

# Effectiveness of Sub-Occipital Release in Cervicogenic Vertigo

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## Abstract:

**Background:** Cervicogenic vertigo is defined as a sensation of rotation, resulting from an alteration of the neck proprioceptive afferents of the upper cervical spine. Sub-occipital Release, a type of Myofascial Release (MFR) is a form of manual therapy technique which can be used for the treatment of cervicogenic vertigo.

**Purpose:** The purpose of this study is to minimize the use of equipment and patient positioning, thus making it easy for providers to treat by using the suboccipital myofascial release technique and find the effects of this technique on cervicogenic vertigo.

**Objective:** To determine whether sub-occipital myofascial release technique in upper cervical region is more effective than the use of conventional exercises in improvement of the symptoms of cervicogenic vertigo.

**Setting:** Otolaryngology(ENT) and orthopaedic clinics of Pune city.

**Method:** We carried out a prospective, randomized controlled, in 60 subjects with cervicogenic vertigo who were assigned randomly to an Exercise group (N = 17) and Sub-occipital Release group (N = 17). Subjects received treatment three times a week, for 2 weeks. By the end of session, pre- and post-comparison was done for the signs and symptoms of cervicogenic vertigo.

**Participants:** Age group 20-40 years were taken for the study. Patients with other types or causes of vertigo, acute cervical fractures or atlanto-axial joint instability were excluded from the study.

**Outcome measure:** The primary outcome measure of this study was to find the intensity of the signs and symptoms of cervicogenic vertigo by using a Dizziness Handicap Inventory-NDI Questionnaire<sup>[6]</sup>.

**Results:** Statistical significance was found between and within the groups with respect to the signs and symptoms of cervicogenic vertigo. The results showed a statistically significant difference (P<0.05) between the pre-treatment and post-treatment values for both the groups. Also, a significant improvement of signs and symptoms of cervicogenic vertigo was found in the sub-occipital group as compared to the exercise group.

**Conclusion:** This study concluded that sub-occipital release technique is significantly effective for the treatment of cervicogenic vertigo.

**Keywords:** Vertigo, Sub-occipital Myofascial Release, Dizziness Handicap Inventory-NDI

**Introduction:** Cervicogenic dizziness (CGD) is caused by trauma, inflammation, degeneration, or mechanical dysfunction of the cervical spine, and is characterized by unsteadiness, neck pain, stiffness, headache, dysphagia, nausea, visual disturbances, ear fullness, tinnitus, temporomandibular joint pain, and other psychological problems<sup>[Error! Reference source not found.]</sup>. Many researchers divide the causes of cervicogenic dizziness into three major categories: irritation of sympathetic plexus, abnormal somatosensory input, and vertebral artery insufficiency. Of these, many clinicians have no doubt about the link between dizziness and vertebral artery insufficiency<sup>[Error! Reference source not found.]</sup>.

Sub-occipital Release, a type of Myofascial Release (MFR) is a form of manual therapy technique which can be used for the treatment of cervicogenic vertigo. Sub-occipital muscles, dura matter and C2 vertebrae are connected to each other through the fascia. If there is any fascial restriction in one part then other part will also get involved<sup>[Error! Reference source not found.]</sup>. Hyperirritable point along with tense band of muscle is known as trigger points. When there are trigger points in sub-occipital muscles pain radiates toward the sides of the head typically over the occipital region and can also lead to dizziness<sup>[Error! Reference source not found.]</sup>. In a related study conducted by Kim et al., stated that suboccipital release technique causes decompression of the vagus nerve which runs through the jugular foramen. Tissue stretching and tension over the foramen are relieved when traction along with pressure is applied by the fingers of the therapist over the posterior aspect of the neck and suboccipital muscles. When slow and sustained stretching is provided over time, it allows elongation and relaxation of the fascia. Thus, increases range of motion, flexibility, and decreases pain<sup>[Error! Reference source not found.]</sup>. The present study was undertaken to find effect of Suboccipital Myofascial Release in cervicogenic vertigo.

**Need of study:** A lot of remedies such as physiotherapy, manual therapy, exercise therapy, vestibular rehabilitation and sensorimotor training are used for cervicogenic vertigo. Manual therapy techniques like of Mulligan sustained natural apophyseal glides (SNAGs) and Maitland mobilizations have been studied for treatment of cervicogenic dizziness. There are also some studies about MFR and its effects which include: increase extensibilities of soft tissues, increase ROM, improve joint biomechanics, decrease pain and muscles tone significantly. But since the effect of sub-occipital myofascial release on cervicogenic vertigo has not been studied individually, the present study was undertaken. The need of this study is to minimize the use of equipment and patient positioning, thus making it easy for providers to treat by using the suboccipital myofascial release technique and find the effects of this technique on cervicogenic vertigo.

### **Materials and Methodology:**

- Study design – Experimental / Interventional study
- Sampling method – Convenient Sampling
- Sample size – 60
- Sampling population- General Population

### **Inclusion criteria-**

- 20-40 years
- both genders

- Patients experiencing dizziness along with cervical pain.

**Exclusion criteria-**

- Other types or causes of vertigo.
- Acute cervical fractures.
- Atlanto-axial joint instability.

**Method:** We carried out a prospective, randomized controlled, in 60 subjects with cervicogenic vertigo who were assigned randomly to an Exercise group (N = 17) and Sub-occipital Release group (N = 17). Subjects received treatment three times a week, for 2 weeks. By the end of session, pre- and post-comparison was done for the signs and symptoms of cervicogenic vertigo.

**Procedure:**

Permission was taken from the institutional ethical committee of Tilak Maharashtra Vidyapeeth, department of physiotherapy. Different clinical set-ups were approached and permission was obtained prior to the study. Also consent from the patients were taken priorly. Before starting the treatment, 60 subjects were selected according to the inclusion and exclusion criteria and procedure of the treatment was explained. Firstly, they were given the Dizziness Handicap Inventory-NDI questionnaire and asked to fill the questionnaire which is based on the signs and symptoms of cervicogenic vertigo. Subjects were further divided into 2 groups – Experimental group and control group with 30 patients in each. The subjects under experimental group were given suboccipital release which was – one set of three repetitions with 3 min. hold in 8 treatment sessions for 2 weeks, whereas the Control group were given simple physiotherapeutic exercises. After completion of the protocol in 8 treatment sessions for 2 weeks, the subjects were given to fill the Dizziness Handicap Inventory-NDI questionnaire. Pre and post values of the experimental groups were assessed and compared according to the grading of the Dizziness Handicap Inventory-NDI questionnaire. The values of the experimental and control group were also compared accordingly. The data was analysed with statistical techniques and at last all findings and results were concluded.

**Results and discussion:** The primary outcome measure of this study was to find the intensity of the signs and symptoms of cervicogenic vertigo by using a Dizziness Handicap Inventory-NDI Questionnaire.

**Table No. 1: DISTRIBUTION OF GENDER**

| GENDER  | NO. OF SUBJECTS |
|---------|-----------------|
| Females | 38              |
| Males   | 22              |

**Inference:** Above table shows that out of 60 participants, 63% are females and 37% are males.

**Table No. 2: DIFFERENCE BETWEEN PRE AND POST MEAN VALUES OF CONTROL GROUP**

|  |              |               |
|--|--------------|---------------|
|  | Pre response | Post response |
|--|--------------|---------------|

|            |       |       |
|------------|-------|-------|
| Mean value | 45.13 | 19.23 |
| P value    | 0.05  |       |

**Inference:** The above table shows that mean value of the post response is less as compared to the pre response to the questionnaire of the control group.

**Table no. 3: DIFFERENCE BETWEEN PRE AND POST MEAN VALUES OF EXPERIMENTAL GROUP**

|            |              |               |
|------------|--------------|---------------|
|            | Pre response | Post response |
| Mean value | 49.46        | 10.46         |
| P value    | 0.02         |               |

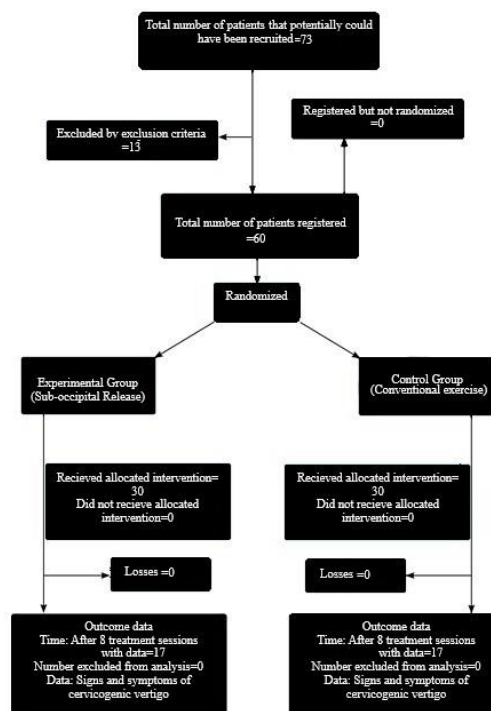
**Inference:** The above table shows that mean value of the post response is less as compared to the pre response to the questionnaire of the experimental group.

**Table No. 4: DIFFERENCE BETWEEN VARIANCE OF POST RESPONSES OF EXPERIMENTAL AND CONTROL GROUP**

|          |                    |               |
|----------|--------------------|---------------|
|          | Experimental Group | Control Group |
| Variance | 1.9                | 5.3           |

**Inference:** The above table shows that the variance of post values of experimental group is less than the control group.

Hence, according to the above results H0 is rejected and H1 is accept.



**Figure 1: Flow diagram for randomized studies.**

**Discussion:**

This study is carried out to find the effectiveness of sub-occipital myofascial release in patients having cervicogenic vertigo between age group of 20-40 years using Dizziness Handicap Inventory-NDI questionnaire. The total number of participants in the study are 60 patients who were included from various ENT and orthopaedic clinics in Pune. In Graph no. 1 it showed that females are higher (N=38) making 63% of the population than males (N=22) which are the rest 37% of the population.

Graph no. 2 depicts the difference between pre and post mean values of the group given with exercises. It shows that the post mean value for the questionnaire is 19.23 which is less as compared to pre mean value of the questionnaire that is 45.13. Statistical analysis revealed significant ( $P < 0.05$ ) difference within the group. In 2017 a study entitled “Sub occipital myofascial release technique for the treatment of cervicogenic headache”<sup>[2]</sup> similarly showed difference between pre-test and post-test measurements for Pressure Pain Threshold in both the experimental and control groups before and after treatment. The difference of the headache intensity, frequency, duration and pressure pain threshold between both the groups was statistically significant. They concluded that that MFR and Exs are effective interventions for reducing headache intensity, frequency, and duration and improving PPT of transverse and spinous process of upper cervical joints in individuals with Cervicogenic Headache.

Graph no. 3 depicts the difference between pre and post mean values of the group given with sub-occipital release. It shows that the post mean value for the questionnaire is 10.46 which is less as compared to pre mean value of the questionnaire that is 49.46. Statistical analysis revealed significant ( $P < 0.05$ ) difference within the group. Similar comparison was conducted in a 2017 study entitled “Sub occipital myofascial release technique for the treatment of cervicogenic headache”<sup>[2]</sup> showing difference between pre-test and post-test measurements for mean VAS in both groups. A significant improvement in headache intensity, frequency, duration and pressure pain threshold was seen after treatment in both the myofascial release and exercise groups compared to before treatment. The conclusion was that the application of sub-occipital myofascial release and common exercises produce a rapid and early return improvement in pain intensity, frequency and Pressure Pain Threshold in subjects with cervicogenic headache.

Graph no. 4 depicts the difference of variance of post values of questionnaire between the sub-occipital release and exercise groups. It shows that the variance of post values of sub-occipital release group that is 1.9 is less than the exercise group which is 5.3. In 2022, a study entitled “Effect of Suboccipital Release Technique in Forward Head Posture: A Comparative Study”<sup>[1]</sup> conducted a similar intragroup comparison for calculating the cervical range of motion in degrees. Statistical significance was found between and within the group with respect to pain, disability, and cervical range of motion. They concluded that suboccipital release technique along with conventional treatment significantly improve neck pain, disability, and range of motion in forward head posture.

Thus from Graph no. 1 we got that 63% of the total population was female (N=38) whereas 37% of it was male (N=22). Graph no. 2 showed that there was statistically significant difference between the pre and post mean values of the exercise group. Further, Graph no. 3 showed that the difference between the pre and post mean values of the sub-occipital release group was statistically significant. Lastly, Graph no. 4 depicted that there was statistically significant difference of variance of the post values of questionnaire between both the sub-occipital release and exercise groups. The participant flow diagram provided in Figure 1 reports the numbers and timing of randomization assignment, interventions, and measurements for each group.

From this study we can state that the effect of sub-occipital release caused better improvement of the symptoms cervicogenic vertigo as compared to the effect of physiotherapeutic exercise.

**Conclusion:**

From this study we conclude that sub-occipital release technique is significantly effective for the treatment of cervicogenic vertigo.

**Limitation:**

- The sample size was small. Therefore, clinical findings still need to be confirmed with larger studies.
- We assessed the effects of two approaches that are sub-occipital release and exercise at only 2 weeks, so we cannot be certain if differences remain in the long term.

**Future scope:**

This study can be used to find out effectiveness of sub-occipital release in cervicogenic vertigo in a targeted work related population.

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