



Use of Blount Staple in the Avulsion of the Tibial Crest in Dog: Surgical Technique Innovation

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Abstract

The avulsion of the tibial crest is a type of fracture that occurs with some frequency. In this event the separation of the cranial border of the crest of the body of the tibial bone occurs. It most commonly occurs in young animals due to the greater intensity of physical activity of high-performance characteristic of these animals. This article aims to describe a new technique of osteosynthesis, using the Blount clamp as an alternative to treat this type of fracture, and analyze the surgical results of twelve patients undergoing the new treatment suggested. The results were evaluated throughout convalescence and skeletal maturation of the animals for one year, concluding that this new technique applied shows extremely satisfactory results, superior to the classical method recommended by the veterinary medical literature.

Keywords: Young dogs; Orthopedics; Avulsion fracture; Osteosynthesis; Tibial crest; Blount clip

Introduction

The tibial tuberosity is an apophyse (protrusion), where the insertion of the quadriceps muscles is located, through the patellar tendon. When the Joelho is flexed with excessive force, the result may be an avulsion of the tuberosity. The dislocation can be minimal or severe, resulting in dislocation of the tuberosity and proximal dislocation of the patella [1].

Fractures due to avulsions are common in children, mainly in the cranial-proximal metaphyseal region of the tibia [2]. Tibial tuberosity avulsion is an event that does not occur frequently, and is limited to younger animals, generally between four and six months of age. The tibial tuberosity is a separate and transformed growth center.

It fuses to the proximal epiphyse, and enters the metaphysis of the tibia as the animal reaches maturity [3].

The tibial tuberosity serves as an insertion point for the quadriceps muscles through the patellar ligament and as avulses occur due to muscle contraction while the Joelho is flexed, so it is firmly positioned at all. Such a mechanism can easily occur during jumps, runs, or perhaps in a run or run [4].

Fractures due to tibial crystal avulsion can be complete or incomplete. Nas complete, the bone segments are found separated, and incomplete, the segments are aligned. As complete avulses, it will result in no proximal dislocation of the tibial tuberosity, and must be reduced and stabilized so that the function of the quadriceps muscle and extension in the joint of the Joelho is restored [1].

The most common clinical symptoms include the cranial aspect of the joint, intense pain, severe instability and claudication. The tubercle can be palpated proximally in its normal position, and the patella will be positioned proximally, in the trochlear groove. In incomplete fractures, there will be only a small dislocation of the distal portion of the tibial tubercle, which is evident in the animal's lameness, therefore, maintaining certain stability of the member [5].

Conservative management using external coupling with a tala or gesso may be the best treatment in cases where there is minimal dislocation and mild claudication. External coaptation may also be considered in more chronic cases due to late diagnosis, since open reduction may be a challenge if surgery is delayed for long periods. In surgical cases, where there is severe dislocation, in small patients it is possible to perform fixation with two Kirschner pins, Steinmann pins or with compressive parafuso.

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In most cases, a tension band hand is the recommended technique [6].

The objective of this article is to discover a new surgical technique for the treatment of tibial crystal avulsion using the Blount Gramp, and to offer an alternative treatment for this type of fracture in the new generations of orthopedic surgeries, as well as how to relate them.

Results obtained in 22 patients subjected to this technique, accompanied and evaluated during the immediate and immediate postoperative period in surgery.

The proposed treatment alternative uses a 316 L stainless steel clamp in U format, Blount clamp, which has deep grooves on the sides in opposite directions to its socket, making it difficult to remove after being stressed in the fracture site. This technical-surgical innovation aims to avoid strangulation of the distal part of the patellar ligament and consequently obtain a satisfactory postoperative without the need to remove the gram, with reduced stability and absence of pain and discomfort for the animal, as well as turning or less invasive surgical procedure and a peaceful post-operative procedure.

Clinical Case Report

It was applied to the new surgical technique in 22 animals in the period between 2001 and 2016. The duration varied from 3 to 7 months (average 4.7 months). Nine patients (42%) were female and thirteen (58%) were male. Two services were provided at the Bom Pastor Veterinary Clinic, located near Jardim Catarina in São Gonçalo RJ, in 2013 with 15 animals, and 9 animals at the Niterói Veterinary Hospital located on Av. Rui Barbosa in São Francisco, Niterói, RJ, both are located in the metropolitan region of RJ.

The data relating to age, sex, race and behavior are shown in Table 1.

You are all encouraged to present classic clinical symptoms of fracture, such as: Edema in the region affected, to instability and lameness with instability of the member. The diagnosis was confirmed by history, physical-clinical examination and radiographs in two positions.



Figure 1: Clamp models.



Figure 2: Dog measuring 7 m with avulsion on left M. Observe the edema in the Joelho region.

Table 1: Distribution of patients by age, sex, race and size.

Case	Life (months)	Sex (M/F)	Race	Bearing
1	7	M	Chow Chow	Half
2	3	M	Boxer	Big
3	3	M	German Dogue	Big
4	3	M	Bulldog	Little
5	3	M	pinscher	Little
6	3	M	Rottweiler	Big
7	3	F	Rottweiler	Big
8	4	M	French bulldog	Half
9	4	M	MR. D	Half
10	5	M	Rottweiler	Big
11	6	F	Labrador	Big
12	9	F	MR. D	small
13	4	F	MR. D	Half
14	5	F	German Dogue	Big
15	4	F	Boxer	Half
16	5	M	Chow Chow	Half
17	6	F	Argentine Dogo	Big
18	5	F	French bulldog	Half
19	6	M	Pointer	Big
20	7	M	Cuvax	Big
21	7	M	German Dogue	Big
22	7	F	Boxer	Big

None of two patients attended had osteoarticular diseases associated.

A female patient, Boxer breed, presented a complete chronic avulsion, or seja, 21 days of fracture, observing as well as complete instability of the leg with consequent retraction of the quadriceps and hip muscles. No prior hospitalization was necessary for any of the patients treated.

Description of the surgical technique

A box of classic surgical instruments was used, a Blount clamp with grooves, according to the size of the animal, orthopedic hammer, orthopedic drill bit with 1 mm less than the thickness of the clamp, orthopedic drill, suture material and clamp inserter.

It is worth mentioning that Blount clamps are only used to perform bone fixation.

It works in conjunction with the ligamentous and large bones to provide the bone synthesis.



Figure 3: Avulsed crista perforation.

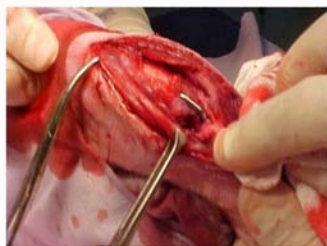


Figure 4: Crista repositioned after being reduced.



Figure 5: Avulsed crista.



Figure 6: After reduced with clamp.

The animals are prepared by performing a wide trichotomy in the femoropatellar region of the affected member and in the dorsal lumbosacral region for the application of epidural anesthesia, as well as in the anterior region of two thoracic members for implantation of a venous catheter. It was performed pre-anesthetic medication using Acepromazine at a dose of 0.1 mg/kg associated with Atropine Sulfate at a dose of 0.025 mg/kg, intramuscularly and pethidine at a dose of 0.2 mg/kg.

There was cephalic venous access and maintained infusion with Soro ringer with lactate. Anesthetic induction was done using Pentobarbital at a dose of 10 mg/kg and maintenance in circuit dated with Isoflurane. Epidural block was performed with Lidocaine at 2% wk vasoconstrictor at a dose of 5 mg/kg in association with morphine at a dose of 0.02 mg/kg. Your animals are monitored through a cardiac monitor and pulse oximeter.

The animal is positioned in lateral recumbency and following the classic procedures of anti-sepsis, a sepsis and isolation of the operative field, a small longitudinal incision is made in the medial cranial region of the tibia. Move away or subcutaneous cell to access the avulsed crista. The glass is pinned with a 25 cm Allis pin and as an extended member. It is traced to glass for the place of origin.

With a low rotation drill bit a smaller caliber drill bit is used in relation to the thickness of the gram, drill the input insertion points of the same, a cranial to the glass and other flow, so that the glass is hugged by the gram. There are cases in which it will be necessary to

carry out a break in the center of the glass for better stabilization of it; care must be taken to ensure that the arm is slightly inclined at 30 degrees in the cranial direction, in order to avoid that the arm is subject to growth, thus avoiding damage to the ossification site.

With a small surgical hammer and an emphasize for the clip, it is also emphasized with small curt and dry hammers, until the complete return of the glass to its bed. The subcutaneous cell with its absorbing fiber Polyglactin 3-0 is then approached. With suture in standard reminder, ending with intradermorrhaphy, using the same thread.

This was a comfortable bandage with a slightly compressive dressing and strained Elizabethan for a week to avoid licking.

No immediate postoperative period, or animal remains hospitalized for 24 h.

Tramadol hydrochloride was applied at 8 in 8 in a dose of 3 mg/kg and antibiotic, Azitomycin in a dose of 10 mg/kg, combined with meloxicam orally every 24 h for 6 days.

It is indicated for all animals, a discreet restriction of freedom for seven days and the use of Elizabethan collar in order to avoid non-local Lamedura of surgery. Liberdade Essa que many owners said they did not have managed to do instead of animals being very young and agitated.

Results

After the end of the surgery, we obtained the following results: (1) shorter surgery time, totaling an average of 20', (2) shorter exposure time of the surgical field, minimizing the risk of contamination; (3) less invasive surgical procedure; (4) better stability of the reduction; (5) absence of strangulation with age of the distal part of the patellar ligament very common in the technique that we propose to abolish (6) absence of intraoperative complications.

Despite the fact that the Boxer breed chain that presents chronic avulsions, the surgery passed satisfactorily, contrary to what was expected, and also the postoperative period in which the member returned to function with considerable speed, thus exceeding expectations.

Among the 22 patients subjected to the new surgical technique and evaluated during the immediate postoperative period and at no interval of 1 year, the following results were obtained: (1) absence of two uncomfortable symptoms of pin tip hygroma; It is very common not to use the tension band used in the old technique; (2) absence



Figure 7: A year after reduction.



Figure 8: Classical form recommended in literature.



Figure 9: Avulsion in small semi-adult children aged 10 months and 9 months.

of dor; (3) you are encouraged, you do not need to rest; (4) better stability of the member; (5) the group is incorporated into the bone tissue as the patient's growth, with no need to remove it; Contrary to the old technique, there was a need to withdraw from the end of the year, like Kirchner's; (6) patient discharge within 24 h; (7) absence of postoperative complications and infections; (8) absence of need for two-point removal, once it was performed intradermorrhaphy using absorbent fluid; (9) Immediate and normal return of the member without any alteration being observed abnormality; (10) absence of need for alternative treatments, curative, immobilization, restraint or any type of significant restraint for the animal.

In two cases we have immediate radiographic accompaniment and one year later, having completed consolidation of the glass with total incorporation of the group.

Discussion

Breeds that are most predisposed to large dogs, such as Rottweiler, Labrador and German Dog, often affect other breeds as well. The diagnosis is not specific and characteristic of different types of fracture, also requiring complementary examinations, such as simple X-rays, for the definitive diagnosis [7].

The treatment must be surgical and the intervention usually recommended by orthopedic and routine literature, is the classic form of osteosynthesis, using one or two Kirschner pins, which is introduced on the tibial ridge perpendicularly with a small angle of 30°, and pressed with steel wires in a tension band pulled in the opposite direction to the forces exerted on the patellar ligament strain [6].

Aoki and Afonso [2] report the treatment of fractures due to avulsion of the tibial tuberosity in puppies. The selection treatment was bone reduction and fixation with Kirschner pine (K-pine), Tension Band (BT) and cerclage. Therefore, five sessions with less than 8 months of time will be carried out osteosynthesis for fracture due to avulsion in the tibial tuberosity, using fine K-pine and tension band associated with Polydioxanone (PDX) 0 or 1, following the principles of the original technique of BT. All of you are presented with excellent member support with a mean of 10 days, without the evolution of bone scarring and without the need for removal of two implants. Only two patients showed K-pine migration after 5 weeks postoperatively, with the same removal, without needing to pull out the PDX, and no radiographic or clinical alteration was shown after the procedure.

Conclusion

Following the accompaniment of two animals operated by this technique, it is concluded that: (1) the small animals present pine tree hygroma, (2) the large animals require rest for more than 15 days to avoid migration. pine, (3) the end of the year to pull the pine, rests on the patellar tendon exerting on this a strangulation in its distal portion, causing local pain, (4) the surgical technique appears more invasive, (5) in most cases necessitate removal of the wood and the pine.

The proposed surgical technique, when properly indicated and applied, presents satisfactory results as a treatment for the avulsion of the tibial bone, as well as superior results to the classical technique recommended in the literature and widely used by veterinary orthopedists, presenting a more useful postoperative for or animal.

However, the technique is shown to be simple to execute and free of trans-operative complications, and can be performed by orthopedic veterinary doctors.

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