

The Effect of Platelet Rich Plasma on Degenerated Cartilage: In Vitro an Experimental Study

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Abstract: OBJECTIVE: In this study, we aimed to reveal of the effectiveness of platelet rich plasma on degenerated chondrocyte cells by using different doses, duration and differ method of activation of thrombocytes.

MATERIALS AND METHOD: Human chondrocyte (CHON-001 ATCC CRL-2846) cells were used in this investigation. Experimental model of chondrocyte cells were yielded in the appropriate medium. Platelet rich plasma was obtained from voluntaries with afarez method at hematology laboratory. Platelet-rich plasma in the form of $4,8 \times 10^6$ - 2.4×10^6 - $1,2 \times 10^6$ - 6×10^5 - 3×10^5 doses were set at five different doses. The first group of platelet rich plasma was left intact, the second group was exploded seven minutes by applying ultrasonic waves in water, the third group was activated with calcium chloride and last group was identified as the control group. The linear damage was created with the tip of ten microliters pipette from side to side. Cell migration was evaluated with inverted microscope at a magnification of x10 and at 0-4-8-24 and 48 hours to observe wound healing and was photographed. The pictures were evaluated by using image J programme to describe the space between migrated cells.

RESULTS: According to the groups healing rates at 4-8 and 24. hours among exploded and intact platelet groups at all doses were found a non-significant, while a significant improvement at 48 hour were observed when compared with the control group with all doses ($p < 0.0001$). A calcium-activated group was not found statistically meaningfull with all doses at 4-8 and 24 hours but significant improvement were observed with $4,8 \times 10^6$ - 2.4×10^6 - $1,2 \times 10^6$ doses at 48 hours when was compared to the control group ($p < 0.0001$).

At 48 hour with 3×10^5 and 6×10^5 doses, intact and exploded platelet groups were significantly different when compared to control group ($p < 0.0001$) . But all groups showed significant improvement at $1,2 \times 10^6$ and higher doses ($p < 0.0001$).

Exploded and intact groups showed significant improvement according to activation methods, at even 3×10^5 and 6×10^5 doses but at 48 hours when compared to third group ($p < 0.01$).

CONCLUSION: Cartilage damage is basic pathology in the pathogenesis of osteoarthritis. It has been shown that all doses of PRP had pozitive effect on healing process. Meanwhile it has been observed that the time was critical parameter of healing process and the significant healing were accomplished at after 48 hours.

Key words: platelet rich plasma, chondrocyte