INTRODUCTION

The incidence of musculoskeletal injuries is common in companion animals, of which fracture of long bones is most common. Among long bone fractures, femur fracture has the highest incidence of 52.5% followed by tibia (18.8%), humerus (9.6%) and radius ulna (8.2%) (Grono, 1964; Thilagar and Balasubramanian, 1988).

Like human being, the domestic animals have been exposed to direct or indirect trauma leading to fracture of bone. The fracture in animals invariably causes pain and suffering to them, apart from loss of functions of their affected limb.

Efforts have been continuously made to overcome pain and reduce the time of fracture healing so that the period of suffering in animals could be reduced.

"The healing power of the nature is great, it must however be conserved" (Masih, 1973).

In treating a fractured bone the ultimate aim of an orthopaedic surgeon is to realign fragments, maintain the anatomical structure and retain the fragments in position for longer duration for initiation of healing processes aligned by simplest effective fixation technique, resulting into early return to normal locomotory function.

Internal fixation technique for repair of fracture was first reported in 1902 (Jacobs and Gueten, 1967) and since then continuous efforts have been made to improve the various types of fixation techniques in the treatment of fracture. The science of fracture repair in animals is benefited from intense research into bone development, skeletal anatomy, skeletal physiology, bone healing, bone biomechanics and fixation device.

The various fracture fixation techniques are being used in small animal practice which includes both internal and external immobilization of fractured bone. Each technique has its own merits and demerits.
Intramedullary implant fixation such as Steinmann pin, rush pin, Kirschner wire and Kuntscher nail are the primary means of immobilization of fracture and are being frequently used to immobilize the fractured fragments of bone but prolong use of such metallic internal device may result in osteopenia and bone becomes prone to refracture (Paavolainen et al., 1978, Saravanan et al., 2004)

The conservative methods such as stainless steel bone plates, Sherman bone plates, heavy duty bone plates are being used because they do not cause any reaction like tissue degradation, rejection and sequestrum. However, the use of such rigid fixation was being disfavoured by mid seventies as stiffness of bone plate induced a ‘stress protection’ effect and acted as a load bearer thus not allowed the load to transmit to bone hence the callus formed was weak underneath the plate making it prone to refracture after plate removal (Tonino et al., 1976, Woo et al., 1976 and Raman et al., 1996).

The ideal intramedullary implant or methods of immobilization adopted by advocating a bone plating assured a weight bearing within 2-3 days without much disturbing locomotion of animal, so also reactive activities of animals were not disturbed while semi rigid fixation allowed some degree of movement at fracture site and hence promoted rapid bony union by the development of external bridging callus (Mckibbin, 1978).

Surgeons made efforts to use a cost effective biological inert material i.e. horn peg, horn plate and intramedullary nail/implant. The encouraging results were documented in small and large animals. The cost of implant was negligible as compared to stainless steel plate, K-nail or Steinmann pin, so also due to its flexibility, chances of refracture were not observed and healing process was also not affected.

A new method of interlocking nail device now a days advocated in human beings is more advantageous because it neutralizes the rotational, bending and axial forces which, in fact, helps for early healing of fractured bone and also helps in early weight bearing.

Recently, biological implant prepared from bovine horn has been used successfully for repair of femoral fracture in canine (Singh and Singh, 1990b; Dubey, 1991; Shinde, 1994; Kulkarni, 2000) and metatarsal fracture in bovine
Sarkate et al., 1993). Therefore, it was contemplated to study the applicability and efficacy of such material which was usually considered as waste. The material chosen should be sufficiently strong, would provide of satisfactory internal environment for healing of fractured bone by formation of periosteal callus. Buffalo horn appeared to fulfill these requirements. Success with implant of such material if proved may be good substitutes to the usually employed stainless steel implant. Buffalo horn would provide scope for preparation of horn peg or nail suitable to individual patient need and proper utilization of waste material would be added advantage.

Studies on rapid healing of fractured bone were conducted by some researcher in which different antibiotics, herbal medicine, magnetic current and actinotherapy was advocated, however results were not much encouraging.

Large animals are usually maintained for milk purpose or for draft purpose. In these animals, the repair of fracture is invariably associated with complications; however in companion animals the treatment of fracture is affordable. The pets are maintained mostly for sentimental reasons and their suffering draws greater attention on the part of owner.

The study was undertaken to decide the suitability of horn peg, K-nail and intramedullary interlocking nail for the repair of femoral fracture in canine with special reference to use of anabolic steroid with following objectives.

1. To evaluate the use of horn peg, K-nail and interlocking nail as intramedullary fixation in repair of femur fracture.

2. To compare the duration required for healing of fracture in above different fixation technique.

3. To study the efficacy of anabolic steroid as stimulating agent in the process of bone healing.

4. To study the haematological and biochemical changes during the process of bone healing.

5. To evaluate the bone healing by radiographic and or angiographic observations.