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Bite raising appliance for treatment of temporomandibular joints (TMJ) myofascial pain dysfunction syndrome and internal derangement

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ABSTRACT

Introduction: Tempromandibular joint disorder is common disorder that has multifactorial etiology presented with cardinal clinical presentation of pain, joint sound and limitation of mouth opening. The most common causes of this disorder are muscular which are commonly referred as a myofascial pain and dysfunction other cause include internal derangement of TMJ structures.

Objectives: This study was established to determine the effect of bite raising appliance in the treatment of myofacial pain and internal derangement of temporo-mandibular joint.

Material & methods: This is a prospective study for 100 cases of temporo-mandibular joint disorder (TMD) patients were selected from department of maxillofacial surgery in Azadi Teaching Hospital, Kirkuk, Iraq and from the private clinic in the period of Jan-2012 to Dec. 20**20**.

Results & conclusion: After 3 months of clinical follow-up the results revealed that bite raising appliance has a good outcomes in relieving pain, clicking and increase mouth opening in patient with myofacial pain and internal derangement of TMJ.

Keywords: *Bite raising appliance; internal derangement, Myofascial pain dysfunction (MFPD), temporomandibular joint (TMJ)*.

INTRODUCTION

Temporo-mandibular joint (TMJ) is a complex articulation between condylar head of the mandible and glenoid fossa of the temporal bone. They are bilateral joint on each side of the head that move concomitantly with each other. Its synovial joint consists of a disc located between the condylar head of the mandible and the glenoid fossa of temporal bone(1). Patients frequently complain of pain due dysfunction in TMJ region. The most common etiology of this disorder is muscular that commonly referred as a myofascial pain and dysfunction. Other cause include internal derangement of TMJ structures.

The etiologies of myofascial pain dysfunction syndrome (MPDS) are either physical or psychologic and social variations. Physical causes represented by trauma, malocclusion and partial or complete edentulous arch. Psychological and social variation are represented by psychological disturbed life style, anxiety, obsessiveness, environmental and occupational factors. (2)

Lateral pterygoid muscle are two out four muscles of mastication, located in the inftratemporal fossa of the skull i.e. lateral pterygoid, medial pterygoid, masseter and temporalis muscles.

Lateral pterygoid muscle has two heads i.e. superior head inserted into the synovial disc while the inferior head inserted in to the head of the condyle. Action of the inferior head rotate the head of the condyle causing rotary movement which act to open the mouth for 20mm; while the action of the superior head cause translatory movement that pulls the synovial disc anteriorly over the articular eminence causing the mandible to depress and open more than 20mm. Due to lack of enough surgical trials on this important issue this study was established to determine the effect of bite raising appliance in the treatment of myofacial pain and internal derangement of temporo-mandibular joint.

MATERIALS AND METHODS

Patients

This is a prospective study for 100 cases of TMD patients were selected from department of maxillofacial surgery at Azadi teaching hospital, Kirkuk, Iraq and from the private clinic in the period of January 2012 to December 2020. Patient with TMD with bruxism and myogenous origin were selected according to three criteria e.g. pain, clicking and maximum mouth opening. Only 100 cases undergoing pain and clicking at the first visit. Measurement of maximum mouth opening for all cases had been done. Only 21 cases had normal mouth opening measured to be (40mm-50mm) while 79 cases had limited mouth opening which was measured (20mm-39mm).

Materials

Bite raising appliance construction done by taking impression for upper and lower jaw of the patient using an alginate impression material. Impression was set up by powder stone, meanwhile mounting the casts on occlusion by using semi-adjustable articulator. Acrylic appliance was made at prosthetic laboratory by raising the bite for 2mm above the maxillary right and left molar teeth as shown in figure-1.

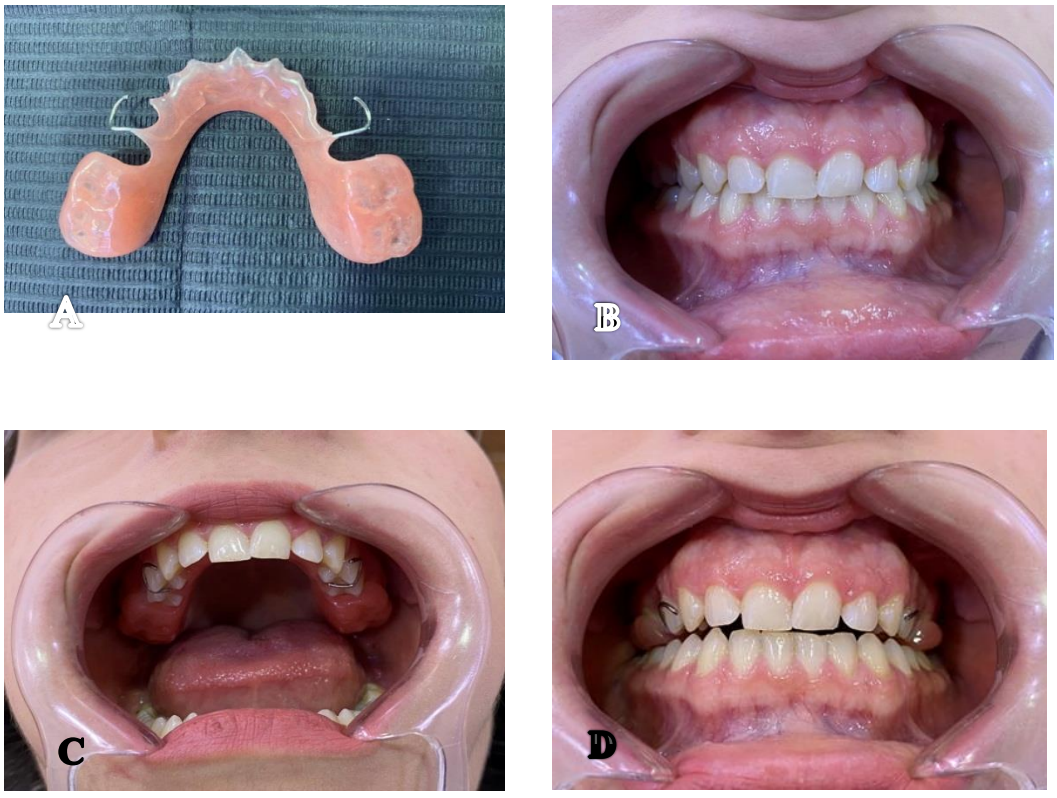

FIGURE-1: (A). Bite razing appliance; (B). Normal occlusion; (C). Bite raising appliance in patient's mouth and (D). A 2mm bite raised by using appliance.

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RESULTS

Age distribution

In this study the age of patients ranged from 10 to 80 years and the mean age is 14.28 years. In regarding the myofacial pain most of cases were in 21-30 years age group, so there is 39 (39%) cases and 25 (25%) were in 10-20 years age group and 20 (20%) were in 31-40 years age group while the other cases were divided in between the rest.

Gender

77 of the cases are female while 23 cases are male.

Relation of pain with progressive use of bite raising appliance

Only100 patient had visited the maxillofacial department in Azadi Teaching Hospital and the private clinic suffering from TMJ mayofacial pain treated by using bite raising appliance and follow up had been done for three months, after one month from using the appliance 36 cases (36%) relieved pain, 30 cases (30%) relieved pain after 2 months, 26 cases (26%) relieved pain after 3 months while 8 cases (8%) the pain not relieved as shown in table 1.

TABLE 1: Relation of pain with progressive use of bite raising appliance

Duration of pain	Percentage (%)
Pain relived after one month	36
Pain relived after 2 month	30
Pain relived after 3 month	26
Pain not relived	8
Total	100

Relation of clicking with progressive use of bite raising appliance

During clinical examination all cases were suffering from clicking sound (27%) clicking subsided after one month from using the appliance, 24 cases (24%) clicking subsided after two months, 30 cases (30%) clicking subsided after three months, while 19 case (19%) clicking still present even after using the appliance.as shown in table 2.

TABLE 2: clicking in relation with progressive use of bite raising appliance

Duration of clickings	Percentage (%)
Clicking subsided after one month	27%
Clicking subsided after 2 month	24%
Clicking subsided after 3 month	30%
Clicking without subside	19%
Total	100%

Maximum mouth opening in relation with progressive use of bite raising appliance

Only 17 cases (21.518%) had normal maximum mouth opening after one month from using the appliance; 24 cases (30.379 %) had normal maximum mouth opening after two months; 23 cases (29.113%) had normal maximum mouth opening after three months, while 15 cases (18.987%) still had limited mouth opening after three months of using the appliance (Table 3).

TABLE 3: Maximum mouth opening in relation with progressive use of bite raising appliance.

Mouth opening duration	No.	Percentage (%)
Good mouth opening after one month	17	21.518
Good mouth opening after 2 months	24	30.379
Good mouth opening after 3 months	23	29.113
Limited mouth opening after 3 months	15	18.987
Total	79	100%

Corticosteroid injection

Triamcinolone vial, 40mg (one cc) injected in 24 cases due to severe pain and limitation of mouth opening (MMO was 20mm), injection was carried out in to the superior synovial space meanwhile three injections used every 4 weeks interval.

DISCUSSION

Mayofacial pain dysfunction syndrome and internal derangement are a common disorder characterized by pain, click, mostly in muscular origin due to both anterior displacement of meniscus and limitation of mouth opening with deviation of mandible to the normal side; sometime is associated with tinnitus (3). Temporo-mandibular joint disorder (TMD) commonly occur in young age group (21-30 years) and its prevalence in female is higher than male (3:1) which is in agreement with another study(4). The difference may be related to behavioral, psychosocial and hormonal difference. It has been suggested that the presence of estrogen receptors in the TMJ of female modulates metabolic functions in relation to laxity of the ligaments and estrogen. The latter would act by increasing vigilance in relation to pain stimuli modulating the activity of limbic system neurons i.e. approximately 20% among women who use oral contraceptives (containing estrogen) showing pain increment(4). There are many studies that support the efficacy of stabilization splint therapy in spite of wide spectrum of splint designs; however, the exact therapeutic mechanisms of most of the occlusal splints remains unclear yet with many theories explaining it.(5)

Para-functional activity of mandible (bruxism and clinching) cause weakness in the fibers of lateral pterygoid muscle leading to failure in returning the disc into its normal position in the glenoid fossa causing anterior dis displacement. When disc is displaced anteriorly it would pull the retrodiscal tissue (which contain the sensory innervation) anteriorly into the glenoid fossa leading to closure of mouth condylar head press the retodiscal tissue and cause pain during closing of mouth. Insertion of bite raising appliance over the maxillary molar teeth raises the bite for 2mm which will be translated into depressing the condylar head 2mm within the glenoid fossa which provide a rest time for the two heads of Lateral pterygoid muscle. It also will return the disc in to the normal position in the glenoid fossa.

In patient with severe pain an intra-articular injection of corticosteroid was used to decrease effusion and pain due to its potent anti-inflammatory effect on synovial tissue which is in concomitant with another study(6).

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