141™ ANNUAL MEETING
MAY 12 – MAY 14, 2011

JEWEL OF THE GREAT LAKES

MICHAEL KANELLIS, DDS, MS, MS

THURSDAY, MAY 12, 2011
1:30 TO 4:00 P.M.

CLINICAL PEDIATRIC DENTISTRY: TRENDS, TECHNIQUES AND CHALLENGES

RECOMMENDED BY THE DENTAL HOME SUBCOMMITTEE
Clinical Pediatric Dentistry: Trends, Techniques and Challenges

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Topics

1. Breastfeeding and ankyloglossia – back to the future
2. The severely decayed first permanent molar – restore or extract?
3. Can mouth guards enhance athletic performance?
4. Trauma update – clinical management of complicated fractures and avulsions
5. Intentional replantation – a role in Pediatric Dentistry?

“Tongue-tie (ankyloglossia) and Breastfeeding: A Review”
“The Importance of the Identification of Ankyloglossia (Short Lingual Frenulum) as a Cause of Breastfeeding Problems”
“Neonatal Frenotomy may be Necessary to Correct Breastfeeding Problems”
“Sore Nipples and Slow Weight Gain Related to a Short Frenulum”
“Ankyloglossia: Cause of Breastfeeding Problems?”
Definition

Tongue-tie (partial ankyloglossia) is a congenital condition in which the membrane under the tongue is too short or may be attached too near the tip of the tongue, thereby preventing tongue protrusion.

Diagnosis

- Tongue-tie is defined in terms of function, rather than on the basis of objective anatomical measurements.
- Typically, it can be identified when the tip of the tongue cannot protrude beyond the lower gums.
- The tongue often displays “notching” when it is protruded.

Neonatal Concerns

- Restricted movement of the tongue caused by ankyloglossia can cause feeding difficulties in the newborn.
- Feeding difficulties can include inadequate milk intake, infant weight loss, and sore nipples.
Prevalence

- Meaningful prevalence studies on ankyloglossia are not available.
- 0.2 percent to 2 percent (Catlin, 1971)

Family History

- Tongue-tie is believed to be hereditary.

Medical Controversy

- Today many medical practitioners are not in favor of surgically correcting tongue-tie.
- Some medical texts state that ankyloglossia is of no known functional significance, and that no difficulty in sucking or swallowing occurs (Avery, 1989; Sato, 1983)
- When surgery is recommended it is usually postponed until after age one (Catlin, 1971; Wallace, 1964; Avery, 1989).
“When the lingual frenulum is clipped, relief from nipple pain and a markedly changed ‘feel’ of the infant’s suckling pattern is noted by the mother. In nearly all cases the baby whose previous weight gain was minimal improves.”

Surgical Technique

- Frenotomy is the simplest surgical procedure for correcting partial ankyloglossia.

Case Study

- Male infant (6 days old)
- Chief Complaint: “…is having trouble breastfeeding…not gaining weight…makes “clicking sound” when feeding…difficulty latching on…”
- Normal pregnancy and delivery
Treatment and Follow-up

- Treatment: lingual frenotomy
- Immediate postop: mother breastfed infant and said the "clicking" sound was gone. Infant seemed to latch on better.
- 24 hours post-op: patient is doing fine – has had several good feedings
- 72 hours post-op: patient feeding better – has been gaining weight

Considering the Extraction of Severely Decayed First Permanent Molars

“When permanent first molars are severely decayed but restorable, and when restoration of the affected teeth will leave them with a questionable prognosis, extraction of these teeth should be considered.”
Wilkinson A: The early extraction of the first permanent molar as the best method of preserving the dentition as a whole. Dental Record 64:1-8, 1948.

• "Decrowding" the mouth is essential in every case.
• Extraction of the 1st permanent molars gives a better result than any other form of decrowding.
• Removal of these teeth results in 70% of cases in complete absence of caries.
• The best age at which to extract is from 8 to 9.


• There is a reduction in the incidence of decay and the general periodontal condition is improved.
• The removal of these teeth is too often essential in the course of routine clinic treatment, and more harm is caused by the failure to remove the opposing tooth, than by extracting all four.

Factors to consider…

• Long term prognosis of the restored teeth
• Dental age of the patient
• Type of malocclusion
• Degree of crowding present
• Overall oral health status
• Financial considerations
• Medical status
• Emotional status
In assessing the long term prognosis of severely affected teeth, you need to consider the potential failure rates of each procedure provided.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Estimated Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apexification</td>
<td>80%</td>
</tr>
<tr>
<td>Root canal</td>
<td>85%</td>
</tr>
<tr>
<td>Stainless steel crown</td>
<td>95%</td>
</tr>
<tr>
<td>Post and core</td>
<td>90%</td>
</tr>
</tbody>
</table>

The total risk factor takes into account the accumulated risk

\[(.8) (.85) (.95) (.9) = 58\% \text{ chance of long term success for 1 tooth}\]

For 2 teeth = 33.6%
For 3 teeth = 19.5%
For 4 teeth = 11.3%


- **Purpose**
  - To assess success of root canal treatment in permanent molars of children and adolescents

- **Methods**
  - 28 endodontically treated 1st permanent molars in 18 patients aged 8-16 years were examined
  - Time elapsed since treatment = 24-77 months (mean 45 mo.)

- Parameters examined
  - Sensitivity to percussion
  - Mobility
  - Quality of restoration
  - Periapical Lesions
  - External root resorption
  - Furcation involvement
  - Interproximal bone resorption

- Results
  - Only 10 (36%) demonstrated complete success

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**Success Rate of First Molar Root Canals**

<table>
<thead>
<tr>
<th>Author</th>
<th>Success Rate</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heling and Tamshe</td>
<td>70%</td>
<td>1970</td>
</tr>
<tr>
<td>Selden</td>
<td>94%</td>
<td>1974</td>
</tr>
<tr>
<td>Jokinen, Kotilainen &amp; Poikkeus</td>
<td>53%</td>
<td>1978</td>
</tr>
<tr>
<td>Oliet</td>
<td>89%</td>
<td>1983</td>
</tr>
<tr>
<td>Petersson, Lewin &amp; Hakansson</td>
<td>74%</td>
<td>1989</td>
</tr>
</tbody>
</table>

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Heavily decayed 1st permanent molar

- Unrestorable
  - Extract
- Restorable
  - Prognosis = ??
  - Restorable prognosis - good
  - Restore

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• Early mixed dentition (7-8.5 yrs.)
  – Crowded Class II = delay extractions = temporary restoration
  – Normally related uncrowded = delay extractions = temporary
• Mid-mixed dentition (8.5-10 yrs.)
  – Crowded Class II = delay extractions = temporary restoration
  – Normally related, uncrowded = extract four molars
• Late mixed dentition (10-11.5 yrs.)
  – Crowded Class II = no extraction
  – Normally related uncrowded =
    • Maxillary = extract
    • Mandible = no extraction
• Early permanent dentition (11.5-12.5 yrs.)
  – Crowded Class II = extract
  – Normally related uncrowded = no extraction

First Molar Extraction – Case Study

• 9 yr. 1 mo. female with seizure disorder
• Seen on emergency – deep caries #14 and #30
• Spontaneous pain #30
• Radiographic evidence of third molars
• Class II malocclusion

Treatment Plan

• Extract all four first permanent molars (extractions done age 9 yrs. 3 mo.)
• Orthodontic treatment for class II malocclusion (orthodontic treatment initiated age 9 yrs. 3 mo.)

- Studies cases with early loss of 1-4 first permanent molars – 25 years postextraction
- 82% exhibited “good” results – minimal to no crowding, upright anterior teeth and a spacing frequency not significantly higher than in an untreated sample.
- Reduction in incidence of caries
- No loss of vertical dimension.


- Maxillary first permanent molars can be extracted with relatively reliable closure of space if done before age 12 yrs.
- Mandibular molars are not as predictable – best results obtained when extracted between 9 and 11 yrs., after eruption of permanent lateral incisor, and before eruption of the second molar.


- Removal of the mandibular first molars after age 10 results in open contacts and poor occlusion.
- Maxillary first molars can be extracted as late as 12 years of age with good results.
- Loss of lower first permanent molars before the age of 8 can result in distal drifting and tilting of the second premolars.
First Molar Extraction – Case Study

- 7 yr. 7 mo. health female
- Caries in first permanent molars secondary to enamel hypoplasia
- History of caries in primary dentition
- No evidence of developing third molars
- Developing class II malocclusion

Treatment Plan

- Temporize first permanent molars until evidence of third molars (SSC’s placed age 7)
- Extract all four first permanent molars following verification of thirds (extractions done age 9)
- Refer for orthodontic treatment to correct class II malocclusion (orthodontic treatment started age 12)

Treatment Objective

- Time removal of first permanent molars to maximize the potential for second permanent molars to migrate mesially and take their place
- Third molars (if present) will take the position of second permanent molars
Sports Dentistry Update: Can Athletic Mouth Guards Enhance Performance?

Michael Kanellis, DDS, MS
Associate Dean for Patient Services

Performance Enhancing Mouthwear

Under armour Mouth Guard

- Patterson Dental
- Claims to improve athletic performance

• Purpose –
  – Introduce readers to “a new retail category – performance-enhancing mouth wear and its effect on the body”

• Background Statements –
  – “Scientists are reviewing known phenomena and applying double blind studies with remarkable results”
  – “Their conclusions are forging a new branch of science: craniofacial neurometabolic physiology”


• Stress Response –
  – Teeth clench in response to elevated stress
  – This signals brain to set in motion a series of reactions that lead to elevated levels of cortisol
  – High cortisol levels can limit peripheral vision, decrease metabolism, cause fatigue, reduce muscle-building and suppress the immune system
  – A “properly designed oral appliance can interrupt the fight-or-flight signal by preventing the completion of the clenching mechanism”


• Recommendation –
  – A person needs an oral appliance that prevents teeth from occluding or clenching under stress and halts the body’s preconditioned flight-or-flight reflex
• Purpose –
  – To review the efforts to improve human performance with oral appliances
  – To review the research exploring the science behind these efforts

• Background –
  – "Legend and history support a link between performance enhancement and oral appliances"
  – Roman soldiers put leather straps between their teeth to improve their prowess in battle
  – Native American women would bite on sticks during childbirth to ease delivery
  – "Biting the bullet" during amputations during Civil War

• Conclusion –
  – "The concept of oral appliances affecting human performance is not new"
  – "Mechanisms for performance enhancement are complex and have been poorly understood"
  – "Science has begun to explain more thoroughly the links between oral appliances and enhancement of human performance"

• Purpose –
  – Compare lactate levels following endurance exercise with and without a mouthpiece
  – Compare cross-sectional area of the oropharynx on CT scans with and without a mouthpiece.

• Hypothesis –
  – “There will be increased airway opening and a decrease in lactate levels with the use of a mouthpiece”

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• Methods –
  – Subjects: 18-21 years old, males enrolled in Citadel
  – “Boil and bite” upper mouthpiece with “greater bite opening distal vs. proximal” (EDGE, Bite Tech)
  – CT scan (i-CAT 3D Dental Imaging System) with and without a mouthpiece. Mean oropharynx area measured in each.
  – Two 30 minute runs on the treadmill at 75%-85% of maximum heart rate; lactate levels assessed at 0, 15, and 30 minutes of the run (Accutrend Lactate Analyzer)

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• Controls
  – “Participants were randomly assigned a mouthpiece during each running trial…”
  – “Participants… were required to refrain from exercising the day before and the day of testing”

• Results
  – Significant increase in mean width value of the oropharynx with vs. without the mouthpiece (p=0.29)
  – "the difference in lactate levels from pre- to post-exercise was lowered with the mouthpiece vs. without the mouthpiece, though not at the level of significance"


• Purpose –
  – To determine if there were improvements in auditory and visual reaction time with the use of a boil and bite mouthpiece.
• Hypothesis –
  – "By improving TMJ positioning and improving blood flow in the area of the TMJ, an oral device should be able to improve auditory and visual reaction time"

*Assistant Professor, Dept. Health, The Citadel
**ACSM Health and Fitness Specialist, the Boeing Company


• Methods –
  – Subjects: 18-21 years old, males enrolled in Citadel
  – BiOPAC Systems equipment used to gauge auditory reaction time
  – Visual test used MS-DOS-based Motor Learning Activity Software System
  – Participants (n=34 for auditory test; n= 13 for visual test) completed trials with and without a mouthpiece (EDGE boil and bite).

- Results –
  - Auditory test: participants performed significantly better with the mouthpiece ($p = .004$)
  - Visual test: participants performed “slightly better with the mouthpiece” ($p = .681$)


- Purpose –
  - Literature Review
- Conclusion –
  - “Broad claims that such devices prevent concussion remain unsupported”
  - “Any claim that the device has some function even when the mandible is not the point of load should be discounted by the knowledgeable practitioner”

Performance-Enhancing Mouthguards: Effect on Strength in Adolescent Male Athletes

Myers CR*, Dawson DV, Kummet C, Shaull K, Walker J, Stayton RL, Kanellis MJ (Department of Pediatric Dentistry, University of Iowa College of Dentistry, Iowa City, IA)

- Purpose
  - The purpose of this study was to determine whether performance-enhancing mouthguards can increase strength in adolescent male athletes.
Methods

Forty-two high school male athletes participating in a strength program at an area high school were recruited and enrolled in the study. Prior to the intervention a one-repetition maximum bench press was established for each participant. Alginate impressions were made for each subject and dental occlusion (overbite and overjet) were recorded prior to mouthguard fabrication. Subjects were randomly assigned to one of three treatment groups:

1) No mouthguard
2) Custom-fit mouthguard (ProForm)
3) UnderArmour performance-enhancing Mouthguard

Subjects in each group completed a strength test consisting of bench-pressing 60% of their one-repetition maximum as many times as possible until exhaustion.

Subjects were blinded to their assigned treatment group until immediately prior to the trial.

Subjects in groups 2 and 3 were blinded as to which mouthguard they were wearing by shielding their vision during mouthguard placement.

Results

The mean number of bench press repetitions across groups was 20.4 (range = 8-30).

There was no significant difference in the mean number of bench-press repetitions between groups (P=.188).

No covariates in the model were significant including: grade in school (P=.840), one repetition maximum (P=.056), or occlusion (P=.470).

Conclusion

The results of this study provide no evidence that performance-enhancing mouthguards can increase strength in adolescent male athletes.
Revisiting the Cvek Pulpotomy: 
Contemporary Treatment Considerations

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Michael J. Kanellis, DDS, MS
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University of Iowa

Epidemiology of Dental Trauma

- 22% of children suffer trauma to the permanent dentition by age 14.
- The prevalence of permanent tooth trauma before age 18 ranges from 5-33%.
- 71% of trauma cases involve the maxillary central incisors.
- Males > females (2:1) with a notable increase in trauma seen in boys 7-10 years of age.

Crown Fracture

- Uncomplicated (No pulp exposure)
  Treatment:
  - Rule out root fracture
  - Restore with Composite
Crown Fracture

- Complicated (Pulp exposure present)
  Treatment:
  - Rule out root fracture
  - Partial Pulpotomy (Cvek)

Partial Pulpotomy - Cvek

- Criteria
  - permanent dentition
  - no signs or symptoms of irreversible pulpitis:
    1. Pain
    2. Swelling
    3. Tenderness to percussion
    4. Periradicular pathology
  - Can also be indicated for carious exposure if meets other criteria

Traditional Cvek Pulpotomy

- Partial pulpotomy – removal of the outer layer of damaged and hyperemic tissue in exposed pulps.
- Objective - maintain pulp vitality by applying wound dressing that enables pulp healing and dentin formation
- Calcium hydroxide traditionally used due caustic effect and capacity to induce dentinal bridge.
- Glass ionomer used as sealing material.
Traditional Cvek Pulpotomy

- Used for small, medium and large pulpal exposures.

Contemporary Treatment Considerations

- Formation of dentinal bridge is not a requirement for successful treatment of partial pulpotomies (Schuurs et al, 2000).
Contemporary Treatment Considerations

- Exposed pulps are capable of healing and dentin bridge formation, regardless of the capping material used, provided proper hemorrhage control and prevention of microleakage leading to recurring inflammation and necrosis (Cox et al, 1987; Snuggs et al, 1993; Cox et al, 1998; Tarim et al, 1998; Hafez et al, 2000).

Contemporary Treatment Considerations

- Concerns:
  - Calcium Hydroxide does not provide long-term protection against microleakage, because it dissolves within 1-2 years, and tunnel defects in the majority of the dentinal bridges allow pulp inflammation and necrosis (Schuurs et al, 2000).

Contemporary Treatment Considerations

- Concerns:
  - It has been speculated that the migration of dissolved Ca(OH)₂ particles into the underlying pulp causes a continued chronic irritation of defense cells fibroblasts, resulting in eventual pulpal necrosis (Cox et al, 1999).
Contemporary Treatment Considerations

- Concerns:
  - Although it has been recognized for many years that various formulations of Ca(OH)$_2$ may promote dentin bridging, use has also been associated with both internal and external resorption (Greeley, 1981).

Contemporary Treatment Considerations

- Concerns:
  - Histologic studies have reported adverse pulpal reaction to Ca(OH)$_2$, including: slight fibrosis; intracanal calcification; internal resorption; complete mummification; and calcific obturation (Ibrahim et al, 1970).

Contemporary Treatment Considerations

- "Out" with calcium hydroxide

- "In" with sodium hypochlorite
Contemporary Treatment Considerations

- Hemorrhage control is critical to developing an integral hybridized seal to eliminate bacterial microleakage.
- Sodium hypochlorite and adhesive systems are nonirritating to pulpotomized tissues for extended periods of time, producing new dentin bridges (Hafez et al, 2000).

Contemporary Treatment Considerations

- 3% Sodium Hypochlorite (Hafez, 2002):
  - Advantages:
  - Disinfection
  - Removal of the clot (chemical amputation)
  - Stops hemorrhage that compromises pulp healing
  - Removes operative debris chips, which compromises healing and bridging mechanisms
  - Not toxic to pulpal tissue.

Contemporary Cvek Technique Using 3% NaOCL

- Criteria –
  - Same as with calcium hydroxide
  - Permanent teeth with no signs or symptoms of irreversible pulpitis including: 1) no history of spontaneous pain; 2) no swelling; 3) no tenderness to percussion; and 4) no radiographic evidence of periradicular pathology.
  - Can also be indicated for carious exposure if meets criteria
Steps of Contemporary Cvek Technique
Using 3% NaOCL

1. Anesthesia followed by rubber dam.

2. Remove 2 mm coronal pulp using a sterile or new 330 or round diamond bur on a high speed with saline or sterile water irrigation.

3. Place cotton pellet soaked with sodium hypochlorite for 30-60 seconds (do not exert pressure on the pellet).
Steps of Contemporary Cvek Technique Using 3% NaOCL

4. Remove cotton pellet and excess moisture with high speed suction (if hemorrhage not under control, repeat steps 3 & 4).

5. Place flowable glass ionomer product (Fuji II, Fuji IX, Vitrebond) on exposure area (do not compress material) and light cure for 20 seconds.

6. Etch and place composite for final restoration.
Questions?

INTENTIONAL REPLANTATION

Intentional Replantation

• Personal experience
  – Muscatine Iowa – patient’s story
  – Iowa City free clinic – patient scenario
  – Conversation with Dr. Rick Walton
  – Experience of Dr. Jyoti Chowdhury
Comparison – Avulsion Therapy vs. Intentional Replantation

• "Boy on the bike" analogy – what are the chances for success?
• Controlled environment for IR – Hank’s balanced salt solution

Clinical Implications

• Classic – retreatment of endodontically treated 2nd molars
• Pediatric Dentistry applications –
  – Patient who can’t afford traditional RCT
  – GA case/behavior management where extraction is likely other option


• "Intentional replantation is the purposeful extraction and reinsertion of an endodontically treated tooth into its socket to correct an apparent clinical or radiographic endodontic failure."
• "IR should not be considered an experimental procedure."
**Procedure**

1. A nonsteroidal anti-inflammatory (NSAID) should be administered prior to the extraction to minimize the inflammatory response and increase patient comfort postoperatively.
2. Patients should rinse with 0.12% chlorhexidine prior to extraction to reduce incidence of bacteremia.
3. Tooth should be extracted with minimal manipulation of the socket, and minimal contact with the root surface. No elevation. Ideally beaks of forceps should only contact tooth coronal to cementoenamel junction.
4. Tooth should be immediately placed in Hank’s Balanced Salt Solution to maintain viability of connective tissue cells.
5. Approximately 1/3 of the root should be amputated with a sterile bur in a high speed handpiece.
6. Obtrate with MTA, amalgam, or Glass ionomer
7. Replant and compress cortical plates back to their original position using finger pressure.
8. Splinting is usually not required.
9. Antibiotics are not usually prescribed.

**BEHAVIOR MANAGEMENT**
Becoming the Alpha Dog in Your Own Home

Becoming the Alpha Dog in Your Own Home

All for a look at “Father Knows Best,” television has been an unintentional teaching aid for parents. To watch Mike and Carol Brady labor tirelessly to boost Jan’s wobbly self-esteem, or Cliff and Clair Huxtable’s Cyril Huxtable’s rebellious impulses with sternness and wisdom, was to learn how to raise happy, healthy children. After all those hours in front of the set, you couldn’t help but absorb the lessons.

“...deal with the philosophy of the Dog Whisperer,” she hast added. Brenna Heiss, a child therapist in Palm Harbor, Fla., who writes an advice blog, The Kid Consultant, adopted Mr. Miller’s central idea, that dogs take their cues from their masters, and misbehave only when the masters fail to carry themselves, in body language and tone of voice, like pack leaders. In a post, “Raising Kids: Wisdom From the Dog Whisperer,” she wrote, “When we present nervous, angry or scared energy in front of our kids, they pick up on those emotions.”

Allana Pearson, author of the novel “I Don’t Know How She Does It,” which explored the stresses of modern motherhood, explained how parents would naturally envy the authority of dog trainers. “My generation got itself in a mess about parenting,” she wrote by e-mail. “We thought that obedience was the enemy of love. We didn’t want the kids to be afraid of us, but after a while we found ourselves wondering: do we have to do what they say the whole time?”
Questions and Observations

• Many dog owners do not know how to train their dog
• The result can be an insecure, fearful, hostile, misbehaving dog
• Dog owners know they have a problem and ask the dog whisperer for help

Questions and Observations

• Cesar separates the dog from their owner and demands appropriate behavior.
• Cesar’s training results in a dog that is more secure, more relaxed, more friendly, more confident, and more enjoyable to be around.

Questions and Observations

• Cesar is never angry, loud, or threatening
• Cesar gets something done the first session
• “exercise, discipline, affection”
On leadership

• In the absence of a 100 percent leader, the dog – even a submissive one – will seek to fill what they see as a vacant role.
• The dog will ignore the owner or act out in other ways.
• This is the beginning of giving control to them.

On leadership

• The pack leader doesn’t project emotional or nervous energy and neither should you.
• Dogs look to the pack leader to set rules, boundaries and limitations.
• If you don’t set rules, boundaries and limitations in calm, assertive ways, your dog will not respect you.

Behavior Management

“How do you get your patients to do what you want them to do?”
Thank you!