

World Journal of *Clinical Cases*

World J Clin Cases 2020 December 26; 8(24): 6213-6545



MINIREVIEWS

- 6213 Role of gut microbiome in regulating the effectiveness of metformin in reducing colorectal cancer in type 2 diabetes

Huang QY, Yao F, Zhou CR, Huang XY, Wang Q, Long H, Wu QM

ORIGINAL ARTICLE

Retrospective Cohort Study

- 6229 Impact factors of lymph node retrieval on survival in locally advanced rectal cancer with neoadjuvant therapy

Mei SW, Liu Z, Wang Z, Pei W, Wei FZ, Chen JN, Wang ZJ, Shen HY, Li J, Zhao FQ, Wang XS, Liu Q

Retrospective Study

- 6243 Three-year follow-up of Coats disease treated with conbercept and 532-nm laser photocoagulation

Jiang L, Qin B, Luo XL, Cao H, Deng TM, Yang MM, Meng T, Yang HQ

- 6252 Virus load and virus shedding of SARS-CoV-2 and their impact on patient outcomes

Chen PF, Yu XX, Liu YP, Ren D, Shen M, Huang BS, Gao JL, Huang ZY, Wu M, Wang WY, Chen L, Shi X, Wang ZQ, Liu YX, Liu L, Liu Y

- 6264 Risk factors for *de novo* hepatitis B during solid cancer treatment

Sugimoto R, Furukawa M, Senju T, Aratake Y, Shimokawa M, Tanaka Y, Inada H, Noguchi T, Lee L, Miki M, Maruyama Y, Hashimoto R, Hisano T

- 6274 Cause analysis and reoperation effect of failure and recurrence after epiblepharon correction in children

Wang Y, Zhang Y, Tian N

Clinical Trials Study

- 6282 Effects of different acupuncture methods combined with routine rehabilitation on gait of stroke patients

Lou YT, Yang JJ, Ma YF, Zhen XC

Observational Study

- 6296 Application of endoscopic submucosal dissection in duodenal space-occupying lesions

Li XY, Ji KY, Qu YH, Zheng JJ, Guo YJ, Zhang CP, Zhang KP

- 6306 Early renal injury indicators can help evaluate renal injury in patients with chronic hepatitis B with long-term nucleos(t)ide therapy

Ji TT, Tan N, Lu HY, Xu XY, Yu YY

Prospective Study

- 6315** Neoadjuvant chemoradiotherapy plus surgery in the treatment of potentially resectable thoracic esophageal squamous cell carcinoma
Yan MH, Hou XB, Cai BN, Qu BL, Dai XK, Liu F

CASE REPORT

- 6322** Uterine rupture in patients with a history of multiple curettages: Two case reports
Deng MF, Zhang XD, Zhang QF, Liu J
- 6330** Pleural effusion and ascites in extrarenal lymphangiectasia caused by post-biopsy hematoma: A case report
Lin QZ, Wang HE, Wei D, Bao YF, Li H, Wang T
- 6337** Eighty-year-old man with rare chronic neutrophilic leukemia caused by CSF3R T618I mutation: A case report and review of literature
Li YP, Chen N, Ye XM, Xia YS
- 6346** Sigmoid colon duplication with ectopic immature renal tissue in an adult: A case report
Namgung H
- 6353** Paraplegia from spinal intramedullary tuberculosis: A case report
Qu LM, Wu D, Guo L, Yu JL
- 6358** Confocal laser endomicroscopy distinguishing benign and malignant gallbladder polyps during choledochoscopic gallbladder-preserving polypectomy: A case report
Tang BF, Dang T, Wang QH, Chang ZH, Han WJ
- 6364** Sclerosing stromal tumor of the ovary with masculinization, Meig's syndrome and CA125 elevation in an adolescent girl: A case report
Chen Q, Chen YH, Tang HY, Shen YM, Tan X
- 6373** Primary pulmonary malignant melanoma diagnosed with percutaneous biopsy tissue: A case report
Xi JM, Wen H, Yan XB, Huang J
- 6380** SRY-negative 45,X/46,XY adult male with complete masculinization and infertility: A case report and review of literature
Wu YH, Sun KN, Bao H, Chen YJ
- 6389** Refractory case of ulcerative colitis with idiopathic thrombocytopenic purpura successfully treated by Janus kinase inhibitor tofacitinib: A case report
Komeda Y, Sakurai T, Sakai K, Morita Y, Hashimoto A, Nagai T, Hagiwara S, Matsumura I, Nishio K, Kudo M
- 6396** Immunotherapies application in active stage of systemic lupus erythematosus in pregnancy: A case report and review of literature
Xiong ZH, Cao XS, Guan HL, Zheng HL

- 6408** Minimally invasive maxillary sinus augmentation with simultaneous implantation on an elderly patient: A case report
Yang S, Yu W, Zhang J, Zhou Z, Meng F, Wang J, Shi R, Zhou YM, Zhao J
- 6418** Congenital nephrogenic diabetes insipidus due to the mutation in *AVPR2* (c.541C>T) in a neonate: A case report
Lin FT, Li J, Xu BL, Yang XX, Wang F
- 6425** Primary gastric melanoma in a young woman: A case report
Long GJ, Ou WT, Lin L, Zhou CJ
- 6432** Extreme venous letting and cupping resulting in life-threatening anemia and acute myocardial infarction: A case report
Jang AY, Suh SY
- 6437** Novel conservative treatment for peritoneal dialysis-related hydrothorax: Two case reports
Dai BB, Lin BD, Yang LY, Wan JX, Pan YB
- 6444** Clinical characteristics of pulmonary cryptococcosis coexisting with lung adenocarcinoma: Three case reports
Zheng GX, Tang HJ, Huang ZP, Pan HL, Wei HY, Bai J
- 6450** Fracture of the scapular neck combined with rotator cuff tear: A case report
Chen L, Liu CL, Wu P
- 6456** Synchronous colonic mucosa-associated lymphoid tissue lymphoma found after surgery for adenocarcinoma: A case report and review of literature
Li JJ, Chen BC, Dong J, Chen Y, Chen YW
- 6465** Novel mutation in the *ASXL3* gene in a Chinese boy with microcephaly and speech impairment: A case report
Li JR, Huang Z, Lu Y, Ji QY, Jiang MY, Yang F
- 6473** Recurrent thrombosis in the lower extremities after thrombectomy in a patient with polycythemia vera: A case report
Jiang BP, Cheng GB, Hu Q, Wu JW, Li XY, Liao S, Wu SY, Lu W
- 6480** Status epilepticus as an initial manifestation of hepatic encephalopathy: A case report
Cui B, Wei L, Sun LY, Qu W, Zeng ZG, Liu Y, Zhu ZJ
- 6487** Delayed diagnosis of prosopagnosia following a hemorrhagic stroke in an elderly man: A case report
Yuan Y, Huang F, Gao ZH, Cai WC, Xiao JX, Yang YE, Zhu PL
- 6499** Oral myiasis after cerebral infarction in an elderly male patient from southern China: A case report
Zhang TZ, Jiang Y, Luo XT, Ling R, Wang JW
- 6504** Rare case of drain-site hernia after laparoscopic surgery and a novel strategy of prevention: A case report
Gao X, Chen Q, Wang C, Yu YY, Yang L, Zhou ZG

- 6511** Extracorporeal shock wave therapy treatment of painful hematoma in the calf: A case report
Jung JW, Kim HS, Yang JH, Lee KH, Park SB
- 6517** Takotsubo cardiomyopathy associated with bronchoscopic operation: A case report
Wu BF, Shi JR, Zheng LR
- 6524** Idiopathic adulthood ductopenia with elevated transaminase only: A case report
Zhang XC, Wang D, Li X, Hu YL, Wang C
- 6529** Successful endovascular treatment with long-term antibiotic therapy for infectious pseudoaneurysm due to *Klebsiella pneumoniae*: A case report
Wang TH, Zhao JC, Huang B, Wang JR, Yuan D
- 6537** Primary duodenal tuberculosis misdiagnosed as tumor by imaging examination: A case report
Zhang Y, Shi XJ, Zhang XC, Zhao XJ, Li JX, Wang LH, Xie CE, Liu YY, Wang YL

ABOUT COVER

Peer-Reviewer of *World Journal of Clinical Cases*, Dr. Adonis Protopapas is a gastroenterology Resident at the first Propaedeutic Department of Internal Medicine of the Aristotle University of Thessaloniki (Greece), located at the A.H.E.P.A Hospital. He earned his Bachelor's degree in 2015 from the Democritus University of Thrace, followed by three Master's of Science degrees, with specializations in clinic pharmacology, medical research methodology, and healthcare management. His research interests are mainly focused on the area of hepatology, although he also participates in various projects related to endoscopy and inflammatory bowel disease. He is particularly fascinated by research on cirrhosis and its complications. (L-Editor: Filipodia)

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The *WJCC* is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, PubMed, and PubMed Central. The 2020 Edition of Journal Citation Reports® cites the 2019 impact factor (IF) for *WJCC* as 1.013; IF without journal self cites: 0.991; Ranking: 120 among 165 journals in medicine, general and internal; and Quartile category: Q3.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Ji-Hong Liu; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lai Wang.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Semimonthly

EDITORS-IN-CHIEF

Dennis A Bloomfield, Sandro Vento, Bao-gan Peng

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

December 26, 2020

COPYRIGHT

© 2020 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

Minimally invasive maxillary sinus augmentation with simultaneous implantation on an elderly patient: A case report

Shi-Hui Yang, Wan-Qi Yu, Jing-Jie Zhang, Zhe Zhou, Fan-Rong Meng, Jun-Yan Wang, Rui-Ning Shi, Yan-Min Zhou, Jing-Hui Zhao

ORCID number: Shi-Hui Yang 0000-0002-2946-9123; Wan-Qi Yu 0000-0002-7223-5103; Jing-Jie Zhang 0000-0002-0381-4080; Zhe Zhou 0000-0001-8567-3893; Fan-Rong Meng 0000-0001-8363-5578; Jun-Yan Wang 0000-0003-4664-8497; Rui-Ning Shi 0000-0003-4842-2969; Yan-Min Zhou 0000-0002-4173-6765; Jing-Hui Zhao 0000-0003-0770-7060.

Author contributions: Zhao JH and Yang SH contributed to study conception and design, reviewed the article, and contributed to manuscript writing and drafting; Zhou YM, Yu WQ and Zhang JJ reviewed the literature and contributed to manuscript drafting; Zhou Z and Meng FR analyzed and interpreted the imaging findings; Shi RN and Wang JY were responsible for revision of the manuscript for important intellectual content; all authors issued final approval of the version to be submitted.

Supported by the Jilin Province Science and Technology Development Plan Project, No. 20180101123JC; 13th Five-Year Science and Technology Project of Jilin Provincial Education Department, No. JJKH20190096KJ; Jilin Province Health and Health Technology Innovation Project, No. 2018J072; Project of Jilin Provincial

Shi-Hui Yang, Wan-Qi Yu, Jing-Jie Zhang, Zhe Zhou, Jun-Yan Wang, Rui-Ning Shi, Yan-Min Zhou, Jing-Hui Zhao, Department of Dental Implantology, School and Hospital of Stomatology, Jilin University, Changchun 130021, Jilin Province, China

Fan-Rong Meng, Department of Stomatology, Aviation General Hospital, Beijing 100000, China

Corresponding author: Jing-Hui Zhao, PhD, Professor, Department of Dental Implantology, School and Hospital of Stomatology, Jilin University, No. 1500 Qinghua Road, Changchun 130021, Jilin Province, China. zhaojh_1986@126.com

Abstract

BACKGROUND

In this case study, a minimally invasive transalveolar approach using platelet-rich fibrin and bone substitute with simultaneous implantation was carried out in an elderly patient. We analyzed the cone-beam computed tomography (CBCT) findings to evaluate bone regeneration.

CASE SUMMARY

A 65-year-old female with no contraindications for dental implants and loss of maxillary bilateral molars is described. Examination by CBCT showed the available vertical bone height in the bilateral posterior maxilla was 0.5-6.8 mm in the left and 2.8-6.5 mm in the right. The patient underwent a transalveolar approach using platelet-rich fibrin and bone substitute with simultaneous placement of an implant 10 mm in length. Six months post-surgery, the implant showed excellent osseointegration with the bone graft. Thereafter, full-ceramic crowns were fitted. Follow-up at 2 years demonstrated satisfactory prognosis.

CONCLUSION

Platelet-rich fibrin and bone substitute can be used to augment the maxillary sinus with a vertical bone height less than 4 mm.

Key Words: Maxillary sinus augmentation; Bone substitute; Bone regeneration; Platelet-rich fibrin; Internal sinus floor elevation; Case report

©The Author(s) 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

Development and Reform Commission, No. 2019C051-2; and Jilin Province TCM Science and Technology Project, No. 2019036.

Informed consent statement:

Informed written consent was obtained from the patient for publication of this report and any accompanying images.

Conflict-of-interest statement: The authors declare that they have no conflict of interest.

CARE Checklist (2016) statement:

The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Unsolicited manuscript

Specialty type: Medicine, research and experimental

Country/Territory of origin: China

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): B
Grade C (Good): 0
Grade D (Fair): 0
Grade E (Poor): 0

Received: July 24, 2020

Peer-review started: July 24, 2020

First decision: September 24, 2020

Revised: October 4, 2020

Accepted: October 13, 2020

Article in press: October 13, 2020

Core Tip: Insufficient height of residual bone in the posterior maxilla is commonly encountered after tooth loss in elderly people. When the vertical bone height is less than 5 mm, the lateral antrostomy approach is recommended. In this case, cone-beam computed tomography examination showed that the available vertical bone height in the bilateral posterior maxilla was 0.5-6.8 mm in the left and 2.8-6.5 mm in the right. We chose the crest approach with platelet-rich fibrin and bovine bone graft material and obtained a good outcome. This case demonstrates that minimally invasive implantation and repair in elderly patients can be achieved, with reduced surgical trauma, postoperative pain, swelling, surgical costs and significantly shortened the course of implantation and repair. Therefore, in elderly patients, based on the premise of strict mastery of surgical indications and operating skills, this minimally invasive method with simultaneous implantation in the maxillary sinus can be considered.

Citation: Yang S, Yu W, Zhang J, Zhou Z, Meng F, Wang J, Shi R, Zhou YM, Zhao J. Minimally invasive maxillary sinus augmentation with simultaneous implantation on an elderly patient: A case report. *World J Clin Cases* 2020; 8(24): 6408-6417

URL: <https://www.wjgnet.com/2307-8960/full/v8/i24/6408.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v8.i24.6408>

INTRODUCTION

Insufficient height of the residual bone in the posterior maxilla is commonly encountered after tooth loss in elderly people. Alveolar bone resorption and increased pneumatization of the maxillary sinus results in a decrease in vertical bone height (VBH) of the posterior alveolus in the edentulous areas. Maxillary sinus augmentation is an effective way of resolving inadequate bone height in the posterior region of the maxilla. There are two main approaches to sinus augmentation in preparation for implant placement: Transalveolar and lateral antrostomy^[1]. Rosen and colleagues^[2] found that the implant survival rate was 85.7% when the VBH was 4 mm or less in the posterior region of the maxilla, which improved to 96% in locations with more than 4 mm of initial bone height. When the residual bone height is less than 5 mm, the lateral antrostomy approach is recommended^[3]. However, with continuous developments in implant technology, the indications for the transalveolar approach are expanding, and it is increasingly favored by oral surgeons and patients due to its advantages of simple operation, less trauma, mild postoperative response, and low cost.

CASE PRESENTATION

Chief complaints

A 65-year-old female complained about the loss of maxillary bilateral molars which were extracted 6 mo previously.

History of present illness

Maxillary bilateral molars were extracted 6 mo previously.

History of past illness

The patient had good general health with a history of bruxism.

Physical examination

Oral examination shows that the attached gingiva was normal and the alveolar crest was less plump. There was no obvious elongation of the jaw teeth and prosthesis. #25 used to be an abutment tooth with vital pulp, which was ready for restoration. The rest of her teeth were heavily worn and she had a tight bite. Sufficient space was available for crown implants with an anatomical design (Figure 1B).

Laboratory examinations

No abnormalities were observed following laboratory examinations.

Published online: December 26, 2020

P-Reviewer: Chhabra N

S-Editor: Zhang H

L-Editor: Webster JR

P-Editor: Liu JH



Imaging examinations

Examination by cone-beam computed tomography (CBCT, [Figure 1A](#)) showed that the available VBH was 0.5-6.8 mm in the left and 2.8-6.5 mm in the right.

FINAL DIAGNOSIS

The final diagnosis was Kennedy II dentition defect with a VBH less than 4 mm.

TREATMENT

According to the patient's condition, the treatment plan was performed using the transalveolar approach to the bilateral maxillary posterior area with four Nobel Active implants. The second stage surgery and crown repair were performed 6 mo later. Before surgery, two blood samples were centrifuged at 3000 rpm for 10 min without any anticoagulant to establish platelet-rich fibrin (PRF, [Figure 2E](#)). After coagulation, each PRF clot was prepared in membrane form ([Figure 2E](#)). In addition, 0.12% chlorhexidine mouthwash was used to rinse the mouth for 3 min/rinse which was repeated 3 times. Local infiltration of Articaine with adrenaline 1:100000 was administered to induce anesthesia. A release incision was performed to make a mucoperiosteum flap in the alveolar crest, then a pilot drill was used to prepare the implant socket leaving an approximately 1 mm gap from the maxillary sinus floor boundary ([Figure 2A and B](#)). Next, using a rounded and blunted osteotome to elevate the maxillary sinus membrane, the cortical bone of the sinus floor was up-fractured ([Figure 2C and D](#)). After that, the patient's nose was pinched to check the integrity of the maxillary sinus. The implant, PRF and bone substitutes were simultaneously implanted ([Figure 2H-J](#)). The implants were placed (4.3 mm × 10 mm, Nobel Active, Sweden) with a torque of 35 N·cm, overlapped by a cover screw ([Figure 2K and 2L](#)). Postoperative CBCT revealed that the implants were located in the appropriate position ([Figure 3](#)).

Antibiotics, including cephalosporin and ornidazole, were administered for 3 d postoperatively.

OUTCOME AND FOLLOW-UP

Six months later, direct contact between the bone and implant interface was observed on CBCT images ([Figure 4](#)). The cover screws were replaced with healing abutments ([Figure 5](#)). Two weeks later, a zirconia ceramic crown was constructed ([Figure 6](#)). The whole permanent abutments added torque force of 35 N·cm. At 1 mo after loading, the CBCT scan showed that the gained bone height was stable ([Figure 7](#)). The patient was followed-up for 30 mo after the first stage of surgery, with satisfactory stability, and without gingival recession ([Figure 8](#)).

DISCUSSION

Tasoulis *et al*^[4] reviewed the literature and found that the success rate of the lateral antrostomy approach was 86%-100% while that of the transalveolar approach was 92.8%-97%. There was no significant difference in the long-term clinical effect between the two approaches. The transalveolar approach is more conservative and less invasive than the lateral approach^[5]. Adequate VBH is a critical factor to avoid complications such as sinus membrane perforation. However, the VBH did not reduce the success rate of the implants and associated prostheses. Gonzalez *et al*^[6] carried out the crestal approach with simultaneous implantation with VBH of 2-4 mm on the posterior maxillary alveolar. In this case, the elderly patient had bone rarefaction in the maxilla, and was more suitable for lateral antrostomy, but considering the patient's poor tolerance, lateral antrostomy takes longer and is more traumatic, the postoperative trauma would be greater, and recovery would be slower. Therefore, following a discussion with the patient and informed consent for treatment, we chose the crest approach. To ensure the success rate, bone substitutes, and PRF were combined to induce bone regeneration.

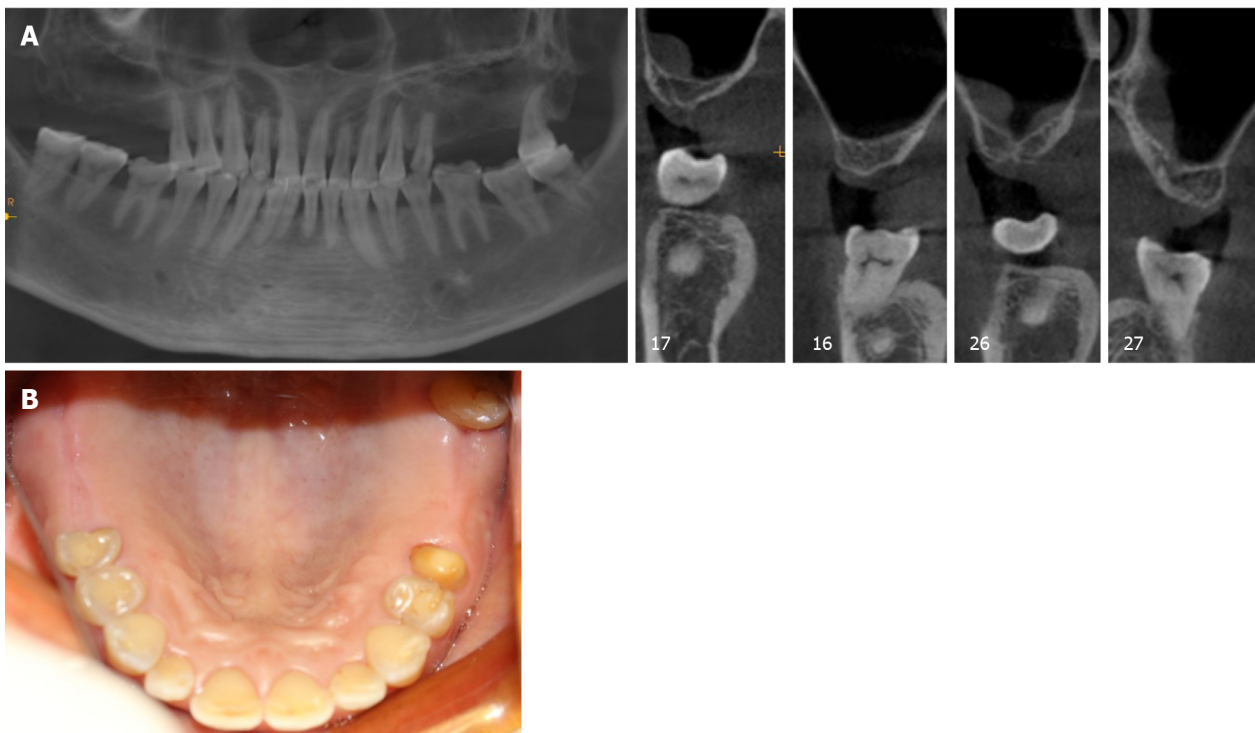


Figure 1 Preoperative cone-beam computed tomography and intraoral photograph. A: Preoperative cone-beam computed tomography; B: Intraoral photograph.

The combination of PRF and bovine bone graft material may be an alternative treatment option to the routinely used combination of bovine bone graft material and collagen membrane. Rodriguez *et al*^[7] believe that the use of platelet-rich plasma in combination with bovine bone is effective for maxillary sinus augmentation with simultaneous insertion of endosseous dental implants in severely resorbed posterior maxillae. In 2001, Choukroun *et al*^[8] developed a simpler method to concentrate platelets and fibrin without blood treatment instead of platelet-rich plasma which is more expensive and difficult to obtain. PRF belongs to the second generation of platelet concentrates, with simplified processing and without biochemical blood handling which contains a strong fibrin matrix and releases cytokines slowly, such as transforming growth factor-beta, vascular endothelial growth factor, and platelet-derived growth factor^[9]. Also, fibrin is applied as a delivery system for growth factors in tissue engineering^[10]. Moreover, fibrin has a significant effect on collagen synthesis in osteoblast-like cells. Thus, both cytokines and the fibrin matrix in PRF are synergistic in terms of cell migration and rapid vascularization, providing a favorable environment for the promotion of proliferation and differentiation of osteoblasts^[11]. On the one hand, PRF as a sole filling material could promote natural bone regeneration when implants are placed simultaneously^[12]. On the other hand, due to its good intrinsic adherence to the Schneiderian membrane, it is not only used to cover the perforation but is also used preventively to reduce the risk of perforation during the transalveolar approach^[13].

Choukroun *et al*^[14] evaluated the effectiveness of freeze-dried bone allograft (FDBA), and an FDBA and PRF mixture in sinus augmentation surgery, and found that the addition of PRF to FDBA accelerated graft maturation and decreased the healing period before implant placement^[15,16]. Zhang *et al*^[16] found that compared with PRF mixed with FDBA, the absence of precursor cells was the reason for the lack of effect of PRF mixed with bio-oss on bone formation. Tatullo *et al*^[17] demonstrated that the combination of PRF and bovine bone graft material can promote the early stability of implants, and revealed that marked neoangiogenesis acted as good trophic support for the newly-formed bone tissue.

CONCLUSION

In this case, we placed PRF and bovine bone graft material in the floor of the maxillary

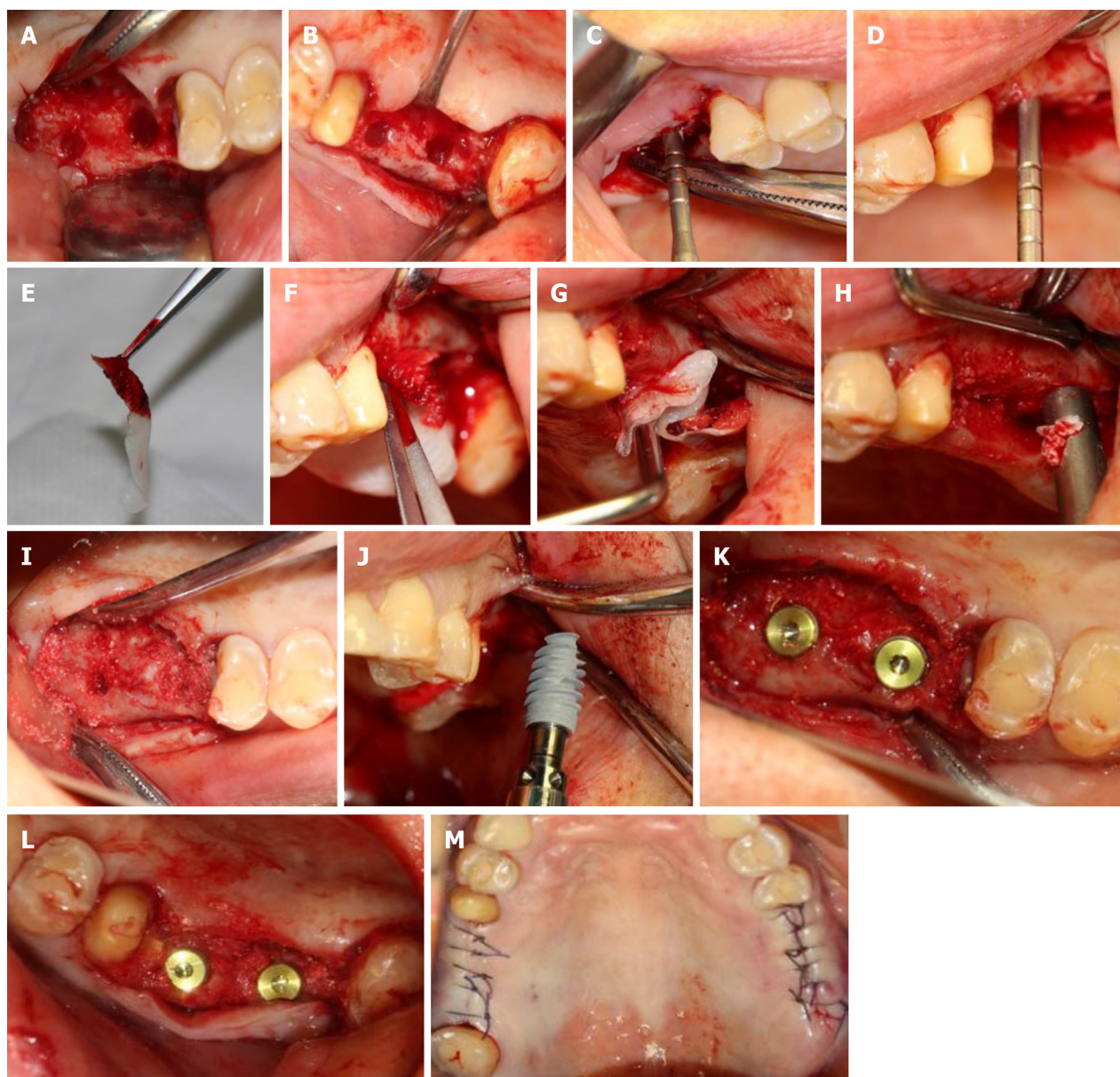


Figure 2 First-stage surgery. A and B: Nest preparation on the right; C and D: Bilateral internal maxillary sinus floor elevation; E: Platelet-rich fibrin (PRF) clots were compressed between sterile dry gauze; F and G: Established PRF membranes were placed in the primary elevated sinus floor; H and I: Implantation of the bovine bone graft material; J: Implant (4.3 mm × 10 mm, Nobel Active, Sweden) was implanted with a torque of 35 N·cm; K and L: Placement of a suitable cover screw; M: Stitches in the wound.

sinus using the crest approach, and performed the restoration 6 mo later with the torque force at 35 N·cm. This method promotes early bone healing, and guarantees initial stability of the implant. The results in this case show that minimally invasive implantation and repair in elderly patients can be achieved, with reduced surgical trauma, postoperative pain, swelling, surgical costs and a significantly shorter implantation and repair time. Therefore, in elderly patients, based on the premise of strict mastery of surgical indications and operating skills, this minimally invasive method of simultaneous implantation in the maxillary sinus can be considered.

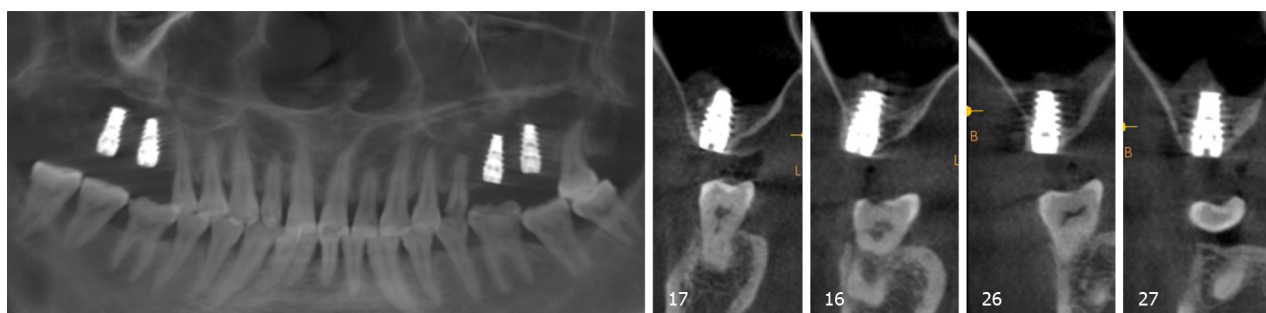


Figure 3 Cone-beam computed tomography after the first-stage surgery.

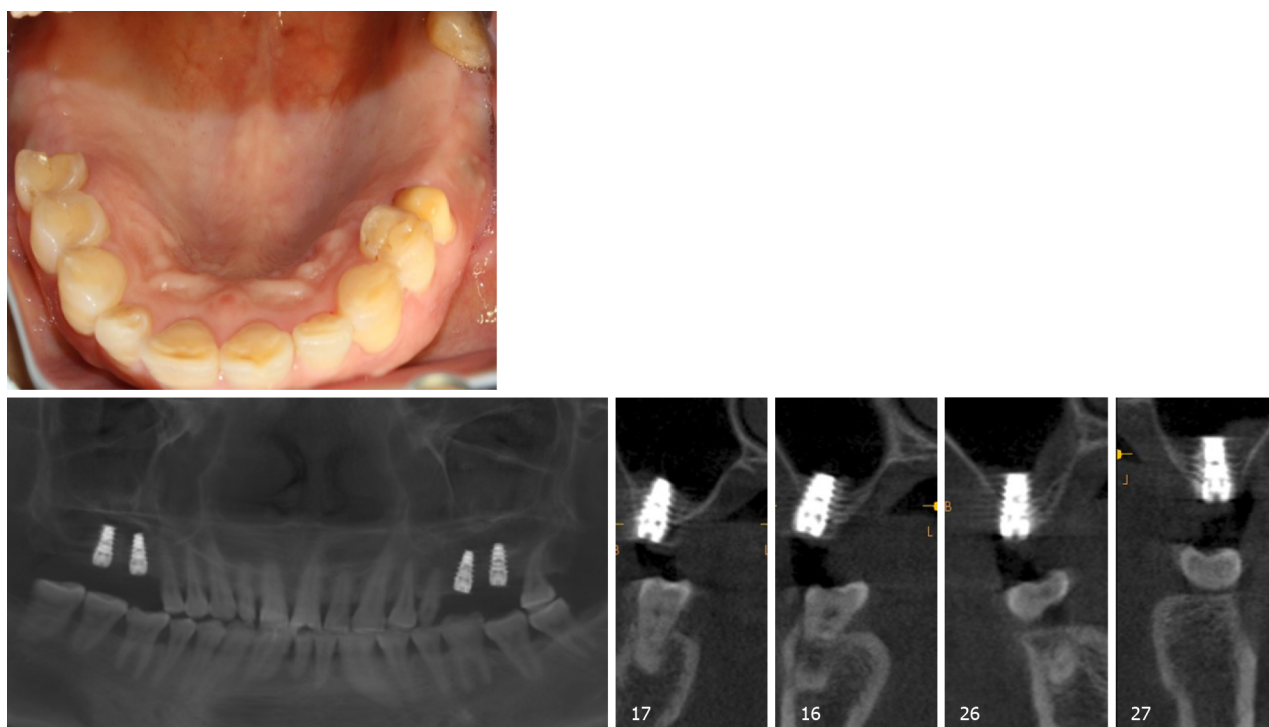


Figure 4 Six months after the first surgery.

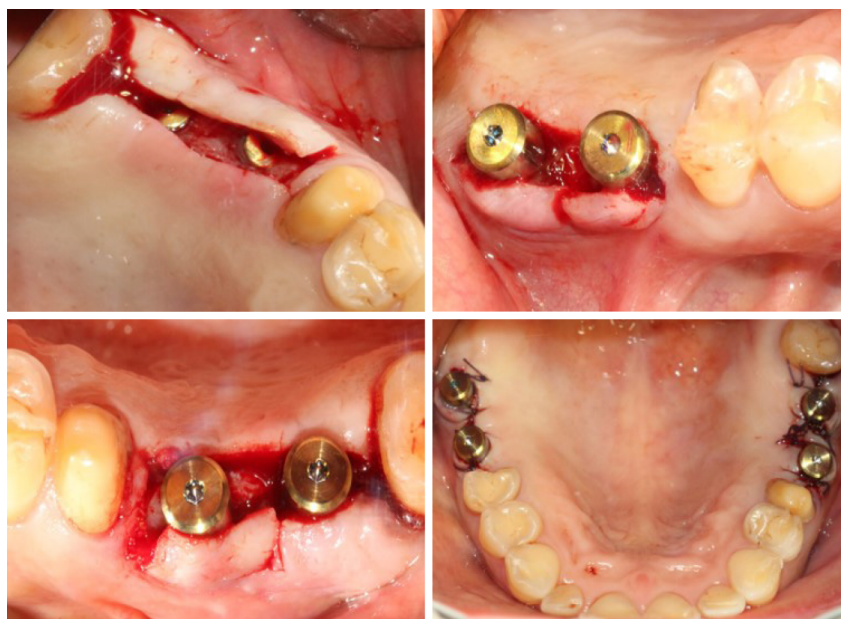


Figure 5 Six months later, the second-stage surgery was performed and the cover screw was replaced with the healing cap.



Figure 6 Zirconia ceramic crowns were constructed. A-D: A painless 35 N·cm torque was added to put the abutment in place; E and F: Zirconium-ceramic crowns; G and H: Buccal view of the final prosthesis in place; I-K: Occlusal view of the final prosthesis in place.



Figure 7 One month after permanent restoration.

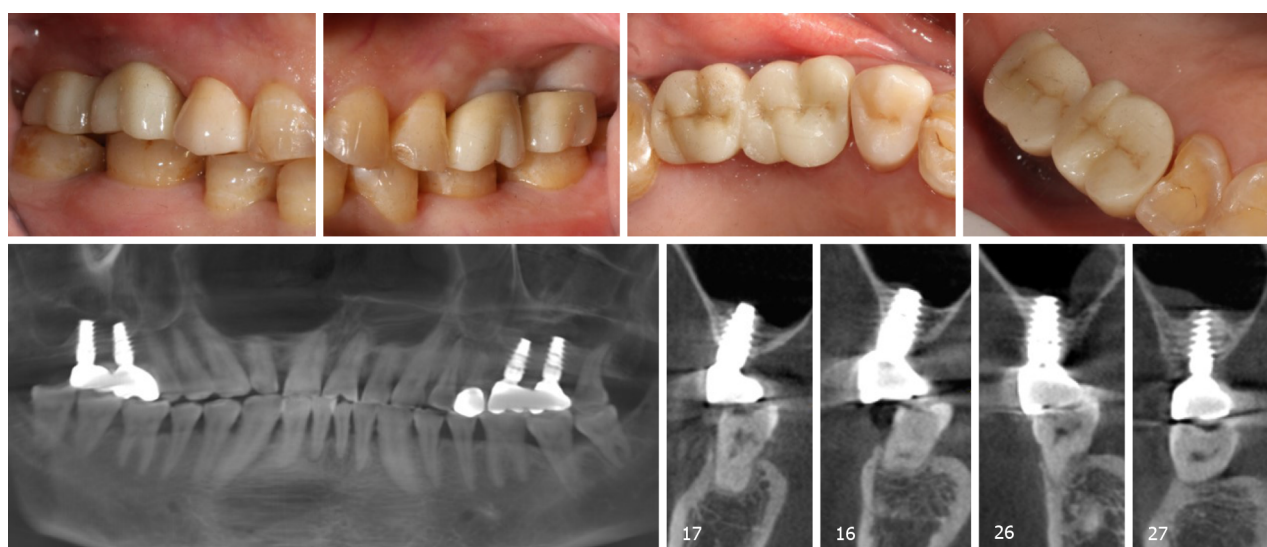


Figure 8 Patient was followed-up for 30 mo after the first stage surgery.

REFERENCES

- 1 **Zitzmann NU**, Schärer P. Sinus elevation procedures in the resorbed posterior maxilla. Comparison of the crestal and lateral approaches. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1998; **85**: 8-17 [PMID: 9474608 DOI: 10.1016/S1079-2104(98)90391-2]
- 2 **Rosen PS**, Summers R, Mellado JR, Salkin LM, Shanaman RH, Marks MH, Fugazzotto PA. The bone-added osteotome sinus floor elevation technique: multicenter retrospective report of consecutively treated patients. *Int J Oral Maxillofac Implants* 1999; **14**: 853-858 [PMID: 10612923 DOI: 10.1046/j.1365-2591.1999.00243.x]
- 3 **Chiapasco M**, Zaniboni M, Rimondini L. Dental implants placed in grafted maxillary sinuses: a retrospective analysis of clinical outcome according to the initial clinical situation and a proposal of defect classification. *Clin Oral Implants Res* 2008; **19**: 416-428 [PMID: 18266875 DOI: 10.1111/j.1600-0501.2007.01489.x]
- 4 **Schulze-Späte U**, Dietrich T, Kayal RA, Hasturk H, Dobeck J, Skobe Z, Dibart S. Analysis of bone formation after sinus augmentation using β -tricalcium phosphate. *Compend Contin Educ Dent* 2012;

- 33: 364-368 [PMID: [22616219](#)]
- 5 **Pjetursson BE**, Lang NP. Sinus floor elevation utilizing the transalveolar approach. *Periodontol* 2000 2014; **66**: 59-71 [PMID: [25123761](#) DOI: [10.1111/prd.12043](#)]
- 6 **Gonzalez S**, Tuan MC, Ahn KM, Nowzari H. Crestal approach for maxillary sinus augmentation in patients with ≤ 4 mm of residual alveolar bone. *Clin Implant Dent Relat Res* 2014; **16**: 827-835 [PMID: [23557102](#) DOI: [10.1111/cid.12067](#)]
- 7 **Rodriguez A**, Anastassov GE, Lee H, Buchbinder D, Wettan H. Maxillary sinus augmentation with deproteinized bovine bone and platelet rich plasma with simultaneous insertion of endosseous implants. *J Oral Maxillofac Surg* 2003; **61**: 157-163 [PMID: [12618990](#) DOI: [10.1053/joms.2003.50041](#)]
- 8 **Choukroun J**, Adda F, Schoeffler C. An opportunity in perioimplantology: The PRF. *Implantodontie* 2001; **42**: 55-62
- 9 **Dohan Ehrenfest DM**, de Peppo GM, Doglioli P, Sammartino G. Slow release of growth factors and thrombospondin-1 in Choukroun's platelet-rich fibrin (PRF): a gold standard to achieve for all surgical platelet concentrates technologies. *Growth Factors* 2009; **27**: 63-69 [PMID: [19089687](#) DOI: [10.1080/08977190802636713](#)]
- 10 **Kawase T**, Okuda K, Wolff LF, Yoshie H. Platelet-rich plasma-derived fibrin clot formation stimulates collagen synthesis in periodontal ligament and osteoblastic cells in vitro. *J Periodontol* 2003; **74**: 858-864 [PMID: [12886997](#) DOI: [10.1902](#)]
- 11 **Miron RJ**, Zucchelli G, Pikos MA, Salama M, Lee S, Guillemette V, Fujioka-Kobayashi M, Bishara M, Zhang Y, Wang HL, Chandad F, Nacopoulos C, Simonpieri A, Aalam AA, Felice P, Sammartino G, Ghanaati S, Hernandez MA, Choukroun J. Use of platelet-rich fibrin in regenerative dentistry: a systematic review. *Clin Oral Investig* 2017; **21**: 1913-1927 [PMID: [28551729](#) DOI: [10.1007/s00784-017-2133-z](#)]
- 12 **Kanayama T**, Horii K, Senga Y, Shibuya Y. Crestal Approach to Sinus Floor Elevation for Atrophic Maxilla Using Platelet-Rich Fibrin as the Only Grafting Material: A 1-Year Prospective Study. *Implant Dent* 2016; **25**: 32-38 [PMID: [26384097](#) DOI: [10.1097/ID.0000000000000327](#)]
- 13 **Simonpieri A**, Choukroun J, Del Corso M, Sammartino G, Dohan Ehrenfest DM. Simultaneous sinus-lift and implantation using microthreaded implants and leukocyte- and platelet-rich fibrin as sole grafting material: a six-year experience. *Implant Dent* 2011; **20**: 2-12 [PMID: [21278521](#) DOI: [10.1097/ID.0b013e3181faa8af](#)]
- 14 **Choukroun J**, Diss A, Simonpieri A, Girard MO, Schoeffler C, Dohan SL, Dohan AJ, Mouhyi J, Dohan DM. Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part IV: clinical effects on tissue healing. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006; **101**: e56-e60 [PMID: [16504852](#) DOI: [10.1016/j.tripleo.2005.07.011](#)]
- 15 **Ali S**, Bakry SA, Abd-Elhakam H. Platelet-Rich Fibrin in Maxillary Sinus Augmentation: A Systematic Review. *J Oral Implantol* 2015; **41**: 746-753 [PMID: [25536095](#) DOI: [10.1563/aaid-joi-D-14-00167](#)]
- 16 **Zhang Y**, Tangl S, Huber CD, Lin Y, Qiu L, Rausch-Fan X. Effects of Choukroun's platelet-rich fibrin on bone regeneration in combination with deproteinized bovine bone mineral in maxillary sinus augmentation: a histological and histomorphometric study. *J Craniomaxillofac Surg* 2012; **40**: 321-328 [PMID: [21664828](#) DOI: [10.1016/j.jcms.2011.04.020](#)]
- 17 **Tatullo M**, Marrelli M, Cassetta M, Pacifici A, Stefanelli LV, Scacco S, Dipalma G, Pacifici L, Inchingolo F. Platelet Rich Fibrin (P.R.F.) in reconstructive surgery of atrophied maxillary bones: clinical and histological evaluations. *Int J Med Sci* 2012; **9**: 872-880 [PMID: [23155361](#) DOI: [10.7150/ijms.5119](#)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

