

DENTAL TRIBUNE

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Gum disease linked to gestational diabetes

A new study by NYU dental researchers has uncovered evidence that pregnant women with periodontal (gum) disease face an increased risk of developing gestational diabetes even if they don't smoke or drink, a finding that underscores how important it is for all expectant mothers - even those without other risk factors - to maintain good oral health.

The study, led by Dr. Ananda P. Dasanayake, Professor of Epidemiology & Health Promotion at New York University College of Dentistry in collaboration with the Faculty of Dental Sciences at the University of Peradeniya, Sri Lanka, eliminated smoking and alcohol use among a group of 190 pregnant women in the South Asian island nation of Sri Lanka, where a combination of cultural taboos and poverty deter the majority of women from smoking and drinking. The findings support an earlier study led by Dr. Dasanayake that found evidence that pregnant women with periodontal disease are more likely to develop gestational diabetes

than pregnant women with healthy gums.

That study, which followed 256 women at New York's Bellevue Hospital Center through their first six months of pregnancy, showed that 22 of the women developed gestational diabetes. Those women had significantly higher levels of periodontal bacteria and inflammation than the other women in the study. The findings were published in the April 2008 issue of the *Journal of Dental Research*.

More than one-third of the women in the new study, which was conducted over the course of one year, reported having bleeding gums when they brushed their teeth. The women were given a dental examination and a glucose challenge test, which is used specifically to screen for gestational diabetes. According to Dr. Dasanayake, those women found to have the greatest amount of bleeding in their gums also had the highest levels of glucose in their blood. Dr. Dasanayake, who presented the findings today at the annual meeting of the International As-

sociation for Dental Research in Miami, said that he expected the final data to show that between 20 and 30 of the women had developed gestational di-

abetes.

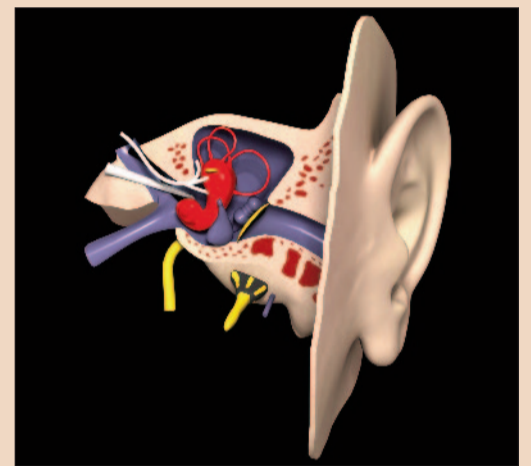
Gestational diabetes is characterized by an inability to transport glucose -- the main source of fuel for the body -- to the cells during pregnancy. The condition usually disappears when the pregnancy ends, but women who have had gestational diabetes are at a greater risk of developing the most common form of diabetes, later in life. Asians, Hispanics, and Native Americans are at the highest risk for developing gestational diabetes. All of the women in the Sri Lanka study were of Asian origin, while 80 percent of the New York study subjects were Hispanic.

"In addition to its potential role in preterm delivery, evidence that gum disease may also contribute to gestational diabetes suggests that women should see a dentist if they plan to get pregnant, and after becoming pregnant," Dr. Dasanayake said. "Treating gum disease during pregnancy has been shown to be safe and effective in improving women's oral health and minimizing potential risks." □

Our ears may have built-in passwords

People may no longer need to remember their password to access bank accounts, they can do that by picking up a phone and letting their ear do the talking. Researchers in England are developing a new biometric technique that elicits the sound ear hairs create when ruffled by noise. If each person's "ear sound" is unique, and stays the same over time, it could become a high-tech password to access accounts and cell-phones.

That's because "hearing is an active process - the ear actually puts energy into the incoming sound waves to replace energy lost as sound is absorbed by the ear's structure", says Stephen Beeby, an engineer at the University of Southampton, UK, who is leading the research. "This



process helps us hear things we otherwise would not.

Predicted in the 1940s but only confirmed with ultralow-noise microphones in the 1970s, ear-generated sound is evoked with a series of clicking noises. Anecdotally, experts say they can differentiate one ear from another, but it "has to be able to reliably recognize people over long time periods," one scientist said. "For example, a fingerprint taken from a 20-year-old is still valid when they are 60." □

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Sipping hot tea can cause throat cancer

PARIS: People who drink their tea piping hot run a higher risk of throat cancer than counterparts who prefer a cooler cuppa, according to an investigation published on Friday by the British Medical Journal.

Cancer of the oesophagus is linked especially to smoking and alcohol abuse but hot beverages have also been considered a risk

factor, possibly because of damage to throat tissue. Interested in finding out more, Iranian researchers went to Golestan province, which has one of the highest rates of oesophageal cancer in the world.

Inhabitants there sip large quantities of hot black tea — typically drinking more than a litre per day per person — but also have a low incidence of tobacco and alcohol use.

A team led by Reza Malekzadeh of the Digestive Disease Research Centre at Tehran University of Medical Sciences looked at 300 people who had been diagnosed with a throat tumour and a matched group of 571 healthy people who lived in the same area.

Those who drank hot tea (between 65-69°C) were twice as likely to develop throat cancer

compared with those who drank warm or lukewarm tea, whose temperature was 65°C or less. Drinking very hot tea (at least 70°C) was associated with an eightfold increased risk compared with warm or lukewarm tea.

In an editorial, the Lancet said the study backed evidence that scorching fluids may cause damage to the throat's epithelial lining and lead to cancer, although ex-

actly how this happens remains unclear.

But it also said that there was no cause for panic, as most people tend to drink tea at a warm temperature. Previous studies in Britain have reported an average temperature preference of 56-60°C. It recommended that tea junkies wait at least four minutes before drinking from a freshly boiled cup. [D](#)

Sports drinks may be tough on teeth

Though some might see sports drinks as a healthier alternative to soda, a new study shows that the citric acid they contain can damage teeth.

The finding comes from a study involving teeth from cows. New York University College of Dentistry researchers cut the teeth in half and placed them in top-selling sports drinks. After soaking for up to 90 minutes, which the researchers said simulated sipping on the drinks throughout the day, the enamel coating of the teeth was partially eaten away. This allowed the drinks to leak into the bonelike material underneath the enamel, causing the teeth to soften and weaken.

The condition, called erosive tooth wear, can result in severe tooth damage and tooth loss, if not treated.

"This is the first time that the citric acid in sports drinks has been linked to erosive tooth

wear," study leader Dr. Mark Wolff, chairman of cariology and comprehensive care at the NYU College of Dentistry, said in a news release issued by the school.

The findings were to be presented Friday at the International Association for Dental Research general sessions in Miami Beach, Fla.

Perhaps surprisingly, brushing immediately after having a sports drink might actually cause more damage, Wolff said, as the softened tooth enamel is vulnerable to the abrasiveness of toothpaste.

"To prevent tooth erosion, consume sports drinks in moderation and wait at least 30 minutes before brushing your teeth, to allow softened enamel to re-harden," he said. "If you frequently consume sports drinks, ask your dentist if you should use an acid-neutralizing, re-mineralizing toothpaste to help re-harden soft enamel." [D](#)

Tobacco used to produce medicine

Scientists have used tobacco to produce medicine for the treatment of a number of diseases, including diabetes.



Research published in the journal BMC Biotechnology details how genetically modified tobacco plants were used to produce medicines for several autoimmune and inflammatory diseases.

Experts set out to create transgenic tobacco plants that would produce biologically-active interleukin-10 (IL-10), a potent anti-inflammatory cytokine.

They tried two different versions of IL-10 (one from a virus, one from the mouse) and generated plants in which this protein was targeted to three different compartments within the cell, to see which would work most effectively.

The researchers found tobacco plants were able to process both forms of IL-10 correctly, producing the active cytokine at high enough levels that it might be possible to use tobacco leaves without lengthy extraction and purification processes.

The authors claim they are keen to use the plants to see whether repeated small doses could help prevent type 1 diabetes mellitus (T1DM), in combination with other auto-antigens associated with the disease.

Commenting on the research, Professor Mario Pezzotti from the University of Verona, said: "Transgenic plants are attractive systems for the production of therapeutic proteins because they offer the possibility of large scale production at low cost, and they have low maintenance requirements.

"The fact that they can be eaten, which delivers the drug where it is needed, thus avoiding lengthy purification procedures, is another plus compared with traditional drug synthesis." [D](#)

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April 26: International Seeds Day

Order 81: "Iraqi farmers shall be prohibited from re-using seeds of protected varieties,"

Organizations, activists and people from various professional and linguistic backgrounds will observe April 26 as International Seeds Day (ISD) advocating for patent-free seeds, organic food and farmers' rights. ISD will be an educational day for the public to learn about genetically modified food and its health hazardous effects and the agribusiness of major US and European companies and their monopoly over the agriculture in Africa and Asia with emphasis on India, Iraq and Afghanistan. It will be a day of solidarity with farmers in countries devastated by war (Afghanistan, Iraq & others) and of resistance: <http://www.INEAS.org/events.htm>

Historically, the Iraqi constitution prohibited ownership of biological resources. Farmers in Iraq have operated in a mostly free-to-little-regulated, informal seed supply system. Farm-saved seeds and the free exchange of planting materials among farmers have long been the basis of agricultural practice in Iraq. Yet all of this has become history.

On April 26, 2004, Paul Bremer, the administrator of the Coalition Provisional Authority (CPA), issued and signed Order 81, which prohibits farmers from reusing seeds harvested from new varieties registered under the law. When ownership of a crop is claimed, seed saving will be banned and farmers will have to be pay royalties to the registered, so-called seed owner.

Order 81 was signed on April 26, 2004 by Paul Bremer, the administrator of the Coalition Provisional Authority (CPA) in Iraq to control Iraq's agriculture. The Order was a declaration of war against farmers. Article 14 of this law states "Farmers shall be prohibited from re-using seeds of protected varieties," Order 81 mends Iraq's original law No. 65 on patents, created in 1970.

A "Greedy law, unjust law is meant to be disobeyed" <http://www.youtube.com/watch?v=I-B1yU278z>

The most significant part of Order 81 is the subject of 'Plant Variety Protection' (PVP), which ensures not the protection of biodiversity, but rather the protection of the commercial interests of USA and European major seed corporations. In order to qualify for PVP, seeds have to be 'new, distinct, uniform and stable'. Therefore, the sort of seeds being encouraged to grow by corporations such as World Wide Wheat Company (WWWC), Monsanto and others will be those registered under PVP.

The law awarded US Corporations complete control over farmers' seed for 20 years. Iraqi farmers had to sign an agreement to pay a "technology fee" plus an annual license fee. Plant Variety Protection (PVP) made seed reusing and saving illegal as well as "similar" seed plantings punishable by severe fines and imprisonment. Agribusiness wants the same rights everywhere, including in the USA. This

will jeopardize the future of organic and independent farming.

According to Latha Jishnu, senior editor of Business Standard "Five years after Order 81 was passed, farm activists across the world have got together to mark April 26 as International Seeds Day to help Iraqi farmers to break the

vice-like grip of the global seed companies. The campaign is coordinated by the Institute of Near Eastern & African Studies (INEAS), based in Cambridge, Massachusetts, and has got the backing of some organisations in India. I met Wafaa Al-Natheema of INEAS, when she was in India earlier in the year to drum up support for the

campaign, and she says the world needs to respond to this threat to agriculture. Iraqi farmers, like the rest of the nation, are unaware of this law and how it could turn their world upside down. "They need our help to learn how to retain their seeds under these circumstances and how to lobby against this unjust law." [\[1\]](#)

<http://www.business-standard.com/india/news/latha-jishnu-order-81-the-plunder-farming/353518/>

For more information:
The Institute of Near Eastern & African Studies (INEAS)
1 (617) 86-INEAS (864-6327)
INEAS@aol.com INEAS_1994@yahoo.com Full text of Order 81: http://www.trade.gov/static/iraq_memo81.pdf
People's rights to water and food: <http://www.navdanya.org/organic/index.htm>
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American Medical Association may investigate journal editors

CHICAGO (AP) — The American Medical Association is seeking an investigation of claims that editors of its leading medical journal threatened a whistle-blower who pointed out a researcher's conflict of interest.

Editors of the Journal of the American Medical Association deny threatening a professor who raised concerns about a study author's undisclosed financial link to a drug company

when JAMA published the study last year. JAMA, like most leading medical journals, has a policy of noting scientists' industry connections.

According to the Wall Street Journal, JAMA editors threatened to ban the professor from their journal and ruin his medical school's reputation if he didn't stop talking to reporters.

The editors deny that. But the flap prompted them to spell out

what amounts to a gag order on anyone who alerts the medical journal about suspicions that a researcher has undisclosed industry ties. The journal editors argue that any suspicions should be kept secret until JAMA can complete its own probe. That is an existing policy, JAMA's editor-in-chief, Dr. Catherine DeAngelis, told The Associated Press on Monday. AMA journals are independent and the medical associ-

ation doesn't interfere with what they publish. But AMA said Friday it has asked an independent oversight committee to investigate how JAMA editors handled the issue.

"As owner and publisher of JAMA, we take these concerns very seriously," AMA board chairman Dr. Joseph Heyman said in a written statement.

The issue involves a study published in JAMA last May that

said the drug Lexapro prevents depression in stroke patients. A Tennessee university professor who reads JAMA told the editors in October that he had learned that a study author had served as a speaker for Lexapro's maker. Though other industry ties were noted in the journal, that one was not. JAMA editors vowed to investigate. The professor, Jonathan Leo of Lincoln Memorial University, also discussed his concerns in a March 5 letter posted on a different medical journal's website.

On March 11, JAMA editors published a correction revealing the undisclosed ties to Lexapro's maker. JAMA's editors acknowledged in a March 20 editorial being upset about Leo airing his concerns. They argue that publicizing unconfirmed allegations about study authors could unfairly damage reputations and interfere with JAMA's own investigations. [D1](#)

Confusion Over Osteoporosis Medication and the Affect on Oral Health

It has been estimated that over 10 million Americans have Osteoporosis; a condition that causes the thinning of the bone along with severe loss of bone density over time. Medications, specifically bisphosphonate are used to treat this often debilitating disease. Although these drugs effectively slow bone loss and possibly increase bone density reducing the risk of fracture, they have recently come under-fire as reports have suggested the use of medications containing bisphosphonates may cause individuals to develop "bisphosphonate-associated" osteonecrosis of the jaw. Considered to be a rare condition osteonecrosis of the jaw results in severe damage due to the temporary or permanent loss of blood supply to the jaw bone possibly causing pain, numbness, exposed bone, tooth loss, and infection.

The American Dental Association and the National Osteoporosis Foundation have teamed-up to provide patients with a brochure titled "Osteoporosis Medications and Your Dental Health," that will be available from dental offices this month. The goal is to separate fact from fiction by providing the brochure as a resource to patients that have become alarmed by the suggestion that their medication may be causing osteonecrosis of the jaw. In a press release Matthew Messina, D.D.S., ADA Consumer Advisor states that "Patients who take bisphosphonates for osteoporosis are encouraged to talk to their dentist so that their dentist can show them good oral hygiene practices as well as monitor their oral health," adding stress to the point that "Patients should not stop taking their osteoporosis medications without speaking with their physicians." [D1](#)

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DTME talks to Mr. Andrew Bennett, Business Developer for 3M Unitek, to find out his views about the Middle East Market and current economic situation

3M Unitek Orthodontist Symposium Transcription

What are the objectives of this Symposium?

The aim is to challenge the traditional core process and to put out some new ideas as to where we think the industry will be going over the next 5, 10 or 15 years. This is not something we would do every single year because the developments achieved are so far advanced that the industry doesn't change enough to warrant 2 days here in beautiful Dubai every year.

The fact that all these orthodontics are still here and didn't cancel their registration proves that they are all still interested in these new cutting-edge concepts from 3M Unitek.

It is quite unusual to be able to get this many orthodontics from across the world together all at the same time. Usually at dental conferences you would have a big group of general dentists so it is great to see so many specialist orthodontists, especially with the current economic climate.

How is the current economic climate impacting 3M Unitek right now?

Of course, this is an elective treatment so – ultimately its not like heart surgery or something ... you have straight teeth or you don't. I think what we are seeing to a small extent, and I literally just relocated from the US, where the economic environment is very different, we saw doctors tending to purchase products when they needed them rather than build up a large inventory. From our perspective we have seen no slow down at all in this region.

We acquired the Incognito brand last year which is a very high end treatment in the Lingual side of the Market. They continue to be a huge success in this region and certainly in mainland Europe this is probably the most expensive treatment you can have. It continues to be a great success and a great acquisition for us. Even as we operate on the higher end of the market everything seems to be ok – the proof of having 500 doctors being prepared to travel from 40 countries here kind of says business is good – business is very buoyant.

As I mentioned earlier, it is an elective treatment so we always know there is always a risk with any treatment which is elective – it's not bandages and it's not tape, but its orthodontics.

You're new to the region, Middle East and Europe –How are you looking forward in this market?

I have been with 3M and Unitek for 15 years and was in the US before I came here. The 3M Unitek range operates from the very top of the pyramid to the very bottom in terms of price perspectives and quality perceptive - our intention is to be able to cover the broadest possible range of doctors as we can and we have done that with acquisitions recently.

Incognito is proof of that. I think you will that as we go forward and expand our range will broaden considerably.

3M Unitek is a business which likes to operate directly with its customers – in 3M's world this is quite unusual. 3M tends to be a distributor to channel based busi-

nesses, 3M Unitek is one of 2 businesses in 3M that is almost entirely direct. It enables us, I think, to service the customers much better. I think we have 50,000 customers, 14,000 SKU's – which is huge for 3M – we will keep driving that model forward, because

it just gives us a better relationship with our customers.

Ultimately our plan has been for many years to build and sustain the best relationships in the

→ DT page 14



Mr Andrew Bennett
BDM for EMEA – 3M UNITEK

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TM Disorders: (Part 3 of 3)ⁱ Treatment & Management Considerations

Ulises A. Guzman & Henry A. Gremillion, USA

The article has been accredited by Health Authority - Abu Dhabi as having educational content and is acceptable for up to 2 (Category 1) credit hours. Credit may be claimed for one year from the date of subscription.

Temporomandibular disorder (TMD) represents a multiplicity of conditions expressed in the masticatory system affecting the temporomandibular joints, masticatory muscles, and/or the associated structures. Many of these conditions share common signs and symptoms, yet require differing treatment/management approaches. Therefore, it is important to identify the specific subcategory of TMD in order to develop a case-specific plan of care.

In addition, etiologic variables and factors associated with perpetuation or recurrence of TMD must be appreciated and determined for each patient. A complete evaluation of each case from historical, clinical presentation and physical/psychological perspectives must be accomplished. Treatment outcomes can be enhanced by the identification of and management strategies that address all the components involved.

The development of a diagnosis-specific plan with a prioritized problem list is necessary to enhance our treatment prognosis. The primary goals of treatment of TMD are to: reduce or eliminate pain; restore a more normal function; allow return to the activities of daily living; reduce long-term health care needs for the problem.

A multi-disciplinary model that includes patient education and self care, cognitive behavioral intervention, pharmacotherapy, physical therapy and orthopedic appliance therapy (interocclusal splints) is favored for the management of the vast majority of TMD patients. It is important to understand that the natural course of TMD does not reflect a progressive disease process, but rather TMD appears to be a complex disorder that is affected by a multitude of interacting factors serving to maintain the disorder or result in recurrence.¹⁻⁵

Most TMD patients will obtain significant improvement of signs and symptoms with a conservative model (non-surgical modalities). Many studies have supported that most TMD patients have minimal or no symptoms after treatment with conservative therapy.⁶⁻⁸ Studies related to intracapsular disorders have demonstrated that in patients with disc displacement (with or without reduction), the natural progression of the disease can

allow for changes that are favorable for a significant number of patients in terms of function and symptoms.⁹⁻¹¹

Involving the patient in the physical and behavioral management of his/her condition is essential in the treatment outcome. As clinicians in the development of an individualized plan of management, we must determine if intervention is necessary, if the condition is acute or chronic and what would be the prognosis of the condition with and without treatment. If intervention is in the patient's best interest, then we must determine to what degree should we intervene (reversible versus irreversible treatment) and decide between a monodisciplinary versus a multidisciplinary approach.

Patient education and self-care is based on the patients' knowledge of their pain concern. The aim of a self-care program is to prevent further injury to the musculoskeletal system and to allow for a period of healing to take place. The success of self-care depends on patient motivation, cooperation and compliance.¹ The most important aspect of self-care is ongoing encouragement and reinforcement by the clinician.

Self-directed care typically includes: limitation of mandibular function, habit awareness and modification, a home exercise program and stress management. Promoting rest for the injured tissues promotes healing. Voluntary limitation of mandibular function, maintaining a soft diet, avoidance of foods that require a great deal of chewing, opening wide, yawning or other activities that promote excessive mandibular function should be avoided.

Clenching, bruxism, maladaptive tongue position habits and other habitual behaviors must be identified. Correction or behavior modification may require clinical assistance.^{12,15} An individualized home exercise program with a detailed description of the program will not only enhance the doctor-patient relationship, but will also assure the patient's compliance, thus making treatment more effective and resulting in a faster rehabilitation.

A program of moist heat and/or ice to the affected areas, massage of the affected muscles, and controlled mandibular movement can enhance joint lubrication and nutrition by encouraging the production of physiological quality and quantity of synovial fluid and minimizing the accumulation of metabolic

by-products and pain mediating substances.

Identification of the source(s) of stress and the importance of the patient understanding the association and adverse influence of stress and the course of TMD are also vital. Clinical and health psychologist participation in your multidisciplinary approach may be required to enhance your treatment outcome.

Pharmacotherapy

Rational utilization of pharmacological agents can be a valuable adjunct in the treatment of TMD. Drugs must be considered on a case-specific basis. A clinician must remember that the treatment of TMD cannot rely on a single drug for all cases. Understanding the variety of drugs utilized in the treatment of musculoskeletal conditions, their potential drug interactions and their side effects can result in a useful tool in our armamentarium.

The most effective pharmacological agents for the management of TMD include analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, anxiolytics, muscle relaxants, and antidepressant at very low dosages.^{14,15}

Non-steroidal Anti-inflammatory Drugs

This category is effective for the management of mild to moderate pain and inflammatory conditions, particularly those of muscle origin. Relief of symptoms is typically achieved prior to the anti-inflammatory effect. In order to obtain anti-inflammatory effects, these medications should be taken for a minimum of two weeks following the recommended schedule. NSAIDs differ in formulation, efficacy and toxicity. It is suggested that if one NSAID fails, another agent should be considered. Common side effects to be considered include gastric distress, inhibition of platelet aggregation, tinnitus/dizziness, and renal/liver toxicity. A list of the most commonly NSAIDs utilized is found in Table 1.

Steroids

Corticosteroids are typically indicated in cases of non-infectious inflammation when NSAIDs have proven to be ineffective. Systemic corticosteroids are not commonly prescribed in the treatment of TMD due to their side effects. They could be considered when in association with the polyarthritides. Intra-articular temporomandibular injection of corticosteroids has been recommended on a selective and limited basis in cases of severe joint pain or in cases of flare ups where conservative therapy has failed.^{16,17} We must recognize that multiple intracapsular steroid in-

Category	Generic	Brand	Dose (mg)
Salicylates	ASA	Bayer	q4h (300)
	Salsalate	Disalcid	bid, tid (500)
	Diflunisal	Dolobid	bid, tid (500)
Propionic Acid	Ibuprofen	Motrin	tid, qid (600-800)
	Naproxen sodium	Naprosyn	qid 375, bid (500)
Acetic Acid	Indomethacin	Indocin	tid (25-50)
COX 2 Inhibitors	celecoxib	Celebrex	Qd, bid (12.5-25)

Table 1: Non-steroidal anti-inflammatory drugs

(Methylprednisolone) Medrol Dosepack	4 mg tablets
(Betamethasone) Celestone	6 mg/cc
(Dexamethasone) Decadron	4 mg/cc

Table 2: Steroids

Generic	Brand	Dose (mg)
Diazepam	Valium	2-5 mg tid
Clonazepam	Klonopin	.05-1 mg tid
Lorazepam	Ativan	0.5-1mg tid
Temazepam	Restoril	15-30mg qhs

Table 3: Antianxiety agents

Generic	Brand	Dose (mg)
Carisoprodol	Soma	350 mg tid
Methocarbamol	Robaxin	750 mg tid
Cyclobenzaprine	Flexeril	10 mg tid
Diazepam	Valium	2-5 mg tid

Table 4: Muscle Relaxants

Generic	Brand	Dose (mg)
Amitriptyline	Elavil	10-75
Desipramine	Norpramin	10-50
Nortriptyline	Pamelor	10-75
Doxepin	Sinequan	10-75

Table 5: Antidepressant agents

jections may have detrimental effects.

These medications are also effective in the treatment of inflammatory conditions such as tendonitis or tendomyositis where, due to the decreased blood flow to the areas, oral medications will provide less than desirable results. Side effects include decreased resistance to infection, fluid retention weight gain, painless myopathy, suppression of the hypothalamic-pituitary-adrenal (HPA) axis, osteoporosis and mood alteration with only short term use. Steroidal medications commonly used are listed in Table 2.

Anxiolytics

Anti-anxiety medication may be utilized as supportive therapy in cases where high levels of emotional stress are associated with TMD. Diazepam can be prescribed for acute exacerbation of masticatory muscle pain,³ sleep disturbances and moving disorders such as bruxism.^{14,18} Due to the significant potential for dependency and/or addiction, these

medications should only be used on a short term basis. No more than a 10-day consecutive period when utilized multiple times a day, and no more than three weeks when utilized at bedtime.

Klonopin has shown to have a significant effect in patients with myofascial pain.¹⁹ Side effects include drowsiness and nausea. Benzodiazepines are contraindicated in patients with narrow-angle glaucoma, and can increase CNS depression. A list of anxiolytic agents typically utilized in TMD, sleep disturbances to include insomnia, and moving disorders such as bruxism are included in Table 3.

Muscle Relaxants

Centrally acting muscle relaxants are frequently used in the treatment of temporomandibular disorders.²⁰ It is still uncertain the mechanism in which the benefit from this medications is obtained due to the clinical efficacy at low doses. Either due to their selective effect on relieving muscle spasm

ⁱ Part 1 appeared in *Dental Tribune Asia Pacific*, No. 9 Vol. 5, September 2007; Part 2 appeared in *Dental Tribune Asia Pacific*, No. 10 Vol. 5, October 2007.

or due to their action as a sedative, they play an important role in the treatment of TMD. Primary indications are for muscle spasm, acute muscle pain and to help prevent the increased muscle activity associated with TMD.

Flexeril (cyclobenzaprine hydrochloride), which is similar chemically to tricyclic antidepressants, is the drug of choice for generalized chronic muscle pain. Flexeril has been shown to provide significant relief of muscle pain, and enhance the quality and quantity of sleep. Its combination with an NSAID can be a very effective tool in the treatment of acute TMD. Diazepam, a benzodiazepine is also used as a muscle relaxant. A list of commonly used muscle relaxants is shown in Table 4.

Antidepressants

These medications are helpful with chronic diffuse pain due to myofascial pain, especially when it has been recognized that sleep disturbance is a contributing factor. The analgesic properties of the tricyclic antidepressants are independent of the antidepressant effect. They have shown pain modification properties at therapeutic dosages much lower than those prescribed for antidepressant effect.

The therapeutic effect of the drugs is thought to be related to their ability to increase the availability of the neurotransmitters serotonin and norepinephrine at the synaptic junction in the central nervous system. Studies have demonstrated their use also in the treatment of sleep related bruxism, tension type headache, migraine headache prophylaxis, fibromyalgia and various neuropathic conditions.^{21,22}

Side effects are mainly related to the anticholinergic activity that induces xerostomia, constipation, fluid retention and weight gain. Patients occasionally complain of sedation upon awakening. Contra-indications include cardiac arrhythmias, seizure disorders and patients suffering from panic attacks. Dosages should begin at the lowest level (10 mg) at bedtime and be increased each week only if needed and tolerated by the patient. Table 5 shows a list of some of the most commonly utilized drugs in this class.

Opioids

Typical indications for opioids in the TMD population include exacerbation of pain, postoperatively and in cases of overt trauma. These medications are best indicated for moderate to severe pain over a short period of time. Most common side effects are nausea, respiratory depression and physical dependence. Opioids may be considered in cases of pain refractory for appropriately integrated multidisciplinary care when properly monitored.

Local Anesthetics

Local anesthetics can be useful in the TMD population as a diagnostic tool and also in selective cases as a therapeutic modality.

Indications are as a diagnostic block and in the management of myofascial trigger points. Injections into skeletal muscle with local anesthetics that contain a vasoconstrictor can increase the toxicity of the solution.

Typically, lidocaine or carbocaine without a vasoconstrictor is recommended, especially when injected into muscle (to minimize myotoxic effects). Diagnostic anesthesia may be as simple as the usage of a topical agent, somatic blocks (infiltration,

field blocks and division blocks), trigger points injections, temporomandibular joint injections and/or a sympathetic neural blockade.

Physical Therapy/Physical Medicine

The goal is to relieve musculoskeletal pain, restore normal function, reduce inflammation, coordinate and strengthen muscle activity and promote repair and regeneration of tissues. Rehabilitation of the compromised masticatory system may require

various physical techniques.⁵ Close cooperation with a physical therapist/physical medicine practitioner who is well trained in the management of musculoskeletal disorders of the head and neck is essential.²²⁻²⁵

Massage

Massage over the painful areas is thought to produce an alteration in the sensory input that exerts an inhibitory influence on pain. It is used to reduce edema and to increase blood flow to the area.

Joint Mobilization

The goal is to passively restore joint motion and to improve joint function by repeated digital manipulation of the jaws by the physiotherapist. Mobilization techniques are indicated for decreased range of motion and pain due to muscle contracture, disc displacement without reduction and fibrous adhesions of the joint. A combination of heat, cold, ultrasound and electrical stimulation is often utilized. Local anesthetic

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injections are often used to improve the outcome.

Jaw Exercises

There are three types of exercises designed to achieve a different purpose. Muscle strength is addressed by isometric exercises. Isotonic exercises are used to increase range of motion. Coordination of muscle function is achieved by repetitive rhythmic exercises. Exercises should be constantly modified as symptoms change. A maintenance program is recommended with instructions on how to avoid activities that can re-injure the involved tissues and to ensure long-term resolution of symptoms.

Physical Modalities

The most common modalities used for the treatment of TMD are superficial heat and cold, ultrasound, short wave diathermy, transcutaneous electrical nerve stimulation (TENS), iontophoresis, anesthetic agents and acupuncture. The use of heat can help relax the muscle and increase blood flow to the compromised muscle. Electrotherapy devices produce thermal, histochemical and physiological changes in the muscle and joints.

Short-wave diathermy provides heat to superficial tissues whereas ultrasound can transmit heat through tissues to a depth of 5 cm.²⁶ The purpose of these modalities is to decrease pain, hyperactivity, increase tissue distensibility and may be neuro-muscular re-education.^{25,26} Iontophoresis uses an electrical gradient to drive an ionic form of the medication into the tender or swollen tissues.²⁷ Acupuncture has also been used for the treatment of chronic musculoskeletal pain.²⁸

Postural Re-education

Maladaptive posture (head/neck or mandibular) may be a contributing factor in the TMD patient. The relationship between the trigeminal nerve and the upper cervical region is well recognized. Postural re-education throughout exercises and behavior modification should be considered. The participation and guidance of a physiotherapist is required for long-term stabilization of the masticatory system.

Behavioral/Psychotherapy

The TMD patient's cognitive, emotional and behavioral responses to pain are key issues in the overall evaluation and treatment. The patient's perception to pain may be maladaptive in the nature of somatization, catastrophizing and mood and subconscious habitual behavior. Failure to identify and address these factors will likely compromise the treatment outcome.

Cognitive-behavioral strategies such as behavior modification, life style counseling, progressive relaxation, guided imagery, hypnosis and biofeedback may be beneficial.^{29,30} This care is typically provided by a clinical health psychologist. Occasionally, TMD may be related to an

underlying psychosocial or psychiatric disorder such as depression or conversion disorder. In these cases, a psychiatric or clinical health psychologist referral is indicated.

Occlusal Appliance Therapy

Occlusal orthosis therapy is the most common form of treatment. They are commonly referred to as interocclusal splints, orthotic, orthosis, bite guards, bite planes, night guards and bruxism appliances. An occlusal appliance is a removable device, usually made of hard acrylic, that is custom made to fit over the occlusal surfaces of the teeth on either arch. There are generally two types of appliances: the flat plane (stabilization) appliance and the anterior reposition appliance.

The effects of appliance therapy include: prevention/reduction in abrasion to the dentition, alteration of the motor pattern of the masticatory musculature by altering periodontal ligament proprioception, alteration of muscle length, enhanced awareness of parafunctional activity, and alteration of the number, direction and quality of tooth contacts.

The major functions of non-directive, flat plane appliance therapy are muscle relaxation, dispersal of forces, enhancement of TMJ stability and the protection of teeth. Most patients are advised to utilize the appliance while sleeping or when their activity prohibits conscious awareness of daytime parafunction. Anterior repositioning appliances are used less often because repositioning of the mandible over a period of time can result in irreversible changes to the occlusion.

The purpose of these appliances is to alter the structural condyle-disc-fossa relationship in an effort to decrease adverse joint loading.^{1,31,32} Complications associated with occlusal appliance therapy arise from poor design/construction and/or excessive or incorrect use of the appliance.

Treatment of occlusion should be considered on an individual basis. Many dental conditions require treatment of the occlusion due to a lack of intra-inter-arch tooth stability, fremitus, tooth mobility, fractured teeth/restoration, and compromised function that requires redistribution of forces to minimize the effects of adverse loading.

Although dental treatment may be necessary for patients with TMD, it is believed to be very seldom necessary for the purpose of treating TMD.^{1,35} If occlusal therapy is necessary to complete treatment, it should only be initiated after the patient has regained his/her range of motion, symptoms, neuromuscular activity and when the psychosocial status is as stable as possible.

Surgery

Temporomandibular joint surgery plays a small but important role in the management of patients with TMD. The literature

shows that about 5% of the patients who undergo treatment for TMD require surgical intervention. The surgical success is dependent on a total treatment plan that involves non-surgical and surgical treatment.

Arthrocentesis is the simplest and least invasive procedure that is performed in the temporomandibular joint (TMJ). It consists of TMJ lavage placement of medications into the joint. Arthrocentesis is usually performed as an office-based procedure under local anesthesia assisted with conscious intravenous sedation. It has been suggested to be as effective as arthroscopy in the treatment of joint restriction in conditions such as internal derangement without reduction.

Surgical intervention includes arthroscopy, condylotomy, and open joint procedures, such as disk reposition and discectomy. Arthroscopy is a minimally invasive technique that is usually performed under general anesthesia. It is primarily performed in the upper joint space, and it's useful for minor debridement and lavage, incision of minor adhesions and biopsies.

Indications for surgery of the TMJ may be divided into relative and absolute. Absolute indications are reserved for conditions such as tumors, growth abnormalities and ankylosis of the TMJ. The general indications for TMJ surgery for the most common disorders, internal derangement and osteoarthritis, are significant TMJ pain and dysfunction that are refractory to nonsurgical treatment, and there is imaging evidence of disease. It has been suggested that arthrocentesis and arthroscopy be used for TMJ pain and limited opening, and open TMJ surgery should be reserved for advanced cases of TMJ derangement and osteoarthritis.⁵⁴

Based on our current understanding of TMD, successful management is dependent upon recognizing the complexity of this condition in terms of the multifactorial nature and the need in most cases of a multidisciplinary approach. Recognizing that on many occasions these musculoskeletal conditions may have a co-existing psychosocial component that may need to be addressed in order to enhance the treatment outcome is also important. A complete and accurate diagnosis on a case-specific basis will provide the development of the most efficacious individualized approach to care. DT

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An interview with Mectron, the company who invented Piezosurgery



Fernando Bianchetti



Domenico Vercellotti



Wolf Narjes



Alexandre Cadau

Mectron, based in Italy, has revolutionised dental surgery with their development of piezoelectric bone surgery. Recently, the company presented the 3rd generation of their Piezosurgery device at the IDS show in Cologne in Germany. We spoke with company founders Domenico Vercellotti and Fernando Bianchetti, as well as area managers Wolf Narjes and Alexandre Cadau, about the clinical advantages of their invention and how the company is reacting to the current market conditions.

Dental Tribune: Market prospects for 2009 are rather uncertain due to the financial crisis. Is your company prepared for a potential economic slowdown?

Fernando Bianchetti: The only way to withstand this crisis is to remain successfully in the market through investments in scientific and technical research, in Europe and other countries.

Domenico Vercellotti: What Fernando just said has always been our corporate philosophy; it will certainly help us in difficult times like this. Mectron offers high quality products at reasonable prices and puts a lot of effort into the development of new technologies and not merely into expensive marketing campaigns.

Wolf Narjes: Being a family-owned company, Mectron is probably more flexible and manageable than larger companies. Therefore, we can react relatively quickly to unexpected market changes.

Have you already experienced an economic climate change in Italy and other markets?

Fernando Bianchetti: Since our company was founded in

1979, we have already had to go through occasional tough economic times. However, nothing really compares with the latest financial crisis.

been studied, to ensure that there is no risk for users and patients and that the medical effects are always positive. Many companies have at-

Alexandre Cadau: Piezosurgery has certainly been one of the most important developments in the dental and medical field. This unique device

the whole clinical research and training activities in Piezoelectric Bone Surgery and works independently from Mectron.

“Piezosurgery has certainly been one of the most important developments in the dental and medical field.”

Alexandre Cadau: Fernando is right. At the moment, we are experiencing a huge loss of confidence in all consumer groups. On the other hand, we have always been challenged by the depreciation of various foreign currencies, like in 1992 when devaluation hit many countries.

Your company is mainly known for its innovative Piezosurgery technology. What are the main advantages compared to traditional surgical technologies?

Domenico Vercellotti: Mectron invented piezoelectric bone surgery in collaboration with Prof. Tomaso Vercellotti almost ten years ago. Back then, it was not just another product: it was a significant innovation in the field of dentistry based on technical expertise and years of clinical research. Thanks to Piezosurgery, oral surgery evolved from traditional rotating instruments to a new system of cutting bone that spares soft tissue and accelerates the healing process.

Wolf Narjes: Our Piezosurgery device is scientifically approved and we are considered to be the only company in this field to have a clinical database on each available surgical instrument. All the clinical applications for the device have

tempted launching similar products, but they are still missing scientific data or research regarding the effectiveness of their methods.

Would you tell us more about how Piezosurgery was developed and how it has been received in different markets?

Wolf Narjes: I have found that several countries, including South Korea, Italy, and Germany, have been very open-minded to this new technology. Most Scandinavian countries, however, have only begun to understand how to use this innovative technique.

allows the surgeon to work in less stressful and safer conditions. Postoperative healing times are also reduced three-fold with this method.

Domenico Vercellotti: The latest innovation is tips for the implant site preparation that have demonstrated histological benefits and a better osseointegration of implants compared to the traditional twist drill (Giulio Preti et al., ‘Cytokines and Growth Factors Involved in the Osseointegration of Oral Titanium Implants Positioned using Piezoelectric Bone Surgery Versus a Drill Technique: A Pilot Study in

Wolf Narjes: It is essential to be suitably trained in this technique. Therefore, we offer courses in Europe, Asia, as well as North and South America. Last year, we opened a new branch in Phuket in Thailand that serves as the Piezosurgery training centre for the whole Asia Pacific Region.

Alexandre Cadau: There is a reason that training is crucial for Piezosurgery. Users experience a steep learning curve before getting used to the micrometric movement of Piezosurgery, which is completely different to the traditional techniques. We organise workshops in many countries around the world that help dentists learn the differences between Piezosurgery and conventional burs and saws. In addition, we collaborate with universities, to offer attending clinicians cadaver dissection courses that help them appreciate the surgical benefits.

“It is essential to be suitably trained in this technique.”

Fernando Bianchetti: All the clinical protocols and techniques developed for Piezosurgery are based on scientific publications endorsed by universities and credible specialists in the field of dental surgery. They confirm not only the benefits for the clinician, such as maximum surgical precision and wider intra-operative visibility, but also those for patients who suffer from less postoperative pain.

Minipigs’, *Journal of Periodontology*, 78 (2007): 716–722).

Training courses are regularly offered at the Piezosurgery Academy in Italy. Do you also offer courses in other parts of the world?

Domenico Vercellotti: Piezosurgery Academy was established by Prof. Tomaso Vercellotti to give scientific support to the Piezoelectric Bone Surgery. It is managing

With four regional headquarters, do you consider yourself a global cooperation?

Fernando Bianchetti: Certainly, our branches in Germany, India, and the Asia Pacific region report to our headquarters in Italy. In other countries, we have worked successfully with local dealers for almost ten years, in some countries even 20 years.