University of Mosul

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An Evaluation of Some Gelfoam Types In Reducing Dry Socket Incidence

A Thesis submitted by

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Blessing and peace upon our prophet Muhammed

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Supervisor's Certification

We certify that the thesis entitled **(An evaluation Of Some Gelfoam Types In Reducing Dry Socket Incidence)** under our supervision at the Department of Conservative Dentistry, College of Dentistry, University of Mosul, in partial fulfillment of the requirements for the Degree of master in Dental Sciences/Conservative Dentistry.

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Report of the Linguistic Evaluator

I certify that the linguistic evaluation of this dissertation was carried out by me and it is accepted linguistically in expression.

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Report of the Head dental basic science Dentistry Department

I certify that this thesis was carried out in Department of Conservative Dentistry and I nominate it to be forwarded to discussion.

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According to the recommendations presented by the supervisor of this dissertation and the linguistic evaluator, I nominate it to be forwarded to discussion.

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We certify as an examination committee that we have read this thesis; we have examined the postgraduate student **Dhafar Mikdad AL-kashab**, and in our opinion, it meets the standard of a thesis for degree of master in Dental Sciences/Conservative Dentistry.

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Abstract

Dry socket is one of the most common postoperative complication following the extraction of permanent teeth especially third molar . because of the severe pain of dry socket symptomatic ,and prompt treatment is required .The big question in the treatment of dry socket is what medicament dose one can place in the extraction site and what type of dressing is used to obtain fast ,optimal healing that is pain free decrease pain ,bleeding , inflammation and not interfere with healing. From 1955 many European and Scandinavian authors have promoted the use of antimicrobial agent with dressing to increase healing .

Aims: Evaluate the effect of different types of gelfoam (gelfoam alone, lincomycin gelfoam ,chlorhexidine gelfoam) on the reduce the incidence of dry socket , on the soft tissue healing , reduce the incidence of dry socket and finally to know the correlation between parameters in all study groups.

Materials and methods : 63 patients divided into 4 groups: group I(16) patients have extraction of lower third molar ,did not receive any medication ,group II:(16) patients have extraction of lower third molar and use gelfoam as medication ,group III (16) patients have extraction of lower third molar and use lincomycin gelfoam as a medication ,group IV:(16) patients use chlorhexidine gelfoam as medication ,give all patient local anesthesia maximum 2 carrtridage simple analgesic also given to the patients and asked them to return if they suffer from (bleeding ,sever pain ,or any other sign of dry socket). saliva is taken from all patient before extraction and at seven day after extraction for measuring salivary biomarker (Interlukine-6 and Tumor necrosis factor-alpha) by using (ELISA) kits

Results: significance difference were observed between four groups after one week of treatment in Interlukine-6 and no significance difference in Tumor

necrosis factor -alpha between four groups after one week of treatment we also observed in each group there is different in inflammatory biomarker before and after treatment , in control group there is significant difference in Interlukine -6 and with no significant difference in Tumor necrosis factor-alpha before and after treatment , the gelfoam group there is significant difference in Interluikine-6 . and there is no significance difference in Tumor necrosis factor-alpha .in the chlorhexidine gelfoam there is significant difference in Interlukine -6 also there is significant difference in the Tumor necrosis factor -alpha between before and after treatment ,in the result of the four group (lincomycin gelfoam used)were also observed significant difference in Interlukine-6 but there is no significant difference in the Tumor necrosis factor-alpha before extraction and at seven day after extraction .. there is significance difference in the mean of soft tissue index

conclusion; Chlorhexidine gelfoam /lincomycin gelfoam/ Gelfoam seems to be an effective technique in the decrease of inflammatory biomarker and decrease the incidence of dry socket. and aid in soft tissue healing .

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ABBREVIATIONS

AO	Alveolar osteitis
CHX	Chlorhexidine
CD4	Cluster of Differential 4
CRP	C-Reactive Protein
ELISA	Enzyme- Linked Immune Sorbent Assay
IL-6	Interluikine-6
GCF	Gingiva Cervical Fluid
HRP	horseradish peroxidase
PRF	Platelet-Rich Fibrin
PDGF	Platelet t- Derived Growth Factor
TFGFB	TransForming Growth Factor Beta
TNF-**α**	Tumor Necrosis Factor-Alpha
TMP	Tetramethylbenzidine
PG/ML	Picogram per millileter
OCF	Oxidized Cellulose Form
AM	Afternoon
MOH	Ministry of Health
SDI	Samara Drugs Industry

Chapter One

Introduction

CHAPTER ONE

INTRODUCTION

1.1 Alveolar Osteitis

Alveolar Osteitis(AO) is a well-known complication after extraction or surgical removal of tooth .commonly known as "dry socket" this condition remains a common postoperative problem that result in severe pain and repeated practice/hospital visit.(AL-Saffar *et al,* 2008)

Alveolar Osteitis is an acute inflammation of the alveolar bone around the extraction site which is characterized by severe pain ,it is usually start between the second and the third day after extraction accompanied by a partial or total disintegrated of blood clot within the alveolar socket with or without halitosis (ALHindi,2017)

many studies has been shown that dry socket is more common following the extraction of mandibular third molar (Jaafar *et al,* 2000) ,some authors believe that increased bone density ,decreased vascularity ,and reduced capacity of producing granulation tissue are responsible for the site specifity (Mansuir et al., 2006),However there is no evidence suggesting a link between AO and insufficient blood supply .the area specificity is probably due to the large percentage of surgically extracted mandibular molar and may reflect the effect of surgical trauma than the anatomical site (Nussiar *et al,* 2007).

1.2 Gelfoam

Gelfoam is a hemostatic gelatin sponge intended to minimize adverse postoperative bleeding (Jing *et al,* 2017) it is effective and economical clot stabilization material, it is purified porcine skin gelatin ,the major benefit of using gelfoam is that it is completely absorbable and dose not required to be removed ,it is easily resorbed into surrounding tissue ,it is small size that is

enough for single patient use .and there is small amount of waste of excess material ,it is also easy to manipulate and conform to post-extraction socket additionally gelfoam is comparatively inexpensive which make the step economical for routine used. (Gabriela *et al,* 2017)

1.3 Chlorhexidine Gelfoam

chlorhexidine is the most common antimicrobial agent used for the prevention of bacterial colonization and ,in turn the enhancement of the socket healing after extraction , Chlorhexidine act against a broad spectrum of aerobic and anaerobic oral pathogens is tolerated by the human immune system and does not create resistance.(Raul *et al,* 2020)

1.4 Lincomycin Gelfoam

Lincomycin is a semisynthetic antibiotic ,they inhibit the bacterial RNA Polymerase in a completely specific way .

In Dentistry lincomycin used locally for the gram-positive infection as a maxillary sinus , abcess wound ,dry socket ,cleansing of fistula in a form of gel. (Kasap et al ,2018)

Many studies have employed the intra-alveolar use of antibiotics with hemostatic agent help to prevent dry socket due to the presence of different type of micro-organism in oral cavity (Baker *et al,*2008)

1.5 Inflammatory Biomarkers (Cytokine)

Cytokine are proteins have a major role in cell to cell communication , they can adjusted a number of normal physiological and pathological process such as development, differentiation ,inflammation ,and cell death. (Stevkoviska *et al,* 2020)

1.5.1 Interlukine -6

IL-6 is a cytokine indicator for the inflammation inside the body (Fustter *et al,*2014),it can act as pyrogen and can induce fever during infection ,non-infection and even autoimmune disease . (Riabaric *et al,*2004)

1.5.2 Tumor Necrosis Factor-α

TNF-α is a cytokine produced by macrophage and T-cell and is a key cytokine in the development of inflammation ,it was identified as soluble factor that inducer necrosis of tumor. (Ping *et al,* 2017)

1.5.3 Proinflammatory cytokines

Proinflammatory cytokine produced predominantly by activated macrophages and are involved in the up -regulation of inflammatory reaction ,these inflammatory cytokines are diagnosed by biological fluid such as blood, urine (Edger et al, 2012)

1.5.4 Saliva

Saliva is oral fluid that can be collected non invasively by individual and it offers effective approeach for the screening of large population .(Kulasinghe *et al,* 2015)

This research concentrates on the effect of different type of gelfoam on the prevention of dry socket (increase healing)by evaluate the effect of them on inflammatory mediator as TNF-α and IL-6

1.6 Aims of study

1- Was to evaluate the efficacy of different types of gelfoam (gelfoam alone ,chlorhexidine gelfoam, lincomycin gelfoam) in the decrease the incidence of dry socket

2-Was to evaluate the effect of different types of gelfoam (gelfoam alone ,chlohexidine gelfoam ,lincomycin gelfoam) on inflammatory mediator(TNF-α ,IL-6)

3-Was to evaluate the effect of different type of gelfoam (gelfoam alone , chlorhexidine gelfoam , lincomycin gelfoam) on soft tissue healing.

4-Correlation among result of different group.

Chapter Two

Review Of Literatures

Chapter Two

Review of Literatures

2-1 Alveolar Osteitis (AO)

Alveolar Osteitis (AO) is an acute non-suppurtive inflammatory process localized in the dental alveolus which is affect about millions patient around the world (Ashok *et al,* 2012)

2-1-1 Clinicall appearance of AO

Clinically dry socket formation is associated with intense pain, a foul smell and the disappearance of blood clots from the socket after tooth extraction, causative investigation of dry socket formation have often been complicated by the presence of multiple cause, (such as curetting) generally, mandibular third molar extractions have exhibited the highest dry socket incidence due to extensive effort required to extra entrenched root structure (kolokythas, *et al,* 2010)

2-1-2Aetiology

The aetiology of alveolar osteitis is not fully understood and several mechanisms and factors have been postulated that can increase the risk of its presentation. (Daly *et al,* 2012)

Bacteria may perform a contributing agent of aetiology of alveolar ostietist of various studies countenance that bacterial infection consider are a great danger for the development of the alveolar ostietis, the recurrence of alveolar ostietis rises in patients that have little oral hygiene and pre-existing local infection as pericoronitis with proceeding periodontal infection, lated

healing can occur because of existence of microorganisms for example enterococcus, streptococcus viridians, bacillus coryne form proteus vulgaris, psendomonal aeruginosa, citrobacter frenudii with Escherichia coli), the anaerobic bacteria, treponemd dinticola showed plasminogen like fibrinolytic activity (Gowda *et al,* 2014)

2-1-3 Predisposing Factor of Dry Socket

1- Age:

Alveolar Ostietis appearance consider high of age group of(21-30)years they are some studies that complemented of the surgical removal for impacted mandibular third molar must be carried out good before the age of 24 years. (Khan *et al,* 2013)

2- **Gender:**

Alveolar Ostietis occurs extra percentage in females than males due to hormonal modification , the occurrence of alveolar ostietis in females is 4.1 % compared for males IS 1.5% . (Khan et al 2013)

3- **Extraction site:**

Alveolar ostietis exist extremely in the mandible more than the maxilla because of that thick cortical bone, producing in the poor perforation of blood outfit the mandible, an incidence of dry socket is more common in mandibular third molar region duo to increase bone density, decreased vascularity with lowerd ability to provide granulation tissue are accountable of position specificity. (Preetha *et al,* 2014)

5- **Trauma:**

Hard extractions occur in older and dense bone which may have a decreased vascularity, (preetha *et al,* 2014) trauma due to extraction or attacker curettage may lead to inflammation that progresses which release the cells

mediators, which can cause fibrinolysin activity , physical dislodgement for the blood clot because of manipulation or negative pressure produced during sucking on a straw atrauma may be a main contributor to alveolar ostietis. (Karnure *et al,* 2013)

6- **Smoking:**

Smoking reduce neutrophil chemotaxis with phagocytosis the tend the providing of immnnoglobulin, smokers has increase percentage of alveolar ostietis is 12 % over the people with non-smoker 4 %, but there is a potent union between the amount of smoking and the appearance of (AO)t.(Paul *et al,* 2019)

7-**Vasoconstrictors:**

The local anesthesia present in extraction can else take part for fashioning of alveolar ostietis , studies mention that presence of local anesthesia and vasoconstrictors lead to temporary local ischemia that raise of hazard of promoting alveolar osteitis. Lehner, (2013) discoveried that alveolar ostietis reocurrence increase & infiltration anesthesia due to transitory ischemia as well as most studies mention this ischemia exist from 1-2 h with is directed to reactive hyperemia. (Al Hindi *et al,* 2017)

8- **Systemic Disease:**

Reaserches offered that systemic disorder may be connected with alveolar ostietis , immunocompromised or diabetic patients due to promote alveolar ostietis which change healing. (Gowda et al. 2014)

9- Traumatic Extraction

Most studies demand this operator's experience consider a danger agent for the development alveolar ostietis , Larsen complemented which surgeons

inexperience may be lead to trauma through extraction, particularly surgical extraction for wisdom tooth (Cardoso et al. 2010)

10- **Bone/root fragments remaining in the wound**

Most studies proposed this bone & root fragment with debris of extraction socket might guide to impair full healing & take part to the improvement of alveolar ostietis (kolokythas *et al,* 2010)

11- **Oral Contraceptive**

Most studies demonstrate that alveolar ostietis are higher prevalent in females over male, women with oral contraceptive have higher evidence more these with no have taking that specific hormones as estrogens have a significant part in elevated fibrinlytic procedure and this due to indirectly activate the fibrinlytic framework thus elevated blood clot (Taberner et al., 2015) .

2-1.4 Pathogenesis

Various studies has been suggested on the etiology of alveolar ostietis. These is trauma through extraction, bacterial disease, biochemical factors , & fibrinolysis. Fibrinolysis is more consented thesis. Fibrinolysis has normal physiological steps which bring out fibrin debars of enzymatic digestion of the fibrin meshwork into smaller soluble pieces. Local raises in fibrinolysis appears in repayment to bleeding. the fibrinlytic action is raises in alveolar ostietis. In normal post-extraction position, fibrin clot are formed of thrombin & fibrinogen, and others , the epithelium emigrates. New blood vessels are created in the clot then formulation the granulation tissue, & the clot degrades during action of fibroblast & fibrinolysis. but, as of alveolar ostietis , kinases are released through inflammation during direct & indirect action of plasminogen in the blood. These kinases cause lysis and demolition of the blood clot. Tissue or plasma activators and activators alter the plasminogen to

fibrin, that causes dissolved the clot by disintegration of fibrin.(Longo et al. 2019)

The plasminogen cascade action may be of 2 kinds 1- direct (physiologic) 2- indirect (non-physiologic) activators. Direct activator is liberated to the alveolar bone cells next to trauma. Indirect activators are liberated by bacteria, Direct activators are split into extrinsic and intrinsic. Direct extrinsic activators are tissue plasminogen activators & endothelial plasminogen activators. Direct intrinsic activators involve constituent of plasma such as urokinase & factor XII (AL-Mutiri ,2019)) figure (2.1)

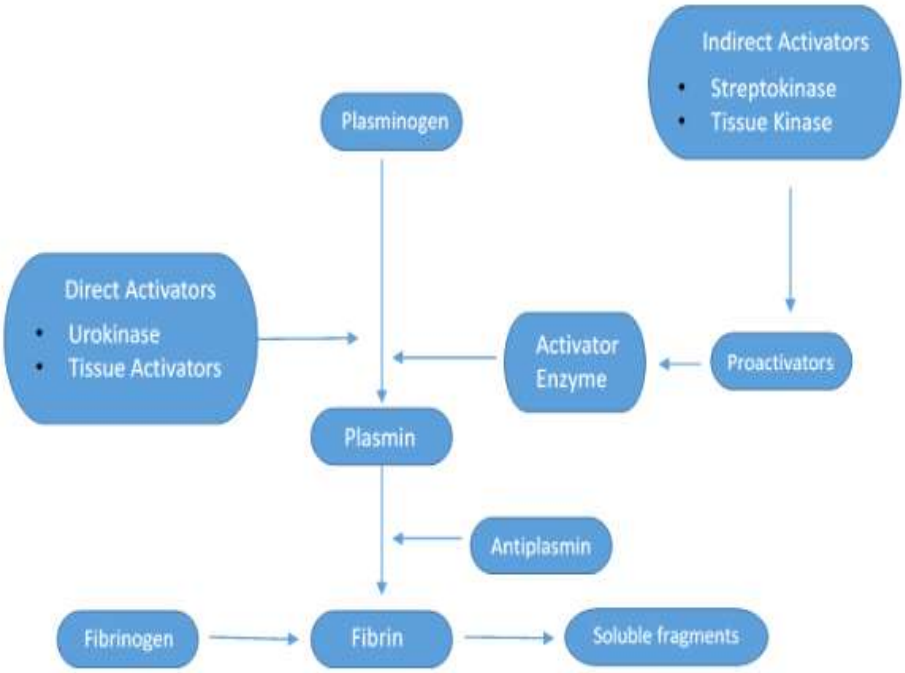


Figure (2.1) pathogenesis of dry socket(AL-Mutairi etal ,2019)

2.1-5 Incidence of dry socket

The percentage of alveolar ostietis had been recorded between (3-4%,) tailing dialy dental extraction and 45% after the removal of mandibular third molar (Ezhill, 2019)

2.1-6 Histology

Microscope-level magnification of 6 to 8 or greater, combined with head-mounted or co-axial illumination, facilitates the observation of dry socket lesion anatomy such as exposed bone, either inside the socket or around the socket occlusal perimeter, areas of vital healing epithelium (which shows tensile strength when lightly probed), food particles or clumps of bacterial biofilm material with in the socket, or inflamed gingival tissue, which may be sensitive to touch, but is not as sensitive as exposed bone. (Mamoun, 2018)

2-1-7 Diagnosis

Diagnosis is based on the history , symptoms ,and clinical presentation typically "AO" as an exposed socket devoid of blood clot ,in constant normally healing socket consist of blood clot that a subsequently replace by a granulation and connective tissue with gingival healing typically over 1-2 week period healing by secondary consolidation and dry socket begin remodeling with bone (Veale et al. 2018)

2-1-8 Treatment

1- Antimicrobial Photodynamic Therapy .(Tarakji *et al,*2015)

2- Low-Level Laser Therapy. (Bowe *et al,* 2011)

3-Biodegradable Polymers. (Kumar *et al,*2017)

4-Oxidized Cellulose Foam . (Tarkage *et al,* 2013)

5-Platelet-rich Fibrin .(Singh *et al,* 2017)

6--Topical Antibiotics. (Kanure. et al .2013)

2.2.1 Gelfoam

Gelfoam is an absorbable gelatin sponge that is non-toxic, non-immunogenic non pyrogenic, and non-allergenic it is gamma-sterilized and

provided with double packing, the sponge is easily cut to fit the surgical cavity, it may be applied dry to the wound, it absorbs 40 times it's weight of whole blood or 50 times of water and adheres easily to the bleeding site forms a stable adherent coagulum when implanted in vivo it is completely absorbed within 3-5 weeks (Ebenezer, 2015)

2.2.2 Product description

Primarily, absorbable hemostatic factor are arranged as drugs & needed a recent drug usage for trading approval. as 1976, within Medical Device A modulation of Federal food; Drug, and Cosmetic Act, a number of products arranged such as drugs, involving absorbable hemostatic agents, were transmitted to device regulations because these regulations were more suitable. Absorbable hemostatic factors confirmed by regulatory steps to date contain porcine or bovine gelatin, bovine collagen, or regenerated oxidized cellulose. The two more newly confirmed absorbable hemostatic factors, Flo Seal (Baxter) & Co Stasis (Cohesion Technologies), contain bovine thrombin (Flo Seal et al 2005) . A list of absorbable hemostatic agents present is available in Table (2. 1).

(Table2. 1) Absorbable Hemostatic Agents & Their Approval Dates (Johnson et al 2019)

Topical Hemostatic	Constituent	Approval Date
Surgiced (Johnson and Johnson)	Regenerated oxidized cellulose	October 14- 1960
Gelfoam (Pfizer)	Porcine gelatin molded to a sponge	Available 1945; approved July 8- 1983
Surgifoam (Johnson & Johnson)	Porcine gelatin sponge	September 30- 1999

Topical Hemostatic	Constituent	Approval Date
Avitene (Davol)	Bovine collagen	August 26- 1976 (such as a drug); October 24- 1980 (as a device)
Instat (Johnson and Johnson)	Bovine collagen	October 10- 1985
Helistat (integra - lifeSciences)	Bovine collagen	November 8- 1985
CoStasis (Cohesion Technologies)	Flowable Bovine collagen& Bovine platelets	June 13- 2000
FloSeal (Baxter)	Flowable Bovine gelatin matrix and Bovine thrombin	December8- 1999

2.2.3 Pharmacology of Absorbable Hemostatic Agents .

Absorbable hemostatic uses do the pharmacologic actions at diverse stages during coagulation pathway. It had been theorized which cellulose based product, Surgical, and gelatin-based products, as Gelfoam & Surgifoam, initiate clotting during contact activation; as well as, it is accurate action not fully understood (Rondinion *et al,* 2003) Collagen-based products, as Avitene, and Helitene, supply hemostasis during a dual action: contact activation & enhance of platelet aggregation, that present such as a direct effect of contact between blood and the collagen in the products.(Heliten, 2005) Once platelet aggregation is under way, degranulation & release of coagulation factors occur. Coagulation factors, in conjunction with plasma factors, result in the formation of fibrin and, subsequently, a clot. FloSeal contains both a gelatin matrix & thrombin. These 2 constituents work synergistically to yield a stable clot at the bleeding position by restricting blood flow, supplying a matrix around which a

clot can take, and delivering thrombin to the surface of the tissue. Thrombin activates several coagulation agents & platelets in coagulation pathway & converts fibrinogen into fibrin monomers , that combine to form polymers. The result is a fibrin clot. CoStasis, a variant on fibrin sealants, is used in conjunction with a patient's plasma. The thrombin component of CoStasis changes plasma fibrinogen - fibrin. There after, fibrin comes into contact with the collagen in CoStasis, there by resulting in a collagen-fibrin gel matrix that potentiates the formation of a clot. (Costasis *et al,* 2005)

2.2.4 Indications

Absorbable hemostatic agents are used through surgical process , adjunctive therapy when bleeding is not controlled by conventional ways, as ligature or application of pressure.(Floseal, *et al,* 2003) Even through the product labeling explicitly states that thrombin is for absorbable use only, it has been administered by a variety of routes for unlabeled indications, including oral administration for the control of upper gastrointestinal bleeding (Weavey, 2005) and direct injection for the treatment of pseudoaneurysms. ,many studies have employed the intra-alveolar used of gelfoam in the prevention of dry socket (Basco et al.2008)

2.2.5 Adverse effects and toxicities

Several adverse effects had been associated & absorbable hemostatic agents (Table 2.2). most of them reported effects were observed when absorbable hemostatic agents are used through specific surgical procedures as laminectomy, craniotomy, lobectomy, & nasal surgery.

Adverse effects involving thrombin had been reported of biomedical paper. These paper generally allergic reactions for thrombin & the development of inhibitory antibodies which interact with the hemostatic process.(GenTrac, 2004) . thrombin preparations are of bovine origin patients may develop

antibodies to bovine coagulation factors that may cross-react with endogenous human clotting proteins. (Wicker , 2005) however thrombin is widely used. in health care institutions, some case reports describing adverse action (i.e., bleeding complications, coagulopathies, rashes) related & thrombin uses had been present. (Sarfati et al. 2004)

Table 2.2

Reported Adverse Reaction with Absorbable Hemostatic Agent (Michael et al , 2019)

Arachnoiditis	Meningitis
Bladder and bowel dysfunction	Pain
Hearing loss	Sneezing
Hematomas	Paralysis
Impotence	Toxic Shock syndrome
Excessive Fibrosis	Fever
Headaches	Edema

2-3 Chlorhexidine Gelfoam

Chlorhexidine solution has been shown a higher anti microbial effect than other Antiseptics used in oral cavity for various clinical solution, preoperative mouth rinse with CHX has been shown to reduce dry socket occurrence by 45-80% (Raul et al ,2020) Recently, CHX has been Introduced as 1% bioadhesive gel increasing the chance of reducing dry socket occurrence due to higher concentration opposed to 0.12% and 0.2% CHX preparation

(Claydon *et al,* 2001) .Chlorhexidine is a bi-guanide. Antiseptics has proved to be a good prophylactic agent for (AO) also it is effective against both aerobic and anaerobic organisms and yeast, rinsing with CHX is known to reduce oral microbe population, the effective in reducing the incidence of AO has generated wide speared interest (Haraji *et al,* 2012).

2.4 Lincomycin gelfoam

Lincomycin is a lincosamide which has primary effectiveness against gram. Positiive pathogens and is often used in the oral cavity

It is abroad spectrum antibiotic synthesized by streptomyces lincolnensis which shows in vitro and in vivo activity comparable with erythromycin against staphylococci, streptococci and diplococcic, The Immediate effect of lincomycin in S. aurens is the complete inhibition of protein synthesis it is action comparable to that of chloramphenicol and puramycin where the possible sites of action are the transfer or polymerization of aminoacids (Silva *et al,* , 2009).

2.5.1 Saliva

Saliva is a complex fluid composed of secretion from salivary glands and gingival curricular fluid), the oral cavity is a moist environment, constantly coats it is inner surface and occupies, it is space between the lining oral mucosa and teeth, whose important role is maintaining the well being of the mouth (Benn et al. 2015),.there has been much recent research on the topic of salivary dysfunction as it related to disease or side effect of certain medication (Williams *et al,* 2020),It is a complex oral fluid secreted by major and minor salivary glands (Edger *et al,*2012)

2.5.2 Function of Saliva

There is a various function of saliva , among them digestive, protective, lubrication, demulcent properties, maintenance of mucous membrane integrity, soft tissue repair, maintenance of ecological balance, debridement and lavage direct Antibacterial properties, hormanal function maintenance of PH, maintenance of tooth integrity. (Kumar, *et al,* 2017)

2.5.3 Composition of Saliva

Saliva is composed of 99% water, other component of saliva are sodium potassium, Calcium, magnesium, bicarbonate, phosphates, immunoglobulin, protein, enzymes, mucin, urea, and ammonia. The normal saliva pH. is 6 to 7 (Benn *et al,* 2012).

2.5.4 Saliva as a diagnosis tools

There are many advantage of using saliva as a bio fluid, it is collection is fast, easy, inexpensive, and non-invasive, in addition saliva as a mirror of the body can reflected the physiological and pathological stated the body therefore, it serves as a diagnostic and monitoring tool in many field of science such as medicine, dentist, pharmacotherapy (Karolina *et al,* 2017).

Chemokines have been shown to be important in both inflammation and carcinogenesis are able to be measured in saliva with relatively robust methods including enzyme-linked immune sorbent assay {ELISA} (Edger *et al,* 2012).

2.6 Healing process after extraction .

Every person has his own capacity to recover ,which determined by his biotype & biological profile consist from cytokine & inflammation mediators. (Atwood et al.2001) , The various process involved may additionally be changed by ageing or by potential healing also depended by acquired factor and especially by the cause of extraction (trauma, endodontic lesion

,periodontal lesion) after any surgical procedure . Healing take place in three stages ; an inflammatory phase ,a Proliferative phase , and Maturation phase ,(figure 2.2)

Healing steps is initiated as well as blood platelet present contact with collagen connective tissue as blood fill empty socket that create a platelet aggregation which for a clot (erythrocyte & leukocytes embedded in a fibrin gel) the clot control bleeding also serves as a support for the successive steps of cicatrization ,the platelet produce growth factor and mediators (Cytokine) involve in angiogenesis the platelet- Derived growth factor & the Trans-forming Growth Factor Beta also signal the attraction of macrophages which stimulate them to secrete the cytokines such as the Fibroblast Growth Factor , The TNF-α TNF-β and IL-1 , The dental socket rapidly colonized by granulation tissue consisting of neo-vascular tissue ,inflammatory cell & erythrocytes that virtually replace the entire clot within a week ,The next stage is the provisional matrix where the mesenchyme cells are organized into a dense network within the collagen fiber. The vessels The mineralization progressively begins that resemble the finger like formation of immature bone(Aydintug *et al,* 2002)

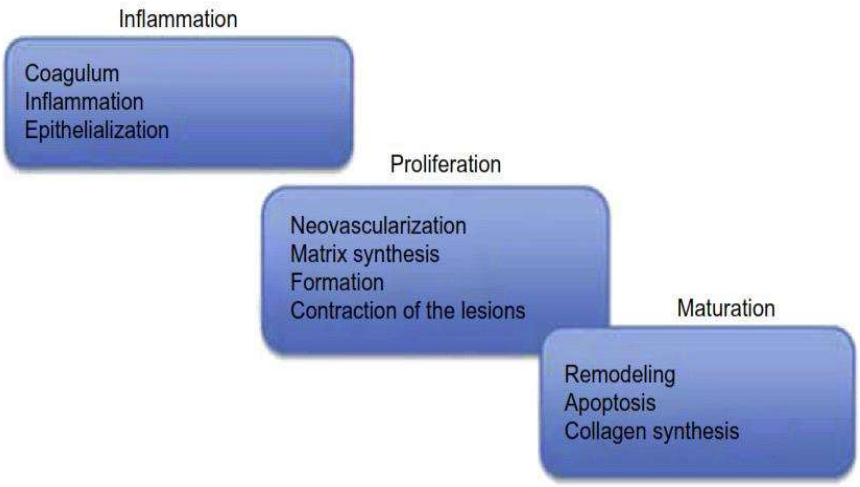


Figure (2-2) tissue phenomena of cicatrization over time (cohen *et al*, 2014)

2-7 CYTOKINE

Cytokine are soluble protein that play an important role in the initiation and maintenance of inflammation and immune response as well as cell cross-talking .cytokine are low molecular weight polypeptide its produced in inflamed tissue as well as in lymphoid organ (Chillida *et al,* 2010)

2.7-1 Tumor Necrosis factor

TNF-α is a pro -inflammatory cytokine due to its role in initiating a cascade of cytokines and growth factor in the inflammatory response , TNF-α is mainly produced by activated macrophages also produced by Lymphocytes , NK, CD4 , The primary role of TNF-α is the regulation of immune response ,TNF being an endogenous pyrogens is able to induce fever , apoptosis, cell death , sepsis s and inflammation and can inhibit tumor genesis and viral replication, chronic TNF deregulation has been associated with autoimmune disease such as rheumatoid arthritis and inflammatory bowel disease as well as psoriasis , TNF-α can be inhabited by the exercise induced cytokines such as IL-6 and IL-10 in healthy individual with no sign, of oral inflammation, TNF is often very low to detectable (Ping et al. 2009). It is produced by macrophages and T-cell and it is a key cytokine for the inflammation (Sakiska *et al,*2020), In the inflammatory phase local tissue "epithelial, connective and endovascular " injured by insults release pro inflammatory cytokine (Coleman *et al,*2012)

2.7.2 Human interluekin--6 .

Is a polymorphic cytokine involved in a number of physiologic and biological proccess include response to infection and trauma ,development and progression of inflammation and malignancy . IL-6 is cytokine that is secreted mainly by T-cell and macrophage and neutrophils keratinocytes ,fibroblast ,endothelial cell (Naldini *et al,* 2005) , IL-6 cell signal are transmitted through a receptor expressed in a wide range of target cell types

is also is released from muscle cell during exercise in response to muscle contraction, IL-6 induces an essential immune globulin-secreting cell, IL-6 is also is a potent inducer of c-reactive protein in the liver,IL-6 is involved in osteoporosis, pulmonary fibrosis, liver cirrhosis, is ischemia, and berylliosis and oral cancer among other disorders of interest such as chronic periodontitis, (Fustter *et al,* 2014)., Endogenious IL-6 is active during B cell maturation and inflammation , in resting phase IL-6 receptor are available on normal activated B cell and normal T-Lymphocytes ,Inflammatory reaction is carried out by the IL-6 it initiate the transcription factor that are present on various inflammation pathway (Naseem *et al,*2016).

Chapter Three

Materials And Methods

CHAPTER THREE

MATERIALS AND METHODS

3.1.1 Materials and Methods

The present study was carried out at Al-Noor Specialized center for dentistry in Mosul city/ Iraq, from August 2019 to Febreuary2020,

3.1.2 Records :

1. A data case sheet for each patient was obtained (appendix 1)

2. A written informed consent was signed by each patient to start the procedure for this study (appendix 2)

3. Permission to examine the patients and perform the research were obtained from the concerned authorities in the Directorate a General Heath in Nineveh (appendix3) .

3.2. 1 Drug used

- **Gelfoam (Maquira Company) (Figure 3.1)**
- **Chlorhexidine gelfoam. 0.2 % (Maquira Company)(Figure 3.2)**

  Lincomycin gelfoam (Maquira Company) (Figure 3.3)
- **Lincomycin gelfoam (Maquira)(Figure 3.3)**

Figure (3.1)Gelfoam

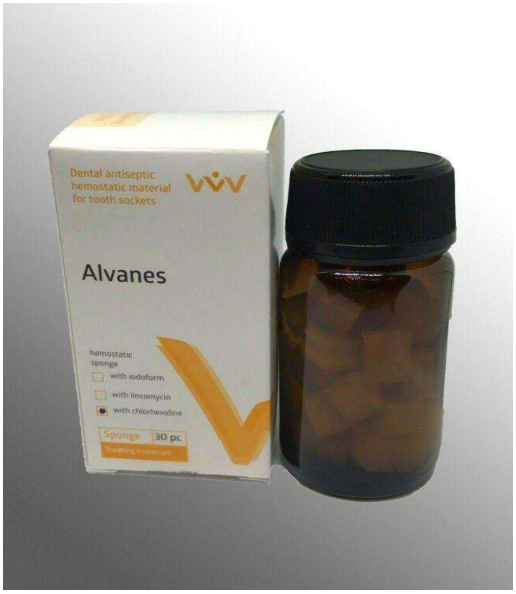


Figure (3.2)chlorhexidine Gelfoam

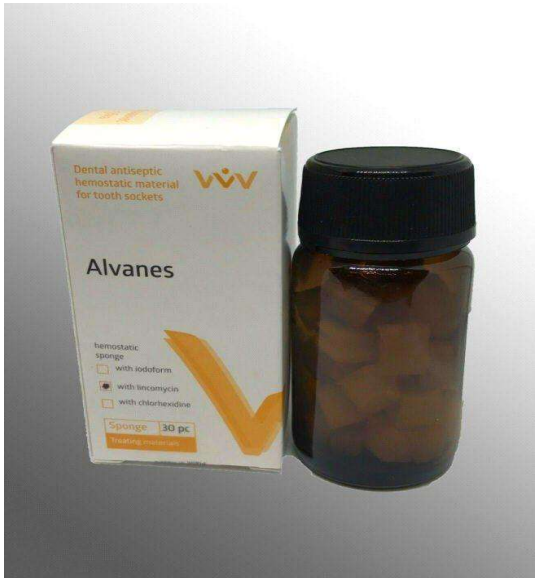


Figure (3.3) lincomycin Gelfoam

3.2.2 Suppliers and Equipment used for collection, separation and Storage of saliva table (3.1)

Table (3.1) material and equipment used for(collection ,separation ,and storage of saliva)

Equipment	Supplier
Salivate	SARSTEDT(Germany)
Centrifuge 80-1 TABLETTOP lowspeed	GSJ ,China
Micropipette 10-100 ml	JINAN ,China
Eppendrof	
tube 1.5ml	China
Rank of Eppenodrof Refrigerator	China
Biofilm	China
Freezer	Universal ,Koria
Cool Box	China

3.3 Patients

A total patients included in this study was(64) ;(54) females and (10) males, patient with an average range between (20-40) years old.

3.3.1 Criteria of patient selection.

- All patients required closed –surgical extraction of lowered third molar .
- Healthy Individual range between (20-40) years .
- No medical of drug affected salivary function for two weeks .
- No history of any complication from dental treatment .
- No history of allergy to drug used in our study.
- Non –smoker
-Non –alcoholic

3.3.2 Study Design and Sample.

Patients Grouping ;

Group 1 : (16) patients who have an appointment for dental extraction without using of any drug for prevention of dry socket.

Group 2 : (16) patients who have an appointment for dental extraction with using of gelfoam alone for dental extraction.

Group 3 : (16) patients who have an appointment for dental extraction with use of lincomycin gelfoam for prevention of dry socket.

Group 4 : (16) patients who have an appointment for dental selection with using of chlorhexidine gelfoam for prevention of dry socket.

3.3.3 procedure

1- Each patient receive local anesthetic cartridge 1.8 ml (nerve block) to produce anesthesia to all patients (MOH/ Iraq) .

2.The patient given paracetamol tablet 500mg after extraction (SDI/Iraq)

3. All patients after extraction of lowered third molar give instruction to irrigation with salt water after extraction.

4. In the first group the patient receive nothing

5. Second group dentist place gelfoam in the socket

6. In the third group dentist place lincomycin gelfoam in the socket .

7. In the forth group dentist place chlorhexidine gelfoam in the socket.

8. Patients asked to return to the dentist for the follow up

3.3.4 Criteria of dry socket

Assessment based on Balm Criteria (Dalta *et al,*2015)

- Post- extraction pain in and around extraction site with
- Partially or totally disintegrated blood clot.
- With or without bad odor.
- With or without necrotic debris.
- Denuded socket
- Exudate or pus in the socket.

3.3.4 Salivary sample Collection

Un stimulated saliva were collected from the all groups Before extraction and seven days post extraction by asking the patients to rinse the mouth with ten ml of tap water to remove food debris then Cotton- based techniques by using a cotton dental roll of specialized devices (Salivate)

Salivate contain a cotton roll that is sucked or chewed in a patient mouth (floor of mouth ,cheek ,over the tongue) for 1 minute this allow the saliva to be absorbed &d collected in the swab in an easy and hygienic fashion.

3.3.5 Method of using salivate

- Remove the top cap of the tube to expose the round sponge But not remove the holder that the sponge is sitting in figure(3.4.A)
- Place the sponge directly into month by tipping the tube so the sponge falls into mouth without touch the sponge with figure(3.4.B)

Keep the main sponge in mouth, very gently chew and roll the sponge around in mouth for. 1 minute, Spit the sponge back into the tube, without touch the sponge with finger All samples should be collected between 9-11 AM and should be clear of blood contamination (Kanegon *et al,*2009)

3.3.6 Salivary Sample Storage

Saliva in Salivates then centrifuged at 3000rpm for 10 minute ,which yield a clear fluid sample at the bottom of the tube after centrifuge while leaving debris and residue in cotton swab ,then the clear fluid place in clear eppendrof tube and stored at deep freeze -20C to be thawed for analysis (Nater *et al,* 2005)

Figure(3.4A) method of use of salivate

Figure(3.4B) method of use of salivate

3.4 Assessment of Soft tissue Healing

At seven day after extraction, the wound healing was assessed by the same dentist using a healing index by Landry et al.,(1988) (Table3 2) which grades the wound on a score of 1–5, where 1 indicates very poor healing and five indicates excellent healing.

Table(3. 2): Healing index by Landry et al.

Score. 1	**Very poor**	Tissue color: > 50% of gingiva red Response to palpation: Bleeding Granulation tissue: Present
Score. 2	**Poor**	Incision margin: Not epithelialized, with connective tissue exposed Poor
Score. 3	**Good**	Tissue color: 25% and<50% of gingiva red Response to palpation: No bleeding Granulation tissue: None Incision margin: No connective tissue exposed
Score. 4	**Very Good**	Tissue color: <25% of gingiva red Response to palpation: No bleeding Granulation tissue: None Incision margin: No connective tissue exposed
Score. 1	**Excellent**	Tissue color: All tissues pink Response to palpation: No bleeding Granulation tissue: None Incision margin: No connective tissue exposed

3.5 Diagnostic Kit

3.5.1.Human TNF-α ELISA Kit Figure (3-5) A,B

principle of test

This kit was based on sandwich enzyme -linked immune- sorbent assay technology of 96 wells, Anti -TNF-α polyclonal antibody was pre-coated onto 96 well plate and the biotin conjugated anti-TNF polyclonal antibody was used as detection antibodies ,The standard ,test sample and biotin conjugated detection antibody were added to the well subsequently and wash with wash buffer .

Avidin -Biotin -Peroxidase complex with added and unbound conjugated were washed away by wash buffer ,TMB was catalyzed by HRP to produce a blue color product that changed to yellow after adding acidic stop solution ,The density of yellow is proportional to the TNF-α amount of sample captured in the plate

A. 10,000 pg/ml of standard solution: Add 1 ml of Sample / Standard diluent buffer (Kit Component 3) into one Standard (Kit Component 2) tube, keep the tube at room temperature for 10 min and mix thoroughly.

B. 1000 pg/ml of standard solution: Add 0.1 ml of the above 10 ng/ml standard solution into 0.8 m sample diluent buffer (Kit Component 3) and mix thoroughly

C.500 µ of standard solutions: Label 6 Eppendorf tubes with 500 pg/ml, 250 pg/ml, 125 pg/ml, 62.5 pg/ml, 31.2 pg/ml, 15.6 pg/ml, respectively. Aliquot 0.3 ml of the Sam diluent buffer (Kit Component 3) into each tube. Add 0.3 ml of the above 1000 pg each tube. Add 0.3 ml of the above 1000 pg/ml standard solution most tube and mix thoroughly. Transfer 0.3

ml from 1st tube to 2nd tube and mix thoroughly. Transfer 0.3 ml from 2nd tube to 3rd tube and mix thoroughly, and so on.

standard curve can be plotted as the relative O.D. of each in gald solution (Y) vs. the respective concentration of the standard solution (X). The Human TNF-α concentration of the samples can be interpolated from the standard curve

plate, and clap the plate on absorbent filter papers or procedure two more times for a total of three washes.

Automated Washing: Aspirate all wells, then wash all wells, invert plate, and clap the recommended that the washer be Component ten) (overfilling wells with the buffer). After the final wash, invert plate, and plate on absorbent filter papers or other absorbent material. It is recommended that the set for a soaking time of 1 min or shaking.

1. Add 0.1 ml of ABC working solution into each well cover the plate and incubate at 37°C for 30 min
2. Remove the cover and wash plate 5 times with Wash butter (Kit Component 10), and each time to the wash buffer stay in the wells for 1-2 min. (See Step 9 for plate wash method)
3. Add 0.1 ml of TMB substrate (Kit Component 8) into each well, cover the plate and incubate at 37 in dark within 30 min. (Note: This incubation time is for reference use only, the optimal time should be determined by end user) And the shades of blue can be seen in the first 3-4 weils (with most concentrated Human TNF-α standard solutions), the other wells show no obvious color figure(3.6 A)
4. Add 0.1 ml of Stop solution (Kit Component 9) into each wel and mix thoroughly. The color changes into yellow immediately figure (3.6.B)

5. Read the O.D. absorbance at 450 nm in a microplate reader within 30 minute adding the stop solution Figure (3.7).

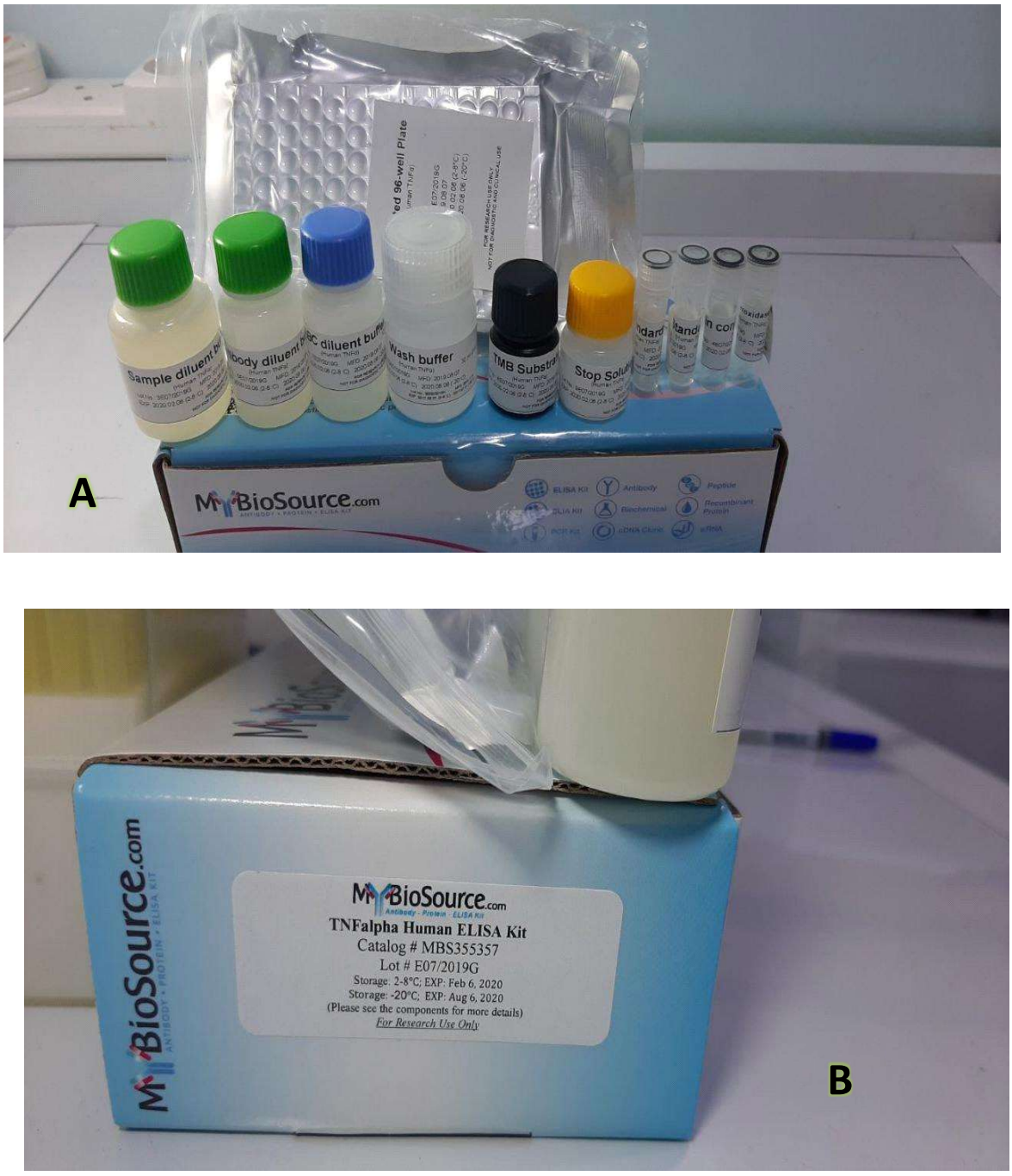
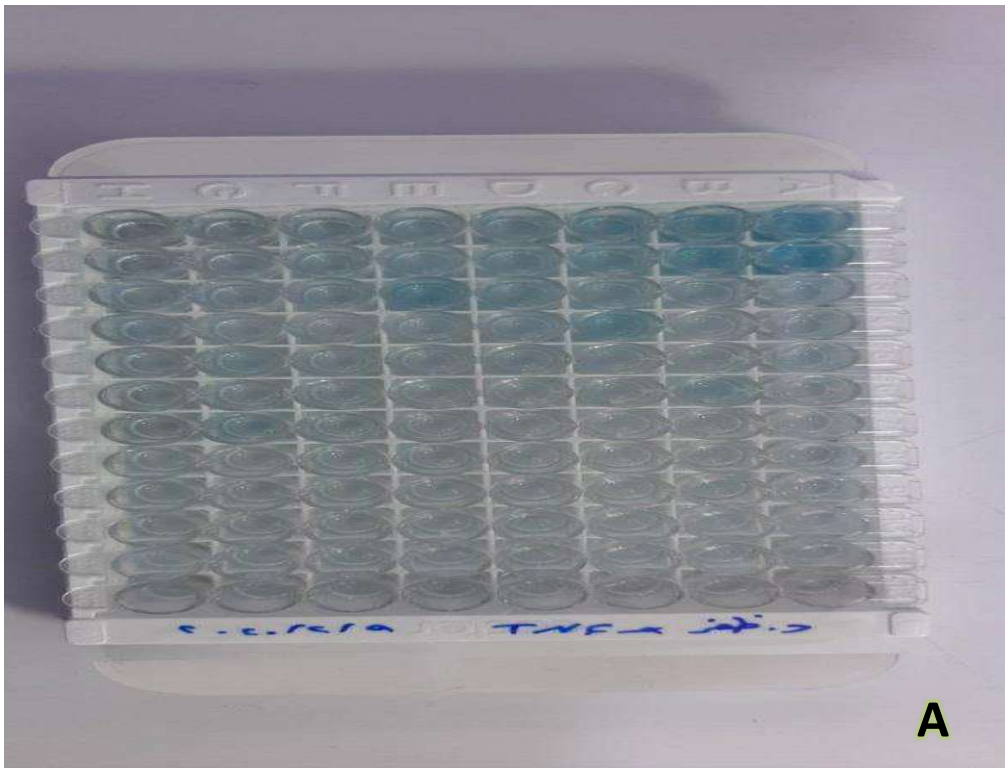


Figure (3.5) A ;kit components

B;TNF-alpha Human ELISA kit (MyBioSource, USA)



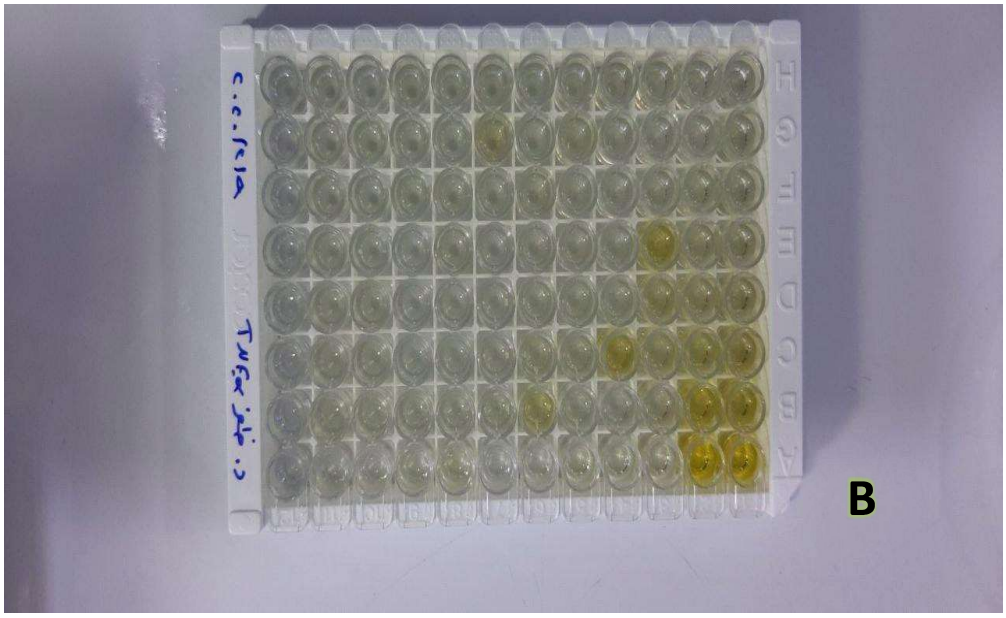


Figure (3.6) A .color of well after adding of antibody solution

B. color of well after adding a stop solution for saliva TNF-alpha by ELISA

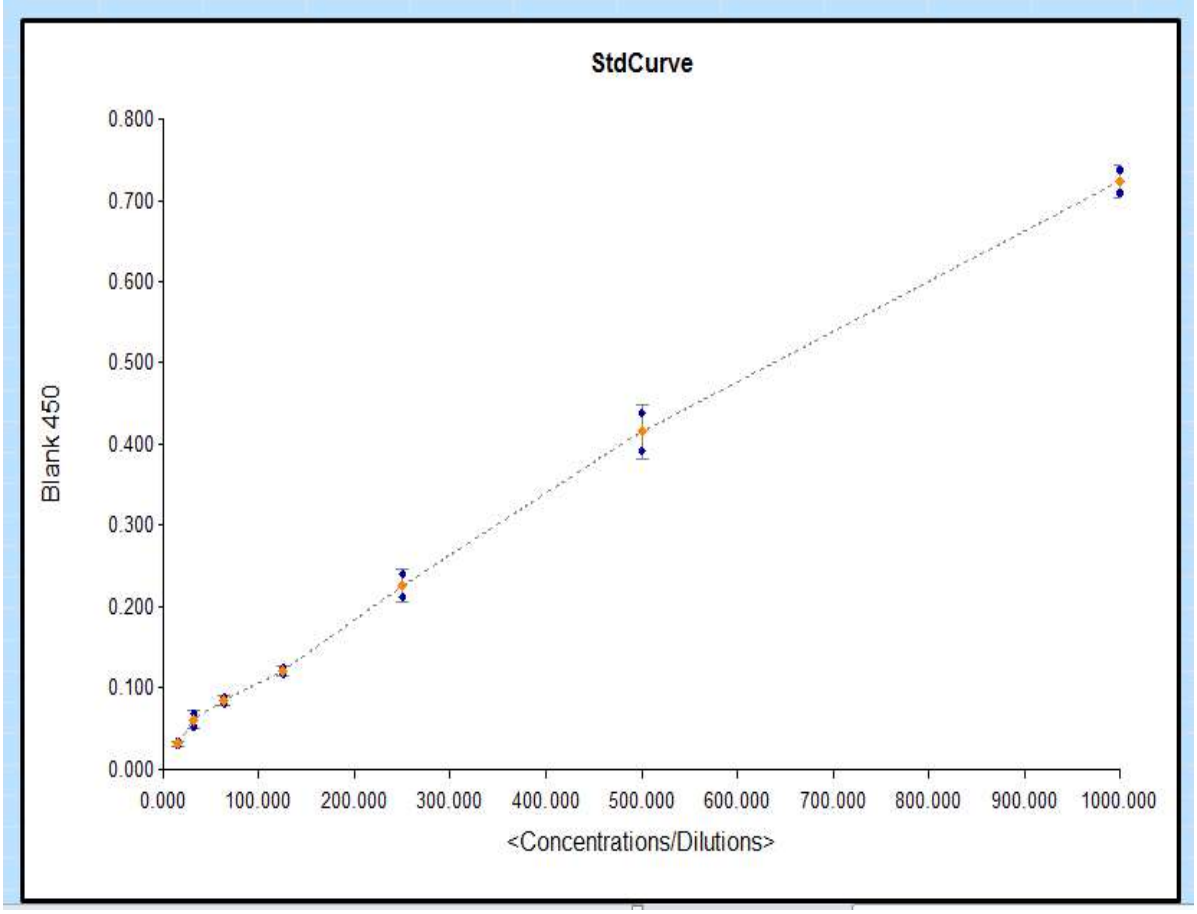


Figure 3.7 standard curve of Human TNF- α ELISA kit

3.5.2 Human IL-6 in Saliva

Principle of test

This is a sandwich ELISA kit of 96 wells IL-6 in standard and samples binds to the antibody engaging locations on microliter plate ,After incubation unbound composition are washed away ,Biotin conjugated to goat antibody to human IL-6 are added and attach the bound IL-6 after incubation , unbound composition are washed away, Streptavidin conjugated to the goat antibodies . Bound Streptavidin -HRP is measured by the reaction of the horseradish peroxidase enzyme to the substrate tetramythylbenzidine (TMB) this reaction

gives a blue color ,A yellow color is appeared after stopping the reaction with the acidic solution , The optical density is read on a standard plate reader at 450 nm ,The amount of Streptavidin-HRP is proportional to the amount of IL-6.

Reagent preperation

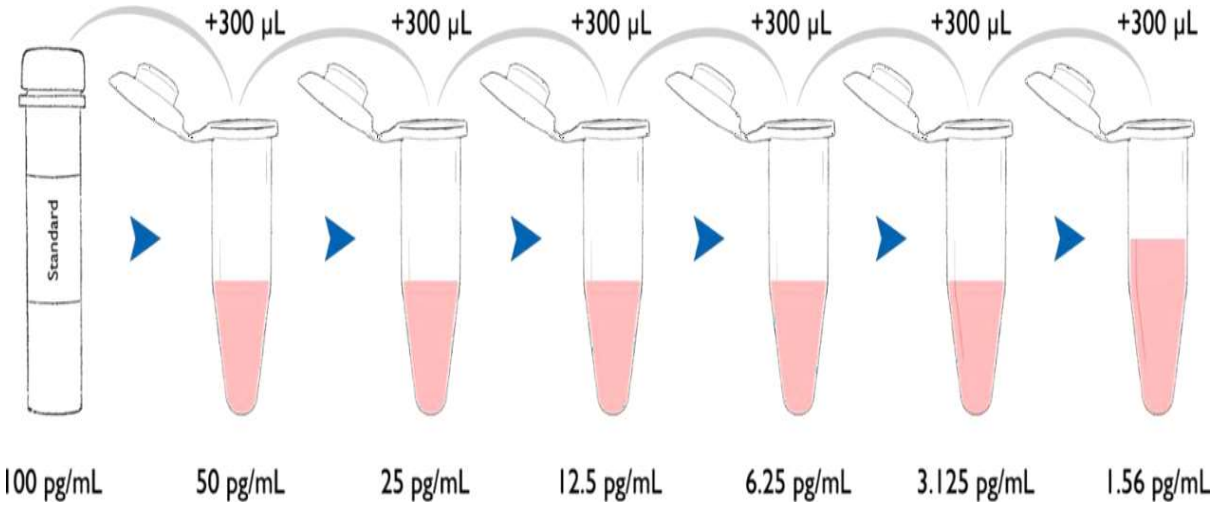


Figure (3-8) Prepare serial dilution of the IL-6 Standard

Figure(3.9) A. Kit Components.

B. Salivary Interleukin-6 SLISA Kit (Salimertic , USA)>

Procedure

Step 1: Read and prepare reagents agreed to the Reagent Preparation section before starting assay. Determine your plate layout. Here is a mentioned layout. (Standards, controls, and saliva samples should be assayed in duplicate.)

Step 2: hold the desired number of strips in the strip holder and place the remaining strips back in the foil pouch. Reseal the foil pouch within unused wells and desiccant. Store at 2-8°C.

Step 3: Pipette 12 mL of IL-6 Assay Diluent into each of two various disposable tubes. (Scale down proportionally if not using a full plate). Set aside for Step 8 and Step 11.

Step 4: Dilute saliva samples 5X in IL-6 Sample Diluent using 60 µL saliva to 240 µL IL-6 Sample Diluent. **Do not dilute samples in IL-6 Assay Diluent.**

Step 5:

- Pipette 100 µL of standards, controls, and diluted saliva samples into suitable wells.
- Pipette 100 µL of IL-6 Assay Diluent into 2 wells to do as the Zero Standard.

Step 6: Put adhesive cover supplied over plate. Mix plate on a plate rotator **constantly** at 500 rpm for 1 hour at room temperature.

Step 7: Wash the plate 4 times with 1X wash buffer. A plate washer is recommended. as well as, washing may be done by curfully squirting wash buffer into each well with a squirt bottle, or by pipetting 300 µL of wash buffer into each well and then dismissing the liquid over a sink. After each wash, the plate must be during blotted on paper towels

before turning upright. If using a plate washer, blotting is still recommended after the last wash

Step 8: Dilute the antibody conjugate 1:500 by adding 24 µL of the antibody conjugate to the 12 mL of IL-6 Assay Diluent. (Scale down proportionally if not using the entire plate.) Antibody conjugate tube can be centrifuged for a few minutes to bring the liquid down to the tube bottom. Instantly mix the diluted antibody conjugate solution and add 100 µL to each well using a multichannel pipette.

Step 9: Put a new adhesive cover (provided) over plate. Mix plate on a plate rotator **continuously** at 500 rpm for 2 hours at room temperature.

Step 10: Repeat wash step from Step 7.

Step 11: Dilute the Streptavidin-HRP 1:100 by adding 120 µL of the Streptavidin-HRP to the 12 mL of IL-6 Assay Diluent. (Scale down proportionally if not using the entire plate.) Streptavidin-HRP tube can be centrifuged for a littele minutes to bring the liquid down to the tube bottom. Immediately mix the diluted Streptavidin-HRP solution and add 100 µL to each well using a multichannel pipette.

Step 12: Mix plate on a plate rotator **constantly** at 500 rpm for 20 minutes at room temperature.

Step 13: Reiterate wash procedure from Step 7.

Step 14: Add 100 µL of TMB Substrate Solution to every well with a multichannel pipette.

Step 15: Mix on a plate rotator for 5 minutes at 500 rpm and incubate the plate in the dark (covered) at room temperature for an additional 15 minutes.

Step 16: Add 50 µL of Stop Solution with a multichannel pipette.

Step 17: Read the O. D. absorbance at 450 nm in a microplate reader within 30 minute adding the stop solution figure (3.10)

Step 18: Mix on aplate rotator for 3 minute at 500 rpm . If green color stays continue mixing until green color turns to yellow . Be ensure each wells have turned yellow figure (3.11 A .B)

Figure (3.10); Reading O.D. absorbance of the plate by microplate Reader device

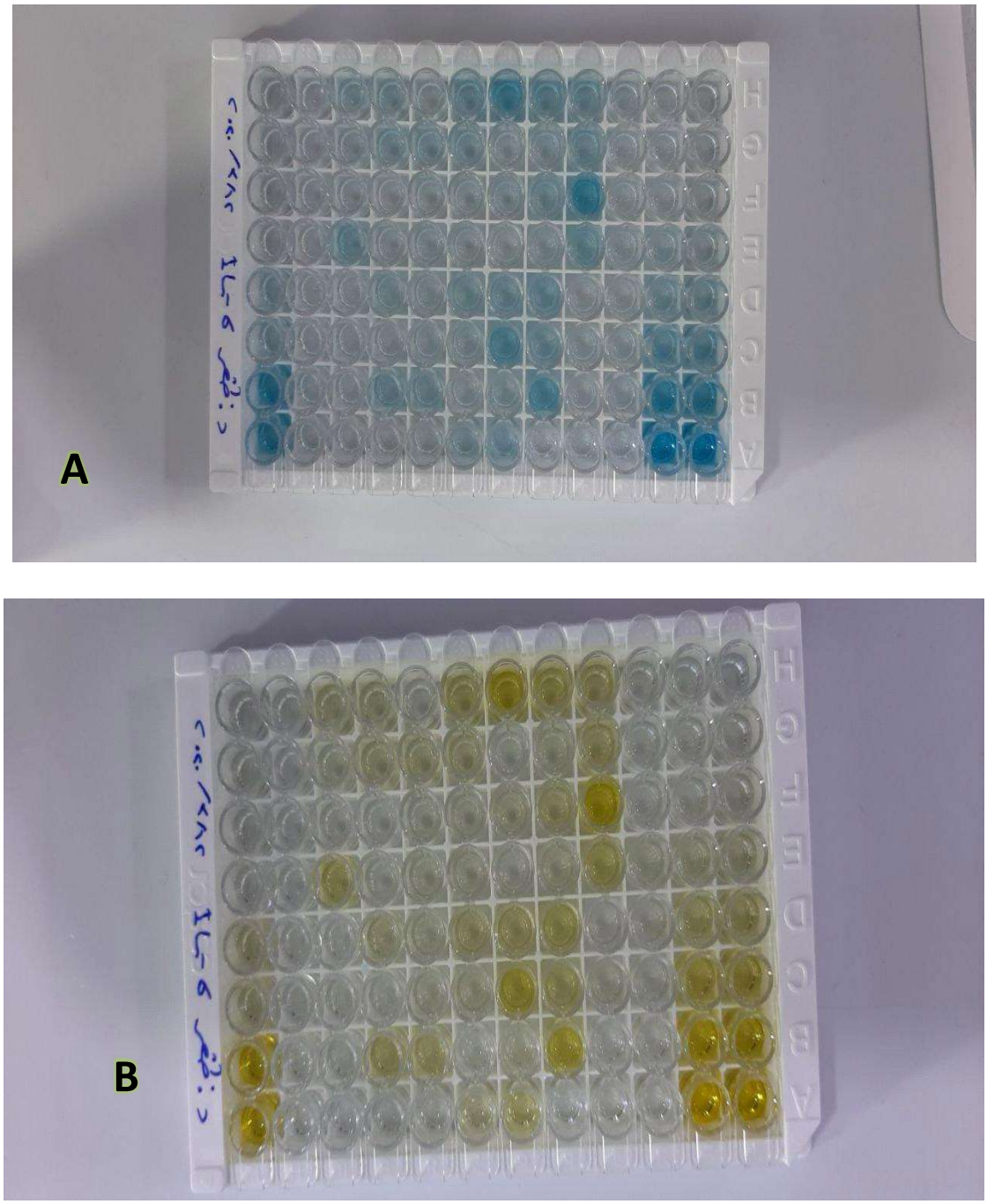


Figure (3.11) A. color of wells after adding of antibody solution.

B. color of wells after adding of stop solution for saliva IL-6 by ELISA

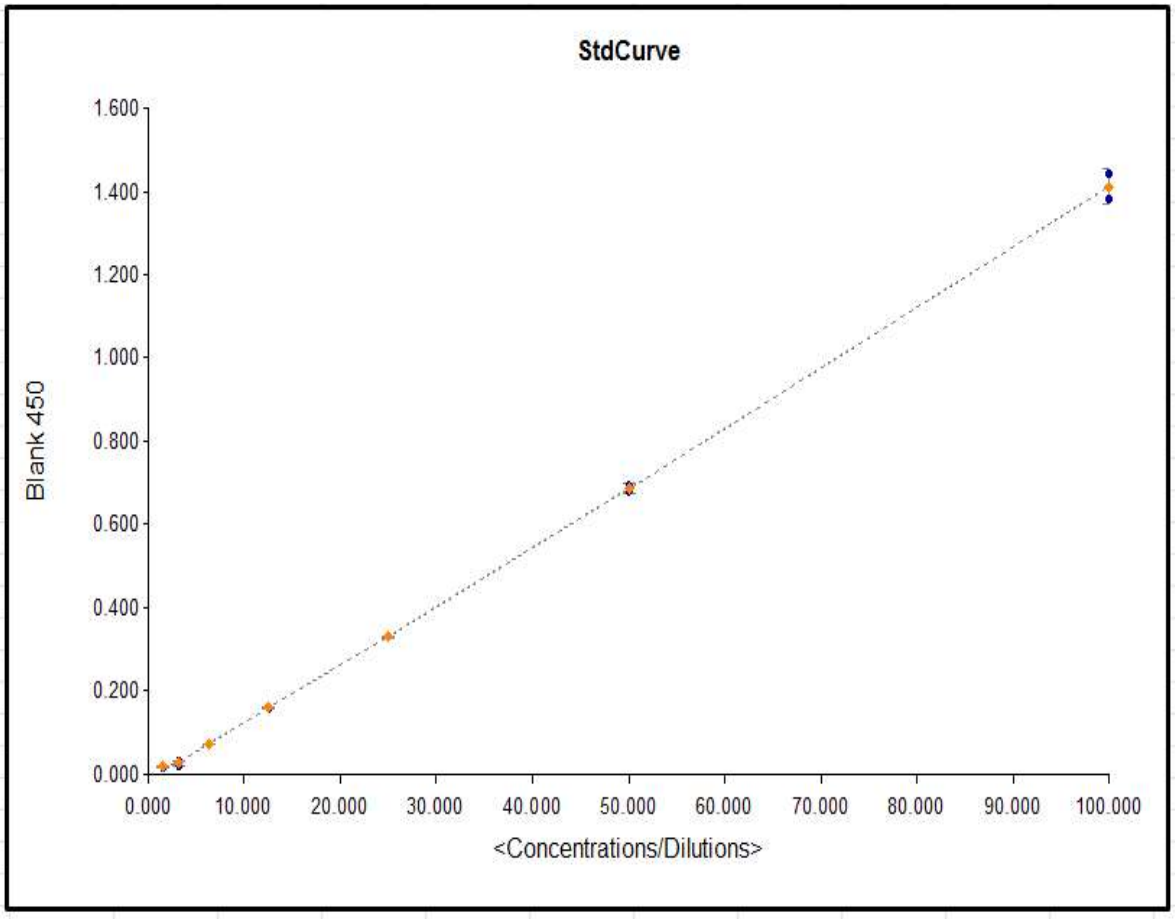


Figure (3.12) Standard curve of Human IL -6 ELISA Kit

3.6 Statistical Analysis .

Microsoft Excel -2010 was used for data categorization and coding Descriptive and analytic statics was performed using Minitab version 18 software statistical program .

The descriptive statics include mean ± Standard Deviation (SD) for measurable variables and frequencies and percentages for catigoral variables.

1.Chi-square test was applied for comparison in categorical variables .

2.Dependent t-test of the two means was used for difference in parameters before and after application of gelfoam .

3.One way Analysis Of variance test (ANOVA-test)

4. Tukey' s pair –wise comparison was used for comparison in salivary levels of TNF-α and IL-6 among the four groups

5. Correlation matrix between different parameters in each four groups was performed using Pearson 'correlation coefficient (r) ,which regarded as a simple linear correlation .

P-values ≤ 0.05 were considered statistically significant through out data analysis.

Chapter Four

RESULTS

Chapter Four

Results

4.1 Demographic Data

A total of 64 patients were included in this study .All subject were completed the consent form, case sheet before starting the follow up visit , patient were divided randomly into four groups , control group consist of (16) patients (78%) females and (22%) males, gelfoam group consist of (16) patients (83%)females and (17%) males , patients treated with lincomycin gelfoam consist of (17) (82%) females and (18%) males ,and group 4 (16) patient (78%)females and (22%)males the mean of age of treated group is (29.59 ± 7.59) at group I and (29.58 ± 7.88) at groupII and (31.55 ± 9.62) at groupIII and (28.00 ± 7.08) at group IV with p value =(0.769) with no significant different among them table (4.1),also in the Gender of groups there is no significant difference with p value =(0.937) and figure(4.1)

Table (4.1)Mean ages of the study sampled population.

Groups	No.	Mean*	SD
I: Control group	16	29.25	7.59
II: Gelfoam group	16	29.58	7.88
III: Gelfoam and lincomyin	16	31.55	9.62
IV: chlorhexidine gelfoam	16	28.00	7.08

* P = 0.769 using One-way ANOVA-test.

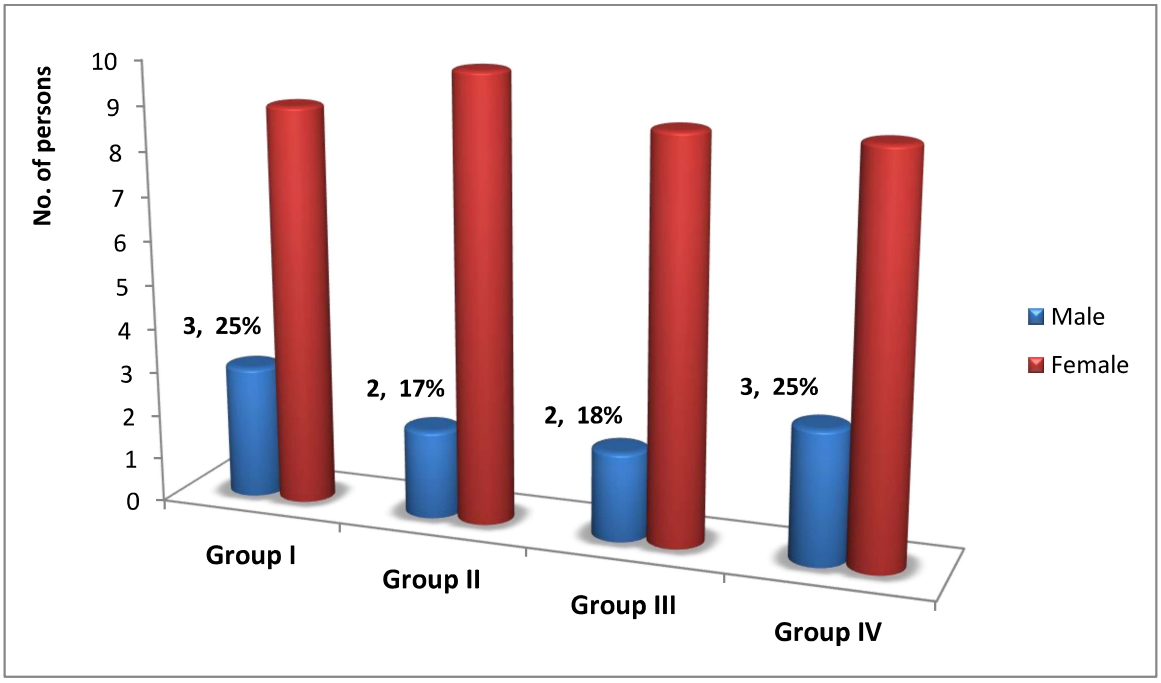


Figure (4.1) Gender distribution of the study sampled population

4.2 The incidence of dry socket among the study sampled groups after one week.

The result of incidence of dry socket is 5(31.25%) in group I, 4(18.75%) in group II, 0(0.00%) in group III and 0(0.00%) in group IV with P-Value=0.044 there is significance difference between groups by using chi-square table (4.2).

Table (4.2): the incidence of dry socket among the study sampled groups after one week.

Dry Socket	Group I [n=16] No.(%)	Group II [n=16] No.(%)	Group III [n=16] No.(%)	Group IV [n=16] No.(%)	P-Value*
Yes	5(31.25)	4(18.75)	0(00.0)	0(0.00)	0.044
No)	11(68.75)	12(81.25)	16(100.0)	16(100.0)	

*chi-square was used, d.f=3

4.3 Comparison in mean soft tissue index after one week in the study sampled groups.

The result of Comparison in mean soft tissue-Index show there is no significance in mean Group after one week . but there is significance different between lincomycin gelfoam group and chlorhexidine gelfoam group.

Table (4.3): Comparison in mean soft tissue index after one week in the study sampled groups.

Groups	No.	Mean*	SD	Minimum	Maximum
I	16	2.33 $^{A B}$	0.89	1.00	3.50
II	16	2.59 $^{A B}$	0.81	1.30	3.50
III	16	2.94 ^{A}	0.7043	1.50	3.50
IV	16	2.04 ^{B}	0.66	1.00	3.00

* P = 0.048 using One-way ANOVA-test with Tukey's Pair wise comparisons. Means that do not share a letter are significantly different.

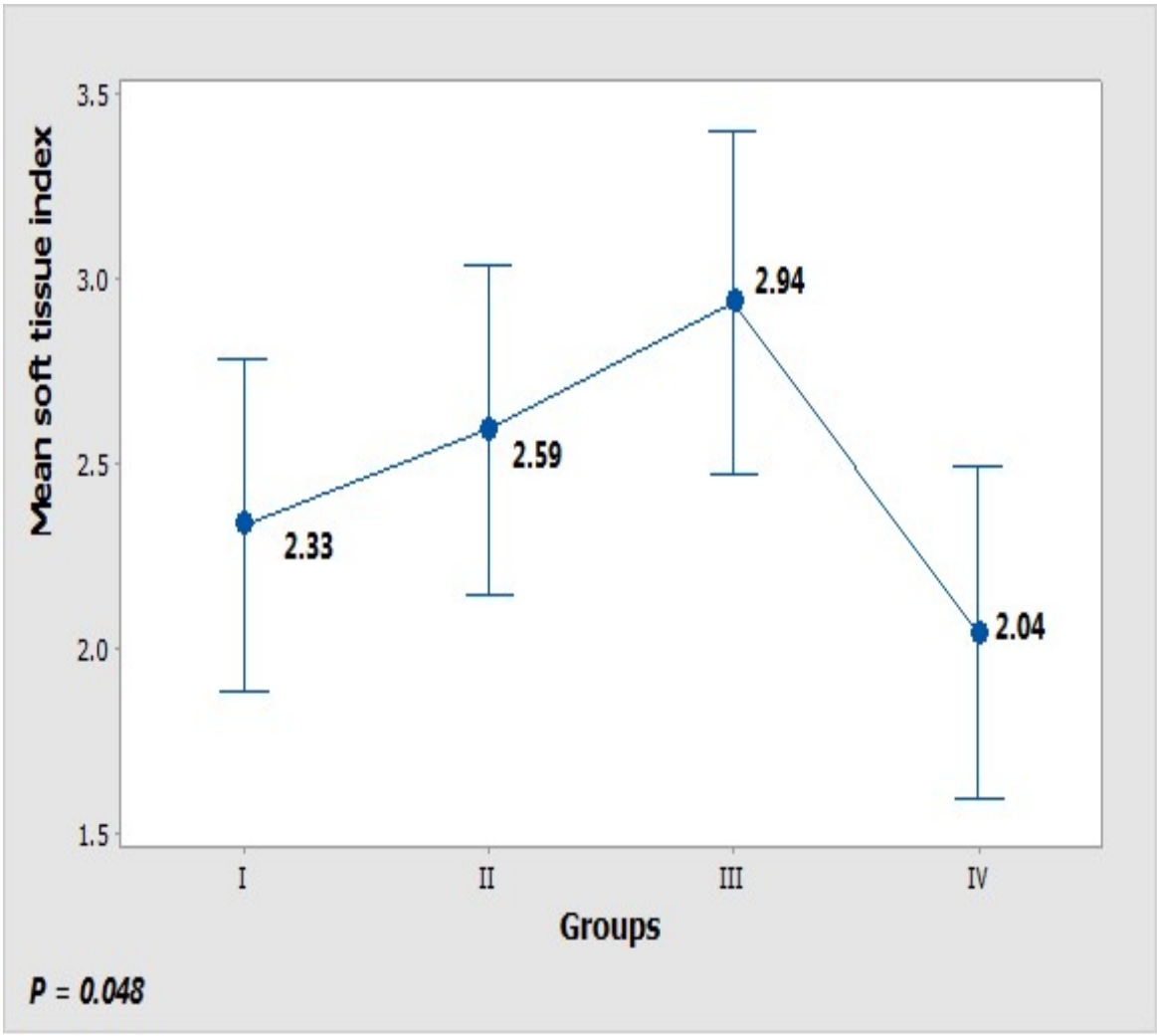


Figure (4.2): The difference in mean soft tissue index among the study sampled groups after one week.

The result show significant decrease in mean soft tissue index among the study sampled groups after one week.

4-4 Result of Control group on mean salivary levels of TNF-α and interlukine-6 after one week

The mean ± SD of group II at the beginning of study TNF-α is (46.8 ± 34.6) and after one week is (19.4 ± 9.3) with P-Value(0.205) with no significant difference, while the result of (mean ± SD) of IL-6 of the beginning of study is (1.96 ± 0.51) and after one week is (6.20 ± 5.22) with P-Value (0.014)with significant difference by using paired T-test of two means) as in table (4.4).

Table (4-4) Result of control group on mean salivary levels of TNF-α and interlukine-6 after one week .

Salivary parameters	Group II "control group "		P-Value*
	Beginning Mean ± SD	After one week Mean ± SD	
TNF-α (pg/ml)	46.8 ± 34.6	19.4 ±9.3	0.205
Interlukine-6 (pg/ml)	1.96 ± 0.51	6.20 ± 5.22	0.014

*paired T-test of two means was used.

4.5 Effect of gelfoam alone on mean salivary levels of TNF-α and interlukine-6 after one week Group II.

The result showed that (mean ± SD) of IL-6 at the beginning of study is (1.51 ± o.13) and after one week is (11.90 ± 11.61) with p value =(0.010) with significant difference and showed that the level of TNF-α at the beginning of study is (45.2±35.3) and after one week is (15.6 ± 4.3) with p- value=(0.123) with no significant difference by using paired T-test of two main

Table (4-5) Effect of gelfoam alone on mean salivary levels of TNF-α and interlukine-6 after one week (n=16). In group II

Salivary parameters	Group I "gelfoam alone"		P-Value*
	Beginning Mean ± SD	After one week Mean ± SD	
TNF-α (pg/ml)	45.2 ± 35.3	15.6 ± 4.3	0.077
Interlukine-6 (pg/ml)	1.51 ± 0.13	11.90 ± 11.61	0.010

*paired T-test of two means was used.

4-6 Effect of gelfoam with lincomycin on mean salivary levels of TNF-α and interlukine-6 after one week .

It showed that (mean± SD) of group III of the beginning at study of TNF-α is (41.5 ± 34.2) and after one week is (15.6 ± 0.04) with P-Value (0.254) with no significant difference while IL-6 is (1.74 ± 0.92) at the beginning of study and (5.36 ± 493) after one week with P-Value is (0.014) with significant difference by using paired T-test of two mean Table (4.6).

Table (4-6) Effect of gelfoam with lincomycin on mean salivary levels of TNF-α and interlukine-6 after one week .

Salivary parameters	Group III "gelfoam + lincomycin"		P-Value*
	Beginning Mean ± SD	After one week Mean± SD	
TNF- (pg/ml)	45.4 ± 38.3	15.6 ± 0.04	0.245
Interlukine-6 (pg/ml)	1.74 ± 0.92	5.36 ± 4.93	0.014

*paired T-test of two means was used.

4-7 Effect of chlorhexidine gelfoam salivary levels of TNF-α and interlukine-6 after one week .

The result showed that (mean ± SD) of TNF-α at the beginning of study is (45.4 ± 38.3) and after one week is (37.8 ± 27.6) with P-Value is(0.041) and IL-6 is (1.57 ± 0.18) at the beginning of study and (16.99 ± 13.31) after one week with P-Value is (0.002) by using paired T-test of two mean, with significant different of P-Value of both biomarkers table (4.7).

Table (4-7) Effect of chlorhexidine gelfoam salivary levels of TNF-α and interlukine-6 after one week in group IV .

Salivary parameters	Group IV "chlorhexidine gelfoam"		P-Value*
	Beginning Mean ± SD	After one week Mean± SD	
TNF-α (pg/ml)	45.4 ± 38.3	37.8 ± 27.6	0.041
Interlukine-6 (pg/ml)	1.57 ± 0.18	16.99 ± 13.31	0.002

*paired T-test of two means was used.

4.8 Comparison in salivary levels of TNF-α and Interlukine-6 among the four groups at the beginning of the study.

Comparison of means of salivary parameters level at the beginning of study there are no significant different in mean of both parameters table (4.8).

Table (4.8): Comparison in salivary levels of TNF-α and Interlukine-6 among the four groups at the beginning of the study.

Parameters	Group I Mean ± SD	Group II Mean ± SD	Group III Mean ± SD	Group IV Mean ± SD	P-value*
TNF-α (Pg/ml)	45.4± 38.3 A	45.2 ± 35.3 A	41.5 ± 34.2 A	45.4 ± 38.3 A	0.930
IL-6 (Pg/ml)	1.57 ± 0.18 A	1.51 ± 0.13 A	1.74 ± 0.92 A	1.96 ± 0.51 A	0.161

* One-way ANOVA-test with Tukey's Pair wise comparisons was used. Means that do not share a letter are significantly different.

Table (4.9): Comparison in salivary levels of TNF-α and Interlukine-6 among the four groups after one week.

Comparision of means of salivary parameters level between groups at the end of study showed that there is no significant different of TNF-α while there is significant deference in mean of IL-6 with p-value(0.018) as table (4.9).

Table (4.9): Comparison in salivary levels of TNF-α and Interlukine-6 among the four groups after one week.

Parameters	Group I Mean ± SD	Group II Mean ± SD	Group III Mean ± SD	Group IV Mean ± SD	P-value*
TNF-α (Pg/ml)	**19.4 ± 9.3 A**	**15.6 ± 4.3 A**	**15.6 ± 0.04 A**	**37.8 ± 27.6. A**	**0.065**
IL-6 (Pg/ml)	**6.20 ± 5.22 B**	**11.90 ± 11.61 B**	**5.36 ± 4.93 B**	**16.99 ± 13.31 A**	**0.018**

* One-way ANOVA-test with Tukey's Pair wise comparisons was used. Means that do not share a letter are significantly different.

4.10 Correlation matrix between different parameters in group I at the end of the study,

The Result of the Correlation between soft tissue index and TNF-α is relationship(0.511) with p value (0.090) ,soft tissue index and IL-6 is negative relation(-0.703) with P-Value=(0.011) is significant difference as in table (4.10) figure (4.3)

Table (4.10): Correlation matrix between different parameters in group I at the end of the study,

Parameters	Correlation coefficient*	TNF-α	IL-6	Soft tissue index
IL-6	R	-0.462	---	---
	P	0.131	---	---
Soft tissue index	R	0.511	-0.703	---
	P	0.090	0.011	---
Dry Socket	R	*	*	*
	P	*	*	*

*person correlation method (r) was used

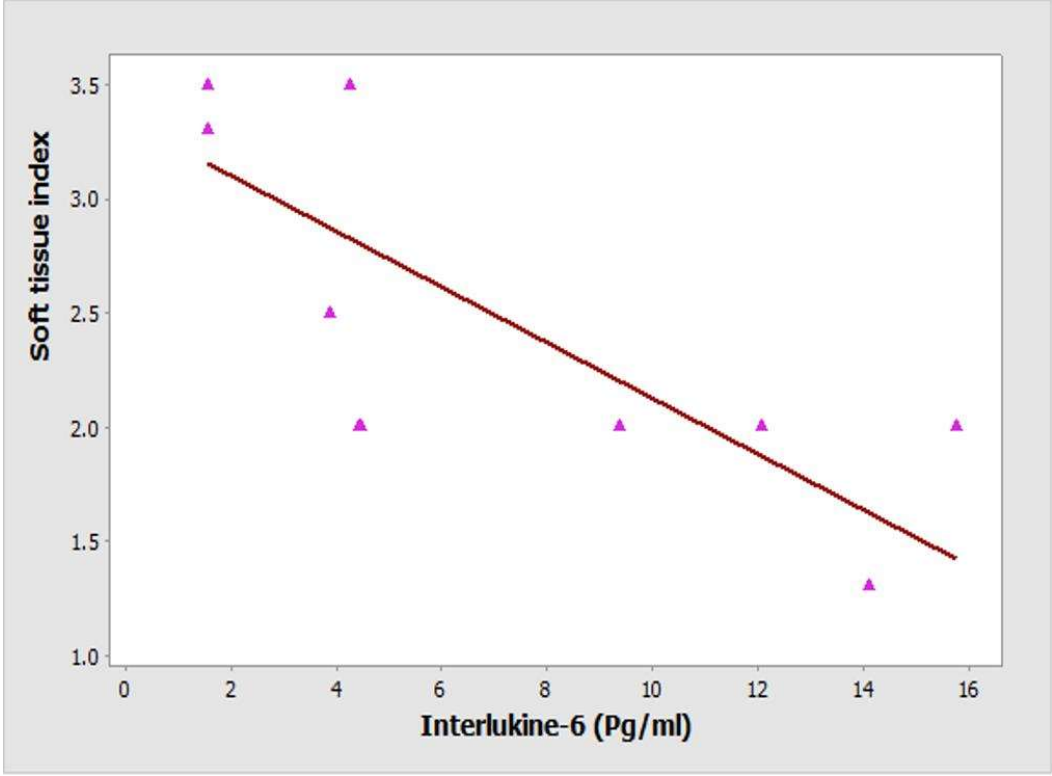


Figure (4.3): the correlation between salivary interlukine-6 and soft tissue index in group I at the end of the study.

4.11 Correlation matrix between different parameters in group II at the end of the study,

Result of the group I of the end of study correlation relation between soft tissue index and interleukin-6 is(-0.839) of negative relationship between soft tissue index and TNF-α=-0.070 as in table (4.11) figure (4-4), with P-Value=(0.829) of TNF-α with no significant difference, , the Dry Socket with IL-6 have positive relationship(0.915) , TNF-α negative relationship -0.245 with P-Value=(0.442) with no significant difference as in table (4-11).figure (4.4)

Table (4.11): Correlation matrix between different parameters in group II at the end of the study.

Parameters	Correlation coefficient*	TNF- α	IL-6	Soft tissue index
IL-6	R	-0.006	---	---
	P	0.948	---	---
Soft tissue index	R	0.070	-0.839	---
	P	0.829	0.001	---
Dry Socket	R	-0.245	0.915	-0.702
	P	0.442	0.000	0.011

*person correlation method (r) was used

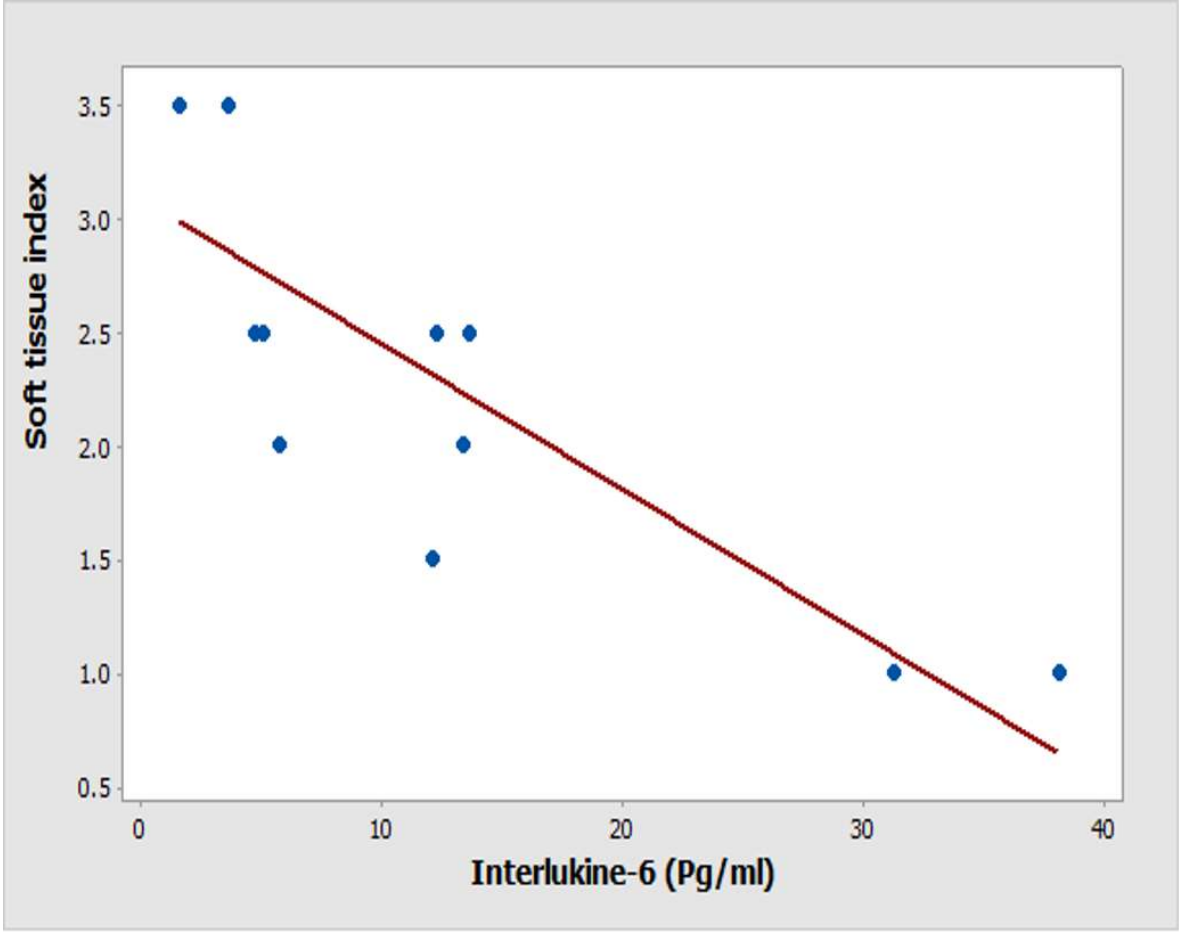


Figure (4.4): The correlation between salivary interlukine-6 and soft tissue index in group II at the end of the study.

4.12 Correlation matrix between different parameters in group III the end of the study.

The Result of the Correlation between soft tissue index and TNF- α is positive correlation 0.649 with P-Value 0.031 with no significance difference as in table (4.12), figure (4-5), the correlation between soft tissue index of IL-6 is negative relationship -0.733 with P-Value=(0.010) significant difference is present as in table (4.12), figure (4.5).

Table (4.12): Correlation matrix between different parameters in group III at the end of the study.

Parameters	Correlation coefficient*	TNF-α	IL-6	Soft tissue index
IL-6	R	-0.359	---	---
	P	0.278	---	---
Soft tissue index	R	0.649	-0.733	---
	P	0.031	0.010	---
Dry Socket	R	*	*	*
	P	*	*	*

*person correlation method (r) was used

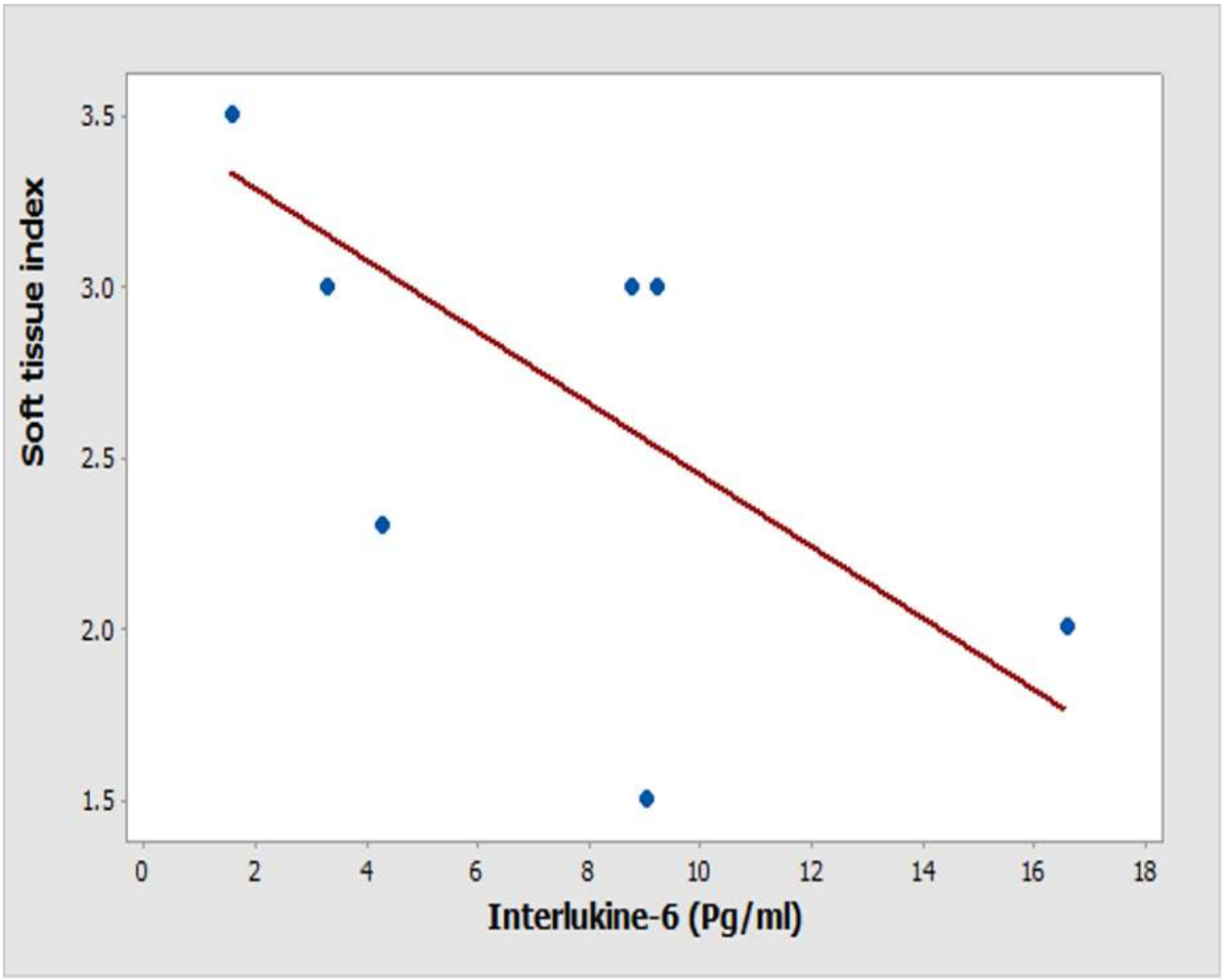


Figure (4.5): the correlation between il-6 and soft tissue index in group III at the end of the study.

4.13 Correlation matrix between different parameters in group IV at the end of the study.

it showed correlation between soft tissue index and TNF-α is positive =0.511 with P-Value(0.090) as in Table (4-13), while the correlation between soft tissue index and IL-6=(-0.703) is negative relationship with P-Value 0.011) it means significance difference between soft tissue index and IL-6 as in table and IL-6 as in table (4.13), figure (4.6).

There is positive relationship between IL-6 and TNF-α (0.148) with P-Value =(0.646) with no significant difference, there is negative relation ship between soft tissue index and TNF-α(-0.511) with p- value (0.090) ,there is negative relation ship between soft tissue index and IL-6 (-0.703) with p value (0.011) as in table (4.13) ,figure (4.6)

Table (4.13): Correlation matrix between different parameters in group IV at the end of the study,

Parameters	Correlation coefficient*	TNF-α	IL-6	Soft tissue index
IL-6	R	0.148	---	---
	P	0.646	---	---
Soft tissue index	R	-0.511	-0.703	---
	P	0.090	0.011	---
Dry Socket	R	*	*	*
	P	*	*	*

*person correlation method (r) was used

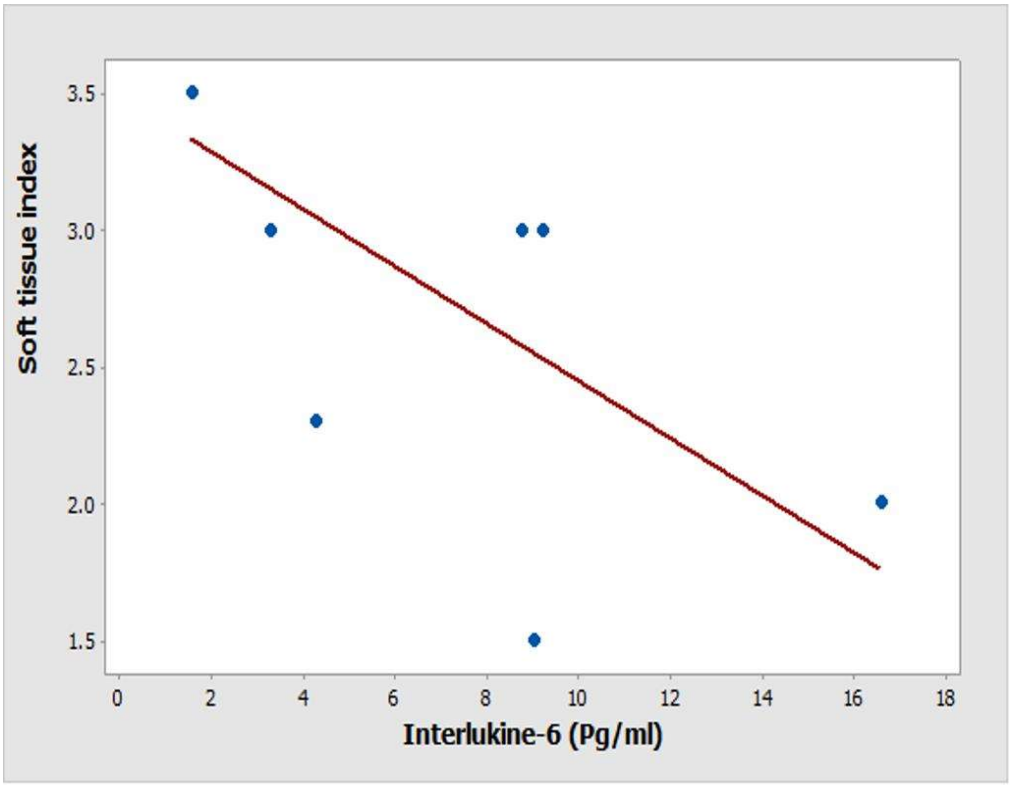


Figure (4.6):The correlation between salivary interlukine-6 and soft tissue index in group IV at the end of the study.

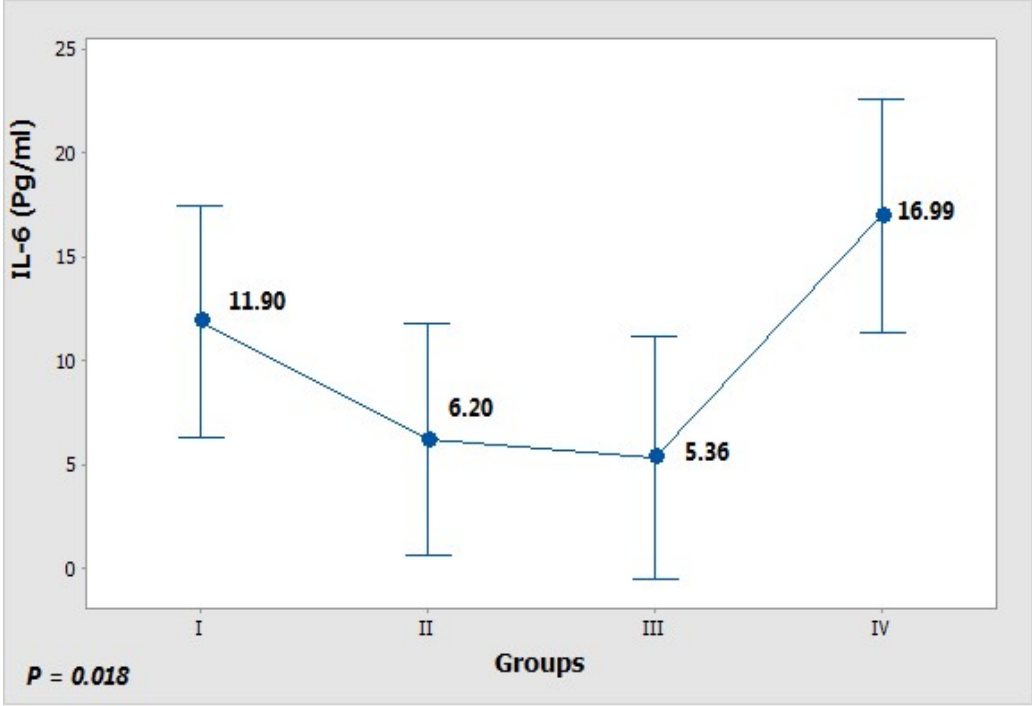


Figure (4.7): The difference in mean salivary levels of Interlukine-6 among the study sampled groups after one week.

The result show that there is significance decrease in mean of salivary level of IL-6 among the study sampled groups after one week.

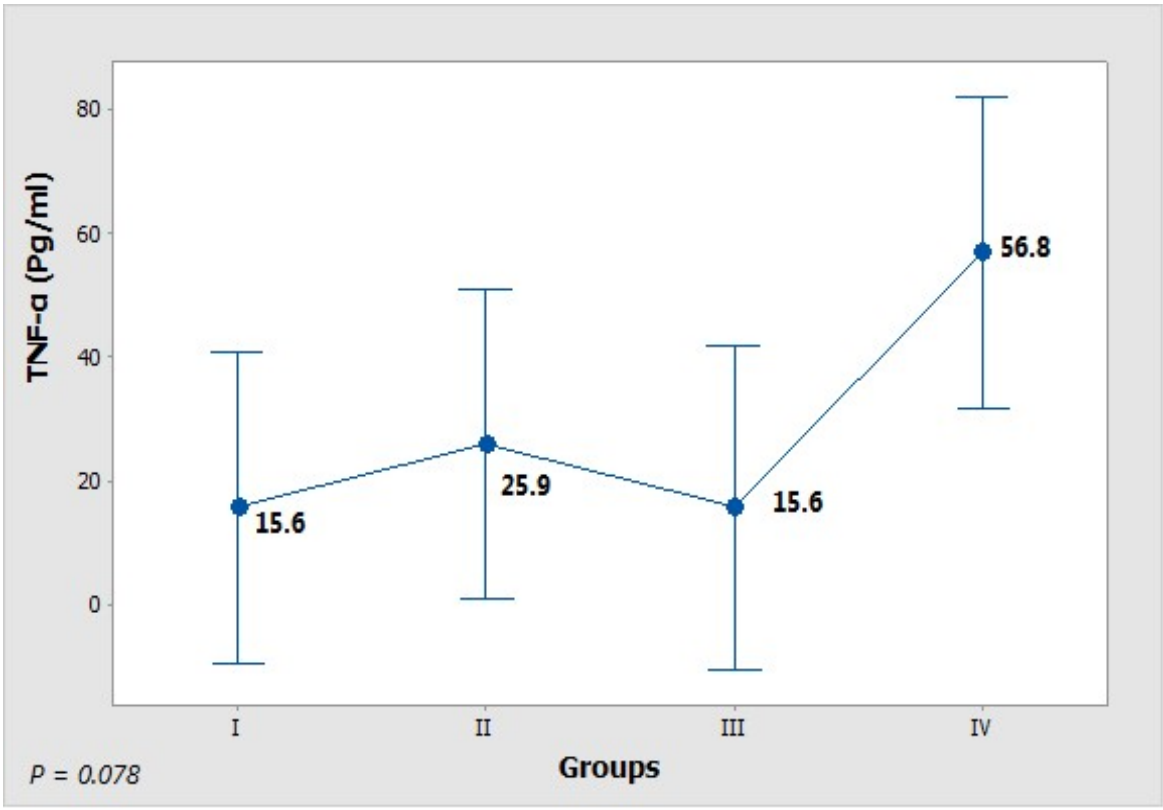


Figure (4.8): The difference in mean salivary levels of TNF-α among the study sampled groups after one week.

The result show that there is no significance difference in the level of TNF-α among the study sampled groups after one week.

Chapter Five

DISSCUTION

CHAPTER FIVE

DISSCUSSION

The consequence of extraction procedure have not always been accurately assessed ,whereas many mucosal and osseous complication show up after the extraction ;bone desorption with collapse of the alveolar process ,a gingival cleft or gingival recession in the area surrounding the extraction site (Matsuno *et al,*2002)

Dry socket is considered one of the most common problems after extraction especially in the third molar it is varied from 3% to35% (Nussair . et.al , 2007)

Smoker ,pregnant women ,women take contraceptives , patient with systemic disease were excluded from study , smoking has been the key factor in the reduction of phagocytosis and neutrophil chemotaxis (Majumadar *et al,* 2016) along with the disruption in immunoglobulin production (Gug et al 2010) also smoking significantly contribute in efficiently lowering the immediate post -extraction filling of socket with blood (Eshghpour *et al,* 2018)

Pregnancy comes with many systemic changes due to elevated levels of both progesterone and estrogen in the maternal blood circulation which can accordingly modify the immune system(Smith *et al,*2018)

Women on oral contraceptive have increase in certain hormones like estrogen , that has a significant role in increasing fibrinolytic system and it is proved to indirectly activate the fibrinolytic system and therefore increase lysis of blood clot (Sharma *et al,*2015)

Patient with any systemic disease being immune compromised will alter healing process (Gowda *et al,* 2013)

In the present study saliva was used as diagnostic fluid since it became popular for clinical researches in current years , it is non-invasive and easy assortment makes it perfect for diagnosis and monitoring of alot of disease (Lim *et al,* 2019)

Studies and publication concerning of dry socket ,incidence and reduction are numerous ,As in medicine when the etiology and pathogenesis of a disease entity are not clear out ,the theories of cause and treatment are many and varied .As alluded to earlier ,hundreds of papers have been published concerning AO ,and it is prevention or reduction.

Most of the studies showed that it was not possible to determine an ideal or consensual treatment protocol therefore it is necessary to follow preventive methods in the daily practice of teeth permanent extraction especially third molar .(Holla *et al,*2009)

Salivary biomarkers are potentially important for determining the presence ,risk, and progression of inflammatory reaction , Human saliva is an increasingly attractive medium for biomarker discovery due to it is amenability to noninvasive and repeated sampling , ease of collection and processing and suitability for single analytic or metabolic measurement (Jessica *et al,* 2015,Tothova *et al,* 2015) ,

4.1 Effect of gelfoam on Salivary Parameters.

Camil et al (2010) reported that microscopically Dry socket is characterized by presence of inflammatory cellular infiltrate including numerous phagocytes and giant cell in the remaining blood clot associated with the presence of bacteria and necrosis of the lamina dura .

Garica et al (2003) study agreement with Birn et al(1973) and agreement with our study reported that anti-inflammatory process can extend to the medullar space and sometimes to the periosteal resulting in connective

tissue inflammation of the contagious mucosa ,with microscopic features typical of osteomyelitis, and a degradation of blood clot in association with dissolution of erythrocytes and fibrinolysis ,deposition of hemosiderin and the absence of granulation

Cytokines are a complex regulators of inflammation and immunity where they regulator of inflammation and immunity system where they integrate function of several cell types in various body compartment into a coherent immune response (Gulati *et al,* 2016 , Berezniakova AL and Cheremisina etal ,2017) demonstrate changes in their level; especially interluekine like with alveolar osteitis ,gingivitis and other diseases indicate a decrease in body adaptive reserve and may effect the dynamic of the inflammatory process of any tissue healing in the body (Holla et al 2009)

Acorrding to the result of this study the level of TNF- α compared to the control group show no significant difference in the result after seventh day of study from the beginning of study

TNF-α is expressed on activated macrophages and lymphocytes as well as other cell types ,it is a potent pro-inflammatory cytokine which exert peliotropic effect on various cell types and play a critical role in the pathogenesis of many inflammatory disease such as Rheumatoid Arthritis (Auroch et al 2010),TNF-α is one of the cytokines released in various chronic inflammatory disease as periodentits ,gingivitis, alveolar osteites (Jacques-Oliver *et al,*2008).TNF- α blockadge could be beneficial in reducing inflammation and enhance healing process which may lead to prevent alveolar osteitis

Each individual has his own capacity to heal ,that is determined by his biotype and biological profile consisting of cytokine and inflammatory mediators (Claydon . et al 2001)

TNF is able to act independently or in conjugation with other factors it is exerted in two forms TNF- α and TNF-β both bind to the same receptor and have half life of 15-18 minute yet indicating metabolic and hemodynamic change , there is a presence of endogenous inhibitors (transmembrane soluble TNF receptors -stnfrs) which inhibit the potiential unregulated TNF activity .(AL Gurabi et al 2014)

TNF- α has a cytotoxic effect on endothelial cell through regulation of adhesive vascular permeability , both directly and indirectly through activation of neutrophils(Matsuno2002),it helps the release of prostaglandins PGE2 it activate Thrombocyte activating factor and the coagulation process ,TNF- α and IL-1 are the most important inducer of the acute phase response ,that is why it is high at the beginning of our study than the seventh day after extraction (Horiuchi . et al 2010)

IL-6 is a key regulator of the host response to microbial infection and major modulator of extracellular matrix catabolism and bone desorption, it is main feature include synergism with IL-1 and TNF for the purpose of co - stimulating immunological response and inducing production of acute phase protein .it has of a short life span of about 1 hour following the occurrence of trauma , it is value can be detected after 1 hour , the concentration peak is reached after 4-6 hours and it can be present for 10 day in circulation this cytokine is constantly detected in plasma which suggest it is constantly produced it is also created in phagocytes ,the vascular endothelial cell and the fibroblast ,IL-6 enable B-cell replication ,differentiation and immunoglobulin production ,it is also created in phycocytes ,the vascular endothelial cell and the fibroblast (Stevkovska *et al,*2018)

IL-6 has the role of acute phase reaction (CRP, haptoglobin, amyloid, antitrypsin and complement activation C and factor B) it possess immunomedulatory characteristics including initiating polymorphnuclear

leukocytes mediated hyper inflammatory and paradoxically differed immunosupression of the host. (Nibali *et al,* 2012)

IL-6 can also serve as anti-inflammatory mediator through sophisticated mechanism of realizing soluble TNF receptor the increase plasma concentration has been registered in acute phase such as surgical of TNF -α intervention, burns and bacterial infection

IL-6 is closely associated with the event occurring in the post-operative period (elective surgery) or following trauma with increase level of IL-6 forty eight hours post-operative complication (Stevkovska *et al,*2018)

5.1 Effect of gelfoam on the level of salivary parameter

In the present study IL-6 is the cytokine that the most constantly elevated or most easily detected which is in agreement with the study of Mtsuno et al (2002) who showed that TNF-α can increase the production of IL-6 while in contrast dose not increase the production of TNF-α and IL-6.

In this study the use of gelfoam showed that there is significant decrease in IL-6 after seventh day of extraction from the beginning of study and there is significant difference between gelfoam group and control group which lead to increase chance of healing and decrease infection. due action it is action by scaffold formation to enhance platelet aggregation. This is agreement with Hamid et al (2002) pointed out that Gelfoam application is recommended in surgical site especially in large bone cavity because of it is favorable tissue response in the ultimate healing process.

5.2 Effect of lincomycin gelfoam on Salivary Parameter

A Cochrane review, carried out by Lodi et al (2012) looked at studies surrounding the topic of the efficacy of antibiotics in reducing post extraction complication after extraction of mandibular third molar one of this antibiotic is lincomycin which is used in present study.

Lincomycin has primary effectiveness against gram positive pathogen and it is used in oral cavity (Dorota *et al,* 2010).

It is study is in agreement with the study of Tufano et al (1992), who showed that the lincosamide, clindamycin notably stimulated the release of TNF-α and IL-6, while lincomycin induced a notable increment of IL-4 from monocytes. is a very strong inducer of TNF-α, IL-1

Briala et al(2017) study ;which is in agreement with our present study observed that The anti-inflammatory effect of lincomycin is that ,it is reduces the production of neutrophil chemo -attractants such as peptide chemotactic factor and lipase also inhibit chemotactic activity of neutrophils by chelating intracellular calicum and thus prevent the assembly of microtubules , this action subsequently affect cell movment of leukocytes also inhibit matrix metalloprotien ,protein Kinase C (an enzyme related in signal transmision of inflammation)and granuloma formation

In our present study Lincomycin gelfoam group showed no significant difference on TNF-α at seventh day after treatment compare it with the beginning of study also there is no significant difference between the lincomycin group and control group

There is significant decrease in IL-6 after the seventh day after treatment compare it with the beginning of study and between this group and control group the result in agreement with Hirato *et al,* (2001) which reported that

lincomycin gelfoam has significant reduction in inflammatory mediator when compare it with tetrecycline hydrochloride gelfoam

Joshi *et al,* (2016) observed in his study the effect of lincomycin on reduction the form of pain which prevent the development of alveolar osteitis.

5.3 Effect of chlorhexidine gelfoam on Salivary Parameter

Yang et al. (2007) mentioned that Chlorhexidine is effective aganist both aerobic and an aerobic organism and yeast, rinsing with chlorhexidine is know to reduce oral microbe population and decrease the incidence of dry socket

It is use has been monitored and it has shown positive effect on reduction of dry socket after extraction of mandibular third molar either in solution form or gelfoam

ALmutairi, (2019) showed that in 30 second 0.12% chlorhexidine use there was 50% reduction in the development of dry socket along with this 0.2% chlorhexidine gelfoam also contributed to reduction 45.5% of (AO) development.

Among various antimicrobial chlorhexidine have been used by the most practioners due to It is anti-inflammatory effect, antiseptic effect, , low cost (Baber et al 2012)

Serra et al (2009) study is agreement with our present study when he used a syringe with a blunted needle to apply 2% of chlorhexidine three time a day within 10 minutes in the bottom of the pocket of single rooted teeth reported 99.9% reduction in colony forming unit and black pigmented bacteriod reduction compatible to the scaling and root planning

Baber et al (2019) in his study recommended that the use of chlorhexidine in antiseptic surgery to avoid inflammatory reaction. (Baber *et al,*2019)

In the present study there is significant decrease in the IL-6 after treatment and when compare the result with control group this an agreement with the study of(Houri-Haddad et al. 2008) observed that chlorhexidine gelfoam had a strong anti-inflammatory effect by reducing the basal concentration of leukocytes migration into the cell ,it is also reduced the concentration of pro-inflammatory cytokine and there is significance difference in TNF-α before and seventh day after treatment and between the chlorhexidine group and control group

Piano et al (2002) disagreed with this present study, he reported that chlorhexidine can delay the formation of granulation tissue in rats, Similarly, Bassetti and Kallenberger, (1980) pointed out that the use of high concentration of chlorhexidine post extraction delay wound healing in rats.

5.4 Correlation of inflammatory biomarker with soft tissue healing process

in each pathology healing remain the most clinical problem after any damage or disruption to the normal anatomical structure and function that range from simple to difficult (villa *et al,*2016)

Dogan et al (2017) recommended that Soft tissue healing is regulated by endogenous substance such as pro and anti-inflammatory factor such as, the resolution of inflammation appear important for the outcome of healing for example tissue destruction due to high level of pro-inflammatory cytokine such as TNF-α, IL-6, IL-1 (Dogan et al 2017)

in our present study we observed that there is increase of both cytokines (IL-6 and TNF-α) after to extraction

It is an agreement with Dogan et al (2017) which observed that concentration of IL-6 increase significantly as early as after one day after extraction the early peak of these pro-inflammatory cytokines related to the physiologic reaction to tissue injury the early inflammatory phase of wound healing.

Inflammatory cell play a key role in wound healing by cleaning bacteria and tissue debris from wound Leukocytes ,neutrophils ,macrophage , mast cell and Lymphocytes (Passos *et al,*2019)

Hoe et al. (2011) pointed out TNF-α is necessary for inducement of expression of adhesion molecule and chemokines, secretion of another inflammatory mediator

Eming *et al,* (2007) agreed with our present study when reported the incremental reduction of the level of TNF-α at seven day which correspond to the transition between phase of wound healing

In contrast the level of IL-6 is elevated over the entire observation period which agreement with Lin et al. (2003) which have negative relation with soft tissue healing process

The main advantages associated with the use of gelfoam/chlorhexidine gelfoam/lincomycin gelfoam were better epithilization of soft tissue, less pain, less swelling and trismus (Baron *et al,* 2013)

Three studies reported data about soft tissue healing, Anitue et al (1999) evaluated epithelization clinically and histologically, and connective tissue formation at the defect site.

Alissa et al (2010) used healing index described by Landdry and coworker (1988) which we depended on it in our study carried to evaluate the extend of soft tissue healing after tooth removal, to assess and grade the color of tissues, epithelialization of wound margins, presence of bleeding on palpation, granulation and suppuration.

In vitro and in vivo studies demonstrate the ability of therapy in stimulating human fibroblast, immune cells, and epithelial cell, along with superior angiogenesis, growth factor release and postoperative pain management to improve healing (Lingamaneni *et al,* 2018) with this present study.

Dutta, et al (2016) which in agreement with our study suggested that some medication such as gelfoam can be used to accelerate the healing of soft tissue are mainly involved in the migration of fibroblast, their proliferation, and collagen synthesis also found that there is benifical effect of use combination of antimicrobial agent with hemostatic agent success to decrease pain, prevent alveolar ostietis and improve healing process.

Duewelhenke et al (2007) investigated the effect of 20 types of antibiotics from different classes and antibacterial mechanism only lincomycin from them had no effect on cytotoxicity, proliferation, or the metabolic activity of primary human osteoblasts and it exhibited good activity against anaerobes.

Herman *et al,* (2000) which in an agreement with our study noted that CHX gelfoam significantly improves healing process ad showed to be valid support for reducing post-surgical bacterial load has been transformed into a reduction of inflammatory response.

In summary the use of chlorhexidine gelfoam / lincomycin gelfoam /gelfoam alone allowed us to obtain encouraging result in improve soft tissue healing process and decrease the incidence of dry socket which may be helpful for the dentist and the patients to use it or other types of gelfoam routinely after extraction of wisdom tooth.

Chapter Six

CONCLUSION AND RECOMMENDATION

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The following conclusion can be drowned from this study.

1. Gelfoam has a significant decrease IL-6 when used after extraction of lower third molar
2. Lincomycin gelfoam has a significant decrease of IL-6 when used after extraction of lower third molar
3. Chlorhexidine gelfoam has a significant decrease of both biomarkers IL-6 and TNF-alpha, decrease the incidence of dry socket, decrease pain and improve healing.
4. Level of saliva IL-6 and TNF-alpha appear to aid in the diagnosis of dry socket and the prediction of these treatment can reduce salivary IL-6 and TNF-alpha level, so it has a good anti-inflammatory effect.

6.2 Recommendation

1. Alveolar osteitis has been largely happened after extraction of lower third molar, hence it becomes important to use medication to decrease it.

2. long term trial and more types of gelfoam encouraged to be investigated.

3.Further studies of other cytokines level in whole saliva, GCF, and serum sample in dental disease is recomended .

4. Further study with patients have chronic disease to demonstrate the effect of types of gelfoam used on dry socket.

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Appendix

Appendix

(1)

Patient Sheet

After extraction of lower

third molar

Patient's name: -

Gender **Male**

Female

File number

Date

Age

Socket affected or not

Use of gelfoam

Use of gelfoam with chlohexidine

Use of gelfoam with lincomycin

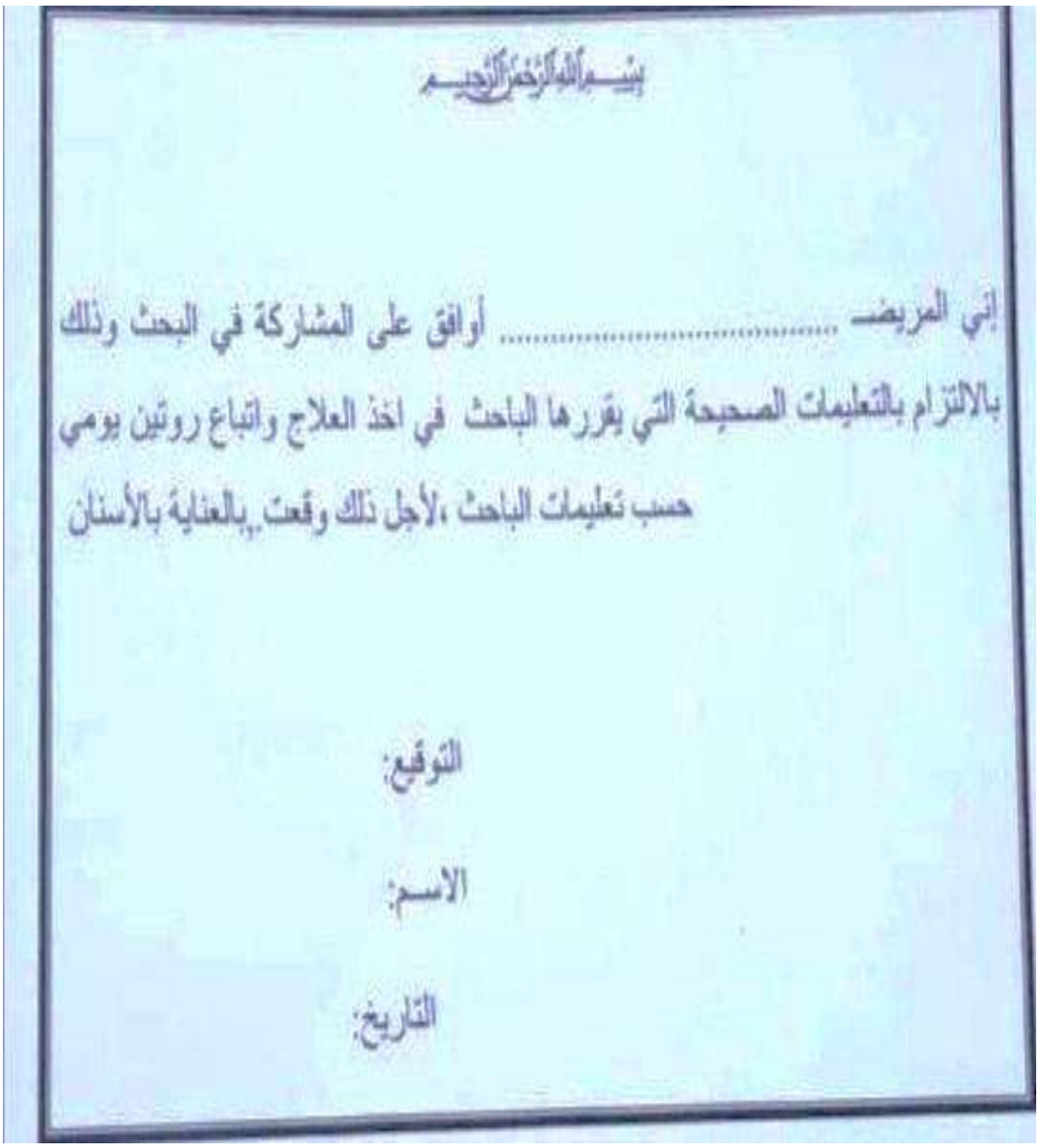
Sign and symptor: **Pain**

Emptysocket

Halitosio

Bare Bare

(2)



بسم الله الرحمن الرحيم

إني المريض ..... أوافق على المشاركة في البحث وذلك بالالتزام بالتعليمات الصحيحة التي يقررها الباحث في اخذ العلاج واتباع روتين يومي حسب تعليمات الباحث ،لأجل ذلك وقعت بالعناية بالأسنان

التوقيع:

الاسم:

التاريخ:

Appendix2

وزارة الصحة و البيئة
دائرة صحة نينوى
مركز التدريب و التنمية البشرية
العدد :
التاريخ : / /٢٠١٩

Ministry Of Health and Environment
Nineveh Health Directorate
Training Center & Human Development

إلى/ المجمع التخصصي لطب الاسنان / النور

م/ تسهيل مهمة

تحية طيبة ..

بالاشارة الى موافقة لجنة البحوث العلمية والأخلاقية بجلستها المرقمة (١٨٧) والمنعقدة في دائرتنا بتاريخ ٢٠١٩/٨/٧ على مشروع البحث المرقم (١٩/ ١٠٩) . حصلت الموافقة على إجراء البحث ضمن الخطة المقدمة لمشروع البحث المدرج تفاصيله فيما يأتي :

عنوان البحث :

Comparison between deferent type of Gel foam in prevention of dry socket

اسم الباحث: ظفر مقداد عبد الفتاح

مدة البحث : من ٢٠١٩/٨/٨ الى ٢٠٢٠/٨/٨

ترجى تزويده بالمعلومات والعينات المطلوبة من الإمكانيات المتاحة على أن لا تتحمل وزارة الصحة والمؤسسات التابعة لها أي تبعات مادية. وعلى الباحث تقديم نسخة من البحث بعد الانتهاء منه إلى لجنة البحوث.

نأمل التفضل بالاطلاع ... مع الاحترام

الدكتور
جاسم ابراهيم المعماري
المدير العام / وكالة
٢٠١٩/ /

نسخة منه الى :
- مكتب المدير العام / للعلم مع الاحترام
- جامعة الموصل / كلية طب الاسنان كتابكم ذي العدد ١٩٧٣ في ٢٠١٩/٧/٢٩ يرجى تبليغ الباحث والمشرف بتسليمنا نسخة من الأطروحة أو البحث بعد طبعها و اقرارها مع التقدير
- مركز التدريب والتنمية البشرية شعبة ادارة المعرفة ... مع الاولياء

@gmail.com

إقرار المشرف الرئيسي

"أقر أن إعداد الرسالة جرى تحت إشرافي في جامعة الموصل وهي جزء من متطلبات نيل درجة الماجستير في علم الأدوية / أدوية الفم والأسنان.

التوقيع

المشرف: أ.د. مها طلال الصفار

التاريخ:

إقرار المقوم اللغوي

اقر أن هذه الرسالة الموسومة "تقييم لبعض أنواع الرغوة الهلالية في الحد من حدوث النسخ الجاف" تمت مراجعتها من الناحية اللغوية، وتصحيح ما ورد فيها من أخطاء لغوية وتعبيرية، وبذلك أصبحت الرسالة مؤهلة للمناقشة بقدر تعلق الأمر بسلامة الأسلوب وصحة التعبير.

التوقيع:

الاسم:

التاريخ:

إقرار رئيس فرع علوم طب الأسنان الأساسية

بناءً على التوصيات المقدمة من قبل المشرف والمقوم اللغوي أرشح هذه الرسالة للمناقشة

التوقيع:

الاسم: أ. م. د. أحمد شهاب الطويل

التاريخ:

إقرار رئيس لجنة الدراسات العليا

بناءً على التوصيات المقدمة من قبل المشرف والمقوم اللغوي ورئيس فرع طب الأسنان الأساسية أرشح هذه الرسالة للمناقشة

التوقيع:

الاسم:

التاريخ:

الخلاصة

مقدمة :النسخ الجاف هو احد اكثر التعقيدات شيوعاً بعد قلع الأضراس الدائمية وخاصة الضرس الثامن وبسبب الالم الشديد الذي يسببه النسخ الجاف فان من الضروري ايجاد العلاج المناسب والسؤال المهم في علاج المرض ما هو الدواء الذي يمكن للشخص وضعه في حجر الضرس واي نوع من الضماد التي يمكن ان تستخدم المقلاع للحصول على اقصى واسرع مستوى في العلاج مع تقليل النزف وتقليل الالتهاب وتقليل الالم وبدون ان يتعارض مع خطوات الالتئام سلباً.

الهدف :

- تقييم تأثير الانواع المختلفة من الرغوات الهلامية)رغوة هلامية فقط/رغوة هلامية مع الكلورهكسين رغوة هلامية مع النكوماسين (في تقليل نسبة حدوث النسخ الجاف.
- تقييم تأثير مختلف انواع الرغوات الهلامية)رغوة هلامية فقط/رغوة هلامية مع الكلورهكسين رغوة هلامية مع اللنكومليسين (على مستوى وسائط الالتهاب TNF-α و IL-6في لعابهم.
- تقييم تأثير الانواع المختلفة من الرغوات الهلامية)رغوة هلامية فقط رغوة هلامية مع الكلورهكسين رغوة هلامية مع اللنكومايسين (على سرعة التئام النسيج.
- معرفة العلاقة بين نتائج المجاميع المستخدمة في البحث.

المواد وطرائق العمل:

المرضى البالغ عددهم ٦٤ مريض تم تقسيمهم الى اربع مجاميع /المجموعة الاولى (١٦) مريض الذين تم قلع الضرس السفلي الثامن وبدون اي علاج /المجموعة الثانية (١٦) مريض تم قلع الضرس السفلي الثامن مع استخدام الرغوة الهلامية / المجموعة الثالثة (١٦) مريض تم قلع الضرس السفلي الثامن مع استخدام رغوة هلامية مع الكلورهكسين /المجموعة الرابعة (١٦) مريض تم قلع الضرس الثامن.

مع استخدام الرغوة الهلامية مع اللنكومايسين ,تم إعطاء جميع المرضى (2)كاربول كحد اقصى للتخدير الموضعي واعطاءهم مسكن بسيط مثل البراسيتومل 500ملم ونصح المريض اذا ظهرت عليهم اعراض الاصابة بالنسخ الجاف كالالم الشديد او النزف او غيرها لمراجعة طبيب الاسنان/اللعاب يؤخذ من جميع المرضى قبل السن وبعد القلع بـ (7)ايام لقياس TNF-α و IL-6 في اللعاب بواسطة عدة التشخيص القياسية باستخدام جهاز إليزا.

النتائج:

هناك فرق معنوي واضح بين المجاميع الاربعة بعد اسبوع من العلاج في IL-6ولا يوجد فرق معنوي في TNF-αوكذلك في كل مجموعة يوجد فرق معنوي قبل وبعد العلاج ففي المجموعة الضابطة هناك فرق معنوي في IL-6ولا يوجد فرق معنوي في TNF-αوفي المجموعة التي تستخدم الرغوة الهلامية فقط هناك فرق معنوي في IL-6ولا يوجد فرق معنوي في ,TNF-αاما المجموعة التي تستخدم الرغوة الهلامية مع الكلورهكسدين هناك فرق معنوي في TNF-αو ,IL-6 والمجموعة الرابعة التي تستخدم الرغوة الهلامية مع اللنكومايسين هناك فرق معنوي في IL-6ولا يوجد فرق معنوي في TNF-α

الاستنتاج:

أدى استخدام الرغوة الهلامية مع الكلورهكسين/الرغوة الهلامية مع اللنكومايسين/الرغوة الهلامية لوحدها لها تأثير على وسائط الالتهاب وكذلك على تقليل نسبة حدوث النسخ الجاف وبالتالي سرعة التئام النسيج.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

(32)

سورة البقرة

الآية (32)

تقييم لبعض انواع الرغوة الهلامية في الحد من حدوث النسخ الجاف

رسالة تقدمت بها

ظفر مقداد عبدالفتاح الخشاب

إلى

مجلس كلية طب الاسنان /جامعة الموصل

كجزء من متطلبات نيل شهادة الماجستير في علوم ادوية الفم والاسنان

بإشراف الاستاذ المساعد الدكتور

مها طلال الصفار

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