

**Autonomic Functions in Tiles Cutting Workers at Construction Site: Case Study**Dr. Vibha Gangwar<sup>1\*</sup>, Dr. Manish Kumar Verma<sup>2</sup>, Dr. Nitin Ashok John<sup>3</sup>, Dr Rajani Bala Jasrotia<sup>4</sup><sup>1</sup>Assistant Professor, Physiology Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India<sup>2</sup>Assistant Professor, Physiology Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India<sup>3</sup>Professor & Head, Physiology Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India<sup>4</sup>Associate Professor, Physiology Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India**Case Report****\*Corresponding author**

Dr. Vibha Gangwar

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**Abstract:** Tiles' cutting is highly hazardous work. It produces high level of noise pollution which may affect our health in various ways. The aim of the investigation was to evaluate the autonomic function tests in a tiles cutting worker exposed to this profession for duration of 1-5 years and the other individual with 6-10 years of duration of exposure at construction site. These cases were male, residing in the same geographical area. Their age ranged between 17-20 years. Their autonomic function tests were examined using 3 channels Physiograph. In both the cases LF was decreased indicating decreased sympathetic activity. HF was decreased in case 1 (duration of exposure was 2 years) and increased in case 2 (duration of exposure was 9 years) indicating variable change in parasympathetic activity. 30:15 ratio and heart rate response to deep breathing were normal in both the cases. Valsalva ratio was less in case 1 and change in diastolic blood pressure after hand grip exercise was less normal in case 2. All these results showed that autonomic functions of these tile cutting workers were not normal more of suggestive of decreased sympathetic activity. This data gives us an impetus to conduct a pilot research protocol for evaluation of autonomic function test in tiles cutting workers.

**Keywords:** hazardous work, sympathetic activity, disease processes.

**INTRODUCTION**

Construction companies are increasing day by day in India. Laborers working on the constructions sites are the most neglected persons in terms of health.

There is a lot of marble cutting for the formation of floor, walls etc. at the construction site of a new building. This results in high level of pollution of every type specially noise pollution at the work site. Everyday exposure to this pollution is a part of job of marble cutting workers which is associated with various health hazards. In India very few studies have been done on the ill effects of this pollution on the health of marble cutting workers. Various functions of internal organs are controlled by autonomic nervous system. The normal functioning of autonomic nervous system is very important for maintaining health. Disturbances in autonomic nervous system play an important role in pathogenesis of various disease processes. We are presenting the case report of autonomic function evaluation in tiles cutting workers at the construction site in respect to duration of exposure.

We studied the autonomic function tests in 2 cases of tiles cutting workers at the construction site of Academic Block of Dr Ram Manohar Lohia Institute of Medical Sciences, Lucknow. Both the cases were males working for 8 hours daily. One of them was doing tiles cutting for 2 years & other was for 9 years.

Following tests were performed in both the subjects using three channels Physiograph (AD Instruments):

- Heart rate variability: Lf, HF, LF/HF ratio & total power
- Heart rate response to standing (30:15 ratio)
- Heart rate response to deep breathing
- Heart rate response to Valsalva Manoeuvre
- Blood pressure response to sustained hand grip exercise

The results of the tests are shown in the table.

**CASE REPORT**

**Table-1: Autonomic function tests**

Case no.	Age (years)	Total duration of work (years)	LF (ms <sup>2</sup> )	HF(ms <sup>2</sup> )	TP (ms <sup>2</sup> )	LF/HF ratio	30:15 ratio	Heart rate response to deep breathing		Valsalva ratio	DBP (mmHg) change on hand grip
								E/I Ratio	Deep breathing difference (DBD) (beats per minute)		
1	17	2	257 (33.3%)	234.7 (30.4%)	771.3	1.095	1.25	1.51	40	1.16	26
2	19	9	229.9 (0.9%)	2107 (81.1%)	2597	0.1091	1.23	1.31	18	1.52	14

## DISCUSSION

Autonomic nervous system integrates functioning of all the visceral functions of body. The aim of this study was to investigate the integrity of these autonomic control mechanisms in marble cutting workers at construction site.

### Heart rate variability

Case 1: HF was decreased very much LF/HF ratio was more than 1 indicating decreased parasympathetic drive.

Case 2: HF was very high and LF decreased. LF/HF ratio was also less than 1. These results indicated high parasympathetic activity.

### Other autonomic function tests

30:15 ratio, E/I ratio, DBD was normal in both the cases. Valsalva ratio was abnormally low in case 1 indicating decreased parasympathetic activity. BP response to sustained hand grip exercise was less than normal in case 2 showing decreased sympathetic response similar to the results of HRV.

Above results showed that autonomic function tests in tile cutting workers at construction site were deranged. These workers are continuously exposed to high level of noise. In developing countries, effects of noise on the health are still ignored [1]. According to some studies [2-4] noise may result in various non-auditory morbidity in workers depending on the level & duration of exposure. In our study the workers were doing their job for 8-9 hours per day for 8 years. This long duration of exposure to noise of tiles cutting machine may be the reason of derangement of autonomic functions in them. Noise disturbs activities and communication, causing annoyance. In some cases, annoyance may lead to stress responses, and possibly illness [5]. Exposure to noise causes increase in heart rate and blood pressure, peripheral vasoconstriction and thus increased peripheral vascular resistance [6]. All these physiological responses are mediated by autonomic nervous system. Several studies have been done on the hearing loss in the

workers at construction site. But no study has been done the autonomic functions in these workers. We initiated this work and the results are conflicting. Further studies are needed to explore the effect of tiles cutting profession in these workers.

## CONCLUSION

The profession of tiles cutting at the construction sites affects the autonomic functions (parasympathetic dominance) depending upon the duration of exposure.

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