



## HEALING OF BONE DEFECTS BY AUTOGENOUS PLATELET RICH PLASMA IN PEDIATRIC PATIENTS

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### ABSTRACT

**OBJECTIVES** – Objective of this study is to evaluate the new bone formation in bony defects after placement of PRP and its efficacy of regenerative potential .

**METHOD** – Twenty five pediatric patients were selected for the study and PRP was extracted from patients own blood and placed in defect in all patients. Post operative clinical and radiographic observation was done at 1<sup>st</sup>, 4<sup>th</sup> and 6<sup>th</sup> month.

**RESULTS** – Faster bone healing in all patients was observed.

**CONCLUSION** – It can be concluded by the study that PRP is a better source of bone induction growth factors and regeneration of bone can be done at faster rate which is a favorable biological response similar to natural healing process.

**KEY WORDS:** Platelet rich plasma [PRP], Osseous defects, Osteoinduction, Osteoconduction, Bone regeneration, Centrifugation

### INTRODUCTION

Local defects in bone arising as a result of trauma or surgery are frequently restored by bone graft<sup>1,2</sup> substitutes, preferably by autografts and allografts.

Allografts and xenografts may be toxic, chemically unstable, cause inflammatory or antigenic reaction<sup>3</sup>. Another important property is that its microstructure can not be controlled to promote the formation of pores that can allow the migration of blood vessels and bone tissues into the material<sup>4</sup>.

Platelet Rich Plasma[PRP] is a graft material for restoration of bone defects . It can be used alone or in combination with other alloplast or xenograft materials. Autogenous PRP has advantages over allografts in many aspects<sup>5</sup>. It initiates the osteoinduction process which is mediated by growth factors present in platelets. When these platelets are present in higher number, it can produce large amount of growth factors initiating bone formation<sup>6</sup>. Platelets can be taken from patients own blood in labs via different procedures. PRP initiates bone regeneration and healing of surrounding tissues also.

### MATERIAL & METHODS

This study was carried out on 25 children aged 8 to 13 years, having no acute infection. or

medical compromise. The cases of peri apical cyst, peri apical pathology and bone defects after extraction were selected and grafting was done in all cases. The surgical procedure was performed to remove pathologies or tooth. 20 ml of blood was withdrawn from each patient and centrifuged at 15000 rpm for 10 minutes to separate RBCs and plasma. The plasma was re-centrifuged for 15 minutes, Calcium chloride [0.5%] added and hot water bath given for 20 minutes, to achieve Platelet rich Plasma.

PRP is now collected from the top layer for packing into the defect [Fig.1]. The flap was closed and medications prescribed



Fig. 1 PRP packed in defect

The postoperative evaluation of all the patients was done at 1<sup>st</sup>, 2<sup>nd</sup> and 6<sup>th</sup> month to assess bone swelling, formation and graft rejection by Radiographic and clinical observation at recalls.

## RESULTS

After recording the clinical and radiographic data following results were tabulated :

**Table I: Incidence of Swelling**

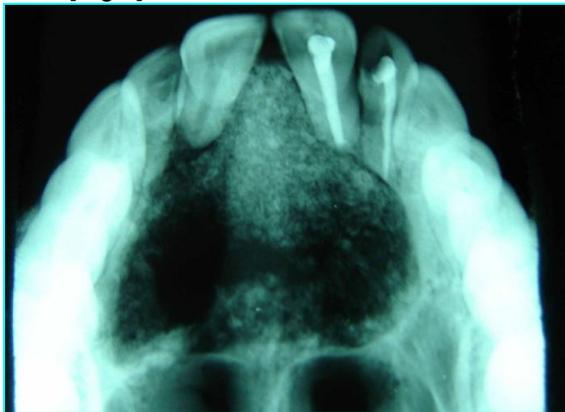
	1 <sup>st</sup> month follow up		2 <sup>nd</sup> month follow up		6 <sup>th</sup> month follow up	
	Yes	%	No.	%	No.	%
Present	25	100	00	00	00	00

Swelling was observed in 1<sup>st</sup> month only.

**Table II: Radiographic evidences of bone formation**

	1 <sup>st</sup> month follow up		2 <sup>nd</sup> month follow up		6 <sup>th</sup> month follow up	
	No.	%	YES	%	YES	%
Present	25	100	25	100	25	100

Bone formation was observed at the end of 2<sup>nd</sup> month which is higher than the normal healing rate. Assessment of radiograph was done on the basis of radio-pacity and trabeculi pattern of bone [Fig.2].



## DISCUSSION

Bone substitutes are in great demand in the treatment of various disorders like periodontal diseases, dental periapical abscess, bone tumors, trauma and other bone defects<sup>7</sup>. The use of autogenous bone has remained the gold standard in restoring bone defects<sup>8</sup>, but it is not always possible to obtain enough bone or the amount of bone needed may exceed than that may be available<sup>9</sup>.

For these reasons, biomaterials have been investigated as an alternative to autogenous

bone grafts<sup>10</sup>. Bone substitute materials are grafted to serve as a filler and scaffold to promote wound healing<sup>11</sup> and facilitate bone formation.

The present study was done to determine the efficacy of PRP grafted into the osseous defects in pediatric patients ranging from 8-13 years . Hypothesis behind early bone formation in PRP is as a result of the effect of different growth factors, namely mitogenesis , angiogenesis, fibroblastic and osteoblastic activity, macrophage activation, maturation of bone and osteoclast mediated resorption<sup>8</sup> are the processes which take place to initiate bone formation. Bone is formed from all aspects of bone available at site.

These results indicated that the PRP can be used as graft material in bone defects for early bone formation.

## CONCLUSION

Bone grafts are used for treatment of various osseous defects but PRP holds the potential for bone formation similar to natural bone healing pattern in a faster way. The use of autogenous bone has remained the gold standard in restoring bone defects since long time and PRP continues the same phenomenon without any complication.

Following conclusion can be drawn that Post surgical healing with good clinical and radiographic values without adverse complication can be done by PRP.

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