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Femoral Head Avascular Necrosis Treatment & Management

Updated: Nov 03, 2016 | Author: John D Kelly, IV, MD; Chief Editor: Craig C Young, MD [more...](#)

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Essentially, nonoperative treatment for symptomatic AVN of the hip yields unfavorable results. Restricted patient weight bearing with the use of a cane or crutches has not been shown to affect the natural history of the disease and is useful only in controlling symptoms. Physical therapy provides only symptomatic control and also does little to alter disease progression.

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If the AVN is associated with a patient's alcohol use, the clinician is urged to assist the patient in alcohol abstinence. Patient referral to social services, psychologic or psychiatric counseling, or community outreach is recommended. For patients with prolonged steroid use, osteoporosis screening is indicated. (See also the Medscape Reference article [Anabolic Steroid Use and Abuse](#), as well as [Alcohol Disorders Common, Largely Untreated Among American Adults](#) and [Predictors of Future Anabolic Androgenic Steroid Use](#) on Medscape News.)

Surgical Intervention

Surgical treatment of AVN can be broadly categorized as either prophylactic measures (to retard progression) or reconstruction procedures (after femoral head collapse). Small asymptomatic lesions do not warrant surgical intervention and are closely monitored with serial examination. If symptoms ensue, repeat imaging and surgical treatment are indicated.

- Prophylactic measures
 - The most commonly performed prophylactic surgical intervention is core decompression, whereby one or more cores of necrotic femoral head bone is removed in order to stimulate repair. ^[11] Core decompression is often supplemented with bone grafting (cancellous autograft or structural allograft) to enhance mechanical support and augment healing. Biologic augmentation of core decompression includes the addition of demineralized bone matrix, bone morphogenic proteins, or electric/electromagnetic stimulation. ^[12] These agents are purported to either enhance bone formation or decrease bone resorption in the hope of maintaining the structural integrity of the femoral head. Biologic augmentation of core decompression alone offers therapeutic benefit—if it is instituted before subchondral collapse (Steinberg stage III). ^[12] A study analyzed the clinical, functional and radiological outcome of core decompression and bone grafting in 20 patients with 28 cases of osteonecrosis of the femoral head (ONFH) up to stage IIB (Ficat & Arlet). The study concluded that core decompression and bone grafting provide satisfactory outcome when patients are carefully selected in early stages of the disease (stage I), before the stage of collapse. However patients with stage II disease had poorer outcomes approximately 50% with improvement. ^[13]
 - The addition of a vascularized fibular graft to core decompression offers promise in cases with more advanced lesions, but this procedure involves considerable morbidity. One study indicated that vascularized fibular grafts were more effective in preventing femoral head collapse than nonvascularized fibular autografts. ^[14, 15]
 - The results of prophylactic measures for femoral head AVN have considerable variation, but certain generalizations can safely be stated. Namely, the clinical results of core decompression alone deteriorate with more advanced lesions. ^[12] The addition of cancellous bone grafting appears to slightly enhance clinical outcomes if subchondral fracture is present. ^[14] The addition of demineralized bone matrix to core decompression confers little (if any) clinical response, and the effects of bone morphogenic protein remain uncertain.
 - The supplemental implementation of electrical stimulation with core decompression has provided disappointing results. ^[12] Low-frequency pulsed electric and magnetic fields may offer more promise, but clinical results thus far are inconclusive. The placement of a structural graft

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through a core tract into the femoral head generally yields disappointing results. However, grafts placed into the femoral neck or directly into the femoral head are more promising. Free vascularized fibular grafting significantly alters disease progression in precollapse lesions and is even useful in modifying disease in mildly collapsed and early arthritic hips. ^[14]

- Osteotomies are performed in attempt to move necrotic bone away from primary weight-bearing areas in the hip joint. Osteotomies can be angular or rotational, with the latter proving to be much more technically difficult. These techniques may delay arthroplasty, but they are best suited for small precollapse or early postcollapse of the femoral head in patients who don't have an ongoing cause of AVN. However, osteotomies make subsequent arthroplasty more challenging and, unfortunately, these procedures are associated with an appreciable risk of nonunion.
- The role of arthroscopy to better stage the extent of disease has emerged. Arthroscopic evaluation of the joint can help better define the extent of chondral flaps, joint degeneration and even joint collapse and may help with the temporary relief of synovitis. ^[16] Arthroscopic-assisted reduction of the head collapse is experimental at this time.
- Reconstruction procedures
 - Despite aggressive management, most hips that undergo collapse ultimately require reconstruction (ie, replacement). Prosthetic replacement offers the most predictable means of pain relief in advanced AVN; however, many arthroplasty options are available to meet the challenge of painful arthropathy in younger patients. ^[17]
 - Femoral resurfacing arthroplasty is gaining acceptance for younger patients. ^[17] Both the femoral head and acetabulum are "resurfaced" with metal, indicating minimal bone resection. This procedure circumvents the problem of polyethylene wear. However, technical and design problems with surface replacements may explain the relatively high failure rate in some clinical series. ^[18] Nonetheless, refinements in both technique and design predict improved outcomes.
 - Resurfacing arthroplasty remains a controversial procedure that likely will not last a patient's lifetime. Current recommendations are that resurfacing is contraindicated if the avascular area exceeds one third of the femoral head. Furthermore, there is a 1% incidence of femoral neck fracture with this procedure. Lastly, the issue of metal ion release has spurred much debate, although there are no good data available to suggest injurious effects. Fortunately, resurfacing arthroplasty likely confers no significant compromise for subsequent arthroplasty.
 - A report on preliminary clinical results of 5 subjects who underwent a total of 7 focal anatomic-resurfacing implantation procedures for the treatment of osteonecrosis of the femoral head, found that the alternative

technique of focal anatomic hip resurfacing yielded preliminary successful results at 2+ year follow-up. ^[19]

- Bipolar arthroplasty theoretically decreases shear stress and impact load on acetabular cartilage, although this concept has not been born out clinically. ^[17] Persistent groin pain, high rates of polyethylene wear, and early loosening have mitigated the appeal of this option. Resection arthroplasty should only be considered in very young patients and in debilitated patients who are at high risk for infection (eg, patients on dialysis).
- Total hip arthroplasty is perhaps the most commonly performed and successful surgery for advanced AVN of the hip. However, clinical outcomes are inferior to those of total hip arthroplasty that is performed for osteoarthritis. Cementless prostheses with an improved design may afford increased longevity relative to cemented counterparts. Despite recent improvements in prosthetic replacement, replacement arthroplasty precludes further participation in impact activities (eg, running, jogging) because these activities greatly decrease implant longevity.

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Consultations

Because AVN of the hip is often associated with pronounced medical comorbidities (eg, sickle cell disease, systemic lupus erythematosus), medical consultation is prudent, particularly during the perioperative period. Furthermore, if no obvious cause of AVN is seen, medical consultation would be a reasonable measure in order to help discern less common etiologies. (See Clinical, Causes, above.)

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Other Treatment

Injections of cortisone into the hip joint may temporarily alleviate the symptoms of AVN; however, these injections are not generally recommended because of their invasiveness and short-lasting effects.