

DEGREE OF PROMINENCE OF PALATAL EXOSTOSIS AND SPECIFICITIES OF FABRICATION OF TOTAL PROSTHESIS

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Torus palatinus (TP) is a benign, slow-growing bony protrusion of varying shape and size, most commonly situated along the sutura mediana in the frontal or back third of the hard palate. A large discrepancy in the resilience of its mucosal envelope and adjacent mucosa (resilient zones by Shroeder), especially in cases with large protrusions, can bring about the problems in the manufacture of total prostheses and especially in wearing them („rocking“, fracture of the prosthesis along the palatal midline, injury to the mucosa in the region of TP, etc.).

This paper presents in extenso the plan of the administered prosthetic treatment of a female patient aged 62 years, admitted to the clinic because of total edentulousness of the upper jaw and a very distinct TP. After clinical examination and necessary consultations with an oral surgeon, using the method of selective decompression of TP during the functional imprint acquisition, an upper total prosthesis was manufactured with a small chamber in the region. Possible complications mentioned above were thus avoided, and the patient adapted to the prosthesis completely after one common reocclusion and two control visits. *Acta Medica Medianae 2011;50(1):54-59.*

Key words: torus palatinus, functional imprint, upper total prosthesis

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Introduction

Since the vault of the bony palate constitutes a great deal of support to the upper total prosthesis, it should be given particular attention regarding the prognosis of prosthesis success. In view of that, the importance of this jaw exostosis (described differently by numerous authors) should not be underestimated.

Some authors believe that this is a hyperostosis, others describe it as a tumor-like growth, while some authors do not differentiate between this and other bony protrusions, such as occipital, frontal, and others (1-3). However, one thing is certain: it never protrudes towards the nasal cavity. It reaches its maximum size in the third decade of life. Literature data on the prevalence of this exostosis are conflicting, above all because of the numerous factors implicated in its genesis, such as racial, ethnic, and geographical background of the affected, their age, gender dimorphism with a characteristic two-fold prevalence of female gender.

The values vary from as low as 10% to the high percentages of 65-71.17% (4). Our results obtained in the sample of the Niš Municipality population ranged from 6.18% to 38.3% (5, 6).

Compared to TP, torus mandibularis (TM) in the lower jaw occurs, according to some authors' reports, in about 7% of patients, with almost equal prevalence in both genders. The basic factor in the etiology of TP is not known yet. Heredity, frequent traumas of this portion of the jaw, and malocclusions supposedly have a predominant role in the pathogenesis.

The study of Bandain (7) and Boyden et al. (8) demonstrated that salient TP forms are in correlation with the gene (LRP5) coding for low-density lipoprotein receptor-related protein 5. In fact, in two observed families an aminoacid substitution caused a mutated gene on the chromosome 11q 12-13, which induced increased osseous apposition of TP, thus unambiguously confirming genetic etiology of the exostosis.

A most recent study on 370 postmenopausal women, using bone density measurement with double-energy x-ray absorptiometry, demonstrated that bone density directly correlates with TP size in each affected individual (9).

Since clinically there are variations in the shape, size, and form of TP in different individuals, the interest of dentists, and even more of prostheticians, is directed more to the practical solutions helping us to avoid the situations in which TP could be the hypomochlion

of plate dental prostheses. We thus present the commonly cited classification of TP in five types by Landa (Figure 1) (10).

In our population, four most common non-prominent TP forms (at the level of the skin) have been described (2). The diagnosis of TP is made by inspection and especially palpation, and in some cases with profile skull x-ray. Prominent forms are very rare, and in terms of differential diagnosis they produce a clinical picture similar to the tumors of the region.

The success of prosthetic therapy is determined by numerous factors: shape, size, and site of TP, shape and undermining of the residual alveolar ridges, width of adjacent resilient zones, period required for a total prosthesis fabrication, degree of patient cooperation and compliance, etc.

Indication for surgical removal are as follows: speech disturbances due to the size and height above 4 mm; extension of TP in the posterior direction, compromising the valve border in the pharyngeal portion, and thus the retention of dental prosthesis; in persisting mucosal injuries; and in the phenomenon of „rocking“ prosthesis over the exostosis (3,11,13-15).

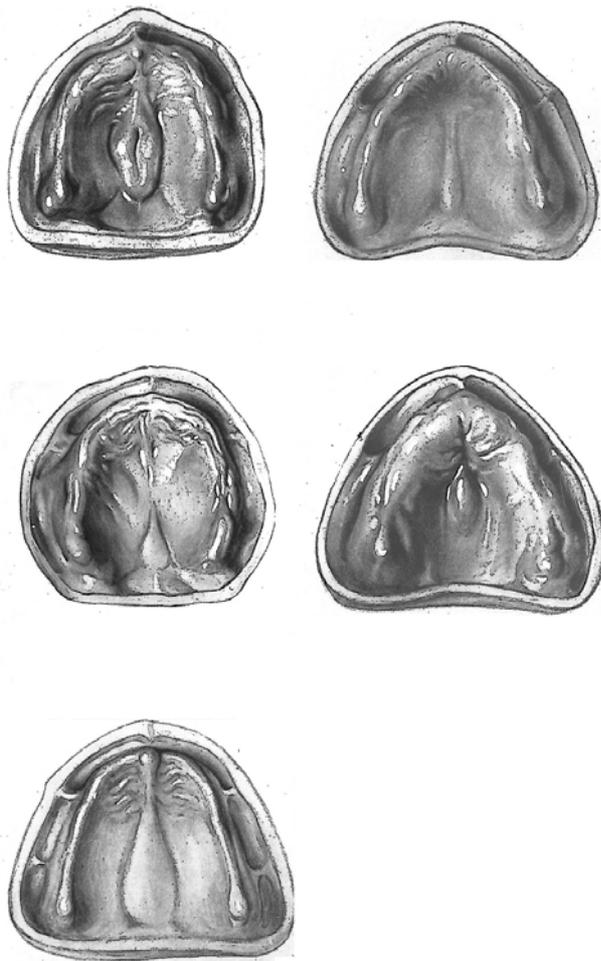


Figure 1.

Case report

Our patient M.T., 62 years old, visited the Dentistry Clinic, Department of Dental Prosthetics, because of total edentulousness in the upper jaw and presence of a very prominent TP (Figure 2). Her residual alveolar ridge was uneven in the right lateral region and in the frontal part, where slight undermining was observed bilaterally, from the frenulum of the upper lip (Figure 3). By way of palpation, we discovered that the TP consists of 3 segments. The first, the largest segment, elipsoid in the sagittal direction, is prominent above the level of the mucosa, and is located in the distal third of the palate. In the middle and anterior portion of the palate, the TP is narrower and slightly prominent over the level of the adjacent mucosa. Our palpatory impression about the size and shape of the TP was delineated on the mucosa using an ink pencil, obtaining a clear picture about its form and size.

After history taking, in which there were no information about hereditary etiology of TP, and clinical examination, we took a preliminary (anatomic) imprint in alginate imprint mass, obtaining the contours of TP previously drawn on the mucosa (Figure 4). Casting of the imprint produced an anatomical model of TP contour. A small plate of pink wax was then cut out according to the TP contour and adapted over the contour to the model (Figure 5). The model and wax plate are isolated and over the model an individual spoon was made of autopolymerizing acrylate Palavit L, Galenika. After the processing and removal of the spoon from the model, a wax plate remained on its internal-gingival side during the adaptation of edges of individual spoon on the patient and shaping of the valve edge in thermoplastic mass (Figures 6, 7).

Immediately before functional imprint was taken with the soft paste based on zinc-oxide eugenol - Vikopres, Galenika, the interspace for it was provided by removing with freza-cutter a thin layer of 1 mm from the internal surface of the spoon in the zone of immobile mucosa, and then we removed the plate of pink wax from the spoon in the region of TP, in which then remained a small chamber for soft imprint mass.

In order for the mass to leave the chamber easily during functional imprint taking, the spoon was perforated with a round steel drill in several spots (Figure 8). An ample space in individual spoon for soft imprint mass and the possibility of leaking of excess mass enabled that the imprint mass could not create any pressure in the TP region, and did not lead to tissue dislocation, enhancing thus the stability of the prosthesis.

The same procedure was used to relieve the wobbly alveolar ridges, i.e. to prevent any dislocation of lax tissues in functional imprint taking. On the contrary, if there is no any small chamber, the soft paste confined inside with formed valve edge can lead to certain tissue compression since it would be in a semi-confined space (16).



Figure 2.



Figure 3.



Figure 4.



Figure 5.



Figure 6.



Figure 7.



Figure 8.



Figure 9.



Figure 10.



Figure 11.

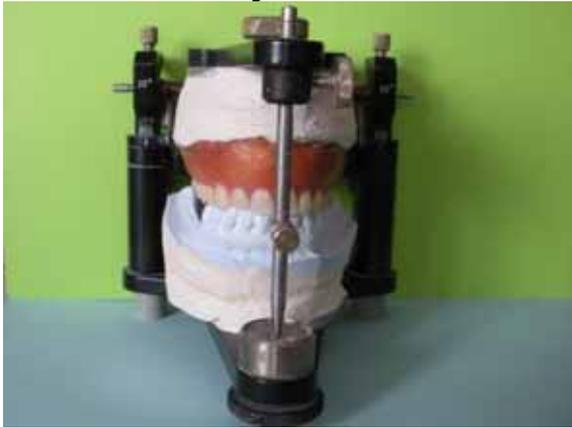


Figure 12.



Figure 13.



Figure 14.



Figure 15.

The obtained functional imprint (Figure 9) was appropriately prepared in our dental technology laboratory, i.e. valve edges were protected with a band of pink wax, and cast, and the final working model was produced with finalized all subsequent clinical and laboratory phases of fabrication of total prosthesis.

On the functional working model, bite template was produced (Figure 10), by means of which we determined the position of prosthetic plane orientational, proper vertical and horizontal relationship of mandible and maxilla, drawing the orientational lines on the bite bank and determined the color of artificial teeth in the upper prosthesis. The transfer of the model into articulator was done without a buccal arch (Figure 11). After the placement of artificial teeth

(Figure 12) and their final tryout in the patient's mouth, we started with final processing of the prosthesis outer surfaces in wax, proceeded with placement of the prosthesis in a cuvette (two-sided placement method), application, and acrylate polymerization.

When released from the cuvette, the prosthesis was first roughly, then smoothly treated and polished to a high shine, and finally given to the patient (Figures 13, 14).

On the second day of prosthesis use, the patient came for reocclusion, when we rounded a sharp edge of the valve edge in the region of frenulum of the upper lip and pterygomandibular plica, on the right.

To the patient's satisfaction and our own, her clinical findings were normal after two control

visits in the period of twenty days, as well as appropriate retention and stabilization of the prosthesis, masticatory function, phonation, and especially esthetics was evident, as well as the absence of pathologic changes in the TP region (Figure 15)

Discussion

The vault of the bony palate, according to many authors, represents the largest part of the surface onto which the total prosthesis is placed, and therefore has a prominent role in its retention, based on adhesion and other retention factors, and in the wearing prognosis as well (2,5,10,12,15,17).

The vault separates the mouth cavity from nasal cavity thanks to its topographic position. On a transversal section, the vault can be of different shape, which can favor or influence in a negative way the retention of total prosthesis. In the relevant literature, numerous different shapes of the vault have been categorized into four basic clinical forms (2): tetragonal form, with moderately prominent concavity, is the most common form, prognostically the most favorable regarding retention and stabilization of total prosthesis, since the mucosa too is optimally resilient; triangular form, with very prominent alveolar ridges (the so-called „gothic palate“), is an unfavorable form with poor wearing prognosis for upper total prosthesis; and flat palate, with marked resorption of alveolar ridges and minimal resilience of the mucosa, is the least favorable form associated with very poor prognosis regarding satisfactory retention of total prosthesis.

This classification certainly has a clinical importance, implying the presence of only non-prominent TP forms. Prominent cases of the exostosis, as in our case, tamper with the palatal vault configuration in all four clinical forms, and most significantly in the last two, since in association with other relevant morphological-anatomical details of an edentulous upper jaw (width of the valve zone in the pharyngeal region, prominence of the maxillary tuberosity and paratuberal spaces, etc.) reduce the total retention potential of an upper total prosthesis (5,13,16,18).

A high degree of agreement has been present among the authors regarding the significance of clinical phases in the fabrication of total dental prostheses. It is believed, without diminishing the importance of other phases, that functional imprints and determination of interjaw relationships are the two predominant phases in the fabrication of functional and esthetic total dental prostheses (2,4,5,12,13,18,19).

In fact, the most common cause of failure of a prosthetic device is insufficient extension or poor adjustment of the prosthesis in the pharyngeal region – i.e. a „short“ prosthesis and insufficient relief of prosthesis in the TP zone. Therefore, careful attention should be paid to precise adaptation of the edges of individual spoon from the vestibular side to the lower

border of transition of immobile to relatively mobile mucosa upwards, and pharyngeally to the A-line, i.e. the zone of flexion of the soft palate over the bony edge of the hard palate, as well as to its total relationship with the jaw segment in question. Most authors advocate the use of non-compression functional imprints realized with individual spoon with an interspace for soft imprint mass, with appropriate relief of hard zones (such as TP) with a plate of pink wax during the process of imprint taking.

The other two suggested procedures of TP relief, i.e. multilayer enveloping of TP with foils on its functional model or forming a chamber immediately before the deliverance of finished prosthesis, are arbitrary and imprecise, commonly causing papillary hyperplasia of the mucosa in this region (1,5,13,17).

The clinical phase of reconstruction of interjaw relationships in each of its three steps (determination of the position of orientational occlusal plane, determination of proper vertical and horizontal relationships of the jaws) requires the selection and use of the methods with best results in everyday clinical practice. These are extraoral and intraoral methods of determination of the position of orientational occlusal plane, method of mandibular position in physiological rest, phonetic method and swallowing method in the determination of bite height, method with Valkhof's ball, as well as methods of palpation of the condyles and temporal muscles in the control of establishment of central relation (2,6,13).

For a prosthetic therapy to be successful in general, the period of time after the deliverance of a prosthetic device to a patient should be stressed, during which all the information related to wearing and irreproachable hygiene of the device should be given, and initial (first 24-48 hours) and subsequent (10-30 days) problems resolved.

The interval and degree of adaptation to a prosthesis is individually variable (from 20 to 90 days, or even longer); in 8.3% complete adaptation never takes place, which is determined by numerous patient and environment-related factors, but also by the speed at which the prosthesis is fabricated (19).

In all that, patient motivation is of huge importance, as well as his persistence in resolving the emerging problems with our support (19,20).

The patient described in the paper adapted well to the new prosthesis after 18 days (his own words), which was a minimal period of adaptation, without any functional and/or esthetic complaints, similar to some other authors' results (up to 20 days in 54.9% of cases) (20,21).

Conclusion

Prominent TP forms, similar to other exostoses, are very rare clinical entities. The treatment approach is interdisciplinary and always requires oral surgeons to be consulted, especially when the exostosis involves the distal portions of the hard palate, comprising the

achievement of valve edge and optimal retention of total prosthesis in the pharyngeal region. Surgical removal of TP is a necessity in such cases, if the patient can accept it and there are no medical contraindications for the intervention.

On the contrary, adequate selection and correctly implemented methods of prosthetic therapy will provide the patients with prostheses with optimal prophylactic, functional, and esthetic qualities.

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IZRAŽENOST NEPČANE EGZOSTOZE I SPECIFIČNOSTI IZRADJE TOTALNE PROTEZE

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Torus palatinus (TP) predstavlja benignu, spororastuću koštanu izbočinu, različitog oblika i veličine, najčešće lokalizovanu duž suture mediane u prednjoj ili zadnjoj trećini tvrdog nepca. Velika diskrepanca u rezilijenciji sluzokože koja ga oblaže i okolne sluzokože (rezilijentne zone po Šrederu), a posebno kod slučajeva sa njegovom naglašenom veličinom, može stvoriti problem kod izrade totalne proteze, a naročito kod njenog nošenja (klackanje proteze, prelom proteze po sredini nepca, oštećenje sluzokože u predelu TP i dr.).

U ovom radu prikazan je u celini plan sprovedene protetske terapije bolesnice, stare 62 godine, koja se javila na kliniku zbog potpune bezubosti gornje vilice i prusustva veoma izraženog TP. Nakon obavljenog kliničkog pregleda i neophodnih konsultacija sa oralnim hirurgom, metodom selektivne dekompresije TP, kod uzimanja funkcionalnog otiska, urađena je gornja totalna proteza sa komoricom u pomenutom predelu. Tako su izbegnute moguće, napred navedene komplikacije, a bolesnica se nakon jedne uobičajene reokludacije i dve kontrole u potpunosti adaptirala na protezu. *Acta Medica Medianae* 2011;50(1):54-59.

Ključne reči: TP, funkcionalni otisak, gornja totalna proteza