Arthroscopic Bone Graft and Fixation for Unstable Scaphoid Nonunions

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Unstable scaphoid nonunion can cause carpal instability or humpback deformity that may lead to degenerative arthritis. Restoration of normal kinematics of the wrist via scaphoid healing and correction of any carpal deformity is crucial to prevent arthritis. This video shows arthroscopic bone grafting and fixation for the management of unstable scaphoid nonunion.

The case presentation of a 50-year-old, right hand–dominant woman who presented with a long-term history of vague left wrist pain is reviewed. Physical examination revealed pain with the scaphoid shift test. CT scans and MRIs revealed an unstable scaphoid nonunions.

With the arm suspended in an Arc Wrist Tower (Acumed), the nonunion was confirmed by introducing a 1.9-mm scope into the ulnar midcarpal portal. After débridement of nonunion sites through the radial midcarpal portal, the nonunion site was reduced with the use of a probe or other instruments under arthroscopic and fluoroscopic guidance. A 15-guage needle was percutaneously inserted to the scaphoid tubercle, and a Kirschner wire was inserted through it and passed from the scaphoid tubercle to the proximal fragment for temporary fixation. An additional Kirscher wire was passed through the 15-guage needle parallel to the first wire. Before reaming along the guidewire, cancellous bone was harvested from the iliac crest via the trephine technique with the use of a bone biopsy needle through a small incision. A small rongeur was engaged to break the harvested bone into small chips, which were placed in the sheath of a 3.5-mm burr. Next, the bone-packed sheath was introduced through scaphotrapezial trapezoid or midcarpal radial portal into the nonunion gap under direct arthroscopic visualization, emanating from the ulnar midcarpal portal. The nonunion gap was filled with cancellous bone, using a slightly undersized bone biopsy trocar to empty the sheath. While performing bone grafting under arthroscopic guidance, the supplied water was blocked, and a probe or a dura elevator was used to pack the defect with grafted bone. After sufficient impaction bone grafting, 1 mL of fibrin glue was injected into the midcarpal joint to contain the grafted bone.

Two previously passed Kirschner wires were replaced with guidewires for two 2.0-mm headless compression screws. A 5-mm transverse incision was subsequently made at the prepositioned guidewire tips after removing the 15-guage needle, and a sharp hemostat was used to spread the soft tissue. A free wire of equal length was passed through the incision onto the cortex of the scaphoid tubercle and parallel to the guidewires. The difference in lengths of the trailing wire ends equaled the scaphoid length. The screw size necessary was 4 mm less than the scaphoid length, permitting 2 mm of clearance at each end of the scaphoid. Under fluoroscopic surveillance, two 2.0-mm headless compression screws were secured at points along the guidewires to fix the scaphoid nonunion.

The patient had no pain at 8 months postoperatively. Union was achieved, and carpal alignment was restored. Grip power and arc of movement were more than 90% compared with the contralateral intact side.

Arthroscopic bone graft and fixation for unstable scaphoid nonunions resulted in satisfactory clinical outcomes in this patient. In addition, the series conducted the authors of this video showed that arthroscopic and open bone grafting and internal fixation for the management of unstable scaphoid nonunions was not associated with any substantial differences in clinical and radiographic outcomes at a minimum follow-up of 2 years postoperatively.