1

2 □ Oral Management for the Head and Neck Cancer Patients

Management of Sleep Apnea for the Dental Professionals

Dental Considerations for the Methamphetamine Users

South Carolina Dental Hygiene Association Symposium 2013

3

4 □ BSAE – Wichita State University 1990

DDS – University of Missouri at Kansas City 1995

GPR – University of Nebraska Medical Center 1996

AEGD – University of Minnesota 1997

Prosthodontics Residency – Marquette University 2000

Master of Science in Prosthodontics – 2000

Maxillofacial Prosthodontics Fellowship – Memorial Sloan-Kettering Cancer Center 2001

Assistant Professor of Prosthodontics – UT at Memphis 2001-2003

Prosthodontist – New Mexico Health Care System VA Center 2003 - 2007

Prosthodontist – WJB Dorn Health Care System VA Center 2007 - present

5 □ Oral Management for the Head and Neck Cancer Patients
Overview about Head and Neck Cancer.

Oral Complications.

Oral Management.

Oral Rehabilitation.

What month is Oral Cancer Awareness Month?

Oral Cancer Facts

34,000 Americans diagnosed with oral or oral pharyngeal cancer each year.

8,000 deaths – one person per hour.

People over age of 40.

History of tobacco and alcohol abuse – at least 75% are tobacco users.

15 times greater risk of developing OC if smoking and drinking.

Genetics of Oral Cancer

Neoplastic transformation.

– Mutations in gene that control cell behaviors.

Mutated genes resulted in uncontrollable cell growth.

Unable to repair itself or self destruct or die (apoptosis).

Passing on the mutations to all of its progeny when it divides.
10 **Risk Factors**
* Smoking.
  *
* Alcohol.
  *
* Age.
  *
* Persistent viral infections such as HPV.
  *
* Lifestyle.
  *

11 **Signs and Symptoms**
* White or red patches in the mouth that do not resolve in 14 days.
  *
* Lumps or masses inside the oral cavity or neck.
  *
* Pain or difficulty in swallowing.
  *
* Hoarseness.
  *
* Numbness in the oral facial region.
  *
* Unilateral persistent earache.
  *

12 **Common Sites of Oral Cancer**
1
  *
  *
2 * Lips
  *
  * Tongue and floor of the mouth.
  *
  * Between the lower lip and cheek.
  *
  * The base of the tongue.
  *
  * Oropharynx.
  *
  * Pillars of the tonsils.
The Role of Health Professionals
★ Comprehensive oral cancer screening.
    ★ Visual examination of soft tissues in the mouth.
      – Extension of the tongue.
      – Palpation of the floor of the mouth.
      – Lymph node examination of the neck.
      – Make a habit on routine dental/medical exam.

Treatment of Oral Cancer
★ A multi-disciplinary approach.
    ★ Surgeon (Medical / Dental).
      – Radiation oncologist.
      – Nutritionist.
      – Rehabilitation specialist (MP).
      – Chemotherapy / Radiation / Surgery.

Dental Oncology.
★ Maxillofacial Prosthodontics.
    – A sub specialty of Prosthodontics.

The effects of surgery are immediately obvious, while those of radiation therapy continue the patient’s entire life.

Considerations for the Irradiated Patients
★ Oral Mucous Membranes
    ★ Taste and Olfaction
    ★ Edema and Trismus
    ★ Hard and soft tissue
* Salivary Glands
* Periodontium
* Oral Flora

19 **Oral Membranes**
* Radiation effects appear early in the course of radiotherapy.
* Erythema leads to extensive ulceration of the membranes.
* Pain and dysphasia are common.
* Mucositis after 2 to 3 weeks - reaches a peak at the tumor site.

  - Varies from patient to patient.

20 **Systems for Rating Mucositis**
  Score 0 - None
  *
  Score 1 - Painless ulcers, erythema or mild soreness.
  *
  Score 2 - Painful erythema, edema or ulcers.
  Patient can eat solids.

  Score 3 - Same as 2 but patient cannot eat solids.

  Score 4 - Requires feeding tube.

21 **Taste**
* Taste acuity is readily affected by cancercidal doses of radiation.

* Taste buds show sign of degeneration and atrophy at 1000cGy and at cancercidal levels of radiation, the architecture is almost obliterated.
  * J Oral Med. 38:14;1983

* Alterations in taste seen in second week and continue throughout the course of treatment.

* Reduction in saliva appears to decrease the number of taste buds affecting taste acuity.
  * Annal Int Med. 76:375;1972

22 **Olfaction**
★ Olfactory loss in patients irradiated for head and neck has not been well studied.

★ Olfactory epithelium is not included within the radiation field of most tumors - the sense of smell is less affected.

★ One study showed that none of the 12 patients have achieve complete recovery six months after treatment.
  

23  Edema
★ Most prominent in the submental areas following irradiation of lateral tongue or F.O.M carcinoma.

★ Apparent during the early post radiation period.

★ Compromises tongue mobility, impairing salivary control and speech articulation.

★ Likely due to lymphatic and venous obstruction.

24  Trismus
★ Most noticeable following treatment of nasopharyngeal, palatal, parotid and nasal sinus tumors that TMJ and muscles of mastication are in the radiation field.
★
★ May not be immediately apparent but occurs progressively as mucositis subsides.

25  Soft Tissue Necrosis
★ A serious complication because it often leads to osteoradionecrosis.

★ Diminished blood supply and fibrosis of the radiated tissue decrease the ability of the tissue to heal and ward off infection.
★
★ It is easier to prevent soft tissue necrosis than to treat it.

– Irradiated tissues must be protected from thermal, chemical and mechanical trauma.

26  Hard Tissue Necrosis
★ Bone is 1.8 times as dense as soft tissue, absorbing a larger proportion of radiation than soft tissue.
★
★ The mandible absorbed more radiation than the maxilla due to its increased density and reduced vascularity - higher incidence of osteoradionecrosis.

27  The exact incidence of ORN is unknown.

★ The reported incidence ranges from 0.8% to 37% with many older series reported approximately 10% to 15%.

J Prosthet Dent 58:78-82, 1987
Salivary Glands

* Parotid
  - Serous.
  - Largest producer.

* Submandibular
  - Mixed serous and mucous.

* Sublingual
  - Mucous.

* All three account for 90% of salivary flow.

* Minor salivary glands account for 10%.

Serous acinar cells appear more readily affected by radiation than acinar cells.

This is due to more rapid turn over rate and more profuse vasculature compared to mucous acinar cells.

Secretary duct system remains largely intact after the completion of radiation treatment.

Radiat Res. 97: 386;1984

When all the major salivary glands are within the radiation beam, average salivary output can be reduced from 86% to 93%.

J Surg Oncol. 48:81;1991

King et al reported that 68% of the head and neck patients had a decreased quantity of the saliva by the second week of treatment and thicker saliva by the third week.

Onc Nurs Forum 12:55-61, 1985

XEROSTOMIA          POOR OH          CARIES

Radiation Dermatitis

* Dermatitis resolves by itself but fibrosis of the skin often develops.
Radiated skin is smooth to palpation and the field can be estimated by noting hair loss and color changes.

**Periodontium**

- Periodontal ligament - a specific network of fibers become disoriented and thicken.

- Decreased cellularity and vascularity.

- Many ORNs are preceded by periodontal infection associated with teeth in the primary beam of radiation.

  *Head and Neck Surg, 6:819, 1984*

- Periodontal surgery should be considered with caution.

**Oral Flora**

- Significant increase have been noted in the number of Streptococcus mutans and Lactobacillus and Actinomyces population.

- Changes in oral flora are long lasting and secondary to the radiation induced xerostomia.

- Amount of plaque per unit area increased as xerostomia became more profound.

**Oral Management**

**Management of Mucositis**

- Avoid tobacco, alcohol, and caffeine.

- Diet consisting of soft, bland, non-irritating foods and beverages.

- Use ultra soft toothbrush with baking soda.

- Use applicable mouthrinses but do not use if bleeding or clotting is noted.

**Mouthrinses for Mucositis**

- Neutral rinse - .25 tsp salt, .25 tsp baking soda, 1.0 qt water.

- Saline - .5 tsp salt and 8.0 oz water.
* GUM (chlorohexidine gluconate).
* Hydrogen Peroxide – dilute 1:4 with water.

**Oral Hygiene Modifications**
* Clean the teeth every four hours (PATIENT).
* Use extra soft toothbrushes or sponges.
* Soften the bristles in warm water before use.
* Dip in Peridex mouthwash if blood count is low.
* Use interdental brushes dipped in Peridex if blood count is low.

* Use oral irrigators at lowest settings.
* Rinse mouth several times daily with a solution of baking soda and one cup of warm water – very important after vomiting.
* Before bed, rinse with alcohol-free mouthwash.
* At bedtime, use custom fluoride trays with neutral sodium fluoride gel.
* Have teeth cleaned every eight weeks during treatment as blood count allows.
* Chew Xylitol gum to help prevent caries.

**Pain Management**
* Reduction of inflammation and pain:
  – Rx: Dexametasone (Decadron) elixir 0.5 mg/5 ml.
    – Disp: 100 ml. Sig: Hold 5 ml (1 teaspoon) in the mouth for 5 minutes and spit out 4 or 5 times a day.
  – Crushed ice in the mouth to numb the oral mucosa, popsicles and ice cream can be used as well for that purpose.
    – Rx: Diphenhydramine HCL (Benadryl elixir) or Promethazene 12.5 mg/5ml 50/50 with Kaopectate (or Malox).
    – Disp: 8 oz (or 200 ml). Sig: 1-2 tsp q2h rinse and spit out..
– Dyclonine HCL 0.5% 1 oz can be added to the above prescription to enhance anesthetic power.

Rx: Dyclone (Dyclonine HCL 0.5% or 1.0%). Disp: 1 oz bottle.
– Sig: Rinse with 1 tsp. full for 2 minutes and spit out before each meal.
– Note: topical anesthetics reduce the gag reflex so patients must be advised to take caution when eating or drinking in order to avoid respiratory compromise.

Anti fungal management:

Rx: Clotrimazole (Mycelex) troches 10mg. Disp: 50 troches.
– Sig: Dissolve 1 troche in mouth 5 times a day.
– Rx: Nystatin pastilles, 200,000 units.
– Disp: 50 pastilles. Sig: Dissolve 1 pastille in mouth 5 times a day.
– Rx: Diflucan (Fluconazole) tablets 100 mg.
– Disp: 15 tablets.
– Sig: First day 2 tablets then, 1 tablet per day.

Management of Dysgeusia

Consultation with dietician or nutritionist is needed.

Sauces or gravies can enhance favors or disguises unappetizing flavors.

Bacon, ham, onion or herbs can add flavor.

Lemonades or oranges.

Serve food at room temperature and turning on kitchen fan.

Serve food at colder temperature.

Use plastic utensils.
Management of Xerostomia

★ Patient education is crucial!
★
★ Drink water and carry it at all times.
★
★ Avoid cariogenic beverages that are acidic or with sugar content.
★
★ Use sugar-free candies or lozenges.
★
★ Use commercially available saliva substitute.
★
★
★

Brush teeth after EVERY meal.
★ Use Fluoride via brushings or custom tray.
★
★ Coat oral tissues with oral moisturizing gel at bed time.
★
★ Maintain three month hygiene recall.

What is the best saliva substitute?

Osteoradionecrosis

★ ORN is a condition of nonvital bone in a site of radiation injury.
★
★ ORN can be spontaneous but commonly resulted from tissue injury.
★
★ Grades 1 to 3.

Frequency of ORN

★ Rare in patients with less than 60 Gy.
★
★ Incidence around 3 – 8%.
★
★ The incidence has decreased over three decades.
★
★ Over 65 Gy places patients at high risk.
★
★

Etiology

★ Direct trauma – 84%.
Clinical Presentation of ORN

- Pain.
- Trismus.
- Swelling.
- Exposed bone.
- Pathological fracture.
- Malocclusion.

Management of ORN

Stage 1

- 30 HBO dives at 2.4 atmosphere for 90 minutes.
  - Continue treatments to a total of 40 dives.

Stage 2

- For patients who do not respond to Stage 1.
  - Perform sequestrectomy with primary wound closure followed by continued HBO to a total of 40 dives.

Stage 3

- Perform mandibular resection, wound closure and follow by an additional 10 postoperative dives.
Prosthodontic Considerations

- Tissue management is extremely important!
- Utmost care is taken to ensure:
  - No over extension of denture borders.
  - If not sure, aim for short borders.
  - Escape holes in impression tray.
  - Light body impression material.
- Frequent recalls.
- Patient cooperation.

Management of Trismus

Skin Care
- Use electric shaver.
- No pre shave or after shave product.
  - Irritates the skin.
- Use mild soap.
- Cream is contraindicated.

Dental Clearance
- A must for Head and Neck cancer patients!
  - Patient education – what to expect?
  - Allow the dental team to monitor the patients during treatment.
  - Prevent post op complications!
Pre-Radiation Examination

- Patient education !!!
  - Advise the patients on what to expect but do NOT alarm the patient!
- Disease control and prevention.
  - Address potential dental problems that may occur during radiation therapy.
  - Initiate a prevention plan.
- Determine if radiation shield should be fabricated.

Radiation Shield

- Indicated for patients with multiple alloy restorations.
  - Soft mouth guard material.
  - Free of sharp edges!

Pre-Radiotherapy Extractions

- Caries (non-restorable).
  - Active periodontitis.
  - Partial impaction or incomplete eruption.
  - Inadequate plaque control.

Healing time should be allowed after extraction before radiation therapy can be initiated.
  - 7 to 10 days post extraction.
  - Time may vary.
Stents must be checked to ensure comfort to the patient.

- Remove sharp edges.
- No heavy mucosa contact.

**During Radiation Examination**

- Patients should be seen every two weeks into therapy.
  - Checking the status of oral condition and patient’s compliance.
  - Modify regimen as needed.
  - Address any dental complications may may occur during this time.
    - Mucositis and Fungal infection.
    - Denture sore.
  - Provide understanding and support.
  - Encourage the patient to keep up with oral intake as much as possible.

**After Radiation Examination**

- Patients should be seen 1 to 2 weeks after completion of therapy.
  - Reinforce fluoride therapy and immaculate oral hygiene.
    - Check on the supply Fl and provide refills as needed.
    - Remind the patients the risks of any oral and periodontal surgery procedures.
  - Provide the patient with contact information.
  - Provide a regular recall regimen at your office.
    - 1 month post completion of therapy.

**FREQUENTLY ASKED QUESTIONS**

- Will my mouth be dry for the rest of my life?
- Will my taste come back and if so, how long?
Can I see my regular dentist at my home town?

Can I have regular cleaning and fillings, crowns, dentures?

Can I have extractions?

How soon can I have a cleaning?

Do I have to come and see you for all my dental needs?

Must I use the trismus appliance?

Dental Reconstruction

Maxillofacial Prosthodontics

Dedicated to the prosthetic correction and management of maxillofacial defects acquired from surgical ablation or traumatic injuries, congenital-birth defects and alterations in growth and development.

Maxillofacial Prosthodontics

Extra and intraoral prosthesis.

- Congenital defects.
- Trauma.
- Cancer.

A sub-specialty of prosthodontics.

Residency in prosthodontics/fellowship in MP.

At major cancer centers with rehabilitative teaching programs, it is not uncommon for the surgically resected head and neck patient to require 20-25 appointments for appropriate rehabilitative care in a 1-year period”.

www.oralcancerfoundation.org

Most Common Procedures

Obturators.

- Surgical.
- Interim.
- Definitive.
* Speech prosthesis.
* Palatal lift.
* Palatal drop.
* Speech bulb.
* Prosthesis for mandibulectomy patients.
* Facial prosthesis.

Communication between the surgeon and the dentist is very important!
* Extent of the disease.
* Anticipated post operative defects.
* Anticipated healing time.
* Treatment time line.
* Post operative care issues.
* Anticipated treatment option.
* Obtaining oral or maxillofacial impressions.

Reconstructive Prostheses
* Surgical Obturator.
* Interim Obturator.
* Definitive Obturator.

Surgical Obturator

Two accurate impressions of the area of surgery.

Margin of resection outlined on cast.

Who will follow up with the patient?
Don’t get stuck in the middle!

Surgical Obturator

★ Support the surgical packing placed in the resection cavity created by the removal of the walls of the maxillary sinus.

★ Restore the continuity of the hard palate.

★ Will be removed after 5 to 7 days.

Interim Obturator

★ Delivered when the surgical obturator is removed.

★ Requires weekly adjustment as the healing process taking place.

★ Modified with a soft dental liner to conform to the periphery of the surgical site.

★ Will be converted to a hard acrylic after approximately 1 month.

A must have item !

Definitive Obturator

★ Following complete tissue healing - months or more.
★ Metal framework and acrylic bulb.
★ Exercise the same care as conventional dentures.
★ Solid or hollow bulb?
★ Hole or no hole?

FACIAL PROSTHESIS

Wanna to be an artist?

★ Maxillofacial Prosthodontist.
★ Maxillofacial Prosthetist.
★ Anyone who wants to learn....

History

★ 2nd Century A.D - China prostheses made of wax to conceal mutilation
How does a dental provider save a life?

Management of Sleep Apnea for the Dental Professionals

Objectives

★ Know the different types of Sleep Apnea.
★ Know available treatment options.
★ Dentist’s role in treating Sleep Apnea.
★ Learn how to make an oral appliance.
★ Literature review.

What is Sleep Apnea?

★ Breathing disorder characterized by brief interruptions of breathing during sleep.
★
Common in adults but rare in children.

- Affecting over 18 million people in the USA.
- The Obstructive Sleep Apnea (OSA) is most common.
  - 2% and 4% for women and men over 35 years old.

- Apnea.
  - Occurs when a person stops breathing for 10 seconds or more.
  - At least 4% reduction of oxygen saturation.
  - Occurs during sleep.
  - Measured during a two-hour period.
  - A.I (Apnea Index) = Number of apneas/hour.

- Hypopnea.
  - Abnormally shallow in breathing (under breathing).
  - 4% or greater in oxygen desaturation for 10 seconds or longer.
  - Not as severe as apnea.
  - Disrupts the level of sleep.
  - Hypopnea Index (H.I)

**Apnea-Hypopnea Index (AHI)**

- Index of severity that combines apneas and hypopneas.
- Numbers of apneas and hypopneas / numbers of sleep hours.
- AHI Rating (American Academy of Sleep Medicine).
  - Less than 5 – Normal
  - 5 to 15 – Mild
–
– 15 to 30 – Moderate
–
– Greater than 30 - Severe

### Respiratory Disturbance Index
*Called the “RDI” index.*
*Consists of AH episodes as well as other respiratory events.*
– Respiratory Effort Related Arousal (RERA).

### Multiple Sleep Latency Test (MSLT).
– Normal is 10 minutes to fall asleep.
– Excessive sleepiness is 5 minutes or less.
–
– Maintenance of Wakefulness Test (MWT).
– 4 forty minutes sessions – 2 hours apart.
– Normal is awake for 4 sessions.
–

### Complications from SA
Morning headache.
Excessive daytime sleepiness.
Associated with high blood pressure, heart attack and stroke.
Decreased job performance.
Learning and memory difficulties.
Sudden Infant Death Syndrome.

### Sleep Apnea Types
Central Sleep Apnea – 0.4%* (*Mayo Clinic Study *)

– Brain fails to send signals to muscles to initiate breathing.
– Apneas lasting more than 20 seconds.
• Change in heart rates, reduction blood oxygen and hypotonia.
  * Obstructive Sleep Apnea – 84%*
  * Air obstruction due to anatomy.
  * 80 to 90% of patients meeting the criteria of moderate OSA remained undiagnosed (Young et al. 1993).
  * Most common.
  * Mixed Sleep Apnea – 15%*
  * Combination of Central and Obstructive.

### Four Components of OSA
- Airway collapses.
- Unsuccessful attempt to take a breath.
- Oxygen in the blood drops.
- The brain signals the body to wake up.

### Who gets OSA?
- Occur in all age groups.
- More commonly in men.
- 1 in 5 adult Americans have at least mild OSA.
  
  * Obstructive sleep apnea: implications for cardiac and vascular disease. JAMA 2003; 209 (14):1906-14
- Overweight, alcohol abuser.
- Physical abnormality in the nose, throat and upper airway.
- Genetic basis.

### Risk Factors
- More commonly for men.
- Worsens in severity with obesity.
- Cardiac patients – 30-50%.
- Stroke patients – 60%.
- African-Americans – 2.5 times than Caucasians.
- Use of alcohol.

### Facts about Snoring and OSA
- An estimated 30 million (1/8 people) snore.
- Approximately 18 million people suffered from sleep apnea.
  - 28% of men over 65 years.
- Up to 50% of patients have HBP.
- Risk for heart attack and stroke may increase in those with SA.
- Snoring is improved and often eliminated in almost 100% of patients who use OAs.
- Each year, sleep disorders add an estimated 15.9 billion to the NHCB.

**National Sleep Foundation, American Sleep Apnea Association and American Academy of Sleep Medicine**

### How serious is OSA?
- “There is strong association between sleep apnea, as measured by the apnea-hypopnea index, and the risk of traffic accidents”.


- In the USA, each year, there are 310,000 obstructive sleep apnea related collisions causing:
  - 1400 fatalities.
  - 15.9 billions in costs.

**Treatments for CSA**
- Treatment of the medical conditions.
- Reduction of opioid medications.
- Supplemental oxygen.
- Medications to stimulate breathing – Acetazolamide.
- Continuous Positive Pressure Therapy.

**Treatment for MSA**
- Combination of CSA and OSA.
- Medications, CPAP and Oral Appliance therapy.

**Treatments for Obstructive Sleep Apnea**
- Positional therapy.
- Medications.
- Behavioral therapy.
- Positive pressure therapy.
- Surgical therapy.
- Others.
- Oral appliances.

**Positional Therapy**
- Applicable in mild cases.
- Sleeping on the side.
  - Use of tennis balls sewed together and place on the back of the pajamas.
  - Use of pillow to raise the head.

**Medications**
- No effective drug based treatment that have FDA approval.
  - Clinical trials of Mirtazapine.
Behavioral Therapy

- Avoidance of alcohol, sleeping pills.
- Maintain ideal weight.
- Effective in mild cases.

Positive Pressure Therapy

- Continuous Positive Airway Pressure (CPAP).
- Auto-titration.
- Bi-level Positive Airway Pressure.

CPAP

- A nasal or facial mask to be worn at night while sleeping.
- The mask is connected to a compressor.
- The compressor sends air under pressure into the mask and imparts a positive pressure into the airway – keeping it from collapsing.
- A most common form of positive airway therapy.

Bi-level Positive Airway Pressure

- A variation of CPAP.
- Reduces the pressure when patient exhales.
- Electronic circuitry to monitor the patient’s breathing.

Auto - Titration

- Designed to provide the minimum pressure needed.
"Smart CPAP" machine.

Machine adjusts the pressure as the need requires.

Advantages of CPAP

- Safe and reversible.
- Generally well tolerated.
- Simple to use.

Disadvantages of CPAP

- Requires full compliance.
  - 60% to 70% compliance.
- Leakage of air.
- Claustrophobic sensation.
- Noise.
- Dry mouth.
- Bloating.
- Dry skin.

Surgical Options

- Nasal surgery.
  - Tonsillectomy.
  - Reduction of soft palate and uvula (UPPP).
  - Reduction of tongue base.
  - Genioglossus advancement.
  - Hyoid suspension.
  - Maxillomandibular advancement.
  - Pillar procedure.
Others

- No alcohol before bed time.
- Playing wind instruments.
- Acupuncture.

Oral Appliance Therapy

- A small plastic device worn during sleep only.
- Dated back as far as 1900s.
- Becoming popular in late to mid 80s.
- Mechanisms.
  - Tongue repositioning devices.
  - Mandibular repositioning devices.
  - Soft palate lifting devices.

Oral Appliances

- Clear acrylcs that are snapped onto teeth.
- Adjustable mechanism to bring the lower jaw forward and side-to-side movement.
- Simple to fabricate and use.
- Reversible.
- Non invasive.
- Effective for mild to moderate OSA.

Oral Appliance Mechanism

- Mandibular protrusion resulted in significant increase in airway diameter, primary in the oropharyngeal diameter.
50% of maximum protrusion produced a 33% increase in airway caliber.

Maximum protrusion resulted in almost doubling upper airway cross sectional area.

*Am J Respir Crit Care Med 1997;155-1748-54*

**FDA Approved OAs**

*There are over 40 appliances approved for treatment of snoring and OSA.*

*There are many types of designs but similar mechanisms.*

*http://www.dentalsleepmed.org/FDA Clearance.aspx*

**Considerations**

*Before provide the oral appliance, you must know the diagnosis.*

*The dental appliance is most effective for mild to moderate OSA.*

*Consult with patient’s physician before rendering treatment.*

– Do NOT discontinue current intervention without consultation !

*Patients must know the limitations of wearing a dental prosthesis.*

*Patients must accept the potential complications from OAT.*

*Patient must know that the appliance may or may not work and/or other treatment options maybe required.*

**Contraindications**

*Poor oral hygiene.*

*Active TMD.*
Our roles as dentists

- Review “Problem List”.
- Watch out for cardinal signs of OSA.
- Order sleep test through Pulmonary/Respiratory Consults.
- Inquire about treatment modalities and outcome.
- Inform and educate our colleagues about our roles.
- Inform and educate the patients.

Appliance Efficacy

- There were 41 studies with 9 studies that analyzed the success by the severity of OSA (1995-2004).
- Lower success rate for severe OSA averages 14% to 61%.
- Success rate for mild to moderate OSA average 57% to 81%.
- The amount of protrusion varies from 6 to 10 mm (50-70% of maximum).
  - Walker-Engstrom (2003) – 50% versus 75% of maximum protrusion (31% and 52% success rate).

Benefits of MRA treatment include substantial decreases of daytime sleepiness, improvement in work performances, and improved sleep quality.

Arai et al., 1998; Cameron et al., 1998, Mehta et al., 2001; Gotsopoulos et al.,
Five studies evaluated the success rate when there is a difference of OSA in lateral and supine position.

- Three found greater success with OA therapy when there is a difference.
- Two did not find supine dependent OSA was associated with treatment success.
- A higher mass index was associated with lower efficacy.

Adverse Events

Thirty eight articles evaluated more than 1700 patients.

- Commonly reported minor and temporary side effects.
  - TMJ pain.
  - Myofacial pain.
  - Tooth pain.
  - Salivation.
- Frequency from 6% to 68%.
- Side effects associated with OA are minor, temporary and do not significantly affect appliance use.


Compliance

- Compliance with OA varies.
  - 75% to 100% (Lindeman and Bonemark, 2001)
  - 30% to 64% (mail surveyed of 544 patients- Almedia et al, 2005)
★CPAP is more effective than MRAs at improving AHI.
★
★
★Many patients prefer the MRAs to CPAP for long term treatment.
★
★
★MRAs are more effective than UPPP in terms of reducing AHI.
★
★Oral appliances are less effective in patients with severe OSA or higher BMI.

Guidelines Address Use of Oral Appliances for Sleep Apnea (Feb. 2006)
★
The Standard of Practice Committee of the AASM reviewed relevant literature through July 2004.
★
★Evidence was derived from peer-reviewed literature with preference for randomized well designed trials.
★
– The presence or absence of OSA should be determined with a review of symptoms, signs and polysomnographic findings prior to initiation of treatment of OA.
–
– Patients with severe OSA should not be treated with OA as this modality is judged to be less effective than nasal CPAP in severe OSA.
–
– OA should be fitted by qualified dental professionals.
–
– Cephalometric evaluation is not always needed prior to use of OA.
–
– OA can be used for patients with snoring when weight loss and change in sleep position fail to improve the symptoms.

– Oral appliance (OA) are indicated for patients with mild to moderate OSA who prefer OA over CPAP, who do not respond to CPAP or behavior measures and who are not appropriate candidates for CPAP.
–
– OA is particularly successful in cases in which OSA is positional and the patient’s body max index is lower.
–
– Severe OSA should be treated with CPAP or upper airway surgery.
–
– Following final adjustments, patients should undergo sleep study to assess the efficacy of the device.
–
– Patients treated with OA should have follow up visits every 6 months for 1 year.
then annually.

• Monitor compliance.
• Oral health.
• Integrity of the occlusion.
• Device deterioration.
• TMJ

• The referring clinician should also evaluate patients on OA regularly for signs and symptoms of OSA.

• Future research is encouraged.

All images shown here are courtesy of QuietSleep.com

More than meet the eyes...

* Thornton Adjustable Positioner (TAP)
  - Can be titrated in the sleep lab.
  - Keeps the airway open and holds the jaw forward.
  - Can be used with CPAP machine.

* SomnoMed MAS
  - Allows normal mouth opening and closing.
  - Allows speech and drinking.
  - Adjustable lower jaw advancement.

* Herbst Telescopic Appliance
  - Allows lateral and vertical movements without disengaging the appliance.
Adjstable jaw protrusion (.25 mm increments).

Signature

Snor – X

* A mouth guard that holds the tongue forward during sleep.
* Place tongue in the sleeve and squeeze the bulb to create suction.
* Adjustable tongue extension.

Tongue Retaining Device (TRD)

* Tongue is held by negative pressure in the vacuum bulb.

Mandibular Inclined Repositioning Splint (MIRS)

* Incline flange holds the tongue downward and forward position.
* Upper teeth provide prosthesis retention.
* Non-adjustable.

OSAP

* Compatible for night time bleaching.
* Works with fully edentulous patients.
* Non-adjustable.

Sleep Apnea Goldilocks Appliance (SAGA)

* Hard acrylic shell laminated with soft vinyl liner.
* Non-adjustable.
\*\*SnoreFree
\*\*Thermoplastic one-piece mandibular positioning appliance.
\*\*Chair side procedure.
\*\*Inexpensive and easy to fabricate.
\*\*Non-adjustable.

\*\*Adjustable PM Positioner
\*\*Thermoplastic two-piece adjustable mandibular positioning appliance.
\*\* Allows lateral and protrusive movements via a wrench.

\*\*APM Ultra
\*\*Next generation of adjustable PM Positioner
\*\*Wide anterior breathing hole.
• More freedom of jaw movement (6mm).
• Smaller expansion screws.
• Shorter periphery and overall size.

\*\*Hilsen Adjustable Positioning Appliance
\*\*Velcro-like attachments on occlusal surfaces.
\*\*Adjustable lateral and protrusive amounts.
\*\*Patient user friendly.
•
\*
**OASYS**
- First Oral / Nasal Airway System to be reviewed by Dental and ENT divisions of the FDA.
- Mandibular repositioning and nasal dilator.

**Elastic Mandibular Advancement Appliance (EMA)**
- Use of interchangeable elastic straps.
- Adjustable.

**NORAD Appliance**
- Chair side procedure.
- Holds the lower jaw in protrusive position.
- Adjustable.

**Snore –Aid**
- Advancing the mandible and positioning the tongue.
- Allows natural jaw motions while sleeping.
- Adjustable.

**Thera-Snore Adjustable**
- Chair side procedure.
- Too bulky for my taste!
- Allows lateral movements and adjustable protrusion.
  - Chair side procedure.
  - Stainless steel mechanism.
  - Can be used for edentulous patients.

**SomnoGuard AP Pro**
- Laboratory made.
  - Stainless steel mechanism.
  - Can be used for edentulous patients.

**D.I.Y OSA Appliance**
- Obtain maxillary and mandibular impressions.
- Put three tongue blades on the incisors and have the patient close and protrude to about 70% of maximum protrusion.
- Repeat the procedure and obtain protrusive records.
  - Make sure that the protrusion is without right or left deviation!
- Mount and fabricate the appliance.

**Considerations**
- Use clear mouthguard material .040”.
- No articulator or face bow transfer is needed.
- Minimize interocclusal opening (3 tongue blades).
- Allow anterior space for breathing.
- Ensure patient can breath easily.
Appliance Delivery

* Insert the appliance and ensure proper fitting.
* The initial setting is between 50% to 75% of maximum protrusion.
* Make sure the patient is comfortable.
* If the patient does not respond, increase the amount of protrusion without side effects.
* The titration should be done gradually.
* Inquire about the patient’s perceived symptoms and signs.
* Request a follow up sleep study to confirm the effectiveness.

Dental Follow Up

* Observe appliance usage, side effects, complications – 1 to 2 week intervals.
* Once the patient responds to treatment, a more permanent appliance can be considered.
* Make sure you send the registration protrusive records.
* Recall patient every three months to evaluate the integrity of the prosthesis.

Medical Follow Up

* Refer patient back attending sleep clinician for clinical assessment and/or repeat overnight assessment.
* Ask for a sleep study test to confirm the efficacy of the appliance.

CPT Codes

* Category : ADJUNCTIVE
  * E0485/E0486 (prefabricated/custom)
  * Oral device/appliance used to reduce upper airway collapsibility, adjustable or non-adjustable, custom fabricated, including fitting and adjustment.

Trouble Shooting

* Inability to breath through the opening of the appliance.
  * Detachment of members (provisional).
Inability to engage/disengage the TAP device.

* Metal allergy.

If more protrusion is needed, move the bar lingually.

* If less protrusion is needed, move the bar forward.

* This can be done on same visit.

In short ...

* Watch out for signs and symptoms of OSA.

* Place consultation through Pulmonary/Respiratory if OSA is suspected.

* Oral appliance is effective in treating mild to moderate OSA.

* There are many oral appliances on market with similar mechanisms.

* Side effects are minor.

* Educate our colleagues our roles in treating OSA.

Recommended Readings

The role of oral appliances in treating obstructive sleep apnea.

* JADA, volume 134, No.4, 2003, 442-449

Oral appliances for Snoring and Obstructive Sleep Apnea: A Review

* Sleep, Volume 29, No.2, 2006


Dental Considerations

for the Methamphetamine Users
Methamphetamine or “meth” is considered the fastest growing illicit drug in America.

Agency for Toxic Substances and Diseases Registry 2005

**National Drug Threat Survey 2007**

**Methamphetamine Seizures on the Southwest Border, in Kilograms 2001-2007**

**Number of Primary Methamphetamine Treatment Admissions to Publicly Funded Treatment Facilities, 2000-2005**

**Top 5 States for Identity Theft Complaints per 100,000 Population 2006**

- Arizona – 147.8
- Nevada – 120.0
- CA – 113.5
- Texas – 11.6
- Florida – 98.3

**What is Methamphetamine?**

- Powerful and highly addictive stimulant drug that affects the CNS.
- Illegally produced and distributed.
- Comes in several forms.
  - Powder, crystal, rocks and tablets (yaba).
  - Taken by swallowing, snorting, smoking or injecting.

**Street Names**

- Meth.
- Speed.
- Ice.
- Chalk.
- Fire.
222, agua, albino poo, alffy, all tweakend long, anny, anything going on, bache knock, bache rock, bag chasers, baggers, Barney Dope, batak, Bato, bato, batu kilat, batu or batunas, batuwhore, beegokes, bianca, bikerdope, Billy, bitch, biznack, blanco, Blizzard, Blue acid, blue funk, bomb, booger, boorit-cebuano, boo-yah, Brian Ed, buff stick, bugger sugar, buggs, bumps, buzzard dust, caca, candy, cankinstien, CC, chach, cha-cha-cha, chalk, chalk dust, chank, cheebah, cheese, chicken flippin, chikin or chicken, chingadera, chittle, chizel, chiznad, choad, clavo, coco, coffee, cookies, CR, crack whore, crankster gansters, cri, criddle, cringe, crissy, critty, crizzly, crothch dope, crow, crank, crypto, crystal meth, Crystalight, cube, Debbie, devil dust, devil's dandruff, Devil's drug, dingles, dirt, dirty, dizzy-D, D-Monic Or D, do da, doody, doo-my-lau, dope, Drano, Dummy Dust, dyno, epimethrine, Epod, eraser dust, Ethyl-M, Evil Yellow, Fetch, fedrin, fil-layered, fizz wizz, gackle-a fackle-a, gak, gas, gear or get geared up, gemini, glass, go, go fast, go-ey, go-go, go-go juice, Gonzales, goop, got anything, grit, gumption, gyp, Haiwaiian Salt, Hank, high speed chicken feed, highthen, hillbilly crack, hippy crack, homework, hoo, Horse Mumpy, Hydro, hypes, ice, ice cream, Icee, ish, izice, jab, jab, jasmine, Jenny Crank Program and TOO MANY TO LIST HERE !!!

**Flavored MA from Western Drug Markets**

- Red cherry flavored MA was used by teenagers in CA – “Go Fast”.
- Cola, orange, chocolate, root beer flavor.

**History**

- In 1880s, Amphetamine was synthesized in Germany as drug.
- In 1919, a derivative Methamphetamine (MA) was formulated by a Japanese chemist and used to treat asthma, narcolepsy and others (OTC).
- In 1930’s, Benzedrine was initially used for treatment of asthma and low blood pressure.
- During WWII, MA was used to increase alertness among troops, pilots.
In 1960’s amphetamines were readily available but were curtailed by the Controlled Substance Act of 1970.

In the 1960’s, home made MA began to emerge and increased throughout the US including Hawaii.

In the 1990’s and 2000’s, MA was referred as the “blue collar drug” – “crank”.

Methamphetamine (MA) has a similar chemical structure to amphetamine.

Synthesized by attaching various substituents (methyl, halogen or sulfur) to the phenol ring.

A potent nervous system stimulant.

Highly addictive and potential for abuse.

Used in treatment of ADD, obesity and narcolepsy.

Illicit Amphetamine Analogues

Methylenedioxymethamphetamine.

— “Ecstasy”.

Methylenedioxymphetamine.

— “The Love Pill”.

Methamphetamine.

— “Crystal Meth”.

How is Meth Made?

Meth is made from variety of store bought chemicals.

Common ingredients are pseudoephedrine (cold medicine), ether, thinner, acetone, Freon, iodine crystals, red phosphorous, drain cleaner, battery acid and lithium.
Often produced in crude laboratories or in home basements.

Cooking process is simple but very dangerous and toxic.

Categories of Meth Labs

Super labs.

- Produce large quantities and supply organized drug trafficking groups that distribute in the US.
- Controlled by Mexican Drug Trafficking Organizations.

Small Toxic Labs.

- Amateur type set up.

Number of Reported Methamphetamine Laboratory Seizures 2002-2007

Blue line – weight of meth seized (x100g).

Red line – number of meth lab incidents.

User Profile

- Between the ages of 19 and 40.
- Higher among males.
- 18-25, 12-17, 26 and older.
- 12.3 millions Americans (5.2%) age 12 and older have tried meth.
  2003 National Survey on Drug Use and Health.
- 1.9 million (>12) in 2006 and 1.3 in 2007.

The National Survey on Use and Health (NSDUH) reported young adult use rate is highest in Wyoming, Arkansas, Minnesota and Nevada. (2005).

Lowest use in New York, Connecticut and Vermont.

Methods of Use

Oral ingestion.

- Pill form or mix with drinks – “biker coffee”.
-
IV.

- Meth crystal dissolved in water and inject into vein / blood stream.
- Smoking.
- Meth is melted in the glass pipe then inhaled.
- Intranasal Absorption.
- Meth crystals crushed into powder then snorted through a straw.
- Rectal Absorption.
- Meth crystals dissolved in water is injected into the rectum (booty bump).

Why Do People Use Meth?

- Longer lasting and more intense than cocaine.
- Increased awareness and energy.
- Increased libido, endurance and exaggerate euphoria during sex.
- Can function for 12 hours or more without eating – incentive for losing weight.
- Cheap and easy to make.
  - $ 600 equals $2000.

Meth Abuse Patterns

- Low Intensity MA.
  - Swallow or snort route.
– Occasional users to boost work performance, to lose weight.
– People with normal jobs and families.
– Binge MA.
– Smoke or inject route.
– People that need to have the euphoric high for functioning.
– High Intensity MA.
– Often called “Addicts” or “Speed Freaks”.
– Whole existence focuses on preventing a “crash” or wanting the INITIAL perfect rush when first use.
– Very unpredictable and extreme violent.
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** Terminology

* Addiction.
  – Total loss of control over the use.
* Crash.
  – Effects of meth are fading followed by long periods of sleep.
* On a Run.
  – Using meth for days without sleep.
* Tweaking or Binging.
  – Actively using meth (every 2-3 hours).
Mechanism of Action

- Altering levels of CNS neurotransmitters.
- Stimulates the release and blocks the reuptake of dopamine, nor epinephrine and serotonin.
  - Nucleus sccumbens.
  - Prefrontal cortex.
  - Striatum.

Neurotransmitters.
- Relay signals between neuron and other cell.
- Dopamine.
  - Plays a role in the reward system and motor movements.
- Nor epinephrine.
  - Flight or fight system.
- Serotonin.
  - Regulator of sleep, mood, appetite.

Oral administration.
- Maximum plasma concentration (Tmax) is 2 – 3 hours.
- Onset is 20 minutes.
- IV, snorted, smoking.
  - Onset is 2 -4 minutes.
- Elimination half-life is 12 hours.
Meth and The Body

Meth releases a surge of dopamine.

- Rush of pleasure followed by euphoric high.

- 1250 units (M) compared to 350 (C) and 200 (sex).

- Over time, the dopamine receptors are destroyed – impossible to feel pleasure.

- Causes the brain to release adrenaline.

  - Anxiety, wakefulness, “tweaking”.

- Hyperactive and OCD behaviors.

Neurotoxin.

Cognitive abilities are damaged.

- Depletion of monoamines in the brain.

- Similar to people of Parkinson’s Disease.

Meth is structurally related to epinephrine and causes a rise in systolic and diastolic blood pressure.

Respiratory center is activated.

- Increased depth and rate of respiration.

Mild intoxication.

- Dizziness, headache, irritability, hypertension, tachycardia, tremor.

Severe intoxication.
* Confusion, diaphoresis, palpitations, nausea, vomiting, hallucinations, convulsions and coma.

**Sex and Meth**

* Increases in sex drive and lower inhibitions.
  
  * Dopamine and adrenaline releases.
  
  * More aggressive sex for longer periods of time increasing the chances of injury and spreading infections.
  
* Decreases desirability and stamina.
  
  * “Crystal dick”.

**Physical Signs and Symptoms**

* Rapid weight loss.

* Poor personal and oral hygiene.

* Rampant dental caries.

* Halitosis.

* Xerostomia.

* Dilated pupils.

* Sores on skin.

**Behavioral Signs and Symptoms**

* Restless, repetitive activity.

* Insomnia, high energy.

* Declining performance at work.

* Stealing or asking for money from family and friends.
• Rages.
• Paranoid behaviors.

• Increases sexual drive.
• Decreases in appetite.
• Intense euphoric “rush”.
• Irritability.
• Fatigue.
• Headaches.
• Anxiety.
• Aggressive feelings.

• Depression.
• Cravings.
• Psychotic.
• Hallucination.
• Mood disturbances.
• Delusions.
• Homicidal.
• Suicidal.

Visible Signs
• Acne appears, sores takes longer to heal, skin loses its luster.
• Skinny and frail.
Older age appearance.

- Poor oral hygiene, teeth grinding, rampant destruction of tooth structure.

Crank bugs (formication).

The Other Sides of Meth

Considerations for the Dental Professionals

- Know that MA use is on the rise in the US.
- The effects of meth in the oral cavity.
- Know the warning signs of a meth user.
- How do I offer treatment and intervention?
- What is my ethical responsibility?
- How can I protect myself?

Oral Effects

- A study was done looking at MA medication on three children treated for ADD.
- Incidence of gross caries was greater than normal!


Meth Mouth

- A generalized term for the oral condition associated with MA user.
- But there is more than just caries ...

What do we see?

- Rampant caries.
- Heavy plaque accumulations.
- Gingivitis/periodontitis.
- Halitosis.
* Xerostomia.
* Evidence of bruxism.

Class V caries that encircle the entire tooth.
Many are broken to the gingival.
Grayish – brown in color.
Sharp edges on teeth.
Gingivitis and periodontitis.

What Causes Meth Mouth?
Toxic ingredients?
Battery acid, drain cleaner, antifreeze, fertilizer, lighter fluids...
Xerostomia?
Neglect of oral hygiene?


Parafunional habits?

Some suggested behaviors associated with meth user are responsible for the decline of the oral health.

Others thought the hydrochloric acid in meth and the route of administration play a role.

Literatures
Rampant dental caries in MA user.
Caries pattern involves the buccal surfaces of posterior teeth and proximals of


95% of participants (MA and Ecstasy) reported “dryness of their mouths”.

73% reduction in parotid salivary secretion (AM) and 59% reduction in stimulated secretion (AM and marijuana).

The caries rate in MA was four times of the controls.


Enamel erosion and breakdown is noted when MA contains phosphoric, sulfuric or
muriatic acid is smoked.


207

* Chemicals used in meth manufacturing?
  – Patients taking oral MA developed characteristic lesions seen in MA abusers.

208

* Incidence of “grinding and clenching their teeth together” to be from 70 -90%.

The etiology of “meth mouth” is due to...

209

* Xerostomia.
  – MA acts on Alpha and Beta adrenergic receptors.
  * Vasoconstriction properties.
  – Decreased saliva production.
  – Increased metabolism and physical activities.
  * Reduction of antibacterial enzymes.
  * Change in pH.
  – Intake of high acid sugary drinks.

210

*
Concomitant drug use.
- Majority of meth users also smoke tobacco and drink alcohol.
- Bruxism.
  - Increased motor activities.
- Neglect of oral hygiene.
- Chemicals used in manufacturing?
- Route of administration?
- 

### Points to Ponder...

- What is the timeline?
- Do meth users complaint of pain?
- How can I distinguish tooth decay is related to MA use or history of head and neck radiation or simply poor oral hygiene?
  - Watch out for warning signs.
  - Know patient’s history.

### Warning Signs
- Confused, unable to focus.
- Malnourished and frail.
- Talks constantly, paranoid.
- Rapid eye movements.
- Complaints of teeth grinding.
- Rampant caries, broken teeth, restorations.
214 Know Patient’s History
★ Ask patient about drug use.
★ Guarantee confidentiality.
★ Show your genuine concern for patient’s well being and safety.

215 Dental Considerations
★ Carry out the same modalities as patients with high caries rate/risk.
★ The ultimate goal is disease control and prevention.
★ You need to take into account of dependability.
  – Travel.
    – Finance.
    – Understanding problems and solutions.
    – Support of family and friends.
    – Commitment to overcome drug addiction.
★ Avoid elaborate treatment options until the underlying cause is addressed.
★
★

216 Pain Control
★ Unless contraindicated, anti-inflammatory medications should be the drug of choice.
★
Avoid narcotics as it can cause cardiac reactions.

* Use long acting local anesthetic (Marcaine) if patient has not had MA in past 24 hours.

* Avoid vasoconstrictors as they may lead to increased blood pressure, stroke, cardiac arrest, dysrhythmias or CVA.

(Turnipseed et al, 2003; McGee et al, 2004; Bolla and Cadet, 2007; Little at al 2008)

* Keep prescription pads out of reach.

Xerostomia

* Encourage patients to chew sugarless gum.

* Counsel patients to avoid carbohydrate rich soft drinks.

* Increase water intake.

  - 8-10 glasses of water/day.

* Rinse mouth often with plain water.

* Avoid caffeine, tobacco, and alcohol beverages.

* Pilocarpine HCL (Salagen) or Cervimeline HCL (Evoxac).

  - 5 mg three times daily.

Caries

* Sealing the areas with fluoride and a xylitol releasing fluoride varnish.

* IRM restorations.

* Use acrylic temporary crowns.

* Brush on or fluoride tray?

Bruxism

* Smooth out sharp edges.

* Fabrication of soft mouthguard.

* Fabrication of acrylic provisionals.

Periodontal Disease
★ Remove causative factors.
★ Educate the patient.
★ Use of alcohol free Chlorohexidine rinses.

221 Oral Mucosa
★ Rinse with 50-50 Kaopeptate and Benedryl aids in healing and pain.
★ Evaluate for presence of candida albicans – Nystatin or Clotrimazole troches.

222 Treatment Summary
★ Obtain complete history – ask about drug use.
★ – Assure patient of complete privacy.
★ Discuss the dangers of MA and the effects on the oral cavity.
★ Educate the patient on oral hygiene.
★ Dietary counseling.
★ Discuss different treatment options. Resist the temptation to have the most elaborate option.
★
★
★
★

223 ★ Provide soft mouth guard to protect the teeth from bruxism.
★ Place the patient on fluoride regimen.
★ Offer referral to substance abuse treatment center.
★ Be understanding and compassionate!
★

224 Dealing with Tweakers
★ Tweakers behave violent and short tempered.
★ Keep your distance.
★ Keep the light away from the face.
★
Slow your speech and hand movements.

Contact the police if you feel threatened.

Keep talking.

Communication Tips

Concern.

– Speak in an objective caring manner.

Support.

– Recommend to an addiction treatment center.

Trust.

– Make sure patient understand that he/she is protected under HIPAA rules of confidentiality.

Hope.

Mandatory Reporting

You must report if you suspect children at the age of 18 or younger is exposed to an environment that involves the manufacturing, distribution and use of meth.

How about reporting minor meth users?

"Second Hand" Meth Mouth

"Court records show the girl is suffering from a medical condition called "meth mouth" caused by breathing vapors from the chemicals used in the manufacture of meth".


Meth Mouth Prevention and Recovery Act

H.R 1671.

"To understand and comprehensively address the oral health problems associated with methamphetamine use”.

– Educational grants.

– Funding for treatment facilities.

– Research.
Resources for Treatment Addiction
- Whitehousedrugpolicy.gov
- Nationaldec.org
- SayNotoMeth.com
- Crystalrecovery.com
- Samhsa.gov

In Summary
- Watch out for potential meth users.
- The detrimental effects on the oral cavity is well documented.
- We need to be on the look out to recognize the warning signs.
  - Accelerated tooth decay in teenagers and young adult.
  - Distinctive patterns of decay.
  - Malnourished appearance with skin lesions.
  - Excessive tooth wear.
  - Poor compliance to preventive treatment and unreliability in keeping appointments.

Questions and comments?
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