

# Numb Chin Syndrome Associated with Residual Ridge Resorption in Edentulous Mandible: Report of a Case

## Dişsiz Mandibulada Rezidüel Kret Rezorpsiyonu ile İlişkili Uyuşuk Çene Sendromu: Bir Olgu Sunumu

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### ABSTRACT

Residual ridge resorption (RRR), which follows a chronic, progressive, and irreversible course, is due to alveolar remodeling under the influence of cumulative effect of many local and systemic factors after tooth extraction. Decreased height of the mandible leads to change in the location of the mental foramina at the crest of the residual ridge and also subjective pain and paresthesia under mandibular dentures due to the pressure caused by the denture, a phenomenon known as “numb chin syndrome”. In this article, a case with excessive mandibular RRR is presented along with clinical and radiological findings.

Clinical and radiological examinations of a 61-year-old female patient who admitted to our clinic with tenderness and soreness complaints in the right mandibular edentulous alveolar ridge were performed. Intraoral examination revealed severe resorption of the edentulous mandibular alveolar ridge. The right mental foramen was observed to be close to the alveolar crest in panoramic radiograph. Cone beam computed tomography scan confirmed the severe mandibular atrophy and mental foramen exposure at the top of the alveolar crest, clearly revealing the cause of the patient’s tenderness and soreness complaints.

In the edentulous mandible, RRR predisposes the mental nerve to injury because of the proximity of the mental foramina to the alveolar crest. Chronic pressure on the mental nerve may cause pain in the mental nerve distribution region and numbness in the lower lip. Radiographic examinations should definitely be considered as

an indispensable component of diagnosis and prosthetic treatment planning, especially in edentulous patients with RRR.

**Keywords:** Residual ridge resorption, mental foramen, edentulous mandible, numb chin syndrome, cone beam computed tomography

### ÖZ

Kronik, progresif ve irreversibl bir seyir izleyen rezidüel kret rezorpsiyonu (RKR), diş kaybı sonrası birçok lokal ve sistemik faktörün kümülatif etkisi altındaki alveolar remodelinge bağlıdır. Mandibula yüksekliğinin azalması; mental foramenin rezidüel kretteki lokalizasyonunun değişmesine ve “uyuşuk çene sendromu” olarak bilinen mandibular protezlerin baskısı nedeniyle subjektif ağrı ve parestezi ortaya çıkmasına yol açar. Bu olgu sunumunda; mandibulada şiddetli RKR mevcut olan ve subjektif ağrı ve parestezi şikayeti ile başvuran hastanın klinik ve radyolojik bulguları sunulmaktadır.

Sağ mandibular dişsiz alveoler krette hassasiyet ve ağrı şikayeti ile kliniğimize başvuran 61 yaşındaki kadın hastanın klinik ve radyolojik muayenesi gerçekleştirilmiştir. İntraoral muayenede, dişsiz mandibular alveol kretinde şiddetli rezorpsiyon saptanmıştır. Panoramik radyografide, sağ mental foramenin alveol kret tepesine çok yakın lokalize olduğu izlenmiştir. Konik ışıklı bilgisayarlı tomografi görüntülemesi mandibuladaki şiddetli atrofiyi ve her iki taraftaki mental foramenin kret tepesinde konumlandığını doğrulayarak hastanın hassasiyet ve ağrı şikayetinin nedeni açıkça ortaya koymuştur.

Dişsiz mandibulada RKR, mental foramenin alveolar kret tepesine yakın konumlanmasından dolayı mental sinirin zarar görmesine yol açabilir. Mental sinirin kronik baskıya maruz kalması, mental sinirin dağılım bölgesinde ağrı ve alt dudakta uyuşukluk şikayetine neden olabilir. Özellikle RKR mevcut olan dişsiz ağızlarda, detaylı radyolojik inceleme kesinlikle tanı ve protetik tedavi planlamasının önemli bir bileşeni olarak düşünülmelidir.

**Anahtar Kelimeler:** Rezidüel kret rezorpsiyonu, mental foramen, dişsiz mandibula, uyuşuk çene sendromu, konik ışıklı bilgisayarlı tomografi

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## INTRODUCTION

Residual ridge resorption (RRR) begins within a couple of months after tooth extraction and continues progressively (Kovačić et al., 2012; Al-Jabrah&Al-Shumailan, 2014). The resorption rate in the mandible is more striking in comparison to the maxilla (Tallgren, 1972; Al-Jabrah&Al-Shumailan, 2014; Dekker et al., 2018). In the later stages of resorption, up to 60% of the initial mandibular bone substance is lost (Dekker et al., 2018). RRR is among the primary causes of stability and retention loss in mandibular complete dentures (Knezović-Ziatarić&Celebić, 2003; Al-Jabrah&Al-Shumailan, 2014).

Tooth loss results in alveolar crest resorption, as well as significant alterations in the height of the mandible and the location of the mental foramen (Charalampakis et al., 2017). Severe atrophy of the mandibular alveolar process, which may cause the ridge to descend to the mental foramen, is more common in geriatric patients wearing mandibular dentures (Kale et al., 2010). The positioning of the mental foramen nearby the residual ridge crest has frequently been accompanied by the subjective pain and paresthesia felt under mandibular dentures due to pressure on the superficially located mental nerve (Murray, 1994; Närhi et al., 1997). This sensory neuropathy of the mental nerve, which is typically characterized by unilateral numbness in the chin and lower lip, is called “numb chin syndrome” (Rimmele et al., 2019).

Numb chin syndrome was first reported in 1830 by Charles Bell as numbness of the left side of the lower lip as a result of compression of mandibular metastasis on the inferior alveolar nerve (Bell, 1830). This syndrome was often referred to as “Vincent’s syndrome” after Vincent reported this syndrome in 1896 as hypoesthesia and anesthesia of the mental region following damage to the mandible (Vincent, 1896). The term “numb chin syndrome” was first adopted in 1963 by Calverley and Mohnac to describe five cases (Calverley&Mohnac, 1963). Since then, the term “numb chin syndrome” has been widely used to describe this syndrome in most studies (Baskaran et al., 2006; Yoshioka et al., 2009; Divya et al., 2010; Ryba et al., 2010; Chapa et al., 2014; Smith et al., 2015; Rimmele et al., 2019). Only a few studies have defined this condition as “Vincent’s syndrome”, “mental neuropathy”, or “numb lip syndrome” (Burt et al., 1992; Bar-Ziv&Slasky, 1997; Laurencet et al., 2000).

The purpose of this study is to present a case of numb chin syndrome with excessive mandibular RRR along with clinical and radiological findings.

## CASE PRESENTATION

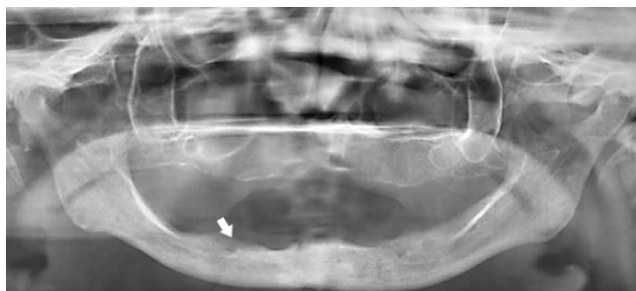
A 61-year-old female patient, with the medical history of acetylsalicylic acid allergy, was admitted to our clinic with the complaints of tenderness, soreness, and intermittent paresthesia in the right mandibular edentulous alveolar ridge. The patient also reported wearing maxillary and mandibular complete dentures for more than 15 years and no control or maintenance therapy since then.

Intra-oral examination revealed severe resorption of the edentulous mandibular alveolar ridge. Epulis fissuratum, a benign fibrous connective tissue hyperplasia that develops as a reactive lesion to chronic mechanical irritation caused by a poorly fitting denture, was noted in the mandibular vestibule in the immediate vicinity of the denture flange. A residual root fragment on the lingual aspect of the alveolar crest in the anterior region was also observed (Figure 1).



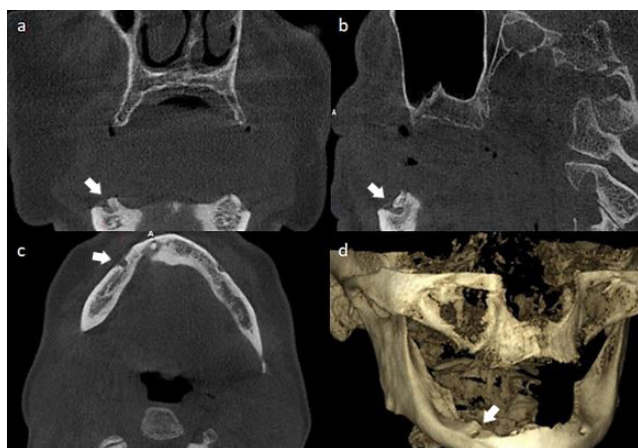
**Figure 1.** Intra-oral clinical view of the patient.

In panoramic radiograph, the right mental foramen was noted to be close to the alveolar crest. A residual root fragment was observed in the region of the extracted mandibular right lateral tooth (Figure 2).



**Figure 2.** Panoramic radiograph showing the right mental foramen located close to the alveolar crest.

The cone beam computed tomography scan confirmed severe atrophy of the mandible and exposure of the right mental foramen at the top of the alveolar crest explaining the cause of tenderness, soreness, and paresthesia complaints of the patient (Figure 3).



**Figure 3.** Cone beam computed tomography images of a) coronal, b) sagittal, c) axial planes, and d) 3D reconstruction.

Then the patient was referred to the department of oral and maxillofacial surgery and department of prosthetic dentistry with the diagnosis of numb chin syndrome for surgical and prosthetic reconstruction of the severely resorbed edentulous mandible.

## DISCUSSION

Tooth loss triggers continuous RRR in the alveolar bone. RRR is influenced by many systemic and local factors such as age and gender, ethnic characteristics, racial miscegenation, shape and size of neurocranium, head position, face biotype, size of the teeth, general health, dietary habits, status of edentulism, muscle forces, parafunctions, occlusion, quality of dentures, environmental influences, and several socioeconomic factors (Charalampakis et al., 2017).

However, the pathogenesis of RRR and the effect of these factors on the RRR rate have not yet been fully elucidated (Čelebić et al., 1993; Al-Jabrah&Al-Shumailan, 2014).

The bone loss severity is particularly correlated with aging, with most studies reporting that the rate of resorption increases with advancing age (Watanabe et al., 2007; Al-Jabrah&Al-Shumailan, 2014; Charalampakis et al., 2017). Gender-related differences are also considered important determinants of the amount of bone resorption, and several studies showed that women have significantly greater amount of mandibular RRR than men (Zarb et al., 1990; Watanabe et al., 2007; Amorim et al., 2008; Al-Jabrah&Al-Shumailan, 2014).

The duration of edentulism may be an influential factor in RRR, and generally more mandibular bone loss is observed with a long period of edentulism in comparison to shorter periods (Charalampakis et al., 2017). In addition, the duration of denture wearing was found to be directly related to RRR between genders. Significantly greater RRR was observed in women compared to men with respect to the duration of complete denture wearing (Arifin et al., 2005; Watanabe et al., 2007; Al-Jabrah&Al-Shumailan, 2014).

Bone loss in the edentulous mandible may be associated with systemic diseases such as estrogen deficiency (Xie et al., 1997; Al-Jabrah&Al-Shumailan, 2014). Experimental studies demonstrated that, in contrast to the dentate mandible, estrogen depletion contributes to a significant bone mass loss in the edentulous mandible (Arifin et al., 2005; Watanabe et al., 2007). However, one study reported that the resorption of maxillary bone is connected with denture-related local factors rather than systemic diseases (Xie et al., 1997).

While the bone resorption process occurs very rapidly in the first year following extraction and is progressive throughout life, there is a great interindividual variation in the resorption rate that may be influenced by several nutritional and physiological factors (Tallgren, 1972; Närhi et al., 1997). In most patients, slowly progressive resorption gives the mental nerves and vessels sufficient time to show adaptation to the anatomical alterations in the mental foramen region (Närhi et al., 1997).

Numb chin syndrome is a sensory neuropathy associated with altered sensation through the anatomical border of the nerve and most frequently affects the mental nerve. Although there are several studies reporting that the localization of the mental foramen at the top of the residual ridge may arouse problems in complete denture wearers, reports on

the frequency of symptoms and signs related to numb chin syndrome are scarce (Närhi et al., 1997).

Although numb chin syndrome is a rare condition, it has essential clinical signs and symptoms. This syndrome in generally emerges as unilateral numbness of the lips and chin, and senses resembling local anesthesia are described by the patients (Divya et al., 2010; Ryba et al., 2010; Chapa et al., 2014). Despite the fact that the symptoms are mostly unilateral, bilateral numbness has been reported in approximately 15% of cases (Laurencet et al., 2000; Smith et al., 2015; Rimmele et al., 2019). Furthermore, the sensory impairment is not restricted to only hypoesthesia, but may also demonstrate as paresthesia, dysesthesia or anesthesia with orofacial pain from mental nerve compression (Smith et al., 2015; Rimmele et al., 2019). Facial weakness and motor/taste disturbance are mostly absent, and lip and tongue functions, namely movement and taste, may appear to be normal (Bar-Ziv&Slasky, 1997; Laurencet et al., 2000; Yoshioka et al., 2009; Ryba et al., 2010; Chapa et al., 2014; Smith et al., 2015; Rimmele et al., 2019).

After tooth extraction, the cortical bone undergoes greater resorption in the vestibular region and thin and low alveolar crests are observed on radiographs. In edentulous patients, the only radiographic landmarks remaining in the mandibular corpus are the mandibular superior and inferior borders and the mental foramen (Čelebić et al., 1993). In the case of severe mandibular atrophy, the height of the bone between the alveolar crest and the mental nerve is very narrow, and patients may experience pain as a result of the pressure applied to this area (Kadioglu et al., 2014). In several studies, panoramic radiography was primarily preferred for the evaluation of the mandibular bone and mental nerve region (Arifin et al., 2005; Al-Jabrah&Al-Shumailan, 2014; Smith et al., 2015).

Numb chin syndrome frequently has a dental origin including iatrogenic causes, which may lead to injury to the nerves of the ramus and hypoesthesia, such as mandibular trauma, nerve damage due to extraction, mandibular surgery, ill-fitting dentures, and implants (Bar-Ziv&Slasky, 1997; Divya et al., 2010; Chapa et al., 2014). Other causes include tumors, radiotherapy, osteomyelitis, and dental abscess (Bar-Ziv&Slasky, 1997; Divya et al., 2010; Ryba et al., 2010; Chapa et al., 2014). Additionally, systemic diseases such as diabetes mellitus or disorders such as multiple sclerosis may cause nerve damage and neuropathies. Moreover, similar findings of chin numbness have been correlated with multiple sclerosis, which typically involves several cranial nerves together with the mandibular nerve (Colella et al., 2009;

Chapa et al., 2014). Apart from these reasons, if numbness symptoms without an obvious source are present, consultation with a specialist should be considered (Chapa et al., 2014).

As mentioned earlier, the origin of numbness is based on the various conditions, and a more in-depth imaging with computed tomography, cone beam computed tomography or magnetic resonance imaging techniques may be necessary for differential diagnosis (Smith et al., 2015). In addition, if facial sensory symptoms spread beyond the distribution area of the mental nerve, an electromyogram may contribute to broader assessment of trigeminal nerve dysfunction. More advanced evaluation with serological tests may be required for evaluation of inflammatory or infectious etiologies such as diabetes, Sjögren's syndrome, sarcoidosis, amyloidosis, and Lyme disease in isolated trigeminal neuropathy cases predominantly affecting the mandibular branch (Smith&Cutrer, 2011; Smith et al., 2015).

Numb chin syndrome, which is a result of RRR in edentulous mandible, often presents with symptoms mimicking Tic Douloureux and is manifested by sudden, severe, and sharp pain of short duration (Baskaran et al., 2006; Chapa et al., 2014). On closer consideration, it will be noticed that pain arises with functional loading of the denture and mastication stresses, and simulated symptoms may be induced by digital pressure on the mental foramen area.

Our case was a 61-year-old female patient with tenderness, soreness, and intermittent paresthesia complaints on the right mandibular alveolar ridge. Clinical and radiological examinations revealed that the complaints were related to the pressure of the denture on the exposed mental foramen.

## CONCLUSION

The bone loss severity and the high incidence of RRR are associated with osteoporosis, increase with advancing age, and favour the female sex for predisposition. In the edentulous mandible, the mental nerve becomes prone to damage due to close location of the mental foramina to the alveolar crest as a result of RRR. Chronic compression on the mental nerve may result in subjective pain and paresthesia in the mental nerve region under mandibular dentures. Radiographic examinations should be considered as an integral part of diagnosis and prosthetic treatment planning in edentulous patients with RRR.



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## AUTHOR CONTRIBUTIONS

BG and MPA; contributed to study conception and design. MPA, SD and EI; collaborated for patient management and data collection. BG and MPA; drafted the manuscript. All authors reviewed and approved the manuscript.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## REFERENCES

1. Al-Jabrah O, Al-Shumailan Y. Association of complete denture wearing with the rate of reduction of mandibular residual ridge using digital panoramic radiography. *Int. J. Dent. Res.* 2014;2(1):20-25.
2. Amorim MM, Prado FB, Borini CB, Bittar TO, Volpato MC, Gropo FC, Caria PHF. The mental foramen position in dentate and edentulous Brazilian's mandible. *Int. J. Morphol.* 2008;26(4):981-987.
3. Arifin AZ, Asano A, Taguchi A, Nakamoto T, Ohtsuka M, Tsuda M, Kudo Y, Tanimoto K. Computer-aided system for measuring the mandibular cortical width on dental panoramic radiographs in identifying postmenopausal women with low bone mineral density. *Osteoporos Int.* 2006;17(5):753-759.
4. Bar-Ziv J, Slasky BS. CT imaging of mental nerve neuropathy: the numb chin syndrome. *Am. J. Roentgenol. (AJR)* 1997;168(2):371-376.
5. Baskaran RK, Krishnamoorthy, Smith M. Numb chin syndrome—a reflection of systemic malignancy. *World. J. Surg. Oncol.* 2006;4:52.
6. Bell C. *The nervous system of the human body.* London: Longman; 1830.
7. Burt RK, Sharfman WH, Karp BI, Wilson WH. Mental neuropathy (numb chin syndrome). A harbinger of tumor progression or relapse. *Cancer.* 1992;70(4):877-881.
8. Calverley JR, Mohnac AM. Syndrome of the numb chin. *Arch. Intern. Med.* 1963;112:819-821.
9. Čelebić A, Valentić-Peruzović M, Prpić G, Stipetić J. Alveolar ridge resorption as detected on panoramic radiographs. *Acta Stomatol. Croat.* 1993;27(1):17-23.
10. Chapa NJ. Numb chin syndrome: a signal of underlying concern. *J. Dent. Hyg.* 2014;88(6):348-352.
11. Charalampakis A, Kourkoumelis G, Psari C, Antoniou V, Piagkou M, Demesticha T, Kotsiomitis E, Troupis T. The position of the mental foramen in dentate and edentulous mandibles: clinical and surgical relevance. *Folia Morphol. (Warsz).* 2017;76(4):709-714.
12. Colella G, Giudice A, Siniscalchi G, Falcone U, Guastafierro S. Chin numbness: a symptom that should not be underestimated: a review of 12 cases. *Am. J. Med. Sci.* 2009;337(6):407-410.
13. Dekker H, Schulten EAJM, Ten Bruggenkate CM, Bloemena E, van Ruijven L, Bravenboer N. Resorption of the mandibular residual ridge: A micro-CT and histomorphometrical analysis. *Gerodontology.* 2018;35(3):221-228.
14. Divya KS, Moran NA, Atkin PA. Numb chin syndrome: a case series and discussion. *Br. Dent. J.* 2010;208(4):157-160.
15. Kadioglu MN, Senturk MF, Oncul AMT, Cambazoglu M. Repositioning of the mental nerve in case of severe mandibular atrophy: A case series. *Int. J. Experiment. Dent. Sci.* 2014;3(1):41-43.
16. Kale TP, Patel JN, Bhutani H. Mental nerve repositioning – A case report. *Int. J. Dent. Clin.* 2010;2(3):58-60.
17. Knezović-Ziatarić D, Celebić A. Mandibular bone mineral density changes in complete and removable partial denture wearers: a 6-month follow-up study. *Int. J. Prosthodont.* 2003;16(6):661-665.
18. Kovačić I, Knezović Zlatarić D, Celebić A. Residual ridge atrophy in complete denture wearers and relationship with densitometric values of a cervical spine: a hierarchical regression analysis. *Gerodontology.* 2012;29(2):e935-947.
19. Laurecet FM, Anchisi S, Tullen E, Dietrich PY. Mental neuropathy: report of five cases and review of the literature. *Crit. Rev. Oncol. Hematol.* 2000;34(1):71-79.
20. Murray D. Full dentures for the aging patient. Barnes IE, Walls A, editors. *Gerodontology.* Oxford: Wright; 1994, p.146-159.
21. Närhi TO, Ettinger RL, Lam EW. Radiographic findings, ridge resorption, and subjective complaints of complete denture patients. *Int. J. Prosthodont.* 1997;10(2):183-189.
22. Rimmele F, Maschke H, Großmann A, Jürgens TP. A case report: Numb Chin Syndrome due to thalamic infarction: a rare case. *BMC Neurol.* 2019;19(1):303.
23. Ryba F, Rice S, Hutchison IL. Numb chin syndrome: an ominous clinical sign. *Br. Dent. J.* 2010;208(7):283-285.
24. Smith JH, Cutrer FM. Numbness matters: a clinical review of trigeminal neuropathy. *Cephalalgia.* 2011;31(10):1131-1144.
25. Smith RM, Hassan A, Robertson CE. Numb Chin Syndrome. *Curr. Pain. Headache. Rep.* 2015;19(9):44.
26. Tallgren A. The continuing reduction of the residual alveolar ridges in complete denture wearers: a mixed-longitudinal study covering 25 years. *J. Prosthet. Dent.* 1972;27(2):120-132.
27. Vincent B. Sur un signe précoce de certaines ostéites du maxillaire inférieur se terminant par une nécrose. *Rev. Trimestr. Suisse d'Odontol.* 1896;6:148-163.
28. Watanabe PCA, Issa JPM, Oliveira TM, Monteiro SAC, Iyomasa MM, Regalo SCH, Siéssere S. Morphodigital study of the mandibular trabecular bone in panoramic radiographs. *Int. J. Morphol.* 2007;25(4):875-880.
29. Xie Q, Närhi TO, Nevalainen JM, Wolf J, Ainamo A. Oral status and prosthetic factors related to residual ridge resorption in elderly subjects. *Acta. Odontol. Scand.* 1997;55(5):306-313.

30. Yoshioka I, Shiiba S, Tanaka T, Nishikawa T, Sakamoto E, Kito S, Oda M, Wakasugi-Sato N, Matsumoto-Takeda S, Kagawa S, Nakanishi O, Tominaga K, Morimoto Y. The importance of clinical features and computed tomographic findings in numb chin syndrome: a report of two cases. *J. Am. Dent. Assoc.* 2009;140(5):550-554.
31. Zarb CA, Bolender CL, Hickey JC, Carlsson GE. *Boucher's Prosthodontic Treatment for Edentulous Patients*. St Louis: Mosby; 1990.