
Text Neck Syndrome - Systematic Review

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ABSTRACT

Introduction and Background: A recent study shows that 79% of the population between the age 18-44 have their cell phones with them almost all the time, with only 2 hour of their walking day spend without their cell oh hand¹. Text neck most commonly causes neck pain and soreness. In addition, looking down at your smart phone too much can lead to upper back pain ranging from chronic, nagging pain to sharp and severe upper back muscles spasm. Shoulder pain and tightness, possibly resulting in painful shoulder muscle spasm.

Methodology: A structured literature search was done using various electronic and print data bases.

Source of data: PubMed, APTA, PeDRO, Science direct, Cinhal, Embase, Cochrane library, Scholar, Scopemed, etc. **Study design:** Systematic review.

Result: Total 45 studies were shortlisted, from which 10 of them with proper methodology were reviewed and reported. Studies include both survey, cross sectional, cohort and few randomised control trials. Studies reported a considerable variation in the scales related to neck pain and disability and also a greater incidence.

Discussion: According to The Wireless Association, texting statistics have increased astronomically. In June 2006 in the USA, there were 12.5 billion texts sent monthly. By June 2011, that number grew to 196.9 billion. The most common condition that contributes to neck pain is forward head and shoulder posture. Forward head posture is when the neck slants forward placing the head in front of the shoulders. The most common condition that contributes to neck pain is forward head and shoulder posture. Forward head posture is when the neck slants forward placing the head in front of the shoulders. This head position leads to several problems.

Conclusion: As stated in the review smart phone induced neck pain and associated problems are of chronic progressive nature, timely interpretation and interventions along with good knowledge about postural correction will be the key entities to deal with Text Neck Syndrome. Further clinical trials recommending the effectiveness of current practice

will be of great use in designing an evidence based protocol.

Key word used: Neck pain, Text neck syndrome, Text neck, Cervical spine.

INTRODUCTION

The neck or cervical spine is a coordinated network of nerves, bones, joint, and muscles directed by the brain and the spinal cord. Additionally, irritation along the nerve pathways can cause pain into the shoulder, arm and hand. "Text neck" is the term used to describe the neck pain and damage sustained from looking down at the cell phone, tablets or other wireless device too frequently and for too long.

A recent study shows that 79% of the population between the age 18-44 have their cell phones with them almost all the time, with only 2 hour of their walking day spend without their cell oh hand¹. Text neck most commonly causes neck pain and soreness. In addition, looking down at your smart phone too much can lead to upper back pain ranging from chronic, nagging pain to sharp and severe upper back muscles spasm. Shoulder pain and tightness, possibly resulting in painful shoulder muscle spasm.

The term "Text neck" was coined by Dr. Dean L. Fishman, who is a US chiropractor. The term text neck is used to describe a repetitive stress injury or an overuse syndrome where a person has his/her head hung or flexed in a forward position and is bent down looking at his/her mobile or other electronic device for prolonged periods of time². In today's world, where the mobile technology has advanced so much, there are more and more people who are spending an increased amount of time on handheld devices, such as Smartphone, computer, tablets and e-readers. The end result is prolonged flexion of the neck when bent over these electronic devices resulting in the "text neck". This condition is a growing health concern and has the potential to affect millions of people all over the world. People's contemporary lifestyle has become much dominated by computer technology; often overuse in digital tasks on handheld mobile technology induces 'Text Neck', seemingly a world-wide health effect. The term of 'text neck', or another

phrase ‘turtle neck posture’, can be described as a repeated stress injury and pain sustained from excessive watching or texting on handheld devices for long periods of time. Text neck may cause many harmful symptoms such as neck pain, shoulder pain, upper back pain, chronic headaches and increased curvature of the spine. Mobile device users frequently adopt prolonged forward head posture while looking down at the screens of mobile devices³.

Text neck directly affects the spine while flexing the head forward at varying degrees -when the head tilts forward at 15 degrees, the forces on the neck surge to 27 pounds, at 30 degrees 40 pounds, at 45⁰ degrees 49 pounds and at 60 degrees 60 pounds, then at 90 degrees the model prediction was not reliable. This issue is a major concern with children; since their heads are larger in relation to their body size than adults, and thus they are have an increased risk for text neck given their propensity to use mobile phones. Serious permanent damage of untreated text neck can be the result and be quite similar to occupational overuse syndrome or repeated stress/strain injury⁴.

In upright posture, when the ears are aligned with the centre of your shoulders, the weight of the average head exerts approximately 10-12 lbs of force through the muscles of neck. But when your head is moved forward by one inch away from this neutral position, the weight of your head dramatically increases approx six times as much force can be generated that is the same weight as an average 8 year old baby or six ten-pin bowling ball. If left untreated, a ‘text neck’ can lead to the inflammation of the neck ligaments, nerve irritate and increased curvature in the spine. If this condition is left untreated, then a ‘text neck’ can result inflammation of the neck ligaments, muscles and nerves along with permanent arthritic damage with increase in curvature of the spine. Nowadays, text neck is more common in today’s generation of young adults who constantly crane their neck or are bent over their electronic devices even while doing simple tasks of daily living , such as living , eating ,walking etc^{4,5}.

If text neck is left untreated, then it can lead to some serious permanent damage, such as:

- Flattening of the spinal curve
- Onset of early arthritis.
- Spinal misalignment can be an outcome of text neck
- Spinal degeneration
- Disc compression
- Disc herniation
- Nerve damage

- Muscle damage
- GI problems
- Loss of lung volume capacity

STIFF NECK: Soreness and difficulty moving the neck, especially when trying to turn the head from side to side after a long use of Smartphone.

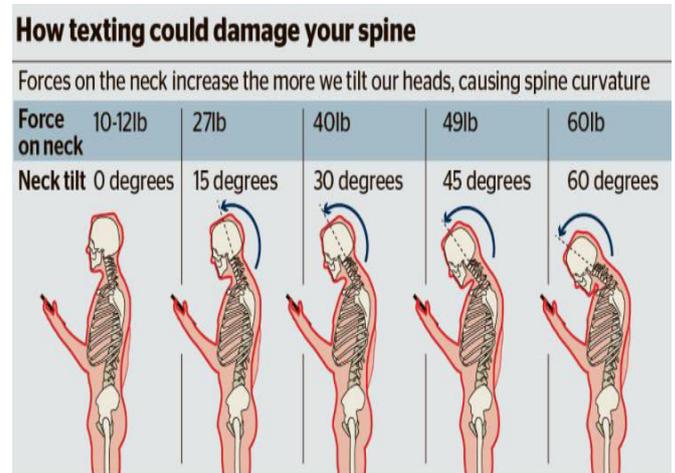
SHARP PAIN: Sometimes this symptom can also be observed by the patient of text neck syndrome, localized to one spot and might feel like it’s stabbing or stinging. Often, this type of pain occurs in the lower levels of the neck.

GENERAL SORENESS: The pain is mostly in one spot or area of neck and trapezius muscle region.

RADIATING PAIN: Due to the excessive forward head posture, the pain can radiate along a nerve from the neck into the shoulder and arms.

WEAKNESS AND NUMBNESS: Shoulder muscles and especially trapezius, scalenus, romboidius and sternocleido mastoid muscles are the main to go for weakness.

HEADACHES: Sometimes an irritation in the neck can also affect muscles and nerve to the head. This could be a tension headache, such as from neck muscles tightening.





MATERIALS AND METHODS

A structured literature search was done using various electronic and print data bases.

Source of data: PubMed, APTA, PeDRO, Science direct, Cinhal, Embase, Cochrane library, Scholar, Scopemed, etc.

Study design: literature review

Inclusion criteria: only English articles,
Exclusion criteria: articles of other languages.

Key word used: Neck pain, Text neck syndrome, Text neck, Cervical spine.

To identify relevant studies database like Pub Med, Medline and APTA were searched, MeSH database was used, and only English articles were considered for the study. This study was done to review the available literature on text neck syndrome which is among common and serious injuries in smart phone user.

LITERATURE REVIEW

Hae-jung lee (department of physical therapy, silla university, busan, Korea) had done a study to investigate neck posture ,range of motion, muscle endurance and self report of pain and disability in Smartphone users. There he took 78 university student volunteer between 28-30 yrs and were assessed for head neck posture by measuring cranial vertical angle, neck range of motion and a deep neck flexors endurance using a stabilizer. In result he found that, 38% subject experience recurrent neck pain with or without upper limb pain. He also found that the Smartphone usage time was negatively correlate with neck pain intensity and disability but it has positive relationship with flexibility and postural deformity of subject⁵.

Ji In Lee and Ho Sueb S (Department of Acupuncture & Moxibustion Medicine, College of Orinetal Medicine, Gachon University) had done a

study on The Correlation Analysis between Hours of Smartphone Use And Neck Pain in the Gachon University Students. A survey on 2,353 number of student was conducted in Gyeonggi province and Incheon city using a self report questionnaire from April 1 to 11 2013. The questionnaire of questions regarding the hours of using smartphone, mainly used function in participant's smart phone and neck discomfort degree. Neck disability index(NDI) was used to evaluate degree of pain. 66.97 % of them answered that they use their smart phone daily more than 2 hours and 48.18 % of them answered that they use their smart phone 10 to 30 minutes every time they use it. The overall distribution of NDI scores was 'no disability (0~4 score, 62.92 %', 'mild disability (5~14 score, 32.85 %)', 'moderate disability (15~24 score, 1.19 %'. As a result of t - test, we found that the average NDI score for female students was significantly higher than the average NDI score for male students⁶.

Kk Agrawal et al (Indian journal of clinical practice vol 24- june 2013) has conducted a survey, which include 25 nurses of one hospital, 25 office staff of one public company, 25 media desk executives of one electronic TV media house and 87 family physician from all across the Delhi to find out their cell phone habits. The result showed 26% of doctors and other staff suffer from severe mobile phone induced anxiety or any other problems as text neck, blackberry thumb, disturbed sleep, computer vision syndrome⁷.

Sang-Yong Lee et al Department of Physical Therapy, U1 University has done a study on The Effects of Posture on Neck Flexion Angle While Using a Smartphone according to Duration. The subjects in this study were 16 healthy young students in their 20s. The purpose of this study was to examine changes in the neck flexion angle according to posture while using a smart phone and the duration of smart phone usage. The result showed Neck flexion is affected by the posture while using a smart phone ($p < .05$). Neck flexion in the standing position is larger than that in the sitting on the floor position. Neck flexion was affected by smart phone usage duration ($p < .05$). In general, as usage time increases, the neck flexion angle increases as well⁸.

Poonsri VU et al (Assumption University of Thailand, Thailand) has done a study on Text Neck Epidemic: a Growing Problem for Smart Phone Users in Thailand. This research study examined the rapid changes in computer user behaviour among Thai internet users, and analyzed differences in the computer health risk between desktop users and mobile device users. The emphasis is on "Text Neck" which has become a

global epidemic affecting millions of people of all ages using various computer devices and smart phones. The main research instrument was an internet-based survey which yielded 642 responses. On occasions, 62.3 percent of users experienced pain in the neck and/or shoulder regions when working on the computer or smart phones⁹.

Smai aiabdul wahab et al (department of rehabilitation health science, kind soud university, Saudi Arabia) has done a study on smart phone use addiction can cause neck disability. He took a sample of 78 students from kind soud university (39 males and 39 females). The research shows close relationship between the addiction of smart phone use and various degree of neck problems among the participants¹⁰.

Jangwhon Yoon, Taelim Yoon et al (Department of Physical Therapy, Dongshin University, Naju, Republic of Korea, Department of Physical Therapy, Yonsei University, Wonju, Republic of Korea) had done a study on the Effect of Smartphone Typing on the Muscle Recruitment in Neck and Upper Extremity: a preliminary report. The aim of this study was to understand the muscle recruitment in the neck and upper extremity while texting identical messages with one hand and two hands, and put the phone vertically and horizontally. Fourteen healthy college students without any history of neuromuscular disorders or ongoing pain who used the smart phone more than one year were taken for the study. Result shows Less muscle activities were found in elbow and thumb with one hand use and in the neck with horizontally located phone and most of them have neck problem associated¹².

RESULTS

Total 45 studies were shortlisted, from which 10 of them with proper methodology were reviewed and reported. Studies include both survey, cross sectional, cohort and few randomised control trials. Studies reported a considerable variation in the scales related to neck pain and disability and also a greater incidence.

DISCUSSION

According to The Wireless Association, texting statistics have increased astronomically. In June 2006 in the USA, there were 12.5 billion texts sent monthly. By June 2011, that number grew to 196.9 billion. The most common condition that contributes to neck pain is forward head and shoulder posture. Forward head posture is when the neck slants forward placing the head in front of the shoulders. The most common condition that

contributes to neck pain is forward head and shoulder posture. Forward head posture is when the neck slants forward placing the head in front of the shoulders. This head position leads to several problems⁴.

The text neck syndrome can be used to tightness of neck muscles, which is due to forward head position to tilting head position. The forward pull of the weight of the head puts undue stress on the vertebrae of the lower neck, contributing to degenerative disc disease and other degenerative neck problems. Similarly, this posture causes the muscles of the upper back to continually overwork to counterbalance the pull of gravity on the forward head. The position is often accompanied by forward shoulders and a rounded upper back, which not only feeds into the neck problem but can also cause shoulder pain. The more time spent with forward head posture, the more likely it is that one will develop neck shoulder problems. The part of the neck that is particularly vulnerable to forward head posture is the lower part of the neck, just above the shoulder. The lower cervical vertebra c_5 and c_6 may be slightly slide or shear forward relative to one another as a result of the persistent pull of gravity on a forward head. This shear force can be problem for patients with jobs that require them to look down or forward all day, such as pharmacists who spend many hours counting pills or data entry workers who look at a computer screen or normal people who use smart phones whole day^{6,7}.

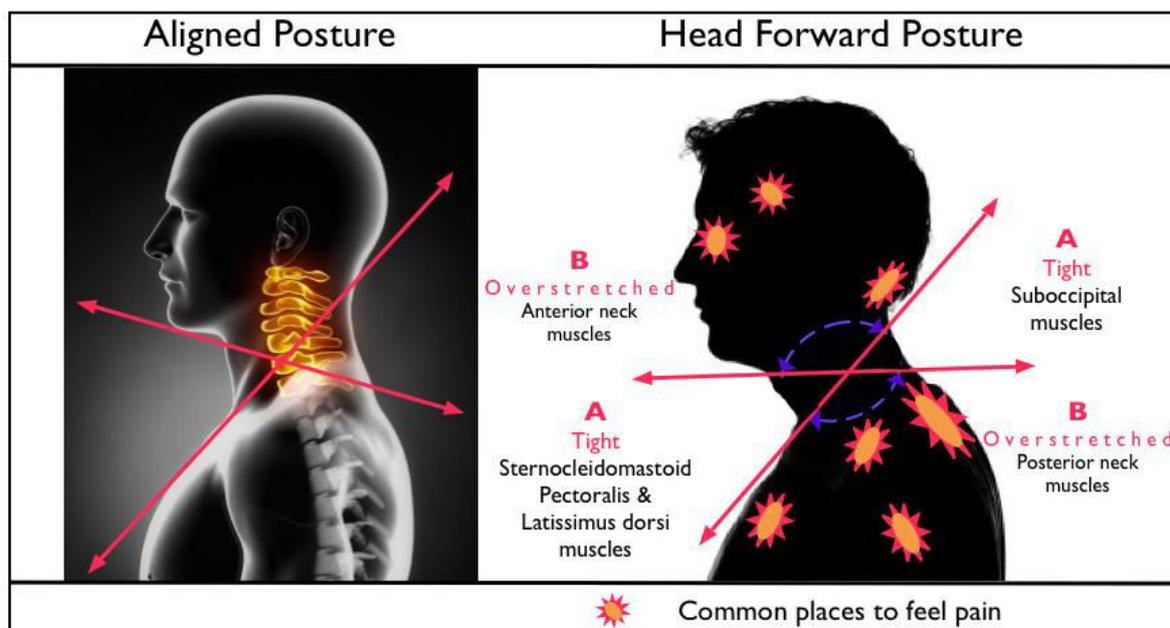
Prolonged shearing of the vertebrae from forward head posture eventually irritates the small facet joints in the neck as well as the ligaments and soft tissues. This irritation can result in neck pain that radiates down to the shoulder blades and upper back, potentially causing a variety of conditions, including: Trigger points in the muscles, which are points of exquisite tenderness that are painful to touch, along with limited range of motion, Disc degeneration problems, which may potentially lead to cervical degenerative disc disease, cervical OA, or a cervical herniated disc etc. There are some simple lifestyle changes which greatly help in alleviating the muscular pain and discomfort of the text neck before the condition worsens. A person can make some simple changes in his/her daily posture and lifestyle to make him/her feel better. Taking frequent breaks helps in relieving the stress on neck and shoulders.

As a text neck is a repetitive stress injury, it can be easily relieved or prevented by taking frequent breaks from the mobile device, like every 20 min or so. You should constantly look up bring the neck back into its original neutral position. Other

alternatives are to hold the mobiles/electronic devices higher, so that it is alignment with the eyes and the stress on the neck muscles is reduced. Doing posture focused exercises, such as Pilates and yoga, which aim is gaining the right posture,

will reduce the stress on the neck and shoulder. These exercises will increase the awareness of the way the mobile devices are used and should be used.

Upper Cross Syndrome



Treatment of any clinical condition is done in two major ways i.e. Conservative management and surgical management. Since text neck syndrome is not that much severe case to go for surgical intervention, conservative treatment is recommended. Very rarely, some case of text neck shows very severe pain and postural deformity in which surgical intervention can be recommended.

Acute cases:

Sometimes small efforts can relief the pain from the text neck syndrome whereas in some cases many other techniques should be done to get out of text neck syndrome. Some of the techniques done to get relief from text neck are mention below. The main problem of the text neck syndrome are muscle spasm, neck pain, stiffness, postural deformity etc.

Warm up your neck muscles time to time: In every 30-40 min of using smart phone or I-readers you need to warm up your neck muscles by some short of exercises i.e. rotate your head, to and fro of head, change directions or posture etc. At least repeat this for 10 times.

Stretches: You can do different muscles stretch and hold for 10-30 seconds. Such as side neck stretch, levator scapula stretch, front neck stretch etc.

Chin and scapula retraction: Chin and scapula can be retracted and hold for 20-30 seconds. It helps to strengthen the muscles of neck and head stabilizing muscles and get rid of neck pain and postural instability.

Talk more and text less: we have lost our ability to make more genuine connections. we don't even call to wish each other happy birthday anymore. It seems minor point but if a person text he/she takes more time on phone rather than in calling for same work.

Rest: With most neck strains and sprains, going easy for a few days is all that is needed while the muscles and tendons heal on their own. It is important to be careful to avoid strenuous activities or movements that are causing more pain.

Ice and/or heat: Applying ice can work as an anti-inflammatory to reduce swelling and pain. Initially, it's better to apply ice or cold packs for neck pain because they can temporarily close small blood vessels and prevent swelling from becoming worse. After a couple days, ice or heat can be applied on an alternating basis. Applying continuous heat can cause increased swelling.

Massage: Often employed after applying ice or heat, a massage can soothe muscle tension and spasms, reducing pain.

Better posture: If poor posture is causing the neck pain, then simple changes might be the solution. This could include changing a workstation to become more ergonomically friendly, with a chair, monitor, mobile phones and keyboard positioned in ways to keep the body, head, and neck more aligned in a natural position; or learning to sleep on the back (instead of the stomach or side) with an ergonomically-friendly pillow and mattress.

Modify lifestyle: If certain activities are found to cause neck pain that keeps coming back, then those activities might need to be limited or avoided. For example, if someone spends a few hours every day with their neck craned over a smart phone while texting friends and checking updates, then that activity should be reduced; and the phone should be held up closer to eye level to keep the neck more upright while texting.

Over-the-counter medications: Many over-the-counter pain relievers are available to either reduce inflammation or hinder pain signals from reaching the brain. However, these drugs must be used with caution. Read the pain reliever entire label for directions and warnings, and be careful not to overdose. For example, the active drug in Tylenol is acetaminophen, which is also found in many other common drugs, such as cold and allergy medications^{12,13}.

Chronic cases:

“Text neck” syndrome is a group of symptoms and cases are treated accordingly to the sign and symptoms. Most of the clinical features of text neck syndrome are same as that of neck pain and other syndrome like computer vision syndrome, forward head syndrome, cross syndrome etc.

Treatment for the acute cases are described before now if the text neck syndrome leads to the chronic pain and chronic clinical features near by the neck and shoulder region following treatment can be done respectively:

Medical care for most types of neck pain typically starts with non-surgical treatments such as one or some combination of the following:

Physical therapy: Most treatment programs usually include some form of physical therapy to improve neck strength and flexibility. The physical therapy program’s structure and length will vary depending on the specific diagnosis and situation. In the beginning, the person will typically have

multiple sessions per week with a trained physical therapist, and then in time will progress to performing the prescribed exercises at home.

Prescription pain medications: If an over-the-counter pain reliever hasn’t been effective, prescription-strength medications may be tried. Many pain medications are available, and each has its own potential risks and benefits. While opioids have commonly been prescribed for pain relief in the past, the CDC changed its guidelines in 2016 and recommends fewer opioid prescriptions for chronic pain management due to the risk for addiction and other possible complications.

Cervical epidural steroid injections: This procedure involves injecting cortisone steroid solution into the cervical epidural space, which is the outer layer of the spinal canal. To ensure that the injection goes into the epidural space near the inflamed nerve, X-ray guidance (fluoroscopy) is used. The goal of the injection is to reduce inflammation of the nerves, or nearby tissues caused by a disc herniation. These injections can help reduce the pain to enable the person to return to normal activities and/or make progress with a physical therapy program. This injection is not always effective and has some risks, including the possibility of infection, and its use might be limited to a few times a year.

Cervical facet injections: If neck pain is caused by irritation of the facet joints, injections of steroids into the specific joints can reduce the pain. If the facet injections yield predictable but temporary pain relief, sometimes radiofrequency ablation (RFA) of the small sensory nerves that go to the affected facet joints may be recommended. While these RFA procedures may have longer effects, these injections are not designed to cure the problem, but rather to temporarily offer relief for the irritated facet joints.

Trigger point injections: Irritation of specific muscle bundles can be the source of pain. Trigger point injections are designed to reset the normal orientation of these irritated muscle bundles. The injection materials can vary from saline, lidocaine, dextrose, or cortisone. This type of treatment may be nuanced but effective for well-defined trigger point irritations to the neck muscles. These treatments may not have long term efficacy, or may not have the desired pain reduction.

Manual manipulation: A chiropractor or other health professional may make manual adjustments to the spine in an effort to improve range of motion and reduce pain. Also referred to as a chiropractic adjustment, manual manipulation is usually done in

an office on a table. The chiropractor will typically use his or her hands to do the adjustments, but sometimes a machine can be used to make gentle adjustments. Some people report that chiropractic adjustment has helped reduce neck pain, but not everyone reports benefits. Also, while rare, there have been reports of high-velocity cervical spine adjustments being associated with negative outcomes, such as stroke or paralysis.

Acupuncture: With its roots in Chinese medicine from thousands of years ago, acupuncture involves placing thin needles into the body at key points based on the condition being treated. A typical treatment might last less than an hour before the needles are removed. In the US, the needles must be disposed and not reused. It's important that the acupuncturist is licensed and uses sterile needles. Acupuncture is usually well-tolerated by most patients and is generally considered safe.

In addition to the above treatments, anything the individual can do to lead a healthy life will also positively impact neck pain. For example, moderate aerobic activity several times each week, and stopping smoking, can be beneficial for most types of neck problems^{14,15,16}.

CONCLUSION

As a text neck is a repetitive stress injury, it can be easily relieved or prevented by taking frequent breaks from the mobile device, like every 20 min or so. You should constantly look up bring the neck back into its original neutral position. Other alternatives are to hold the mobiles/electronic devices higher, so that it is alignment with the eyes and the stress on the neck muscles is reduced. Doing posture focused exercises, such as Pilates and yoga, which aim is gaining the right posture, will reduce the stress on the neck and shoulder. These exercises will increase the awareness of the way the mobile devices are used and should be used.

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As stated in the review smart phone induced neck pain and associated problems are of chronic progressive nature, timely interpretation and interventions along with good knowledge about postural correction will be the key entities to deal with Text Neck Syndrome. Further clinical trials

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