



POST NATAL DE QUERVAIN SYNDROME TREATMENT: EFFECT OF DICLOFENAC PHONOPHORESIS VERSUS KINESIOTAPE ON PAIN AND GRIP STRENGTH

MOHAMED G. ALI¹, HALA M. EMARA².

¹DEPARTMENT OF PHYSICAL THERAPY FOR WOMEN'S HEALTH, FACULTY OF PHYSICAL THERAPY, SOUTH VALLEY UNIVERSITY.

²DEPARTMENT OF PHYSICAL THERAPY FOR WOMEN'S HEALTH, FACULTY OF PHYSICAL THERAPY, CAIRO UNIVERSITY.

Abstract

Purpose: This study was conducted to determine the effect of sodium diclofenac phonophoresis versus kinesio tape in the treatment of post natal De quervain syndrome. **Subjects and methods:** Thirty women participated in this study. They had post natal De Quervain's syndrome (De Quervain's tenosynovitis); (+ve finkelstein's test) with moderate pain on VAS (visual analogue scale). They were chosen from outpatient clinic of faculty of physical therapy Cairo University. Their ages were ranged from 22 to 35 years old. They were divided randomly into two groups equal in number, group (A) was treated by sodium diclofenac phonophoresis 5 min, 0.5 w/cm², 3MHZ with continuous mode, 3 times/ week for one week while group (B) was treated by kinesio tape with 25-50 % of available tension on the two stretched tendons of the first dorsal compartment (using space correction technique) 3 times/week for one week. Pain and grip muscle strength were evaluated before, immediately post treatment after one week and follow up after another one week without any intervention for both groups. **Results:** The obtained results showed a statistically significant decrease in pain and increase in grip muscle strength in both groups, when both groups were compared together, there was no statistically significant difference in pain, palmer and key grip strength between the two studied groups but there was a statistically significant increase in tip strength in group (A) than group(B). **Conclusion:** we recommend using these two modalities as a new, effective and safe treatment for post natal de quervain syndrome.

Key words: Post natal - De quervain syndrome – Diclofenac phonophoresis – Kinesio tape.

Introduction

De Quervain syndrome; also known as gamer's thumb, was her woman's sprain, radial styloid tenosynovitis, de Quervain disease, de Quervain's

tenosynovitis, de Quervain's stenosing tenosynovitis, mother's wrist, or mommy thumb), is a tenosynovitis of the sheath or tunnel that surrounds two tendons that control movement of the thumb¹.

De Quervain tenosynovitis is caused by inflammation of the abductor pollicis longus (APL) and the extensor pollicis brevis (EPB) tendons which pass through the first dorsal compartment at the radial styloid².

It is caused by overuse and repetitive activities of the wrist in ulnar deviation, thumb in abduction and extension, or may be associated with rheumatoid arthritis or pregnancy³.

Mild symptoms may be present during the later stages of pregnancy and then increase markedly at or shortly after delivery. Patients who have persistent symptoms have reported that the activities of the infant care often aggravate the condition⁴. Often these post natal symptoms persist in women who are breast-feeding and do not cease until nursing has been discontinued⁵. Although this condition is seen commonly in both females and males, de quervain tenosynovitis appears to be significantly more common in women. Some sources even quote a female-to-male ratio as high as 8:1. Interestingly, many women suffer from de quervain tenosynovitis during pregnancy or the postnatal period⁴.

Phonophoresis is the use of ultrasound to enhance the delivery of topically applied drugs. Phonophoresis has been used in an effort to enhance the absorption of topically applied analgesics and anti-inflammatory agents through the therapeutic application of ultrasound⁶. Diclofenac is used to treat pain, inflammatory disorders and dysmenorrhea⁷.

Therapeutic ultrasound (US) required

frequency between 0.75 and 3 MHz, but now KHZ ultrasound is available and at intensities in the range 0.1 to 3.0 w/cm² either at continuous or pulsed mode⁸. The ultrasound parameters chosen (continuous, 1 MHz frequency, 0.5 W/cm² intensity, and 5 min irradiation) are of common use in rehabilitation programs. and almost certainly do not produce any harm to the skin⁹.

Kinesio Tape (KT) is a new and popular taping method proposed by KenzoKase, that claims to gather fascia to align the tissue in its desired position, lift the skin over areas of inflammation, pain, and edema, increase stimulation of the mechanoreceptors to either stimulate or limit movement, provide a positional stimulus to the skin, and decrease pressure over the lymphatic channels that provide a path for the removal of exudates¹⁰.

There are several theoretical benefits claimed for the tape. One of those is correcting the alignment of weak muscles as well as facilitating joint motion as a result of the tape's recoiling qualities. Additionally, the tape is claimed to lift the skin, increasing the space below it, and increasing blood flow and circulation of lymphatic fluids (swelling). This increase in the interstitial space is said to lead to less pressure on the body's nociceptors, which detect pain, and to stimulate mechanoreceptors, to improve overall joint proprioception¹¹.

Subjects, Materials and Methodology

Thirty women having post natal de

quervain's tenosynovitis were selected randomly from outpatient clinic faculty of physical therapy shared in this study with the following criteria: All females were clinically diagnosed with De Quervain's tenosynovitis (+ve finkelstein's test) with moderate pain on VAS, Their ages were ranged from 22 to 35 years old, They were in postnatal period (during the first year after delivery), They were multiparous women (at least having 2 deliveries), They were housewives, All patients were in the chronic stage without any previous treatment, A written consent was obtained from the subject stating that the subject would complete the study.

Group (A): 15 women were treated by sodium diclofenac phonophoresis

5 min, 0.5 w/cm, 3MHZ with continuous mode, 3 times/ week for one week and follow up after another week.

Group (B): 15 women were treated by kinesio tape with 25-50 % of available tension on the two stretched tendons of the first dorsal compartment (using space correction technique) 3 times/week for one week and follow up after another week. The study was conducted through the period from November 2014 to May 2015 in outpatient clinic Faculty of physical therapy Cairo University.

Evaluative materials: Informed consent form, Recording data sheet, Visual analogue scale was used to assess pain intensity, B&L pinch gauge was used to assess grip strength in pounds(lbs).

Therapeutic materials: Ultrasound with

sodium diclofenac gel for group A &Kinesio tape for group B.

Methodology: A full history was taken from each patient before starting this study according to the items of the recording data sheet. Each patient was instructed carefully about the evaluation procedure. A consent form was signed for each patient before participating in the study.

a) For evaluation:

Visual analogue scale used to assess pain in both groups A & B Pinch gauge for both groups.

b) For treatment:

Study group A: Fifteen patients participated in this study for 2 weeks, three sessions for 1 week and follow up for another week without any intervention. Continuous ultrasound with sodium diclofenac (10mg) as a coupling medium was used on the two stretched tendons of the first dorsal compartment, with frequency of 3 MHZ, intensity of 0.5 w/cm² for 5 min. **Study group B:** Fifteen patients participated in this study for 2 weeks, Kinesio tape was designed to be worn for 2 days / three sessions for 1 week without irritation and follow up for 1 week without any intervention, kinesio tape was used with 25-50 % of available tension on the two stretched tendons of the first dorsal compartment.

Statistical analysis:

- Results are expressed as mean ± standard deviation (SD).
- According to test of normality, comparison between normally distributed variables in the two studied groups was performed using

Corresponding Author Mohamed G. Ali

unpaired t test. In not normally distributed variables, comparison between the two studied groups was performed using Mann-Whitney test.

- SPSS computer program (version 16 windows) was used for data analysis. P value less or equal to 0.05 was considered significant and less than 0.01 was considered highly significant.

RESULTS

There was no statistical significant difference in the mean values of age and parity between group A (30.67 ± 3.83) and (2.87 ± 0.64) and group B (27.67 ± 6.60) and (2.40 ± 0.74) with t-test=1.523 and 1.852; p value=0.139 and 0.075 respectively.

Mean values of VAS pre, immediately post treatment & follow up for two groups (A &B):

Mann-Whitney test was used to show the statistical difference in the mean value of VAS between the two studied groups at different time of measurements.

There was no statistical significant difference in the mean value of VAS measured pre treatment, immediately post treatment and at follow up between group A (5.47 ± 1.06), (3.47 ± 1.60), (2.47 ± 1.46) and group B (5.87 ± 0.99), (3.67 ± 0.90), (2.87 ± 1.73) with Z test = -1.036, -0.915, - 0.787 and p value = 0.300, 0.360, 0.431 respectively (Table 1).

Table (1): Comparison between mean values of VAS in the two studied groups measured at different time of measurements.

	Group A (n= 15)	Group B (n= 15)	Z value	P value
Pre-treatment	5.47 ± 1.06	5.87 ± 0.99	-1.036	0.300 (NS)
Immediately post-treatment	3.47 ± 1.60	3.67 ± 0.90	-0.915	0.360 (NS)
Follow up	2.47 ± 1.46	2.87 ± 1.73	-0.787	0.431 (NS)

Data are expressed as mean ± SD.

Z= Mann-Whitney test. NS= $p > 0.05$ = not significant.

Mean values of Tip strength pre, immediately post treatment & follow up for two groups (A &B):

Mann-Whitney test was used to show the statistical difference in the mean value of tip strength between the two studied groups at different time of measurements.

Pre-treatment, there was no statistical significant difference between group A (12.47 ± 2.30) lbs and group B (11.0 ± 2.48) lbs with Z test = -1.641 and p value = 0.101.

Immediately post-treatment, there was a statistical significant increase in group A (14.27 ± 2.34) lbs than group B (12.27 ± 2.79) lbs with Z test = - 1.961 and p value = 0.050.

At follow up, there was a statistical significant increase in group A (15.20 ± 2.70) lbs than group B (12.47 ± 3.56) lbs with Z test = -2.124 and p value = 0.034 (Table 2).

Table 2: Comparison between mean values of tip strength in the two studied

groups measured at different time of measurements.

	Group A (n=15)	Group B (n=15)	Z value	P value
Pre-treatment	12.47 ± 2.30	11.0 ± 2.48	-1.641	0.101 (NS)
Immediately post-treatment	14.27 ± 2.34	12.27 ± 2.79	-1.961	0.050 *
Follow up	15.20 ± 2.70	12.47 ± 3.56	-2.124	0.034 *

Data are expressed as mean ± SD. Z= Mann-Whitney test.

NS= p> 0.05= not significant; *p< 0.05= significant.

Mean values of Palmer strength pre, immediately post treatment & follow up for two groups (A &B):

There was no statistical significant difference in palmer strength, measured pre treatment, immediately post treatment and at follow up between group A (13.33 ± 3.37, 14.87 ± 2.97 and 16.60 ± 2.75) lbs and group B (11.53 ± 2.07, 13.40 ± 2.13 and 14.27 ± 3.57) lbs with Z test = -1.906, -1.570 and -1.900 and p value = 0.057, 0.116 and 0.057 respectively (Table 3).

Table 3: Comparison between mean values of palmer strength in the two studied groups measured at different time of measurements.

	Group A (n=15)	Group B (n=15)	Z value	P value
Pre-treatment	13.33 ± 3.37	11.53 ± 2.07	-1.906	0.057 (NS)

Immediately post-treatment	14.87 ± 2.97	13.40 ± 2.13	-1.570	0.116 (NS)
Follow up	16.60 ± 2.75	14.27 ± 3.57	-1.900	0.057 (NS)

Data are expressed as mean ± SD. Z= Mann-Whitney test.

NS= p> 0.05= not significant.

Mean values of Key strength pre, immediately post treatment & follow up for two groups (A &B):

Using unpaired t-test, there was no statistical significant difference in key strength, measured pretreatment, immediately post treatment and at follow up between group A (14.67 ± 3.11, 16.07 ± 2.34 and 16.00 ± 2.83) lbs and group B (13.40 ± 2.69, 14.30 ± 3.00 and 13.93 ± 3.26) lbs with t value = 1.193, 1.792 and 1.854 & p value = 0.243, 0.083 and 0.074 respectively (Table 4).

Table 4: Comparison between mean values of key in the two studied groups measured at different time of measurements.

	Group A (n=15)	Group B (n=15)	t value	P value
Pre-treatment	14.67 ± 3.11	13.40 ± 2.69	1.193	0.243 (NS)
Immediately post-treatment	16.07 ± 2.34	14.30 ± 3.00	1.798	0.083 (NS)
Follow up	16.00 ± 2.83	13.93 ± 3.26	1.854	0.074 (NS)

Data are expressed as mean ± SD. NS= p> 0.05= not significant.

Discussion

De Quervain syndrome is caused

by inflammation of the abductor pollicis longus (APL) and the extensor pollicis brevis (EPB) tendons which pass through the first dorsal compartment at the radial styloid according to Dennis (2001)².

These results are similar to findings of White (1991), who studied the effects of topical non-steroidal anti-inflammatory drugs (NSAIDs) in the treatment of inflammatory musculoskeletal disorders. The study showed clinical improvement and reduction of painful and inflammatory symptoms of traumatic injuries of soft tissues, joints, osteoarthritis of knee and muscular pain. He reported that adjunct therapy using ultrasound was useful and that topical NSAIDs are particularly useful for the short-term treatment of acute musculoskeletal pain and inflammation and have less and less serious, side effects than oral NSAIDs¹².

The results of our study are also supported by Klaiman et al., (1998), who carried their research to determine whether pain response after phonophoresis (PH) differs from the pain response after ultrasound (US) alone on forty-nine subjects with soft tissue injuries including epicondylitis, tendinitis, and tenosynovitis who were randomly assigned (double blinded technique) to PH or US treatment groups¹³.

The obtained results also agreed with those reported by Denizetal. (2009) who found that both continuous and pulsed ultrasound with diclofenac gel phonophoresis more effective for pain and functional status of patients with knee osteoarthritis than topical application of diclofenac gel¹⁴.

Our results agreed with those reported by Guardia and Charlene, (2010) who said that there is sufficient evidence

to use Kinesio Tape as an adjunct to therapy for upper extremity musculoskeletal disorders such as De Quervain's tenosynovitis¹⁵.

The obtained results agreed with those reported by Villoco, (2012)who said in a 2012 journal article from the Journal of Hand Therapy suggests that kinesio tape might have some effect on lymph drainage. Based on two different studies, kinesio tape showed quicker drainage than manually and better patient compliance¹⁶.

On the other hand, Our results were contradicted with Kushaletal.(2013)who said that some physical and occupational therapists use other treatments based on the rationale that they reduce inflammation and pain and promote healing: UST, SWD, or other deep heat treatments, as well as TENS, dry needling, or infrared light therapy, and cold laser treatments. However, the pathology of the condition is not inflammatory changes to the synovial sheath and inflammation is secondary to the condition from friction¹⁷.

Conclusion

Hand problems are common during pregnancy and in the postnatal period. Surveys of pregnant women indicate that as many as 35 percent experience symptoms suggestive of carpal tunnel syndrome or de quervain syndrome. De Quervain syndrome is a common cause of wrist pain in pregnant and postnatal females.

It could be concluded that sodium diclofenac phonophoresis and Kinesio tape were effective adjunct methods in reducing pa

in and increasing grip muscle strength in post natal de quervain syndrome. So, we recommend using these two modalities as a new, effective and safe treatment for post natal de quervain syndrome.

References

1. Ilyas A, Ast M, Schaffer AA and Thoder J. 2007: De quervain tenosynovitis of the wrist. *J Am Acad Orthop Surg* 15 (12): 757–64.
2. Dennis M. 2001: Understanding inflammatory disorders of the upper extremity, *JAAPA*, 14(3):16-20, 23-24.
3. Weiss AP, Akelman E and Tabatabai M. 1994: Treatment of de Quervain's disease. *J Hand Surg Am.* 19:595-598.
4. Schned E. 1986: De Quervain tenosynovitis in pregnant and postpartum women. *Obstet. Gynecol.* 68(3):411 – 894.
5. Johnson C. 1991: Occurrence of de quervain disease in post partum women. *J.fam.pract.* 32; 325-327.
6. Bare AC, McAnaw MB, Pritchard AE and et al. 1997: Phonophoretic delivery of 10% hydrocortisone through the epidermis of humans as determined by serum cortisol concentrations. *PhysTher* 76 (7): 738–45; discussion 746–9.
7. Diclofenac Epolamine. 2011 :The American Society of Health-System Pharmacists
8. Guirro R, Serraa F, Elias D and Bucalon A. 1997: Calibration of therapeutic ultrasound equipment, *Phys. Ther.*, 83:419-422.
9. Asano J, Suisha F, Takada M, Kawasaki N and Miyazaki S. 1997: Effect of pulsed output ultrasound on the transdermal absorption of indomethacin from an ointment in rats. *BioIPhann Bull*; 20:288-291.
10. Kase K, Wallis J and Kase T. 2003: Clinical therapeutic applications of the kinesio taping method. Albuquerque, NM: Kinesio Taping Association.
11. Williams S, Whatman C, Hume PA and Sheerin K. 2012: Kinesio taping in treatment and prevention of sports injuries: a meta-analysis of the evidence for its effectiveness. *Sports Med* 42 (2): 153–64.
12. White S. 1991: Topical Non-steroidal Anti-inflammatory Drugs (NSAIDs) in the Treatment of Inflammatory Musculoskeletal Disorders, Prostaglandins, Leukotrienes and Essential Fatty Acids. 43: 209-222.
13. Klaiman M, Shrader J, Danoff J, Hicks J, Pesce W and Ferland J. 1998: phonophoresis versus ultrasound in the treatment of common musculoskeletal conditions. *Med.Sci.Sports.Exerc.* 30(9):1349-1355.
14. Deniz S, Topuuz O, Atalay NS, Sarsan A, Yildiz N, Findikoglu G et al. 2009: Comparison of the effectiveness of pulsed and continuous diclofenac phonophoresis in treatment of knee osteoarthritis. *JPhysTher Sci*, 21:4331-4336.
15. Guardia M and Charlene MA. 2010: A

systematic review to determine the effectiveness of Kinesio Taping for De quervain's tenosynovitis. Texas Woman's University, 50 pages; 1490060.

16. Villeco J P. 2012: Edema: A Silent but Important Factor. *Journal of Hand Therapy* 25 (2): 153–161.
17. Kushal R, Kashyap K and Mark H. 2013: De Quervain's Disease, Eplasty: 13: ic52.

SVU-IPPTS