Advanced Imaging for Diagnosing Traumatic Injuries in the Primary Dentition

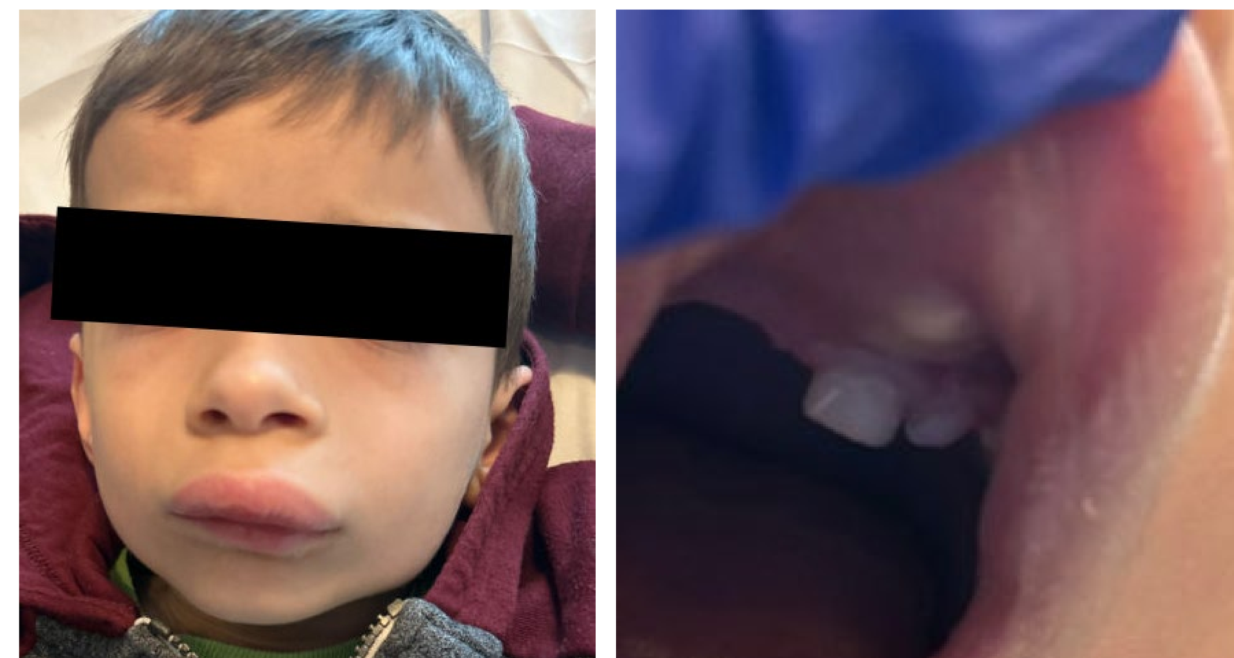
Kaitlyn Solano DMD; Rosa Pelaez-Shelton DDS, MDS
School of Dental Medicine, Pediatric Dentistry, UConn Health

UCONN HEALTH

INTRODUCTION

A 6-year-old male presented to the Emergency Department at Connecticut Children's Medical Center for significant facial swelling with history of a recent dental trauma.

Photographs



History of Present Illness

- **Four-day history of progressing upper lip swelling**
  - **Three weeks ago:** trauma to upper teeth/ lip when accidently struck by the handle of a wheelbarrow
    - Initial pain and swelling of the upper lip resolved within a week, parents report no dislocation of the teeth, did not present to dental home
  - **Two days ago:** emergency visit to dental home, diagnosed with root fracture #F and referred to oral surgery for extraction; possible concern for maxilla fracture/ alveolar fracture
  - Advised to present to CCMC ED due to progressing symptoms
- **PMH:** Non-contributory. Healthy male
- **Allergies:** Amoxicillin
- **Medications:** None
- **Dental history:** Receives routine dental care; no prior restorations or extractions

Clinical Exam

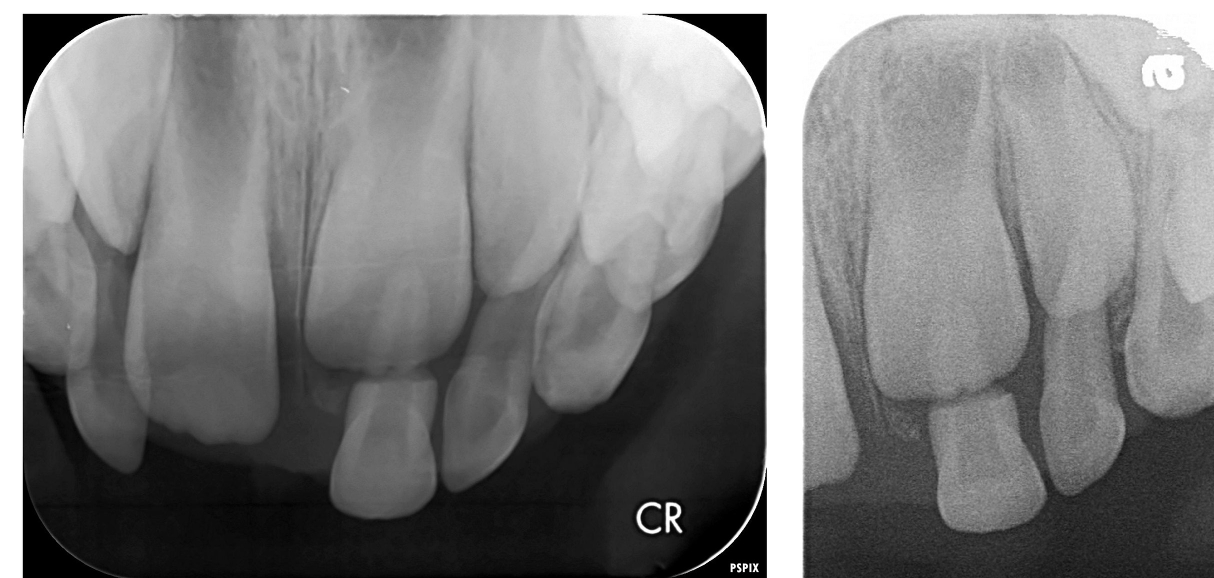
EOE: Significant edema of the upper lip, tracking periorbitally. Left buccal swelling at the angle of the mandible, which was non-tender. Bilateral submandibular lymphadenopathy, mobile, soft, slightly tender

IOE:

- No trauma to the lower lip, cheeks, tongue, or palate; no lacerations
- Mandibular dentition WNL
- #E exfoliated naturally prior to trauma, #8 unerupted
- #F grade II mobility, no coronal fracture
- #G grade II mobility, no coronal fracture
- #F and #G moving independently with deficient interproximal bone
- No alveolar fracture
- 2-3 cm fluid filled, yellowish abscess in the labial vestibule apical to #F

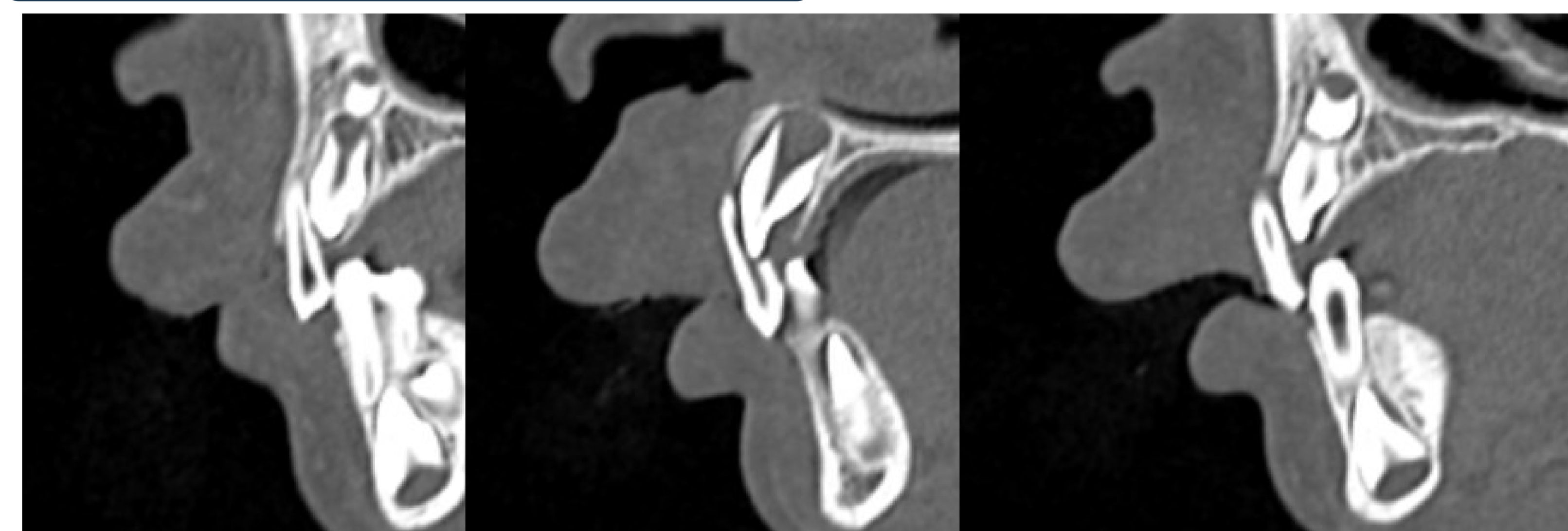
ASSESSMENT

2D Imaging

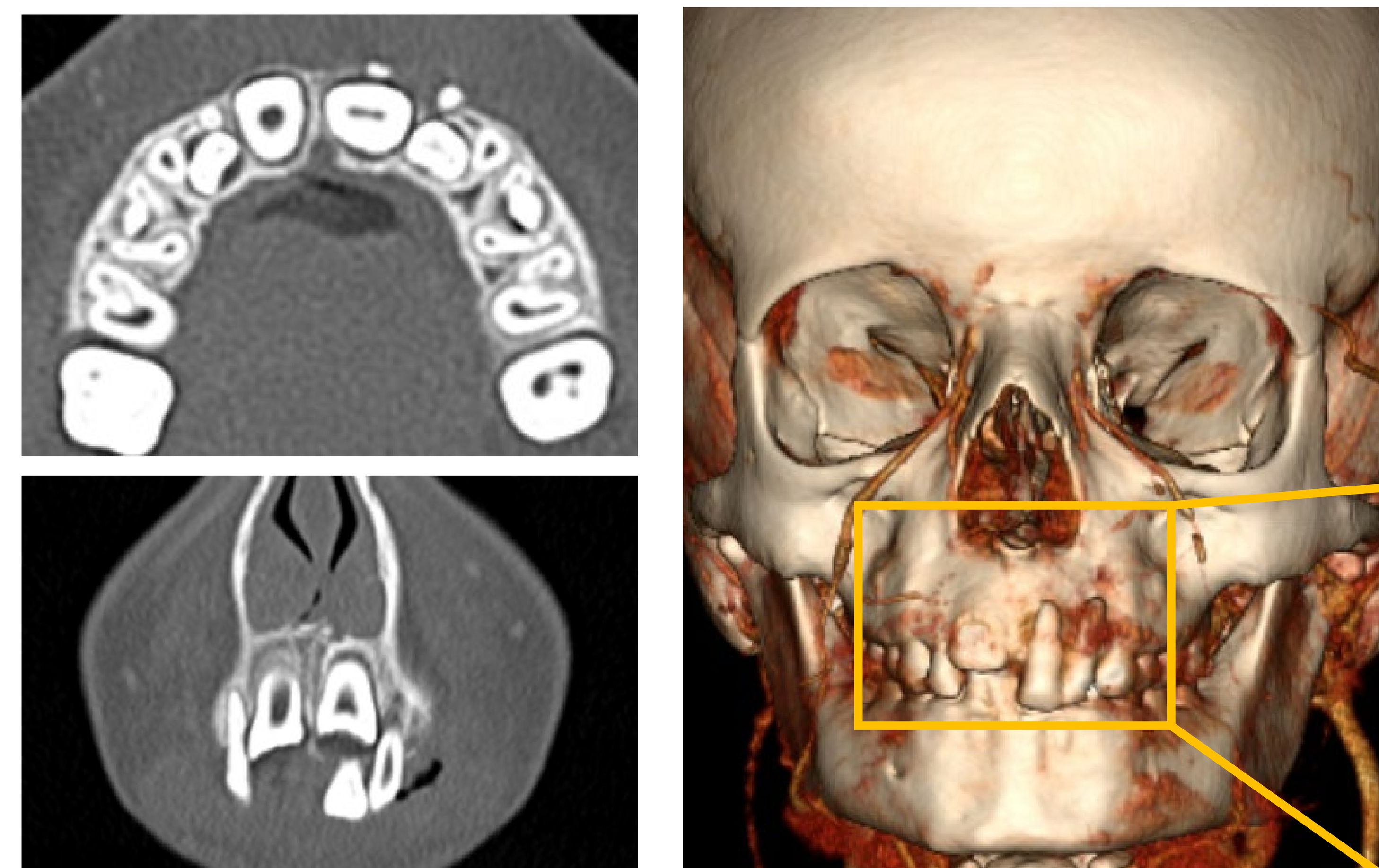


Occlusal radiograph from dental home; Periapical radiograph in ED

3D Imaging



CT Sagittal slices through #D , #F , and #G



Above: axial slice through maxilla; *Below:* coronal slice through maxillary incisors; *Right:* 3D Reconstruction

Radiology report: "Dehiscence of the maxillary bone along the left greater and lateral incisors with associated extensive thickening and inflammatory stranding involving the upper lip soft tissues extending to the skin and 1.7 cm hypodensity at midline. Findings are concerning for infectious process with phlegmonous changes/developing abscess."

CONCLUSION

IADT Guidelines

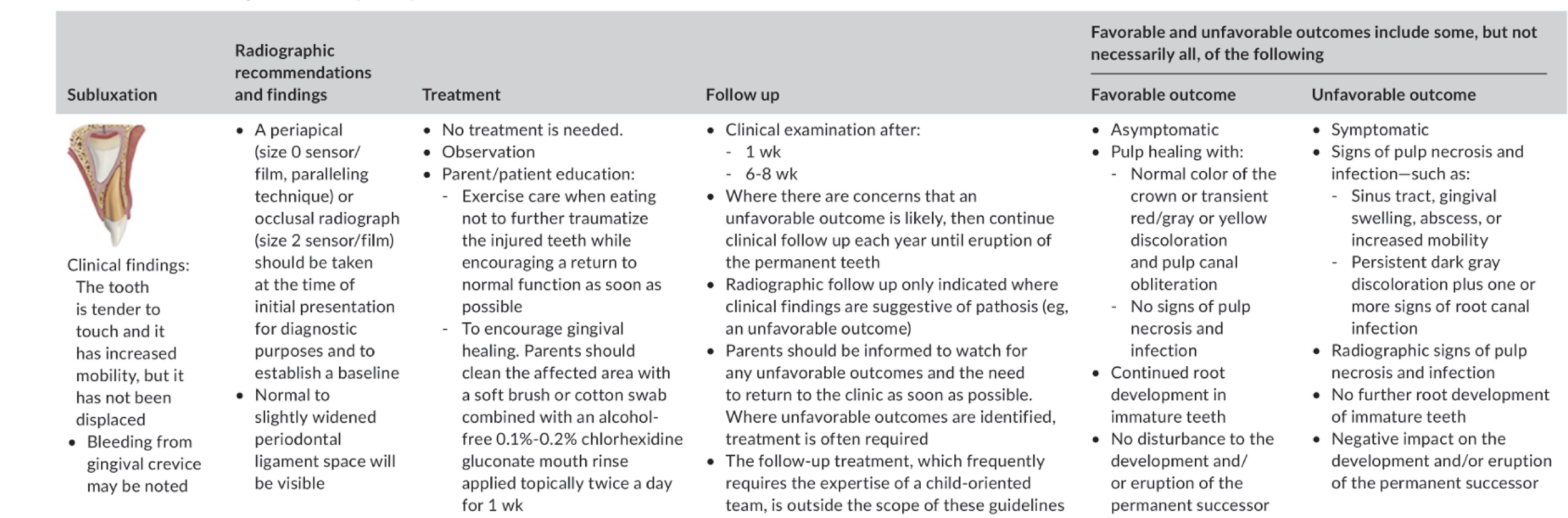


TABLE 8 Treatment guidelines for primary teeth: Subluxation

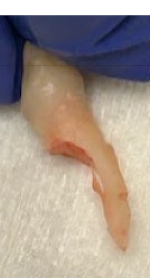
Subluxation	Radiographic recommendations and findings	Treatment	Follow up	Favorable and unfavorable outcomes include some, but not necessarily all, of the following: Favorable outcome	Unfavorable outcome
Clinical findings: The tooth is tender to touch and it has increased mobility, but it has not been displaced • Bleeding from gingival crevice may be noted	• A periapical (size 0 sensor/ film, paralleling technique) or occlusal radiograph (size 2 sensor/film) should be taken at the time of initial presentation for diagnostic purposes and to establish a baseline • Normal to slightly widened periodontal ligament space will be visible	• No treatment is needed. • Observation • Parent/patient education: - Exercise care when eating not to further traumatize the injured teeth while encouraging a return to normal function as soon as possible - To encourage gingival healing. Parents should clean the affected area with a soft brush or cotton swab combined with an alcohol-free 0.1%-0.2% chlorhexidine gluconate mouth rinse applied topically twice a day for 1 wk	• Clinical examination after: - 1 wk - 6-8 wk • Where there are concerns that an unfavorable outcome is likely, then continue clinical follow up each year until eruption of the permanent teeth • Radiographic follow up only indicated where clinical findings are suggestive of pathosis (eg, an unfavorable outcome) • Parents should be informed to watch for any unfavorable outcomes and the need to return to the clinic as soon as possible. Where unfavorable outcomes are identified, treatment is often required • The follow-up treatment, which frequently requires the expertise of a child-oriented team, is outside the scope of these guidelines	• Asymptomatic • Pulp healing with: - Normal color of the crown or transient red/gray or yellow discoloration and pulp canal obliteration - No signs of pulp necrosis and infection • Continued root development in immature teeth • No disturbance to the development and/ or eruption of the permanent successor	• Symptomatic • Signs of pulp necrosis and infection—such as: - Sinus tract, gingival swelling, abscess, or increased mobility - Persistent dark gray discoloration plus one or more signs of root canal infection • Radiographic signs of pulp necrosis and infection • No further root development of immature teeth • Negative impact on the development and/or eruption of the permanent successor

Discussion

- While 3D imaging is not routinely recommended or required for simple injuries in the primary dentition, a CT was obtained prior to dental consult.
- This allowed us to rule out the original diagnoses of root fracture and alveolar fracture. Reconstruction enhances our ability to conceptualize the extent of the dehiscence. It is unclear whether the dehiscence was caused by the initial trauma (subluxation vs. lateral luxation), the resulting infection, or both.
- While the "wait and watch" approach is appropriate treatment for subluxations and lateral luxations in the primary dentition, rapid evaluation of trauma is advisable to obtain baseline radiographs and establish follow up protocol.
- Anticipatory guidance given during routine recall appointments should include orofacial trauma and dental injury so parents and patients will know to seek evaluation following even minor traumas.
- Following traumatic injuries, parents and patients should be informed of signs and symptoms of favorable and unfavorable outcomes. Education regarding possible developmental defects to the permanent successors is especially important. The most common sequelae is enamel discoloration/ hypoplasia.
- Damage secondary to trauma is significantly greater when it occurs at a younger age. Severe trauma at an early stage of odontogenesis may have more drastic consequences: malformation, failure to erupt.

Treatment

- **Source control:** Extraction of #F & #G
- **Adjunct:** Antibiotic therapy
- **Pain management:** Ibuprofen
- **Pharmacological Behavior Management:** Midazolam



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