AN INVITRO COMPARISON OF HUMAN DENTAL PULP CELL DIFFERENTIATION AND MINERALISING ABILITY OF THREE PULP CAPPING AGENTS

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ABSTRACT

Background & Objective:

An ideal pulp capping agent should be able to stimulate the differentiation human dental pulp cell (hDPSCs) and promote formation of reparative dentin, thus aid in the healing of pulp-dentin complex. The objective of present study is to investigate Biodentine, TheraCal LC and TotalFill BC RRM in their ability to induce Odontoblastic differentiation and mineralization in hDPSCs.

Methodology:

Human dental pulp tissue was isolated from freshly extracted teeth for cell culture. hDPSCs were seeded with Biodentine, TheraCal LC and TotalFill BC RRM respectively. The genetic expression of odontoblastic differentiation related genes OC, DMP-1 and DSPP were assessed by quantitative RT-PCR. ALP activity and Alizarin Red Staining were done to evaluate the mineralization potential on day 3, 5 and 7. Statistical significance was set at $p<0.05$.

Results:

TotalFill BC RRM showed highest expression of all odontoblastic genes ($p<0.05$) on all days except on Day 3 of OC which was highest in Biodentine. TotalFill BC RRM showed expression to be highest by day 7. By day 5 and 7 TotalFill BC RRM showed highest ALP activity followed by Biodentine and TheraCal LC. The results of Alizarin red showed there was increase in calcium rich deposits from day 3 to 7 in all groups. TheraCal LC showed lumping of cells.

Conclusion:

TotalFill BC RRM showed the highest differentiation and mineralization potential followed by Biodentine. TheraCal LC showed poor results for odontoblastic differentiation and mineralization.

Key Words:

Pulp Capping; human dental pulp cells; Bioactivity; Alkaline phosphatase; RT-PCR; Alizarin Red; Biodentine; TheraCal LC; TotalFill BC RRM