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Evaluate the Effect of Bike Riding on Posture

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Abstract:

Objective:

The purpose of the present study was to examine the posture deformity in bike riders.

Study Design: Observational study conductedamong student and physiotherapist of Karachi.

Sample Size: 30 Participant were included.

Sample population: Male Undergraduates of Ziauddin College of physical therapy and physiotherapist of Ziauddin hospital in Karachi.

Method: Every partaker was asked to stand in a quiet room with air condition and proper lightening. We informed the participant about full procedure and distribute the consent form among all participants. Participant attended an experiment on different stations to measure different deformitiesEach session consisted for 15-20 minutes. Participant voluntarily responded the pre survey questionnaire before experiment. Afterward physical examination is done i.e. height and weights of participants are taken. During session scoliosis, kyphosis, bilateral shoulder shift and lumber lordosis are measured at each station and then participants are allowed to rest there for 5 minutes.

Result: Study concluded that there is a significant effect on posture while riding a bike for prolong period.

Conclusion: Due to prolong bike riding time there is a significant effect on cervical, lumber and thoracic spine in bike rider which having discomfort while riding, extend riding period and faulty sitting posture.

Key words: Bike riders, Bike, Scoliosis, Kyphosis, Lordosis, Bilateral shoulder shift.

Introduction:

Bike riding is an activity appreciated by many people for transportation, recreation and competition. Unfortunately, although bike riding is generally beneficial, it also carries inherent risks for its participants. There are thousands and thousands millions of motor cycle incidents| each year. With such high occurrences, further investigation related to the possible triggers of these accidents is valuable to any types of riders.[1]Motor cycle 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 motor bike (MB) for transportation Now lengthen sittingon motor

cycle mostly effect the Spine and associated structures.[2]A pitch-over is categorized by a rider and his motor bike encountering a quicklosing speed, resultant in a forward somersault about the front wheel.1 A large number of Various factors are known to affect cycling performance: (a) the geometry of the bike, such as turn length1 and saddle position (b) various aerodynamic parameters such as proper aero position and (c) pedaling frequency, which determines {maximum power output during riding a bike. Alterations in posture, such as changing from a seated to a position posture, also cause changes in performance. When riding a bike with a standing good posture, a greater production of power output is developed for the same acceleration, presumably to manage the increased quantity range of degrees of freedom of the reduced legs due to the damage of contact of the buttocks with the saddle.3Generally acquired sitting posture for a long time increases fatigue level of lumbopelvic muscles, particularly lumber multifidus (LM) and internal Oblique (IO). This muscles help in providing a local system for counterbalancing the compressive forces on spine and helps in spine stability at lumber area. In relation to ergonomic, authentication in sitting on motorcyclists riding consider a key factor. Comparatively hazard of sitting posture are more prone on bike riders than car drivers. In addition, backrest support is not equipped in motorcycle riding. Therefore, to balancing the stress equilibrium mal-posturing acquired by motorcycle riders which changes the biomechanics of their body. Because of long sitting on MB different types of posture deformities like lumber lordosis, kyphosis, scoliosis, slouch posture and tilted shoulders are seen among the population living in major cities. However, it is evident that backrest support is providing comfort sitting, it would making least effect of stress on spine and associated structures.[4]According to the spine deformities major deformities are scoliosis[5], Kyposis[6],lordosis shoulder shift mostly noted[5]Symmetric as well as asymmetric and heavy lifting in static posture. Three standing and nine unsupported sitting positions has been studied to measure the disc pressure of third lumbar and myoelectric activity of most muscles of back. The myoelectric activity same in relaxed sitting and unsupported sitting and highest in forward sitting and lowest in posterior sitting. The disc pressure is higher in sitting without support then in standing. Results show that myoelectric activity and disc pressure always higher when sitting unsupported. In different position both myoelectric activity and disc pressure are low like writing and higher in typing and in higher lifting.[7]If thoracic curve is disturbed the mechanical changes are produced like impaired the cervical spine functions tilted head forward as well as cardiopulmonary dysfunctions are seen. In lumbar region deformity symptoms of neurological deficit and impairment in functional activity are seen. Foresee in thoracic region create kyphoscoliosis that create death and foresee in lumbar region cause instability that produce arthritis and pain in later years. The congenital scoliosis will produce grotesque deformities and neurological deficit. In the growing spine these deformities are not produce and most of other severe complications can be prevented[8]. During standing and sitting numerous changes have been noticed. Thoracic kyphosis decrease significantly when spine straight in sitting position and lumbar lordosis majorly affect the lumbar spine and pelvis[9]Pelvic changes and spinal deformity seen mostly in the people who spend much more of their time in sitting. The posture changes depending on the alignment of spine and degenerative changes. Kinematic behavior and sagital mobility are the parameter on which upper and lower lumbar lordosis was defined. Standing and supine are significant positions in which lumbar lordosis were effect lordosis are greater in standing position and decrease in supine or sitting position. Age is a factor that significantly affect the lordosis in 20s the upper lumbar spine is more flexible as compared to in 60s.[10]

In The prolonged flexed posture that a cyclist maintains may lead to increased mechanical strain of the lumbar spine, causing LBP.[11]

Research conducted by Usabiaga, Jaime et al result concluded that due to prolong riding cyclist position intricate a change from discallordosis to kyphosis and the contraction of paravertebral thoracic muscles are responsible for cervical hyperextension. Harrison DD, Harrison SO, Croft AC, Harrison DE, Troyanovich SJconducted a research to develop a new sitting vertebral model and an optimum driver's seat and located that Sitting causes the pelvis to rotate in reverse and causes reduction in lumbar lordosis, trunk-thigh position and knee angle and an increase in muscle effort and disc pressure. Seated posture is damaged by seat-back angle, seat-bottom angle and foam denseness height above floor, and occurrence of armrests. [4]

Methodology:

Thirty male motor cyclists volunteered to serve as participant collected from the physiotherapy department students and OPD physiotherapist of Ziauddin hospital and university.During setting of demographic data height and weight are excluded in this study It was an observational study and the Probability sampling (systematic sampling) was used. Inclusion criteria for motorcyclist were included. The Performa was use to collect the data and informed consent was taken from each participant. The Data was analyzed through SPSS.16, in a cross tabulation and value of p was obtained by one way Anova Test.Clinical information inclusion in this study such as pain time frames 'distribution of pain,numbness,history of back pain, numerical rating scale of pain and pain location improve the study.Additionally use of reliable and accurate tools scoliometer and postural grid set the data as well.

Result:

Our main aim was to find the effect of bike riding on posture in Ziauddin university students and physiotherapist in ZiauddinHospital.

Effect of sitting posture on riding on cervical, thoracic, lumber spine, shoulder and neck:

Value of p shows insignificant Effect of sitting posture onriding on lumber spine, shoulder and neck. But having a significant effect on sitting posture on cervical spine and thoracic spine which create deform structure at neck and upper back.

One way Anova

ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
cervical curve in cm	Between Groups	6.483	4	1.621	2.679	.055
	Within Groups	15.124	25	.605		
	Total	21.607	29			
thoracic curve in cm	Between Groups	11.145	4	2.786	3.146	.032
	Within Groups	22.142	25	.886		
	Total	33.287	29			
thoracic deviation in degree	Between Groups	187.933	4	46.983	10.105	.000
	Within Groups	116.234	25	4.649		
	Total	304.167	29			
lumbosacral angle in cm	Between Groups	2.004	4	.501	.804	.534
	Within Groups	15.582	25	.623		
	Total	17.587	29			
bilateral shoulder shift in degree	Between Groups	110.599	4	27.650	10.439	.000
	Within Groups	66.216	25	2.649		
	Total	176.815	29			

Effect of feel pain in sitting or standing after riding on cervical, thoracic, lumber spine, shoulder and neck:

Value of p shows insignificant Effect of feel pain in sitting or standingafter riding on cervical, thoracic, lumber spine, shoulder and neck.

One way *Anova*

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
cervical curve in cm	Between Groups	.455	1	.455	.602	.444
	Within Groups	21.152	28	.755		
	Total	21.607	29			
thoracic curve in cm	Between Groups	.038	1	.038	.032	.859
	Within Groups	33.249	28	1.187		
	Total	33.287	29			
thoracic deviation in degree	Between Groups	18.477	1	18.477	1.811	.189
	Within Groups	285.690	28	10.203		
	Total	304.167	29			
lumbosacral angle in cm	Between Groups	.254	1	.254	.410	.527
	Within Groups	17.333	28	.619		
	Total	17.587	29			
bilateral shoulder shift in degree	Between Groups	1.885	1	1.885	.302	.587
	Within Groups	174.929	28	6.247		
	Total	176.815	29			

Effect of estimated time of riding on cervical, thoracic, lumber spine, shoulder and neck:

Value of p shows insignificant effect of estimated time of riding on cervical, thoracic spine, shoulder and neck. However there is a significant effect on lumbosacral angle on estimated time of riding which shows longer the time you ride more will be effect on lumbosacral angle.

One-way Anova

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
cervical curve in cm	Between Groups	2.137	4	.534	.686	.608
	Within Groups	19.470	25	.779		
	Total	21.607	29			
thoracic curve in cm	Between Groups	4.682	4	1.171	1.023	.415
	Within Groups	28.605	25	1.144		
	Total	33.287	29			
thoracic deviation in degree	Between Groups	8.929	4	2.232	.189	.942
	Within Groups	295.238	25	11.810		
	Total	304.167	29			
lumbosacral angle in cm	Between Groups	5.868	4	1.467	3.130	.032
	Within Groups	11.719	25	.469		
	Total	17.587	29			
bilateral shoulder shift in degree	Between Groups	5.925	4	1.481	.217	.927
	Within Groups	170.889	25	6.836		
	Total	176.815	29			

Conclusion:

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.

Discussion:

In previous several studies [13,14,15,16,17]was showed to find out the effects of bike riding on postures these past studies was focused specifically on postural changes due to prolong bike riding therefore we conduct a study on postural changes.Past studies show that there is change in posture during prolong bike riding in different people of different age.The large effect size (Cohen's effect size) for maleswas reported on upper back, low back and buttocks. The results show that there is a link between the discomfort and poor biomechanics (due to the force that acts between/inside the musculoskeletal. Research conducted among student and physiotherapist concluded that Prolong bike riding show a marked effects on cervical spine .we assess the cervical spine throughpostural 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.The result shows that there is great effect of bike riding on thoracic spine we compare the our study from past studies[13,14,15,16,17]we evaluate the thoracic spine we took measurements through scoliometer we find that there is thoracic deviation in most of the people from the normal value.Thoracic curve changes asprevious studies states that these changes in cervical curve is due to faulty posture when we assess the thoracic curve through postural grid there is increase in thoracic (kyphotic) curve .We evaluate the lumbar spine through scoliometer and find that there is change in posture as well as increase in lumbosacral angle due to the lack of back support.Aim of our study is to aware the people that they can reduce the stress on spine and musculature and maximize the comfort through correct sitting and back support. Results show that there is no significant effect of bike riding on shoulder there is change in shoulder posture (shoulder tilt) is not due to the bike riding previous study show this change is due to the faulty posture our results also show that there is no shoulder deformity due to bike riding these results are similar to the previous studies

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