https://africanjournalofbiomedicalresearch.com/index.php/AJBR
Afr. J. Biomed. Res. Vol. 27 (October 2024); 1052-1056

Research Article

Prevalence of maxillofacial muscle weakness in post dental retainer patients

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ABSTRACT

Background: The study's goal was to ascertain the prevalence of maxillofacial muscle weakness among dental retainer users. This study's primary focus is on how retainers affect the maxillofacial muscles. The purpose of this study is to determine how common maxillofacial muscle weakness is in patients who have received dental retainers. This study has been carried out in Karad city's Satara neighbourhood over the past six months. This study established the frequency of maxillofacial muscles. The buccinator muscle is measured as follows: 92% for a functional status, 98% for a functional state, and 7% for a weak functional condition.

Methods: The research A survey was carried out in Karad, with patients chosen at random based on inclusion and exclusion criteria. Upon selection, participants were informed about the study, its methodology, and its significance; they were chosen voluntarily. Then, using a visual analogue scale to measure facial muscle discomfort, the weakening of muscles such as the masseter, buccinator, orbicularis, oris, and mentalis was examined. The results were recorded appropriately.

Result: A study found low prevalence of maxillofacial muscle weakness in post-dental retainer patients. Muscle strength increases significantly during activity. However, 46% experience pain during activity and 3% during rest. Temporary muscle fatigue is common, but persistent issues require early detection and rehabilitation to prevent complications like TMJ pain and decreased muscle strength.

Conclusion: According to this study, there is a very low prevalence of maxillofacial muscle weakness in patients who have had dental retainers. With an extremely low p-value and statistically significant observed differences, the null hypothesis is strongly rejected. Thus, it can be said that the change from rest to activity has an impact on muscular strength, with muscle strength often rising during exercise. Pain is experienced by 46% of persons when they are active and 3% when they are at rest.

Keywords: dental retainers, muscle weakness, maxillofacial muscles.

Received 22/10/2024, Acceptance 26/10/2024

DOI: https://doi.org/10.53555/AJBR.v27i3.3120

INTRODUCTION

Mastication and emotional expression are two of the vital everyday duties carried out by the striated facial muscles, which connect the skin of the face to the skull bone. Although these muscles perform a wide range of specific motions, it might be useful to divide them into two general categories: the muscles of mastication and the muscles of face expression, also referred to as the mimetic muscles. The mandibular division of the trigeminal nerve (cranial nerve V3) innervates the muscles of mastication, while the facial nerve (cranial nerve VII) innervates the muscles of facial expression. The facial muscles generally work in unison, despite having distinct innervations and purposes. For instance, when eating, the buccinator and orbicularis oris; [1] Facial movements support a variety of functions in human behaviour. They participate in automatic somatic and visceral motor programs, they are essential in producing communicative displays of affective states and they are also subject to voluntary control. When there are abnormalities in the neuromuscular junction (such as in myasthenia gravis) or when there are muscle diseases, facial

paresis is symmetrical and bilateral and is not brought on by damage to the face nerve.[2] In general, orthodontic therapy results in properly aligned teeth and a healthy occlusion. The tissues around the teeth take about a year to adjust after they have been orthodontically placed into their new position. A relapse—in which the teeth move back towards their initial position—usually happens if the teeth are not kept in place during this time. The orthodontic procedure might take up to two years, and it is frequently very expensive. The patient has a rigorous two years filled with many trips to the orthodontist, pain, discomfort, issues with maintaining proper oral hygiene, and challenges eating specific foods. In addition, the patient faces higher risk of caries and possible adverse effects such as root resorption/shortening.3Because the tissues around the teeth take many months to reorganise, the treatment's outcome is not stable. In addition, pressure from the lips, tongue, and cheeks along with ongoing growth can push teeth into undesirable positions, which can lead to relapse. After debonding, fixed or removable retainers must be used for an extended amount of time to prevent relapse. [4] After receiving orthodontic (dental) braces, retention is the orthodontic therapy that aims to maintain the teeth in their repaired locations. In the absence of the retention phase, there is a chance that the teeth will relapse, or revert to their original position. Almost all patients receiving orthodontic treatment will need some kind of retention to avoid relapse. Relapse following orthodontic treatment is a constant consent of orthodontists. Fixed retention is preferred especially for lower arch by most orthodontists. Different kinds of removable or fixed retainers are worn, either permanently or for a longer period of time, to prevent relapse in the mandibular anterior region. The two most common forms of fixed retainers are those that are attatched to all six anterior teeth and those that are connected just to the lingual surfaces of the canines (3-3 retainers).10–12 Flexible spiral wire (FSW) retainers are the most often used type of fixed retainer, which is bonded to all six anterior mandibular teeth. In orthodontics, the treatment result's stability is a crucial consideration. [5] Unless a suitable retention regimen is put in place, the removal of active appliances almost invariably causes some degree of recurrence. Unfortunately, as orthodontic treatment advances, patient cooperation tends to decrease. Furthermore, the gains obtained during therapy can sometimes be undermined by noncompliance with retention appliances. [6] The maxillofacial muscle weakness of the post-dental retainer patient will be evaluated in this study. To measure facial muscle discomfort, we have employed a visual analogue scale and manual muscle testing grading. And the prevalence was calculated based on the findings.

METHODS

The study Survey was conducted in Karad, patients were selected randomly according to inclusion and exclusion criteria. Subjects with neurological disorders and history of facial trauma were excluded as they will be having weakness of facial muscles due to nerve injury of facia trauma. After selecting the participants were told about the study and procedure and its importance, participants were selected willingly. Then with the help of manual muscle testing the weakness of muscles like buccinator, masseter, orbicularis Oris and mentalis was checked and by using visual analogue scale pain was assessed of facial muscles, and outcomes were noted accordingly.

RESULT:

STATISTICAL ANALYSIS AND RESULTS:

No.	Muscle	Mean on rest	Mean on activity	Std dev on rest	Std dev on activity
1	Buccinator	0.5940594	1.519802	0.5931318	0.6632529
2	Orbicularis oris	0.5940594	1.519802	0.5931318	0.6632529
3	Mentalis	0.5940594	1.519802	0.5931318	0.6632529
4	Masseter	0.5940594	1.519802	0.5931318	0.6632529

Standard error of the mean (SEM) on rest	Standard error of the mean (SEM) on activity	Test statistic T- Value	P Value	CI lower	CI Upper
0.04173	0.04666	-44.10681	<0.0001	-0.9671	-0.8843
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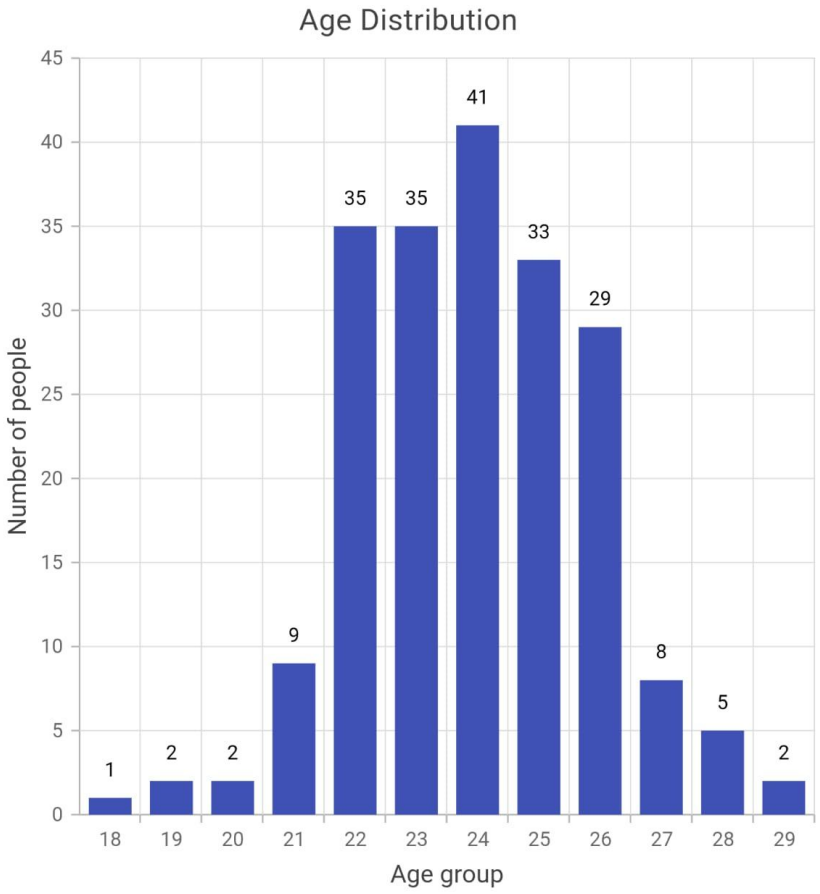
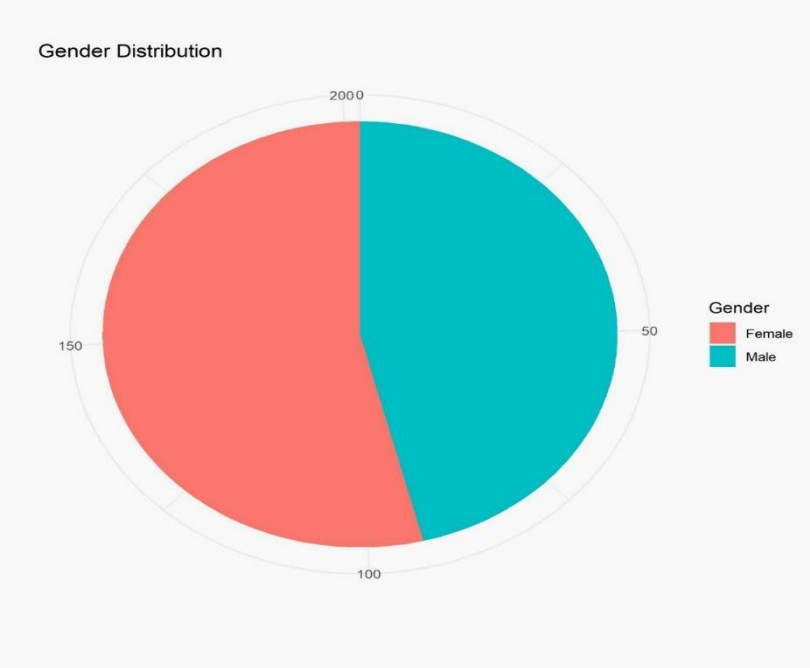
1] Age distribution



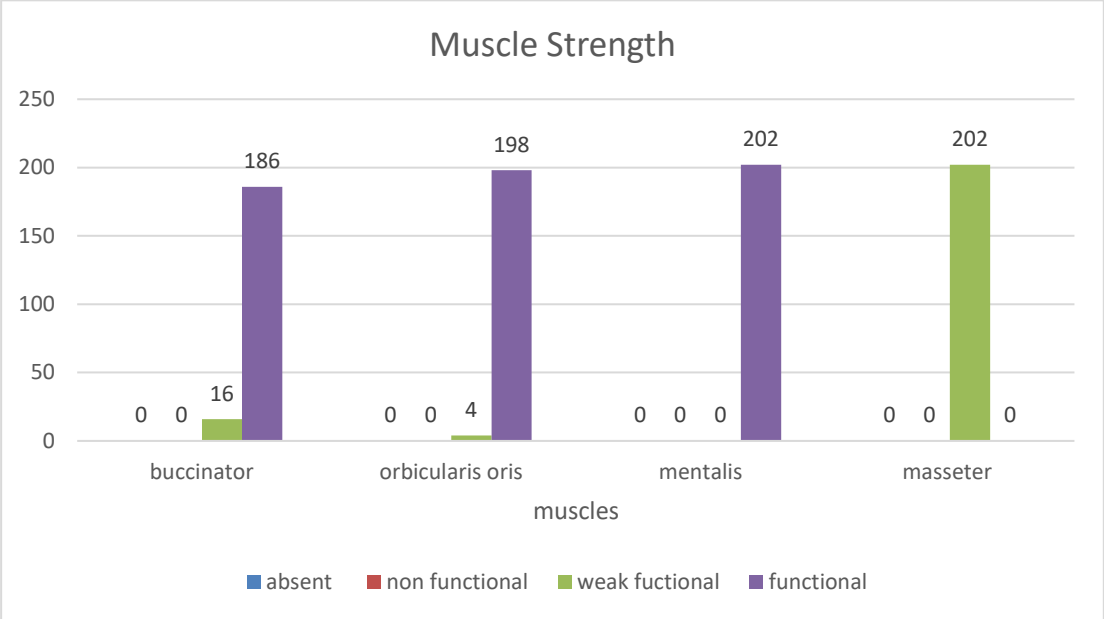
Interpretation:
The data reveals a concentration of people in their early to mid-20s, with the highest frequency (20%) occurring among those aged 24 and up. Significant participation is also seen in the ages of 22 and 23 (17% each). Less frequent are older age groups, especially those between the ages of 28 and 29.

2.Gender distribution



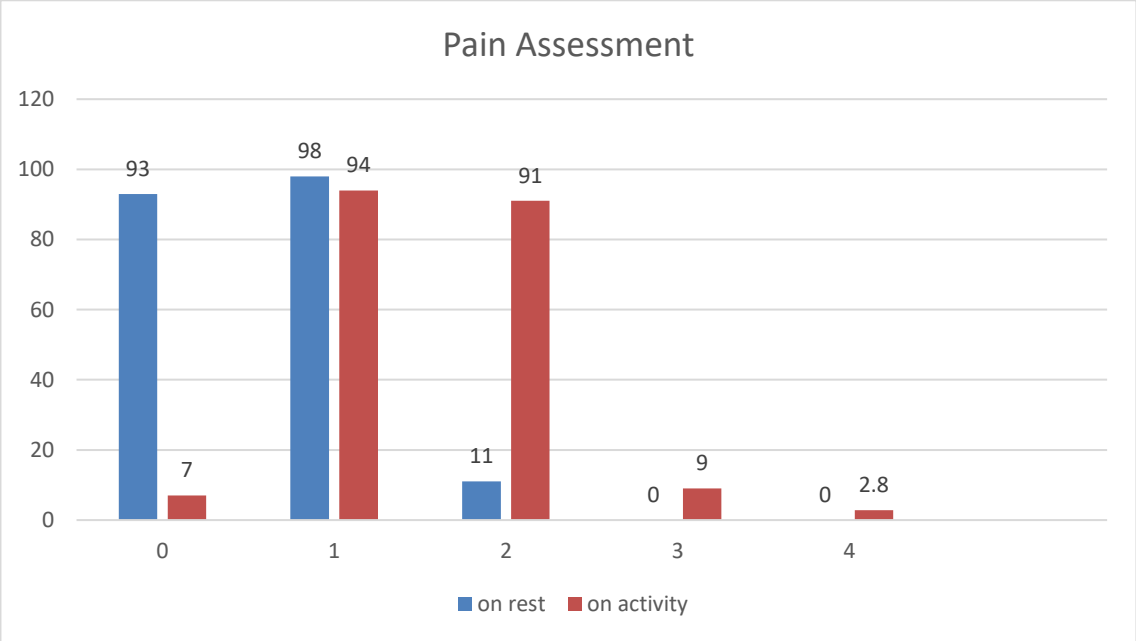
Interpretation:
The above chart represents, 45% are male and 54% are female.

3.Muscle Strength



Interpretation: The above chart indicates that the buccinator muscle has two different measurements: 7% for weak functional state and 92% for functional status. These figures probably represent various degrees of muscle health or activity, which makes them potentially helpful for determining how well muscles are working or monitoring changes over time.
There are 98% fully functional units and 1.9% weakly functional units in the orbicularis oris muscle surrounding the mouth. This indicates that while the majority of the muscle functions well, a tiny portion is less so.
The table shows that there are 100% functional instances and no weak functional instances in the mentalis muscle, which controls the movements of the chin and lower lip. This implies that there are no indications of weakening in the mentalis muscle in the cases that have been studied.
When chewing, the masseter muscle is essential. With a score of 100%, "weak functional" indicates that it is functional but weak. A score of 0 for "Functional" denotes average performance.

4. pain Assessment



Interpretation:

The graph represents that 46% of the condition or performance observed during rest and 3% during activity are represented by the grade in the data. First-grade data indicates 48% for rest and 46% points for activity. The results show excellent performance in both cases, with a little preference for rest over activity. In grade 2 pain during at rest is 5% and on activity it is 45%. In grade 3 on rest there is 0% participants and on activity 4% participants have pain. In grade 4 0% participants have no pain and on activity there are 1% participants.

Statistical Significance:

The paired t-test statistic is -10.416 for all muscles, indicating a substantial difference in muscle strength between rest and activity conditions.

The p-value associated with the paired t-test is approximately 3.156e-14 for all muscles. This extremely low p-value indicates strong evidence against the null hypothesis (that there is no difference in muscle strength between rest and activity conditions) and suggests that the observed differences in muscle strength between rest and activity are statistically significant.

DISCUSSION:

The study was carried out to find out prevalence of maxillofacial muscle weakness in post dental retainer patients. In general, orthodontic therapy results in properly aligned teeth and a healthy occlusion. The tissues around the teeth take about a year to adjust after they have been orthodontically placed into their new position. This study is focused on the effect on maxillofacial muscles due to retainers. The aim of this study is to find out the prevalence of maxillofacial muscle weakness in post dental retainer patients. This study was done in Karad city, Satara district from past 6 months. In this study we found the prevalence of maxillofacial muscles, Buccinator muscle has two different measurements: 7% for weak functional state and 92% for functional status, 98% fully functional units and 1.9% weakly functional units in the orbicularis oris, there are 100% functional instances and no weak functional instances in the mentalis muscle, the masseter muscle is essential. With a score of 100%, "weak functional" indicates that it is functional but weak. 46% people have pain during activity and 3% of people have pain during rest. Therefore this study shows prevalence of maxillofacial muscle weakness in post dental retainer patient is very low. In some cases, patients may experience temporary muscle fatigue or soreness in the jaw muscles when they first start wearing a retainer. This is typically due to the adjustment period as the muscles adapt to the new positioning of the teeth. But in some cases the muscle strength of buccinator, masseter, mentalis, orbicularis oris may decrease or patient may have pain temporomandibular joint (jaw). These complications get worsened by avoiding them. Therefore according to my conclusion my study there is very less muscle weakness in post dental retainer patient.

CONCLUSION:

This study shows prevalence of maxillofacial muscle weakness in post dental retainer patient is very low. Overall, the analysis demonstrates a significant increase in muscle strength during activity compared to rest across all muscles examined. The observed differences are statistically significant with a very low p-value, indicating strong evidence to reject the null hypothesis. Therefore, it can be concluded that muscle strength is affected by the transition from rest to activity, with muscle strength generally increasing during activity. 46% people have pain during activity and 3% of people have pain during rest. patients may experience temporary muscle fatigue or soreness in the jaw muscles when they first start wearing a retainer. This is typically due to the adjustment period as the muscles adapt to the new positioning of the teeth. However, this fatigue should diminish as the patient becomes accustomed to wearing the retainer. But in some cases the muscle strength of buccinator, masseter, mentalis, orbicularis oris may decrease or patient may have pain temporomandibular joint (jaw). These complications get worsened by avoiding them. These complications can be prevented by early detection and admission to rehabilitation. Knowledge and awareness can help to prevent these complications.

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