



OSSAPCON  
2026

55th Annual Conference Of Orthopedic Surgeon Society Of Andhra Pradesh

# Efficacy of Bone Marrow Aspirate Concentrate-Assisted Core Decompression in Precollapse stage Of Avascular Necrosis of the Femoral Head



---

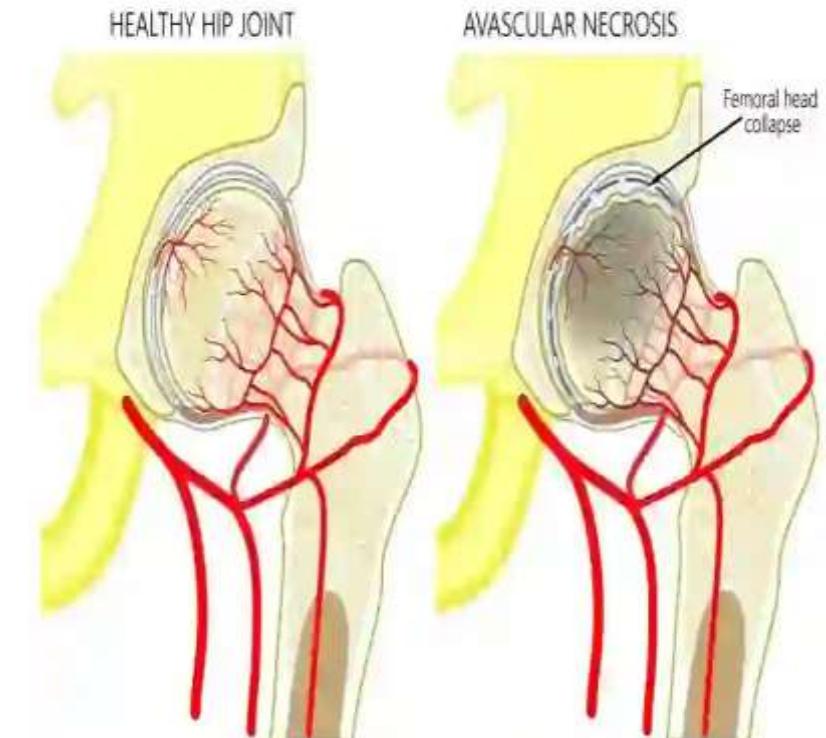
AUTHOR: Dr. M S S V KRISHNA SAI

CO-AUTHOR: Dr. V. NAGESWARA RAO,  
PROFESSOR & HOD,  
DEPARTMENT OF ORTHOPAEDICS  
GSL MEDICAL COLLEGE AND HOSPITAL

# INTRODUCTION

---

- Avascular necrosis of the femoral head occurs due to **compromised vascularity of the subchondral bone**
- Cellular ischemia results in **osteocyte and osteoblast death**, leading to structural weakening
- During **precollapse stages**, the articular cartilage remains intact
- Disease progression ultimately causes **subchondral fracture and femoral head collapse**
- Early intervention before collapse offers the **best opportunity for joint preservation**



## AIM AND OBJECTIVES

### AIM

❖ To evaluate the **clinical efficacy** of **BMAC-assisted core decompression** in patients diagnosed with **precollapse avascular necrosis of the femoral head**

### OBJECTIVES

- ❑ To evaluate functional improvement following surgery using Harris Hip Score
- ❑ To study radiological status of the femoral head during follow-up

## MATERIALS AND METHODS

**STUDY DESIGN:** Prospective study

**DURATION OF STUDY:** JANUARY 2025 to JUNE 2025

**STUDY SETTING:** OPD and wards of department of orthopaedics

**PLACE OF STUDY:** Tertiary care hospital affiliated with NTRUHS

**Inclusion:** Precollapse AVN (Ficat–Arlet I–II), age 25–65 years, consented and willing for follow-up.

**Exclusion:** Collapsed AVN (Stage III–IV), unfit/unwilling for surgery or follow-up, congenital or metabolic bone disorders.

# METHODS

- Functional outcome of core decompression with BMAC is assessed by using Harris hip score at Preoperative, immediate postoperative , follow up at 3 months and 6months
- The maximum score possible is 100. Results can be interpreted with the following:  
<70 = poor result; 70–80 = fair, 80–90 = good, and 90–100 = excellent.
- Radiological assessment is done using X-ray pelvis with both hips (anteroposterior view) and MRI pelvis with both hips.
- SURGICAL TECHNIQUE: Core decompression assisted with bone marrow aspirate concentrate



1.



2.



3.

After centrifuge



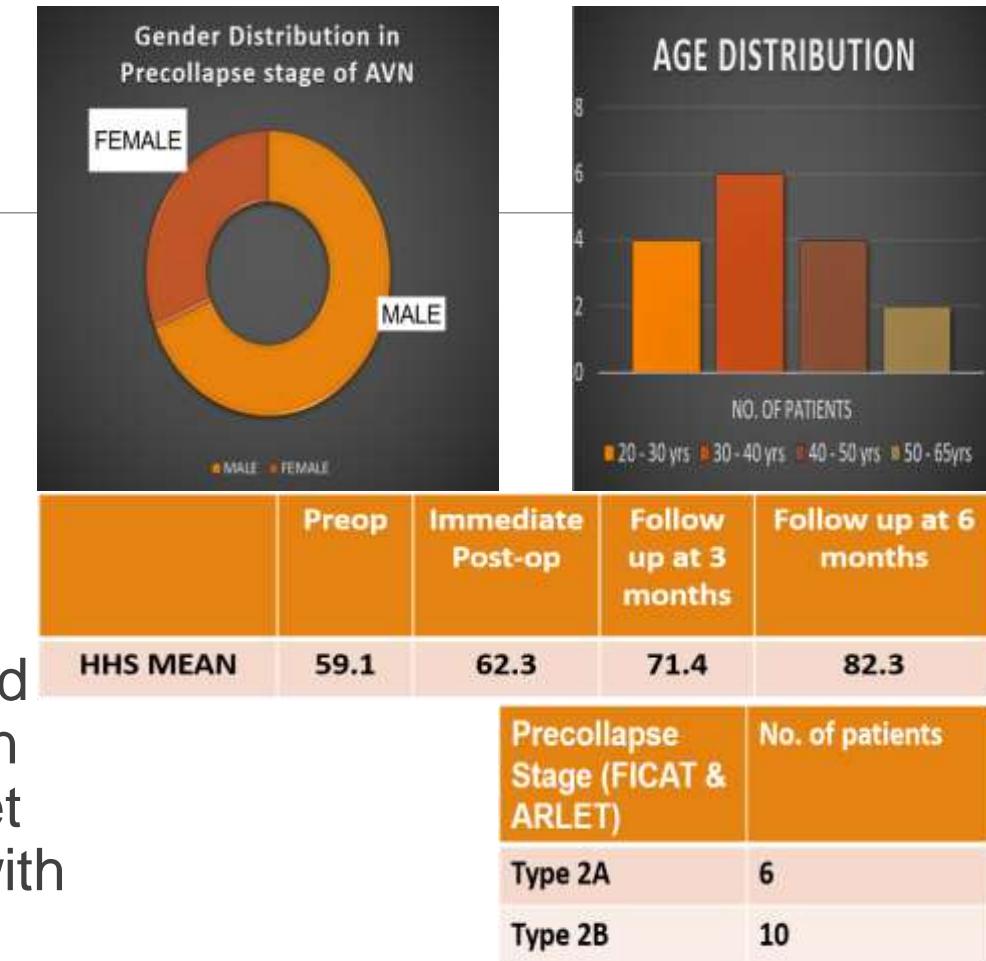
4.



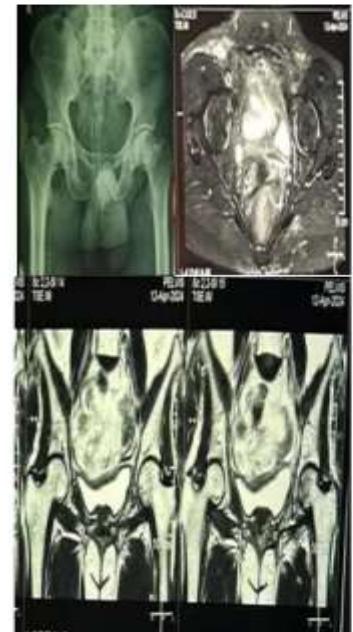
BMAC INJECTION

# RESULTS AND DISCUSSION

- **Sample size:** 16 hips with precollapse AVN.
- **Age:** Majority aged 30–40 years (37.5%), followed by 20–30 years (25%) and 40–50 years (25%).
- **Sex:** Male predominance (68.75%).
- **Stage:** FICAT IIB – 62.5%, IIA – 37.5% (precollapse stage).
- **Functional outcome:** Mean HHS improved from 59.1 (pre-op) to 82.3 at 6 months, showing progressive functional recovery.
- **Inference:** The demographic profile and functional outcomes in our study are comparable to those reported by Pawar et al. (2021), Einhorn et al. (2017), Ferozkhan et al. (2024), Jhunjhunwala et al. (2023), and Mathew et al. (2024), supporting the role of core decompression with BMAC as an effective hip-preserving procedure in precollapse AVN.



PRE-OP IMAGING



FOLLOW UP AT 3 MONTHS  
XRAY



FOLLOW UP AT 6 MONTHS  
IMAGING



PRE-OP CLINICAL  
PHOTO (Limited  
Abduction 0°-14°)



FOLLOW UP AT 6 MONTHS  
CLINICAL PHOTO  
(Abduction within normal  
range 0°-45°)

# CONCLUSION

---

- ❖ Avascular necrosis of femoral head is a progressive disease with high morbidity if untreated and affects the young and middle-aged population.
- ❖ Arthroplasty performed at a younger age carries a high lifetime risk of revision surgery
- ❖ Early intervention in precollapse stage is critical for joint preservation.
- ❖ Core decompression helps by reducing intraosseous pressure and improving femoral head perfusion
- ❖ Core decompression combined with BMAC which enhances angiogenesis and osteogenesis :
  - Provides significant pain relief and improves functional outcome
  - Shows promising short-term radiological stability
  - BMAC-assisted core decompression is a **safe, effective, and biologically sound option** for precollapse AVN of femoral head

# REFERENCES

1. Ferozkhan S, Sivakumar AP, Elumalai SB, Jeyaraman N, Jeyaraman M. Core decompression with bone marrow aspirate concentrate implantation in osteonecrosis of the femoral head with a minimum of 2-year follow-up ? a pilot study. *J Orthop Case Rep.* 2024;14(8):192-199.
2. Saini U, Jindal K, Rana A, Aggarwal S, Kumar P, Sharma S. Core decompression combined with intralesional autologous bone marrow-derived cell therapies for osteonecrosis of the femoral head: A systematic review and meta-analysis. *The Surgeon.* 2023;21(3):e104-e117.
3. Pawar N, Vaish A, Vaishya R. Core decompression and bone marrow aspirate concentrate injection for avascular necrosis of the femoral head: A scoping review. *J Clin Orthop Trauma.* 2022;24:101691.
4. Jain A, Daultani D, Doshi K, Palanivel A, Syed T, Kumar MA, Shetty MS, Pai S. Bone marrow aspirate concentrate therapy for pre-collapse stage of avascular necrosis of femoral head: An interventional comparative study. *Int J Orthop.* 2020;6(4):974-979.
5. Khanna V, Jeyaraman M, Goel S, Khanna M. Functional outcome of autologous bone marrow concentrate implantation in osteonecrosis of femoral head: A two-year follow-up study. *J Clin Trials.* 2019;9:379.
6. Jhunjhunwala HR, Tawri P. Management of avascular necrosis of hip using core decompression, bone graft and bone marrow aspirate concentrate. *Int J Res Orthop.* 2023;9(6):1212-18.
7. Mont MA, Cherian JJ, Sierra RJ, Jones LC, Lieberman JR. Osteonecrosis of the femoral head. *J Bone Joint Surg Am.* 2015;97(19):1604-1627.
8. Zhao D, Cui D, Wang B, et al. Treatment of early-stage osteonecrosis with autologous BMSC implantation. *Bone.* 2012;50(1):325-330.
9. Hernigou P, Poignard A, Zilber S, Rouard H. Cell therapy of hip osteonecrosis. *Bone.* 2009;45(5):830-834.
10. Sen RK. Management of avascular necrosis of femoral head at pre-collapse stage. *Indian J Orthop.* 2009;43(1):6-16.
11. Hernigou P, Beaujean F. Treatment of osteonecrosis with autologous bone marrow grafting. *Clin Orthop Relat Res.* 2002;405:14-23.
12. Einhorn TA, Anoushiravani AA, Chen KK, et al. Treatment of early-stage osteonecrosis of the femoral head with core decompression and bone marrow aspirate concentrate. *Semin Arthroplasty.* 2017;28(4):239-45.