Relationship Between Torus Mandibularis, Torus Palatinus, Parafunctional Habits, and Anxiety in a Sample from Eastern Libyan Population

By

Salmen Moftah Hussan Ali

Supervisor:

Prof. Mohamed S H Ingafou

This thesis is submitted in partial fulfillment for requirement of Master Degree in Oral Medicine

University of Benghazi

Dental Faculty

Oct 2021

University of Benghazi **Faculty of Dentistry**

Department of Oral Medicine Oral Pathology
Oral Diagnosis and Radiology

Relationship between Torus Mandibularis, Torus Palatinus, Parafunctional Habits and Anxiety in a Sample from Eastern Libyan Population

By:

Salmen Moftah Hussan Ali

This Thesis was Successfully Defended and Approved on: 27/10/2021

Supervisor ;

Prof. Mohamed S Hammad Ingafou

Signature: **……..**

Prof. Ali Mohamed Elmurtadi **Internal Examiner**

Signature: ……..

Prof Azzam Ahmed Sultan **External Examiner**

Signature: ……..

Dean of Dental Faculty **Director of Graduate studies and training**

Dedication

To my lovely father;
My great mother; beloved sisters and brothers;
For their enormous support

To my teachers
For their believe in me

I dedicate my thesis

Salmen Moftah Hussan Ali

Acknowledgement

I would like to express my deep sense of gratitude to my supervisor professor Mohamed Ingafou for his outstanding guidance and support, which helped me in completing this work in all the stages of this thesis. Beside my supervisor, it is a matter of great privilege for me to present this project to my thesis examiners, for their cooperation and being part of this work. Many thanks to my colleagues in Benghazi dental school for their support and encouragement. I appreciate all the help provided to me by the clinical staff and the administration of Al-Marij central dental clinic. I‘m fully thankful to my wonderful and lovely patients included in this study for their patience and cooperation.

My heartfelt thanks to my family, specially my mother and sisters for their unconditional and generous support and encouragement for their listening to my complains and frustrations, and for believing in me.

Declaration

I confirm that this thesis entitled *"relationship between torus mandibularis, torus palatinus, parafunctional habits, and anxiety in a sample from eastern Libyan population"* is a record of research carried out by myself. Except where otherwise stated, the research design and analysis were my own work, subject to the help and advice received from those who were acknowledged. I have consulted all the references cited. This research has not previously been submitted for a high degree.

Salmen Moftah Hussan Ali

Table of Contents

List of Tables

List of Figures

List of abbreviation

AB	Awake Bruxism
BMD	Bone Mineral Density
Ca	Calcium
CBCT	Cone Beam Computed Tomography
HADS	Hospital Anxiety and Depression Scale
PRP	Platelet Rich Plasma
PTH	Parathyroid hormone
SB	Sleep Bruxism
SD	Standard Deviation
TM	Torus mandibularis
TMD	Temporomandibular Joint Disorders
TMJ	Temporomandibular joint
TP	Torus palatinus

Relationship between torus mandibularis, torus palatinus, parafunctional habits, and anxiety in a sample from eastern Libyan population

By

Salmen Moftah Hussan Ali

Supervisor: Prof. Mohamed S H Ingafou

Abstract

Background: Torus is a benign, rounded, smooth-surfaced, non-neoplastic growth composed of nodular dense bone appears on the midline of the palate or the lingual aspects of the mandible. Its etiology is probably due to interplay of multifactorial genetic and environmental factors or may be associated with teeth grinding and parafunctional occlusal habits, or temporomandibular joint disorders (TMD) .

Aims: The current study aims to describe the demographic and clinical features of oral tori, by measuring their dimensions, size, and shape beside the frequency of signs and symptoms of parafunctional oral activity (such as clenching, teeth grinding and/or bruxism). It aims also to measure the level of blood calcium, vitamin D, and parathyroid hormone and the level of anxiety and depression in these patients.

Subjects and Methods: This study included patients with clinical evidence of oral torus seen from October 2019 through December 2020 from routine consecutive patients in Northern East region of Libya to describe the clinical presentation of tori. Furthermore, a maxillary and mandibular dental impressions were taken by a rubber base butty and light body then dental casts were immediately fabricated in dental laboratory using gypsum material (Elite Model, Zhermack). The biochemical findings of Calcium+ level, Vitamin D, and PTH levels were investigated. The level of anxiety and stress in the study group is assessed by HAD scale..

Results: This study comprised 50 Libyan patients (39 females and 11 males) aged 16-63 years. The facial muscle clenching and fatigue was reported by 32 (64%) and morning jaw/neck fatigue was reported by 23 (46%), teeth grinding in 20 (40%), TMJ morning

stiffness in 18 (36%) patients, nocturnal habit of bruxism in 11 (22%) , diurnal bruxism in 9 (18%), grinding sounds during sleep in 7 (14%). Only 18 (36%) were aware of presence of tori in their mouths. No reported difficulties in speech or deglutition or interferences with sleep. The signs of a presumed parafunctional activity included attrition in 34 (68%) of the patients, presence of shiny facets in 32 (64%) of patients, fractured teeth or restorations in 23 (46%) patients, mobility of teeth in 20 (40%) of patients and wear on the occlusal surface appliance in only 11 (22%) patients who had such appliances. Forty-four (88%) of the patients have Angle class I occlusion, and all of them except three had U shaped dental arch. Teeth spacing was detected in 17 (34%) patients, teeth crowding in 19 (38%), hypodontia of the upper lateral incisors in 2 (4%) patients and no supernumerary teeth were detected.

Twenty six patients (52%) had TM, 10 (20%) had TP while a concurrence of TP and TM was noticed in 14 (28%) patients. The size of all TP exceeded 10 mm in its longest dimension diameter regardless of its shape. 14 (58%) patients had spindle shaped TP, 7 (29.17%) heart shaped and 1 (4.17%) lobulated, and two of other shapes. Thirty five (87.5%) cases of TM were bilateral, 18 (45%) rounded, 10 (25%) lobulated, eight (25%), oval and 4 (10%) other shapes.

Calcium, vitamin D and PTH levels all the levels were within normal values. The Hospital Anxiety and Depression Scale (HAD) scores didn’t reveal any statistically significant association with any of the signs and symptoms of parafunctional activity, however, an association exists between the anxiety score and facial muscle clenching and tigue (p=0.002)

Conclusion: Further controlled studies involving larger number of subjects and ing wider areas of the country should be undertaken to shed light on different aspects of this overgrowths. The likely benefits of oral tori as a potential source of bone auto graft for Ridge augmentation should be explored as well as their potential use as an indicator for higher bone quality of the subject should also be elaborated. As oral tori are benign outgrowths, the future studies should concentrate on their potential use in implantology and other medical uses as their clinical and epidemiological characteristics had long been investigated in the past.

INTRODUCTION

Chapter: 1 INTRODUCTION

1.1. Overview

Torus is a benign, rounded, smooth-surfaced, non-neoplastic growth of nodular dense bone appears on the midline of the palate or the lingual aspects of the mandible. *Tori* are painless overgrowths of different shapes and sizes covered by normal overlying mucosa. Their etiology is probably due to interplay of multifactorial genetic and environmental factors. Identical lesions occurring on the facial surfaces of alveolar bone of the mandible and maxilla are termed exostoses. However, similar lesions arising on the periosteal surfaces, but not in the previously mentioned locations, are termed *osteomas.* As tori and *exostoses* are thought to be reactions to bone stresses, osteomas are considered as true benign neoplasms. Torus is commonly occurs in two specific intraoral locations:

(1) The midline of the hard palate, termed (*torus palatinus).*

(2) The lingual of the mandible in the cuspid and premolar region, termed *torus mandibularis.*

1.2. Definitions

Torus (meaning *"to stand out"* or *"lump"* in Latin) (kalaignan & Jayakumar, 2018).

Torus palatinus: Bony protuberance of dense cortical bone located on the midline of the hard palate at the junction of the intermaxillary suture and the transverse palatine suture. Larger tori interfere with speech, placement of prosthetic appliances, and oral hygiene maintenance and on trauma may develop non-healing ulcers that progress to chronic osteomyelitis.

***Torus mandibularis*:** A prominence seen on the lingual aspect of the mandible at the base of its alveolar part in the cuspid and premolar area of the lingual aspects of mandible. Larger growths may interfere with tongue movement, oral hygiene maintenance, and the ability to wear an intraoral prosthesis. They are easily lacerated and slow to heal.

Exostosis: An exophytic multiple (or single) asymptomatic bony excrescences nodular growth of dense cortical bone occur less common than tori (Jainkittivong & Langlais, 2000)

and frequently located on maxillary buccal alveolar bone and very rarely on the buccal side of the mandible (Kukula & Plakwicz, 2016).

***Osteoma*:** An exophytic nodular growth of dense cortical bone on or within the mandible or maxilla in locations other than those occupied by tori or exostoses. Osteomas found at nearly any age and may be solitary or multiple. They may be located either superficially or intraosseously on any bone of the cranium or face or within the sinus cavities. When multiple, they are often associated with Gardner syndrome.

***Osteoid osteoma and osteoblastoma*:** Are benign intraosseous lesions with similar clinical, radiographic, and histopathologic features making a well-demarcated, rounded intraosseous swellings, each with an active cellular central nidus surrounded by a wide zone of osteoid, with pain upon palpation (Regezi, Sciubba, & Jordan, 2008; Sayan, 2002).

1.3. Torus Palatinus

Despite the nomenclature suggested to be a tumor, TP is overgrowth of the bone in the palatal region and represents an anatomic variation. it is a slowly growing, flat-based bony protuberance or excrescence which occurs in the midline of the hard palate. Numerous theories have been suggested for its pathogenesis, but a plausible and thoroughly convincing explanation for this common oral lesion is still lacking (Nogueira et al., 2013).

TP usually found on the mid-palate of over 20% of adults worldwide. It is not present in young patients, developing only after puberty in susceptible individuals. Although the palatine torus may occur at any age, including the first decade, it appears to reach its peak incidence shortly before the age of 30 years. Women have more torus palatine than men, with an approximate ratio of 2:1 (Loukas et al., 2013).

There is a little clinical significance attached to this lesion, since it is benign and never becomes malignant, but they may obscure radiographic details of maxillary sinuses and lower premolars. They may also interfere with the construction and function of removable dentures, as well as oral functional movement (Seah, 1995). The torus is usually not treated, although occasionally it may be of such size and shape that it is impossible or impractical to construct a full or partial denture over the structure because of undercuts (Abrams, 2000).

1.4. Torus Mandibularis

Torus mandibularis (TM) is an outgrowth of bone found on the lingual surface of the mandible as a rounded bony protuberance on the lingual surface of the mandible and usually found above the mylohyoid line, medial to the molar roots in over 30% of adults (Ihunwo & Phukubye, 2006). TM are almost always bilateral, infrequently; a torus may be noted on one side only. These lesions are asymptomatic, exhibiting slow growth during the second and third decades of life (Regezi et al., 2008).

The mandibular tori are of a multifactorial origin. It may be associated with teeth grinding and genetic or ethnic background is suggested, for example, by the high frequency of occurrence in Mongoloid groups and a low frequency in Caucasoid groups, as pointed out by (Sellevold, 1980, Auškalnis et al., 2015). It is possible for mandibular tori to influence airway volume by occupying the space for tongue and cause sleep apnea (Ahn et al., 2019).

TM seldom needs treatment, except when it interferes with the construction of a removable denture. Taking an impression might be quite difficult in some cases, but an interesting idea is to use the maxillary tray to make an alginate impression for patients with large bilateral mandibular tori was attempted (Fernandez, 1992). The probability of trauma to the overlying mucosa or inability to seat the denture, owing to rocking are another challenges. In such cases the situation must be appraised and the torus removed surgically before the construction of the prosthetic appliance (Abrams, 2000). However, recurrence of some mandibular tori after surgical removal was reported (Brunsvold et al., 1995).

1.5. Multiple Exostoses

Multiple exostoses occasionally occur in the same individual. Multiple exostoses of the jaws are somewhat less common than the maxillary and mandibular tori and are usually found on the buccal surface of the maxilla below the mucobuccal fold in the molar region. Because buccal and palatal exostoses and TM are similar in morphology and location, that hypothesizing that the quasi-continuous model of inheritance may also apply to buccal and palatal exostosis (Antoniades, Belazi, & Papanayiotou, 1998). Palatal exostoses are found on the palatal

aspect of the maxilla, and the most common location is the tuberosity area (Jainkittivong & Langlais, 2000).

1.6. Histological features

The histological features of tori and other types of exostoses are identical (Neville et al., 1995) and composed of hyperplasic bone, consisting of mature cortical and trabecular bone. All lesions pass through several phases. Initially a small focus of active osteoblasts is followed by a period in which wide zones of osteoid are deposited. In the mature stage, the osteoid becomes well calcified, creating an atypical form of bone. The center usually remains vascular with increased numbers of plump osteoblasts and large osteoclasts. The density and size of the cellular component is often of concern and can be confused as a sign of malignancy (Regezi et al., 2008).

Tori are characterized by a specific asymmetric bone remodeling pattern which seems to determine their shape and could constitute a specific histological feature allowing differentiating tori from exostoses (Kun-Darbois et al., 2017).

Osteoma is composed of dense cortical bone with a lamellar pattern. The cortical bone is sclerotic and relatively avascular. The medullary bone is denser than normal with reduced marrow spaces. The periosteal layer is often more active in osteoma than in tori or exostoses (Koong, 2017)

Osteoid Osteoma and Osteoblastoma share many common clinical and histological features with each other and with cementoblastoma, their histologic pattern is consisting of a central nidus of increased vascularity with extremely active osteoblasts and clasts surrounded by cellular bone that contains a wide zone of osteoid. Their radiographic features are pathognomonic and consist of rounded, well-defined central radiolucency (nidus) surrounded by a zone of increased radiopacity (Regezi et al., 2008).

1.7. Hematological and biochemical findings

The relationship between two opposite phenomena in elderly bone, bone loss (osteoporosis) and excessive bone formation (oral exostosis) has been investigated by (Hosoi et al, 2003)

in 44 female subjects without any conditions known to affect bone metabolism. The subjects were examined for exostosis, and bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry and found that some common mechanisms are involved in the elevation of skeletal BMD and the occurrence of oral exostosis.

1.8. Psychological connotation of oral tori

Psychological stress due to anxiety and depression had long been blamed for a substantial number of cases of particularly TM, as they might associate with occlusal stress in many occasions. The Hospital Anxiety and Depression Scale (HADS) is a brief self-report measure that was specifically designed to screen for distinct dimensions of anxiety and depression in non-psychiatric hospital departments; somatic symptoms were excluded (Snaith, 2003). The severity of anxiety and depression are assessed using two subscales, each consisting of seven items that are rated on a four-point Likert-type scale. It is one of the most popular clinical and research instruments used to screen for anxiety and depression (Gough & Hudson, 2009).

1.9. Clinical implication of tori

Tori may cause pain during the impression making (as there is often only a thin oral mucous membrane covering them) which is easily irritated (Al Quran & Al-Dwairi, 2006). In many occasions, mandibular tori can present significant challenges for endotracheal intubation and laryngoscopy or they may limit the space for the tongue which may result in speech impediment (Durrani & Barwise, 2000, Takasugi et al., 2009). they may obstruct in situations that require direct visualization of the anterior commissure or base of tongue for diagnosis and management of lesions at those sites, so the surgical removal of theses tori may is mandatory (Low et al., 2019). Its role in worsening sleep apnea has also been reported (Ahn et al., 2019, Khaled et al., 2016). On the other hand, many authorities believe that tori may enforce the mandible to resist tortional forces during bite occlusion (Sellevold, 1980), beside its potential application as a source of auto graft in cases of ridge augmentation procedures (Barker et al., 2001).

1.10. Methods of studying tori

As with most of other oral lesions, several studies were carried out to understand various aspects of tori. By and large, they have been a subject of scrutinized epidemiological and clinical studies. Some other studies have applied other methodology such as measurements on gypsum study casts, radiography, blood investigations or radiological methods such as tomography (Simunkovic et al., 2011). The alleged relationship between both parafunctional habits and psychological stress with oral tori has caught the attention of few more studies to analyze different psychometric properties and correlation between them (King et al., 2012).

1.11. The rationale and prospects of the present study

Although exostoses are not a rare finding, a relatively few studies had investigated these structures in the past. There is relatively scarce information regarding these overgrowths in literature. The information on the relationship between tori or exostosis and different environmental factors such as stress, anxiety, masticatory over activity are very limited because of the scarcity of cases reported in the literature. Perhaps the benign nature of these overgrowths and the relatively few complications of them had discouraged the investigators to pay attention to them (Nolte & Schirren, 1997).

The current study used a combination of clinical description, measurements on gypsum study casts, biochemical investigation, and assessment of anxiety and depression of all study subjects in order to have in-depth view of various aspects of this elusive oral condition.

LITERATURE REVIEW

Chapter: 2 LITERATURE REVIEW

Tori represent an anatomical variation rather than pathological condition and they usually become apparent until the second or third decade of life (Al-Sebaie & Alwrikat, 2011) and rarely in young children or infants (Axelsson & Hedegaard, 1985). Their world occurrence in different populations and races provoked many comparative international studies. Although their etiology is obscure until now their clinical implication had been the subject of scrutiny in many studies, particularly their relationship with occlusal stress and parafunctional habits (Kerdporn & Sirirungrojying, 1999).

2.1. Historical overview

Torus has been mentioned in the literature for about 180 years (Allord, 1972). However, little has been revealed about it until the sixties and the seventies of the last century when great advances were made in the field of genetics (Johnson, Gorlin, & Anderson, 1965). The human skeleton sometimes shows some peculiarities: such as TM which is not a pathological or tumoral formation but a rare anatomic peculiarity. It is an exostosis which appears on the medial side of the body of the mandible. This exostosis is neither embarrassing nor dysfunctional. It is not a pathologic development nor does it cause any pathology but sometimes a removable dental plate may be a source of injury (Rouas & Midy, 1997).

Tori are slowly growing, usually multiple lobed, and may become very large, they may arise as solitary nodules or as a multiple nodular masses that appear to coalesce (Ihunwo & Phukubye, 2006). The outgrowth of the tori does not continue after the third decade, and tori do not change to malignant lesions (Azaz, 1975). The overlying mucosa is intact, but occasionally appears blanched or may become ulcerated if traumatized. The torus itself is composed either of dense compact bone or of a shell of compact bone with a center of cancellous bone, and thus it is often visible on an intraoral palatal radiograph.

Exostosis frequently occurs in long bones where tendons and muscles are inserted. Exostosis or abnormal bone growth within the ear canal is called as Surfer's ear . Bony exostoses are found randomly in adult patients, usually occurring on the attached gingiva over the apices of teeth. Buccal exostoses most commonly appear on the buccal plate over the bicuspids as

multiple rounded or oval nodules of dense bone of maxilla or mandible, usually in the premolar and molar areas. Palatal exostoses are found on the palatal aspect of the maxilla, and the most common location is the tuberosity area. They are of little importance unless they are cosmetically unacceptable or interfere with the placement of a prosthesis. Clinically, these exostoses appear as small nodular protuberances over which the mucosa may appear blanched. These are numerous small excrescences parts of bone on the buccal surface of the maxilla above the teeth and below the muco-buccal fold. Their etiology is unknown, and no figures are available as to their incidence or disposition. They are of no clinical significance except that, if large, they may interfere with the preparation or insertion of a prosthetic appliance (Telang et al., 2019).

2.2. Etiology of tori and exostosis

Although the exact etiology of oral tori is unknown so far, several authors have postulated that the etiology of oral tori consists of an inter-play of multifactorial, genetic and environmental factors However, the exact etiology, mechanism of formation and their real impact on orofacial apparatus are still far from being completely understood (Haugen, 1992, Neville et al., 1995, Seah, 1995).

2.2.1. Etiological factors

The etiology of tori has been investigated by several authors; however, no consensus has been reached. Some of the postulated causes include genetic factors, (Regezi et al., 2008, Reichart et al., 1988, Eggen, 1989, Gorsky et al., 1998), environmental factors (King & Moore, 1976, Haugen, 1992, Eggen & Natvig, 1991, masticatory hyperfuction, temporomandibular disorders, presence of crowding and bone mineral density and parafunctional activities (such as clenching and grinding) (King & Moore, 1976, Eggen & Natvig, 1986, Kerdporn & Sirirungrojying, 1999) and continued growth (Topazian & Mullen, 1977).

2.2.2. Mechanism of formation of tori and exostosis

The quasi-continuous genetic or threshold theory states that the environmental factors responsible must first reach a threshold level before the genetic factors can express themselves in the individual; hence, both genetic and environmental factors determine expressivity, mak-

ing the etiology multifactorial (Haugen, 1992), this may apply to TP also (Antoniades et al., 1998).

Buttressing bone formation phenomenon was proposed, but it is still unclear, nonetheless, the evidence suggest that bone flexion could result in the release of bone morphogenic proteins, which could stimulate bone growth, express as thickening or exostosis at a point of stress (Horning et al., 2000). Internal functional stresses associated with dental implant may prevent otherwise expected alveolar bone loss as suggested by some investigators (Sennerby et al., 1988).

Mechanical factor of micro strain could have a significant effect on bone modeling. When mechanical loads are low, bone atrophy occurs; when normal mechanical loads are experienced normal bone turnover occurs; when higher mechanical loads occur, bone hypertrophy occurs with increased lamellar bone and when pathologically higher loads are imposed (Marx & Garg, 1998). These findings are consistent with those of Pietrokovsky and Massler who observed that following extraction, the alveolar bone becomes atrophic and resorbs (Pietrokovsky & Massler, 1967).

2.2.3. Genetic factors in etiology of torus

Some previous studies emphasized genetic factors as the cause of tori formation, based on comparisons of torus frequencies in genetically different populations living in lar environments (Sellevold, 1980), or by examining torus incidences in families (Suzuki & Sakai, 1960, Johnson et al., 1965, Alvesalo & Kari, 1972). Genetic factors play a more significant role than factors related oro-maxillofacial function in the etiology of TP. and to identify the factors associated with the formation of TP (Yoshinaka et al, 2010). The occurrence of tori is considered to be an interplay of genetic and environmental factors (Loukas et al., 2013).

Based on these findings, genetic role may be possible as an important cause of tori. Because the highest incidence was reported in the 40- to 55-year-old age group (50.4%), as the oral environment may had been exposed to more rigid functional activities may be a contributing factor (Nery et al., 1977).

Many studies tried to link oral tori to hereditary patterns. In a segregation analysis of 99 sibships in two samples from Venezuela and Japan indicates that a TP is inherited in simple dominant fashion. The gene shows variable expressivity and penetrance close to 85%, without significant heterogeneity between the populations considered. No evidence of sporadic cases has been found (Barbujani et al., 1986).

2.2.4. Relationship to occlusal stress

It has been suggested that torus represents a reaction to increased or abnormal occlusal stress to the teeth in the involved areas and strong association between the presence of TM and occlusal stress indicated by the documentation of the pressure of clenching and grinding (Kerdpon & Sirirungrojying, 1999).

Occlusal forces has long been blamed for the appearance of TM (Yoshinaka et al., 2010). In one study, TM was present in more than half of the young healthy dentate participants and was closely associated with dental attrition and occlusal contact area (Morita et al., 2017).

In another study, the correlation of mandibular torus, palatine torus, oral exostoses to dental wear/loss and TMJ damage has been studied in 504 skulls of 223 African American and 281 European Americans aged between (30 and 80 years). The data were further analyzed using Pearson's Chi-square for significance of sex, age, ancestry, and wear in these groups, as well as the interactions between the demographic variables and the presence of mandibular torus, palatine torus, and oral exostoses. Wear was statistically significant by age and sex but not ancestry. The maxillary exostoses varied significantly by age, ancestry and wear but not sex. Mandibular torus frequencies varied significantly by wear, sex and ancestry. The palatine torus varied significantly across wear groups, sex and ancestry. More than age, sex or ancestry, the degree of dental wear and tooth loss influences the presence and expression of the oral cavity traits. The sample can be characterized as the presence of exostoses in higher frequencies in young African American males with little tooth loss. Males of both ancestral groups with heavy wear have higher frequencies of mandibular tori than females. The palatine torus is more common in edentulous European American females (Lease, 2020).

2.2.5. Relationship to Temporomandibular Disorders

Temporomandibular disorders (TMD) is a collective term representing a number of clinical problems involve the masticatory musculature, the temporomandibular joint (TMJ) and associated structures, or both (Clifford, Lamey, & Fartash, 1996). Parafunctional activity such as grinding, or clenching teeth and/or bruxism is considered an etiological factor of TMD. Many studies point that torus TM is more common in TMD than in control groups, whereas no such finding is noticed with torus palatinus (TP) and TMD (Sirirungrojying & Kerdpon, 1999).

2.2.6. Relationship to psychological stress

The association between signs and symptoms of bruxism and tori could help clinicians to recognize the likely patients susceptible to bruxism (Morita et al., 2021). This knowledge might also aid in understanding of tori development and stimulate new relevant research. However, there is no sufficient evidence to credit or discredit the association of tori and other signs and/or symptoms of bruxism (Bertazzo-Silveira et al., 2017).

2.2.7. Association with number of teeth

Patients with TM had on the average more teeth present than those without torus in patients less than 50 years of age. This is a finding of study Comparing the incidence of TM and average number of present teeth among 2010 consecutive dental patients over 10 yr of age. Patients with TM had on the average fewer unerupted canines than those without torus indicating that the hyperostosis seemed to be associated with more adequately-developed jaws. The decreasing incidence of TM with age approximately paralleled the decreasing number of present teeth, indicating that number of functioning teeth seems to be a factor of importance for the maintenance of the trait (Eggen & Natvig, 1986).

2.2.8. Association with Parafunctional habits

Parafunction in the form of tooth clenching or grinding has been associated with temporomandibular disorders (TMD) and recently migraine. Man studies denote the possible ole of parafunctional habits in the etiology of oral tori (Clifford et al., 1996). Bruxism is an oral parafunctional activity that involves the median ptrygoid muscles, which move the opposing dental arch one against another in a side to side motion. This is associated intraoral-

ly with grinding of teeth and clenching of the jaw. It is one of the most common sleep disorders and it can result in occlusal trauma, abnormal wear patterns, abfractions, tooth fractures, tooth loss and/or gum recession (Khaled et al., 2016). Bruxism has two distinct manifestations; it might occur during sleep (sleep bruxism-SB) or during wakefulness (awake bruxism-AB) Signs of bruxism include evidence of teeth grinding, abnormal tooth wear, indented tongue, facial muscle hypertrophy, and jaw locking, and symptoms like morning headache, facial pain, or fatigue; reports of teeth grinding or jaw clenching sounds during sleep (by the sleep partner or self-report) (Lavigne et al, 2008).

2.2.9. Relationship to attrition and abrasion

A strong relationship between dental attrition and the presence of tori in Thai patients was found by (Reichart et al., 1988), but not in German subjects; however, they stated that the functional influences should not be overestimated by this single observation. (Rezai et al., 1985) found a correlation between the occurrence of tori and tooth abrasion.

2.2.10. Correlations with dental wear/loss & TMJ damage

The presence of abnormal tooth wear might be associated with tori, mainly TM (Bertazzo-Silveira et al., 2017) as the presence of mandibular tori apparently related to conditions associated with parafunctional activity. In a study of patients attending facial pain clinic in Belfast assessed for the presence of tori compared to the age and gender of matched controls found that mandibular tori were present significantly more commonly in both migraineurs and TMD patients, which support an association with parafunction in the etiology of mandibular tori and suggest that tori are a useful marker of past or present parafunction in some patients (Clifford et al., 1996).

2.2.11. Possible relationship to nutrition

A possible role of nutrition in the etiology of torus has been raised by Eggen who noticed that the prevalence of TP appeared to be higher among natives of Lofoten in Norway who consume the softer food, than among natives of Gudbrandsdalen. This higher prevalence being hypothesized to have some connection with nutrient substances present in saltwater fish, possibly omega 3 polyunsaturated fatty acids and vitamin D that is involved in bone growth which increases the chances of tori (Eggen & Natvig, 1991).

2.2.12. Exostoses as a postoperative squeal of dental treatment procedures

Bony exostosis development secondary to soft tissue graft procedures has been reported in a small number of cases as a consequence of shallow vestibules which were treated with the use of skin grafts (Siegel & Pappas, 1986), subsequent to connective tissue graft (Corsair et al., 2001) and subsequent to free gingival grafts (Pack et al., 1991, Czuszak et al., 1996).

2.3. Prevalence of oral tori

Although the reported occurrence of tori in various ethnic groups' ranges from 9% to 66%, it has been statistically proven that some differences do occur between various ethnic groups and the sex. Even between similar ethnic groups living in different environments, different figures have been reported.

Such variations in prevalence of tori among different studies, is probably due to racial divergence or ethnic group differences (Gorsky et al., 1998; Reichart et al., 1988). As instance, it has been found for sure that the prevalence of TP and TM is higher in Mongoloids than in Caucasoid (Shah et al., 1992, Kolas et al., 1953). As such, the prevalence of TP and TM in 1000 Jordanian hospital patients was reported at 9.5% and 1.4% respectively.

It is clear that the prevalence of TP varies throughout the world. As example, in the USA, it has been estimated to lie between 20 and 25% (Kolas et al. 1953), in India 9.5% (Shah et al. 1992), in Croatia 42.9% (Simunkovic et al., 2011) and Japan 17% in (Yoshinaka et al., 2010). it seems that difference do exist among different races within the same country, as example, certain races, such as the American Indians and the Eskimo exhibit much higher incidence of TP than other races of general population in the USA (Sonnier et al., 1999).

2.3.1. The prevalence of oral tori in different ethnic groups

It had long been advocated that certain ethnic groups are more prone to have more torus than others are. However, tori were reported in almost all races worldwide with ent prevalence, which might be due to different methodology, and geographic variations. Country wise studies reported different figures.

In the USA, (Sonnier et al., 1999) reported 56% incidence of palatal exostoses in modern American skulls, consisting of whites and African Americans, with a higher prevalence

among men of both racial groups and among African-Americans. Few years later, a multiethnic study of 448 females aged between (18-88 years), TM were detected in 35.4% of African Americans, 32.3% of Caucasians, 30.2% of Hispanics, and in 38.9% of Asians. Whereas TP was found in 69.7% of women from all ethnic groups with slightly higher percentage in the Hispanics, then the African Americans, and the least in the Caucasians (Chohayeb & Volpe, 2001). In another American study, (Bouquot & Gundlach, 1986) reported a 0.09% prevalence of buccal exostoses in white Americans, and approximately 73% of the lesions were encountered on the maxillary alveolus. They found no sex-specific differences in prevalence. (Romanos et al., 2013), studied 1,323 patients in the Rochester, New York area and noticed high prevalence of TM (37.8%), with a mean population age of 40 years and 52% of them were observed in men.

A study from South Africa, of 284 modern skeletal specimens was studied for prevalence, side location, type and shape of oral tori. The later were found in 60 (24.4%) of dentate mandibles, and in only 1 (4.3%) edentulous mandible. Males constituted the majority of subjects 48 (80%) whereas there were only 12 (20%) females. the prevalence of torus was the highest among the 40-60 years age group. Thirty seven (61.7%) TM were bilateral, 42 (70%) were solitary, and 31 (51.7%) were rounded in shape. (Ihunwo & Phukubye, 2006).

The Croatian Simunkovic and co-associates in (2011) studied the prevalence of tori in 1679 Croatians subjects, where TP was found in 42.9% subjects and TM in 12.6% of the subjects. The spindle-shaped TP was the most frequent type (45.6%), while most of TM (35.4%) were solitary and bilaterally distributed overgrowths. In the same study, TP was found in 40.1% of the total number of the studied females and in 46.8% of males, indicating a significantly higher preponderance of TP towards the male gender ($p = 0.006$). TM was found in 11.3% of the female population and in 14.6% of the male population, again indicating significantly higher prevalence in the male population ($p = 0.046$). The results of this study showed significantly higher prevalence of TP and TM in the male subjects. Furthermore, no differences in the prevalence of either TM or TP regarding age were found in that study (Simunkovic et al., 2011).

The prevalence of (TP) among 664 elderly Japanese subjects was (17.0%) 113 subjects, and more frequently in women than in men (24.6% versus 7.5%, $P<0.01$). Moreover, there

was significant relationship between the appearance of TP and the presence of TM in the same group of subjects (13.3% versus 25.9%). (Yoshinaka et al., 2010). In another Japanese study, out of 97 subjects there were (29.7%) had TM. The occlusal force seems to play a significantly role in this group of patients as it was higher in patients with TM than those without TM ($p<0.05$) (Yoshinaka et al., 2010).

A Turkish study included 2660 consecutive dental patients, found that the prevalence of TP was 4.1% and it was significantly higher ($P<.001$) in females (5.7%) than in males (1.8%). Most TP were flat in shape (62.7%), smaller than 2 cm (75.4%) and located at the premolar-molar region (66.4%) (Sisman et al, 2008).

In Mexico, (Larato, 1972) found palatal exostoses in 30% of their sample, which consisted of human skulls of Mexican origin. The highest occurrence (59.1%) was in adults 55 years old and older. (Nery et al., 1977) examined 681 skulls of four ethnic groups and reported a 40.5% incidence of palatal exostosis. There were significant differences in the prevalence of exostoses among the four ethnic groups.

In Norway, variations in (TP) prevalence were investigated among 2010 dental patients over 10 years of age native to two different regions in Norway, the Lofoten Islands in northern Norway and the Gudbrandsdalen valley, an inland area in the southeastern part of the country. The two groups were presumed to belong to the same Caucasian stock, but were extremes with regard to the fish-to-meat ratio of the diet, which was 3:1 in Lofoten and 1:3 in Gudbrandsdalen, respectively representing a soft type of diet, and a tough type requiring greater muscular forces during mastication. The study revealed that the prevalence of TP is higher among women than men. TP is likely to arise from a multifactorial liability, with part of the genetic factors residing on the X chromosome; and the prevalence of TP appeared to be higher among natives of Lofoten, who consume the softer food, than among natives of Gudbrandsdalen. this higher prevalence being hypothesized to have some connection with nutrient substances present in saltwater fish, possibly omega 3 polyunsaturated fatty acids and vitamin D; and lastly, TP seemed to be a dynamic phenomenon capable of growth and subject to resorption and remodeling (Eggen & Natvig, 1991).

In a study of the Mongoloids, where the Oceania- Asia specimens (representing Mongoloids) showed the highest incidence of palatal exostoses (47.2%), whereas the Africans exhib-

ited the lowest incidence (25%) (Jainkittivong & Langlais, 2000). (Touyz & Tau, 1991) reported a 14.5% incidence of palatal exostoses in the skulls of blacks, mixed whites, and Chinese, with a male to female ratio of 3.5 : 1.

In a Moroccan study of 353 patients, the prevalence for exostosis was 3.1%, TM 2%, TP 0.8.%, with higher prevalence in female patients (7.3%) than in male patients (6.3%). Patients with occlusal parafunctional activity presented with significantly more tori and exostosis (P=0.016) (Oualalou et al., 2014).

In comparative study of the prevalence of oral tori in a Thai and German populations TP was found in 13.5% of 1317 German patients (606 men, 711 women) with no statistically significant difference between the sexes, while TM was recorded in 5.2% of the same group (8.6% men and 2.4% women . For Thai patients, the same study reported that TP was found in 23.1% of 947 Thai (404 men, 543 women). The difference between the two sexes was significant (P< 0.001). TP is more common in women as it was detected in 28.5%, and in only in 15.8% of the men. TM in the same study was found in 9.4% of the men and 9% of the women) (Reichart et al., 1988). Another study from Asian region found that the prevalence of both tori in Thai population were comparable to the Mongoloids and other Asian populations. (Apinhasmita et al., 2002).

In Ahmedabad of India, the prevalence of TP and TM in 1000 hospital patients, was estimated at 9.5% and 1.4% respectively. TP was more common in females than males. Majority of the tori were found in the age group of 11 to 30 years and were rarely seen before the age of 10 years (Shah et al., 1992).

In a Malay sample; the prevalence, size, shape, and location of TP and TM, and their sex-related and age-related differences were studied in 60 persons. The prevalence of TP was 38-63% and that of TM was 1-10%. TP was frequently more common in females than in males and it was frequently found in medium sizes; spindle shaped, and was often located at the combined premolar to molar areas. The prevalence of TM was not significantly different in males and females, occurred most commonly in bilateral multiple form, and was often located at the canine to premolar area (Hiremath et al., 2011).

In a Saudi Arabia; it has been found among 847 subjects, 149 (17.59%) had either TP or TM, 66 (7.79%) subjects had TP, whereas 83 (9.80%) had TM. The maximum percentage

(36.36%) of oral tori was observed in the age group of 60-69 years. The percentage of males with either tori was higher (19.0%) when compared to females (15.94%). According to the shape, the occurrence of flat-shaped TP (57.58%) and bilateral solitary TM (39.76%) was the more common picture (AlZarea, 2016).

In Jordan, 338 studied subjects show a prevalence of TP of 29.8%, TM 42.6%. A concurrence of both types of tori was observed in 27.7% of cases, but no significant difference in the prevalence of tori between males and females was observed (Al Quran & Al-Dwairi, 2006).

The prevalence of tori was studied in three Iceland populations; in the South- and North-Thingeyjarsyslas, Northeast Iceland, where 987 schoolchildren (489 male and 487 female), the prevalence and size of oral tori were affected by age and population but not by sex. A concurrence of TP and TM was not found which emphasized the importance of environmental etiological factors and diminish the value of TP as a racial trait (Axelsson & Hedegard, 1981).

2.4. Clinical characteristics of tori

Torus palatinus and Torus mandibularis are common exostoses of the mouth, (i.e., localized benign bony overgrowths arising from cortical bone) (Neville et al., 1995). They are occasionally found incidentally during routine examination of the oral cavity (Chatterjee, 2016). TM represents growth on the lingual surface of the mandible occurs above the mylohyoid line, usually opposite the bicuspid teeth. Like the TP, it may vary considerably in size and shape.

2.4.1. Age distribution

Tori tend to appear more frequently during middle age of life; Prevalence of torus is the highest in 40-60 years age group. (Ihunwo & Phukubye, 2006) and is rarely reported in infants or small children (Beena, 2012), however, some authors believe that there is no relationship between age and the presence of tori (Chohayeb & Volpe, 2001). Tori are frequently observed in young adults and in middle-aged persons (Eggen et al., 1994), very unusual in infants (Beena, 2012). It has been theorized that because some tori are found with some frequency during the middle phase of life, this indirectly suggests not only a genetic cause, but also environmental and functional factors involvement, particularly those related to

masticatory stress (Haugen, 1992, Eggen, 1988) and probably some parafunctional habits (Clifford et al., 1996).

2.4.2. Gender distribution

TP is more commonly observed in females, but this is not the case with the TM (Garcia-Garcia et al., 2010, (Ihunwo & Phukubye, 2006). furthermore, ethnic differences in TP are frequency present only in females. TP is more commonly observed in females, but this is not the case with the TM (Garcia-Garcia et al., 2010). In a study of 60 cases from RSA more tori was found in males 48 (80%) than females 12 (20%), (Ihunwo & Phukubye, 2006). This finding was supported by the results of study carried out in the Rochester, New York, area USA, of the 1,323 subjects studied, 37.8% had TM, with a higher frequency occurring in male patients (overall mean age: 40 years); 52% of the tori were observed in men (Romanos et al., 2013) In another study, TP was found to be more common in females than males and the majority of tori were found in the age group of 11 to 30 years and were rarely seen before 10 years of age (Shah et al., 1992).

2.4.3. Size of tori

The relationship of TP occurrence and size to age and sex is quite interesting as the medium and large-sized TP tended to be found in females more than in males. The subjects in the older age group were more likely to have large-sized TP than those in the 13-19 year age group (Apinhasmita et al., 2002). The occurrence of TM in small, medium and large sizes was not significantly different between males and females.

Most studies reported that TM were small and bilateral and multiple (59.5%), followed by the bilateral single. The most common location of TM was the canine to premolar area (40.5%), followed by the premolar area (25.7%) (Apinhasmita et al., 2002). The morphology of the mandibular torus was studied comprehensively by (Sellevold, 1980).

2.4.4. Shape of tori

TP may assume a variety of shapes, hence it has been classified clinically on this basis as flat, spindle-shaped, nodular or lobular (Regezi et al., 2008). Once begun, lesions usually grow slowly over the patient's entire life. Growths commonly consist of four evenly spaced lobes composed of dense bone with a thin layer of mucosa tightly stretched over the surface.

Lesions can grow large, sometimes becoming pedunculated. The flat shaped TP was is the most commonly reported shape as it constitutes (56.4%) of the cases, followed by the spindle (17.9%), nodular (17.3%), and lobular (8.4%). There was a relationship between shape and size of TP as most spindle-shaped TP are in medium and small sizes, while most nodular TP are of small size while most lobular TP were of medium size and all flat TP were small shapes (Chang et al., 2020).

2.4.5. Bilateralism of TM

Although the mandibular tori are usually bilateral, as many as 20% of the cases are seen as unilateral. Both unilateral and bilateral protuberances may be single or multiple, and they are frequently visible on dental periapical radiographs. One study in South Africa reported that (61.7%) of mandibular tori are bilateral and (70%) were solitary (Ihunwo and Phukubye 2006). the torus on the left side tending to be longer and more forward in position than the right (Sellevold, 1980).

2.4.6. Concurrence of Torus Palatinus, Torus Mandibularis

Concurrence of TP and TM was occasionally reported. There is no correlation in the frequency of simultaneous occurrence of torus palatinus and TM, according to previous study of (Kolas et al., 1953) suggesting that the two conditions are not related. Reports on the concurrence of TP and TM generally describe a low frequency of occurrence, denoting a non-significant correlation. However, (Haugen 1992) reported that the probability of finding a TM in a person with a TP was more than twice as high as in a person without a TP, and vice versa. The concurrence of tori with exostosis was rarely reported. One case each of TP with palatal exostoses was reported by (Topazian & Mullen, 1977) and by (Blakemore, Eller, & Tomaro, 1975). A third case of concurrence of TP with palatal and buccal exostoses was described by (Antoniades et al., 1998) but claimed that the concurrence of tori with exostoses in the same individual is a rare finding. However, another case was reported in a twenty two years old Pakistani woman with a concurrence of TP, bilateral TM, and maxillary buccal exostoses; and a possibly associated with an abnormal occlusal stresses and extensive use of calcium and vitamin D supplements (Khan, 1977).

2.5. Investigations for tori

2.5.1. Classifying and categorizing tori

Some studies, tori were measured and classified by size (Eggen, 1989, Eggen & Natvig, 1991, Kerdpon & Sirirungrojying, 1999, Sirirungrojying & Kerdpon, 1999). Even though torus classification by size might be more accurate than other subjective descriptive standards, measuring small tori is difficult unless they are measured in trimmed gypsum casts, as done by (Reichart et al., 1988). However, this method is rather laborious.

2.5.2. Diagnosis of tori

Visual inspection and digital palpation is the most widely used method of diagnosis of oral tori,(Bruce et al., 2004; Hjertstedt et al., 2001; Hosoi et al., 2003). In a single case report, the computed tomography scan (axial, coronal and sagittal view) provided a detailed assessment of the TP and elimination of other possible diagnoses, furthermore it allowed for a better analyzed of the anatomic relation with adjacent structures. (Nogueira et al., 2013). Syndromes associated with facial exostoses such as Proteus syndrome or Gardner's syndrome should be clinically excluded (Nolte & Schirren, 1997). Morphological changes of the mandibular cortical bone are found to be related to presence of TM by measuring the mandibular cortical index (MCI) by visual assessment of changes in the morphology of the mandibular cortex on panoramic radiographs (Koc & Cagirankaya, 2019).

2.5.3. Differential diagnosis

Oral tori must be differentiated from other growths in the mouth including fibromas, mucoceles, osteomas, osteochondromas, and osteoid osteomas (Ladizinski & Lee, 2014). However, oral tori can usually be distinguished from other conditions on the basis of clinical findings alone. Biopsy may be warranted if there is doubt (Chatterjee, 2016).

2.6. Management of torus

Torus is benign overgrowth does not need any treatment, however, conservative surgical removal continues to be the first choice treatment when the torus must be removed (Bernaola-Paredes et al., 2020). Surgical removal of the oral tori is indicated in the following circum-

stances: (1) deglutition and speech impairment, (2) cancer phobia, (3) traumatized mucosa over the torus, and (4) prosthetic reasons.

The use of laser, such as Er:YAG excision (TM) or Er:YAG peeling (TP) are safe clinical techniques easy to practice even if the time required for excision or surface smoothing is more than the time required with bony burs and high speed instruments (Rocca et al., 2012).

2.6.1. Clinical implications and the uses of oral tori

TP and TM are found in approximately 20% and 27% of the population, respectively, are feasible options for bone regeneration, with several advantages compared to other sources of bone as it result in surgery with less morbidity when included in the treatment plan (Moraes et al., 2010).

It has been used as autogenous grafts to fill an intrabony defect at the mandibular right central incisor. The TM provided sufficient graft material and eliminated the need for a second surgical site (Pal et al., 2018). The use of Platelet Rich Plasma (PRP) gel in combination with TM offers a potentially useful treatment for periodontal osseous defects (Hassan et al., 2015).

2.6.2. Beneficial utilization of oral tori

The extra bony areas offered by tori could be useful in some clinical challenges. As example, they can be utilized as a prime sites for harvesting autogenous bone for bone grafting for dental implants placement, alveolar ridge augmentation (Barker et al., 2001) and maxillary sinus lifting, (Neiva & Wang, 2006), periodontal osseous defect and can be used for multiple reconstructive uses such as nasal reconstruction (Puttaswamaiah et al., 2011).

2.6.3. Relationship of osteonecrosis to torus

Osteonecrosis of the jaw usually related to bisphosphonate use. Bisphosphonates are medications used orally and intravenously for a variety of conditions including cer metastatic to bone, hypercalceamia of malignancy, Paget's disease and sis. Osteonecrosis of the jaw most commonly occurs in the setting of nous bisphosphonate use and concomitant dental work or trauma. Oral bisphosphonates have much less risk of osteonecrosis of the jaw. Osteonecrosis of the palate is a rare condition which is even rarer when occurring on a TP and associated with bisphosphonate (Godinho et

al., 2013). A report of a case on an oral bisphosphonate for nine years, with a TP, who burned her palate while eating a slice of pizza and was presented after six months with an area of denuded bone and diagnosed osteonecrosis of the TP (Ryan & Larson, 2016). Another rare case of bisphosphonate-related osteonecrosis of the palatal torus in 72-year-old woman with osteoporosis who was on alendronate sodium hydrate once every week for six years. She had a 2-month history of oral pain because of intractable mucositis and ulceration of the palatal torus diagnosed as stage 2 bisphosphonate-related osteonecrosis of the jaw caused by trauma, she discontinue alendronate. She was prescribed oral antibiotics for five days and an oral antibacterial rinse. The mucositis with ulceration healed in approximately 10 weeks, but left a small scar (Kaneko & Takahashi, 2014).

2.6.4. Biochemical studies

Although Oral exostosis is a pathological condition of bone that is characterized by excessive bone formation, however, there is rather scarce information about any changes in bone minerals or other elements associated with calcium metabolism. A Japanese study investigators suggested that some common mechanisms are involved in the elevation of skeletal BMD and the occurrence of oral exostoses (Hosoi et al., 2003). The relationship between TM and mandibular bone quality based on the measurement of mandibular cortical index indicated that subjects with TMs may have a higher mandibular bone quality compared to those without TMs (Koc & Cagirankaya, 2018). Secondary hyperparathyroidism in renal dialysis patients does not contribute to the formation of tori in peritoneal dailysis patients Hsu (Hsu et al., 2016).

AIMS OF THE STUDY

Chapter: 3 AIMS OF STUDY

This study was conducted on patients with clinical evidence of oral tori to:

1. describe the demographic and other clinical features of patients with oral tori and other dental findings such as teeth number, mobility, crowding, and spacing, dental occlusion type and dental arch shape.
2. measure the dimensions and size of oral tori and determine their shapes.
3. determine the signs and symptoms of parafunctional oral activity (such as clenching, teeth grinding and/or bruxism) in this group of patients.
4. study the level of blood calcium, vitamin D, and parathyroid hormone in the study group.
5. determine the level of anxiety and depression in the patients with oral tori using HAD score.

MATERIALS AND METHODS

Chapter: 4 MATERIALS AND METHODS

4.1. Study Design and Sample Population

To address the research purpose, this cross-sectional study was designed and implemented to provide an accurate description and analysis of demography and clinical characteristics of oral tori in Libyan patients residing in the Eastern north region of Libya.

4.2. Study subjects

This study only includes patients with oral tori. A torus was considered to be present when there was a bony protuberance seen and, in doubtful cases, digital palpation was used as described by (Chew & Tan, 1984).

4.3. Sitting

Fifty Libyan patients with clinical evidence of oral tori were studied in the period from October 20, 2019 through December 20, 2020. They were randomly selected from consecutive patients attending two main dental centers providing dental services in two different towns and cities in northern east region of Libya namely:

1- Dental faculty of Benghazi University.
2- Central public clinic in (Almarej).

   Both clinics are currently among the biggest dental centers in the eastern provinces of the state of Libya; providing dental services to a wide region of the country with a considerable flow of patients.

4.4. Ethical consideration:

The study was registered in the registry of clinical studies of the dental faculty and permission for the study conduct was obtained from the ethical committee of the faculty. Implied consent was obtained from each individual included in this study after the patient had been fully informed about the study and agreed to participate in it.

4.5. Armamentarium

1- (High consistency putty suitable for double step impressions):
   a) Ormadent Putty®
   b) Ormamax® Light body
2- Gypsum material (Elite Model, Zhermack®)
3- Electronic Digital Caliper 0-6 inch/150 mm Vernier Extra Large LCD Screen, Stainless Steel Body, Conversion Millimeters Inches Precision Measurement Tool.
4- Dental mirrors
5- Dental probe,
6- Measuring gauge
7- Disposable impression tray (sizes xs- xl)
8- Rubber bowel
9- Spatula
10- Latex gloves.
11- Dental Cast laboratory fabrication facility.

4.6. Study conduct

1- Patients with clinical evidence of oral tori were selected from routine consecutive patients attending dental clinics for various reasons. The suitable cases had full explanation of the purpose of the study. If agreed to participate; a signed written consent regarding of volunteering to this study was obtained. On a specially designed clinical audit (Appendix 1) the information were recorded at chair side. The patient was assisted to complete an Arabic translated version of HAD scale (Appendix 4).
2- A comprehensive clinical examination, including extraoral examination of the muscles of mastication and TMJ for pain, clicking sounds, or headaches.
3- An objective and subjective symptoms or signs of parafunctional habits were examined such as the wear facets or masticator muscles tenderness.
4- The size shape and location of the torus was examined through inspection and digital palpation and all information were recorded in a specially formulated clinical audit (Appendix 2).

5- Venous Blood sample was obtained by a trained dental nurse and sent to the same credible laboratory for investigation of calcium, vitamin D and parathyroid hormone.
6- A maxillary and mandibular dental impressions were taken by a rubber base butty and light body as indicated in the materials section. Dental casts were immediately fabricated. In the dental laboratory using gypsum material (Elite Model, Zhermack).
7- Further measurements of size of torus, dental arches shape and the type of dental occlusion were done on the finished dental cast.

4.7. Inclusion criteria:

1- An adult Libyan (female or male) with clinical evidence of either mandibular tori, torus palatines volunteered to this study.
2- Completely or partially edentulous patients undergoing prosthetic replacement of teeth with an evidence of tori.
3- Patients with symptomatic or clinical evidence of parafunctional habits and clinical evidence of tori.

4.8. Exclusion criteria

1- Patients with known major systemic bone diseases such as chronic renal failure, osteoporosis, Paget's disease hemolytic anemia or diseases with abnormal calcium metabolism.
2- Patients with major psychiatric or nervous disorders.
3- Patients with malignancy or currently treated for malignancy.
4- Patients taking drugs which known to affect calcium metabolism.

4.9. Data records

1- **Size of torus**: Torus was assessed both clinically and on the dental casts for their size, site and bilateralism (unilateral or bilateral). The size of tori were measured using calipers (Model 505, Mitutoy 0) (Figure 12). For the ovoid or circular shaped tori, the diameter was taken. They were labeled according to their size as:

A. small the diameter is (< 3 mm)

B. medium the diameter is (3–6 mm).

C. large the diameter is (> 6 mm).

For the tori with two dimensions or the non-circular (both the meso-distal and occluso apical dimensions were taken).

2- **Shape of the tours**: each torus was allocated to one of the following shapes:

A. Rounded
B. Oval
C. Spindle shape
D. Lobulated
E. Other

4.10. Tours Palatinus

4.10.1. Dimensions of Tours

It was measured based on the greatest mesio-distal dimension obtained at the point of greatest convexity on the torus, measured in millimeters by using an electronic caliper.

4.10.2. Vertical dimension of torus

The Occlusso-Apical of the torus palatine was measured in millimetres from the roof of the palatal vault to the most inferior point of convexity on the tori.

If the torus was lobulated, and multiple lobules of varying vertical heights were present, only the most inferior point of convexity on the most prominent lobule was measured.

4.11. Torus Mandibularis

In this sample, as most of the patients presented with bilateral TM, and only few of them have a unilateral tori. In cases of bilateral TM, both right and left mandibular tori either single or multiple were carefully-assessed separately and the average of their dimensions was used as reference.

4.11.1. Dimensions of TM

Mesio-distal dimensions of the tours was measured based on the greatest mesio-distal dimension obtained at the point of greatest convexity on the torus, measured in millimeters by using an electronic caliper.

4.11.2. Vertical dimension of TM

Height of the torus was measured in millimeters from the floor of the mouth to the most superior point of convexity on the torus by using an electronic caliper

If the torus was lobulated, and multiple lobules of varying vertical heights are present, only the most superior point of convexity on the most prominent lobule is measured. After individual measurements was made from each left and right tori, their mean average values were obtained by addition of both values of a category, and divided by two.

4.11.3. Diameter of the rounded torus

In the case of ovoid or circular shape of the torus the diameter was measured fom the entre to the perimeter.

4.12. Shape of the dental arches:

The shape of dental aches was visualized on the dental cast and described as:

A. U shaped
B. V shaped
C. Square

4.13. Blood Chemistry

Venous Blood sample was obtained by a trained dental nurse and sent to the same credible laboratory for investigation of:

1. Serum calcium level.
2. Vitamin D level.
3. Parathyroid hormone level.

4.14. Measurements of anxiety and depression

The Hospital Anxiety and Depression Scale (HADS). Patients completed an assisted questionnaire composed of statements relevant to either generalized anxiety or 'depression. Each item had been answered by the patient on a four point (0–3) response category so the possible scores ranged from 0 to 21 for anxiety and 0 to 21 for depression. An analysis of scores on the two subscales of a further sample, in the same clinical setting, enabled provision of information that a score of 0 to 7 for either subscale could be regarded as being in the normal range, a score of 11 or higher indicating probable presence *'caseness'* of the mood disorder and a score of 8 to 10 being just suggestive of the presence of the respective state. Further work indicated that the two subscales, anxiety and depression, were independent measures. Subsequent experience enabled a division of each mood state into four ranges: normal, mild, moderate and severe and it is in this form that the HADS is now issued by its publisher In the case of illiteracy, or poor vision, the wording of the items and possible responses may be read to the respondent.

4.15. Data analysis:

Measurements from all 50 patients were tabulated and analyzed using the statistical package SPSS version 23. The data analyzed for:

1- Exploring the general data for the demographic characteristics of the sample (using descriptive analysis).
2- The shape of dental arches and type of occlusion, number of teeth present (frequency tables).
3- The number, size, and shape of tori were described by (frequency tables).
4- Relationship between oral tori and the symptoms of parafunctional activity such as inability to open mouth widely, TMJ morning stiffness, Diurnal bruxism, Muscle Clenching, Teeth Grinding, Grinding sounds during sleep, Morning jaw/neck fatigue, Facial muscles fatigue, Nocturnal habit bruxism : were described by frequency tables first then by linear regression.

5- Relationship between oral tori and the signs of parafunctional activity such as (Mobility of teeth, Wear on occlusal appliance, Number of teeth present, Fractured teeth or restorations, Attrition, Presence of shiny facets).

6- All patients were investigated regarding their calcium, vitamin D and PTH levels. The results were tabulated and analyzed by descriptive analysis.

7- The Hospital Anxiety and Depression Scale (HADS) for every patient was compared by linear regression for a presumable association with the symptoms and signs of stress and depression.

RESULTS

Chapter: 5 RESULTS

Data were analyzed for the general features of the study group, their demography, reasons of attendance to dental office and the general findings on clinical examination such as the shape of dental arch, type of occlusion,, number of teeth present, crowding, hypodontia, supernumerary teeth.

The clinical presentation of tori were studied comprehensively for their number, type, shape and dimension. The study tried to investigate the correlation between the presence of tori and the clinical evidence of stress such as bruxism, muscle fatigue, wear facets and mouth opening. The biochemical findings of the Ca+ level, Vitamin D, and PTH levels were investigated. The level of anxiety and stress in this group was assessed by HAD scale.

5.1. Demography

This section describes the demographic data of the study sample such as age gender, occupation, and referral pattern of the patient.

5.1.1. Study sample and design

This study comprised 50 consecutive patients with clinical evidence of oral tori included in this study for investigating the clinical characteristics of oral tori and their relationship to anxiety and stress.

5.1.2. Age of study group

The age of the included individuals varied from 16 years to 63 years, with a median age of 36.5 years and SD of 9.6 as shown in (Table 1).

Table 1: Age of the patients

No of patients	50
Mean	35.78
Median	**36.50**
Mode	37
Std. Deviation	9.696
Minimum	16
Maximum	66

Most patients lie in the ages between 20 and 50 years. 22 (44%) of the patients lie in the age group 30-40 years, 12 (24%) lie in the age group 20- years and 10 (20%) lie in the age group 40-50 years as shown in (Table 2) and (Figure 1).

Table 2: Age Groups

Age group	**Frequency**	**Percent**
<20	3	6.0
20-30	12	24.0
30-40	22	44.0
40-50	10	20.0
50-60	2	4.0
>60	1	2.0
Total	50	100.0

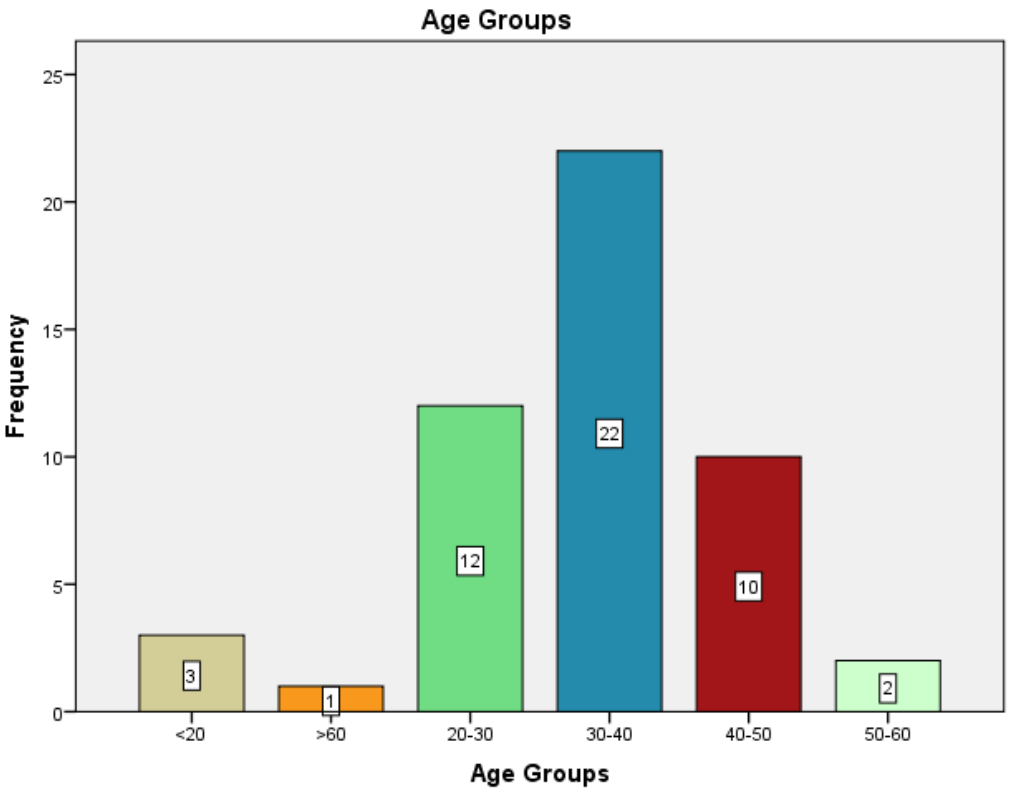


Figure 1: Age groups of the study sample

5.1.3. Gender

The number of females surpluses that of males in this study sample as there were 39 females and 11 males as shown in (Figure 2).

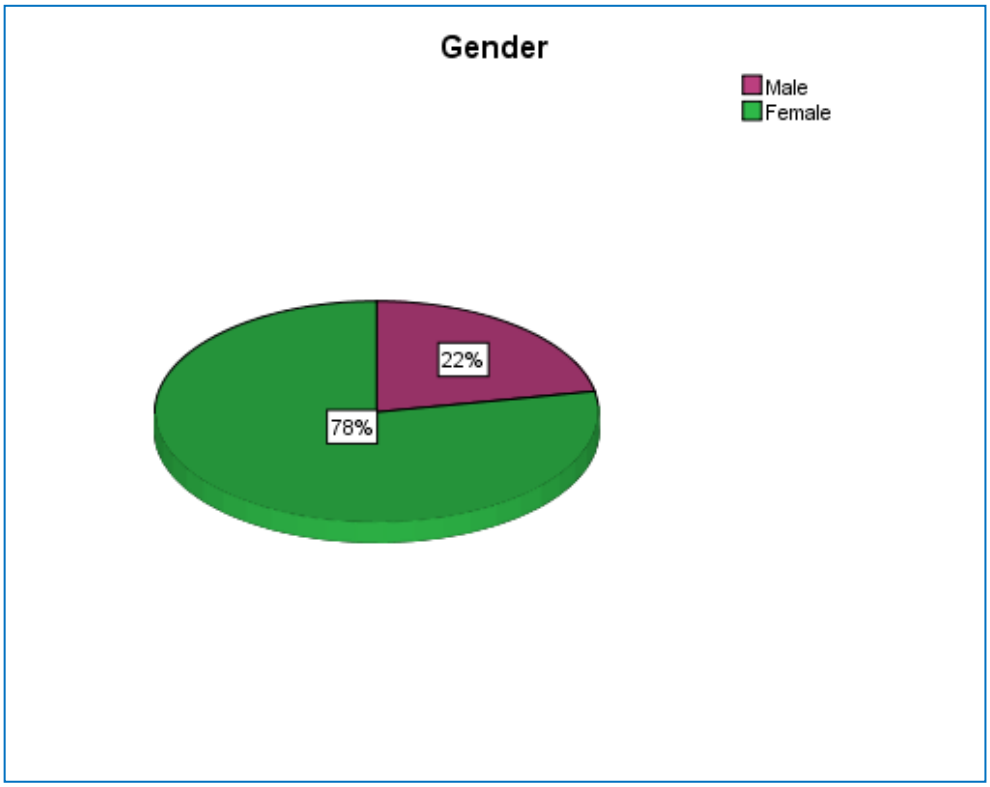


Figure 2: Gender of the study group

Although there were more cases of TM in females than males, this difference is not statistically different in this sample Chi-Square 0.044, df =2 (p-value=0.978), as shown in (Tables 3 & 4).

Table 3: Type of torus according to gender

		Gender		Total
		Male	Female	
Tori Type	T Palatinus	2	8	10
	T M	6	20	26
	Both	3	11	14
Total		11	39	50

Table 4: Comparison between TM & TP according to gender

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-
Pearson Chi-Square	.044[a]	2	.978
Likelihood Ratio	.044	2	.978
Linear-by-Linear Association	.003	1	.953
N of Valid Cases	50		

5.1.4. Occupation of the patients

The occupation of the included subjects represented a wide range of different jobs of different socioeconomic backgrounds. It mainly included teachers (10), house wives (9), students (6) and cashiers (5) and other jobs in a lesser extent as shown in (Table 5).

Table 5: Occupation of the study group

Occupation	Frequency	Percent%
Business man	3	6.0%
Cashier	5	10.0%
Doctor	1	2.0%
Engineer	1	2.0%
Hammersmith	1	2.0%
House wife	9	18.0%
Lab technician	1	2.0%
legal counsel	1	2.0%
Office manger	1	2.0%
Municipal Guard	1	2.0%
Nurse	4	8.0%
Pharmacist	1	2.0%
Soldier	2	4.0%
Student	6	12.0%
Teacher	10	20.0%
Tourist guide	1	2.0%
Unemployed	2	4.0%
Total	50	100.0%

5.2. The subjects of study

5.2.1. Mode of referral of the of the patients

Most patients (82%) in this study were new consecutive patients and only three patients were referred to specialist opinion regarding cancer-phobia as shown in (Figure 1). This is clearly show that only few fraction of patients were really concerned by the presence of oral tori as shown in (Figure 3).

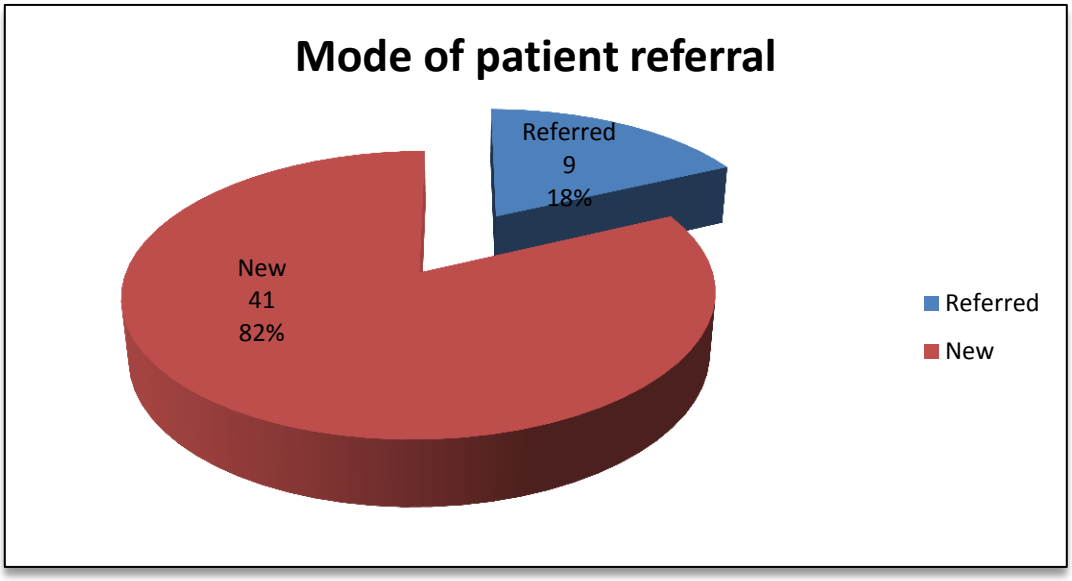


Figure 3: Mode of referral of patents

5.2.2. Reasons for attendance to dental surgery

Most patients came to dental clinic seeking dental advice for complaints mostly related to dental caries and periodontal diseases such as dental fillings, periodontitis, prosthetic replacement or exodontias. Only 3 patients were referred for reassurance about cancer phobia from these tori as shown in (Table 6).

Table 6: Reasons of attendance to dental clinic of the study group

No	Reason of attendance	Frequency	Percent
1	Dental check up	5	10.0
2	Fillings of teeth	17	34.0
3	Prosthetic reasons	5	10.0
4	cancer phobia	3	6.0
5	Periodontal problems	11	22.0
6	Exodontia	9	18.0
7	Total	50	100.0

5.2.3. Smptoms of a presumed parafunctional habits

Facial muscle clenching and fatigue was the most prevalent symptoms as 32 (64%) of the patients suffer from such symptoms. Morning jaw/neck fatigue in 23 (46%) patients, teeth grinding in 20 (40%) patients, TMJ morning stiffnessin 18 (36%) patients, nocturnal habit of bruxism in 11 (22%) patients, diurnal bruxism in 9 (18%) patients, grinding sounds during sleep in 7 (14%) patients and 18 (36%) patients were aware about the presence of oral tori in their mouths as listed in (Table 7). No reports of practical difficulties of speech or deglutition caused by the presence of tori or any interferences with sleep.

Table 7: Symptoms attributed to torus

	Symptoms	No. of patients	Percentage
1	Facial muscle Clenching and fatigue	32	64%
2	Morning jaw/neck fatigue	23	46%
3	Teeth Grinding	20	40%
4	TMJ morning stiffness	18	36%
5	Nocturnal habit of bruxism	11	22%
6	Diurnal bruxism	9	18%
7	Grinding sounds during sleep	7	14%
8	Awareness of torus presence	18	36%

5.2.4. Signs of parafunctional activity

The signs of presumed parafunctional activity were recorded such as attrition in 34 (68%) of the patients, presence of shiny facets in 32 (64%) of patients, fractured teeth or restorations in 23 (46%) patients, mobility of teeth in 20 (40%) of patients and wear on the occlusal surface appliance in only 11 (22%) patients as shown in (Table 8).

Table 8: Signs of tooth wear or muscle fatigue

No.	Sign	Number	Percentage
1	Attrition	34	68%
2	Presence of shiny facets on teeth	32	64%
3	Fractured teeth or restorations	23	46%
4	Mobility of teeth	20	40%
5	Wear on occlusal surface of appliance (if the patient owns one)	11	22%

5.2.5. General dental findings of the study sample

The studied group of patients there were 44 (88%) patients with Angle class I malocclusion and only 6 (12%) were with Angle's class II malocclusion. All the patients except three of them had U shaped dental arch. Teeth spacing was detected in 17 (34%) patients, while there were only 2 patients with hypodontia of upper lateral incisors and no supernumerary teeth were detected in this study group. As shown in (Table 9).

Table 9: Clinical findings of the study sample

Character		Frequency	Percent
Occlusion type Angle	*Angle class 1*	44	88%
	Angle class 2	6	12%
Dental Arch shape	*U shape*	47	94%
	V shape	2	4%
	Square- shape	1	2%
Teeth spacing		17	34%
Crowding		19	38%
Hypodontia		2	4%
Supernumerary teeth		0	0%

5.3. Clinical presentation of oral tori

5.3.1. Concurrence of palatal and mandibular Tori

Most patients, 26 (52%) had TM only at the time of examination, while another 10 (20%) had TP and in 14 (28%) patients there was a concurrence of both TM and TP, as shown in (Table 10) and (Figure 4).

Table 10: Concurrence of oral tori

Type of torus	Frequency	Percent
Torus Mandibularis.	26	52.0%
Torus Palatinus	10	20.0%
Both TM & TP	14	28.0%
Total	50	100.0%

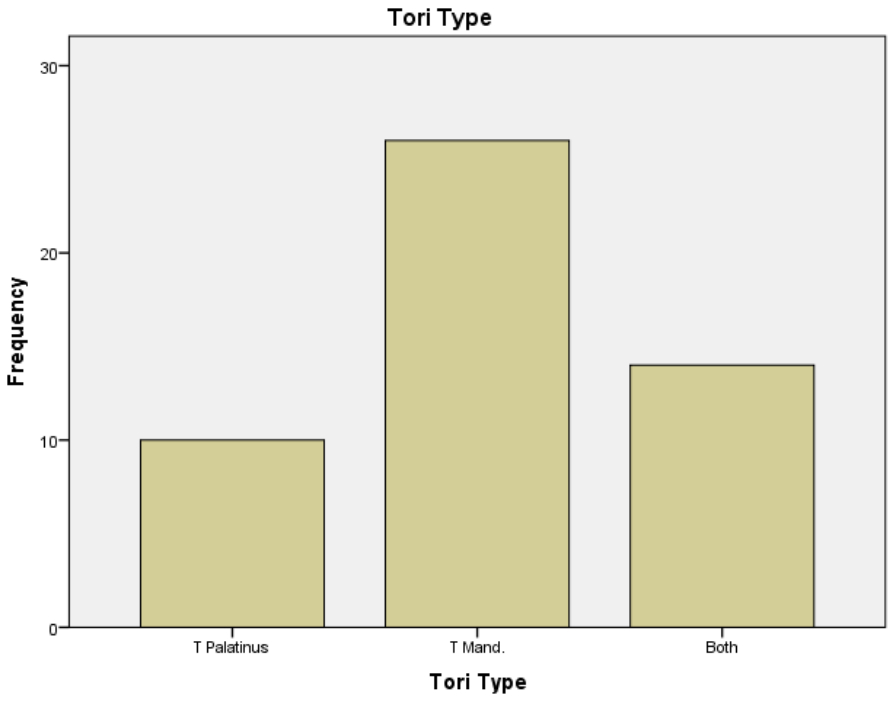


Figure 4: Type of oral tori in the study group

5.3.1. Number of tori

Single torus was the most prevalent presentation in this study as 37 (74%) patients had a single torus, which is quite different from the bilateralism of the mandibular tori (could be single or multiple). Only 13 (26%) cases had multiple tori at presentation as shown in (Table 11) and (Figure 5).

Table 11: Number of tori in each patient

Type of torus	Frequency	Percent
Single	37	74.0
Multiple	13	26.0
Total	50	100.0

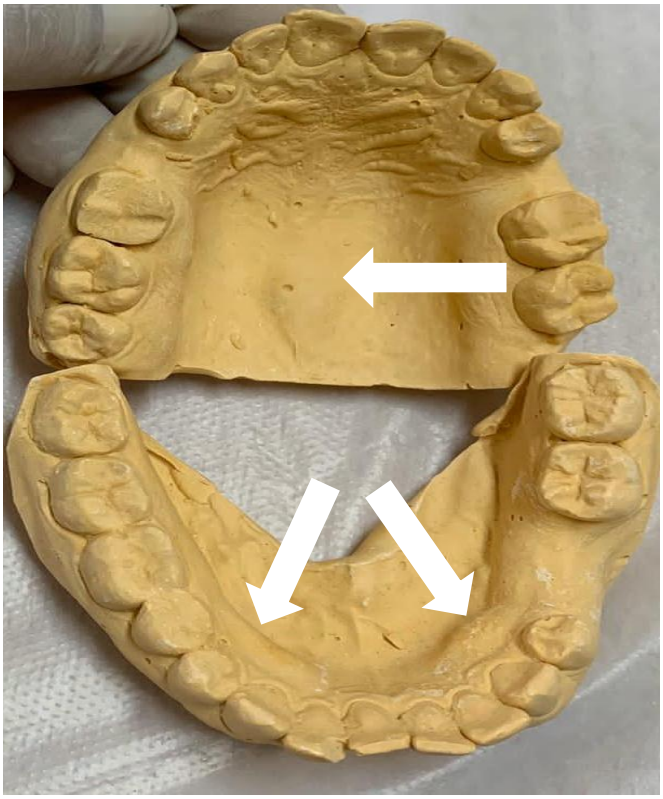


Figure 5: Study cast shows a concurrence of palatal and mandibular Tori

5.4. Torus palatinus (TP)

5.4.1. The number and size of TP

TP detected in 24 cases, occurred alone in 10 cases and in a concurrence with TM in another 14 cases. The size of all TP exceeded 10 mm in its longest dimension diameter regardless of the shape.

5.4.2. The shape of TP

Of the 24 cases with TP, 14 (58.33%) patients had spindle shaped torus, 7 (29.17%) had heart shaped torus, 1 (4.17%) had lobulated torus and other shapes in another two patients as shown in (Table 12) and (figure 6).

Table 12: The shape of TP

Shape	Frequency	Percent
Spindle shape	14	58.33%
Heart shaped	7	29.17%
Other shapes	2	8.33%
Lobulated	1	4.17%
Total	24	100.0%

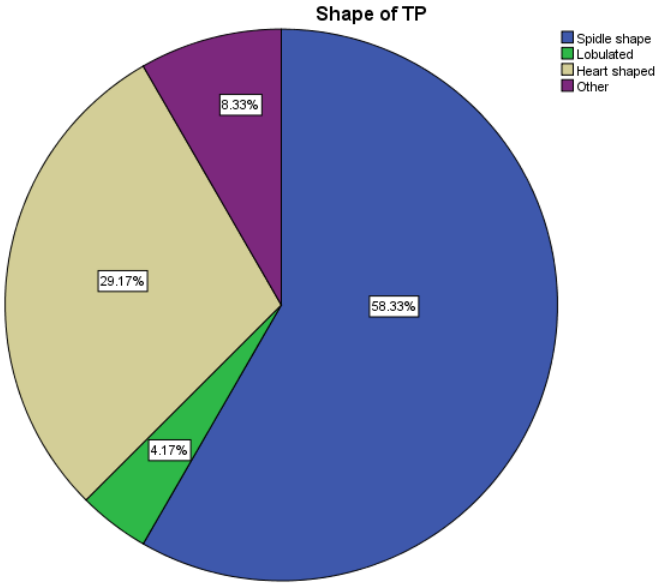


Figure 6: The shape of TP

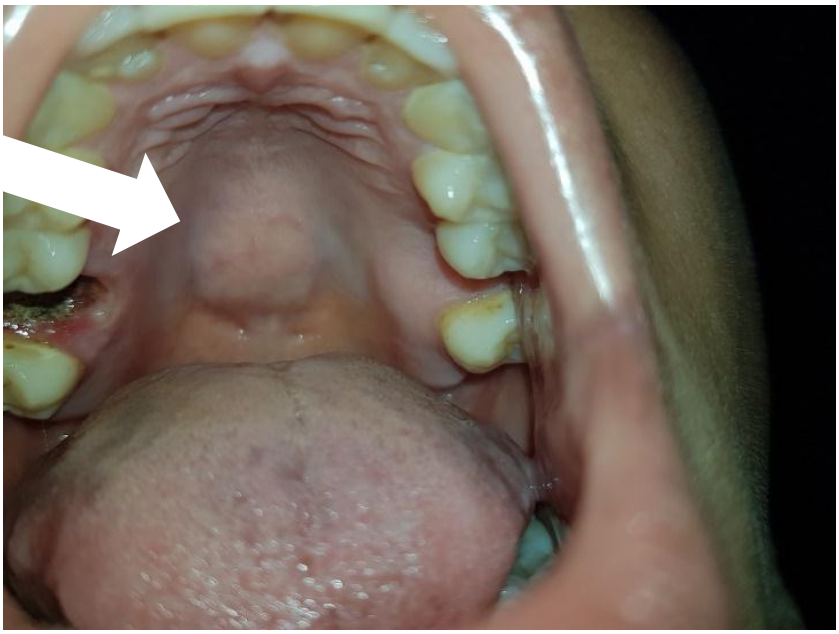


Figure 7: Torus palatinus at posterior part of the hard palate

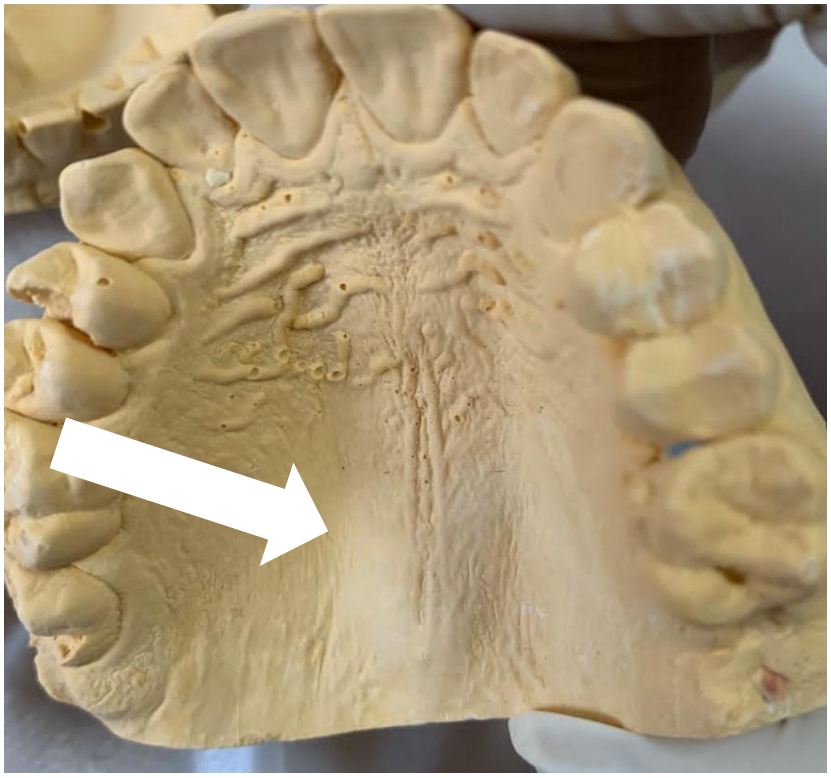


Figure 8: Study model showing TP at posterior region of hard palate

5.5. Torus mandibularis (TM)

5.5.1. The number of cases with TM

TM was the most common type found in this study group, as it has been detected in 40 cases; alone in 26 cases and along with TP in 14 cases.

5.5.2. Bilateralism of TM

Thirty five (87.5%) of the cases of TM were bilateral and only 5 (12.5%) were unilateral. Regardless if the TM appeared alone or in a concurrence with TP as shown in (Table 13).

Table 13: Bilateralism of TM

Type	Frequency	Percent
Bilateral	35	87.5%
Unilateral	5	12.5%
Total	40	100.0%

5.5.3. The shape of TM

Most of mandibular tori were rounded as 18 (45%) of all the mandibular tori were as such. Other shapes included 10 (25%) cases of lobulated shape, 8 (20%), oval shape and other shapes in 4 (10%) cases as listed in (Table 14).

Table 14: The shape of TM

Type	Frequency	Percent
Rounded	18	45.0%
Lobulated	10	25.0%
Oval	8	20.0%
Other	4	10.0%
Total	40	100.0

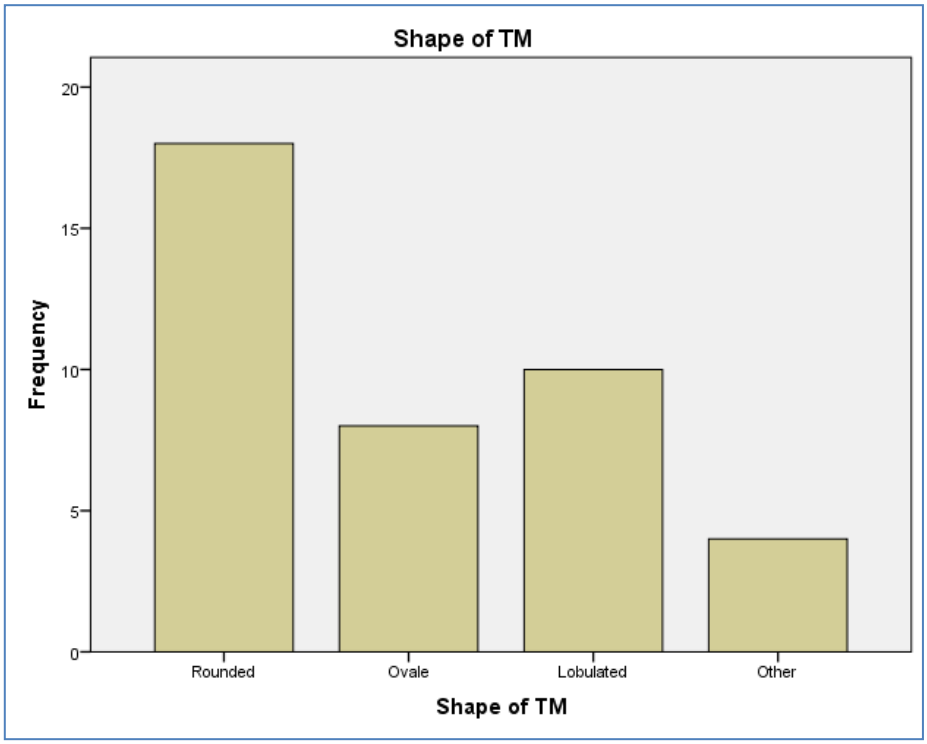


Figure 9: The shape of TM

5.5.4. The size of TM (on the right side)

Generally TM attains smaller size than that of TP. The size of tori were almost comparable to those of the left side. Twenty eight (70%) of mandibular tori had more than 6 mm in their longest dimension. Eleven (27.5%) of the cases have 3-6 mm in their longest dimension and only one (2.5%) had less than 3mm in its longest dimension as shown in (Table 15).

Table 15: The size of TM (on the right side)

Size	Frequency	Percent
> 6 mm	28	70.0
3-6 mm	11	27.5
< 3 mm	1	2.5
Total	40	100.0

5.5.5. The size of TM (on the left side)

The size of left TM in case of bilateral tori were comparable to those of the right side in the same case. Of 35 tori occurred on the left side of the mandible there were 21 (60%) cases more than 6 mm in diameter, 13 (37.1%) of 3-6 mm in diameter and only one case of less than 3 mm in diameter as listed in (Table 16) and (Table 17).

Table 16: Size of TM (on the left side)

Size	Frequency	Percent
> 6 mm	21	60.0
3-6 mm	13	37.1
< 3 mm	1	2.9
Total	35	100.0

Table 17: Comparison between the sizes of TM on the left and right side of the mouth

Size	LT		RT	
	Frequency	Percent	Frequency	Percent
> 6 mm	21	60.0%	28	70.0%
3-6 mm	13	37.1%	11	27.5%
< 3 mm	1	2.9%	1	2.5
Total	35	100.0%	40	100.0%

Figure 10: Bilateral Multiple rounded TM

Figure 11: Bilateral single spindle shape TM

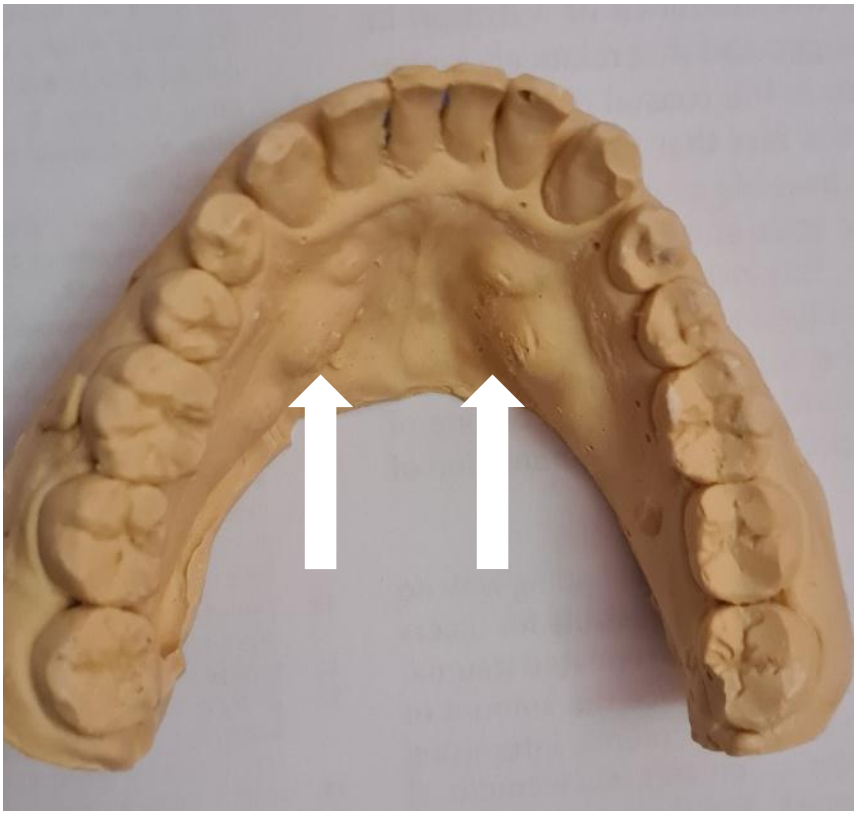


Figure 12: Study cast revealing multiple bilateral TM

Figure 13: Study cast revealing single unilateral TM

5.6. Biochemical findings

All the patients were investigated regarding their serum calcium, vitamin D and parathyroid hormone (PTH) levels. Their results were tabulated and analyzed as shown in (Table 18).

Serum calcium level was within normal range in 41 patients. Below the mal values (i.e. 8.1 mg/dl) were recoded in only 9 patients, however, this hypocalcaemia was not accompanied by any further disturbances in other biochemical values (i.e. PTH and Vit D) except for one patient only who had all the three values subnormal. PTH levels below (15 pg/ml) in only one subject and was above the higher limit in another 3 individuals.

Levels of vitamin D in 29 (58%) patients were below the minimum recommended level (i.e 30 ng/ml). These figures are comparable with other control subjects without oral tori.

Table 18: Biochemical findings in the whole group

	Ca+	PTH level	Vitamin D level
Normal range	8.1 – 10.4 mg/dl	15-65 pg/ml	30-50 ng/ml
Mean	8.54	43.08	21.05
Median	8.70	41.75	17.40
Mode	8.90	43.10	18.10
Std. Deviation	0.71	18.06	11.54
Minimum	6.5	17.8	5.4
Maximum	9.9	96.2	47.3

*5.7.*Hospital anxiety and depression scale (HAD)

The Hospital Anxiety and Depression Scale (HAD) scores for every patient was used to investigate any correlation between anxiety or depression scores with the signs or symptoms of parafunctional oral habits. Anxiety score and depression score were used as dependent variables in a linear regression analysis against the signs and symptoms of parafunctional oral habits.

The only statistically significant association found in this study was between the anxiety score and facial muscle clenching and fatigue (p=0.002) as listed in (Table 19).

5.7.1. Anxiety Scale

After calculation of anxiety scores according to the recommended method described in the methods section it is apparent from (Table 19) and (Figure 14) that there were 34 (68%) patients had a probable clinical case and 12 (24%) were case of concern regarding anxiety and only 4 (8%) of the patients were regarded as normal according to the current findings.

Table 19: Anxiety scores

Anxiety scores	Number of patients	Percent
Normal	4	8.0
Cause of concern	12	24.0
Probable clinical case	34	68.0
Total	50	100.0

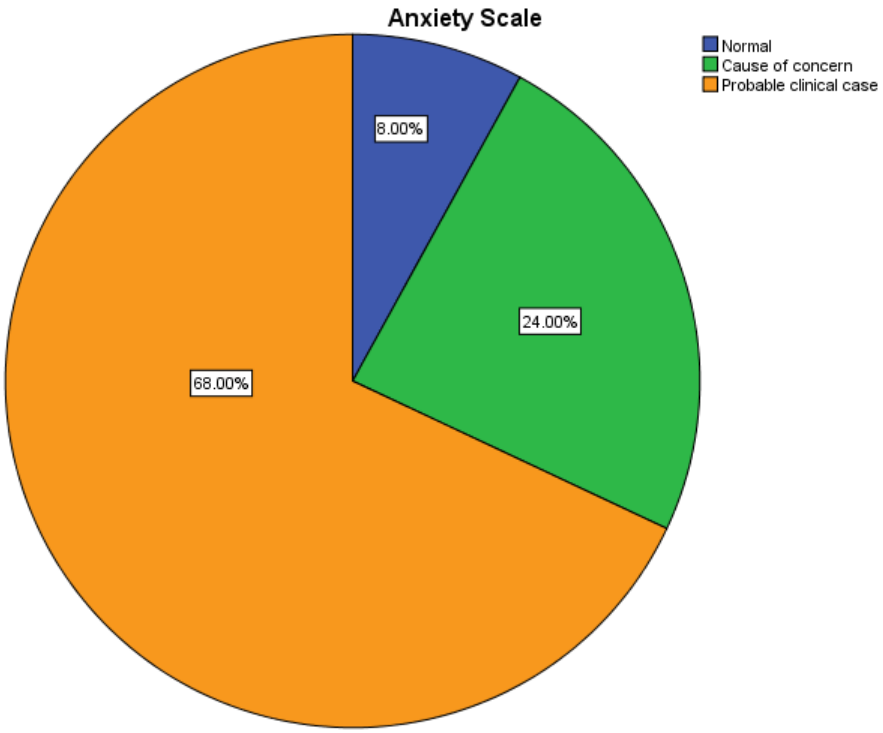


Figure 14: Anxiety scale

5.7.2. Depression scale

There were 23 (46%) cases of concern in regard to depression score out of the 50 patients of this study. Whereas 22 (44%) had probable clinical cases and only 5 (10%) patients were normal as shown in (Table 20) and (Figure 15).

Table 20: Depression scores

	Frequency	Percent
Normal	5	10.0
Cause of concern	23	46.0
Probable clinical case	22	44.0
Total	50	100.0

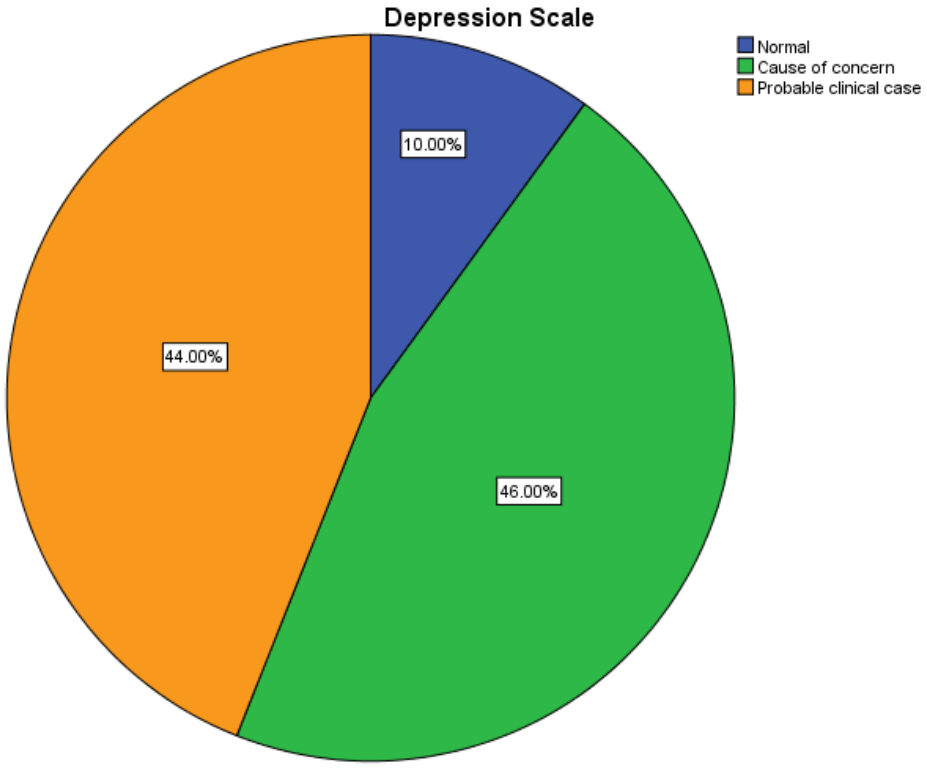


Figure 15: Depression scores

5.8. Relationship of anxiety and depression to parafunctional habits

5.8.1. Anxiety score and parafunctional habits symptoms

On analysis of data by linear regression, the only statistically significant association between anxiety and parafunctional habits symptoms was noticed with facial muscles fatigue at morning as shown in (Table 21).

Table 21: Parafunctional habits symptoms and anxiety

Co-efficients[a]					
Model	Unstandardized Coefficients		Standardiz Coseft	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.119	.826		3.775	.001
Diurnal bruxism	.218	.284	.132	.767	.448
Nocturnal habit bruxism	-.107-	.306	-.070-	-.348-	.729
Muscle Clenching	-.081-	.202	-.061-	-.400-	.691
Teeth Grinding	-.024-	.202	-.019-	-.120-	.905
Morning Facial muscles fatigue	-.629-	.209	-.478-	-3.004-	**.005**
TMJ morning stiffness	-.191-	.207	-.145-	-.926-	.360
Grinding sounds during sleep	.078	.327	.043	.240	.812
Morning jaw/neck fatigue	.162	.198	.128	.821	.416
Unable to open mouth wide	.189	.486	.059	.389	.699

a. Dependent Variable: Anxiety score

5.8.2. Anxiety score and parafunctional habits signs

By linear regression, there was no statistically significant association between anxiety and the signs of oral parafunctional habits as shown in (Table 22).

Table 22: Parafunctional habits signs and anxiety score

Co-efficients[a]					
Model	Unstandardized Coefficients		Standardized Co-efficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.773	.854		3.246	.002
Teeth sire when bite	-.460-	.235	-.302-	-1.956-	.057
Presence of shiny facets	.400	.470	.303	.850	.400
Attrition	-.269-	.469	-.199-	-.575-	.569
Fractured teeth or restorations	.321	.194	.253	1.651	.106
Wear on occlusal appliance	-.207-	.255	-.135-	-.809-	.423
Number of teeth present	.020	.026	.113	.765	.449
Mobility of teeth	-.128-	.180	-.099-	-.711-	.481

a. Dependent Variable: Anxiety calculation

5.8.3. Depression score and parafunctional habits symptoms

There was no statistically significant association between depression and the symptoms of oral parafunctional habits as shown in (Table 23).

Table 23: Parafunctional habits symptoms and depression score

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Co	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.920	.953		3.065	.004
Diurnal bruxism	-.264-	.328	-.156-	-.805-	.426
Nocturnal habit bruxism	.025	.353	.016	.072	.943
Muscle Clenching	-.153-	.233	-.113-	-.655-	.516
Teeth Grinding	.085	.232	.064	.364	.718
Morning facial muscles fatigue	-.046-	.242	-.034-	-.191-	.850
TMJ morning stiffness	.072	.238	.053	.301	.765
Grinding sounds during sleep	.097	.377	.052	.258	.798
Morning jaw/neck fatigue	-.064-	.228	-.049-	-.281-	.780
Unable to open mouth wide	-.202-	.560	-.061-	-.360-	.720

a. Dependent Variable: Depression cal

5.8.4. Depression score and parafunctional habits signs

There was no statistically significant association between depression score and the signs of oral parafunctional habits as shown in (Table 24).

Table 24: Depression score and parafunctional habits signs

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Co-efficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.937	.909		2.131	.039
Teeth sire when bite	-.299-	.250	-.190-	-1.193-	.240
Presence of shiny facets	-.392-	.500	-.288-	-.783-	.438
Attrition	.489	.499	.350	.980	.333
Fractured teeth or restorations	.038	.207	.029	.185	.854
Wear on occlusal appliance	-.056-	.272	-.036-	-.206-	.838
Number of teeth present	.047	.028	.254	1.669	.103
Mobility of teeth	-.240-	.192	-.180-	-1.252-	.217

a. Dependent Variable: Depression cal

DISCUSSION

Chapter: 6 DISCUSSION

Torus palatinus, torus mandibularis, buccal and palatal exostoses are common localized benign bony overgrowths arising from cortical bone (Neville et al., 2009). They are occasionally found incidentally during routine examination of the oral cavity. They are present in all races with slight differences in the gender and age prevalence. It has been postulated that groups of the same population living in different environments have different frequencies of occurrence of the torus (Mayhall et al., 1970). The relatively older studies had concentrated on the prevalence, clinical presentation and etiology of oral tori, while recent researches focuse up on the clinical presentations, their relation to stress and parafunctional habits as well as their potential use in as a source of bone graft for different purposes such as ridge augmentation.

Because of their benign nature tori have not been studied comprehensively in the past, however, because of the recent advances in dentistry, particularly the field of impalntology and periodontolgy, clinicians are now more alerted to the clinical importance of these structures. Few problems were linked to oral tori such as their easily laceration during denture insertion or mastication, potential osteoradionecrosis of TP if it get injury and most commonly the difficulties encountered during denture fabrication.

Previous studies have suggested that oral tori are benign anatomical variations probably related to several factors such as functional stress, gender predisposition, number of teeth present, and nutritional factors (Al-Dwairi et al., 2017). Other suggested factors clude autosomal dominant inheritance, trauma, and life style factors (Eggen, 1989), vitamin deficiency, calcium rich diet, fish consumption, (Loukas et al., 2013), (Ladizinski & Lee, 2014) and chewing on dry, raw, or frozen meat (as in Eskimo cultures). Masticatory hyperfunction and bruxism are thought to be risk factors. This study has investigated some of these factors in group of Libyan patients specially the parafunctional habits, occlusal stress, TMD and psychological stress.

Despite the nomenclature suggested to be a tumor, TP is an overgrowth of the bone in the palatal region and represents an anatomic variation. however, it seems to be a multifactorial

disorder with genetics and environmental involvement (Nogueira et al., 2013). however the exact role of such factors is not fully understood. On the other hand, some cases of (TM) (usually seen as a bilateral protuberances) on the lingual side of the bicuspid area of the lower jaw is believed to be associated with bite and occlusal forces, parafunctional habits and psychological stress.

There is a disagreement between as many relatively-recent worldwide studies and the earlier findings of Gorlin and Goldman and of Suzuki and Sakai and of Sakai about the frequencies of TP and TM among different racial groups, gender and age (Chew & Tan, 1984). The earlier studies indicated that oral tori are more common in females, and the prevalence varies considerably between geographic areas and ethnic groups. It is more common in Native Americans, Eskimos, Norwegians, and Thais (Garcia-Garcia et al., 2010). However, many recent studied from different parts of the world indicated that oral tori are not uncommon in these parts of the world and their prevalence and frequencies are almost comparable with those previously reported.

Some studies reported oral tori incidence of TP and TM in the United States was 6-9.1 % and 1.4%-1.7% respectively, with no sex predilection (Mayhall et al., 1970; Shah et al., 1992). Some races, such as the Alaskan Eskimos and Aleuts, are reported to have a much higher incidence of mandibular tori. Among the general population in the USA, the TM is infrequently seen in the first decade of life, but it usually has its onset by the age of 30 years. As the present study was not an epidemiological one, any prevalence figure of oral tori can't be claimed for the studied region, however most of patients were females in a 4:1 ratio to males and the smallest member was just 16 years old female and most patients lie in the age group of 20 to 50 years in accordance with the finding of (Jainkittivong, Apinhasmit, & Swasdison, 2007) from Thailand who reported a peak incidence of TP and TM the third decade of life and at a lower age group of (60-69 years in New Zealand) which was reported by (AlZarea, 2016). The relatively high prevalence of tori among major ethnic groups supports the probable hypothesis of the role of environmental factors (Telang et al., 2019).

In some epidemiological studies the gender differences were not statistically significant in cases of TM and exostoses (Sawair et al., 2009). Gender differences in the prevalence of tori have also been reported, and most authors found that TP is more frequently seen in wom-

en, whereas TM is more common in men (King & Moore, 1976, Reichart et al., 1988), Haugen, 1992, Sonnier et al., 1999). Furthermore, females have considerably higher rates of TP than males (El Sergani et al., 2020). in this study the number of females surpluses that of males in this study sample. This may represent the pattern of visits to dentists as females usually seek dental services and advice more than males. The occupation related factors is unlikely to play any role in the etiology of oral tori as they have been found individuals in different occupations and all socioeconomic groups.- few patients only really concerned by the presence of oral tori in their mouths;

Interestingly, in the present study by reporting a figure of 28% of concurrence of oral tori, it is considered as the highest reported figure of concurrence of TP and TM so far, but in an agreement with some other studies of high figures of concurrence of TM and TP (Haugen, 1992), but in contrast with the findings of some older studies (Kolas et al., 1953, Topazian & Mullen, 1977) who reported a lesser figures.

The term *'exostosis'* is usually used clinically to describe a variety of bony outgrowths in different parts of the body. It implies a non-neoplastic lesion that may be of developmental origin or that may have arisen in response to a stimulus such as a chronic trauma (a reactive exostosis) or following surgery, for example after a free gingival graft (Soames & Southam, 2005). None of the mentioned etiological factors were reported in this study group.

TM is usually rounded bony protuberance on the lingual surface of the mandible (and rarely on the buccal aspect) and usually found above the mylohyoid line, medial to the molar roots (Ihunwo & Phukubye, 2006), TP is overgrowth usually located in the posterior part of the hard palate, spindle of shape or lobulated. The clinical presentation of oral tori are fully matches that had been reported in many studies.

The influence of mechanical stimulation on the formation of TM is still poorly understood (Cortes et al., 2014). However, the relationship of oral tori and occlusal stress has been investigated in terms of parafunctional activity (clenching and grinding) in 609 Thai patients and found strong association between clenching and grinding habits and the presence of TM was found. The presence of TM might be useful as a clue to look for signs of parafunction (Kerdpon & Sirirungrojying, 1999). In the present study, the muscle clenching habit is associated with stress in patients with mandibular tori.

There are contradictory findings about the relationship between mandibular tori and parafunctional habits. In a "Meta-analysis" study, the presence of abnormal tooth wear was associated with TM (Bertazzo-Silveira et al., 2017), furthermore, strong association was found between mandibular torus and presence of bruxism and wear facets in another study (Khaled et al., 2016), but another study failed to prove the existence of any relationship between TP and diurnal and nocturnal teeth grinding, occlusal force, occlusal support and temporomandibular diseases symptoms (Yoshinaka et al., 2010). In conclusion there is not enough high-quality evidence to fully support the hypothesis that teeth grinding and/or clenching, as identified by self-awareness or anamnesis, are associated with tori (Lavigne et al., 2008).

Morita and co-associates had reported that more than half of the young healthy tate participants had TM which was closely associated with dental attrition and sal contact area, this may provide the clinician with useful information to help prevent the development of TM before middle age (Morita et al., 2017). In this study, which didn't include any (totally edentulous patient), the number of teeth present was not different from that of other people in the same population without oral tori treated in the same clinics (although it is not tested statistically in this study). However the notion that the patients with oral tori have superior cortical bone quality enabling their alveolar bone to resist bone resorption, thus, less teeth would be lost to periodontal disease is quite interesting idea and is to be fully investigated.

Many measurements of the size and shape of tori were carried out by different ways of categorization and descriptions, but with almost identical results. Chew and Tan in their study, had divided the appearance of torus into a well-defined (measured more than 15 mm x 10 mm) or ill-defined shape (measured less than 15 mm x 10 mm), while others had divided the tori size into small, medium and large (K. H. Lee, Lee, & Lee, 2013),(Pradhan, Patil, & Uttarwar, 2017). In this study the size of torus was divided into small, medium and large according to their size (measured in millimeter). Generally, almost all TP in this study group was larger than 10 mm, while TM were of a smaller size than TP, in an agreement with most other studies which measured the size of tori. This study agreed with the findings of the Jordanian study which reported that most TP were of a large in size, spindle or flat in shape, and located at the premolar-molar region and the TM were mostly medium to large in size, bilat-

eral, composed of single lobe and located at the premolar region (Sawair et al., 2009) or nodular (Sathya, Kanneppady, & Arishiya, 2012).

Many previous studies tried to correlate the appearance of oral tori with occlusal bite force. In those studies, while the size, shape, and incidence of TP was not significantly correlated with bite force, however, the size of TM increased significantly in proportion to the bite force. As the size of TM provides information about bite force and can thus be used to clinically assess occlusal stress (Jeong, Kim, Jang, Kim, & Huh, 2019). The idea of the role of TM in reinforcing the strength of mandible is not recent one; Ritchie (1923) proposed that a "torus will form in the premolar region as a reinforcement of the bone in this area in response to the tortional stress created by very heavy mastication sell" (Sellevold, 1980). In this study, the bite force was not measured directly, but it has been indirectly addressed by studying the correlation between the signs and symptoms of parafunctional habits and tori. The only variable of statistical significance was the facial muscle clenching and TM but it fails to find any direct correlation between oral tori and parafunctional habits.

This study findings about the size of oral tori confirms the findings of Sathya and co-associates in Thailand who reported that most TP were of smooth type, more than 2 cm, while all TM were bilateral and nodular and less than 2 cm (Sathya et al., 2012) and with that of Sawair and co-associates from Jordan (Sawair et al., 2009, Telang et al., 2019) from Malaysia. There is no explanation so far for the differences in shape of tori or their clinical significance. Many other studies had reported almost the same findings.

The use of gypsum study casts had enabled us to get better and more precise measurements of the dimension of oral tori using digital caliper and with help the clinical photos of the tori taken during clinical examination. There were many studies in the past depended on study casts for this purpose. Nowadays, better results can be obtained by the use of the more advanced imaging techniques such as CBCT which we consider as drawback of this study. In this study, the size of torus was categorized as small, medium or large according to their size. Almost all TP are larger than 1 cm in many studies, and most of TM are small in size and they were even smaller than their palatinus counterparts in the cases of concurrence with each other.

One study reported that the presence of a TP can affect the development of the maxilla as it may be of greater size in female subjects (Cagirankaya, Kansu, & Hatipoglu, 2004), but in this study the size of TP was not different between the two genders despite the fact that almost all TP in this study was larger than 10 mm in both genders.

This findings of study do not support the presumption that the patients who was having square shaped dental aches are more prone to have TM as it had been claimed by Cortes and co-associates in terms that the mandibular geometries that favor stress concentration (such as square-shaped mandibles), are associated with a greater prevalence of TMs (Cortes et al., 2014). In fact, only one case in this study had square shaped dental arches and another two with V shape dental arch and the rest of them have U shaped dental arch.

The presence of abnormal tooth wear might be associated with tori, mainly TM. There is no sufficient evidence to credit or discredit the association of tori and other signs and/or symptoms of bruxism. It is emphasized that the presence of torus should be carefully evaluated and construction of denture be modified accordingly (Bertazzo-Silveira et al. 2017). in regard to parafunctional oral habits, the findings of this study is in consistent with previous findings that there is no sufficient evidence to credit or discredit the association of tori and other signs and/or symptoms of bruxism (Bertazzo-Silveira et al. 2017).

The association between TMs and mandibular morphology may suggest that subjects with TMs may have a higher mandibular bone quality compared to those without TMs (Belsky, Hamer, Hubert, Insogna, & Johns, 2003; Koc & Cagirankaya, 2018).

Most of the previously reported problems associated with tori were not noticed in this group of patients, such as pain during impression taking, surface laceration, difficulties in direct visualization during intubation for laryngoscopy or increased incidence of sleep apnea.

The Hospital Anxiety and Depression Scale (HADS) is a popular measure to screen for distinct dimensions of anxiety and depression in non-psychiatric hospital departments was used in this study for this purpose. In the present, although there had been high scores of anxiety and depression in the whole group but these scores are not associated with any individual variable of signs and symptoms of parafunctional oral habits, except for the association of

anxiety with facial muscles clenching habit. These findings support the findings of many previous studies.

Oral parafunction in the form of tooth clenching or grinding has been associated with temporomandibular disorders (TMD) and recently with migraine. Patients attending a facial pain clinic in Belfast were assessed for the presence of tori and results compared to age and gender matched controls. Their findings was that the mandibular tori were present significantly more commonly in both migraineurs and TMD patients. These results support the idea of parafunction in the etiology of mandibular tori and suggest that tori are a useful marker of past or present parafunction in some patients (Clifford et al. 1996). The data of this study, revealed high prevalence of both anxiety and depression scores in the study individuals but failed to find any association between the individual variables of parafunctional activity and these scores. Consequently, it was difficult to draw a conclusion about the relationship between the appearance of mandibular tori and such habits.

Patients should be reassured about the nonpathologic nature of this condition. the use of tori as forensic tool to identify the unknown skeletal remains was reported but it is not widely used (Gupta, Rizor, Saul, Kesha, & Berman, 2019). The presence of tori at young adulthood may be a marker of higher bone mineral density (BMD) in the future and of a lower risk for developing osteoporosis (Hjertstedt et al., 2001; Hosoi et al., 2003). The association between TMs and mandibular morphology may suggest that subjects with TMs may have a higher mandibular bone quality compared to those without TMs (Koc & Cagirankaya, 2018).

6.1. Conclusion

The current study used a combined approach to study the features of oral tori in 50 Libyan patients which included clinical description, measurements on gypsum study casts, biochemical investigation and assessment of anxiety and depression by HAD scale for all the subjects in order to get in-depth view of various aspects of this elusive condition. oral tori are not uncommon in the region of the country, with marked female predilection and not reported in children under 16 years of age, but can be detected in all adults with highest incidence in 20 years to 50 years age group. TP is usually larger than 1 cm, locate in the posterior half of the hard palate, usually flat and spindle in shape. Generally, TP is larger in size than

TM. The later, is usually bilateral, with a single or multiple lobes, rounded in shape. The biochemical findings in this group are normal and it is unlikely that there is any disturbances in the calcium metabolism had led to the appearance of these oral tori in this group of patients.

The relationship between mandibular tori and parafunctional habits could not precisely be evaluated because of the small number of the sample and the lack of control subjects control subjects to establish any presumed relationship between tori and such habits.

6.2. Recommendations

1- Further controlled studies involving larger number of subjects and covering wider areas of the country should be undertaken to shed light on different aspects of this overgrowths.
2- The likely benefits of oral tori as a potential source of bone auto graft for Ridge augmentation should be explored as well as their potential use as an indicator for higher bone quality of the subject should also be elaborated.
3- As oral tori are benign outgrowths, the future studies should concentrate on their potential use in implantology and other medical uses as their clinical and epidemiological characteristics had long been investigated in the past.

STUDY SUMMARY

Background: Torus is a benign, rounded, smooth-surfaced, non-neoplastic growth composed of nodular dense bone appears on the midline of the palate or the lingual aspects of the mandible. Its etiology is probably due to interplay of multifactorial ic and environmental factors. TP is found on the mid-palate of over 20% of adults worldwide, while TM can be detected in about 7.5% of the adults and may be associated with teeth grinding and parafunctional occlusal habits, or temporomandibular joint disorders (TMD).

Information on the relationship between tori or exostosis and different tal factors such as stress, anxiety and masticatory over activity are very limited because of the scarcity of cases reported in the literature. The current study used a combination of clinical description, measurements on gypsum study casts, biochemical investigation and assessment of anxiety and depression scale (HADS) in all study subjects in order to have in-depth view of various aspects of this elusive condition. There is a little clinical significance attached to this structure, since it is benign and never becomes malignant

Aim of the study was to describe the demographic and clinical features of patients with oral tori as well as the dimensions and size of oral tori and determine their shapes. The study also aims to determine the frequency of signs and symptoms of parafunctional oral activity (such as clenching, teeth grinding and/or bruxism) and the level of blood calcium, vitamin D, and parathyroid hormone and the level of anxiety and depression in these patients.

Subjects and Methods: This study included only patients with oral tori. A torus was considered to be present when there was a bony protuberance seen and, in doubtful cases, digital palpation. Fifty Libyan patients with clinical evidence of oral tori were randomly selected from the consecutive patients from October, 2019 through December 2020 from routine consecutive patients attending two main dental centers in two different cities in Northern East region of Libya. The clinical presentation of tori was ied comprehensively for their number, type, shape and dimension. The study investigate the correlation between tori and the clinical evidence of oral parafunctional habits such as bruxism, muscle fatigue, wear facets and mouth opening. A maxillary and lar dental impression were taken by a rubber base putty and light body then dental casts were immediately fabricated in dental laboratory using gypsum material (Elite

el, Zhermack). The biochemical findings of the Ca+ level, Vitamin D, and PTH levels was investigated. The level of anxiety and stress in the study group is assessed by HAD scale.

Results: this study comprised 50 Libyan patients (39 females and 11 males) aged 16-63 years (median age of 36.5. years and SD of 9.6), with a clinical evidence of oral torus detected by direct visualization and digital palapation. Facial muscle clenching and fatigue was the most prevalent symptoms as 32 (64%) of the patients suffer from such symptoms. morning jaw/neck fatigue in 23 (64%) patients, teeth grinding in 20 (40%) patients, TMJ morning stiffnessin 18 (36%) patients, nocturnal habit of bruxism in 11 (22%) patients, diurnal bruxism in 9 (18%) patients, grinding sounds during sleep in 7 (14%) patients and 18 (36%) patients were aware about the presence of oral tori in their mouths. No reported difficulties in speech or deglutition or interferences with sleep.

The signs of presumed parafunctional activity included attrition in 34 (68%) of the patients, presence of shiny facets in 32 (64%) of patients, fractured teeth or restorations in 23 patients, mobility of teeth in 20 (40%) of patients and wear on the occlusal face appliance in only 11 patients. 44 (88%) of the patients have Angle class I occlusion and all of them except three had U shaped dental arch. Teeth spacing was detected in 17 (34%) patients, teeth crowding in 19 (38%), hypodontia of the upper lateral incisors in 2 (4%) patients and no supernumerary teeth were detected.

Thirty seven (74%) patients presented with a single torus, 26 (52%) had mandibular tori, 10 (20%) had TP and in 14 (28%) patients there was a concurrence of TP and TM. The size of all TP exceeds 10 mm in its longest dimension diameter regardless of its shape. 14 patients had spindle shaped TP, 7 (29%) heart shaped torus, and 1 (4.17%) lobulated, 2 other shapes. Thirty five (87.5%) cases of TM were bilateral, 18 (45%) rounded, 10 (25%) lobulated, 8 (25%), oval and 4 (10%) other shapes. Twenty eight (70%) of mandibular tori had more than 6 mm in their longest dimension. Eleven (27.5%) of the cases have 3-6 mm in their longest dimension and only one (2.5%) had less than 3 mm in its longest dimension. Calcium, vitamin D and PTH levels all the levels are within normal values. The Hospital Anxiety and Depression Scale (HAD) scores didn't reveal any statistically significant association with an of the signs and symptoms of parafunctional activity, however, an association exists between the anxiety score and facial muscle clenching and fatigue ($p=0.002$).

Conclusion: Further controlled studies involving larger number of subjects and covering wider areas of the country should be undertaken to shed light on different aspects of this overgrowths. The likely benefits of oral tori as a potential source of bone auto graft for Ridge augmentation should be explored as well as their potential use as an indicator for higher bone quality of the subject should also be elaborated. As oral tori are benign outgrowths, the future studies should concentrate on their potential use in implantology and other medical uses as their clinical and epidemiological characteristics had long been investigated in the past.

STUDY PROTOCOL

Relationship Between Torus Mandibularis, Torus Palatinus And Parafunctional Habits And Anxiety In A Sample From Eastern Libyan Population

العلاقة بين نوامي الفك السفلي و النامية الحنكية والعادات الغير نافعة و التوتر في عينة من سكان الجزء الشرقي من ليبيا

Protocol of a dissertation for Master degree in

Oral Medicine

By

Salmen Moftah Hussan Ali

(BDS, 2008)

Supervisor
Prof. Mohamed S H Ingafou

Dental faculty – Benghazi University

(2019)

CONTENTS

1- Introduction

The word tori means “to stand out” or “lump in Latin which is known as a “localized benign bony overgrowths arising from cortical bone” (1). This bony protuberance is composed of mature bone with benign characteristic, resulted from overwork of osteoblasts, which led to gradual bone deposits along the line of fusion of the palate or on the hemi-mandibular bodies. Tori or exostoses are consist of dense cortical bone with limited amount of bone marrow, covered by a thin, blanched and poorly vascularized oral mucosa, which creates a hard visible mass in the oral cavity (2).

Tori were reported in all ethnic groups, but mostly in dark skinned people. The peak incidence of tori is in the third decade of life (3,18,19). They probably begin to develop in the early adulthood and may enlarge very slowly over the years. On the basis of their location in the mouth (depending on their anatomical location), tori are divided into three main types:

1- Torus palatinus (TP) which is seen only along the midline of the hard palate. (5,6) TP is more common in females than males, while TM is much more higher in males than in females (2,3,4). TP can be seen as flat, nodular, lobular, sessile or spindle shaped overgrowth at the middle of the hard palate.(1,5)

2- Torus mandibularis: (TM) usually seen as bilateral overgrowths occur only in the lingual surface of the mandible, near the premolar teeth, (located above the mylohyoid muscle's attachment (mylohyoid line) but below the alveolar margin) they might be extended to the molar region. (2, 5, 6). TM are usually nodular, usually bilateral and occasionally unilateral may be single or multiple while exostoses are multiple bony nodules usually located on the buccal aspect of alveolar bone and rarely palatally at the maxillary tuberosity region(2).

3- Buccal and palatal exostoses also called as bony exostoses, occur only on facial or the outer aspect of the upper jaw (7) and maxillary tuberosity area (20,21).

Although there is no clear criteria for their classification, but arbitrarily tori can be classified into two groups A) 2 mm, 2 to 4mm, and above 4mm, or B) 3mm, 3 to 6mm, and above 6mm (2). Tori of about 2mm and 3mm have been found to be the most common

sizes exist (2). Tori of 1.5mm to 4cms in diameter can be found as a single growth, or they may be grouped together in a cluster (i.e. nodular appearance). Both TP and torus mandibularis are much more frequently found than bony exostosis (2, 17, 20, 21, 22)

The exact underlying cause of appearance of tori is unclear (1,2,6,8,9), however, the most accepted theory of TM today is the genetic role in 29.5% of the cases while an increased masticatory stress or occlusal stress is thought to be the prime underlying cause in about 70% of the cases (2,8). Another cause is probably superficial injuries or its occurrence as a functional response in individuals with well-developed chewing muscles or in patients with abraded teeth due to occlusion (10, 11,17).

Significant correlation between TM and parafunctional habits has been postulated by many studies; although such a relationship had not been found in the case of TP (9,12). Many investigators proposed that such correlation may indicate a probable role of tempromandibular disease (TMD) in the appearance of TM or it may further be used as an indicator for an increased risk of (TMD) (13).

Other proposed predisposing factors to the appearance of tori are abnormal eating habits, vitamin deficiency or the use of dietary supplements rich in calcium. It could be also associated with an increased consumption of fish, (as fish contains omega 3, unsaturated fatty acids and vitamin D, which encourage bone growth). The prolonged use of phenytoin drug may lead to an increase in the size of torus as it induces an increased pattern of calcium homeostasis, which is functioning as an osteogenic agent (17).

Clinically, tori are harmless structures and usually do not produce any symptoms, and frequently remain undisturbed over the patient's lifetime (14, 17). Mostly discovered during routine clinical examination at the dental clinic. Rarely Tori can cause phonetory disturbances, sleep apnoea, limitation of masticatory mechanics, ulcerations of the overlying mucosa, food deposits, periodontitis, and prosthetic instability and sometimes, patients may present with cancer phobia on their discovery in the mouth.(1,2,6,15). Oral tori must be differentiated from other benign growths in the mouth including fibromas, mucoceles, osteomas, osteochondromas, and osteoid osteomas. However, oral tori can usually be distinguished from other conditions on the basis of clinical findings alone. Biopsy may be warranted if there is a doubt of otherwise bony pathosis (16).

Hospital anxiety and depression score (HAD) score is widely used tool by many clinicians to assess the degree of anxiety and depression among their patients. It focuses on the non-physical symptoms so that it can be used to diagnose depression in people with significant physical ill-health. Any overlap, for instance impaired

Many studies were carried out in the past to figure out different aspects of tori and tried to correlate their presence with oral conditions, but apparently, none had succeeded to establish any clinical significance of tori so far. In this study, we are trying to shed light on some clinical aspects of tori in a group of Libyan population in the Eastern part of the country and explore any relationship between their existence and anxiety or other parafunctional habits.

2- Aims and objectives of this study

1- The aim of the study to determine the level of stress and anxiety in the patients with oral tori using HAD score in these patients.

2- To determine the number of patients with tori who had parafunctional oral activity (such as clenching, grinding teeth and/or bruxism) which frequently provoke masticatory muscle fatigue or even TMD.

3- To measure the size and shape of different types of tori in the study group and to determine the type of dental occlusion, the shape of dental arch in the study group.

4- To study the profile of blood calcium, vitamin D levels and parathyroid hormone levels in the study group.

3- Material and methods

I. Study subjects and Sitting:

Fifty Libyan patients with clinical evidence of oral tori will randomly be chosen from consecutive patients attending three main dental centers providing dental services in two different towns and cities in Northern East region of Libya namely:

3- Dental faculty of Benghazi University.

4- Central public clinic in (Almarej)

Both clinics are currently among the biggest dental centers in the Eastern area of the State of Libya; providing dental services to a wide region of the country. An official permission letters will be addressed to the relevant clinic.

II. Ethical consideration:

The study is to be registered in the registry of clinical studies of the dental faculty and permission for the study conduct will be obtained from the ethical committee of the faculty. A signed written consent will be obtained from each individual included in this study. All information obtained will be kept confidential and the study casts and photographs will be destroyed at the end of study.

III. Materials

12- (High consistency putty suitable for double step impressions):

c) Ormadent Putty®

d) Ormamax® Light body

13- Gypsum material (Elite Model, Zhermack®)

14- Electronic Digital Caliper 0-6 inch/150mm Vernier Extra Large LCD Screen, Stainless Steel Body, Conversion Millimeters Inches Precision Measurement Tool (See Photos).

15- Dental mirrors

16- Dental probes

17- disposable impression tray

18- rubber bowel

19- spatula

20- Latex gloves.

21- Dental Cast laboratory fabrication facility.

IV. Study conduct

8- Patients with oral tori are to be selected from the consecutive patients attending for different reasons in the dental clinics. If the case found suitable the purpose of the study is explained to the patient and asked to join the study. If agreed a signed written consent regarding being a volunteer to this study to be obtained. A specially designed clinical audit (Appendix 1) will be completed at chair side. An Arabic version of HAD score (Appendix 4) is to be handed over to the patient and completed separately.

9- Comprehensive clinical examination, extraoral examination of the muscles of mastication and TMJ will be carry out to test for the presence of pain, TMJ sounds, TMJ locking, ear pain, or headaches and all other objective and subjective symptoms of parafunctional habits will be examined.

10- An intraoral examination will be carried out to determine the size shape and location of the torus. Tori will be examined by clinical inspection and digital palpation (all observations will be recorded in a specially formulated clinical audit (Appendix 2).

11- Venous Blood sample will be obtained by a trained dental nurse and to be sent to the same credible laboratory for investigation of calcium, vitamin D and parathyroid hormone.

12- A maxillary and mandibular dental impression will be taken by a rubber base butty and light body as indicated in the materials section. Dental casts are immediately fabricated. In the dental laboratory using gypsum material (Elite Model, Zhermack).

13- The measurements of tori, and dental arches shape and type of dental occlusion will be done on the finished cast.

V. Definitions

-Torus mandibularis is a prominence seen on the lingual aspect of the mandible at the base of its alveolar part.

-Torus palatinus is bony protuberance found on the hard palate at the junction of the intermaxillary suture and the transverse palatine suture.

VI. Inclusion criteria:

4- An adult Libyan (female or male) with clinical evidence of either mandibular tori, torus palatines volunteered to this study will be included.
5- Completely or partially edentulous patients undergoing prosthetic replacement of teeth with an evidence of tori.
6- Patients with symptomatic or clinical evidence of parafunctional habits and clinical evidence of tori.

VII. Exclusion criteria

5- Patients with known major systemic bone diseases such as chronic renal failure, osteoporosis, Paget's disease hemolytic anemia or diseases with abnormal calcium metabolism.
6- Patients with major psychiatric or nervous disorders.
7- Patients with malignancy or currently treated for malignancy.
8- Patients taking drugs which known to affect calcium metabolism.

VIII. Data records

3- Size of torus: Tori will be assessed both clinically and on the casts for size and site (unilateral or bilateral). The size of tori will be measured using calipers (Model 505, Mitutoy o). They will be labelled according to their size as:

D. small (< 3 mm)
E. medium (3–6 mm)
F. large (> 6 mm).

4- Two dimensions of the torus is to be measured If it is not circular (mesodistal and occluso apical). In ovoid or circular shape tori, the diameter is to be taken.

5- Shape of the tours:

□ Rounded □ Oval □ Spindle shape □ Lobulated □ Other

6- Shape of the dental arches

□ U shaped □ V shaped □ Other

IX. Data analysis:

Measurements from all 50 patients will be tabulated and analyzed using an appropriate statistical package SPSS version 22 or higher. The data will be analyzed for:

8- Descriptive analysis of the demographic data of the sample to determine the general characteristics of the study group (descriptive analysis will be used).

9- The size, location and shape of the tori and the shape of dental arches (frequency statistics)

10- Correlation between the presence of oral tori and parafunctional activity and muscle fatigue: it compares the number of patients with tori who is having parafunctional habits to those who has tori without having parafunctional habits by linear regression can be used if it found appropriate).

11- Relationship between tori to individual parafunctional activity (clenching, grinding teeth and/or bruxism).

12- Those patients who need an investigation regarding their calcium, vitamin D and PTH levels their results to be tabulated and analyzed (student t test).

13- The Hospital Anxiety and Depression Scale (HAD) scale and the presence of tori. It concentrates on secondary to pain rather than depression, and estimates the number of those patients who had high HAD scores (chi square static).

4- References

(1). Andres S. Garcia-Garcia et al. Current status of the torus palatines and torus mandibularis. Med Oral Patol oral Cir Bucal. 2010;1:15(2):e353-60.

(2). Kuk Han lee, Jong Hun Lee, Ho Jung Lee. (2013)Concurrence of torus mandibularis with multiple buccal exostoses. 40(4):466-468.

(3). Jainkittivong A, Apinhasmit W, Swasdison S. (2007). Prevalence and clinical charecteristics of Oral tori in 1520 Chulalongkorn University dental school patients. Surg Radiol Anat. 29(2):125-31.

(4). Shah DS, Sanghavi SJ, Chawda JD, Shah RM. (1992). Prevalence of torus palatines and torus mandibularis in 1000 patients. Indian J Dent Res. 3(4):107-10.

(5). Naville, Damm Allen Bouquot. Oral & Maxillofacial Pathology; Developmental defects of the Oral and Maxillofacial Region by Restricted South Asia edition, 3rd ed. reprint 2009 Chapter 1, PP 672.

(6). Petersons Principle of Oral and Maxillofacial Surgery ; Benign non ododntogenic lesions of the jaw by Michael Miloro; CBS Publishers & Distributors, 3rd ed. Vol. Chapter 30 . Page 671-73.

(7). Chandna S, Sachdeva S, Kochar D, Kapil H. (2015). Surgical Management of the bilateral Maxillary buccal exostosis. J Indian Soc Periodontol. 19(3):352-5.

(8). Medsinge SV et al. Buccal exostosis :a rare entity. (2015). J Int Oral Health. 7(5):62-4

(9). Basha S, DuttSC. (2001). Buccal sided mandibular angle exostosis-a rare case report. Contemp Clin Dent. 2(3):237-9.

(10). Reichart PA, Neuhaus F, Sookasem M. (1988). Prevalence of torus palatinus and turus mandibularis in Germans and Thai. Commun Dent Oral epidemiol. 16:61-4.

(11). Clifford T, Lamey PJ, Fartash L. (1996). Mandibular tori, migraine and temperomandibular disorders. Br Dent J. 180:382-4.

(12). Kerdpon D, Sirirungrojying S. (1999). A clinical study of oral tori in southern Thailand: prevalence and the relation to parafunctional activity . Eur J Oral Sci.107:9-13.

(13). Sirirungrojying S, Kerdpon D. (1999). Relationship between oral tori and temporomandibular disorders. Int Dent J. 49:101-4

(14). Pynn BR, Kurys-Kos NS, Walker DA, Mayhall JT. (1995). Tori mandibularis: a case report and review of the literature. J Can Dent Assoc. 61(12):1057-8.

(15). Shubha ranjandutta, Don Verghese, Amar Bhuibhar, Ronak Desai. (2013). Mandibular Exostosis. Dental impact. 2013;5(1):28-33.

(16). Ladizinski B, Lee KC. (2014). A nodular protuberance on the hard palate. JAMA 2;311:1558-1559.

(17). Neville BW, Douglas DD, Carl MA, Bouquot J. Developmental defects of the oral and maxillofacial region. In: Neville BW, Douglas DD, Carl MA, Bouquot J, eds. Oral and Maxillofacial Pathology. 3rd ed. St. Louis, MO: WB Saunders; 2009:1–53.

(18). King DR, Moore GE. (1971). The prevalence of torus palatinus. J Oral Med. 26: 113-115.

(19). Kolas S, Halperin V, Jefferis K, Huddleston S, Robinson HBG. (1953). The occurrence of torus palatinus and torus mandibularis in 2478 dental patients. Oral Surg; 6:1134-1141.

(20) Nevill BW, Damm DD, Allen CM, Bouquot JE, editors. Oral and maxillofacial pathology: WB Saunders Co, Philadelphia; 1995:17–20.

(21). Shafer, WG, Hine, MK, Levy, BM. (1983). A textbook of oral pathology. in: 4th ed. WB Saunders Co, Philadelphia; 169.

(22). Regezi, JA, Sciubba, JJ. (1989). Oral pathology: clinico-pathologic correlations. WB Saunders Co, Philadelphia; 386–387.

APPENDIX

Appendix 1: Clinical audit of Tori

Benghazi University
Faculty of Dentistry
Department of Oral Medicine
Oral Pathology Diagnosis and Radiology

Relationship between torus mandibularis, torus palatinus and parafunctional habits and anxiety in a sample from eastern Libyan population

Case Number ----------

I. General information

- Patient name (optional) _____ Age _____ gender ----------
- Place of Residency:_____ Phone number._____
- Occupation _____
- □ New patient □ Referred patient
- Reasons for attending dental clinic

  ☐ ulcer ☐esthetic ☐ prosthetics ☐ cancer phobia ☐ Others
- Patient awareness of presence of the condition in his mouth □ Aware □ Not aware
- Any problems caused to the patient by presence of tori in the mouth Yes ☐ No ☐
- Health problems (chronic disease drugs history)

  _____

II. symptomatic evidence of parafunctional habits

Objective symptoms

Awareness of diurnal bruxism	Yes ☐	No ☐
Awareness of nocturnal habit bruxism	Yes ☐	No ☐
Muscle clenching Habit	Yes ☐	No ☐
Teeth grinding habit	Yes ☐	No ☐

Subjective symptoms

☐ Facial muscles fatigue

☐ TMJ Stiffness or pain upon awakening at morning

☐ Informed about grinding sounds during sleep by their partner or others

☐ Morning headache and jaw/neck fatigue

☐Difficulty mouth opening wide

☐Teeth sire when bite

☐Nutritional behaviors (chewing very hard foods or ice)

III. Clinical evidence of parafunctional habits

☐ Presence of shiny facets with sharp edges that matched with opposing teeth facets in an eccentric position
☐ Wear on an occlusal appliance
☐ Mobility of teeth with evidence of periodontitis
☐ Fractured teeth or restorations

III. Clinical examination

☐ Type of basal occlusion: ----------

☐ Number of teeth present: ----------

Clinical evidence of attrition: Yes ☐ No ☐

☐ Type of dental occlusion : ----------

☐ Shape of dental arch : ----------

Teeth spacing Yes ☐ No ☐

Crowding Yes ☐ No ☐

Anodontia . Yes ☐ No ☐

Supernumerary teeth Yes ☐ No ☐

Dental chart

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
			E	D	C	B	A	A	B	C	D	E			
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8

Remarks:

Sign of clinician Date ----/----/---------

Appendix 2: Laboratory investigations and

Benghazi University
Faculty of Dentistry
Department of Oral Medicine
Oral Pathology Diagnosis and Radiology

Relationship between torus mandibularis, torus palatinus and parafunctional habits and anxiety in a sample from eastern Libyan population

Case Number ---------

I. Laboratory investigations

1- Serum calcium level …….. (normal range of the lab. ……..).

2- PTH level …….. (normal range of the lab. ……..).

3- Vitamin D level …… (normal range of the lab. ……..).

II. Clinical evidence of tori or bony Exostosis

III. Type of the torous:

Torous ☐ Single ☐ Multiple

☐ TM Torus. Mandibularis ☐bilateral ☐unilateral

☐ TP Torus palatinus

IV. Shape of the dental arches

☐ U shaped ☐ V shaped ☐ Other

V. Measurements of the torous:

1- Size of the tours (maximum projection or thickness)

☐ Less than 3 mm

☐ 3-6 mm

☐ More than 6 mm

2- Dimensions:

☐ Meso-distal: …… cm

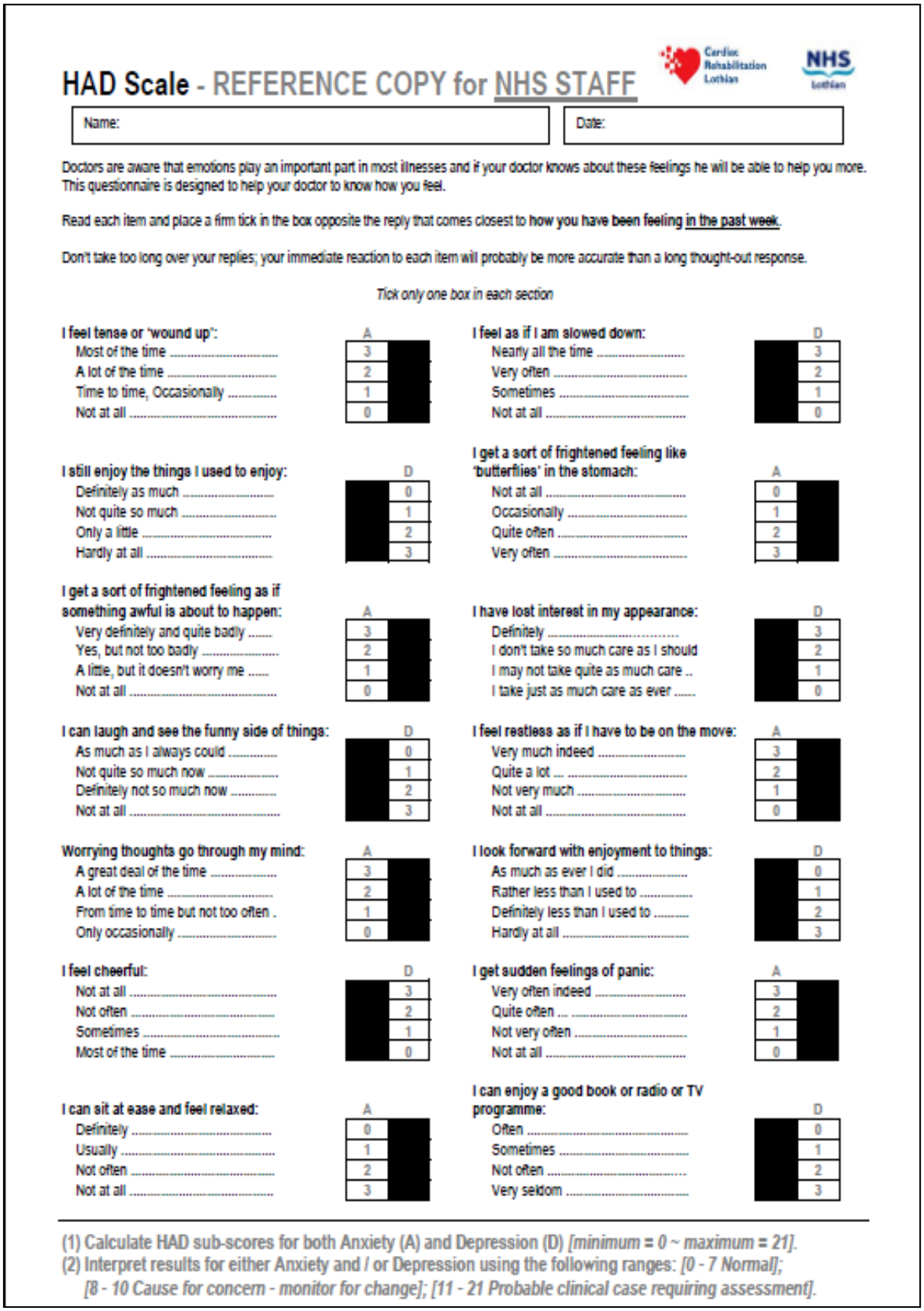
☐ Oclusso-apical: ……cm

☐ Diameter (in case of ovoid or circular): …… cm

Shape of the tours:

☐ Rounded ☐ Oval ☐ Spindle shape ☐ Lobulated ☐ Others

Appendix 3: HAD scale used in this study[1]



HAD Scale - REFERENCE COPY for NHS STAFF

Cardiac Rehabilitation Lothian — NHS Lothian

Name: Date:

Doctors are aware that emotions play an important part in most illnesses and if your doctor knows about these feelings he will be able to help you more. This questionnaire is designed to help your doctor to know how you feel.

Read each item and place a firm tick in the box opposite the reply that comes closest to how you have been feeling in the past week.

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

Tick only one box in each section

I feel tense or 'wound up':	A	**I feel as if I am slowed down:**	D
Most of the time	3	Nearly all the time	3
A lot of the time	2	Very often	2
Time to time, Occasionally	1	Sometimes	1
Not at all	0	Not at all	0
I still enjoy the things I used to enjoy:	D	**I get a sort of frightened feeling like 'butterflies' in the stomach:**	A
Definitely as much	0	Not at all	0
Not quite so much	1	Occasionally	1
Only a little	2	Quite often	2
Hardly at all	3	Very often	3
I get a sort of frightened feeling as if something awful is about to happen:	A	**I have lost interest in my appearance:**	D
Very definitely and quite badly	3	Definitely	3
Yes, but not too badly	2	I don't take so much care as I should	2
A little, but it doesn't worry me	1	I may not take quite as much care	1
Not at all	0	I take just as much care as ever	0
I can laugh and see the funny side of things:	D	**I feel restless as if I have to be on the move:**	A
As much as I always could	0	Very much indeed	3
Not quite so much now	1	Quite a lot	2
Definitely not so much now	2	Not very much	1
Not at all	3	Not at all	0
Worrying thoughts go through my mind:	A	**I look forward with enjoyment to things:**	D
A great deal of the time	3	As much as ever I did	0
A lot of the time	2	Rather less than I used to	1
From time to time but not too often	1	Definitely less than I used to	2
Only occasionally	0	Hardly at all	3
I feel cheerful:	D	**I get sudden feelings of panic:**	A
Not at all	3	Very often indeed	3
Not often	2	Quite often	2
Sometimes	1	Not very often	1
Most of the time	0	Not at all	0
I can sit at ease and feel relaxed:	A	**I can enjoy a good book or radio or TV programme:**	D
Definitely	0	Often	0
Usually	1	Sometimes	1
Not often	2	Not often	2
Not at all	3	Very seldom	3

(1) Calculate HAD sub-scores for both Anxiety (A) and Depression (D) *[minimum = 0 ~ maximum = 21].*
(2) Interpret results for either Anxiety and / or Depression using the following ranges: *[0 - 7 Normal];*
[8 - 10 Cause for concern - monitor for change]; [11 - 21 Probable clinical case requiring assessment].

[1] The original English version used by NHS in the UK

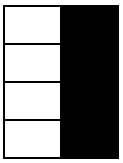
Appendix 4: Arabic translation of HAD scale used in this study

مقياس المستشفى عن القلق و الحزن (م. ق. ح)

الجنس:.....	التاريخ: / /

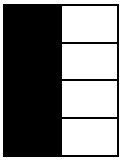
الأطباء يدركون أن العواطف تلعب دورا مهما في معظم الأمراض. وإذا كان لدى طبيبك خلفية عن تلك المشاعر فلربما يستطيع مساعدتك بشكل أفضل. و قد صمم هذا الاستبيان لمساعدة الطبيب على تفهم أفضل لمشاعرك
الرجاء قرأة كل فقرة ثم ضع علامة صح بشكل واضح في المربع المقابل الإجابة الأقرب للتعبير عن مشاعرك في الأسبوع المنصرم.اختر مربعا واحدا فقط

اشعر بالضغط النفسي **A**



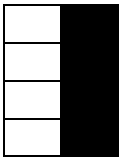
معظم الوقت .....
أغلب الأوقات .....
من حين لآخر .....
لا اشعر بذلك إطلاقا .....

أجد المتعة في الأشياء التي تعودت التمتع بها **D**



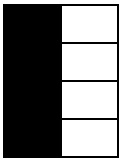
بشكل واضح وإلى حد بعيد .....
ليس بالقدر المعتاد .....
نوعا ما .....
بالكاد أجد ذلك .....

لدي إحساس بأن شيئا سيئا على وشك الحدوث **A**



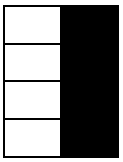
بشكل أكيد و بوقع مأساوي جدا .....
نعم ولكن ليس بتلك الدرجة من السوء .....
قليلا و لكن ذلك لا يقلقني .....
ليس لدي مثل ذلك الشعور .....

أستطيع الضحك ورؤية الجوانب المرحة للأشياء **D**



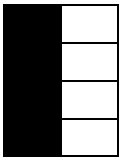
بملء شدقيّ و بكل حرية .....
ليس قدر كبير الآن .....
بشكل اقل الآن و لا يهمني ذلك .....
لا أستطيع فعل ذلك على الإطلاق .....

تمر بمخيلتي أفكار مقلقة و سوداوية **A**



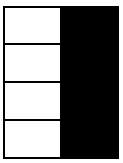
في اغلب الأحيان .....
في كثير من الأوقات .....
من حين لآخر و لكن ليس في اغلب الأوقات .....
نادرا ما يحدث ذلك .....

اشعر بالغبطة و الابتهاج **D**



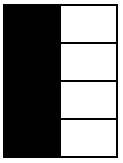
لا اشعر بذلك على الإطلاق .....
ليس كثيرا .....
أحيانا .....
معظم الأوقات .....

يمكنني الارتياح و الشعور بالاسترخاء **A**



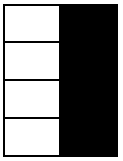
بكل تأكيد .....
عادة .....
ليس كثيرا .....
لا على الإطلاق .....

أشعر و كأنني محبط



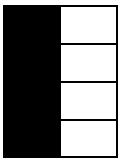
كل الوقت تقريبا .....
معظم الأوقات .....
أحيانا .....
لا على الإطلاق .....

لدي أحساس بالخوف و قرقعة في الأمعاء **A**



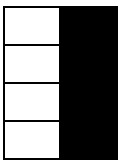
لا أشعر بمثل ذلك على الإطلاق .....
بعض الأحيان .....
أغلب الأوقات .....
معظم الأوقات .....

لقد فقدت الاهتمام بمظهري **D**



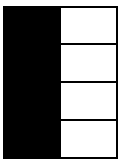
بشكل واضح .....
لا أهتم بمظهري كما يجب .....
ربما لست مهتما به بالشكل المطلوب .....
لدي نفس الاهتمام بمظهري كما في السابق .....

اشعر بعدم الاستقرار كما لو أني على وشك **A**



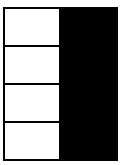
اشعر بذلك بشكل واضح .....
في معظم الأوقات .....
ليس كثيرا .....
لا اشعر بذلك على الإطلاق .....

أتطلع إلى درجة إمتاع الأشياء من حولي **D**



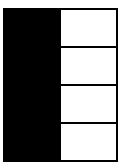
كما إنا متعود عليه دائما .....
اقل مما اعتدت عليه في السابق .....
اقل من ذي قبل بشكل واضح .....
بالكاد أن انظر إلى ذلك من هذا المنظور .....

ينتابني شعور مفاجئ بالرعب **A**



معظم الأوقات .....
من وقت لآخر .....
ليس في كل الأوقات .....
لا يحدث ذلك لي على الإطلاق

أستمتع بقراءة كتاب جيد و الاستماع لبرامج



غالبا .....
أحيانا .....
ليس بالقدر الكبير .....
من النادر جدا .....

The Digital caliper used for dimensions

1. 

Figure16: Digital caliper for measurement of dimensions

REFERENCES

REFERENCES

1- Abrams, S. (2000). Complete denture covering mandibular tori using three base materials: a case report. J Can Dent Assoc, 66(9), 494-496.

2- Ahn, S. H., Ha, J. G., Kim, J. W., Lee, Y. W., Yoon, J. H., Kim, C. H., et al. (2019). Torus mandibularis affects the severity and position-dependent sleep apnoea in non-obese patients. Clin Otolaryngol, 44(3), 279-285.

3- Al-Dwairi, Z. N., Al-Daqaq, A. N. F., Kielbassa, A. M., & Lynch, E. (2017). Association between oral tori, occlusal force, and mandibular cortical index. Quintessence Int, 48(10), 841-849.

4- Al-Sebaie, D., & Alwrikat, M. (2011). Prevalence of torus palatinus and torus mandibularis in Jordan. Pakistan Oral & Dental Journal, 31(1), 214-216.

5- Al Quran, F. A., & Al-Dwairi, Z. N. (2006). Torus palatinus and torus mandibularis in edentulous patients. J Contemp Dent Pract, 7(2), 112-119.

6- Allord, J. C. (1972). Hereditary aspects of the etiology of the oral tori. (Literature review). Chronicle, 36(3), 71-72.

7- Alvesalo, L., & Kari, M. (1972). [Dental survey in Hailuoto. V. Torus mandibularis: incidence and some viewpoints connected with inheritance]. Proc Finn Dent Soc, 68(6), 307-314.

8- AlZarea, B. K. (2016). Prevalence and pattern of torus palatinus and torus mandibularis among edentulous patients of Saudi Arabia. Clin Interv Aging, 11, 209-213.

9- Antoniades, D. Z., Belazi, M., & Papanayiotou, P. (1998). Concurrence of torus palatinus with palatal and buccal exostoses: case report and review of the literature. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 85(5), 552-557.

10- Apinhasmita, W., Jainkittivongb, A., & Swasdisonc, S. (2002). Torus Palatinus and Torus Mandibularis in a Thai population. Scince Asia, 28, 105-111.

11- Auškalnis, A., Rutkūnas, V., Bernhardt, O., Šidlauskas, M., Šalomskienė, L., & Basevičienė, N. (2015). Multifactorial etiology of Torus mandibularis: study of twins. Stomatologija 17(2), 5-40.

12- Axelsson, G., & Hedegaard, B. (1985). Torus palatinus in Icelandic schoolchildren. Am J Phys Anthropol, 67(2), 105-112.

13- Axelsson, G., & Hedegard, B. (1981). Torus mandibularis among Icelanders. Am J Phys Anthropol, 54(3), 383-389.

14- Azaz, B. (1975). Bilateral multiple mandibular tori. Oral Surg Oral Med Oral Pathol, 40(3), 429-430.

15- Barbujani, G., Rolo, M., Barrai, I., & Pinto-Cisternas, J. (1986). Torus palatinus: a segregation analysis. Hum Hered, 36(5), 317-325.

16- Barker, D., Walls, A. W., & Meechan, J. G. (2001). Ridge augmentation using mandibular tori. Br Dent J, 190(9), 474-476.

17- Beena, J. P. (2012). Torus palatinus in an infant: a case report. J Dent Child (Chic), 79(3), 181-184.

18- Belsky, J. L., Hamer, J. S., Hubert, J. E., Insogna, K., & Johns, W. (2003). Torus palatinus: a new anatomical correlation with bone density in postmenopausal women. J Clin Endocrinol Metab, 88(5), 2081-2086.

19- Bernaola-Paredes, W. E., Pereira, A. M., Albuquerque Luiz, T. A., Martins, I. S., Lima, F. F., & Vallejo-Rosero, K. A. (2020). An atypical presentation of gigantiform torus palatinus: A case report: Atypical tori palatine and surgical management. Int J Surg Case Rep, 75, 66-70.

20- Bertazzo-Silveira, E., Stuginski-Barbosa, J., Porporatti, A. L., Dick, B., Flores-Mir, C., Manfredini, D., et al. (2017). Association between signs and symptoms of bruxism and presence of tori: a systematic review. Clin Oral Investig, 21(9), 2789-2799.

21- Blakemore, J. R., Eller, D. J., & Tomaro, A. J. (1975). Maxillary exostoses. Surgical management of an unusual case. Oral Surg Oral Med Oral Pathol, 40(2), 200-204.

22- Bouquot, J. E., & Gundlach, K. K. (1986). Oral exophytic lesions in 23,616 white Americans over 35 years of age. Oral Surg Oral Med Oral Pathol, 62(3), 284-291.

23- Bruce, I., Ndanu, T. A., & Addo, M. E. (2004). Epidemiological aspects of oral tori in a Ghanaian community. Int Dent J, 54(2), 78-82.

24- Brunsvold, M. A., Kaiser, D. A., & Faner, R. M. (1995). Recurrence of mandibular tori after surgical removal: two case reports. J Prosthodont, 4(3), 164-167.

25- Cagirankaya, L. B., Kansu, O., & Hatipoglu, M. G. (2004). Is torus palatinus a feature of a well-developed maxilla? Clin Anat, 17(8), 623-625.

26- Chang, P. C., Hsu, C. L., Tai, S. Y., Tsai, A. I., Wang, I. K., Weng, C. H., et al. (2020). Torus Palatinus in Taiwan Patients Receiving Peritoneal Dialysis and Hemodialysis: A Prospective Observational Study. J Multidiscip Healthc, 13, 373-379.

27- Chatterjee, S. (2016). Bony bumps in the mouth. Cleve Clin J Med, 83(1), 17-18.

28- Chew, C. L., & Tan, P. H. (1984). Torus palatinus. A clinical study. Aust Dent J, 29(4), 245-248.

29- Chohayeb, A. A., & Volpe, A. R. (2001). Occurrence of torus palatinus and mandibularis among women of different ethnic groups. Am J Dent, 14(5), 278-280.

30- Clifford, T., Lamey, P. J., & Fartash, L. (1996). Mandibular tori, migraine and temporomandibular disorders. Br Dent J, 180(10), 382-384.

31- Corsair, A. J., Iacono, V. J., & Moss, S. S. (2001). Exostosis following a sub epithelial connective tissue graft. J Int Acad Periodontol, 3 38-41.

32- Cortes, A. R., Jin, Z., Morrison, M. D., Arita, E. S., Song, J., & Tamimi, F. (2014). Mandibular tori are associated with mechanical stress and mandibular shape. J Oral Maxillofac Surg, 72(11), 2115-2125.

33- Czuszak, C. A., Tolson, G. E. t., Kudryk, V. L., Hanson, B. S., & Billman, M. A. (1996). Development of an exostosis following a free gingival graft: case report. J Periodontol, 67(3), 250-253.

34- Durrani, M. A., & Barwise, J. A. (2000). Difficult endotracheal intubation associated with torus mandibularis. Anesth Analg, 90(3), 757-759.

35- Eggen, S. (1988). [Torus mandibularis and muscular hyperactivity]. Nor Tannlaegeforen Tid, 98(6), 220-226.

36- Eggen, S. (1989). Torus mandibularis: an estimation of the degree of genetic determination. Acta Odontol Scand, 47(6), 409-415.

37- Eggen, S., & Natvig, B. (1986). Relationship between torus mandibularis and number of present teeth. Scand J Dent Res, 94(3), 233-240.

38- Eggen, S., & Natvig, B. (1991). Variation in torus mandibularis prevalence in Norway. A statistical analysis using logistic regression. Community Dent Oral Epidemiol, 19(1), 32-35.

39- Eggen, S., Natvig, B., & Gasemyr, J. (1994). Variation in torus palatinus prevalence in Norway. Scand J Dent Res, 102(1), 54-59.

40- El Sergani, A. M., Anderton, J., Brandebura, S., Obniski, M., Ginart, M. T., Padilla, C., et al. (2020). Prevalence of Torus Palatinus and association with dental arch shape in a multi-ethnic cohort. Homo, 71(4), 273-280.

41- Fernandez, A. J. (1992). Use of a maxillary tray to make an alginate impression for patients with large bilateral mandibular tori. J Prosthet Dent, 68(3), 560-561.

42- Garcia-Garcia, A. S., Martinez-Gonzalez, J. M., Gomez-Font, R., Soto-Rivadeneira, A., & Oviedo-Roldan, L. (2010). Current status of the torus palatinus and torus mandibularis. Med Oral Patol Oral Cir Bucal, 15(2), e353-360.

43- Godinho, M., Barbosa, F., Andrade, F., Cuzzi, T., & Ramos, E. S. M. (2013). Torus palatinus osteonecrosis related to bisphosphonate: a case report. Case Rep Dermatol, 5(1), 120-125.

44- Gorsky, M., Bukai, A., & Shohat, M. (1998). Genetic influence on the prevalence of torus palatinus. Am J Med Genet, 75(2), 138-140.

45- Gough, K., & Hudson, P. (2009). Psychometric properties of the Hospital Anxiety and Depression Scale in family caregivers of palliative care patients. J Pain Symptom Manage, 37(5), 797-806.

46- Gupta, A., Rizor, L., Saul, J., Kesha, K., & Berman, G. (2019). The use of torus palatinus in the identification of unknown skeletal remains. Med Leg J, 87(3), 130-132.

47- Hassan, K. S., Al-Agal, A., Abdel-Hady, A. I., Swelam, W. M., & Elgazzar, R. F. (2015). Mandibular tori as bone grafts: an alternative treatment for periodontal osseous defects - clinical, radiographic and histologic morphology evaluation. J Contemp Dent Pract, 16(3), 192-200.

48- Haugen, L. K. (1992). Palatine and mandibular tori. A morphologic study in the current Norwegian population. Acta Odontol Scand, 50(2), 65-77.

49- Hiremath, V. K., Husein, A., & Mishra, N. (2011). Prevalence of torus palatinus and torus mandibularis among Malay population. J Int Soc Prev Community Dent, 1(2), 60-64.

50- Hjertstedt, J., Burns, E. A., Fleming, R., Raff, H., Rudman, I., Duthie, E. H., et al. (2001). Mandibular and palatal tori, bone mineral density, and salivary cortisol in community-dwelling elderly men and women. J Gerontol A Biol Sci Med Sci, 56(11), M731-735.

51- Horning, G. M., Cohen, M. E., & Neils, T. A. (2000). Buccal alveolar exostoses: prevalence, characteristics, and evidence for buttressing bone formation. J Periodontol, 71(6), 1032-1042.

52- Hosoi, T., Yoda, T., Yamaguchi, M., Amano, H., & Orimo, H. (2003). Elderly women with oral exostoses had higher bone mineral density. J Bone Miner Metab, 21(2), 120-122.

53- Hsu, C. L., Hsu, C. W., Chang, P. C., Huang, W. H., Weng, C. H., Yang, H. Y., et al. (2016). Oral Tori in Chronic Peritoneal Dialysis Patients. PLoS One, 11(6), e0156988.

54- Ihunwo, A. O., & Phukubye, P. (2006). The frequency and anatomical features of torus mandibularis in a Black South African population. Homo, 57(4), 253-262.

55- Jainkittivong, A., Apinhasmit, W., & Swasdison, S. (2007). Prevalence and clinical characteristics of oral tori in 1,520 Chulalongkorn University Dental School patients. Surg Radiol Anat, 29(2), 125-131.

56- Jainkittivong, A., & Langlais, R. P. (2000). Buccal and palatal exostoses: prevalence and concurrence with tori. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 90(1), 48-53.

57- Jeong, C. W., Kim, K. H., Jang, H. W., Kim, H. S., & Huh, J. K. (2019). The relationship between oral tori and bite force. Cranio, 37(4), 246-253.

58- Johnson, C. C., Gorlin, R. J., & Anderson, V. E. (1965). Torus Mandibularis: A Genetics Study. Am J Hum Genet, 17, 433-442.

59- kalaignan, P., Mohan, J. S., & Jayakumar, A. (2018). Determination of Grading for Maxillary and Mandibular Tori- an in Vivo study. Biomed. & Pharmacol. J, 11(2), 679-688.

60- Kaneko, K., & Takahashi, H. (2014). Bisphosphonate-related osteonecrosis of the palatal torus. ORL J Otorhinolaryngol Relat Spec, 76(6), 353-356.

61- Kerdpon, D., & Sirirungrojying, S. (1999). A clinical study of oral tori in southern Thailand: prevalence and the relation to parafunctional activity. Eur J Oral Sci, 107(1), 9-13.
62- Khaled, Y. A., Flores, C., & Forst, D. (2016). Mandibular Tori and Sleep Bruxism: Is There a Relationship? A Systematic Review. EC Dental Science, 4(2), 733-741.
63- Khan, J. A. (1977). Torus palatinus. J Laryngol Otol, 91(12), 1113-1116.
64- King, D. R., & Moore, G. E. (1976). An analysis of torus palatinus in a transatlantic study. J Oral Med, 31(2), 44-46.
65- Koc, N., & Cagirankaya, L. B. (2018). Mandibular tori are associated with mandibular bone quality: a case-control study. Folia Morphol (Warsz), 77(4), 736-741.
66- Koc, N., & Cagirankaya, L. B. (2019). Investigation of the determinants of the mandibular cortical morphology. Dent Med Probl, 56(1), 21-25.
67- Kolas, S., Halperin, V., Jefferis, K., Huddleston, S., & Robinson, H. B. (1953). The occurrence of torus palatinus and torus mandibularis in 2,478 dental patients. Oral Surg Oral Med Oral Pathol, 6(9), 1134-1141.
68- Koong, B. a. (2017). Atlas of oral and maxillofacial radiology (1st ed.): John Wiley & Sons.
69- Kukula, K., & Plakwicz, P. (2016). Oral pathology: Exostosis deforming face features. Br Dent J, 221(2), 50-51.
70- Kun-Darbois, J. D., Guillaume, B., & Chappard, D. (2017). Asymmetric bone remodeling in mandibular and maxillary tori. Clin Oral Investig, 21(9), 2781-2788.
71- Ladizinski, B., & Lee, K. C. (2014). A nodular protuberance on the hard palate. JAMA, 311(15), 1558-1559.
72- Larato, D. C. (1972). Palatal exostoses of the posterior maxillary alveolar process. J Periodontol, 43(8), 486-489.
73- Lavigne, G. J., Khoury, S., Abe, S., Yamaguchi, T., & Raphael, K. (2008). Bruxism physiology and pathology: an overview for clinicians. J Oral Rehabil, 35(7), 476-494.
74- Lease, L. R. (2020). Correlations between dental wear and oral cavity characteristics: Mandibular torus, palatine torus, and oral exostoses. Am J Hum Biol, e23446.

75- Lee, H. M., Kang, D. W., Yun, P. Y, et al., (2021). Associations between mandibular torus and types of temporomandibular disorders, and the clinical usefulness of temporary splint for checking bruxism. BMC Oral Health, 21(1), 182.

76- Lee, K. H., Lee, J. H., & Lee, H. J. (2013). Concurrence of torus mandibularis with multiple buccal exostoses. Arch Plast Surg, 40(4), 466-468.

77- Loukas, M., Hulsberg, P., Tubbs, R. S., Kapos, T., Wartmann, C. T., Shaffer, K., et al. (2013). The tori of the mouth and ear: a review. Clin Anat, 26(8), 953-960.

78- Low, C. M., Price, D. L., & Kasperbauer, J. L. (2019). Mandibular Tori Limiting Treatment of Carcinoma of the Upper Aerodigestive Tract. Clin Med Insights Case Rep, 12, 1179547619856599.

79- Marx, R. E., & Garg, A. K. (1998). Bone structure, metabolism and physiology: its impact on dental implantology. Implant Dent 7, 267-275.

80- Mayhall, J. T., Dahlberg, A. A., & Owen, D. G. (1970). Torus mandibularis in an Alaskan Eskimo population. Am J Phys Anthropol, 33(1), 57-60.

81- Moraes Junior, E. F., Damante, C. A., & Araujo, S. R. (2010). Torus palatinus: a graft option for alveolar ridge reconstruction. Int J Periodontics Restorative Dent, 30(3), 283-289.

82- Morita, K., Tsuka, H., Kuremoto, K. I., Kimura, H., Kawano, H., Yokoi, M., et al. (2021). Association between buccal mucosa ridging and oral feature/symptom and its effects on occlusal function among dentate young adults in a cross-sectional study of Japan. Cranio, 39(1), 24-28.

83- Morita, K., Tsuka, H., Shintani, T., Yoshida, M., Kurihara, H., & Tsuga, K. (2017). Prevalence of Torus Mandibularis in Young Healthy Dentate Adults. J Oral Maxillofac Surg, 75(12), 2593-2598.

84- Neiva, R. F., Neiva, G. F., & Wang, H. L. (2006). Utilization of mandibular tori for alveolar ridge augmentation and maxillary sinus lifting: a case report. Quintessence Int, 37(2), 131-137.

85- Nery, E. B., Corn, H., & Eisenstein, I. L. (1977). Palatal exostosis in the molar region. J Periodontol, 48(10), 663-666.

86- Neville, B., Douglas, D., Carl, M., & Bouquot, J. (2009). Developmental defects of the oral and maxillofacial region. In Oral and Maxillofacial Pathology| (3 ed., pp. 1-5). St. Louis: MO: WB Saunders.

87- Neville, B. W., Damm, D. D., Allen, C. M., & Bouquot, J. E. (1995). Oral and maxillofacial pathology. Philadelphia: WB Saunders Co.

88- Nogueira, A. S., Goncales, E. S., Santos, P. S., Damante, J. H., Alencar, P. N., Sampaio, F. A., et al. (2013). Clinical, tomographic aspects and relevance of torus palatinus: case report of two sisters. Surg Radiol Anat, 35(9), 867-871.

89- Nolte, A., & Schirren, C. G. (1997). [Torus mandibularis]. Hautarzt, 48(6), 414-416.

90- Oualalou, Y., Azaroual, M. F., Zaoui, F., Chbicheb, S., & Berrada, S. (2014). [Prevalence and clinical characteristics of oral bony outgrowth in a Moroccan population]. Rev Stomatol Chir Maxillofac Chir Orale, 115(5), 268-273.

91- Pack, A. R., Gaudie, W. M., & Jennings, A. M. (1991). Bony exostosis as a sequela to free gingival grafting: two case reports. J Periodontol, 62, 269-271.

92- Pal, M., Gupta, K., Kumar, S., & Gopalkrishna, P. (2018). Use of a mandibular torus for autogenous grafting: a case report. Gen Dent, 66(5), 73-76.

93- Pietrokovsky, J., & Massler, M. (1967). Alveolar ridge resorption following tooth extraction. J Prosthet Dent, 17, 21-27.

94- Pradhan, M. S., Patil, S., & Uttarwar, V. S. (2017). Multiple Mandibular Tori: Three Case Reports And Review. Journal of Dental and Medical Sciences, 16(6), 26-29.

95- Puttaswamaiah, R. N., Galgali, S. R., & Gowda, V. S. (2011). Exostosis: a donor site for autograft. Indian J Dent Res, 22(6), 860-862.

96- Regezi, J., Sciubba, J. J., & Jordan, R. (2008). Clinical Pathologic Correlations (5 ed.). Philadelphia: Saunders, An Imprint of Elsevier.

97- Reichart, P. A., Neuhaus, F., & Sookasem, M. (1988). Prevalence of torus palatinus and torus mandibularis in Germans and Thai. Community Dent Oral Epidemiol, 16(1), 61-64.

98- Rezai, R. F., Jackson, J. T., & Salamat, K. (1985). Torus palatinus, an exostosis of unknown etiology: review of the literature. Compend Contin Educ Dent, 6(2), 149-152, 147.

99- Rocca, J. P., Raybaud, H., Merigo, E., Vescovi, P., & Fornaini, C. (2012). Er:YAG Laser: A New Technical Approach to Remove Torus Palatinus and Torus Mandibularis. Case Rep Dent, 2012.

100- Romanos, G. E., Sarmiento, H. L., Yunker, M., & Malmstrom, H. (2013). Prevalence of torus mandibularis in Rochester, New York, region. N Y State Dent J, 79(1), 25-27.

101- Rouas, A., & Midy, D. (1997). About a mandibular hyperostosis: the torus mandibularis. Surg Radiol Anat, 19(1), 41-43.

102- Ryan, J. L., & Larson, E. (2016). Osteonecrosis of the Torus Palatinus in the Setting of Long-Term Oral Bisphosphonate Use--A Case Report. S D Med, 69(1), 23-25.

103- Sathya, K., Kanneppady, S. K., & Arishiya, T. (2012). Prevalence and clinical characteristics of oral tori among outpatients in Northern Malaysia. J Oral Biol Craniofac Res, 2(1), 15-19.

104- Sawair, F. A., Shayyab, M. H., Al-Rababah, M. A., & Saku, T. (2009). Prevalence and clinical characteristics of tori and jaw exostoses in a teaching hospital in Jordan. Saudi Med J, 30(12), 1557-1562.

105- Sayan, N. (2002). Peripheral osteoma of the oral and maxillofacial region: a study of 35 new cases. J Oral Maxillofac Surg, 60(11), 1299.

106- Seah, Y. H. (1995). Torus palatinus and torus mandibularis: a review of the literature. Aust Dent J, 40(5), 318-321.

107- Sellevold, B. J. (1980). Mandibular torus morphology. Am J Phys Anthropol, 53(4), 569-572.

108- Sennerby, L., Carlsson, G. E., Bergman, B., & Warfvinge, J. (1988). Mandibular bone resorption in patients treated with tissue integrated prostheses and in complete denture wearers. Acta Odontol Scand, 46, 15-140.

109- Shah, D. S., Sanghavi, S. J., Chawda, J. D., & Shah, R. M. (1992). Prevalence of torus palatinus and torus mandibularis in 1000 patients. Indian J Dent Res, 3(4), 107-110.

110- Siegel, W. M., & Pappas, J. R. (1986). Development of exostoses following skin graft vestibuloplasty: report of a case. J Oral Maxillofac Surg, 44(6), 483-484.

111- Simunkovic, S. K., Bozic, M., Alajbeg, I. Z., Dulcic, N., & Boras, V. V. (2011). Prevalence of torus palatinus and torus mandibularis in the Split-Dalmatian County, Croatia. Coll Antropol, 35(3), 637-641.

112- Sirirungrojying, S., & Kerdpon, D. (1999). Relationship between oral tori and temporomandibular disorders. Int Dent J, 49(2), 101-104.

113- Sisman, Y., Ertas, E. T., Gokce, C., & Akgunlu, F. (2008). Prevalence of torus palatinus in cappadocia region population of Turkey. Eur J Dent, 2(4), 269-275.

114- Snaith, R. P. (2003). The Hospital Anxiety And Depression Scale. Health Qual Life Outcomes, 1, 29.

115- Soames, J. V., & Southam, J. C. (2005). Oral pathology (4th ed. ed.). Oxford: Oxford University Press.

116- Sonnier, K. E., Horning, G. M., & Cohen, M. E. (1999). Palatal tubercles, palatal tori, and mandibular tori: prevalence and anatomical features in a U.S. population. J Periodontol, 70(3), 329-336.

117- Suzuki, M., & Sakai, T. (1960). A familial study of torus palatinus and torus mandibularis. Am J Phys Anthropol, 18, 26-272.

118- Takasugi, Y., Shiba, M., Okamoto, S., Hatta, K., & Koga, Y. (2009). Difficult laryngoscopy caused by massive mandibular tori. J Anesth, 23(2), 278-280.

119- Telang, L. A., Telang, A., Nerali, J., & Pradeep, P. (2019). Tori in a Malaysian population: Morphological and ethnic variations. J Forensic Dent Sci, 11(2), 107-112.

120- Topazian, D. S., & Mullen, F. R. (1977). Continued growth of a torus palatinus. J Oral Surg, 35(10), 845-846.

121- Touyz, L. Z., & Tau, S. (1991). Frequency and distribution of palatal osseous alveolar marginal exostoses--POAMES. J Dent Assoc S Afr, 46(9), 471-473.

122- Yoshinaka, M., Ikebe, K., Furuya-Yoshinaka, M., Hazeyama, T., & Maeda, Y. (2010). Prevalence of torus palatinus among a group of Japanese elderly. J Oral Rehabil, 37(11), 848-853.

الملخص العربي

العلاقة بين نـوامي الفك السفلي و النامية الحنكية والعادات الغير نـافعة و التوتر في عينة من سكان الجزء الشرقي من ليبيا

اعداد:

سالمين مفتاح حسين علي

تحت إشراف:

أ.د محمد حماد انقافو

الخلفية: النامية أو الطور هو نمو حميد ، مستدير ، أملس السطح ، غير ورمي يتكون من عظم كثيف عقدي يظهر على خط الوسط من الحنك أو الجوانب اللسانية للفك السفلي. من المحتمل أن تكون مسبباته ناتجة عن تفاعل العوامل الوراثية والبيئية متعددة العوامل. يظهر النامي الحنكي العلوي (TP) في منتصف الحنك لأكثر من 20٪ من البالغين في جميع أنحاء العالم ، بينما يمكن اكتشاف نوامي الفك السفلي (TM) عند حوالي 7.5٪ من البالغين وقد يكون مرتبطًا بطحن الأسنان وعادات الإطباق شبه الوظيفية، أو اضطرابات المفصل الصدغي الفكي.(TMD)

المعلومات المتعلقة بالعلاقة بين النوامي أو الانفتال والعوامل البيئية المختلفة مثل الإجهاد والقلق والمضغ المفرط محدودة للغاية بسبب ندرة الحالات المبلغ عنها في الأدبيات. استخدمت الدراسة الحالية خليط من الوصف السريري، والقياسات على قوالب دراسة الجص ، والتحقيق البيو كيميائي وتقييم مقياس القلق والاكتئاب (HADS) لجميع الفراد موضوع الدراسة من أجل الحصول على – نظرة عميقة للجوانب

المختلفة لهذه الحالة المراوغة. هناك القليل من الأهمية السريرية المرتبطة بهذه النوامي ، بما أنها حميدة ولا تصبح خبيثة أبدًا.

الهدف من الدراسة هو وصف السمات الديموغرافية والسريرية للمرضى الذين يعانون من النامي الفموي بالإضافة إلى أبعاد وحجم النامي الفموي وتحديد أشكالها. كما تهدف الدراسة أيضًا إلى تحديد تواتر علامات وأعراض نشاط الفم غير الوظيفي (مثل شد العضلات ، طحن الأسنان و / أو صرير الأسنان) ومستوى الكالسيوم في الدم وفيتامين د وهرمون الجار درقية ومستوى القلق والاكتئاب عند هؤلاء المرضى.

الموضوعات والطرق: شملت هذه الدراسة فقط المرضى الذين يعانون من النامي الفموي. تم اعتبار النامية موجودة عندما يكون هناك نتوء عظمي بادٍ للعيان، وفي الحالات المشكوك فيها ، يمكن تحسسه بالملامسة بالبنان. تم اختيار خمسين مريضًا ليبيًا لديهم دليل إكلينيكي على النامي الفموي عشوائيًا من أكتوبر 2019 حتى ديسمبر 2020 من المرضى الروتينيين المتعاقبين المترددين على مركزين رئيسيين لطب الأسنان في مدينتين مختلفتين في شمال شرق ليبيا. تمت دراسة الحالة السريرية للنوامي بشكل شامل من حيث عددها ونوعها وشكلها وأبعادها. و بحثت الدراسة في العلاقة بين النامي والدليل السريري على عادات تشوه الفم مثل صرير الأسنان وإرهاق العضلات وجوانب التآكل وفتح الفم. تم أخذ طبعة الأسنان و الفك العلوي والسفلي بواسطة مادة القاعدة مطاطية وجسمها الخفيف ، ثم تم تصنيع قوالب الأسنان على الفور في معمل الأسنان باستخدام مادة الجبس (Elite Model، Zhermack). كما تم التحقيق في النتائج البيو كيميائية لمستويات ايون الكالسيوم بالدم، و فيتامين د ، وهرمون الغدة الجار درقية. كذلك تم تقييم مستوى القلق والتوتر في مجموعة الدراسة من خلال مقياس HAD.

النتائج: شملت هذه الدراسة عدد 50 مريضًا ليبيًا (39 أنثى و 11 ذكرًا) تراوحت أعمارهم ما بين 16 و 63 عامًا مع وجود دليل سريري على وجود نامية بالفم تم اكتشافها بالعين المجردة أو بالجس بالبنان كان انقباض عضلات الوجه والتعب أكثر الأعراض انتشارا حيث يعاني 32 (64٪) من المرضى من مثل هذه الأعراض. إجهاد الفك / الرقبة في الصباح عند 23 (46٪) مريضا ، طحن الأسنان في 20 (40٪) مريضا ، تيبس الفك الصباحي في 18 (36٪) مريضا ، عادة صرير الأسنان الليلي في 11 (22٪) مريض ، صرير الأسنان النهاري في 9 (18٪) مرضى ، أصوات طحن الاسنان أثناء النوم في 7 (14٪)) مرضى و 18 (36٪) مريض كانوا على دراية بوجود النامي الفموي في أفواههم. و لم يتم الإبلاغ عن صعوبات في الكلام أو البلع أو التدخل في النوم بسبب هذه النوامي.

تضمنت علامات النشاط شبه الوظيفي المفترض حدوث تناقص مادة السن (attrition) في 34 (68٪) من المرضى ، ووجود جوانب لامعة على سطح السن في 32 (64٪) من المرضى ، وكسور في الأسنان أو في حشواتها عند 23 (46%) من المرضى ، او حركة الأسنان في 20 (40٪) من المرضى وتآكل سطحي الأجهزة الإطباقية في 11 مريضًا فقط. 44 (88٪) من المرضى لديهم اطباق اسنان من الدرجة الأولى وجميعهم باستثناء ثلاثة منهم كان لديهم قوس أسنان على شكل حرف U. تم الكشف عن تباعد الأسنان في 17 (34٪) مريضا ، وعدم تخلق الأسنان للقواطع الجانبية العلوية في 2 مريض.

وجد ان سبعة وثلاثون (74٪) مريضًا لديهم نوامي فردية ، 26 (52%) لديهم نوامي في الفك السفلي فقط، و 10 (20٪) لديهم نوامي بالحنك العلوي، وفي 14 (28٪) مريض كان هناك توافق آني في الظهور بين TP و TM. تجاوز حجم كل النوامي الحنكية 10 ملم في قطرها الأطول بعدًا بغض

النظر عن شكله. و 14 مريضًا لديهم شكل مغزلي للنامية الحنكية TP، 7 (29%) نامية على شكل قلب ، و 1 (4.16 ٪) على شكل مفصص ، 2 أشكال أخرى. أما بالنسبة منواني الفك السفلي فكانت خمس وثلاثون (87.5٪) حالة على الجهتين من الفك ، 18 (45٪) مدورة ، 10 (25٪) مفصصه ، 8 (25٪) ، بيضاوية و 4 (10٪) أشكال أخرى. ثمانية وعشرون (70٪) من نوامي الفك السفلي كانت أكثر من 6 ملم في أطول أبعادها. 11 (27.5٪) من الحالات أبعادها الأطول 3_6 مم وواحدة فقط (2.5٪) أبعادها أقل من 3 مم. مستويات الكالسيوم وفيتامين D و PTH كانت جميعها ضمن القيم الطبيعية. لم تكشف درجات مقياس القلق والاكتئاب في المستشفى (HAD) عن أي ارتباط ذي دلالة إحصائية بين درجة القلق و علامات او أعراض الاجهاد الا في حالة انقباض وتعب عضلات الوجه .(P=0.002)

الخلاصة: ينبغي إجراء مزيداً من الدراسات الخاضعة للرقابة على عددٍ أكبر من الناس تغطي مناطق أوسع من البلاد لإلقاء الضوء على الجوانب المختلفة لهذا النمو الزائد. يجب أيضًا استكشاف الفوائد المحتملة للنوامي الفموية كمصدر محتمل للتطعيم التلقائي للعظام لدعم القنطرة بالإضافة إلى استخدامها المحتمل كمؤشر لعلو جودة عظام الفك نظرًا لأن النوامي الفموية عبارة عن نواتج حميدة ، يجب أن تركز الدراسات المستقبلية على استخدامها المحتمل في زراعة الأسنان والاستخدامات الطبية الأخرى حيث انه تم بالفعل التحقق من خصائصها السريرية والوبائية منذ فترة طويلة.

العلاقة بين نـوامي الفك السفلي و النامية الحنكية والعادات الغير نـافعة و التوتر في عينة من سكان الجزء الشرقي من ليبيا

اعداد:

سالمين مفتاح حسين علي

تحت إشراف:

أ.د محمد حماد انقافو

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الماجستير في طب الفم

وامراض الفم والتشخيص والأشعة

جامعة بنغازي

كلية طب وجراحة الفم والاسنان

أكتوبر 2021