

The Epidemiology and Treatment of Pulled Elbow in Pediatric Population

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ABSTRACT

Introduction: The pulled elbow is one of the common conditions in children that bring them to an emergency. Children present with not being able to move their forearms.

Methods: We conducted a prospective study of patients who presented with a history suggestive of a pulled elbow. Here we studied demographic character, clinical presentations, and reduction techniques.

Results: There were a total of 96 patients with the pulled elbow. The mean age of the patient was 29.62 ± 13.14 months, with boys 27 (28.1%) and girls 69 (71.9%). The left side was commonly involved 67 (69%). History of traction injury is the most common mode of injury. The success rate of reduction by supination-flexion is 42 (87.5%), whereas the success rate of hyper pronation is 46 (95.83%). There was no significant difference between the two methods of reduction (p-value > 0.05).

Conclusion: The pulled elbow is common at two years, with female children predominant. Click in the region of radial head palpable during reduction confirms the diagnosis and signs of successful treatment. Hyper-pronation was easy, more effective at the first attempt, and the most successful reduction technique.

Keywords: Child; Elbow; Joint Dislocations

INTRODUCTION

A pulled elbow is also known as a nursemaid's elbow is a radial head subluxation occurring in the pediatric population. It is one of the common conditions in children under 5 years of age that bring them to an emergency.^{1,2} Child usually presents with an inability to move the elbow, holding the elbow inside in

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slight flexion with the forearm in a pronated position.^{3,4}

Pulled elbow occurs due to traction injury when force is applied longitudinally to the pronated elbow.⁵ The diagnosis is made from the history, and clinical findings. Radiology is normal.⁶ There are different methods of reduction for a pulled elbow.^{3,7} It can be reduced by supination followed by flexion of the elbow. Another method of reduction is hyper pronation in a slight flex position of the elbow.^{8,9} These are the commonest and the easiest methods of reduction for pulled elbow, via this study, we aim to compare the outcome of supination-flexion and hyper pronation methods of reduction for the pulled elbow.

METHODS

It is a prospective study conducted in the Department of Orthopaedics, Manipal teaching hospital, Pokhara, Nepal, from August 2020 to November 2021. A total of 96 patients with pulled elbows were included in the study.

Patients younger than 5 years, with a clinical history of the pulled elbow were included. Children more than 5 years, having deformity, local swellings, ecchymosis at the elbow, and polytrauma cases were excluded from the study.

Informed consent was obtained from all the patient's parents. All patients were reduced by either supination- flexion or hyper-pronation methods.

Children with an odd number were treated by supination-flexion methods, while even numbers with hyper-pronation methods. Group 1 patient reduced by supination of the forearm followed by full flexion of the elbow. In Group 2, the reduction was done by flexing the elbow to 90 degrees and rotating the forearm into hyper-pronation. As the child uses the injured arm, or if we feel click it is accepted as a successful reduction of the pulled elbow. If not, a second attempt was performed with the same reduction maneuver. After the failure of the second attempt, the

elbow was reduced by alternate methods. Results were statistically analyzed using SPSS. In our study, a p-value of < 0.05 was considered significant.

RESULTS

There were a total of 96 patients with pulled elbows included in the study. We grouped patients by six months intervals. The average age at diagnosis was 29.62 ± 13.14 months. Maximum numbers of the child were affected over 1½ to 2½ years. None of the patients in our study was below six months. The demographic profiles of the patients are in Table 1.

Table 1: Demographic profiles of the patients

Parameters	Numbers or Means		Range
Age	29.62 ± 13.14 months		6 months – 5 years
Sex	Male	27 (28.1%)	
	Female	69 (71.9%)	
Time duration from trauma to arrival at the hospital	8.43 ± 6.93 hrs		1 hr – 48 hrs

Sixty-seven (69.8%) patients had left side involvement, and 29 (30.2%) children had involvement of the right elbow. The mean arrival time at the hospital was 8.43 hrs. Most of the patients arrive within 6 hrs of injury.

The mechanism of injury in most of the cases was traction injury 75 (78.13%). There is no history of trauma in 21 (21.87%) patients. The recurrent pulled elbow occurs in 19 (19.8%) patients.

In Table 2, we compare two methods of reduction techniques for the pulled elbow.

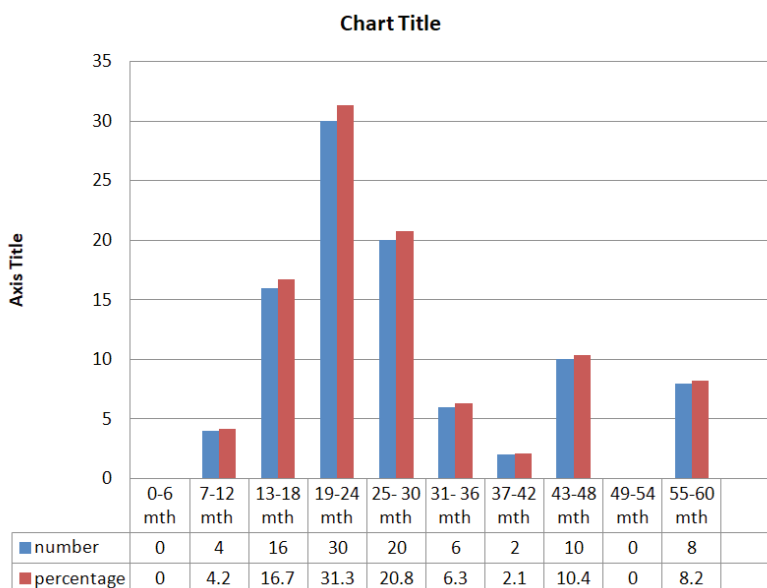


Figure 1: Group of patients at 6 months intervals

Table 2: Comparison of reduction maneuver

	Supination –flexion method n=48	Hyperpronation method n=48	p -value
Age (months)	27.79 ± 12.32	31.64 ±13.78	0.173
Sex			
Male	11 (22.92%)	16 (33.33%)	0.256
Female	37 (77.08%)	32 (66.67%)	
Successful reduction	42(87.5%)	46 (95.83%)	0.140
Need alternative methods	6(12.5%)	2 (4.17%)	
Fail of reduction	0	0	

There is no statistically significant difference between the two techniques (p-value > 0.05). Hyper-pronation was less painful and had more success rate in comparison to supination and flexion.

DISCUSSION

The pulled elbow is a common injury that causes subluxation of the annular ligament due to sudden longitudinal traction.¹⁰ Age of distribution shows pulled elbow commonly affect at 2-3 years. As the radial head size is the same as that of the shaft, it is easily subluxated.^{1,11} Irrespective of the number of the recurrent pulled elbow is not common after six years due to an increase in radial head size.¹²

In most of the studies, girls have been found more affected than boys.^{13,14} Similarly, in our study, most patients with pulled elbow occurred in female children 71.9%. It is not clear why it is common in female children. Probably it is related to the behavioral difference between females versus males or anatomical factors.¹⁰ In 78.13 % of cases, there is a history of trauma in our study, which is similar to the study of Biswajit B et al.¹⁴ However there was no history of trauma or patients could not explain the injury in 21.87% of cases. Whatever may be the mechanism, the cause of pulled elbow is forceful traction injury that occurs in the pronated elbow.¹⁴

In our study, the left side is more commonly

affected as compared to the right side, which is similar to the study done by Irie et al.¹⁵

This is thought because parents usually use the left hand to hold their child as most are right-handed, this might be the cause for the pulled elbow on the left side.^{10,15} There is faster development of muscle strength in the child's dominant right arm may have a preventive effect on this arm with age.¹⁵

Recurrence of the pulled elbow is rare; however, in our study recurrent rate is 19.8%. Different studies show a 5% recurrent rate of the pulled elbow, it was much higher in our study.¹⁶ As most parents want to visit the same doctor for the same problem. It might be the reason for the increased number of recurrent pulled elbow cases. Irrespective of the number of the recurrent pulled elbow, it is not seen after 6 years due to an increase in radial head size.^{12,17}

The history and clinical findings are sufficient to make the diagnosis of the pulled elbow. Radiography or ultrasonography is not necessary for diagnosis and treatment. An X-ray of the elbow may be needed if the history consists of falling from a high place or when history is not clear and there is an abnormal clinical finding.¹⁸

Click in the region of radial head palpable, sometimes audible signs of successful reduction. A click results from the release of trapped annular ligament and soon after manipulation child can move their elbow as they forget their pain. Click felt in 90 % of cases.^{10,14}

In our study, there is no significant difference in the success of the reduction technique. The success rate of hyper-pronation is more than supination–flexion, which is similar to the study of Bexkens et al.¹⁹ Hyperpronation maneuver was more efficient at the first attempt, easier for reduction, and less painful.²⁰

Also, cases of irreducible pulled elbow that required surgical reduction were reported²¹ however, in our study there were no cases that required surgical reduction, and all patients

were reduced by either of two methods and had a good prognosis.

The study was limited by the number of cases. In addition, there is a somewhat subjective nature of the diagnosis of the pulled elbow.

CONCLUSION

The pulled elbow is a common pediatric condition affecting female children at the age of two years. The left side is commonly affected. History of pulling and click felt during reduction will confirm the diagnosis as well as successful reduction. Hyper-pronation methods are easy and most successful in the reduction of the pulled elbow.

CONFLICT OF INTEREST

None

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None

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