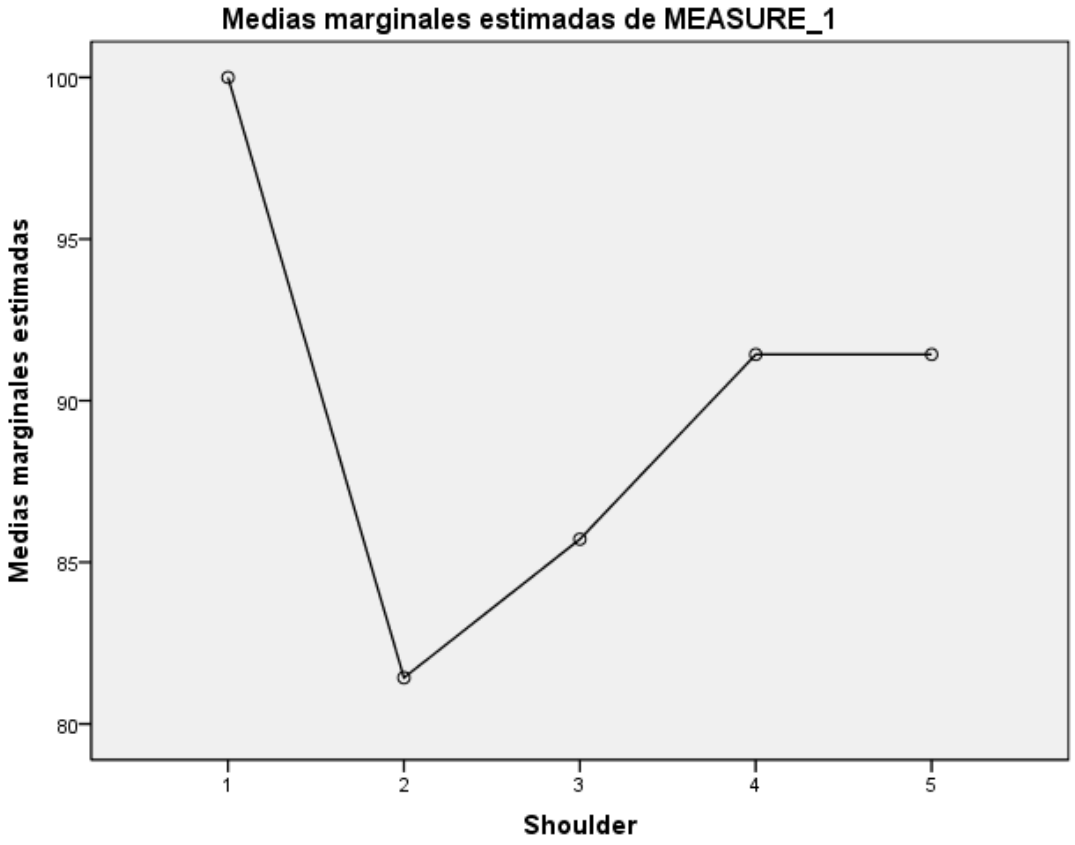


Figure (21):

Figure clearly shows a nonlinear change in shoulder evaluation over the period of 9 month.

9 - Taste

Descreptive Study			
	Mean	**Standard Deviation**	**Significance P value**
Pre operative	**98.00**	**.000**	**.005**
1month post operative	**80.67**	**32.706**	<0.0005
3 month post operative	**96.50**	**13.568**	1.000
6 month post operative	**95.50**	**8.660**	1.000
9 month post operative	**95.50**	**8.660**	1.000

In table (16), we show the initial diagnostic statistics (Mean and Standerd Deviation).

Pillai, lambda of Wilks, Hotelling, **and Roy test** give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that taste changes over the time. Thus, the mean level of taste occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 16, we show the data obtained from "taste" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series.

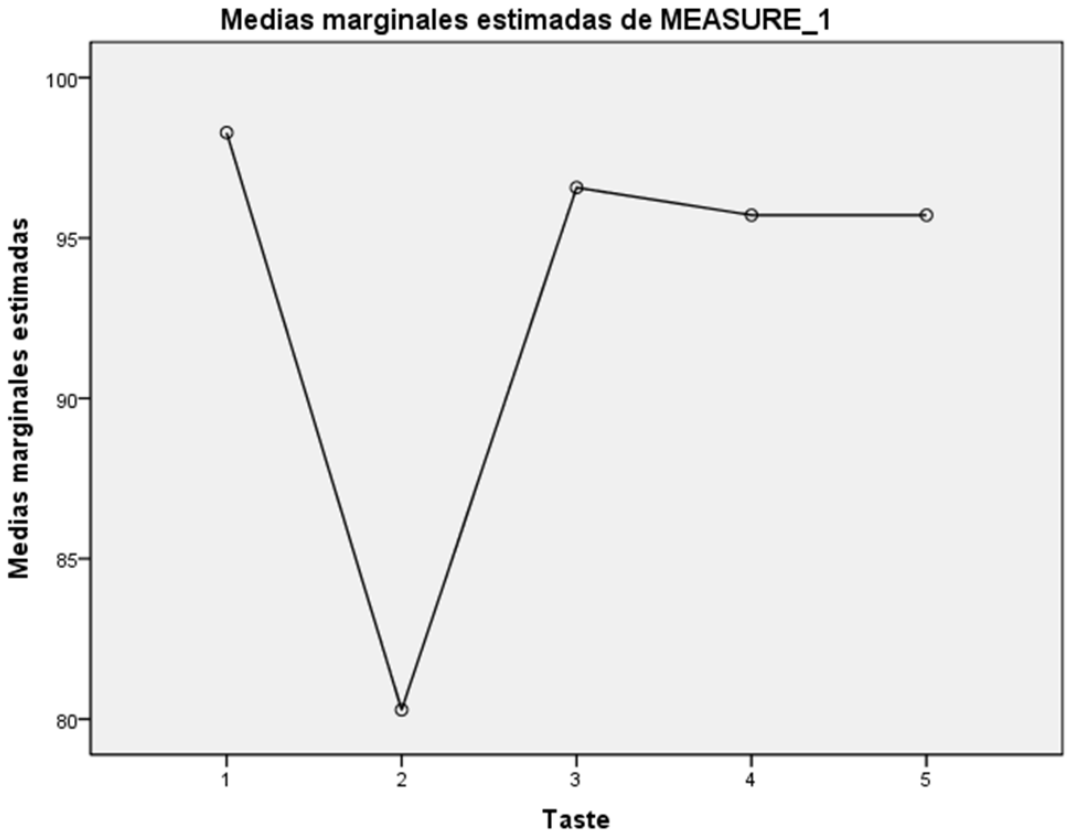


Figure (22):

Figure clearly shows a nonlinear change in taste evaluation over the period of 9 month.

10 – Saliva

Descreptive Study			
	Mean	**Standerd Deviation**	Significance P value
Pre operative	**100.00**	**.000**	**.005**
1month post operative	**94.00**	**15.667**	**<0.0005**
3 month post operative	**82.50**	**8.660**	**<0.0005**
6 month post operative	**62.50**	**8.660**	**<0.0005**
9 month post operative	**78.50**	**8.660**	**<0.0005**

In table (17), we show the initial diagnostic statistics (Mean and Standerd Deviation)

Pillai, lambda of Wilks, Hotelling, and Roy test give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that saliva changes over the time. Thus, the mean level of saliva occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 17, we show the data obtained from "saliva" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series.

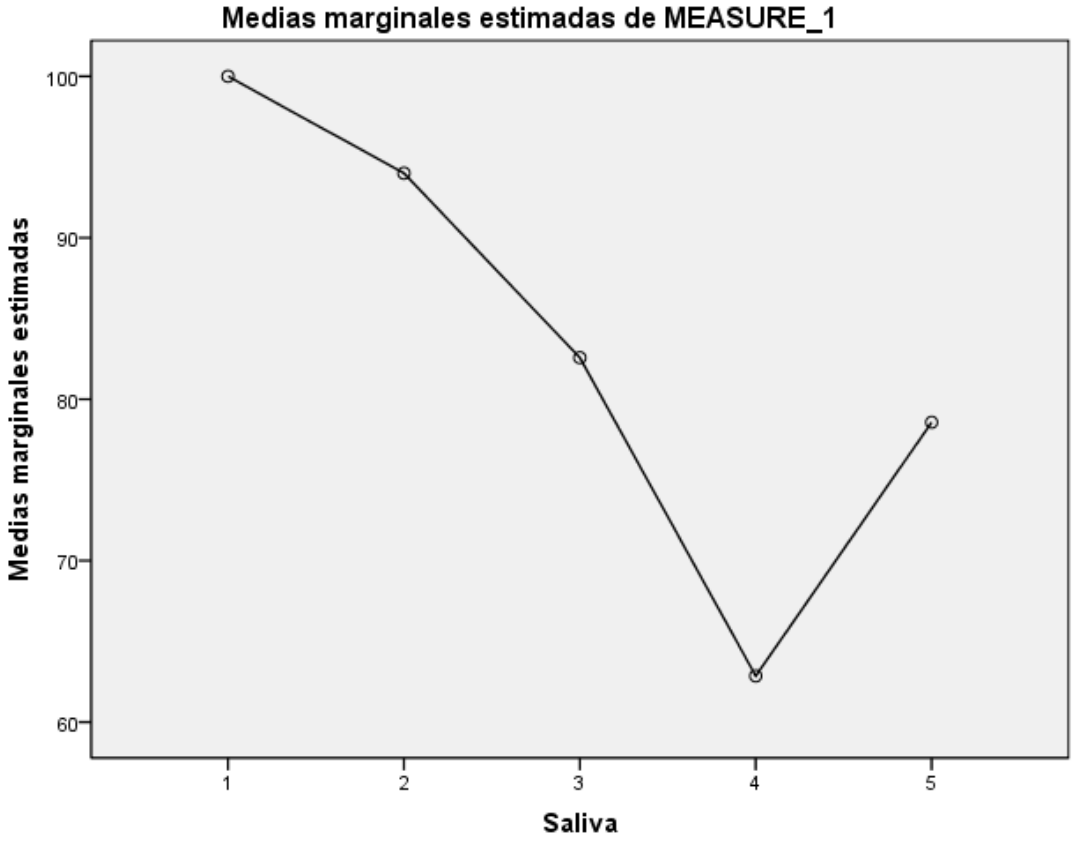


Figure (23):

Figure clearly shows a nonlinear change in saliva evaluation over the period of 9 month.

11 – Mood

Descreptive Study			
	Mean	**Standard Deviation**	Significance P value
Pre operative	**62.33**	**34.267**	**.005**
1month post operative	**70.75**	**18.844**	**0.393**
3 month post operative	**77.08**	**7.217**	**0.005**
6 month post operative	**85.33**	**16.283**	**<0.0005**
9 month post operative	**96.58**	**16.714**	**<0.0005**

In table (18), we show the initial diagnostic statistics (Mean and Standerd Deviation)

Pillai, lambda of Wilks, Hotelling, **and Roy test** give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that mood changes over the time. Thus, the mean level of mood occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 18, we show the data obtained from "mood" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between levels were significant different. Specifically, differences between 1 and 2, 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series.

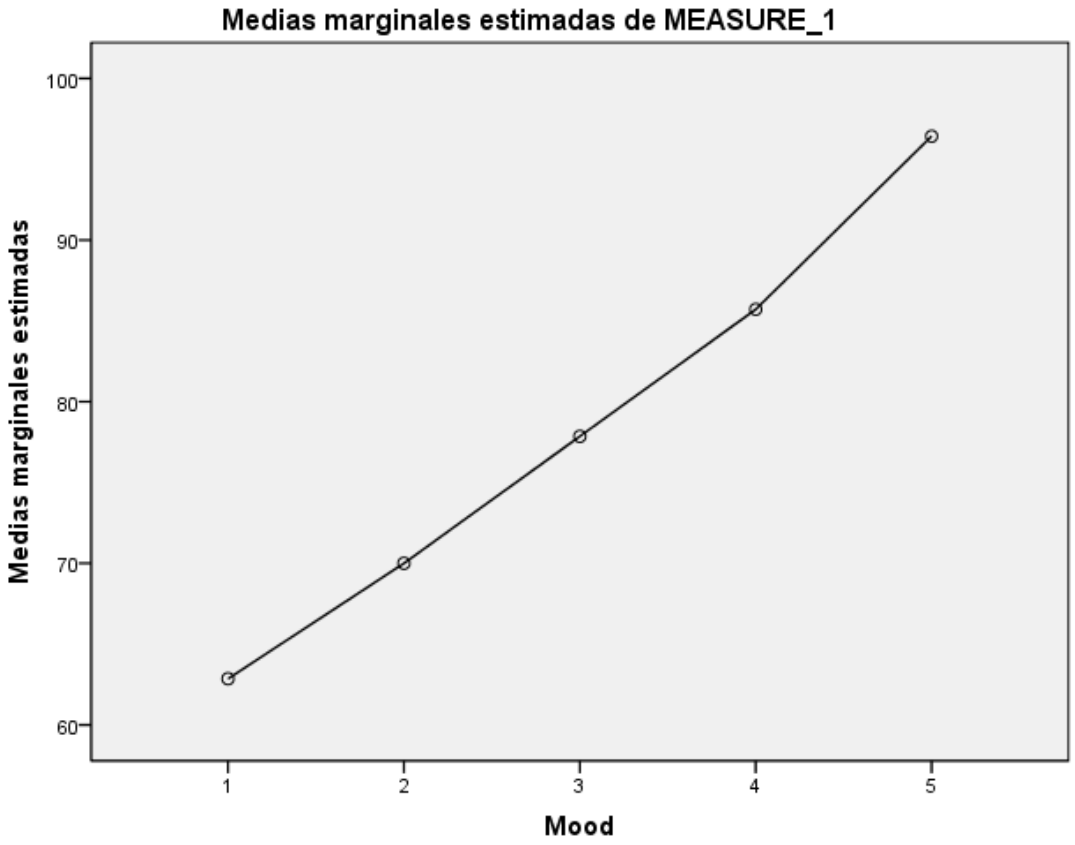


Figure (24):

Figure clearly shows a nonlinear change in mood evaluation over the period of 9 month.

12- Anxiety

Descreptive Study			
	Mean	Standard deviation	Significance P value
Pre operative	50.17	35.537	.005
1month post operative	65.67	25.879	.027
3 month post operative	76.58	29.596	<0.0005
6 month post operative	85.17	22.344	<0.0005
9 month post operative	97.17	22.344	<0.0005

In table (19), we show the initial diagnostic statistics (Mean and Standerd Deviation)

Pillai, lambda of Wilks, Hotelling, and Roy test give a result what was, in all of them, statistically significant ($p < 0.0005$). Consequently, we can reject H0 of equality of means, and assume that anexity changes over the time. Thus, the mean level of anexity occurred over 9 month had significance correlation with time.

The Mauchly test of sphericit also had a significant value less than 0.0005, so we must accept the hypothesis that the variance of differences between levels was significantly different. In other words, the assumption of sphericity has been violated. Here, we must use the **epsilon index** in order to correct the previous result which can be estimated using **Greenhouse-Geisser or Huynh-Feldt tests.**

On table 19, we show the data obtained from "anexity" and the important column is the one containing the significant value. The significant value is <0.0005 which is less than 0.05; so we must accept the hypothesis that the variance of difference between

levels were significant different. Specifically, differences between 1 and 2 1 and 3, 1 and 4, 1 and 5 have been observed. No other differences appeared in our series.

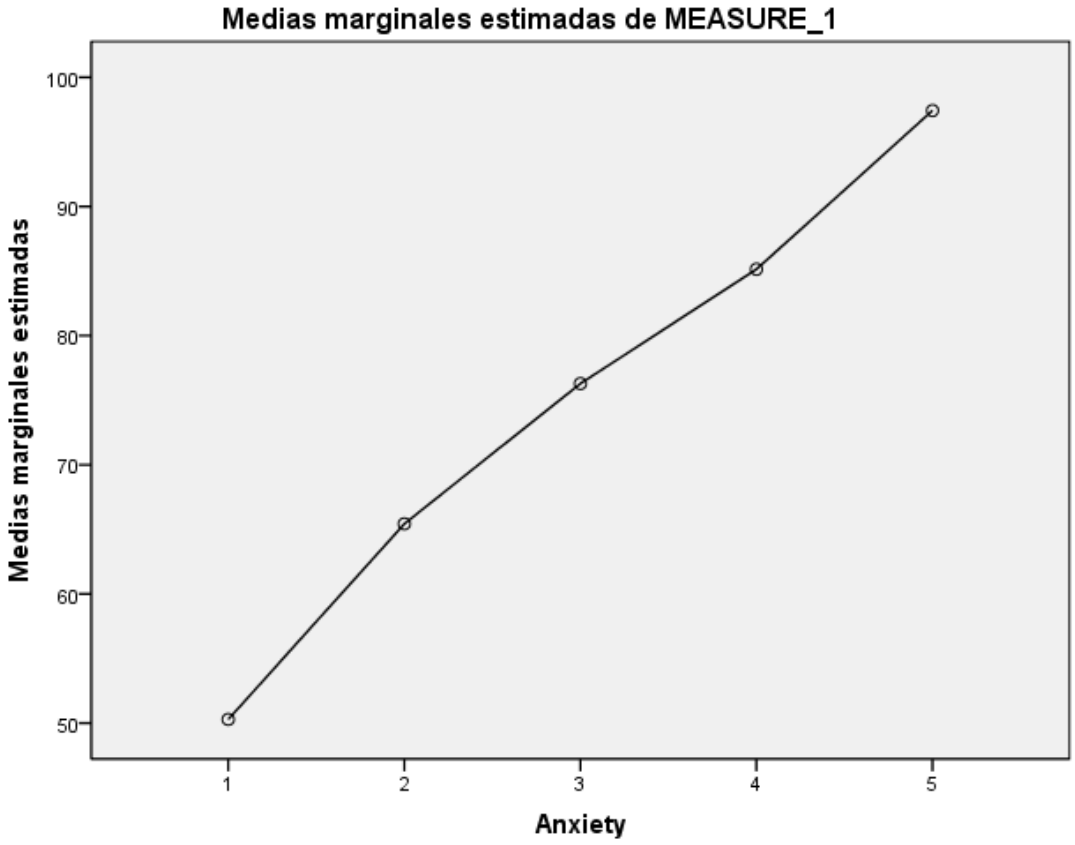


Figure (25):

Figure clearly shows a nonlinear change in anexity evaluation over the period of 9 month.

Chapter 6

Case Presentation

Case 1

Male patient 70 years old

Presenting by mucoepidermoid carcinoma of right parotid that infiltrate pre auricular skin.

Total parotidectomy done with reconstruction with free anterolateral thigh flap.

A- Pre Operative

B- Carcinoma of parotid infiltrates the skin

C- Post Operative ,reconstruction with ALT

D- 3 Months post operative

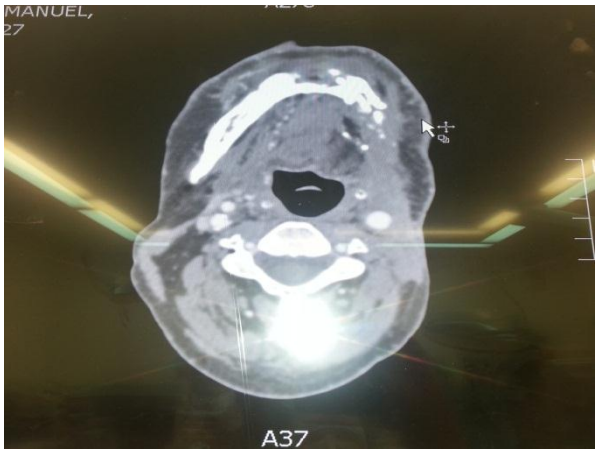
Case 2

Male patient 56 years old

Presenting by gingival mandibular carcinoma

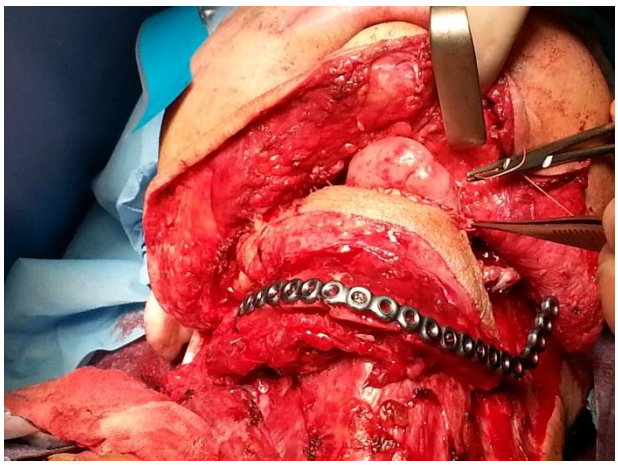
Resection donewith reconstruction with osteocutenous free fibular flap

A –



Pre Operative

b- CT Scan of lower mandible.



C- Resected part of mandible.

D-

Free fibula fixed by reconstructive plate

Case 3

Male patient 80 years old

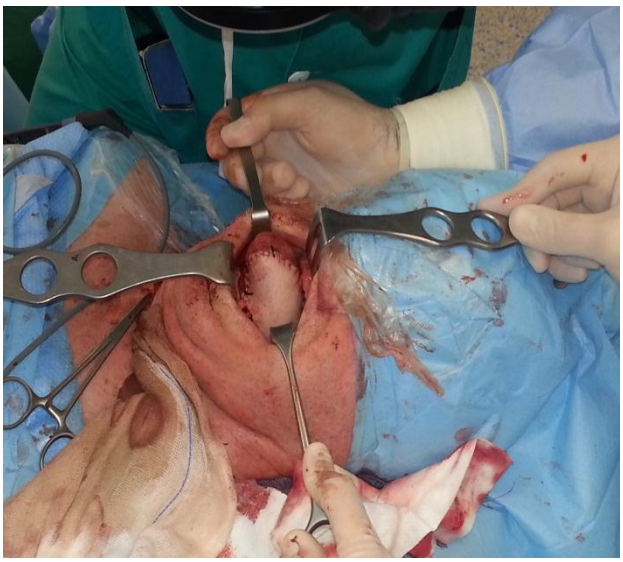
Presenting by cancer tongue in left lateral border of the tongue

Resection done with reconstruction with free radial fore arm flap

A- Pre operative

B- Hemiglossectomy

C- Harvest of RFFF.



D- Reconstruction of Tongue by RFFF.

Case 4

Male patient 62 years old

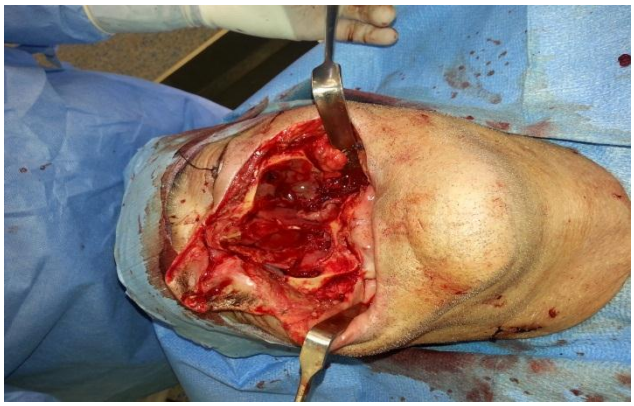
Presenting by cancer maxilla

Total maxillectomy done with reconstruction with free anterolateral thigh flap ALT

A- Pre Operative

B- Intra Operative

C- Limit of Resection



D- Intra Operative Defect

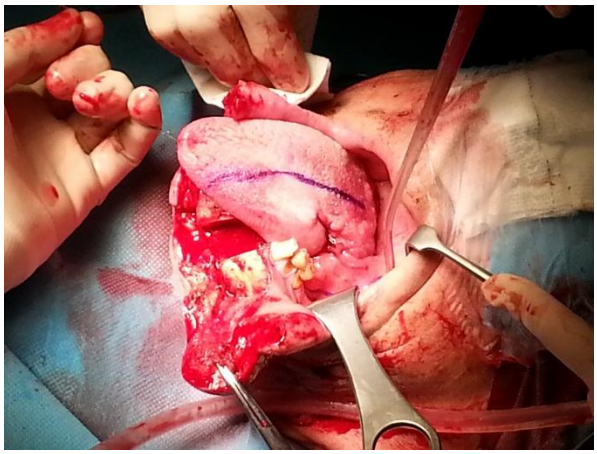
E- Post Operative Reconstruction with ALT

Case 5

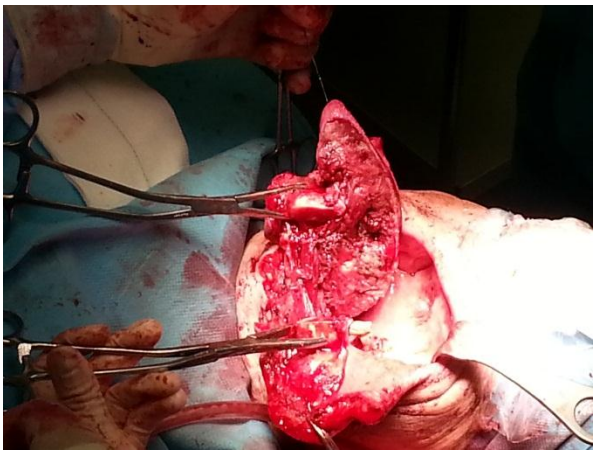
Male patient 74 years old

Presenting by cancer tongue on lateral border

Resection done with reconstruction by radial fore arm free flap



A –Cancer tongue intraoperative.



B- Intraoperative Hemiglosectomy.

C- Resected part of tongue

D- Reconstruction with RFFF

E- Post operative 5 days

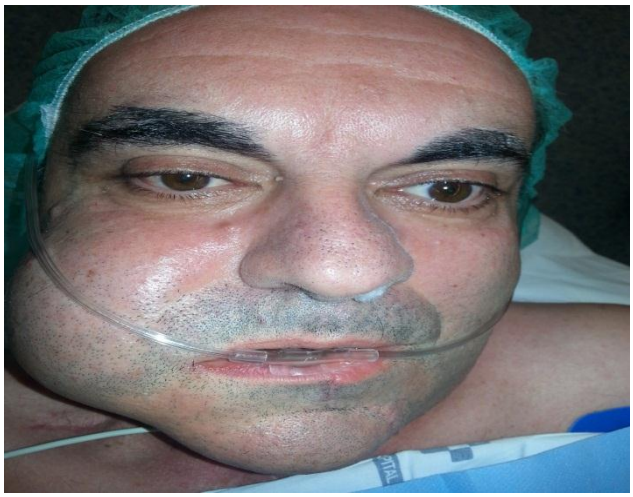
F- Post operative 10 days

Case 6

Male patient 48 years old

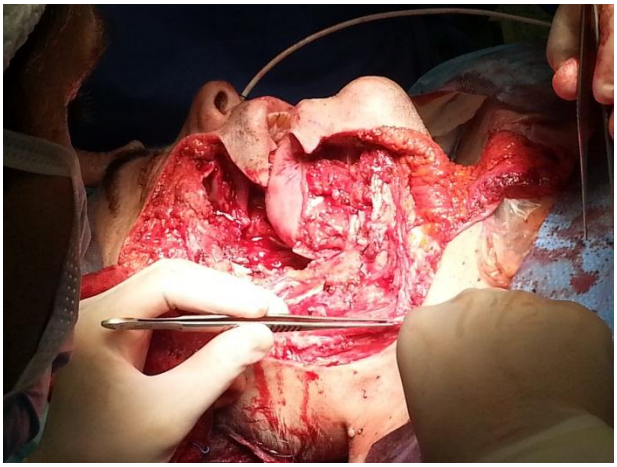
Squamous cell carcinoma of right cheek

Resection done with reconstruction with free antro lateral thigh flap



A- Pre operative.

B- Intra operative.



C- Intra Operative Defect.

D- Immediate Post Operative

E- Post Operative 2 weeks.

Case 7

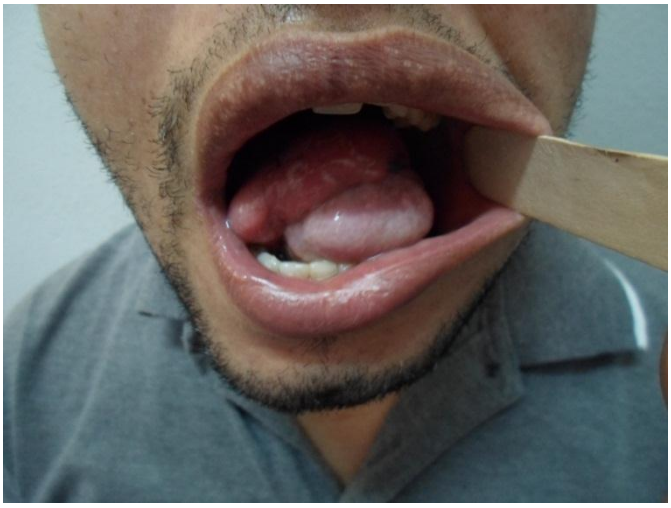
Male patient 35 years old presented by cancer floor of mouth

Resection done with reconstruction by Free Radial Fore Arm Flap

A- Cancer floor of Mouth Pre Operative.

B- Immediate Post Operative.

C- One Month Post Operative.



D – 3 months post operative

Case 8

Femal patient aged 20 years old

presenting by mandibular amleoblastom

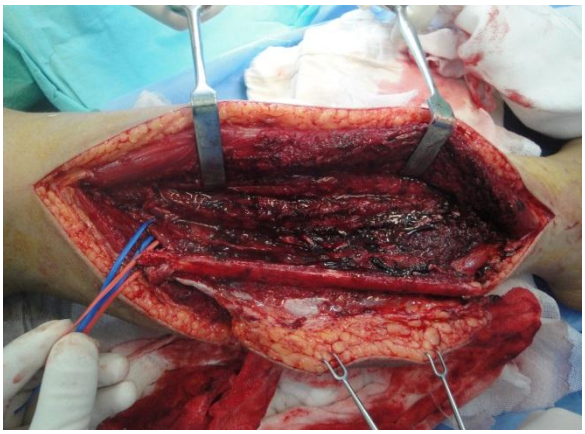
Reconstruction by free fibular flap

A- Preoperative.

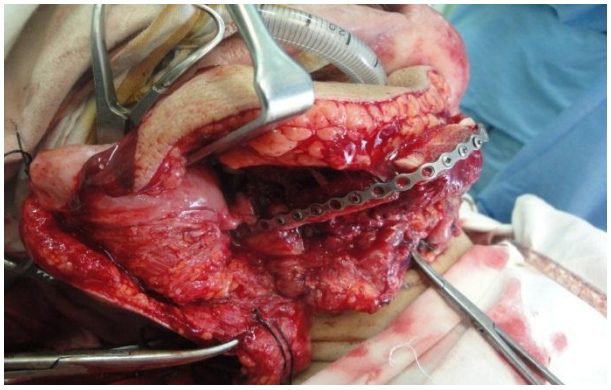
B- Intra oral Examination Pre operative

Resected part of the Mandible.

C –



D- Harvesting of Free Fibula



E – Intraoperative Reconstruction using free fibular flap

Case 9

4 years old presenting by Retinoblastoma

Resection done with reconstruction with ALT

A – Pre Operative .

B- Harvesting of ALT .

C- Anterolateral thigh flap.

D- Immediate Post operative.

Chapter 7

Discussion

DISCUSSION

In this study, patient's data were collected from patients in Oral and Maxillofacial Department in the Central University Hospitals of Asturias in Spain in collaboration with Head and Neck, Maxillofacial Unit in General Surgery Department , Sohag University Hospitals in Egypt between Januaray 2013 and September 2015, in accordance to approved institutional review board guidelines.

We set out collect data on the patients of head and neck cancer treated with tumor resection and reconstruction with free flap transfer in the descriptive part of this research. We was looking for the most affected age group, sex, primary tumor site, pathological and histological type of the tumor, type of neck dissection, method of free flap reconstruction and using of radiotherapy and chemotherapy. Another important aim of our work is study functional, psycological and aesthetic results in patients of head and neck cancer treated by tumor resection and reconstruction with free flap.

A further aim of our study was to examine and follow up the changes in the QOL of head and neck cancer patients through comparisons before the surgery and after the surgical resection and reconstruction with free flap transfer after one month, three months, six months and nine months after the surgery and to investigate whether our free flap reconstruction methods can improve the QOL of head and neck cancer patients significantly.

The assessment of the quality of life in every day clinical practice is become increasingly in last few years. The number of articles addressing this issue has grown significantly in recent years and it is currently over 190,000 published in PubMed and Science Direct (139 – 140).

We decided to use the University of Washington Quality of Life questionnaire, version 4 (UW-QOL) (141), a HNC disease-specific questionnaire, because it is well-validated, brief, simple to process, and proven to provide clinically relevant information, particularly in HNC. We adopted a self-administration mode, because it avoids potential interviewer bias, is quick, simple, allows the patient to complete it at their convenience and is easy to process.

The UW-QOL questionnaire has been proven to have psychometric validity, reliability, and responsive instrument. It is self-completed by the patients, inexpensive, and easy to administer.(141).

HNC and its treatment can have a profound effect on the patient's physical, functional and emotional well-being, especially decreasing the QOL. (Evans *et al.*, 2003 (142), Jones *et al.*, 1992 (143), Rogers *et al.,* 1999 (144), Kazi *et al.,* 2010 (145) Hassanin KAM *et al*, 2005 (166).

QOL evaluation has increasingly become an important supplement in the interpretation of the outcome information in HNC treatment (Hassan *et al.*, 1993, (147) Murphy, 2009 (148), Vartanian *et al.,* 2004 (149), Nazare*t al.,* 2010 (150). It can be measured by the administration of specific questionnaires to the patients. In Egypt and Spain, there have been no such examinations of the QOL. A survey of the international literature revealed numerous papers related to the comparison and validation of different QLQs, the comparative analysis of the QOL before and after treatment with different types of questionnaires, and the comparison of the outcome following several treatment methods, but we have found no studies involving a review of the QOL of HNC patients before and after maxillofacial reconstruction using University of Washington QOL Questionnaire (UWQOL). This was the background in the selection of the goals in this study.

7.1: Sociodemographic and epidemiologic analysis

Male : female ratio:

Here, we found that the male: female ratio was 3:1. This agrees with the results of other authors such as Kim *et al.* (3.:1) (151), Arstaad *et al.* (3:1) (152), Nazar *et al.* (3:1) (150), Scharloo *et al.* (3:1) (153), Thomas *et al.* (3:1) (154), Hammerlid *et al.* (3:1) (155), Gritz *et al.* (3:1) (186), and differs from finding of others authors like Hassan *et al (2:1)(147).*, Hassanein *et al.* (2:1) (146), Kornblith *et al.* (2:1) (157), Lam Tang *et al. (158)* and Yang *et al. (159),* Head *et al.* (6:1) (160), Silveira *et al.* (5:1) (161), de Graeff *et al.* (4:1) (162), Alicikus *et al (163).* (4:1), Lopez *et al.* (4:1) (164) and Schoen *et al.* (1:1) (165).

Examined patients with HNC we found that the oral cavity was more common as tumor location among our patients males (77.1%) than among female. Hammer lid *et al .* examined patients with oral, pharyngeal and laryngeal cancer and found that the oral cavity was more common as tumor location among females (52%) than among males (155).

Age of the patients:

The average age of patients in this study was 57 (range of 26 to 88 years). This is in agreement with the results of Hassan *et al.* (55 years) (147), Hassanein *et al.* (58 years),(146), Lam Tang *et al.* (55.5 years) (158), Gritz *et al.* (58.4 years)(156), Kim *et al.* (60.6 years)(151), Scharloo *et al.*, (59.5 years)(153), Silveira *et al.* (59.4 years)(161), Alicikus *et al.* (53 years)(163), Lopez *et al.* (55.78 years)(164), Stevens *et al.* (56.1 years)(166), Verdonck-de Leeuw *et al.* (59 years)(167) and Kornblith *et al.* (59.5 years)(157). In several studies, the mean age was over 60 years: Bjordal *et al.* (61 years)(168), Rinkel *et al.* (62 years)(169), Head *et al.* (60.2 years)(160), Nalbadian *et al.* (62.57 years)(170), Rogers *et al.* (62 years)(141), Nazar *et al.* (64.4 years)(150), Hammerlid *et al*. (63 years)(155) and Schoen (63.5 years) (165). Only one study reported a mean age under 50 years: Kazi *et al.* found it to be 49.6 years (145).

Smoking and Alcohol:

Among the present HNC patients, 20 (57.1%) were non - smokers and 15 (42.8%) were smokers, and 7 patients (20%) consumed alcohol regularly. These habits have been considered in only a small proportion of the analogous investigations, although they are very important factors in the development of tumors in the head and neck region, and later play a considerable role in the changes in the QOL after treatment, as confirmed by the xerostomia. In the study by Hammerlid *et al.* (155), 29% of the patients had never smoked . Our result correlates with this finding. Meyer *et al.(171)* found a 64% incidence of tobacco use among their studied patient group. Vartanian *et al.* (2006) (167) started that 80% of their patients reported previous tobacco use and 75.7% alcohol consumption. Gritz *et al.(156)* observed a significant reduction in smoking status after a 1-year follow-up, and a significant decline in alcohol use following treatment, with a significant increase in alcohol use between 1 month and 1 year.

Primary Site:

The most commonly affected primary sites were the anterior two-thirds of the tongue in 11 patients (31.4%), followed by the gingiva mandibular in 7 patients (20 %), floor of the mouth in 4 patients (11.4 %), posterior third of the tongue in 3 patients (8.6 %), maxilla in 3 patients (8.6 %), parotid gland in 3 patients (8.6 %) and retromolar region in 2 patients (5.7 %). Our results are similar to those of Lopez *et al.(164)* that found the tongue was the most affected site (38%), followed by the floor of the mouth (10%). Hassanein *et al.*(176) found the floor of the mouth (29%), the tongue (21%) and the mandibular alveolus (18%) as more relevant sites. In the study by Lam Tang *et al.* (158), the mandible was the most affected area (44%). Hassan *et al (147).*examined patients with pharyngeal and laryngeal tumors, too and found the oral cavity to be most affected (36%). Thomas *et al.(154)* examined 77 patients, in 34 (44%) of whom the tumor was in the tonsillar fossa, and in 20 patients (26%) in the tongue. Kruse *et al.(172)* studied 99 elderly patients with HNC and found that the maxillary and mandibular alveolar ridges (24% each) were the most affected, followed by the tongue (18.9%). In the 47 patients in the study by Biazevic *et al.*(173), the tumor was in the oral cavity (the floor of the mouth, the gingiva, the retromolar area or the palate) in 19 cases (40%) and, in the oropharynx in 12 cases (25.5%), with 11 in the tongue (23.4%). Kim *et al.(151)* conducted a study on 133 patients, and found the tonsillar area to be affected in 89 cases (66.9%), the base of the tongue in 23 (17.29%) and the soft palate in 15 patients (11.28%).

Method of Treatment:

The most frequently applied treatment method was surgery together with radiotherapy in 29 patients (82.9%), whereas 6 patients (17.1%) were treated with surgery only. This result is larger than the results of Rinkel *et al.(169)* (50%), Nazar *et al.(150)* (47.2%) and Kim *et al.(151)* (71.2%). Scharloo *et al.(174)* found that the use of irradiation alone was the most frequent treatment method (40.7%). In the investigation by Thomas *et al.*(154), 88.3% of the patients received primary or adjuvant radiotherapy. Vartanian *et al.(149)* (2004) examined 301 patients, 158 of whom (52.5%) underwent only surgery, 34 (11.3%) were irradiated, and 98 (32.6%) received a combination of surgery and radiotherapy. Nalbadian *et al.(170)* found surgery alone to be the most commonly applied treatment method (54.1%). In the

study by Verdonck-de Leeuw *et al.*(167), radiotherapy was the most frequently applied treatment (32%), followed by a combination of surgery and radiotherapy (27%). Hassanein *et al* (146) reported surgery as the most common (70%) treatment method, with surgery combined with radiotherapy (18%) in second place.

The tumor localization and the treatment method, together with the general disease stage, play essential roles not only in the treatment of HNC, but also in the incidence and intensity of the side-effects and the QOL (Alicikus *et al.*, 2009).(163).

7.2: Comparative analysis of measurements of QOL questionnaires

In this study, it was analyzed which function was especially damaged by tumor treatment and measured the changes in the QOL through a comparison before and after maxillofacial, head and neck reconstruction with free flaps. Most of the available studies made comparisons between some special QLQs (e.g. comparative studies with KPS, CARES or UW QOL questionnaires) or with only one or two domains (e.g. the speech domain), or between healthy and tumor patient groups, or on the longitudinal effects of cancer treatment. Merely a few studies extended to the changes in the all domain of QOL used by UW QOL questionnaires after maxillofacial head and neck reconstruction with free flaps. This study can give a new comparison profile before and after the surgical treatment for the patients and international literature.
We feel that the domain scores should be analyzed separately so that treatment-specific effects may then become apparent through contrasting specific responses within the domains.

7.3: Discussion of each domain separately

Pain

In the pain score we show the significance *p* value (below 0.005) shows an effect of time in dependent variable which is the pain; and we show subject effect reflected repeated measures. The test shows significance interaction between pain and time level, this mean that level of pain occurred over 9 month had significance correlation.

After summation of the mean of pain item in all the patients, preoperatively, and compare it with the mean after 9 month of follow up, we found significant increase of the summation from 76.429 and become 99.286 and this indicate the success of our resection and reconstruction by decreasing the level of the pain gradually with progression of the time after the surgery.

Our patients show similar results regarding the domain of the pain with another works like the work of Herce J, Rollón*et al* (175) in 2007 published on a sample of 23 patients found that high scores also correspond to the pain and also in the work of Rogers et al (176) and Hammerlid and Taft *et al* (177), although they find statistical significance correlation of the pain as regard to the time.

Our good results in the pain dimension correspond to those published by other authors like Rogers et al (176), Hammerlid and Taft *et al* (177), found positive results but no significant differences in the pain. We believe that the~~se~~ differences reported in these studies are specific and detect sharp peaks of pain from other sources not related to pathology and oncology, and they do not affect other dimensions as vitality, and general health physical function, where the results are better than the general population. It would be necessary to use of tests specifically designed to detect the problems that cause our treatment in patients with HNC.
We believe that the measure of quality of life of the patients at 9 months of treatment provides valuable information and gives us a real insight of which is the patient's situation when he or she has the perception of having passed the disease. In other study (176), the quality of life is considered when the patient cured of his or her disease without pain and keep coming to our clinic for review. Although the time of pass the questionnaires is not a fact consensual in literature and authors like Rogers *et al* (176) and culls *et al*.(178) think that quality of life assessed after a year treatment is a useful indicator in the longer term, and others like Schlipake *et al*.(179) are in our line, saying the overall quality of life and symptoms depression can improve from 3 years. Other studies have also found changes between the first and fifth years, especially in patients treated with radiotherapy (180-181).

Appearance

In the appearance score we show a significantly effect of time in the dependent variable, i.e. appearance; and we show subject effect reflected repeated measures. The test shows significance interaction between appearance and time level, this mean that level of appearance occurred over 9 month had significance correlation with time.

As regard to the analysis of the appearance score over the nine months we show mild improvement of the appearance near the previousone when we are compared the preoperative (85.00) and 9 month post operative (77.85).
Also patients over time tend to cope and adapt and this will mean that they are likely to give better scores than those during the early post-operative period.
Overall the response rate was acceptable (66%) and comparable to other studies.(182-183). There was no key difference between the responders and the non-responders. Appearance was increasingly rated as one of the three most important issues in the previous week the lower (worse) UWQOL appearance score. These data also reflects the importance of oral functioning and although appearance was important, it was overall a relatively lesser issue with patients. This study indicates that the patients who report a problem with appearance are more likely to have appearance as a major issue in combination with a set of other domains. Around a quarter of the patients had either notable issues regarding their appearance or was bothered by it.
The main problems patients reported on UWQOL regarding aspects of their appearance they were most concerned about were the mouth and the face. However a significant number of patients were also concerned about their teeth and neck, with others reporting problems with lip, speech, chin and the donor site. The patients reported disfigurement and scarring as the significant issues. Others reported quality of speech, dribbling of saliva and droopy smile as other related appearance issues and this correlate to Hassanien.K et *al* 2001(146).
In the wording of UWQOL questionnaire seems to give a clear demarcation between minor changes in appearance and something more significant and this is reflected in the answers of the patients.
Patients with a poor appearance score reflected this UWQOL questionnaire and this well observed in younger patients (<65 years) to be more concerned about their

appearance. In our study, female patients dissatisfied with their post treatment appearances. Dropkin (184) report that younger patients experienced greater anxiety after major surgery in head and neck. This confirms that younger patients with advanced disease report significant problems and therefore identifying them would help to recognize these problems and will enable clinician to offer appropriate help. Katz et al (185) report lack of correlation between disfigurement and T stage and attribute this finding to possibly a low sample size. In our study patients who had appearance problems tended to report associated mood problems and related QOL problems. Millsopp et al (182).reported that patients may not express their specific concerns with regard to appearance and that there may be several reasons why the appearance issue may not be addressed such as other treatment priorities, swallowing difficulties and recurrence issues. They also suggest utilizing the UWQOL as a trigger for discussion of patient problems such as appearance.

Activity

In the activity score we show a significantly effect of time in the dependent variable, and we show subject effect reflected repeated measures. The test shows significance interaction between activity and time level. This mean that level of activity occurred over 9 month had significance correlation with time and patients with time become more active and regain to normal or near the normal activity.

As regard to the analysis of the activity score over the nine months we show perfect improvement of the activity more than the previous one when we compared the preoperative (92.85) and 9 month post operative (95.71). In activity domain we conclude from this resultthatthe level of the activity is affected by disease preoperatively and after resection of tumor and reconstruction with free flap and with time the activity of the patients is become improved.

Recreation

In the recreation score we show a significantly effect of time in the dependent variable recreation; and we show subject effect reflected repeated measures. The test shows significance interaction between recreation and time level. This mean that level of

recreation occurred over 9 months had significance correlation with time and patients with time become more enjoying and regain to normal or near the normal recreation. As regard to the analysis of the recreation score over the nine months we show perfect improvement of the recreation near the previous one when we ~~are~~ compared the preoperative (90.71) and 9 month post operative (95.71). In domain of recreation we conclude from this result that the level of the recreation is affected by disease preoperatively and after resection of tumor and reconstruction with free flap and with time the recreation of the patients is become improved.

The best improvements following resection and reconstruction with free flap were in activity and recreation.

Swallowing

In the swallowing score we show a significantly effect of time in the dependent variable swallowing, and we show subject effect reflected repeated measures. The test shows significance interaction between swallowing and time level. This mean that level of swallowing occurred over 9 months had significance correlation with time and patients with time we note the improvement of swallowing near the normal activity.
In the swallowing domain we observed a worse result in scale as the score of patients preoperative was (80.82 %), after one month postoperative was (39.42%) and this number indicate the patients cannot swallow in the post-operative period and this domain is increased in upcoming 9 month which was after 9 month (77.42%) and this mild improvement.This findings indicate that deglutition outcomes after reconstruction of the head and neck by means of microvascular free-tissue transfer are likely to be satisfactory, provided other circumstances relating to food transport are close to normal.
This improvement is correlated to the result of Kazi *et al* (2008)(175). Otherwise, Biazevic *et al (173).*found swallowing (24%), chewing (48%) and speech (44%) to be the most prevalent complaints at the time of treatment, and chewing (60%) and swallowing (52%) at the 1-year follow-up. It is interesting that Rogers *et al.* (2007)(186) found no trouble with swallowing and chewing in 45% of the patients in their study group.

The swallowing problem associated with the treatment of HNC in our study was that 2.8% of patients had most or all of their nutrition through a gastrostomy feeding tube. Only 55 % of patients had normal diet, whilst, 42% had pureed food. These outcomes are better than to other published reports. Pauloski *et al*(187) relay more than 50% of oropharyngeal cancer patients as having non-normal diet and 13% feeding tube dependence at 1 year post radiation with or without chemotherapy. In Mowry et al.'s (188) study of patients with chemo-radiation for stage 2–4 oropharyngeal cancer and a mean follow-up of 11 months, six out of fourteen patients scored 30% or less in the swallowing domain of UW-QOL. In a survey of 12 patients who had surgery with free flap reconstruction and post-operative radiotherapy for advanced tongue base tumours, Winter and colleagues *et al* (189) reported a mean score in swallowing domain of UW-QOL as 47.5, compared to the mean score of 77.42 in our study. In another study the feeding tube dependence for patients with stage 3–4 oropharyngeal cancer who had surgical excision with free flap reconstruction and postoperative radiotherapy was 50%.

We also did not find any correlation between swallowing function and age, gender, or nodal status, and this result is similar to L Tomas 2007(190).

Chewing

Here we show a significantly effect of time in the dependent variable chewing, and we show subject effect reflected repeated measures. The test shows significance interaction between chewing and time level, this mean that level of chewing occurred over 9 month had significance correlation with time and patients with time we note very little improvement of chewing near the normal activity.

In the chewing domain, we observed a worst result in scale as the score of patients preoperative was (64.82), after one month postoperative was (12.85) and this number indicate the patients cannot chewing in the period post operative and this domain is increase in upcoming 9 month which was after 9 month (54.28) and this is very little improvement toward preoperative level.

In this study chewing is the worst result and this correlated with the result of Hassanien K *et al* 2001 (146) and Kazi *et al* (2008) (145). Otherwise, Biazevic *et al.(183)* found chewing (48%) and speech (44%) to be the most prevalent complaints

at the time of treatment, and chewing (60%) and swallowing (24%) at the 1-year follow-up. In their study, chewing was the QOL domain which exhibited the largest reduction in rating, from 74.0 at baseline to 34.0 1 year after surgery. It is interesting that Rogers *et al.* (2007) (186) found no trouble with chewing in 45% of the patients in their study group.
In their study, chewing was the QOL domain which exhibited the largest reduction in rating, from 74.0 at baseline to 34.0 1 year after surgery.

Speech

Here we show a significantly effect of time in the dependent variable speech, and we show subject effect reflected repeated measures. The test shows significance interaction between speech and time level, this mean that level of speech occurred over 9 month had significance correlation with time and patients with time we note very little improvement of speech near the normal activity.
In the speech domain it has been observed that the worse result in scale as the score of patients preoperative was (83.71), after one month postoperative was (38.57) and this number indicates the patients cannot speak as it in the postoperative period and this domain increases in upcoming 9 months which was after 9 month (73.14) and this is very little improvement toward preoperative level.

In our study we found that patients treated for oral cancer speech with difficulties. This was observed by speaking with the patients postoperatively and we noted the voice and speech quality was altered and this affection showed mild improvement with the time but not regain to normal function or near normal.

We report in our study that patients afflicted from T3-4 tumours had worse voice, speech intelligibility and dysarthria severity results due to wide area of resection and wide reconstruction flap and high dose of radiotherapy. Worse outcomes with increasing T stage have been reported with Brown J.S *et al (191),* Pauloski B.R *et al(187) and* Zuydam A.C *et al (192).* It has been seen from our UW-QOL results that only 25% of the patients have near normal speech after resection and reconstruction with free flap for oral cancer specially in cancer of the tongue and floor of mouth. The majority, about 63% have only mild speech and articulation impairment. However, 12% had major speech impairment.

Some reports highlight good speech results in oral cancer patients. There was no subsite specific association seen with speech and voice outcomes, and has been reported by others as well (Colangelo LA *et al* (193) and Chandu A *et al*.(194)). There are reports of soft palate tumors leading to different speech outcomes compared to other oropharyngeal subsites.

Free-flap reconstruction has had an impact on all aspects of speech and voice. Thomas, L., Jones, T.M. 2009 (190) reported that speech domain mean scores on UW-QOL were worse by about 20–25 points for those who had radiotherapy, late stage disease and free-flap reconstruction. Another study identified only extent of resection and use of free-flap as significantly related to post-treatment speech intelligibility. Few reports reported speech outcomes in oncological patients reconstructed with free-flap. Radiotherapy did not affect the speech intelligibility or articulation in other reports. (195-196).

From our point of view, the four-point scale for speech in UW-QOL may not be enough for detailed speech assessment and rehabilitation. Thus UW-QOL seems to be quite sensitive and an appropriate screening tool for assessment of speech disability in this group of patients. It is quick and easy to complete and does not add major financial or manpower burden to administer. For this reason, we need well-developed voice assessment tools for study the assessment and rehabilitation of the speech and voice after oral and oropharyngeal cancer resection and reconstruction with free flaps.

Shoulder

Here we show a significantly effect of time in the dependent variable shoulder, and we show subject effect reflected repeated measures. The test shows significance interaction between shoulder pain and time level, this mean that level of shoulder pain occurred over 9 month had significance correlation with time and patients with time we note a good result of improvement of shoulder pain near the normal activity. In the shoulder pain domain we observed a good result in scale as the score of patients preoperative was (100), after one month postoperative was (81.42) and this number indicate the patients can move his shoulder with some limitation in the

postoperative period and this domain increased in upcoming 9 month which was after 9 month (91.42) and this is very good improvement toward preoperative level.

Dysfunction of the shoulder and neck after neck dissection can result in poor quality of life. The importance of shoulder function in activities of daily living is evident from the questions asked in the shoulder-specific questionnaires. Difficulties with dressing, writing, driving, lifting light objects, and reaching for things can have a serious effect on social activities, recreation, and work. Van Wilgen et al.(197) reported that reduced abduction and neck pain were related to poor outcome in several domains of quality of life, and were associated with depression. Although the UW-QOL is well established, no studies have compared the shoulder domain with other more recent shoulder-specific functional questionnaires. Such comparisons help our understanding of how patients score the UWQOL shoulder domain. This is a weighted test that combines scores for patients' symptoms and objective measures of range of movement and strength of the shoulder. Thirty-five percent of patients reported either "pain or weakness in my shoulder has caused me to change my work/hobbies" or "I cannot work or do my hobbies because of problems with my shoulder". After modified radical or radical dissection, patients scored worst. However, despite objective and subjective deficits after neck dissection, the shoulder domain ranked as one of very important domain in the UW-QOL questionnaire. This reflects the importance of other functional aspects such as swallowing, saliva, speech, and chewing in patients after treatment of oral and oropharyngeal cancers. Morbidity in the shoulder and neck after neck dissection is well recognized. Physiotherapy has an important role in promoting function and reducing pain by maintaining length of muscles, range of movement, and preventing secondary complications such as adhesive capsulitis. Rogers *et al*. published article in 2007 (186) where they saidthat progressive training in resistance exercises may improve scapular stability and the strength of the upper extremity and serve as an adjunct to standard physiotherapy. Pain in the shoulder after neck dissection can be problematic, and is associated with a restricted range of movement. In a pilot study, Vasan *et al*.(198) reported fast and significant reduction of pain after neck dissection with only one session of injections of botulinum toxin type A into trigger points of painful muscles.

Taste

Regarding taste, here we show a significantly effect of time in the dependent variable taste, and we show subject effect reflected repeated measures. The test shows significance interaction between taste and time level. This means that level of taste occurred over 9 month had significance correlation with time and patients with time described the improvement of taste to multiple food and fluid near the normal taste. In the taste domain we observed a very good result in scale as the score of patients preoperative was (98.82 %), after one month postoperative was (80.28%) and this number indicates the taste of the patients decrease as result to surgical resection and reconstruction with free flap in the postoperative period and this domain is increased in upcoming 9 month which was after 9 month (95.71%) and this was a very good improvement in the taste domain . This finding indicates that taste domain outcomes after reconstruction of the head and neck by means of microvascular free-tissue transfer are likely to be satisfactory, provided other circumstances relating to foods and fluids are close to normal.

We observed in this study 2 patients (5.7%) with cancer of anterior two-thirds of the tongue with significant impairment of taste in postoperative period due to resection of large part of the tongue more than the half of the tongue, after follow-up of the patients for 9 month we notice significant improvement of taste domain of those patients.

Saliva

Regarding salivation, here we show a significantly effect of time in the dependent variable saliva, and we show subject effect reflected repeated measures. The test shows significance interaction between saliva and time level, this mean that level of saliva occurred over 9 month had significance correlation with time and circumstances and factor that affect patients in post operative period like post operative radiotherapy and patients with time we note the decrease in volume of saliva to multiple food and fluid to the normal saliva.

In the saliva domain we observed a the second worse item in this study with bad results in scale as the score of patients preoperative was (100 %), after one month postoperative was (94 %) and this number indicates that the saliva of the patients

decreases as result to surgical resection and reconstruction with free flap in the period post operative and this domain is clearly decreased in upcoming 9 month which was after 9 month (78.57%) and this result is worse in the saliva domain. This finding indicates that saliva is strongly affected with surgical effect and post operative radiotherapy effect.

Mood

Regarding mood, here we show a significantly effect of time in the dependent variable mood, and we show subject effect reflected repeated measures. The test shows significance interaction between mood and time level, this mean that state of mood occurred over 9 month had significance correlation with time and circumstances and factors that affect patients in post operative period. In this series, we noted that patients with time showed a significant improvement of level of the mood and the family support did not show any significant change and all feeling answers were equally positive. This is good from the aspect of the QOL because it means that the family stands up for the patients in their enormous problems and helps them in the healing period.

In the mood domain, we observed a very good improvement in scale as the score of patients preoperative was (62.85 %), after one month postoperative it increased and it was (70 %). This number indicates the patient satisfaction to surgical resection of the tumor and reconstruction with free flap either in hospital stay or few days after discharge. Mood of the patients is clearly increase in upcoming 9 month which was after 9 month (96.42%) and this result indicate excellent improvement of psychological aspects of our patients.

Anxiety

Regarding anxiety, here we show a significantly effect of time in the dependent variable anxiety, and we show subject effect reflected repeated measures. The test shows significance interaction between anxiety and time level, and this mean that level of anxiety occurred over 9 month had significance correlation with time and circumstances and factors that affect patients in post operative period. Patients with time we note significant improvement of level of the anxiety and this supported by

family relations did not show any significant change and all feeling answers were equally positive. This is good form of the aspect of the QOL because it means that the family stands up for the patients in their enormous problems and helps them in the healing period .

In the anxiety domainweobserved a very good improvement in scale as the score of patients preoperative was (50.28 %), after one month postoperative it increased and it was (65.42 %) and this number indicate the patient satisfaction to surgical resection of the tumor and reconstruction with free flap either in hospital stay or few days after discharge. Level of anxiety of the patients is clearly decrease in upcoming 9 month which was after 9 month (96.42%) and this result indicate excellent improvement of psychological aspects of our patients and the patient not thinking in bad manner in their diseases .

We decided to use the University of Washington Quality of Life questionnaire, version 4 (UW-QOL), a HNC disease-specific questionnaire, because it is well-validated, brief, simple to process, and proven to provide clinically relevant information, particularly in HNC. We adopted a self-administration mode, because it avoids potential interviewer bias, is quick, simple, allows the patient to complete it at their convenience and is easy to process.

Swallowing, chewing, speech and saliva were the most commonly identified important issues as identified in our series. This is totally acceptable considering the location of these cancers. The low score would indicate a significant discontent and therefore this is an area which needs to be addressed and certainly be taken into account when deciding on treatment.

In our study, we found that time since surgery, reconstruction, neck dissection, complications and radiotherapy were significant predicators of the QOL scores.

Much of the significant effects of radiotherapy on the domains of saliva, swallowing and chewing could be explained by its effect on the production of saliva that is essential for lubrication. We also noticed that the saliva issue improved significantly with time and this is possibly due to habituation as well a palpable increase in the amount of saliva with time. While the negative effect of a neck dissection on shoulder mobility is clearly comprehensible, we can only hypothesize about the effect of complications and reconstruction on the mood and activity domains. Speech domain was significantly affected as a result of complications and this could be a result of

further surgery/reconstructions that many of these patients consequently require. In our study, the younger patients were significantly more anxious than the older patients and this could be related to their active, professional status.

Chapter 8

Conclusions

Conclusions

Microvascular free-tissue transfer has become the best reconstructive modality of choice for many patients after head and neck cancer ablative surgery. Modern assessment of outcome after such surgical procedures now includes evaluation of QOL. Our series is a prospective study that have analyzed QOL after head and neck reconstructive surgery in Spain and in Egypt using UW-QOL.

Oncologic surgeons must think of all the options available from the reconstructive ladder for the management of cancer defects as it is often possible to carry out adequately safe surgical resection yet provide good function using free flaps . microvascular free-flaps offer a reasonable method for reconstruction of large oral and head and neck defects.

CONCLUSIONS

1. The results of this study support the original description of the University of Washington Quality of Life questionnaire, version 4 (UW-QOL), in the terms of its advantages are that it is brief and self-administered, it is multifactorial, and allows sufficient detail to identify post-operative changes.

2. The University of Washington Quality of Life questionnaire, version 4 (UW-QOL), a head and neck cancer (HNC) disease-specific questionnaire, is well-validated, brief, simple to process, and proven to provide clinically relevant information, particularly in HNC. We adopted a self-administration mode, because it avoids potential interviewer bias, is quick, simple, allows the patient to complete it at their convenience and is easy to process.

3. Patients who score is equal to 100 or higher of 100. This should be clarified. 100 on the UW-QOL, which occur in early stages, do not require further evaluation. Those who score is below 70 could benefit from regular follow up to help clarify the specific problem and the impact of treatment on his quality of life domains.

4. More awareness of appearance concerns is needed particularly for younger patients with advanced disease with recognition of distress that it can cause to such patients. The UW-QOL appearance domain in spite of its simplicity reflects the real scores occurs for patient post operatively. A score of less than 75 in the appearance domain is associated with disfigurement and this cut-off could act as a trigger on an individual patient basis in out-patients for further evaluation with a view to offering support and intervention.

5. The worst problems after treatment were related to chewing, swallowing, speech and saliva domains and the best increase after reconstruction with free flap was pain with additional significant improvements in activity and recreation. There was no change in the level of family relations. This means that tumor as a disease does not affect personal contacts in the family in a negative way and it does not need improvement.

6. There was a distinct and statistically significant difference in postoperative shoulder function associated with the two forms of neck dissection evaluated in this study. Radical neck dissection resulted in significant change in shoulder function, as well as increased postoperative pain. The shoulder domain component of the UW QOL questionnaire was responsive to the functional differences associated with various forms of neck dissection. Adjuvant radiotherapy was not associated with worsened shoulder dysfunction.

7. Dry mouth is one of the most important issues for patients after treatment for oral and oropharyngeal cancer. Its presence and impact on patients can be obtained by using UW-QOL. Despite its simplicity, the UW-QOL questionnaire seems be able to appropriately identify patients with dysfunction in salivation especially after using radiotherapy. It is possible to use the UW-QOL saliva domain as a quick screening tool. Patients scoring <70 have notable subjective saliva dysfunction, and this seems to be an appropriate cut off to use in clinic when considering which patients might benefit from further assessment and possible intervention.

8. Ample evidence suggests the significant presence of psychological distress in patients who have been treated for head and neck cancer. Early detection and appropriate specialist referral are integral components of patient care. The assessment of emotional morbidity (anxiety and distress) by the UW-QOLv4 has been a very useful addition to the questionnaire, and early indications would suggest that these domains could be used to screen for psychological distress.

Conclusiones En Espaniol

La transferencia de tejido libre microvascular se ha convertido en la mejor modalidad reconstructiva de elección para muchos pacientes después de cirugía de ablación de cáncer de cabeza y cuello. La evaluación moderna del resultado después de estos procedimientos quirúrgicos incluye ahora la evaluación de la CDV. Nuestra serie es un estudio prospectivo que ha analizado la CDV después de cirugía reconstructiva de cabeza y cuello en España y en Egipto utilizando UW-QOL.

Los cirujanos oncológicos deben pensar en todas las opciones disponibles de la escala reconstructiva para el manejo de los defectos del cáncer, ya que a menudo es posible llevar a cabo una resección quirúrgica adecuadamente segura y proporcionar una buena función usando colgajos libres. microvascular libre-flaps ofrecen un método razonable para la reconstrucción de grandes oral y cabeza y cuello defectos.

Este trabajo de investigación es primer trabajo de investigación en España medido QOL después de cirugía reconstructiva de cabeza y cuello utilizando UW-QOL.

CONCLUSIONES

1. Los resultados de este estudio apoyan la descripción original del cuestionario de calidad de vida de la Universidad de Washington, versión 4 (UW-QOL), en términos de sus ventajas es que es breve y autoadministrado, es multifactorial y permite un detalle suficiente para identificar los cambios postoperatorios.

2. El cuestionario de calidad de vida de la Universidad de Washington, versión 4 (UW-QOL), un cuestionario específico para la enfermedad de cáncer de cabeza y cuello (HNC), está bien validado, breve, simple de procesar y demostrado proporcionar información clínicamente relevante , particularmente en HNC. Adoptamos un modo de autoadministración, ya que evita posibles sesgos del entrevistador, es rápido, simple, permite al paciente completarlo a su conveniencia y es fácil de procesar.

3. Los pacientes que califican son iguales a 100 o más de 100. Esto debe aclararse. 100 en la UW-QOL, que se producen en etapas tempranas, no requieren una evaluación adicional. Aquellos que obtienen puntajes por debajo de 70 podrían beneficiarse de un seguimiento regular para ayudar a aclarar el problema específico y el impacto del tratamiento en sus dominios de calidad de vida.

4. Más conciencia de las preocupaciones de apariencia es necesaria, especialmente para los pacientes más jóvenes con enfermedad avanzada con reconocimiento de angustia que puede causar a estos pacientes. El dominio de apariencia de UW-QOL a

pesar de su simplicidad refleja las puntuaciones reales que se producen para el paciente post operatorio.

5. Los peores problemas después del tratamiento se relacionaron con los dominios de masticación, deglución, habla y saliva y el mejor aumento después de la reconstrucción con colgajo libre fue el dolor con mejoras adicionales significativas en la actividad y la recreación. No hubo cambios en el nivel de las relaciones familiares.

6. Hubo una diferencia distinta y estadísticamente significativa en la función postoperatoria del hombro asociada con las dos formas de disección del cuello evaluadas en este estudio. La disección radical del cuello resultó en un cambio significativo en la función del hombro, así como en el aumento del dolor postoperatorio.

7. La sequedad bucal es uno de los problemas más importantes para los pacientes después del tratamiento para el cáncer oral y orofaríngeo. Su presencia e impacto en los pacientes se puede obtener utilizando UW-QOL. A pesar de su simplicidad, el cuestionario UW-QOL parece ser capaz de identificar adecuadamente a los pacientes con disfunción en la salivación, especialmente después de usar la radioterapia. Es posible utilizar el dominio de saliva UW-QOL como una herramienta de detección rápida. Los pacientes con un puntaje <70 presentan una disfunción subjetiva notable de la saliva.

8. Una amplia evidencia sugiere la presencia significativa de angustia psicológica en pacientes que han sido tratados por cáncer de cabeza y cuello. La detección temprana y la derivación especializada apropiada son componentes integrales de la atención al paciente. La evaluación de la morbilidad emocional (ansiedad y angustia) por la UW-QOLv4 ha sido una adición muy útil al cuestionario, y los primeros indicios sugieren que estos dominios podrían ser utilizados para detectar el malestar psicológico.

Chapter 9

University of Washington Quality of Life questionnaire

University of Washington Quality of Life Questionnaire (UW-QOL v4)

Please answer all of the questions by ticking one box for each question.

1. **Pain**. (Tick one box: _)
□ I have no pain. (100)
□ There is mild pain not needing medication. (75)
□ I have moderate pain - requires regular medication (e.g. paracetamol). (50)
□ I have severe pain controlled only by prescription medicine (e.g. morphine). (25)
□ I have severe pain, not controlled by medication. (0)

2. **Appearance**. (Tick one box: _)
□ There is no change in my appearance. (100)
□ The change in my appearance is minor. (75)
□ My appearance bothers me but I remain active. (50)
□ I feel significantly disfigured and limit my activities due to my appearance. (25)
□ I cannot be with people due to my appearance. (0)

3. **Activity**. (Tick one box: _)
□ I am as active as I have ever been. (100)
□ There are times when I can't keep up my old pace, but not often. (75)
□ I am often tired and have slowed down my activities although I still get out. (50)
□ I don't go out because I don't have the strength. (25)
□ I am usually in bed or chair and don't leave home. (0)

4. **Recreation**. (Tick one box: _)
□ There are no limitations to recreation at home or away from home. (100)
□ There are a few things I can't do but I still get out and enjoy life. (75)
□ There are many times when I wish I could get out more, but I'm not up to it. (50)
□ There are severe limitations to what I can do, mostly I stay at home and watch TV (25)
□ I can't do anything enjoyable. (0)

5. **Swallowing**. (Tick one box: _)
□ I can swallow as well as ever. (100)
□ I cannot swallow certain solid foods. (70)
□ I can only swallow liquid food. (30)
□ I cannot swallow because it "goes down the wrong way" and chokes me. (0)

6. **Chewing**. (Tick one box: _)
□ I can chew as well as ever. (100)
□ I can eat soft solids but cannot chew some foods. (50)
□ I cannot even chew soft solids. (0)

7. **Speech**. (Tick one box: _)
□ My speech is the same as always. (100)
□ I have difficulty saying some words but I can be understood over the phone. (70)
□ Only my family and friends can understand me. (30)
□ I cannot be understood. (0)

8. **Shoulder**. (Tick one box: _)

□ I have no problem with my shoulder. (100)

□ My shoulder is stiff but it has not affected my activity or strength. (70)

□ Pain or weakness in my shoulder has caused me to change my work / hobbies. (30)

□ I cannot work or do my hobbies due to problems with my shoulder. (0)

9. **Taste**. (Tick one box: _)

□ I can taste food normally. (100)

□ I can taste most foods normally. (70)

□ I can taste some foods. (30)

□ I cannot taste any foods. (0)

10. **Saliva**. (Tick one box: _)

□ My saliva is of normal consistency. (100)

□ I have less saliva than normal, but it is enough. (70)

□ I have too little saliva. (30)

□ I have no saliva. (0)

11. **Mood**. (Tick one box: _)

□ My mood is excellent and unaffected by my cancer. (100)

□ My mood is generally good and only occasionally affected by my cancer. (75)

□ I am neither in a good mood nor depressed about my cancer. (50)

□ I am somewhat depressed about my cancer. (25)

□ I am extremely depressed about my cancer. (0)

12. **Anxiety**. (Tick one box: _)

□ I am not anxious about my cancer. (100)

□ I am a little anxious about my cancer. (70)

□ I am anxious about my cancer. (30)

□ I am very anxious about my cancer. (0)

Appendix: Spanish Version of the UW-QOL Questionnaire

Cuestionario de la Universidad de Washington sobre
Calidad de Vida (UW-QOL)

Por favor conteste todas las preguntas marcando una alternativa para cada pregunta.

1. **Dolor**. (Marque un recuadro:)
e No tengo dolor.
e Tengo un dolor leve que no requiere medicamentos.
e Tengo un dolor moderado - requiero medicamentos regularmente: codeína o analgésicos no-narcóticos(antiinflamatorios o paracetamol).
e Tengo un dolor severo que sólo se controla con analgésicos narcóticos (morfina o derivados).
e Tengo un dolor severo que no se controla con medicamentos.

2. **Apariencia**. (Marque un recuadro:)
e No hay ningún cambio en mi apariencia.
e Hay un leve cambio en mi apariencia.
e Mi apariencia me molesta, pero mantengo mis actividades habituales.
e Me siento desfigurado(a) y limito mis actividades debido a mi apariencia.
e No puedo estar con otras personas debido a mi apariencia.

3. **Actividad**. (Marque un recuadro:)
e Estoy tan activo(a) como siempre.
e Hay ocasiones en las que no puedo mantener mi antiguo ritmo, pero no es lo habitual.
e A menudo estoy cansado(a) y he disminuido mis actividades, pero aún salgo de casa.
e No salgo de casa porque no me siento capaz.
e Habitualmente estoy en cama o en una silla y no salgo de casa.

4. **Recreación**. (Marque un recuadro:)
e No tengo limitaciones para divertirme en casa o fuera de casa.
e Hay algunas cosas que no puedo hacer, pero aún salgo y disfruto de la vida.
e Muchas veces quisiera salir más, pero no me siento capaz.
e Hay grandes limitaciones a lo que puedo hacer, generalmente me quedo en casa y veo televisión.
e No puedo hacer nada que me entretenga.

5. **Deglución (tragar)**. (Marque un recuadro:)
e Puedo tragar igual que siempre.
e No puedo tragar algunas comidas sólidas.
e Sólo puedo tragar comidas líquidas.
e No puedo tragar porque la comida “se va por el camino equivocado” y me atraganto.

6. **Masticación**. (Marque un recuadro:)
e Puedo masticar igual que siempre.
e Puedo comer alimentos blandos, pero hay algunas comidas que no puedo masticar.
e No puedo masticar ni siquiera alimentos blandos.

7. **Habla**. (Marque un recuadro:)
e Hablo igual que siempre.
e Tengo dificultades para decir algunas palabras, pero me entienden cuando hablo por teléfono.
e Sólo mi familia y amigos me entienden cuando hablo.
e Nadie me entiende cuando hablo.

8. **Hombro**. (Marque un recuadro:)
e No tengo problemas con mi hombro.
e Mi hombro está rígido, pero no ha afectado mi actividad ni mi fuerza.
e Me he cambiado de trabajo debido al dolor o debilidad en mi hombro.
e No puedo trabajar debido a los problemas en mi hombro.

9. **Gusto**. (Marque un recuadro:)
e Siento el sabor de la comida igual que siempre.
e Puedo sentir el sabor de la mayoría de las comidas.
e Puedo sentir el sabor de algunas comidas.
e No siento el sabor de ninguna comida.

10. **Saliva**. (Marque un recuadro:)
e Mi saliva es de consistencia normal.
e Tengo menos saliva de lo normal, pero es suficiente.
e Tengo muy poca saliva.
e No tengo saliva.

11. **Ánimo**. (Marque un recuadro:)
e Mi ánimo es excelente y no ha sido afectado por mi cáncer.
e Mi ánimo es generalmente bueno y sólo a veces es afectado por mi cáncer.
e No estoy ni de buen ánimo ni deprimido debido a mi cáncer.
e Estoy algo deprimido(a) debido a mi cáncer.
e Estoy muy deprimido(a) debido a mi cáncer.

12. **Ansiedad**. (Marque un recuadro:)
e No estoy ansioso(a) debido a mi cáncer.
e Estoy un poco ansioso(a) debido a mi cáncer.
e Estoy ansioso(a) debido a mi cáncer.
e Estoy muy ansioso(a) debido a mi cánce

Chapter 10

Publications and Awords From this Thesis

Oviedo 23 CONGRESO NACIONAL SECOM 4-6 JUNIO 2015

sociedad española de cirugía oral y maxilofacial secom mxf 50 1965 2015

LA SOCIEDAD ESPAÑOLA DE CIRUGÍA ORAL Y MAXILOFACIAL CERTIFICA QUE LA COMUNICACIÓN TITULADA

QUALITY OF LIFE OUTCOME MEASURES USING UW-QOL QUESTIONNAIRE V4 IN EARLY ORAL CANCER/SQUAMOUS CELL CANCER RESECTIONS OF THE TONGUE AND FLOOR OF MOUTH WITH RECONSTRUCTION USING MICROSURGICAL FREE FLAPS

de los autores

Ahmed Amer I. ; De Vicente J.C.

ha sido presentada como **póster**
en el transcurso del 23 Congreso Nacional de Cirugía Oral y Maxilofacial,
celebrado en Oviedo del 4 al 6 de junio de 2015.

Juan Carlos de Vicente Rodríguez
Presidente Comité Organizador

Luis Manuel Junquera Gutiérrez
Presidente Comité Científico

Javier González Lagunas
Presidente SECOM

Oviedo 23 CONGRESO NACIONAL SECOM 4-6 JUNIO 2015

sociedad española de cirugía oral y maxilofacial secom mxf 50 1965 2015

La Sociedad Española de Cirugía Oral y Maxilofacial certifica que la comunicación titulada

THE VALIDITY AND RELIABILITY OF THE SPANISH VERSION OF THE UNIVERSITY OF WASHINGTON QUALITY OF LIFE QUESTIONNAIRE FOR PATIENTS WITH HEAD AND NECK CANCER

de los autores

AHMED AMER, I.; DE VICENTE, J.C.

ARTMENT OF ORAL AND MAXILLOFACIAL SURGERY, CENTRAL UNIVERSITY HOSPITAL OF ASTURIAS. OVIEDO FACI

ha sido galardonada con el premio a la mejor Comunicación póster
A, presentada en el transcurso del 23 Congreso Nacional de Cirugía
Oral y Maxilofacial, en Oviedo los días 4 al 6 de junio de 2015.

Juan Carlos de Vicente Rodríguez
Presidente Comité Organizador

Javier González Lagunas
Presidente SECOM

24 2017 CONGRESO NACIONAL SECOM MÁLAGA

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Sociedad Española de Cirugía Oral y Maxilofacial

certifica que la comunicación

MODIFICATION OF FLAP DESIGN FOR TOTAL MOBILE TONGUE RECONSTRUCTION USING ANTERO-LATERAL THIGH FLAP

Measurement of Quality of Life Using UW-QOL

de los autores

Islam A.Amer (Egipto) , Juan Carlos De Vicente (Oviedo)

Ha sido presentada como poster con Defenca Oral

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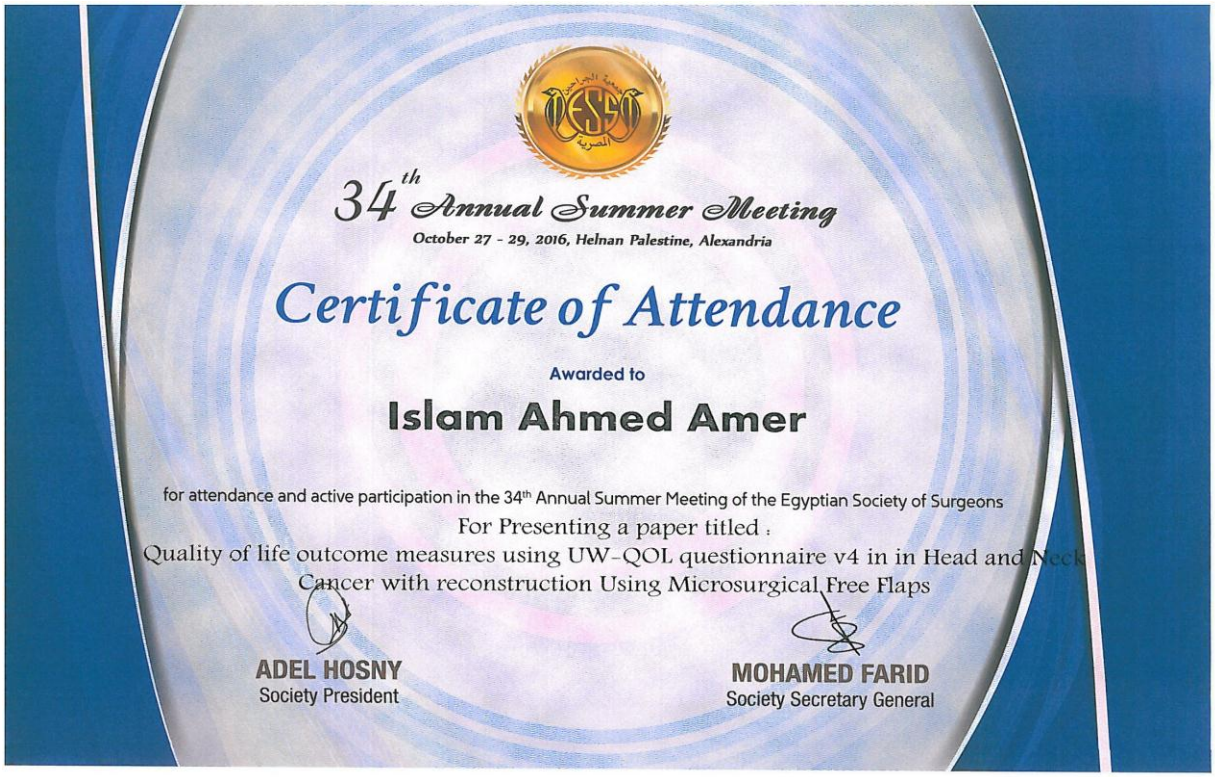
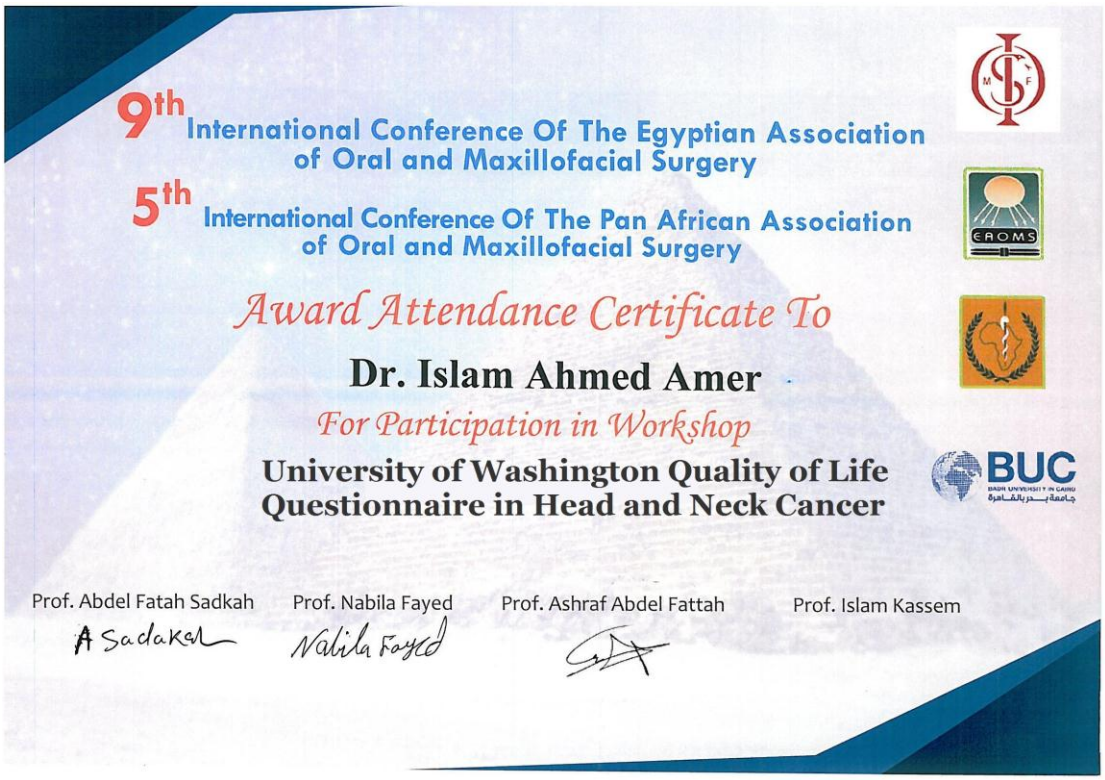
Málaga del 8 al 10 de junio de 2017.

Yolanda Aguilar Lizarralde
Presidenta Comité Organizador

Fernando García Marín
Presidente SECOM





9th International Conference Of The Egyptian Association of Oral and Maxillofacial Surgery

5th International Conference Of The Pan African Association of Oral and Maxillofacial Surgery

Award Attendance Certificate To

Dr. Islam Ahmed Amer

For Participation in Workshop

University of Washington Quality of Life Questionnaire in Head and Neck Cancer

Prof. Abdel Fatah Sadkah — Prof. Nabila Fayed — Prof. Ashraf Abdel Fattah — Prof. Islam Kassem

مؤتمر سوهاج السنوى للجراحه والمناظير والأورام

Sohag Annual International Conference of Surgery, Laparo-endoscopy and Oncology

Organized by : General Surgery Department,Sohag University

18 - 19 November, 2015

Appreciation Certificate

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For his Attendance and Active Participation in the Conference scientific Activities as a Speaker for a Presentation

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Prof. Alaa El Din El Suity — Conference President

Prof. Aneese Mohamed Sheha — Dean of Sohag Faculty of Medicine

Prof. Alaa Ahmed Redwan — Conference General Secretary

مؤتمر سوهاج السنوى للجراحه والمناظير والأورام

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measurement of Quality of Life Using UW-QOL

Prof. Alaa El Din El Suity
Conference President

Prof. Aneese Mohamed Sheha
Dean of Sohag Faculty of Medicine

Prof. Alaa Ahmed Redwan
Conference General Secretary

34th Annual Summer Meeting

October 27 - 29, 2016, Helnan Palestine, Alexandria

Certificate of Presentation

Awarded to

Islam Ahmed Amer

for attendance in the 34th Annual Summer Meeting of the Egyptian Society of Surgeons and presentation of a paper titled:

Quality of life outcome measures using UW-QOL questionnaire v4 in in Head and Neck Cancer with reconstruction Using Microsurgical Free Flaps

ADEL HOSNY
Society President

MOHAMED FARID
Society Secretary General

Faculty of Medicine
Post-Graduate Studies and Research Office

CERTIFICATE

We certify that Dr/ Islam Ahmed Ahmed Mohamed Amer , Lecturer of Maxillofacial , Head and Neck Surgery , has an accepted manuscript (publication) in Sohag Medical Journal ISSN/ 1110 – 7529 under title of

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Chapter 11

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Chapter 12

RESUMEN

RESUMEN DEL CONTENIDO DE TESIS DOCTORAL

1.- Título de la Tesis	
Español/Otro Idioma: **Evaluación de la Calidad de Vida de Pacientes Sometidos a Reconstrucción Mediante Colgajos Libres de Defectos Resultantes de Cirugía Ablativa de Tumores de Cabeza y Cuello en Asturias, España**	Inglés: Measurement of Quality of Life of Free Flap Transfer in Reconstrucion of the Head and Neck Tumor Defect after Ablative Surgery in Asturias, Spain

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RESUMEN (en español)

La transferencia de tejido libre microvascular se ha convertido en la mejor modalidad reconstructiva de elección para muchos pacientes después de cirugía de ablación de cáncer de cabeza y cuello. La evaluación moderna del resultado después de estos procedimientos quirúrgicos incluye ahora la evaluación de la CDV. Nuestra serie es un

estudio prospectivo que ha analizado la CDV después de cirugía reconstructiva de cabeza y cuello en España y en Egipto utilizando UW-QOL.

Los cirujanos oncológicos deben pensar en todas las opciones disponibles de la escala reconstructiva para el manejo de los defectos del cáncer, ya que a menudo es posible llevar a cabo una resección quirúrgica adecuadamente segura y proporcionar una buena función usando colgajos libres. microvascular libre-flaps ofrecen un método razonable para la reconstrucción de grandes oral y cabeza y cuello defectos.

Este trabajo de investigación es primer trabajo de investigación en España medido QOL después de cirugía reconstructiva de cabeza y cuello utilizando UW-QOL

Hipótesis y objetivo

Hemos recogido datos sobre los pacientes de cáncer de cabeza y cuello tratados con resección tumoral y reconstrucción con transferencia de colgajo libre en la parte descriptiva de esta investigación.

Se buscó el grupo etario más afectado, el sexo, el sitio del tumor primario, el tipo patológico e histológico del tumor, el tipo de disección del cuello, el método de reconstrucción de la aleta libre y el uso de radioterapia y quimioterapia.

Los objetivos de este trabajo fueron los siguientes:

1) Estudiar los resultados funcionales en pacientes de cáncer de cabeza y cuello tratados mediante resección tumoral y reconstrucción con colgajo libre.

2) Examinar y dar seguimiento a los cambios en la calidad de vida de los pacientes con cáncer de cabeza y cuello mediante comparaciones antes de la cirugía y después de la resección quirúrgica y reconstrucción con transferencia de colgajo libre después de un mes, tres meses, seis meses y nueve meses después de la cirugía.

Pacientes y métodos

Nuestro trabajo se realizó mediante la colaboración entre Maxilofacial, Cirugía de Cabeza y Cuello del Departamento de Cirugía de los Hospitales Universitarios de Sohag en Sohag, Egipto y el Departamento de Cirugía Oral y Maxilofacial del Hospital Universitario Central de Oviedo, Asturias, entre enero de 2013 y septiembre de 2015 después de la aprobación

del comité de ética y el consentimiento informado por escrito de los pacientes.

En nuestro estudio, 35 (87,5%) fueron elegibles y acordaron participar en este estudio, categorizados en dos grupos:

Primer grupo: Grupo de reconstrucción del oro mandibular (10 pacientes).

Segundo grupo: Grupo de reconstrucción de tejido blando (25 pacientes) incluyendo; cavidad oral, región parotídea, cara media, cara lateral y región del cuero cabelludo.

Diseño del estudio: Este estudio se realizó como un estudio prospectivo.

Evaluación clínica inicial

Todos los pacientes fueron sometidos a la historia completa de la toma, a través del examen clínico y la determinación del sitio primario, la afectación ganglionar y la estadificación. Se informaron los detalles del tratamiento previo incluyendo radioterapia y quimioterapia.

Usos del cuestionario de calidad de vida de la Universidad de Washington para pacientes de cáncer de cabeza y cuello:

Se solicitó a los pacientes que completaran 5 conjuntos de cuestionarios: el primer grupo se administró 1 día antes de comenzar el tratamiento, 2,2 y una madre en el postoperatorio, 3er tres meses, 4º 6 meses.

El análisis estadístico de los datos recogidos se realizó utilizando el programa estadístico SPSS versión 20.

CONCLUSIONES

1. Los resultados de este estudio apoyan la descripción original del cuestionario de calidad de vida de la Universidad de Washington, versión 4 (UW-QOL), en términos de sus ventajas es que es breve y autoadministrado, es multifactorial y permite un detalle

suficiente para identificar los cambios postoperatorios.

2. El cuestionario de calidad de vida de la Universidad de Washington, versión 4 (UW-QOL), un cuestionario específico para la enfermedad de cáncer de cabeza y cuello (HNC), está bien validado, breve, simple de procesar y demostrado proporcionar información clínicamente relevante , particularmente en HNC. Adoptamos un modo de autoadministración, ya que evita posibles sesgos del entrevistador, es rápido, simple, permite al paciente completarlo a su conveniencia y es fácil de procesar.

3. Los pacientes que califican son iguales a 100 o más de 100. Esto debe aclararse. 100 en la UW-QOL, que se producen en etapas tempranas, no requieren una evaluación adicional. Aquellos que obtienen puntajes por debajo de 70 podrían beneficiarse de un seguimiento regular para ayudar a aclarar el problema específico y el impacto del tratamiento en sus dominios de calidad de vida.

4. Más conciencia de las preocupaciones de apariencia es necesaria, especialmente para los pacientes más jóvenes con enfermedad avanzada con reconocimiento de angustia que puede causar a estos pacientes. El dominio de apariencia de UW-QOL a pesar de su simplicidad refleja las puntuaciones reales que se producen para el paciente post operatorio

5. Los peores problemas después del tratamiento se relacionaron con los dominios de masticación, deglución, habla y saliva y el mejor aumento después de la reconstrucción con colgajo libre fue el dolor con mejoras adicionales significativas en la actividad y la recreación. No hubo cambios en el nivel de las relaciones familiares.

6. Hubo una diferencia distinta y estadísticamente significativa en la función postoperatoria del hombro asociada con las dos formas de disección del cuello evaluadas en este estudio. La disección radical del cuello resultó en un cambio significativo en la función del hombro, así como en el aumento del dolor postoperatorio.

7. La sequedad bucal es uno de los problemas más importantes para los pacientes después del tratamiento para el cáncer oral y orofaríngeo. Su presencia e impacto en los pacientes se puede obtener utilizando UW-QOL. A pesar de su simplicidad, el cuestionario UW-QOL parece ser capaz de identificar adecuadamente a los pacientes con disfunción en la salivación, especialmente después de usar la radioterapia. Es posible utilizar el dominio de saliva UW-QOL como una herramienta de detección rápida. Los pacientes con un puntaje <70 presentan una disfunción subjetiva notable de la saliva.

8. Una amplia evidencia sugiere la presencia significativa de angustia psicológica en pacientes que han sido tratados por cáncer de cabeza y cuello. La detección temprana y la derivación especializada apropiada son componentes integrales de la atención al paciente. La evaluación de la morbilidad emocional (ansiedad y angustia) por la UW-QOLv4 ha sido una adición muy útil al cuestionario, y los primeros indicios sugieren que estos dominios podrían ser utilizados para detectar el malestar psicológico.

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RESUMEN (en Inglés)

Microvascular free-tissue transfer has become the best reconstructive modality of choice for many patients after head and neck cancer ablative surgery. Modern assessment of outcome after such surgical procedures now includes evaluation of QOL. Our series is a prospective study that have analyzed QOL after head and neck reconstructive surgery in Spain and in Egypt using UW-QOL.

Oncologic surgeons must think of all the options available from the reconstructive ladder for the management of cancer defects as it is often possible to carry out adequately safe surgical resection yet provide good function using free flaps . microvascular free-flaps offer a reasonable method for reconstruction of large oral and head and neck defects.

This research work is first research work in Spain measured QOL after head and neck reconstructive surgery using UW-QOL.

Hypothesis and objective

We have collected data on the patients of head and neck cancer treated with tumor resection and reconstruction with free flap transfer in the descriptive part of this research.

We were looking for the most affected age group, sex, primary tumor site, pathological and histological type of the tumor, type of neck dissection, method of free flap reconstruction and using of radiotherapy and chemotherapy.

The aims of this work were the following:

1) To study functional results in patients of head and neck cancer treated by tumor resection and reconstruction with free flap.

2) To examine and follow up the changes in the QOL of head and neck cancer patients through comparisons before the surgery and after the surgical resection and reconstruction with free flap transfer after one month, three months, six months and nine months after the surgery.

Patients and methods

Our work was conducted by collaboration between Maxillofacial, Head and Neck Surgery Unit in Surgery Department in Sohag University Hospitals in Sohag ,Egypt, and Oral and Maxillofacial Surgery Department in Central University Hospital of Oviedo, Asturias, Spain, between January 2013 and September of 2015 after the approval of ethical committee and taken written informed consent of the patients.

In our study, 35 (87.5%) were eligible and agreed to participate in this study, categorized into two groups*:*

First group: Oro mandibular reconstruction group *(10 patients).*
Second group**:** Soft tissue reconstruction group (*25 patients*) including; oral cavity, parotid region, mid-face, lateral face and scalp region.

Study Design : This study was conducted as a prospective study.

Initial clinical assessment

All patients were subjected to full history taking, through clinical examination and determination of primary site, the lymph node involvement and staging. Details of previous treatment including radiotherapy and chemotherapy were reported*.*

Uses of University of Washington Quality of Life Questionnaire for patients of Head and Neck Cancer

The patients were asked to complete 5 sets of questionnaires: the first set was given 1 day before beginning treatmen**,2,**2nd one momthe post operative,3rd three months,4th 6 months..

The statistical analysis of the collected data was undertaken using the SPSS statistical program version 20**.**

CONCLUSIONS

1. The results of this study support the original description of the University of Washington Quality of Life questionnaire, version 4 (UW-QOL), in the terms of its advantages are that it is brief and self-administered, it is multifactorial, and allows sufficient detail to identify post-operative changes.
2. The University of Washington Quality of Life questionnaire, version 4 (UW-QOL), a head and neck cancer (HNC) disease-specific questionnaire, is well-validated, brief, simple to process, and proven to provide clinically relevant information, particularly in HNC. We adopted a self-administration mode, because it avoids potential interviewer bias, is quick, simple, allows the patient to complete it at their convenience and is easy to process.
3. Patients who score is equal to 100 or higher of 100. This should be clarified. 100 on the UW-QOL, which occur in early stages, do not require further

evaluation. Those who score is below 70 could benefit from regular follow up to help clarify the specific problem and the impact of treatment on his quality of life domains.

4. More awareness of appearance concerns is needed particularly for younger patients with advanced disease with recognition of distress that it can cause to such patients. The UW-QOL appearance domain in spite of its simplicity reflects the real scores occurs for patient post operatively.
5. The worst problems after treatment were related to chewing, swallowing, speech and saliva domains and the best increase after reconstruction with free flap was pain with additional significant improvements in activity and recreation. There was no change in the level of family relations.
6. There was a distinct and statistically significant difference in postoperative shoulder function associated with the two forms of neck dissection evaluated in this study. Radical neck dissection resulted in significant change in shoulder function, as well as increased postoperative pain.
7. Dry mouth is one of the most important issues for patients after treatment for oral and oropharyngeal cancer. Its presence and impact on patients can be obtained by using UW-QOL. Despite its simplicity, the UW-QOL questionnaire seems be able to appropriately identify patients with dysfunction in salivation especially after using radiotherapy. It is possible to use the UW-QOL saliva domain as a quick screening tool. Patients scoring <70 have notable subjective saliva dysfunction.

8. Ample evidence suggests the significant presence of psychological distress in patients who have been treated for head and neck cancer. Early detection and appropriate specialist referral are integral components of patient care. The assessment of emotional morbidity (anxiety and distress) by the UW-QOLv4 has been a very useful addition to the questionnaire, and early indications would suggest that these domains could be used to screen for psychological distress.