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Prosthodontic rehabilitation of atrophied edentulous mandible with enlarged genial tubercle with conservative management: A case report

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Abstract
Genial tubercles are the group of four small bony elevations located at the inner part of symphysis menti. Severe resorption mandibular ridge may lead prominent genial tubercle. This may cause a problem when a complete denture is planned for the patient. Usually, surgical removal of prominent genial tubercle before the prosthetic treatment is preferable. However due to certain systematic condition, surgical exposure was not considered. Following Case report describes a stepwise guide to prosthodontic rehabilitation of patient with prominent genial tubercle (7mm height, 11mm width) conservatively.

Keywords: genial tubercles, complete denture, CBCT

Introduction
The genial tubercles consist of a group of four small bony elevations located at the inner part of symphysis menti, midway between the superior and inferior borders of the mandible, and surrounding the lingual foramen bilaterally [1]. The geniohyoid and genioglossus muscles are attached to the genial tubercles. The action of these muscles is associated with two important vital functions- speech and deglutition. Genioglossus muscles helps in tongue protrusion and elevation of its tip thereby completing buccal phase of deglutition. It also contributes in pharyngeal phase by forming Winslow's geniopharyngeous muscle along with pharyngeoglossus muscle [2]. Both these muscles of tongue help in pushing the food towards the pharynx during deglutition. Geniohyoid aids in laryngeal closure as it lowers the epiglottis by its influence on hyoid bone [3].
Following tooth extraction, the mandibular alveolar crest undergoes a centrifugal resorptive pattern. In case of excessive resorption of mandible genial tubercles remain as hard projection in anterior alveolingual sulcus, sometimes extremely prominent [4]. In the literature, certain cases can be found where enlargement of genial tubercles and mandibular bone resorption were responsible for poor adaptation of the prosthesis, painful swelling, ulceration, haematoma in the floor of mouth, limited tongue mobility and dysphagia [3].
The prosthodontics rehabilitation in cases of prominent genial tubercles is quite a challenge. The impression procedures are to be carefully conducted especially in lingual border of restoration. The denture borders are to be relieved on the tubercles to avoid pain, dislodgement of denture and other complications.
This clinical report explains the prosthodontics management of atrophied mandible in correlation with a prominent genial tubercle.

Case Presentation
A 68 years old male patient reported to the department with a chief complaint of ill fitting upper and lower complete dentures and wanted them to be replaced with a new one.
Clinical examination revealed maxillary and mandibular edentulous arches. The mandibular anterior ridge was resorbed. Ulceration were seen in mandibular anterior region. A prominent growth was observed in the midline in anterior mandibular region lingually.

On inspection it was confirmed that the growth was bony hard and asymptomatic. (Fig 1) The patient was advised Cone beamed computer tomography (CBCT) to investigate radiographically. On inspecting the previous dentures, it was found that dentures were ill fitting, the teeth were attrided which lead to loss of vertical dimension. The mandibular denture was fractured in midline and was repaired twice with PMMA.

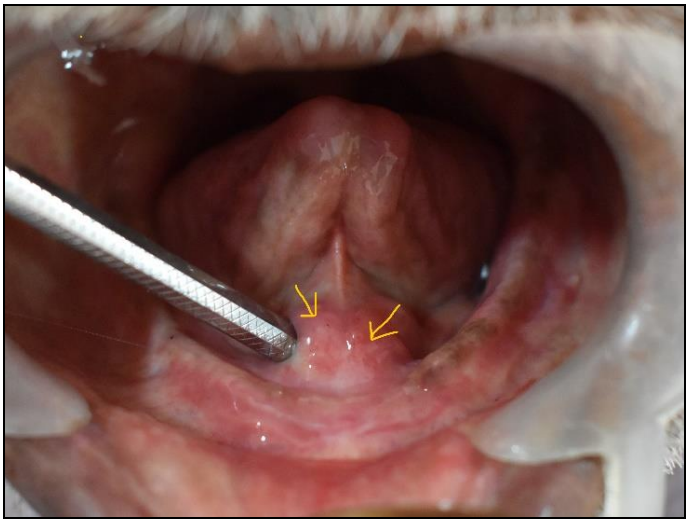

Fig 1: On inspection it was confirmed that the growth was bony

CBCT examination revealed that atrophy of mandibular ridge in anterior region. The superior border of the mental foramen was not visible on the right side due to resorption. The prominent genial tubercles were confirmed in the anterior region. The genial tubercles were asymmetrical, more prominent o the right side with the height 0f 7mm, 6 mm thickness and 11 mm width.

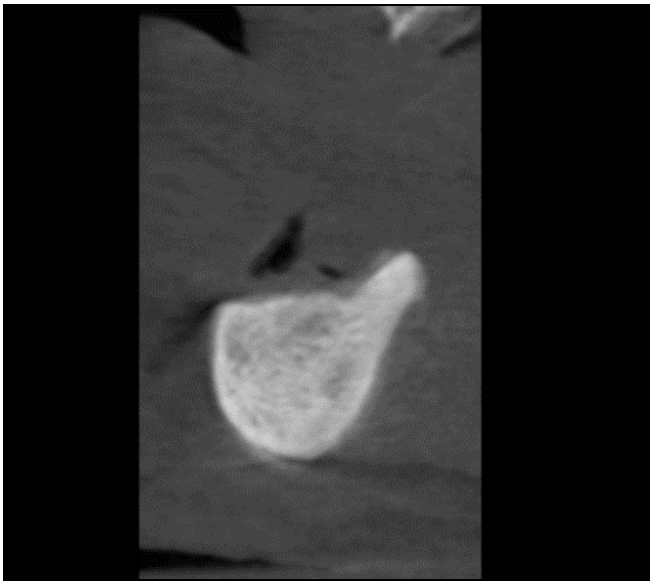

Fig 2: CBCT – Sagital Section

Considering the patients systemic factors and severity of mandibular atrophy surgical management was not possible. Hence prosthodontic management with conventional complete denture was considered.

The following clinical steps were followed –

- The patient was a previous denture wearer. The previous dentures were used as the tray and primary impression was made in a irreversible hydrocolloid impression material (Tropicalgin; ZhermackSpA, Badia Polestine, Italy).
- The primary impression was poured in type 2 dental stone. Wax spacer was adapted on the cast. Custom tray was fabricated in self cure acrylic resin. The tray was fabricated in a way that genial tubercles were relieved. The Custom tray was adjusted intraorally.
- The maxillary and mandibular border molding was done with a low fusing impression compound and wash impression was made in low consistency polysiloxane (OrawashL; Zhermack SPA, Badia Polestine, Italy). (Figure 3)
- The impression was poured in Type 3Dental stone. and master cast was made. The record base was adapted on the master cast. Wax occlusal rim were fabricated with the ideal dimensions.
- The Occlusal plane was adjusted parallel to Ala Tragus line. The vertical Dimensions were established with Niswongers technique. The vertical dimension was verified by swallowing and silvermans closest speaking space. The centric relation was recorded.
- The try in was done and necessary changes were made in teeth arrangement.
- The denture processing was carried out, the flasking and dewaxing was done prior to packing a metal mesh was adapted carefully in anterior mandibular region to increase the strength and packing was done with heat cured PMMA with compression moulding technique. The denture was processed, finished and polished. (Figure 4,5)
- The denture was placed in the patients mouth and necessary occlusal adjustments were done. Care was taken to relieve genial tubercles. (Figure5).
- The patient was recalled after 7 days for follow up.

Fig 3: Maxillary and mandibular final impression Figure 4 - Metal mesh adapted

Fig 5: Metal mesh incorporated in Figure6- Maxillary and mandibular Mandibular denture Denture finished and polished

Fig 6: Intraoral Placement of maxillary and mandibular denture

Discussion

This Clinical report explained the management of atrophied mandible with prominent genial tubercle with conventional complete denture with metal mesh and carefully relieving the genial tubercle.

Thomson, in 1915 [5], accomplished a study on the morphology of the genial tubercles and their association with the faculty of speech. He examined 1,670 mandibles from anthropoids and concluded that the genial tubercles may be absent, replaced by pits, and in some cases well-developed. According to him all the tubercles may fuse to form a median crest with a projection 3–5 mm long. The etiology of the enlarged genial tubercles is usually associated with edentulous mandibular bone loss, as a remodeling process following compressive forces and heavy loading on the alveolar bone due to imbalance of the denture. Mandibular alveolar bone generally resorbs four times higher than the maxillary alveolar bone. The masticatory force may lead to spontaneous fracture of the enlarged genial tubercles [6].

The surgical resection is usually advocated as a treatment of choice for prominent genial tubercle. However considering the risk factors in the case, prosthodontic management was only option. The impression procedure was the critical step in the overall treatment plan. Careful placement of anterior lingual border of the denture is critical since excessive pressure can lead to the fracture of the tubercles. Since the patients previous mandibular denture fractured in the midline, metal mesh was incorporated in the denture base to add the strength. The denture had an optimum retention, despite the atrophy of the anterior mandible and genial tubercles which interfered with the lingual seal.

This case report explains that conservative prosthodontics rehabilitation with conventional denture with good occlusal relation in the case of the prominent genial tubercle can be considered successfully.

Conclusion

Mandibular atrophy is a matter of concern while rehabilitating the edentulous patients. This is due to the rate of resorption, lesser surface area, anatomy of the bone, presence of the tongue. Various techniques in impression techniques, occlusal scheme has been advocated to enhance the retention of the complete denture. Implant supported prosthesis has greatly solved the problem faced due to extreme resorption. However in certain situations implant retained prosthesis may not show a predictable prognosis. In this clinical case the only treatment option was rehabilitation with complete denture considering all anatomic and systemic factors. Detailed analysis of the challenges, complications and proper clinical and laboratory steps lead to a successful and predictable treatment.

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