

## Efficacy of absorbable bone plate treated with freeze-dried allograft cortical bone in canine fracture model

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**Introduction:** Conventional metal material such as bone plate, screw and pin used widely for orthopedic surgery must be removed after union, because that much more rigid than bone may cause recurrent fracture. Though, absorbable fixation materials such as ceramics, decalcified cortical bone and several synthetic absorbable polymer have been applied in clinic, some disadvantages such as early absorption, low strength and a few fixation ability were reported. In this study, the effectiveness of internal fixation with absorbable bone plate using freeze-drying allograft cortical bone(FACB) was investigated in canine fracture model.

**Materials and Methods:** Fracture was induced by making transverse defects of 5mm length in diaphysis of ulna of 18 dogs. Absorbable bone plate treated with freeze-dried allograft cortical bone(FACB) with metal bone screw was applied in 12 dogs, and metal bone plate and screw composed of titanium alloy was used in 6 dogs. To prepare FACB, cancellous bone, bone marrow, periosteum and blood materials were removed mechanically. Then, it was soaked into chloroform-methanol solution for 7 days and freeze dried at -80°C. Radiographic evaluation criteria such as new bone formation, union of defected gap, and absorption of bone plate were evaluated every 2 to 4 weeks intervals for 150 weeks.

**Results:** The new bone formation in FACB bone plate group was noticed in 10 out of 12 dogs, and started from 5.7 weeks, and evidence of union was apparent from 13 weeks after operation. Absorption of FACB bone plate was observed in all cases started from 7 weeks and continued to 48 weeks in all dogs.

**Clinical relevance:** The bone plate processed with freeze-dried allograft cortical bone could be applied clinically as a absorbable internal fixation material to facilitate healing by induction of new bone formation and avoid an additional surgery to remove the fixation devices.

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