

Original Research Article

Hand Function Assessment in Beauticians

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ABSTRACT

Background: Work related musculoskeletal disorders (WRMD's) in the beauty industry have increased over the years. They can lead group of disorders namely cumulative traumatic disorders, occupation overuse disorders repetitive strain or motion injuries. The wrist & hand are the common joints affected in beauticians, due to high exposure to repetitive movements, use of tools & awkward postures. **Objective:** The objective of this study was to assess hand function in beauticians using pinch meter and Jebsen Taylor Hand Function Test. **Methodology:** 100 beauticians were assessed for hand function with Pinch Meter and Jebsen Taylor Hand Function by testing dominant & non dominant hand. **Results:** The pinch strength of dominant hand was more as compared to non-dominant hand. The Jebsen Taylor Hand Function test used to assess performance common tasks used in daily activities, the dominant hand took lesser time for the activities as compared to non dominant hand. **Conclusion:** Excessive working of dominant hand over non-dominant hand could make it more prone to overuse injuries

Key Words: Jebsen Taylor Hand Function Test, Pinch Strength, beauticians, cumulative trauma disorders.

INTRODUCTION

Cosmetologists, aestheticians, beauticians, massage and beauty therapists are synonymous terms referring to people who work in the beauty industry. Their common tasks include facial cleansing, skin, nails and body hydrotherapy and care, anti-wrinkle, pigmentation and acne treatment, make up, depilation, body and face massage, reflexology, aromatherapy, face and body hair removal, etc. [1]

Tasks like manicure, pedicure, facial, hairdressing, massage, threading, waxing, etc. these following tasks which a beautician performs on a daily basis, all require fine motor activity of fingers, pinch strength, grip strength and wrist movements. Work-related Musculoskeletal Disorders

(WMSDs) in the beauty industry have increased significantly over the years. Different terminologies are used to describe WMSDs problems such as Cumulative Trauma Disorders (CTDs), Repetitive Strain Injury (RSI), Repeated Motions Injury (RMI) and Occupational Overuse Disorders (OODs). [2]

The beauty industry performs several different tasks in beauty salons in a various positions. A high prevalence of WMSD's has been recorded among workers who are exposed to manual labour; work in unusual and restricted postures, repetitive and static work, cold temperatures and vibrations. In most studies only a few of these risk factors have been taken into account. This makes it difficult to appreciate

the impact of specific risk factors since most studies did not control appropriately for concurrent risk factors. Studies have shown a high prevalence for hand/wrist complaints, mainly as a consequence to high exposure to physical risk factors (work at prolonged sitting and strenuous body postures). Also, “manual handling of vibrating tools” in awkward postures can lead to burdening various parts. This shows the need for a thorough ergonomic analysis of the activities in cosmetology practice that may lead to musculoskeletal disorders. [1]

An exploratory study of occupational health risks for beauty therapists who carry out massage and spray tanning treatments suggested that, during massage treatments, the beauty therapists carried out movements for longer period of time in non-neutral postures. These included an estimated 90% in non-neutral neck/trunk postures and 64% in non-neutral wrist postures. The REBA analysis of the sample postures assessed 73% of trunk, 75% of neck, 81% of shoulder and 68% of wrist postures as non-neutral. [3] Non-neutral postures affect a beautician’s work in later stages, leading to injuries. A study on work-related symptoms in Hairdressers showed that more hairdressers (43, 30%) experienced wrist and hand pain compared to controls (9, 14%) and 27 (19%) had experienced hand or wrist pain in the previous week with only 4 controls (6%) complaining of current pain. Significantly more hairdressers considered this pain to be work related. [4] Work related musculoskeletal conditions e.g. CTD’s like Carpal tunnel syndrome (CTS), De Quervain’s tendinitis, tennis elbow, etc occur that can cause pain which interferes in work as well as reduces the strength in hand and wrist. [5]

Thus, in view of previously reported studies, our study aimed to assess the hand function in beauticians. The objectives of this study were: (1) to compare the pinches i.e. pad to pad, tip to tip, lateral pinch in dominant and non-dominant hand using the Jamar pinch meter, (2) the compare the

Jebsen Taylor Hand Function tests in dominant and non- dominant hand

MATERIALS & METHODS

A Cross sectional study was carried out with 100 female beauticians as subjects in the age group of 18-35yrs of age group, working for more than 5hours & without any neurological or cardiovascular or systemic conditions. The assessment was done using Jamar Pinch Meter & Jebsen Taylor Hand Function Test Kit which consisted of Card with written sentence of minimum 24 letters “The sun is rising bright today”, Pen, Paper, Stopwatch, Cards-5, Checkers-5, Spoon, Beans-5, Container, Bottle caps/Coins-5, Cans/Glasses, Water/Stones.

A consent form was filled by them before they performed the test and they were assured that their information would be kept confidential.

Jamar Pinch meter was used in this study to measure the strength of 3 pinches used commonly by beauticians’. Pinch meter helps measure strength of the pinch in relation to the force applied by the thumb and fingers. [6]

Testing position-subject seated on chair. Shoulder adducted and neutrally rotated with elbow flexed at 90 degree. Forearm flexed with wrist flexed in neutral position.

1. Tip to tip pinch-Thumb tip to index finger tip
2. Pad to pad pinch-Thumb pad to pad of index finger
3. Lateral pinch-Thumb pad to lateral aspect of middle phalanx of index finger.

Readings were taken in both dominant and non-dominant hand. [4]

Jebsen Taylor hand function test (JTHFT) was used to objectively assess a broad range of everyday hand functions through performance of tasks that are representative of functional manual activities. It consists of 7 tasks writing, picking up small objects, card turning, stimulated feeding, stacking checkers, lifting large light objects and lifting large

heavy objects. The test does not seem to focus on the actual performance of the task, but rather the time that it takes. There is no measure for quality of task or level of assistance required.

The tasks are performed first by dominant hand and then non dominant hand and the time taken to complete the tasks is noted. It consists of seven tasks namely, writing, card turning, picking up small objects, stimulated feeding, stacking checkers, lifting large light objects, lifting large heavy objects. [7, 8]

Statistical Analysis

Graph pad prism 6 was used for statistical analysis.

Paired t-test was used to analyze the values of dominant and non-dominant hand

Microsoft word 2007 was used for preparing the graphs

RESULTS

The study consisted of 100 female beauticians in Mumbai. Among them 36% were in age group of 18-24, 36% in age group of 30-35 and 28% in age group of 24-29. The working hours were 8-10hrs for 69% , <8hrs for 21% and 11-12hrs for 10%. The 3 maximum areas of body causing pain are lower back (37%), fingers (22%) and neck (17%), Neck: 17%, Ankle: 4%, Elbow: 4%, Knee: 4%, Shoulder: 4%, Upper Back: 4%, Foot: 3%, Wrist: 1%, Hip: 0%.

As a reference to this, the study concentrated more on the second most affected area i.e., fingers 22%.

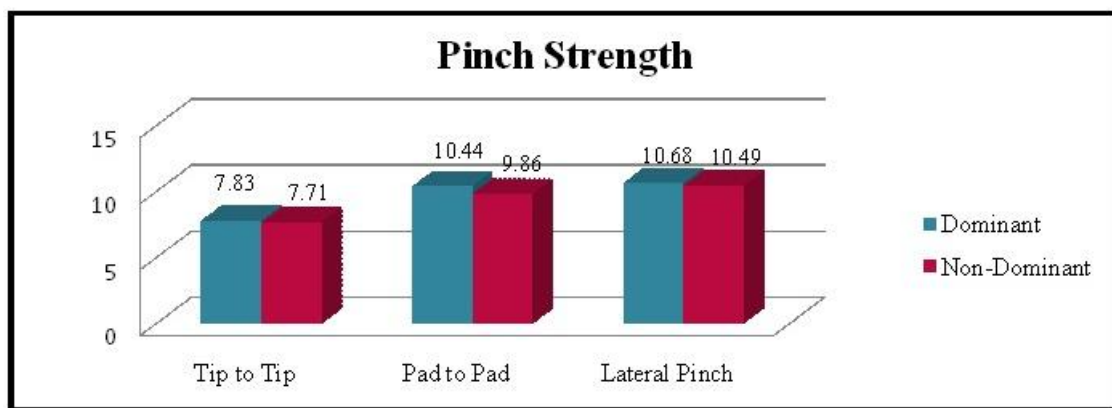


Figure 1: The tip to tip pinch strength was 7.83 pounds in dominant hand and 7.71 pounds in non-dominant hand. The pad to pad strength was 10.44 pounds in dominant hand & 9.86 pounds in non-dominant hand. The lateral pinch strength was 10.68 pounds in dominant hand & 10.49 pounds in non-dominant hand.

There is significant relation in pad to pad pinch, writing, card turning, picking up small objects, stimulated feeding, lifting up large light objects, lifting large heavy objects and the tip to tip and lateral pinch and stacking checkers are statistically not significant.

DISCUSSION

The word Ergonomics in simple terms can be defined as the study of work. It helps to fit the job to the worker instead of fitting the worker to a job. Such a study deals with study of people at work, in terms

of equipment design, workplace layout, the working environment, safety, productivity, and training, which in turn affects the physiology, biomechanics, psychology, anthropometry and kinesiology. Ergonomics helps in determining the risk and to initiate strategies to control work related musculoskeletal disorders. [9, 10]

WRMSDs occur when there is an imbalance between physical capabilities of the worker and physical requirements of the job. Damage to a worker’s body leading to MSDs can occur due to prolonged exposure to ergonomic risk factors. In beauticians the

common risk factors could be repetition of movements; awkward postures, or unsupported positions, static postures, or maintained for long periods of time, Motion, such as increased speed or acceleration when bending and twisting, can body; Compression, from grasping sharp edges like tool handles, can concentrate force on small areas of the body, Inadequate recovery time due to overtime, lack of breaks, and failure to vary tasks; Excessive

vibration, usually from vibrating tools. One of the most frequently affected areas is the arms, mainly the wrist and fingers that can lead to tendon disorders such as tendinitis, tenosynovitis, De Quervain's disease, trigger finger, and carpal tunnel syndrome, Raynaud's syndrome, etc. [10]

Thus, this study assessed the pinch strength and hand function activities in beauticians to analyze how prone they are to develop WRMSD's.

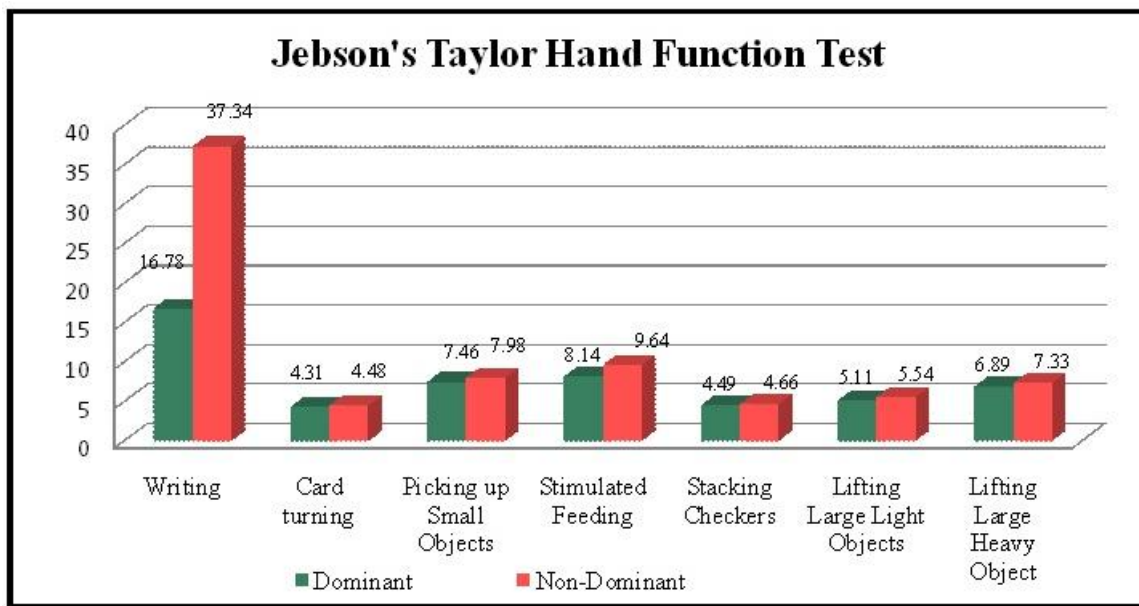


Figure 2: The time taken for writing was 16.78 seconds in dominant hand and 37.34 seconds in non dominant hand. The time taken for card turning was 4.13 seconds in dominant hand and 4.48 seconds in non dominant hand. The time taken for picking up small objects was 7.46 seconds in dominant hand and 7.98 seconds in non dominant hand. The time taken for stimulated feeding was 8.14 seconds in dominant hand and 9.64 seconds in non dominant hand. The time taken for stacking checkers was 4.49 seconds in dominant hand and 4.66 seconds in non dominant hand. The time taken for lifting large objects was 5.11 seconds in dominant hand and 5.54 seconds in non dominant hand. The time taken for lifting heavy objects was 6.89 seconds in dominant hand and 7.33 seconds in non dominant hand

PINCH GRIP STRENGTH

Pinch meter helps to determine the strength of the pinches i.e. pad to pad, tip to tip and lateral pinch. The pinch grip involves an activity limited due to the Metacarpophalangeal (MCP) joints and involves the radial side of the hand. It's for accuracy and precision. The index and long fingers provide control by working with the thumb to help with precision handling. Precision handling requires more fine motor

control and intact sensation. In beauticians, pinches play a key role for holding tools like nail filler, plucker, etc as well as for various techniques. [6,11]

The thumb is essential for pinch grips because it provides stability and control of direction and can help in, providing power to grip and it also resists the pressure of an object held in between it and the fingers. Its loss can affect hand function greatly. The index finger is

important due to its musculature, its strength and its interaction with thumb. Its loss affects lateral and pad to pad pinch. [6]

The loss of thumb function affects about 40%-50% of hand function following which loss of index finger function is about 20% of hand function loss. Middle finger 20%, Ring finger 10% and Little finger 10% loss of hand function. [6]

Beauticians require pinch grip for various activities in their occupation such as using plucker, while threading, filling nails, holding a makeup brush, etc and many more. Reduced strength pinches may affect these activities on a large scale. Also the thumb and index finger play key roles in various beauty tasks such as massage, facial, holding scissors, coloring hair, holding various machines for beauty treatments. Due to recurrent use of thumb and index they are more prone to CTD's injury, leading to weak muscles which cause inability to perform pad to pad pinch with full strength.

JEBSEN TAYLOR HAND FUNCTION TEST (JTHFT)

This test is used to test primarily measures gross coordination, assessing prehension and manipulative skills of hand and fingers with seven functional subtests.

The above are the day to day tasks used to check co-ordination and fine motor activity. All the 7 tasks performed with non dominant hand took more time as compared to dominant hand in beauticians. As the non dominant hand is not well trained to do these tasks on a regular basis, it takes more time to perform these activities. While, the dominant hand performs these tasks swiftly in lesser time because part of brain that controls these tasks helps the dominant hand with memory i.e.: Hippocampus and co-ordination i.e.: The cerebellum and as it is a daily activity the muscles are well trained to perform them on a faster rate, hence taking lesser time to complete the task. [12]

The continuous use of dominant hand in later time can lead to overuse injuries like CTD. CTD's affects the muscles, bones, nerves and tendons. They

are caused due to repeated movements of body. It includes musculoskeletal problems like entrapment neuropathies, vascular injuries, tendinitis and synovitis. Stressful postures like extreme flexion, extension of wrist, pronation, and supination. The force applied during task performance also contributes to the development of overuse syndrome. [5]

CTS occur due to compression at wrist against any sharp end for a longer period of time i.e.: repetitive wrist flexion, extension, radial and ulnar deviation. Abnormal patterns of wrist movement, firm grasping, repetitive use of hand, awkward positions, use of hand held tools that vibrate or require awkward position of wrist, position putting direct pressure on wrist, etc lead to CTS. [5]

Muscle pain and spasm syndromes develop from a cyclic spasm and pain cycle. The initial injury mostly occurs due to awkward, constricted postures they produce isolated fiber spasm and consequent pain. Spasm will cause constriction to blood flow in that area. There is reduced supply of oxygen and nutrients to the tissue. It causes palpable knots which produce pain, similar to trigger points. [5]

Overuse injuries or repetitive strain injuries overtime have adverse effects on wrist n fingers, making their muscles weak and leading to inability to perform certain tasks.

As per the statistical analysis, the strength as well as the co ordination is faster in the dominant hand which proves that it works more as compared to the non dominant hand so it is more prone to overuse injuries leading to WRMSD's.

CONCLUSION

In beauticians, among the pinches the mean values of dominant hand is more compared to non dominant hand but only the value of Pad to Pad pinch is statistically significant and among the co-ordination the mean values of dominant hand is more compared to non dominant hand but the values of writing, card turning, picking up

small objects, stimulated feeding, lifting up large light objects, lifting large heavy objects is statistically significant.

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