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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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THE BIO-STIMULATORY EFFECT OF ADVANCE PLATELET RICH FIBRIN COMBINED WITH LASER ON DENTAL IMPLANT STABILITY: AN EXPERIMENTAL STUDY ON SHEEP

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Abstract.

Background: Implant stability is the major important requirement for the progress of a dental implant in the bone bed before loading the dental implant without clinical micro motion of the macula. Advance platelet rich fibrin (A-PRF) can be considered a "tissue engineering marvel" due to the typical properties of an osteo promoting matrix that improve the sustained release of growth factors that modulate and support osteoblast proliferation, migration, and adhesion, and at the same time regulates the production of collagen proteins. Low level laser therapy (LLLT) biostimulation increases blood circulation, promotes the revitalization process, reduces the risk of infection, improves metabolic activity, and accelerates the healing of damaged tissues.

Aim of the study: This study aimed to assess the effect of Advance platelet rich fibrin (A- prf) with low level laser therapy biostimulation (LLL Biostimulation) on implant stability.

Materials and Methods: Four healthy male sheep were randomly divided into 2 groups (two in each group).Group 1 (control), at of which ten implants were placed on one side of the tibia and ten dental implants on the other side of the tibia with no additions for a total of 10 implants and Group 2 (study) where ten implants were placed on one side and ten dental implants on the other side of the tibia augmented with Advanced Platelet Rich Fibrin Membrane and LLLT Bio stimulation. Primary and secondary dental implant stability were recorded by radiofrequency evaluation using Osstell device immediately after placement, four and eight weeks postoperatively.

Results: The results of the current study showed no significant difference between control and study group in implant stability at baseline (day of surgery) but after four and eight weeks there was a significant difference between the control group and the study group.

Conclusion: Advance platelet rich fibrin (A- prf) with low level laser therapy biostimulation (LLL Biostimulation) plays a role in new bone formation and enhance implant stability.

Key words. Advanced platelet rich fibrin, implant stability, laser biostimulation.

Introduction.

The major important requirement for the progress of a dental implant is to achieve and maintain maximum stability in the bone bed before loading the dental implant. Two kinds of dental implant stability can be observed and measured: primary stability and secondary stability. The primary stability of the dental implant results from the mechanical connection of the dental implant to the surrounding cortical bone while secondary stability can be organized at various time intervals after peri-implant bone remodeling [1]. Resonance frequency analysis (RFA) is the primary clinical quantitative method employed for non-invasively assessing dental implant stability at various time intervals. This technique was initially established by Meredith in 1996 through an animal study, The user's text is too short to be rewritten academically [2]. The RFA technique assesses the depth of anchorage of the implant in the bone, the height of the marginal bone and the stiffness of the bone implant fixation [3-5]. RFA measurements determined by Resonance Frequency, a graph of the amplitude and frequency of the activated Smart Pin. The Implant Stability Quotient (ISQ) is a numerical scale ranging from 1 to 100 that is used to assess the stability of dental implants. An increase in the ISQ grade is directly correlated with higher levels of implant stability, an ISQ grade of 55 or less is assumed here There is too much lateral movement of the and the implant construct needs to better connect to the implant to achieve secondary stability prior to loading [6]. and if the ISQ score is initially low and does not elevate over time, the implant is impractical and must be removed [7].

Platelet Rich Fibrin (PRF) is a second-generation platelet concentrate, a natural fibrin matrix design by Choukron et al. in 2001 for specific use in oral and maxillofacial surgery [8]. Choukron platelet-rich fibrin concentrate (PRF) is defined as an autologous biomaterial rich in platelets, leukocytes, and fibrin [8-12]. Physicians use (PRF) to produce a naturally occurring concentration of autologous growth factors used in numerous medical applications to aid in hard and soft tissue regeneration. Several protocols for preparation of PRF are available based on the centrifugation cycle and one of which is Advanced Platelet Rich Fibrin. In this protocol, blood samples are gathered. The samples were placed in 10 mL dry glass tubes or glass-coated plastic tubes without anticoagulant and afterwards subjected to gentle centrifugation at 1500 rpm for a duration of 14 minutes [13].

The word laser is short for "light amplification through stimulated emission of radiation" [14]. The laser apparatus produces energy in the form of a coherent beam of light that interacts with the specific tissue of interest, resulting in an optimal outcome. The light emitted by the resultant beam exhibits several distinctive characteristics that distinguish it from conventional flashlight illumination. Therefore, it possesses distinctive characteristics that are characterized by monochromaticity, coherence, and collimation [15,16]. The diode lasers most frequently employed in dental practice include gallium aluminum arsenide (GaAlAs) lasers operating at a wavelength of 810 nm, gallium arsenide (GaAs) lasers operating at a wavelength of 940 nm, and indium gallium arsenide (InGaAs) lasers operating at a wavelength of 980 nm. These lasers are regularly utilized for various dental procedures [17]. The diode laser has the potential to be employed in surgical procedures, wherein it is utilized to maintain direct contact

between the optical fiber and the tissue [18]. Apart from surgical operations, the diode laser in dentistry can be employed for the purpose of analyzing and quantifying the extent of caries [19]. The current study aimed to evaluate the impact of the use of advanced –platelet rich fibrin and LLLT on bone healing around dental implants in a sheep animal model.

Materials and Methods.

Study design and sample size: The study received funding from the Research Committee within the Department of Oral and Maxillofacial Surgery at the Faculty of Dentistry, University of Mosul. The study was assigned the reference number UoM.Dent/A.70/22. The research comprised a cohort of four male landrace sheep, aged between 1.5 and 2.5 years, with weights ranging from 35 to 45 kg (mean = 40 kg). All sheep were sourced from a single farm. The health and diet of the individual in question were consistently monitored by a veterinary professional. The animals underwent a two-week acclimatization period preceding each surgical procedure, during which their overall health was assessed to confirm the absence of any systemic or communicable diseases. In order to mitigate the potential for operator mistake, all procedures conducted during the trial were carried out by a single surgeon.

Experimental design: The sheep were divided into two groups, with each sheep model serving as two observation subgroups. The tibia of both sides of each sheep will undergo random surgical procedures at one-month and two-month intervals between each operation. A total of 40 dental implants were implanted, with each sheep receiving ten implants (five implants in each tibia). The groups were divided as follows: Group 1 (Control) in which ten implants were placed in each sheep (five dental implant in each tibia) and Group 2 (Study group in which ten implants were placed in each sheep (five dental implant in each tibia) with Advanced Platelet Rich Fibrin Membrane and LLLT Biostimulation.

Preparation of A-PRF: The jugular vein is the preferred site for blood collection in sheep. At first, the sheep is restrained at the head and nearest body part and held upright prior to blood collection. The removal of wool in the vicinity of the blood collection site is undertaken to enable enough visual and mechanical access, as well as to prevent any potential contamination of the area. The process of cleansing exposed skin involves the application of a solution containing 10% povidone iodine. By extending the neck and rotating the head to one side, a hypothetical vertical line is delineated from the center of the pupil of the sheep's eye using a ruler. This line serves as an approximate guide for locating the path of the jugular vein. Upon palpation, a 21 G needle is gradually pushed into the jugular vein. Two blood samples, each measuring 10 ml, are obtained from the sheep and promptly subjected to centrifugation. Based on the established preparation protocol, the centrifugation cycle for the preparation of A-PRF is 1500 rpm for 14 minutes in a Hettich model PC-02 centrifuge (Nice/ France) and at the end of the centrifugation cycle for the two protocols, half the membrane (platelet-rich side, i.e. Proximal to the red end) are processed, minced, and placed in the osteotomy bed prior to implant placement.

Surgical procedure: Prior to the implementation of the method, every animal is allowed unrestricted grazing and provided with unrestricted access to drinking water. The removal of coarse fibers inside the designated operational area is accomplished by the use of scissors and electric clippers. The surgical procedures were performed with general anesthesia and inside a sterile environment. In order to achieve general anesthesia for surgical procedures, an intravenous administration of a combination of ketamine-hydrochloride, a general anesthetic with a concentration of 10 mg/ml/kg, and Xylazine, a sedative-analgesic solution with a concentration of 2 mg/ml/kg, is utilized. This administration results in the animal being anesthetized for approximately one hour, which is sufficient to cover the duration of the surgery. The veterinarian diligently checked the vital signs of the sheep for the entirety of the process. Any residual fragile mats present at the treatment site are carefully removed with a scalpel blade labeled as #1. Subsequently, the treatment area is cleansed by wiping it with a solution containing 10% povidone iodine. In order to achieve hemostasis, the surgical site is infiltrated with local anesthetic containing epinephrine at a concentration of 1:80,000 prior to making the incision. A 15 cm skin incision is made to expose the margins of the tibia, with careful attention given to exposing the bone. Using a generous amount of cooled 0.9% saline for irrigation, a total of five conventional osteotomy sites were created, ensuring a minimum distance of 0.5 cm between each site. These sites were specifically prepared to accommodate the implantation of five dental implants, each with a diameter of 3 and a length of 8. The B&B Slim Line System, manufactured in Italy, features a surface that has been etched with acid, as per the guidelines provided by the manufacturer. In the first group, twenty implant beds served as controls in which they were embedded without additives, in the second group twenty osteotomy beds served as study groups , in which crushed A-PRF pieces were placed before implant installation and the area was exposed to low-power laser using diode laser with a wavelength d-wave of 940 nm, an output power of 0.5 watts and a time of 10 seconds for an area of 1 cm^2, a distance of 1 cm from the object, continuous operation with a total dose of 5 joules/cm^2 under laser protection protocol (wear glasses). Healing screws were then placed and at completion of surgery, the soft tissue was closed in layers (for fascia absorbable suture was used and for skin non-absorbable 3-0 black silk suture was used) the wound was treated with an antibiotic aerosol spray before being carefully bandaged. The post-operative treatment of the animal involved administering a drug in the form of an intramuscular injection of the antibiotic Oxytetracycline at a concentration of 20 mg/ml per 10 kg of body weight. During the initial week, the animals were confined within the animal housing facility and provided with unrestricted access to a standardized diet and water. Additionally, regular inspections were conducted by a veterinarian to ensure their well-being. The dressing applied to the incision was replaced at three-day intervals, and the wound was regularly examined for any indications of infection until the sutures were removed on the tenth day following the operation.

Primary and Secondary Dental Implant Stability Measurements: The primary and secondary stability of dental

implants was measured using Osstell device immediately after placement, four and eight weeks postoperatively. The same protocol was adopted for ISQ score measurements and as follows:

A - Baseline (at the time of surgery): Before placement of healing screw and after adequate isolation and dryness, a smartpeg was screwed in using an adapter to measure primary dental implant stability with the Osstell device in which two directional readings of ISQ values were recorded: buccolingual and mesiodistal. The mean of the two ISQ measurements was used for statistics.

B - After 4 weeks: A sedating analgesic solution of Xylazine (2 mg/ml/kg) was administered to the sheep with a small amount of local anesthetic infiltrated into the periphery over the healing site of the dental implant. The soft tissue covering the healing screw of dental implant was gently removed using scalpel blade no.15. The healing screw was removed with a screwdriver from the B&B kit, and the Smart Peg was hand-tightened with an adapter in the holder to measure secondary stability. After proper site isolation and drying, two directional readings of ISQ values were recorded with the Osstell device: buccal-lingual and mesio-distal. A strict measurement protocol was followed, positioning the tip of the device 2mm from the Smart Peg.

C- After 8 weeks: The same protocol as week 4 was followed.

Statistical analysis: The statistical analysis was performed using Statistical Package Social Statistic (SPSS) Version 21 for windows software. One way ANOVA was used to compare implant stability difference between the control and study group. A p- value of p < o.o5 was considered statistically significant.

Results.

In the current study, there was no significant difference between control and study group in implant stability at baseline (day of surgery) (Table 1). After four weeks there was a significant difference between the control group and the study group with a mean value of 68.40 and 73.60, respectively (Table 1), while the mean value of the test group at eight weeks was higher than that of the control group as shown in (Table 1), showing a significant difference. In four and eight weeks it was observed there was significant difference of ISQ from baseline (day of surgery) in control while there was no significant difference between four and eight weeks although there was a difference in the mean value (Table 2). In the study group, there was no significant difference in ISQ between four and eight weeks but showed a significant difference on day of surgery (Table 3).

Discussion.

Platelet rich fibrin (PRF) possesses characteristics that make it a remarkable advancement in tissue engineering. It exhibits an osteopromoting matrix with optimal properties, facilitating the continuous release of growth factors that regulate and facilitate the proliferation, migration, and adhesion of osteoblasts. Additionally, PRF effectively modulates the production of collagen proteins [20]. The Platelet-Rich Fibrin (PRF) is widely acknowledged as a highly effective promoter of bone formation and regeneration. It achieves this by stimulating the proliferation of osteogenic cells, hence facilitating the reduction of bleeding, and expediting the healing process of both hard and soft tissues.

Table 1. *Comparison of changes in means of ISQ between control and study group protocols throughout the three scheduled intervals.*

Interval	Protocol	Number	Mean±SD.	p value
Baseline (day of surgery)	Control group	10	63.60 ±3.43	0.63
	Study group	10	64.40±2.19	
Four weeks	Control group	10	68.40±3.78	0.02
	Study group	10	73.60±2.40	
Eight weeks	Control group	10	70.80±3.11	0.01
	Study group	10	76.00±2.12	
SD.: Standard Deviation / Sig.: Significance at $p \leq 0.05$.				

Table 2. *Mean rank difference of ISQ in control group throughout the three scheduled intervals.*

Interval	Number	Mean ± SD.
Baseline(day of surgery	10	a 63.60±3.43
Four weeks	10	b 68.40±3.78
Eight weeks	10	b 70.80±3.11
*The difference letters means significant difference by Duncan at $p \leq 0.05$		

Table 3. *Mean rank difference of ISQ in study group throughout the three scheduled intervals.*

Interval	Number	Mean ± SD.
Baseline(day of surgery)	10	a 64.40±2.19
Four weeks	10	b 73.60±2.40
Eight weeks	10	b 76.00±2.12
*The difference letters means significant difference by Duncan at $p \leq 0.05$		

Furthermore, it should be noted that PRF has the capacity to mitigate inflammation, impede the process of osteoclastogenesis, and promote the process of osteoclastogenesis. The present study investigates the expression patterns of various growth factors in mesenchymal cells [21]. Platelet-rich fibrin (PRF) offers numerous benefits in various clinical applications. One notable advantage is its ability to expedite the process of vascularization through the release of growth factors. Additionally, PRF derived from autologous sources eliminates the risk of allergic reactions. Another advantage is the ease and efficiency of preparing PRF within a short timeframe. Furthermore, PRF poses no risk of disease transmission, making it a safe option for medical procedures. Moreover, PRF aids in the regulation of inflammation through the action of leukocytes and their associated cytokines. These advantages, among others, contribute to the growing popularity and utilization of PRF in medical and dental fields. The act of inhibiting or controlling the spread and growth of infectious agents inside a biological system [22,23] and fibrin-rich blood clots can accelerate bone regeneration [24-26]. Cell proliferation is one of the processes that are encouraged by low-level laser therapy (LLLT) 27, protein and collagen synthesis [27], wound healing [28], and differentiation of osteoblasts and chondrocytes [29],

cell regeneration [30], bone remodelling and healing capacity, restoration of nerve function following damage, maintenance of hormonal equilibrium, management of the immunological and lymphatic systems, mitigation of inflammation and edema, and provision of pain relief [31]. In addition, Low-level laser therapy (LLLT) has been shown to enhance blood circulation, facilitate the rejuvenation process, mitigate the likelihood of infection, enhance metabolic activity, and expedite the healing of compromised tissues [32]. The utilization of low-level laser therapy (LLLT) at optimal dosages has been observed to have a therapeutic impact on the biostimulation of bone tissue and the facilitation of bone healing [33]. Low-level laser therapy (LLLT) has been widely acknowledged as a viable treatment option for pain management, inflammatory control, promotion of new tissue generation, and facilitation of wound healing. The tissue undergoes absorption of the laser beam, which then triggers metabolic pathways. This process results in the activation of the mitochondrial respiratory chain and ultimately leads to an augmentation in the production of ATP (adenosine triphosphate), NO (nitric oxide), and a minimal quantity of ROS (reactive oxygen species). Consequently, low-level laser therapy (LLLT) expedites cellular processes and exerts an impact on the tissue-level healing mechanism [34].

Conclusion.

Based on the findings of the study, it can be inferred that the utilization of Advanced Platelet Rich Fibrin (APRF) in conjunction with low level laser therapy (LLLT) bio stimulation exhibits the potential to enhance the stability of dental implants subsequent to implant surgery. This suggests that APRF and LLLT may play a significant role in expediting the process of bone healing and facilitating the production of new bone at the site of implantation.

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