

Comparison of Results of Total Hip Replacement (THR) with Femoral Head Ostectomy (FHO) in dogs - Review of Literatures

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ABSTRACT

Background: In THR the surgeon removes and replaces both the ball and socket with prostheses. Most canine hip replacement prostheses have a metal ball at the top of the femur that fits into a dense plastic socket.

Aim: To compare the results of total hip replacement with femoral head ostectomy in dogs

Methods: We have tried to review the results of both procedures in literatures and compare them to advise to select the proper procedure in your cases.

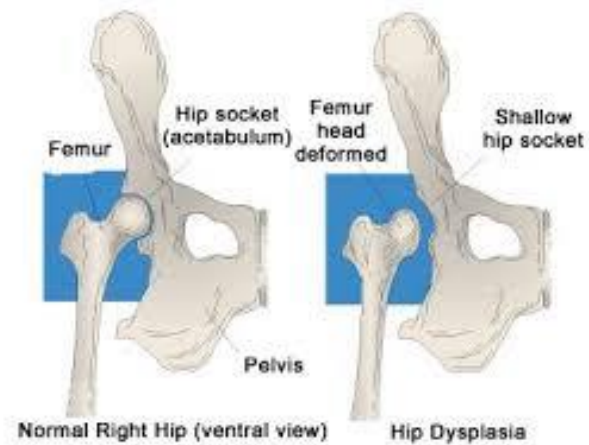
Conclusion: we concluded that, in dog without concerning it's size, suffering hip disease and pain, performing Femoral Head Ostectomy (FHO) instead of Total Hip Replacement (THR) is not sufficient for restoring all hip mobility and comfort. Incidence of pain, movement restrictions, limb shortness and muscle atrophy were more common in FHO cases than THR cases

Keywords: Total hip replacement, femoral head ostectomy, dogs,

INTRODUCTION

Regardless of the etiologies of hip pain and arthralgy there are two different approach to improve dog's quality of life by reducing and eliminating the pain including total hip replacement (THR) and femoral head ostectomy (FHO).

In THR the surgeon removes and replaces both the ball and socket with prostheses. Most canine hip replacement prostheses have a metal ball at the top of the femur that fits into a dense plastic socket. The prostheses are generally held in place using special bone cement.



An FHO, or femoral head ostectomy, is a surgical procedure that aims to restore pain-free mobility to a diseased or damaged hip, by removing the head and neck of the femur (the long leg bone or thighbone)⁶.



REVIEW OF LITERATURE:

We have tried to review the results of both procedures in literatures and compare them to advise to select the proper procedure in your cases.

- 1- Gendreau and Cawley reviewed the results of 35 FHO operations with an average follow-up interval of 3.1 years after surgery. Only 37.1% of the dogs had "Excellent" function, with no disability and inability to tell which limb had surgery. 25.7% had "Good" function with slight gait abnormality, 25.7% had "Fair" function with noticeable lameness, and 11.4% had "Poor" function with severe gait impediment and carrying the leg most of the time. Therefore concluded that FHO does not always return function to the operated limb. The outcome was less favorable in larger dogs, but some small dogs and a cat had poor or fair results. Young dogs did not have better results than older dogs⁵.

- 2- Vasseur showed that in mature dogs with severe DJD affecting the hip joints, THR restores hip function more commonly, and much more faster than FHO. He recommends a vigorous rehabilitation program and maintenance of normal body weight to help restore function. Complications include shortening of the operated limb, with prominence of the greater trochanter, decreased range of motion in the pseudoarthrosis as compared to the normal hip, muscle atrophy, and impaired function. Occasional lameness is not unusual in larger dogs, and they may have difficulty jumping and climbing stairs. In addition, hunting dogs or dogs expected to perform other challenging physical tasks should not anticipate a complete return to normal function. Vasseur also states that it may take as long as 6 to 12 months for the animal to achieve an optimal result after FHO, with only fair return of function¹¹.
- 3- Berzon et al reported on the efficacy of FHO in 94 dogs and cats. The five most common indications for a FHO included degenerative joint disease, avascular necrosis of the femoral head, capital epiphyseal and femoral neck fracture, comminuted acetabular or pelvic fracture, and non-reducible or chronic coxofemoral luxation. All of these indications, with the possible exception of some acetabular fractures, are also indications for a THR. Acetabular fractures and pelvic fractures are generally repairable injuries⁽¹⁾
A majority of the evaluations were done subjectively by the patient's owners using a questionnaire. The results were considered "Excellent" if dogs had 75-100% (but not necessarily 100%) limb usage. Only 83% of the dogs were in the "Excellent" category. The other 17% had "Good" (51-75% limb function), "Fair" (26-50% limb function) or "Poor" (25% limb function). It was acknowledged that the procedure may be performed where primary repair would be time-consuming, difficult, and economically prohibitive to the owner.
- 4- Budsberg et.al. reported a study that compared the results of treating 16 dogs with bilateral coxofemoral osteoarthritis using total hip replacement on one side versus not on the other side. The ground reaction forces (weight bearing) indicated that dogs had significantly increased loading function of the treated side after unilateral total hip replacement. The study data provided substantial evidence of improvement in dogs after total hip replacement³.
- 5- Grisneaux et al obtained objective data using force plate computerized gait analysis on limb function 3, 15, and 120 days after FHO with (for 21 days) and without the use of postoperative anti-inflammatory medication. The results show that operated dogs had significantly lower peak vertical, peak propulsive, and impulse propulsive forces on the limb and lower angles of hip joint abduction and extension than did normal dogs. Most of the limbs treated by FHO were unable to regain normal function and muscle mass after surgery. Body weight did not appear to be associated with the outcome of the FHO. The extent of muscle atrophy at the time of surgery correlated with prolonged recovery time. Dogs with the lesser trochanter preserved functioned better than those where it was partially or completely removed. Although all owners subjectively expressed complete satisfaction with results of surgery at the end of the study, operated dogs still had objectively significantly lower peak vertical, peak propulsive, and impulse propulsive forces and lower angles of hip joint abduction and extension than did control dogs at day 120. Owners noticed worsening of the lameness following cessation of anti-inflammatory medication. A conclusion states that active physical therapy may be a life-long necessity of dogs undergoing FHO. The hypothesis of the study was that promotion of active physical therapy during the first postoperative weeks combined with administration of an NSAID would minimize the reduction of mobility and, therefore, result in treated dogs having greater impulse propulsive forces and hip joint abduction and extension angles than dogs receiving a placebo. The hypothesis could not be demonstrated⁸.
- 6- Plante et al reported force plate objective data comparing conservative management, FHO, and triple pelvic osteotomy treatment of hip dysplasia in immature dogs. The dogs in the FHO group showed ground reaction force abnormalities, most likely due to the absence of a coxofemoral joint. The FHO group had decreased peak propulsive and impulsive force compared to the triple pelvic osteotomy and control group.⁽¹⁰⁾
- 7- Montgomery et. al. compared 3 different FHO surgical techniques. They concluded the specific techniques compared did not improve results between any of the groups for the percentage of leg use during normal activity, mean postoperative time until leg use, use of the leg or hopping while running, or lameness with exercise. The results were similar for large and small dogs, although the lameness tended to be milder in small dogs. Most of the small dogs were lap dogs with little opportunity for extreme exercise. The incidence of postoperative problems did not vary with increased body weight. Dogs (hunting dogs) whose intended use included vigorous exercise had a higher frequency of moderate to severe lameness⁷.
- 8- Lewis also evaluated different surgical techniques for performing the FHO surgery. An overview of the FHO procedure shortcomings was presented. He concluded that previously reported improved results with new techniques provided inconsistent results⁹.
- 9- Duff and Campbell reported shortened limbs, restricted hip movement, and multiple other problems in a study of 267 FHO surgery patients. Difficulty jumping and climbing stairs was not uncommon. Muscle atrophy was reported in about 50% of the dogs and was a frequent finding by dog owners even 8 years after surgery. This atrophy can only indicate diminished limb function. Another common finding was difficulty jumping and climbing stairs. 20% of the dogs had hip pain when examined and the high incidence of pain was present during the first year after surgery. 40% of the dogs had reduced extension of the knee on the operated side. 51% of the dogs had reduced hip extension and 50% had bony and or

soft tissue crepitation in the joint. There was a high incidence of pain in the first postoperative year. Patella instability was present 18% of the time and all were small breed dogs that had limb shortening. 50% of the dogs were walking "well" in 8-10 weeks and only 75% were running in 4-5 months. 69% of the dogs examined had limb shortening – especially in small breeds having surgery for avascular necrosis of the femoral head. 60% of the dogs showed prominence of the greater trochanter of the femur associated with true limb shortening. Only 50% of the dogs were walking "well" after 8-10 weeks and 75% by 3-4 months. 50% of the dogs were running well after 10-12 weeks and 75% were considered to be running well by 4-5 months⁴.

- 10- Brinker states that an FHO is a nonreversible salvage procedure that is used to improve quality of life. A fibrous false joint forms and thus it does not maintain biomechanical function. There is a tendency of overuse the procedure for conditions that are repairable. Results vary considerably. A limp may remain because the leg is shortened by removal of the femoral head and neck, some loss of range of motion and a gait abnormality persists, and the thigh and hip muscles remain somewhat atrophied².

The FHO is suitable if it is acceptable to have compromised hip joint integrity, if lack of total pain relief is acceptable, or if there are financial constraints. The text continues stating that active use of the limb may take over 1 month and rehabilitation time of 6 months or more are not uncommon.

At the end, Off and Matis published the only reference that could be found that based results on objective data. 132 dogs and 51 cats were examined using computerized gait analysis, kinematic measurements, radiographs, limb measurements, orthopedic examination, and owner questionnaire. They concluded that functional results were rated at good in 38% of the animals, satisfactory in 20%, and poor in 42%. Functional deficits in small, as well as large, breed dogs resulted from the FHO procedure.

CONCLUSION

By reviewing the literature we concluded that, In dog without concerning its size, suffering hip disease and pain, performing Femoral Head ostectomy (FHO) instead of Total Hip Replacement (THR) is not sufficient for restoring all hip mobility and comfort. Incidence of pain, movement restrictions, limb shortness and muscle atrophy were more common in FHO cases than THR cases.

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