



Self-Mutilation of Digits in a Military Working Dog after Tarsometatarsal Arthrodesis



Chandler, an active-duty Military Working Dog (MWD) transferred to the Dog Center for Surgery and Rehabilitation care. Canine, Belgian Malinois, Male-intact, 5 Yrs. old (DOB 3Mar11). He became acutely non-weight-bearing lame on left hind limb during a training event. The initial assessment found a left tarso-metatarsal fracture/luxation. His left tarsus was rotated laterally and severely painful, and he was non-weight bearing lame in the left pelvic limb. Upon Chandler's initial evaluation, he was prescribed Tramadol (6mg/kg) TID & Carprofen (2.2mg/kg) BID and a Robert Jones bandage was placed on the left hind limb under sedation. Pre-operative blood panels were performed and then surgery was scheduled. Arthrodesis of the left tarsometatarsal joint was performed involving placement of a lateral plate across the

proximal intertarsal and all tarsal joints, and a medial plate across the middle and distal intertarsal joints. After surgery, he was prescribed Cephalexin (25mg/kg BID) and Hydromorphone (3 mg) every 3 hours for the 24-48 hours as well as continuing the Tramadol and Carprofen. Cryotherapy on his left tarsal area using a cold compression unit with a stifle sleeve with medium to high pressure for 15 minutes was performed during recovery. A thermoplastic splint with bandage was placed laterally and a bucket (standard equipment replacing an E collar for MWDs) was placed on him to prevent getting to his bandage. Chandler was rechecked daily for the next month. During that time due to his behavior/attitude, he had to be sedated with dexmedetomidine at 0.75 mg I. V. (prior to any bandage/splint changes), which were almost every day, and was reversed with atipamezole at 125mcg/kg (at the same volume as the dexmedetomidine). Chandler's digits were swollen intermittently with bandage changes and a tension wound developed over the lateral plate, as well as interdigital pressure wounds, suspected to be from the toenails.



At one point, he chewed through the bandage onto his toes, resulting in a complete avulsion of the nail of digit #3 with active tissue maceration and bleeding. Hemostatic powder was applied and his daily post op care was changed to bandage/splint removal, foot soaks in warm water with betadine and Epsom salts for 10 minutes with massage, followed by either mupirocin ointment or silver sulfadiazine crème (SSD) application. A matrix wound dressing was applied to toes and incision, and then a thermoplastic material was used for the splint and he was re-banded. A more robust triple head bucket was placed as well as a "bite not" collar since he was demonstrating a tendency to chew at his bandage frequently.



At 27 days post op, again he could slip out of his triple bucket and get to his bandage and caused severe self-mutilation to digits 3 and 4. He was anesthetized and wounds were cleaned well, a hydrogel wound dressing was used on the digits and incision and the bandage/splint replaced. He was started on amoxicillin and clavulanate potassium at 15mg/kg BID, enrofloxacin 20mg/kg, divided and given BID. Gabapentin at 10mg/kg BID and amantadine 5mg/kg SID were added to address neuropathic pain which may have been leading to the self-mutilation. He was also fitted with a basket muzzle that attached to a collar through which he could eat and drink water, and could be worn always to prevent him chewing on his bandage.

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At 34 days post op, the Rehabilitation Department was consulted regarding the delayed wound healing, and treatment with a combination of Extracorporeal Shockwave (ESWT) and low level laser was used. The ESWT was performed twice a week for 6 treatments using the R05 trode, at energy level 3 and 250 shocks to each wound site. On the other days, the wounds were treated with the class 3b therapeutic laser at 5 J/cm². Foot soaks were continued plus SSD, the matrix wound dressing and then re-applying the splint/bandage. He was seen every day with bandage/splint changes, foot soaks, and the laser. All wounds were healing; granulating and contracting well. Imaging at five weeks post-op showed bone remodeling of middle and distal intertarsal joints with no evidence of implant compromise or infection.

At 8 weeks post op, alternate day bandage/splint changes with the SSD and matrix wound dressing between toes and over incision was begun. He was prescribed omega 3 free fatty acids, 1706 mg of EPA & DHA once daily. On 11Jul16, Chandler could chew on his bandage/splint again, and digits 3 & 4 showed fresh hemorrhage but limited additional damage. He had been off his Amantadine for a few days and there was concern that an increased neuropathic pain had caused the self-mutilation, so the Amantadine at 5mg/kg SID see if that would help his behavior.



At 11 weeks post op, there was concern about the progression of wound healing again. It was suggested to add back the ESWTs treatment. ESWT was performed 2x/week for 4 treatments under sedation along with bandage changes. On the days when ESTW was not used, a class IV laser for wound healing therapy was added. Imaging revealed proximal intertarsal joints showed little to no radiographic evidence of arthrodesis now. He began slow, short leash walks outside twice daily. At 14 weeks post op, healing had progressed well and he was moved into a run and the splint was removed. Treatment of the small wound with class 3b laser and applying a light bandage daily was performed. The muzzle, buckets and bite not collar was kept as a preventative. At 15 weeks post op,

he could begin exercise in the underwater treadmill (UWTM). Using cavaletti rails and passive range of motion (PROM) was performed on the limb. Imaging showed incomplete fusion at the proximal intertarsal joint of the arthrodesis, so it was decided to do ESWT for bone healing. The R05 trode was used, with an energy level setting of six, with 500 shocks applied to the medial and lateral side of the tarsus and they were scheduled for 16 and 18 weeks post op. At 17 weeks post op, it was noted that Chandler was getting an aural hematoma, so the buckets were removed and just left him with the muzzle. The Class IV laser was set at 1.0 watts, and 62 joules for the hematoma repair protocol. At 18 weeks post, he was lame prior to the scheduled ESWT and became aggressive during PROM, so the Class IV laser using a pain reduction protocol, at 7 watts and 987 joules for the tarsal joint was started. The scheduled ESWT at 18 weeks post op was performed. Radiographs at 19 weeks post op revealed mild progressive healing of arthrodesis with minimal evidence of proximal intertarsal joint healing. Assisted sit-to-stand exercises for active range of motion were introduced, increasing tarsal flexion in a manner better tolerated by Chandler. We used the blue foam squares under his bottom to assist with the "sit to stands" while offering cookies up to raise his head and nose and giving the "sit" command.

Gradually the devices designed to inhibit self-trauma were removed. Chandler could go without his muzzle during working hours for the last week. A large toy that could be chewed on was placed with the additional benefit of getting treats from the toy occupied him. At 24 wks. post op due to his delayed healing, the surgeon removed both plates (medial & lateral) and imaging revealed fusion of tarsal bones consistent with arthrodesis procedure. The images showed a large amount of proliferative new bone surrounding the tarsus especially proximal and distal to the now absent plates consistent with disuse osteopenia of the tarsal bones. Decreased opacity of the tarsal bones were noted. Class IV laser (7 W, 987J) to the incision and slow leash walks for the first few weeks, then slowly added in the land/dry treadmill at 1.0mph for 15 minutes.



Cavaletti rails were used at 4 inches high with 4 poles for 10 reps. at each session. Weaves using 4 cones at about 2 feet about with 10 reps at each session were performed. Once the incision was sealed, he began the UWTM. The water was at stifle level to start strengthening, at 1.0 mph for 15 minute sessions. The dry/land treadmill speed and distance were slowly increased over the next two weeks to 2.5mph for 15 minute sessions. Chandler was continued with cavaletti rails at different heights (4-6") to challenge him, weaves and sit to stands on an incline, performing 8-10 reps per session.

At 29 weeks post op, his aural hematoma kept getting worse, so it was decided to do a surgical repair which delayed his return to unit. He departed @ 31 weeks post op with a home program to continue gaining strength and endurance to return to full duty. The home program included warm up walks,

continue dry treadmill if they have access to one, PROM to the left hind limb. We also suggested performing a variety of exercises that they could mix and match up with the dry treadmill: stair exercises, 5-10 reps, curb weaving on and off for 2-3 minutes, walking up and down hills for 5 minutes. They were instructed to slowly increase the speed/time on the treadmill and other exercises to only every week to week and a half, to hopefully prevent tendonitis. Also, suggested that he do 2-3 shorter sessions per day as opposed to one long session per day.

The following activities were to be avoided the 1st month back: NO obstacle course, kong/toy retrieval, any exercise that will cause him to plant hind fee and must quickly turn/shift body.

Now, his unit has reported two instances of lameness since he returned. He currently is awaiting an imaging work up at his unit and the decision will be made about his status as a working dog after that.





About the Author

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Kelley graduated from Fairmont State College with her degree in Veterinary Technology in 1988. She worked in a private practice as the Lead Technician for two years in San Antonio, TX. She then began working at the University of Texas Health Science Center as a Veterinary Technician in Lab Animal Resources where she obtained her RVT and LAT and then LATG certifications. She worked in the research field for five years and then began working at the DOD Military Working Dog Veterinary Hospital, where she's been since 1995. She worked in all the clinics, Radiology, Internal Medicine, Laboratory, Surgery and finally Rehabilitation/Sports Medicine for the last 14 years. She began with an interest in the older dog population which led her to obtain her CCRP from University of Tennessee program in 2006. She helped start/create the Rehabilitation program at the Military Working Dog Hospital. Since 2001 she occasionally provides relief work in various private practices.

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