REGENERATION OF AN IMMATURE PERMANENT MAXILLARY CENTRAL INCISOR WITH NECROTIC PULP & PERIAPICAL LESION USING PRF AS SCAFFOLD:A CASE REPORT

Present protocol of treatment of non-vital immature tooth with or without pathology is to undergo the procedure of revascularization ensuring thickening of the dentinal wall, closure of apex, lengthening of tooth as well as its vitality, adding strength to the tooth which is not possible in conventional apexification procedures with calcium hydroxide or MTA &BioDentine.

Regenerative endodontic procedures (REP) can be described as biologically based procedures designed to replace diseased or missing pulp–dentin complex[1].Although, first reported in literature by Nygaard-Ostby[2] in 1961, it re-emerged as a viable alternative to apexification with the work of Banchs& Trope[3] in 2004 & Iwaya[4] in 2001.

The conceptof regenerative endodontics is the triadof **scaffold, stem cells & growth factors** which is based on **tissue engineering**.

CASE REPORT

A 9 year old male patient reported to the department with the complaint of 21 with fractured incisal edgedue to trauma 2years back. There was no relevant medical history or any pain or swelling. The tooth was not tender to percussion or palpation. It was also non responsive to thermal & electrical pulp tests.

Radiographic examination revealed an immature tooth with a periapical radiolucency of size 8x8 mm (Fig.1). REP was planned using PRF as scaffold and written informed consent was obtained from the patient’s parents.

The tooth was isolated with the rubber dam (Hygenic, ColteneWhaledent, Germany) and access opening was done. Using hand K files (Mani, India), gentle filing was done to disrupt the biofilm on the canal walls. The working length was determined by IOPA x ray (Fig.2). Without mechanical instrumentation, gentle irrigation of the canal was performed using 20 mL of 3% sodium hypochlorite solution (Prime Dental, India)followed by irrigation with 20 mL of 17 % EDTA.

The canal was then dried with sterile absorbent paper points (DentsplyMaillefer). Calcium Hydroxide paste (Ultracal XS, Ultradent,USA) was placed asintracanal medicament. The tooth was sealed coronally with 4 mm Cavit (3M ESPE, Germany).

On the second appointment, after 3 weeks, the tooth was re-accessed and calcium hydroxide removed throughsame irrigation protocol.10 mL of Patient's own blood was drawn in a syringe and immediately centrifuged in a table top centrifuge (REMI Laboratories, Mumbai) at 3000 rpm for 15 minutes. Three distinct layers were formed in the tube: Acellular plasma at thetop, PRFclot in the middle and red blood cells at the bottom (Fig.3).PRF clot was removed from the acellular plasma & the RBCs (Fig.4). Itwas squeezed to drive out the fluids (Fig.5)& placed as a whole in the dried root canal below the CEJ. This was followed by placement of 3 mm MTA, which was covered by moist cotton pellet & sealed withCavit. Both the latter two were subsequently removed & restored with composite resin after 24 hours (Fig.6).

Fig.1: Pre-op

Fig.2: Working length determination

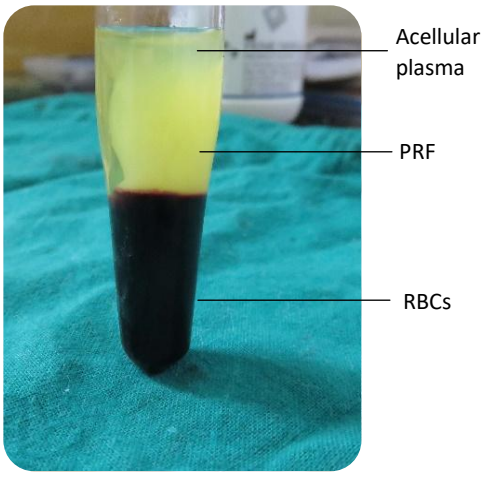
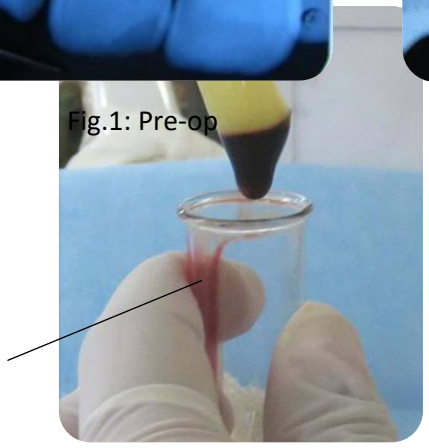
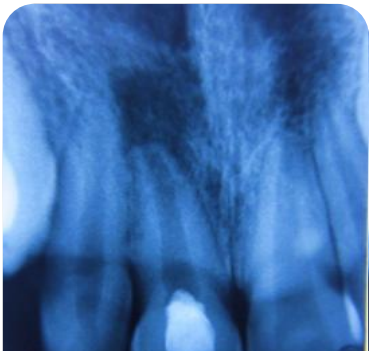


Fig.3: Platelet rich fibrin-immediately after centrifugation





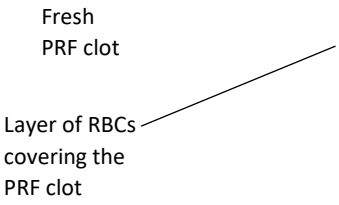


Fig.4: Platelet rich fibrin

Fig.5:Squeezed PRF clot

Fig.6: Immediately after placing PRF

The patient was kept under regular follow upfor clinical & radiological examinationsupto 18 months. Healing of the periapical lesion was appreciable at 6 months (Fig.6), with the lesion completely healed at 12 months (Fig.7). There was continued root maturation with lateral dentinal thickening evident at 12 months & apical closure at 18 months (Fig.8). However, vitality could not be elicited by heat, cold or electric pulp testing.

DISCUSSION

Stem cells important for regeneration are **Stem Cells from Apical Papilla&multipotent dental pulp stem cells**. Important growth factors are **Vascular Endothelial Growth Factor and Transforming Growth Factor Beta 1**[5].

3% NaOCl was used due to concerns regarding decreased stem cell survival with increased concentration of NaOCl[5]. A final irrigation was done with 17% EDTA to reverse it'sdeleterious effects of dentin conditioning.

As intracanal medicament, Calcium hydroxide (Ultracal) was used as it has no detrimental effect on stem cell survivalin contrast to Triple Antibiotic Paste which is also being used[6].

A scaffold is a three dimensional structure that supports cell organization, vascularisation & contains growth factors. PRF is far superior to PRP, Blood clot, Collagen[7]& other synthetic scaffolds - Chitosan&Polylactic Glycolic acid (PLGA) etc.[9] as it release growth factor steadily in 7-14 days during the time of ingrowth of

stem cell, placement is easy in root canal & elicit no untoward reaction as its preparation requires no chemical.

Fig.6: 6 months

Fig.7: 12 months

Fig.7: 18 months

The case is still kept under regular follow up &vitality is expected subsequently.

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Case of the Month – January 2018

Contributors' Form

I / We certify that I/we have participated sufficiently in the intellectual content, conception and design of this work or the analysis and interpretation of the writing of the manuscript, to take public responsibility for it and have agreed to have my/our name listed as a contributor. I/we certify that all the data collected during the study is presented in this manuscript and no data from the case report has been or will be published by the editors, I/we will provide the data/information or will cooperate fully in obtaining and providing the data/information on which the manuscript is based, their assignees.

We give the rights to the corresponding author to make necessary changes as per the request of the panel, do the rest of the correspondence on guarantor for the manuscript on our behalf.

All persons who have made substantial contributions to the work reported in the manuscript, but who are not authors, are named in the Acknowledgment permission to be named. If I/we do not include an Acknowledgment that means I/we have not received substantial contributions from non-authors and Name

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