Evaluate clinical effectiveness of autologous platelet rich plasma (PRP) using curasan technique in treating intrabony defects using regenerative material
Bone graft / GTR membrane

M Sesha Reddy
College of Dentistry, Gulf Medical University, Ajman, UAE

ABSTRACT
Objective: Ultimate aim of periodontal treatment is to ensure betterment in overall periodontal conditions that in turn suit the patient desire. In order to accomplish this objective majority of periodontal procedures intend to decrease probing pocket depth and gain in clinical attachment level that measured as surrogate endpoints. Various surgical modalities are available in order to treat intrabony defect. Remarkable attention to polypeptide growth factors (PGFs) as biological mediators in periodontal tissue regeneration has given importance to PRP. The advantage of using growth factors for periodontal regeneration is their regulatory effect on bone and periodontal ligament cells to proliferate and differentiate to form new tissue. This case report was undertaken to evaluate the clinical efficacy of PRP when used along with bone graft or GTR membrane, bone graft in the treatment of intra bony defect.

Materials and Method: Three wall intra bony defects were selected from two different patients for the study. One defect each was treated using PRP with bone graft and other using PRP, bone graft and GTR membrane. Clinical parameters such as probing pocket depth, clinical attachment levels and radiographic bone fill were measured at baseline and then after six months respectively.

Results: By the end of six months there were considerable differences noticed in clinical parameters such as reduction in probing pocket depth 9mm to 4mm, gain in attachment loss of 4mm and radiographic bone fill was significant after six months.

Conclusion: PRP which has abundant amount of growth factors has a detrimental effect on periodontal wound healing. A combination of PRP plus bone graft / PRP plus bone graft with GTR membrane was more effective in the treatment of intrabony defects. Supplementary studies are needed to confirm the results of the present study.

Keywords: PRP, intrabony, GTR, bone graft

INTRODUCTION
Ultimate aim of periodontal treatment is to ensure betterment in overall periodontal conditions that in turn suit the patient desire. In order to accomplish this objective majority of periodontal procedures intend to decrease probing pocket depth and gain in clinical attachment level that measured as surrogate endpoints. Various surgical modalities are available in order to treat intrabony defect. However, in most cases when conventional methods were adapted, histological studies revealed healing by repair rather than regeneration1. True regeneration is defined as reorientation of new periodontal ligament fibers into new cementum that was previously denuded by periodontal disease2.

Ever since flap surgical procedures with or without bone, grafts had partial accomplishment in-terms of true regeneration newer techniques have been tried out keeping in mind the advancement made in the field of tissue engineering3-5. Remarkable attention to polypeptide growth factors (PGFs) as biological mediators in periodontal tissue regeneration has given importance. The advantage of using growth factors for periodontal regeneration is their regulatory effect on bone and periodontal
ligament cells to proliferate and differentiate to form new tissue.

Comprehensive review on Platelet derived growth factor (PDGF) and transforming growth factor –β (TGF-β) were done amid all growth factors. Many in vitro animal studies have revealed true regeneration when PDGF and TGF-β used. When prepared platelet rich plasma serves as an autologous source of highly concentrated dose of platelets. PRP preparation can be by single or double spin of patients own blood.

This case report describes the intrabony defect treated by autologous PRP with GTR membrane in one tooth and PRP with bone graft in another defect. Over six month period clinical and radiographic parameter was reevaluated.

**PRP preparation:** Curasan et al technique was followed to prepare PRP.

**CASE REPORT: 1**

A 35 years old male patient reported to department of periodontics complaining of food impaction and dull pain in the lower left back tooth region since few months and also feels an urge to dig that area. Patient systemic health and medical history was normal. Intra oral assessment revealed generalized bleeding on probing without exudates. Probing pocket depth (PPD) 36 was 9mm mesiobuccal, with no signs of mobility or trauma from occlusion. Periapical radiograph revealed presence of interproximal intra bony defect in relation to 36. Comprehensive treatment planning was performed based on periodontal findings.

- Oral hygiene instructions (OHI) to educate and motivate the patient for better oral hygiene maintenance
- Scaling and Root planning was performed using standard gracey curettes.
- Reevaluation after 6weeks of phase I periodontal therapy to evaluate PPD and Clinical attachment loss (CAL) which was 8mm and 5mm respectively.
- Surgical periodontal therapy was done after reevaluation of the patient.

**Surgical Procedure: Case 1**

Presurgical mouth rinsing was performed using 0.2% chlorhexidine digluconate. Inferior alveolar nerve block was given to anesthetize the area. Subsequent to anesthesia conventional mucoperiosteal flaps were reflected keeping in concern regarding preservation of inter-proximal soft tissue as much as possible. Later ultrasonic instruments and curettes were used for through defect debridement. PRP with bone graft (Perioglass) was placed into the defect. (Figures 1, 2) Simple interrupted sutures (4-0) were used to reposition the mucoperiosteal flap and later periodontal pack was placed to secure the raw wound surface. Pre and post-operative radiographs show difference in bone fill (Figures 3,4).
CASE REPORT: 2
A 30-year-old male patient reported to the department of periodontics complaining of bleeding gums and bad breath. Patient was systemically healthy. Intraoral examination revealed generalized bleeding on probing and deep pocket in relation to 46 without signs of mobility or trauma from occlusion. A periapical radiograph was taken which revealed presence of interproximal intra-bony defect in relation to 46. (Figure 1) Based on the clinical and radiologic findings, the following periodontal treatment plan was followed:

A. Oral hygiene instructions (OHI) to educate and motivate the patient for better oral hygiene maintenance

B. Scaling and Root planning was performed using standard gracey curettes.

C. Reevaluation after 6 weeks of phase I periodontal therapy to evaluate PPD and Clinical attachment loss (CAL) which was 7 mm and 6 mm respectively.

D. Surgical periodontal therapy was done after reevaluation of the patient.

Surgical Procedure: Case 2
Presurgical mouth rinse was performed using 0.2% chlorhexidine digluconate before periodontal surgery. Inferior alveolar nerve block was performed to anesthetize 46 tooth regions. Following anesthesia conventional flap surgery was done and care was taken to preserve the interdental papilla for proper flap closure of GTR membrane. Surgical debridement of the defect was done using specific curettes. Later, after through debridement the intra bony defect was filled with PRP with bone graft (Perioglass), then GTR membrane was placed in and stabilized in position with sling sutures. Both facial and lingual flaps were approximated using intercepted sutures, followed by application periodontal dressing (Figure 4). Pre and post-operative radiographs show difference in bone fill (Figures 5, 6).

Postoperative care:
Antibiotics and analgesics (amoxicillin 500 mg three times per day for 5 days and Ibuprofen 500 mg three times for 5 day) were prescribed, along with 0.2% chlorhexidine digluconate which was to be rinsed twice daily for 2 weeks. Two weeks post-operatively periodontal dressing and sutures were removed. Following this proper oral hygiene instructions were given to the patient. In follow up period after 6 months both PPD and radiographs were taken to assess any improvement in reduction in PPD and gain in radiographic bone fill.
DISCUSSION
In the present scenario clinical use of PRP with bone graft as well as GTR with PRP, bone graft was evaluated clinically. Success of periodontal therapy by using PRP was assessed by means of PPD and radiographic findings. In the present report there was significant reduction in PPD from 8mm 5mm and also radiographic bone fill was observed. All of which could be attribute to the use of PRP which has enormous growth promoting factors resulting in accelerating the periodontal wound healing by its mitogenic properties\textsuperscript{13}.

Literature review suggests that growth factor available to tissues is directly proportional to the concentration of platelets. Various growth factors like TGF-β1, PDGF AB, and IGF-1 within the PRP can stimulates cascade of wound healing like mitogenic, angiogenic and chemotactic activities of natural proteins and other growth factors\textsuperscript{14,15}. In the present cases report defects were IBD, so the advantage of 3wall defects is that it provides the best spatial relation for defect self-bridging by vascular and cellular elements\textsuperscript{16}. This type of defects could also help to prevent membrane collapse and provide space for periodontal tissue regeneration.

Use of bone graft or bone graft with membrane are cost effective and failure to attain true periodontal regeneration will be a burden on patient\textsuperscript{17,18}. In this aspect the use of autologous PRP to promote periodontal regeneration shows promising results compared to other materials which results in long junctional epithelium formation. PRP has various bio-mimicking factors which accelerate periodontal wound healing\textsuperscript{19,20}.

PRP has high concentration of platelets and fibrinogen that favors scaffold formation. This in turn enhances cellular migration which is an essential step in the regeneration of IBD. It also helps in the early stages of wound healing by attracting undifferentiated mesenchymal cells within the fibrin matrix and trigger
cell division all of which is responsible for cascade of events taking place during periodontal wound healing.

CONCLUSION
Information from present case reports conclude that PRP is clinically and radio graphically useful in the treatment of IBD. PRP is economical when compared to other regenerative materials. Along with this it has a regulatory effect on proliferation and differentiation of cells from bone and connective tissue which can hasten wound healing.

REFERENCES

