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PROSTHETIC REHABILITATION WITH DENTAL BRIDGE CONSTRUCTIONS IN A PATIENT WITH PROGENIA: A CASE REPORT

ПРОТЕТСКА РЕХАБИЛИТАЦИЈА СО МОСТОВНИ КОНСТРУКЦИИ КАЈ ПАЦИЕНТ СО ПРОГЕНИЈА: ПРИКАЗ НА СЛУЧАЈ

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Abstract

Dental bridges are prosthetic restorations whose primary role is not to correct jaw irregularities, but to replace missing teeth and the discontinuity in the dental arch. In case where patients don't receive timely orthodontic treatment, and prosthetic rehabilitation becomes necessary, treatment maypresent a challenge in everyday dental practice. **Aim:** To achieve prosthetic rehabilitation a patient with progenia, using two statically balanced fixed bridge constructions, and correction of the occlusion. **Materials and methods:** A 50-year-old patient, with Class III orthodontic malocclusion and a need for prosthetic rehabilitation, visited the University Dental Clinical Centre 'St. Pantelejmon'. With the provision of two statically balanced dental bridge constructions, a reduction of the interocclusal space, replacement of the missing teeth, and correction of the overbitewas performed. **Result:**Precise tooth preparation was performed,resulting inreduction of the interocclusal distance and successful replacement of the missing teeth and correction of the occlusion with two dental bridges. **Conclusion:** Accurate preparation is an important factor in dimensioning and positioning bridge constructions, especially when lower teeth overlap the upper teeth. A multidisciplinary approach to the prosthetic treatment is crucial for achieving successful results. **Keywords:** progenia, bridge, impression, preparation.

Апстракт

Денталните мостови претставуваат протетски надоместоци, чијашто примарна улога не е да ги коригираат виличните неправилности, туку да ги надоместат изгубените заби и настанатиот прекин во забниот лак. Кога пациентите не добиваат навремен ортодонски третман, а се јавува потреба од протетска рехабилитација, тие претставуваат предизвик во секојдневната стоматолошка практика. **Цел:** Протетска рехабилитација кај пациент со прогенија, преку изработка на два статички урамнотежени мостовски конструкции и корекција на загризот. Материјал и метод: На Универзитетскиот Стоматолошки Клинички Центар„Св. Пантелејмон" Скопје, се јави пациент на 50-годишна возраст, со ортодонска малоклузија од III класа и со потреба од протетска рехабилитација. Со изработка на две статички урамнотежени мостовни контрукции, постигнавме намалување на интероклузалниот простор, надоместување на изгубените заби и корекција на оклузијата. **Резултат:** Беше спроведена многу прецизна препарација на преостанатите заби, намалување на интероклузалното растојание, успешно надоместување на преостанатите заби и корекција на загризот преку изработка на две мостовни контрукции. **Заклучок:** Прецизната препарација е важен фактор во димензионирањето и во позиционирањето на мостовните конструкции, особено кога долните заби ги преклопуваат горните заби. Мултидисциплинарниот пристап во протетскиот третман е многу значаен за постигнување на успешни резултати. **Клучни зборови:** прогенија, мост, отпечаток, препарација.

Introduction

Patients who have not received timely orthodontic treatment in their lifetimepose a challenge during prosthetic rehabilitation. Orthodontics plays an essential role in maintaining oral health by treating dental irregularities, including malocclusions and misalignments of the dental arches and individual teeth. This specialty focuses on the

diagnosis, protection, and correction of dental and facial-skeletal irregularities and uses various orthodontic appliances in its practice (functional appliances, mobile orthodontic appliances, fixed therapy, positioners, etc.). On the other hand, prosthodontics plays a fundamental role in the rehabilitation of oral function and aesthetics, using prosthetic restorations (crowns, bridges, dentures, and implant-supported prosthetic solutions) to replace missing teeth and surrounding tissues[4].

The most widely used systemfor theclassification of malocclusions is that proposed by Edward H. Angle in 1899, as well as the classification by Marković from 1976.

Angle classified malocclusions into three classes based on the anteroposterior relationship of the first permanent molars and the sagittal relationship of the jaws. Class I (neutroclusion) includes irregularities of individual teeth and dental arches. Class II (distocclusion) is characterized by a distal positioning of the mandible in relation to the maxilla in the sagittal direction. Angle further subdivided Class II into Division 1 (Class II/1), where the maxillary anterior teeth are protruded, and Division 2 (Class II/2), where the maxillary anterior teeth are retroclined. Class III malocclusion is relatively less common and represents a sagittal discrepancy in which the mandible is positioned in a mesial directionwith respect to the maxilla. Depending on its severity and clinical presentation, various forms may occur, including pseudo-prognathism, true prognathism (progenia), anterior crossbite, and forced prognathic bite[5].

Mandibular prognathism is a skeletal malocclusion, most often of genetic origin, characterized by an excessively mandibular development in the sagittal and vertical direction. This malocclusion is considered the most severe form of Class III. In this condition, the maxilla may be normally developed, underdeveloped, or overdeveloped, and very often exhibits protrusion of the maxillary anterior teeth[6,7].

From a prosthodontic standpoint, dental bridges are prosthetic replacements whose primary role is not to correct dental arch irregularities, but to restore missing teeth and the continuity of the dental arch (due to extraction or trauma). These constructions with special connections are attached to the holder teeth that border the defect[8]. When the static stability of individual bridges is compromised, the connection of posterior and anterior bridge segments into a single unified framework results in a more mechanically balanced prosthetic construction. Through surface (polygonal) linking, thisdesign more effectively counteracts the detrimental transverse and sagittal forces acting within the horizontal plane[9].

Aim

The purpose of this study is to present a case of progenia and its prosthetic rehabilitation using two statically balanced bridge constructions in the maxilla and mandible, with the purpose of restoring missing teeth and correct the bite within physiological limits.

Material and methods

At the University Clinical Center “St. Pantelejmon,” specifically at the Clinic of Fixed Prosthodontics, a 50-year-old patient with a Class III orthodontic malocclusion requiring prosthetic rehabilitation (Figure 1.).

Based on the patient’s medical history, no previous orthodontic treatment had been undertaken. Intraoral examination revealed sensitivity to vertical percussionof the first premolar in the upper left quadrant , absence of both maxillary central incisors, andabsence of premolars and molars in the upper right quadrant. Additionally, a metal post restoration was observed on the canine in the upper left quadrant.Intraoral examination of the mandible

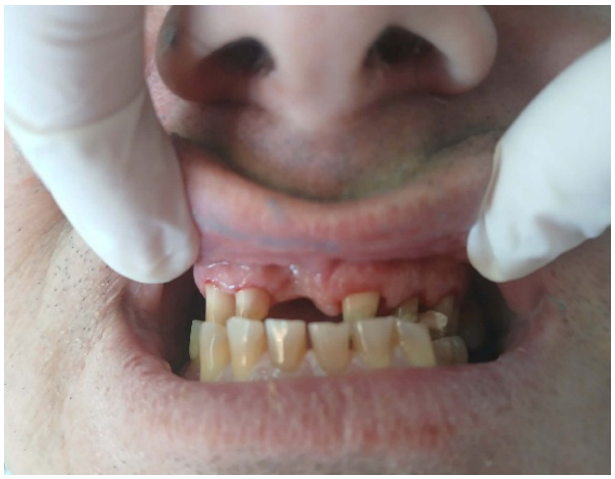

Figure 1. *Overbite of mandibular teeth towards the maxillary teeth*

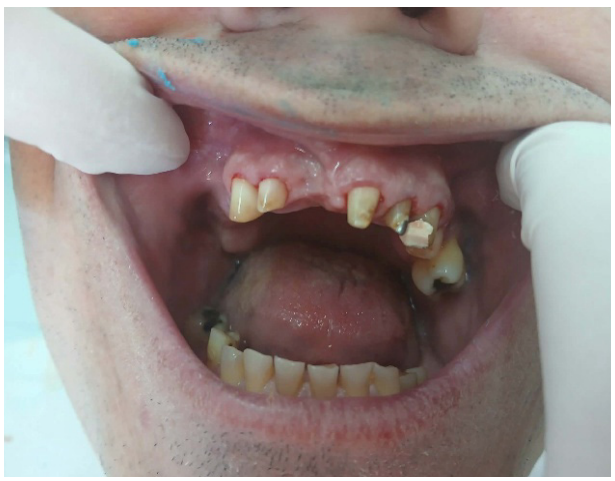

Figure 2. *Intraoral examination findings*

revealed extraction of the second premolar in the lower right third quadrant and absence of the molars in the lower left fourth quadrant. The incisal edges of the lower anterior teeth were slightly abraded (Figure 2.).

Clinical examination of the gingiva revealed inflammatory changes, including slight bleeding, erythema, and edema. Furthermore, dental calculus was observed in the region of the lower anterior teeth. Before initiating prosthetic treatment, the patient was referred to the Clinic of Oral and Periodontal Diseases for periodontal therapy and to the Clinic of Dental and Endodontic Diseases for the management of a periapical lesion identified on panoramic radiography.

In the first phase of the prosthetic therapy, simultaneous preparation of the maxillary teeth was performed (Figure 3.). Tooth preparation was carried out with a tangential finish line located in the subgingival region. After completion of the final stage of tooth preparation, attention was directed towards the preparation of the gingival sulcus and the oral cavity for impression taking. For retraction of the gingival sulcus, chemical-medication agents and a gingival retraction cord were used.

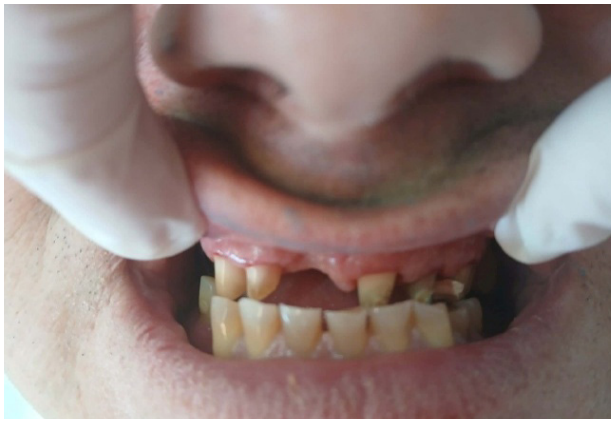

Figure 3. *Preparation of the maxillary teeth*

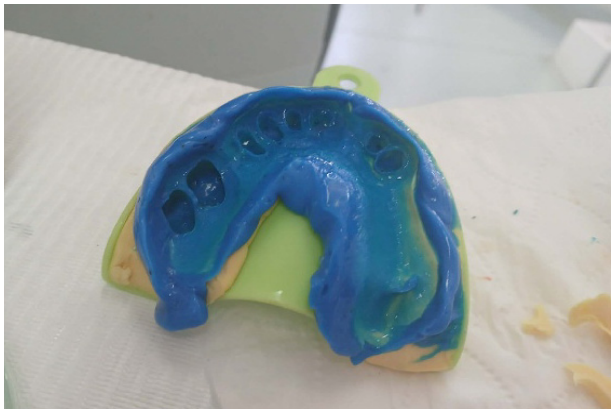

Figure 4. *Two-step corrective dental impression*

A perforated custom tray was used to take an impression of the processus alveolaris and the maxillary teeth. In this patient, a two-step corrective impression technique was performed, using a heavy-body impression material followed by a light-body material (Figure 4.). The use of a two-step impression technique in designing metal-ceramic bridges provides better dimensional stability compared to other impression methods, which is crucial for obtaining accurate models and precise fixed prosthetic restorations[10,11,12].

Using a tangential finish line, with circular margin design, provides optimal marginal closure of crowns on the abutment teeth. This technique is also easy to perform and is characterized by minimal removal of dental substance. In teeth with reduced periodontal support, the finish line may have a para-gingival position[13,14].

In the second phase of the prosthetic therapy, we tested the metal sub-construction of the maxillary bridge in occlusion, its relationship with the adjacent teeth, as well as the vestibular and palatal surfaces, along with assemsment of the retention, marginal fit, and overall adaptation (Figure 5.).

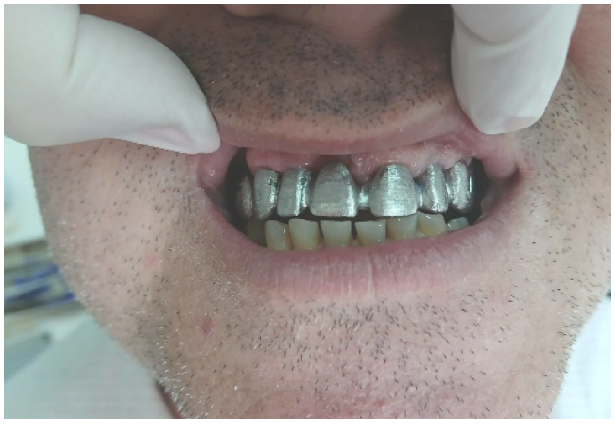

Figure 5. *Testing the metal skeleton of the dental bridge*

To test the fit of the metal skeleton, the following method was implemented: underlaying the bridge with a flowable silicone material (xanthoprene - blue). The interior walls of the crowns and the bridge framework were filled with silicone, and the restoration was then seated in the oral cavity under gentle pressure. Areas where the material was displaced were appropriately adjusted.

In the third phase of prosthetic therapy, evaluation was made onthe gingival fit of the metal-ceramic bridge, its relationship with the antagonistic and agonistic (supporting) teeth, the tooth color, shape, size, and overall esthetic appearance (Figure 6.). To test the gingival fit of the faceted dental bridge, the same fit-check method was used as in the second phase, underlaying the bridge with a flowable sili-

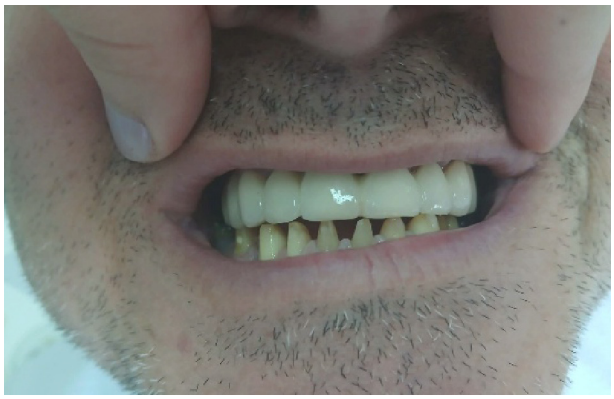

Figure 6. *Testing the gingival seating of the maxillary metal-ceramic bridge*

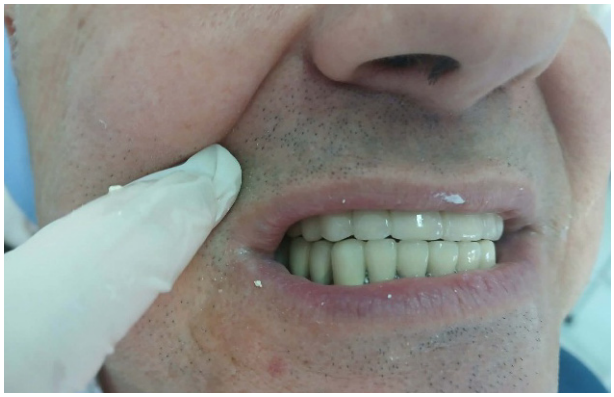

Figure 7. *Final testing of the occlusion, before definitive cementation*

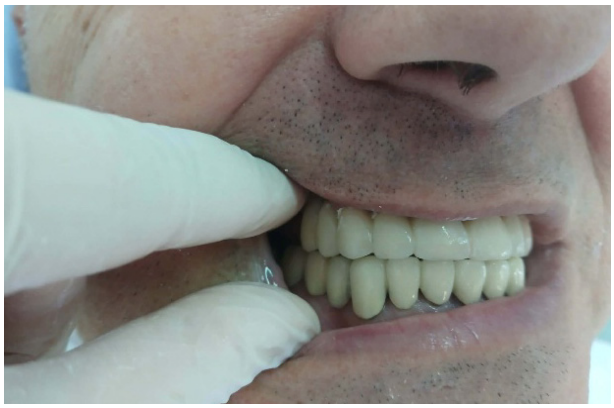

Figure 8. *Definitive cementation of both prosthetic restorations*

cone material (xanthoprene - blue). The interior walls of the crowns and the body of the bridge were filled with silicone, and the restoration was then seated in the oral cavity under gentle pressure.

Areas where the material was displaced were appropriately adjusted. After recording the occlusal relationship between the maxillary and mandibular teeth,with the preparation of the mandibular teeth was initiated.

The maxillary bridge was temporarily cemented by applying a thin layer of temporary cement to the gingival third of the carrier teeth, aiming to seal the communication of the dentin exposure with the external environment, prevent potential infection, and allow patient adaptation[15].

During this phase, any potential clinical manifestations that could indicate theneed for re-occlusion or re-articulation were monitored.

While the maxillary dental bridge was temporarily cemented, the previously described procedural steps were applied toprepare the mandibular dental bridge.

In the final phase of prosthetic therapy, we evaluated the occlusal relation between the maxillary and mandibular dental bridges (Figure 7). Once both bridges achieved a satisfactory interocclusal relationship, acceptable esthetic appearance, and functional integrity, definitive cementation of the two prosthetic restorations was performed simultaneously (Figure 8). For cementation of the patient's bridge constructions, a glass-ionomer cement was used, which allows fluoride release and promotes remineralization of the dental structures[16,17].

Results

The prosthetic therapy of this case resulted withtwo balanced fixed prosthetic constructions that restore the lost teeth and are designedto more successfully oppose the transversal and sagittal forces in the horizontal direction. With our prosthetic therapy, we achieved satisfactory reconstruction of the esthetics in the facial lower third, reduction of the interocclusal space by performing a precise preparation, improved occlusion, and bridging of the interalveolar space caused by tooth extraction. The patient expressed improved phonetic and masticatory performances, no clinical manifestations or symptoms of TMJ dysfunction, better social well-being, and quality of life.

Discussion

In everyday dental practice, a clinical dilemma may arise regarding the treatment of choice for unilateral terminal edentulism: whether to fabricate a visil partial denture with a Bonwill clasp on the natural teeth, a conventional dental bridge, or a bridge-supported implant restoration[16]. However, the choice of prosthetic therapy in many cases also depends on the patient's financial circumstances. Some literature sources recommend treating unilateral terminal edentulism with a remobable (visil) partial denture incorporating Bonwill clasps on the natural teeth. This clasp also requires preparation of the natural teeth to create space for an occlusal rest or the fabri-

cation of custom crowns. However, the use of removable partial dentures in the management of unilateral shortened dental arches, or in cases requiring replacement of both lateral and anterior teeth in extended or fixed saddle areas, has demonstrated limited clinical and phonetic performance, while implant-supported prosthetic solutions remain costly. The fabrication of dental bridges, i.e., fixed prosthetic restorations, whenever clinical conditions allow, should be prioritized in the management of such cases. Fixed restorations enhance the perception of naturalness and comfort, provide improved structural stability of the bridge, and protect the remaining natural teeth from the forces exerted by clasps, which are directed into the infra- and supra-occlusal zones. The degree of mandibular prognathism further determines whether management should be limited to orthodontic therapy alone or require a multidisciplinary approach involving maxillofacial surgical intervention, prosthetic restorations, dental implants, and orthodontic treatment[17].

Conclusion

Precise tooth preparation is a critical factor in fabricating, dimensioning, and positioning of bridge constructions in patients with mandibular teeth overlapping maxillary teeth. In this case, during preparation of the maxillary teeth, greater reshaping was performed on the palatal surfaces toward the buccal direction. In contrast, during the preparation of the mandibular teeth, greater reshaping was carried out on the labial surfaces toward the lingual direction. Such tooth preparation approach allows a reduction of the interocclusal space in the anterior segment. Furthermore, it is essential to continuously monitor patients' feedback on newly made prosthetic restorations to facilitate faster adaptation and achieve an integrated esthetic, functional, and high-quality outcome. Furthermore, the sequential provision of the maxillary and mandibular dental bridges, followed by their simultaneous definitive cementation, allows reconstruction of the vertical dimension and correction of the occlusal relationship, as in complete dentures.

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