



ORIGINAL RESEARCH PAPER

Orthopaedics

REVIVING INTEREST IN MUSCLE PEDICLE BONE GRAFTING FOR AVASCULAR NECROSIS OF THE HIP: A CONTEMPORARY APPROACH

KEY WORDS:

Dr. Yashika Demba

Department of Orthopaedics, Index Medical College Hospital and Research Centre, Indore (MP)

Dr. Akash Gupta

Department of Orthopaedics, Index Medical College Hospital and Research Centre, Indore (MP)

Dr. Abhay Manchanda*

Professor Department of Orthopaedics*Corresponding Author

ABSTRACT

Avascular necrosis (AVN) of the femoral head is a progressive disorder that commonly affects young and middle-aged adults. This paper evaluates tensor fascia lata (TFL) muscle pedicle bone grafting combined with core decompression as a hip-preserving procedure in Ficat-Arlet stage II and III AVN.

INTRODUCTION

Avascular necrosis (AVN) of the femoral head is a debilitating condition with limited therapeutic, more so post-COVID, the incidence of AVN appears to have surged.

While spontaneous remission is rare, early diagnosis and intervention are crucial to prevent femoral head collapse and subsequent osteoarthritis

Despite total hip replacement (THR) serving as the gold standard treatment, accessibility challenges may hinder its immediate application for certain patients. Therefore muscle pedicle bone grafting can be considered as a promising method to slow down the progression of the disease, giving patients more time before needing a total hip replacement.



- TIMELY CLINICAL AND RADIOLOGICAL DIAGNOSIS
- CLINICAL EVALUATION
 - Atypical symptoms:
 - Groin pain radiating to knee
 - Restricted hip ROM
- X-rays
 - Ficat-Arlet classification system
- MRI

Early diagnosis is particularly important as the disease mainly affects young and middle-aged adults. Without prompt treatment, femoral head collapse occurs in up to 80% of cases. In the initial stages of AVN, head preservation procedures are recommended to relieve intraosseous pressure and improve blood flow to the femoral head.

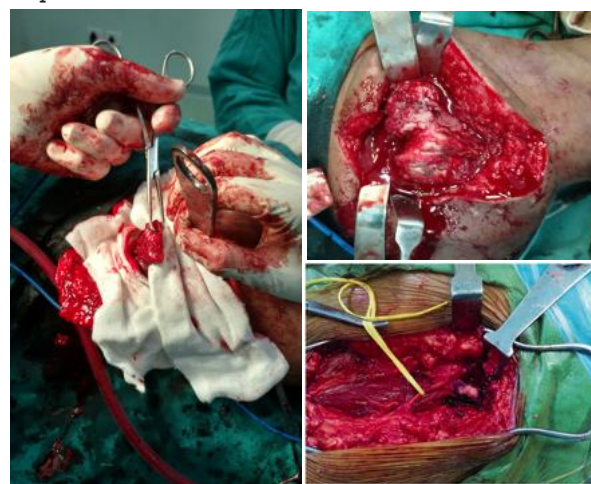
MATERIALS AND METHODOLOGY

This retrospective study scrutinized 8 cases of AVN with Ficat-Arlet stage II and III femoral head osteonecrosis. The study excluded patients with chronic diseases, previous hip surgeries, active infections, or Ficat-Arlet stage IV AVN. The surgical procedure involved core decompression coupled with TFL pedicle bone grafting using an anterolateral approach preceded by a derotational boot and bar cast for a month.

SURGICAL TECHNIQUE

The TFL muscle pedicle bone graft was harvested from the iliac crest with its vascularized muscle attachment. Following core decompression, a cortical window was created and the graft was rotated into the femoral head defect to provide structural support and revascularization.

- Step 1: Exposure
- Step 2 : Identification and safeguarding of the lateral femoral cutaneous nerve
- Step 3: Graft Harvesting
- Step 4: Window Creation
- Step 5: Graft Placement
- Step 6: Immobilization



RESULTS

All subjects experienced minimal discomfort after surgery and maintained the ability to sit cross-legged and squat comfortably for an average of 4-8 years. Postoperative outcomes showed a significant reduction in pain, leading to

improved mobility, daily functioning, and quality of life. The study utilized the Harris Hip Score (HHS) to evaluate clinical outcomes at various follow-up intervals. The HHS assesses pain, limp, distance walked, support required, sitting ability, public transportation use, stair climbing, ability to put on shoes and socks, absence of deformity, and range of motion. Scores range from 0 to 100, with higher scores indicating better outcomes.

- **Excellent Outcomes (90-100):** Observed in 35% of cases, indicating significant improvement in hip function and pain relief.
- **Good Outcomes (80-89):** Found in 47.5% of cases, suggesting substantial functional improvement.
- **Fair Outcomes (70-79):** Noted in 15% of cases, representing moderate improvement in hip function.

DISCUSSION

Postoperative management focuses on early mobilization and a gradual return to weight-bearing. Patients are encouraged to sit up in bed within 24 hours and begin static exercises for thigh and gluteal muscles as soon as pain allows. Range of motion exercises are initiated after two weeks, followed by a progressive weight-bearing program. Full weight-bearing is typically allowed after 15-24 weeks.

1 st Day	Sit up in bed, static exercises
2 nd Week	Range of motion exercises
6 th Week	Toe touch-down non-weight bearing
12 th Week	Gradual weight bearing with crutches
15 th -24 th Week	Full weight-bearing

ADVANTAGES OF TFL MUSCLE PEDICLE BONE GRAFTING

The TFL muscle pedicle bone grafting technique offers several advantages over other surgical options for AVN of the femoral head. It is a minimally invasive procedure that preserves the native hip joint, delaying or potentially eliminating the need for total hip replacement. The procedure also boasts a relatively short operative time and a less steep learning curve for surgeons compared to other grafting techniques and is cost effective

- **Improved Blood Supply :** The attached TFL muscle provides a direct blood supply to the graft, promoting faster healing and revascularization.
- **Structural Support :** The bone graft offers structural support to the femoral head, preventing further collapse and promoting bone remodeling.
- **Faster Recovery :** The minimally invasive nature of the procedure allows for quicker recovery times and a faster return to daily activities.

CONCLUSION

The TFL muscle pedicle bone grafting procedure demonstrates promising results in managing AVN of the femoral head. This minimally invasive technique offers several advantages, including improved blood supply to the graft, structural support for the femoral head. While further research with larger sample sizes and longer follow-up periods is necessary, this study highlights the potential of TFL muscle pedicle bone grafting as a valuable tool in preserving hip function and improving quality of life for individuals with AVN

FUTURE DIRECTIONS

The TFL muscle pedicle bone grafting procedure demonstrates promising results in managing AVN of the femoral head. This minimally invasive technique offers several advantages, including improved blood supply to the graft, structural support for the femoral head. While further research with larger sample sizes and longer follow-up periods is necessary, this study highlights the potential of TFL muscle pedicle bone grafting as a valuable tool in preserving hip function and improving quality of life for individuals with

AVN.

- **Promising Outcomes:** The study observed excellent to good clinical outcomes in a significant proportion of patients, indicating the effectiveness of the procedure in relieving pain and improving hip function
- **Hip Preservation:** The TFL muscle pedicle bone grafting technique offers a valuable alternative to total hip arthroplasty, particularly in younger patients, preserving the native hip joint and potentially delaying or eliminating the need for future joint replacement.
- **Future Research:** Further studies with larger sample sizes, longer follow-up periods, and comparative analyses with other treatment modalities are warranted to solidify the long-term efficacy and safety of the TFL muscle pedicle bone grafting procedure.

REFERENCES

1. Nam KW, Kim YL, Yoo JJ, Koo KH, Yoon KS, Kim HJ: Fate of untreated asymptomatic osteonecrosis of the femoral head. J Bone Joint Surg Am. 2008, 90:477-84. 10.2106/JBJS.F.01582
2. Liu N, Zheng C, Wang Q, Huang Z: Treatment of non-traumatic avascular necrosis of the femoral head (review). Exp Ther Med. 2022, 23:321. 10.3892/etm.2022.11250
3. Vardhan H, Tripathy SK, Sen RK, Aggarwal S, Goyal T: Epidemiological profile of femoral head osteonecrosis in the north Indian population. Indian J Orthop. 2018, 52:140-6. 10.4103/ortho.IJOrtho_292_16
4. Gun BK, Frank RM, Gratton RW, Bader JO, Kusnezov N, Orr JD, Waterman BR: Non-modifiable risk factors associated with avascular necrosis in the US military. Mil Med. 2020, 185:e178-82. 10.1093/milmed/usz128
5. Carli A, Albers A, Séguin C, Harvey EJ: The medical and surgical treatment of ARCO stage-I and II osteonecrosis of the femoral head: a critical analysis review. JBJS Rev. 2014, 2:e2. 10.2106/JBJS.RVW.M.00066
6. Tripathy SK, Goyal T, Sen RK: Management of femoral head osteonecrosis: current concepts. Indian J Orthop. 2015, 49:28-45. 10.4103/0019-5413.143911