Case report

Prosthodontic Management of a case with massive Torus Palatinus using Molloplast-B

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Abstract

The management of patients with largetorus palatinus in denture fabrication can be quite challenging for a dental practitioner. A large palatal tori usually affect the close adaptation of the denture base to the mucosa thereby leading to loss of retention and stability of maxillary denture. It is, therefore, very important in the ways of management of patients with ~~big~~large Torus palatinus. The purpose of this article is to provide an overview of the modified approaches during acrylic removable partial denture fabrication for a patient with large Torus palatinus.

Keywords: Torus palatinus, denture fabrication

Introduction

Torus and its plural term tori are benign developmental localised bony protuberances occurring within the oral mucosa. Tori, with its Latin origins explain the anatomical morphology resembling cushion or knots in an entangled rope[1]. Depending on its location intra-orally, tori can be further denoted as torus palatinus and torus mandibularis[1]. Torus palatinus is a slow growth, non-malignant intra-oral hamartoma that arises from the median intermaxillary-interpalatine suture and extends inferiorly through the vault of the palate[2,3,4]. The oral mucosa surrounding the tori would be thin and relatively avascular. This contributes to the clinical appearance of paled or white mucosa enclosing the torus palatinus, whereas other areas in the palate region present a deeper red in shade.

While the exact pathogenesis of torus palatinus remains shrouded in mystery,researchers have identified that torus has a multifactorial etiology. Few studies have shed some insight regarding the role of genetics in the formation of torus palatinus[5,6,7].Cagirankayaet al[8] hypothesised that presence of torus palatinus serves as a bio indicator of an adequately

developed maxillary arch with little establishment of intra-arch malocclusions. However more recent studies seem to disproveCagirankaya et al study, instead alluding the formation of torus palatinus as a physio-mechanical process that continues throughout the dentate period[9,10,11]. It is imperative to note that the association between functional stresses within the oral cavity and development with 'maturation' of torus palatinus holds little water till date[12], although the converse is true for formation of torus mandibularis[13,14]. Certain medical conditions such as hypothyroidism, trauma, infection, use of certain drugs, environmental and nutritional disturbances could increase the chances for development of torus palatinus[15,16].

Worldwide prevalence of torus palatinus and torus mandibularis varies 8 to 51% and 6% to 32% respectivelyfrom region to region [16-30].Tori are found to be more common in females.In United States of America, prevalenceof torus palatinus were found in 69.7% of women from all ethnic groups[18]. It is also noted that tori is prevalent in specific ethnic and racial groups, especially Asians. Sing AK et al reported 33% of prevalence rate among

Malaysian population [31].Jainkittivong et al revealed a much higher prevalence of torus palatinus (60.5%)in Thai population [32].

Thoma and Goldman, in 1960 classified tori as: 1) flat; 2) nodular; 3) spindle and 4) lobular types[3,4,11,33]. Irrespective of its morphology, the mere presence of a large torus palatinus (diameter exceeding six centimetres) would greatly interfere with the placement of any dental prosthesis involving the palate, especially for removable partial and complete dentures requiring adequate palatal coverage to aid in its retention and stability[3,4,11,33]. The thin oral mucosa overlying the palatal tori could easily ulcerate without undue pressure from the denture owing to poor vascularisation. Repetitive traumatic loading by the rigid intaglio surface of denture against soft friable tissue during denture seating and masticatory functions could further degenerate oral mucosa covering the tori on long-term. Such discomfort and painful association would surely reduce the comfort and compliance of denture wearer in the long run, thus negatively affecting the quality of life thereon[3,4,11,33,34].

A cursory review of literature published on treatment and management options for large torus palatinus would fall back on surgical resection, a clinically-proven method, accepted and practiced internationally by oral and maxillofacial surgeons and operatory teams[3,4,11,33,34]. As with any elective maxillofacial surgery, the expected benefits of the surgery should be weighed carefully against the potential risks, especially in medically compromised patients, and often it is geriatric and potentially frail patients who undergo torus resection as a step toward better dental prostheses. Additionally, few authors have expounded the usage of softer yet resilient materials on the intaglio surface of dentures to minimise traumatic loading and occurrence of palatal ulceration[36].Soft denture liners provide a cushion like effect between the intaglio surface of the denture and the palatal mucosa thereby help in even distribution of the functional load on the denture-bearing area. They are widely for improving the retention of the dentures by engaging undercuts thereby increasing patient comfort and compliance to denture application. This case report describes the use of Molloplast B on

the intaglio surface of the denture in a patient with large torus palatinus as an adjunct therapy to improve the retention and stability of the removable denture.

Case report

A 60 years old male patient visited Segi Oral Health Care with chief complain of difficulty in eating due to loss of teeth. Patient did not have any denture wearing experience and had been edentulous for 15 years. Patient had no significant medical history. Intraoral examination showed thatedentulous maxillary arch with only left lateral incisor remaining. The maxillary arch was classified as Kennedy's Class Iand mandibular arch as Class II with modification 2. Patient had a large torus palatinus of approximately 3cm in diameter. (Figure 1a, 1b) Patient was advised to undergo extraction of the remaining left lateral incisor in the maxillary arch to fabricate a complete denture but he insisted on retaining the tooth.

Figure:1a

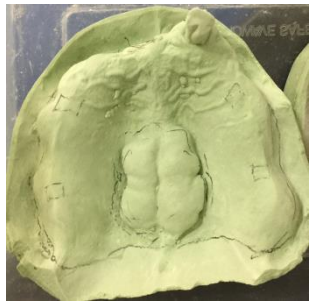

Figure:1b

After discussing the treatment optionswith the patient,which included implant supported overdenture, conventional removable denture and cast removable denture, the treatment plan was to fabricate a conventional removable partial denture for both maxillary and mandibular arch. This treatment option was devised based on financial concerns of the patient and time constraints. The maxillary and mandibular dentures were made following the standard clinical and laboratory protocols. The maxillary denture was modified to relief the toruspalatinus. The posterior border of the maxillary denture was made following the contour and outline of the torus palatinus. (Figure 2). When the maxillary denturewas inserted, it appeared to non- retentive due to the interference of the torus and failure to achieve a tight contact between the soft tissue and the denture base.

(Figure 2)

The maxillary denture was then planned to modify the posterior border by using Molloplast-B around the tori region to improve the retention and stability of the denture. First, the maxillary denture was trimmed to resemble a U-shaped denture (Figure 3) and approximately 2mm away from the tori region using diamond acrylic bur.

Figure:3

The acrylic portions that have been trimmed off were then replaced by Molloplast-B. (Figure 4).

Figure-4

The maxillary denture was invested in the dental flask using dental plaster. Molloplast-B was compacted into the gap between the denture and the torus palatinus. The denture was then cold cured , excess flash of the Molloplast-B was removed using a lecron carver and acrylic diamond bur. The final maxillary denture was finished and polished.

The modified maxillary denture was then inserted in the patient's mouth. The denture border modified by Molloplast-B around the tori engaged into the undercut of the tori without causing any pain or discomfort. (Figure 5) The modified maxillary denture had good retention after the relining of the surrounding of the torus palatinus using Molloplast-B.

Discussion

Soft denture lining materials are widely used in the treatment of traumatized oral mucosa, ridge atrophy, bony undercuts, bruxism, xerostomia, edentulous arches opposing natural dentition, congenital oral defects requiring obturation to enhance the retention and comfort of the prosthesis. There are two types of denture intaglio lining surface material which are soft in consistency: 1) acrylic compounds and 2) silicone elastomers which are widely used in clinical dental practices worldwide[37]. In this case report the tori observed was of Nodular type according to Thomas and Goldman classification, extending upto the border of the posterior palatal seal area. Hence, obtaining adequate retention with conventional technique was challenging since the denture seal would be jeopardized. We opted to use Molloplast-B (Regneri GmbH & Co., KG Karlsruhe, West Germany and distributed by Buffalo Dental Mfg. Inc., United States of America) a silicone elastomer becauseit can retain its 'elastic' dimensional stability for a greater length of time compared to soft acrylic compounds[38].Previously, Molloplast

because of its unique properties has been used as a permanent liner under denture bases to prevent trauma to the tissues, but never attempted for fabricating a palate less denture. This technique was a novel approach to improve the retention of the maxillary denture using Molloplast to engage the undercuts around the tori. While the maxillary denture is being seated over the palatal surface, the mucosa overlying the extensive torus palatinus would be subjected to less traumatic force as the permanent soft silicone denture intaglio surface liner deforms readily and returns to its original intended dimensions after successful seating of denture[37-40] ·Also, the material would engage within the undercuts present surrounding the margins of the torus palatinus, further enhancing the retention of maxillary denture against gravitational and adhesive forces of macerated foods[37]. During mastication, the permanent soft silicone denture intaglio surface liner would undergo transient deformation under functional loading thereby ensuring forces are distributed evenly throughout the material before being transmitted into the underlying oral mucosa[37-40].

Limitations

One of the drawbacks of such design being incorporated into the fabricated maxillary denture would be iatrogenic-induced degradation of the permanent soft silicone denture intaglio surface liner. Such degradation occurs when the patient fails to adhere proper hygiene instructions regarding maintenance and care of denture. The usage of abrasive toothpastes to clean the intaglio surface of denture and utilization of excessive brushing force are strongly discouraged. Not only the permanent soft silicone liner would lose its 'elastic' dimensional stability rapidly, the roughened and surface porosities present would greatly increase the chances of plaque maturation. Subsequent exposure of the intaglio surface of denture directly in contact with the oral mucosa overlying the torus palatinus would lead to bacterial invasion and infection of the friable tissues. This could compromise healing rate due to relatively poor vascularisation[3,4,33,34]As such, the manufacturers of Molloblast-B claimed to have developed specific oral plaque inhibitors within the material in attempts to negate such unfortunate

occurrences. The efficacy of the plaque inhibitors within the permanent soft silicone denture intaglio surface liner after following the manufacturer's recommended heat-curing process has yet to be established via clinical means.

Another drawback of soft denture liners is the failure or poor adhesion between the soft denture liner and the denture base. Few studies [41,42,43]indicate that bond strength is higher when Molloplast-B was applied to unpolymerized polymethyl methacrylate (PMMA) and processed together while Kawano F et al report better boning on polymerized PMMA. In this case we have applied the Molloplast- B on the polymerized denture surface to improve retention since the treatment plan was modified after denture issue.

Conclusion

Torus palatinus present in patients can be quite difficult to manage using conventional methods and materials. In some situations, patient may refuse to undergo surgery to remove their tori. Therefore, a combination of materials and methods may be

required to effectively increase the function and retention of the prosthesis without the need of surgical procedures.

References:

1. Consolaro A, Consolaro RB. Origin of torus palatinus and torus mandibularis: basis for clinical interpretation. Dental Press Implantology. 2015; 9 (2): 39-54.
2. Che Ibrahim NH, Md Shukri N. Is it as dangerous as it looks? Malays Fam Physician. 2017;12(1);35–36.
3. Forghani R, Smoker WRK., Curtin H.D. Pathology of the oral region. In Som PM and Curtin H.D. (eds) Head and Neck Imaging, 5th Edition, London: Mosby Inc.;2011
4. Rajendran, R. Shafer's Textbook of Oral Pathology, 6th Edition, India: Elsevier Inc.; 2011.
5. Seah YH. Torus palatinus and torus mandibularis: a review of the literature. Aust Dent J. 1995;40(5):318-21.
6. Gorsky M, Bukai A, Shohat M. Genetic influence on the prevalence of torus palatinus. Am J Med Genet. 1998 ;75(2):138-40.

7. Barbujani G, Rolo M, Barrai I, Pinto-Cisternas J. Torus palatinus: a segregation analysis. Hum Hered. 1986; 36: 317-325.
8. Cagirankaya LB, Kansu O, Hatipoglu MG. Is torus palatinus a feature of a well-developed maxilla? Clin Anat. 2004 ;17(8):623-5.
9. Yoshinaka M, Ikebe K, Furuya-Yoshinaka M, Hazeyama T, Maeda Y.Prevalence of torus palatinus among a group of Japanese elderly. J Oral Rehabil. 2010;37(11):848-53
10. Al-Dwairi ZN, Al-Daqaq ANF, Kielbassa AM, Lynch E. Association between oral tori, occlusal force, and mandibular cortical index. Quintessence Int. 2017; 48(10):841-849.
11. Donado M. Pre-prosthetic Surgery. In: Donado M, ed. Cirugía bu-cal. Patología y técnica. [Oral Surgery. Pathology and Technique] 2thed. Barcelona: Masson; 1998. p. 481-510.

12. Loukas M, Hulsberg P, Tubbs RS, Kapos T, Wartmann CT, Shaffer K, Moxham BJ. The tori of the mouth and ear: a review. Clin Anat 2013; 26:953–960
13. Kerdpon D, Sirirungrojying S. A clinical study of oral tori in southern Thailand: prevalence and the relation to parafunctional activity. Eur J Oral Sci 1999; 107: 9-13
14. Sirirungrojying S, Kerdpon D. Relationship between oral tori and temporomandibular disorders. Int Dent J. 1999; 49 (2): 101-104.
15. Morrison MD, Tamimi F. Oral tori are associated with local mechanical and systemic factors: a case-control study. J Oral Maxillofac Surg 2013; 71: 14-22
16. García-García AS, Martínez-González JM, Gómez-Font R, Soto-Rivadeneira A, Oviedo-Roldán L. Current status of the torus palatinus and torus mandibularis. Med Oral Patol Oral Cir Bucal. 2010 ;15 (2): 353-60
17. King DR, Moore GE. The prevalence of torus palatinus. J Oral Med 1971; 26: 113-115.

18. Chohayeb AA, Volpe AR. Occurrence of torus palatinus and mandibularis among women of different ethnic groups. Am J Dent. 2001; 14:278-280.
19. Al-Bayaty HF, Murti PR, Matthews R, Gupta PC. An epidemiological study of tori among 667 dental outpatients in Trinidad & Tobago, West Indies. Int Dent J. 2001; 51(4):300-4.
20. Maduakor S.N., Nwoga M.C. Prevalence of mandibular and palatine tori among the Ibos in Enugu, South-East Nigeria. Niger J Clin Pract. 2017; 20: 57-60.
21. Al-Zarea, B.K. Prevalence and pattern of torus palatinus and torus mandibularis among edentulous patients of Saudi Arabia. Clin Interv Aging. 2016;11: 209-213.
22. Sisman Y, Ertas ET, Gokce C, Akgunlu F. Prevalence of torus palatinus in Cappadocia region population of Turkey. Eur J Dent. 2008; 2: 269-275.
23. Gorsky M, Raviv M, Kfir E, Moskona D. Prevalence of torus palatinus in a population of young and adult Israelis. Arch Oral Biol.1996; 41(6):623-5.

24. Sawair FA, Shayyab MH, Al-Rababah MA, Saku T. Prevalence and clinical characteristics of tori and jaw exostoses in a teaching hospital in Jordan. Saudi Med J. 2009; 30: 1557-1562.

25. Simunkovic SK, Bozic M, Alajbeg IZ, Dulcic N, Boras VV. Prevalence of torus palatinus and torus mandibularis in the Split-Dalmatian county, Croatia. Coll Antropol. 2011; 35: 637-641.

26. Reichart PA, Neuhaus F, Sookasem M. Prevalence of torus palatinus and torus mandibularis in Germans and Thai. Community Dent Oral Epidemiol. 1988; 16: 61-64.

27. Shah D S, Sanghavi S J, Chawda J.D, Shah R.M. Prevalence of torus palatinus and torus mandibularis in 1000 patients. Indian J Dent Res. 1992; 3: 107-110.

28. Ohno N, Sakai T, Mizutani T. Prevalence of torus palatinus and torus mandibularis in five Asian populations. Aichi Gakuin Dent Sci. 1988; 1: 1-8.

29. Hiremath V K, Husein A, Mishra N. Prevalence of torus palatinus and torus mandibularis among Malay population. J Int Soc Prev Community Dent. 2011; 1: 60-64.
30. Sathya K, Kanneppady SK, Arishiya T. Prevalence and clinical characteristics of oral tori among outpatients in Northern Malaysia. J Oral Biol Craniofac Res. 2012;2(1):15-9.
31. Kumar Singh A, Sulugodu Ramachandra S, Arora S, Dicksit DD, Kalyan CG, Singh P. Prevalence of oral tori and exostosis in Malaysian population - A cross-sectional study. J Oral Biol Craniofac Res. 2017 ;7(3):158-160.
32. Jainkittivong A, Apinhasmit W, Swasdison S.Prevalence and clinical characteristics of oral tori in 1,520 Chulalongkorn University Dental School patients. Surg Radiol Anat. 2007;29(2):125–13

33. Neville BW, Damm DD, Allen CM, Chi AC. Oral and Maxillofacial Pathology, 4th edition. London: Elsevier Inc.; 2016
34. Ness G M. Atlas of Oral and Maxillofacial Surgery. Missouri: Saunders; 2016.
35. de Carvalho RW, de Carvalho Bezerra Falcão PG, Antunes AA, de Luna Campos GJ, do Egito Vasconcelos BC. Guided surgery in unusual palatal torus. J Craniofac Surg. 2012;23(2):609-11
36. Abrams S, Hellen W. Fabrication of an overdenture covering a torus palatinus using a combination of denture base materials: a case report. Dent Today. 2006;25(4):74, 76-7
37. Chladek G, Żmudzki J, Kasperski J. Long-Term Soft Denture Lining Materials. Materials (Basel). 2014 Aug 12;7(8):5816-5842
38. Qudah S, Harrison A, Huggett R. Soft lining materials in prosthetic dentistry: a review. Int J Prosthodont. 1990 ;3(5):477-83.

39. Gonzalez JB. Use of tissue conditioners and resilient liners. Dent Clin North Am. 1977 ;21(2):249-59.
40. Salloum AM. Effect of Aging on Bond Strength of Two Soft Lining Materials to a Denture Base Polymer. J Indian Prosthodont Soc. 2014;14: 155-60.
41. Amin WM, Fletcher AM, Ritchie GM. The nature of the interface between polymethyl methacrylate denture base materials and soft lining materials. J Dent. 1981;9(4):336-46.
42. Baysan A, Parker S, Wright PS. Adhesion and tear energy of a long-term soft lining material activated by rapid microwave energy. J Prosthet Dent. 1998 ;79(2):182-7.
43. Jagger RG1, al-Athel MS, Jagger DC, Vowles RW. Some variables influencing the bond strength between PMMA and a silicone denture lining material. Int J Prosthodont. 2002 ;15(1):55-8

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