

## ▪ Basic Research

### *Effect of TheraBite Jaw Rehabilitation System on Trismus Post Maxillofacial Surgeries*

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#### **ABSTRACT**

**Context:** Trismus is a tonic contraction of the muscles of mastication resulting from any abnormal condition or disease with mouth opening of  $\leq 35$  mm. Maxillofacial surgeries cause fibrosis and subsequent scar contracture in the muscles of mastication that lead to a detrimental impact on quality of life; difficulty in activities such as biting, chewing, swallowing.

**Aim:** The study aims to assess the effects of TheraBite Jaw Rehabilitation System on trismus post maxillofacial surgeries.

**Methods:** A convenience sample of 20 patients attended to maxillofacial clinic; they suffer from trismus post maxillofacial surgeries. Patients trained of using TheraBite Jaw Rehabilitation for one month. The outcome measured every week by using TheraBite scale of Mouth range of motion, Eat-10 assessment scale and visual analogue scale.

**Results:** There was improvement of mouth opening (MO) after regular use of TheraBite Jaw Rehabilitation, improvement of score of Eat-10 assessment scale, and decrease of pain dramatically.

**Conclusion:** Patients suffer from trismus exhibit an improvement of mouth opening, score EAT-10 and decrease pain.

**Recommendation:** Applying educational sessions by nurses for patients to early use of TheraBite Jaw rehabilitation system post maxillofacial surgeries.

**Keywords:** TheraBite, Rehabilitation, Trismus, maxillofacial.

## 1. Introduction

The head and neck region embodies complex anatomical structures essential for breathing, swallowing, voicing and speech. Unfortunately, management of the disease on these region may also cause extensive functional problems (Dwivedi and et al. 2009).

The most common abnormalities post maxillofacial surgery include reduced retraction of the base of tongue, delay in the swallowing reflex, decreased inversion of the epiglottis, reduced elevation of the larynx, and bolus residue in the valleculae or on the posterior pharyngeal wall after completion of the swallow seems to increase aspiration rate (La Touche and et al. 2011, Michael, Stubblefield, Manfield,& Riedel 2010)

Trismus is a tonic contraction of the muscles of mastication resulting from any abnormal condition or disease with mouth opening of  $\leq 35$  mm; caused by elongation of the mandibular coronoid process which strikes against the zygomatic arch during mandibular movement that leads to painless difficulty in opening the mouth; Local anesthesia injection; Infection; Whether odontogenic or non-odontogenic infection; Trauma which may be sufficient to cause fracture of zygomaticomaxillary complex fracture or fracture of zygomatic arch alone or even fracture of the condylar process; Temporomandibular joint disorders; myofascial pain dysfunction syndrome MPDS; Submucous fibrosis; Dental procedures ,that may be due to inflammation of muscle of mastication or direct trauma to TMJ; Malignancy in the vicinity; Radiotherapy to head and neck; In irradiated patients and Hysteria (psychogenic) (Lee and et al. 2012).

Trismus results from fibrosis and subsequent scar contracture in the muscles of mastication (temporalis, masseter, medial pterygoid and the lateral pterygoid). It causes a detrimental impact on quality of life; difficulty in activities such as biting, chewing, swallowing and speaking and further lead to poor oral hygiene, pain, weight loss and even depression (Angrwal, Kumar,& Rai 2016).

TheraBite Jaw Motion Rehabilitation System, a handheld portable instrument, which has been designed to mechanically assist anatomically correct mandible motion in patients experiencing mandible hypomobility. It is applied to the anterior teeth or arches of the upper and lower jaw, after which the patient can

passively move the lower jaw by manually pressing the device (Maloney and et al. 2002).

## **2. Significance of the study**

Trismus being one of the most common and most frequented postoperative sequelae was experienced by patients (Grossi and etal 2007, Balakrishnan & et al. 2017). Patients with trismus often experience difficulties in performing activities of daily living, such as eating, drinking, laughing, and kissing; adversely affect their quality of life. Moreover, as the access to the oral cavity is restricted, intubation, dental treatment, and follow-up may become more complicated (Bensadoun and etal 2010).

Due to lack of clarity about the prevalence of trismus and the associated factors, clinicians are uncertain about when to take precautionary measures to prevent trismus (Van Der Geer and etal 2019).

Nurses play an important role in the recovery phase after Maxillofacial surgery, especially when the surgery causes symptoms and alteration of physical function. Hence the study intended to improve trisums by training TheraBite Jaw Rehabilitation System and examine the effect on management of the mouth opening and dysphagia.

**3. Aim of the study:** This study intended to examine the effects of TheraBite Jaw Rehabilitation System on trisums post maxillofacial surgeries.

## **4. Research Hypotheses**

Patients with trisums post maxillofacial surgeries who keep trained on TheraBite Jaw Rehabilitation System will exhibit self-reported improvement of mouth opening and dysphagia.

## **5. Subjects and Methods**

**5.1. Research design:** A quasi experimental; pretest and posttest design are followed to test the effectiveness of the Intervention.

## **5.2. Research setting**

This study was conducted at the maxillofacial outpatient clinic affiliated to one of the main university hospitals of Alexandria Faculty of Medicine. The clinic is dedicated to delivering free quality and contemporary care to patients, serving Alexandria, ElBahera, Kafer ElSheikh, and Matruh Governorates. Patients suffered from trisums post maxillofacial surgeries were included who visited the Department of Maxillofacial Surgery between January 2019 and January 2020.

**5.3. Subjects:** The study included a convenience sample of 20 patients who were suffering from trisums post maxillofacial surgeries; attending maxillofacial department outpatient clinic suffering from decrease opening of mouth. An appointment with the patient to explain the study verbally and in writing. Patients were then asked to give written informed consent.

## **5.4. Tools of the study:**

### **5.4.1. Structured interview questionnaire:**

It developed by the researcher after reviewing related literature (Steiner and et al 2015, Wetzels and et al 2014), to assess socio-demographic characteristics and clinical condition of patients. The following data were recorded on the registration form: patient identification number; date of birth; sex; dental status, Surgery, reconstruction after surgery (no reconstruction, skin graft, soft tissue flap, plates, or bony tissue flap); radiotherapy (no radiotherapy, radiotherapy, or reirradiation); chemotherapy (yes or no); and trismus treatment (yes or no).

### **5.4.2 The theraBite scale range of motion scale:**

The patient was asked to open mouth as much as possible. Place the theraBite scale between the central incisors and measure the maximum vertical distance during active mouth opening (Figure 1,2). Scale is a disposable paper measurement tool, which measures maximum mouth opening MMO in millimeters (mm), earlier researchs has shown excellent intrarater (0.92 to 0.97) reliability when assessing MMO in 3 different craniocervical positions (Wright Demenech, fisher 2000, & Saud, Pearson, Dietrich 2012)



**Figure 1:** TheraBite range-of-motion (ROM) scale (Shaffer, Brismee, Sizer, Courtney 2014)



**Figure 2:** Using TheraBite range-of-motion (ROM) scale (Van Rossen 2013)

#### 5.4.3. Eating Assessment Tool (EAT-10):

This tool was adopted by the researcher; (EAT-10) is a clinical instrument to document the initial dysphagia symptom severity in patients with swallowing disorders. It is rapidly administered, simply calculated. EAT-10 includes 10 questions about the severity of symptoms of oropharyngeal dysphagia. Each question will be scored from 0 to 4 (“no problem” to “severe problem”). The total T-EAT-10 score is calculated by adding up the scores of each question, and higher scores indicate a self-perception of a high level of dysphagia severity. The time to complete the instrument is less than 2 minutes. The internal consistency (Cronbach alpha) of the final instrument was 0.960. The test-retest intra-item correlation coefficients ranged from 0.72 to 0.91. (Belafsky, Moudadeb, Rees 2008).

#### **5.4.4. Visual analogue scale**

The visual analogue scale (VAS) is a simple and frequently used method for the assessment of variations in intensity of pain, is often considered as a measure of the efficacy of treatment. The amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain (Schwenk 2002).

**5.5. Procedures:** The study was conducted as follows:

The Dean of the Faculty of Nursing, Modern University, the directors and the nursing directors of the Maxillofacial department issued permission to conduct the current study. The study was divided into three phases:

**Phase (A): Pre-treatment assessment:** Baseline outcome measures: socio-demographic characteristics and clinical condition of patients. Pain intensity was measured on Visual analogue scale, mouth opening using the TheraBite scale range of motion scale, and assess dysphagia symptom using Eating Assessment Tool (EAT-10). Data were recorded at the beginning of the study on the first day.

**Phase (B): Intervention Phase:** The intervention was given for four weeks.

During their first visit, patients were familiarized with the use of the TheraBite and received exercise instructions (The mouthpieces are placed between the maxilla and mandible. The stretching effects occur when the handle of the TheraBite is squeezed).

This was carried for 5 sessions per day with 5 stretches per session with 30 seconds hold. Patients were encouraged to continue exercising following this schedule until no further improvement in mouth opening could be achieved (Kanstra and etal 2012).

**Phase (C): Post-treatment Phase:** In the final, outcome measures were recorded at the end of each week. This phase carried out after month of regular TheraBite Jaw Rehabilitation exercises. Patients re-evaluated by using previous tools to determine the effectiveness of exercise on patients' mouth opening,

dysphagia and pain. A comparison between the baseline data and final data was made. All data was collected recorded and analyzed.

**5.6. Ethical considerations:** The researcher obtained informed consent from all patients after the explanation of the aims of the study before starting the study. Confidentiality, anonymity, and privacy were assured. Participation was on a voluntary basis. All the patients had the right to withdraw from the study at any time without any drawbacks.

**5.7. Data analysis:** Data was fed to a personal computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative variables presented as frequency and percentage. Quantitative data presented mean and standard deviation. The significance of the obtained results was considered at the 0.05 level. The used tests were: Anova (multipule regression test): For normally distributed quantitative variables, to compare between the baseline data, during and post intervention data.

## 6. Results

**Table 1: Socio-demographic characteristics of studied patients:**

<b>Sociodemographic data</b>		No (20)	%
1. Age in years	20-30 years	4	20.0
	30-40 years	8	40.0
	40-50 years	4	20.0
	50-60	4	20.0
<b>Mean ± SD</b>		38.35± 11.856	
2. Sex	Male	13	65.0
	Female	7	35.0
	Total	20	100.0
3. Occupation	Laborer	4	20.0
	Clerical	6	30.0
	Professional	6	30.0
	Housewife	3	15.0
	Retired	1	5.0
4. Level of education	Read & write	2	10.0
	Primary	2	10.0
	Secondary	10	50.0
	University	6	30.0
5. Area of residence	Rural	6	30.0
	Urban	14	70.0

Table 1 demonstrates the study patients socio-demographic characteristics; the patients' mean age was 38.35± 11.856; more than half of patients were male; most of them were working, 30% professional jobs, 30% were clerics and 20% were laborer; most of patients were educated as 50% had secondary education, 30% graduated from university. Concerning patients' area of residence, the highest percentage from urban areas.



**Table 2: clinical data of the studied patients:**

Clinical Data		N= (20)	%
1. <b>Surgical procedure</b>	▪ Radical Neck Dissection	2	10.0
	▪ Extended Neck Dissection	1	5.0
	▪ Jaw Reconstruction	5	25.0
	▪ Soft tissue flap	6	30.0
	▪ Plates	3	15.0
	▪ Bony tissue flap	3	15.0
2. <b>Chief complaints</b>	▪ pain	20	100
	▪ Appearance	0	0
	▪ mouth opening	20	100
	▪ Speech	5	25
	▪ Swallowing	9	45
	▪ Chewing	13	65
	▪ Saliva	0	0
3. <b>Previous Maxillofacial surgery</b>	▪ Yes	1	5.0
	▪ No	19	95.0
4. <b>Dental status</b>	▪ None	8	40.0
	▪ loss teeth	5	25.0
	▪ decayed teeth	7	35.0
	▪ use of denture	0	0
5. <b>Prescribed current medications</b>	▪ No Trismus treatment	2	10.0
	▪ Pain killer/analgesics	16	80.0
	▪ radiotherapy	10	50.0

**Table 2** represents the clinical data of the study group; as regards to surgical procedure; the highest percentage of patient had been undergone soft tissue flap surgery and Jaw Reconstruction surgeries (30%, 25%) respectively. Concerning their complains after the surgery were 100% suffer from difficulty of mouth opening, and associated with pain, while 65% suffered from difficulty in

chewing and 45% difficulty in swallowing. Most of patients had not undergone previous maxillofacial surgeries. Regarding their dental status, about third of patients (35%) had decayed teeth, (25%) had loss teeth. Most of cases were treated by pain killer or analgesics.

**Table 3: TheraBite Jaw range of motion follow up:**

<b>The theraBite range of motion scale</b>	<b>1st Visit (pre)</b>	<b>2nd visit</b>	<b>3rd visit</b>	<b>4th visit</b>
<b>Mean ± SD</b>	18.80±2.441	23.40±2.441	30.45±2.441	36.35±2.441
Test of significance	F= 3.925	P= 0.028*		

Table 3 reveals TheraBite Jaw range of motion scale follow up; it was found that the mean score of mouth opening on the theraBite range of motion scale at first visit was 18.80±2.441; that was improved in second and third visit for flow up to 23.40±2.441, 30.45±2.441 respectively. Finally, TheraBite jaw range of motion at 4<sup>th</sup> visit (final evaluation) was 36.35±2.441; there were statistically significant differences between four visits, as P= 0.028.

**Table 4: Eating and Dysphagia assessment of studied patients:**

Tool III: Eating Assessment Tool (EAT-10)		Pre		1 <sup>st</sup> follow up		2 <sup>nd</sup> follow up		4 <sup>th</sup> follow up		Test of significance
		N=(20)	%	N=(20)	%	N=(20)	%	N=(20)	%	
		<b>1. My swallowing problem has caused me to lose weight.</b>	No problem	0	0	0	0	0	0	
Mild problem	0	0	0	0	6	30.0	6	30.0		
Mild to moderate	2	10.0	4	20.0	13	65.0	2	10.0		
Moderate problem	14	70.0	16	80.0	1	5.0	0	0		
Severe problem	4	20.0	0	0	6	30.0	0	0		
<b>2. My swallowing problem interferes with my ability to go out for meals.</b>	No problem	0	0	0	0	0	0	15	75	F=5.773 P=0.005*
Mild problem	0	0	0	0	0	0	1	5		
Mild to moderate	0	0	0	0	14	70	4	20		
Moderate problem	7	35	18	90	5	25	0	0		
Severe problem	13	65	2	10	1	5	0	0		
<b>3. Swallowing liquids takes extra effort.</b>	No problem	0	0	0	0	13	65	18	90	F=8.505 P=0.001*
Mild problem	0	0	1	5	4	20	2	10		
Mild to moderate	4	20	16	80	3	15	0	0		
Moderate problem	12	60	3	15	0	0	0	0		
Severe problem	4	20	0	0	0	0	0	0		
<b>4. Swallowing solids takes</b>	No problem	0	0	0	0	0	0	18	90	F=8.677 P=0.003*

<b>extra effort.</b>	Mild problem	0	0	0	0	15	75	2	10	
	Mild to moderate	0	0	0	0	4	20	0	0	
	Moderate problem	0	0	20	100	1	5	0	0	
	Severe problem	20	100	0	0	0	0	0	0	
<b>5. Swallowing pills takes extra effort.</b>	No problem	0	0	1	5	17	85	18	90	F=10.512 P=0.000*
	Mild problem	0	0	9	45	3	15	2	10	
	Mild to moderate	1	5	9	45	0	0	0	0	
	Moderate problem	15	75	1	5	0	0	0	0	
	Severe problem	4	20	0	0	0	0	0	0	
<b>6. Swallowing is painful.</b>	No problem	0	0	0	0	8	40	18	90	F=6.767 P=0.004*
	Mild problem	0	0	7	35	9	45	2	10	
	Mild to moderate	0	0	7	35	3	15	0	0	
	Moderate problem	12	60	6	30	0	0	0	0	
	Severe problem	8	40	0	0	0	0	0	0	
<b>7. The pleasure of eating is affected by my swallowing .</b>	No problem	0	0	0	0	2	10	19	95	F =4.357 P=0.030*
	Mild problem	0	0	0	0	16	80	1	5	
	Mild to moderate	0	0	8	40	2	10	0	0	
	Moderate problem	0	0	12	60	0	0	0	0	

	Severe problem	20	100	0	0	0	0	0	0	
<b>8. When I swallow food sticks in my throat.</b>	No problem	0	0	0	0	4	20	19	95	F=4.357 P=0.030*
	Mild problem	0	0	2	10	12	60	1	5	
	Mild to moderate	0	0	9	45	4	20	0	0	
	Moderate problem	10	50	9	45	0	0	0	0	
	Severe problem	10	50	0	0	0	0	0	0	
<b>9. I cough when I eat.</b>	No problem	0	0			13	65	19	95	F=4.357 P=0.030*
	Mild problem	0	0	4	20	7	35	1	5	
	Mild to moderate	2	10	6	30	0	0	0	0	
	Moderate problem	12	60	10	50	0	0	0	0	
	Severe problem	6	30	0	0	0	0	0	0	
<b>10. Swallowing is stressful.</b>	No problem	0	0	0	0	13	65	18	90	F=8.592 P=0.000*
	Mild problem	0	0	0	0	7	35	2	10	
	Mild to moderate	0	0	8	40	0	0	0	0	
	Moderate problem	7	35	12	60	0	0	0	0	
	Severe problem	13	65	0	0	0	0	0	0	

**Table 4** represents frequency of eating and swallowing problems that the study group suffered from; **In the first visit; it can be found that 60% of the studied patients moderately experience loss of weight due to swallowing problems;** this percentage was increased to 80% at the second visit while at the third visit it was decreased to 65% of the studied patients who experience mild loss of weight due to **swallowing** problem. At the fourth visit 60% of the studied patient stated that they didn't experience any swallowing problem or weight loss which indicate high improvement in their eating pattern.

**The table shows that;** a high percentage of the patients experience severe problem in their ability to go out for meals due to swallowing problems. At the second visit 90% of them perceived moderate decrease in their ability to go out for meals due to swallowing problems. moreover, at the third and fourth visit a highly significant improvement in patients' ability to go out for meals and decrease in their swallowing problem by (70%, 75%), respectively.

In relation to **effort experienced due to swallowing problems:** more than half (60%) of the studied patients experienced moderate effort to swallow liquid in the first visit, at the second visit 80% of them their swallowing problem improved to mild-moderate problem, while (65% and 90 %), respectively of them experienced no problems in swallowing liquid at the third and fourth visit.

As regards **effort experienced from Swallowing solids;** it can be noticed that all (100%) of the studied patient experienced severe to moderate swallowing problems with solids liquid at the first visit and second visit. While highly improvement was perceived by the patient to mild and no problem with swallowing solid liquids by (75% and 90%), respectively of the studied patients.

Concerning **effort experienced from Swallowing pills;** it can be noticed that three quarters (75%) of the studied patient experienced moderate swallowing problems with Swallowing pills at the first visit. At the second and third visit this was improved to mild and mild to moderate problem among

(45% and 45%), respectively of the studied patients. While, the improvement continues to no problem among 90% of the studied patients at the fourth visit.

Regarding **pain during swallowing**, (60% and 40%), respectively of the studied patients experienced sever to moderate pain during swallowing at the first. At the second visit improvement was noticed among (35% and 35%), respectively of patient who experienced mild to mild-moderate pain during swallowing. At the fourth visit 90% of patients stated that they had no painful experience during swallowing.

In relation to **effect of swallowing problems on pleasure of eating**; almost all the studied patients experienced severe loss of eating pleasure due to swallowing problems at the first visit. While, this was improved among (60% and 80%), respectively of patient to moderate and mild problem at the second and third visit. Moreover, the improvement in pleasure of eating was continued to disappear among 95% of the studied patient at the fourth visit.

Concerning **stick of food in the throat due to swallowing problems**; half of the studied patients reported moderate and severe problems in the first visit. While 45% and 45% of them experienced mild to moderate and moderate problem in the second visit. In the third and fourth visit improvement was noticed among 60% and 95% of the studied patients who experienced mild and no problem related to stick of food in the throat as result of swallowing problems.

As regards **cough experience during eating** due to swallowing problem; moderate coughing problem was noticed among 60% of the studied patients at the first visit, while this was improved to 50% among studied patients at the second visit. Additionally, 65% and 95% of the studied patients reported that they experienced no cough during eating problem due to swallowing problems.

In relation to **stressful swallowing experience**, more than half of the studied patients stated that they had severe stressful problem in swallowing at the first visit. At the second visit stressful swallowing problems was improved

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to moderate problem among 60% of the studied patients. At the third and fourth visit stressful swallowing experience was improved among (65% and 95%) respectively to have no stress problem during swallowing.

There were statistically significant differences between four visits at the eating assessment scale.

**Table 5: Degree of pain of studied patient:**

Pain scale	1 <sup>st</sup> Visit (pre)		2 <sup>nd</sup> visit		3 <sup>rd</sup> visit		4 <sup>th</sup> visit	
	N= (20)	%	N= (20)	%	N= (20)	%	N= (20)	%
<b>0 No pain</b>	0	0	6	30	15	75	18	90
<b>1-3 Mild pain</b>	0	0	8	40	4	20	2	10
<b>4-6 Moderate Pain</b>	5	25	6	30	1	5	0	0
<b>7-10 Severe pain</b>	15	75	0	0	0	0	0	0
Test of significance	F= 8.657 P= 0.000*							

Table 5 reveals frequency of pain that the study group complain from it during treatment with TheraBite Jaw Rehabilitation. Regarding the first visit most of cases suffered from severe pain (75%); while on the second visit 40% suffered from mild pain; on third visit is 75% of the patients had no pain. Finally, 90% of the patient had no pain. There were statistically significant differences improving of patients; pain after TheraBite rehabilitation (P=0.000).

## 7. Discussion

Trismus is pathologic condition result from contraction of muscle of mastication; which yield connective tissue contracture leading to restriction in mouth opening (David etal 2009); many studies proved that immature fibrosis were the major causes of limited mouth opening after maxillofacial surgeries



(Lund, Cohen 1993, Cohen, Deschler, Walsh, & Hayden 2005, Michael D, Stubblefield, Manfield, Riedel R 2010). The current study finding showed that the age of patients was  $38.35 \pm 11.85$  and male, the complication of maxillo-facial surgery tend to increase with age, this findings was in line with Osunde, Saheeb 2013, they study 150 patients aged 16–38 years; they found that sex had no effect on pain and trismus throughout the periods of postoperative evaluation but postoperative swelling was not affected by gender but patients above 25 years.

This study showed that the highest percentage of patient had been undergone soft tissue flap surgery and Jaw Reconstruction surgeries, and 50% had radiotherapy. The result support the report of previous authors; (Agarwal, Kumar, Rai 2016) who found that trismus was a significant complication of oral malignancies or its surgical and radiotherapy treatment, or both. In study done by Baslakrishnan and et al 2017, out of fifty patients, only nine patients had experienced limited MO during postoperative period when the duration of procedure exceeded 30 min.

Almost all patients in this study present with history of severe trismus that develop gradually after maxillofacial surgeries, and mouth opening using TheraBite scale was less than 35 mm which is the cutoff point to determine Trismus. There was almost steady increase in the mouth opening from the 2<sup>nd</sup> visit after one week, 3<sup>rd</sup> visit after two weeks, 4<sup>th</sup> visit after 3 weeks of using TheraBite Jaw Rehabilitation; can be attributed to the use of TheraBite Jaw Rehabilitation therapy and improve the range of motion. These proved by many studies as (Kamstra et al 2012 found that after TheraBite exercises, mouth opening increased averagely with 5.4 mm after oncology treatment. also Maloney 2002 stated that various treatments are available to increase the mouth opening like unassisted mouth opening; finger assisted stretching exercises, spatulas, screws, wooden tongue depressor, etc. The devices used are wedged between the upper and the lower jaw, the front teeth, this placement can loosen teeth or can dislodge crowns. They are difficult to use and cause only simple static stretching.

At the end of the 4th weeks patients were satisfied with their mouth opening by improving the quality of life “chewing, speaking, swallowing and improved oral

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hygiene". These supported by the study of Montalvo and et al 2017 who found that a significant improvement in mouth opening and improved quality of life was observed post-structured exercise with the jaw-mobilizing device for patients with trismus independent of time since oncologic treatment.

The study showed that pain history throughout the treatment was decreased dramatically and steadily. This may be explained by breaking the cycle of muscular spastic trigger point. This proposed by Simons and Travell 1998, who stated that stretching the spastic muscle by mechanical and medical aids help to decrease the pain dramatically.

## **8. Conclusion**

The current study finding showed that patients with trismus who keep trained using TheraBite Jaw rehabilitation improve mouth opening using TheraBite scale and improved quality of life on (Eat -10) scale and decrease pain level dramatically.

TheraBite Jaw opening is a safe and effective method in increasing mouth opening it is good way for relieve pain associated with mouth spasm.

## **9. Recommendation**

- Early using of TheraBite Jaw Rehabilitation post Maxillo-facial surgeries improving surgery outcome and prevent incidence of trismus complications.
- Training programs for nurses' maxillofacial units, head and neck surgery unit and dental surgery unit about using TheraBite Jaw opening rehabilitation.
- Further researches concerning the effective timing of using jaw exercises to prevent trismus post maxillofacial surgery.

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## الملخص العربي

### تأثير نظام إعادة التأهيل باستخدام جهاز TheraBite Jaw على ضمّر عضلات الفك ما بعد جراحات الوجه والفكين

**المقدمة:** ضمّر الفك هو انقباض العضلات المسئولة عن عملية المضغ و تحريك الفك الناتج عن وجود حالة غير طبيعية ينتج عنه حركات محدودة لفتح الفك اقل من  $\geq 35$  ملم. قد تسبب جراحات الوجه و الفكين الى حدوث تليف و ندبة في الجلد وما يتبعه من تقلص او قصر العضلات المسئولة عن عملية المضغ والتي تؤثر سلبا على جوده و نوعية الحياة و صعوبة في بعض الانشطة مثل العض و المضغ و البلع.

**الهدف من الدراسة:** تهدف الدراسة إلى تقييم تأثير نظام إعادة تأهيل باستخدام جهاز TheraBite Jaw على ضمّر عضلات الفكين بعد جراحات الوجه والفكين.

**اسئلة البحث:** سوف تجيب هذه الدراسة على الفرضية الاتية: سيظهر المرضى الذين يعانون من ضمّر الفك بعد عمليات الوجه والفكين، الذين انتظموا على التمرين على نظام إعادة التأهيل باستخدام TheraBite Jaw تحسناً ذاتياً في فتح الفم و عسر البلع.

**تصميم البحث:** اتبع البحث تصميم شبه تجريبي لاختبار فعالية التدخل بجهاز التأهيل TheraBite Jaw على مرضى ضمّر الفك بعد عملياً الوجه والفكين.

**منهجية البحث:** تمت الدراسة بعيادة قسم جراحة الوجه والفكين بالمستشفى الرئيسي جامعة الاسكندرية و اشتملت عينة الدراسة على عشرين مريضاً ممن يحضروا لعيادة الوجه والفكين يعانون من حركات محدودة للفكين بعد جراحات الوجه والفكين. تم تدريب المرضى علي استخدام اداة نظام إعادة تأهيل TheraBite Jaw وهو اداة محموله تم تصميمها لمساعدته تصحيح حركة الفك السفلي الطبيعيه في المرضى المصابين بنقص حركه الفك السفلي ويتم تطبيقه علي الاسنان الامامية او الفك العلوي والسفلي وبعد استخدامه يمكن للمريض تحريك الفك السفلي بشكل سلمي عن طريق الضغط يدويا علي اداة TheraBite لمدة شهر.

وقد استخدم لتقييم و متابعة المرضى اربع ادوات: **الاولى:** استبيان مقابلة لجمع المعلومات الديموغرافية و الحالة السريرية للمرضى، **الثانية:** ميزان TheraBite لتقييم فتح الفم بالمليمتر اسبوعياً، **الثالثة:** مقياس Eat-10 لتقييم اعراض عسر البلع، **الرابعة:** المقياس التماثلي البصري لقياس حدة الالم.

**النتائج:** لقد اسفرت نتائج البحث عن الاتي: **اولاً:** كانت هناك فروق ذات دلالة إحصائية بين زيارات المتابعة للمرضى لحركة الفك باستخدام ميزان TheraBite اكثر من 35 ملم، حيث  $P = 0.028$ . **ثانياً:** تحسن قدرة المرضى بشكل كبير بقدرة المرضى على البلع مما ادى الى تحسن جودة الحياة. **ثالثاً:** كان هناك فروق ذات دلالة احصائية بتحسّن حدة الالم لدى هؤلاء المرضى.

**التوصيات:** افضت نتائج هذه الدراسة الى التوصيات التالية:

1- الاستخدام المبكر لنظام التأهيل TheraBite Jaw بعد جراحة الوجه والفكين لتحسين نتائج الجراحة ومنع حدوث مضاعفات ضمّر الفك. 2- برامج تدريبية للممرضات بوحدات الوجه والفكين ووحدة جراحة الرأس والعنق ووحدة جراحات الأسنان حول استخدام نظام التأهيل TheraBite Jaw.

3- مزيد من الأبحاث حول التوقيت الفعال لاستخدام تمارين الفك لمنع ضمّر الفك بعد جراحة الوجه والفكين