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# PRP: Indispensable to advanced dental implantology

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***Kandhappan M Pillai**, Professor and Head and **Dr Yeshwanth Rao**, Senior Lecturer, Department of Oral and Maxillofacial Surgery, Daswani Dental College, Kota, Rajasthan impart insights on the use of PRP and its advantages in dental implantology*

Dental implants are now becoming the mainstay of replacing lost natural tooth with artificial ones, thanks to the process of osseointegration. Osseointegration is achieved when there is no progressive relative movement between the implant and the bone in direct contact with it and is the result of two complex stages. Osteoinduction is the process by which osteogenesis is induced and osteoconduction is the growth of bone on a surface.

Unfortunately not every case is endowed with the needed amount of bone for successful osseointegration or functional loading and life of implants. In such cases, it becomes mandatory

FEATURED VIDEO

on the operator to resort to various bone augmentation with autogenic or allogenic bone substitutes, to achieve a favourable implant bed.

Favourable implant bed can be qualitatively and quantitatively enhanced by using growth factors and the quickest, safest and the most efficient way to extract growth factor is through PRP or Remi PRP extractor. Platelet-rich plasma (PRP) is an inexpensive way to obtain many GFs in physiological proportion and has already been largely applied as a carrier of GFs in different fields of medicine (sports medicine, orthopaedics, dermatology, ophthalmology, plastic and maxillofacial surgery, neurosurgery, urology and cardiothoracic surgery) due to its property of favouring tissue healing even in tissues with low healing potential.

## Discussion

Implant dentistry entails surgical reconstruction of localised alveolar defects to improve quality and quantity of the host bone using bone substitute with osteogenic properties (osteoconduction and osteoinduction). Guided bone regeneration is an accepted surgical method to help achieve this goal. PRP derived from autologous blood is safe and rich in growth factors like—

1. PDGF
2. TGF $\beta$
3. PDEGF
4. IGF1

PRP and its constituents are obtained by centrifugation of autologous blood and addition of CaCl<sub>2</sub> and thrombin which makes it into PRP gel. This has a high concentration of platelets and fibrinogen. The addition of thrombin and CaCl results in the release of a cascade of growth factors from the platelets ( $\alpha$ -granules).

PRP is being used nowadays to derive these factors in high concentrations to sites requiring osseous-grafting, prior to or in conjunction with implant placement.

**Advantages of autologous PRP include:**

## Becoming sedentary is giving birth to NCDs

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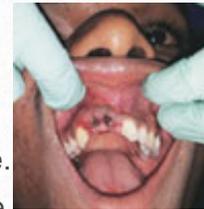
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- Quick and substantial alveolar bone augmentation
- Better handling of the graft material (alloplastic/ autogenous) in the presence of an adhesive medium aiding in compaction
- Increased rate of collagen matrix synthesis
- Increased rate of bone deposition and quality of bone achieving along with quick soft tissue healing
- No risk of infection or disease transmission
- Obvious ease of procurement and preparation.

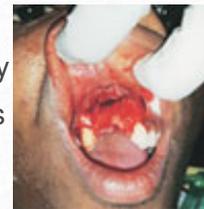
### Case studies

A 24-year-old male patient reported to our OPD with a traumatic injury to the face sustained following a road traffic accident. Pre-operative picture 1 shows the extent of damage. Preoperative radiographs showed that 12 — the upper right lateral incisor was impacted into the bone close to the floor of nose. After primary care it was decided to rehabilitate the patient dentally. During the course of conversation with the patient and his family it was more than abundantly clear that they did not want to opt for any replacement that looked or felt like artificial. Keeping in mind the patient's insistence on wanting a replacement as natural as possible it was decided to replace the lost teeth using two Endosseous TS-III implants for missing 12,11.



Picture 1

The main problem that we faced was that there was severe bone loss secondary to trauma especially the outer or the buccal cortical plate was totally shattered and thus there was just not enough bone bed to anchor the implants for initial stability critical for osseointegration. This quest for favourable bone bed led us to contemplate bone grafting by allogenic graft materials mixed to patient's own PRP for optimum results.



Picture 2

The patient was taken under local anaesthesia and Muco-Periosteal flap raised and the Impacted Lateral Incisor exposed and extracted. Note the complete loss of buccal cortical

bone upto the level of piriform aperture and floor of the nose in Picture 2.

Osteotomy on the palatal cortical plates in the apical third done for anchorage of implants, lack of bone support led us to obtain purchase only on the apical third of the implant length. Picture 3 shows installation of implants 12, 11. Please note that almost the entire buccal surface of the implant is exposed and is devoid of any bone coverage.



Picture 3

10cc of blood is withdrawn from the patient's arm for extraction of PRP in Remi's specially designed refrigerated centrifuge. After two rounds of centrifugation cycle PRP is extracted using the PRP kit, thus in matter of few minutes PRP gel was ready, PRP gel was mixed with Bone Graft Allogenic – Combination of Beta TCP and Hydroxy – Apatite- Ossify from Equinox, Netherlands used, shown in Picture 4, covering the exposed surface of the implants and sutures placed following insertion of membrane – guided bone regeneration technique.

Patient was regularly followed up for post-operative difficulties of complications, but as it turned out that the healing was rather surprisingly quick and uneventful. Also, it was noted that the post-operative oedema was significantly lesser than the cases where only bone graft of similar kind was placed alone of course barring individual patient factors that come into play.



Picture 4

The antibiotic regimen was continued for the first seven days post operatively and the sutures were removed on the fourteenth day following surgery.

Picture 5 shows one month post operation. Note the quick and amazing thickness of bone formation, smooth contoured surface, implant or its threads were not perceptible. In fact it is worth to note that the bone is much thicker on the grafted side as compared to the natural side which would eventually normalise as the bone underwent functional remodelling.



Picture 5

Also as noted and experienced that the epithelisation is also effectively speeded up when PRP is used, thus resulting in quick wound healing and flap preservation even in cases where the blood supply to the flap may be compromised or the flap

has been stretched beyond usual.

## Conclusion

Theoretical advantages as stated and practicality of use and advantages as experienced, lead us to inference that PRP is an indispensable armamentarium in the hands of implantologist who plan to push the limits beyond the limits of currently accepted good case domain. The advantages of PRP has been proven beyond realms of doubt by various authors and studies, what needs to be seen for the future is development of standard protocols and practises for clinical application. It is also important the PRP is harvested using REMI PRP Centrifuge which comes in refrigerated version, since during harvesting the temperature of blood should be between 20 to 24°C. Any increase in temperature will result in disruption in platelet count, which will affect the therapy.

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