

Effectiveness of Active Release Technique versus Cyriax Technique in DeQuervain's Tenosynovitis on Physiotherapists

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ABSTRACT

Background: Dequervain's tenosynovitis is a painful condition that affects the tendons of the thumb which commonly occurs due to repetitive hand and wrist movements which may lead to pain, tenderness, swelling and reduce or restrict normal range of motion of thumb in physiotherapist. There is an inflammation of tendons of first dorsal compartment of wrist, specifically the abductor pollicis longus and extensor pollicis brevis which is frequently seen in individuals performing repetitive hand and wrist movements.

Methods: Dequervain's tenosynovitis in physiotherapist underwent NPRS, Finkelstein's test, DASH questionnaire, Pinch Grip dynamometer, ROM of Thumb joint. Demographic data was taken such as Age, Gender, Dominant hand, affected hand, Years of experiences, Symptoms duration, Previous upper limb fracture/ surgery for last 3 months, pregnancy and other pathological conditions were excluded.

Result: A total 110 physiotherapists with De Quervain's tenosynovitis were participated in this study with 96 female (87.30%) and 14 male (12.70%) were involved, where participants was randomly divided into two groups, with 55 participants in group A (Active release technique) and 55 participants with group B (Cyriax). In group A with the conventional therapy, the mean pain score (NPRS) decreases from 7.25 to 3.76. The DASH score improved from 64.52 to 34.49, and Pinch grip strength increased from 18.45 to 29.69 kg. In group B (Cyriax) with conventional therapy, the mean pain score decreased from 5.36 to 3.33, the DASH score improved from 63.29 to 49.32, and the pinch grip strength increased from

25.6kg to 27.76 kg. Overall, both the interventions were effective in reducing pain and improving hand functions. However, ACTIVE RELEASE TECHNIQUE demonstrated

greater improvement in functional ability and grip strength as compared to CYRIAX TECHNIQUE.

Conclusion: This study conducted to evaluate and to compare the effectiveness of Active release technique and Cyriax technique for the management of De' Quervien's tenosynovitis in physiotherapists. Key findings include ACTIVE RELEASE TECHNIQUE is more effective in reducing the pain, increasing the range of motion of thumb and improving the functional ability of De' Quervien's tenosynovitis in physiotherapist.

Keywords: De' Quervien's tenosynovitis, Active Release technique, Cyriax, Dynamometer, goniometer, Finkelstein's test, DASH score questionnaire

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INTRODUCTION

The De Quervien's syndrome is a tenosynovitis in abductor pollicis longus (APL) and extensor pollicis brevis (EPB), which is also known as the representative disease that causes pain in the forearm at the level of radial styloid process ⁽¹⁾. It involves inflammation and thickening of the synovial sheath surrounding the (APL and EPB) tendons.

De Quervien's syndrome is also known as stenosing tenosynovitis of the first dorsal compartment that

includes tendons of abductor pollicis longus and extensor pollicis brevis i.e. (APL & EPB) muscles ^(4,5). Since women's wrist is often angulated further than men's tendons which are more vulnerable to stress. This is likely the reasons why women are three times more susceptible than men to developing stenosing tenosynovitis near the radial styloid

⁽³⁾. It's the one of the most common causes of radial-sided wrist pain. De Quervien's tenosynovitis is

basically the inflammation of common tendon sheath of (APL & EPB), This condition can be caused due to microtraumas which occurs due to repetitive mechanical activities and systemic diseased of connective tissue ⁽¹⁾. This pathological narrowing causes painful restriction of tendons gliding, leading to discomfort in thumb movements such as grasping, pinching, or lifting object.

The pathophysiology of De Quervien's syndrome is an inflammatory condition involving the narrowing or the inflammation of the synovial membrane of common sheath of adductor pollicis longus and extensor pollicis brevis. This tendon sheath has the shape of tube covering muscles tendons which consists of two layers composed of laminae i.e. external fibrous and internal synovial. Normally, tendon sheath reduces friction and also facilitate sliding movements of the tendons, they also maintain their positions ⁽²⁾.

The First symptoms of De Quervien's are peritonitis or tenosynovitis, followed by fibrosis and thickening, a secondary inflammatory and repair reaction of the retinaculum of the first extensor compartment occurs. The retinaculum can be damaged and regenerated multiple times as the condition progresses, which in turn leads to formation of degenerated scars. The pain is intense while movement of extension of thumb. Pain is caused by an oversized and fibrotic retinaculum, which is too flexed because from the pressure from the tendons during the extension and flexion of the thumb ⁽²⁾. Occurrence of forearm pain at the height of radial A thumb is a highly mobile digit that allows for opposition, precision grip also power grip.

Physiotherapeutically treatment is an important element of conservative treatment of de Quervien's tenosynovitis. Above 40% of patients suffering from this condition are referred to a physiotherapist. Therefore, there is a strong need to look for the most effective physiotherapeutic methods and their combinations to treat this tenosynovitis ⁽²⁾.

For conservative management advise given to patient is to rest and do activity limitations such as to avoid exacerbate syndrome, for immobilization and support advice given to use wrist splints or braces to limit movements and to reduce strain also taping should be done to support function of tendon.

The McKenzie method with platelet rich plasm (PRP) are effective in reducing pain and improving the range of thumb mobility ⁽²⁾. Mobilization with manipulation (MWM) in combination with ionophoresis, Cryotherapy and Deep transverse friction massage (DTFM) were used ^(1,8,11) to reduce pain, soft tissue mobilization to reduce stiffness ⁽¹¹⁾. ACTIVE RELEASE TECHNIQUE AND CYRIAX technique, both are manual therapy methods use to addresses for affective wrist joint functions.

Active release technique (ART) is a specialized manual therapy which focuses on eliminating scar tissues and adhesions ⁽¹¹⁾ which causes pain,

styloid process which increases during extension of the thumb. Other symptoms include redness and swelling in the region.

This condition occurs in men is 0.5% and in women is 1.35% ⁽¹⁾. In the general population, 3.7% of 402 people had De Quervien's syndrome were concluded ⁽²⁾, with the means age of

64.1 years (30 years – 88 years). It is more common in menopausal women, pregnancy or the postpartum period. The prevalence of physical therapist with De Quervien's syndrome Is 40.5% ⁽³⁾. Epidemiologically, De Quervien's tenosynovitis is more prevalent among women, particularly between the ages of 30 and 50, and is associated with repetitive thumb motion, forceful gripping, and activities involving ulnar deviation of wrist. Occupations and lifestyles that demand frequent mobile phones use, childcare activities, or repetitive wrist-hand movements increase susceptibility.

The clinical hallmark of the condition a positive Finkelstein's test, where the pain is elicited along the radial-styloid when the thumb is flexed into the palm and the wrist is ulnar deviated.

As the thumb plays a pivotal role in hand function, accounting for nearly 40-50% of hand utility in daily activities. It's unique saddle-shaped carpometacarpal joint, along with strong extrinsic and intrinsic musculature, allows complex movements such as opposition, grasping, and fine precision. However, these functional advantages predispose the thumb and its associated tendons to overuse injuries.

Laser treatment is one of the most commonly used physiotherapeutically treatment in physiotherapy ⁽¹⁾ which reduces the conduction of pain stimuli in an afferent fiber as well as vasodilatory and angiogenic effects ⁽²⁾.

Ultrasound helps to alleviate pain and reduce tonicity and it also improves circulation, reduces swelling and promote tissue and tendon healing ⁽²⁾.

Electrotherapy in the form of Dia dynamic therapy, iontophoresis and TENS were used as a form of therapy ⁽²⁾. Massage is one of the elements of combination therapy ⁽²⁾. Kinesiology tape is to be considered as method for treating dequervain tenosynovitis, as it is use to reduce pain, swelling and inflammation ⁽²⁾. Joint mobilization to reduce wrist biomechanics, a gentle wrist flexion and extension for stretching exercises also for strengthening exercise eccentric and isometric exercises is advisable ⁽¹²⁾, also grip strengthening exercises.

Eccentric exercise has major role in treatment for overuse tenosynovitis; it seems to be very effective ⁽¹¹⁾.

stiffness, muscle weakness and abnormal sensation including mechanical dysfunction in muscle, myofascial and soft tissue

⁽¹³⁾ also works over reduce pain also improving range of motion and enhancing blood flow to tendon ⁽¹³⁾. It is effective on wrist tendinopathies for chronic

overuse or microtrauma.

Active release technique applies precise pressure while guiding the wrist through movement, helping to release scar tissues and adhesions that restrict tendon gliding^(13,14). Increasing blood flow – technique enhancing circulation, provide essential nutrition and oxygen to injured tissues to help in healing restore mobility –Reducing pain and inflammation⁽¹³⁾.

Common wrist injury conditions treated with Active release technique are TENOCYNOVITIS and CARPAL TUNNEL TENOSYNOVOTIS.

While on other hand CYRIAX is a therapeutic massage that produces controlled inflammation in areas proximal to the tendon insertions, restoring the properties of injured connective tissue⁽⁷⁾.

CYRIAX technique has been one of the physiotherapy interventions suggested for management of tendinopathy⁽¹³⁾. Emphasized a precise examination to identify the specific tendon affected and to determine stage of injury. Deep transverse friction massage: A primary CYRIAC technique which use for breakdown fibrotic adhesions, reduce pain through desensitization of nerve ending and encourage proper collagen alignment during tissue remodelling⁽¹³⁾. Progressive tendon loading which integrates progression strengthening post - DTFM, eccentric strengthening exercises.

The study aims to conduct a comparative analysing between two approaches that of Active release technique and CYRIAC approach in reducing pain, enhancing mobility and improving range of motion in physiotherapist with DE Quervien's tenosynovitis.

METHODOLOGY

An Interventional, Analytical study conducted using Simple, Random sampling on licensed physiotherapists currently practicing in clinical settings who were diagnosed with Dequervain's tenosynovitis, MPTth students for a duarion of 1 year 6 months. Study subjects were selected fulfilling inclusion and exclusion criteria.

MATERIALS

Pain assessment: Numerical pain rating scale
Outcome measure: Dash scale (Questionnaire)
Range of motion: Goniometer measurement
Grip strength: Dynamometer

Inclusion criteria- Age between 20 to 40 years, Licensed and actively practicing physiotherapists, Clinical diagnosis of De' Quervien's Tenosynovitis, Symptom duration of at least 2 weeks, Finkelstein test to be positive, Patients with Dequervain's tenosynovitis are willing to participate.

Exclusion criteria: Previous fracture, surgery, or corticosteroid injection at the wrist or thumb within the last 3 months, History of neurological disorders or inflammatory joint disease, Pregnancy, Presence of other upper limb musculoskeletal conditions that may interfere with the outcomes

PROCEDURE

The research was a comparative study between the Active release technique and Cyriax technique with De Quervien's tenosynovitis with specific inclusion and exclusion criteria.

The study protocol was presented for approval in front of institutional ethical committee and protocol committee of DY PATIL EDUCATION SOCIETY, deemed to be university Kolhapur and DY PATIL COLLEGE OF PHYSIOTHERAPY, Kolhapur and ethical approval was granted by the committee.

The comparative study titled "Effectiveness of Active release technique & Cyriax technique on De Quervien's tenosynovitis in physiotherapist was conducted in Kolhapur region.

Potential subjects were approached and provided with an explanation of study purpose

Participants are divided into GROUP A (ACTIVE RELEASE TECHNIQUE and GROUP B (CYRIAX TECHNIQUE). There will be 31 participants in each group.

Group A will receive Active release technique with conventional treatment and will last for min. The participants in group B will receive Cyriax technique for the duration of 30 min. along with the conventional treatment. As per the inclusion and exclusion criteria.

Group A – Active Release Technique (ART)

SESSION: 12 sessions / 3 times a week / over 4 weeks.

TECHNIQUE: Explain the techniques and treatment process to the patient, position of patient should be seated with the forearm in mid-prone, wrist in neutral position and resting on the treatment table.⁽¹³⁾. According to the protocol for that specific pain distribution, specific anatomic sites were treated with deep manual therapy and active release manoeuvres. All patients were treated twice a week for 4 weeks. The patients that reported as completely symptom free were discharged.⁽⁴⁾

STEPS:

Palpation & Identification: Locate the restricted/wounded tendon (e.g., FCU, FCR, ECR, ECU).

Identify scar tissue, adhesions, or tender spots.
Application of Tension: Therapist applies precise, sustained pressure with thumbs or fingers on the muscle/tendon unit.

Active Movement: While pressure is maintained, instruct the participant to actively move their wrist through a full range of motion: For wrist flexors → extend the wrist while pressure is applied.⁽¹³⁾

Group B – Cyriax Approach (Deep Transverse Friction Massage - DTFM)

SESSION: 12 sessions 3 times per week for 4 weeks

TECHNIQUE: Direct transverse friction is applied perpendicular to the tendon fibres at the pain site. Performed without lubricant, using the thumb or index finger. Focus on injured tendon (usually FCR, or FCU). Position of patient: in sitting on a chair comfortably.

STEPS:

Locate Affected Tendon, Identify the painful area (usually over distal insertion of ECU, FCR, or FCU) ⁽¹⁴⁾.

Apply deep transverse friction perpendicular to the tendon fibres, use fingertips or thumb pad. Avoid lotion or oil. Friction should be firm but tolerable, creating mild discomfort without intense pain. Perform for 10 minutes, with pauses every 2–3 minutes to assess tolerance

Pre-Assessment:

Finkelstein test

NPRS scale

DASH questionnaire

Grip strength (thumb dynamometer)

Range of motion

Acute stage:

In this stage, there is increased fluid in the sheath mainly serous exudate, and hence, conventional treatment aimed to protect injury from further damage and included symptom control measures.

a. Hand splint for thumb and wrist for at least 2 weeks to settle the pain before starting to move the thumb or wrist

1. **AGE DISTRIBUTION:** The table no. represents the age-wise distribution of the study of participants. The subjects were categorized into two different groups according to prevalence of study

	Minimum	Maximum	Mean	Std. Deviation
AGE	20	30	24.6	2.397

Table no.06

The result indicates maximum 30 age and minimum 20 age belongs to the most affected age group.

2. **GENDER DISTRIBUTION:** The following table represents the gender distribution of male and female participants included in study.

3. **HAND DOMINANCE:** below table shows the frequency of subject's hand dominance

HAND DOMINANCE	Frequency	Percent
LEFT	8	7.30%
RIGHT	102	92.70%
Total	110	100%

Table no.08

the results shows, right handed dominant participants is more than left handed dominance.

GRAPH NO.02

4. **AFFECTED SIDE OF**

Help identify risk factors/aggravating activities. Patients were advised to avoid motions that evoke pain, such as those involving twisting of the wrist and pinching with the thumb (activity modification)

b. Task modifications and ergonomic recommendations. Workspaces and hobbies can be evaluated and modified ergonomically to accommodate neutral alignment of the wrists and hands with activities such as typing. This helps to decrease chronic overuse of the APL and EPB tendons ⁽⁶⁾

The study enrolled 110 physiotherapist with De' Quervien's tenosynovitis. The age range of participants was 20-40 years. With mean age 24.6 (± 2.397) years. The participants who had history of fracture and any pathological condition they were excluded.

Pain intensity was assessed using a Numeric Pain Rating Scale (NPRS), with scores ranging from 0 to 10 and Finkelsteins test to assess thumb pain

For assessing muscle strength of wrist joint using hand held dynamometer and goniometer was used to assess range of motion of wrist

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GENDER	Frequency	Percentage
Female	96	87.30%
Male	14	12.70%
Total	110	100%

no.07
results
a
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representation of a particular gender. The frequency of female participants is more than male participants (as shown in graphical representation). This variation may be influenced by occupational exposure, hormonal factors or activity levels associated with the condition under the study.

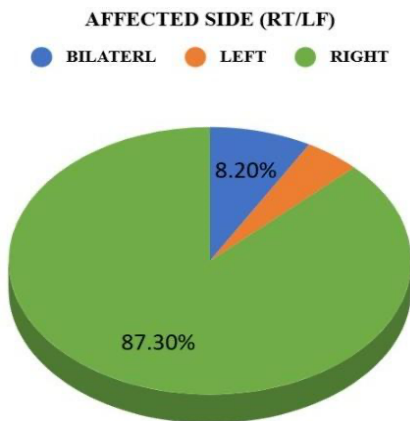
GRAPH NO.01

PARICIPANTS: The following table shows the affected side of participants.

AFFECTED SIDE (RT/LF)	Frequency	Percent
BILATERAL	9	8.20%
LEFT	5	4.50%
RIGHT	96	87.30%
Total	110	100%

Tab.no.09

The results shows that, frequency of right-handed subject is more than left-handed as well as participants with bilateral affected side.

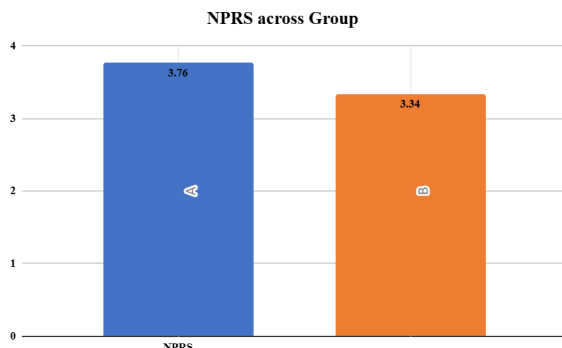


GRAPH

NO.03

5. COMPARING PARAMETERS OF OUTCOME MEASURES: The following table represents a statistical analysis of various parameters comparing two groups i.e. GROUP A (ART) and GROUP B (CYRIAX) of pre and post intervention. Thereby, this study evaluates six outcomes- NPRS, MCP joint ROM (flexion, abduction and opposition), pinch grip strength and DASH Questionnaire scale.

Parameters	Group	Mean	Std.	p-value
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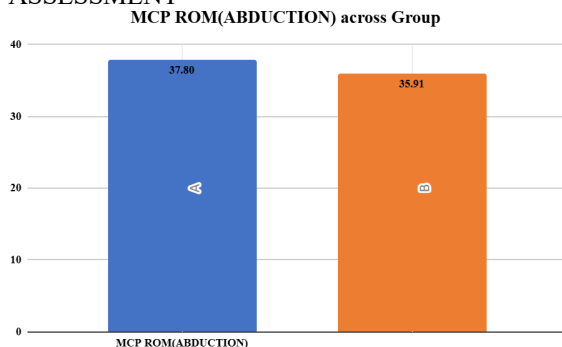


GRAPH NO.04

NPRS OF GROUP A AND GROUP B POST INTERVENTIONAL ASSESSMENT

GRAPH NO.05

MCP ROM (FLEXION) OF GROUP A AND GROUP B POST INTERVENTIONAL ASSESSMENT



GRAPH NO.06

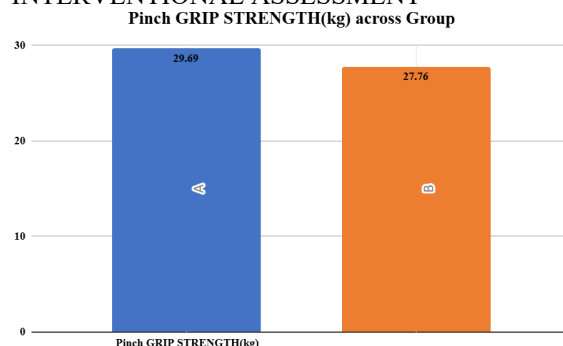
MCP ROM (ABDUCTION) OF GROUP A AND GROUP B POST INTERVENTIONAL ASSESSMENT

GRAPH NO.07

	p		Deviation	
NPRS	A	3.76	1.38	0.172
	B	3.34	1.85	
MCP ROM(FLEXION)	A	46.67	4.33	<0.001*
	B	32.98	10.81	
MCP ROM(ABDUCTION)	A	37.80	3.05	0.009*
	B	35.91	4.96	
MCP ROM(OPPOSITION)	A	7.84	1.00	0.002*
	B	7.13	1.54	
Pinch GRIP STRENGTH(kg)	A	29.69	7.26	0.074
	B	27.76	6.60	
DASH SCALE	A	34.49	10.50	<0.001*
	B	49.33	14.62	

TABLE NO. 10

MCP ROM (OPPOSITION) COMPARING GROUP A AND GROUP B POST INTERVENTIONAL ASSESSMENT



GRAPH NO.08

PINCH GRIP STRENGTH COMPARING GROUP A AND B POST INTERVENTIONAL ASSESSMENT

GRAPH NO.09

DASH SCALE OF COMPARING GROUP A AND B POST INTERVENTIONAL ASSESSMENT

DISCUSSION

De Quervien's syndrome is also known as stenosing tenosynovitis of the first dorsal compartment that includes tendons of abductor pollicis longus and extensor pollicis brevis i.e. (APL & EPB) muscles ^(4,5). It's the one of the most common causes of radial-sided wrist pain. De Quervien's tenosynovitis is basically the inflammation of common tendon sheath of (APL & EPB). This condition can be caused due to microtraumas which occurs due to repetitive mechanical activities and systemic disease of connective tissue ⁽¹⁾. The pain is intense while movement of extension of thumb. Pain is caused by

an oversized and fibrotic retinaculum, which is too flexed because from the pressure from the tendons during the extension and flexion of the thumb⁽²⁾

The purpose of this study was to compare the effectiveness of two physiotherapeutic interventions in subjects diagnosed with Dequervain's Tenosynovitis. The main objective was to evaluate reduction in pain and improvement in thumb functional range of motion after treatment using outcome measures such as Numeric Pain Rating Scale and metacarpophalangeal joint range of motion, pinch grip strength.

Our study concluded a comparative analysing between two approaches that of Active release technique and CYRIAC approach in reducing pain, enhancing mobility and improving range of motion in physiotherapist with DE Quervien's tenosynovitis. In previous study, by B Schiottz-Christensen, Vert Mooney, Shadi Azad conducted a study – The role of Active release manual therapy for upper extremity overuse syndromes- a preliminary report- To evaluate the efficacy of a specific protocol for the treatment of overuse syndromes, The result was demonstrated a 71% of efficacy rate⁽⁴⁾.

Another study by Saavedra GC, Martinez SB conducted a study of- effectiveness of cyriax massage in increasing ROM with Dequervain's tenosynovitis and the results were positive for increased ROM and also decreasing pain⁽⁷⁾.

The present study is conducted by comparing both Active release technique and Cyriax technique in management of Dequervain's tenosynovitis among physiotherapists. This study interprets that the majority of participants belonged to the age group of 20-30 years, which represents the most professionally active phase for physiotherapist, which may cause.

commonly while performing manual therapy techniques, mobilization, and patients handling activities.

A higher prevalence was observed more among female physiotherapist, which is consistent with previous studies that studies reporting increasing susceptibility of females to Dequervain's tenosynovitis.

The pre-treatment assessment revealed that participants of both the groups A (ART) and group B (CYRIAX) exhibited moderate to severe pain, reduced thumb and wrist ROM, decrease pinch grip strength due to pain and increase in functional disability as measured by DASH questionnaire scale. The positive Finkelstein's test in all participants further confirmed the clinical diagnosis.

The parameters value of both the group A and B- (ART & CYRIAX) represents the average measures, while standard deviation indicates the dispersion of data around the mean. Pre- interventional baseline values show initial conditions (higher pain, limited ROM, lower pinch grip strength and higher disability) while post-interventional values reflect

changes after treatment (reduced pain, improved ROM, increase pinch grip strength and reduced disability).

The parameters and assessment in post-interventional period evaluated six outcomes' measures, i.e.- NPRS scale, MCP joint ROM for – flexion, abduction and opposition, pinch grip strength and DASH questionnaire scale. Comparative analysis of group A and group B : for NPRS (Numeric pain rating scale)-Group A(ART) reduced mean NPRS from 7.25 to 3.76 (3.49) meanwhile group B (CYRIAX) reduces mean NPRS ranges from 5.37 to 3.34 (2.03). Both the groups show significant improvement ($p < 0.001$), but group A (ART) exhibits a larger absolute pain reduction. In MCP ROM for flexion, abduction and opposition- both groups achieve significant gains in all three ROM measures ($p < 0.001$). Group A (ART) states with lower pre-intervention ROM values and shows slightly larger absolute improvements in flexion ROM and opposition ROM compared to group B (CYRIAX). For pinch grip strength in group A increases from 7.84kg to 29.69kg (21.85kg) while in group B increases from 6.05kg to 27.76kg (21.71kg). Therefore, the magnitude of strength gain is comparable, indicating similar effectiveness in improving muscular performance. Dash questionnaire scale for group A (ART) reduces from 64.53 to 34.49 (30.04) while in group B (Cyriax) DASH reduces from 63.29 to 49.33 (13.96), although group A (ART) shows a substantially greater functional improvement than group B (CYRIAX).

Post-interventional analysis demonstrated improvement in all outcome measures in both groups A (ART) & group B (CYRIAX) in managing Dequervain's tenosynovitis. Participants in group A (ART) showed a marked decreasing in NPRS score, improving in thumb and wrist ROM, enhancement in pain-free pinch grip strength, and significantly decrease in DASH score. Similarly, group B (CYRIAX) demonstrated improvement in pain levels, ROM, pinch grip strength and also functional ability.

Comparing the post-treatment outcomes between two groups, ACTIVE RELEASE TECHNIQUE demonstrated superior improvements across most outcome measures compared to group B (CYRIAX TECHNIQUE). The dynamic component of ART, which combines sustained manual pressure with active movements, may provide additional benefits by restoring normal biomechanics and improving neuromuscular control, particularly in individuals whose are exposed to repetitive occupational stress. The result of our study suggests that ACTIVE RELEASE TECHNIQUE can be considered a superior manual therapy approach for physiotherapist suffering from Dequervain's tenosynovitis.

CONCLUSION

This study revealed a significant prevalence of

Dequervain's tenosynovitis in physiotherapist.

This study conducted to evaluate and to compare the effectiveness of Active release technique and Cyriax technique for the management of De' Quervien's tenosynovitis in physiotherapists.

Key findings include –

ACTIVE RELEASE TECHNIQUE is more effective in reducing the pain, increasing the range of motion of thumb and improving the functional ability of De' Quervien's tenosynovitis in physiotherapist.

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