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The Dysplastic Hip: Not for the Shallow Surgeon

Suksan Tangsatapron, MD, Mansour Abolghasemian, MD, Paul R. Kuzyk, MD, David J. Backstein, MD, FRCSC, Med, Oleg A. Safir, MD, FRCSC, Med, and Allan E. Gross, MD, FRCSC, OOnt

Patients who have hip dysplasia are often young and active. Hence, total hip replacement in this group needs meticulous planning to obtain satisfactory fixation with good long-term outcome. Acetabular reconstruction is often complex because of acetabular bone deficiency. Various techniques to deal with the deficiency of acetabular bone stock have been described, including cemented and cementless cups with or without bone graft, impaction bone grafting, perforating the medial acetabular wall (the cotyloplasty technique), and a small-diameter cup at elevated hip center. Multiple studies have reported long-term results of various techniques for acetabular reconstruction.

KEYWORDS dysplastic hip, total hip arthroplasty, long-term results, acetabular autogenous bulk bone graft

Total hip replacement for the patient with a dysplastic hip is difficult. The severity of hip dysplasia varies widely, ranging from the shallow acetabulum to the completely dislocated hip. We find that Hartofilakidis classification is the most practicable for addressing during the planning and implementation of total hip replacement.[1] Type 1 hips are those with dysplasia, in which the femoral head is still within the true acetabulum. Type 2 hips are those with low dislocation, in which the femoral head is in a false acetabulum, the inferior lip of which is in contact with or overlaps the true acetabulum. Type 3 hips are those with high dislocation, in which the false acetabulum has no contact with the true acetabulum. This classification corresponds to the Crowe classification as follows[2]: type 1 hips (dysplasia) correspond to Crowe type I and II hips, type 2 hips (low dislocation) correspond to Crowe type III hips, and type 3 hip (high dislocation) correspond to Crowe type IV hips.

Type 2 and type 3 present the surgeon with certain technical problem. The cup can be placed at the correct level or at an elevated hip center. The practice of the senior author (A.E.G.) is to place the cup at the correct or nearly correct anatomical level. The loads on the hip were lowered significantly by placing the center of the acetabulum as far medially, inferiorly, and anteriorly as was anatomically feasible.[3] Various techniques to deal with the deficiency of acetabular bone stock in developmental dysplasia have been described, including cementless cups with[4-7] or without[8-10] bone graft, cemented cups with structural bone graft,[11,12] impaction bone graft[13] or without graft,[14-16] medialization of the hip center (the cotyloplasty technique),[3,17] and small-diameter cup at elevated hip center.[9] Numerous authors have reported various long-term results from difference techniques of socket implantation.

Cementless Cup with Bone Graft

After the correct level for the true acetabulum is identified by finding the fovea or the base of ischium, drill hole is made through the medial part of the acetabulum and a depth gauge was used to determine how deep to ream. Reaming stopped about 5 mm from the inner cortex. If trial cup has <70% coverage by host bone as determined by intraoperative visual inspection, a shelf autograft is used. The structural bone graft prepared from the resected femoral head is used.[4]

Autogenous bone is considered the gold standard material for bone grafting because it is osteoconductive and osteoinductive. Moreover, it provides osteogenic cells.[17,18] Two

Division of Arthroplasty, Orthopedic Department, Mount Sinai Hospital, University of Toronto, Toronto, Ontario, Canada.
D.J.B. is a consultant for Zimmer and Stryker Company. A.E.G. is a consultant for Zimmer.
Address reprint requests to Suksan Tangsatapron, MD, Department of Orthopaedic Surgery, Division of Arthroplasty, Mount Sinai Hospital, 600 University Ave, Ste 476A, Toronto, Ontario M5G 1X5, Canada. E-mail: sataporn12@yahoo.com

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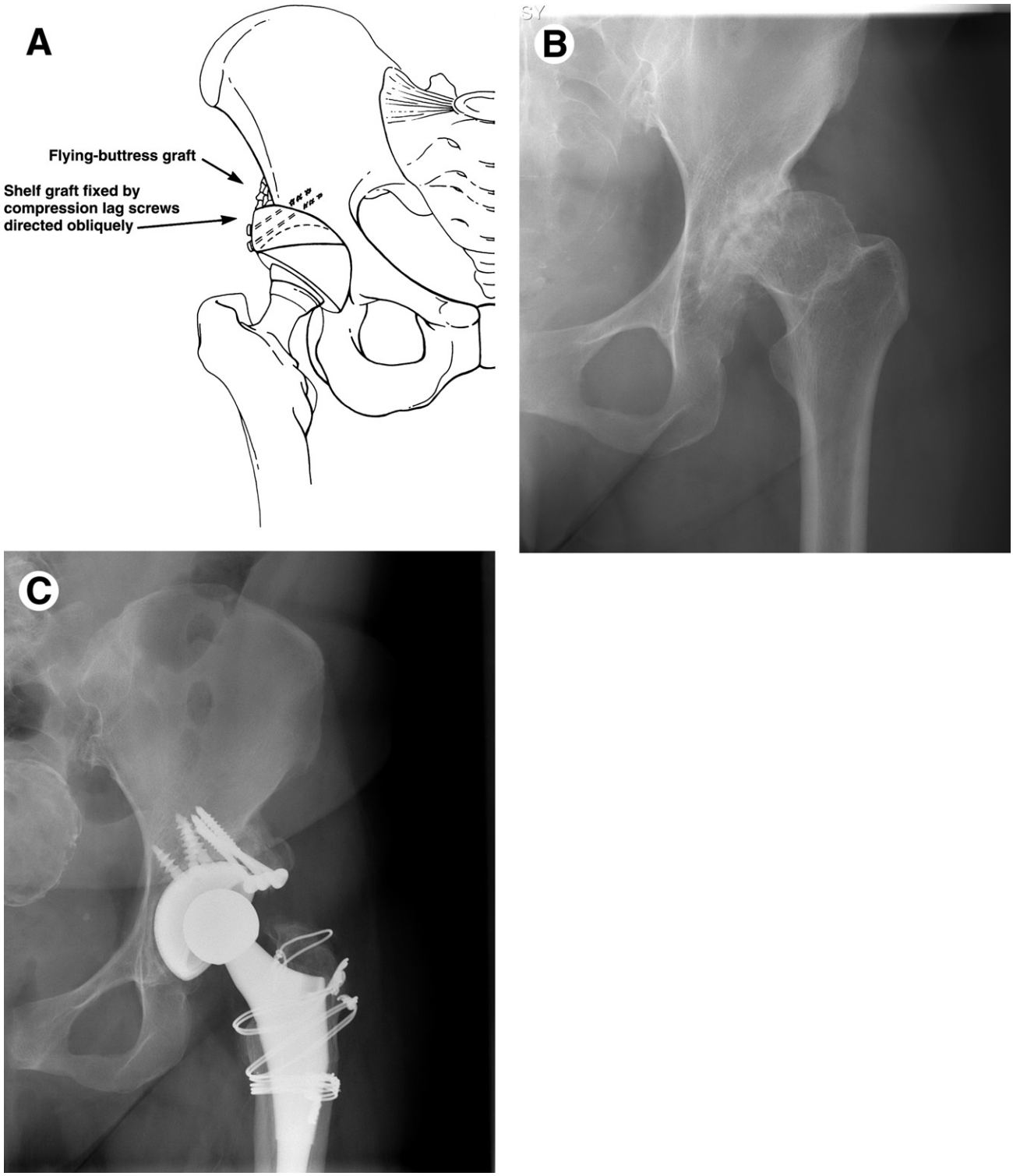

Figure 1 (A) Diagram illustrating flying buttress graft packed against the ilium and the shelf graft. (B) Preoperative x-ray. (C) The shelf graft has united and the buttress graft has consolidated.

types of bone grafts, structural and morselized, help restoration of acetabular bone deficiencies as seen in dysplasia of the hip (DDH) patients. Structural autografting of the superolateral acetabulum with bone from the femoral head increases both the coverage and the stability of the acetabular component.[19-21] Careful preparation of the graft and its bed, stable fixation, and precise positioning are important technical factors.[22-24] The cancellous surface of the graft abuts the cup leading the subchondral bone facing superior. Multiple drill holes are placed above the graft and are covered with morselized autograft to encourage remodeling and union of the graft (Fig. 1). The morselized graft is called a flying buttress graft.[25]