

Effect of Ergonomic Advices and Neck Exercises on Neck Pain in Beauticians

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Abstract: Work related musculoskeletal disorders are a common cause of disabilities, absenteeism and increased work restriction in workers who work for a prolonged period of time in awkward postures, repetitive motions or causing forceful exertions. Beauticians are people working in beauty industry where the common task performed by them are, facial cleansing, skin, nail and body hydrotherapy and care, pigmentation and acme care, make-up, face and body hair removal. Performing all these tasks requires them to remain severely flexed in the trunk and non-neutral neck posture causing neck pain. This study was conducted to analyse the effect of ergonomics and neck exercises on the work related neck pain in beauticians.

Keywords: Beauticians, ergonomics, exercises, neck pain.

1. Introduction

Ergonomics developed into a recognised field during the second world war, when for the first time, technology and the human sciences were systematically applied in a co-ordinated manner. Physiologists, anthropologists, medical doctors, work scientists and engineers together addressed the problems arising from the operation of complex military equipment. The results of this interdisciplinary approach appeared so promising that the co-operation was pursued after the war, in industry. Interest in the approach grew rapidly, especially in Europe and the United States, leading to the foundation in England of the first ever National ergonomics society in 1949, which is when the term 'ergonomics' was adopted.⁸

The word 'ergonomics' is derived from the Greek words 'ergon' (work) and 'nomos'(law). A succinct definition would be that ergonomics aims to design appliances, technical systems and tasks in such a way as to improve human safety, health, comfort and performance. The formal definition of ergonomics, approved by the International Ergonomics Association reads as follows.

Ergonomics (or human factors) is the scientific discipline concerned with understanding of the interactions among humans and other elements of a system and the profession that applies theory, principles, data and method to design, in order to optimise human well-being and overall system performance.⁷

Types of ergonomic interventions:¹

There are two types of ergonomic improvements:

- Engineering improvements

- Administrative improvements

1. Engineering improvements - These include rearranging, modifying, redesigning, providing or replacing tools, equipments, workstations, packaging, parts, processes, products or materials.
2. Administrative improvements - Alternate heavy tasks with light tasks. Provide variety and jobs to eliminate or reduce repetition (i.e overuse of the same muscle groups)
 - Adjust work schedules, work pace or work practices.
 - Provide a recovery time (e.g. short rest breaks)
 - Make the workers do workstation exercises or postural exercises after specific time period with specified or prefix frequencies.
 - Modify work practices so that workers perform work within their power zone (i.e. above knee, below the shoulders and close to the body)
 - Rotate workers through jobs that use different muscles, body parts or postures.

Manual Material Handling (MMH) work contributes to a large percentage of over half of a million cases of musculoskeletal disorders reported annually. Scientific evidence show that effective ergonomic improvements can lower the physical demands of MMH work tasks, thereby lowering the incidence and severity of musculoskeletal injuries they can cause. Their potential for reducing injury related costs alone make ergonomic interventions a useful tool for improving a company's productivity, product quality and overall business competitiveness.¹

Injuries of this type are known as musculoskeletal disorders or MSDs. Work related MSD that developed due to the nature of work affect the quality of life of workers, cause absenteeism, increased work restriction or disabilities than any other group of diseases with a considerable economic toll on the individual and society³. Experiencing discomfort and disorders while still present at work results in a loss of productivity by 6-9%.⁴ In 2006, approximately 14.3% of Canadian population was living with a disability, with nearly half due to MSDs.⁵

Such type of work may expose workers to physical risk factors like awkward postures, repetitive motions, forceful exertions, pressure points (it is a localised injury to the skin or

underline tissue usually over a bony prominence as a result of pressure, shear, or friction or a combination of these factors)⁶ and static postures. If these tasks are performed repeatedly or over a long period of time without paying attention to the ergonomic detailing can lead to fatigue and injury.¹

Signs and symptoms of musculoskeletal injury⁹. These can include:

- Pain
- Tenderness
- Weakness
- Tingling, numbness
- Disturbed sleep
- Swelling
- Unreasonable fatigue
- Difficulty performing tasks or moving specific parts of the body.

A. Specific stages of MSDs

- *Stage 1* - Mild discomfort present while working, but disappears when not working, does not affect to work or daily living tasks, completely reversible.
- *Stage 2* - Pain is present while working and continues when not working, may be taking pain medication (non-prescription). Begins to affect work and daily living tasks. Completely reversible.
- *Stage 3* - Pain is present all the time, work is affected, may not be able to complete simple daily tasks, non-reversible, can improve (but not a full recovery).

MSI risk factors are

- Force
- Posture: Static and awkward
- Repetitive movements
- Improper techniques
- Workplace environment

Aestheticians, beauticians, massage and beauty therapists are synonyms terms referring to the people who work in beauty industry. Their common task include facial cleansing, skin, nail and body hydrotherapy and care, anti-wrinkle pigmentation and acne treatment, makeup depilation, body and face massage, reflexology, aromatherapy, face and body hair removal, etc. To perform all these tasks they need to work with their trunk severely flexed which leads to non-neutral neck posture burdening the neck muscles and the vertebrae. The prevalence of work related musculoskeletal disorders in beauticians has been established and neck pain was the most prevalent musculoskeletal complaint reported by the subjects.²

B. Need for study

Factors such as repetition, force, static posture for long duration maintenance and vibrations are associated with higher risk of MSDs. All these factors are involved in the beauty industry and it can cause detrimental effects on cervical spine. Therefore, this studies conducted to analyse the effect of workstation exercises and ergonomic guidelines on their pain

and functionality in order to reduce the prevalence of MSDs in people working in the beauty industry.

C. Aim

To determine effects of ergonomic advices and neck exercises on neck pain in beauticians.

D. Objective

1. To evaluate the neck pain according to the Neck Disability Index and rate the pain on NRS.
2. To create awareness among beauticians regarding proper working environment, ergonomics and exercises to reduce neck pain.
3. To access the effectiveness of workstation exercises and ergonomic guidelines on neck pain NRS.
4. To assess the effectiveness of workstation exercises and ergonomic guidelines on Neck Disability Index.
5. To compare the pain and NDI score pre and post ergonomic intervention and exercises.

2. Methodology

Type of study: One group pre-test and post-test experimental studies

Study setting: Community.

Sample Size: 30 (Females)

Inclusion criteria: Beauticians having moderate to severe neck pain at least since 6 months causing moderate to severe disability, lying in the age group of 21-35 years, those who have given written informed consent.

Exclusion criteria: 1. Population having neck pain even before taking up this profession.

1. Population with cervical disc pathology, prolapsed intervertebral disc, whiplash injury.
2. Subjects with mild neck pain having no disability or mild disability.

Outcome measures: Neck Disability Index, NRS.

Materials used: Self-made exercise handout.

A. Procedure

Selection of participants according to the inclusion criteria was done. Each participant was assessed with the help of Neck Disability Index scale to find out how neck pain has affected their ability to manage everyday activities and the score was recorded. Numerical Rating Scale was used to record the pain before intervention. The participants were made aware of the ergonomics to be followed and exercises to reduce neck pain were taught to them. Handouts of the same were provided. A brief presentation on ergonomics and its importance, MSDs and their causes, correct static and working posture was given, frequency of changing work stations and the purpose and technique of performing the work station exercises and goals of the program was explained to the participants. It was made sure that the participants follow proper ergonomic guideline and follow-up was maintained on the progress of the same for 4 weeks. After 4 weeks the participants were reassessed using the

same outcome measures.

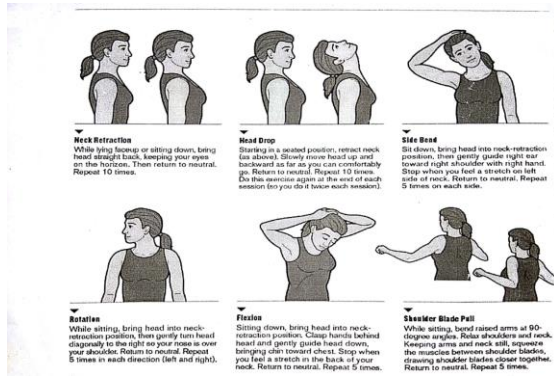


Fig. 1. Isometric exercises: Self resistance

- **Flexion.** Have the person place both hands on forehead and press the forehead onto the palms in a nodding fashion while not moving as shown below

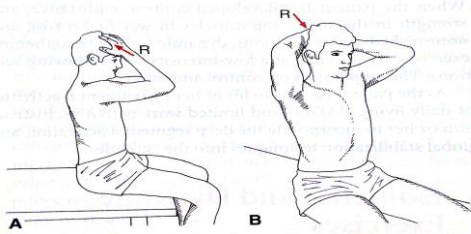


Fig. 2. Flexion

- **Side bending,** Have the person press one hand against the side of the head and attempt to side bend, as if trying to bring the ear near the shoulder but not allowing motion.
- **Axial extension.** Have the person press the back of the head into both hands, which are placed in the back near the top of the head.
- **Rotation.** Have the person press one hand against the region just superior and lateral to the eye and attempt to turn the head to look over the shoulder without allowing motion.

B. Points to remember

- Avoid leaning too far forward while performing activities like manicures or pedicures. Do not bend the neck forward more than 30° and neck not more than 45°.
- Gently move your client's hand (or body part) rather than tilting your head. In order to prevent neck strain, consider placing client's body part on a rest that elevates the part to prevent forward tilt of the head and neck.
- Take frequent breaks, change positions frequently and don't hold any position or posture for a long period.
- When taking a break is not possible, do gentle

stretching motions in between clients; stretch the neck, raise arms and stretch the back.

- The heights of bed should be appropriate to avoid excessive bending of neck.
- make use of foot stool / pillows to adjust heights.

3. Results

Table 1
Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard deviation
Pre NDI	30	8	31	17.666	7.251
Post NDI	30	5	24	12.166	4.969
Pre NRS	30	3	8	6.066	1.285
Post NRS	30	1	5	2.866	1.306

Table 2
Wilcoxon matched paired test for NRS values

Scale	Mean (pre)	Mean (post)	Diff.	Standard deviation	P value	Significance
NDI	17.66	12.66	5	2.713	< 0.0001	Highly significant

Table 3
Wilcoxon Paired test for NDI values

Scale	Mean (pre)	Mean (post)	Difference	Standard deviation	P value	Significance
NRS	6.066	2.866	3	0.23	< 0.0001	Highly significant

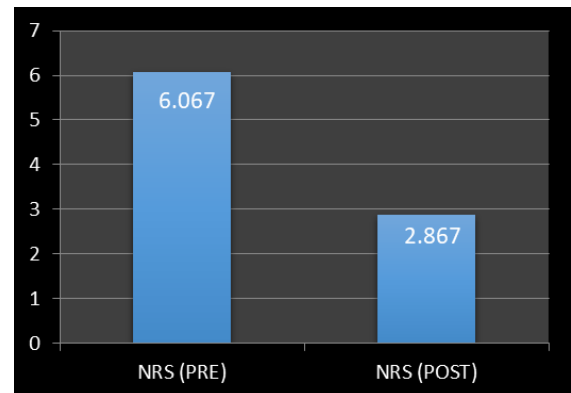


Fig. 3. GRAPH 1- Comparison of pre and post values of NRS

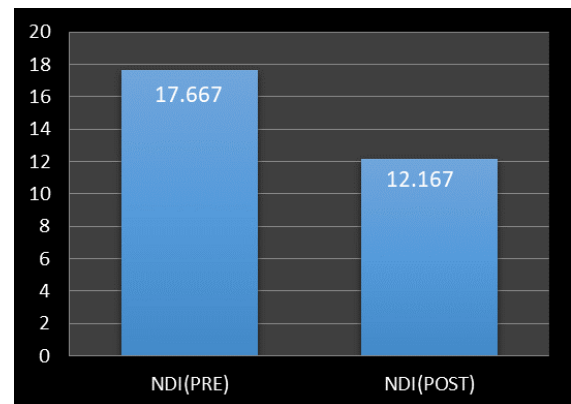


Fig. 4. GRAPH 2 - Comparison of pre and post values of NDI

A. Discussion

The data collected in the study was analysed using Wilcoxon paired test. Before commencing the protocol, the mean for Neck Disability Index was 17.66 (SD 7.251) and post exercise protocol the mean was 12.166 (SD 4.969) with a difference of 5 and a p value of less than 0.0001 was obtained, suggesting the results are highly significant.

For NRS pre values, the mean for NRS was 6.066 (SD 1.285) and post exercise protocol the mean was 2.866 (SD 1.306) with a difference of 3 and a p value of less than 0.0001 suggested the results were highly significant. The above result shows the effectiveness of performing workstation exercises and following proper ergonomic guidelines on neck pain and improve the functionality of beauticians. Ergonomics has already been defined and its primary focus is on the design of work activity that suits the person in that it takes account of their capabilities and limitations. Matching the requirements of a job with the capabilities of the worker is the approach to be adopted in order to reduce the risks of musculoskeletal injuries resulting from handling materials manually. There may be jobs that will include a specific task that require extended reaches or overhead work that cannot be sustained for long periods, by using ergonomics principles to design these tasks, more people should be able to perform the job without the risk of injury and reduced absences, because workers will be less likely to take time off to recover from muscle soreness, fatigue and MSD related problems.¹⁵

Workers who perform static or repetitive work should have frequent breaks to ensure that muscular fatigue does not reduce performance or adversely influence health. Various research conducted by Murrell, Rohmert, Sunderling and Hagberg & Fisher *et al* all found that workers usually wait until they experience musculoskeletal discomfort before taking a rest break, whereas short rest breaks earlier in the work spell can prevent (or delay) such problems occurring.

Task variation covers factors such as postural change during work, changes in task characteristics as well as breaks, especially breaks that include an exercise regime or a variation in posture from that when working.

Introducing exercise breaks is an additional way of increasing variation in the job which does not require work tasks to be reallocated among workers.

Exercises and stretches can help decrease exposure to the risk of developing an injury. The research by Fenety and Walker [2002] studied the impact of regular exercise at a work station on musculoskeletal discomfort in 11 VDU operators. The participants who engaged in exercise reported a short term reduction of musculoskeletal discomfort, this work is supported by Wenning *et al* [1997], where it was determined that short breaks combined with exercises were more effective than passive rest break for computer workers.¹⁶

Static postures occur when a part of body is held in a particular position for an extended period of time. Muscles holding a static pressure typically fatigue very quickly. Due to

prolonged static posture there can be many number of ailments such as low back pain, chronic neck pain, headaches, rotator cuff tendonitis, pain in the upper and mid spine.¹²

B. Clinical implication

Workstation exercises can be used in breaks (active breaks) in population maintaining static postures for longer periods of time.

C. Future scope

Such studies can be conducted in larger population for a longer duration along with incorporation of engineering improvements as ergonomic intervention to produce better results using a high quality study. Outcome measures can be used to calculate the percentage of disability and productivity.

D. Limitation

- Small sample size
- Unable to incorporate engineering control methods as ergonomic intervention
- long term effects could not be assessed

4. Conclusion

Workstation exercises and ergonomic guidelines are effective on the neck pain in beauticians. These means were also effective in reducing disability in beauticians.

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