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## RESEARCH ARTICLE

### EVIDENCE BASED CASE STUDY REPORT ON A FORWARD HEAD POSTURE SUBJECT WITH CERVICAL DISC LESION AND ABDOMINAL MUSCLE WEAKNESS TREATED WITH PHYSIOTHERAPY

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#### ABSTRACT

Repeated movements, static postures were known to cause postural problems cervical and lumbar disc lesions. This case study subject employed a fitter, where handling of heavy objects with more repetitive manual tasks were involved as part of his occupation. The objective of this case study report was to focus on to clinically evaluate, analyse and treat neck muscle imbalance and posture but also to strength the co existing abdominal muscle weakness. With an improved motor power of neck, abdominal muscles, reduction of VAS by 60 % and 42% in the subjective scoring of neck disability index. Hence an evaluation and treatment of spine should be focused instead of localized symptomatic treatment is the core of this study for an enhancing maximal patient benefit.

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## INTRODUCTION

Workers work under tough conditions to perform the desired task. These tough conditions normally give rise to various musculoskeletal disorders within the workers. These disorders emerge within the workers body due to repetitive lifting, differential lifting height, ambient conditions (Aman Sachdeva 2011). Awkward posture, lifting, forceful movement and manual work at rapid rate contribute to Musculo skeletal disorder (MSD) (Lakhwinder Pal Singh, 2012). Occurrence of MSD, due to pain and muscle stiffness, over months and years, the body adapts to the abnormal posture caused by these muscles imbalances and maintains this unbalanced posture not only at work but in leisure activities also (Valachi and Valachi, 2003). Prolonged static postures are thought to be associated with MSD (Peter Leggat *et al.*, 2007; Ratzon 2000). Abnormal postures including muscle imbalance, muscle necrosis, trigger points, hypo mobile joints, nerve compression and spinal disc herniation or degeneration may result in serious detrimental physiological changes in the body. These changes often result

in pain, injury or possible neuro skeletal disorders like carpal tunnel syndrome (Sagar *et al.*, 2013). Repetitive movements of upper limbs, with exposure high load on the trapezius muscles bilaterally, as well forwards bending of the head can lead to cervical discopathy resulting in cervical pain and negative effects on Musculo skeletal system and peripheral nervous system (Peter *et al.*, 2007). Musculoskeletal disorders are injuries affecting muscles, tendons, ligaments and nerves, which includes neck strain, lowback strain, tendonitis (Jaspreet *et al.*, 2012) and working environment and the development of MSD results in significant sickness, absence and reduced productivity (Buckle and Devereux, 1999). MSD proved to be a major problem for modern industrialized countries can generate short term advantages such as cost reduction and productivity improvement as well as long term benefits from increased employee motivation and reduced absence due to sickness and reduced insurance costs (Markku and Waldemar 1993). The risk factor MSD comprise repeated movements and prolonged awkward or forced body posture (Durga Harutunian *et al.*, 2011) but mostly help human operate to be comfortable (Asim Zaheer *et al.*, 2012). Performing jobs in prolonged standing has contributed numerous health effects such as work related musculoskeletal disorders, chronic venous insufficiency, preterm birth and spontaneous abortion and

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carotid atherosclerosis (Isa halim and Omar, 2011). MSD are there in the welding process where workers are working in kneeling posture and it shows that there is needed to change the body postures (Agarwal *et al.*, 2011). Physical therapy was evidenced in subjects with occupational induced MSD with posture correction, ergonomic advice and stretching exercises (Pooja Vincet, 2011). The application of ergonomic principles would help to increase machine performance and productivity. Stress can elicit muscular contraction and pain especially in the trapezius muscle (Pandis *et al.*, 2007) head ache and low back ache (Melis *et al.*, 2004). Meta analyses of 90 studies have shown, that frequent work – related disorders are a great problem, since the change of work conditions are recommended (kesson *et al.*, 1999).

### Aims & Objectives

1. This case study strives to analyse the clinical reasoning for forward head posture
2. Patho mechanics of poor neck posture disc lesion
3. To evaluate various therapeutic options this subject to be treated
4. Highlight importance of treating coexisting abdominal muscle weakness with forward head posture

### Past Medical H/O

Mr. XXXX, Aged - 40 years employed as fitter in a factory

### C/O

Neck pain, left knee pain and occasional head ache since 2012

### O/le

- Forward head posture
- Anteverted scapulae
- Tenderness positive over C3, C4 paravertebral cervical spine muscles
- Cervical spine → no tender areas
- Active ROM of cervical spine restricted due to pain and fear
- Atrophy of posterior neck muscles
- Exgrated lumbar lordosis with frequent lowback ache and left knee joint early Patella femoral arthritic changes

### Background Information Includes

Non vegetarian, non alcoholic, nonsmoker, father of two children and he is the sole earning member of the following. With repeated weight lifting and hard manual work surgeons else where he is attending the department for rehabilitation since May 2016.

### Clinical Impression

MRI spine taken in Oct 2015 has revealed posterior central disc protrusion at C3, C4, C6, C7 and disc bulge at L4, L5 causing mild compression of bilateral neural foramina.

### Treatment Given

1. Shoulder bracing exercises
2. Strengthening of bilateral upper extremities
3. Irradiation exercises to spinal muscles
4. Physioball exercises for core strengthening

5. With a frequency of twice a week from May 2016 till December 2016 the subject was treated with each session lasting to 20-25 minutes at an exercise intensity of 60-70% of his maximal heart rate.
6. From January 2017 till today he attends the centre weakly once for physiotherapy session and continues home programme with a set of exercises and neck care

**Table 1. Results of pre and post motor power of neck, abdominal muscles, VAS and neck disability index of this case study subject**

	Motor of Power		VAS	Neck Disability Index
	Neck	Abdominal Muscle		
Pre	2/5	Grade II / V	8	76%
Post	4/5	Grade IV/ V	3 ↓by 60%	44% ↓by 42%

The major purpose of this case study was to analyse with evidence for the following clinical points:

- a. Musculoskeletal disorder due to occupational means
- b. Repetitive tasks, and sustained posture for longer duration involved at work with cervical disc lesion
- c. Forward head posture influences cervical spine disorders
- d. Relate abdominal muscle weakness with forward head posture

### DISCUSSION

- Maintaining poor posture for longer periods of time can result in chronic muscular fatigue, discomfort or pain, ever if the soft tissues are not structurally altered (Pandis *et al.*, 2007). More significantly prolonged exposure to high static muscle and joint may lead to pathological effects and permanent disability (Valachi, 2003)
- According to occupational safety and health administration (OSHA) of the U.S, some physical factors at the workplace that were associated with the occurrence of MSD were awkward posture, repetitive movement, force of movements, vibration and temperature. Awkward posture is defined as the deviation of a body part from its national or neutral position
- While job tasks are being performed (NIOSH, U.S). These postures typically include reaching behind, twisting, working ahead, wrist. Bending, kneeling stooping and squatting (OSHA 2010). Such postures are usually related to injuries incurred during tasks that are static in nature and relatively long lasting and during tasks that demand extraction of force awkward posture has been found to be associated with decreased efficiency of performance and increased complications of MSD among workers (Rahman Basha *et al.*, 2015). This study subject was treated for coexisting abdominal muscle weakness along with neck muscle imbalance with an improved VAS scale by 60% and decreased neck disability index by 42% as shown in the above table: 1
- A cross sectional Malaysian study among 232 automobile industry workers conducted in Malaysia have concluded awkward posture were the significant risk factor for MSD (Rahman *et al.*, 2014)

- Another Brazil based study among computer, telephone interactive tasks have reported job tenure and awkward posture to be predictor for MSD symptoms (Ferreira *et al.*, 2002)
- 250 lab professionals from Udupi district, Karnataka, India with 21% subjects with MSD and 8% with neck symptoms (Parul *et al.*, 2014)
- This study subject employed as fitter with neck pain, discomfort the reason could be static posture adopted by the neck during work with high levels of static contraction, prolonged static loads and awkward postures involving the neck and shoulder muscles were associated with an increased risk for MSD (George 2010)
- Poor postures have also been found to be associated with decreased efficiency of performance, an important cause of which was recognized to be the body discomfort resulting from the restricted postures (Haslegrave, 1994). The need to improve working posture has been documented well with stress full postures at work and functional disturbances (Aarås and Stranden, 1988)
- More suitable working postures may have a positive effect on workers musculoskeletal systems and may allow for effective control of work performance and reduction in the number of occupational injuries (Mattila, Vikki, 1999)
- Among 25 small scale industry workers a study was conducted in Wardha have recorded 53% of the workers were working at high risk levels and their neck, trunk, wrist were under high physical strain and need early action (Ansari *et al.*, 2014)
- Through this case study didn't analyse subjects posture at work, was taught with proper awareness on ergonomics, advised to avoid static postures, he was treated with due stretching exercises of tightened soft tissue structures, and correction of muscle imbalance. Through the subjects motor power of neck and abdominal muscles have improved, for sustained progress a through work injury prevention means, promote ergonomical modifications were highly recommended from this study outcome so as to prevent work injuries among various industries, promote quality of life and productivity.

### Uniqueness

Chronic neck pain with cervical disc lesion and forward head posture may be associated abdominal muscle weakness as part of patho mechanics. Hence physiotherapist should not only focus on regional complaints but should involve in overall evaluation and focus on treatment to the subject as single unit.

### Critical Clinical Implications From This Case Study Report

Repeated movements, static faculty postures, can lead to pain, muscle imbalance and joint stiffness. Such changes may lead to musculoskeletal disorders and neuro skeletal disorders. Also while treating specific major complaints of the subject as in this case having neck muscle weakness, therapist should clinically evaluate for abdominal muscle weakness and treat for them also to maximize subjects health benefits. Prophylactic analysis of each vulnerable subject in various industrial sectors, professionals, including provision of due

ergonomic support, promote awareness on occupational health hazards and due corrective means with physiotherapeutic remain unaddressed, hence larger sample analysis involving various measurable parameters not only shall help individuals, but the society and the nation at large with health and economical means.

### Conclusion

Impact of muscular fatigue and imbalance leading to joint stiffness and disc lesion can result in pain and limiting physical function. Comprehensive management with physiotherapy, self correction of posture, and ergonomic modification are to be focused for complete rehabilitation. Further longer duration study on posture, larger samples and other measurable parameters can highly be implicated towards betterment of posture related occupational health

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