

TARSAL ARTHRODESES WITH HINGED TYPE CIRCULAR EXTERNAL SKELETAL FIXATOR IN 7 DOGS

Sinan ULUSAN¹, Shaheen JAAFAR¹, Ozkay NASIBOĞLU¹, Ozge OZDEMIR², Hasan BILGILI¹

1. Ankara University, Faculty of Veterinary Medicine, Department of Surgery, Ankara, Turkey.

2. Cumhuriyet University, Faculty of Veterinary Medicine, Department of Surgery, Sivas, Turkey.

SUMMARY: The purpose of this study is to use circular external skeletal fixator (CESF) for talocrural joint (TCJ) and tarsometatarsal joint (TMTJ) arthrodesis and to share all outcomes to our colleagues. Our study was performed in 7 dogs within different ages, breed and sex. After preoperative clinical and radiological evaluations of cases, an opened-fracture on tibiotarsal region and instability due to luxation in a cases, and talocrural instability in latter were determined. 2 full rings in 75 mm diameters within double-blocks; 3 rods and hinged type CESF were applied on cases. One of double-blocks was applied on tibia, the other was on metatarsus. Hinge level was positioned on tarsal joint level carefully. 2 Kirschner pins in 2.0 mm diameters, for each ring (totally 4 rings), were used crossly on cases. The apparatus were assembled for preoperative findings and after then they rehearsed on cases. First usage of affected limb was at the same postoperative day for cases, besides they weight bearing on affected limb on postoperative between 17-25 days and used the affected limb functionally for radiological findings arthrodeses were observed on tarsal joint postoperative between 43-52 days. The fixators were removed on cases respectively; on postoperative between 50-62 days, under general anesthesia. As a result, hinged type circular external fixator was used for applying of TMTJ and TCJ arthrodesis in dogs, as a safety method.

INTRODUCTION

Tarsal joint injuries are seen common in cats and dogs (1, 10, 14). Tarsal joint injuries usually happens by car accidents, dog bite, high fall and the high powered injuries (8, 10,13). Talocrural joint luxations are the most common injuries. In addition to this medial collateral ligament ruptures, lateral collateral ligaments injurs or distal tibiofibular ligament ruptures. Malleolar fractures are the most common type of talocrural luxations (6). Also proximal intertarsal subluxations are usually seen especially in Shetland Sheep dogs, middle aged athletic dogs, overweighted dogs and hound dogs are predisposed dogs and seen bilateral. Intertarsal subluxations and tarsometatarsal joint (TMTJ) injuries (15) are rare seen tarsal joint injuries. Bandage usually fails in tarsal joint injuries, but arthrodesis results successful in these patients (10, 15). There so many techniques for arthrodesis. These are; intramedullary pin, pin and tension band wiring (6, 10), pin and cross transfixation pin (14, 15), screw, dorsal plantar applied DCP plates (19) and lateral plane plate applications (7, 13), plantar plane plate applications (15, 19), acrylic (18) and/or linear external skeletal fixator (15, 18) and CESF are used (7, 8, 10, 13). But all these techniques have some advantages and disadvantages (3, 4, 5, 9, 11, 18). Ilizarov's circular external fixator was used in a study on 3 dogs for tarsometatarsal arthrodesis (10, 17), and in another study in 2 dogs for pancarpal arthrodesis and in 2 dogs talocrural arthrodesis and pantarsal arthrodesis (12).

The purpose of this study is to use circular external skeletal fixator (CESF) for talocrural joint (TCJ) and tarsometatarsal joint (TMTJ) arthrodesis and to share all outcomes to our colleagues.

MATERIALS AND METHODS

This study was performed on 7 dogs different ages, breed and sex. After preoperative clinical and radiological evaluations of both cases, an infected opened-fracture on tibiotarsal region and instability due to luxation in first cases, and tarsometatarsal instability in latter were determined. Owners are advised to choose CESF and with their approval 7 dogs are included to study.

Anesthesia: Anesthesia was induced by a combination of intramuscular xylazine hydrochloride (0.1 mg/kg, Rompun, Bayer, Germany) and ketamine hydrochlorure (10 mg/kg, Ketamidol, Richter Pharma AG, Austria) which is maintained with Pentothal (0.5 gr, Pentothal sodium, Abbott, Italy).

Planning and operation: The ring diameters, number of the rings, suitable Kirschner wire thickness (K-wire, Tipsan, Turkey) were determined. Blood supply of the tarsal area (16), innervation and anatomic cross section of CESF (CEF, Tipsan, Turkey) were determined (2, 7, 19-21, 30). 2 full rings in 75 mm diameters within double-blocks; 3 rods and hinged type Ilizarov apparatus were applied on both cases. One of doubled-blocks was applied on tibia, the other was on metatarsus. Hinge level was positioned on tarsal joint level carefully. In the first case additionally a K wire to metatarsus L/L was used to increase the stability. In second case distal tibia malleolar osteotomy was performed due to open and engected fracture. 2 Kirschner pins in 2.0 mm diameters, for each ring (totally 4 rings), were used crossly on both cases. A pin tensionmetre used to tension the pins. The apparatus were assembled for preoperative findings and after then they rehearsed on cases.

Postoperative follow-up: Phenylbutozone (44 mg/kg, 3 times a day) was administered intramuscularly for 3 days where applicable. The transection level and directions of the pins through the tarsal joint region were checked by taking two sided radiographs, and no problem was encountered. In order to prevent pin track infection, tampons involving rifamicine (Rifosin amp., Hoechst 250 mg/3 ml.) and nitrofurason (Furaderm pom., Toprak 0,2%) were placed to the holes where the pins pass through the skin (fig. 10a). The apparatus was protected from surrounding with a bandage. As a parenteral antibiotic, Septazidim penhydrate (Fortum amp., Glaxo-Wellcome 1.0 gr.) was used for 5 days postoperatively. Radiographs from the subjects were taken periodically every 15 days. Moreover, 10 minute leash-walk (twice a day) was recommended for the subjects. The owners were also advised to end the physiotherapy after the subject is able to use its operated limb. The fixator was locked and callus formation was followed up by radiographs. Fixator was removed under general anesthesia after radiologic consolidation.

RESULTS:

First usage of affected limb was at the same postoperative day for cases, besides they weight bearing on affected limb on postoperative 21st day and used the affected limb functionally for radiological findings arthrodesis were observed on a case with tibiotarsal instability on postoperative 45th day and the other case with tibiotarsal instability on postoperative 30th day. The fixators were removed on cases respectively; on postoperative 60th day and 45th day, under general anesthesia.

DISCUSSION AND CONCLUSION:

Arthrodesis has an indication for contusions that are unable to treat; gunshot injuries, open intra articular fractures, luxations that has advanced displacement, chronic and painful arthrosis (1, 2, 7-10). Range of motion that will be gained after operation depends on the breed and the dogs own conditions but the angle aimed to gain is the opposite limbs weight bearing angle. Preoperative planning is made due to the model of other limbs position. This

angle is usually 135-140⁰ for talo tibial joint in dogs (2). Usually, Steinmann and Kirschner wires, plates and screws, spongiose and compact bone grafts are used for arthrodesis (1, 6, 10, 14, 15, 18, 19). Post operative bandage and cast may be used for 3-4 weeks until radiologic union is seen. In these 7 patients first usage of affected limb was at the same postoperative day for cases, besides they weight bearing on affected limb on postoperative between 17-25 days and used the affected limb functionally for radiological findings arthrodeses were observed on tarsal joint postoperative between 43-52 days. The fixators were removed on cases respectively; on postoperative between 50-62 days, under general anesthesia. As a result, hinged type circular external fixator was used for applying of TMTJ and TCJ arthrodesis in dogs, as a safety method.

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