Dental implants at sites of focal high and mixed density osseous lesions: Clinical practice guidelines

Joshua A. Akers,[*] Thomas M. Johnson,[†] Jennah C. Wagner,[†] Sarah M. Vargas,[†] Aaron N. Colamarino,[†] Andrew C. Jenzer,[‡] Adam R. Lincicum,[†] Jennifer B. Hawie[§] and Douglas D. Lancaster[†]

Focused Clinical Question: Under what circumstances may a clinician consider dental implant placement at a site exhibiting a focal high or mixed density (HMD) osseous lesion radiologically?

Summary: Some conditions and pathologic entities exhibiting high and mixed density radiological appearance pose low risk for dental implant failure or complications following implant surgery. However, other lesions represent contraindications to implant placement, and implant surgery at such sites can result in severe morbidity.

Conclusion: Potential implant sites exhibiting focal HMD osseous lesions/conditions present varying levels of risk. In most cases, optimal management will include advanced imaging of the site, multidisciplinary consultations, and detailed informed consent to assure full understanding of procedural risks, benefits, and complications. Currently, clinical recommendations rely on case reports, opinion, and usual practice (level 3 evidence). The strength of each recommendation provided in this report is categorized as level C. *Clin Adv Periodontics* 2022;0:1–15.

Key Words: Clinical protocols; dental implants; morbidity; oral pathology; radiology; treatment outcome.

BACKGROUND

Decision process

When confronted with a patient desiring implant therapy at a site exhibiting a focal high or mixed density (HMD) lesion/condition radiologically, four questions predominate in the decision process: (1) What is the differential diagnosis (DDx)?, (2) Based on the DDx, should the clinician remove the lesion and develop the site prior to implant placement?, (3) Are acceptable alternatives to implant therapy available?, (4) Given full understanding of all treatment options and the associated risks, benefits, and complications, what are the patient's desires? To the extent possible, these questions define the risks present and establish the risk tolerance of the patient and clinician. Although the conditions and lesions addressed herein include a variety of reactive, developmental, neoplastic, and acquired entities, practitioners may group the most common entities according to management strategy (Figure 1).

*Department of Periodontics, United States Army Dental Health Activity, Landstuhl, Germany

†Department of Periodontics, Army Postgraduate Dental School, Fort Gordon, Georgia, USA

‡Department of Oral and Maxillofacial Surgery, Army Postgraduate Dental School, Fort Gordon, Georgia, USA

§Department of Oral Pathology, Army Postgraduate Dental School, Fort Gordon, Georgia, USA

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Clinical scenarios

Patients in this report presented to the Army Postgraduate Dental School, Uniformed Services University, Fort Gordon, Georgia, USA. Each patient completed an informed consent process involving verbal and written components.

RETAINED ROOT FRAGMENT

Clinical management

A retained root fragment (RF) may appear radiologically similar to other focal HMD lesions with well-defined borders such as idiopathic osteosclerosis (IO), cemento-osseous dysplasia (COD), and odontoma.[1] Typically, RFs exhibit periodontal ligament remnants,[1] and the dental history may confirm this diagnosis or render alternatives less likely. Treatment options include removing the presumptive RF at implant surgery (Figures 2 and 3), removing the fragment prior to implant surgery with or without alveolar ridge augmentation, implant placement without RF removal, or selecting a nonimplant treatment option (Figure 4). Patients and clinicians should weigh factors such as RF accessibility, invasiveness of the contemplated site development procedures, treatment needs of the adjacent teeth, importance of replacing the lost tooth, and patient desires.

Outcomes

Although controversial and not endorsed for routine application, various authors have successfully placed implants in contact with dental tissue—impacted teeth, ankylosed roots, and RFs—in order to avoid invasive surgical procedures.[2–7] Conversely, Nevins and coworkers presented two cases of late implant failure associated with unintentionally retained RFs.[8] On scanning electron

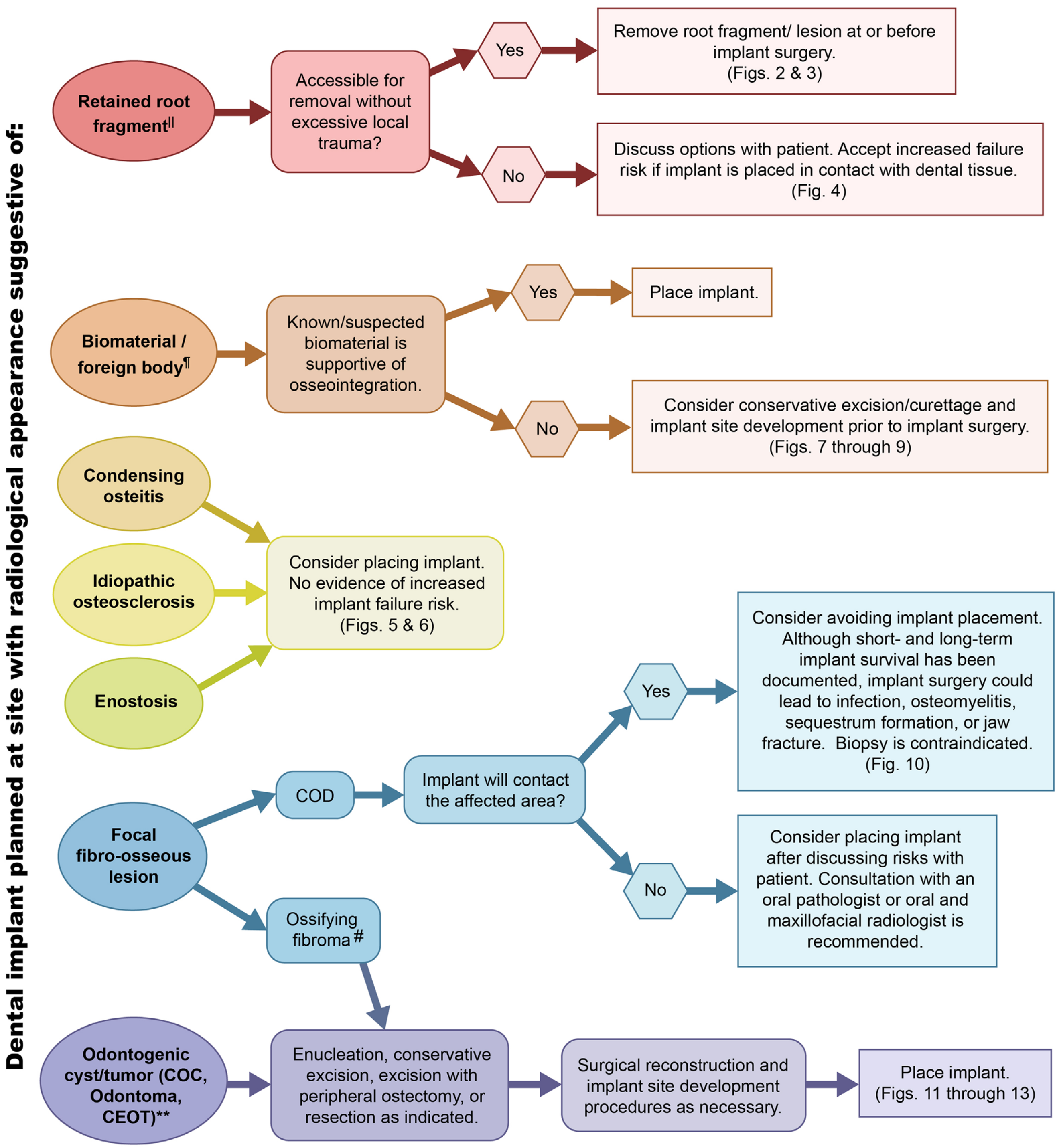

FIGURE 1 Decision algorithm when considering dental implant placement at a site exhibiting a focal high or mixed density (HMD) osseous lesion/condition. ‖Root fragment. Practitioners should submit root fragments for histopathologic evaluation even when the history and radiologic survey are strongly suggestive of the diagnosis. ¶Biomaterial/foreign body. Histopathologic examination is required for identification if the material is unknown. Some common bone derivatives/substitutes may appear radiologically similar to various HMD osseous lesions. However, such materials permit osseointegration. If the patient record confirms the presence of an appropriate bone biomaterial, implant placement can proceed without biopsy. #Ossifying fibroma. Biopsy required for definitive diagnosis and treatment. **Odontogenic cysts and tumors. Biopsy required for definitive diagnosis and treatment.

microscope assessment, the failed implant surfaces exhibited bacterial deposits and calculus.[8] Likewise, Langer and colleagues reported outcomes of seven implants in six patients placed with clinically undetectable root-implant contact.[9] Three of the implants were ultimately removed due to severe coronal bone loss, and three additional fixtures required surgical treatment (RF removal, implant decontamination, and grafting).[9] Overall, existing data suggest that contact with dental tissue may not negatively

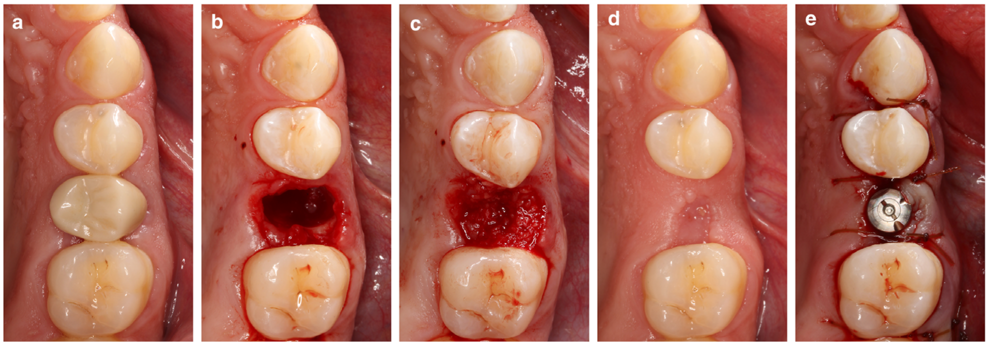

FIGURE 2 Case 1. Root fragment retained following extraction of tooth #13 with alveolar ridge preservation. **2a** Baseline clinical appearance. **2b** Extraction socket. Tooth #13 was ankylosed, rendering extraction difficult. We detected a residual root fragment near the maxillary sinus floor. In order to optimize alveolar ridge dimensions and the buccal contour, we avoided flap reflection. Rather, we elected to remove the root fragment at implant surgery. **2c** Freeze-dried bone allograft applied in the extraction socket. A neodymium-doped yttrium aluminum garnet laser was used to establish a clot and contain the graft. **2d** Clinical appearance four months following tooth extraction. We noted slight reduction in the horizontal ridge dimension but favorable bone volume for implant placement. **2e** Dental implant stabilized (40 Ncm insertion torque). Prior to placing the implant, we removed the residual root fragment (Figure 3).

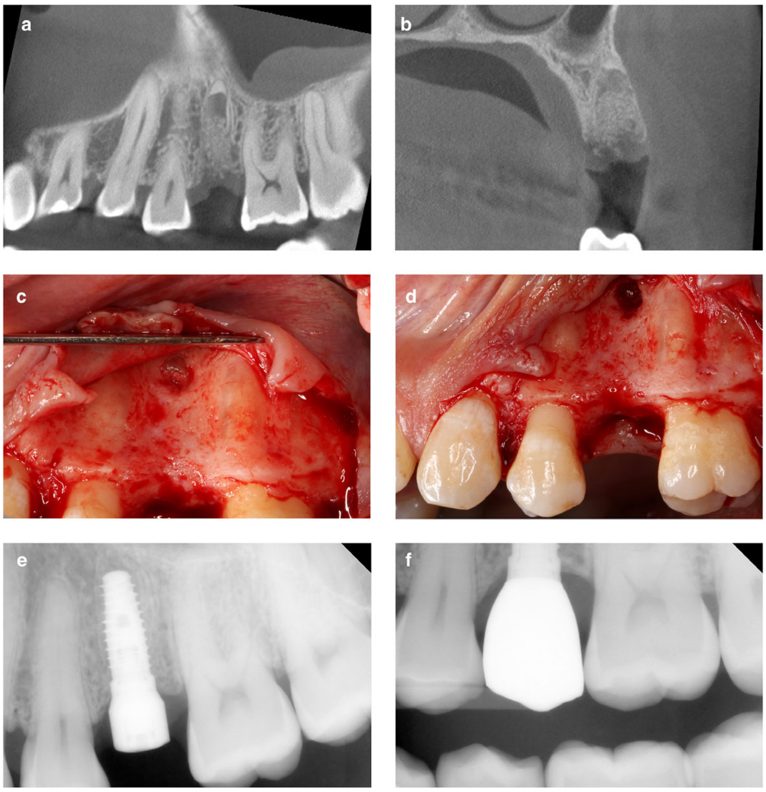

FIGURE 3 Case 1. Accessible root fragment. **3a** Cone-beam computed tomography (CBCT) volume exhibiting a retained root fragment in the tooth #13 position, custom view (mesiodistal slice through the left posterior maxilla). **3b** CBCT volume, coronal view. **3c** Root fragment upon flap reflection. In this case, the root fragment was small and accessible. Removal did not cause undue damage or compel extensive implant site development. **3d** We thoroughly debrided the area adjacent to the root fragment, then applied a freeze-dried bone allograft and absorbable collagen membrane. **3e** Periapical radiograph at implant surgery. **3f** Follow-up radiograph at postoperative month five.

influence implant success per se.[2] However, a contaminated RF may serve as a nidus of bacteria, eventually leading to peri-implantitis and late implant failure.[3,8,9] The dental history, including the reason for tooth extraction, may aid the practitioner in weighing risks.

CONDENSING OSTEITIS AND IDIOPATHIC OSTEOSCLEROSIS

Clinical management

Several intrabony processes may produce dense or sclerotic bone at a potential implant site. Condensing osteitis

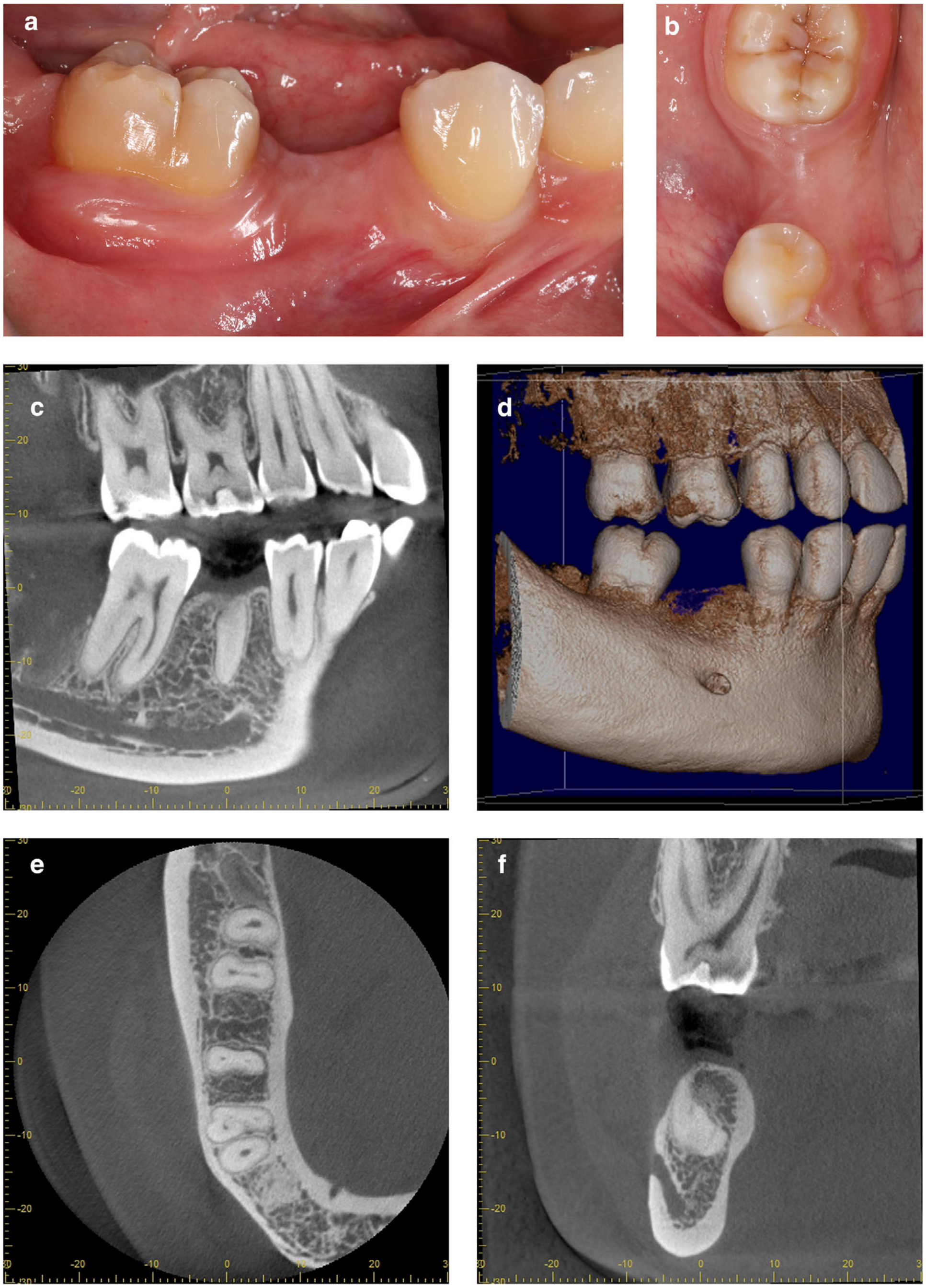

FIGURE 4 Case 2. Retained root fragment. The patient received extraction of tooth #29 during adolescence to facilitate orthodontic therapy and tooth #30 at age 17. The reason for extraction of tooth #30 was unknown, and the retained root fragment had been present for eight years. The retained dental tissue encroaches upon the mental foramen and the lingual cortical plate. Although staged implant therapy was possible following conservative surgical excision and site development, this patient declined treatment after discussing options. **4a** Clinical appearance, buccal view. **4b** Clinical appearance, occlusal view. We noted a moderate horizontal alveolar ridge deficiency in the tooth #30 area. **4c** Cone-beam computed tomography (CBCT) volume, custom view (mesiodistal slice through the right mandibular molar area), demonstrating a relatively large retained root fragment. **4d** The volume rendering demonstrated a prominent external oblique ridge as well as the location of the mental foramen. **4e** CBCT volume, axial view. The fragment was less than one millimeter from the lingual cortical plate. **4f** CBCT volume, coronal view. The crestal aspect of the fragment was superficial. However, the apical aspect exhibited ≈ 2-mm buccal bone thickness. The mental foramen was present ≈ 2 mm from the retained root.

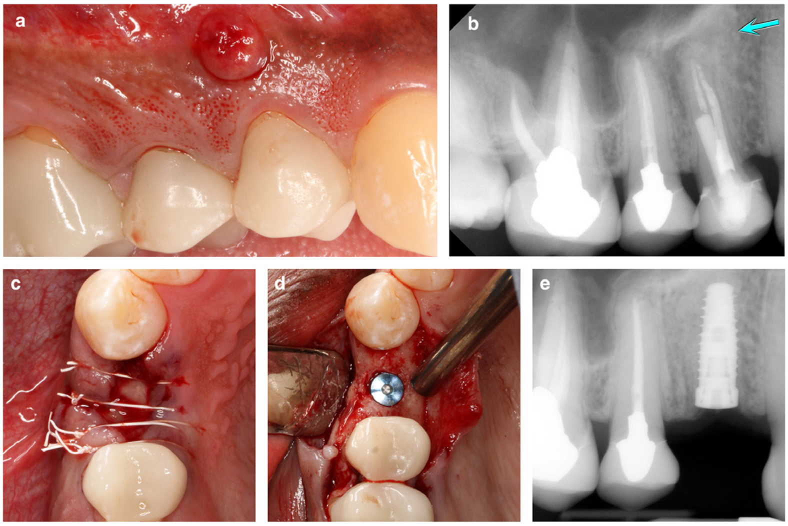

FIGURE 5 Case 3. Condensing osteitis, tooth #5 area. **5a** Clinical appearance of #5 displaying chronic apical abscess, buccal view. **5b** The tooth was nonrestorable due to a mid-root perforation associated with a previously existing metal post. We appreciated sclerotic bone adjacent to the inflammatory lesion (arrow). **5c** Clinical appearance following extraction of tooth #5 and alveolar ridge preservation. **5d** Implant stabilized with insertion torque of 60 Ncm. **5e** Peri-apical radiograph at the time of implant placement.

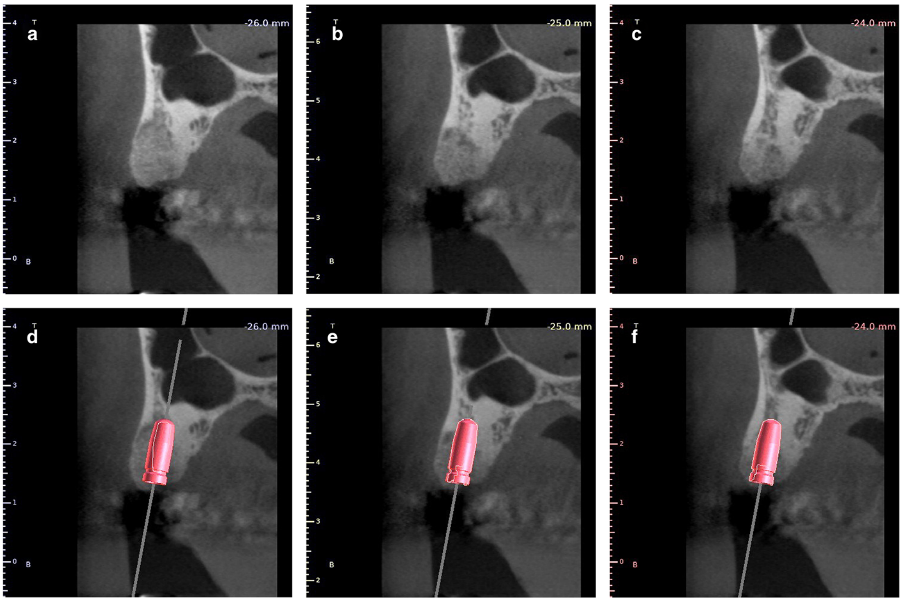

FIGURE 6 Case 3. Condensing osteitis, cone-beam computed tomography (CBCT). **6a through 6c** Consecutive cross-sectional slices (1 mm thick) through the tooth #5 area. Sclerotic bone previously associated with an inflammatory stimulus is apparent in each slice. **6d through 6f** The same cross-sectional slices with virtual implant in place. The planned implant position involved engaging the area affected by condensing osteitis. Surgical removal of the sclerotic bone may have resulted in unjustified local destruction. Although we did not acquire a follow-up CBCT volume to relate the positions of the implant and the lesion, we used implant planning software and a restrictive surgical guide to position the implant as intended.

(CO) is a localized area of bone sclerosis associated with apices of teeth with nonvital or inflamed pulp tissue.[10] The area of increased radiodensity is typically uniform and well-defined, and the periodontal ligament space may appear widened.[10] The sclerotic bone may persist following extraction of the associated tooth (Figures 5 and 6). While CO occurs secondary to an inflammatory stimulus, IO represents an asymptomatic focus of increased bone density with unknown etiology.[10–12] Other terms for this condition include dense bone island and enostosis.[11,12] Like CO, IO usually presents with uniform hyperdensity and well-defined borders.[10–12] Both entities occur most commonly in the mandibular posterior region and are nonexpansile.[9–11] IO may occur in association with or separate from a root apex, between roots, or rarely, surrounding an impacted tooth.[11,12]

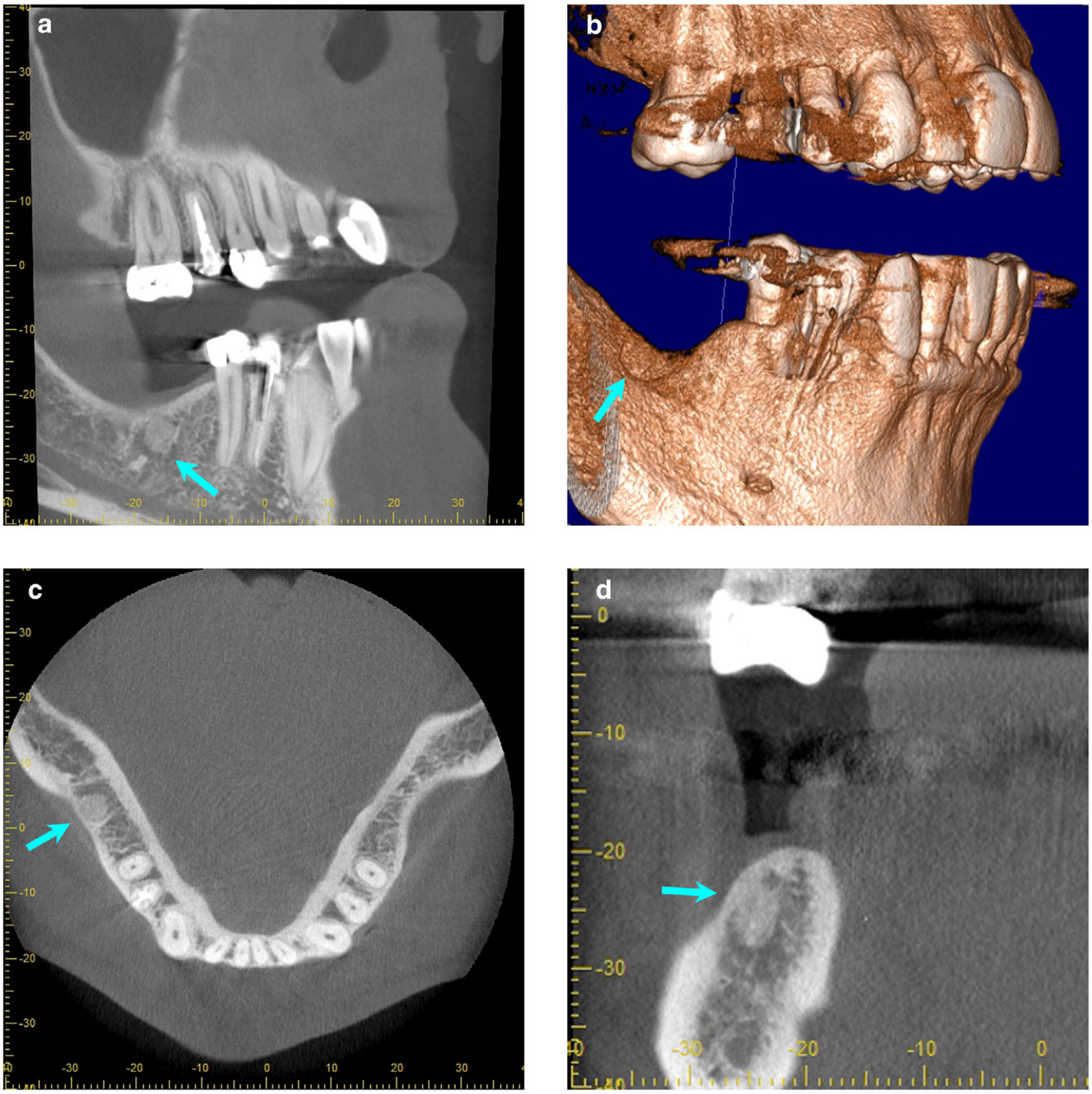

FIGURE 7 Case 4. Biomaterial/foreign body. Baseline cone-beam computed tomography assessment. This Caucasian male, aged 42 years, presented for replacement of his missing posterior teeth with dental history significant for excessive bleeding following extraction of teeth #30 and 31. The dentist reportedly applied an unknown substance to promote hemostasis. Radiologically, in the tooth #30/31 position, an ovoid area of high density (approximately 5 × 6 mm) was surrounded by a peripheral low-density zone extending to the lingual cortical plate and the osseous crest (arrows). Based on the patient's race, sex, and dental history, we did not suspect a fibro-osseous lesion. In consultation with an oral pathologist and an oral and maxillofacial radiologist, the patient elected conservative surgical excision and curettage with staged implant placement. **7a** Custom view (mesiodistal slice through the right posterior mandible). **7b** Volume rendering. **7c** Axial view. **7d** Coronal view.

Outcomes

No reports have associated CO or IO with implant failure, although research addressing this topic is scant.[12,13] Lin and coworkers placed two implants in a healed site after excision of an IO lesion and, in another patient, directly inserted an implant at an IO site.[12] The authors noted implant survival and peri-implant tissue health at each site after 12–18 months of follow-up.[12] One author reported successful implant surgery following removal of a large CO lesion.[13] However, the reported histopathologic features in the case call into question the diagnosis of CO.[13]

BIOMATERIALS AND FOREIGN BODIES

Clinical management

One possibility practitioners must consider when assessing a focal HMD osseous lesion is that the radiologic appearance could represent an implanted bone derivative or substitute, a ceramic, or a polymer.[14] Clinicians utilize such biomaterials to augment or preserve alveolar ridge dimensions, treat periodontal disease, or promote hemostasis and patient comfort.[14–18] The dental history may identify the precise biomaterial applied and the potential for implant placement at the affected site. Biopsy is prudent when the biomaterial is uncertain (Figures 7 through 9).

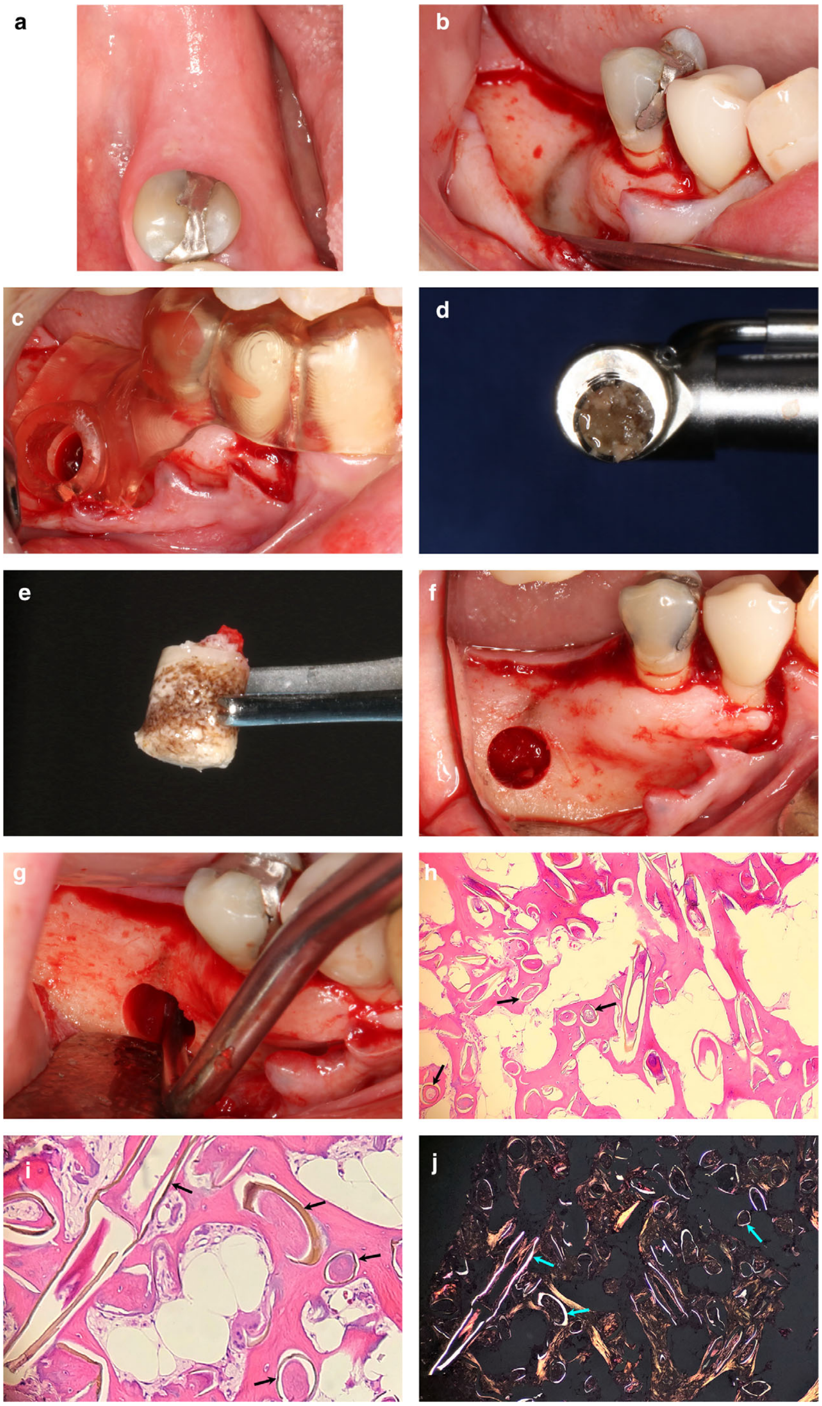

FIGURE 8 Case 4. Biomaterial/foreign body. Conservative surgical excision and curettage. **8a** Preoperative occlusal view. **8b** Intraoperative buccal view demonstrating dark staining of the affected area. **8c** Surgical guide directing placement of a 6-mm trephine. **8d, 8e** We appreciated dark staining and virtually no bleeding in the specimen submitted for histologic assessment. **8f** Appearance of the site following biopsy. **8g** We chose not to remove the stained buccal cortex extending from the bone core site to the osseous crest and instead curetted the site thoroughly, removing additional darkly stained material embedded within cancellous bone. After thorough irrigation with normal saline, we applied a stiff absorbable collagen membrane without addition of any graft material. **8h** Low-power view demonstrating numerous ring-shaped structures (arrows) within trabecular bone (hematoxylin-eosin, x40magnification). **8i** High-power view illustrating brown staining of ring-shaped fibers (arrows) and presence of multinucleate giant cells (hematoxylin-eosin, x100magnification). **8j** Low-power photomicrograph obtained under polarized light confirms the presence of numerous ring-shaped foreign bodies (arrows) within bone (hematoxylin-eosin, x40magnification). Based on the dental history in this case and a review of the literature, we suspected use of a hemostatic paste containing butamben, eugenol, iodoform, spearmint and olive oils, and penghawar djambi fibers derived from ferns indigenous to the mountain forests of Sumatra.

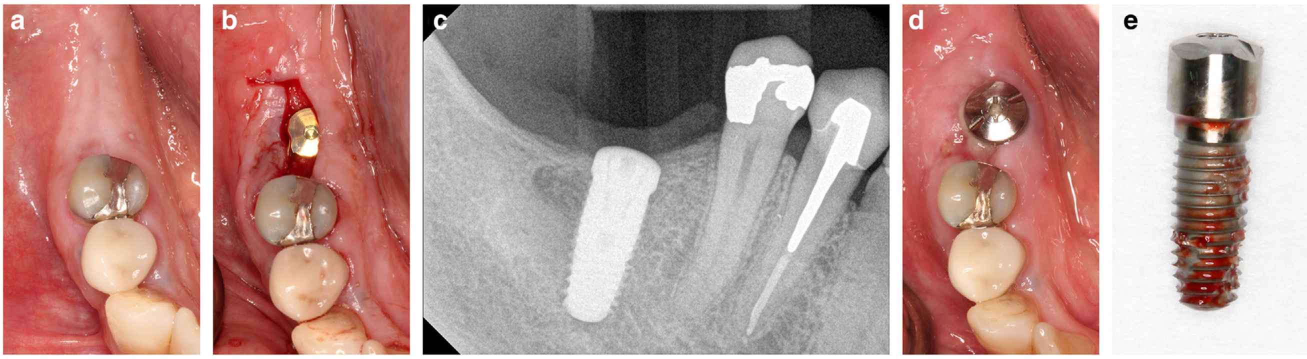

FIGURE 9 Case 4. Biomaterial/foreign body. **9a** Occlusal view 4 months following excision/curettage. **9b** Implant stabilized, tooth #30 area. **9c** Periapical radiograph at implant placement. The circular radiolucent area related to the bone core biopsy is projected superiorly due to the position of the X-ray source relative to the buccal cortex. **9d** Three weeks after implant placement, the patient complained that the implant felt loose. **9e** We confirmed early implant failure and explanted the fixture.

Outcomes

Biomaterials vary substantially in immunogenicity, regenerative potential, resorption rate, tendency to remain sequestered in fibrous connective tissue (CT), and ability to support osseointegration.[14,15,17–19] Clinicians routinely rely on biomaterials for implant site development procedures.[15,17,18] However, investigators have associated various biomaterials with impaired healing and unfavorable outcomes in some patients.[19–22]

FIBRO-OSSEOUS LESIONS

Clinical management

The potential for implant therapy at a site affected by a fibro-osseous lesion depends upon the specific pathologic entity encountered. The fibro-osseous lesion most commonly identified in the tooth-bearing areas of the jaws is COD.[11,23–28] Other entities in this group include fibrous dysplasia (FD) and ossifying fibroma (OF).[11,23–33] FD is characterized by diffuse "ground glass" opacification with ill-defined borders, bone expansion, and displacement of adjacent structures.[11,23,29–31] Because FD is a diffuse rather than focal process, this entity is less relevant to our narrow topic. COD is a reactive, nonneoplastic process in which tissue characterized by aberrant bone- and cementum-like particles embedded in fibrous CT replaces normal bone.[11,23–28] Clinical and radiographic features distinguish focal, periapical, and florid COD variants.[11,23–28] All forms of COD demonstrate a comparable maturation pattern radiographically, with early lesions appearing predominantly radiolucent.[11,23–28] Over time, accumulation of mineralized material and diminishing CT proportions offer a mixed radiolucent-radiopaque appearance, and sclerotic lesions at full maturity may appear densely radiopaque (Figure 10).[11]

OF, also known by the less preferred term cemento-ossifying fibroma, is a fibro-osseous lesion classified as a true neoplasm.[11,23,32,33]Small OF lesions are clinically undetectable, whereas large lesions cause substantial bony expansion, facial asymmetry, and displacement of adjacent structures.[11,23,32,33] Radiographic features of OF depend upon lesion maturity and thus vary markedly. Early lesions appear radiolucent, more mature examples present as mixed radiopaque-radiolucent lesions, and fully mature lesions can appear densely radiopaque with sclerotic borders or thin peripheral radiolucent rims.[32] Most OF lesions readily separate from adjacent normal bone and are amenable to enucleation.[11] Thus, in the context of implant treatment planning, management of OF lesions and other benign tumors is similar, typically involving staged implant placement after eradication of the lesion and, if necessary, site development.

Outcomes

COD lesions are hypovascular and at risk for necrosis and infection.[11,23–28] Exposure of a sclerotic lesion to the oral cavity often coincides with the onset of symptoms.[11] Surgical manipulation of bone at sites affected by COD can lead to infection, osteomyelitis, sequestrum formation, and jaw fracture.[25,26] At sites exhibiting radiologic features consistent with COD, some authors recommend avoiding elective surgical procedures such as biopsy, tooth extraction, and dental implant placement.[11,23,25,26] In one report, implant placement at a COD-affected site induced chronic osteomyelitis.[26] Conversely, after inserting an implant at a site exhibiting COD, Park and colleagues histologically documented direct contact between the implant and cementum-like tissue after 16 years of function.[27] Gerlach and coworkers noted implant failure 26 months after placement in a patient diagnosed with florid COD.[24] Upon removal of the implant, the authors noted the unusual finding of concomitant OF at the implant site.[24] Esfahanizadeh and Yousefi successfully placed two implants adjacent to a COD-affected area—one mesial and one distal to the lesion.[25] The implants supported a fixed dental prosthesis, which remained stable through 18 months of follow-up.[25]

Intuitively, implant success after OF removal and reconstruction of the alveolar ridge may compare with success

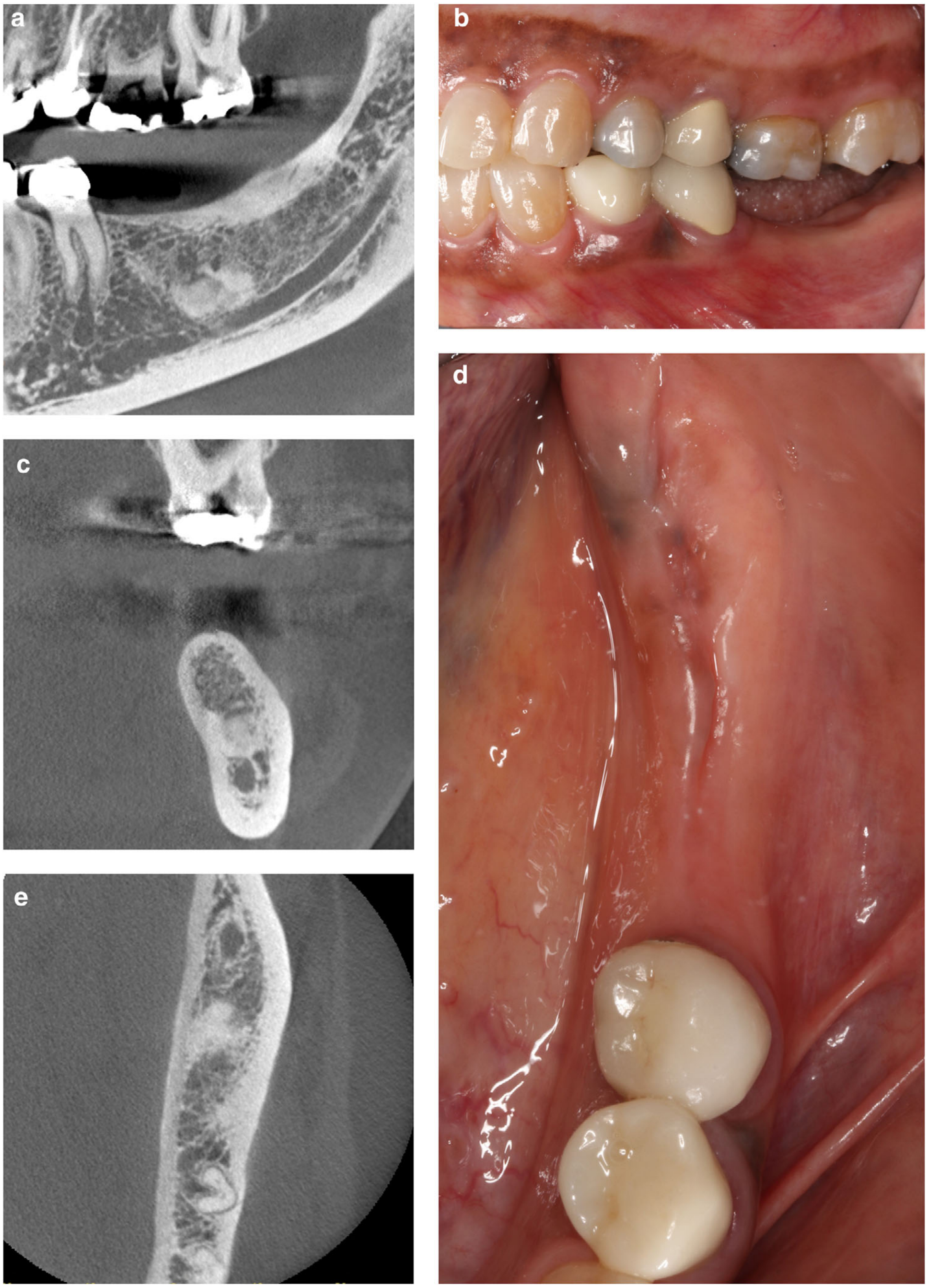

FIGURE 10 Case 5. Cemento-osseous dysplasia (COD). This asymptomatic 39-year-old black female desired replacement of teeth #18 and 19 with dental implants. Cone-beam computed tomography (CBCT) revealed a mixed density mass in the tooth #19 area, adjacent to the superior cortical outline of the left mandibular canal. We consulted with an oral and maxillofacial radiologist who suspected periapical cemento-osseous dysplasia. Based on the likely diagnosis, biopsy for histologic confirmation was contraindicated. We recommended against implant surgery. After discussing risks, benefits, and complications associated with implant placement in the affected area, the patient elected no treatment. **10a** Custom CBCT view (mesiodistal slice through the left posterior mandible). **10b** Clinical appearance, buccal view. **10c** CBCT coronal view. **10d** Clinical appearance, occlusal view. **10e** CBCT axial view.

rates observed at other grafted sites. However, practitioners should advise patients that OF has exhibited recurrence rates ranging from 12% to 28%.[32,33] Interestingly, a few authors have reported cases describing survival of implants placed at sites affected by FD.[29–31]

ODONTOGENIC CYSTS AND TUMORS

Clinical management

Management of odontogenic cysts and tumors relevant to our topic will involve surgical removal of the lesion, alveolar ridge development as indicated, and subsequent

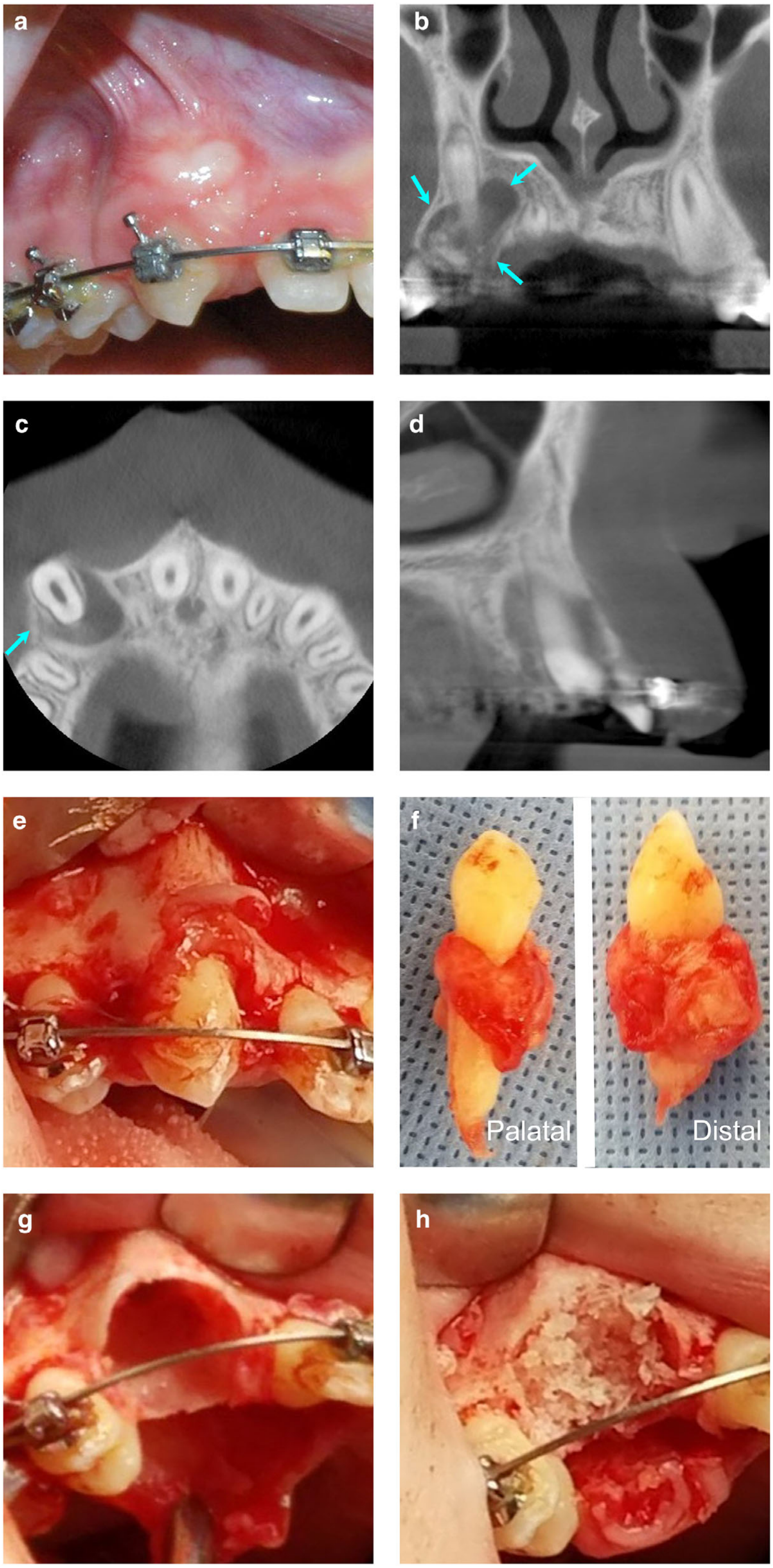

FIGURE 11 Case 6. Calcifying odontogenic cyst (COC). This 16-year-old female was referred for evaluation of an expansile lesion associated with tooth #6. **11a** Baseline clinical appearance, facial view. **11b** Cone-beam computed tomography (CBCT) volume, coronal view. A well-defined mixed low-high density lesion appeared associated with tooth #6 (arrows). **11c** CBCT volume, axial view. The high density portion of the lesion (arrow) was adjacent to the distal surface of the tooth. The lesion appeared to displace tooth #6 facially. **11d** CBCT volume, custom view (faciopalatal slice mesial to tooth #6). **11e** Intraoperative appearance of the lesion. **11f** Palatal and distal views of extracted tooth #6 with the associated lesion. Subsequent histopathologic assessment confirmed the diagnosis of COC. **11g** Extraction socket, tooth #6 area, after debridement. **11h** Freeze-dried bone allograft applied for alveolar ridge preservation.

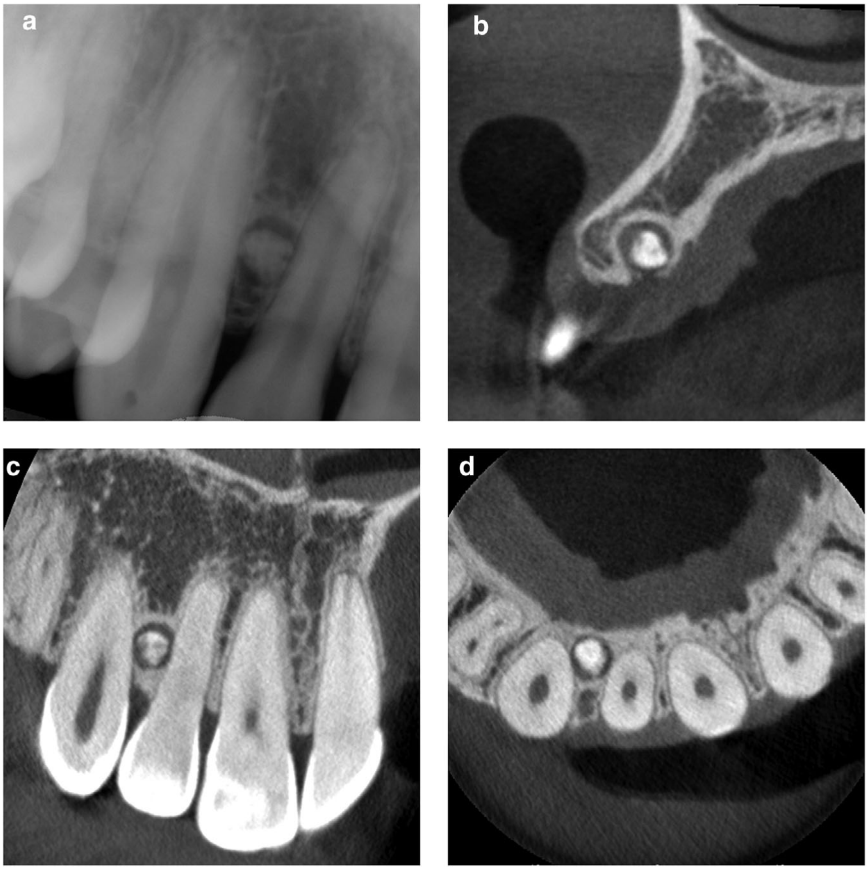

FIGURE 12 Case 7. Odontoma and calcifying odontogenic cyst (COC). Although implant therapy was not indicated, this case illustrates the clinical and radiological features of the most common odontogenic tumor and the association between odontoma and presence of a COC. **12a** Periapical radiograph demonstrating a well-defined mixed radiolucent/radiopaque lesion between the roots of teeth #6 and 7. The lesion appears to displace the roots of adjacent teeth slightly. **12b** Cone-beam computed tomography (CBCT) volume, custom view (faciopalatal slice through the center of the lesion). The central area of the lesion demonstrated variable density, consistent with presence of enamel and dentin. The peripheral low density rim exhibited a corticated border, with perforation of the palatal cortex. **12c,12d** Custom (mesiodistal) and axial views, respectively.

rehabilitation with implant therapy.[34] Calcifying odontogenic cyst (COC), also known as Gorlin cyst or calcifying cystic odontogenic tumor, is an uncommon odontogenic lesion predominantly occurring in cystic form (Figure 11), with infrequent benign and malignant neoplastic variants recognized by the World Health Organization.[35,36] This lesion exhibits predilection for anterior segments of both jaws and is commonly associated with an asymptomatic swelling, although pain and tooth displacement are possible.[36] COC is typically a mixed lesion with radiopaque foci appearing within a well-defined radiolucency.[36] Approximately 20% of COCs occur concomitantly with odontomas (Figures 12 and 13).[35]

Odontomas represent the most common odontogenic tumors.[35,37] These lesions are considered developmental anomalies (hamartomas) rather than true neoplasms.[35,37] Histologically, odontomas are classified as compound, complex, or mixed.[35,37] Compound odontomas consist of small tooth-like structures and occur more commonly in the anterior segments of the jaws.[37] Complex odontomas are disorganized conglomerates of dental tissue identified more commonly in posterior areas.[37]

Adenomatoid odontogenic tumor (AOT), an uncommon lesion with striking predilection for incisor/canine areas, occurs twice as often in the maxilla as in the mandible.[35] Whether AOT represents a true neoplasm or a hamartoma remains a matter of controversy.[38–40] These lesions may appear completely radiolucent or exhibit fine snowflake radiopacities.[35]

Calcifying epithelial odontogenic tumor (CEOT), the Pindborg tumor, is a rare odontogenic neoplasm of uncertain histogenesis occurring most commonly in the posterior mandible of patients aged 30–50 years.[34,35,41] The lesion typically produces a painless swelling and appears as a unilocular or multilocular radiolucency containing calcifications of varying size and density.[34,35,41] The lesion periphery may appear ill-defined, well-defined, or corticated.[34,35] Although surgeons and pathologists agree that the surgical procedure to remove a CEOT must be sufficient to the need, disagreement persists regarding the extent of surgery required.[34] Case-specific factors—anatomic location, lesion size, clinical activity, and histocytologic characteristics—may identify the most appropriate option.[35] Enucleation and curettage is usually

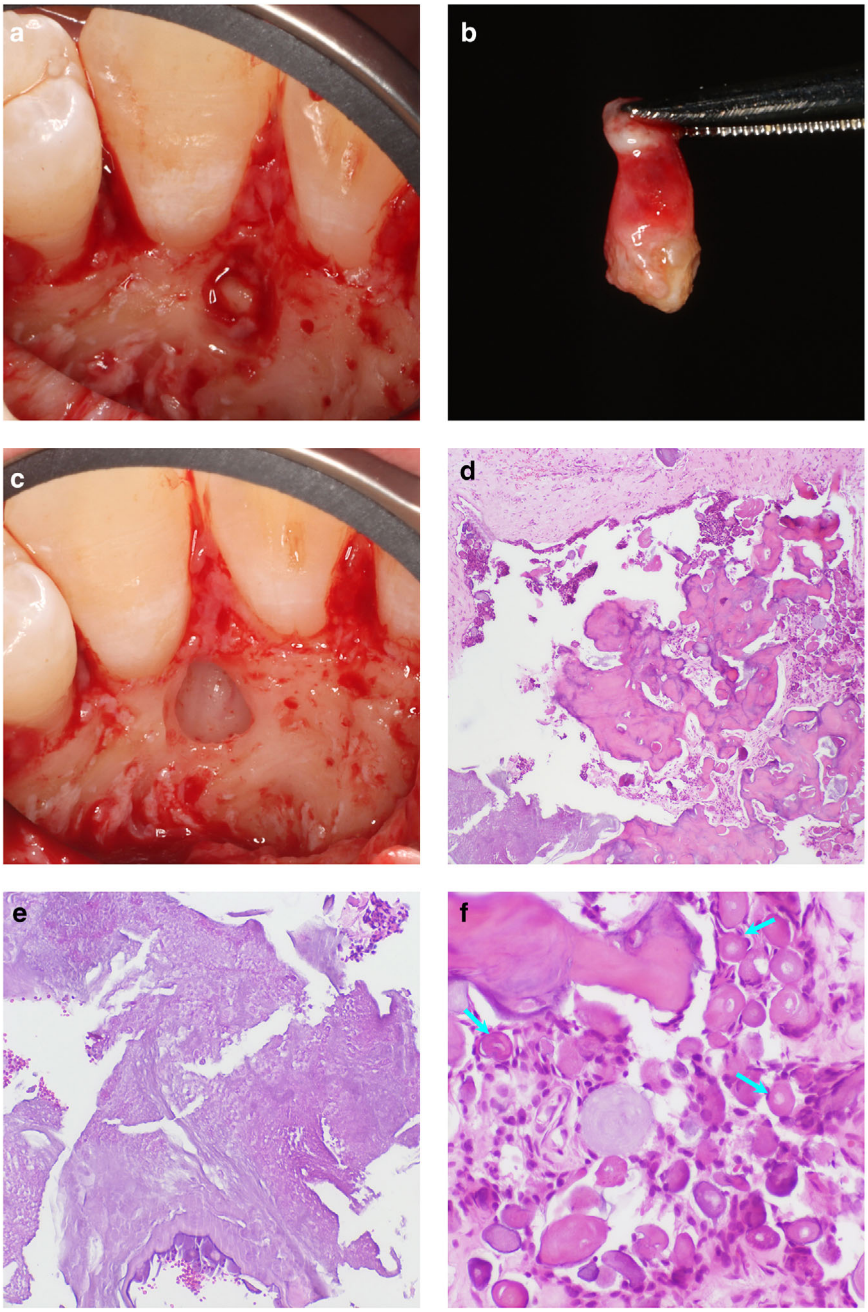

FIGURE 13 Case 7. Odontoma and calcifying odontogenic cyst (COC). Enucleation and histologic assessment. **13a** Intraoperative view prior to enucleation. **13b** Specimen submitted for histologic assessment consisting of hard and soft (cyst-like) tissue. **13c** Appearance of the site following enucleation, debridement, and irrigation. We did not apply any graft material or membrane. **13d** Low-power view demonstrating enamel- and dentin/cementum-like tissue. Ghost cells, which are associated with COC, are apparent at low power (hematoxylin-eosin, x40magnification). **13e** High-power view exhibiting a large enamel deposition (hematoxylin-eosin, x100magnification). **13f** High-power view in which ghost cells (arrows) are more easily appreciated (hematoxylin-eosin, x200magnification).

insufficient.[34,35] In some cases, conservative excision with thin peripheral ostectomy may represent adequate treatment.[35] Other CEOTs may require resection, observing margins of at least 1 cm.[34,42]

Outcomes

Local diseases—including odontogenic cysts and tumors—are known etiologic factors contributing to hard tissue deficiencies at implant sites.[43] COC, odontoma, and AOT exhibit low recurrence following enucleation or conservative excision.[34–40] No evidence suggests history of these lesions compromises implant success. Although CEOT appears less aggressive than ameloblastoma, these lesions do recur in about 15% of patients, and CEOT removal may necessitate more

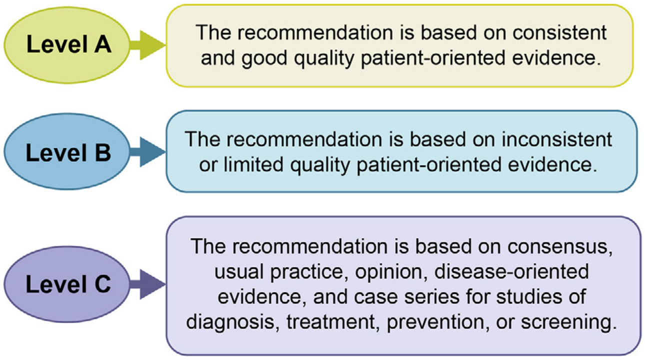

FIGURE 14 Strength of recommendation taxonomy (SORT).[44]

extensive reconstruction than other pathologic entities relevant to our topic.[34,35,41,42]

DISCUSSION

Our purpose was to identify circumstances permitting implant placement at sites exhibiting focal HMD osseous lesions. After reviewing available evidence and formulating clinical practice guidelines, we applied the strength of recommendation taxonomy[44] scale to each recommendation (Figure 14). All relevant reports on this topic consisted of case reports/series, opinion, and usual practice (level 3 evidence).[44] Thus, the strength of each recommendation in this report is categorized as level C.[44]

As indicated in Figure 1, the DDx is of principal importance. For many focal HMD lesions and conditions, removal of the "pathology" at or prior to implant surgery represents a sound treatment plan.[8–11] Practitioners may consider placing an implant without removal of the aberration in some situations—in the presence of CO, IO, dense bone, or a biomaterial permissive of osseointegration,[14,15,17,18] and possibly, when the implant will contact dental tissue.[2–7] Although some authors have documented short[24,25] or long-term[27,29–31] survival of implants inserted into fibro-osseous lesions, we concur with those who caution against such treatment when other options are accessible.[11,23,25,26] Based on a single case report, practitioners could consider implant placement in normal bone near a COD lesion if the osteotomy does not involve the affected area.[25]

CONCLUSION

A focal HMD lesion at a potential implant site may present minimal or no impediment to predictable implant success. However, innocuous lesions and conditions are not always distinguishable radiologically from entities that place the patient at risk for severe postoperative morbidity. Successful management will usually include advanced imaging, multidisciplinary consultations, and detailed informed consent. Selected therapy relies on a careful risk-benefit analysis and a shared/informed decision-making process involving both patient and doctor. Unfortunately, available evidence on this topic consists of case reports/series, opinion, and usual practice (level 3 evidence). We categorize the strength of our recommendations as level C. Clinicians should follow these recommendations with caution due to limited scientific/clinical evidence.

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CONFLICT OF INTEREST

The authors report no conflicts of interest related to this report.

Correspondence
Thomas M. Johnson, Department of Periodontics, Army Postgraduate Dental School, 228 East Hospital Road, Fort Gordon, GA 30905, USA.
Email: thomas.m.johnson34.mil@mail.mil

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