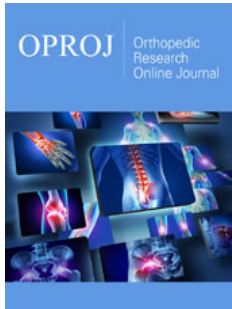


Relationship between Use of Smart Devices and Traps Muscle Myalgia

ISSN: 2576-8875



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Submission: 📅 June 19, 2024
Published: 📅 August 01, 2024

Volume 11 - Issue 1

How to cite this article: Haidar Jouni*. Relationship between Use of Smart Devices and Traps Muscle Myalgia. Ortho Res Online J. 11(1). OPROJ. 000754. 2024. DOI: [10.31031/OPROJ.2024.11.000754](https://doi.org/10.31031/OPROJ.2024.11.000754)

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Abstract

The Purpose of the study is to link the relationship between smart devices and their effect on the muscular system, especially muscle of neck and upper extremities-traps muscle. The use of smart devices, especially the mobile, iPad, laptop etc. for periods ranging from two to six hours per day, affects the nervous and muscular systems. The age group that was the target of the research is young people, both genders, aged between 16-40 years who suffer from neck pain and headaches. Through the research, it was found that the use of smart devices for long periods, with disproportionate vision with the devices and neck instant stress, was a primary cause of traps myalgia. During the study, the degree of neck inclination was measured while using the smart devices, as well as Jouni Test.

Introduction

The trapezius muscle, or as it is often called in many countries, traps muscle, is a large surface muscle of the upper back that resembles a trapezoid. It extends from the external projection of the occipital bone -external occipital protuberance to the lower thoracic vertebrae and laterally to the scapular spine (Figure 1). The trapezius has three sections, the superior, middle, and inferior fibers, and each segment plays a role in specific movements of the neck and shoulders [1,2]. Upper fibers elevate the shoulder, while Lower fibers depress the shoulder, and Middle fibers brace back (retraction) of shoulder. Traps muscle helps you to move your neck, head and shoulders. Muscle strains injury can affect the traps muscle and cause pain and decrease its mobility (Figure 1).



Figure 1: Trapezius muscle.

The anterior branches of the C3 and C4 spinal nerves innervate the sensory functions of the trapezius muscle. While the spinal accessory nerve (cranial nerve XI) innervates the motor function of the trapezius. Branches of XI cranial nerve perforate both sternocleidomastoid and the trapezius muscle. It passes, posterior to the sternocleidomastoid edge of the muscle itself and about 4 to 9 centimeters below the apex of the mastoid process. Another point is in the trapezius muscle, about 2 to 9 centimeters above the clavicle towards the acromion-clavicular joint, at the junction between middle and lower muscle fiber. There are some signs

and symptoms that affect the traps muscle, these signs can be found daily, especially among young people and those who use smart devices for long periods of time with an improper muscle increases the pressure on the muscles specially the trapezius and erector muscles and causes severe myalgia and headaches [3,4].

The study was conducted on a sample of 62 people (32 males and 30 females). Their ages range between 16 and 40 years. The sample that was the subject of the study was people who use smart devices for periods of time between two -6 hours per day. They had not previously complained of any medical symptoms related to the neck and shoulders, nor any symptoms related to diseases of the nervous and muscular system.

Subjects and Methods

Subject

The use of smart devices has increased recently with technological development and the connection of public life and its requirements with the increasing use of devices, but the method and duration of use have a negative impact on health especially on neurologic and musculoskeletal system. The sample that was the target of the study suffered from headaches, neck and shoulder pain, and cases were excluded if they had any history of migraine, upper extremity or cervical spine injury or malformation as well as deformity within the past year, vertigo, visual problems, dizziness, previous history of surgery, or neurological, musculoskeletal, or systemic disorders. They were also excluded if they had taken any sedative drug or alcohol within the past days and due to the above reasons [4-6].

Methods

The study was conducted on a sample of patients 62 cases both genders of patients at Jouni clinic (Table 1). Their ages ranged between 16-40 years (Table 2), and they didn't suffer any health problems in the neck and shoulders. The study was based on medical history, clinical examination, and x-rays radiographs of cervical spine and shoulder, as well as MRI - magnetic resonance imaging -for some cases, and nerve EMG. During the study, cases suffering from shoulder disc were excluded patients with clinical signs of herniated bulge or disc, rotator cuff injury, headaches,

migraine. The required examination -Jouni test- was performed, and it was found that the pain had disappeared when the examination was performed [7-9].

Table 1:

Gender	Male	Female	Total
TOTAL	32	30	62

Table 2:

Age	Male	Female	Total
16-24	14	12	26
25-32	8	10	18
33-40	8	8	16
Total	32	30	62

Jouni test the examination is done by grabbing the straps muscle at the junction of traps muscle with acromio- clavicular joint 3-4cm medial to the junction (a) and 2-3cm below the border of the descending fibers of traps muscle (b), a and b must be at right angle (Figure 2). We place the thumb from the back, and we place 3rd and 4th fingers from the front of the traps muscle, and we squeeze the muscle at the point c. Then we ask the patient to move the head and neck towards the right and left, forward and backward, and we will see that he moves freely without pain, as if the muscle was not spasmodic, and this point is where the nerve enters the muscle.

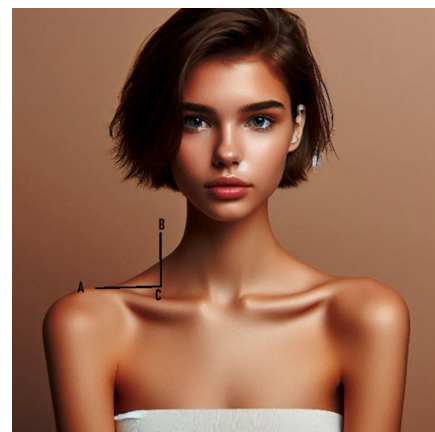


Figure 2:

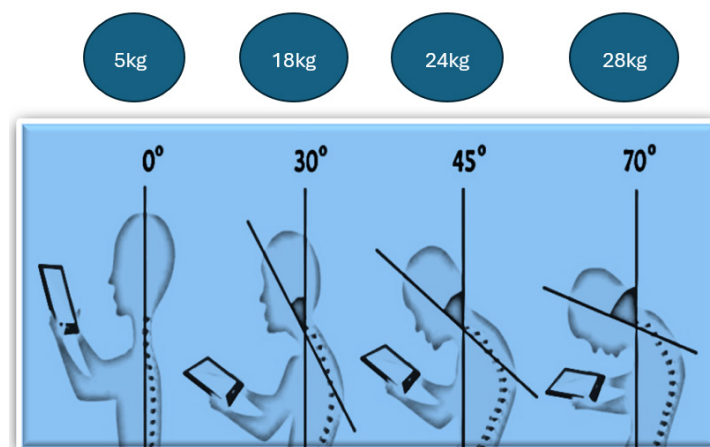


Figure 3:

The method of using the mobile phone and the angle of bending during use were studied because the neck is affected by the method of use, which causes muscle tension ,Trapezius and erector neck muscles, and through follow-up it was found that ,When we hold our head at an ideal angle, which is called the neutral position, the load on the cervical part of the spine ranges from 4.5 to 5kg, and this is the normal size for carrying weights from the head to the neck [10-12]. While when the head is fixed or bent forward, the neck muscles, tendons and peripheral ligaments support the head to help the cervical vertebrae carry the extra weight. Studies reveal that when the neck is bent at an angle of 15 degrees, the load on the neck is 12.25kg, and the load on the neck are 18kg at 30 degrees and 22kg and 45 degrees respectively. This type of repetitive stress over time can lead to premature stress and traps muscle myalgia (Figure 3).

The study demonstrated the incorrect position of the neck during the use of smart devices for both genders) Table 3), as well as the result of Jouni test sensitivity in cases of traps muscle myalgia (Table 4).

Table 3:

DEGREE	0	30	45	70	TOTAL
MALE	0	14	17	1	32
FEMALE	1	21	6	2	30
TOTAL	1	40	18	3	62

Table 4:

JOUNI TEST	POSITIVE	NEGATIVE	TOTAL
MALE	31	1	32
FEMALE	30	0	30
TOTAL	61	1	62

Result

After the physical, clinical, and radiological (x-ray or MRI), and EMG examination, the cases were diagnosed, and it became clear that the myalgia could be related to incorrect position of the neck during the use of smart devices. The study was conducted on 62 patients from different age groups, ranging in age from 16 to 40 years and from both sexes (Tables 1,2), who suffer from different sign and symptoms 'in the neck, head, and shoulders, in other words, pathological conditions that have a common denominator, which is pain or myalgia in the neck muscles.

Recently, the use of smart devices has increased, and they have become a part of our lives without percussion about the time and manner of use, which causes many diseases of the nervous and muscular system, including traps myalgia. Through the study, we found that young people spend a longer time using smart devices and that the degree of neck inclination was between 30 and 45 degrees in general (98%of cases) (Table 3), which is the reason of traps myalgia as shown, and few people pay attention to proper neck bending, And he pays attention about the time of use and rest, and performing sports movements of the neck when used for a long.

It turned out that the Jouni test was positive for the majority (99%), and therefore it can be used as a diagnostic method (Table 4).

Conclusion

Through the study that was conducted, it can be concluded that traps muscle myalgia is a condition that can be caused by incorrect overuse of smart devices, as well as being limited to the traps muscle. The possibility of distinguishing between cases is by conducting a Jouni test procedure, because in most cases caused by muscle myalgia only, the examination is positive, while it is negative in one case that the traps muscle suffers from it, which may be the result of other diseases. The conclusion is that the only case that did not give a positive result could be due to the location of the nerve entering point to the muscle, and this requires additional studies to determine the distances and the nerve entry point from AC joint and clavicle. The reason of myalgia is due to excessive smart devices use for periods exceeding two hours per day and excessive neck bending while working on smart devices, so we must pay attention to the time and method of use.

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