

THE EFFECTS OF ADDING COAGULANT/ANTIMICROBIAL AGENT ON THE BLOOD CLOTTING TIME AND MG63 CELL ACTIVITY OF CALCIUM PHOSPHATE CEMENT

Chia-Ching Lin^{1,3}, Dan-Jae Lin^{1,3}, Wen-Cheng Chen²

¹Department of Dental Hygiene, China Medical University, Taichung, Taiwan

²Department of Fiber and Composite Materials, Feng Chia University, Taichung, Taiwan

³Dental biology Laboratory, China Medical University, Taichung, Taiwan

E-mail: djlin@mail.cmu.edu.tw

INTRODUCTION

The purpose of this study was to investigate the effects of adding bismuth subgallate (BS) (a coagulant/antimicrobial agent) to the calcium phosphate cement (CPC) on its blood clotting time and cell viability.

METHODS

5, 10, 15wt% BS (5BS, 10BS, 15BS) were added to the CPC original powder (TTCP/DCPA) and mixed with 1M phosphoric acid at a liquid/ powder ratio of 0.35. The pastes were filled in a stainless mold to form specimens of 3mm thickness and 6mm diameter. Samples without BS were set as control group. The clotting time was determined by dropping 5 μ L adult whole blood on each specimen and measured the total time until protein fiber formation which was tested every 15sec by a blood taking needle. MG63 human osteosarcoma cell viability were measured by MTT assay at 1 hour and 24 hours. Data were analysis by ANOVA followed with Tukey's test for post-hoc comparison.

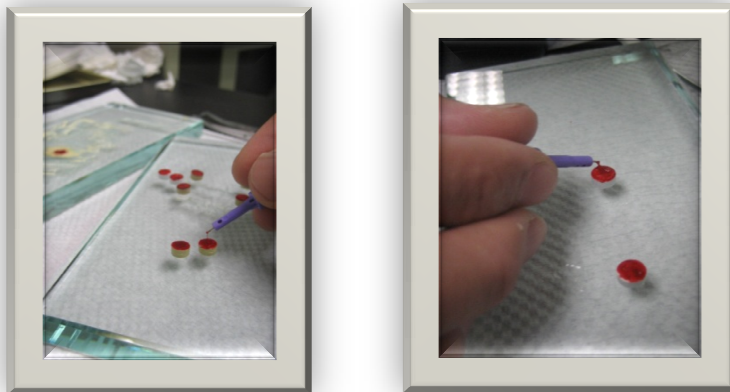


Figure 1 Powders and liquid were mixed on a cold glass plate. The clotting time was determined after setting for 15 minutes using a blood taking needle every 15 sec.

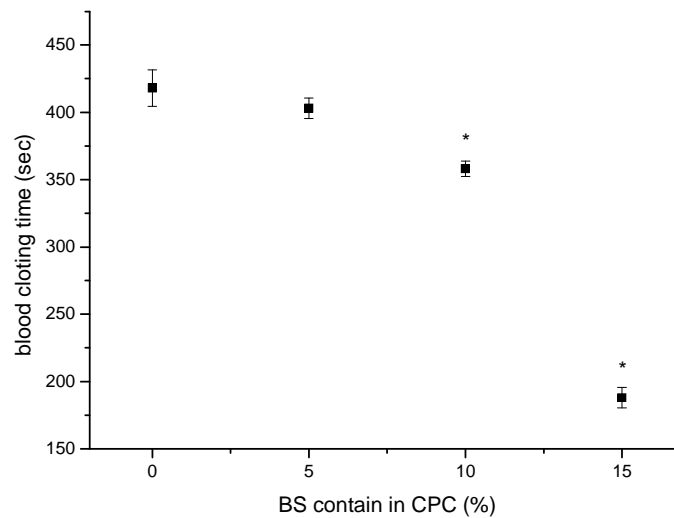


Figure 2 Clotting time of CPC 0%, 5%, 10%, and 15% BS.
* means significant different to the control group (0% BS)

RESULTS AND DISCUSSION

The clotting time of 10BS (358±6sec) is significantly shorter than that of the control group (418±13sec, $p < 0.001$). The clotting time of 15BS is only 188±7sec. The one hour cell viability of each group containing BS was higher than that of the control group and blank group. After 24 hours, cell viabilities of BS-contained groups were still higher than that of the control group but there were no significant difference to the blank group.

CONCLUSION

Adding more than 10wt% BS can significantly accelerate the blood clotting on the CPC. Adding BS will increase the viability of MG63 cell at the first hour, but the cell viabilities at 24 hours were similar to the blank group.

REFERENCES

1. V. Callanan, A.J. Curran, D.A. Smyth, P.K. Gormley. *J Laryngol Otol.*, **109**, 206-208. 1995.
2. H.H. Xu, S. Takagi, J.B. Quinn, L.C. Chow. *J Biomed Mater Res A.*, **68**, 725-734, 2004.
3. S.A. Puia, S.J. Renou, E.A. Rey, M.B. Guglielmotti, C.E. Bozzini. *Int J Oral Maxillofac Surg.*, **38**, 785-789, 2009.