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Research Article

WhatsAppitis: Recent Study on SMS Syndrome

Malarvani T[1*], Ganesh E[1], Nirmala P[2], Ajit Kumar[1], Manish Kr. Singh[1]
[1]Department of Anatomy, Tribhuvan University, National Medical College, Birgunj, Nepal
[2]Department of Anatomy, Kathmandu University, Nobel Medical College & Teaching Hospital, Biratnagar, Nepal

***Corresponding author**
Malar Vani
Email: malardewdrop@gmail.com

Abstract: The muscles and tendons of the thumb are very strong but are not designed for the type of intense activity associated with many of today's handheld devices. Muscle fatigue and excessive muscle tension can cause pain and ache in the muscles and restrict the joint flexibility. Over the long term this kind of excessive use can irritate the tendons and lead to premature arthritis. The repetitive strain injury so called SMS syndrome and recently called as WhatsAppitis, is a rapidly growing condition as more people use thumb-operated gadgets WhatsAppitis is technically known as De Quervain's syndrome, BlackBerry thumb, gamer's thumb, washerwoman's sprain, radial styloid tenosynovitis, mother's wrist, mommy thumb or "teen texting tendonitis. The current study compared such 200 individuals who are over using the electronic gadgets like mobile phones and tablet for sending texts for a longer duration with the normal volunteers (control group). The analyzed report shows that the extremely statistical significant between the control and experimental group while we compare the range of motion and muscle strength of wrist , thumb and index finger between control and experimental group. No matter how fast or how slow you text, excessive texting is not good for our fingers including wrist. WhatsAppitis can be a form of tendinitis, tenosynovitis or a combination of both of those disorders. In either case it means something is irritated, inflamed and swollen.
Keywords: Repetitive strain Injury**,** SMS syndrome, Blackberry thumb, Tenosynovitis.

INTRODUCTION

The hand is a "multitool" on which humans have always depended to master everyday life. We have faced varied demands in our lives and have been able to meet this demand for variation – quite simply by using a wide range of different patterns. Monotony and a lack of variation have made us vulnerable even to small stresses [1].

People love their Smartphones, some of them to the point of obsession, sneaking a peek at the mobile an astonishing 150 times a day. According to Nokia, an average person used to check phone every six-and-a-half minutes in a 16-hour waking cycle. Cell phones having standard number pad often use a predictive text entry or other method in order to make input easier, helpng a lot but not enough to counteract how often most people text. Smart phones are even worse where they do have full keyboards to make input easier they have larger surfaces for the thumb to travel over and can often involve both thumbs [2].

However explosive use of text messages may now have lead to a new, modern affliction, namely SMS syndrome or WhatsAppitis. There are so many applications used now-a-days to send messages but WhatsApp is the most common application used by all the people. Hence we are considering the text message injuries are commonly due to repeated use of texting through WhatsApp, so called WhatsAppitis. No matter how fast or how slow you text, excessive texting is not good for our fingers including wrist. WhatsAppitis can be a form of tendinitis, tenosynovitis or a combination of both of those disorders. In either case it means something is irritated, inflamed and swollen.

Whats Appitis is technically known as De Quervain's syndrome, BlackBerry thumb, gamer's thumb, washerwoman's sprain, radial styloid tenosynovitis, mother's wrist, mommy thumb or "teen texting tendonitis".

MATERIALS AND METHODS

In this study 400 volunteers (200 members in Control Group & 200 members in Experimental Group) of both male and females were included. The consent form was signed by all the volunteers which contained all aspects of human care complied with the ethical guidelines and technical requirements approved by the Institutional Ethics Committee. The period of investigation was from September 2013 – September 2014. The volunteers selected in control group are those who don't have the habit of texting in Mobiles, Tablets etc., whereas the volunteers in experimental group were selected based on the following inclusion criteria:

- Individuals having the habit of sending minimum 50 text messages per day through smart phones or tablets (Fig. 1 & 2).
- No previous history of trauma, fracture, or any neuropathies related to hand.

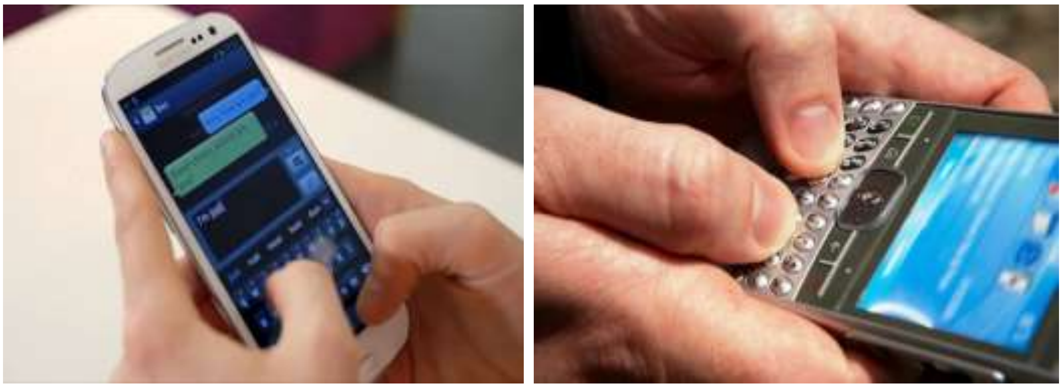

Fig. 1 & 2: Text messages through smart phone

Investigation was done for every three months in four periods (period 1 – 1st quarter; period 2 – 2nd quarter; period 3 – 3rd quarter; period 4 – 4th quarter.). Assessment of movements of wrist, thumb and index finger of both right and left sides were done during all the four periods. Assessment includes muscle power and tightness or weakness which is responsible for wrist, thumb and index finger movements (Universal Goniometry and Fine Micro caliper). Tenosynovitis has been assessed by De Quervain, s test.

Table: 1 Modified Oxford scale for muscle power grading [3]

Muscle power	Description
0	No palpable or observable muscle contraction
1	Palpable or observable contraction, but no motion
1+	Moves limb without gravity loading less than one half available ROM
2-	Moves without gravity loading more than one half ROM
2	Moves without gravity loading over the full ROM
2+	Moves against gravity less than one-half ROM
3-	Moves against gravity greater than one-half ROM
3	Moves against gravity less over the full ROM
3+	Moves against gravity and moderate resistance less than one-half ROM
4-	Moves against gravity and moderate resistance more than one-half ROM
4	Moves against gravity and moderate resistance over the full ROM
5	Moves against gravity and maximal resistance over the full ROM

RESULTS

Wrist Joint

The movements occurring at wrist joint are flexion, extension, radial deviation and ulnar deviation. These movements were measured and compared between control group and experimental group. The Range of motion between two groups was analyzed using t-test and tabulated below in the tables 2- 5. All the measurement variables of the wrist joint between the control and experimental groups are extremely statistically significant (p=0.0001).

Flexion

Table 2: Comparison of wrist flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	82.76	4.44	0.31	
Experimental	66.68	5.55	0.39	0.0001*

*p = 0.0001, extremely statistically significant

Extension

Table 3: Comparison of wrist extension between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	P-Value
Control	74.25	5.89	0.42	0.0001*
Experimental	66.46	2.43	0.17	

*p = 0.0001, extremely statistically significant

Radial Deviation

Table 4: Comparison of wrist radial deviation between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	19.47	2.91	0.21	0.0001*
Experimental	14.04	2.06	0.15	

*p = 0.0001, extremely statistically significant

Ulnar deviation

Table 5: Comparison of wrist ulnar deviation between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	P-Value
Control	35.75	2.76	0.20	0.0001*
Experimental	20.28	2.70	0.19	

*p = 0.0001, extremely statistically significant

The muscles responsible for above mentioned wrist joint movements were analyzed using Modified Oxford Scale. The power of the muscle groups for control group lies in the mean value from 4 to 5. Whereas for the experimental group , the power of wrist flexors lie between 2+ to 3+; wrist extensors 4 - to 4; wrist radial deviators 2+ to 3+ and wrist ulnar deviators 3 to 4 -.

Joints of the Thumb

Joints of the thumb include 1st Carpo-metacarpal (CMC) joint, 1st Matacarpo-Phalangeal (MCP) joint and Inter Phalangeal (IP) joint. All are freely movable synovial joints of condylar type (CMC), Hinge type (MCP and IP).

1st Carpo-Metacarpal (CMC) Joint

The movements occurring at 1st carpo-metacarpal joint are flexion, extension, abduction, adduction and opposition. These movements were measured and compared between control group and experimental group. The Range of motion between two groups was analyzed using t-test and tabulated below in the tables 6 - 10.

All the measurement variables of the 1st carpo-metacarpal joint between the control and experimental groups are extremely statistically significant (p=0.0001).

Planar Flexion (Fig. 3 & 4)

Table 6: Comparison of 1st CMC planar flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	31.37	2.84	0.20	0.0001
Experimental	19.47	3.15	0.22	

*p = 0.0001, extremely statistically significant

Fig. 3: CMC in Neutral

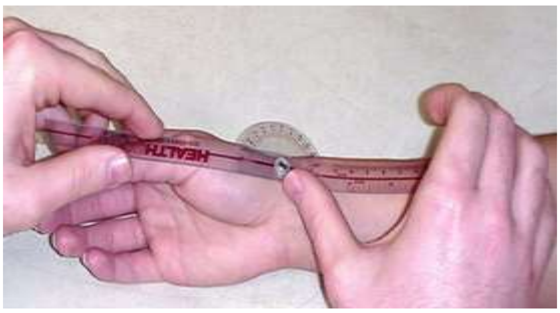

Fig. 4: CMC Planar flexion

Planar Extension

Table 7: Comparison of 1st CMC planar extension between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	9.96	1.30	0.09	
Experimental	5.79	1.93	0.14	0.0001

*p = 0.0001, extremely statistically significant

Planar Abduction from Neutral (Fig. 5 & 6)

Table 8: Comparison of 1st CMC planar abduction between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	68.48	2.71	0.19	
Experimental	62.89	2.19	0.15	0.0001

*p = 0.0001, extremely statistically significant

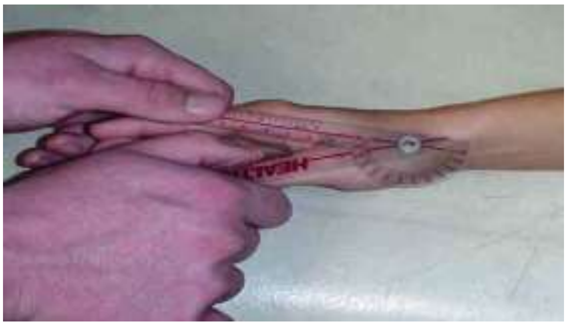

Fig. 5: CMC in Neutral

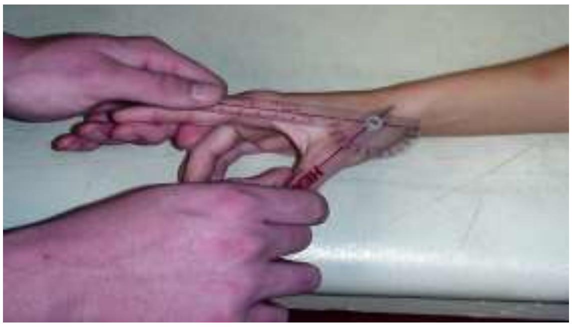

Fig. 6: CMC Planar Abduction

Planar Adduction from end range of Abduction

Table 9: Comparison of 1st CMC planar adduction between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	68.48	2.71	0.19	
Experimental	29.77	6.70	0.47	0.0001

*p = 0.0001, extremely statistically significant

Distance from tip of Thumb to base of Digiti minimi (Modified - Opposition)

Table 10: Comparison of 1st CMC opposition between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	0.00	0.00	0.00	
Experimental	4.92	1.61	0.11	0.0001

*p = 0.0001, extremely statistically significant

The muscles responsible for above mentioned 1st CMC joint movements were analyzed using Modified Oxford Scale. The power of the muscle groups for control group lies in the mean value from 4 to 5. Whereas for the experimental group , the power of 1st CMC flexors lie between 4- and 4; 1st CMC extensors 2+ and 3+; 1st CMC abductors 2+ and 3+; 1st CMC adductors 3 to 4- and 1st CMC opposition muscles between 4- and 4.

1st Matacarpo-Phalangeal (MCP) and Inter Phalangeal joints

The movements occurring at 1st Matacarpo-Phalangeal and inter Phalangeal joints are flexion and extension. These movements were measured and compared between control group and experimental group. The Range of motion between two groups was analyzed using t-test and tabulated below in the tables 11 - 14. All the measurement variables of the 1st Matacarpo-Phalangeal and inter Phalangeal joints between the control and experimental groups are extremely statistically significant (p=0.0001).

Flexion

Table 11: Comparison of 1st MCP flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	54.53	3.22	0.23	0.0001
Experimental	38.30	5.21	0.37	

*p = 0.0001, extremely statistically significant

Extension

Table 12: Comparison of 1st MCP extension between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	17.35	1.94	0.14	0.0001
Experimental	6.82	1.68	0.12	

*p = 0.0001, extremely statistically significant

1st Inter-Phalangeal (IP) Joint

Flexion

Table 13: Comparison of 1st IP flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	73.87	5.02	0.36	0.0001
Experimental	63.02	2.49	0.18	

*p = 0.0001, extremely statistically significant

Extension

Table 14: Comparison of 1st IP extension between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	26.42	2.10	0.15	0.0001
Experimental	12.67	3.52	0.25	

*p= 0.0001, extremely statistically significant

The muscles responsible for above mentioned 1st MCP and 1st IP joint movements were analyzed using Modified Oxford Scale. The power of the muscle groups for control group lies in the mean value from 4 to 5. Whereas for the experimental group , the power of 1st MCP and IP flexors lie between 4- and 4; 1st MCP and IP extensors between 2+ and 3+.

Joints of the Index finger

Joints of the index finger include 2nd Matacarpo-Phalangeal (MCP) joint, Proximal inter Phalangeal joint (PIP) and Distal inter Phalangeal (DIP) joint. All are freely movable synovial joints and of condylar type (MCP), Hinge type (PIP and DIP).

2nd Matacarpo-Phalangeal (MCP) Joint:

The movements occurring at 2nd Matacarpo-Phalangeal joints are flexion, extension, adduction and abduction. These movements were measured and compared between control group and experimental group. The Range of motion between two groups was analyzed using t-test and tabulated below in the tables 15 - 17. All the measurement variables of the 2nd Matacarpo-Phalangeal joints between the control and experimental groups are extremely statistically significant (p=0.0001).

Flexion (Fig. 7)

Table 15: Comparison of 2nd MCP flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	94.94	4.26	0.30	0.0001
Experimental	85.14	2.89	0.20	

*p = 0.0001, extremely statistically significant

Fig. 7: Index MCP flexion

Extension

Table 16: Comparison of 2nd MCP extension between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	31.85	4.63	0.33	
Experimental	19.35	3.68	0.26	0.0001

*p= 0.0001, extremely statistically significant

Abduction

Table 17: Comparison of 2nd MCP abduction between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	22.32	1.93	0.14	
Experimental	15.28	2.46	0.17	0.0001

*p= 0.0001, extremely statistically significant

The muscles responsible for above mentioned 2nd MCP joint movements were analyzed using Modified Oxford Scale. The power of the muscle groups for control group lies in the mean value from 4 to 5. Whereas for the experimental group , the power of 2nd MCP flexors lie between 2+ and 3+; 2nd MCP extensors 4- and 4; 2nd MCP abductors 4- and 4 and 2nd MCP adductors 4 to 5 (like control group).

Index Proximal and Distal Inter-Phalangeal (PIP and DIP) Joints

The movements occurring at proximal inter phalangeal and distal inter phalangeal joints are flexion and extension. These movements were measured and compared between control group and experimental group. The Range of motion between two groups was analyzed using t-test and tabulated below in the tables 18 - 20. All the measurement variables of the proximal inter phalangeal and distal inter Phalangeal joints between the control and experimental groups are extremely statistically significant (p=0.0001).

Index Proximal Inter-Phalangeal (PIP) Joint Flexion

Table 18: Comparison of PIP flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	P-Value
Control	111.45	5.19	0.37	
Experimental	94.37	2.67	0.19	0.0001

*p= 0.0001, extremely statistically significant

Extension

Table 19: Comparison of PIP extension between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	111.45	5.19	0.37	
Experimental	90.14	5.75	0.41	0.0001

*p = 0.0001, extremely statistically significant

Index Distal Inter-Phalangeal (DIP) Joint Flexion

Table 20: Comparison of DIP flexion between control and experimental groups

Result	Mean (N)	Standard Deviation (SD)	Standard Error of the Mean (SEM)	p-Value
Control	76.80	4.97	0.35	0.0001
Experimental	66.83	3.31	0.23	

*p = 0.0001, extremely statistically significant

The muscles responsible for above mentioned PIP and DIP joint movements were analyzed using Modified Oxford Scale. The power of the muscle groups for control group lies in the mean value from 4 to 5. Whereas for the experimental group , the power of PIP and DIP flexors lie between 2+ and 3+; PIP and DIP extensors between 4- and 4.

Tenosynovitis has been assessed using DE Quervain's test which was positive for all the individuals in the experimental group. Of which the tendons of Abductors and Extensors of thumb and Flexors tendons of index finger are more commonly affected.

DISCUSSION

The muscles and tendons of the thumb are very strong but are not designed for the type of intense activity associated with many of today's handheld devices. Muscle fatigue and excessive muscle tension can cause pain and ache in the muscles and restrict the joint flexibility. Over the long term this kind of excessive use can irritate the tendons and lead to premature arthritis. Anything that causes repeat motion can predispose someone to injuries of various sorts, whether it is tendinitis or aggravating underlying arthritis. The repetitive strain injury so called SMS syndrome and recently called as WhatsAppitis, is a rapidly growing condition as more people use thumb-operated gadgets. The current study compared such 200 individuals who are over using the electronic gadgets like mobile phones and tablet for sending texts for a longer duration with the normal volunteers (control group). The analyzed report shows that the extremely statistical significant between the control and experimental group while we compare the range of motion and muscle strength of wrist , thumb and index finger between control and experimental group.

Dr. Gurinder Bedi[2], had stated that smartphone induced injuries have been raising; of the 20-25 patients he sees every day, at least 10% face smart phone and computer-related injuries in the 20-45 age groups, usually upwardly mobile patients constantly looking at their phone in a bent-forward position. They complain of their backs stiffening up, developing a stoop and text neck besides the tendons in their thumbs hurting when they text, the common one which has been proved in our current study.

Chris Adams an Ergonomics Expert [4] stated that, 'Texting Thumb" is a repetitive stress injury affecting the thumb and wrist. Pain and sometimes a popping sound are present on the outside of the thumb at or near the wrist. There can also be a decrease in grip strength or range of motion which is similar to the recent study and this has been proved in our study statistically.

Einspine, RSI resources [5] and C. Forrest McDowell [6] have listed the Symptoms of Blackberry thumb as Pain: At the base of the thumb which may continue even when the thumb is not being used, Ache: In the thumb web space or base of thumb joint, Muscle tension: In the web space between the thumb and index finger. But they did not mention about the decrease in the ROM which has been done in a detailed manner in the present study and analyzed.

The Lancet [7] has published an article stating that "The patient was on duty on Dec 24 (Christmas Eve), and the following day, she responded to messages that had been sent to her on her Smartphone via WhatsApp instant messaging service. She held her mobile phone that weighed 130 g, for at least 6 h. During this time she made continuous movements with both thumbs to send messages which have resulted in pain in the thumb leading to tendinitis" and it is the proof for our current study.

CONCLUSION

Hand tendon injuries are a stressful affair so it's better to be safe than sorry. American Society for Surgery of the Hand mentioned "Most hand tendon injuries take longer time to recover than most other operations elsewhere in the body" and the entire process can be very stressful. Two months after tendon surgery is the usual time that many people run out of steam, lose faith and get depressed about their recovery is a normal happening. If you feel that this event has triggered a clinical depression, get professional help for this, it will help your recovery, not to mention your emotional well being, and you still may have a way to go, final plateau of recovery may take about a year. Don't let your finger take over your life, you will eventually find that you will be able to do much more with your hand than you currently think possible, despite the changes brought on by the injury. Excess of anything is bad. Too much texting can lead to a "Thumbs down" situation so you better know our limits. So, the next time you pick up your phone to WhatsApp, text, reply to an email or take a selfie, ask yourself: Do I really need to do that!

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