Effect of the Silk Scaffold Contained Nano-hydroxyapatite for Osteogenesis
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Introduction
Due to the risk of possible immune responses, disease transmission, and the cost of allografts, many biomaterials have been used for clinical application, mainly in orthopaedics and dentistry. Hydroxyapatite (HAp) is a widely used biomaterial for bone tissue substitution, because of its chemical similarity with natural bone. So, in this study we tried to make a silk scaffold contained nano-HAp for dental tissue engineering.

Materials and Methods
The silk scaffolds extracted sericin were coated with 0.3g, 0.15g, 0.03g of nano-HAp dissolved in PBS. Then, they were soaked in a 1% type I atelocollagen solution and air dried. They were crosslinked with 0.02% carbodiimide and lyophilized for 48 h. And they were sterilized by γ-irradiation at 10 KGy. DPSCs were seeded into silk scaffolds contained nano-HAp at a density of 2.8×10^4 cells/cm^2 and cultured for 3 weeks in growth medium. Then, they were cultured for 4 weeks in differentiation medium and were transplanted in the nude mouse. The biopsy was processed at 8 weeks.

Results
![Fig. 1. RT-PCR analysis after 4 weeks with differentiation medium in vitro.](image)

Col III and fibronectin, osteocalcin, osteopontin, osteonectin, osteoprotegerin and BMP-2 levels in the culture were greatest in the 0.15g of HAp.

Fig 2. Histological comparison of the scaffolds following 8 weeks after transplanted (A, B: Control(HAp 0g), C, D: HAp 0.03g, E, F: HAp 0.15g, G, H: 0.3g).
The calcification and the revelation of osteocalcin and osteopontin were better made in the silk scaffold contained 15mg of nano-HAp.

Discussion and Conclusions
We could make silk scaffold contained various concentration of nano-HAp. Among them, 15mg of nano-HAp was the most effective for osteogenesis. It will be a suitable substrate as biomaterial for bone tissue.

References List references cited in text as

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Disclosures