

## **ABSTRACT**

Recently, photobiomodulation has been shown to positively modulate the properties of dental pulp stem cells (DPSCs) in regenerative endodontics which is considered a promising solution to standard therapies for preserving pulp vitality and avoiding more extensive treatments such as endodontic therapy and tooth extraction. Therefore, the present study evaluated the effects of photobiomodulation and exosomes of DPSCs for pulp regeneration in dogs. Five healthy mature mongrel dogs were divided into four groups; group I, negative control; group II; Positive control (exposed pulp covered by A sterile piece of polytetrafluoroethylene (PTFE, Teflon tape) , group III: PBM group with 980 nm diode laser with output power 100 mw for one minute , group IV; exosomes, group V: exosomes + PBM.. Each dog represented one group. Blood samples were collected from dogs after 14dayspostoperatively. Biochemicals as total and ionized calcium, phosphorus, and alkaline phosphatase levels and the gene expression levels of matrix metalloproteinase 9, osteocalcin, transforming growth factor beta genes were measured with real-time quantitative polymerase chain reaction. Statistical analysis showed that there were significance differences between PBM, exosomes and combination group of PBM and exosomes compared to control group in different assessed biochemicals and genes expression's levels. PBM combined with exosomes enhanced the mineral content like total and ionized calcium, phosphorus level and alkaline phosphatase (ALP) as well as increased gene expression of Matrix metalloproteinase 9 (MMP 9), Transforming growth factor beta (TGF-  $\beta$ ), and Osteocalcin OCN during pulp regeneration in dogs.

**Keywords:** Photobiomodulation, Exosome, Matrix Metalloproteinase 9 , Growth Factor , Osteocalcin .