Odontogenic cystic lesions of the jaws include keratocystic odontogenic tumors (KCOTs), radicular cysts (RCs) and dentigerous cysts. These cystic lesions of the jaws, along with odontogenic tumors such as ameloblastomas (ABs), have the potential to grow and significantly expand the jaws through the process of bone resorption and expansion into contiguous tissues without inducing pain. This can cause injury to adjacent vital structures, such as the inferior alveolar neurovascular bundle and maxillary sinus, and create facial asymmetry, tooth displacement and pathological jaw fractures.

AB is a benign but locally aggressive epithelial odontogenic tumor; the unicystic AB (UAB) is a subtype considered less aggressive than the solid subtype. Therefore, decompression by reducing the size of the lesion, followed by more radical surgery to lower the recurrence rate for the residual tumor, may be considered.

Decompression of odontogenic cysts is less invasive than marsupialization, enucleation, curettage or resection because it requires a smaller bony window. Fashioning an opening into the cystic cavity and suturing a device to the peripheral overlying mucosa to hold it in place and allow irrigation leads to a reduction in the intramural pressure, encourages the formation of new bone and results in fewer complications. Decompression requires that the opening maintain its patency with gauze packing or by suturing a device such as a tube or stent to its periphery. In contrast, marsupialization involves the creation of a large window within the cyst bone wall.

To evaluate the effectiveness of decompression as the principal surgical treatment for KCOTs, RCs and UABs by taking into account causes that influence the relative speed of reduction of the cyst cavity and subsequent bone regeneration, Gao et al from Xi’an Jiaotong University College of Medicine, China, assessed 32 patients who had been treated with decompression of their odontogenic cysts by...
placement of customized thermoplastic resin stents into the defects to maintain an opening. Analysis included clinical examinations and pre- and postdecompression panoramic radiographs (Figure 1).

The treatment protocol in this study stated the following:

- KCOTs and RCs ≤ 3 cm² should be treated by enucleation.
- UABs ≤ 3 cm² should be treated by enucleation with marginal resection.
- Cystic lesions >3 cm² should be treated via decompression and placement of a customized thermoplastic stent for daily irrigation (Figure 2).

The results of the study revealed that decompression of cystic lesions of the jaws using customized thermoplastic resin stents reduced the size and increased the density of RCs, KCOTs and UABs. KCOT’s shrank at a rate of 2.87 cm²/month, RCs at 3.37 cm²/month and UABs at 2.71 cm²/month. The relative diminution of lesion size was influenced by the duration of the decompression and the size of the original radiolucent area, not by patient age. The increase in bone density was fastest for RCs, followed by KCOTs and UABs.

**Conclusion**

Decompression using customized stents reduced the size of KCOTs, RCs and UABs while increasing their bone density. Shrinkage demonstrated a linear relationship with decompression time. For aggressive cystic lesions of the jaws, secondary definitive surgery is still recommended to remove the residual lesion after decompression shrinkage.


**Treatment For Avulsed Permanent Teeth**

A

Avulsion of a permanent tooth, one of the most serious of all dental injuries, represents 0.5% to 3% of all dental injuries. Timely and appropriate emergency management is essential to achieve a favorable outcome, but the proper procedure varies depending upon the nature of the precipitating event.

The International Association of Dental Traumatology (IADT) published a consensus statement reflecting the most current best evidence for proper management of an avulsed permanent tooth. Andersson et al from Kuwait University reported the recommendations of the IADT regarding treatment of these teeth.

In most circumstances, replantation is preferred for an avulsed permanent tooth, but often this cannot be accomplished immediately. Some contraindications for replantation of an avulsed permanent tooth include extensive caries or periodontal disease, or a patient who is noncooperative or has severe medical conditions (e.g., immunosuppression, severe cardiovascular conditions).

**First aid for an avulsed tooth at the site of accident**

- Pick up the tooth by the crown; avoid touching the root.
- If the tooth is dirty, wash it briefly under cold running water and reposition it in the socket.
- When the tooth has been put
back in place, have the patient bite on a handkerchief or equivalent to hold it in position.

- If replantation is not possible, place the tooth in a special storage or transport medium (e.g., tissue culture/transport medium, Hanks balanced storage medium, saline) if available or a glass of milk (not water) and bring it and the patient to an emergency clinic.

**Guidelines for an avulsed permanent tooth**

The treatment approach is often based on the maturity of the root (open vs closed apex) and the status of the periodontal ligament (PDL) cells. PDL cells are most likely to survive when tooth replantation occurs immediately.

When the tooth is kept in an appropriate storage medium for ≤1 hour, PDL cells may be compromised; after >1 hour, PDL cells are nonviable. Mature teeth with closed apices should undergo root canal therapy 7 to 10 days after replantation and prior to splint removal. Immature teeth with open apices should be given time for revascularization; if that does not occur, initiate root canal therapy.

**Tooth has been replanted before the patient presents to the clinic**

- Clean the area with water spray, saline or chlorhexidine.
- Suture gingival lacerations, if present.
- Assess the position of the tooth clinically and radiographically.
- Apply a flexible splint for up to 2 weeks.
- Check tetanus immunization status.

**Tooth has been stored in a satisfactory medium for <60 minutes**

- Clean the root surface.
- Administer local anesthesia.
- Irrigate the socket.
- Replant the tooth gently.
- Suture gingival lacerations.
- Examine the tooth position clinically and radiographically.
- Apply a flexible splint for up to 2 weeks.
- Administer systemic antibiotics.
- Check tetanus immunization status.

**If the tooth has been dry for >60 minutes**

- Remove necrotic tissue from the tooth.
- Perform endodontic treatment prior or subsequent to replantation.
- Reposition any fracture of the alveolar socket wall.
- Replant the tooth gently.
- Suture gingival lacerations.
- Examine the tooth position clinically and radiographically.
- Stabilize the tooth for 4 weeks using a flexible splint.
- Administer systemic antibiotics.
- Check tetanus immunization status.
- Plan for probable ankylosis and tooth loss.

**Conclusion**

The consensus group discussed a number of promising treatments for avulsed teeth. According to the group members, there is currently insufficient weight or quality of clinical and/or experimental evidence to recommend some of these newer methods at this time.


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**Bone Loss Around Single-And Multiple-Implant Retained Prostheses**

Marginal bone loss around dental implants can be affected by numerous factors, including surgical technique, implant positioning, tissue thickness, the presence of a microgap at the implant-abutment junction, platform switching, prosthesis design and implant design. Dental reconstruction using conventional nonimplant prostheses permits the abutment tooth to move up to 100 µm inside the periodontal membrane, thereby compensating for slight imprecision of a fixed prosthesis. But implants can move only within a 10 µm range. This lack of accommodation can lead to marginal bone loss.

Previous studies have demonstrated that marginal peri-implant bone loss transpires during the first year and then tends to stabilize for most of the implants. Firme et al from University of Grande Rio, Brazil, performed a systematic review and meta-analysis to evaluate the current literature and compare the marginal bone loss surrounding implants used to support single fixed prostheses and multiple-unit screw-retained prostheses.

A search of MEDLINE, Science Direct, the Cochrane Center Register of Controlled Trials and Scopus yielded 2107 studies, of which 17 (7 related to single-tooth prostheses and 10 to multiple-implant screw-retained prostheses) satisfied the inclusion criteria. Periapical radiographs were used in all included studies to evaluate marginal bone loss.

The most widely used system was the Brånemark implant system, with 1591 external-hexagon implants in-
serted; follow-up ranged from 1 to 20 years. The second most-utilized system was Osseotite, with 247 external-hexagon implants placed; follow-up ranged from 1 to 5 years.

The meta-analysis found that the mean marginal peri-implant bone loss was 0.9 mm for multiple-implant screw-retained prostheses and 0.58 mm for single-implant prostheses, a difference that did not approach statistical significance.

**Conclusion**

Although a lack of randomized controlled clinical trials prevents a direct comparison, no evidence exists indicating any significant differences in marginal peri-implant bone loss between single fixed and multiple-unit implant-supported prostheses.


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**Influence of Mandibular Flexure on Implant Fixed Prostheses**

**Similar to all long bones in the body, the human mandible will deform when loaded. Mandibular flexure is defined as “the change in shape of the mandible caused by the pterygoid muscles contracting during opening and protrusion movements.”** The extent of the deformation is measured by strain, defined as “the change in length per unit of length.” The muscles of mastication exert force on the body of the mandible and contribute significantly to mandibular flexure. Law et al from the University of Otago, New Zealand, assessed the influence of mandibular flexure on the implant-framework system and examined the literature on this subject.

It has been determined that the mandible will deform instantaneously and simultaneously to coincide with jaw movement. Four types of mandibular deformation have been suggested:

1. **Symphyseal bending associated with medial convergence or coronal approximation** is related to contraction of the lateral pterygoid muscle during jaw opening.

2. **Dorsoventral shear** is the consequence of the vertical components of the lateral pterygoid muscles and the reaction forces at the condyles.

3. **Corporal rotation** occurs during rotation of the body of the mandible and produces constriction of the dental arch.

4. **Anteroposterior shear** results from contraction of the lateral components of the jaw-elevating muscles.

The precise role of mandibular flexure in implant therapy has not been definitively delineated, but it is suspected that factors likely to produce mandibular flexure—such as impression taking, the number of implants placed and materials used—contribute to the prosthesis misfit and a less positive long-term prognosis. The periodontal membrane around natural teeth absorbs part of the displacement conveyed to the mandible and diminishes the amount of mandibular flexure. Dental implants, particularly those that are splinted rigidly, produce a restriction in the amount of mandibular flexure that ensues during function.

**Conclusion**

Because cross-arch prostheses restrict mandibular flexure, curtailing the impact of mandibular flexure on the implant prosthesis may be accomplished by dividing the prosthesis at the symphysis or into several implant fixed dental prostheses. The clinical significance of mandibular flexure on the outcomes of dental implant therapy is unclear, and future investigation is warranted.


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**In the next issue:**

- Medication-related osteonecrosis of the jaw: 2014 update
- Success of narrow-diameter dental implants
- Removal of third molars with mild pericoronitis symptoms
- Loading protocols for implant-supported overdentures in the edentulous jaw

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