



## TO STUDY THE IMPACT OF MTWP IN PINCH STRENGTH AMONG PEOPLE WITH WRIST INJURIES

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Article DOI: <https://doi.org/10.36713/epra4999>

### ABSTRACT

**Introduction and aim:** Wrist injuries by colles' or fracture of distal radius are the most prominent diagnosis referred to occupational therapy department for work program in India. In this project, a modified therapeutic work program for wrist injuries was evaluated. The objective of the study is to find out whether MTWP addressed to enhance the grip strength so as work skills and its success in the client return to work, level of work satisfaction & self-performance level post injured wrist.

**Methods:** Single group pretest posttest experimental design followed by descriptive analysis. 51 patients with dominant hand injured, shared similar demographic background with post-injured from 8 to 40 weeks with mean age of 16 weeks.

**Results:** 94% clients who completed the program returned to work and switched over to different position and different type of work. 56% clients return to competitive employment with same work type, work situation, having work satisfaction and 80-100% work skills in compare to pre MTWP work situation.

**Discussion:** The MTWP addresses the range of needs demonstrated by wrist injuries clients, from traditional therapy to prevocational and vocational intervention. The evaluation of the program indicates that the program was successful with wrist injury working age adult.

### PROGRAM DESCRIPTION (MTWP)

The program is designed to help an individual to make a gradual, progressive transition from a medical setting to work placement and community reentry. MTWP has 6 phases. The client functional status and progress were monitored on an ongoing basis, and transition to new phases was determined by the Occupational Therapist and based on the client needs. Not all clients went through each phase or follow the sequence. Client continues with individual occupational therapy throughout their involvement in the MTWP.

**KEY WORDS:** MTWP, colles fracture, vocation, wrist injuries, grip strength, pinch strength.



## INTRODUCTION

The importance of hand in human culture and functional activities has long been recognized. Wrist is structured to provide a stable base to allow hand to conduct complex motion, and is the major joint responsible for work tasks. In India, wrist injuries are the therapy department for work program. In this project, a modified therapeutic work program for wrist injuries was evaluated.

Colles' fracture is defined as a linear transverse fracture of the distal radius approximately 20-35 mm proximal to the articular surface with dorsal angulations of the distal fragment (1). The unstable fractures are distinctly comminuted often with corresponding avulsions of the ulnar or radial styloid that have the potential to cause compression neuropathies, especially of the median nerve (1). The other complications that have been reported include reflex sympathetic dystrophy and degenerative joint disease (1).

As the life expectancy continues to increase with increase in industrialization in country like India, the frequency of fractures to the wrist can be expected to increase in years to come. The patients with distal radial fracture are off work from 67 days upto 20 weeks (8, 9). It is for this reason that post traumatic occupational therapy is critical in restoring function and has a direct influence on the quality of life, as well as duration of sick leave, laborer compensation and therefore is of social economic interest.

The current study is primarily based on the concept of TWP. However it is intended for use on the individual with wrist injury in combination with traditional therapies. Literature search failed to reveal similar studies in Indian context.

## MATERIAL AND METHODS

**DESIGN-** Single group pretest posttest experimental design followed by descriptive analysis. A different subject prospective, experimental, flexible design has been used for the purpose of this study. MTWP has 6 phases with treatment plan based on client capabilities, deficits, interest, work history and goals.

**SUBJECTS-** A total number of 51 subjects having wrist injuries by colles' or fracture distal radius of dominant hand were selected for the study. Mean age was 36 years (range 25 to 55 years) having both male and female. The post injury duration for participation in MTWP is 08 to 40 weeks, mean 16 weeks (Table 1). Period of study from April 09 to Aug 10. Clients were explained the purpose of the study and were requested to participate in the study. Written consent obtained from each participant before study begins.

**Instrumentation:**

- Minnesota Manual Dexterity Test (MMDT)
- Pinch meter & Hand dynamometer
- Short Form-36 (version 1) – subjective outcome assessment for functional/ work status.

## PINCH METER

There are three basic type of pinch: (1) Chuck or three finger pinch (Pulp of the thumb to pulp of the index and middle finger) (2) Lateral or key pinch (Prehension of thumb pulp to the lateral aspect of the index middle phalanx) (3) Tip pinch (thumb tip to the tip of the index finger). These 3 types of pinch are usually assessed and can be tested with a pinch meter (Figure 2b). As with grip measurement, the mean of 3 trials is recorded and comparisons are made with the opposite hand. Reliability of pinch meter needs investigation. Hydraulic pinch instruments are more accurate than spring loaded.





## MODIFIED THERAPEUTIC WORK PROGRAMME

MTWP Six Phases:

Phase 1- Individual assessment and treatment in occupational therapy department.

Individualized assessment by occupational therapist were obtained from Initial general occupational therapy assessment format, which includes-

- Date of injury, participation in MTWP
- About previous job specification / demand which based on information from Canadian Classification and Dictionary of Occupations.
- Obtaining background information pertinent to work.
- FIM for ADL.

Phase 2- Group treatment.

•In this phase as client progress to higher level of functioning they participate in group treatment.

- Groups are led by occupational therapist.
- Emphasis is on interaction and interpersonal skills.
- Groups are functionally based and focus on area such as functional living skills, debate and effective communication and family education.

Phase 3 - Prevocational assessment.

The first two sessions are devoted to a prevocational assessment. These assessments establish a baseline performance level and guides appropriate task selection.

- The outcome measure as mentioned earlier is used here.

•It guides appropriate secretarial task, and assembling task to be chosen as per the need of an individual client.

Phase 4 - Therapeutic work groups.

- All Initial transition from role of client to the role of worker.

•Client received 5 days per week for 1(One) hour daily for 4 weeks.

•The group structure includes sign an attendance register in and out, a daily routine, involved in variety of assembly tasks (Figure 4) and secretarial task (Figure 5).

•Emphasis is on developing prevocational and work readiness skills, not on training for specific job.

Phase 5 - Work placement within the institute.

•Supervised work placements within the institute are available on block printing, appliqué & computer programming.

•If only client show interest to participate then posted under vocational counselor for further guidance and training.

Phase 6 - Back to previous job or supervised placement in community or further education and training.

•Previously employed client go back to their respective job.

•Supervised placement in community

•Clients engage in further education and training.

## RESULT & DISCUSSION

**Table 1 (Demographic Details of patients participated in MTWP)**

Sl. No.	Characteristic	Groups
01	No. of Subjects	51
02	Age range	25-55 yrs.
03	Mean age	36
04	Male/Female	21/30
05	Dominant hand injured Rt./ Lt.	46/05
06	Post injury duration	08 to 40 weeks, mean 16 weeks

**Table - 2**

**Work status comparison of Pre MTWP and Post MTWP Subjects (N - 48)**

Work Status	Pre morbid	Post MTWP
Competitive employment	33	31
Homemaker	15	14
Trainee	00	01
Unemployed	00	02

As table-2 shows, out of 48 clients in premorbid stage, 45 clients were working after participating in the

MTWP (31 were competitively employed, 14 primary homemaker) whereas 1 trainee and 2 were unemployed.



**Table -3**  
**Work type comparison of Premorbid (N- 48) and Post MTWP (N- 46) Subjects**

Work Type	Premorbid	Post-MTWP
Managerial	12	13
Heavy labor	03	01
Light Labor (Secretarial & assembling)	18	16
Student	00	01
Home maker	15	14
Others	00	01

The work type comparison (eg. managerial, heavy labor, light labor, home maker) of premorbid and post MTWP subjects (Table-4) shows, the categories of

work vary from those prior to the wrist injuries. The clients did work that was different from the work they had done prior to the wrist injuries.

**Table - 4**  
**Work situation comparison preceding and following Wrist injury (N-46)**

Work Situation	Number of subjects (N -46)
Same company / Same position	39(14)a
Same company/ other position	04
Other company/same work type	02
Other company/other work type	01(1)b

'a' for home maker and 'b' for student

Table-5 shows, the comparison of present job with former job. Return to the same or a different company was related to the length of time of prior employment.

**Table -5**  
**Number of jobs held by subjects since discharge (N- 46)**

Number of jobs	Number of Subjects
1	37
2	05
3& more	03
NR	01

'NR'- Not Report

Table-5 shows, 37 out of 46 subjects had one jobs, 05 had two jobs, 03 had three or more jobs since discharge from MTWP. The majority of respondent, 44 out of 46 were working 40 or more hours per week.

As per job satisfaction level out of 46 subjects; 32 liked their job, 05 did not enjoy their work, 03 home makers want to be involved in competitive employment and 05 subjects feel the job is challenging and look forward to it.

**TABLE -6**  
**SUBJECTIVE WORK DIFFICULTY (N - 46)**

Job required more physical demand	08
Job required high cognitive demand	03
Easiest job that repetitious, familiar & required few cognitive & physical demand	35

Post MTWP in the area of work difficulty, 35 subjects suggest the job that repetitious, familiar, required little cognitive & physical demand is easy to perform (Table

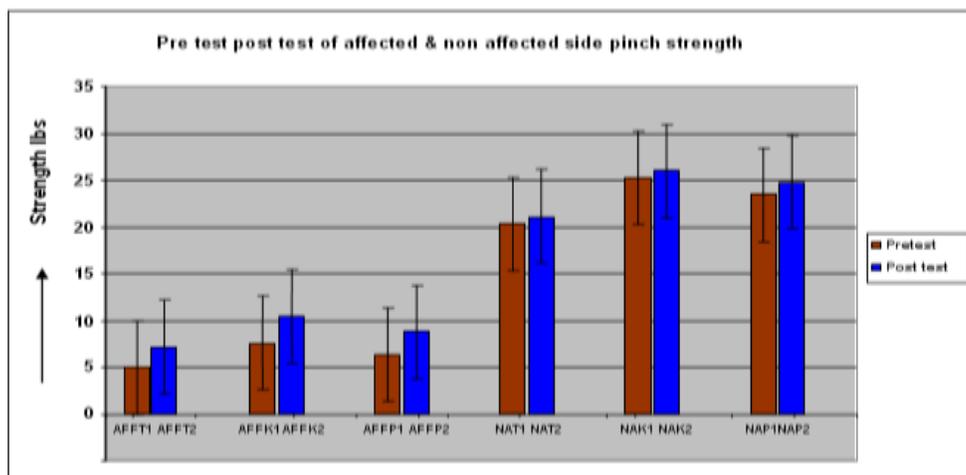
8). In comparing their present work skills with their skills prior to affection 27 subjects self reported 100 to 80 % of their prior level in job performance (Table 9).



**Table -7**  
**Self-evaluation of job performance**

GROUP	Mean	SD	SE Mean	t	p
Tip to tip pinch injured side( AFFTP1-AFFTP2)	-2.10	0.85	0.15	-12.20	0.00
Tip to tip pinch non-injured side ( NATP1-NATP2)	-0.72	0.66	0.12	-5.20	0.00
Key Pinch injured side( AFFKP1-AFFKP2)	-2.66	1.22	0.18	-12.36	0.00
Key Pinch non-injured( NAKP1-NAKP2)	-0.62	0.72	0.12	-4.60	0.00
Palmar Pinch injured (AFFPP1-AFFPP2)	-2.40	1.02	0.18	-10.80	0.00
Palmar Pinch non-injured (NAPP1-NAPP2)	-1.20	1.62	0.30	-4.00	0.00

Table showing mean pinch strength injured side in compare to mean pinch strength Non-injured before and after 4 weeks during MTWP.



**Graph 1 showing pretest posttest of affected & non affected side pinch strength**

## CONCLUSION

The MTWP addresses the range of needs demonstrated by wrist injuries clients, from traditional therapy to prevocational and vocational intervention. The evaluation of the program indicates that the program was successful with wrist injury working age adult. 94% clients who completed the program returned to work and switched over to different position and different type of work. 56% clients return to competitive employment with same work type, work situation, having work satisfaction and 80-100% work skills in compare to premorbid work.

## REFERENCES

1. Yochum T, Rowe L. *Essentials of skeletal radiology*. 2<sup>nd</sup> edition Vol. 1. Maryland: Williams & Wilkins, 1996; 664-665,756-757.
2. Buterbaugh GA, Palmer AK. *Fractures and dislocations of the distal radioulnar joint*. *Hand Clin*.1988; 4:361-75
3. Golden GN. *Treatment and prognosis of Colles' fracture in a North American Community*. *American Journal of Public Health* 1982; 72:605-7.
4. Gartland JJ Jr, Werley CW. *Evaluation of healed Colles' fracture*. *J Bone Joint surgery [AM]* 1951; 33-A: 895-907.
5. Bacorn RW, Kurtze JF. *Colles fracture: a study of two thousand cases from the New York State Workmans' Compensation Board*. *Journal of Bone Joint surgery [AM]* 1953; 35-A: 643-58.
6. Golden GN. *Treatment and prognosis of Colles' fracture*. *Lancet* 1963; i: 511-5.
7. Katharine Raymond Morey, Anne Harvey Watson. *Team approach to treatment of the post traumatic stiff hand: A case report*. *Physical Therapy*; Vol. 66 No.2, February 1986.
8. Wentzensen A, Leutfink D. *External quality assurance exemplified by distal radius fracture pilot projects of legal accident insurance*. *Z Arztl Fortbild Qualitatssich* 1997; 91:484-5.



9. *Wittemann M, Jung A, Hornung R, Germann G. Die sog. "kleine Handverletzung" und ihre sozioökonomischen Folgen. Chirurg 1994; 65:1004-7.*
10. *Lyons & Morse .A Therapeutic Work Program for Head injured clients; AJOT, 1988*