

## **PHEMISTER TECHNIQUE FOR EPIPHYSEAL PLATE AND EFFECT ON TIBIAL BONE GROWTH FOR TREATMENT THE SHORT –LEG SYNDROME IN DOGS**

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### **ABSTRACT**

This study was designed to assign the effectiveness of experimental epiphysiodesis with phemister technique on the epiphyseal plate of the longest bone in puppies.

Eight puppies local breed male , aged between 1.5-2.5 months, and weighing 4-6 kg were used .The animals were divided into two groups ;-The first group was treated in the proximal tibia of epiphyseal plate .with epiphysiodesis and second group treated in the distal tibial of epiphyseal plate . All animals observed clinically and radiographically for 3 months post operation .

The animal was anesthetized by giving pre-medication with atropin sulphat .0.04mg/kg B.w intramuscularly after 10 minute injection of a mixture of xylazine Hcl 5 mg/kg B.w and ketamine Hcl 15 mg/kg B.w .An incision from medial aspect under knee joint after that separate the superficial digital flexor muscle and gastrocnemius muscle then remove the osteum by blunt object . Also high exposure the distal tibia epiphyseal plate above the metatarsal joint. When complete exposure the epiphyseal plate drilling with phemister technique called epiphysiodesis.

The clinical and radiographaical results show in two groups the treated limb supporting and carry the weight in normal position , lameness ,in two days after operation , then disappear for one , two months according the lameness appear again after one and two months of operation in second and first group respectively .

The conclusions of this study the epiphysiodesis is very important to correct the deformity of limb lengthening and shortening in dogs

## **INTRODUCTION**

The short-leg syndrome called asymmetry of the limbs or limb-girdles and the symptom by clinicians may be tempted to postulate mechanical stress .There have been several studies of unequal length of legs and pain at low back. In measurement of the true and apparent leg-length by tap measure and simple palpation of the iliac crests. While correcting pelvic tilt with heel blocks of different heights . [1].

Simple developmental inequality of length of the leg is usually not gross, there may be some asymmetry of the height of the shoulder is which may well have been noted previously by an observant tailor-on the short side the flank will appear less hollow, the hip less prominent , and the gluteal fold lower .More extreme cases may be due to congenital or acquired hip disease , while growth of the bones may be retarded by polioymelitis and accentuated by chronic osteomyelitis and vascular malformation ,some degree shortening is common after major fractures of the lower limbs [2].

In cosmetic surgery ,the asymmetry of legs is a problem to correct , these problems may be structural , that is real and functional , apparent . The treatment of the short –leg syndrome depended according the classification of problems. If the problem structurally treated with heel elevation .But in functional problem treated by correct position the feet and associated with cosmetic surgery [3]-

The asymmetry of legs, treated with different methods such as lengthening the short leg or by shortening the long leg through growth modification in stimulatory or inhibitory that's methods is very useful and very common the inhibitor method of growth of bone done by phemister technique in 1933 to stop of growth the epiphyseal plate [4].

The aim of present study is conducted the phemister technique to inhibit bone growth of epiphyseal plate.

## **MATERIAL AND METHODS**

### **animals :**

Eight local breed male puppies , aged of 1.5-2.5 months with body weight of 4-6 kg-were used in this study, puppies were purchased from different localities of Basra city puppies were maintained at individual cages in the animal house of veterinary medicine Basra university , and exposed to the same environment including climate, management and feeding .These animals were examined clinically and radiographically to ensure that the health ,specially bones as well as the animals were administered with antiparasitic drug (ivermectin)200 /kg.B-W s/c )

### **Experimental dosing**

Puppies were divided into two groups: the first group the proximal epiphyseal of tibial was treated. While in the leg second group the distal tibial epiphyseal plate was treated . All the animal in this experiment were examined clinically and radiographically for 3 month after operation .

### **Surgical procedure :-**

The animal was anaesthetized by giving the atropine sulphate at dose 0.04 mg kg B.w and after 10min give a mixture of Xylazine at dose 5mg/kg B.w and ketamine Hcl 15 mg/kg. B.W [5].

The surgical operation were performed with animals under standard aseptic technique the animal recumbent on its right side and an incision above the proximal tibial epiphyseal from medial view under knee joint after that separated the superficial digital flexor muscle and gastrocnemius muscle another of them to high exposure the epiphyseal plate (Fig-1), to remove periosteum by blunt object, as well as the exposure of distal tibial epiphyseal plate above the metatarsal joint about 1cm then remove periosteum by blunt object to prevent any damage in the tendon which pass through this area.

After complete the exposure the region in the proximal and distal tibial epiphyseal plate drilling the epiphyseal in the proximal and distal tibia and fibula- in diameter of drill 1,2 ml the penetrating performed from the frontal of epiphyseal plate toward the caudal aspect (fig- 2 & 3) .

When after finishing the drilling ,the site of operation was closed by simple suturing with simple interrupted technique with surgical slik (3-0).The limb treated without external supporting

The radiograph was taken every 15 days , the observation of animals extended for 3 months . The other limb in the same animal used as a control and a comparative study the x-ray with mediolateral exposure that observation for photographic with calcuted points through? From the courtyard ? distance between the condylar and medial heel in the tibial bone.



Fig.1: Show the blunt anatomical of knee joint

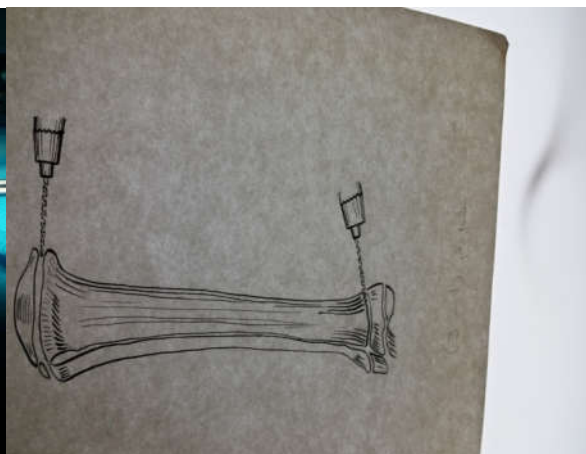


Fig.2: Diagram show the proximal & distal epiphyseal plate

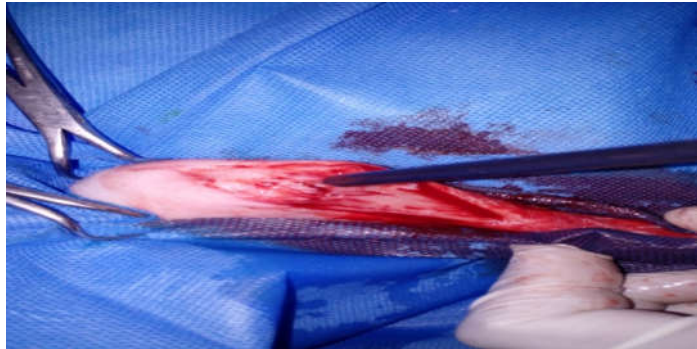


Fig.3: Show the drill of epiphyseal plate

## RESULTS

The result was recorded through the clinical observation and findings at the period of study .All animals were cured without any complications.

proximal of tibial epiphyseal plate group .

### 1- Clinical observation

The animals in this group were supporting on the limb treated , and carry weight in normal position at the third day after operation , there is no lameness but slightly at the first and second day then return after 2 month

### 2 Radiographical observation

The radiographic picture indicated differences between length of control bone and treated limb (fig-4 )

- Distal tibial epiphyseal plate

### 1- Clinical observation

The puppies were supporting limb treated and carry weight in normal at the 3rd days but there is evidence of lameness after 30 days of operation .

### 2- Radiographical observation

The radiograph of this group show the differences in between the length of tibia control bone and treated (fig- 5 ).

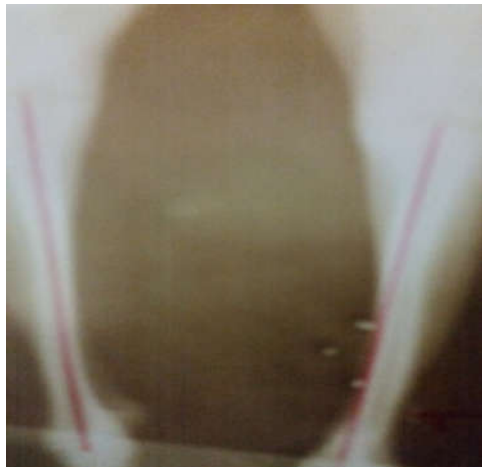


Fig.4- Radiograph in proximal epiphyseal plate  
 group show the different length in tibia (red & rullar )



Fig: 5 – Radiograph in distal epiphyseal plate  
 group show the different length

## DISCUSSION

The epiphyseal plate is considered ossification in the long bone in limb, according to the time and average the final length of bone. The researcher indicated the time of closed of epiphyseal plate in long bone at time 6-11 month.

In the other study some worker of experimental studies to induce damage or injury epiphyseal plate to determine effects of damage on the epiphyseal plate and the results appear delay on bone growth in the length according to the degree or type of injury or damage of plate [6].

The results of this study according to the damage or drilling of the proximal and distal tibial epiphyseal plate by epiphysiodesis technique that is very clear to differ between treated and control limb in puppies. According to the phimester technique[19-22]. This agree with [7]. due to damage the center ossification in two group, in our study, we describe a method, which achieves growth inhibition by drilling or closed center ossification primary and secondary and it is effective in achieving predictable growth inhibition on the side of surgery as is evident of epiphysiodesis. That may be agree with [6 and 8].

The shortening occur in the limb after 30 days occur due to bone bridge formation and lead to delay in bone growth, but another study show, the cause is formation of spongy bone bridge after damage of epiphyseal plate. that agree with [9-12] and [10] be agree with evaluation the deviation of axis lower limb, to atrophy the muscle above or attachment in the area.

The epiphyseal plate may be continuous in growth for limited period after epiphysiodesis technique reach at least 5 cm additive for length bone before closed epiphyseal plate growth. That is agree with [10]. No complications occurred in this technique. noreaction in the proximal and distal epiphyseal plate region[13-15].

The radiographic show in the first group the bone bridge and lameness after two months in the proximal tibial epiphyseal plate ( epiphysiodesis ) but in distal tibia epiphyseal plate , no formation this bridge due to decrease the blood supply for 3rd distal tibia compare with proximal part of tibia duo to adjacent the femur bone and muscle[16-18] .

## **CONCLUSIONS**

At the end of this study the following appointments were appeared the epiphysiodesis of epiphyseal plate in the proximal and distal tibia by drilling lead to closed in early stage in the epiphyseal plate duo to bridge bone formation and then occur shortening in the limb without complications or deformities in the bone shape .

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