



OCCUPATIONAL THERAPY INTERVENTION USING ICF FRAMEWORK IN CHILD WITH RADIO-ULNAR SYNOSTOSIS-A CASE STUDY

Rehabilitation Sciences

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ABSTRACT

Radio-ulnar synostosis is a rare anomaly. It restricts the pronation-supination movements. In few patients it also restricts wrist movements. This leads to difficulty in performing daily functional activities. Objectives was to assess the functional limitations in child with radioulnar synostosis & functional recovery after using ICF frame of reference & adaptive approach.

3.5 years old male assessed for functional activities, presented with difficulty in self-care such as eating, bathing, personal hygiene, dressing, toileting & was assessed using ICF. Participation restriction was secondary to his deviated body structure & environmental structures. Procedural & pragmatic clinical reasoning with ICF frame of reference (FOR), was used for prescribing adaptations. Family centered approach was used. Child was also assessed on COPM pre & post intervention.

RESULTS: Environmental factors during functional activity has improved from -2 to +1. Child improved significantly in his participation. Parent's satisfaction level has improved from 3 to 8 on COPM scale.

DISCUSSION: Type of intervention in radioulnar synostosis is dependent on extent of malformation. Use of local resources for adaptations shown the significant improvement. Strategies to improve level of functioning & functional retraining with adaptations has improved the participation with parent's satisfaction and Quality of life of child.

KEYWORDS

Activity limitation, Functional difficulties, ICF, Synostosis, Radioulnar

INTRODUCTION

Synostosis between the radius and ulna can take two general forms: congenital and posttraumatic.¹ Radioulnar synostosis is the failure of segmentation of the adjacent radius and ulna. Radio-ulnar synostosis is a rare anomaly. Radioulnar synostosis affects the supination and pronation movements of the elbow joint. Potential consequence of restricted elbow movement includes excessive strain on the shoulder joint above and the wrist joint below. In few patients it also restricts wrist movements.² Forearm rotation is important in most tasks can result in severe impairment of activities of daily living. Normal active forearm pronation in healthy male subjects was found to be approximately 76° and supination, 82°. Morrey et al found that most positional and functional tasks can be achieved within a rotation arc of 100° (50° of pronation and 50° of supination). More contemporary tasks, such as using a keyboard, may require an even greater arc of forearm rotation.³ Gates et al, in their study observed that, Forearm pronation was generally minimally required (<15°). Forearm supination is required in maximum activities of daily living, maximum range of 53° occurred during perineal care. At wrist joint, all tasks tested could be accomplished with 38° of wrist flexion and 40° of wrist extension.⁴ These functional ranges may be affected due to synostosis of Radioulnar joint & results in participation restriction. Occupational therapist can significantly decrease this restriction through active intervention.

The study was done to analyze the effect of Occupational Therapy intervention with adaptations/adaptive devices (ICF FOR) in functional recovery of the patient.

Objective was to assess the functional limitations in child with radioulnar synostosis & functional recovery after using adaptive approach.

METHODS

A 3.5 years old, right-handed male child from rural area, diagnosed with bilateral Radioulnar synostosis. Child indicated that he was born with the restricted elbows and learnt to live with it, eg. accepting the objects in supination when offered. Child reported pain, inability to move his forearm & use his hands for functional activities (mainly eating food). Then, he was referred to the Occupational Therapy department for assisting in his functional difficulties. Parents, both were working as laborer at farms. They briefed that the child some times remains hungry till both of them return from work. This concern has brought them for child's treatment.

Family centered approach was used while planning Occupational Therapy intervention for child. He complains of difficulty in self-care

activities such as Eating, Bathing, Personal hygiene, Dressing, Toileting. Various adaptations utilizing local resources were provided after procedural & pragmatic clinical reasoning.

Written consent was obtained from parents as per Helsinki guidelines. Patient & his parents were informed of the possible benefits of adaptations. Child was assessed for participation in functional activities was done using International Classification of Functioning, Disability & Health (ICF) & to assess parents' perception about child's abilities on Canadian Occupational Performance Measure (COPM) was used, pre & post intervention. ICF defines components of health and some health-related components of well-being.⁵ COPM is a client-centered outcome measure for individuals to identify & prioritize everyday issues that restrict their participation in everyday living & grade the performance & satisfaction in selected activities.⁶ The parents were trained to encourage the child to use adaptations for appropriate functions. Follow up was taken a week after providing adaptations & doing environmental adaptations.

Following adaptations (Fig.1-7) were given to child for his functional tasks,

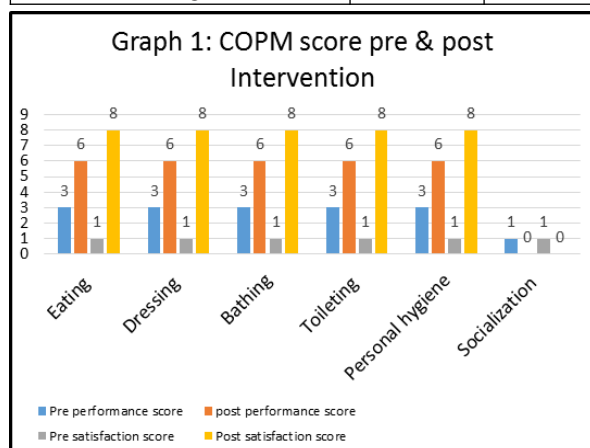
- Eating: Swivel spoon, plate guard, bilateral handled utensil to drink water
- Bathing: bilateral handled mug
- Personal hygiene: Advised bilateral hand use
- Dressing: use of T-shirt than Shirt
- Toileting: container with tap & pipe on it



RESULTS:

Table 1 shows pre & post intervention scores on ICF, in which Environmental factors during functional activity has improved from -2 to +1.

Table 1: Pre & post intervention scores on ICF				
Part 1a: impairments of body function	Qualifier			
	Pre-intervention		Post-intervention	
b280: Pain	1		1	
b710: mobility of joint	3		3	
b730: muscle power	3		3	
Part 1b: Impairments of body structures	1st Qualifier		2nd Qualifier	
	Pre	Post	Pre	Post
s730: upper extremity (arm, hand)	3	3	7	7
Part 2: Activity limitations & participation	Performance Qualifier		Capacity Qualifier	
	Pre	Post	Pre	Post
d4. MOBILITY				
s430 lifting & carrying objects	3	1	3	3
d440 fine hand use	3	1	3	3
d5. SELF CARE				
d510 Washing oneself (<i>bathing, drying, washing hands, etc</i>)	3	1	3	3
d520 Caring for body parts (<i>brushing teeth, shaving, grooming, etc.</i>)	3	1	3	3
d530 Toileting	3	1	3	3
d540 Dressing	3	1	3	3
d550 Eating	3	1	3	3
d560 Drinking	3	1	3	3
d6. DOMESTIC LIFE	PQ		CQ	
d640 Doing housework (<i>cleaning house, washing dishes laundry, ironing, etc.</i>)	3	1	3	3
d660 Assisting others	3	1	3	3
d8. MAJOR LIFE AREAS				
d810 Informal education	3	1	3	CBT
d820 School education	3	1	3	CBT
d9. COMMUNITY, SOCIAL AND CIVIC LIFE				
d910 Community Life	3	1	3	CBT
d920 Recreation and leisure	3	CBT	3	CBT
Part 3: Environmental factors				
e1. PRODUCTS AND TECHNOLOGY	Pre		Post	
e110 For personal consumption (<i>food, medicines</i>)	-2		+1	
e115 For personal use in daily living	-2		+1	
e125 Products for communication	-2		+1	
e4. ATTITUDES				
e420 Individual attitudes of friends	-2		CBT	
e465 Social norms, practices and ideologies	-2		CBT	



Graph 1 shows Pre & post intervention scores on COPM. Parents were told assessed on COPM to rate the preferential activities & they were graded for performance & satisfaction levels for parents. Activities are prioritized on COPM. Child showed significant improvement in both the performance from 3 to 6 & satisfaction scores from 1 to 8.

DISCUSSION

Assessment using ICF revealed that the Occupational Therapy intervention has helped in Quality of life. Performance qualifier has improved from 3 to 1 post intervention as capacity qualifier remained constant. Environmental factors which include products & technology & attitudes has improved from -2 to +1. Parent's satisfaction level has improved from 1 to 8 on COPM. The child had lacked opportunity to learn activities due to congenital anomaly. In the study on ADL functioning in Developmental Coordination Disorder children, delays in learning of ADL were a predictor for poor performance of ADL, and poor performance of ADL was a predictor for less frequent participation in ADL compared to other children.⁷

Another study by Patrick Kane et al stated that forearm position affects various radioulnar, radiocarpal, and ulnocarpal ligamentous tensions and lengths leads to activity limitations in which wrist movements are required.⁸

The adaptations are provided for improving the abilities. In modifying approach to occupational therapy intervention implement adaptation in activity or provide adaptive device & environment to promote independence in occupational functioning by compensating for impairments (AOTA, 2008).¹⁰ Ecaterina Vasluian et al stated that Young people with upper limb reduction deficiencies are satisfied and socially well-adjusted with adaptive devices.⁹ Child improved significantly in his functional activities participation, his performance has reached to the maximum capacity. Parents were also given home program to improve his fine motor skills.

Prescription of and training in the use of assistive devices or adapted tools and utensils to enable occupational performance by persons who are physically disabled is a primary function of occupational therapy.¹⁰ These adaptations are made using local materials to develop, improve, sustain, or restore the person's ability to provide their own care in hospital or at home. Thus, the adaptations as mentioned in figures enabled the child to perform self-care activities independently.¹¹

The use of local material for adaptation has decreased parental stress about adjustment on country side. Also, the child started involving actively in play activities. Due to time constrain, the child's participation in play could not be documented. Also the carry over effect of intervention & parental compliance could not be assessed further. But the parents were happy that they got solution for child's activity limitations. They had promised for further follow ups. The child may need further intervention in-school activities. He was not attending the school, when he was referred to Occupational therapy services. His parents neither gave preference to his academic activities. They were counseled regarding the same & has been advised regarding the same. This Single case study, results cannot be generalized. The study may be done on larger sample size & with longer follow ups.

CONCLUSION

On conservative management, child has improved significantly in his self-care activities. Occupational Therapy intervention along with adaptations/ adaptive devices has made significant difference in perception of parent about the child's functions. Use of local resources has made it easy to design the adaption for the child. Strategies to improve level of functioning & functional retraining has improved the activity participation & parent's satisfaction.

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