

## **Femoral Head and Neck Excision Arthroplasty – Anatomical Basis and Indications in Small Animals**

**<sup>1</sup>Muhammad Suhail, <sup>1</sup>Arsha B Raj, <sup>1</sup>Meghadass M,  
<sup>1</sup>Anupama and <sup>2</sup>N S Sunilkumar**

<sup>1</sup>BVSc&AH graduate students

<sup>2</sup>Assistant Professor, Department of Veterinary Anatomy  
College of Veterinary and Animal Sciences, Mannuthy,  
Thrissur, Kerala, India

Kerala Veterinary and Animal Sciences University

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### **Introduction**

Femoral Head and Neck Excision Arthroplasty (FHNE), sometimes referred to as femoral head ostectomy, is a well-established surgical procedure in small animal veterinary medicine. This procedure is considered as a functional salvage procedure to eliminate pain and allowing reasonable mobility where hip pain cannot be controlled by pain killers or by other surgical procedures. This article will explore the anatomical principles behind FHNE and outline the key situations where it is the recommended course of action for our canine and feline companions.

### **The Anatomical Basis: Creating a Functional "False Joint"**

To understand FHNE, it's essential to recall the normal anatomy of the hip joint. It's a classic "ball-and-socket" joint, where the rounded head of the femur (thigh bone) fits snugly into the cup-shaped acetabulum of the pelvis. This precise fit, along with strong ligaments and surrounding muscles, allows for smooth, pain-free movement.

In FHNE, the fundamental principle is to permanently remove the diseased or damaged femoral head and neck. This surgical act eliminates the painful bone-on-bone contact that occurs in conditions like severe arthritis, fractures or avascular necrosis. Once the head and neck are removed, a gap is created between the remaining femur and the pelvis.

Over time, this gap heals and fills with fibrous scar tissue, forming what is known as a pseudoarthrosis, or "false joint." Crucially, it's the powerful muscles surrounding the hip (such as the gluteal muscles and biceps femoris) that act as a sling, supporting the remaining femur and enabling movement. While this new "joint" won't have the perfectly smooth articulation of a healthy natural hip or a prosthetic implant, it becomes pain-free and allows for a surprisingly good range of motion.

A critical anatomical point during the surgery is ensuring that all of the femoral neck is removed. Any remaining bony prominence can lead to persistent pain due to impingement on the pelvis, defeating the purpose of the procedure. Surgeons typically make the osteotomy (bone cut) just below the lesser trochanter, a small bony projection on the inner aspect of the femur, to ensure complete excision. The joint capsule may also be used to create a flap that further separates the raw bone surfaces, encouraging smooth pseudoarthrosis formation.

### **Key Indications for FHNE in Small Animals**

FHNE is typically reserved for cases where conservative management (e.g., pain medication, physical therapy) is insufficient, or when more extensive procedures like total hip replacement (THR) are not feasible. It's an excellent choice for:

**1. Severe Hip Dysplasia and Osteoarthritis:**

This is perhaps the most common indication. In advanced cases of hip dysplasia, the hip joint develops abnormally, leading to chronic instability, inflammation and severe osteoarthritis. When pain becomes debilitating and medical management fails, FHNE offers significant relief by removing the source of pain.

**2. Fractures of the Femoral Head or Neck:**

If a fracture to the femoral head or neck cannot be repaired surgically (e.g., due to fragmentation, poor bone quality, or patient factors), FHNE provides a viable option to eliminate pain and restore function.

**3. Irreducible Hip Luxation/Dislocation:**

When the femoral head dislocates from the acetabulum and cannot be put back into place, or repeatedly reluxates despite other repair attempts, FHNE offers a permanent solution to instability and pain.

**4. Legg-Calvé-Perthes Disease (Avascular Necrosis of the Femoral Head):**

This condition primarily affects young, small-breed dogs, where the blood supply to the femoral head is interrupted, causing it to degenerate and collapse. FHNE effectively removes the necrotic (dead) and painful bone, allowing for a return to comfortable function.

**5. Chronic or Septic Arthritis:**

In cases of severe, persistent infection or inflammation within the hip joint that doesn't respond to other treatments, FHNE can be life-saving by removing the infected joint surfaces.

**6. Failed Total Hip Replacement (THR):**

Although rare, if a total hip replacement fails (e.g., due to infection, implant loosening, or severe complications), FHNE can be performed as a salvage procedure to alleviate pain.

## Surgical procedure

### 1. Preparation:

**Anesthesia and Incision:** The patient is anesthetized, and the surgical area is clipped, prepped and draped. A skin incision is made over the hip, typically centered over the affected joint.

**Exposure:** The hip joint is exposed by carefully separating or transecting muscles, such as the pectineus muscle and potentially the deep gluteal muscle, depending on the approach.

**Capsular Incision:** The joint capsule is opened to allow access to the femoral head and neck.

### 2. Femoral Head and Neck Removal:

**Dislocation:** The hip joint is dislocated, often by externally rotating the femur, to allow better access to the femoral neck.

**Osteotomy:** The femoral neck is cut using a saw or osteotome. The precise location of the osteotomy may vary, but it's generally performed at or slightly below the level of the lesser trochanter.

**Head Removal:** The femoral head is then removed from the acetabulum (hip socket).

### 3. Soft Tissue Management:

**Capsular Flap:** A capsular flap may be created and positioned in the space left by the removed bone to prevent bone-on-bone contact and promote the formation of a pseudoarthrosis.

**Muscle Reattachment:** Some muscles, such as the deep gluteal tendon, may need to be reattached after the osteotomy.

### 4. Closure:

**Wound Closure:** The joint capsule is closed, followed by muscle layers and finally the skin.

### 5. Post-operative Care:

**Pain Management:** Pain medication is administered to manage post-operative discomfort.

**Rehabilitation:** Physical therapy is crucial to rebuild muscle strength and range of motion, with gradual weight-bearing exercises as tolerated.

**Monitoring:** The patient is monitored for signs of infection or other complications.

#### Advantages of Neck Excision Arthroplasty:

- **Effective pain relief:** Achieved by removing the diseased femoral head and neck, which eliminates the source of infection or necrosis.
- **Useful in specific cases:** Especially beneficial for chronic infections (e.g., tuberculosis, septic arthritis), failed joint replacements, or avascular necrosis in settings with limited resources.
- **Simpler procedure:** Involves a shorter operative time and reduced blood loss compared to total hip replacement.
- **Avoids implant complications:** Eliminates issues like loosening or metal wear associated with prosthetic implants, making it suitable for elderly or medically unfit patients.
- **Temporary solution:** Can serve as a provisional measure before a more definitive surgery like total hip arthroplasty.

#### Disadvantages of Neck Excision Arthroplasty:

- **Hip joint instability:** Loss of the femoral neck leads to instability, resulting in a waddling gait and significant limb shortening (often several centimeters).
- **Walking difficulties:** Patients usually require a shoe lift, cane, or walker due to difficulty walking.
- **Muscle weakness and joint stiffness:** Common due to altered biomechanics and prolonged immobilization.
- **Impaired mobility in younger patients:** Can lead to severely impaired mobility and poor quality of life for younger, active individuals.
- **Persistent pain risk:** There's a risk of

ongoing pain from soft tissue irritation or fibrous ankylosis.

- **Last-resort or temporizing procedure:** Generally considered as such, even though it can be life-saving and pain-relieving in certain situations.

#### Conclusion

Femoral head and neck excision arthroplasty is a limited but valuable and necessary form of therapy in diseases of the hip. By understanding its anatomical basis – the creation of a functional pseudoarthrosis – and recognising its key indications, veterinarians can effectively utilise this salvage procedure to relieve debilitating hip pain and enable countless dogs and cats to enjoy a more active and comfortable life.

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