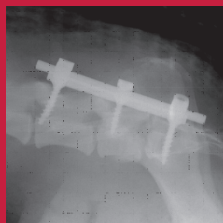


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**2017**



**Case Report :**  
**Use of PCSO-524 for Treatment of Spine Fracture in Conjunction with Pedicle Screw-Rod Fixation (PSRF)**



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## Abstract

An intact male mixed breed dog aged 2 years engaged in a fight with several dogs resulting in disable of hind limbs and loss control of elimination. Physical and radiographic examination showed fracture and luxation of the 7th lumbar vertebrae. Spinal cord injury (SCI) was also found and the fracture was identified as the cause. The spinal cord trauma could occur since the incident and was left for more than 2 weeks. Pedicle screw-rod fixation (PSRF) was operated to fix the vertebral column. After the second operation, it was suspected that there was remain of inflammatory cytokines that probably increased after the operation. Anti-inflammatory medication for prohibition of inflammatory cytokines synthesis was essential but its adverse effect must be concerned. The study therefore used holistic treatment including PSRF, non-steroidal drug and PCSO-524<sup>®</sup> anti-inflammatory extract, in conjunction with physical therapy. Follow-up examination on neurological system, walking, and urinary system showed promising result. The neurological system was restored, and adverse effect of long-term use had not been found.

Keywords: PCSO-524<sup>®</sup>, lumbosacral fracture-luxation, pedicle screw-rod fixation (PSRF), spinal cord injury (SCI), postoperative care

## Introduction

Injury or trauma of spinal cord is classified into primary and secondary incident. The primary trauma is caused by direct concussion of elements in neurological system resulting in malfunction or disruption of spinal cord (1). The secondary traumais divided into 3 stages, each of which starts at 0-48 hours, 48 hours-2 weeks, and 2 weeks after the primary trauma, respectively (1).

The first stage of secondary trauma is characterized by increased degree of the damage, for example, hemorrhage of spinal cord and change of polarization voltage. When neuron stimulation reaches a critical level (excitotoxicity), free radicals and inflammatory mediators are released (7, 8), particularly the secretion of phospholipase A2 and eicosanoid (2). The trauma in this stage consequently causes inflammation and degeneration of neuron tissue and prohibits the restoration of neuron function.

Some inflammatory mediators;interleukin-1 $\beta$  (IL-1 $\beta$ ), interleukin-6 (IL-6) and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), causeinflammation of neurological system and damage its function (6, 7).

Loss of neurological function does not necessarily occur where the fracture is located. Edema or hemorrhage of spinal cord from the secondary trauma could cause the loss of neurological function in other areas (4).

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## Case history

An intact male mixed breed dog aged 2 years was engaged in a fight with several dogs on the 6<sup>th</sup> of October 2017 resulting in paresis of hind limbs and loss control of elimination. The dog was taken to the hospital on the 10<sup>th</sup> of October 2017. Radiographic examination found vertebral fracture and luxation of L7. Medication included gabapentin 10 mg/kg bid, multivitamin 1 tablet bid, and vitamin E 200 IU bid was provided. Surgical treatment was done on day 18 after the trauma. Post-operative care included additional medication as follows; firocoxib 5 mg/kg sid and PCSO-524<sup>®</sup> (Antinol<sup>®</sup>) 1 capsule bid. The dog showed effort to walk in a short distance on day 3 after the operation. However, on day 5 the dog was unable to walk again. Radiographic images showed that the planted instruments could not hold body weight of the animal. Therefore, the second operation was done 13 days after the first operation with similar technique but adding more screws and bandage throughout the body. Prescription for post-operative care included morphine injection for pain control, fentanyl pain relief plaster, firocoxib 5 mg/kg sid, PCSO-524<sup>®</sup> (Antinol<sup>®</sup>) 1 capsule bid, gabapentin 10 mg/kg bid and multivitamin B1 B6 B12 (neurobion<sup>®</sup>) 1 tablet sid.

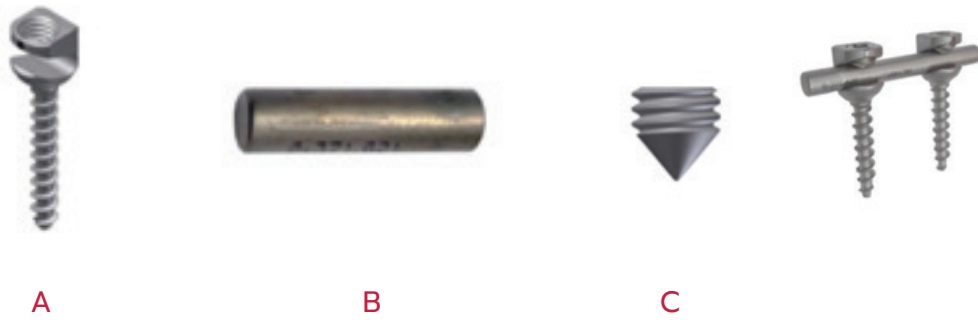


Figure 1. Instruments used in surgical treatment: Pedicle screw-rod fixation  
a) Pedicle screw b) Rod c) Inner screw (orthopeasia®)

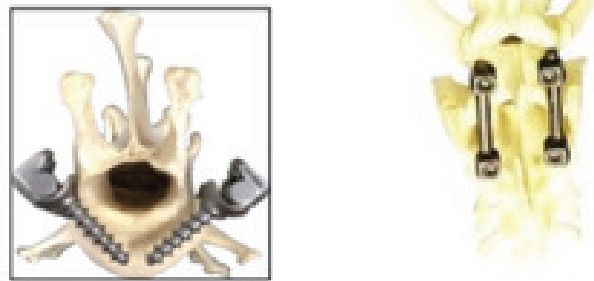


Figure 2. Method of instruments (orthopeasia®) insertion



Figure 3. Insertion of the instruments

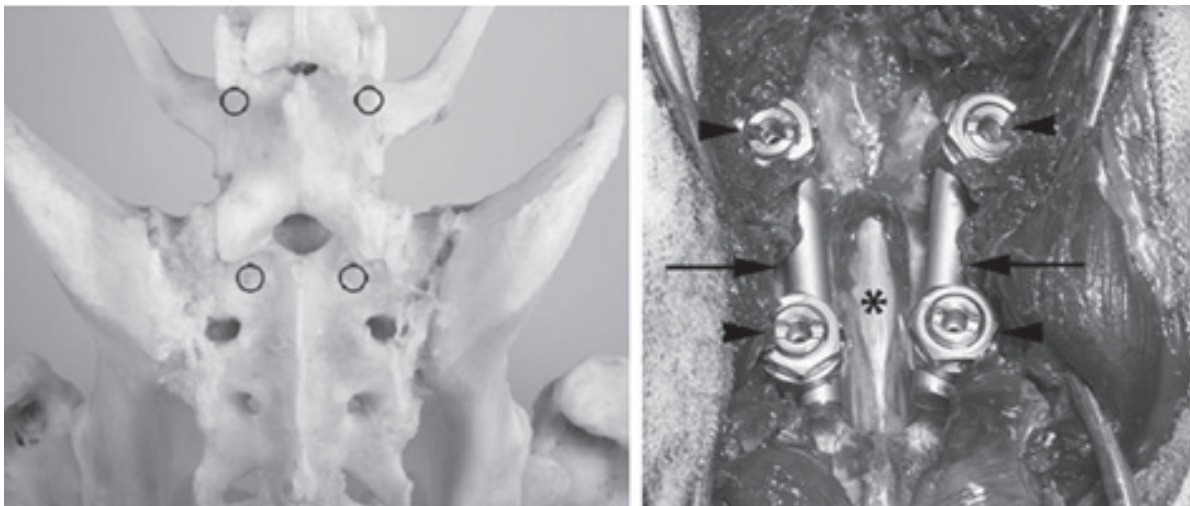


Figure 4. Position of instrument insertion on the vertebral column (Bjorn P. Meij, 2012)

Follow-up each week after the operation showed that the dog rapidly resumed body weight bearing but also developed cast dermatitis. Firocoxib was terminated on the 15<sup>th</sup> of November 2017, after 22 consecutive days of administration. The dog was transferred to rehabilitation unit for electrotherapy and hydrotherapy. At this point, the dog was not able to control elimination and prepuce retraction. On the 8<sup>th</sup> of December 2017, 1 month after the operation, radiographic image showed that the instruments were in place and there was healing of the vertebral fracture. On 28<sup>th</sup> December 2017, the follow-up found that body weight bearing while walking was satisfied, the elimination was not completely under control, and the prepuce retraction was resumed. At this point, the dog still received PCSO-524<sup>®</sup> (Antinol<sup>®</sup>) 1 capsule bid and multivitamin B1 B6 B12 (neurobion<sup>®</sup>) 1 tablet sid.

## Treatment outcome

The leg function of the dog was fully recovered and there was a promising sign of neurological system restoration after the pain and anti-inflammatory medication and surgical treatment were given. Follow-up on walking, neurological function and elimination control showed satisfied treatment outcome (Table 1).

**Table 1. Results of neurological examination**

DD/MM/YY	Paretic grade	Voluntary /ambulatory	Deep pain	Superficial pain	Proprioceptive reflex	Patella reflex	Sciatic reflex	Perineal reflex
6/10/17	N/A	-	N/A	N/A	N/A	N/A	N/A	+
16/10/17	IV	-	+ (less lateral )	+	0	2+	0	-
17/10/17		-	+ (less lateral )	+	delayed	2+	0	-
24/10/17				First operation				
27/10/17	II	+	+	+	delayed	2+	1+	-
29/10/17	IV	-	+ (less lateral )	+	0	2+	0	-
6/11/17				Second operation				
15/11/17	II	+	+	+	delayed	2+	1+	-
8/12/17	II	+	+	+	delayed occasionally	2+	1+	-
28/12/17	II	+	+	+	+	2+	2+	-





Figure 5. The dog after 8 weeks of treatment

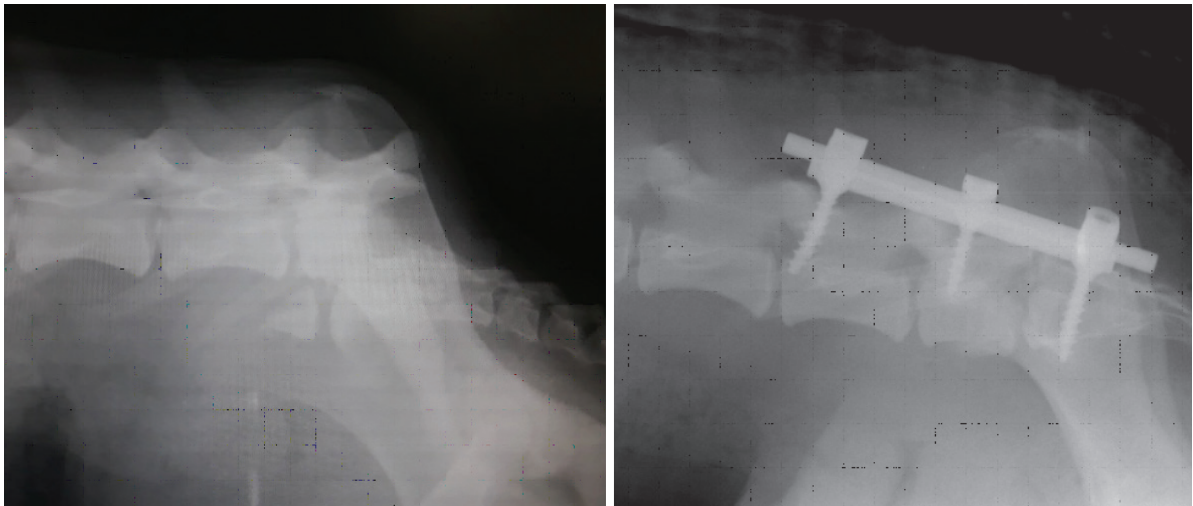


Figure 6. Radiographic images showing spinal column before and after instrument installation



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## Discussion

Standing and supporting the body with hind legs requires cooperation of several nerves in area between L4 to S. Therefore, dogs have high ability to use hind legs. Dogs may show only slight symptoms when there is more than 50% luxation of 7<sup>th</sup> lumbar vertebrae since the area has sufficient space to compensate distorted route of nerves without severe compression (4). Dogs may not walk in the early stage of trauma because of pain and inflammation caused by the fracture (4).

Anal sphincter is controlled by motor neurons originated from S1-S3 (3). Therefore, the dog in this study could not control elimination since the trauma occurred in the area above the sacrum. Fracture of sacrum usually results in malfunction of elimination control (3).

Surgical treatment is recommended in case of impaired neurological function. Medication and extract supplementation are also necessary to reduce inflammation caused by the fracture and following operations (7).

Extract from New Zealand green-lipped mussel is consisting of 6 categories of lipid and other excellent anti-inflammatory substances. Lack of side effects even for a long-term use makes it appropriate for reducing inflammation caused by secondary trauma that can last longer than 2 weeks (1).

## Conclusion

Fracture of vertebral column and spinal trauma cause inflammation and severe malfunction of neurological system. Integration of various medications and appropriate surgical treatment, in conjunction with anti-inflammatory extract PCSO-524<sup>®</sup> (Antinol<sup>®</sup>), gave satisfied treatment outcome without any complication.

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