

## **COMPARATIVE EFFECTIVENESS OF PLASTER OF PARIS AND FIBRE GLASS CASTS IN THE MANAGEMENT OF LONG BONE FRACTURES IN CANINES**

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**Abstract:** Canines suffering from long bone fractures were immobilized by plaster of paris and fiber glass cast. Most of the fracture involved shaft of bones. The present study was conducted in clinical cases of 20 dogs suffering from long bone fractures. Animals were divided in two groups viz. **Group I:** Plaster of Paris cast (N=12) and **Group II:** Fiber Glass cast (N=8). The Group-II animals showed early full weight bearing that might be because of rigid fixation and light weight of cast. . Complications like breakage of cast and displacement of bamboo splints were seen only with plaster of paris cast. Fiber glass cast as external immobilizing technique was considered as a better orthopedic modality than plaster of paris as it provide rigid fixation, light weight, less time consuming and less complications.

**Keywords:** Canine, fracture, Plaster of paris cast, Fiber glass cast, long bone fracture.

### **Introduction**

Repair of long bone fracture in pet animal has made distinct progress in past decade. The high incidence of fracture of long bones in dogs demands cheap but effective method of immobilization (Wilson and Vanderbay, 1995). Plaster of paris bandage is still the most common material used for immobilization of injured limbs. It is inexpensive and can be used with ease to produce a smooth, conforming and safe cast. Many of the synthetic materials now available for casting and also have excellent conforming characteristics. External immobilization technique is a very useful method of treating the bone fracture. It doesn't disturb internal inflammatory process which favours quicker fracture healing (Merck, 2006).

### **Materials and Methods**

The present study was conducted on 20 dogs suffering from long bone fractures. Animals were divided in two groups as under.

**Group I:** Plaster of Paris cast (N=12) (Plane 1)

**Group II:** Fiber Glass cast (N=8) (Plane 2)

A complete history regarding breed, age, sex, etiology and duration of fracture in dogs was carefully recorded. All the animals suffering from fracture were subjected for radiography pre-operative to assess the type of fracture, immediately after fracture fixation and during the process of fracture healing up to the 60th day at regular interval of 30 days (Plane 3 to 4). All the dogs were premedicated with atropine sulphate at the dose rate of 0.04 mg/kg body weight subcutaneously, anaesthesia were induced with ketamine hydrochloride and diazepam combination at the dose rate of 10 mg/kg, i.v. and 0.5 mg/kg body weight, i.v., respectively and were maintained on 2 per cent isoflurane in oxygen.

### **Result and Discussion**

Out of 20 dogs (11 males and 9 females) 11 were less than one year of age. 13 dogs were injured from automobile accident, due to fall down from height in 5 cases and in stepping into hall while running in 2 cases. Similarly Aithal *et al.* (1999) and Kornmayer *et al.* (2014) recorded automobile accident as a major cause of fracture.

On clinical examination of fractured limb, 11 dogs were affected with right limb and 9 were with fracture of left limb. While fractures of tibia were 9 followed by 8 cases of radius-ulna, and one case of humerus, metatarsal and metacarpal. Similarly, higher incidences of tibial fractures were also observed by Aithal *et al.* (1999) and Kornmayer *et al.* (2014). There were 10 oblique types of fractures, 7 transverse, 2 had multiple and 1 dog had longitudinal fracture. Out of 20 fracture cases, 10 were having midshaft fractures, 6 were having proximal third and 4 had distal third of long bone. Aithal and Singh (1999) also noticed that most of the fracture involved shaft of bones. For induction of general anaesthesia with ketamine at the dose rate of 10 mg per kg body weight and diazepam at the dose rate of 0.5 mg per kg body weight combination intravenously, was adequate for anaesthetic induction and intubation. The general anaesthesia maintained with 2 per cent isoflurane in all the dogs provided excellent surgical plane of anaesthesia to carry out fracture immobilization. Keeping the affected limb on upper side help for easy approach to the site.

The overall observations for weight bearing in the present study revealed that the Group-II animals showed early full weight bearing that might be because of rigid fixation and light weight of cast (Table-1 and 2). Similar observations were also observed by Ayyappan *et al.* (2009). The early radiological union was seen before 30 days and was complete at 60 days in both the groups. However it was more evident in fiber glass group.

The material cost was higher in immobilizing fractures of Group-II than Group I. The time taken in setting of plaster of paris cast was 20-25 minutes as compared to fiber glass which

sets within 3-5 minutes. Similarly Singh et al. (2008) also observed that the material cost was higher in fiber glass cast than plaster of paris cast and require less time of application and less setting time in fiber glass cast. Complications like breakage of cast in 4 cases and displacement of bamboo splints in 2 cases were seen only with plaster of paris cast whereas fiber glass cast remained intact during the clinical study. These findings were also reported by Boyd *et al.* (2009). Mbiuki and Byagagaire (1984) observed muscle atrophy at the level of flank, pressure point lesions and weakening of joints and tendons in plaster of paris cast.

**Table 1: Assessment of weight bearing in Group I**

Days of observation	Group-I (n=12)											
	I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11	I-12
0	-	-	-	-	-	-	-	-	-	-	-	-
30	+	+	+	+	+	+	+	+	+	+	+	+
60	+++	+++	++	+++	+++	+++	++	+++	++	++	+++	++
Day at full weight bearing	51	48	67	43	46	55	83	56	66	67	45	72

**Table 2: Assessment of weight bearing in Group II**

Days of observation	Group-II (n=8)							
	I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8
0	-	-	-	-	-	-	-	-
30	++	+	++	+	+	+	++	+
60	+++	++	+++	++	+++	+++	+++	+++
Day at which started full weight bearing	35	66	44	72	54	52	44	51

### Conclusions

Fiber glass cast as external immobilizing technique was considered as a better orthopaedic modality than plaster of paris cast as it provides rigid fixation, light weight, less time consuming and less complications.

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**Application of Plaster of Paris**



**Application of Fibreglass cast**