Impact of car and bike driving on cervical range of motion & cranio vertebral angle in healthy subject

A Thesis

Submitted

In partial fulfillment of the requirements for the degree of

MASTER OF PHYSIOTHERAPY

In

MUSCULOSKELTAL

Submitted by

MOHAMMAD MUSTAFA AZAZ

DEPARTMENT OF PHYSIOTHERAPY

INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES AND RESEARCH
INTEGRAL UNIVERSITY, LUCKNOW
INDIA

MAY 2022

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ABSTRACT

Background and purpose: Introduction of this to correct the abnormal posture focusing on cervical spine and ergonomics. The purpose of this study is to see the impact of cranio vertebral angle (CVA) and the cervical range of motion (ROM) of car and bike drivers.

Methods: Thirty participants who driving at least 2 hours daily participated in this study. The measurement of cervical ROM taken by goniometry and the CVA was assessed by surgimap application.

Results: Study concluded that there is a significant impact on cervical range of motion while driving car and bike for prolong period.

Conclusion: Due to prolong car and bike driving there is a significant impact on cervical range of motion and cranio vertebral angle in drivers which having discomfort while driving, extend driving period and faulty sitting posture.

Keywords: Universal goniometer, surgimap system software

CHAPTER I

INTRODUCTION

INTRODUCTION

The habit of repetitive use car and bike driving the body to exhibits bad posture with the associated muscle shortening and elongation due to muscular imbalance leads to malfunctioning of various parts of the body. From past few years the head and cervical posture is a major problem due to biomechanical relationship of head cervical and dentofacial structure. The anterior positioning of the cervical spine causes forward head posture, and each 1 inch anterior positioning of the head adds 10 lbs. (4.5 kg) to the cervical spine, causing musculoskeletal, neurological, and vascular system dysfunction.

Many studies have been done to investigation the correlation of neck pain due to the car & bike driving which shows the decreased length of muscle fibers & decreased of capacity of muscle to generate tension in driving cause severe neck pain.

Driving symptoms include weariness, reduced range of motion, temporomandibular joint dysfunction, pinched nerves, and headache, in addition to significant neck discomfort and muscle imbalance.[1] The cranio vertebral angle (CVA) is defined as an angle made by the intersection of a line joining the midpoint of the tragus of ear to the skin overlying the C7 spinous process and a horizontal line passing through the C7 spinous process. There is a correlation between FHP, neck pain, and CVA. One of the studies reported that subjects having smaller CVA had FHP and were prone to have increased severity of neck pain. There could be both lower cervical flexion and upper cervical extension in FHP and may include tightness of posterior region muscles and weakness and lengthening of anterior cervical muscles.Deep cervical flexor muscles have been identified to play an important function in cervical spine support and strengthening. In the case of cervical problems, studies have shown that if deep flexor muscles are used correctly before strengthening global cervical muscles, a rehabilitation method would be more successful. The usage of a pressure biofeedback device is also proposed as a more effective method of deep flexor muscle strengthening than traditional workouts.[2] Body posture is a condition of alignment of the body for a specified length of time, where appropriate posture describe a state of maintaining balance in the body with little musculoskeletal activity without producing pain or discomfort. The tendency to stay seated for long periods of time is increasing as is the percentage of the population who drives car and bike so much. This can induce structural changes in spine alignment, resulting in incorrect posture, such as rounded shoulders or forward head position. [3] Factors such as continuous sitting at work or poor head posture when driving may have a significant impact in the prevalence of neck discomfort among official drivers, particularly those who drive for lengthy periods of time. Although some studies have reported a substantial difference in head posture between patients and pain-free participants, forward head posture (FHP) has not consistently been linked to neck pain in the literature. Since head, cervical and thoracic postures and their relation with neck pain has not been studied in car & bike drivers. The purpose of this study was to investigate the relationship between some work-related and individual factors, such as poor posture, with neck pain in the official drivers.[4] Musculoskeletal disorders have previously been studied in the context of occupational health and work related disorders. One focus has been on those employed as vehicle drivers who have a high effect of cervical compared with car and bike drivers. Poor posture and exposure to vibration and mechanical shocks are two factors that contribute to the effects of musculoskeletal problems. Amateur and professional racing racers are subjected to high levels of vibration and stress, and so may be predicted to have a high incidence of symptoms of musculoskeletal problems. Previous studies of symptoms of musculoskeletal disorders have focused on professional drivers and have been limited to small populations. This paper reports a study designed to increase the volume of raw data on the types of musculoskeletal symptoms experienced by car drivers and bike drivers by expanding the cohort to include both professionals and amateurs.[5] Several characteristics linked with driving automobiles were found as reasons why driving was classified as one of the high-risk jobs, predisposing the majority of drivers to have cervical discomfort. Among them is the nature of driver's seat and its back rest that persistently exert pressure on the lumbar-vertebral spines due to prolonged hip position at 90 degrees. 14 Other significant indicators are the drivers' ages, years of driving experience, lengthy hours of driving each day with persistent vibratory stresses, and frequent twisting of the lumbar-vertebral spines, among others. The characteristic nature of roads and the condition of vehicles could add to the effect of cervical range of motion and cranio vertebral angle among professional long-distance drivers, because the roads are dilapidated and poorly maintained, whereas the vehicular road worthiness assessments are not strictly followed. The goals of this study were to assess the influence of cervical range of motion and cranio vertebral angle on professional drivers, as well as to identify the related risk factors and their economic implications. [6]Driving is an activity appreciated by many people for transportation, recreation and competition. Unfortunately, although car and bike driving is generally beneficial, it also carries inherent risks for its participants. There are thousands and thousands millions of vehicles accidents each year. With such high occurrences, further investigation related to the possible triggers of these accidents is valuable to any types of drivers. Vehicles usage increased day by day in world especially in Asian countries and this rate growing rapidly. In develop cities most of the middle class people using bike for transportation now lengthen sitting on vehicles mostly effect the Spine and associated structures.

HYPOTHESIS

ALTERNATIVE HYPOTHESIS:

There is a significant impact of car and bike driving on cervical range of motion and cranio vertebral angle in healthy subject.

NULL HYPOTHESIS:

There is no significant impact of car and bike driving on cervical range of motion and cranio vertebral angle in healthy subject.

AIMS & OBJECTIVE

AIM

To investigate the impact of car and bike drivers on cervical range of motion and cranio vertebral angle in healthy subjects.

Objective

1. To finds out the effect of car and bike driving on cervical range of motion.

2. To finds out the effect of car and bike driving on cranio vertebral angle.

OPERATIONAL DEFINITION

SMART PHONE: A Smartphone is a phrase used to differentiate between mobile phones with advanced functionality and simple feature phones. When Ericsson defined its GS 88 "Penelope" design as a smart phone in 1997, the name "SP" first surfaced.

SURGIMAP SOFTWARE: Surgimap is a software application designed for the medical sector. It is a free computer software allowing viewing, storing, and transporting photos. Surgimap Spine software has been utilized for radiological reasons by orthopedists, but it may also be used as an assessment tool for photographic analysis.

RELAIBILITY: The ability of an apparatus to consistently perform its intended or required function or mission, on demand & without degradation or failure.

VALIDITY: It is the extent to which a concept, conclusion or measurement is well founded & corresponds accurately to the real world.

CRANIO VERTEBRAL ANGLE (CVA)

CVA formed at the intersection of the horizontal line through the spinous process of C7 vertebra & a line through the ear tragus. A smaller CVA indicated a greater FHP & a CVA less than 48° - 50° is defined as FHP. 29 The subjects with a CVA below 48° were defined as FHP & those with a CVA above 48° were defined as healthy. The reliability of this procedure is reported as high (ICC = 0.88). A young healthy adult is expected to exhibit an average normal head posture within a 10° range from 49° to 59° of the C7-tragus angle.

GONIOMETER

Various measurement devices are available for cervical ROM evaluation, going from simple instruments like universal goniometer (UG) to electromagnetic 3D FastTrack measurement system or 3D ultrasound equipment. But these equipment are not very accessible for clinical practice due to high cost and complexity for use in specific segments. Therefore, it is very important to consider about the reliability, easiness to use and the cost of the device while choosing the most suitable measurement device. It may help the physiotherapist to determine the diagnosis, formulate the prognosis, design the plan of care, check the progress, and evaluate the efficacy of treatment.[8]

Review of literature

Sutantar singh et al it is concluded from the results of this study that there is 73% prevalence of FHP that affects only a little or no activity of daily living. (1), Isha Sikka et al this study showed that DCF training and postural education of 4 weeks does not cause any significant improvement in FHP in adolescent pupils using computers regularly.(2), Dae-hyun kim et al suggested that decreased CVA and cervical flexion range were predictive factors for the occurrence of pain in the cervical region.(3) Parisa Nejati et al findings have revealed that office employees had a defective posture while working and that the improper posture was more severe in the office employees who suffered from the neck pain.(4), N J Mansfield et al most stage rally drivers and co-drivers report symptoms of musculoskeletal injury. It is logical to relate the high prevalence of symptoms of injury to the extreme environment of the rally car.(5), Adamu Ahmad Rufa et al This study investigated the prevalence, risk factors, and impact of low back pain (LBP) among professional drivers in Nigeria. Two hundred male drivers aged 19-64 years were recruited in the study. Data regarding prevalence, individual risk factors, and impact of LBP were obtained. The prevalence rate of LBP was 73.5%, and LBP have affected the driving performance of up to 74% drivers.(6), Aiman Asyraf Ahmad Sukari et al Cervical flexion-extension, lateral flexion and rotation will be assessed with bedside instruments. This would aid in increasing accuracy and precision of objective measurement while conducting clinical examination to determine the cervical range of motion.(7), Muhammad nazim Farooq et al this study was to perform examine the reliability of active cervical movements measured by UG which is commonly used by clinician. The results demonstrated excellent inter and intra-rater reliability of the UG for measuring active ROM of all cervical movements in healthy subjects.(8), Dr. Abdul Rashad et al Study concluded that effect on cervical, lumber and thoracic spine in bike rider which having pain while riding, prolong riding time and faulty sitting posture. From this result conclusion we produce awareness among bike riders population to beware faulty posture while riding.(9) O Minoyama et al There were some differences in injuries between the two types of car. No serious injuries occurred except for one death. However, the driver's body is subjected to large forces in a crash, hence the high incidence of concussion. The injuries recorded after the race emphasize that motor racing is a demanding sport.(10), Melvin, John W et al. Biomechanical analysis of Indy car crashes using on-board impact recorders (Melvin et al. 1998, Melvin et al. 2001) indicates that Indy car driver protection in high-energy crashes can be achieved in frontal, side, and rear crashes with severities in the range of 100 to 135 G peak deceleration and velocity changes in the range of 50 to 70 mph. These crashes were predominantly single-car impacts with the rigid concrete walls of oval tracks. This impressive level of protection was found to be due to the unique combination of a very supportive and tight-fitting cockpit-seating package, a six-point belt restraint system, and effective head padding with an extremely strong chassis that defines the seat and cockpit of a modern Indy car. In 2000 and 2001, a series of fatal crashes in stock car racing created great concern for improving the crash protection for drivers in those racecars.(11),Kegelman, John C et al. Race car drivers can offer insights into vehicle control during extreme maneuvers; however, little data from race teams is publicly available for analysis. The Revs Program at Stanford has built a collection of vehicle dynamics data acquired from vintage race cars during live racing events with the intent of making this database publicly available for future analysis.(12), Baur et al. eventy percent of motor sports athletes report low back pain. Information on the physical capacity of race car drivers is limited. The purpose of this study was to compare the maximum trunk extensor and flexor strength of elite race car drivers and physically active controls. (13), Yanagida, Ryo et al. The present study measures heart rate (HR) on a number of professional race-car drivers during actual car races through annual seasons to test hypotheses that faster relative speed and higher cabin temperature would induce higher HR. (14),Jarrod A J Shugg et al. We observed a large degree of variability in cervical axial rotation during driving. We observed that most of the driving tasks related to stopping had increased proportion of time out of neutral rotation. Also, right-hand lane changes increased time out of neutral rotation more than left-hand lane changes. Drivers routinely adopt no neutral head positions (on average 13% of the time); this is likely not enough to lead to injury.(15), N Bogduk et al. The fact and precepts covered in this review underlie many observations that are critical to comprehending how the cervical spine behaves under adverse conditions, and how it might be injured. Forthcoming reviews draw on this information to explain how injuries might occur in situations where hitherto it was believed that no injury was possible, or that no evidence of injury could be detected.(16), G A Anoop et al.the prevalence of DMSDs among two-wheeler riders have been studied in this paper. Most of the subjects reported lower back pain due to the constrained postures and long hours of riding. The prevalence of DMSDs at upper back, shoulder and neck are also reported as higher among these riders. It is evident from the study that the prevalence of musculoskeletal disorders is not depended on any specific age group, gender or class of vehicle.(17), J. Rogé, S et al.numerous instances of collision between Vulnerable Road Users (VRU) and cars reveal that car drivers fail to identify VRUs in time to avoid a collision, mainly due to poor conspicuity.(18), M. Ranchet et al several cases of collisions between cars and cyclists indicate that car drivers, due to low visibility or sensory conspicuity, fail to see the latter in time.(19), J. Al-Awar Smither et al it was stated that in most motorcycle collisions, there is an involvement of another vehicle that disrupted or violated the motorcycle's right-of-way at an intersection.(20), S.R. Davoodi et al indicated that low conspicuity is usually to be blamed for the recurring collisions and fatalities encountered by motorcycle riders.(21), M.S. Solah et al it was stated that a lack of conspicuity of motorcycles by other road users is one of the major factors that results in a large number of motorcycle crashes, particularly during day time traffic.(22), P. Gershon, D. Shinar et al it can be said that road fatalities and accidents that involve motorcycle riders is an alarming matter and a cause of significant concern in Malaysia as well as other ASEAN countries, where low conspicuity is one of the key accountable factors.(23), U.D.P.U. Zlsur et al low conspicuity of PTW is a significant factor in the occurrence of accidents.(24), P.L. Olson et al night driving was considered to be a challenge, particularly when trying to overtake. At night, there are more constraints pertaining to computer graphics performance, since most of the relevant details are associated with low luminance and low contrast values. The overall difference has been found to be considerably high because of light sources stemming from vehicle headlamps and road lighting. While in the USA. (25), Chris Ho Ting Yipa et al Results demonstrate that there is a high degree of test–retest reliability in measuring the CV angle by using ARTICLE IN PRESS C.H.T. Yip et al. / Manual Therapy 13 (2008) 148–154 153 the Head Posture Spinal Curvature Instrument (HPSCI). The CV angle in subjects with neck pain is significantly smaller than that in normal subjects. The CV angle is negatively correlated with the disability of patients with neck pain. The smaller the CV angle (that is, the more forward head posture), the higher the NPRS score will be and vice versa. We recommend that CV angle as measured by the HPSCI can provide clinicians with further objective information on the disability and severity of patients with neck pain.(26)

CHAPTER 2
MATERIAL & METHOD

MATERIAL & METHOD

Study population

Age group between 18 years to 45 years and both male and female of car and bike driver

Sample size

Total 30 subjects were selected on the basis of inclusion & exclusion criteria.

Time duration

The duration of this study is 1 months (4 weeks)

Study setting

All Participants were taken from integral university and gomti nagar, Lucknow Uttar Pradesh, India.

SELECTION CRITERIA

INCLUSION CRITERIA

1. Age within 18-45 years.
2. Male and Female both gender was included in the study.
3. Car and bike drivers.
4. Those who are willing to participate in the study.

5. Who drives car and bike since 10 years
6. Who drives car and bike at least 2 hours daily.

EXCLUSION CRITERIA

1. Neurological deficit.
2. Any shoulder pathology/trauma.
3. Any other postural deformities.

VARIABLES

INDEPENDENT VARIABLE

1. Cervical ROM
2. CRANIOVERTEBRAL ANGLE

TOOLS & INSTRUMENTATION

MEASUREMENT TOOLS

1. UNIVERSAL GONIOMETRE
2. SURGIMAP SYSTEM SOFTWARE

INSTRUMENTATIONS

1. Smartphone.
2. Laptop
3. Graph paper
4. Digital camera.
5. Anatomical reflective marker.
6. Pen & paper.

PROCEDURE

CVA MEASUREMENT

A picture from the sagittal plane of each subject was taken to objectively access CVA through smart phone's camera with Surgimap application used for analyzing photographs. The distance between SP's camera & subject were 1.5 meter, the height of the SP were adjust to the level of subject's shoulder & a self-balanced position was chosen to standardized the head & neck posture of the subjects in neutral position. The necessities maintaining the neutral position before the photography were exposed to the subject. The adhesive anatomical reflective marker is placed over the tragus of the ear & C7 spinous process once the picture obtain, it was used for measuring CVA with the Surgimap smart phone application. Subject stand near the plumb line that was suspended from the ceiling, the plumb line reflect the true vertical line. In order to measure CVA, the angle between the horizontal line passing through C7 & a line extending from the tragus of the ear to C7 was calculated; the CVA was measured with the Surgimap application.

ROM MEASUREMENT

CERVICLE FLEXION & EXTENSION

Request for the patient to sit up straight on a chair with his/her thoracic spine positioned against the back of the chair, arms dangling to their sides and feet flat on the floor. Then, observe the patient from the side. This position can be considered as 0°. To assess cervical flexion, ask the patient to nod forward and bring their chin towards their chest. Normal cervical flexion is usually approximately 80º. To assess cervical extension, ask the patient to look upwards as far as possible, until full extension of the neck is achieved. Normal cervical extension is usually 50°. Total range of cervical motion from full flexion to full extension should be 130°. Nevertheless, it is possible to gauge if the patient has normal cervical flexion if he/she is able to touch his/her chest with their chin.

POSITIONING & PLACEMENT OF UNIVERSAL GONIOMETER

Using a universal goniometer, first place the axis of the universal goniometer over the external auditory meatus. Align the stationary arm vertically or perpendicular to the floor. Align the moving arm to the base of the nose. Note this as 0°. Then ask the patient to flex and extend his/her neck and record readings of the universal goniometer at each extreme of the motion. The axis should remain at the external auditory meatus and the stationary arm vertical to the floor, but the moving arm should be realigned following the base of the nose.

CERVICLE LATERAL FLEXION

Ask the patient to sit up straight in a chair with the thoracic spine positioned against the back of the chair, with arms dangling on the sides and feet flat on the floor. Instruct the patient to look straight ahead, ideally at a fixed point of eye level. Observe the patient from the front. Consider this the starting point (i.e. 0°). Ask the patient to tilt his/her head laterally to the left, without rotating the head, while his/her shoulders remains fix (i.e. bring ear as close as possible to the shoulders without lifting the shoulders). Examiner can assist in fixing the position of the shoulders by gently placing their hands onto the patient's shoulders. Repeat the procedure for the opposite side and note the angle of flexion of the head. Normal flexion from starting point on either side is 45° and the total angle of maximal lateral head flexion should be 90°. Eyeballing is difficult, therefore the use of a universal goniometer or CROM instrument may aid in accurate measurement of the angle of head tilt.

POSITIONING & PLACEMENT OF UNIVERSAL GONIOMETER

Firstly, place the axis of the universal goniometer; over the spinous process of the C7 if examining from the back, or at the sternal notch if examining from the front. Align patient's stationary arm along the imaginary line between the two acromion processes either vertically or perpendicular to the floor or horizontal and parallel to the floor. Align patient's moving arm; over the external occipital protuberance if examining from posterior or along the center of the patients' nose if examining from anterior. Consider this position as 0°. Then, instruct patient to flex his/her neck laterally and record readings of the universal goniometer at each extreme of the motion. Ensure that the axis and the stationary arm remains fixed throughout the motion and adjust the moving arm accordingly.

CERVICAL ROTATION

Ask the patient to sit up straight in a chair with the thoracic spine positioned against the back of the chair with arms dangling on the sides and feet flat on the floor. Instruct the patient to look straight ahead, ideally at a fixed point of eye level. Observe the patient from above. Next, ask the patient to rotate his/her head to the left as far as possible without tilting or tipping his/her head. Stabilize the shoulders by lightly pressing onto them. Repeat the process for the opposite direction.

Normal rotation is approximately 80° while the neck's total angle of rotation is 160°. For a rough approximation, when observing from above, the patient's chin should just be slightly anterior to the shoulder during maximal rotation on either side.

POSITIONING & PLACEMENT OF UNIVERSAL GONIOMETER

First, place the axis of the universal goniometer from above over to the center of the patients' head. Align his/her stationary arm along an imaginary line between the two acromion processes. Align his/her moving arm at the tip of the nose. Then ask the patient to rotate his head. Record readings of the universal goniometer at each extreme of the motion. Ensure that the axis remains at the center of the patient's head, the stationary arm along the imaginary line of the two acromion processes, and the moving arm realigned following the tip of the nose.

DATA ANALYSIS

DEMOGRAPHIC DATA	MEAN±SD
AGE	27.2±7.058377
HEIGHT	5.660667±0.324292
WEIGHT	68.9±12.65006

Mean value – Average value

SD value – Standard value

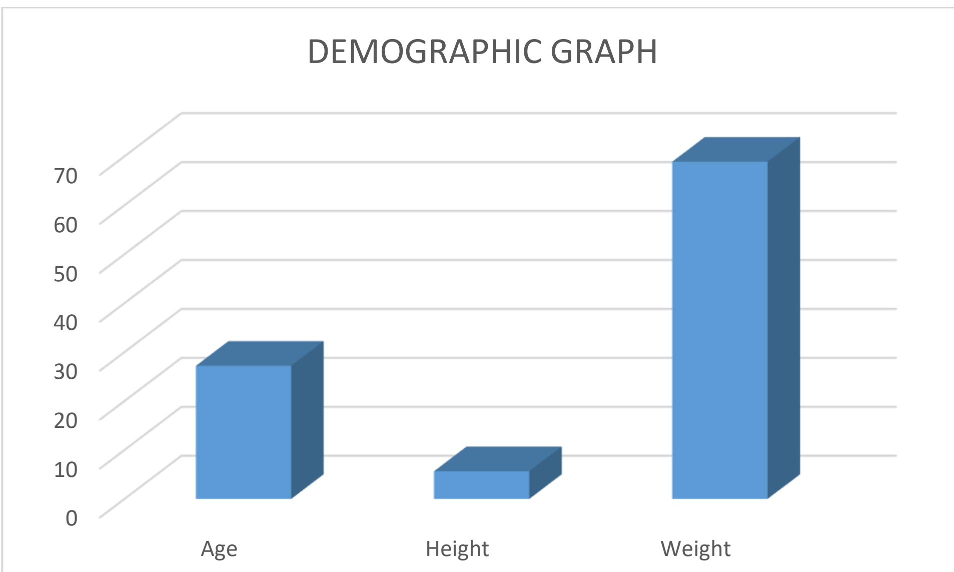

Table no.1

Age in years

Height in feet

Weight in kg

GENDER	MALE	FEMALE
	27	3

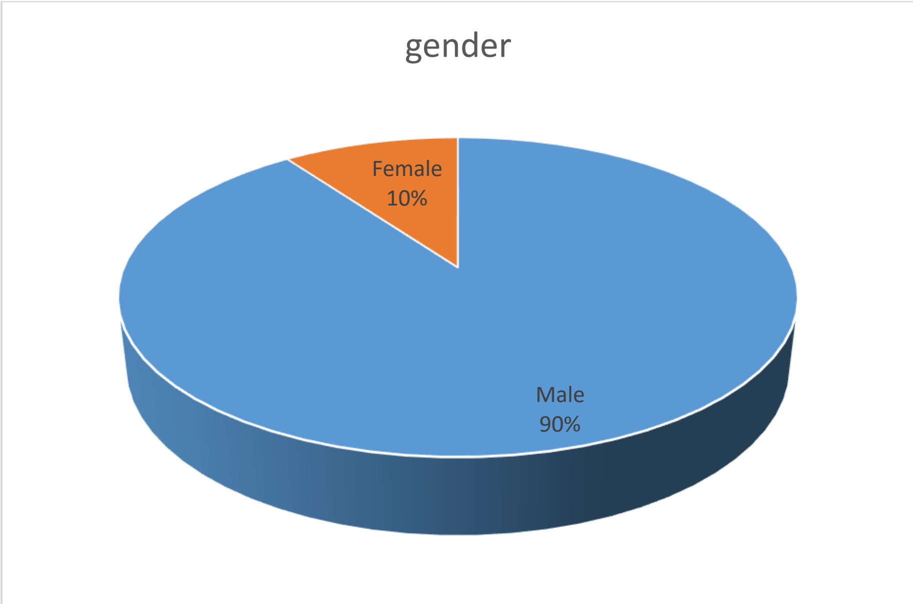

Table no.2

ROM	F	E	LR	RR	LF	RF
MEAN±SD	41.8±4.366013	38.46666667±4.366012937	56.53333±4.366013	57.2±4.366013	35.7±4.366013	34.03333±4.366013

*ROM- range of motion *mean value *SD- standard deviation

*F- Flexion *E- Extension *LF- Left Flexion *RF- Right Flexion

*LR- Lateral Rotation *RR- Right Rotation

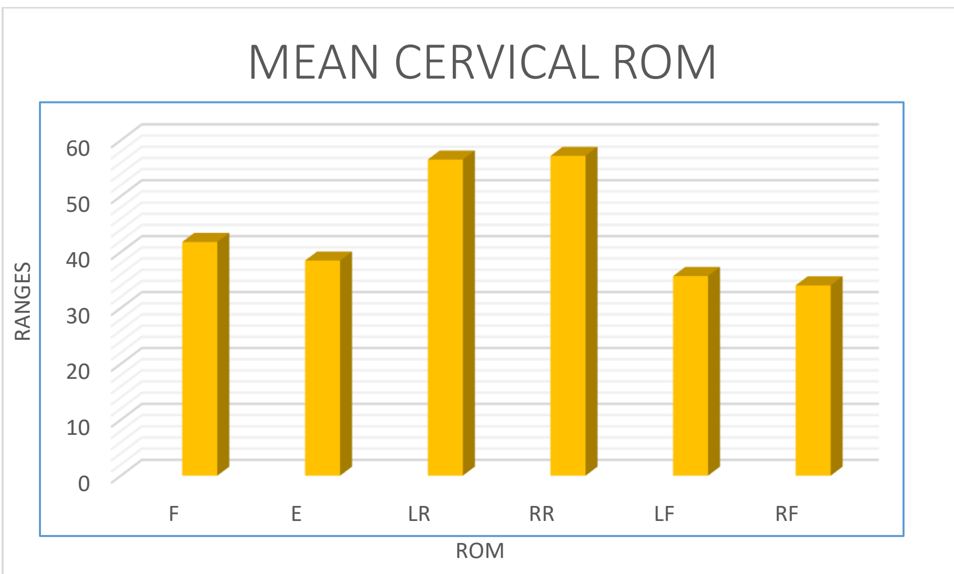

Table no.3

CVA & DRIVING HOURS(IN A DAY)	
MEAN	4.366667
SD	3.109866
P VALUE	0.037977
T - STAT	-2.178117755

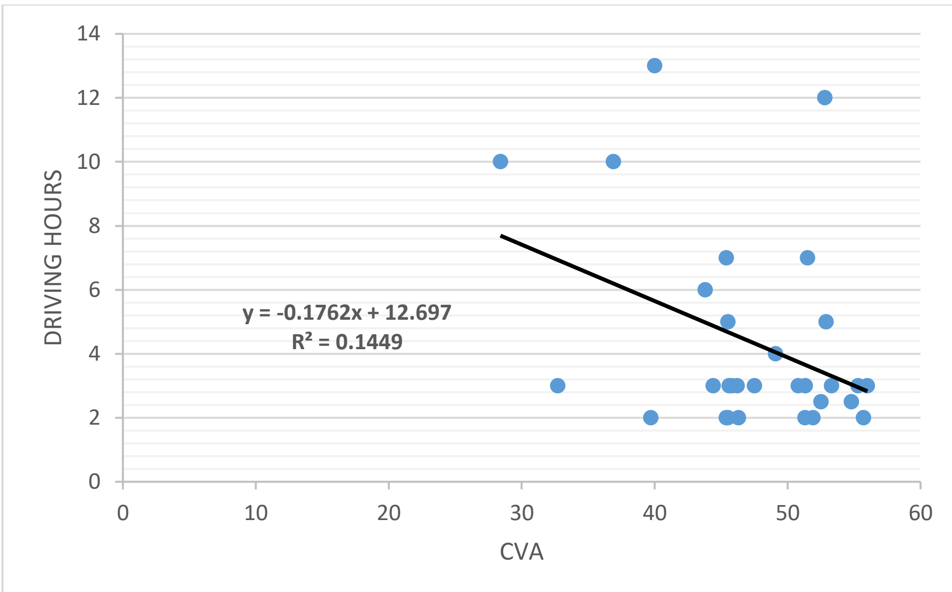

Table no.4

Data analysis shows that is significant correlation of driving hours with cranio vertebral angle, Therefore correlation was moderate. Where the value is $R^2 = 0.1449$.

CVA & DRIVING DURATION (IN YEARS)	
MEAN	4.95
SD	3.50947
P VALUE	0.014806457
T – STAT	-2.59738

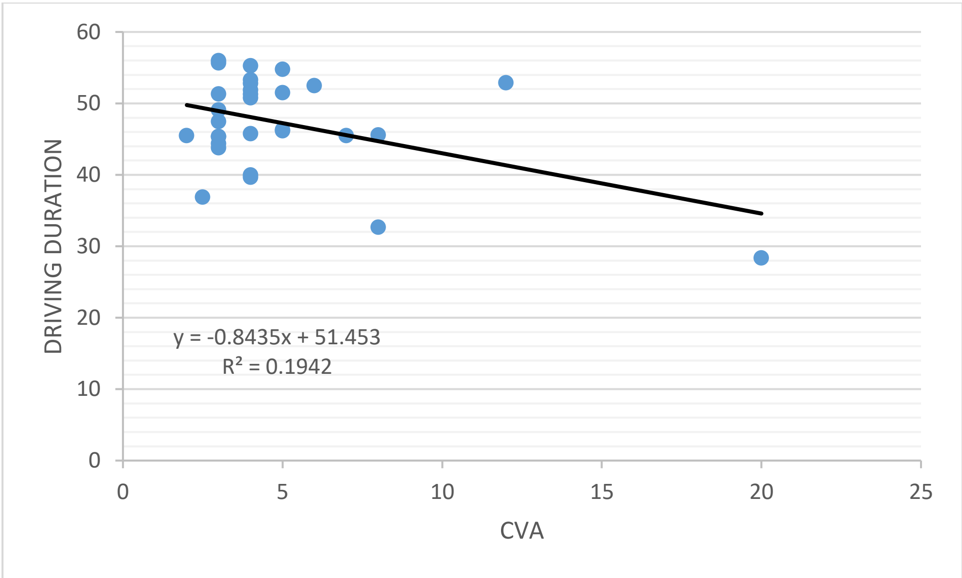

Table no.5

Data analysis shows that is significant correlation of driving duration with cranio vertebral angle, Therefore correlation was moderate. Where the value is $R^2 = 0.1942$.

RESULT

The data of 30 subjects were analyzed using mean percentage to find out the impact of cranio vertebral angle and cervical range of motion, and it is found that 30 subjects have effect on cranio vertebral angle and cervical range motion, whereas some having limited flexion and extension of cervical who drives daily for long time (e.g. . 8 to 11 hours/day) and some having limited left rotation and right rotation of cervical who drives for a long duration (e.g. since 7 to 8 years and for 2 hours daily)

DISCUSSION

The impact of car and bike driving, who drives for a long duration can cause neck pain and muscle imbalance and it also can cause the abnormal posture, decrease range of motion & impact normal life. The result of this study shows that car and bike drivers especially those subject who drives for long time can result in increase of cranio vertebral angle. There is moderate negative correlation between cranio vertebral angle and car and bike driving. Subject with small cranio vertebral angle have a greater forward head posture. This study also revealed that car and bike drivers especially those subject who drives for long time result in decrease of flexion, extension and rotation of cervical spine. Research conducted among student and physiotherapist concluded that Prolong bike riding show a marked effects on cervical spine. Dr. Abdul Rashad et al assess the cervical spine through postural grid when we evaluate the cervical curve during measurements there is a significant deviation of values from normal values we find that mostly cervical lordotic curve is increase in most of the participants these all changes are due to prolong bike riding and faulty sitting posture.(9)

CONCLUSION

Study concluded that there is an impact on cervical range of motion and cranio vertebral angle in car and bike drivers in healthy subjects driving for at least two hours.

LIMITATION OF STUDY

1. The sample size was small.

2. The duration of study was limited.

3. The study conducted includes a few female subjects.

4. The study is limited on subjects aged 18 to 45 years.

FUTURE RECOMMENDATION

1. Sample size can be larger.

2. To see the interrater reliability of this study.

3. We can find the difference between male & female population.

4. We can measure other postural angles & then compare the results.

5. We can compare the measurement of CVA with asymptomatic neck pain.

6. We can also compare with different age group population.

APPENDIX 1

PATIENT INFORMATION SHEET

PATIENT INFORMATION SHEET

- DEMOGRAPHIC DATA:

Name:

Gender:

Age:

Height/weight:

Occupation:

Duration of Driving:

Type of Vehicle:

Driving from how long

- RANGE OF MOTION DATA:

MOVEMENT	
FLEXION	
EXTENSION	
LEFT ROTATION	
RIGHT ROTATION	
LEFT SIDE FLEXION	
RIGHT SIDE FLEXION	

- CRANIO VERTEDRAL ANGLE

SIGNATURE OF THERAPIST:

DATE:

APPENDIX II

CONSENT FORM

CONSENT FORM

Department of physiotherapy,

Integral Institute of Allied Sciences and Research,

Integral University, Lucknow.

I ____hereby give the consent to participate in the study "Impact of car and bike driving on cervical range of motion and cranio vertebral angle in healthy subjects.

A study will be conducted by MOHAMMAD MUSTAFA AZAZ a post graduating student from the department of physiotherapy. Integral Institute of Medical Sciences & Research, Integral University Lucknow.

I have been informed about the nature and purpose of the study. The purpose of the study being stated: impact of car and bike driving on cervical range of motion and cranio vertebral angle in healthy subject. I duly understand the risks and benefits involved in the study, hereby referred to:

RISKS: There is no risk involved with this study.

BENEFITS: The study will help in evaluating impact on cervical range of motion (ROM) and cranio vertebral angle in car activity of daily living (ADL) in subject with car and bike drivers.

The above said information has been explained to me in the language I understand. I have been assured that the information I'll give will be kept confidential. I am free to withdraw from the study at any time I wish to.

Signature

Date

APPENDIX III

MASTER CHART

SL NO.	AGE	SEX	HEIGHT	WEIGHT	DRIVING HOURS	DRIVING DURATION	CVA	RANGE OF MOTION					
								F	E	LR	RR	LF	RF
1	30	M	6	80	12	4	52.8	35	30	80	80	35	40
2	35	M	5.5	70	7	5	51.5	35	25	55	75	30	25
3	26	M	6	78	3	3	47.5	50	45	45	70	35	35
4	22	M	5.9	110	10	2.5	36.9	35	40	70	65	50	30
5	26	M	5.8	72	13	4	40	40	33	55	65	30	25
6	25	M	5.9	76	2	4	51.9	42	35	55	45	32	30
7	25	M	5.3	78	3	8	32.7	50	45	60	50	30	30
8	53	M	5.8	78	3	8	45.6	40	38	35	40	50	48
9	45	M	5.7	82	10	20	28.4	35	30	40	40	25	20
10	20	M	5.9	70	3	3	44.4	45	47	65	62	43	40
11	23	M	5.9	60	3	4	53.3	44	40	64	70	43	40
12	21	M	5.8	62	3	4	55.3	45	42	60	55	44	40
13	22	M	4.8	50	2.5	6	52.5	40	35	40	50	40	30
14	26	F	5.5	50	2	4	51.3	40	40	60	50	30	27
15	22	M	5.8	56	3	3	56	35	25	70	65	30	30
16	25	M	5.2	62	7	3	45.4	40	40	60	60	35	40
17	23	F	5.4	57	3	4	50.8	45	40	50	40	35	30
18	27	M	5.9	68	3	5	46.2	40	35	45	55	25	31
19	23	M	5.7	64	2	3	55.7	40	50	60	50	35	30
20	29	M	5.7	77	5	12	52.9	41	43	50	50	40	40
21	26	M	6	95	6	3	43.8	40	38	55	45	30	30
22	28	M	5.11	60	2.5	5	54.8	45	41	55	45	40	40
23	22	M	5.8	65	5	2	45.5	45	40	70	70	30	30
24	26	M	5.8	65	3	4	45.8	45	40	45	72	30	47
25	30	M	5.7	60	2	4	39.7	40	40	55	55	35	38
26	35	M	5.11	65	2	7	45.5	45	42	55	55	30	25
27	26	M	5.9	65	2	3	45.4	45	40	55	50	30	30
28	25	M	5.9	70	2	5	46.3	42	40	60	65	45	40
29	29	F	5.1	65	3	3	51.33	40	30	60	58	39	30
30	21	M	5.9	57	4	3	49.1	50	45	67	64	45	50

*CVA – Cranio Vertebral Angle * ROM- Range of motion

*F- Flexion *E- Extension *LF- Left Flexion *RF- Right Flexion *LR- Lateral Rotation *RR- Right Rotation

KEY WORD FOR MASTER CHART

- CVA – Cranio Vertebral Angle
- ROM – Range of Motion
- Readings are in degree
- Age in years.

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