

# **Simultaneous implant placement and bone regeneration around dental implants using tissue-engineered bone with fibrin glue, mesenchymal stem cells and platelet-rich plasma.**

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## **Abstract:**

This study was undertaken to evaluate the use of tissue-engineered bone as grafting material for alveolar augmentation with simultaneous implant placement. Twelve adult hybrid dogs were used in this study. One month after the extraction of teeth in the mandible region, bone defects on both sides of the mandible were induced using a trephine bar with a diameter of 10 mm. Dog mesenchymal stem cells (dMSCs) were obtained via iliac bone biopsy and cultured for 4 weeks before implantation. After installing the dental implants, the defects were simultaneously implanted with the following graft materials: (i) fibrin, (ii) dMSCs and fibrin (dMSCs/fibrin), (iii) dMSCs, platelet-rich plasma (PRP) and fibrin (dMSCs/PRP/fibrin) and (iv) control (defect only). The implants were assessed by histological and histomorphometric analysis, 2, 4 and 8 weeks after implantation. The implants exhibited varying degrees of bone-implant contact (BIC). The BIC was 17%, 19% and 29% (control), 20%, 22% and 25% (fibrin), 22%, 32% and 42% (dMSCs/fibrin) and 25%, 49% and 53% (dMSCs/PRP/fibrin) after 2, 4 and 8 weeks, respectively. This study suggests that tissue-engineered bone may be of sufficient quality for predictable enhancement of bone regeneration around dental implants when used simultaneous by with implant placement. Copyright © Blackwell Munksgaard 2006.