www.sada.co.za / SADJ Vol. 81 No.1

What's new for the clinician – summaries of recently published papers (February 2026)

SADJ FEBRUARY 2026, Vol. 81 No.1 P40-P44

Edited and Compiled by Prof V Yengopal, Faculty of Dentistry, University of the Western Cape

1. CONCENTRATED GROWTH FACTORS (CGF) FOR CLOSURE OF OROANTRAL COMMUNICATIONS AFTER TOOTH EXTRACTION: A RANDOMIZED CONTROLLED CLINICAL TRIAL

Concentrated growth factors (CGF) offer a promising autologous biomaterial for managing oroantral communications (OAC) post-tooth extraction. Oroantral communication (OAC) refers to pathological communication between the oral cavity and maxillary sinus caused by tissue defects, primarily occurring after the extraction of maxillary posterior teeth. If OAC is not appropriately managed, it may progress to an oroantral fistula (OAF), where the soft and hard tissues in the communication area fail to heal completely, and symptoms such as nasal congestion and rhinorrhea associated with maxillary sinusitis may occur. The risk of OAC progressing to OAF increases over time. Therefore, once OAC occurs, it should be closed as early as possible.

Oroantral communications arise when maxillary tooth extraction breaches the thin maxillary sinus floor, often after removing upper molars or premolars. Small defects (<5 mm) may heal spontaneously with measures like figure-of-8 suturing or oxidized cellulose, but larger ones risk oroantral fistula (OAF) formation, sinusitis, or chronic infection if unmanaged. Traditional closures use buccal advancement flaps (98.7% success) or buccal fat pads (95.8%), but these involve tension, donor morbidity, or relapse risks. Platelet concentrates like CGF address these by enhancing soft/hard tissue regeneration without synthetics.

CGF derives from venous blood centrifuged at variable speeds (e.g., 2700 rpm for 12 minutes), yielding a fibrin-rich matrix with platelets, leukocytes, growth factors (VEGF, PDGF, TGF-β), and cytokines. Unlike PRF, CGF's denser structure and higher growth factor concentration accelerate angiogenesis, osteogenesis, and epithelialization. Applied as membranes or clots in extraction sockets, CGF seals OAC, prevents sinus contamination, and fills defects to preserve ridge dimensions. Its biocompatibility minimizes inflammation, promoting granulation tissue by day 4 versus week 1 conventionally

Li and colleagues (2025)[1] employed CGF and suture methods to treat OAC and assessed the effects on soft and hard tissue repair, as well as the degree of pain experienced by patients after surgical repair. The aim of their study was to provide improved treatment options for OAC repair, particularly for cases that require implant repair after tooth extraction.

Materials and methods

This study was a prospective, randomized, controlled, single-centre clinical trial conducted in China. Between June 2024 and June 2025, 30 patients were consecutively enrolled for repair of oroantral communications following tooth extraction. Patients were randomly assigned to the control or the Concentrated growth factor (CGF) group using the envelope method, with allocation concealment performed by individuals unfamiliar with the study protocol. Blinding was limited to the evaluators. Two weeks before the surgery, all patients underwent preliminary screening to ensure they met the inclusion criteria and obtained their informed consent for participation in this study. The formal enrolment of patients was scheduled immediately after the extraction of maxillary posterior teeth and the acquisition of post-extraction beam computed tomography (CBCT) images.

The inclusion criteria were as follows: (a) maxillary premolars or molars meeting the criteria for extraction and pre-extraction CBCT revealed the tooth root entering the maxillary sinus; (b) pre-extraction CBCT and post-extraction CBCT both revealed a maximum diameter of 3–5 mm in the discontinuous maxillary sinus floor at the lesion site; (c) no acute inflammation of the maxillary sinus or chronic inflammation of the maxillary sinus was controlled; (d) no acute or chronic infectious diseases in the oral cavity; (e) the minimum vertical distance from the border point of the bone defect in the Oroantral communication (OAC) area to the crest of the extraction socket was ≥4 mm; and (f) adult patients.

The exclusion criteria were as follows: (a) oroantral communication caused by factors other than tooth extraction; (b) severe heart disease; (c) severe haematological disorders; (d) active infectious diseases that may impair routine healing; (e) hepatic or renal insufficiency/failure; (f) currently undergoing cancer treatment or within 18 months of completing chemotherapy or radiotherapy; (g) uncontrolled diabetes; (h) pregnancy or planning pregnancy; (i) smoking (>10 cigarettes/day); and (j) use of medications known to affect bone or soft tissue metabolism.

Patients who met the inclusion criteria underwent clinical, haematological, and CBCT examinations two weeks before surgery.

All surgeries were performed by the same experienced surgeon. Before tooth extraction, patients were instructed to rinse with 0.12% chlorhexidine solution for 1 min. Under local anaesthesia with lidocaine, the gingiva was separated using periotomes without flap elevation, and the affected tooth was extracted using minimally invasive extraction forceps or elevators. When necessary, a diamond fissure bur was used to section the roots, with careful protection of the surrounding hard and soft tissues. Granulation tissue on the wall of the tooth extraction socket was removed with a curette. After the defect was carefully palpated with a conventional blunt probe (diameter: 1 mm), further CBCT examination was performed. Using CBCT measurement

tools, the maximum diameter of the OAC was determined to be 3–5 mm, and the minimum vertical distance from the defect border point in the OAC area to the crest of the extraction socket was ≥4 mm.

CGF preparation

In the GCF group, approximately 18 ml of venous blood (two tubes) was collected from the patients using sterile vacuum tubes. Samples were centrifuged immediately. After centrifugation, the venous blood was separated into three layers from top to bottom: a platelet-poor plasma layer, a fibrin layer (CGF layer), and a red blood cell layer. Sterile tweezers were used to extract the CGF, and the lower red blood cell layer was trimmed off. Two CGF clots were prepared, one of which was compressed into a CGF membrane.

For the OAC repair in the CGF group: The CGF clot was placed into the extraction socket of the OAC area without compression, covered with a layer of CGF membrane, and stabilized in the extraction socket using 4 – 0 non-absorbable sutures(Johnson® 4 – 0) in a figure-of-8 suture, with no additional incisions or local soft tissue flaps applied in the surgical area.

For the Control group: Once the extraction socket of the OAC area was filled with fresh blood, the gingiva was sutured using 4 – 0 non-absorbable sutures in a figure-of-8 suture, with no additional incisions or local soft tissue flaps applied in the surgical area.

Patients were prescribed cefadroxil tablets 500 mg twice daily for 6 days and ephedrine hydrochloride and nitrofurazone 1–3 drops three times daily for 1 week. No painkillers were used. Follow-up assessments were conducted on postoperative Days 1, 3, 7, 30, and 90 to collect clinical and imaging data.

The ***primary outcome*** was the height of the newly formed bone (H). All measurements were performed by the same evaluator who was blinded to the group assignment. CBCT images taken immediately after tooth extraction and at 90 days postoperatively were converted to DICOM format and imported into Materialise Mimics Research version 21.0.

Secondary outcome measurements were also made using the Materialise Mimics Research software program to calculate New Bone Volume, New Bone Density and OAC closure rate (Closure rate at 30 days = number of closed cases/total number of cases × 100%). A modified version of the Masse Healing Index was used to assess soft tissue regeneration, maturation, and quality at 7 days and 30 days postoperatively. This index includes four parameters, each with three scoring levels: tissue colour (1 = the gingival tissue was entirely pink; 2 = less than half of the gingival tissue was red, movable, and hyperaemic; 3 = more than half of the gingival tissue was red, movable, and hyperaemic), healing tissue consistency and colour (1 = pink, close-grained; 2 = red, soft; 3 = grey-green, fragile), bleeding (1 = none; 2 = only upon palpation; 3 = spontaneous), and suppuration (1 = none; 2 = none but significant amounts of plaque around the walls of the socket; 3 = suppuration). Scores range from 4 to 12, with higher scores indicating poorer soft tissue healing outcomes.

All patients agreed not to use painkillers for 7 days postoperatively. The Visual analogue scale Visual analogue scale (VAS) was used to assess pain levels on Days 1, 3, and 7 postoperatively, with scores ranging from 0 (no pain) to 10 (severe pain).

RESULTS

A total of 40 patients were assessed for eligibility and 30 of them were randomly assigned into two groups finally. All participants completed the follow-up schedule, and no complications were reported.

For the primary outcome, New bone formation was observed in both groups at 90 days post-surgery. The **height** of new bone formation in the CGF group was approximately 3.866 ± 0.8048 mm, whereas that in the control group was approximately 2.761 ± 1.236 mm, with a statistically significant difference between the two groups ($P = 0.0033$).

Secondary outcomes

- ***New bone volume:*** The volume ratio in the control group was 0.742 ± 0.08495, while that in the CGF group was approximately 0.8153 ± 0.06556, with the CGF group significantly higher than the control group (P = 0.0132).
- **New bone density:** At 90 days post-surgery, the density of new bone in the CGF group was approximately 189.8 ± 44.74, while that in the control group was approximately.
- **OAC closure rate:** At the 30-day postoperative follow-up assessment, the defect closure rate was 100% (15/15) in both groups, with no significant difference between the two groups (P > 0.999).
- ***Modified Mass Healing Index scores:*** At 7 days post-surgery, the mean HI scores for the control group and CGF group were 6.133 ± 1.06 and 5.267 ± 0.7037 ($p = 0.0148$ At 30 days post-surgery, there was no significant difference between the two groups ($p > 0.999$).
- ***Visual analogue scale scores:*** Within 7 days postoperatively, VAS scores of both groups gradually decreased. On Days 1 and 3 postoperatively, the VAS score was significantly lower in the CGF group than in the control group (P = 0.049, P = 0.0122)

CONCLUSION

The researchers concluded that he use of concentrated growth factors (GCF) is a reliable method for closing oroantral communication. During the 90-day observation period, compared with suture repair, the CGF repair method promoted new bone formation in the extraction socket while facilitating soft tissue healing and reducing postoperative pain reactions.

Implications for practice: for almost al of the primary and secondary outcome measures, patients in the GCF group had significantly better outcomes. GCF is an important option for the repair of OAC.

REFERENCE:

1. Li Z, Chen Y, Qian J, Zhu Z, Zou D, Lyu C. Concentrated growth factors for closure of oroantral communications after tooth extraction: A randomized controlled clinical trial. Clinical oral investigations. 2025 Nov 22;29(12):583.

www.sada.co.za / SADJ Vol. 81 No.1

2. CLINICAL PERFORMANCE OF SHORT FIBER-REINFORCED AND INDIRECT RESIN COMPOSITES IN CLASS I AND CLASS II RESTORATIONS: A THREE-YEAR RANDOMIZED CLINICAL TRIAL

Short fiber-reinforced resin composites (SFRC) and indirect resin composites enhance durability in Class I and II restorations, addressing limitations of conventional direct composites like fracture and shrinkage.

Class I (occlusal) and II (proximal) cavities in premolars/molars endure high masticatory stresses, polymerization shrinkage, and microleakage risks. Conventional microhybrid composites show 5-10% annual failure from fractures or secondary caries, prompting innovations like SFRC and indirect systems. SFRC incorporates randomly oriented short E-glass fibers (aspect ratio >10) in a resin matrix (e.g., everX Posterior), mimicking dentin's fibrous structure to dissipate stresses. Indirect composites (e.g., SR Nexco) undergo lab polymerization for better conversion, reduced shrinkage, and precise anatomy via CAD/CAM or heat-light curing.

SFRC's fibers halt crack propagation, boosting flexural strength (150-200 MPa vs. 100-120 MPa for hybrids) and fracture toughness. Polymerization shrinkage drops to 1.5-2.5%, minimising adaptation gaps. Indirect composites achieve 70-80% conversion, superior polishability, and wear resistance (50-100 µm/year), but require multi-step cementation (e.g., Multilink N). Both excel esthetically (VITA shade matching) and bond via universal adhesives (e.g., G-Premio BOND),

Salama et al (2025)[1] reported on a split mouth trial using the PICO approach to develop the research question:P (Population): patients requiring Class I and Class II posterior composite restorations; I (Intervention): included SFRC and indirect lab composite restorations; C (Comparison): microhybrid resin composite restorations; and O (Outcome): marginal adaptation as the primary outcome, with other FDI criteria assessed as secondary outcomes. This randomized clinical trial was designed to evaluate and compare the three-year clinical performance of SFRC and indirect lab composite with that of a microhybrid resin composite placed in Class I and Class II cavities, with marginal adaptation defined as the primary outcome. The null hypothesis stated that the three restorative materials would exhibit comparable clinical performance according to FDI criteria.

Materials and method

This study was a split-mouth prospective double-blinded (including both patients and examiners), randomized controlled clinical trial, reported in a CONSORT format.

Three different restorative materials were utilised in this study: SFRC (everX Posterior), indirect lab composite (SR Nexco, Ivoclar Vivadent), and microhybrid resin composite (G-aenial Posterior). They were equally allocated into three groups, with the first two restorative materials designated as the test groups and the microhybrid resin composite serving as the control group, as follows:

- **Group 1:** Direct restorations using SFRC (everX Posterior), capped with a 1 mm occlusal layer of microhybrid resin composite (G-aenial Posterior, GC).
- **Group 2:** Indirect lab composite (SR Nexco, Ivoclar Vivadent), cemented with a universal dual-curing resin cement (Multilink N, Ivoclar Vivadent).
- **Group 3:** Direct restorations using microhybrid resin composite (G-aenial Posterior), placed incrementally.

The study included 33 patients aged 18–35 years of both genders with good oral hygiene, categorized as low to moderate caries risk based on the CAMBRA (Caries Management by Caries Risk Assessment) protocol. Eligible participants presented at least three primary occlusal or proximal carious lesions (Black Class I or II) with an ICDAS (International Caries Detection and Assessment System) severity score of 4 or 5 upon visual examination. The carious teeth had to be vital, without periapical radiolucency (confirmed by periapical radiography), and in stable occlusion. Patients were excluded if they exhibited extremely poor oral hygiene, uncontrolled systemic diseases, chronic periodontitis, or heavy bruxism. Further exclusion criteria comprised extensive cavities exceeding two-thirds of the intercuspal width, lesions requiring cusp coverage, ongoing orthodontic treatment, or inability to attend scheduled follow-up appointments.

A randomization code was generated according to the three treatment possibilities. Each patient received three different posterior restorations in a unique sequence determined by the developed random sequence plan. To ensure allocation concealment, the randomization sequence was secured using sequentially numbered, opaque, sealed envelopes, which were prepared by an independent coordinator not involved in the clinical procedures or outcome evaluation. Each envelope was opened only after confirming patient eligibility and obtaining informed consent. Blinding was implemented for both the patients and the outcome assessors; however, blinding the operator was not feasible due to the inherent differences in material composition and the distinct application techniques required for each restorative system.

The operative procedures were conducted by a sole operator. Preoperative digital photographs were taken as part of the dental screening. Patients were administered local anesthesia prior to restorative procedures in order to alleviate pain and discomfort. Fluoride-free prophylaxis paste was used for cleansing the teeth of all participants. Subsequently, the operative field was isolated using rubber dam and high suctioning.

Direct restorations

The initial cavity preparation was performed using suitably sized carbide straight fissure burs in a high-speed handpiece while maintaining a constant, copious air-water cooling system. In deep cavities where the remaining dentin thickness was estimated to be <1 mm, pulp protection was provided using a thin layer of calcium hydroxide liner (Dycal). The liner was applied in a thin layer over the deepest part of the cavity floor and light-cured for 20 s before adhesive application.

Selective enamel etching was performed by applying 37% phosphoric acid gel to the enamel margins for 20 s prior to adhesive application, while dentin was left unetched, following the manufacturer's instructions. Each cavity was then thoroughly rinsed with water for 20 s and gently air-dried, retaining the dentin surface with a slightly moist

appearance. G-Premio BOND universal adhesive was applied to the prepared enamel and dentin surfaces and left undisturbed for 10 s. A gentle stream of air was then applied for 5 s to ensure thorough evaporation of the solvent and create a uniform adhesive film. Light curing was performed for 20 s using a light-emitting diode (LED) curing unit. In Class II preparations, the proximal wall was restored utilizing a horizontal incremental technique.

Following the manufacturer's recommendations, SFRC (everX Posterior) was applied in one increment, leaving 1 mm space for a surface layer of microhybrid resin composite, followed by 40 s of light polymerization for each. However, in the microhybrid resin composite group (G-aenial Posterior), the composite was applied incrementally, with each increment light-cured for 40 s from the occlusal aspect.

Following the removal of the matrices, all restorations were additionally light-polymerized to ensure adequate curing of the proximal margins. Polishing procedures were performed implementing a low-speed handpiece with silicon carbide impregnated cups and points under continuous water cooling, following the manufacturer's recommended sequential protocol. For Class II cavities, interdental flossing was employed to assess the tightness of proximal contacts and to ensure the absence of flashes or overhangs.

Indirect restorations

Inlay cavity preparations were performed utilizing a specialized inlay preparation kit in order to attain an estimated 10^0-12° occlusal divergence angles. A preliminary impression was obtained for each patient utilizing equal proportions of the base and catalyst of high-viscosity impression material (Presigum Putty). Afterwards, a final impression was taken for each cavity using light-viscosity impression paste (Presigum Low viscosity). Provisional restorations were applied using light-curing, eugenol-free temporary restorative material. Each impression was then delivered to the dental laboratory for casting into a die stone.

A professional dental technician fabricated all the restorations on the die stone, following the manufacturer's guidelines. Each inlay was carefully removed from the die model before being finished with fine diamonds and carbide burs under low speed and light pressure. The restorations were then polished with leather buffing wheels and Universal Polishing Paste.

Inlays cementation was conducted under rubber dam isolation and high suctioning. In order to achieve an excellent bond with the luting composite, the internal surfaces of the inlays were carefully sandblasted with 80-100 µm Al_2O_3 at 1 bar pressure, then they were conditioned by applying a thin layer of universal priming agent (Monobond N) and allowed to react for 60 s. The two primer liquids, Multilink N Primer A and B, were mixed together in equal parts on a mixing pad, then applied to the entire cavity with 30 s scrubbing, and the excess was dispersed with air until the mobile liquid film was no longer visible. Multilink N cement was applied directly to the inner surface of the restoration, then the restoration was seated rapidly in place. The excess material was removed using a foam pellet, followed by additional light curing to all margins for 20 s. Subsequently, the occlusion was assessed using articulating papers and the restorations were finished with flexible discs (Sof-Lex) using the recommended sequence.

Two blinded assessors evaluated the restorations clinically utilizing the FDI criteria. The participants were recalled for baseline evaluation after a week, followed by further assessments at 6 months, 1-year, 2-years, and 3-years. All participants adhered to the assigned treatment protocols, and no major protocol deviations occurred during the study period. The assessed criteria included functional properties such as marginal adaptation, material fracture, and the quality of proximal contact and contour. Additionally, biological properties including postoperative hypersensitivity, caries around restoration margins, and tooth integrity were also considered. Finally, esthetic properties as surface luster and texture, marginal staining, and colour matching were evaluated. Among these, marginal adaptation was designated as the primary outcome, while all other assessed FDI criteria were considered secondary outcomes.

The restorations were categorized utilizing the following ranking terms: clinically excellent or very good, clinically good, clinically satisfactory, clinically unsatisfactory, and clinically poor. Rankings of 1, 2, and 3 were designated as "clinically successful," while 4 and 5 were seen as indicative of failure. The parameters that required visual examination were conducted using a magnifying dental loupe, with a powerful attached light source. Marginal adaptation was assessed using two specialized blunt-tip probes (150 µm and 250 µm) in conjunction with dental floss for comprehensive evaluation. Postoperative sensitivity was evaluated by blowing a stream of cold air for 3 s at a distance of 2–3 cm from the restoration. Clinical intraoral photographs were taken at each follow-up appointment to monitor any visual alterations in the restorations.

RESULTS

Thirty-three patients, including 23 females and 10 males, were enrolled in this study. The mean age of the patients was 25.7 years. The study's recall rates were as follows: 100% at baseline, 93.94% at six months, 87.88% at one year, and 84.85% at both two and three years. Five patients were lost to follow-up due to loss of contact despite multiple recall attempts through phone calls and text messaging.

After a three-year follow-up, both SFRC (everX Posterior) and indirect lab composite (SR Nexco) had a 100% success rate, whereas microhybrid resin composite (G-aenial Posterior) attained a success rate of 96.43%.

Following a three-year follow-up period, the outcomes revealed no statistically significant differences among the three assessed restorative materials in terms of functional properties ($p > 0.05$). Concerning marginal adaptation, 92.9% of SFRC, 78.6% of indirect lab composite, and 85.7% of microhybrid resin composite restorations exhibited excellent marginal adaptation, scoring (1). A statistically significant difference was observed for indirect lab composite restorations between the baseline and 1-year measurements, compared to 2-year and 3-year scores. For microhybrid resin composite restorations, the significant differences were observed between baseline and 3-year measurements ($p < 0.05$). Nonetheless, no significant difference was noted between the follow-up periods for SFRC ($p > 0.05$).

Regarding material fracture and retention, at the 3-year evaluation, SFRC restorations revealed ideal performance (100% scoring 1), whereas only one indirect lab composite restoration presented with hairline crack (score 2). At the 6-month follow-up, one microhybrid resin composite restoration exhibited minor fractures that were deemed

clinically acceptable without compromising functionality, followed by another one at the two-year recall. However, by the end of the three-year duration, one microhybrid resin composite restoration was clinically unsatisfactory and required repair (score 4). The intragroup comparisons revealed no statistically significant differences between the follow-up periods for the three restorative materials ($p > 0.05$). All the restorations exhibited normal proximal contact and contour with no statistically significant differences detected at any follow-up evaluation in both intergroup and intragroup comparisons ($p > 0.05$).

No statistically significant differences were detected in biological characteristics among the three restorative materials after three years ($p > 0.05$). Similarly, intragroup comparisons demonstrated no significant differences between the follow-up durations among the assessed restorative materials ($p > 0.05$). Regarding postoperative hypersensitivity, indirect lab composite restorations revealed no sensitivity throughout the evaluation periods. However, at the 6-month evaluation, two SFRC restorations exhibited minor sensitivity, which was temporary and subsided shortly afterward. Furthermore, one microhybrid resin composite restoration revealed mild transient hypersensitivity at the 1-year follow-up, followed by two restorations at the 3-year follow-up. Concerning secondary caries and tooth integrity, no statistically significant differences were observed between the three restorative materials at any follow-up evaluation in both intragroup and intergroup comparisons ($p > 0.05$).
The three restorative materials exhibited no statistically significant differences in terms of esthetic properties after three years ($p > 0.05$).

CONCLUSION

After a three-year follow-up period, both SFRC and indirect lab composite demonstrated acceptable clinical performance, comparable to that of microhybrid resin composite, as evaluated by the FDI criteria.

Implications for practice: the 3 materials and techniques demonstrated clinical equivalence in terms of the outcomes measured. The importance clinical skill, patient selection and selection of technique are key in ensuring clinical success.

REFERENCE

1. Salama RM, Hamama HH, Mahmoud SH. Clinical performance of short fiber-reinforced and indirect resin composites in class I and class II restorations: A three-year randomized clinical trial. Clinical Oral Investigations. 2025 Dec;29(12):580.

Online CPD in 6 Easy Steps

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.