The Technique and Strategy for Distal Radius Fracture-Related Problems Using a Bioabsorbable Plate

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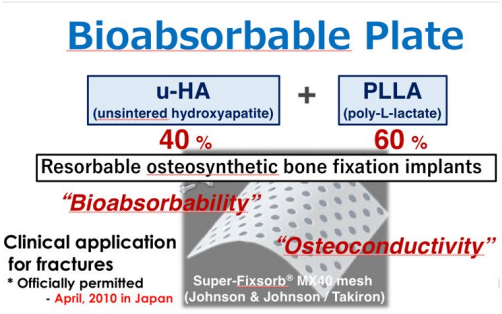
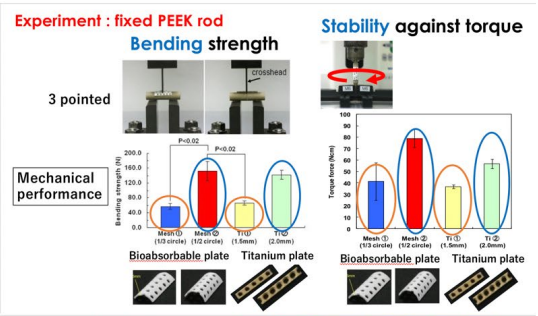
Purpose: Using bioabsorbable implants that would negate the need for subsequent removal could offer significant clinical advantages for the fixation of fractures. However, previous bioabsorbable plates (BAPs) have had several issues concerning clinical usage. This study aimed to compare the mechanical properties of a novel BAP with those of titanium plates in a fracture model and to demonstrate the clinical results of these new plates for hand fractures. The second aim is to explain the technique and strategy for distal radius fracture-related problems using BAPs.

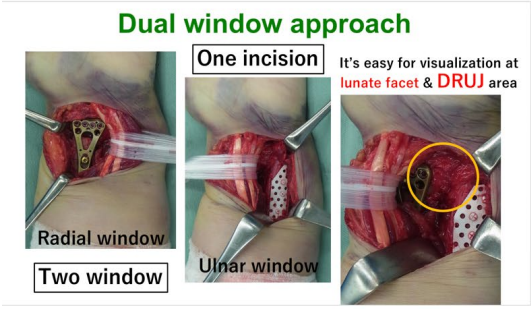
Methods: The first set of experiments compared the mechanical properties of BAP and titanium plates. Two types of BAPs made of hydroxyapatite/poly-L-lactide (1/3- and 1/2-circle in cross-section) and 2 titanium plates (for 1.5- and 2.0-mm screws) were tested. Each plate was fixed on a polyetheretherketone (PEEK) rod, transversely cut at its midsection.
The second part of the studies demonstrated the clinical results of BAPs used in 39 cases of 40 distal radius and ulnar fracture cases from July 2008 to May 2019. The follow-up period ranged from 3 months to 8 years and 8 months. The mean age of the patients was 69.0 years (range, 28-90).

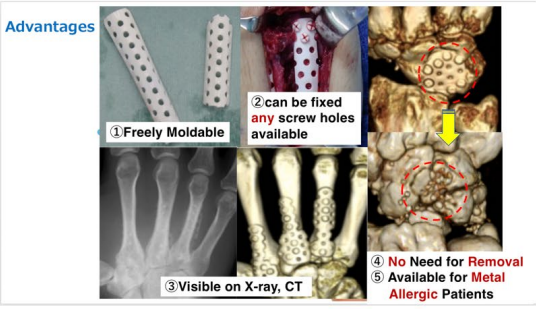
Results: The bending strength and stiffness of 1/3-circle BAP constructs were comparable with those of titanium plates for 1.5-mm screws, and those of 1/2-circle BAPs were comparable with those of titanium plates for 2.0-mm screws.
The nonunion rate was 2.5% (1 case in distal ulnar fracture in 40 patients). No case needed implant removal because of loose screws in 3 cases of distal ulnar fractures. We will present typical cases of BAP use (buttress plate fixation of comminuted dorsal fractures of the distal radius and fixation using the dual window approach for fractures of the distal radius and ulnar) and will discuss the techniques in detail.

Conclusion: The clinical study of BAPs used in the distal radius and ulnar fractures revealed satisfactory union rate, range of motion, and grip strength results. The bending strength, stiffness, and torsional strength of novel 1/3- or 1/2-circle BAPs were comparable with those for titanium plates for 1.5- or 2.0-mm screws. BAPs can be custom-made for each case and have many potential treatment options.









NEW TECHNIQUES

See the meeting website for complete listing of authors' disclosure information. Schedule and presenters subject to change.