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Case Report

Simultaneous Intraoral and Extraoral Sinus Tracts Associated with a Mandibular Second Molar: A Case Report

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Abstract

Aim: The aim of this case report is to present the diagnostic process, nonsurgical endodontic treatment, and 12-month clinical and radiographic follow-up findings of a mandibular right second molar associated with simultaneous intraoral and extraoral sinus tracts.

Case Report: A 21-year-old female patient with no known chronic systemic disease was referred to the endodontics clinic for evaluation of a possible odontogenic source of infection after being hospitalized for septic shock. Based on a detailed medical and dental history, clinical examination, pulp sensibility tests, periapical and panoramic radiographs, and cone-beam computed tomography findings, the pulpal diagnosis for tooth #47 was established as pulp necrosis, while the apical diagnosis was chronic apical abscess, accompanied by intraoral and extraoral sinus tract formation. Following chemomechanical preparation and intracanal medication with calcium hydroxide–chlorhexidine, root canal treatment was completed using gutta-percha and a resin-based root canal sealer.

Clinical and radiographic follow-up examinations revealed marked healing of the intraoral and extraoral sinus tracts, a reduction in the size of the periapical lesion, and osseous healing.

Conclusion: This case highlights the importance of considering a possible odontogenic source in the differential diagnosis of persistent cutaneous sinus tracts in the head and neck region and documents a favorable clinical and radiographic outcome following nonsurgical endodontic treatment.

Keywords: Chronic Apical Abscess; Endodontic Treatment; Extraoral Sinus Tract; Intraoral Sinus Tract; Septic Shock

Mandibular İkinci Molar Diş ile İlişkili Eş Zamanlı İntraoral ve Ekstraoral Sinüs Yolları: Bir Olgu Sunumu

Öz

Amaç: Bu olgu sunumunun amacı, eş zamanlı intraoral ve ekstraoral sinüs yolları ile ilişkili mandibular sağ ikinci molar dişin tanı sürecini, cerrahi olmayan endodontik tedavisini ve 12 aylık klinik-radyografik takip bulgularını sunmaktır.

Olgu Sunumu: Bilinen kronik sistemik hastalığı bulunmayan 21 yaşında kadın hasta, septik şok nedeniyle hastaneye yatırıldıktan sonra olası odontojenik enfeksiyon odağının değerlendirilmesi amacıyla endodonti kliniğine yönlendirilmiştir. Ayrıntılı tıbbi ve dental anamnez, klinik muayene, pulpa duyarlılık testleri, periapikal ve panoramik radyografi ile konik ışınlı bilgisayarlı tomografi değerlendirmesi sonucunda; pulpa nekrozu ile ilişkili kronik apikal apse ve eşlik eden intraoral ve ekstraoral sinüs yolu oluşumu tanısı konulmuştur. Kemomekanik preparasyon ve kalsiyum hidroksit–klorheksidin ile intrakanal medikasyonu sonrası; güta-perka ile rezin esaslı kanal patı kullanılarak kök kanal tedavisi tamamlanmıştır.

Klinik ve radyografik takiplerde intraoral ve ekstraoral fistül yollarında belirgin iyileşme, periapikal lezyonda küçülme ve kemik iyileşmesi saptandı.

Sonuç: Bu olgu, baş-boyun bölgesindeki persistan kutanöz sinüs yollarının ayırıcı tanısında olası bir odontojenik kaynağın değerlendirilmesinin önemini vurgulamakta ve cerrahi olmayan endodontik tedavi sonrasında elde edilen olumlu klinik ve radyografik sonucu belgelemektedir.

Anahtar Kelimeler: Ekstraoral Sinüs Yolu; Endodontik Tedavi; İntraoral Sinüs Yolu; Kronik Apikal Apse; Septik Şok

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Introduction

Odontogenic infections develop when microorganisms from a necrotic pulp spread into the periapical tissues (1, 2). If untreated, the infection may perforate the cortical bone and form an intraoral or, less commonly, an extraoral sinus tract (1, 3). These sinus tracts facilitate the drainage of exudate from the infected area into the surrounding tissues and may therefore substantially alter the clinical presentation of the disease.

Because continuous drainage may reduce pain and swelling, extraoral sinus tracts can be misdiagnosed as dermatologic lesions, epidermal cysts, or chronic skin infections, resulting in delayed or inappropriate treatment (4). Such diagnostic delays may not only allow the local infection to persist but may also facilitate its spread to deeper anatomical spaces in some patients.

Although most odontogenic infections remain localized, extension into adjacent fascial spaces or the systemic circulation may lead to severe complications, including deep neck infections, sepsis, and septic shock (5, 6). Therefore, odontogenic sources should be considered in patients presenting with persistent cutaneous sinus tracts or unexplained systemic infection.

Periapical and panoramic radiographs are useful for identifying the suspected causative tooth and associated periapical pathology; however, their two-dimensional nature limits assessment of cortical perforation and lesion extent (2, 7, 8). In selected cases, cone-beam computed tomography (CBCT) can provide three-dimensional information on lesion extent and cortical bone involvement, thereby assisting diagnosis and treatment planning (7, 9).

This case report presents the diagnostic process, nonsurgical endodontic management, and 12-month clinical and radiographic follow-up of simultaneous intraoral and extraoral sinus tracts clinically associated with a mandibular right second molar diagnosed with pulp necrosis and chronic apical abscess in a 21-year-old patient who had previously been hospitalized for septic shock.

Case Report

A 21-year-old female patient with no known chronic systemic disease had been hospitalized for septic shock and treated with intravenous broad-spectrum antibiotics. Specific laboratory values, culture results, the antibiotic agent and duration of therapy, the hospital discharge diagnosis, and details of the source investigation were not available in the current dental records. Following systemic treatment, the patient's general clinical condition had stabilized, and she was subsequently referred to our endodontics clinic for evaluation and treatment of a possible odontogenic source of infection. The relative clinical chronology is summarized in Table 1.

Table 1. Clinical timeline based on information available in the dental records.

Time	Event	Recorded findings/interventions
Before dental referral	Medical care	Hospitalization for septic shock and treatment with intravenous broad-spectrum antibiotics; specific laboratory values, culture results, antibiotic agent/duration, discharge diagnosis, and source workup were not available in the current dental records.
Initial dental visit	Assessment and treatment initiation	Clinical and radiographic examination; for tooth #47, the pulpal diagnosis was pulp necrosis and the apical diagnosis was chronic apical abscess; nonsurgical root canal treatment was initiated and an intracanal medicament was placed.
Week 2	Interappointment review	Clinical improvement was observed at both sinus tract openings; the intracanal medicament was renewed.
Week 4	Definitive endodontic treatment	After the second 2-week medication period (4 weeks in total), the intracanal dressing was removed, final irrigation was completed, and the root canals were obturated.
Subsequent appointment	Coronal restoration	A fiber post was placed and the tooth was restored with composite resin; detailed material and cementation information was not available in the current record.
Month 3	Follow-up	No clinical symptoms or recurrent drainage were recorded; the periapical radiograph showed early reduction in the periapical radiolucency.
Month 12	Follow-up	Both sinus tract openings remained closed; the tooth was clinically asymptomatic, and radiographs showed marked reduction in the periapical radiolucency with increased bony trabeculation.

Intraoral examination showed a sinus tract on the lingual aspect of tooth #47, while extraoral examination revealed a cutaneous sinus tract in the right mandibular molar region (Figures 1a and 1b, respectively). According to the patient's history, the intraoral and extraoral sinus tracts had been present for approximately 1 year before presentation. Tooth #47 showed no response to either electric pulp testing or cold testing. Palpation and percussion tests were negative, and the tooth exhibited no mobility. No swelling, active suppuration, or regional lymphadenopathy was detected. No active drainage was observed from the extraoral sinus tract or through the root canal system at the time of examination. Periodontal probing depths ranged from 1 to 3 mm on all surfaces. Tooth #47 had a pre-existing deep amalgam restoration, and no clinical or radiographic evidence of cracks, fractures, or furcation involvement was identified. The adjacent teeth (#46 and #48) responded positively to pulp sensibility testing and were considered vital. A contralateral control tooth was also evaluated during pulp sensibility testing and showed a positive response. Tooth #46 had an existing restoration, whereas no carious lesion was detected in tooth #48.

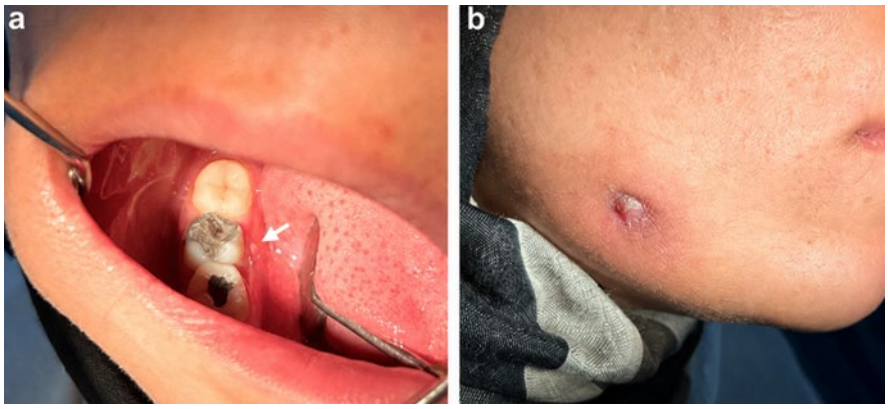

Figure 1. *Pretreatment clinical appearance. (a) Intraoral sinus tract associated with tooth #47. (indicated by the white arrow) (b) Extraoral cutaneous sinus tract observed in the mandibular region.*

Written informed consent was obtained from the patient for the proposed treatment procedures and for the publication of clinical and radiographic images used in this case report for academic purposes. This case report was prepared in accordance with the Preferred Reporting Items for Case Reports in Endodontics (PRICE 2020) guidelines (10).

Panoramic and periapical radiographs obtained for diagnostic purposes revealed a large radiolucent lesion in the periapical region of tooth #47, which had a deep restoration (Figures 2a and 2b). Cone-beam computed tomography (CBCT) images were acquired using a NewTom 5G unit (QR s.r.l., Verona, Italy) at 110 kVp and 10 mA, with an 8 × 8 cm field of view, a voxel size of 0.2 mm, and an exposure time of 3.5 seconds. The images were evaluated using NNT software. CBCT examination demonstrated buccal cortical bone perforation associated with tooth #47. (Figures 2c, 2d, and 2e).

Based on the clinical and radiographic findings, the pulpal diagnosis for tooth #47 was pulp necrosis, and the apical diagnosis was chronic apical abscess. Direct gutta-percha tracing of the intraoral and extraoral sinus tracts was not performed. Tooth #47 was considered the most likely odontogenic source based on the anatomical location of the sinus tract openings, the absence of a response to electric pulp and cold testing, the presence of a large periapical radiolucency associated with the tooth, and buccal cortical perforation demonstrated by CBCT. CBCT demonstrated buccal cortical perforation but did not clearly reveal two distinct drainage pathways. Accordingly, both sinus tracts were considered clinically associated with tooth #47, although a common origin could not be conclusively demonstrated

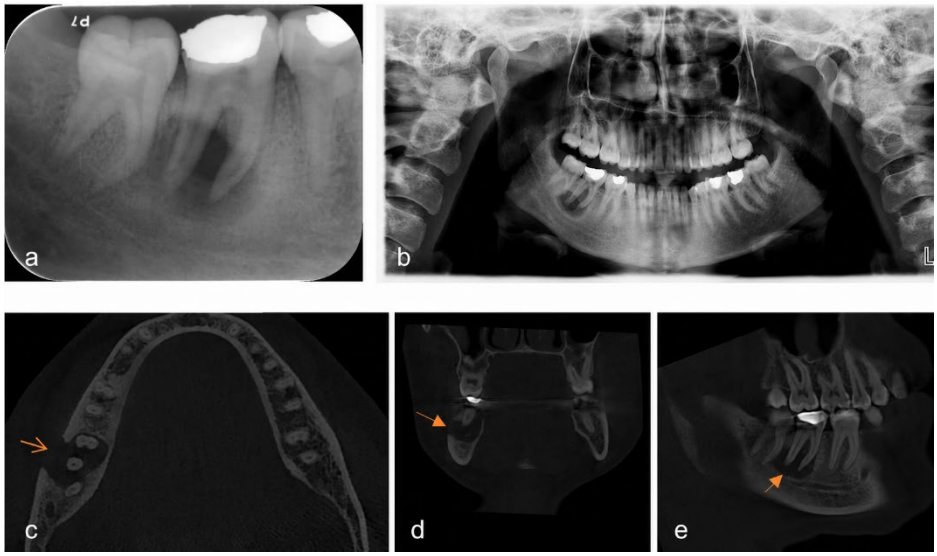

Figure 2. *Radiographic and cone-beam computed tomography (CBCT) images of the periapical lesion and buccal cortical perforation associated with tooth #47. (a) Periapical radiograph, (b) panoramic radiograph, and (c–e) axial (c), coronal (d), and sagittal (e) CBCT sections. Arrows indicate the buccal cortical perforation.*

Based on the clinical and radiographic findings, root canal treatment was planned for tooth #47. Under local anesthesia (Ultracain® DS Forte, Sanofi, Paris, France), the existing amalgam restoration was removed, an access cavity was prepared, and isolation was achieved using a rubber dam. Three root canals, namely the mesiobuccal, mesiolingual, and distal canals, were identified and treated. The working lengths were determined using a size 15 K-file and an electronic apex locator (VDW GmbH, Munich, Germany) and were 21 mm for the mesiobuccal and mesiolingual canals and 20 mm for the distal canal. The root canals were shaped using the ProTaper Next rotary nickel–titanium instrumentation system (Dentsply Sirona, Konstanz, Germany) with a crown-down technique. Irrigation was performed with 2 mL of 2% chlorhexidine after each instrument change, with a total of 12 mL of irrigant used during chemomechanical preparation. The irrigant was ultrasonically activated in each canal for 30 seconds using a DTE ultrasonic unit (Guilin Woodpecker Medical Instrument Co., Ltd., Guilin, China). This chlorhexidine-based irrigation protocol was the protocol applied in the present case. At the end of the first appointment, the canals were thoroughly rinsed with distilled water and dried with sterile paper points. Calcium hydroxide powder was mixed chairside with 2% chlorhexidine solution in approximately equal powder-to-liquid proportions until a homogeneous creamy paste was obtained and the mixture was placed into the root canals using a Lentulo spiral. The access cavity was temporarily sealed with zinc phosphate cement. The patient was referred to the dermatology or plastic surgery department for evaluation of scar-free healing of the extraoral sinus tract; however, she did not attend the referral appointment. Therefore, no biopsy, excision, curettage, topical treatment, or other dermatologic or surgical intervention was performed. The extraoral sinus tract resolved during follow-up after endodontic treatment.

At the 2-week follow-up, healing of both the intraoral and extraoral sinus tracts was observed. Considering the initial extent of the periapical lesion and the clinical severity of the infection, the intracanal medicament was renewed once to maintain interappointment disinfection and to assess the continuation of clinical improvement before obturation. Two weeks later, the intracanal medicament was removed with the aid of root canal instruments and irrigation. For the final irrigation protocol, 17% EDTA was used first. Distilled-water rinsing and drying between 17% EDTA and 2% chlorhexidine were used to minimize direct contact between these solutions, which may form a precipitate when mixed (11). Final irrigation was then performed with 2% chlorhexidine.

At the end of the second 2-week medication period (4 weeks in total), the intracanal medicament was removed and obturation was performed after confirming that the patient was asymptomatic, with no swelling or suppuration, no active drainage from the sinus tracts, no intracanal exudate, and that the root canals could be completely dried with sterile paper points.

Root canal treatment was completed using gutta-percha and AH Plus root canal sealer (Dentsply DeTrey, Konstanz, Germany) with the cold lateral condensation technique. At the subsequent appointment, a fiber post was placed, and the tooth was restored with composite resin.

At the 3- and 12-month follow-up visits, tooth #47 remained asymptomatic, with no recurrent drainage, and both the intraoral and extraoral sinus tract openings remained closed. Radiographic evaluation showed a progressive reduction in the periapical radiolucency and increased bony trabeculation (Figure 3), while clinical examination confirmed closure of the extraoral sinus tract opening (Figure 4). These findings were interpreted as evidence of clinical and radiographic healing; however, complete three-dimensional healing could not be

confirmed using two-dimensional radiographs alone. No treatment-related adverse events were recorded during the treatment or follow-up period.

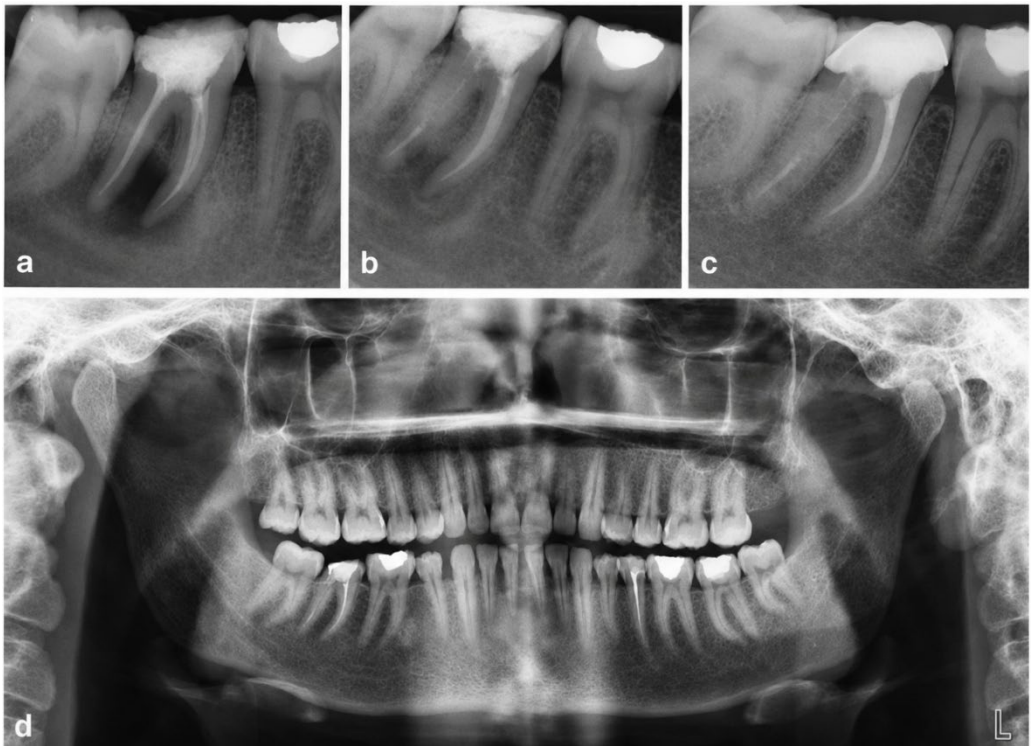

Figure 3. *Radiographic follow-up findings after endodontic treatment. (a) Periapical radiograph obtained after completion of root canal obturation. (b) Three-month follow-up radiograph showing early signs of periapical healing. (c) Twelve-month follow-up periapical radiograph showing marked regression of the periapical radiolucency and osseous healing. (d) Panoramic radiograph obtained at the 1-year follow-up.*

Figure 4. *Closure of the extraoral sinus tract and clinical healing at the 12-month follow-up.*

Discussion

Although odontogenic infections generally remain localized, perforation of the cortical bone may result in the formation of an intraoral or extraoral sinus tract. The simultaneous occurrence of intraoral and extraoral sinus tracts clinically associated with the same suspected odontogenic source is a less commonly reported clinical presentation. Several reported cases have involved pediatric patients or the primary dentition (12, 13). In the present case, the simultaneous occurrence of intraoral and extraoral sinus tracts clinically associated with a mandibular second molar diagnosed with pulp necrosis and chronic apical abscess in a young adult represents a less commonly reported clinical presentation.

Extraoral odontogenic sinus tracts are often misdiagnosed as dermatologic lesions, epidermal cysts, or chronic skin infections (14, 15). Consequently, patients may undergo unnecessary antibiotic therapy, skin biopsies, or surgical interventions (16-18). In the present case, clinical findings were limited because the patient initially had no significant dental complaints and chronic drainage reduced pressure within the infected area. Tooth #47 was considered the most likely odontogenic source based on pulp sensibility testing, clinical findings, and

radiographic evaluation, allowing an appropriate treatment plan to be established. This case supports consideration of an odontogenic source in the differential diagnosis of persistent cutaneous sinus tracts in the head and neck region.

Although periapical and panoramic radiographs revealed the presence of the lesion, they provided limited information regarding cortical bone destruction (19). In this case, CBCT imaging clearly demonstrated destruction of the buccal cortical bone and the three-dimensional extent of the lesion. The updated 2025 joint position statement of the American Association of Endodontists and the American Academy of Oral and Maxillofacial Radiology recommends that CBCT should not be used routinely but should be reserved for selected cases in which patient-specific indications are present based on clinical findings and available two-dimensional imaging (20). Therefore, CBCT was considered to have contributed substantially to confirming the diagnosis and planning treatment in the present case.

Nonsurgical endodontic treatment has been reported to result in favorable clinical and radiographic outcomes in cases of odontogenic sinus tracts (2, 3, 15, 21-24). In the present case, closure of the intraoral and extraoral sinus tract openings, progressive reduction in the periapical radiolucency, and increased bony trabeculation were observed at the 3- and 12-month follow-up visits following nonsurgical endodontic treatment. These findings document a favorable clinical and radiographic outcome in this individual case; however, the outcome cannot be attributed specifically to the chlorhexidine irrigation or calcium hydroxide–chlorhexidine intracanal medication protocol.

Another noteworthy aspect of this case was that the patient had been referred for evaluation of a possible odontogenic source of infection after being hospitalized with septic shock. Although odontogenic infections generally remain localized, they may rarely progress to life-threatening systemic complications, including deep neck infection, sepsis, and septic shock. This highlights the need to consider odontogenic sources, particularly in cases of systemic infection with an unexplained etiology. In such cases, timely and effective multidisciplinary collaboration among emergency medicine, infectious diseases, oral and dental healthcare, and endodontics is essential for establishing an accurate diagnosis (25). Although a definitive causal relationship between the septic shock and the odontogenic infection could not be established in this case, and no microbiological analysis was performed to confirm such a relationship, the referral of the patient for evaluation of a possible odontogenic focus underscores the importance of a comprehensive dental examination in patients presenting with signs of systemic infection.

A methodological limitation of the present case is the use of a chlorhexidine-based irrigation protocol without sodium hypochlorite in a necrotic tooth with a large periapical lesion. Although 2% chlorhexidine was used as part of the clinical protocol in this case, chlorhexidine lacks the organic tissue-dissolving ability of sodium hypochlorite. Therefore, the irrigation protocol used in this case should be interpreted as a case-specific treatment protocol and not as a recommendation for routine clinical practice. Furthermore, the favorable clinical and radiographic outcome cannot be attributed specifically to chlorhexidine irrigation or to the calcium hydroxide–chlorhexidine intracanal medicament.

The strengths of this case include the clinical documentation of simultaneous intraoral and extraoral sinus tracts, demonstration of cortical bone destruction using CBCT, and presentation of a 12-month clinical and radiographic follow-up.

Conclusion

Simultaneous intraoral and extraoral sinus tracts clinically associated with a suspected odontogenic source are infrequently reported. In the present case, tooth #47 was considered the most likely odontogenic source based on clinical and radiographic findings. Nonsurgical endodontic treatment was followed by closure of both sinus tract openings and progressive radiographic reduction of the periapical lesion. Because direct tracing was not performed, a common origin of both sinus tracts could not be conclusively demonstrated.

Ethics Committee Permission Statement

This case report was prepared in accordance with the Declaration of Helsinki and institutional ethical standards. According to institutional policies, ethics committee approval was not required for this case report. Written informed consent was obtained from the patient for the proposed treatment procedures and for the scientific publication of the clinical and radiographic images.

Conflict of Interest Statement

The authors declare that they have no conflicts of interest.

Funding Statement

This study received no financial support.

Authors Contribution Statement

Nisa Nur Duru: Conception, Design, Clinical Evaluation and Treatment, Data Collection and/or Processing, Literature Review, Writing, and Final Approval of the Manuscript.

Neslihan Şimşek: Conception, Design, Supervision, Analysis and/or Interpretation, Literature Review, Critical Review, and Final Approval of the Manuscript.

Data Availability Statement

The clinical and radiographic data supporting the findings of this case report are included in the article. Identifiable patient data are not publicly available to protect patient privacy. Additional non-identifiable data are available from the corresponding author upon reasonable request.

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Not applicable.

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