

# Surgical Stabilisation as the Primary Treatment for Traumatic Luxation of the Elbow Joint in 10 Dogs

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## ABSTRACT

Ten dogs over a 6 year period had surgical stabilisation of traumatic elbow luxation (TEL) post closed reduction. Rechecking instability 48 hours after closed reduction may detect undiagnosed instability. Fifty percent of dogs had local tissue complications in association with the screws and wire used to stabilise the joint. Long term outcome was assessed using clinical notes and owner questionnaire. Long term outcome analysis found that eighty per cent of the dogs had clinical symptoms of stiffness or lameness. Surgical stabilisation of TEL could produce marginally better outcomes compared to closed reduction only based on the current literature.

## INTRODUCTION

Traumatic luxation of the elbow is a relatively uncommon injury in dogs<sup>1</sup>. The majority of elbow luxations can be treated by closed reduction<sup>2</sup>. Early closed reduction of traumatic luxation of the elbow (TEL) has a good prognosis for return to normal function<sup>3,4</sup>. Persistent instability following closed reduction of TEL is common and leads to

disappointing long term results<sup>5</sup>.

## METHODS AND MATERIALS

The records of dogs that had a traumatic luxation of the elbow from 2003 to 2009 were used to investigate the long term outcome of the dogs using clinical notes and owner questionnaire. All of the dogs were referred because the referring veterinary surgeon could not either maintain reduction or reduce the joint. The follow up period ranged from 6 months to 60 months. All dogs that presented with an acute elbow luxation that were found to have any degree of instability had open stabilisation (Fig 1, 2). The technique used to assess the degree of stability of the elbow following closed reduction is the method described by Campbell (1971)<sup>1</sup>. Any joint that was assessed to have a range of movement at all beyond the range of 45 degrees for medial rotation and 70 degrees for lateral rotation had an open stabilisation performed. In addition to this, the degree of rotation was compared to the contra lateral limb as well. There were no cases of medial elbow luxation. The open reduction was performed within 4 days of injury in all cases. Anaesthesia was induced and maintained using isoflurane (Forane, Abbott Laboratories). Analgesics were

**Fig 1** Dislocated elbow post closed reduction



**Fig 2** Postoperative view of prosthetic repair



administered preoperatively and continued for 5 to 10 days postoperatively (Metacam, Boehringer Ingelheim; Torbugesic, Fort Dodge or Temgesic, Reckitt and Coleman). Cephalexin was used preoperatively and for 4 days postoperatively. A lateral approach to the elbow was used in all cases. The joint was flushed with saline and cleared of any debris, and reduced if not already reduced. Inspection and assessment of the lateral collateral ligament was made. Holes were drilled at the proximal radius and distal humerus in preparation for taping. The joint was then stabilised using two screws with washers and wire, with further augmentation using monofilament nonabsorbable suture material. Suturing of the lateral collateral ligament was then performed when possible. A support bandage was applied and removed after 3 days. Immediate postoperative passive flexion exercises 4 times a day for 3 minutes were performed and followed on by the owners. The follow up and subsequent clinical notes were analyzed and used in association with the questionnaire to complete the overall assessment of the outcome of the dogs. The questionnaire was based on 2 questions-

Is your dog stiff and or lame at anytime? and could you rate it as 1. Never 2. Intermittently (up to 3 times weekly) 3. Frequently

(daily)

The data from the clinical notes and questionnaire were used to classify the dogs as-

1. Never stiff or lame-Excellent
2. Intermittent stiffness of lameness - Good
3. Frequently stiff or lame-Poor

Are you happy with the outcome of the surgery and the use of the limb? There were three possible answers 1. Very Satisfied 2. Satisfied 3. Not Satisfied

## RESULTS

The details of the cases are summarised in Table 1. There were 6 males and 4 females and the age range was 1-11 years and the mean age was 3.5 years. Six dogs weighed 25 kg and over and four dogs weighed less than 10Kg. A diagnosis of instability was found in all elbows; with two cases diagnosed after a second check for instability 48 hours post reduction. The degree of instability was recorded as unstable/relaxating in 5 dogs, and unstable /not relaxating in the remaining dogs when manipulated post closed reduction. In those cases of minor instability the comparison with the normal limb was found to be the most useful technique to detect the instability. All lateral collateral ligaments were classified as dam-

**Table 1** Case details

Breed	Sex	Age	Weight	Complications	Owner Satisfaction	Outcome
Bassett Hound	F	2y	26Kg	Seroma over screws	Very satisfied	Good
Cavalier	M	2y	7Kg	None	Very satisfied	Excellent
Collie	M	3y	30Kg	None	Very satisfied	Good
Poodle	M	1y	6Kg	Seroma, screw loosening	Very satisfied	Good
Labrador	M	11y	35Kg	None	Very satisfied	Good
Cavalier	F	1y	8Kg	Seroma, screw loosening	Satisfied	Poor
Collie	F	5y	25Kg	Seroma, screw loosening	Satisfied	Good
JRT	M	2y	6Kg	None	Very satisfied	Excellent
Rottweiler	F	1y	33kg	None	Satisfied	Poor
Retriever	M	8y	30Kg	Seroma, discharge	Satisfied	Poor

**Key***JRT- Jack Russell Terrier**Owner Satisfaction- Very Satisfied, Satisfied, Not Satisfied**Outcome- Excellent- not lame or stiff, Good- Intermittently lame or stiff, Poor- frequent lameness or stiffness*

aged when inspected during surgery, ranging from stretching/swollen to complete rupture. The degree of ligament damage was not recorded. The outcomes were summarised as 2 excellent, 5 good and 3 poor. Six owners were very satisfied and four were satisfied with the outcome. Complications occurred in 5 cases and were caused by irritation of local soft tissues over the screws leading to swelling, seroma, discharge and localised pain.

**DISCUSSION**

Information in the literature on open reduction of TEL is relatively little and somewhat contradictory. There are only 17 cases reported of open reduction/ stabilisation in the main reports on TEL (3, 4, and 5). Most reports mix closed and open reduction and fracture dislocation in the same data. This produces a less than clear predictable prognosis for open reduction cases. All authors in the literature use the method of Campbell (1971) to assess the degree of instability post closed reduction. However it is not clear

from the literature what degree of elbow instability is present using this method. The technique for surgical stabilisation varies with screws/wiring, primary suturing, and pinning being employed <sup>3-5</sup>.

The clinical approach to acute elbow luxation in this report is different to the literature. Following closed reduction surgical stabilisation was performed in all cases, as instability was assessed as being present in all cases to some degree. These results, although the case numbers are too small to be significant, could suggest that the technique of Campbell (1971) will detect instability but may in some cases not detect the degree of instability accurately, as in this report all elbows were graded as unstable. This could be due to the inherent stability of the elbow and the timing of the assessment for instability. In two cases the elbow instability was greater 48hours after closed reduction. The authors' are of the opinion that a reassessment 48 hours after closed reduction may be more accurate in detecting instabil-

ity. This would be an area of further recommended study. All the cases in this report were diagnosed as having elbow instability and damage to the lateral collateral ligament. This result may reflect the population sample as all cases were second opinion cases following attempted treatment at the primary centre. Surgical inspection of the medial collateral ligament was not carried out in this study, and may have caused ongoing problems with the joint in some dogs.

The results of these cases indicate that the technique of two screws and figure of eight wire with nylon augmentation maintains reduction as no cases reluxated post surgery. However those cases where the elbow was radiographed later than 4 weeks postoperatively the wire was broken. The elbows in all cases were assessed between 4-6 weeks postoperatively had stable elbows using the technique of Campbell (1971) to determine stability. In 5 cases the screws and wire were removed due the local swelling and irritation over the screw heads. The irritation of the local soft tissues and screw loosening was a clinical problem, as the area of swelling over the implants was often painful to palpation.

The clinical outcome indicates that post traumatic osteoarthritis is significant and only 20% (2 dogs) could be classified as excellent. It is worth noting that these two dogs were both under 10kg bodyweight. At the same time there were no owners who were not satisfied with the outcome. It is difficult to make direct comparisons with the literature on the outcome but it is interesting to note that less than 25% of cases of TEL treated by closed reduction were classified as having an excellent outcome in the most recent report<sup>5</sup> and the less than optimal results of the rest was attributed to persistent instability. The second grade of classification in that report<sup>5</sup> was good and

represented dogs that sometimes had mild lameness. Only three dogs out of seventeen were classified as good<sup>5</sup>, whereas in this report the comparable classification had five dogs out of ten as good. In the final category of poor/fair in the Schaeffer et al<sup>5</sup> report there were 9 dogs out of 17 and the comparable results from this paper 3 out of 10 were poor. So the degrees of lameness/stiffness could indicate a trend but the number of cases is low and the comparison between the outcomes of the two papers is not ideal. It is possible however in the authors' opinion to postulate that early surgical stabilisation can achieve a marginally better outcome than closed reduction only, noting that in this report all cases had surgical stabilisation and the majority of cases in Schaeffer et al<sup>5</sup> had closed reduction. However a proper double blind random controlled study would need to be performed to fully support this postulate. What is certain is that TEL inevitably results in the majority of dogs having clinically significant stiffness or lameness.

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