

**MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS FOR DIAPHYSEAL
FRACTURES OF RADIUS AND TIBIA IN RUMINANTS**

A.V.AKALYA
ID No. MVN 14032 (VSR)

*Thesis submitted
in partial fulfilment of the requirements for the degree of*

MASTER OF VETERINARY SCIENCE
In
VETERINARY SURGERY AND RADIOLOGY
to the
TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY
CHENNAI – 600 051

DEPARTMENT OF VETERINARY SURGERY AND RADIOLOGY
VETERINARY COLLEGE AND RESEARCH INSTITUTE
NAMAKKAL – 637 002

TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY
CHENNAI – 600 051

2016

TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY

CERTIFICATE

This is to certify that the thesis entitled “MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS FOR DIAPHYSEAL FRACTURES OF RADIUS AND TIBIA IN RUMINANTS ” submitted in partial fulfilment of the requirements for the degree of Master Of Veterinary Science in **VETERINARY SURGERY AND RADIOLOGY** to the Tamil Nadu Veterinary and Animal Sciences University, Chennai – 51 is a record of bona fide research work carried out **A.V.AKALYA**, ID No. **MVN 14032 (VSR)** under my guidance and that no part of this thesis has been submitted for the award of any other degree, diploma, fellowship or other similar titles or prizes.

Place: Namakkal

Date: 20.7.16

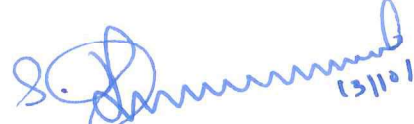

Dr A.KUMARESAN
(Chairman)

APPROVED

Chairman: Dr A.KUMARESAN


13/10/16

Members: Dr S.DHARMACEELAN


13/10/16

Dr A.ARULMOZHI



Place: Namakkal

Date: 13.10.16


EXTERNAL EXAMINER



ABSTRACT

TITLE : MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS
FOR DIAPHYSEAL FRACTURES OF RADIUS AND
TIBIA IN RUMINANTS

NAME : A.V.AKALYA

DEGREE TO WHICH : M.V.Sc., (Veterinary Surgery and Radiology)

SUBMITTED

CHAIRMAN : Dr. A. Kumaresan, Ph.D.,
Assistant Professor,
Department of Veterinary Surgery and Radiology,
Veterinary College and Research Institute,
Namakkal – 637 002.

DEPARTMENT : Department of Veterinary Surgery and Radiology

COLLEGE : Veterinary College and Research Institute,
Namakkal – 637 002

UNIVERSITY : Tamil Nadu Veterinary and Animal Sciences
University

YEAR : 2016

A study was conducted in 12 clinical cases of ruminants with diaphyseal fractures of the radius and tibia presented to Teaching Veterinary Clinical Complex, Namakkal from June 2015 to June 2016. The animals were randomly divided into two equal groups viz., group I and II. The fractures were treated with minimally invasive plate osteosynthesis (MIPO) for both the groups. The fractured fragments were reduced by employing indirect reduction method by hanging limb technique for 10 min which facilitated reduction by muscle relaxation. Proximal and distal incisions were made remote to fracture site and the plate was inserted through an epiperiosteal tunnel and screws were applied on craniomedial approach under general anaesthesia with xylazine, diazepam, ketamine and isoflurane.

The 3.5 mm diameter with six to ten holes LCP and the cortical screws ranging from 12 to 28 mm length were applied in small ruminants body weight ranging from 10.8 to 21.4 kg for diaphyseal fracture repair of radius and tibia with MIPO technique. The 4.5 mm diameter with 10 holes LCP and the cortical screws ranging from 36 to 50mm length were applied in calves body weight between 65.2 and 82.7 kg for fracture fixation of tibia under MIPO technique. Application minimum of 2 to 3 screws for fixation in each proximal and distal segments applied unicortically or bicortically provided adequate stability.

The clinical evaluation of lameness grading revealed that the degree of lameness considerably reduced from grade V to II or I in both the groups. On 60th postoperative day a normal range of motion was observed in 66.67 per cent of animals and decreased range of motion in 33.33 per cent of animals in both the groups. Limb girth evaluation revealed mild of increase in 16.67 per cent animal in both groups and moderate increase limb girth was observed in one animal of group I and two animals of group II. Normal limb length was attained in 83.33 per cent of animals in both the groups. Functional outcome on the 60th postoperative day revealed excellent in 66.67 per cent, 50.00 per cent animals of groups I, II, respectively. The pain score revealed gradual decrease in pain from 30th postoperative day onwards in both the groups.

Radiographic evaluation on 60th postoperative day revealed perfect apposition and alignment of fracture fragments in 66.67 per cent of animals in group I and 33.33 per cent of animals in group II. The angulation of fracture fragment revealed mild valgus in 16.67 per cent of animals in group I and 16.67 per cent in group II. The radiographic evaluation of apparatus (LCP and screws) was found intact throughout postoperative period in all the animals except in one animal of group I and two animals of group II. Radiographic evaluation of fracture healing activity revealed secondary bone healing on postoperative day in all the animals of group I and group II. Radiographic evaluation of architecture of bone and soft tissue revealed soft tissue swelling was noticed in one animal of group I and three animals of group II.

Postoperative complications were skin impingement of plate due to screw loosening noticed in one animal and screw loosening observed in two animals on 30th postoperative day.

Biochemical evaluation of serum calcium, phosphorus and alkaline phosphatase revealed significant increase ($p < 0.05$) only in serum calcium level on 60th postoperative day.

Histopathological examination revealed mesenchymal tissue along with complete ossification and mineralization was observed in the biopsy samples fracture site after plate removal on 60th postoperative day indicating complete fracture healing