Better sugar labelling required

By DTI

NEWTOWN, Australia: In a new study carried out by researchers at the George Institute for Global Health, it was found that a significant amount of sugar is added to foods. Owing to a decline in the oral health of Australians, dentists have called on food manufacturers to state on their packaging the amount of sugar added to the products, according to the Australian Dental Association.

The Health Star Rating front-of-pack labelling system used in Australia rates the overall nutritional profile of packaged foods and includes total sugar content as one of the components. This has been criticised because sugars naturally present in some foods are treated the same as sugars added during processing. However, according to co-author of the study Prof. Bruce Neal, only labelling total sugar content is misleading. This is particularly true for discretionary products containing a great deal of added sugar. “Good sugars are an integral part of a healthy diet, and we need to be able to separate sugars naturally present in dairy, fruits and vegetables from sugars added during manufacturing,” he said.

The aim of the study was to show that greater transparency on added sugar in packaged foods is necessary. The researchers analysed more than 34,000 packaged foods—about 18,000 discretionary foods (those not necessary to meet basic nutritional needs) and nearly 16,000 core foods, like milk, cheese and bread—to learn how the labelling could be improved if added sugars were included. A report published earlier this year found that consumers could avoid 26 teaspoons of sugar a day if they could identify added sugars on food packs.

The study, titled “Incorporating added sugar improves the performance of the Health Star Rating front-of-pack labelling system in Australia,” was published on 5 July in the *Nutrients* journal.

Erosive potential

The low cost and availability of acidic fruit juices, fruit drinks and carbonated beverages encourage their consumption, and this may lead to elevated prevalence of dental erosion. Researchers at the Federal University of Santa Catarina in Brazil recently evaluated the chemical characteristics of grape and orange juice and their erosive potential in the decrease of micro-hardness and the loss of enamel structure.

The results showed that grape juices presented greater erosive potential than orange juices. Pure, powdered and concentrated grape juices showed similar loss of enamel structure to that of a cola soft drink. The erosive potential of the beverages was statistically correlated to pH, titratable acidity, and calcium, phosphate and fluoride concentrations.

Humans’ arrival in Asia

According to recent fossil teeth findings, the human dispersal out of Africa and down to Australia may have occurred 30,000 years earlier than previously thought. Using a new dating program, it was confirmed that the teeth came from modern humans, Homo sapiens, and most interestingly that they dated to as long as 75,000 years ago.

World’s longest tooth

An 18-year-old teenager from India holds the new Guinness World Record for the longest human tooth. With a length of 3.67 cm, the tooth beats the previous world record by almost 5 mm, the records committee confirmed. The canine was buccally located and surgically extracted for aesthetic reasons.

Drop in denture use

MELBOURNE, Australia: From new figures indicating a decline in denture use in Victoria, it appears that more older people are retaining their natural dentition. The data, which was released by the Dental Health Services Victoria (DHSV), relates to the number of dentures provided by Victorian public dental clinics to patients aged 65 and older. Overall, there was a 21 per cent drop in denture use over the eight-year period considered. “Older people are keeping their teeth longer and we hope this trend will continue,” DHSV CEO Dr Deborah Cole said.

In an interview with *Dental Tribune*, Cole explained the underlying reasons for this: “The current cohort of older adults has benefited from substantial improvements made after the post-war boom. These improvements include community water fluoridation and use of fluoride toothpaste, advancement in dental technology and treatment methods, access to healthier diets, improved oral hygiene and more regular dental check-ups.”
ADIA: Association of the Year

New NUS 3-D printing centre to focus on healthcare applications

By DTI
SYDNEY, Australia: The Australian Dental Industry Association (ADIA) has been awarded the first Association of the Year Award presented by Associations Forum, a body committed to assisting non-profit associations and charities in governance, operations, membership and finances. According to the panel, ADIA has distinguished itself by achieving all-round excellence. The award recognises ADIA’s ability to influence government decision-making, deliver world-class exhibitions and publish meaningful market intelligence. In addition, Associations Forum highlighted that the dental body delivers its services at a cost to members lower than that of almost any other similar body.

“Being named Association of the Year is a great tribute to the many individuals who, over many years, have worked to ensure that ADIA is an integral partner to the industry it represents,” ADIA National President Phil Jolly said in his acceptance speech. “ADIA’s commitment is to provide leadership, strategy, advocacy and support. Our members set our agenda, fund our activities and directly benefit from the results—this award is a great independent recognition of our success in this area,” he added.

The Association of the Year Award was presented at a gala dinner held in Sydney on 17 July. More than 300 stakeholders from across the not-for-profit sector attended the event.

By DTI
SINGAPORE: The National University of Singapore (NUS) has formally opened its new US$18 million Additive Manufacturing Centre, AM.NUS. Primarily focusing on healthcare applications, the facility aims to foster knowledge in the field of 3-D printing and additive manufacturing (AM) among NUS clinicians and to stimulate associated medical technology start-ups and spin-offs in the city.

“The NUS Centre for Additive Manufacturing will play a critical role in supporting Singapore’s vision of becoming a leading AM hub. Through this inter-faculty pooling of expertise, we hope to boost technology capabilities as well as advance intellectual property development and commercialisation of AM-enabled biomedical technologies,” said AM.NUS co-director Prof Jerry Ying Fuh from the university’s department of mechanical engineering.

The national President Phil Jolly and ADIA CEO Troy Williams (fifth and sixth from left) celebrating their Association of the Year Award at the award ceremony in July.

After bringing together expertise from the faculty of dentistry, design, engineering and medicine, among others, several key goals have been outlined for the centre’s collaborative efforts. For example, researchers from the university’s Division of Industrial Design will work on the development of 3-D printed surgical instruments, simulators and prosthetics, while scientists from the NUS Yong Loo Lin School of Medicine will study bioprinting techniques for tissue repair and tissue engineering. Moreover, the NUS Faculty of Dentistry will focus on enhancing computer-aided surgical protocols and surgical planning, as well as advancing 3-D printing for dental implant design and tissue engineering.

“Every project is a collaboration of the industry, clinicians, engineers and designers who all bring their own unique perspectives to address complex issues that cannot be solved alone,” said Prof Kelvin Fong Weng Chong from the Faculty of Dentistry. “Future dentists and medical professionals will be better educated right from the start.”

By DTI

The initial funding of S$18 million (US$13.2 million) for the AM.NUS Centre came from NUS, the National Additive Manufacturing Innovation Cluster and the Singapore Economic Development Board. In addition, the centre is already working on a total of 17 collaborative projects, and has raised about $64.7 million (US$5.5 million) in additional project funding.

“AM.NUS will bring together NUS technologies with industry expertise, enabling the accelerated translation of NUS technologies into innovative healthcare products and services,” said Dr Lily Chan, CEO of NUS Enterprise. “The centre is already working on a total of 17 collaborative projects, and has raised about $64.7 million (US$5.5 million) in additional project funding.”

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ADIA National President Phil Jolly and ADIA CEO Troy Williams (fifth and sixth from left) celebrating their Association of the Year Award at the award ceremony in July.

A surgical guide for oral maxillofacial surgery created by a device that uses UV light to cure photosensitive resins into 3-D structures.
Biting and chewing trigger tooth growth

By DTI

SYDNEY, Australia: Research conducted by the University of Sydney has found chewing and biting to be the cause of adult teeth breaking through the gums rather than an innate, unknown force. The researchers used CT scan images of an eight-year-old child’s mandible to design a 3-D model that could be used to observe the forces produced by the jaw when biting and chewing. The aim of the research was to show the stress dispersion within the jaw as a person bites and chews.

“We designed the hard and soft tissues in the jaw and input the data we had about jaw movements into the software,” said Dr Babak Sarrafpour, an oral and maxillofacial pathologist and dentist at the University of Sydney. “We simulated both the back teeth and front teeth chewing and we could assess the stress on the teeth, bone and soft tissue.”

The multidisciplinary team at the university found that the chewing and biting actions of the jaw deform the thin layer of soft tissue surrounding the teeth that are yet to appear, which forces them outwards. During the study, a number of other hypotheses were investigated that were still unsupported by clinical evidence. “There were a number of hypotheses surrounding how adult teeth erupted. Perhaps it was from the root forming and pushing the tooth towards the oral cavity, maybe it was the blood pressure in the dental pulp or perhaps it was the periodontal ligaments forming and contracting, pushing against the tooth,” said Sarrafpour.

However, a number of studies have shown that even with the disconnection of the root and the ligaments from the tooth, the eruption through the bone would still happen. Therefore, the researchers developed another theory. “Perhaps soft tissue dental follicle around unerupted adult teeth acts as a mechanosensor in response to biting forces and remodels the surrounding bone in a way that carries the tooth to the mouth,” Sarrafpour explained.

The team believes that this study could result in further preventive treatments that could change the tooth angle before it erupts, rather than depending on orthodontic bands or braces to realign the tooth later in life.

More information about the research project can be found at the university’s website.

Researchers have developed a 3-D biomechanical model that shows the stress distribution within the jaw as a person bites and chews.

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NOW AS A FLOW!
Mobile breath analysis device promising for early disease diagnosis

By DTI

SEOK, South Korea: Breath pattern recognition was once thought of as a futuristic diagnostic platform. Research in this area has been gaining much attention because breath analysis is a non-invasive and low-cost method. Among the most critical challenges in this regard is the development of sufficiently sensitive sensors. Korean scientists have now developed high-sensitivity sensors to enable early monitoring of various diseases based on biomarker gases in breath.

The research group, led by Dr Il-Doo Kim in the Department of Science and Technology, has developed highly sensitive and selective chemiresistive sensors that can potentially diagnose specific diseases by analysing exhaled breath gases. The sensors were developed by combining hollow protein-templated nanocatalysts with electrospun metal oxide nanostructures, which have large and highly porous surface areas and thus achieve high sensitivity.

Human breath consists of diverse components, including water vapour, hydrogen, acetone, toluene, ammonia, hydrogen sulphide and carbon monoxide, with greater or lesser amounts exhaled in the case of illness. Some of these are closely associated with diseases such as asthma, lung cancer, Type 1 diabetes mellitus, and halitosis.

Breath analysis can detect trace changes in exhaled breath components, contributing to early diagnosis of disease. Breath analysis starts with capturing exhaled breath in a Tedlar bag and subsequently injecting the captured breath gases into a miniaturised sensor system, similar to an alcohol detector. It is possible to analyse exhaled breath very rapidly with a simple analysing process. Breath analysis can detect trace changes in exhaled breath components, contributing to early diagnosis of disease. However, gases in the breath occur at very low levels, from 1 ppb to 1 ppm, and so extremely sensitive sensors are needed for accuracy. In particular, it has been a challenge for chemiresistive chemical sensors to selectively detect specific biomarkers.

Conventionally, platinum and palladium are used in developing the catalysts; however, the sensitivity is insufficient. The sensors in the current study were specially optimised for selective detection of specific biomarkers. Their performance was approximately three to four times better than that of platinum and palladium catalyst-loaded nanofibre sensors. In particular, their sensitivity to acetone and hydrogen sulphide was the highest reported in literature.

New types of heterogeneous nanocatalysts were synthesised using protein templates with sizes around 2 nm and functionalised on various metal oxide nanofibre sensing layers. The established sensing libraries can detect biomarker species with high sensitivity and selectivity. The new and innovative breath gas analysis platform will be very helpful for reducing medical expenditures and continuous monitoring of physical conditions,” said Kim.

The study, titled “Innovative nanosensor for disease diagnosis”, was published in the July issue of the Accounts of Chemical Research journal.

Study evaluates digital scanners

By DTI

CHARLESTON, USA: With intraoral scanning becoming increasingly prevalent in dentistry, knowing which scanner will give the best performance is essential. In a new study led by Dr Walter Renne, from the Department of Oral Rehabilitation at the Medical University of South Carolina, researchers looked at seven scanners and analysed their performance based on 3-D comparisons. They found that Planmeca PlanScan and 3Shape’s TRIOS performed the best.

The study’s main objective was to compare the trueness and precision of the scanners in both posterior sextant and complete-arch scenarios. Additionally, it looked at the time each scan required and correlated it with trueness and precision.

To achieve the most accurate and no-bias results, a custom complete-arch model was fabricated with a refractive index similar to that of tooth structure. Six digital intraoral scanners and one digital laboratory scanner were used to scan the custom model for both scenarios. Analysis was performed using 3-D metrology software to measure discrepancies between the master model and experimental casts.

According to the study, Planmeca PlanScan was found to have the best trueness and precision for sextant scanning, and 3Shape’s TRIOS the best balance of speed and accuracy for complete-arch scanning.

The study, titled “Evaluation of the accuracy of 7 digital scanners: An in vitro analysis based on 3-dimensional comparisons,” was published in the July issue of the Journal of Prosthetic Dentistry.

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